



Celebrating Sixty Years of the Warren Astronomical Society



# The W.A.S.P.

Vol. 53, no. 12

Winner of the Astronomical League's 2021 Mabel Sterns Award

December 2021

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The Warren Astronomical Society Publication

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# HAPPY HOLIDAYS



# The WASP



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Dale Thieme, Editor

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The Warren Astronomical Society, Inc., is a local, non-profit organization of amateur astronomers. The Society holds meetings on the first Monday and third Thursday of each month, starting at 7:30 p.m.

First Monday meeting:	Third Thursday meeting:
Cranbrook: Institute of Science	Macomb Community College
1221 North Woodward Ave	South campus, Bldg. J, Room J221
Bloomfield Hills, Michigan	14600 Twelve Mile Rd.
	Warren, Michigan

## Membership and Annual Dues

Student	Individual	Senior Citizen	for families
\$17.00	\$30.00	\$22.00	add \$7.00

## Astronomical League (optional)\$7.50

Send membership applications and dues to the treasurer:  
c/o Warren Astronomical Society, Inc.  
P.O. Box 1505  
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Pay at the meetings

Also via PayPal (send funds to [treasurer@warrenastro.org](mailto:treasurer@warrenastro.org))

## Among the many benefits of membership are

- Loaner telescopes (with deposit). See 2nd VP.
- Free copy of each WASP newsletter.
- Free use of Stargate Observatory.
- Special interest subgroups. See chairpersons.

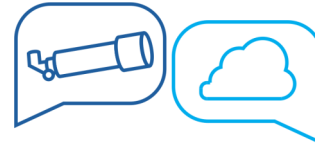
The Warren Astronomical Society Publication (WASP) is the official monthly publication of the Society. Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted in person, via US Mail, or by email ([publications@warrenastro.org](mailto:publications@warrenastro.org))

**Disclaimer:** The articles presented herein represent the opinion of their authors and are not necessarily the opinion of the Warren Astronomical Society or this editor. The WASP reserves the right to edit or deny publication of any submission.

**Stargate Observatory** is owned and operated by the Society. Located on the grounds of Camp Rotary on 29 Mile Road, 1.8 miles east of Romeo Plank Road, Stargate features an 8-inch refractor telescope under a steel dome. The observatory is open according to the open house schedule published by the 2nd VP.

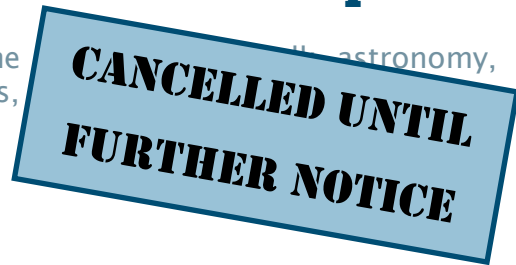
# Snack Volunteer Schedule

The Snack Volunteer program is suspended for the duration. When it resumes, volunteers already on the list will be notified by email.



## Discussion Group Meeting

Come join us for astronomy, space news,



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## President's Field of View

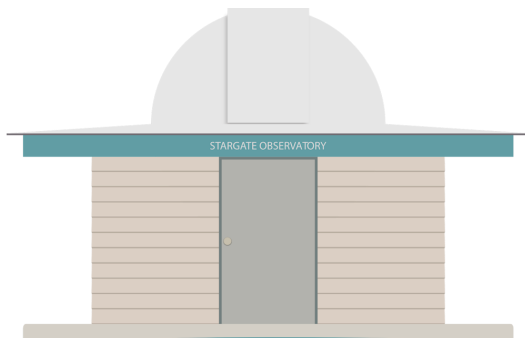
As another year draws to a close, it seems I've been re-elected your President for a fifth term, something unprecedented in this century. Then again, every year hands us something unprecedented, so why not this?

I have been grateful for the support of an excellent Board these past two years, who have been a cohesive force for the good of the W.A.S. despite individual challenges and tragedies and the whole collective... hardship. We say goodbye (for now?) to Dr. Dale Partin, whose latest term as Program Chair has capped off many a year of humane and conscientious service, and welcome Kevin McLaughlin to the role of Outreach Chair at an odd time indeed for outreach. One foot in, one foot out, as it were. We'll make it work; we always do.

I look forward to another year with the rest of my comrades on the Board: our Renaissance Man Bob Trembley, taking over Dr. Dale's role at the helm of our programming. Riyadh Matti, the stalwart maintainer and defender of Stargate, back for one more year as Observatory Chair. Mark Kedzior, our creative and thoughtful taker of meticulous notes. Adrian Bradley, our intrepid photo-chasing Treasurer, a force for modernizing our practices. And last but certainly not least, Dale Thieme, our award-winning Publications Director and general factotum.

The Warren Astronomical Society has made it through a sixtieth year of existence thanks to these officers— often harried, always humble, aware of what a strange and fascinating duty it is to run an astronomy club of such longevity.

This was not, in any sense, a favorite year of mine to be doing astronomy. But it was a year in which I worked alongside people I am glad to know and proud to call my friends. Cheers, and let's slam the door on 2021.



**DETROIT  
PUBLIC  
LIBRARY**

**Business, Science & Technology  
PRESENTS**

### **Doomed, Insignificant, and Ignorant: The Lessons of Modern Cosmology**

**Tuesday, January 25, 2020**

**6:00-7:30 p.m.**

**Online Only**

**An overview of modern scientific views of the universe, its origins, its habits, and the place of humanity within it.**

#### **About this event**

Dr. David Cinabro is Professor of Physics & Astronomy at Wayne State University, and IPA at the US Department of Energy, High-Energy Division.

Detroit Public Library is partnering with the Wayne State University Planetarium on a series of presentations around the JWST launch, with support from NASA's Goddard Space Flight Center.

A Zoom link will be sent to registrants before program.

**Register**

**Main Library**  
5201 Woodward Avenue  
Detroit, MI 48202  
313/481-1391

[www.detroitpubliclibrary.org](http://www.detroitpubliclibrary.org)



**Club Member  
Name Tags**

Email [publications@warrenastro.org](mailto:publications@warrenastro.org) for your personalized name tag





Want to keep track of W.A.S. meetings and exciting astronomical events next year?

## Order your 2022 Warren Astronomical Society calendar now!

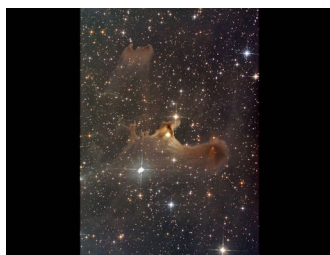
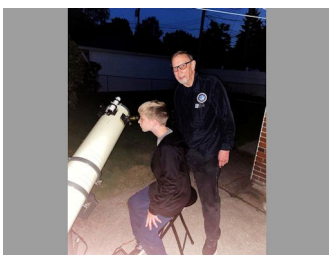
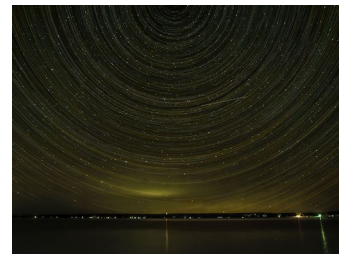
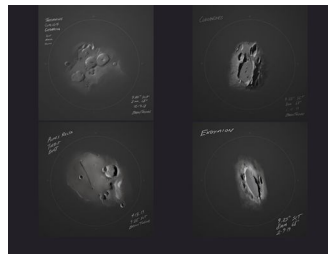
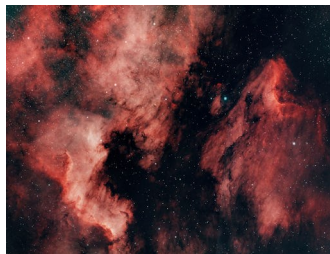
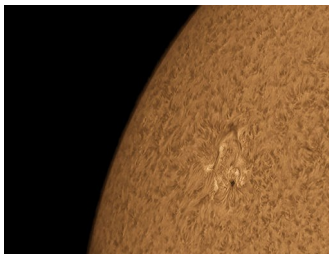
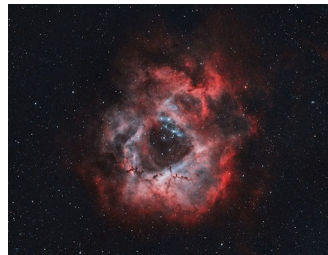
These beautiful calendars feature W.A.S. member astrophotography photos, including:

- Adrian Bradley - Sun in the Clouds
- Steven Tennenberg - M42 Orion Nebula
- Dale Hollenbaugh - C49 Rosette Nebula
- Bill Beers - Omega Centauri Star Cluster
- Bob Berta - Sun in Hydrogen Alpha
- Paul Goelz - North American & Pelican Nebula
- Brian Thieme - Collage of 4 Moon Craters—Hand Drawn
- Fred Pompei - Star Trails
- Ken Heilig - Doing Astronomy Outreach
- Bill Beers - SH2-136 - The Ghost Nebula, Happy Halloween!
- Brian Odell - Lunar Eclipse Series
- David Levy - December Cepheid Meteor

And the capture of the Andromeda Galaxy on the front cover by Doug Bock

You can buy calendars for \$15 each (\$5 flat rate shipping per order regardless the count) by sending a check to Warren Astronomical Society PO Box 1505, Warren MI 48090. [You can also order them online](#) (preferred method). Be sure to include your mailing address so we can get them to you. Email [publications@warrenastro.org](mailto:publications@warrenastro.org) before sending check or paying online as this will be a limited run.

**Buy Yours Today**







# Letters

## LETTER to award winning W.A.S.P.

Article I. The Orion rising picture by Adrian at the *Okie-Tex rendezvous* is mighty good! Even Handsome Joe McBride has never done better -- but has no experience in the south-west (yet).

"That Mickey Spillane sure can write". (1) Well, that "Mister Thumb" sure can take good astro-pics.

Article II. B. Diane Hall's trip down memory lane about observing's triumphs and tragedies rang a few bells for this boy.

TRIUMPHS: 1972 solar eclipse in Nova Scotia with Mark John ("Mad Max") Christensen. We dam' near missed it because we were running out of land, literally. He handled the Renault 16 like Maury Rose whilst I called out the cloud positions.(2) 2017: The Rea expedition to Russellville, Kentucky, motoring as if in a time trial for the Grand Prix. We joined the Bullerman expedition out of Grand Rapids in good order for a stunning solar eclipse.

TRAGEDIES: Stink bomb, 1963 solar eclipse, as we sat tight at Orono, Maine, National Convention of the Astronomical League. (3) At Bar Harbor they saw it with clouds, but we only got to fifty per-cent. How were we to know where to high-tail it in our '58 Olds-88? Last summer, less than half a loaf at Paradise, Michigan with the McBride expedition. Even from the eastern U. P.

we were not well situated, but additionally faced serious low clouds at sun-rise. We travelled "heavy" with civilians, but under the *baton* of Drs. Rea or Christensen we would have melted the pavement south on M-123 to Tahquamenon Bay.

All a far departure from reading *Stars* By Zim and Baker, 1956, how this spiritual journey began.

-- G. M. ROSS

### NOTES:

- (1) From *Marty*, but not spoken by Borgnine.
- (2) Anybody know who he was? Played himself in *To Please a Lady* with Stanwyck and Gable.
- (3) There was dignity in those days, now the asinine "Alcon". Rather too much scienti-fiction influence.

## LETTER re "Skyward"

When reading "Skyward" in the present number of the (award winning) W.A.S.P., one can conclude Savant Levy should take the Cure. The first three paragraphs are not entirely expunged by the final two sentences.

Frequenting all the saloons in Oremont is bad for Hercule Poirot's "little grey cells", and Levy does not sound

like a man on that road to recovery. "*Have courage, my boy, say no*". 19th c. temperance song.

G. M. Ross, 2nd greatest observer ever to use the Veen Obs'y.

## Trying to find History on Michigan Telescope



I have recently come into possession of an older 18" f5.4 fork mount GEM Dobsonian telescope. I am told it was engineered as a prototype for a larger instrument that would be placed in a Michigan University. Any help you may be able to provide is greatly appreciated. Please see attached pictures.

Thank you for your time!  
Sincerely,  
Jim Walls

(Continued on page 6)

(Continued from page 5)

## Forward: Edwin Hubble

Handsome Joe picks up things. A restless mind.

-----Original Message-----

From: Joe McBride

To: gary ross

Date: Saturday, November 20, 2021 19:44

Subject: Edwin Hubble



Happy birthday to astronomer Edwin Powell Hubble, who was born on this day in 1889. Hubble, the namesake for the Hubble Space Telescope, played an important role in expanding our understanding of the universe beyond the Milky Way through his study of galaxies.

Here, Hubble is pictured with his cat, Copernicus, named after another famous astronomer, Nicolas Copernicus.

Copernicus and Hubble had a special relationship, as the black cat would often join the astronomer at his desk at home.

Credit: HUB 1035 (9), The Huntington Library, San Marino, California.

## 1973 and Okie-Tex

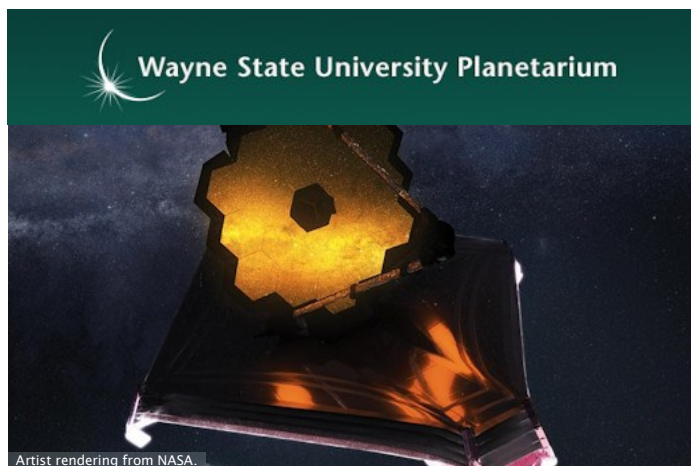
*Seriatim:*

You are too young to remember the flap over Kohoutek at the end of 1973. There was a full page illustration of what it would look like in Popular Science: snowscape of N. England or Quebec with people marvelling at the comet. Essentially a Christmas card with a celestial wonder. That is not -- **not** -- what appeared. I recall a bitter, clear morning in December with the Boys at the (now decommissioned) Oakland U. observatory . . .

That picture of Orion and winter stars rising has a mythical quality. You caught the Spirit, brother.

G.M. Ross

*See cover of November WASP—Ed.*



## December 7, 2021

### Science with the James Webb Space Telescope: Searching for the First Stars

James Webb Space Telescope (JWST), the successor to NASA's famous Hubble Space Telescope, is scheduled to launch on December 18, 2021.

#### About this event

The 6-m diameter mirror and sensitive infrared detectors will allow astronomers to get an unprecedented view of the universe. In this talk Dr. Cackett will discuss the main science goals of JWST, from searching back into the very early universe for light from the first stars, to learning about the atmospheres around extrasolar planets and the search for the building blocks of life elsewhere in the universe.

Dr. Edward Cackett is associate professor of physics and astronomy at Wayne State University. He specializes in the astrophysics of compact objects (neutron stars and black holes).

Detroit Public Library is partnering with the Wayne State University Planetarium on a series of presentations around the JWST launch, with support from NASA's Goddard Space Flight Center.

Zoom link will be sent to registrants before program.

**R.S.V.P.**



## W.A.S. Astro-Image



From Rik: What a rotten night. We had varying densities for all but the last moments of the lunar eclipse. This is what I have but it ain't purdy.

## Join the Astronomical League!



The mission of the Astronomical League is to promote the science of Astronomy. The major benefit of belonging to this organization is receiving the quarterly newsletter, The Reflector, which keeps you in touch with amateur activities all over the country.

Also:

- Participate in the Observing Program
- Avail yourself of the League Store
- Astronomy Books at a discount
- Attend Astronomical League Conventions

Only \$7.50 annually,  
(Membership starts July 1)

[alcor@warrenastro.org](mailto:alcor@warrenastro.org)





# Observation Reports

G.M. Ross

## 4 November

The Sun. Two small groups, four spots.  
Transparency excellent, seeing good.  
5-cm. f/11 refractor @ 60X

### COMMENTARY

K. Tapping, *OBSERVER'S HAND*. (2021) p. 189: "This current minimum is the longest minimum since the beginning of F10.7 [radio flux] measurements in 1947".

## 7 - 8 November

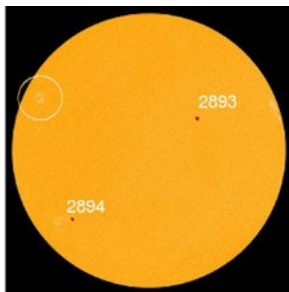
TZ Leonis. Finally logged @ 10.7 in early astro. twil.  
Question about comp.

stars 10.0 & 11.0 on chart, too different for only one mag. apart.

Transparency good. Seeing good.

16" Borr Telescope, Veen Obs'y.

.....  
COMMENTARY: Alleged problem with star mags. on Var. Star Assn. charts old story . Chart brightness vs. visual impression. Handsome Joe McBride once made a picture of DW Cyg region to resolve question. H.Q. in Mass. diligent on Observer's inquiries. Very recently E. O. "Top Woman" Waagen assisted in a SY CMa chart problem: colour diff. as aggravating circumstance.



8  
Nov  
2021  
Image:  
NASA/SDO

## 8 November.

The Sun. Three sm. groups of 5 spots total. Both hemispheres.

Transparency excellent. Seeing fair (low).

5-cm. refractor @ 60X

## 13 November

The Sun. One group of 2 spots.

Transparency excellent, seeing fair (+ wind).

5-cm. refractor + sub-dia. mylar filter. 60X

## 16 November

The Sun. Two small groups w/ 2 spots total. West group strongly foreshortened.

Transparency good. Seeing fair.

5-cm. f/ 11 refractor with mylar filter. 60X

## Lunar Eclipse

Totally cloudy in greater Grand Rapids @ 08.58 U.T.

Classic "lake effect" cloudiness after westerly wind ruined eclipse in western and central Lower Peninsula.

## 22 November

The Sun. No sun-spots.

Transparency excellent. Seeing good. (low)

5-cm. refractor w/ mylar sub-dia. filter. 60X

## 23 November

The Sun. No sun-spots.

Seeing fair.

5-cm. f/ 11 refractor. 60X

## 23-24 November

Jupiter. Obs'd double shadow transit by invitation of Gentleman Jack McCarthy. Ganymede/ Callisto in order. Planet ~ at quadrature, hence tight line of moons to W. of ball. Again, remarkable how dim & blue Callisto (IV) in comparison to others. Appearance of her shadow very slowly first as "bite" in planet's limb whilst Ganymede (III) in progress. Orbital period of Callisto 16.7 d -- over twice Ganymede.

Transparency fair. Seeing poor.

17-in. Hawkins reflector, Veen Obs'y.

.....  
COMMENTARY: 24 double shadow transits this yr. Very rare triple satellite transit 15 Aug. @ 15.30 U.T., day-time in N. Amer. Interesting to calculate sizes of III and IV shadows on Jupiter at mid-points. Mean dist. From planet: 1,070, 000 kilometres for III, and 1,883,000 for IV. Diameters approx. similar. (Project for somebody else.)

## Addendum:

### R Fornacis

I just looked at the light curve for **the 1st time**. A small part of my/ our problem over the last 14 mos. is knowing a little too much. R For is a ~ faint star, but the "R" designation led me to believe it bright. The data in [Observer's Handbook](#) by Ostromecki and Huziak added to the over-confidence. It is in a lonely, barren part of the sky -- except the rich galaxies, i.e. "slim pickin's".

Per haps the workers long ago who assigned the high rating did so out of order of discovery. Just when it was identified/ put in catalogue would take real research.

Your loyal & ob'd servant and formerly Grand Duke of Urban Observing -- ROG

# The View From C.W. Sirius Observatory

## Messier 7 – Open Star Cluster

Messier 7, also known as NGC 6475, is a beautiful open star cluster in the constellation Scorpius. Sometimes called the Ptolemy Cluster, M7 is roughly 1000 light-years away from Earth. Being located close to the "stinger" of Scorpius, it has a declination of  $-34.8^\circ$ , which makes it the southernmost Messier object. M7 has been known since antiquity; it was first recorded by the 2nd-century Greek-Roman astronomer Ptolemy in 130 AD., who described it as a nebula. Italian astronomer Giovanni Batista Hodierna observed it before 1654 and counted 30 stars in it. In 1764, French astronomer Charles Messier



cataloged the cluster as the seventh member in his list of comet-like objects. And English astronomer John Herschel described it as "coarsely scattered clusters of stars". Telescopic observations of the cluster reveal about 80 stars within a field of view of  $1.3^\circ$  across. At the cluster's estimated distance of 980 light-years this corresponds to an actual diameter of 25 light-years. The age of the cluster is around 200 million years, while the brightest member star is of magnitude 5.6. In terms of composition, the cluster contains a similar abundance of elements other than hydrogen and helium as the Sun. On August 29, 2006, Messier 7 was used for first light image of the Long Range Reconnaissance Imager (LORRI) telescope on the Pluto-bound New Horizons spacecraft.

While attending the Texas Star Party last May, I wanted to image the southernmost Messier object. With TSP's lower latitude, it made M7 an easy target. This is also a beautiful star cluster when observed visually. M7 is basically located in the "heart" of the Milky Way, so you can see from the photo the billions of stars around the main cluster. You can view this beautiful object from our northern location if you have a very good southern horizon. It will be only about  $11-12^\circ$  altitude, so quite low. Best time would be late spring / early summer. A wide field, low power refractor telescope is basically all you need. Or even a good pair of binoculars will do the job. Imaging will be difficult since it will be right in the thick atmosphere. So next season get out and give it a try. You can then say that you observed the southernmost Messier object. Happy hunting!



### About CW Sirius Observatory:

C.W. (Cadillac West) Sirius Observatory is located 15 west of Cadillac Michigan. Owned and operated by WAS member Bill Beers. The dome is an 8' Clear Skies Inc dome which houses an 11" f/10 SCT telescope, a 102mm f/7 refractor telescope, Celestron CGEM DX mount, and uses an ASI ZWO 071 color CMOS camera, as well as a QHY8L color CCD camera. The telescope can be remotely operated from inside Bills house.

Anyone interested in learning about astrophotography, or any questions regarding equipment, or how to take astrophotos using your iPhones, or any related questions, can contact Bill at: [BEEZOLL@AOL.COM](mailto:BEEZOLL@AOL.COM)



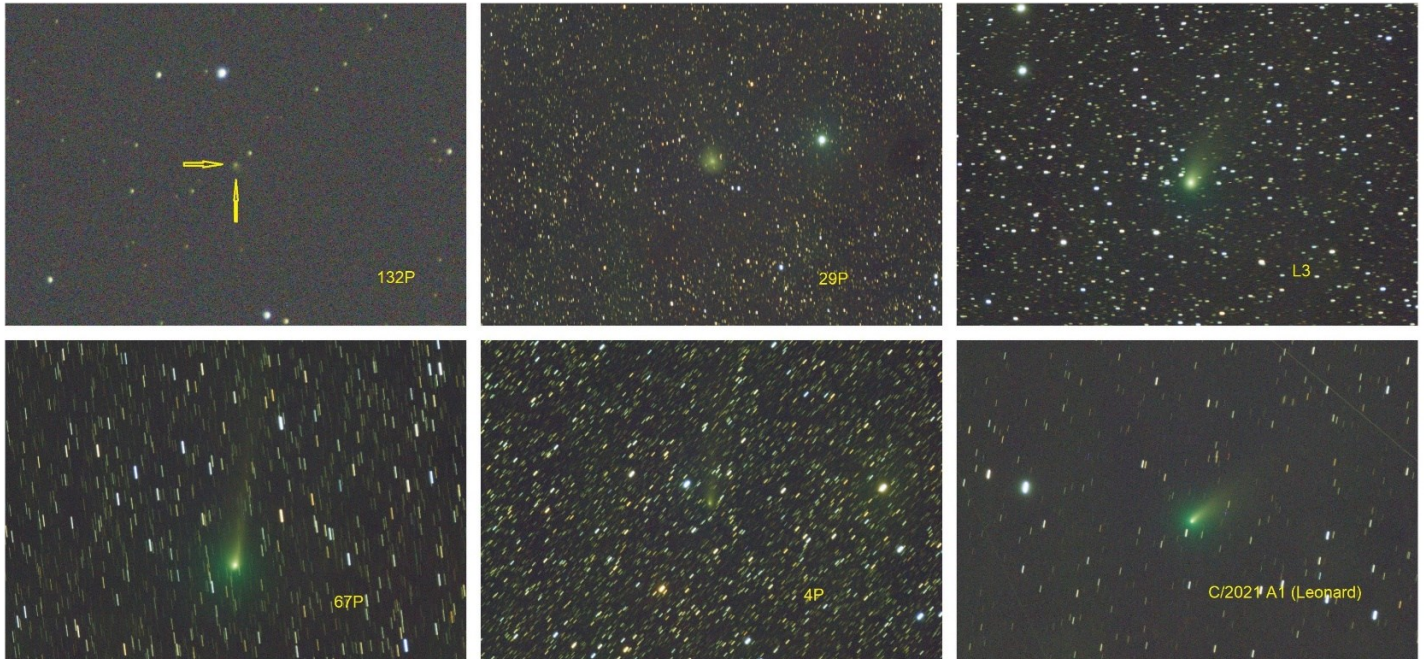


# From the Desk of the Northern Cross Observatory

## Chasing Comets



One of the projects I like to do is image comets as they get bright enough for my system to capture them. This month I spent a couple of clear nights working on imaging a few comets. On the night of November 6/7,



2021, I scripted up a run to capture 6 comets.

Figure 1 - November 6-7, 2021 – all 5 minute subs

This required staggering the run so that the objects were up far enough to move to the next one during the night.

- Comet 132P (Helin Roman Alu)
- Comet 29P Schwassmann-Wachmann
- Comet L3 (ATLAS)
- Comet 67P Churyumov-Gerasimenko
- Comet 4P (FAYE)
- Comet C-2021 A1 (Leonard) Discovered in January 2021

I took 5-minute subs on each object, ranging from 12 to 24 frames stacked on the comet cores to increase contrast relative to the background sky. This means that the star trails will show how much the comets had moved during the hour or two of acquisition time.

Equipment used:

William Optics 105mm f/7 APO refractor  
ZWO asi2600MC PRO camera, gain 100, temp 0C  
Losmandy G11 mount  
Processed in PixInsight

*(Continued on page 11)*



(Continued from page 10)

One of the focus points was Comet Leonard (C/2021 A1), discovered by Gregory J. Leonard at the Mount Lemmon Observatory on January 3, 2021 when the comet was 5 AU from the Sun. This was how it looked on the morning of November 7, 2021 (figure 2) from the observatory. This was 55 minutes of data acquisition, showing about an hour of movement through the sky.



Figure 2 - November 7, 2021 – 55 minutes of data – 5 minute subs



Figure 3 - November 23, 2021 – 110 minutes of data – 2 minute subs

I went back on the morning of November 23, 2021 (figure 3) and imaged it again. It is brightening as it heads toward perihelion and closer to us. Comet Leonard's closest approach to Earth will be on December 12, 2021, at around 13:54 [UTC](#). It'll pass Earth at the extremely safe distance of 21,687,279 miles (34,902,292 km).

Its orbit also suggests that the comet will then pass relatively close (about 2,632,000 miles or 4.2 million km) to planet Venus on December 18, 2021. To see where it will be, use the following link. [Comet Leonard \(C/2021 A1\) | TheSkyLive.com](#)

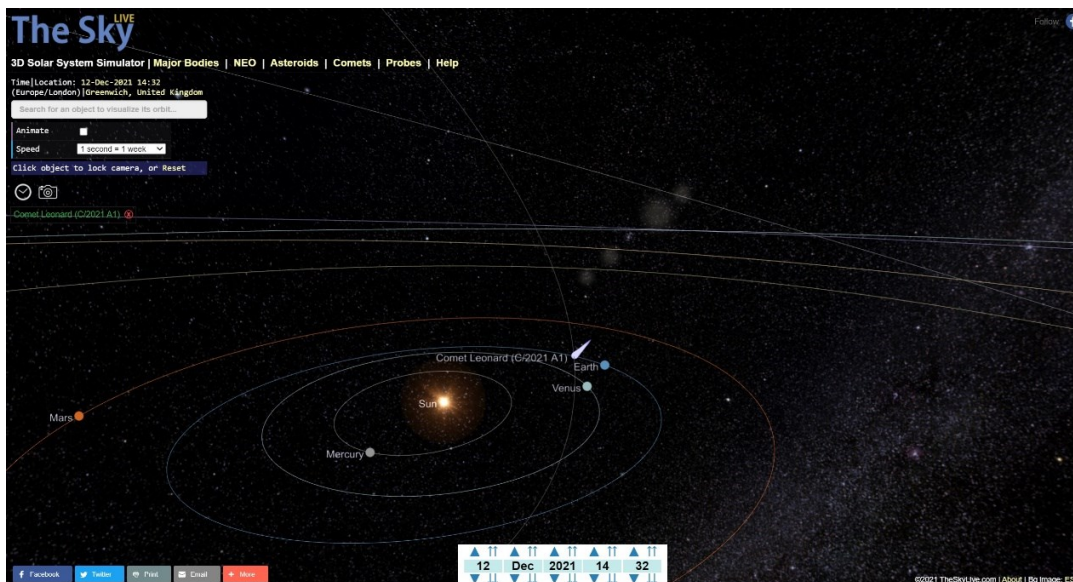


Figure 4 - December 12, 2021 position

-Doug Bock

# Presentations

**Monday, December 6, 2021**

## Virtual Presentations

### Panel Discussion

#### Anti-Science In the US

**Hosted by Bob Trembley**

A group of W.A.S. members will participate in a moderated discussion panel talking about "Anti-Science Sentiment in the U.S."

In 1995, Carl Sagan stated "We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology." This is one of the many topics that panelists will discuss - the viewing audience will be invited to offer their thoughts as well at various points during the discussion.

#### Panelists

##### Bob Trembley

Bob, Outreach Director for a total of 5 terms, is fantastically interested in asteroids, Near Earth objects (NEOs), and meteorites. Bob is a HUGE fan of educational space-related PC software such as: NASA's Eyes on the Solar System, Universe Sandbox, SpaceEngine and Kerbal Space Program.

##### David Levy

David H. Levy is a Canadian astronomer and science writer. Levy discovered 22 comets, either independently or with Gene and Carolyn S. Shoemaker, including Comet Shoemaker-Levy 9 in 1993, which collided with the planet Jupiter in 1994.. He has written 34 books, mostly on astronomical subjects, and provided periodic articles for Sky and Telescope magazine, as well as Parade Magazine, Sky News and, most recently, Astronomy Magazine.

*(Continued on page 13)*

**Thursday, December 9, 2021**

## Virtual WAS Banquet

### Pictures of the Sky

#### A Travelogue of Our Night Sky

**By Adrian Bradley**

Following a long-standing Banquet tradition from years ago, we'll be treated to a collection of astro-photos and nightscapes by Adrian Bradley. A stellar travelogue based on his journey of learning to image the night sky.

#### About the Speaker

"Have camera, will travel" may well be Adrian's mantra. Based in Ann Arbor, he has gone to the Thumb area frequently, Hudson Lake, Mackinac, and the Upper Peninsula -as day trips, in search of nightscapes and auroras. His search for those perfect shots has even taken him to the Okie-Tex Star Party this year.

Adrian is finishing his first term as Treasurer of the WAS, commencing his second in 2022. He is the president of the Great Lakes Association of Astronomy Clubs and a member of the Lowbrows Astronomy Club (U of M). Adrian is also a regular presenter of his work for the Explore Scientific Global Star Parties, hosted every Tuesday by Scott Roberts, president of Explore Scientific.



Photo: Doug Bock

*Adrian and fellow Lowbrow, Joy, at the 2017 Astronomy at the Beach event.*

## WAS PRESENTATIONS

If you would like to present either a short talk (10-15 minutes) or a full-length talk (45-60 minutes) at a future meeting, please email Dale Partin at:

[firstvp@warrenastro.org](mailto:firstvp@warrenastro.org).



(Continued from page 12)

### Diane Hall

Diane is the current president of the Warren Astronomical Society (4 non-consecutive terms, embarking on her 5th; 1st VP-2 terms; Outreach chair- 2 terms). She is a Space Race enthusiast and intermittent movie reviewer for the WASP. Her astronomical bucket list includes seeing the gegenschein and paying a visit to the converted 747 that ferried Space Shuttles around.

### Ken Bertin

Ken Bertin is a hobbyist astronomer for over 65 years, Past President (2 terms) and VEEP of WAS (2 terms), 10 Total Solar Eclipses, 4 Annular eclipses, 6 Transits of Mercury, 2 transits of Venus. 15 Lunar eclipses. He does our presentations of historical figures in astronomy and is currently presenting online to schools and other organizations.

### Constance L. Martin-Trembley

Connie is a local science teacher. Awarded Teacher of the year in 2007, ran two different Girl Scout troops in tandem, a volunteer NASA/JPL Solar System Ambassador, and had an asteroid named after her. Her passion in the sky and space was instilled in her by her mother, nurtured by her husband, and found its passion passing the knowledge along to children.

### Short Talk:



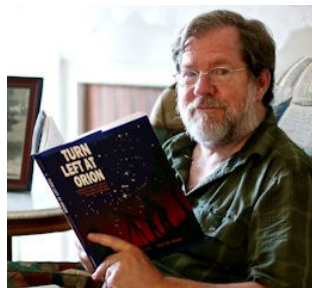
The Life of Robert Burnham Jr

### By Dale Thieme

This talk is an all too brief look at the amazing accomplishment and tragedy of Robert Burnham Jr., Author of *Burnham's Celestial Handbook*, a unique tome, and an Astronomical classic.

### About the Speaker:

Dale has been a club member since 2007, He has served as surrogate secretary, then as elected secretary, treasurer, and publications officer/editor (and is the recipient of the 2021 Astronomical League's Mabel Stearns Newsletter Award).



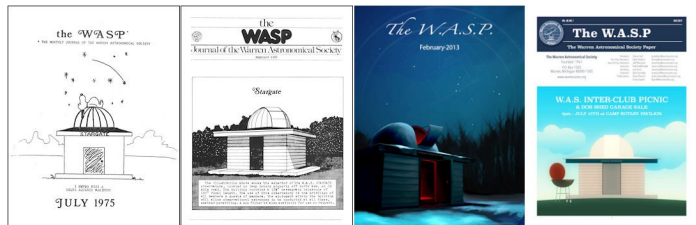
He currently resides in Pensacola, FL, where he enjoys the air conditioning of his Fortress of Solitude while preening the next issue of the WASP—and reading books on astronomy and astronomers.

## About the Cover

There is a tradition of putting Stargate on the cover of the WASP: First in the form of Frank McCullough's cartoons, a drawing of it in the eighties, and the cover creations of Brian Thieme in the early twenty-teens. Then, for the July 2017 issue, Brian came up with a graphical image of Stargate to advertise our picnic. That image morphed into a WASP mascot of sorts, helping to fill space following tragically short articles (our Newtonian Scope image from our logo serves a similar function.)

As editor, I've been looking for new ways to portray Brian's Stargate. He came up with a cloudy night version, I added one with the "sucker hole".

One day I watched Orion rising over my house in Florida and, realizing that the view of Stargate in the graphic is facing east, I was inspired to create an "Orion Rising" version.



## Correction

In the November issue, the NASA Night Sky Notes inaccurately displayed the 15° hand. In their words: *We have updated the "Hand Measurement" image to be more accurate. Our apologies; our intention was to show how you can do approximate measurements, and not exact, we still strive to be as close as possible, even if some folks (such as our hand model) can find the gestures a bit difficult to hold. For exact measurements, a sextant can be used!*







## Daffy Duck

Agreed, this seems like an awfully daffy title for an astronomy article. But there is method to the madness, and there is a story. During the late summer of 2019 there was a star party in southeast Arizona that featured a dark sky and five perfect back-to-back nights. As I spent hour after hour hunting for comets, I came across the sprawling North America Nebula in the northern sky constellation of Cygnus the swan. But this time something different appeared. It was a strange structure, the outline of a dark nebula bordered by a slightly brighter cloud. The whole feature was rather subtle, so that sometimes it was there, and then it faded so that sometimes it wasn't. I spent some time trying to determine a name for it. It looked like the head of a duck. I couldn't call it the wild duck nebula, as there is a cluster with that name. And Donald Duck is a bit confusing. So how about calling it the Daffy Duck nebula?

Thus, the structure is named after Daffy Duck. It is No. 403 in my catalog of interesting things found during my more than 56 years of comet hunting. I believe it is a small dark construction at the northern tip of the North America Nebula, about where Hudson Bay is not accurately located. It could have

been where the Gulf of Mexico is, but that area is virtually impossible to spot visually, even under a dark sky. Like the Horsehead Nebula in Orion, it is very difficult to spot and it is best viewed only in a photograph. The accompanying picture shows it at its top, a little to the left of center. The accompanying photograph was taken using the Hubble Space Telescope.

There are more than four hundred other celestial objects that have come my way over the years. Beginning with NGC 1931 which I spotted in January 1966, many of these are already well-known deep sky objects in the night. But a few are interesting groupings of stars, called asterisms, that no one has pointed out before. One of my favorites is a structure of faint stars I call "Wendee's Ring."

These always welcome objects in the sky are fun to observe and they enhance my enjoyment of my hours under the stars. When I can see Daffy Duck, it reminds me of the happy hours I spent as a child at Beaver Lake, an artificial pond near the top of Mt. Royal in Montreal, that hosts dozens of mallard ducks. On clear, moonless nights now, I offer a cosmic hello to Daffy Duck and the many objects in the night sky I have come to treasure as good friends.



This image shows The North America Nebula, with what I think is the Daffy Duck structure at the top center.. Photograph from Hubble Space Telescope, STScI.

# Lessons from Okie-Tex 2021

Brad Young, Astronomy Club of Tulsa

## INTRODUCTION

As I mentioned last month in my article, there were several positive and enjoyable things this year about the Okie-Tex Star Party (OTSP). Of course, the big improvement was that there was one, as the 2020 party had to be canceled. As usual, I had several excellent nights and views of the objects I planned to observe. This year, the focus was the remaining NGC objects I am trying to observe visually. Several of these targets were quite surprising, even though I am through all the Herschel objects now and deep into the dimmest and smallest of the objects. But, with a fantastic inky sky ([Bortle 1](#)) adjacent to Black Mesa, clear weather, and a great telescope there are still some surprises out there for me after more than 40 years of observing.

## GEGENSCHIN

One of the first surprises was a little embarrassing. One of my friends was commenting on the [gegen-schein](#), which was quite evident on three or four of the nights that week. I sat and admired the view with my friend a while and then went back to the telescope. Soon enough, I was having trouble finding some of the faint galaxies on my list. But I had not had issues with very similar circumstances all that night and the two before. As I became more concerned, it finally hit me what was going on. Skyglow – no matter its source – interferes with drawing out faint objects. I don't remember in times past noticing that the gegenschein had dimmed any deep sky objects, but sure enough, outside the border of its oval glow, everything went back to the same level of visibility as before.

Having learned a bit of a lesson, I noticed on the two nights that I was able to make it to almost dawn that the [zodiacal light](#) rising from Leo into Cancer was also very bright and enjoyable. It also had an augmented effect against the objects in that area, with the Milky Way bright at this dark site. Of course, we want to see the Milky Way, but with both together it really looked like dawn was coming and at that point (about 6:00 a.m.), I didn't need much convincing to go ahead and call it a night.

## USEFUL AND ENJOYABLE METHODS FOR FAINT TARGETS

I made [survey quality images](#) of the NGC objects that remained unseen by me when I began my current attempt at completing the catalog visually. Using even

poor images, you can identify the field stars and approximate visual appearance of the object. When you've looked at dozens of tiny faint fuzzy smudges with averted vision, they do all kind of look the same. The field stars can help you identify items later especially if you have a big group of galaxies involved. As I have no imaging equipment of my own, I use remote telescope imaging.

It may seem the effort is unwarranted – web services like [Aladin](#) and many planetarium programs already provide images from a searchable interface. However, in my experience, these images are not good representations of what a visual observer will see. There may be vast difference in imaging methods, optics used, and processing involved. So, I took (almost) all my images with one scope, one exposure (60 sec) and Luminance only. Limiting the quality also limits temptation to “see” at the eyepiece the image used for comparison. However, I very rarely look at the image before I try the visual observation; I do of course refer to charts sometimes in the field. For the “deep cut” NGC items I'm currently on, you'll need an atlas like Uranometria, but for the brighter objects the Pocket Sky Atlas may be useful instead.

For discussion below, I looked back through the survey images to see if I could find good examples. Unfortunately, most of the images were OK for my use, but not for explanatory purposes. So, for the examples here, I re-imaged several targets using a remote telescope in New Mexico, T21. Of course, the images are better in brighter than what I saw with my eye, but it does show I hope what the sketching of an approximate field star alignment can do for your enjoyment and records.

## Use Field Stars for Object Verification

Many of my sketches have been focused on the field stars around the object. Not only is this important for verifying that the identification is correct, it's also quite pleasing in some cases with unique shapes and lines of stars to add the view. Since these very faint, often small objects are ones I've never seen before, I use my sketch of patterns of the stars around the object to compare to the survey images.

Most of the time, the identification is easy from the field sketches. But there may be confusion when more than one object is visible, or you may want to confirm

*(Continued on page 16)*

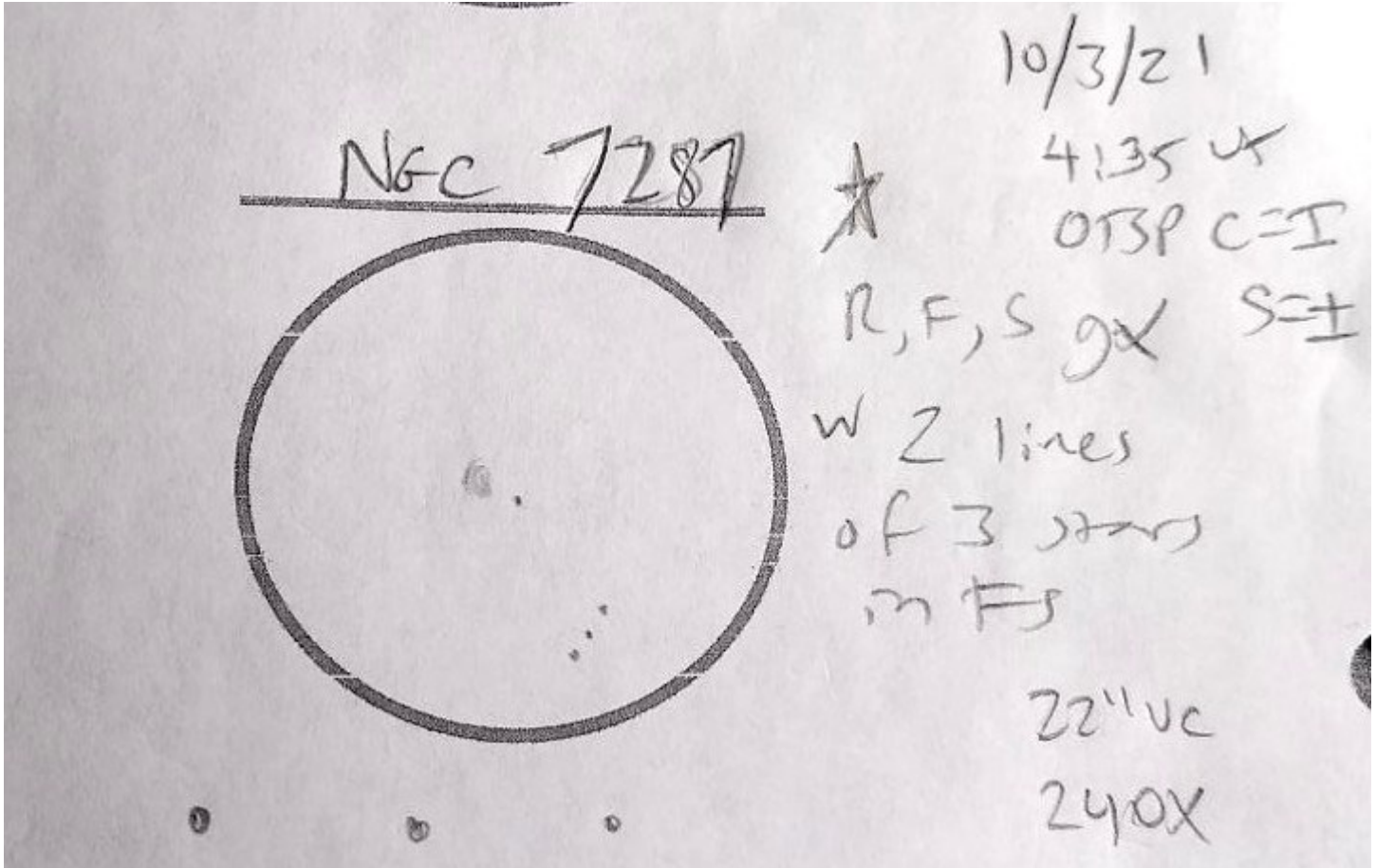


(Continued from page 15)

the position of the object if averted vision was required. You can also check the PA of an extended galaxy, extension of a cluster or nebula. This method has often helped me to identify other objects nearby that I wouldn't have expected to see. I tend to be dyslexic with my drawings and often get the directions mirrored or inverted. Comparison of the field stars

against some other directional clue helps me catch when I do this.

As an example, I chose NGC 7287. As you can see from my sketch, the object has a nice field with a line of three 10-11 mag stars and a small line of three dimmer stars.



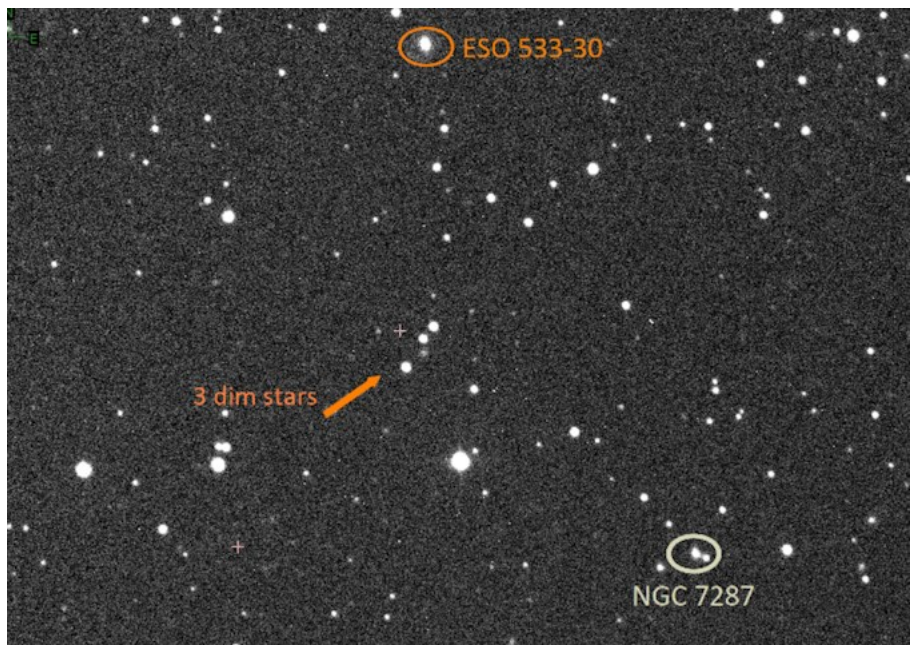
South is UP

South is UP

Later, checking my newer version of an image of NGC 7287, I noticed that even allowing for errors in orientation, this was the nearby galaxy ESO 533-30:

Not the answer you want, but it is better to know and revisit the missed object. Glass half full - I did see a new galaxy, and ESO 533-30 was still a nice catch, with an interesting field.

(Continued on page 17)





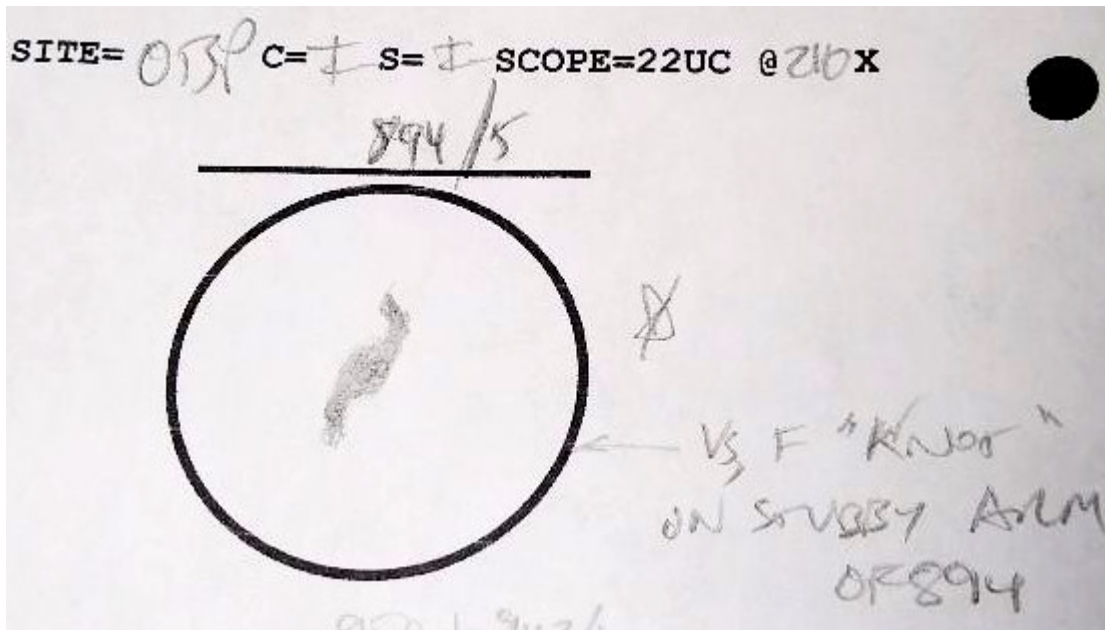
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## Look Around While You're There

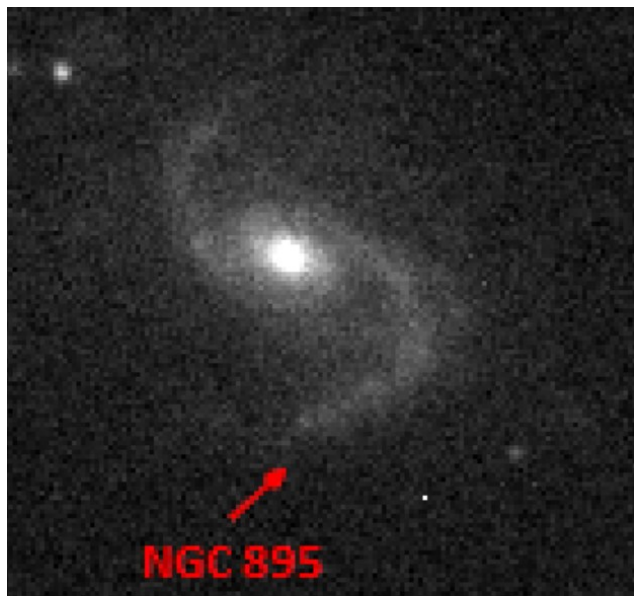
This segues into the next type of observing method to discuss. If you do happen on an unexpected nearby object, it may be on your current or later list, or it may just be an interesting or beautiful thing to see. This “**While You're There**” method has been used with success as the basis of an Astronomical League Observing Program [Two in the View](#). The idea is this: if you are looking at an object, [e.g., a bright galaxy]

and you're confident you see it, look around in the field of view, or on your charts or database to see if there's anything else of interest nearby. There may be a dimmer object associated with the main one (nebula in an open cluster etc.). You may have spotted something that's also on your list of things to look for or might be later.

For a specific example of this effect, consider NGC 895, now on my list to complete the NGC. I knew from the description in the catalog that it was associated with NGC 894, a relatively bright spiral with two main arms. I was able to see a very faint glow in one arm that differentiated it from the other.



South UP and I reversed drawing



South is UP

Although I've seen this galaxy a few times, I never noticed an extension of one of its arms. Once I saw it, it was not difficult to see, and I only wish I had known about it before so I could have noticed how it affects the shape and texture of the main galaxy. [A great image from Kitt Peak AOP](#) shows how the extension is several distinct knots in an almost straight line. My image shows it well, but with much less resolution.

(Continued on page 18)

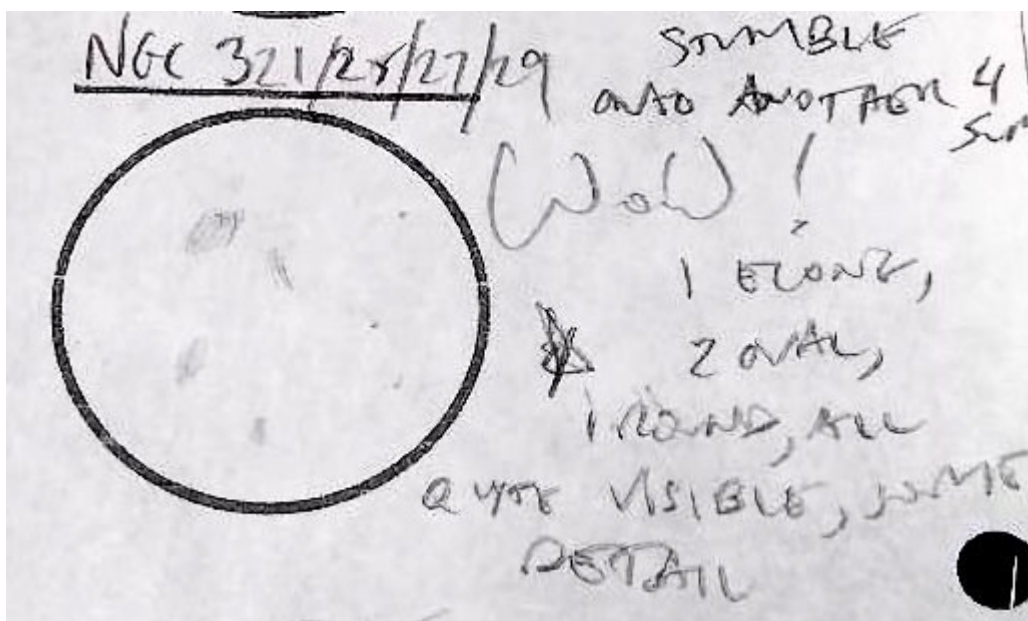
(Continued from page 17)

## Wait on the WOW!

Then of course there are the moments that we all crave. You're going through another list of impossible to see faint objects and then one not only shows up easily in your eyepiece, but it is a beautiful or unusual gem. Perhaps totally unexpected, it can seem like discovering an unknown object, and make the night wonderful. I often write the note "WOW" near

my sketch in the field, just so I can remember that feeling later.

There were a lot of "WOW" moments this year at OTSP, but this one was best. On Tuesday night, it was getting late I was lagging a bit, wondering if it was time to pack up. Then I happened on this field, and I just soaked it in for several minutes while I sketched it and thought it looked familiar, but not quite right. The specifics in this case are four galaxies in one field of view, NGC 321/325/327/329:



North is about 5 on a clock

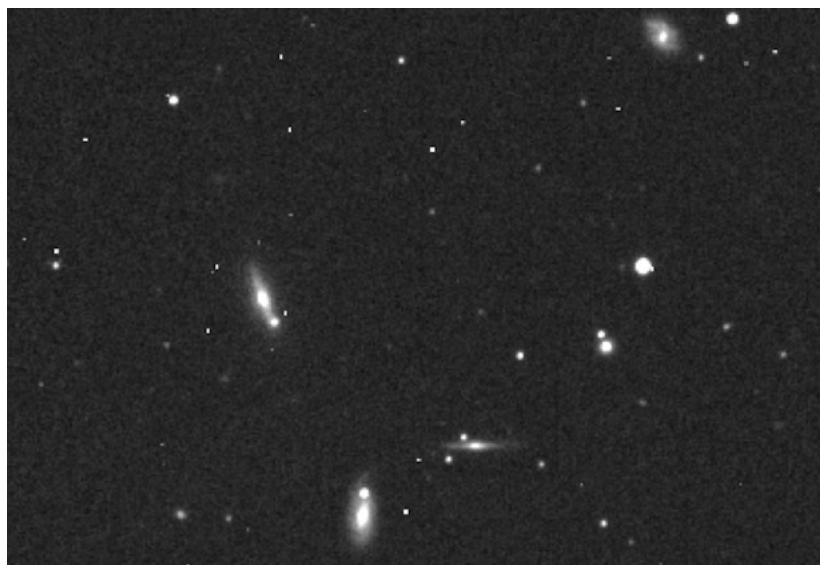
My sketch certainly doesn't do them justice, and the original image was not very usable. My re-imaging this group brought it out well and gives some impression of the ghostly dim glow of the quartet will catch your eye if you're able to glimpse them some clear dark night.

61, ["The Box" in Coma Berenices](#), which is a favorite of mine. The Box is dimmer at my usual suburban observing site, and so is closer to the appearance of this group. But the types of galaxy structures are nearly opposite. Hickson 61 contains a lenticular, two edge-on spirals, and a diffuse odd spiral.

(Continued on page 19)

Now, why the familiarity? I was remembering Hickson

North is UP





(Continued from page 18)

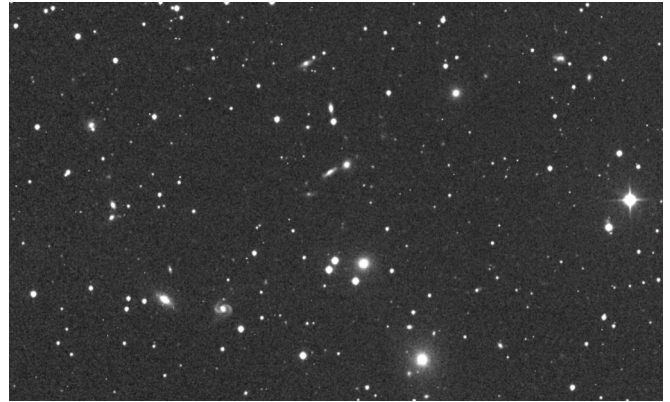
## Plan Some Nice Views

Finally, there is the category I call “nice views”. This isn't a wow moment, it's just something that is nice to see. Maybe you planned to find this one. Or you revisit a target and discovered some new wrinkle to it. But “nice” is subjective, so for an example I chose two areas that have several objects that you can follow along in a line of just a few FOVs.

I have observed both galaxy groups before, but with a smaller scope. I wanted to pick up a few of the surrounding objects that may have been missed before or may not be on the official list of members, though they are in proximity.

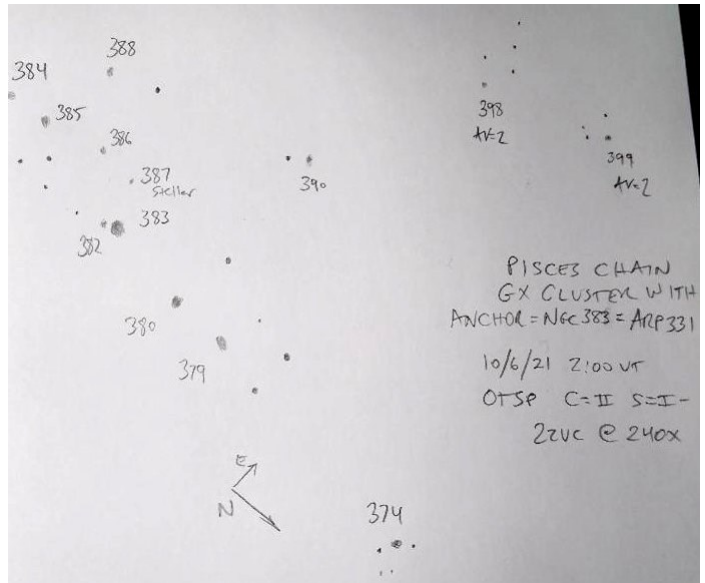
Note that unlike the sketches above, these are edited – a sketch was drawn at eyepiece, and that was transferred as exactly as possible. The originals are too busy to copy well and do not give an accurate look and feel to the FOV(s). Alignment / scaling were changed if needed to better match the image, but the objects are drawn exactly as seen.

The first [galaxy group \(NGC 80 Group\)](#) is a swathe of several galaxies, in Andromeda:

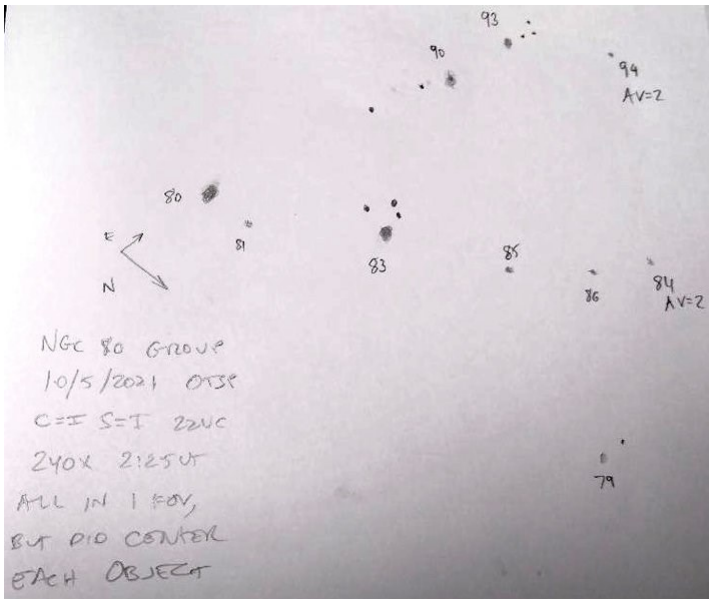


North is UP

The other group includes [The Pisces Chain aka Arp 331](#). I extended past the conventional limits and started at NGC 344, because, interestingly, these several objects run right along the +33° declination line. This involved 4 FOV, but the main group labeled as Arp 331 will fit in one field about 30” wide.



Note North Arrow



Note North Arrow

The group starts with NGC 79 at the NW edge; to the SE is the main concentration with about 12 galaxies total. I had had some trouble a few years ago trying to pick these out but have gotten better at diving how catalogs and databases approach groups like these. NGC 90 and 93 are very interesting spirals with tiny arms – but I didn't make that detail out visually on either one.



North is Up

(Continued on page 20)

(Continued from page 19)

As you can see, the new image captured all the line, and give us some details that differentiate each other from the others.

Hopefully, this article will give you some ideas about ways to approach what you plan to see and add to your enjoyment the next time you're out observing. Of course, the fun and excitement are the important parts. But if you approach your nights with some of

these ideas in mind, you may ferret out dim objects more easily. If you do preliminary lo-fi images, you can get an idea of the field stars and of the object. Visual and imaging methods are not mutually exclusive. Use both, and any other idea you find that makes your amateur astronomy journey richer.

If you have any suggestions for improving planning and the observing process, or comments on this article, please [contact me](#).

## APPENDIX

### Equipment Data for Images used in this Article (all by author):

New Mexico Telescopes	FOV in Degrees	Filters	OTA	Observatory Code
<a href="#">Telescope 21</a>	0.81 x 0.54	Luminance	Planewave 17" CDK	H06

### Links used in article:

[https://en.wikipedia.org/wiki/Bortle\\_scale](https://en.wikipedia.org/wiki/Bortle_scale)

<https://en.wikipedia.org/wiki/Gegenschein>

[https://en.wikipedia.org/wiki/Zodiacal\\_light](https://en.wikipedia.org/wiki/Zodiacal_light)

<https://hafsnt.com/index.php/ngc-new-general-catalog-project/>

<https://aladin.u-strasbg.fr/AladinLite/>

<https://www.astroleague.org/programs/two-view>

<https://www.noao.edu/outreach/aop/observers/n895block.jpg>

[https://observing.skyhound.com/archives/apr/HCG\\_61.html](https://observing.skyhound.com/archives/apr/HCG_61.html)

<https://www.webbdeepsky.com/galaxies/object/NGC80>

<https://www.webbdeepsky.com/galaxies/archive/galaxy/2011/Nov>

<https://hafsnt.com/index.php/parks-and-barks/>

## W.A.S.P. Photo and Article Submissions

We'd like to see your photos and articles in the W.A.S.P. Your contribution is ESSENTIAL!

—  
This is YOUR publication!

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Documents can be submitted in Microsoft Word (.doc or .docx), Open Office (.ods), or Text (.txt) formats, or put into the body of an email. Photos can be embedded in the document or attached to the email and should be under 2MB in size (JPG, PNG or TIFF format). Please include a caption for your photos, along with dates taken, and the way you'd like your name to appear.





## Movie Review with Diane Hall

### The Theory of Everything

I sat on this one a while because quite frankly, “Romantic drama-comedy about Stephen Hawking” is not high on my list of things I want to watch, but I’ve a brother-in-law with a quick and incisive wit and figured bringing a DVD of this to Thanksgiving couldn’t go much wrong. Either it’d be a good watch after all or my brother-in-law would provide commentary to make it worth the slog.

The Theory of Everything is pure, undiluted Oscar Bait, soft focus pornography for the cinematographically-inclined, selling a gauzy fantasy in which Cambridge University is a fairytale realm of Gothic arches, emerald lawns, gay parties on the emerald lawns, limpid waters broken by the oars of young lads in rowboats, staircases that wind like a nautilus shell...

Oh yes, and in this fairytale, the young Stephen Hawking (Eddie Redmayne) is the enchanted princess, brilliant in mind and failing in body. The devoted knight serving, saving, and suffering this quirky princess is Stephen’s first wife Jane (Felicity Jones), upon whose memoirs the film is based. There’s a romantic-comedy beginning (meet-cute, awkward dinner with the family), a brisk transition into terminal-illness movie romance territory, and then when Stephen outlives his initial two-year prognosis it becomes a slog indeed as Jane is worn

down by the ordeal of caring for Stephen and their two kids on what appears to be a shoestring budget. Everything Jane does to try to alleviate the situation leads to more complications... oh, and she’s a devout Christian while Stephen believes that physics and gods are not compatible. Physics means that God must die and cosmology is religion for atheists and something something...whatever.

Jane is luminous and beautiful, Cambridge is luminous and beautiful, the red-headed nurse Jane eventually hires to help Stephen is luminous and beautiful, the choir director Jane visits when she needs some time to herself is luminous and... oh, you get the point. Hell, Redmayne’s Stephen Hawking is precious in own way both before and after his transformation into the wheelchair-using icon with an American-accented talkbox.

There’s some moments to excite those of a scientific bent (young Stephen being let loose in the lab used by J.J. Thomson and Lord Rutherford stands out), but the real drama here is all about inner space.



**Four Moons.** I recognize its overall excellence in a technical sense but it’s just the most fantastical example of a film standing up on tiptoe and begging “Give. Me. All. The Awards.”





# Over the Moon with Rik Hill

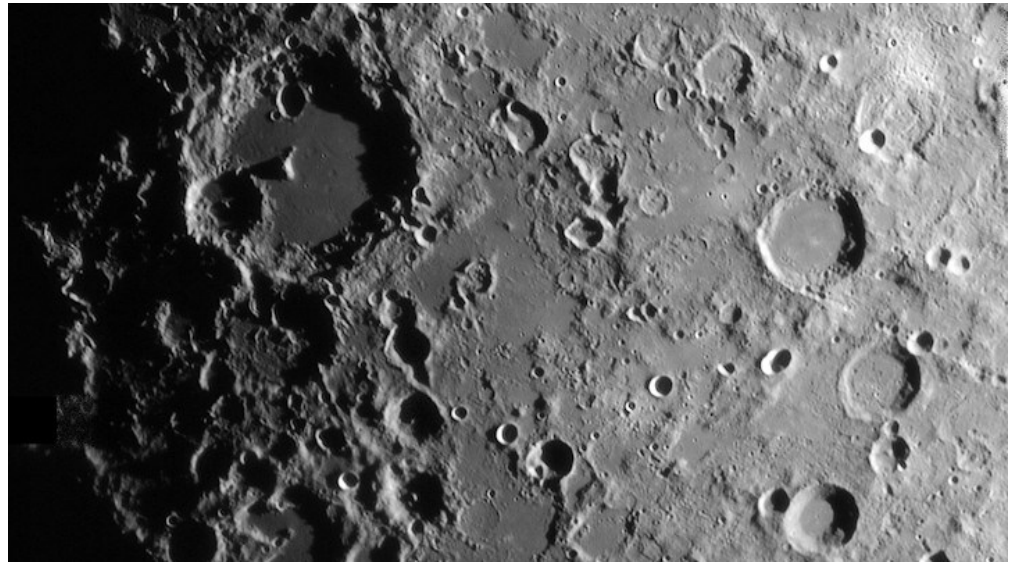
## A-craters

Here we have a very crater saturated region of the southern highlands. This image's largest crater, to the upper left of center, Albategnius (139km dia.) is just short of 4 billion years old. It has a strange off-center central peak with a summit crater, casting a nice shadow on the western side of the crater floor towards the ragged crater Klein (46km). Albategnius has a number of shallow saucer-like craters on its floor that disappears with higher sun angles. Below Klein is the heavily eroded but larger crater Parrot (121km). Normally, with higher sun, this crater is not so obvious. To the right of Parrot is the very identifiable Vogel (27km) which is the center, largest crater in a nearly vertical row of 4 craters. Below Vogel are two more A-craters, Argelander (36km) above and Airy (37km) below. Look at the sunlight just catching the tip of the central peaks in these craters! Notice the long gashes that stretch from the upper left diagonally to towards the middle of the bottom of the image. These gashes are over 100km long and were carved out in seconds when city sized "rocks" were blown out from the Imbrium impact



and ploughed their way across the lunar landscape! These are found in many places on the moon. This impact must have been a breathtaking sight...from a safe distance!

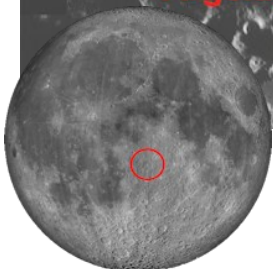
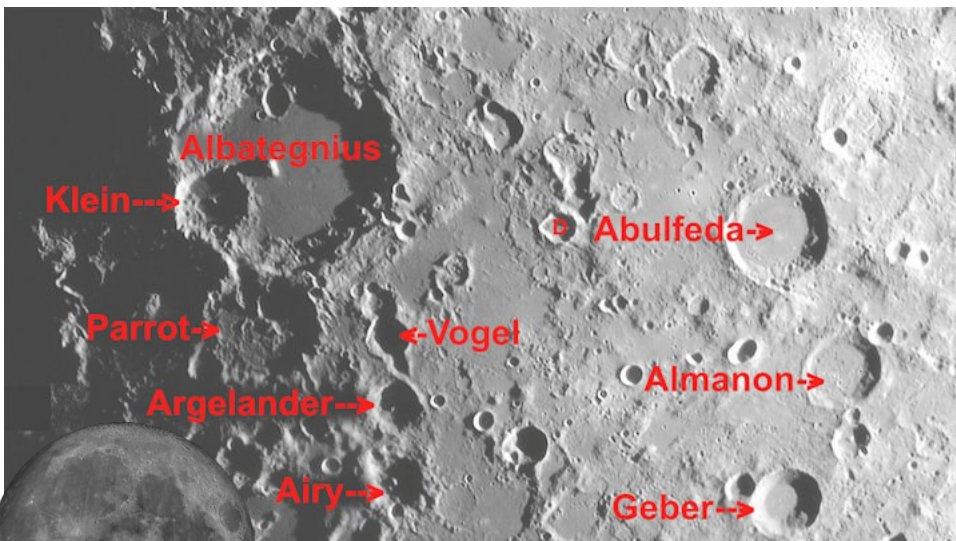
On the right side of the image are three larger craters. The largest just above the mid-line of the image is the flat floored Abulfeda (65km) another of our A-craters. Below it is another flat floored crater, Almanon (51km) and the bottom one is Geber (46km). Notice the beautiful catena between



Abulfeda and Almanon, a line of secondary craters laid out when ejecta was laid down after and impact. It does point back to Albategnius so perhaps that was the origin of the material. Then lastly, just

above the center of this image is a pear-shaped crater, Abulfeda D (20km). Look at the interesting shadow on the floor of this crater hinting of a deep gap in the eastern wall of this crater. The odd feature, looking for all the world like a lava flow from a flooded crater that ruptured to the south. Certainly this is worth scrutiny on a good seeing night!

This image was created from two 1800 frame AVIs stacked with AVIStack2 (IDL) made into a montage with MicroSoft ICE and finish processed with GIMP and IrfanView.

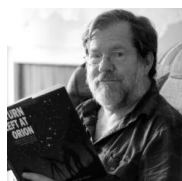


Location maps by Ralph DeCew



# History S.I.G.

## December 1984/ January 1985



This issue leads off with a reprint from the Association of Lunar & Planetary Observers, Solar Section: "Points of Prominence" by Richard Hill, examining the methodology of solar observing.

The remainder of the issue contains charts submitted by Raymond Bullock (our source for the sky charts in our current issues): Location of the Sun, Moon and Planets (for December and January) and a Wordsearch puzzle.

## December 1994

In the issue we have "WAS Hosts School Star Party", an accounting of the event at Lake Pleasant Elementary School in Walled Lake by Don Robinson.

Of course, there is "Computer Chatter" Larry Kalinowski, always entertaining and delightful revisit. A poem, "PHOEBE" by Clarence Day, 1898 is submitted by Greg Milewski and Mike O'Dowd found this gem: "The Universe of the Student's Mind" by Harold P. Coyle (reprinted by permission of Mercury Magazine, May/June 1994.)

Ken Wilson completes the issue with a look back: "25 Years Ago - A Personal Remembrance"

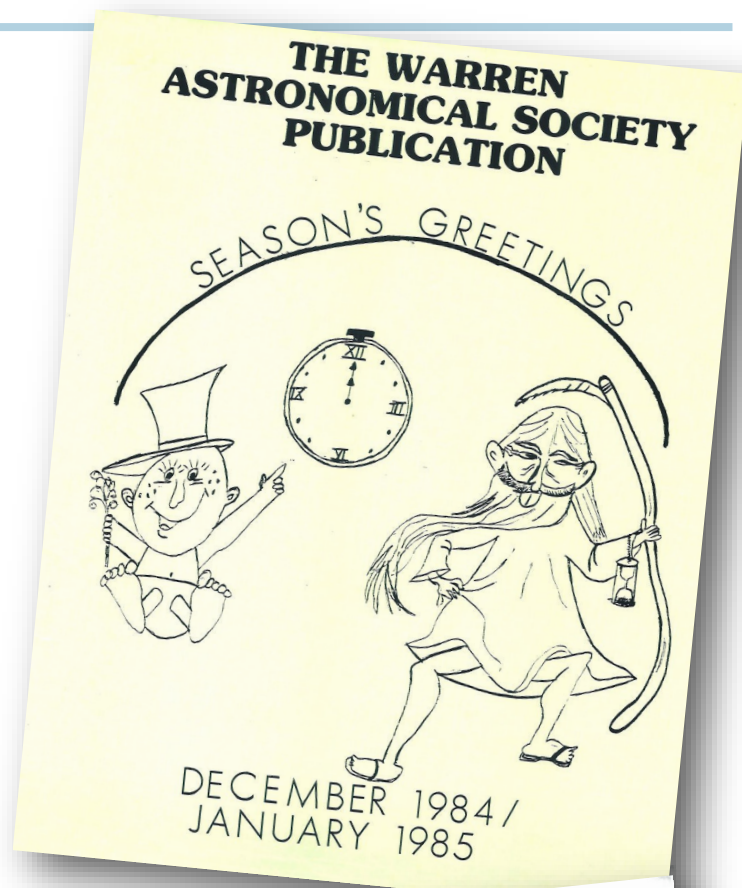
## From the Scanning Room <sup>Editor's Desk</sup>

From my vantage point in the Fortress of Solitude South, 2021 has ben a remarkable year. Articles and images kept coming in without any pleading. One contributor, Brad Young, of the Tulsa astronomy Club, assures me that he has more articles in the works. Could use a few more from our own members \*hint-hint\* (how-to, personal observing sessions, and product reviews are always welcome.)

As Publications Chair, I've stretched my duties to include the email blasts, editing the Meetup pages working with the calendar committee and now, getting the annual mailer together—and still found time to crank out the WASP *and* get the Mable Stearns Newsletter Editor award for 2021.

A heartfelt thanks to all who contributed to our newsletter in 2021 and here's to an inspiring 2022.

Dale Thieme,  
Chief scanner



### WAS HOSTS SCHOOL STAR PARTY

Submitted by Don Robinson

Six club members turned out on Monday evening, October 10th, to host a star party for the Lake Pleasant Elementary School in Walled Lake. The skies were very clear and steady, the local street lights were all turned off, and the moon was approaching first quarter. Over 100 students from the 4th and 8th grades and many parents arrived, most of them hungry for their first tour of the heavens.

Viewing began at twilight (about 7:30 PM). Enough light remained for the students and their parents to look over the variety of telescopes set up by the club, and learn a little about how each one worked. Telescopes on hand included Jeff Bondono's and Larry Kainowski's Equatorial Newtonians, John Herrgott's Kainowski's Schmidt-Cassegrain, Alan Questar, Bob Halsall's Schmidt-Cassegrain, Alan Rothenberg's Refractor, and Don Robinson's Odyssey Dobsonian. This apparent coordination of scope configurations was quite accidental.

The waxing crescent moon provided the first entertainment. The students were allowed to try their own hand with the Telrad finder mounted on the Odyssey scope. The scope was returned to vertical position between each viewer, and each student "wrestled" the scope to bring the moon into the LED target pattern. The first look at the moon was all the more satisfying, knowing that they had found it themselves.

Meanwhile, other scopes were zeroing in on Saturn, which was already shining bright and steady against a deep blue sky in the southeast. This was prime refractor territory, so Alan's scope continued to track Saturn throughout the session. The sky darkened to the point where the Milky Way was faintly visible around

Cygnus at the zenith, and the brighter deep sky objects were obtainable. Bob's 10" Meade provided a nice view of the Ring Nebula (M-57), while Jeff turned his reflector to the Double Cluster. The familiar objects such as M-13 (globular cluster) and the Andromeda Galaxy were exciting to look at when seen for the first time by these students. Most observers were able to distinguish the owl pattern in NGC-457 (open cluster) near Cassiopeia.

With the large crowd and only six scopes, the lines were long. The students were very patient and well behaved. It was fun and challenging to field the variety of questions that came from both children and parents as they waited their turn at the eyepiece. After hearing a brief explanation of how the gold and blue stars of the double Albireo revolve around each other, one parent asked how long they take to complete a revolution. The response of "probably several hundred years" was immediately followed by another parent asking if you could see them move in the eyepiece. This brought a chorus of laughter from the crowd of children around the scope. (Parents are just not "with-it" sometimes!)

After 9:00 PM the chill in the air began to thin the crowd quickly. By 9:30 PM the club members were packing up their scopes and gathering together to relate how great an evening it had been. A check for \$65 was received as a donation to the club. All that was left to do at this point was to drive home and happily wipe the "smudges" from the eyepieces. What better way is there to spend a clear evening in the light of the first quarter moon?

Footnote on Albireo: Reference materials indicate that Albireo is 410 light years away, with a separation of 34 arc seconds. I could not find a reference to the period of revolution, but a minimum estimate can be calculated from this data. The

WASP

Page 1

# DECEMBER 2021

## Notable Sky Happenings

### Dec. 1 - 7

Venus is in the SW evening sky this month, but will have set by chart time. The Moon is at the lower left of Spica on the 1st (SE predawn). Look for Venus below the Moon at 6:00pm on 6th (SW). The Moon is below Saturn on the 7th (SW).

### Dec. 8 - 14

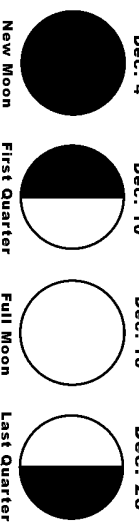
The Moon is below Jupiter on the 8th and the upper left on the 9th (SW evening). The Geminid Meteor Shower peaks the evening of the 14th-15th. It averages 60 meteors per hour, but the Moon interferes this year.

### Dec. 15 - 21

The Moon is at the lower left of Pollux with Castor at the right on the 21st (W predawn). Winter begins for the Northern Hemisphere at 10:59am EST on the 21st.

### Dec. 22 - 31

Moon is above Regulus on the 24th (SW), to the upper left of Spica on the 28th (SSE) and above Antares with Mars to the lower left on the 31st (SE; all in the predawn).



## Now Showing

### "Mystery of the Christmas Star"

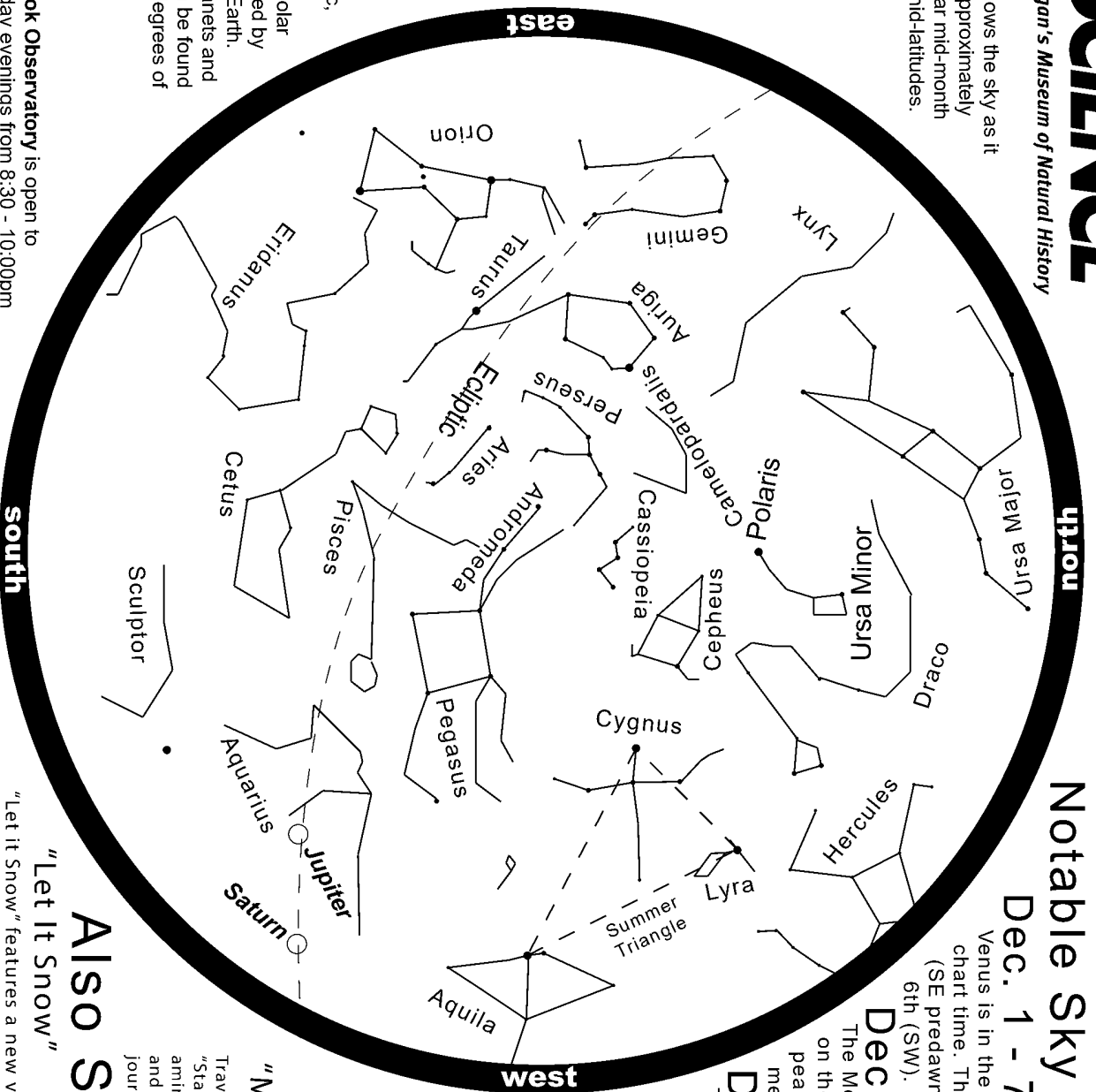
Travel back in time 2,000 years to explore the nature of the "Star" that guided the wise men to Bethlehem. We will examine astronomical events that were occurring at the time and see if any were remarkable enough to have sparked the journey. (Extra shows are presented during the holidays.)

## Also Showing

### "Let It Snow"

"Let it Snow" features a new variety of festive classics from Frank Sinatra and Chuck Berry to Burl Ives and Brenda Lee, and includes a finale by the Trans Siberian Orchestra. The soundtrack is visually enhanced with thematic animation and all-dome scenery. This 32-minute program is a fun and entertaining experience for all ages, especially families.

For astronomy information visit <http://science.cranbrook.edu>



This chart shows the sky as it appears at approximately 8pm EST near mid-month at northern mid-latitudes.

What is that dashed line? It's the ecliptic, the reference plane of the solar system, defined by the Sun and Earth. The major planets and the Moon can be found within a few degrees of this plane.

The Cranbrook Observatory is open to the public Friday evenings from 8:30 - 10:00pm EDT, and the first Sunday of the month from 1:00 - 4:00pm for solar viewing. Come have a look through our 6" telescope! For observatory information visit <http://science.cranbrook.edu/explore/observatory>







Zsolt Nagy - Sunset on the Moon



Paul Goelz - NGC7380 Wizard Nebula

# December 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4 Solar eclipse (Antarctica) New Moon
5	6 Hanukkah ends Cranbrook Virtual Meeting	7	8	9 WAS Banquet	10	11
12	13 Geminids	14	15	16	17	18 Full Moon
19	20	21 Ursids Winter Solstice	22	23	24	25 Christmas Day
26 Kwanzaa begins Boxing Day (Can.)	27	28	29	30	31 New Year's Eve	





# Stargate Observatory

## Monthly Free Astronomy Open House and Star Party

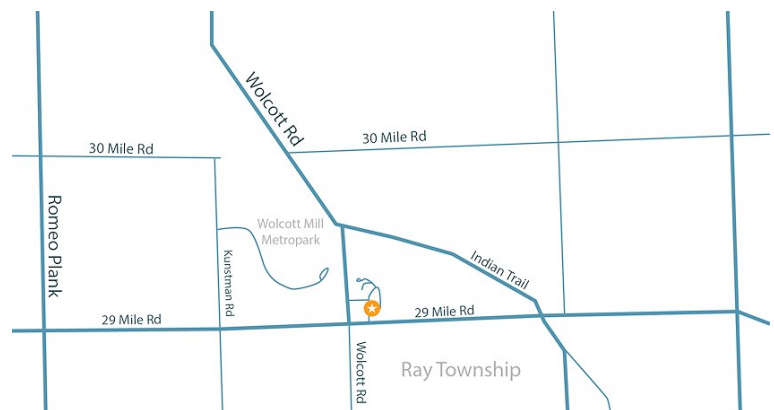
4th Saturday of the month!  
Wolcott Mill Metropark - Camp Rotary entrance

**Advisory:** Concerns are circulating in the amateur astronomy community about a possibility of COVID-19 being passed from one person to another via contact of different persons' eyes with a telescope eyepiece. Sharing telescopes may be considered by some to be high-risk due to the possibility of eyes touching eyepieces. Masks are encouraged, mandatory for children.

- Sky tours.
- See different telescope types in operation.
- Get help with your telescope.
- We can schedule special presentations and outings for scouts, student or community groups.

Contact: [outreach@warrenastro.org](mailto:outreach@warrenastro.org)

Find us on [MeetUp.com](https://www.meetup.com)



20505 29 Mile Rd (1.8 miles east of Romeo Plank Rd) Ray, MI 48096  
82° 55'04" West Longitude, 42° 45'29" North Latitude

### Observatory Rules:

- Closing time depends on weather, etc.
- May be closed one hour after opening time if no members arrive within the first hour.
- Contact the 2nd VP for other arrangements, such as late arrival time. Call 586-909-2052.
- An alternate person may be appointed to open.
- Members may arrive before or stay after the scheduled open house time.
- Dates are subject to change or cancellation depending on weather or staff availability.
- Postings to the Yahoo Group and/or email no later than 2 hours before starting time in case of date change or cancellation.
- It is best to call or email the 2nd VP at least 2 hours before the posted opening with any questions. Later emails may not be receivable ([secondvp@warrenastro.org](mailto:secondvp@warrenastro.org)).
- Generally, only strong rain or snow will prevent the open house... the plan is to be there even if it is clouded over. Often, the weather is cloudy, but it clears up as the evening progresses.

# Stargate Report

The November Stargate open house was canceled due to snow and bad road conditions.

Both buildings and all equipment are in good condition as of 6:12 pm 11/27.

Next open house is scheduled for December 18 as our last open house for 2021.

Thanks to Doug Bock of the Northern Cross Observatory, Jonathan Kade, and Dale Thieme, who helped with WebEx and e-mails, the WAS has had uninterrupted virtual open houses during the pandemic for almost one and a half years. The virtual open house events have been very interesting, educational, and greatly appreciated by many members who attended the web meeting. We hope that all future Stargate observing events will be in person at our observatory.

Please note COVID-19 precautions continue to be in effect at the observatory until further instructions based on future WAS board meetings.

Riyad I. Matti  
2021 WAS 2nd VP  
Observatory Chairperson

## Treasurer's Report

Treasurer's Report for November 30, 2021

### Finances

- Main account, Bank of America \$21,287.52
- GLAAC account, Bank of America \$3,263.95
- PayPal Account \$1,231.23

### Total Memberships

188

### New Members

- Thomas Hagen
- William Slogeris
- Mark Yergin

If there is any interest in RASC or Astronomical League Materials/membership, please let me know with an email to [treasurer@warrenastro.org](mailto:treasurer@warrenastro.org).

Adrian Bradley,  
Treasurer

## Astronomical Events for December 2021

Add one hour for Daylight Savings Time  
Source:

<http://astropixels.com/almanac/almanac21/almanac2021est.html>

Day	EST (h:m)	Event
02	19:28	Mars 0.7°S of Moon: Occn.
03	09:58	Moon at Descending Node
04	02:33	Total Solar Eclipse; mag=1.037
04	02:43	NEW MOON
04	05:01	Moon at Perigee: 356794 km
06	19:48	Venus 1.9°N of Moon
07	20:52	Saturn 4.2°N of Moon
09	01:07	Jupiter 4.5°N of Moon
10	20:36	FIRST QUARTER MOON
14	02:00	Geminid Meteor Shower
16	13:30	Pleiades 4.5°N of Moon
16	19:12	Moon at Ascending Node
17	21:16	Moon at Apogee: 406322 km
18	23:36	FULL MOON
21	04:20	Pollux 2.6°N of Moon
21	10:59	Winter Solstice
22	10	Ursid Meteor Shower
26	21:24	LAST QUARTER MOON
27	04:15	Mars 4.4°N of Antares
29	00	Mercury 4.2°S of Venus
30	20:07	Moon at Descending Node
31	08:54	Antares 3.9°S of Moon
31	15:13	Mars 1.0°N of Moon: Occn.



If you're shopping on Amazon, make sure to use Amazon Smile. It costs you nothing, and if you select us as your charity, Amazon will donate 0.5% of every purchase you make to the Warren Astronomical Society.



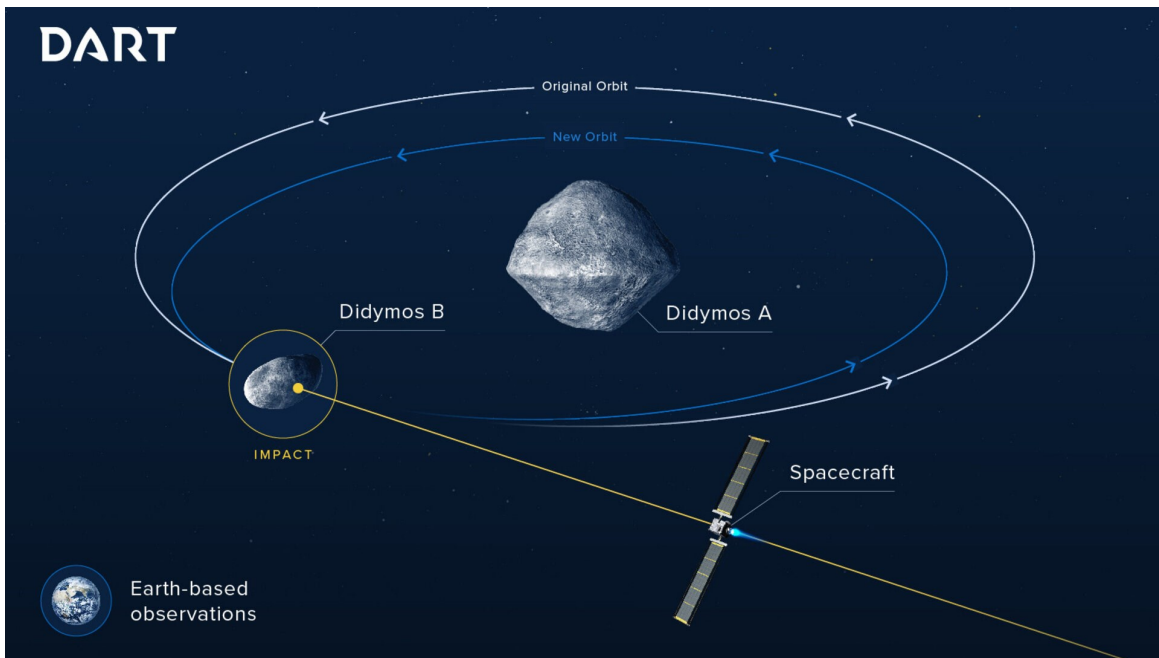
# Outreach Report

## Endeavour Space Academy - What are they teaching these kids?

Connie and I held another meeting of our after-school astronomy and space science club - Connie is having the students construct [Pop! Rockets](#). She was using two different types of *old* film canisters (which the students had never seen before) and Alka-Seltzer® as propellant. I really need to order some model rocket kits for them next!

I asked the students if they'd ever seen a SpaceX launch and landing - *they hadn't...* I honestly did say "What are they teaching kids these days? *MAN!*" I showed them the [Falcon Heavy](#) launch and landings, and the "[How Not to Land an Orbital Rocket Booster](#)" video.

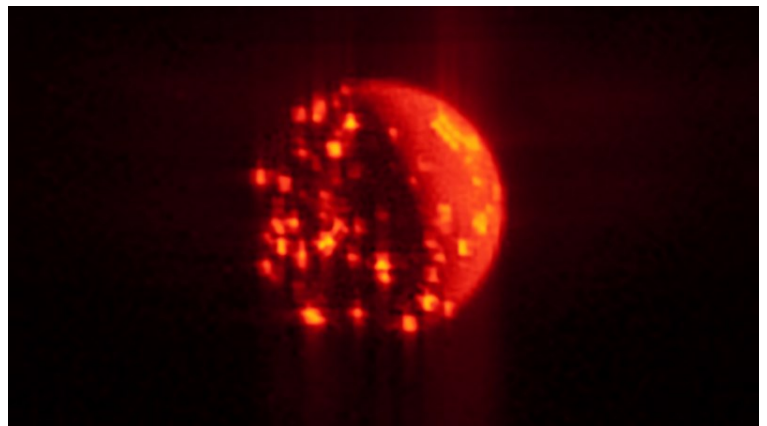
I discussed the Double Asteroid Redirection Test ([DART](#)) mission at length, because... *asteroids!*



As a comparison, I also showed them the animation of comet Tempel 1 being struck by the [Deep Impact](#) mission's impactor.



Image credit: NASA/JPL-Caltech/UMD



Io shown in infrared via the Juno spacecraft. Credit: NASA/JPL-Caltech/SwRI/ASI/INAF/JIRAM). Image processed by Roman Tkachenko.

I also discussed the [Parker Solar Probe's](#) latest perihelion, and Jupiter's volcanic moon Io.

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Speaking of asteroids - in the [WGSBN Bulletin #12](#), I spotted this newly named asteroid:

## (550525) Sigourneyweaver = 2012 NL

*Discovery: 2012-07-12 / T. Kryachko, B. Satovski / Zelenchukskaya Stn / 114*

Sigourney Weaver (b. 1949) is a talented actress and selfless nature protector. Her participation in the legendary cycle of Alien films interested a young generation in the possible problems of space exploration and the search for extraterrestrial intelligence.

## Member Spotlight

**Ken Bertin:** Hosts a weekly “Astronomy of the Week” on [Facebook](#) every Wednesday. Ken also posted photos of the [Lunar Eclipse](#) and answered maybe a dozen questions.

**Adrian Bradley:** Makes regular appearances on [Explore Scientific’s Global Star Party](#).

### Timothy Campbell:

Dec 15 @ Brilliant Detroit — Astronomy Basics

Dec 18 @ Henry Ford Museum — The Science of the Solstices (Liam Finn joining me for this one)

Jan (date TBD) for Livonia Library — James Webb Space Telescope (hopefully it will have launched by then!)

Jan (date TBD) for Dearborn Library — Astronomy 101

**Sandra Macika:** Did a Meteorite presentation for an Astronomy Club at Fox Run (a Senior Living location where Jon Blum and his wife live) on October 20th.

*Thanks to everyone for all the outreach efforts!*



## Great Lakes Association of Astronomy Clubs Board Meeting

October 14, 2021 - ONLINE, 7pm

<https://umich.zoom.us/j/584733345>

Call to Order: 7:03pm, JK

Attendance:

- Jeff Kopmanis - Secretary, Lowbrows
- John Wallbank - VP, Lowbrows
- Mike Ryan - GM, Telescope Field Manager
- Tim Campbell - Ford
- Brian Ottum - Marketing/Communications, Lowbrows
- Shannon Murphy, Lowbrows

(Continued on page 30)



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## Stats from AATB 2021

<u>Presenter</u>	<u>Friday</u>	<u>Saturday</u>
Awni H-alpha	114	103
Maxi S.Hemi	56	
Brian Ottum	313	164 (rain)
Ford	153	176
Doug Bock (NCO)	37	35

## Debrief

Financial stuff has been done for 2021 (Fed and State) - JW

Late decision and marketing affected turnout

## No reflection on quality of presentations Covid Report (largely from Krishna Rao, Lowbrows)

“Stably bad”, but not getting worse

Delta variant in schools

Public schools: mitigations are working (masking, distancing, ventilation)

UM classrooms: mitigations are working

Okie-Tex Lowbrows didn't pick up anything and stayed safe

2:1 AP to visual - an increase from past years where it was primarily visual observers

Ordinary photographers were “scurrying all over the place” and sometimes in dangerous places.

iPhones with adapters were replacing eyepiece viewing for Covid reasons

Indoor dining is single most-risky

Outdoor spread is just not happening, even with close-quarters

## Breathing is best way to catch it; touching is negligibly risky Date for 2022: September 16-17, 2022

Check with DNR for availability

No astronomy purchases in August!!!!

## Nominations for Officers are now open, until the January 13 meeting November 11 meeting: TBA (JW & AB will figure it out and advise the rest of us)

Next Meeting: December 9, 2021

Adjourned: 7:43pm (JW, JK 2nd)

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## Michigan Dark Sky Update



(Edited from emails from Sally Oey)

**Ann Arbor and Detroit:** With holiday lights going up, our Ann Arbor lighting ordinance (A2LO) has gotten lots of attention on NextDoor. Unfortunately many people seem confused about limits on holiday lights. A2LO only specifies that temporary lights must be turned off between midnight and 6am, and cannot be up for more than 90 days. If you can, **please help defend A2LO on NextDoor** if it comes up again. Many thanks to those who posted! Please let us know when a discussion flares up. Our [MIDS website](#) is a good resource for info, and the City's new flyer about [A2LO](#) is attached. Encouragingly, many people are supportive. One person wrote, "*This was heavily supported by the community when it passed. I remember tons of people calling in praising council for it.*" So thanks again to everyone who participated in all the public input sessions -- people notice!

The holiday lights issue led to media attention last week in the [Free Press](#), [MLive](#) (paywall), and WXYZ-TV. The Free Press provides a substantial overview, including news that **Detroit is the #2 most light polluted city** in the US, after Washington, DC, according to [SavvySleeper.org](#), which also anticorrelates light pollution with hours of sleep. The MLive article unfortunately focused more on the NextDoor kerfuffle.

**Washtenaw County, Miller/Wagner roundabout:** David and Lisa Black have filed a lawsuit against the Washtenaw County Road Commission regarding the nuisance that the excessive light from the new roundabout is causing to them. While we've made progress mitigating the brightness of the planned Liberty/Zeeb roundabout, there has been no progress to date on the existing issues at Miller/Wagner.

**University of Michigan:** Members of our MIDS UM task force met with Sue Gott (Campus Planner), Andy Berki (Director of Campus Sustainability), and Mike Rein (Director of Community Relations) on Nov 23. Sue expressed support, but quickly put us off when we asked about the modest revisions we suggested to the UM Design Guidelines, i.e., the campus building code. The UM planning process will be overhauled next semester, so we hope to have good lighting principles included. Sue did invite us to meeting with her again, later. Our group also met with Eddie Washington and John Seto, Executive Director and Operations Director, respectively, of UM Public Safety, on Nov 24. They're already somewhat aware of the non-correlation between lighting and crime, but welcomed the info and resources provided, as they're often requested to provide recommendations for more and brighter lighting. They're very supportive of our efforts. Many thanks to Gillen Brown, John Mirsky, Nicholas Poggioli, Karie Slavik, and other members our task force.

(Continued on page 32)

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**Chelsea Dark Skies Group:** City Manager John Hanifan has confirmed to Kathie Gourlay that the new acorn streetlights installed downtown do have the shielding caps, and that they plan to continue using these going forward. They are also looking into retrofitting existing acorn lights, as long as budget and supply chain issues permit. Chelsea Dark Skies is evaluating the extent to which the new model is fully shielded.

**Ann Arbor Township:** The Township Resilience Committee is **exploring the possibility of developing a lighting ordinance**. Please contact Rick Bunch <[rick.bunch@gmail.com](mailto:rick.bunch@gmail.com)> if interested in this.

- John Mirsky shares [this article](#) detailing how advertising companies are persuading city councils to allow digital billboards in exchange for revenue. Apparently these deals end up not generating the expected funds, and cause light pollution blight in low-income neighborhoods. We've seen this playing out in Detroit with our efforts supporting Scenic Michigan's campaign against the revised Detroit Sign Ordinance.

**Reminder:** Please review our [Wish List of Action Items](#). If you can help move forward any items, please add your name and let us know, including adding new items. There's tons to do!

**Available:** [The End of Night](#) by Paul Bogard, the classic exposition on dark skies. MIDS has a couple copies, just ask!

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## Meeting Minutes

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### WARREN ASTRONOMICAL SOCIETY MINUTES OF (VIRTUAL) BOARD MEETING NOVEMBER 1, 2021 @ 6:30PM

Meeting called to order at 6:33PM by President Diane Hall. Officers present: Diane Hall, Dale Partin, Riyadh Matti, Mark Kedzior, Adrian Bradley, Bob Trembley, Dale Thieme (quorum present).

#### OFFICER REPORTS:

President Diane Hall reviewed the year in retrospect with the board regarding the virtual format, and is looking forward to in person regular meetings based on guidelines from our institution hosts.

1st VP Dale Partin discussed the slate of nominees for the upcoming officer elections. He commented on upcoming presentations of 2021 and into the 2022 meeting year.

2<sup>nd</sup> VP Riyadh Matti reported on the October 23<sup>rd</sup> Open House at Stargate – approximately 25 in attendance (50-50 mix of members and visitors) – cloudy but able to view Jupiter and Saturn for brief periods when holes in clouds appeared for some clear viewing. Everyone observed the safety protocols that were put in place for this event.

Secretary Mark Kedzior reported that the donation request letters for the December 9<sup>th</sup> banquet were sent out (twenty vendors in total).

Treasurer Adrian Bradley reported a total of 187 paid memberships along with Treasurer's report in the November WASP. He also will be providing a PayPal tutorial for members to pay dues on WAS website.

Outreach Chair Bob Trembley gave report on outreach activities by members in the November WASP.

Publications Chair Dale Thieme reports the Novem-

ber WASP is online and a last call for calendar submissions for the 2022 edition.

#### OLD BUSINESS

Discussion on calendar submissions and deadline dates. Discussion on return to in person meetings based on guidelines from host institutions.

#### NEW BUSINESS

Discussion on setting date for 2022 WAS Picnic.

Motion by Diane Hall – supported by Dale Partin to have combination Picnic/Open House on the 4<sup>th</sup> Saturday in August, with officers reporting for setup at 5PM, picnic starting at 6PM, then open house following. Motion passed 7 – 0. Discussion on Mailchimp account took place. Mark Kedzior reported that the City of Warren Library sent a Certificate of Insurance/ Liability Form for WAS members to sign, or present proof of liability insurance that we may carry in order to participate and provide support for the NASA@MyLibrary grant outreach activities at the Civic Center Library. After discussion, the Board unanimously felt that it would not be in the best interest of our organization to sign this document in order to participate and provide support to this program. On behalf of the Board, Mark will be contacting the library to explain its decision on this matter.

Motion to adjourn by Dale Partin, supported by Dale Thieme.

Meeting ended at 7:28 PM.

Respectfully submitted,  
Mark Kedzior  
Secretary

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(Continued from page 32)

## WARREN ASTRONOMICAL SOCIETY CRANBROOK (VIRTUAL) MEETING NOVEMBER 1, 2021 @ 7:30PM

Meeting called to order at 7:32 PM by President Diane Hall. All officers were present and in attendance (Attendance via WebEx - 30, YouTube - 11 at 8:30PM).

### OFFICER REPORTS:

President Diane Hall reports that returning to in person meetings at Cranbrook may take place in the 1st quarter of 2022 - BASED on guidelines from the host institution.

### Notice:

The minutes reflect discussion on returning to in person meetings, based on host institution guidelines, but in light of the recent developments of the COVID rise in Michigan and the reports of a new variant, the WAS Board will be vigilant in making decisions in regard to returning to in person meetings for the safety and well-being of our membership

1st VP Dale Partin reports on the upcoming presentations - at Macomb on November 18th, John Pannuto and Tom Croskey with "Selecting Astronomical Targets for This Season's Viewing or Imaging". The December 6th Cranbrook meeting, Dale Thieme with the short presentation, "Triumph and Tragedy in Three Acts", followed by the main presentation - a panel discussion moderated by Bob Trembley - "Anti-Science Sentiment in the U.S." The December 9th Banquet will have Adrian Bradley presenting "Pictures in the Sky".

2nd VP Riyad Matti reported on the October 23rd Open House at Stargate, with the next one being held on Saturday, November 27th, and the best practices for safe viewing that will be adhered to as was at the October 23rd Open House.

Secretary Mark Kedzior reported the October minutes are in the WASP.

Treasurer Adrian Bradley reported on the account balances of the WAS, GLAAC and PayPal (his report is in the November WASP). He also mentioned that annual memberships should be renewed by 1/22/2022. He also encouraged WAS members to pay dues by PayPal with how-to tutorial on the WAS website.

Outreach Chair Bob Trembley's report of activities are in the November WASP.

Publications Chair Dale Thieme reports the November edition of the WASP is online, and that the calendar submissions deadline is November

20th.

### SPECIAL INTEREST GROUPS:

Solar - No report. Double Star - Not able to observe on October 23rd. History - On hiatus. Astrophotography - Adrian Bradley shared images of "Heart and Soul" Nebula and Double Cluster in Perseus.

### OBSERVING REPORTS:

David Levy reports observing weak auroral activity (reddish glow) in northeast from observing area near Tucson - also observed two new comets - one being Comet Atlas 2019 L/3 - read poem from Old Testament - Psalm 19. Bob Trembley observed moon and stars with granddaughter at 6AM on October 31st. Paul Goelz shared his image - a 4 panel mosaic of the North American Nebula - and details on the equipment used and processing required for final product.

### WAS OFFICER ELECTIONS:

WAS Elections called to order at 8:15 PM, with Ken Bertin conducting the election for the WAS membership. The WAS By Laws Article 5 - Duties of the Officers of the Board - and subsections were read for each office.

The following individuals were nominated, accepted the nominations, and were voted on and duly elected by the membership (per WAS By Laws - no individual can serve more than three (3) consecutive one-year terms for any office):

PRESIDENT: Diane Hall (for 3rd consecutive term)

1st VP - Bob Trembley (for 1st term)

2nd VP - Riyad Matti (for 3rd consecutive term)

SECRETARY - Mark Kedzior (for 2nd consecutive term)

TREASURER - Adrian Bradley (for 2nd consecutive term)

OUTREACH - Kevin McLaughlin (for 1st term)

PUBLICATIONS - Dale Thieme (for 2nd consecutive term. Served as editor under two Publications Officers, a non-elective position)

Motion by Dale Thieme - supported by Riyad Matti - to close the elections of the 2022 WAS Board. Motion passed unanimously.

MAIN PRESENTATION: Dr. Dale Partin introduced former WAS President Bob Berta (with bio) with his presentation on "Solar Astronomy". In his presentation, Bob explained how to observe the sun safely (rules of safe observing, use of solar glasses, Baader Astro-Solar film for making solar filters, Herschel Solar Wedge, Hydrogen Alpha filters/scopes). He also discussed the eleven-year solar cycle, the sun's structure & layers, sunspots/solar activity, coronal mass ejections, and how to do solar astrophotography (equipment needed for taking and processing your images).

(Continued on page 34)

(Continued from page 33)

Questions and discussions followed his excellent and informative presentation.

To see this presentation in its entirety, please go to:

<https://www.youtube.com/warrenastro>

The meeting ended at 9:59 PM.

Respectfully submitted,  
Mark Kedzior  
Secretary

## WARREN ASTRONOMICAL SOCIETY MACOMB (VIRTUAL) MEETING NOVEMBER 18, 2021 7:30PM

Meeting called to order at 7:30 PM by President Diane Hall. All officers present except for Outreach Chair Bob Trembley (illness). (WebEx attendance - 20 @ 8:30 PM).

### OFFICER REPORTS:

President Diane Hall commented on the election of the 2022 WAS Board held on November 1. She commented on the state of returning to in person meetings - Macomb will still be virtual for the foreseeable future - Cranbrook may go to a hybrid format in the 1<sup>st</sup> quarter of 2022, but is based on the guidelines of the host institution (Cranbrook) in regard to moving forward to in person meetings (see also the notice from the Cranbrook *Virtual Meeting Report*). She also commented on the excellent article on the WAS that will be featured in the Warren Weekly November 24<sup>th</sup> edition.

1<sup>st</sup> VP Dale Partin gave upcoming presentation schedule: Monday December 6<sup>th</sup> at Cranbrook - Dale Thieme with his short presentation "Triumph and Tragedy in Three Parts", followed by the main presentation - a panel discussion moderated by Bob Trembley - "Anti-Science Sentiment in the U.S.". At the December 9<sup>th</sup> Banquet our featured presentation will be by Adrian Bradley with "Pictures in the Sky".

2<sup>nd</sup> VP Riyad Matti reported on the October 23<sup>rd</sup> Open House at Stargate - the next Open House will be Saturday, November 27<sup>th</sup>.

Secretary Mark Kedzior reported on the November 10<sup>th</sup> event at the Warren Library - 45 children and 30 adults in attendance - and the November 11<sup>th</sup> Ferndale Library Telescope Program Launch - 10 adults and 8 children in attendance.

Treasurer Adrian Bradley reported the account balances of the WAS, GLAAC and PayPal accounts (report found in November WASP), and encouraged membership to renew their dues along with the Astronomical League dues by 1/22/2022.

The Outreach report is in the November issue of the WASP (Bob Trembley absent due to illness).

Publications Chair Dale Thieme reports the December issue of the WASP is in the production stages

- calendar submissions are due no later than November 20<sup>th</sup>.

### SPECIAL INTEREST GROUPS:

Solar - Spots on the sun (Ken Bertin held up his trusty iPad to show recent sunspot images for members in attendance).

Astrophotography - Adrian Bradley submitted images to RASC for award consideration - also reported on the 75<sup>th</sup> anniversary celebration of the Astronomical League, along with a reminder to send in your \$7.50 dues for membership to that organization along with your 2022 WAS dues.

History - Dale Thieme reports more Detroit Astronomical Society newsletters have been scanned and posted on the WAS website (from the Kim Dyer Collection) and is still continuing to scan newsletters and post from this collection.

### OBSERVING REPORTS:

David Levy reports he will be observing the lunar eclipse from Tucson - read poem by Thomas Hardy on his impression of a lunar eclipse. Adrian Bradley shared 1<sup>st</sup> quarter image of moon with both the Lunar X and Lunar V formations.

### MAIN PRESENTATION:

1<sup>st</sup> VP Dr. Dale Partin introduced John Pannuto and Tom Croskey (with bios) on their presentation "Selecting Targets for This Season's Viewing or Imaging (Useful Hints for Newbies and for Experienced Viewers Too!).

Their presentation outline discussed these four topics in detail: 1) Typical experiences of someone getting into the hobby - 2) Understanding your equipment and its true field of view - 3) Software to help plan your observing sessions - 4) A seasonal approach to planning your observations. As in their title of their presentation, there were many useful hints for both newbies and experienced viewers to help further enhance their viewing experience at the eyepiece of their favorite telescope.

Questions and discussion followed their excellent presentation.

To see this presentation in its entirety, please go to:

<https://www.youtube.com/warrenastro>

The meeting ended at 9:24 PM.

Respectfully submitted,  
Mark Kedzior  
Secretary

# The Warren Astronomical Society is a Proud Member of the Great Lakes Association of Astronomy Clubs (GLAAC)

GLAAC is an association of amateur astronomy clubs in Southeastern Michigan who have banded together to provide enjoyable, family-oriented activities that focus on astronomy and space sciences.

## GLAAC Club and Society Meeting Times

Club Name & Website	City	Meeting Times
<a href="#">Astronomy Club at Eastern Michigan University</a>	Ypsilanti/EMU	Every Thursday at 7:30PM in 402 Sherzer
Capital Area Astronomy Club	MSU/Abrams Planetarium	First Wednesday of each month 7:30 PM
<a href="#">Farmington Community Stargazers</a>	Farmington Hills	Members: Last Tuesday of the month Public observing: 2nd Tuesday of the month
<a href="#">Ford Amateur Astronomy Club</a>	Dearborn	Fourth Thursday of every month (except November and December) at 7:00 PM
<a href="#">McMath-Hulbert Astronomy Society</a>	Lake Angelus	Board and paid members-First Sunday of the month Public open house—first Saturday at 11 am
<a href="#">Oakland Astronomy Club</a>	Rochester	Second Sunday of every month (except May)
<a href="#">Seven Ponds Astronomy Club</a>	Dryden	Monthly: generally the Saturday closest to new Moon
<a href="#">Sunset Astronomical Society</a>	Bay City/Delta College Planetarium	Second Friday of every month
<a href="#">University Lowbrow Astronomers</a>	Ann Arbor	Third Friday of every month
<a href="#">Warren Astronomical Society</a>	Bloomfield Hills/ Cranbrook & Warren/ MCC	First Monday & third Thursday of every month 7:30 PM

## GLAAC Club and Society Newsletters

Warren Astronomical Society:	<a href="http://www.warrenastro.org/was/newsletter/">http://www.warrenastro.org/was/newsletter/</a>
Oakland Astronomy Club:	<a href="http://oaklandastronomy.net/">http://oaklandastronomy.net/</a>
McMath-Hulbert Astronomy Club	<a href="http://www.mcmathhulbert.org/solar/newsletter/">http://www.mcmathhulbert.org/solar/newsletter/</a>
Ford Amateur Astronomy Club:	<a href="http://www.fordastronomyclub.com/starstuff/index.html">http://www.fordastronomyclub.com/starstuff/index.html</a>
Sunset Astronomical Society:	<a href="http://www.sunsetastronomicalsociety.com/">http://www.sunsetastronomicalsociety.com/</a>
University Lowbrow Astronomers:	<a href="http://www.umich.edu/~lowbrows/reflections/">http://www.umich.edu/~lowbrows/reflections/</a>

## WAS Member Websites

Jon Blum: [Astronomy at JonRosie](#)  
 Bill Beers: [Sirius Astro Products](#)  
 Jeff MacLeod: [A Life Of Entropy](#)

Bob Trembley: [Balrog's Lair](#)  
 Bob Trembley: [Vatican Observatory Foundation Blog](#)

Doug Bock: <https://boonhill.org>  
 Facebook: Northern Cross Observatory <https://www.facebook.com/NorthernCrossObservatory>  
 Boon Hill and NCO Discussion <https://www.facebook.com/groups/369811479741758>  
 YouTube channel: <https://www.youtube.com/channel/UC-gG8v41t39oc-bL0tGpS6w>





This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more!

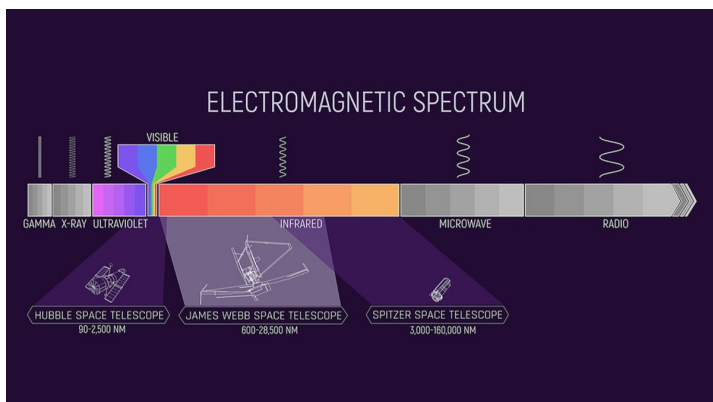
## The James Webb Space Telescope: Ready for Launch!

David Prosper

NASA's James Webb Space Telescope is ready for lift-off! As of this writing (November 15), the much-anticipated next-generation space telescope is being carefully prepared for launch on December 18, 2021, and will begin its mission to investigate some of the deepest mysteries of our universe.

The development of the Webb began earlier than you might expect - the concept that would develop into Webb was proposed even before the launch of the Hubble in the late 1980s! Since then, its design underwent many refinements, and the telescope experienced a series of delays during construction and testing. While frustrating, the team needs to ensure that this extremely complex and advanced scientific instrument is successfully launched and deployed. The Webb team can't take any chances; unlike the Hubble, orbiting at an astronaut-serviceable 340 miles (347 km) above Earth, the Webb will orbit about one million miles away (or 1.6 million km), at Lagrange Point 2. Lagrange Points are special positions where the gravitational influence between two different bodies, like the Sun and Earth, "balance out," allowing objects like space telescopes to be placed into stable long-term orbits, requiring only minor adjustments - saving Webb a good deal of fuel.

Since this position is also several times further than the Moon, Webb's sunshield will safely cover the Moon, Earth, and Sun and block any potential interfer-



Above: Webb will observe a wide band of the infrared spectrum, including parts observed by the Hubble - which also observes in a bit of ultraviolet light as well as visible - and the recently retired Spitzer Space Telescope. Webb will even observe parts of the infrared spectrum not seen by either of these missions! Credits: NASA and J. Olmstead (STScI)

Right: Webb will follow up on many of Hubble's observations and continue its mission to study the most distant galaxies and stars it can - and as you can see in this comparison, its mirror and orbit are both huge in comparison, in order to continue these studies in an even deeper fashion! Credits: NASA, J. Olmsted (STScI)

ence from their own infrared radiation. Even the seemingly small amount of heat from the surfaces of the Earth and Moon would interfere with Webb's extraordinarily sensitive infrared observations of our universe if left unblocked. More detailed information about Webb's orbit can be found at [bit.ly/webborbitinfo](https://bit.ly/webborbitinfo), and a video showing its movement at [bit.ly/webborbitvideo](https://bit.ly/webborbitvideo).

Once in its final position, its sunshield and mirror fully deployed and instruments checked out, Webb will begin observing! Webb's 21-foot segmented mirror will be trained on targets as fine and varied as planets, moons, and distant objects in our outer Solar System, active centers of galaxies, and some of the most distant stars and galaxies in our universe: objects that may be some of the first luminous objects formed after the Big Bang! Webb will join with other observatories to study black holes - including the one lurking in the center of our galaxy, and will study solar systems around other stars, including planetary atmospheres, to investigate their potential for hosting life.

Wondering how Webb's infrared observations can reveal what visible light cannot? The "Universe in a Different Light" Night Sky Network activity can help - find it at [bit.ly/different-light-nsn](https://bit.ly/different-light-nsn). Find the latest news from NASA and Webb team as it begins its mission by following #UnfoldTheUniverse on social media, and on the web at [nasa.gov/webb](https://nasa.gov/webb).

