

STARLIGHT JOURNAL

OCTOBER 2024



The **Iris Nebula** (NGC 7023) captured by DMAS members Heather Johnson and Shawn Gehlsen. This image was taken with a Sony A7III camera and a 600mm lens.

This magnificent blue reflection nebula is located in the constellation Cepheus. This is a very difficult target to acquire and process. Compliments to Heather and Shawn for this stunning image!

If you are viewing the Starlight Journal on your cell phone, it would be worth switching to a larger screen device in order to see the wonderful details of this image.

SAVE THESE DATES NOW!

October 5 - **Member Meeting** at Ashton 6:30 p.m. followed by stargazing

October 3 – 6 - **Iowa Star party** at Whiterock Conservancy

October 12 – Program at Ashton **“Protecting the Night Sky”** by JR Paulson (see our Facebook page)

October 12 – **National Astronomy Day**

October 26 – Program at Ashton **“Was Someone Eclipsed”** by Derryl Barr (see our Facebook Page)

October 2024 – President's Report



Discussions are continuing about management and future planning for our Timberline property. The District Forester has prepared an outline of estimated costs and benefits of implementing a stewardship plan and the members have authorized it. The Board is now working with the District Forester to implement the first step of selective tree harvesting.



The family of Larry and Alice Musselman has donated the telescopes and astronomical equipment from the estate to DMAS. We thank them for this generous donation. We will be doing an inventory and making a determination as to how this equipment can be utilized.

There has been progress on the Radio Telescope project. See Vern's reports in this newsletter to learn more. Thanks to Vern and the Team for this work.

There are some exciting viewing possibilities in the near future. We are monitoring the "Blaze" star in anticipation of its Nova. Greg has noted that the Astronomical League has announced an observing award around this event. If you are interested, check with him for more details.

Comet C/2023 A3 (Tsuchinshan-ATLAS) is currently visible in the Morning sky and will soon transition into the evening sky. See JoAnn's report for more details. The Orionid Meteor shower is in progress through November 22 and will peak on October 21.

Many guests have been interested in viewing the sky through our telescopes in the domes and under the sky outdoors. We have been a bit short on members to act as hosts to greet these guests, answer questions and offer assistance in getting access to the domes, displays, other equipment, and signing the guest book. Please consider volunteering for this important work. Let me know if you are willing to help.

The Globe at Night; (<https://globeatnight.org/campaigns/>) Constellations featured are Cygnus and Pegasus, October 24 – November 2, 2024. Find a viewing site and give it a try!

- Norm

Observatory Committee Report October 2024 Greg Woolever, Observatory Director

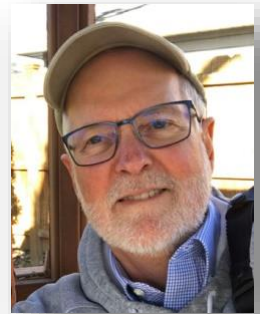
If I was asked to describe September at Ashton, I'd say it was steady and undramatic. Events continued as planned – two talks per month for example. Sometimes the skies were good for gazing, sometimes not so good, but visitors came anyway. On one Saturday of utterly hopeless skies we still had a father and daughter come over from tent camping in the park. We shared our knowledge and passion, and they got an entertaining and memorable event – and a plan to return when the weather was better.

Of course Mother Nature provided Fall Equinox, and dramatically changing sunrise/sunset times. The days are rapidly getting shorter.

We had no private groups in September, but five are scheduled for October.

Maintenance continued in the west dome. As reported previously, we installed new cables and transformer to operate the Argo Navis hand control. For two weeks, that resolved problems we were having. Then the next Saturday, the hand control would constantly reboot and lose any alignment that we had done. Five times we had to start over in order to use the navigation tools in Argo Navis. After guests had departed, Norm and I investigated. We found that

the housing that held the backup batteries was broken, preventing one battery from maintaining contact. And the socket for the power cable into the hand control seemed to lose power if it was jiggled the right (wrong) way. It was unclear if we could finesse needed repairs, and in any case the hand control would still be over 20 years used. We decided to order a replacement hand control. That was always a possible need, but we had opted for cables as a first step. In about two weeks we installed the new hand control and it does indeed eliminate the problems we had been seeing.



Finally, for those needing a warning, the annual Trail of Terror (aka The Ashton Chainsaw Massacre, a fundraiser for Baxter Fun Days) will occur in the Park October 18-19 & 25-26. 7:30-10:30 P.M.

Thanks - Greg Woolever & the Observatory Committee: Dave Heck, Norm Van Klompenburg, Jim VandeBerg, Greg Woolever.



**The Des Moines Astronomical Society
Monthly Members' Meeting
October 5, 2024 – 6:30 P.M.
Ashton Observatory**

- Call to order—Introductions
- Secretary's Report - Minutes
- Treasurer's Report: Financial Reports
- Observatory Director's Report
- Nominating Committee Report
- Timberline Report
- Donations: Surplus property discussion/action
- Committee Reports
 - Member Services/Ashton programs
 - Outreach/programs
 - Dark Skies
 - Electronically Assisted Astronomy
 - Radio Telescope
 - Other Business?
- Member Comments
- Adjourn
- Next Meeting Date: November 2, 2024

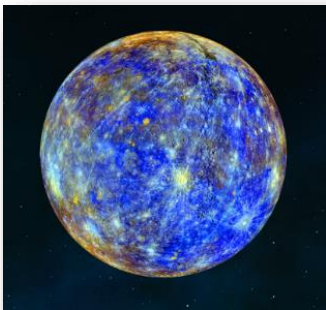
THE PLANETS FOR OCTOBER 2024



*By JoAnn
Cogil*



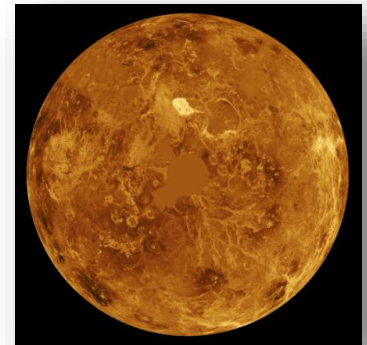
It is still possible to see the Zodiacal Lights
the first couple weeks of October!!! Look to the eastern sky about 2 hours before sunrise.



Mercury – on the 3rd, the Moon will be about 1.8° S-SW of the planet in the evening sky. But by mid-month Mercury will be lost in the Sun's glare as it sets quickly after sunset.

Venus – remains in the evening sky till March 2025. But as it sets this month almost 1 hour after sunset, we may get some great viewing opportunities of this beauty with its -3.9 magnitude. On the 14th, the Moon & Venus pair up nicely in the W-SW evening sky. Venus will be about 3° upper right of

the star Antares on the 25th, in the SW after sunset. Antares is a 1st magnitude star.



Earth – October brings colorful leaves falling to the ground, Happy Halloween and a GREAT month for night sky stargazing!!

Mars – rises after midnight this month with a magnitude of 0.5 & brightening to 0.1 at month's end. On the early morning of the 20th in the eastern sky, the red planet crosses a straight line we find running from Pollux to Procyon. Enjoy Mars about 4° south of the Moon on the 23rd.





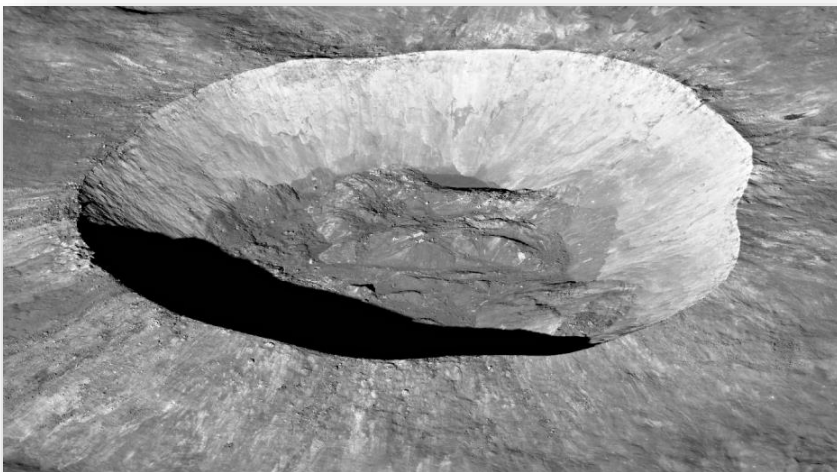
Jupiter – moves into retrograde (westward movement) by the 9th this month. Find the planet between the horns of Taurus with a magnitude of -2.5. Early morning provides the best viewing times. On the 19th, Jupiter follows the Moon as it trails after the Pleiades (M45).

Saturn – The planet is always a fan-favorite during public viewing on Saturday nights at Ashton! This beauty is still in its retrograde motion and is in the SE evening sky as it rises after sunset. It will be in the constellation Aquarius and the moons are quite active this month. On the 14th, the planet will be about $3\frac{1}{2}^\circ$ to the upper right of the Moon. Gotta love it with a magnitude of +0.7.



Uranus – Another planet in retrograde motion, found in Taurus. Uranus is about 6° SW of the Pleiades all month. It has a magnitude of 5.6 this month with the best viewing in the pre-dawn hours. So set you alarms, Rise & Shine for this one!!

Neptune – remains in Pisces with a magnitude of 7.8. It rises before sunset in the SE.



October Moon

2nd – **NEW** moon at 6:49 PM. The moon is at apogee this day at 252,587 miles from Earth, its most distant point of the year.

10th – 1st quarter moon

17th – **FULL** moon at 6:26 AM. It is at perigee at 221,954 miles and is a SuperMoon!!

24th – Last quarter moon

October's moon is a Hunter's Moon, as we prepare for the coming winter. Also known as the Harvest Moon and Falling Leaves Moon.

Moon Facts

- A micromoon, also called a minimoon or apogee moon, is a new moon at apogee.
- A micromoon is when the moon's orbit is farthest away from Earth, at about 251,655 miles.
- A micromoon can be 12.5%-14% smaller than a (full) Supermoon. But it can be 5.9%-6.9% smaller than an average full moon.
- A supermoon is when the full Moon is closest to the Earth in its orbit & appears larger than usual.

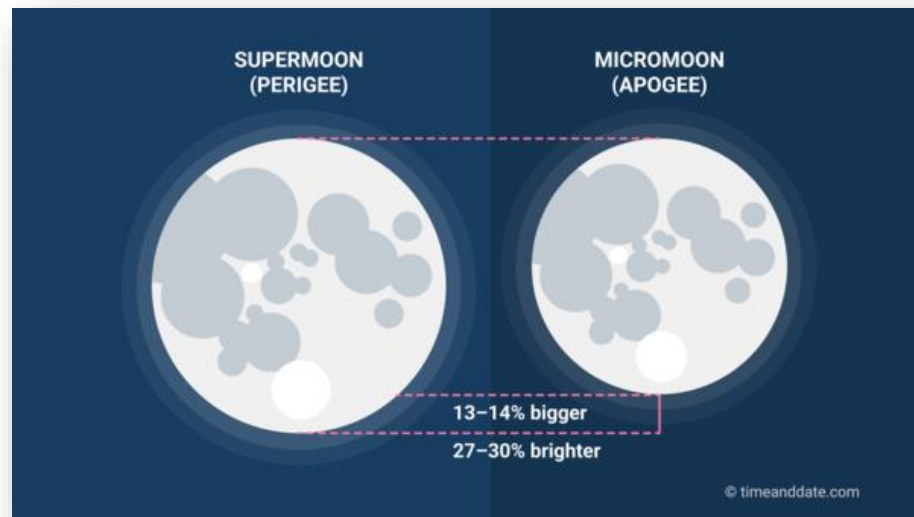


Image courtesy of timeanddate.com

Comet C/2023 Tsuchinshan-ATLAS

- Keep your fingers crossed that the comet survived it's close run by the Sun
- 1st week of October it will be low in the E-SE sky before sunrise
- By the 11th, it moves to the evening dusk sky and is low in the western sky
- It will climb about 5° higher each day
- It will have its closest approach to Earth on the 12th at 43.9 million miles
- On the 13th-14th, it may be 20°-25° NW of Venus
- Binoculars may be your best equipment for viewing the comet
- Be ready to peek each night for a possible view of the comet

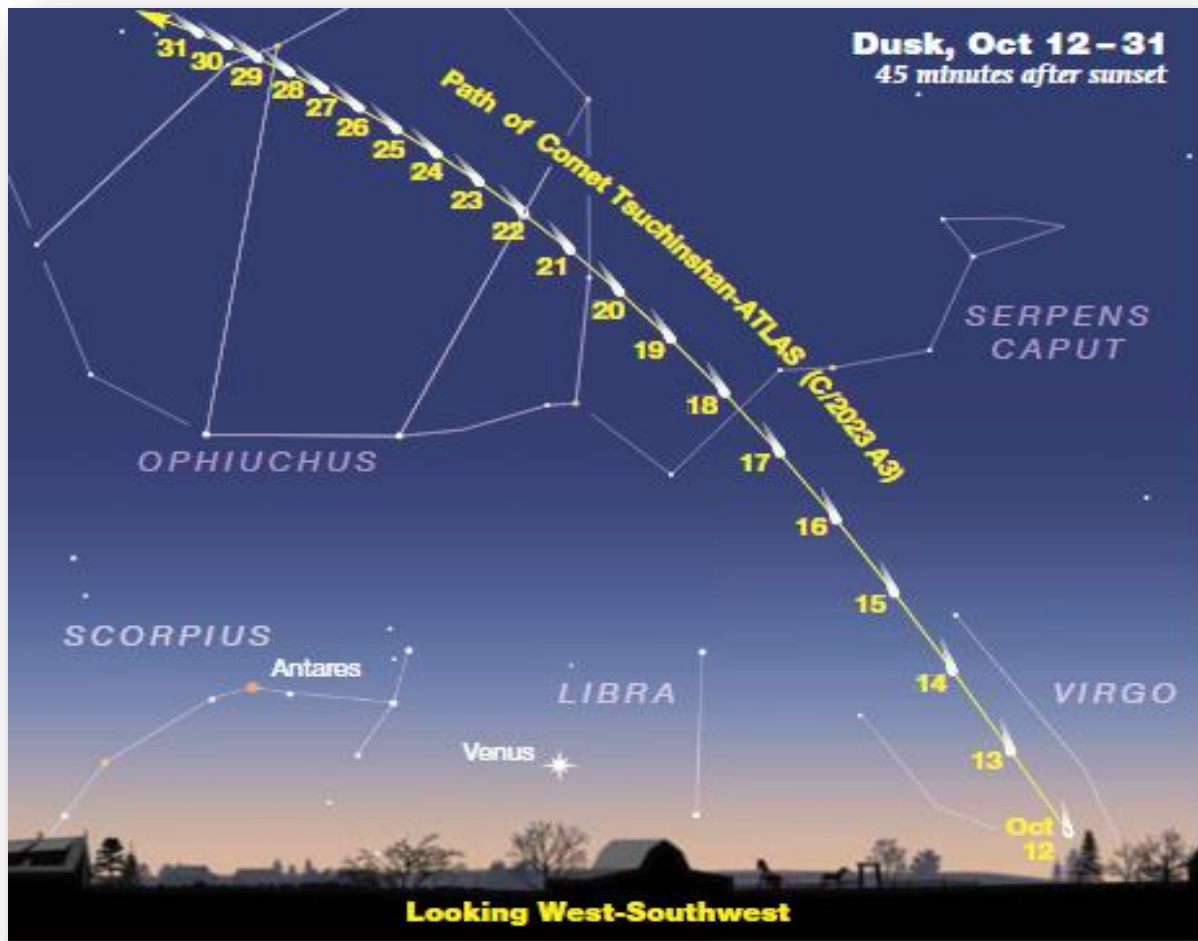
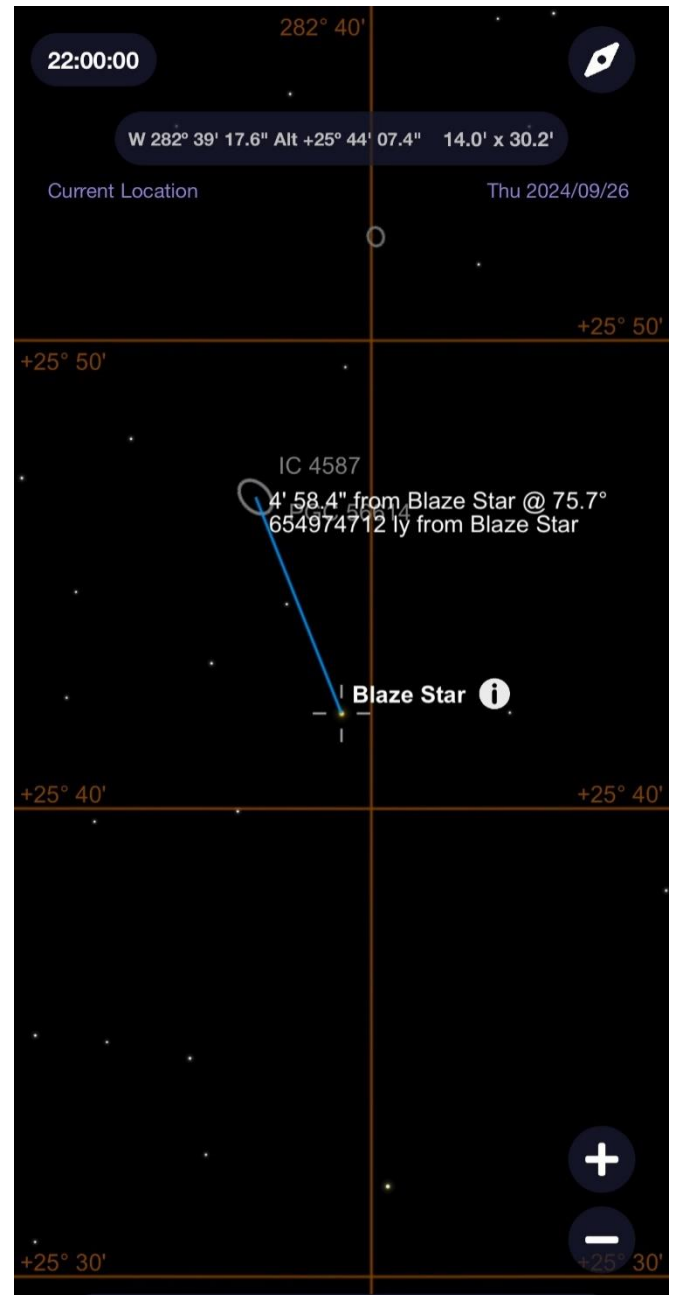


Image courtesy Sky and Telescope

Orionid Meteor Shower

- Is active from October 2nd through November 7th, reaching its peak on October 21st
- 20 meteors per hour is possible
- Is from the remnants of the Halley's Comet
- Moon may impact viewing though as it is between Full and last quarter phases

Preparing for the Blaze Star (T CrB)



The left image (by Greg Woolever) is the current “Before” image of the sky where the Blaze Star (T CrB) is expected to brighten soon. The right image (by Greg, from SkySafari) shows the Blaze Star’s location relative to IC 4587. By centering your telescope on IC 4587, you will be able to capture the Blaze Star in the same field of view. Many thanks to our Observatory Director, Greg Woolever, for preparing us for this astonishing event.



Drake Municipal Observatory

October 4 – Building a Solar System

October 11 – Building a Solar System Part 2

October 18 = Maria Mitchel: American Astronomer

October 26 – Cassini Mission: Everything You Ever Wanted to Know about

Saturn

November 2 – What Time is It?

November 9 – Topic TBD

Drake visitors can expect an Astronomy lesson followed by stargazing with expert guidance. **Lectures begin at 8 PM**, regardless of weather. **Sky Viewing begins at dark if clear conditions.** Children 15 and younger must be accompanied by an adult. **Admission is free and open to all!**

DES MOINES ASTRONOMICAL SOCIETY
PLEASE WELCOME THESE NEW MEMBERS!

January - Kyle and Catherine Bailey

January - Karen Tegtmeyer

March – Rod Williams

April – Paul Caligiuri

April – Jason Hirsch

June – Patrick McIntyre

July – Wade Johnson

July – Kerry & Philip Eganhouse

July – Patrick McIntyre

August – Nick Frisch

September – Stephen Sherrod

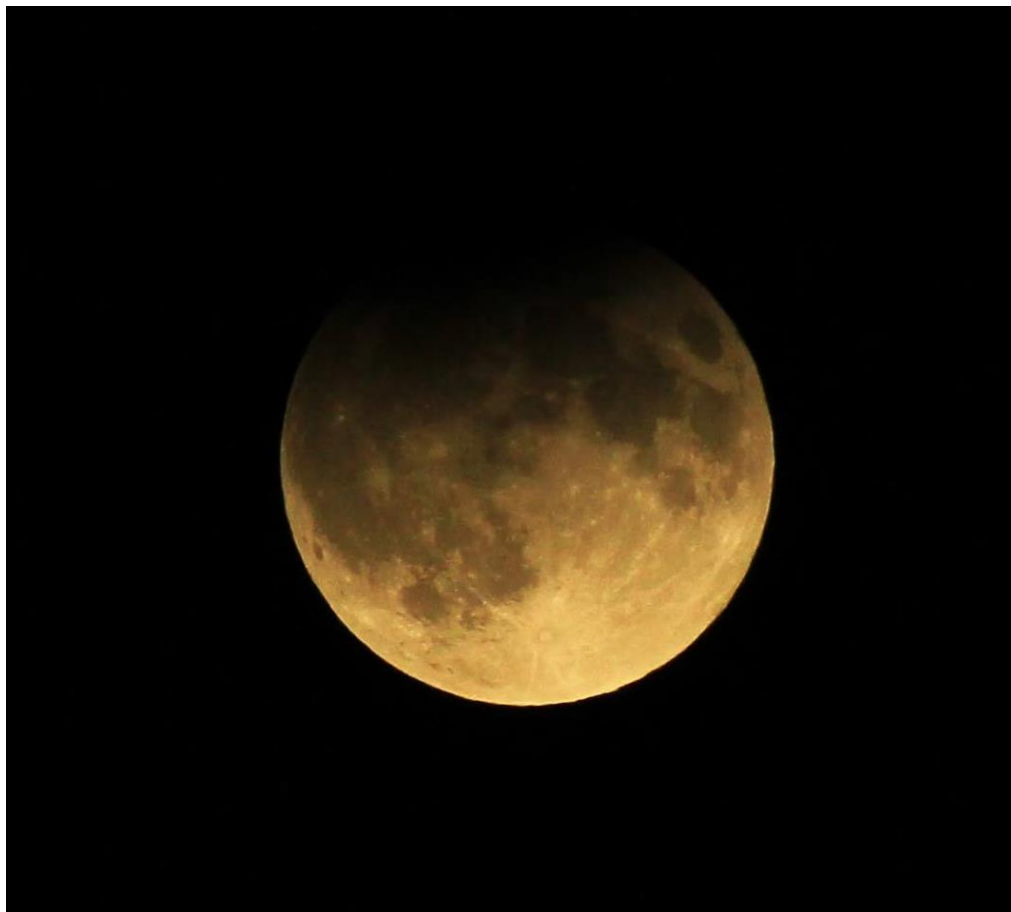
September – Dean Regas (Honorary Member)

The Des Moines Astronomical Society is on Facebook

Recent notices, articles and images are posted on our Facebook page. Be sure to like us when you visit our DMAS Facebook page.



These are some shots that I got last night of the partial lunar eclipse of September 17, 2024, from Des Moines, Iowa. These were taken through a 500 mm lens at F/8 with various exposures settings. - L. Allen Beers



Another image of the partial lunar eclipse on September 17, 2024 by Norm Van Klompenburg. Settings for this photo were ISO 400, F/10 and 1/1,000 seconds

This Month in DMAS History

From the StarLight Journal 25 Years Ago, October 1999

DMAS is investigating the possibility of expanding Ashton Observatory by adding a 30'x30' extension on the north side of the present building.

Estimates for Expansion ...

Brick work and foundation - \$9,105.00 from Henry Jensen, original contractor - includes time and materials.

Completion of building from J. L. Miller Construction Company, by David O'Neal, Des Moines, Iowa - \$37,580.00.

This is a rough estimate, cost could go over by 10-20%. Heating and Cooling - \$2,500.00. Total Estimated Cost: \$49,185.00.

The estimate does not include furniture and audio/visual equipment costs. Funds in the amount of \$60,000.00 would need to be raised to ensure the success of this project.

The board has already approved for the DMAS to begin fund raising for the project, and this effort is beginning.

The building expansion would provide Mark [Wagoner] and John [Parson] {both of Jasper County Conservation} an opportunity to expand their current nature programs at the observatory. The memorial trees located to the north of the present facility would be relocated.

The DMAS would like to know what percentage of participation can be expect from Jasper County, perhaps 50%?

Mark Wagoner commented that all schools in Jasper County use the facility in the spring. A new classroom could be closed while public programs are being presented and the old classroom would become storage and a work area. At the present time there is a lack of work and storage space at the observatory.

Jasper County board members wanted to know where our public attendance came from? Mark Wagoner showed the DMAS guest book register and reported people attend from a wide area of central Iowa.

The Jasper County Conservation Board approved the expansion project and began a discussion on where the funding for the project would come from. Dennis Black suggested he check into the REAP Grant Program through the state; the program can only be initiated by the county and would pay 75% of the total project cost, Jasper County and DMAS would be responsible for 25% -- divided evenly, or 12.5% each. Dennis will check into this possibility and place it on the agenda for the October Jasper County Conservation Board Meeting.

From the StarLight Journal 10 Years Ago, October 2014

RADIO TELESCOPE TEAM AT WORK

The DMAS team working on our Radio Telescope project have been busy. Vern has been ordering discrete electronic parts for two scopes. In late August a neighbor of Vern Naffier heard of the project and donated a complete small used dish antenna useful for the first radio project the team has in mind. Dave Lynch transported it to Ashton where the team will adapt it for use in getting signals from the Sun and Jupiter and more. When member Paul McCuen heard of the project he offered a used antenna for the larger outdoor antenna. This antenna is eight feet in diameter with a tracking motor and mounted on a pedestal that will be set in a four ft. deep concrete footing. The large dish was checked out by Paul and Norm Van Klompenburg. On September 15th a team consisting of Norm, Marvin Woods, Paul McCuen and Wayne Christy dismantled the large dish and transported it in Wayne's trailer to Ashton where it is being stored in an Ashton Park storage shed cared for by Park Officer Jerry Ratliff. Work on assembling the scopes will continue through the winter. Thanks to all supporting this project.



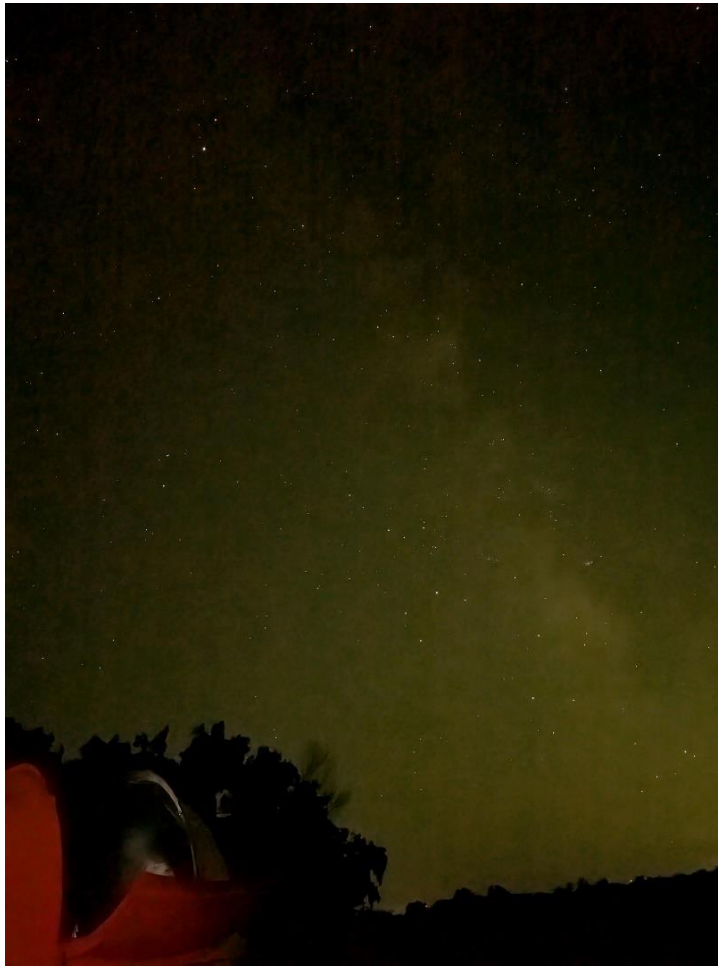
Norm, Paul, Wayne and Marvin have dismantled the dish using DMAS's trailer to haul it to Ashton.

CCD Astrophotography

The revolution in astro-imaging.
Or... how to stress your marriage
and get deeper in debt.



On September 14, JR Paulson presented an interesting and comprehensive program on CCD
Astrophotography





Last night I tried out the night sky photo feature on my Google Pixel 8a Smartphone, at the Ashton Observatory with some great success.

It was a great night last night for observing and photography and camping. The planet Saturn ring system was nearly edge on to our viewing perspective. Very cool. Had a large number of visitors there, some first timers too. They were all impressed with their telescopic views and of the observatory in general. They were all invited back to our lectures in the coming months. A very enthusiastic group indeed. We tried to impress them with our knowledge of the universe and our modern observatory.

L. Allen Beers

Hello sky-watchers.

The end of August and early September is turning out to be great with clear skies and longer nights. This month's images are a neat nebula and another image of our satellite, the Moon. As you will read, the Crescent Nebula is powered by a rare giant star which is burning through its life with great rapidity, in astronomical terms that is.

The Moon is always fun and fascinating to look at with its many features. However, last month I was able to image it with my big scope in very high definition. The tiff image is 275 MB. You have a much lower jpeg at 2.4 M. Nevertheless, if you zoom in on your viewer, I think you will be impressed with the extreme detail. It's like orbiting around the Moon in a spaceship.

You can see the fine detail of the scattered debris from the impact during its formation. Look around at other features. Some, like the Mare, can be seen with the naked eye, others with binoculars or a small telescope. - Clear skies, JR Paulson



Image by DMAS member JR Paulson

Crescent Nebula

The Crescent Nebula, (NGC 6888, Caldwell 27, Sharpless 105) is an emission nebula in the constellation Cygnus, about 5000 light-years away from Earth. It was discovered by William Herschel in 1792. It is formed by

the fast stellar wind from a Wolf-Rayet star. This colossal star is unleashing a powerful stellar wind of charged particles from its surface, which is tearing apart the shell of surrounding material that the star blew off 250,000 years ago when it became a red giant.

With a magnitude of 8.8, the Crescent Nebula is not visible to the naked eye — but if it were, it would appear in the sky as an ellipse one-quarter the size of the full moon. In the future, the nebula's shell may become compressed and begin glowing again, this time as a powerful blast wave moves outward from the Wolf-Rayet star when it completely destroys itself in a supernova explosion.

This image was taken with narrow band filters which shows the energized hydrogen gases in red, and oxygen as teal. Only a few other nebulae have these unusual, very rare, extremely hot Wolf-Rayet stars at their cores. They are the Bubble Nebula and Thor's Helmet. This close-up of the nebula reveals with clarity that the shell of matter is a network of filaments and dense knots, all enshrouded in a thin "skin" of gas (seen in teal). Evaluation of this structure allows scientists to probe the intricate details of the complex system. Such details are crucial to understanding the life cycle of stars and their impact on the evolution of our galaxy. — JR Paulson



Copernicus

Situated prominently on the expanse of Oceanus Procellarum is the impressive and instructive crater Copernicus. This impact crater, near the center of the lunar disk, is one of the youngest craters on the Moon. It was formed by the impact of an asteroid 800 million years ago. This impact sprayed rays of

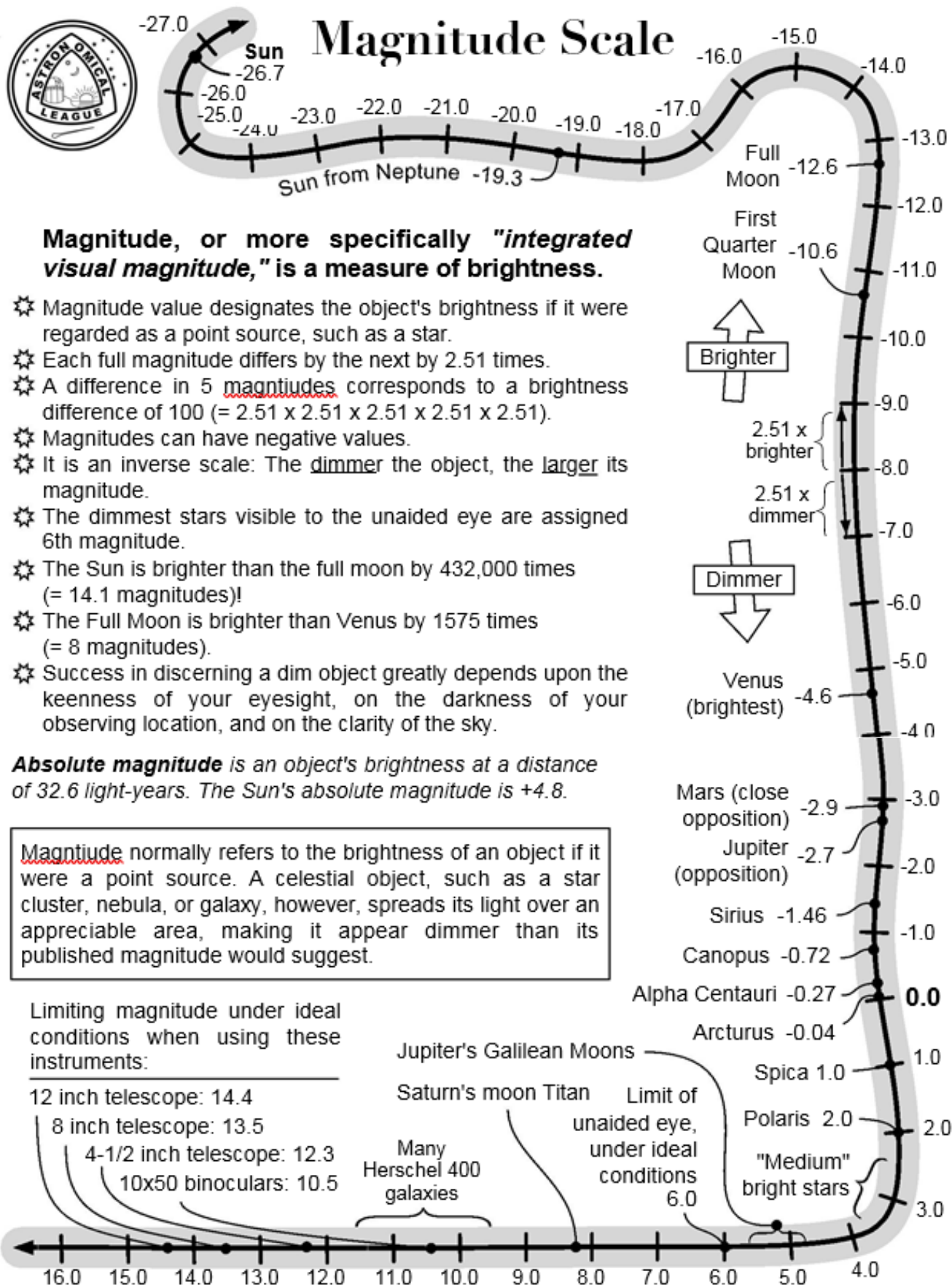
debris out from the crater which exposed the light-colored rock under the darker surface regoliths. Apollo astronauts brought back samples of this ejection blanket, giving us a firm dating of this crater. Most cratering of the Moon occurred very early in its life, with major impacting ending about 3 billion years ago. It has several high central peaks which were formed when the rock directly below the crater rebounded after being compressed by the impacting asteroid. Copernicus is also surrounded by a myriad of small craters and chains of craters made by ejected debris during the crater's formation. The crater has a diameter of 57 miles (91 km) and steep walls. Optimum observing is 2 days after first quarter or 1 day after last quarter.

On Saturday, September 28, Jim VandeBerg gave a classroom program called
"1896 - What we know about the Sky"

Through the eyes of astronomy professor Herbert A. Howe.

Below is a photo of the telescope and observatory that Howe built in Denver, Colorado.





UPDATE REPORT ON THE RADIO TELESCOPE September 24, 2024

To the Radio Telescope Work Team

During the first week of September, several days after the work team had met at Ashton to remount the reinforced feed horn, I went to Ashton to make a repair to the coaxial cable that delivers power to the preamplifiers in the feed horn. The F connector conjoining two lengths of cable had become severed. Part of the cable runs from the power supply at the RT consul inside the observatory through an underground channel to the site of the dish. At the dish the underground cable is connected to a short length of coaxial cable that feeds into the feed horn. I replaced the connector with a new one and reconnected the two coaxial lengths of cables. The power has been restored.

In addition, I installed two stand-off brackets to the dish pedestal to pull the PVC conduits that house cables away from the pedestal, allowing the pedestal to rotate. The conduits otherwise interfered with set bolts in the pedestal inhibiting rotation of the dish. I also installed a directional protractor to the pedestal to assist in pointing the dish. The protractor and pointer are set so that the 90 degree marking on the protractor points directly south. The pointer is aligned with the dish so that the pointer is positioned over the 90 degree mark when the dish is pointing due south. There is also an attachable altimeter to measure and set the elevation of the dish. Dave Lynch built an attachable bar to support a laser pointer and a cell phone loaded with a Stellarium app to aid in

targeting celestial areas which are sources of H1 radiation.

According to my written records, in 2022 I had turned the radio telescope on and found that every component of the system was working, but that I could not pick up an H1 signal. This summer I rechecked all components and connections and found them again to be in A-OK working order (except for the birds' nests that had to be cleaned out, baby birds and all, from the feed horn). Yesterday, Monday, September 23, 2024, late in the afternoon and early evening, I went to Ashton and turned on the RT system with the dish aimed 20 degrees above the local horizon and pointing due south. I ran the SDRuno software on the computer (which controls the SDR) for about a half-hour or more and was able to bring up a time-functioned spectrum on the computer screen, which displayed baseline noise but no H1 signal. I am not surprised that, again, I could not get a signal. In a separate report, titled "Where and When to Find H1 Sources" I will explain in some detail the mechanical structure of the dish mount and the pointing capability of the dish, which impinge on the ability of the dish antenna to pick up signals at any particular time. Spotting H1 sources will take practice and pre-planning, especially in the case of an antenna that is relatively fixed in orientation.

- Vern Naffier

WHERE AND WHEN TO FIND H1 RADIO SOURCES

By Vern Naffier 9/25/2024

Amateur radio telescopes are able to receive Hydrogen1 signals from some of the more powerful sources within the Milky Way Galaxy. The most powerful source is the center of our galaxy in the constellation of Sagittarius.

Finding these sources is facilitated by knowing in advance where they lie at any given time and then pointing the RT antenna in a given direction at a given time to target a given source. To do that introduces another important factor

in finding H1 sources; namely, the dish antenna. In order to locate as many H1 sources as desirable and to be able to conduct certain observations and experiments in radiotelescopy, it is important that the dish not only be sufficiently large to receive weak signals but also be as widely pointing as possible. With that in mind, let's take a closer look at the DMAS 8-foot diameter dish antenna.

The dish, which was gratuitously donated, was originally motorized to allow limited easy altitude adjustment. The dish could also be rotated to cover 360 degrees of azimuth. The feedhorn was designed for satellite dishes tuned to the L Band of around 14 GHz, which is incapable of receiving 1.42 GHz H1 signals. That feedhorn was removed and replaced with a homebuilt feedhorn (based on professional technology and kit components) capable of H1 reception. In addition, the motor was found to be inoperable and was subsequently removed rendering movement of the dish possible only by manual effort requiring use of a monkey wrench, all of which does not make altazimuth movement of the dish easy or quick. That circumstance leads to the following consideration of how much of the sky the DMAS dish is practicably capable of targeting.

In radiotelescopy it is not necessary to be able to optically see a target area, although an interesting activity is to corroborate optical and radiotelescopy in examining the same celestial object. An advantage of radiotelescopy is that observations can be made during daylight hours and on cloudy nights. Radio waves are not blocked under those conditions. Of course, it is easier to target an H1 source if you can see the area in which it is located and using a laser pointer or cell phone app point the dish to that area. So, to begin with, if we want to point the RT dish to a visible part of the sky, at the Ashton Observatory we have available to us an observable portion of the sky that lies between approximately 50 degrees east of due south and 10 degrees west of due south. On either side of those borders the view of the sky is blocked

by trees, and the observatory blocks the view of the sky from the rear of the dish, keeping in mind that the highest elevation of the dish is only about 20 degrees. Fortunately, the "brightest" H1 source – Sagittarius – passes through that window in September and October after sunset. Trying to pick up H1 signals from Sagittarius during this period of time will show whether or not the system is working.

In any case, it is interesting to see just how much of the sky the DMAS dish is capable of covering. We start with the beam width of the DMAS dish, which is about 6 degrees. A circle with an angular diameter of 6 degrees, when projected onto the semi-spherical dome of the sky, covers a tiny 0.17% of square angular area of the sky. If the dish is fixed in position, then the chance that an H1 source at any particular moment might be located in or pass through that miniscule area will be very low. If the RT is allowed to run for 24 sidereal hours in what is called a drift scan, the percentage of the sky that can be scanned in that period will amount to nearly 13%. If, next, we run the RT over a 36 hour drift scan period, raising the dish by 6 degrees after each once-around scan for a total altitude range of 18 degrees, the RT will have covered approximately 36% of the sky – the maximum amount possible by the DMAS dish. While that leaves almost two-thirds of the sky inaccessible to the dish, it is likely that the dish will be able to detect one or more H1 sources. But the observer at the computer will have to stay close to the computer for 36 continuous hours. Otherwise, the detection of sources will need to be saved and reviewed when the RT operator has time to do so. It would be much less time-consuming if the dish were able to be pointed quickly to any area of the sky. To a very limited extent and in cumbersome fashion the DMAS dish will be able to scan a portion of the sky, but it will require a certain amount of patience and persistence of effort. In conclusion, we are hoping to realize some positive results with our DMAS 1.42 GHz radio telescope and to advance in capability in the future.

- Vern Naffier

Your Des Moines Astronomical Society Officers, Directors & Observatory Committee – 2024**President:** Norm Van Klompenburg**Vice-President:** JoAnn Cogil**Secretary/ALCor:** Jim VandeBerg**Treasurer:** Bruce Mumm**Observatory Director:** Greg Woolever**At Large Director:** Derryl Barr**At Large Director:** Jessica Weinreich**At Large Director:** Brennan Jontz**Observatory Committee:** Greg Woolever, Norm Van Klompenburg, Dave Heck, and Jim VandeBerg**Contact us at: info@DMastronomy.com**

The *Starlight Journal* is the monthly newsletter of the **Des Moines Astronomical Society, Inc.** P.O. Box 111, Des Moines Iowa 50301-0111. Our Observatory is located in Ashton Wildwood Park, 8717 West 122nd Street North. Founded in 1970, we are a non-profit, 501(c)(3) organization. Our website is DMastronomy.com. More information and photos can be found on our Facebook page.

Article Deadline: Before the 21st of the month, please send your articles, photos, sketches, poems, cartoons, and news to Jim VandeBerg (FinePineCabin@gmail.com). Articles may be edited to fit the allotted newsletter space. Copyrighted material must have permission from the copyright holder. Views and opinions expressed within submissions are that of the author and not necessarily those of the Des Moines Astronomical Society, Inc.

The Purpose of our Society

- Secure the pleasure and benefits of an association of persons interested in amateur astronomy
- Promote the science of astronomy
- Encourage and promote activities of an astronomical nature
- Foster observational, computational, technical, and creative skills in various fields of astronomy
- Pursue activities with other amateurs and professionals
- Educate the public

Des Moines Astronomical Society
P.O. Box 111
Des Moines, Iowa 50301-0111

