The Bays Mountain Astronomy Club Newsletter

February 2023

Kingsport, TN

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Cosmic Reflections

William Troxel - BMAC Chair

reetings and welcome back to my monthly letter. We had our annual club dinner in January. It was a very nice time with good food and conversation over the course of the evening. Very laid back. Members were very informative and shared many ideas to enhance our future meetings.

February marks the month on the calendar that I like to try to provide an open forum for us to do a review of some of the basic and very important maintenance of our scopes and all our equipment to get it ready for another year of viewing and enjoying the night skies. Your equipment means all of your scopes, including solar, night and binoculars. We're including all the different types because we all need to be refreshed about each of them. We will also be sharing all about the resources we have to help us. One part will be on how to plan for your time outside and what resources are available to prepare and locate your object. I want this to be a whole club program. There are many new members and it does not matter what skill level or how long you have been a member. So,

please come out and share your knowledge and tips with everyone. You just might hear a tip or trick that you've never heard or forgot about and it would nice to add another good tip to add to your manual. The conversation will start at 7p in the Planetarium.

During the business meeting, I want to address our annual picnic and future annual dinners. As the world has changed due to Covid, we must now review how we handle and plan these events for the club. I have said this many times and I must repeat it here and at the meeting. I am not the only member in this club. Please be a part of the conversation so that we can continue to offer enjoyable events!

Upcoming meetings are planned and are described in the calendar at the end of this newsletter.

Thank you again for your ideas and thoughts. I look forward to seeing each of you at the February 2023 meeting. Until then... Clear Skies!

BMAC Notes

BMACers Volunteer at Local School

For those BMACers that have gone through the Park's (City's) Volunteer Program, they get to participate in volunteering for unique events to share the night sky. One such example was the first ever star party for fifth graders at Washington Elementary held in January. Five members ran telescopes under a clear, winter sky. It was organized by one the teachers who wanted to share this experience with her students. About 200 students, parents and siblings all enjoyed the viewing and other activities. Night photo/video photography was a challenge, but you can see the report from WJHL **here**.

Registration is Open for TSP

The 43rd Texas Star Party will be from 10a May 14th, to 10a May 21, 2023 near Fort Davis, Texas!

Click on this **link** for registration and all the details.

Total Solar Eclipse 2023 in Northwestern Australia

small group, aiming for 10-20 people, is going to be avoiding the Exmouth crowds by chartering a couple of small port vessels from Dampier/Karratha to observe around 1 minute 04 seconds of totality at the Lowendal Islands.

Our big distinction setting us apart: unlike the surging Exmouth hordes crawling all over the tops of each other next to clogged roads, we're going to be placing highest emphasis on MOBILITY, right up through the last minutes before arrival of the lunar umbra.

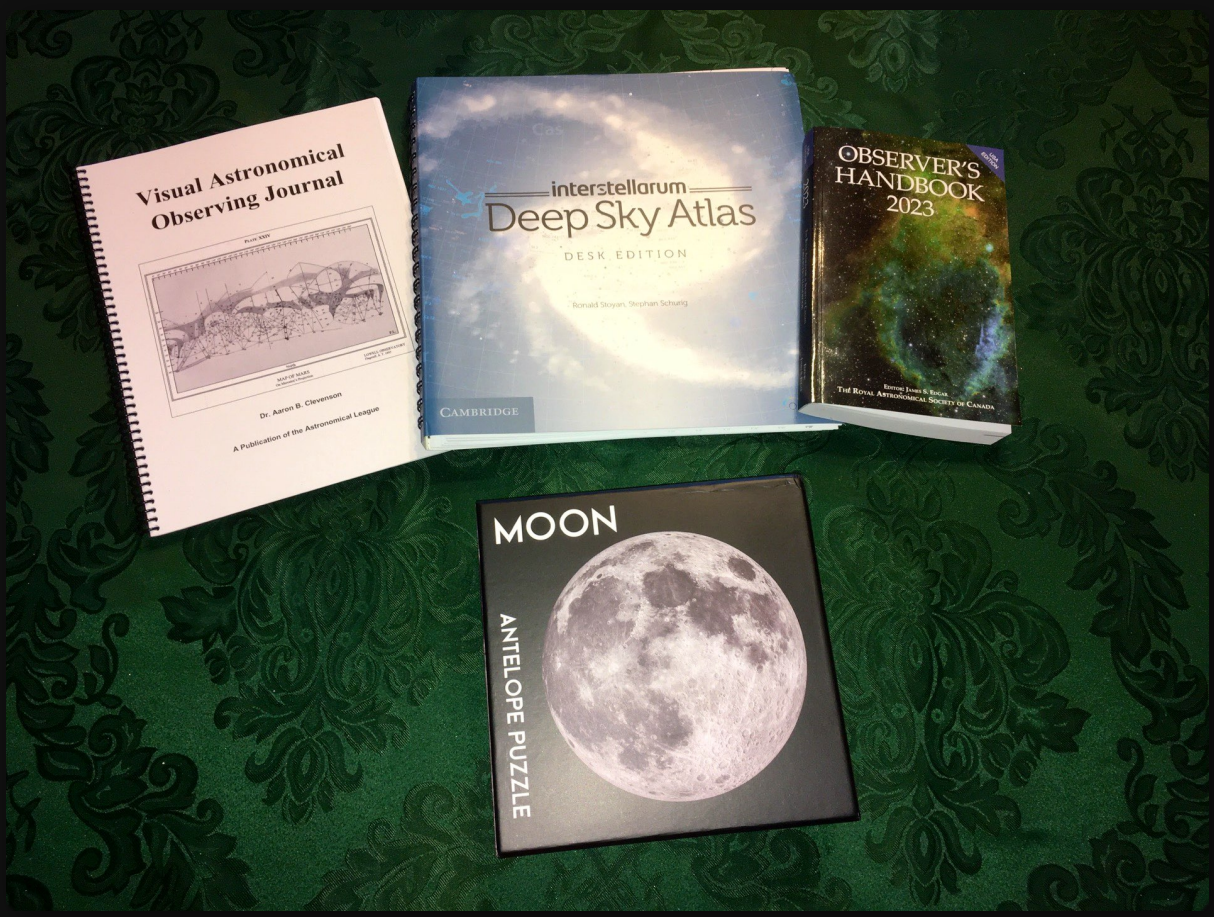
Click **here** for the agenda.

Stellar Observations

Greg Penner

Resources for the New Year

Most of us that have been bitten by the "astronomy bug" end up getting some new toys over the holidays. Often times our holiday toys are in the form of accessories for our telescopes or, dare we dream, new and improved telescopes! This year Santa brought me some items that are not super flashy but should be resources that will help me enjoy my time at the telescope a little more.

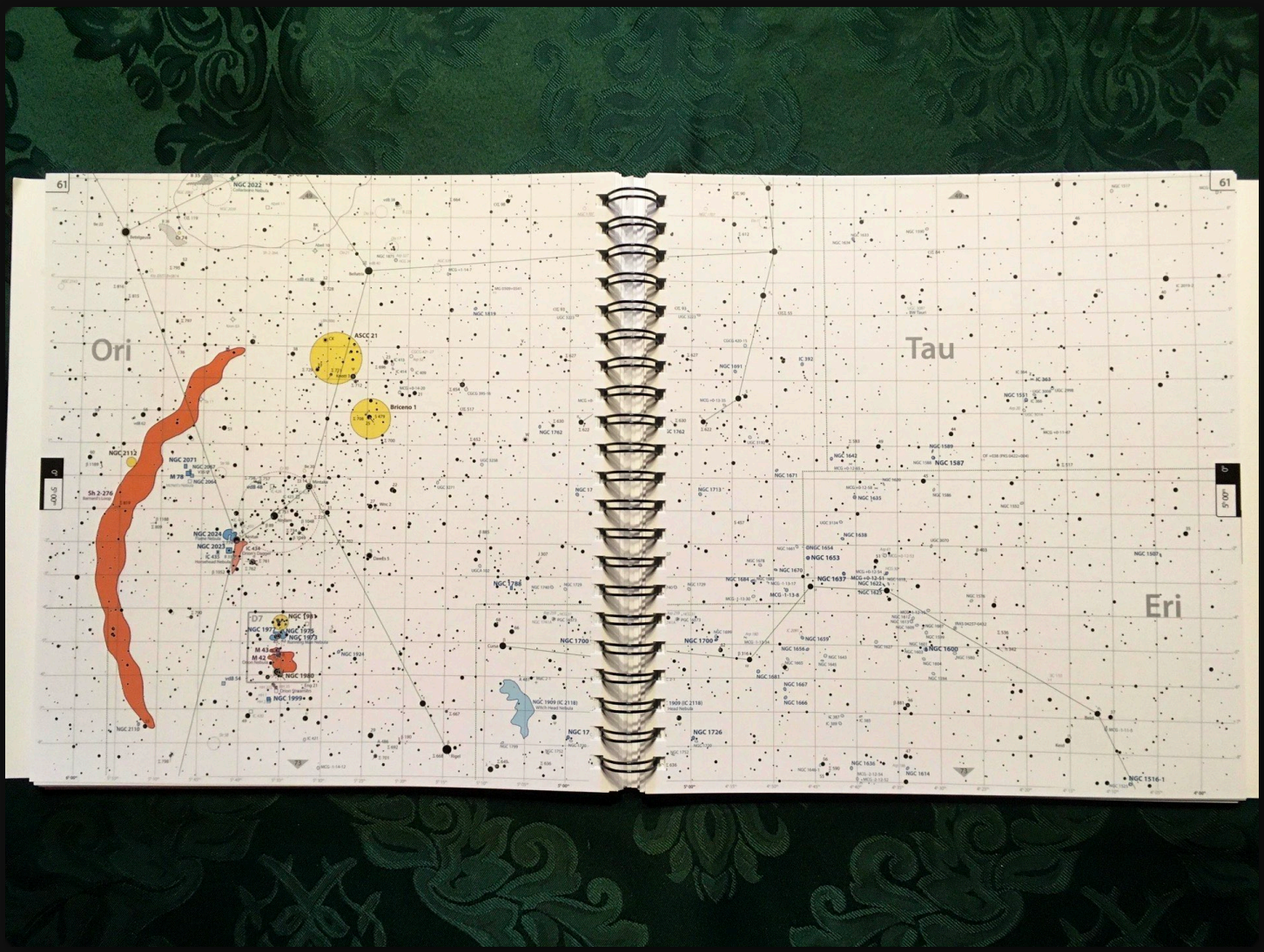


Observing resources I acquired over the holidays.

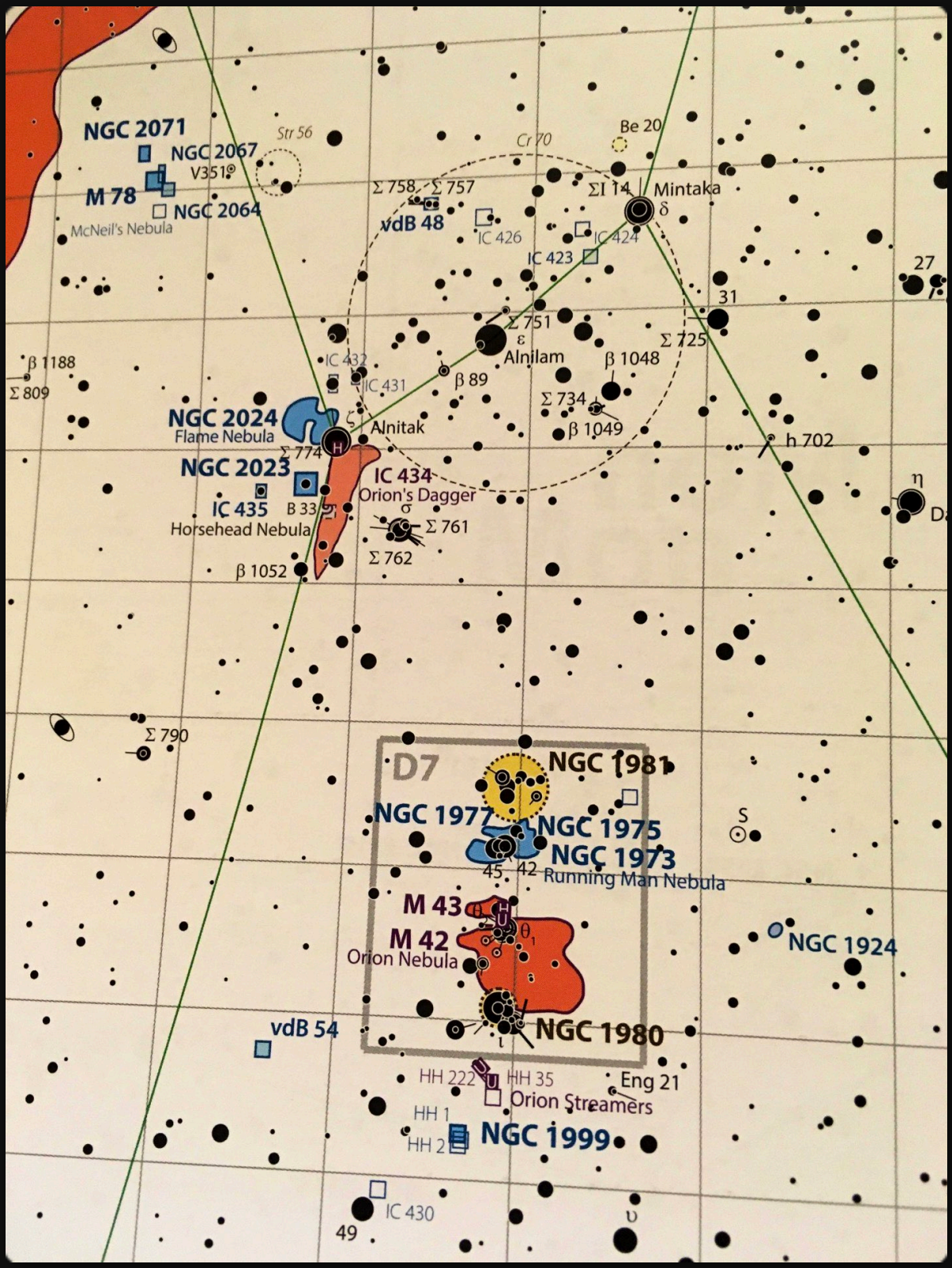
The first item is the Interstellarum Deep Sky Atlas (Desk Edition). I have always been a fan of maps. When planning a trip, my favorite thing to do is start charting a course on a map. So it follows that one of the things I enjoy the most about the astronomy hobby is utilizing "maps of the sky," otherwise known as star atlases, to plan an evening of stargazing. I already own a few atlases from simple constellation guides to the detailed two-volume Uranometria, but when I saw the Interstellarum Deep Sky Atlas and read about what sets it apart, I knew I had to have it. The special features of this atlas are; 1) object outlines according to their visual appearance, 2) deep sky objects identified according to visibility in various telescope sizes, 3) all deep sky objects visible in moderate to large telescopes, 4) printed in color, but fully usable at night, 5) nebula filter suggestions for various emission nebulae, 6) depicts double stars according to their separations, position angles, and magnitude differences, and 7) identifies stars with known exoplanets! The driving factor behind the creation of this atlas is to answer the question, "of the thousands of objects

shown in this atlas, which objects can actually be seen with this telescope?" The German makers of the atlas utilized amateurs to collect 18,000 observations of 5,000 objects over a period of 20 years. The results were used to create an algorithm-based software tool that calculates visual perceptibility of deep-sky objects. The atlas puts all deep-sky objects in three categories: objects visible in 4-inch telescopes, in 8-inch telescopes, and 12-inch telescopes under reasonably dark rural sky conditions. The three categories are identified by font size, outline strength, and color intensity. The user of the atlas should know at a glance if the object will be visible in their telescope or not. This is a thick and heavy atlas (thus, Desk Edition), so if you will use it at the telescope, you will want a table to set it on. It contains 114 double spread pages, each page being about 10" by 11". The limiting magnitude is 9.5 with about 200,000 stars shown. For areas of special interest, such as the Orion Nebula, detailed maps are provided with magnitude down to 11. This atlas has many details and features to be explored, and I look forward to putting it through its paces. I observe with a 3 1/2"

refractor and a 12.5" reflector, so I will be testing the visibility category feature of this atlas extensively! More information (including sample charts) can be found **here**.



Double-page spread from Interstellarum Atlas.

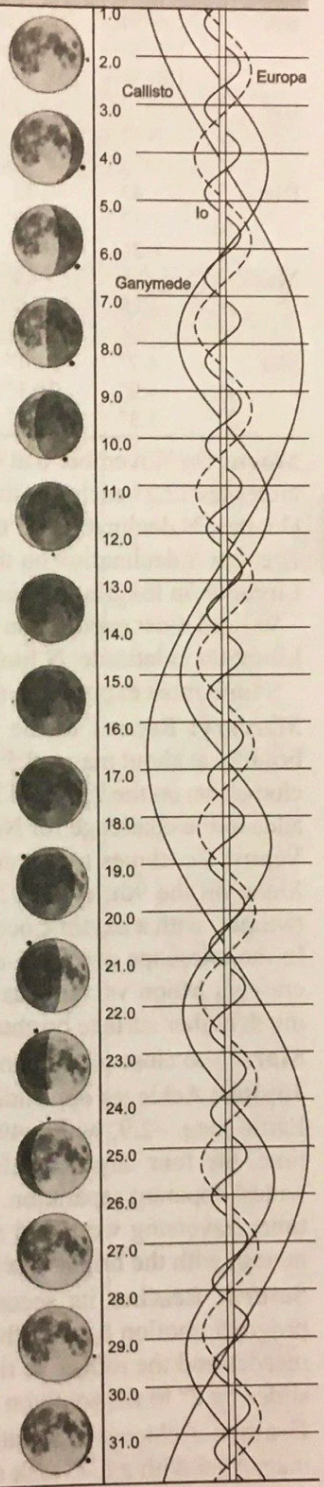


Close-up of Interstellarum Atlas showing accurately drawn nebula outlines, various fonts indicating telescope size visibility, notations recommending appropriate filters (U= UHC filter, H= Hydrogen Beta filter), star with ellipse drawn around it is confirmed exoplanet, star with line protruding is double star position angle.

My second new resource for the new year is the Royal Astronomical Society of Canada (RASC) Observer's Handbook for 2023 - USA Edition. The RASC Handbook has been published for over 100 years and is an excellent reference with sky data for any observer in North America. The two primary kinds of data provided in the handbook are: information on astronomical events that occur in the current year, and astronomical data and other reference information that does not vary from year to year. Information about the current year includes: rise and set times for Sun and Moon, eclipses, planet and bright asteroid locations, periodic comets, meteor showers, star occultations by the Moon/asteroids, orbital positions of the brighter moons for Jupiter and Saturn, and cycle information of many variable stars. The handbook also has a handy section called "The Sky Month by Month," which provides useful at-a-glance information on the Moon, planets, and conjunctions day to day for each month. The other type of information found in the handbook is what could be a real gold mine for amateur observers. Numerous articles are included covering such a wide

range of topics that will leave you feeling like you've taken an introductory course in astronomy. Topics such as "Principal Elements of the Solar System" and "The Electromagnetic Spectrum" are covered. A section on Optics and Observing provides much useful information regarding telescope optics and how to observe properly. Multiple sections cover stars, star clusters, nebulae and galaxies with suggested observing targets that will keep you busy at the telescope for years. I purchased the handbook via the Astronomical League store which can be found on the A.L. website. The next resource I acquired over the holiday season also came from the A.L. store.

Time (UT) d	h	m	OCTOBER EVENTS
Sun. 1	13	09	Algol at minimum
	16		Pallas in conjunction with the Sun
Mon. 2	3		**Jupiter 3° S of Moon**
	17		Uranus 3° S of Moon
Tue. 3			Mercury at greatest heliocentric lat. N
	5		**Moon 1.1° S of Pleiades (M45)**
Wed. 4	9	57	Algol at minimum
Thu. 5			
Fri. 6	13	48	**last quarter**
Sat. 7	6	46	Algol at minimum
	11		**Pollux 1.4° N of Moon**
Sun. 8			
Mon. 9			
Tue. 10	3	25	Algol at minimum
	4		Moon at apogee (405 425 km)
	5		**Venus 2° S of Regulus**
	10		Venus 6° S of Moon
Wed. 11			
Thu. 12			**Zodiacal light vis. in N lat. in E before morning twilight for next two weeks**
Fri. 13	0	24	Algol at minimum
Sat. 14	17	55	**new Moon (lunation 1247)**
			Annular Solar Eclipse (p. 131)
Sun. 15	1	11	Moon at descending node
	16		**Mars 1.0° N of Moon**
	21	13	Algol at minimum
Mon. 16			
Tue. 17			
Wed. 18	14		**Antares 0.8° S of Moon, occultation†**
	18	02	Algol at minimum
Thu. 19			
Fri. 20	5	57	**Double Shadows on Jupiter**
	6		Mercury in superior conjunction
Sat. 21	14	51	Algol at minimum
Sun. 22	0		Orionid meteors peak
	3	29	**first quarter**
Mon. 23	23		**Venus greatest elongation W (46°)**
Tue. 24	8		Saturn 3° N of Moon
	11	30	Algol at minimum
Wed. 25			Venus at ascending node
Thu. 26	1		Neptune 1.5° N of Moon
	3		Moon at perigee (364 872 km)
Fri. 27			Mercury at descending node
	8	29	Algol at minimum
Sat. 28	3	14	Moon at ascending node
	20	24	**full Moon**
			Partial Lunar Eclipse (p. 137)
Sun. 29	8		**Jupiter 3° S of Moon**
Mon. 30	2		Uranus 3° S of Moon
	5	18	Algol at minimum
	15		**Moon 1.1° S of Pleiades (M45)**
Tue. 31			



†Azores, E Canary Islands, most of Europe (except N Scandinavia), most of N Africa, most of Middle East

RASC Monthly event page.

THE FINEST NGC OBJECTS

BY ALAN DYER

Those looking for an observing project beyond THE MESSIER CATALOGUE turn to the New General Catalogue (NGC). The NGC contains 7840 entries and forms the core database of today's computerized backyard telescopes. To match THE MESSIER CATALOGUE, this list contains 110 of the finest NGC objects visible from mid-northern latitudes. The seasonal order is similar to that used in THE MESSIER CATALOGUE, and there is no overlap. While the brightness of the best NGCs rivals many Messier targets, at least a 200-mm telescope is required to see all 110 objects on this list. Most are easy; a few are challenging.

The NGC was originally published by J.L.E. Dreyer in 1888, a work that expanded upon Sir John Herschel's 1864 "General Catalogue." Supplementary "Index Catalogues" were published by Dreyer in 1895 and 1908. The first IC extends the NGC with another 1529 objects discovered visually between 1888 and 1894. Most are faint, elusive targets. (To provide a flavor of this extension to the NGC, one entry from the first IC is included on this list, IC 289.) The Second Index Catalogue contains 3857 entries, most discovered photographically between 1895 and 1907.

The *Sky Atlas 2000.0*, the sets of index card charts called *AstroCards*, *The Night Sky Observer's Guide Vols. 1 and 2* by Kepple and Sanner, and the *Uranometria 2000.0 Deep Sky Atlas* are recommended finder aids. Most planetarium and deep-sky charting computer programs, as well as computerized telescopes, include all the objects on this list and many more.

Notation below is as in THE MESSIER CATALOGUE, p. 312. Magnitudes (m_v) are visual, with the exception of those marked "p," which are photographic, or blue, magnitudes. Most galaxies appear smaller than the sizes listed. For open clusters, the number of stars (*) is also given. Data are taken from *The Deep Sky Field Guide to Uranometria 2000.0* (see the introduction to THE MESSIER CATALOGUE), with some sizes rounded to two significant figures.

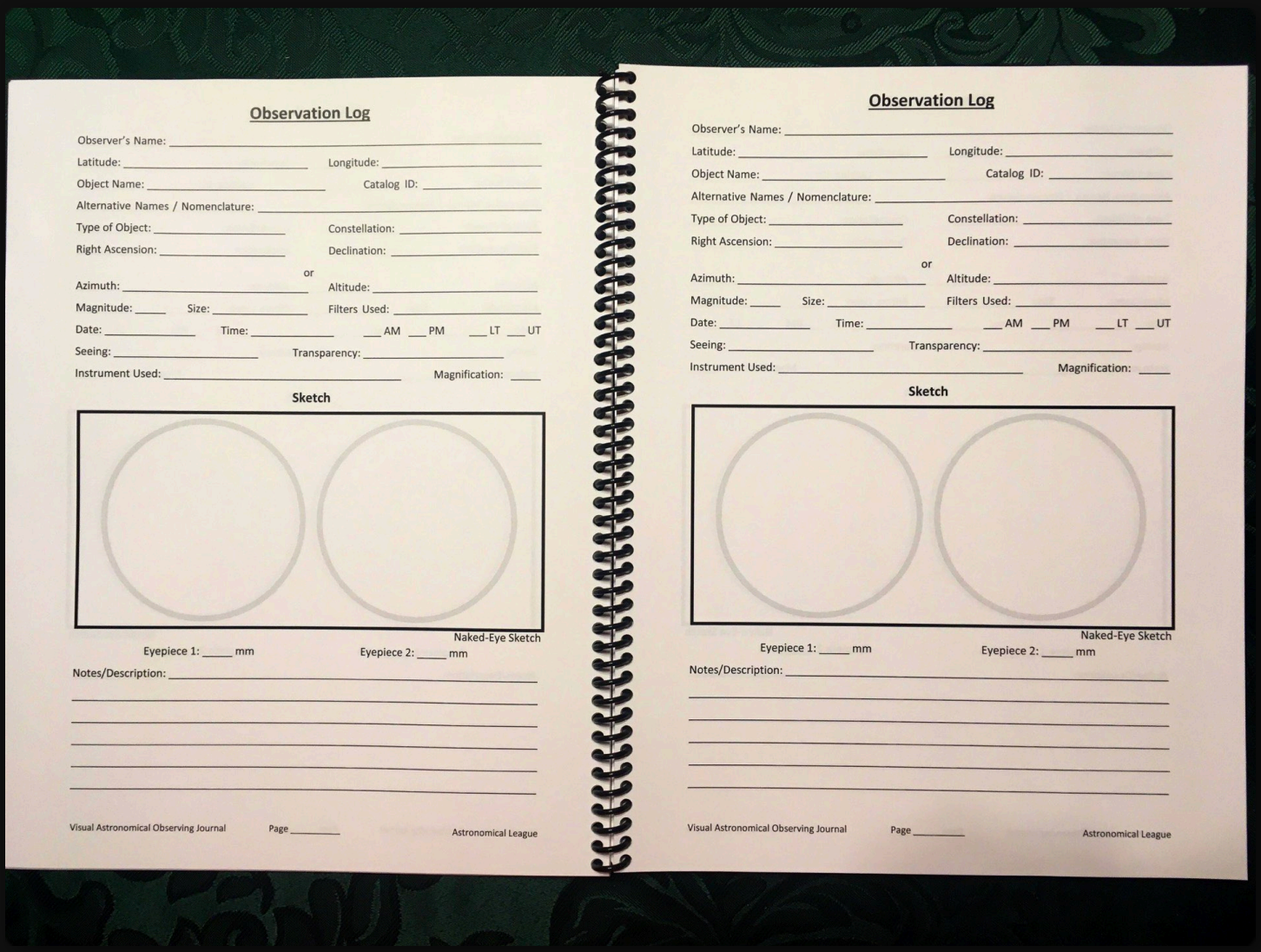
SEASONAL LISTING OF FINEST NGC OBJECTS

#	NGC	Con	Type	RA (2000) h m	Dec ° ′	m_v	Size ′	Remarks
The Autumn Sky								
1	7009	Aqr	PN	21 04.2	−11 22	8.3p	>25″	!! Saturn Nebula; small bright oval
2	7293	Aqr	PN	22 29.6	−20 48	7.3	>769″	!! Helix Nebula; large, diffuse; use filter
3	7331	Peg	G-SAb	22 37.1	+34 25	9.5	10×4	!! large, bright spiral galaxy
4	7635	Cas	EN	23 20.7	+61 12	—	15×8	Bubble Neb.; very faint; 0.5° SW of M52
5	7789	Cas	OC	23 57.0	+56 44	6.7	15	!! 300*; faint but very rich cluster
6	185	Cas	G-E3	0 39.0	+48 20	9.2	14×12	companion to M31; small and faint
7	281	Cas	EN	0 52.8	+56 37	—	35×30	!! large faint nebulosity near η Cas
8	457	Cas	OC	1 19.1	+58 20	6.4	13	80*; rich; one of the best Cas. clusters
9	663	Cas	OC	1 46.0	+61 15	7.1	16	80*; look for NGCs 654 and 659 nearby
10	IC 289	Cas	PN	3 10.3	+61 19	13.3	>34″	dim oval smudge; use a nebular filter!
11	7662	And	PN	23 25.9	+42 33	8.3	>12″	!! Blue Snowball; annular at high power
12	891	And	G-SAb	2 22.6	+42 21	9.9	13×3	!! faint, classic edge-on with dust lane
13	253	Scl	G-SABc	0 47.6	−25 17	7.6	30×7	!! very large and bright but at low altitude
14	772	Ari	G-SAb	1 59.3	+19 01	10.3	7.3×4.6	diffuse spiral galaxy
15	246	Cet	PN	0 47.0	−11 53	10.9	225″	large and faint with mottled structure
16	936	Cet	G-SB	2 27.6	−1 09	10.2	5.7×4.6	near M77; NGC 941 in the same field

RASC NGC Objects list.

The Visual Astronomical Observing Journal was created by the Astronomical League to aid observers in documenting observations. I have read many articles over the years that state the benefits of keeping a journal of observations. The process should make the observer more disciplined and patient at the eyepiece in order to document more details of the object being observed, and the conditions under which the observation is taking place. I have made isolated attempts at the journaling process, but to date have not kept up a sustained process. By acquiring the Observing Journal from the A.L. I am hoping to establish a disciplined habit of journaling my observations. The A.L. Visual Observing Journal begins with a bit of inspiration, showing sketches of the Moon by Galileo Galilei made in 1610. Perhaps sketches I make in this journal will be seen by someone 400 years from now! Multiple pages follow that provide great advice on the why's and how's of keeping a journal and making sketches. Included are some useful calculations and tips for better observing. The meat of the journal is 102 pages of observation logs with blanks for you to fill in with information

such as; object name, type of object, Constellation, RA and Dec, magnitude, instrument and magnification used, two circles in which to make sketches, and multiple blank lines for written notes/descriptions. I am hopeful that using these logs will make me a better, more thorough observer of astronomical objects.



Observation Log

Observer's Name: _____

Latitude: _____ Longitude: _____

Object Name: _____ Catalog ID: _____

Alternative Names / Nomenclature: _____

Type of Object: _____ Constellation: _____

Right Ascension: _____ Declination: _____

or

Azimuth: _____ Altitude: _____

Magnitude: ____ Size: _____ Filters Used: _____

Date: _____ Time: _____ ___ AM ___ PM ___ LT ___ UT

Seeing: _____ Transparency: _____

Instrument Used: _____ Magnification: ____

Sketch

Naked-Eye Sketch

Eyepiece 1: ____ mm Eyepiece 2: ____ mm

Notes/Description: _____

Visual Astronomical Observing Journal Page _____ Astronomical League

Observation Log

Observer's Name: _____

Latitude: _____ Longitude: _____

Object Name: _____ Catalog ID: _____

Alternative Names / Nomenclature: _____

Type of Object: _____ Constellation: _____

Right Ascension: _____ Declination: _____

or

Azimuth: _____ Altitude: _____

Magnitude: ____ Size: _____ Filters Used: _____

Date: _____ Time: _____ ___ AM ___ PM ___ LT ___ UT

Seeing: _____ Transparency: _____

Instrument Used: _____ Magnification: ____

Sketch

Naked-Eye Sketch

Eyepiece 1: ____ mm Eyepiece 2: ____ mm

Notes/Description: _____

Visual Astronomical Observing Journal Page _____ Astronomical League

Astronomical League Observation Journal Log pages.

The final item that Santa brought me is a bit more on the fun side, although I think I will also become a better observer in the process. We enjoy working jigsaw puzzles in our family, so I am now working on a 1,000 piece puzzle of the Moon that I found at the "Antelope Store" on Amazon. This is definitely the most challenging puzzle I've ever worked on! The end result will be a 26.5 inch diameter Moon. So far, after three weeks of working on it intermittently, I have a 26.5" diameter outer ring, a 4" diameter center, and I'm working to fill in the rest. I am becoming very familiar with the craters and the various light and dark shades of grey which indicate the lunar highlands and maria. As I continue to work on this puzzle, I will have to make some telescopic observations of the real Moon to reinforce the lunar education I am getting. All of these new resources have me excited for another great year of astronomical observing!

All images by the author.

My 1,000 piece Moon puzzle progress.

The Queen Speaks

Robin Byrne

Happy Birthday Ernst Mach

This month we celebrate the life of a man whose name is associated with motion, but who studied so much more. Ernst Waldfried Josef Wenzel Mach was born February 18, 1838 in what was then part of Austria. Mach was educated at home until the age of 14, when he entered public school for three years. Mach then attended the University of Vienna, where he majored in physics. After only five years, Mach graduated in 1860 with a doctorate in physics based on his thesis about electrical discharge and induction.

After a series of positions, Mach was hired in 1864 to teach mathematics at the University of Graz, switching to physics two years later. In 1867 he was appointed as chair of experimental physics for the Charles-Ferdinand University in Prague. He would remain there for the next 28 years.

Ernst Mach. Journal of Physical Chemistry, Volume 40, 1902.
Photograph by H. F. Jütte, Leipzig.

In the area of physics, Mach is best known for his work related to shock waves. With his son, Ludwig, Mach used a special photographic technique which disclosed the waves produced by an object moving through a medium. What they found was that when an object, like a bullet, travels faster than the speed of sound, it creates a shock wave of compressed air in front of it. Mach's name will live on as the term given to how fast an object is moving relative to the speed of sound.

In addition to physics, Mach also contributed to the area of philosophy. He held the belief that all of reality must be perceivable by the senses. Therefore, if something could not be directly perceived, it didn't exist. By this reasoning, Mach is quoted as having said, "I don't believe in atoms."

Another of Mach's philosophical postulates is tied to which forces need to be considered when exploring an object's motion. Isaac Newton said that the motion of an object is explained by the forces directly interacting with that object, but Mach argued that the Earth and the rest of the Universe should

be included. Mach was saying that you have to account for all of the Universe when describing any body's inertia. Albert Einstein called this idea "Mach's Principle" and incorporated it into his Law of General Relativity.

Mach also studied human physiology. In 1873, while riding in a train around a sharp turn, Mach noticed that the trees along the track appeared to be angled instead of vertical. This led to a study of human balance and what we use to define our perception of "vertical." To do this, he created a chair that could be spun on multiple axes at the same time. This was the precursor to a similar device used to train astronauts. The experimental subject was placed in the center, inside a box that blocked all visual cues. When motion begins, the subjects could tell their direction of motion, but once the motion became constant, they thought they were stationary. When motion actually stopped, they thought they were now moving in reverse, with the effect lasting for several seconds. When it was repeated, but tilted at an angle, a similar effect occurred, but with an added component of shifting the perceived direction

that was the true vertical. This was why the banked curve of the train affected Mach's perception of the trees. Taking this experiment further, Mach looked to see what was happening in the human body to explain the reaction. The three semicircular canals in the inner ear, which are oriented essentially along the three directions of motion, are filled with fluid. Mach concluded that the pressure of the fluid against the canal walls is how we detect motion and define the vertical direction.

Mach's scientific career ended in 1898 after suffering a heart attack. He retired from the university soon after, but didn't stop working. He was appointed to the upper chamber of the Austrian Parliament. Most of his later years were spent writing various articles and books. Only one day after his 78th birthday, on February 19, 1916, Ernst Mach passed away.

While best known for his contributions to physics, Ernst Mach seemed to have been fascinated by all areas of study, especially if they began with "ph": physics, philosophy, and physiology! Whether hearing a sonic boom, debating the nature of reality,

or understanding a bout of momentary dizziness, we have much for which to thank this month's honoree: Ernst Mach.

References:

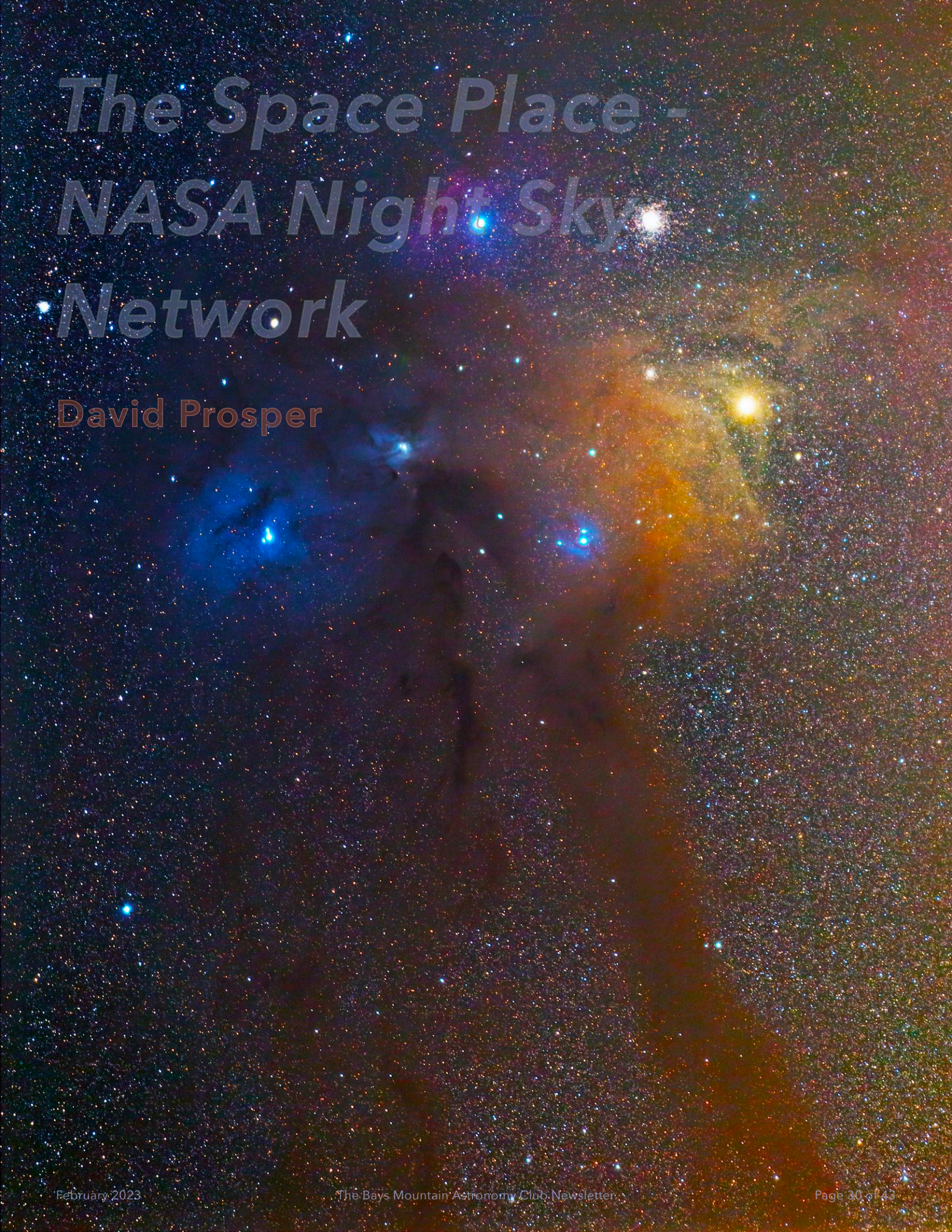
Ernst Mach - Wikipedia

Ernst Mach Austrian Physicist - Britannica

Ernst Mach on bodies and Buckets - Physics Today, by Richard Staley, 2013

The Space Place - NASA Night Sky Network

David Prosper



Spot the King of Planets: Observe Jupiter

upiter is our Solar System's undisputed king of the planets! Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than the planet Mercury. What's more, you can easily observe Jupiter and its moons with a modest instrument, [Ed: including binoculars] just like Galileo did over 400 years ago.

Jupiter's position as our Solar System's largest planet is truly earned; you could fit 11 Earths along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1,300 Earths to fill it up – and that would still not be quite enough! However, despite its awesome size, Jupiter's true rule over the outer Solar System comes from its enormous mass. If you took all of the planets in our Solar System and put them together they would still only be

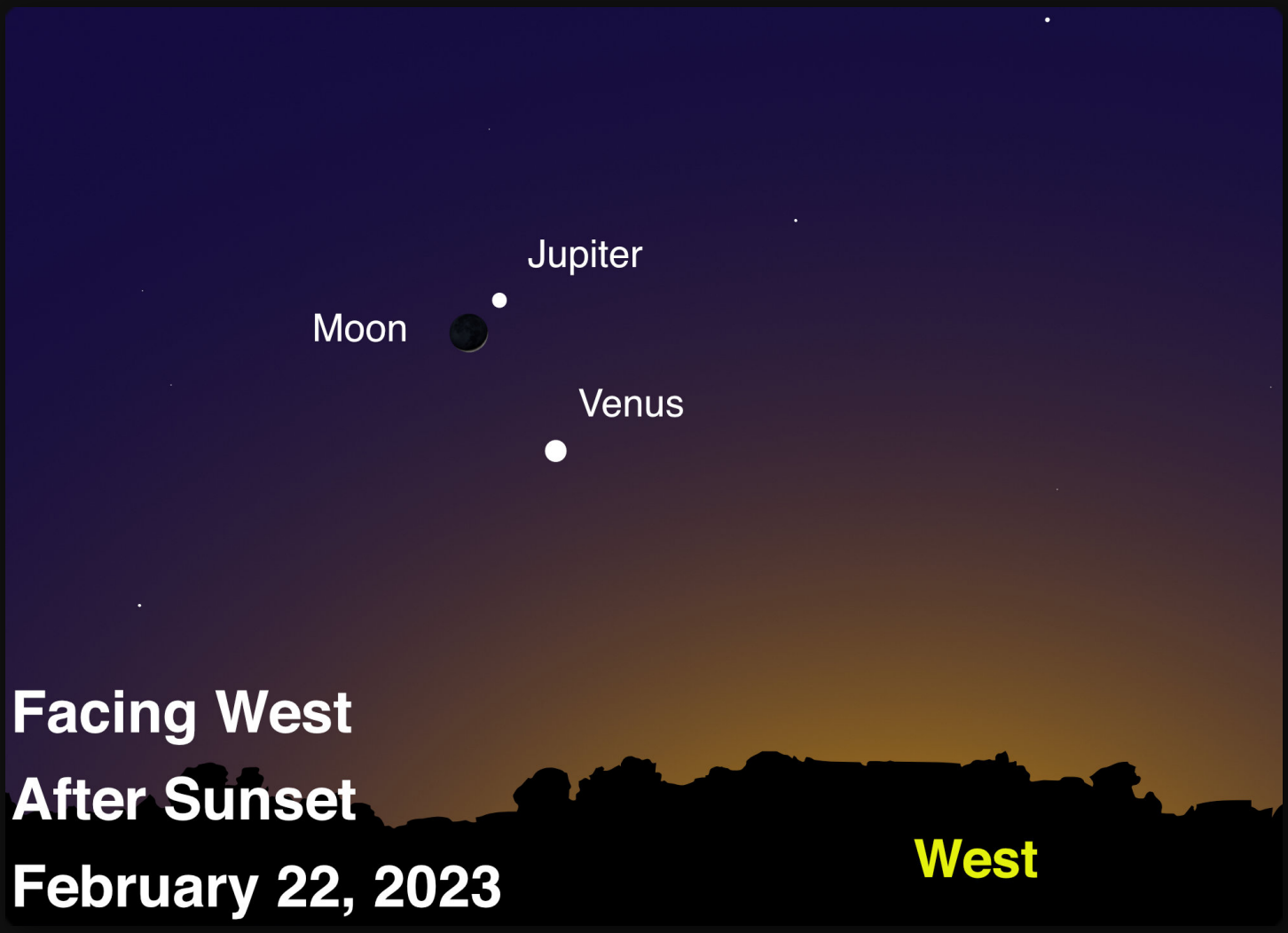
half as massive as Jupiter all by itself. Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner Solar System and also draw them into itself, as famously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere. Its multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Galileo probe, but also observers back on Earth!

Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movement from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at opposition. That's impressive for a planet that, at its closest to Earth, is still over 365 million miles (587 million km) away. It's even more impressive that the giant world remains very bright to Earthbound observers at its furthest distance: 600 million

miles (968 million km)! While the "King of Planets" has a coterie of around 75 known moons, only the four large moons that Galileo originally observed in 1610 – Io, Europa, Ganymede and Callisto – can be easily observed by Earth-based observers with very modest equipment. These are called, appropriately enough, the Galilean moons. [Ed: They are also the only moons of Jupiter that formed with the planet. All the others are captured asteroids.] Most telescopes will show the moons as faint star-like objects neatly lined up close to bright Jupiter. Most binoculars will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but sometimes they can pass behind or in front of Jupiter, or even each other. Telescopes will also show details like Jupiter's cloud bands and, if powerful enough, large storms like its famous Great Red Spot, and the shadows of the Galilean moons passing between the Sun and Jupiter. Sketching the positions of Jupiter's moons during the course of an evening - and night to night – can be a rewarding

project! You can download an activity guide from the Astronomical Society of the Pacific here.

Spot Jupiter



Look for Jupiter as it forms one of the points of a celestial triangle, along with Venus and a very thin crescent Moon, the evening of February 22, 2023. This trio consists of the brightest objects in the sky – until the Sun rises! Binoculars may help you spot Jupiter's moons as small bright star-like objects on either side of the planet. A small telescope will show them easily, along with Jupiter's famed cloud bands. How many can you count? Keep watching Jupiter and Venus as the two planets will continue to get closer together each night until they form a close conjunction the night of March 1. Image created with assistance from Stellarium.

NASA's Juno mission currently orbits Jupiter, one of just nine spacecraft to have visited this awesome world. Juno entered Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious interior. The years have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this gassy world's guts. Juno's mission has since been extended to include the study of its large moons, and since 2021 the plucky probe, increasingly battered by Jupiter's powerful radiation belts, has made close flybys of the icy moons Ganymede and Europa, along with volcanic Io. In 2024 NASA will launch the Europa Clipper mission to study this world and its potential to host life inside its deep subsurface oceans in much more detail. Find the latest discoveries from Juno and NASA's missions at **NASA**.

Jupiter from Juno

This stunning image of Jupiter's cloud tops was taken by NASA's Juno mission and processed by Kevin M. Gill. You too can create amazing images like this, all with publicly available data from Juno. Go to missionjuno.swri.edu/junocam to begin your image procession journey – and get creative!
Full Image Credit: NASA/JPL-Caltech/SwRI/MSSS; Processing: Kevin M. Gill, ***License: CC BY 2.0****)* ***Source****.*

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** to find local clubs, events, and more!

BMAC Calendar & More

Calendar:

MAC Meetings:

- Friday, February 3, 2023 - 7p - Equipment review and getting ready for spring viewing.
- Friday, March 3, 2023 - 7p - Topic TBA. ETSU Astronomy Department Research Presentation by Christi Erba, Research Professor; Grace Anderson and Trevor Cox, Research Students.
- Friday, April 7, 2023 - 7p - Astronomy Jeopardy. This will be a full game. There will be 3 rounds and winners will receive an additional 4,ooo points!
- Friday, May 5, 2023 - 7p - Topic TBA.
- Friday, June 2, 2023 - 7p - Topic TBA.
- Friday, August 4, 2023 - 7p - Topic TBA.
- Friday, September 1, 2023 - 7p - Topic TBA.
- Friday, October 6, 2023 - 7p - Topic TBA.
- Friday, December 1, 2023 - 7p - Topic TBA.

SunWatch:

- Every clear Saturday & Sunday - 3p-3:30p - March-October - By the Dam
  - View the Sun safely with a white-light view if clear.; Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

StarWatch:

- March 4 & 11, 2023 - 7p
- March 18 & 25, 2023 - 8p
- April 1, 8, 15, 22 & 29, 2023 - 8:30p
  - View the night sky with large telescopes at the observatories. If poor weather, an alternate live tour of the night sky will be held in the planetarium theater. Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

Special Events:

- **Astronomy Day - April 29, 2023 - 1p-4p; 8:30p-9:30p**
  - Come help share the fun of astronomy with the public. There will be tables with different themed topics plus solar and night viewing.
- **Annual Club Picnic - July 2023 - Day & Time TBD**
  - Site location will be sent directly to full BMAC members. BMACers and their families are welcome to enjoy an evening of astronomy-themed games and activities along with a potluck dinner and observing.
- **StarFest 2023 - November 3, 4 & 5, 2023**
  - Our 38th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 3 keynote speakers, unique T-shirt and more!
  - **Pre-registration by Oct. 13, 2023 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."**
  - **Link for all the StarFest info including registration and hotel reservation links.**

Regular Contributors:

William Troxel

Robin Byrne

Greg Penner

Adam Thanz

William is the current chair of the club. He enjoys everything to do with astronomy, including sharing this exciting and interesting hobby with anyone that will listen! He has been a member since 2010.

Robin Byrne has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

Greg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He has enjoyed astronomy since childhood when he received a “department store telescope” and viewed Saturn for the first time. He has been a member since 2018.

Adam Thanz has been the BMAC Newsletter Editor for all but a small number of issues since 1992. He is the Planetarium Director at Bays Mountain Park and an astronomy adjunct instructor at NSCC since 2000.

Connection:

Bays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 - **Park Site** - **Club Site**
- Newsletter edited by **Adam Thanz**

Dues:

- Dues are highly supplemented by the Bays Mountain Park Association and volunteerism by the club. As such, our dues are kept at an extremely low cost.
- $16 / person / year
- $6 / each additional family member
- Note: if you are a Park Member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. The easiest way is to pay via the CivicRec online portal. If you are a current member, please log in with your e-mail address and reset your password if you have not already done so. You can then update your membership. Here's the direct **link**. If you want to add family members, then add them via the internal link. You can also pay at the gift shop, by mail or over the phone.

Chapter Background Image Credits:

- **Cover image of Southern Milky Way by Adam Thanz.**
  - *Sony A7ii with Zeiss Batis 2.8/18 lens, f/2.8, 8 sec., ISO 6,400, August 9, 2020.*
- **Table of Contents image of Comet NEOWISE (C/2020 F3) by Adam Thanz**
  - *Sony A7ii with Sony FE 2.8/90 Macro G OSS lens, f/2.8, 8 sec., ISO 4,000, July 15, 2020.*
- **Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.**
  - *Image captured July 23, 2016.*
- **BMAC Notes painting of the Moon with moon glow by Christa Cartwright.**
  - *Painting based on a photograph of the Moon Christa captured July 2020.*
- **Stellar Observations image of Crescent Nebula by David Reagan.**
  - *This image was taken with a 140mm refractor in his suburban backyard using an AstroPhysics 900 mount, 8.7 hours of 5 minute Ha and OIII subexposures, combined in AstroPixelProcessor as an HOO image and processed in Lightroom and Photoshop. Image captured in 2022.*
- **The Queen Speaks image of a solar halo by Robin Byrne.**
  - *iPhone 7, June 8, 2020.*
- **The Space Place - NASA Night Sky Network image of the Rho Ophiuchi cloud complex by Brandon Stroupe.**
  - *Canon 6D with Canon 2.8/70-200mm lens, f/2.8 @200mm, 20 x 120 sec. exposures, ISO 1,000, stacked in Deepsky Stacker, processed in Adobe Photoshop CC, Skywatcher Star Adventure mount, September 19, 2015.*
- **BMAC Calendar & More image of the Moon by Greg Penner.**
  - *iPhone shooting through a 9mm eyepiece and 12.5" Truss Tube Dobsonian @212x.*
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