Binocular Observing Olympics IV

Stellafane 2022 edition

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- To qualify for the BOO pin, you must see 15 of the following 20 binocular targets. Check off each as you spot them.

Seen	#	Object	Const	Chart	Type*	RA	Dec	Mag	Size	Nickname/Notes
	1.	M3	CVn	1	GC	13h 42m	+28° 23′	6.2	18'	
	2.	NGC 6144	Sco	2	GC	16h 27m	-26° 01′	9	7'	
	3.	NGC 6210	Her	3	PN	16h 44m	+23° 48′	10	40″ × 30″	Turtle Nebula
	4.	Barnard 59, 65, 66, 67, and 78	Sgr-Oph	4	DN	17h 27m	-26° 56′	n/a	300' x 140'	Pipe Nebula
	5.	M14	Oph	5	GC	17h 38m	–03° 15′	7.6	11'	
	6.	Taurus Poniatovii	Oph	5	As	18h 04m	+03 20'		8°x3°	Poniatowski's Bull
	7.	M21	Sgr	6	OC	18h 04m	-22° 30′	6.5	14'	Webb's Cross
	8.	M18	Sgr	6	OC	18h 20m	-17° 06′	7.5	10'	
	9.	T Lyrae	Lyr	7	*	18h 32m	+37° 00′	7.6	stellar	carbon star
	10.	M26	Sct	8	OC	18h 45m	-09° 23′	8	14'	
	11.	Stephenson 1	Lyr	7	OC	18h 54m	+36° 55′	3.8	20'	Delta Lyrae Cluster
	12.	Red-Necked Emu	Cyg	9	As	20h 14m	+36° 30'	9	45'	
	13.	Omicron Cygni	Cyg	9	***	20h 15m	+46° 44'	3.9, 7.0, 4.8	107", 335"	
	14.	M29	Cyg	9	OC	20h 24m	+38° 30′	6.6	7'	Cooling Tower
	15.	Ruprecht 173	Cyg	9	OC	20h 42m	+35° 33'	~7	49'	
	16.	NGC 6934	Del	10	GC	20h 34m	+07° 24'	8.9	7'	
	17.	Mu Cephei	Cep	11	*	21h 44m	+58° 47'	4.1	stellar	Herschel's Garnet Star
	18.	Vesta	Aqr	12		22h 41m	-16° 40'	6.2	stellar	opposition on Aug 22
	19.	Eddie's Coaster	Cas	13	As	01h 02m	+63° 36'	7	2° x 1.5°	
	20.	Queen's Kite	Cas	13	As	01h 37m	+58° 38'	5	2° x 1.5°	

Key

***	Triple star		Asteroid	GC	Globular cluster	PN	Planetary Nebula
As	Asterism	DN	Dark Nebula	OC	Open cluster		

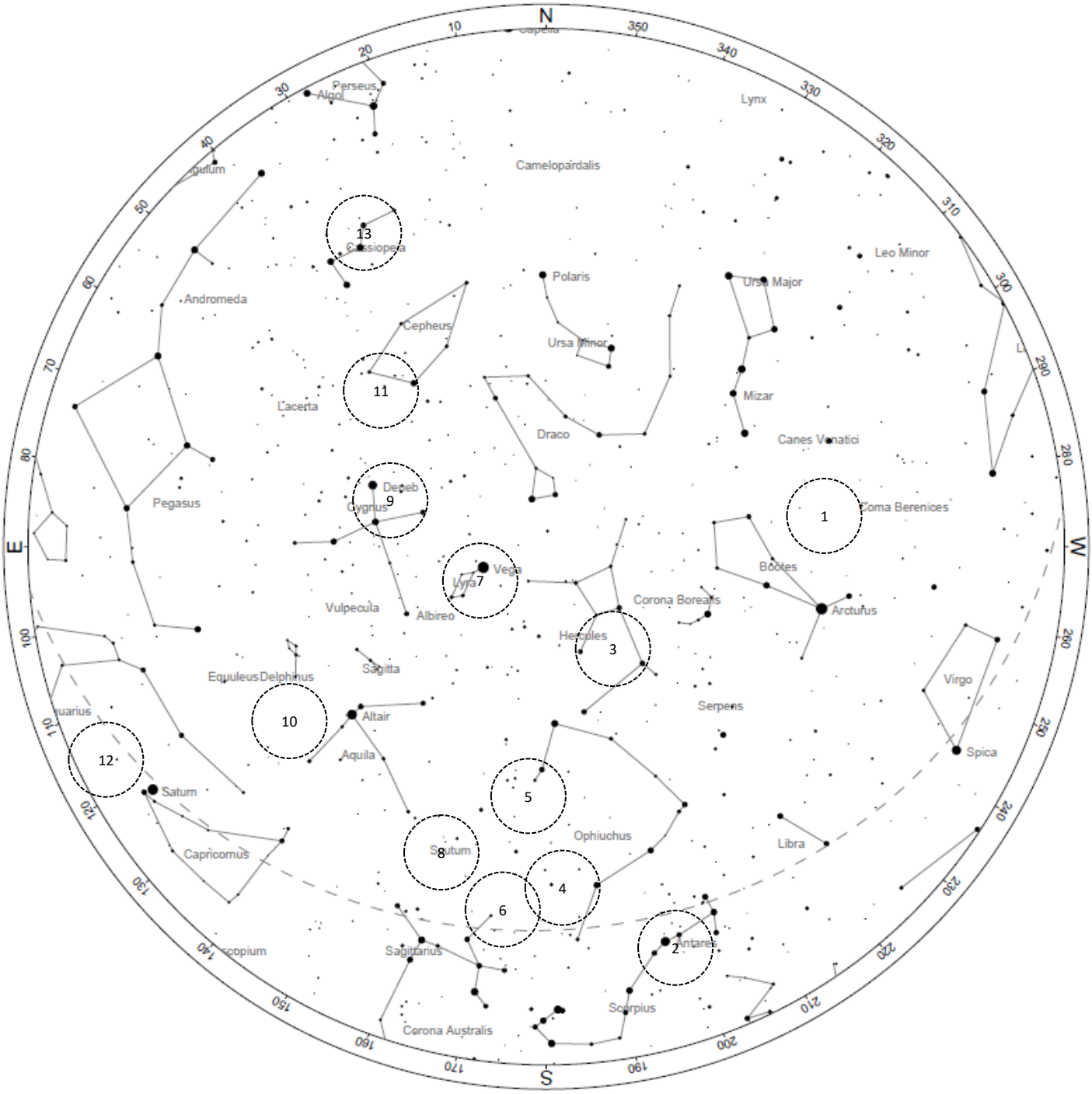
I would enjoy hearing how you make out with this year's list? And would you like to see a new BOO 2023 list next year? Drop me a line through my web site, philharrington.net, and let me know.

Good luck. And remember, two eyes are better than one!

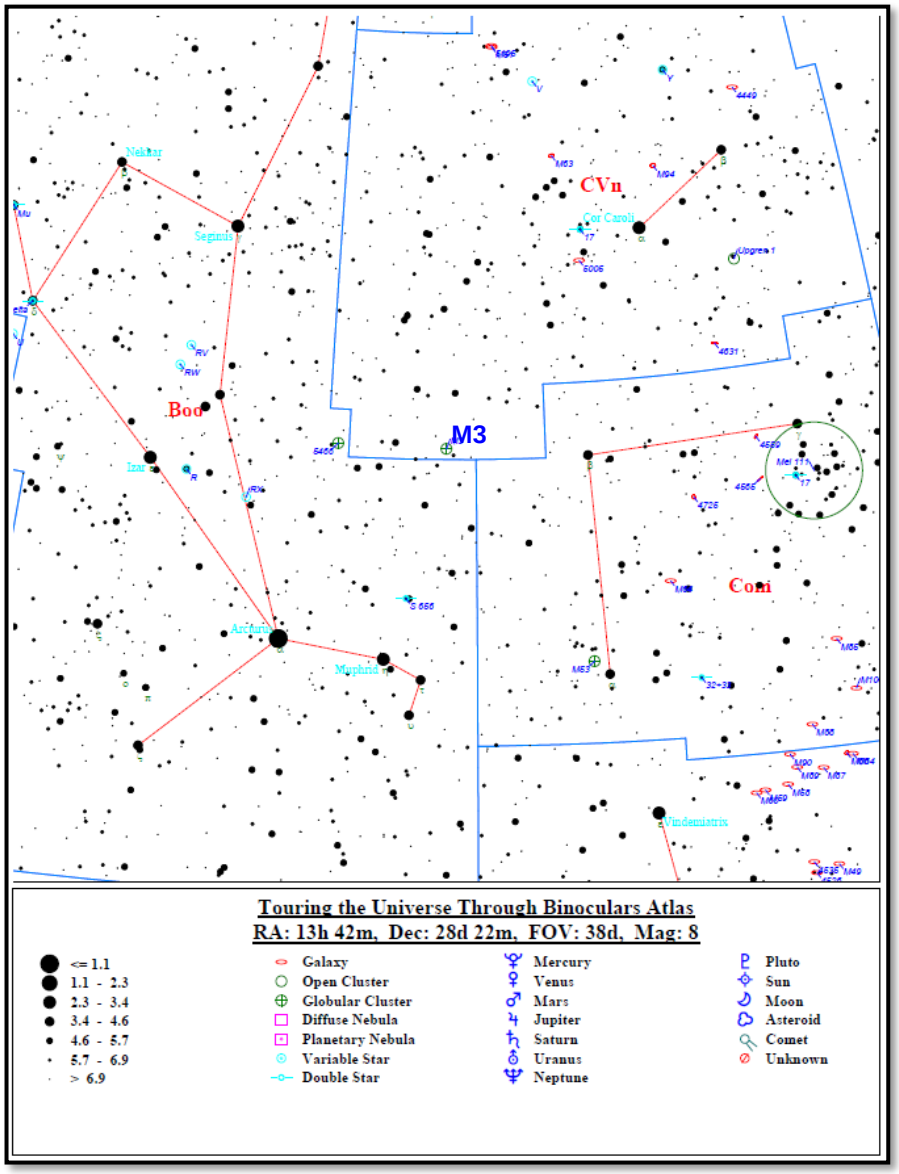
All-Sky Star Chart

(Chart drawn for 10:00 PM)

1 Circled areas correspond to the chart numbers found on the pages that follow.



1. M3

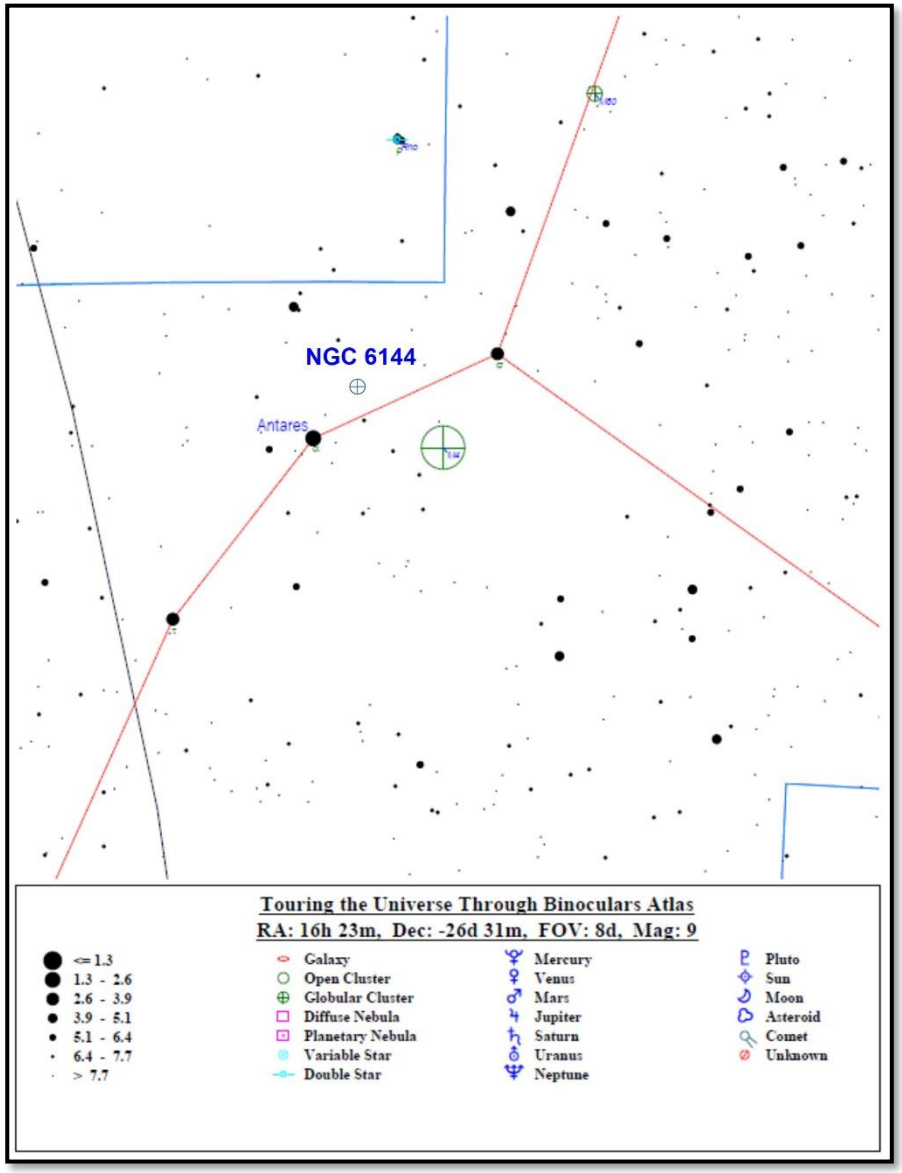


Discovered in 1764 by Charles Messier, M3 is one of the brightest globular clusters in the northern sky. More than half a million stars are believed to be held in its grasp, making M3 one of the largest members of the Milky Way's family of globular clusters.

Amateur astronomers everywhere should thank M3, because it was the spark that lit the fire in Messier to compile his now-famous catalog of deep-sky objects. While Messier had made extensive notes on the objects that later became the first two listings in his catalog, legend has it that his discovery of M3 started him on a systematic quest for other comet-like imposters.

M3 lies in the faint constellation of Canes Venatici. The simplest way to find it is to aim your binoculars at the halfway point between Arcturus and the brightest star in Canes Venatici, Cor Caroli [Alpha (α) Canum Venaticorum]. Cor Caroli is just south of the Big Dipper's Bowl. M3 will look like a tiny puff of celestial cotton hanging near a 6th-magnitude field star.

2. NGC 6144

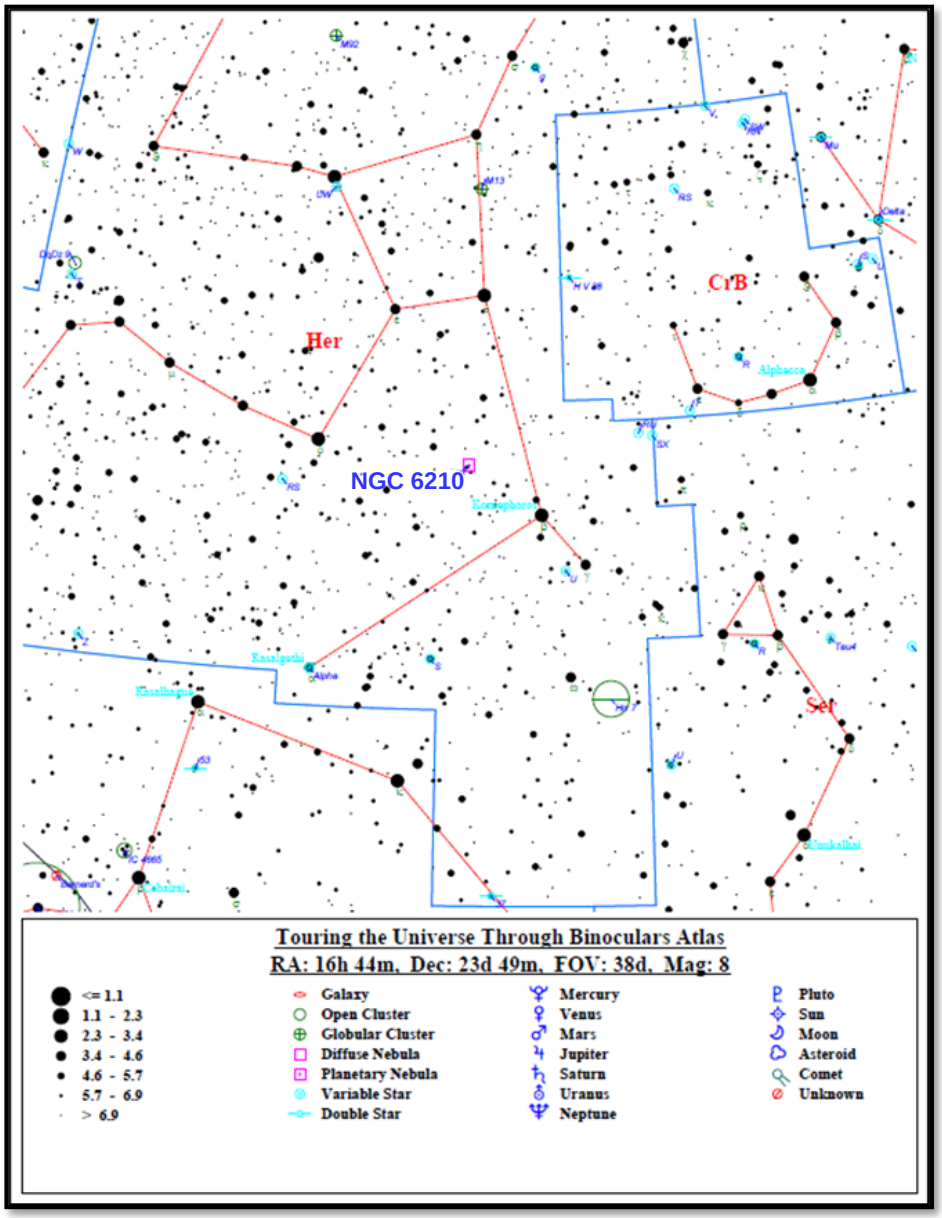


Here is a test for observers with giant binoculars. Aim toward dazzling Antares in Scorpius. After snapping out of the Antarian trance, shift your attention just a degree to the star's west. There, you will find a hidden surprise, a small puff of celestial cotton afloat amongst the stars. That's one of my favorite globular clusters, M4, a colossus of some 100,000 stars.

But M4 is not our target. That was already part of the 2018 BOO list. This year, we are back to look for a second, far fainter globular cluster that appears even closer to Antares.

NGC 6144 often goes unnoticed because of its proximity to both the star and M4. Messier missed it altogether, but it was finally noticed by William Herschel in May 1784. Lying some 30,000 light years away, NGC 6144's glory is subdued by intervening clouds of dust. With careful scrutiny, I've seen it through my 16x70s by first moving the distracting glare of Antares out of the field. Be aware that any interference from dust or dew on a lens, or sky haziness, will render it invisible. Good luck with this one!

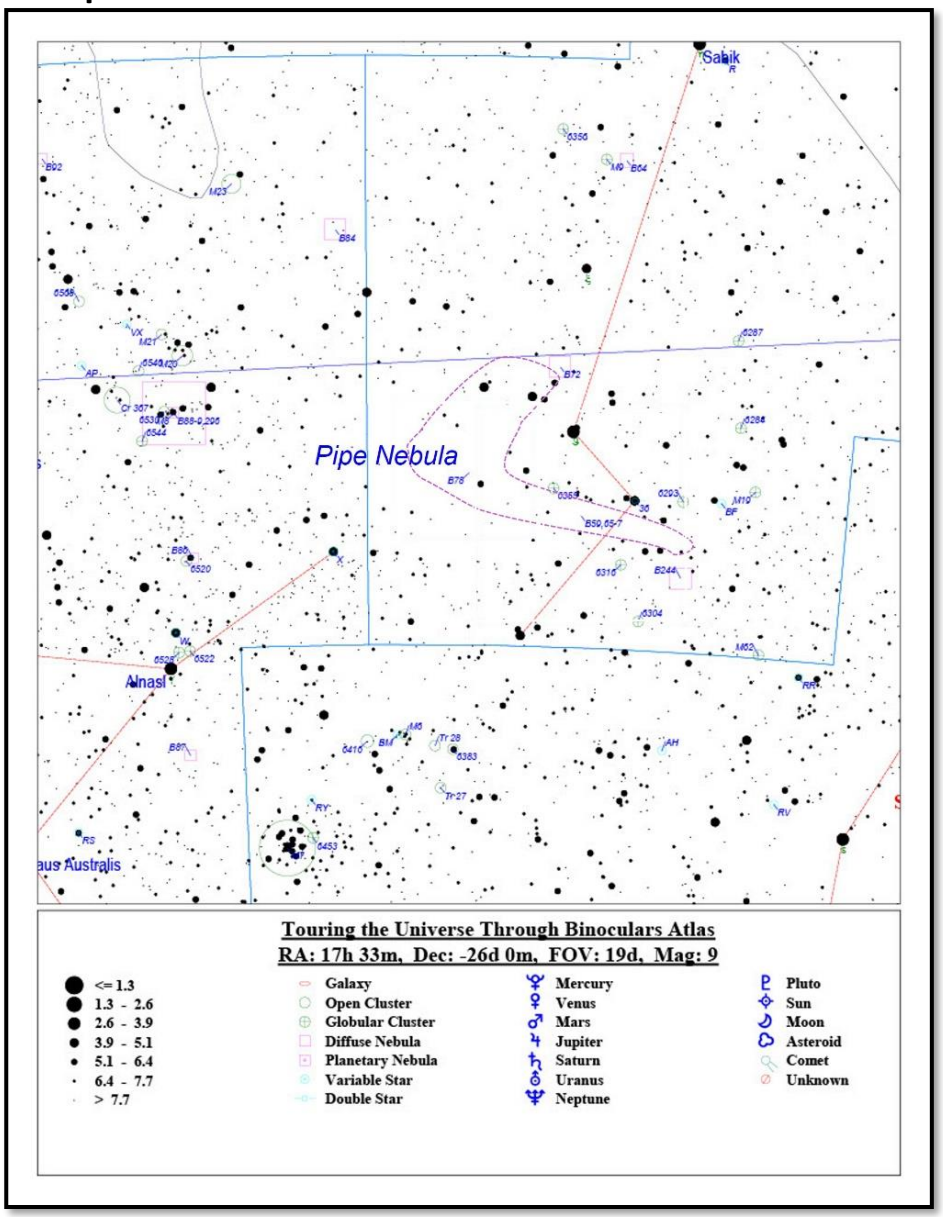
3. NGC 6210



NGC 6210 lies 8° south of Zeta (ζ) Herculis at the Keystone's southwest corner. That's a little more than a typical binocular field. There are two 7th-magnitude stars set nearby, one to its south and another to its southeast. Look for a bluish-green star; that will be NGC 6210.

NGC 6210 rates 9th magnitude, just within the brightness barrier of 50mm binoculars. Of course, with its disk only measuring 15 arc-seconds across, it will only look like a star -- a distinctly blue-green star. That color should help set it apart. NGC 6210 has been nicknamed the Turtle Nebula for the four leg-like protrusions extending from its shell-shaped disk seen in photographs.

4. Pipe Nebula



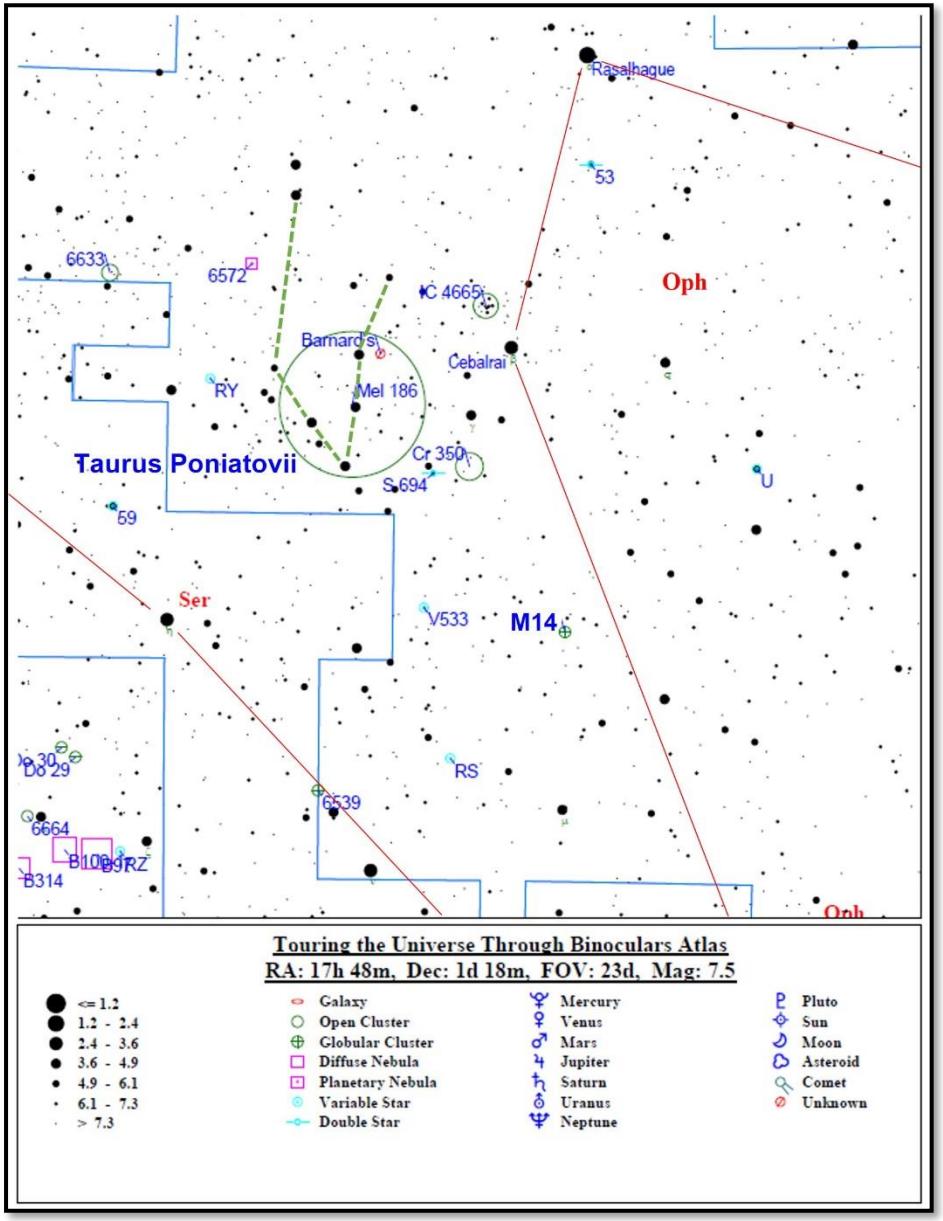
A large complex of dark nebulosity in southern Ophiuchus lies midway between the Small Sagittarius Star Cloud (M24) and brilliant Antares [Alpha (α) Scorpii]. In fact, it is so large that it was assigned several individual entries in the Barnard catalog of dark nebulae. Together, they form the **Pipe Nebula**.

From here at Stellafane, its smoking-pipe shape stands out nicely against the starry milieu. The "bowl" of the pipe, designated Barnard 78, looks roughly rectangular, while the long, thin “stem” is formed by the combination of Barnard 59, 65, 66, and 67. The Pipe is surprisingly obvious in low-power binoculars, given good sky conditions. Be forewarned, however, that it spans more than 7°. As a result, a wider field of view will outperform larger binoculars.

But wait, there’s more. By adding in other, more subtle patches found to the northwest of the Pipe, the area transforms into the profile of a prancing horse. Former Astronomy editor Richard Berry was the first person to publicize the shape of the **Dark Horse Nebula**.

Assembling the horse is like piecing together a cosmic jigsaw puzzle. The Pipe forms the horse's hindquarters, with the bowl of the pipe as the steed's hip and the stem its rear leg. You'll need a more detailed chart than I have here, but crescent-shaped Barnard 63 marks its bent front leg, while the remainder of the horse's torso is created by Barnard 67a, 72, 75, 261, 262, 266, 269, and 396. Barnard 276 outlines the profile of the horse's head, Barnard 259 marks its nose, and Barnard 268 completes its mane. Even without a chart, can you see the full horse? If so, I'd love to hear about it. Drop me an email through my website, philharrington.net.

5. M14 and Taurus Poniatovii



There are two BOO targets on Chart 5, at left. First, aim about two-thirds of the way between Sabik (Eta [η] Ophiuchi) and Cebalrai (Beta [β] Ophiuchi) along the hexagon's eastern side. There, you will find **M14**, just as Messier did when he discovered it on June 1, 1764. When we look toward M14, we are seeing it through obscuring clouds of interstellar dust. That diminishes its brightness by two full magnitudes, to a challenging 8th magnitude. M14 is rated Class VIII on the Shapley–Sawyer scale of globular cluster density. Through most binoculars, it looks like a small blur of light hidden in a field rich in stars.

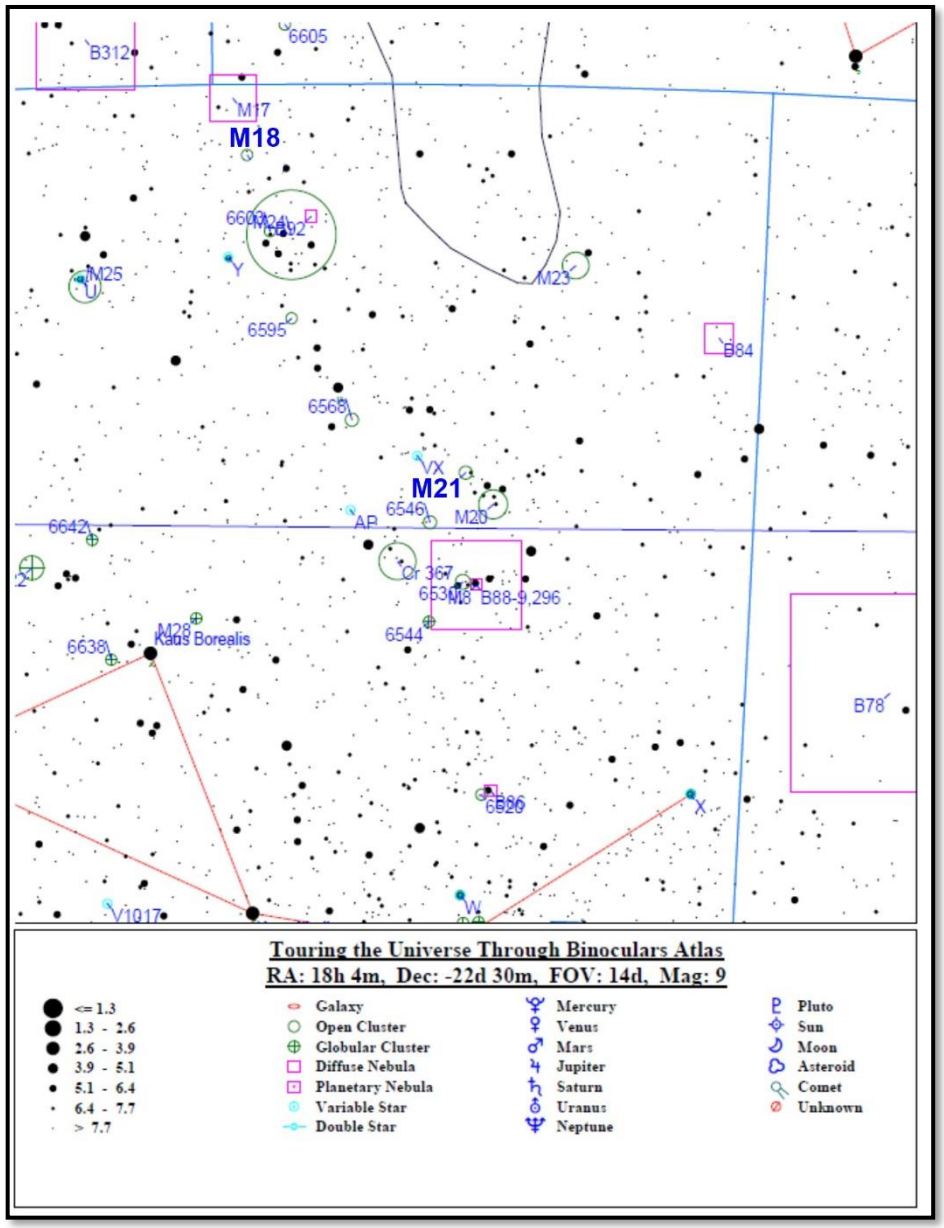
Next, although many obsolete constellations have faded away as footnotes in astronomical history books, there is one in the summer sky that is fun to spot through binoculars. You are familiar with winter's Taurus, the Bull. But what about **Taurus Poniatovii**?

Taurus Poniatovii, or Poniatowski's Bull, was a small constellation created in 1777 by Marcin Poszobutt, a Polish/Lithuanian astronomer and director of the Royal Observatory at Vilna (today's Vilnius, Lithuania), to honor Stanislaus Poniatowski, the king of Poland and Lithuania at the time. Although it was never embraced by the International Astronomical Union as a sanctioned constellation, it is still fun to look at through binoculars.

Like its namesake constellation in the winter, Taurus Poniatovii is drawn from a V-shaped pattern of stars that fills the field of 10x50 binoculars. The stars range from 4th to 6th magnitude and can be found just east of Cebalrai (Beta [β] Ophiuchi), the eastern shoulder of Ophiuchus. If you compare the formation to winter's Taurus, then the role of Aldebaran is played by 6th-magnitude 73 Ophiuchi. The tip of the bull's nose is marked by 68 Ophiuchi, while 66 Ophiuchi is the western eye. Fourth-magnitude 72 Ophiuchi marks the end of the eastern horn, while the western horn extends toward 6th-magnitude HD163641, and beyond.

Three of the stars that form the triangular head of Taurus Poniatovii -- 67, 68, and 70 Ophiuchi – along with a scattering of about a dozen others – belong to a sparse open cluster cataloged as **Melotte 186**. A study in 2005 suggested this may not be a cluster at all, but rather a "moving group" of stars following a similar path through the Milky Way, like the Ursa Major Moving Group.

6. M18 and M21



Messier himself was first to bump into his catalog's 18th entry, undoubtedly as he was viewing M17, the Swan Nebula, which lies just 1° south. His discovery notes made on June 3, 1764, recall: "A cluster of small stars, a little below…No. 17, surrounded by slight nebulosity, this cluster is less obvious than the preceding, No. 16; with an ordinary telescope of 3.5-foot [focal length], this cluster appears like a nebula; but with a good telescope one only sees small stars."

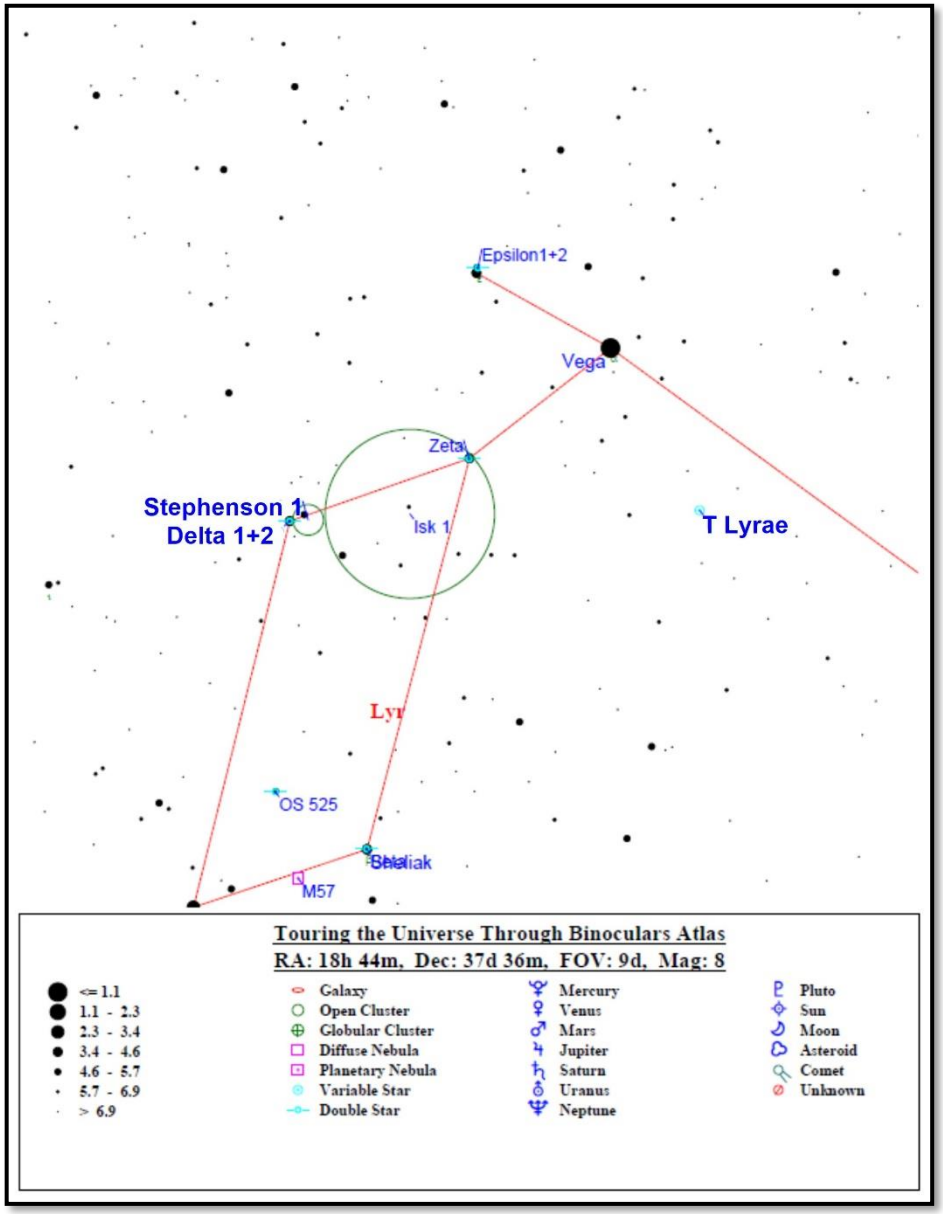
Some 40 stars populate open cluster **M18**, all residing a little more than 4,200 light years away. The brightest of the bunch are set in a triangular pattern that may just be glimpsed in 10x50s, but only under dark conditions. The rest blend into a small knot of hazy starlight.

Open cluster **M21** is 6.5° southwest of M18 and just half a degree northeast of the Trifid Nebula, M20. Its 70 stars are packed into an area spanning less than a quarter of a degree, so things are tight. Most are below binocular threshold, although a few individual points of light shine through the soft combined glow formed from the rest.

The brightest star in M21 is actually a double star cataloged as S698, from the James South Double star Catalog (1826) James South Double star Catalog (1826). If you're using 11x and higher giant binoculars, you just might be able to resolve the 7.2-magnitude primary and 8.5-magnitude secondary. They are separated by 30", with the secondary to the northwest.

M21 is nicknamed Webb's Cluster after a description Rev. T. W. Webb wrote in his classic work Celestial Objects for Common Telescopes, volume 2. Funny, but he wasn't referring to the cluster directly at the time, but rather to the location of nearby M20. In the book, he noted that "The Trifid neb. closely followed a cruciform group." That group also includes M21, hence the moniker.

7. T Lyrae and Stephenson 1

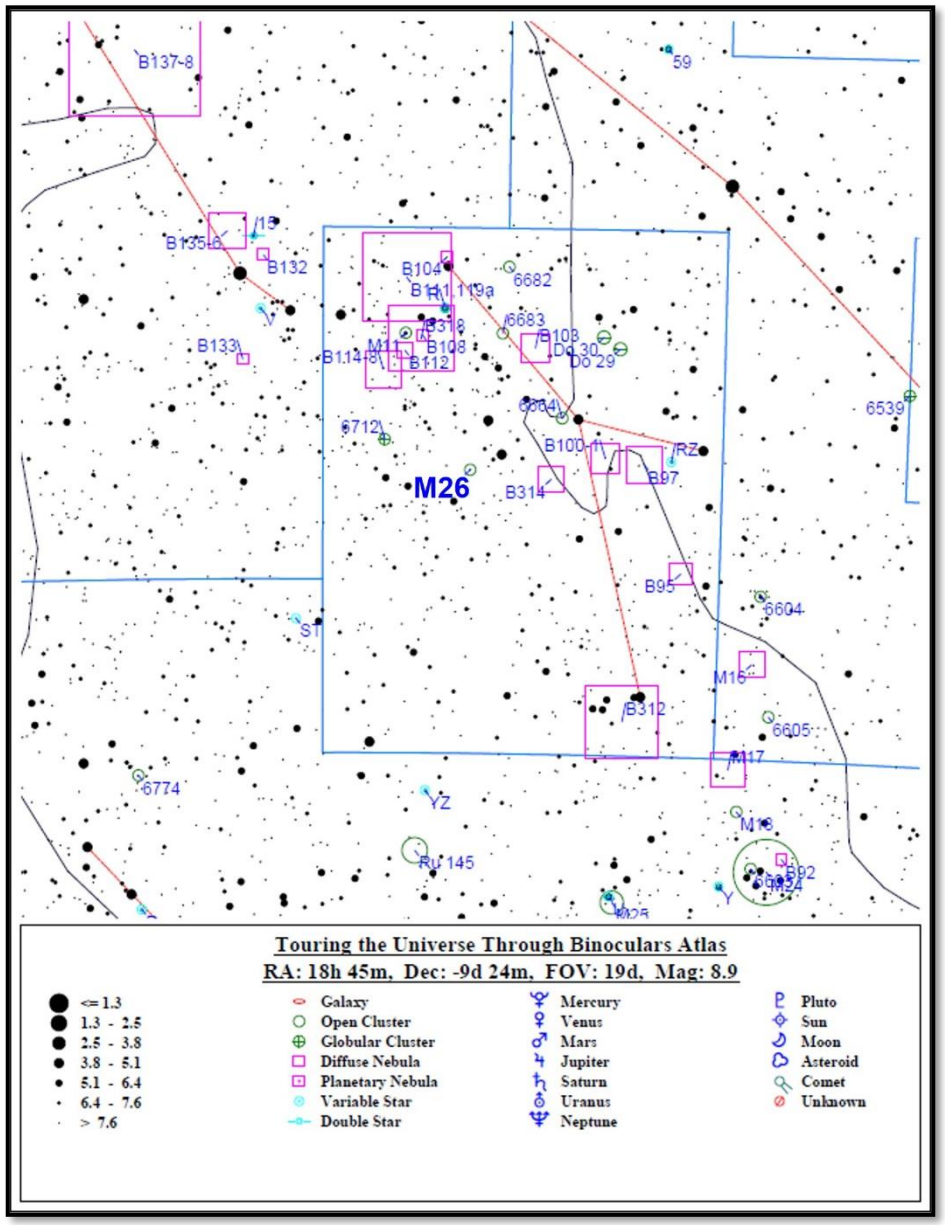


T Lyrae is one of summer's premiere carbon stars. Carbon stars are categorized as spectral class C and are famous for their ruby red color. But T is on the faint side for most binoculars, shining around 8th magnitude, although it can vary down to fainter than 9th. I can usually see it with my 10x50 binoculars from my suburban backyard, but to be successful, you need to know exactly where to look. Fortunately, it lies just 2° southwest of Vega. Aim your binoculars toward Vega and then move it toward the northeast side of the view. Without moving your aim, shift your eyes across the field. You'll find T surrounded by faint, white stars.

Lyra's northeast corner is a busy intersection. Two stars, 4.3-magnitude **Delta-2 Lyrae** and 5.6-magnitude **Delta-1 Lyrae** are cleaved by 10.3 arcminutes. That's three times wider than Epsilon (ε) Lyrae, the famous Double-Double. And like the Double-Double, the Deltas can be resolved by eye alone given dark skies.

Through binoculars, the Deltas do much more than just split. The American astronomer Charles Stephenson was first to suggest that the Deltas, along with some of the fainter surrounding suns, form a weak grouping. That was back in 1959. There was some debate in the ensuing years as to whether the stars actually formed a true cluster. But subsequent studies conducted by a team led by American astronomer Olin Eggen proved that the cluster was real and contained 33 members. The cluster is now appropriately nicknamed the Delta Lyrae Cluster, but is more formally known as **Stephenson 1**, for his original research.

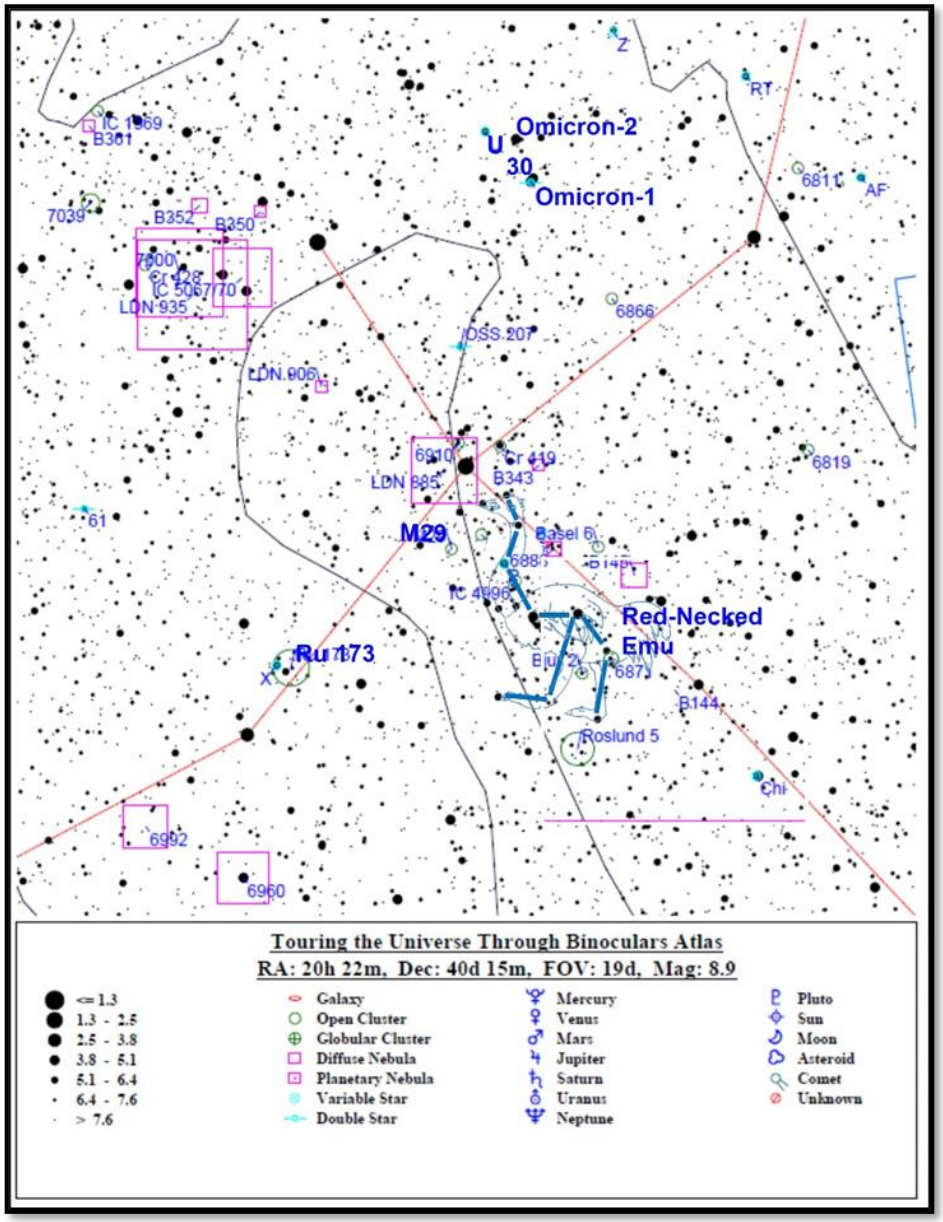
8. M26



No doubt about it, M11 steals the show when it comes to deep-sky objects in Scutum. But King Sobieski's Shield holds another, under-observed Messier cluster that is visible through our binoculars.

Everyone seems to forget about poor, little **M26**. Located less than a degree southeast of 5th-magnitude Delta (δ) Scuti, M26 is a small, condensed open cluster. Its 30 stars, none of which shines brighter than magnitude 9, combine to produce an 8th-magnitude misty glow that appears about half the size of M11. Michigan amateur PJ Anway once told me that, through his 15x60 Zeiss binoculars, M26 impressed him as "brighter toward the west-southwest, giving a slight impression of a comet streaking toward the west." What is the smallest binocular capable of resolving some of the cluster's individual stars?

9. Red-Necked Emu, Omicron Cygni, M29, Ruprecht 173



This is a busy chart!

As you star-surf through Cygnus with your binoculars, you will encounter many colorful gems. One pair that always attracts my attention is the team of 4th-magnitude **Omicron-1 (o-1**) and 5th-magnitude **30 Cygni**. You'll find them 5°, or about a binocular field, northwest of Deneb. They may be resolvable by eye alone, but it will take binoculars to show their true colors. Omicron-1, a spectral class K star, shows off a light topaz tint, while 30, a spectral class A star, appears pearl white.

Adding to this is a third star, HD 192579, 107 arcseconds south of Omicron-1. This class-B star appears distinctly blue, creating a very colorful triple star.

Expanding the view, golden **Omicron-2 (o-2) Cygni** is in the same field, 1° north-northeast of Omicron-1. Omicron-2 is Omicron-1's doppelganger, save for being about 0.3 magnitude fainter.

Finally, 3/4° east-northeast of Omicron-2 is another carbon star, the long-period variable **U Cygni**. When near maximum brightness, U's ruby red glow reaches 6th magnitude, while at minimum, it bottoms out at 12th. Its last maximum occurred in August 2021, with the next expected sometime in November. Keep an eye out for it this summer and fall. When visible, U forms an attractive double star with an 8th-magnitude costar 2 arcminutes southeast.

Next, we have the **Red-Necked Emu** asterism, created by John Barra of Peoria, Illinois. Begin at Sadr (Gamma [γ] Cygni). Move 2½° south-southwest along the "neck" of Cygnus to 34 Cygni, then another 1½° to 29 Cygni. This latter star, a wonderful multiple sun, marks the Emu's tail.

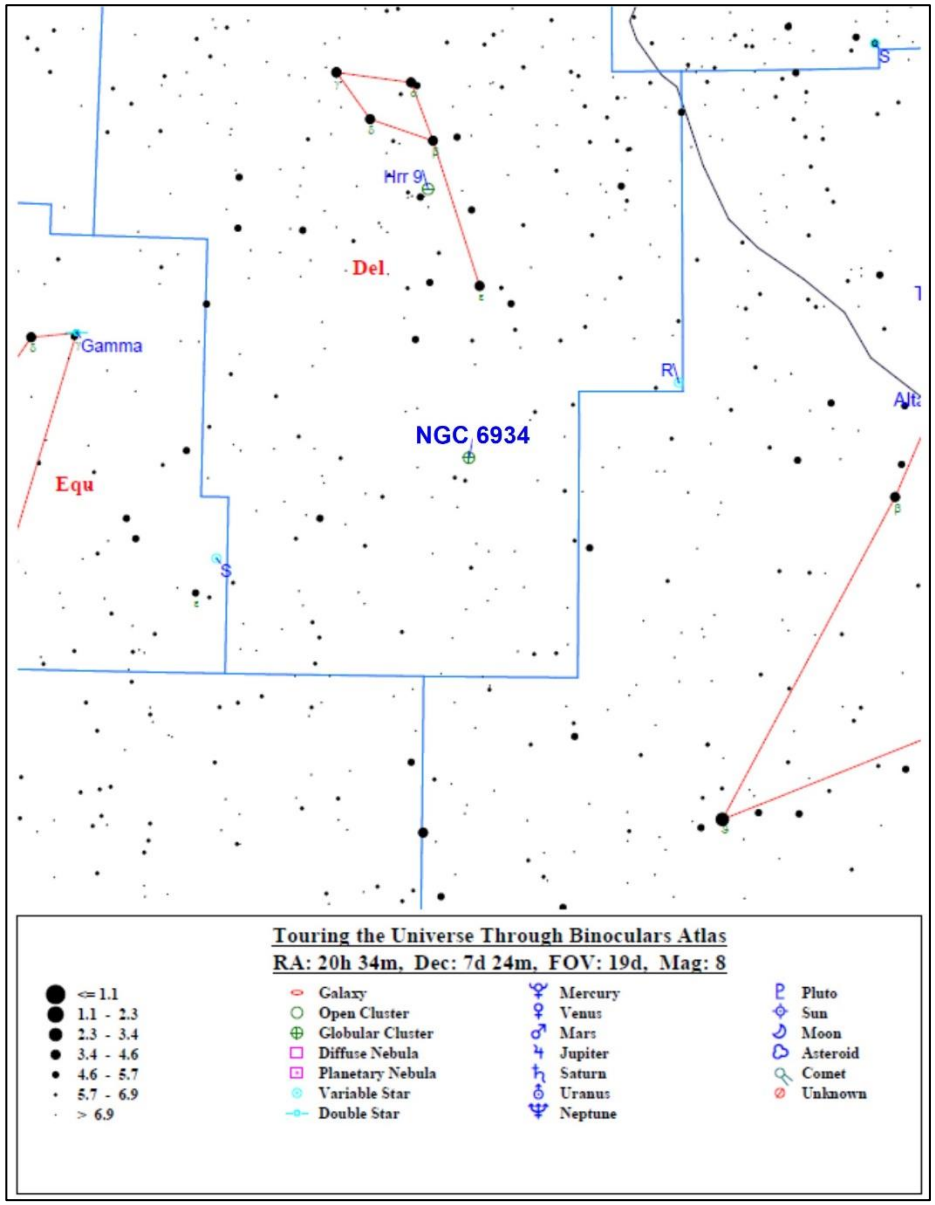
The Emu is drawn in profile in the sky, with its head and feet pointing east. All the stars in the Emu's tail, feet, triangular body, and head, shine with a blue-white luster. Only a lone reddish star marking part of its neck appears different; hence the name red-neck. The color contrast likely needs giant binoculars to be apparent.

Chart 9. Continued

Not far from the Emu or Sadr, we find the tiny open cluster **M29**, a little less than 2° to Sadr's south-southeast. Charles Messier was first to lay eyes on it back in July 1764, when he described it as “A cluster of 7 or 8 very small stars...which one sees...in the form of a nebula.” Through my 10x50s, M29 does indeed look like a tiny, rectangular nebulosity of grayish light. Moving up to my 16x70 giant binoculars resolves those stars Messier mentioned. They form a small dipper-shaped pattern that some liken to the Pleiades in form. Four of the cluster's brightest members create a rectangular bowl, while a fifth can be imagined as a stubby handle. But despite that appearance, the cluster is nicknamed the Cooling Tower. Sorry, but that analogy misses me.

Lastly, scan from Sadr along the Swan's eastern wing to the star Epsilon (ε) Cygni. Epsilon forms a right triangle with 4th-magnitude Lambda (λ) Cygni to its north and 6th-magnitude SAO 70406 to its northwest. If you have a good eye, you should also see that SAO 70406 is surrounded by several fainter suns. That small clump actually forms an open cluster that was missed by Messier and the Herschels. Known as **Ruprecht 173 (Ru 173)**, the cluster spans an area of sky twice as large as the Full Moon. And that's the problem. The cluster is so large, and its stars so loosely packed, that it goes unnoticed through the narrow fields of most telescopes. The wider fields of binoculars, however, are perfect for showing that the 8 brightest cluster stars form a pattern that looks just like a tiny version of the winter constellation Lepus the Hare. That's why I think of this as the Baby Bunny Cluster.

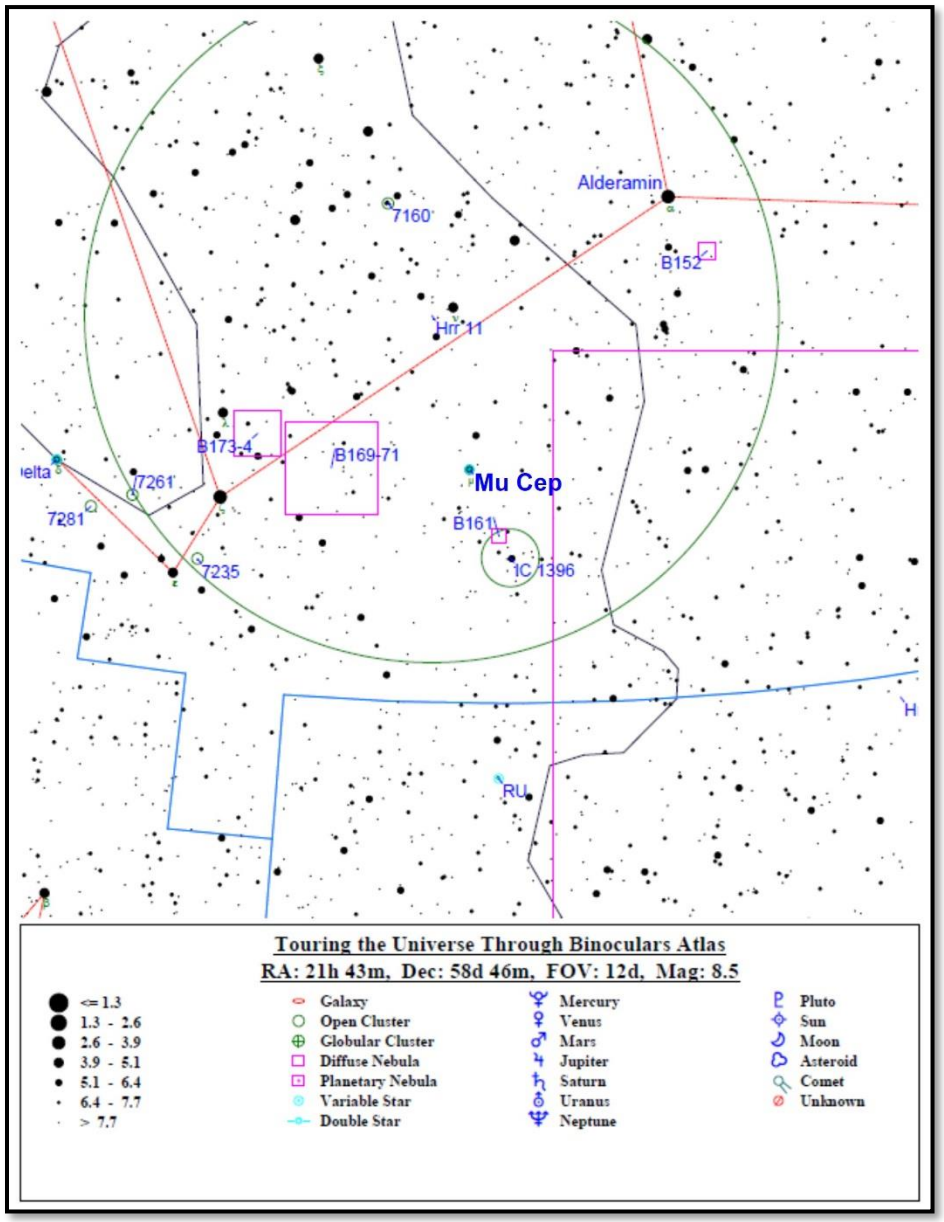
10.NGC 6934



On September 24, 1785, William Herschel discovered a curious sight in Delphinus. He subsequently cataloged it as H I.103 in his Catalogue of Nebulae and Clusters of Stars. That designation meant that it was the 103rd entry in Class I. By definition, all Class I objects were " difficult to resolve and/or measure." Herschel's find was later included in the New General Catalog as **NGC 6934**.

Globular cluster NGC 6934 is found some 4° south of Epsilon (ε) Delphini, the tip of the Dolphin's tail. Shining at 9th magnitude, it's just within reach of 50mm binoculars on dark, clear Stellafane nights. Once, in his Deep-Sky Wonders column, Walter Scott Houston also remarked that, "because of its setting, I find it a particularly pretty object for rich-field telescopes." The same can be said of its appearance through 70mm and larger binoculars, as well. Through 11x80 binoculars, it appears as a small, faint smudge of grayish light in a striking starfield. That's probably why it is included in the Astronomical League's "Binocular Deep Sky Club."

11. Mu Cephei

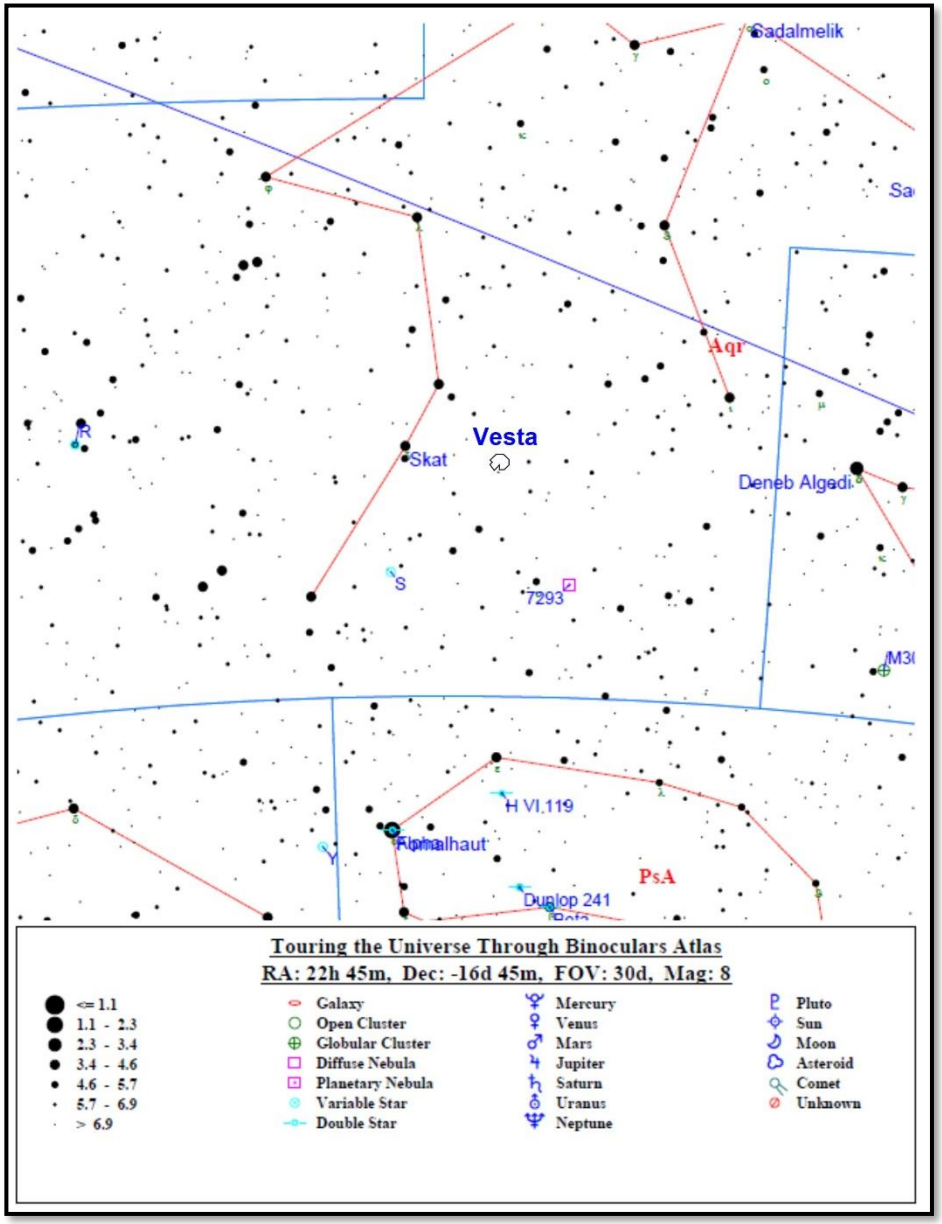


Aim your binoculars south of the line connecting Alderamin (Alpha [α] Cephei) and Zeta Cephei, along the bottom of the Cepheus "house" figure. There, you'll notice a 4th-magnitude star, **Mu (μ) Cephei**. Mu certainly doesn't distinguish itself for its brightness, but it more than makes up for that by its color. You may know Mu by its descriptive nickname, Herschel's Garnet Star. William Herschel described Mu with that colorful adjective in 1783, when he wrote "It is of a very fine deep garnet colour…and a most beautiful object, especially if we look for some time at a white star before we turn our telescope [or binoculars] to it…" Take a look for yourself and repeat Herschel's observation by comparing Mu to surrounding stars. Mu appears reddish-orange through binoculars. Slightly defocusing the field will accentuate its color.

Mu is classified as a red supergiant star. But not just any red supergiant, mind you, but one of the largest known. Mu is estimated to be between 1,260 and 1,650 times larger than our Sun. If we could place it in the center of our solar system, the star's edge would lie between the orbits of Jupiter and Saturn.

Mu is also a variable star that is perfect for binocular study every night you head out. Over a period that averages 730 days, Mu slowly fluctuates in brightness from a maximum of magnitude 3.4 to a minimum of 5.1.

12. Vesta



Vesta, the fourth asteroid discovered, was found on March 29, 1807, by the German physician Heinrich Olbers. Olbers had also discovered the asteroid Pallas two years earlier.

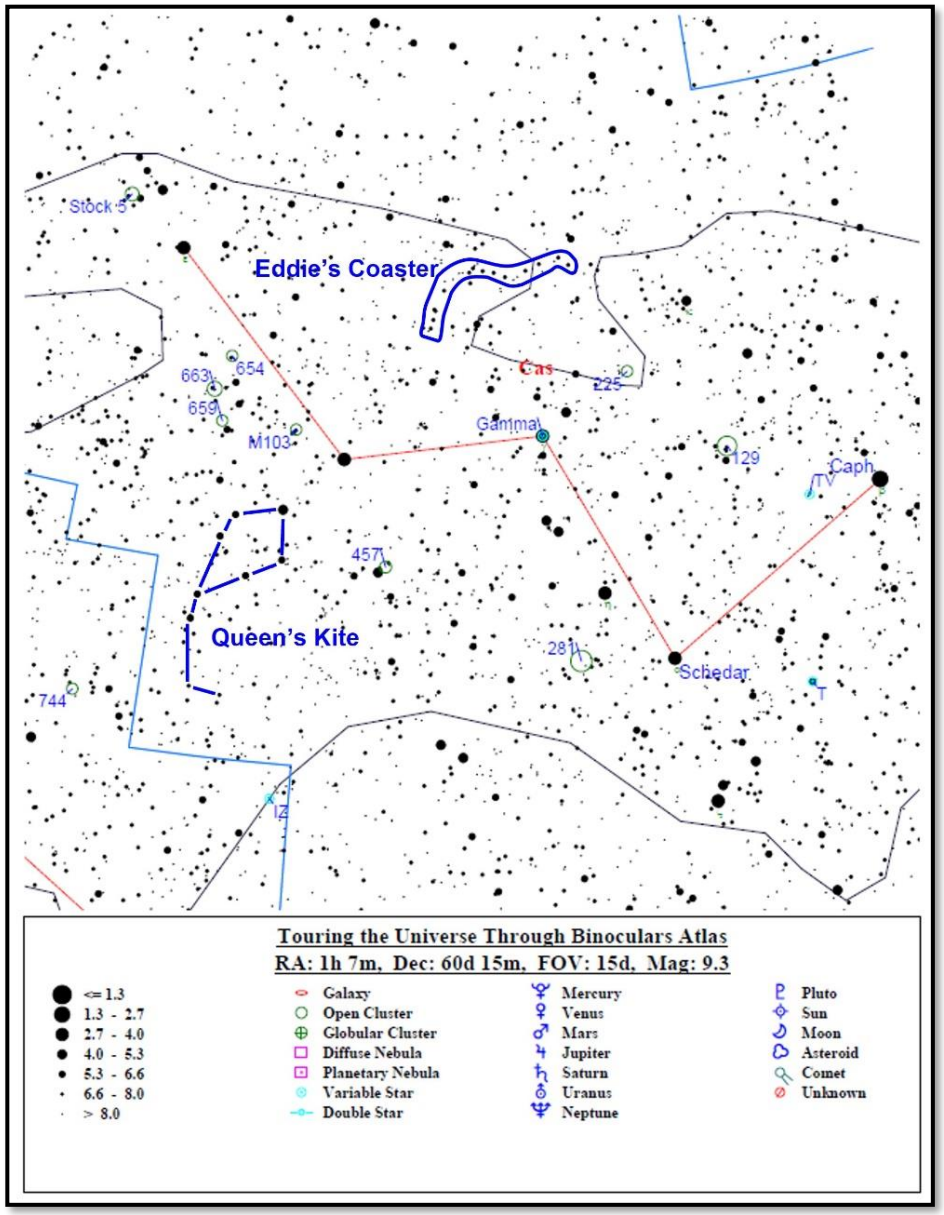
Vesta always puts on a fine show around opposition. That's next set to occur on August 22. But that doesn't mean we can't enjoy it right now through binoculars. You'll just have to wait a little while until it is high enough in the southeast to spot it.

Vesta is currently passing through the constellation Aquarius. The chart at left shows its location on July 29, but it's good enough to find Vesta any night this weekend.

To get there, start at Deneb Algedi (Delta [δ] Capricorni) in neighboring Capricornus. Looking through your binoculars, head east 16°, or a little over two fields of view, to 3rd-magnitude Skat (Delta [δ] Aquarii). You'll know you're in the right place if you also see 5th-magnitude 77 Aquarii half a degree south of Skat. With both stars in view, shift your attention about 3° west, back from whence you came. Do you see a 6th-magnitude star almost touching a faint 8th-magnitude point immediately to its south? That 6th-magnitude point is actually Vesta!

If you are interested in asteroiding, you will need a source of accurate finder charts. One of the best online resources is in-the-sky.org/newsindex.php?feed=asteroids. There, you can download charts for whichever asteroid you are seeking.

13. Eddie's Coaster and the Queen's Kite



Here are two fun asterisms to enjoy through binoculars.

The first was invented by British amateur astronomer Eddie Carpenter. Known as **Eddie's Coaster**, this meandering double-dipping wave of faint stars lies about 3° north-northeast of Gamma (γ) Cassiopeiae, at the center of the "W." Eddie's Coaster includes more than a dozen stars spanning 2.7°. The chance alignment reminded Carpenter of an amusement park roller coaster, which led to the asterism's name. If we ride the coaster from west to east, it starts at 7th-magnitude HD 4841 and then ascends. After topping out, it drops to 8th-magnitude HD 5815, only to rise again before a second, steeper drop brings our ride to an end at 7th-magnitude HD 7156. Admittedly as we see Cassiopeia rising, the coaster is tilted on its side, but use your imagination. All together, they stand out nicely through 10x50 binoculars.

The second asterism, called the Queen's Kite, was born in the inventive mind of the late John Davis. For many decades Davis was a well-known personality here at Stellafane as well as at other amateur astronomy events across New England.

I first met John some three decades ago and we soon became fast friends as we shared stories about conquests through our binoculars. It quickly became clear to me that not only did he have exceptional observing skills, but his inventive mind also let him see patterns, or asterisms, through his binoculars where I just saw random scatterings of stars.

The Queen's Kite is formed from a distinctive diamond-shaped frame about 2° southeast of Delta (δ) Cassiopeiae. The top point of the kite is marked by 5th-magnitude Chi (χ) Cassiopeiae. Half a dozen 6th- and 7th-magnitude stars fill out the rest of the kite's diamond-shaped body. SAO 22566 forms the southernmost tip. More stars in an arc wind toward the west-southwest for the tail.