Binocular Universe:

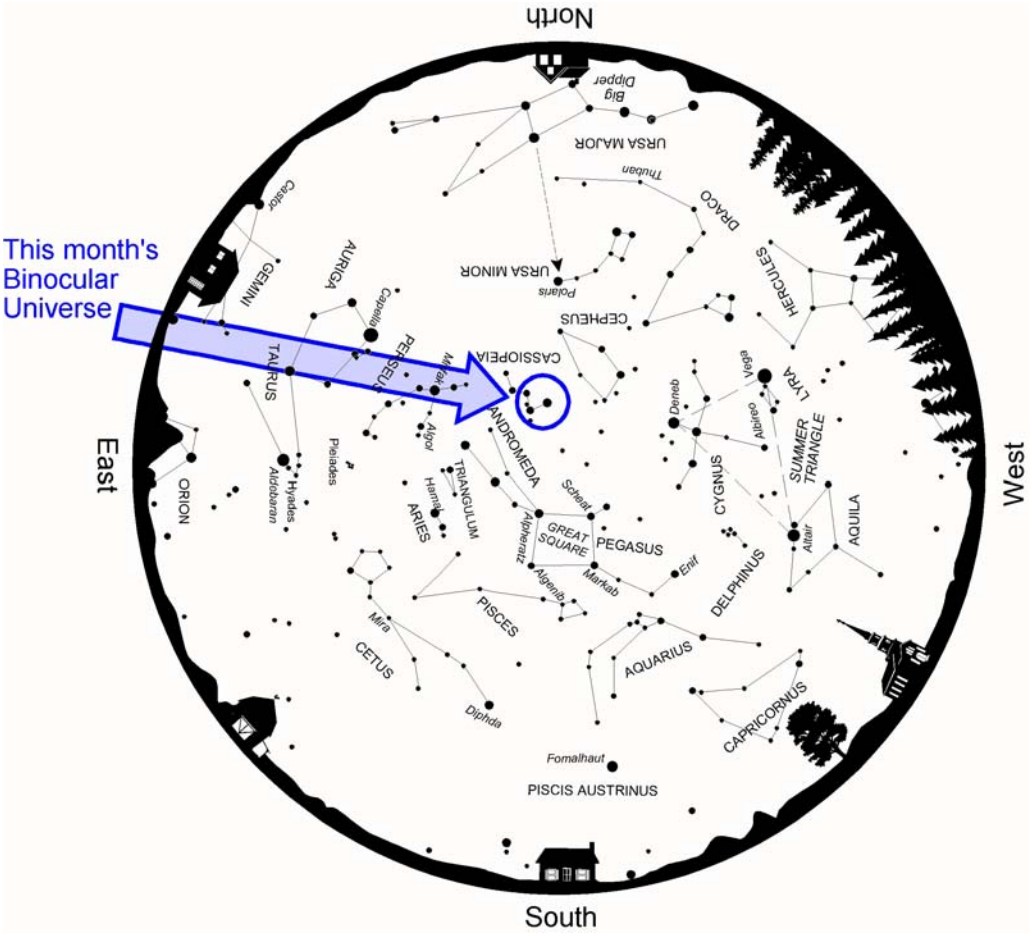
Hail the Queen

November 2010

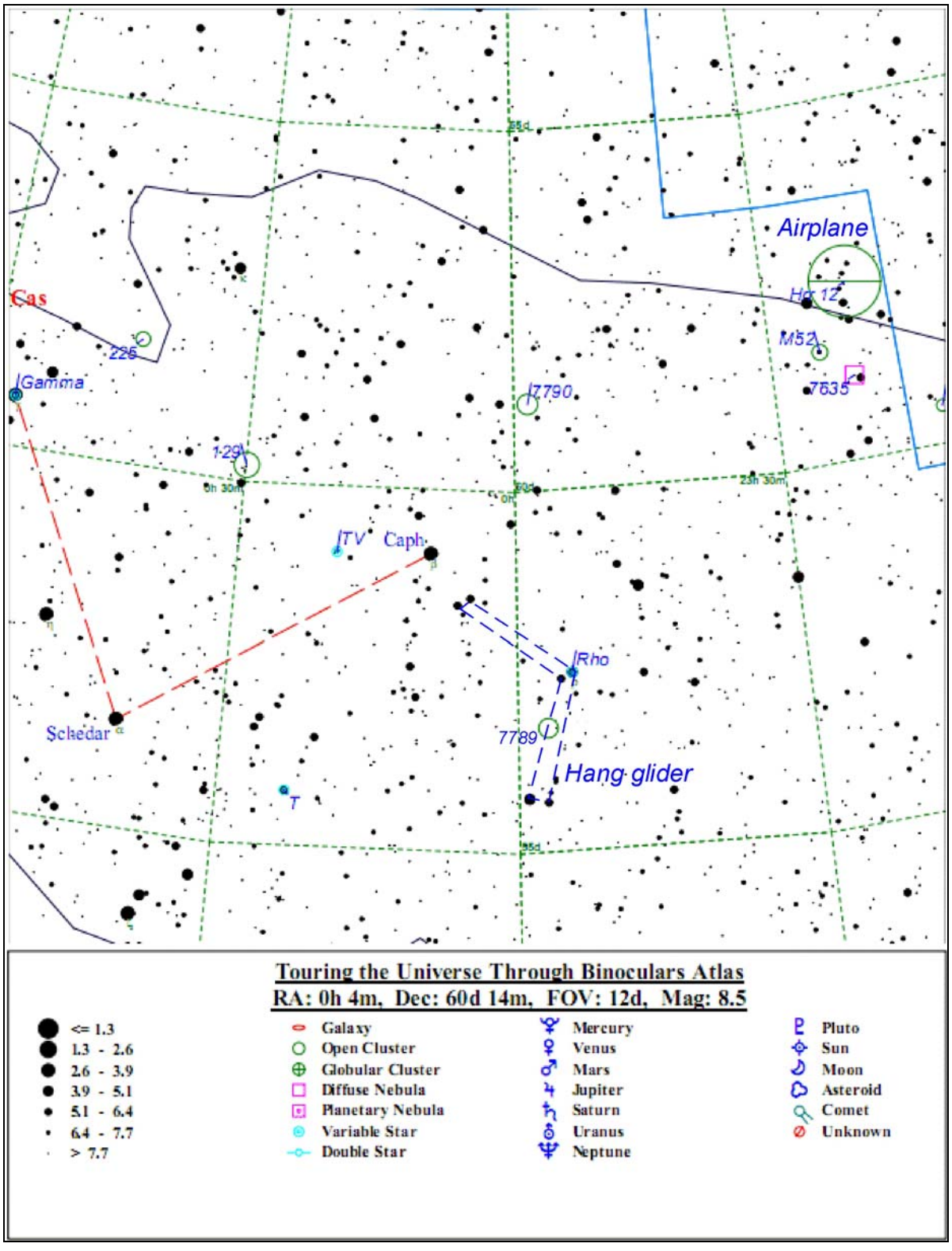
Phil Harrington

I hope you're dressed appropriately, because this month we have an audience with the Queen…Queen Cassiopeia, that is. Cassiopeia reigns over the autumn sky as she rides high in the north, sitting on her royal throne.

You have probably heard the story of Queen Cassiopeia, of how she and King Cepheus ruled ancient Ethiopia. Cassiopeia was well known for two things: her great beauty and her shameless arrogance. One day, she bragged of being more beautiful than the sea nymphs, who were well-known for their exquisite loveliness.



Above: Autumn star map from Star Watch by Phil Harrington



Above: Finder chart for this month's Binocular Universe.

Chart adapted from Touring the Universe through Binoculars Atlas (TUBA), www.philharrington.net/tuba.htm

The sea nymphs overheard this boasting and complained to their father, Poseidon, the king of the seas. Poseidon became so infuriated that he created Cetus the Sea Monster. Cetus was sent to Ethiopia to devour the citizens of the land. King Cepheus was told that his people could be saved only if he were to sacrifice his daughter Andromeda to the sea monster. As king, he had no alternative but to lead his daughter to the water's edge and chain her to a rock. There, she was left to the mercy of Cetus.

Just then, our hero, Perseus, appeared on the scene. Perseus, the son of Zeus, had been ordered to kill a gorgon called Medusa. Medusa was a very ugly creature whose hair was made of snakes. In fact, she was so ugly that anyone who looked at her face would instantly turn to stone. To avoid that fate, Perseus was given a highly-polished shield and told not to look directly at Medusa, but rather only at her reflection. He was also given a helmet that made him invisible and a pair of winged sandals that allowed him to fly. With these, Perseus was able to sneak up on and quickly behead the horrible creature, and put her head in a leather bag. Some of Medusa's blood fell into the water to create Pegasus the Flying Horse. Perseus climbed on the back of Pegasus and flew away.

Meanwhile, back at the seashore, things were looking pretty grim for Andromeda. Perseus heard her cries for help and swooped down to rescue her. Telling Andromeda to close her eyes, he pulled Medusa's head from the bag and dangled it in front of Cetus, who looked at it and instantly turned to stone. Perseus had rescued Andromeda, and they fell in love. They climbed onto the back of Pegasus and flew off into the sunset.

Like its mythological namesake, the constellation Cassiopeia is resplendent with royal beauty when surveyed through binoculars. Let’s begin with one of my favorite open clusters in the constellation, **M52**. To find it, draw a line from Schedar (Alpha Cassiopeiae) to Caph (Beta Cassiopeiae), the westernmost stars in the constellation’s famous W pattern, and continue it an equal distance to the northwest. There, you should spot a four-star diamond pattern. M52 lies just to the diamond's south.

Although about 200 stars call M52 home, only a few are bright enough to crack the binocular barrier; the rest blend into a little cloud of misty starlight. Whenever I look at M52 through binoculars, I am reminded of what Charles Messier himself saw when he discovered the group on September 7, 1774. He described it as "a cluster of very small stars mingled with nebulosity."

If you sit back and scan the area around M52, you're bound to bump into many interesting knots and small clumps of stars. It's always fun to look for patterns and make up your own mini-constellations. That's exactly what my buddy John Davis, a veteran deep-sky observer from Amherst, MA, was doing when he happened upon the little diamond-shaped asterism just to the northwest of M52, which I list in Touring the Universe through Binoculars as **Harrington 12**. Adding in a few stars to its north, Davis sees the outline of an **airplane**. As he explains, "the plane's brightest star (labeled as 4 Cassiopeiae on star atlases) marks the end of the

eastern wing, while a lone 6th-magnitude star lies at the tip of the western wing. A short arc of faint stars stretching northward forms the plane's crooked tail."

Left: A sketch of M52 made by the author through a pair of 10x50 binoculars. Davis's Airplane lies above and to the right of the cluster.

North is up.

Keeping with the aeronautical theme, return to the star Caph in the Cassiopeia W and look to the southwest. Can you also spot three pairs of stars? Although none of these is a true binary star system, each pair forms the corner of a slim triangular asterism that reminds me of a skinny **hang glider**. The brightest star in the asterism, Rho Cassiopeiae, is one of the two at the nose of the hang glider, while 5th-magnitude Sigma Cassiopeiae is the brighter of the two stars at the end of the southern wing.

With sharp eyes, you might notice a faint stain on the trailing edge of the glider's southern wing. That's **NGC 7789**, a rich open cluster discovered in the fall of 1783 by Caroline Herschel, William's sister. Through binoculars, it looks like a round glow with perhaps a few dim points shining through. Although the cluster's individual stars are faint by binocular standards, together they blend into a pleasant little glow that stands out nicely against the starry surroundings.

Two months ago, I received an e-mail from Mike Allen of Bucyrus, Ohio, who suggested a wide double star near Caph. He writes that the double star, **STT 254**, makes a nice target for giant binoculars. STT 254 consists of WZ Cassiopeia, a red-orange carbon star that fluctuates between magnitudes 7.4 and 10, and very blue, 8th-magnitude companion. Burnham's Celestial Handbook lists the separation as 53 arc-seconds. Allen notes that "the red and blue contrasting colors are unusual. Except for a lone yellow star close to the north, the double is surrounded

by a sprinkling of pure white stars of various magnitudes." Take a look and post your impression in this column's discussion forum.

If you draw a line between Caph and Gamma Cassiopeiae, and aim exactly halfway in between, you will find the 6th-magnitude star SAO 21457 and, just to its north, **NGC 129**. NGC 129 is a 7th-magnitude group of some three dozen stars discovered by William Herschel in 1789. Through my 10x50 binoculars, NGC 129 looks like a small, featureless glow, while my 16x70s also show five dim points peeking back at me.

One of those stars is **DL Cassiopeiae**, a Cepheid variable star. Cepheids, which are characterized by rapid rises to maximum brightness followed by slower dimming, were key to unlocking the secret of distances to other galaxies. Across 8 days, this pulsing yellow giant star cycles from magnitude 8.6 to 9.3, and back again.

Our last target this month is another open cluster, **NGC 225**. It resides about halfway from Gamma to Kappa Cassiopeiae. While at Stellafane this past August, I could see that something was in my 10x50s, but it was pretty vague. Upping the game to the 16x70s, NGC 225 evolved into small semicircle of 10 faint points. As with NGC 129, the cluster's star-filled surroundings really add the beauty of the scene.

This concludes our three-month survey of the skies that passed over the hallowed grounds of Stellafane 2010. As I mentioned back in the September column, this year's convention was one for the ages. The weather was great, the skies were just beautiful, and the homemade scopes on display were exquisite. If you've never been there, you owe it to yourself to make the pilgrimage at least once in your lifetime. Hope you can join us next year, over the weekend of July 28-31.

Of course, if you are looking for more binocular targets to enjoy right now, here are some additional sights plotted on this month's TUBA atlas chart:

Object	Con	Type	R.A. (2000)	Dec	Mag	Size/Sep/ Period	Notes
TV	Cas	Vr	0 19.3	+59 8	7.2-8.2	1.813 days	Eclipsing Binary
T	Cas	Vr	0 23.2	+55 48	6.9-13.0	444.83 days	Long Period Variable
129	Cas	OC	0 29.9	+60 14	6.5	21'	*TUB page 114*
225	Cas	OC	0 43.4	+61 47	7.0	12'	
Gamma	Cas	Vr	0 56.7	+60 43	1.6-3.0		*TUB page 114* Irr; Gamma Cas prototype
7635	Cas	DN	23 20.7	+61 12		15'x8'	Bubble Nebula
Hrr 12	Cas	OC	23 20	+62 30		60'	*TUB page 115* Asterism
M52	Cas	OC	23 24.2	+61 35	6.9	13'	*TUB page 115* NGC 7654
Rho	Cas	Vr	23 54.4	+57 30	4.1-6.2	320 days	Semi-Regular
7789	Cas	OC	23 57	+56 44	6.7	16'	*TUB page 115*
7790	Cas	OC	23 58.4	+61 13	8.5	17'	
7510	Cep	OC	23 11.5	+60 34	7.9	4'	

Next month, we will explore some of what our story's hero, Perseus, has to offer. Meanwhile, if you have any comments or suggestions for future columns, e-mail them to me at phil@philharrington.net.

And as always, remember that, when it comes to stargazing, two eyes are better than one!

About the Author:
Phil Harrington is the author of eight books on astronomy, including Touring the Universe through Binoculars. Visit his web site at www.philharrington.net for a preview of his next book, Cosmic Challenge, coming this month from Cambridge University Press.