



## Observing Special Interest Group Session 2 – August 19, 2020

- **Open discussion - what have you seen lately? Please share**

## • Star Hopping and Star Charts,

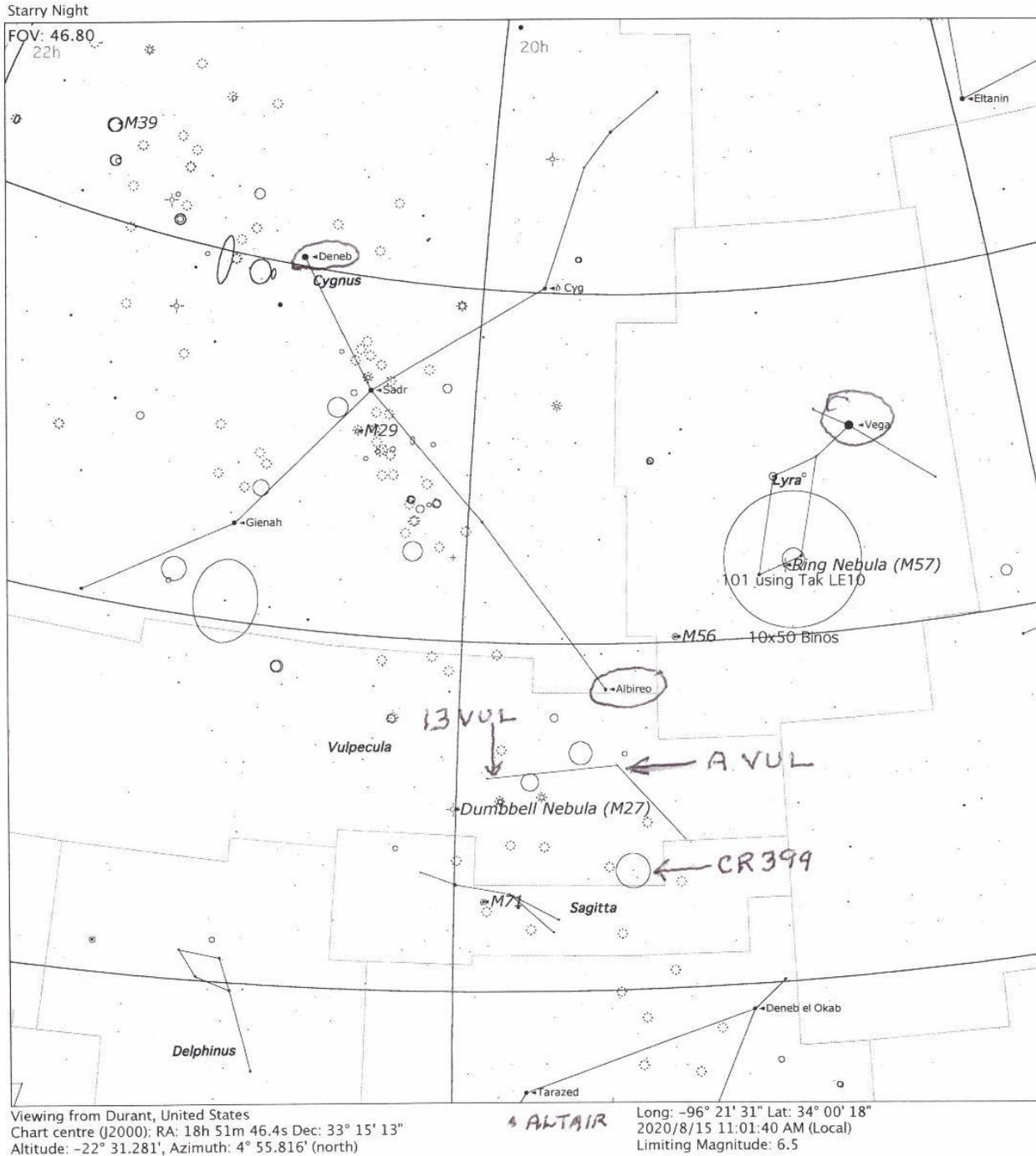
**Before we start trying to hunt down objects you need to know some basic information about the equipment.**

- **Focal length:** is the distance the light travels through the telescope to come to a point of focus. In modern telescopes it is measured in millimeters.
- **Eyepieces:** also have a focal length in millimeters. When choosing an eyepiece you are choosing the focal length.
- **Magnification:** The focal length of the eyepiece & the focal length of your telescope will determine the magnification your optics will provide. How much magnification power are you looking for? Eyepieces with a lower focal length provide larger magnification. The math is: Magnification = Telescope focal length (mm) divided by Eyepiece focal length (mm).  
 $1200/12 = 100x$ .
- **Apparent field of view:** is the size of the field determined by the manufacture. Read the specifications to find it. Some common sizes are  $52^\circ$  and  $82^\circ$ . Basically, this is the field that you see when you hold the eyepiece up to your eye to look through it without the telescope. You must know this number to find the true field of view.
- **True field of view:** is calculated as follows, True Field = Apparent Field divided by magnification  $52^\circ/52x = 1^\circ$ . This actually tells you the size of the field size you are seeing through your telescope. The larger the true field number, the wider the area you will see on the sky. When star hopping it is critical to know the size of your field. If you are told to move your telescope  $3^\circ$  then you must know how many times to move that telescope with that particular eyepiece to make it move  $3^\circ$ . It is hard to have perfectly exact fields but if you have a good idea of what your field is, then with practice, you will learn to use your scope with your eyepieces. Say I have a 4" refractor with 540mm focal length (fl). I use a 10mm eyepiece with the apparent field of  $52^\circ$ . The math is  $52^\circ/54x = .96^\circ$ , very close but not exact.

With this knowledge in mind, let's go to work.

When you try this outside, you will need a telescope of at least 80 to 100mm and a good pair of binoculars. Use the formulas above to figure out your true fields of view. **Note**, most binoculars will tell you the field of view. None of these objects should take more than 80x in a telescope.

This month we will learn some important 1st magnitude stars and three constellations. Also, here is a good link to help you learn more about constellations. <https://www.constellation-guide.com/>



**The Summer Triangle: Deneb in Cygnus, Vega in Lyra and Altair in Aquila**

- Let's start with **M57 in Lyra**. Identify the summer's brightest star, Vega, which is only 25 light years away. Look below it and find the parallelogram, which ancients saw as a Lyre. M57 lies between the two bottom stars, slightly closer to Beta. In an eyepiece with a true field of view of  $1^\circ$  it will show both the star Beta and M57. Looking towards Gamma you should see a tiny greenish looking ring. Center it and change eyepieces to get about 80x and you will have a great view of this planetary nebula. Before moving on, take some time to identify the rest of the constellation. If you are adventurous, M56 is a nice globular cluster that you can track down once you master your star hopping skills.
- Now look northeast to find another 1st magnitude star. This star is **Deneb** in the constellation Cygnus. It is a huge star, that lies at least 1,400 light years away and is probably much further. Its luminosity is 200,000 times greater than the sun and it is 200 times wider as well. Remember, the sun is 869,000 miles wide. These two stars Vega and Deneb are part of the great summer triangle. A third 1st magnitude star is out there of course. Can you see it? Each of the triangle's stars are part of three separate constellations. Identify each star and now you know three constellations. But before we leave Cygnus let's look at another star.
- **Albireo, Beta Cygni** is a 2nd magnitude double star in the constellation of Cygnus. It is one of the most beautiful stars in the sky. Albireo lies at the opposite end of Cygnus, from Deneb. It can be difficult to see naked eye in the city. Albireo has a yellow gold primary and a bright sapphire blue secondary. Really nice.
- Now let's do a more difficult star hop, but this time we will use 10x50 binoculars with a huge  $6^\circ$  field. From Albireo in binos, you will find Alpha Vulpeculae, which is about  $\frac{2}{3}$  of the field south. Alpha Vul is a very wide double star of 4.4 and 5.9 magnitudes which make it distinctive and easier to identify. You will need dark skies to find this star. Placing Alpha Vul at the northern edge of the field you should see a very curious asterism at about 5:00 at the other end. Does it look like a coat hanger to you? This is the name given to CR399. Once you have found it, perhaps you would like to use a very low power, wide angle eyepiece in the telescope to have a better look. Intriguing isn't it? What is an asterism? How is it different from an open cluster?
- Once again, using binoculars put Alpha Vulpeculae at the extreme western edge of the field. Look to the far edge, or just beyond, and you will find Vul 13. It is a 4.6 magnitude star with a very close double that you can't split. Once Vul 13 is centered, the planetary nebula M27 lies about half a field away to the southeast in binoculars and will look like a small grey fuzzy blob. Now that you know the location, change to your telescope and use 75x to 100x to see it clearly. What is a planetary nebula and why do astronomers study them so carefully? How is this one different from M57?
- There you go. Now you have learned three late summer constellations (four if you found Altair in Aquila), have seen two beautiful double stars, an intriguing asterism and two planetary nebulae. Consider yourself an amateur astronomer.

## Some more good things to know.

- **NGC** refers to the New General Catalog. Not so new, published in 1885 by [John Louis Emil Dreyer](#) . It contains 7,840 objects of all kinds, most not viewable in an 8" telescope. But there are hundreds that are easily seen.
- **IC** refers to the index catalog. The IC is newer, 1908, and contains another 5,386 objects of which only a few can be seen with small telescopes. Note, our friend Dennis Harwell refers to IC catalog as the I can't C them catalog. All kidding aside, these two catalogs are the basic databases for modern astronomy. So next time you hear someone say there is NGC457 or IC4665 this is your reference. Both of the catalogs have numerous errors in them and sometimes they list the same object. So don't be too upset if they confuse you from time to time.
- **Messier** - Another catalog or list was created by a man named Charles Messier. He lived from 1730 - 1817. While we were busy with a revolution against the British, he was busy creating a list of 109 objects. These bright and beautiful objects are the basic list for amateur deep sky astronomers. Messier was a comet hunter and just wanted a basic list of things that were not comets. Little did he know all of the wonderful things he was actually seeing. When we say M57 & M27 these are two of the objects on his list.

## Book Corner

[The Light-Hearted Astronomer](#) by Ken Fulton AstroMedia, Milwaukee, Wi.

Best Regards,

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