

## Advanced List

The 2026 Advanced List revisits some of the best of past Advanced/L3 lists, going back 20 years. Matt Vartanian and Howard Banich generated the original lists these objects are from, and I want to give credit to their fine work, and also for Howard's guidance and advice as I take this on.

A goal for this year is to re-ignite interest in the Advanced List. Although there are still some exceptionally challenging objects, most are not quite so extreme... in reach of moderately large aperture scopes with experienced observers.

To help observers with these, some detailed guidance is given for the naked-eye objects and there is a finder chart for Pluto (for 2026 during the week of the event). Finder charts and some photo content from the past are also included.

Most of the objects have a photograph from DSS2 via HiPS2FITS. These were generated with the intent of showing enough background stars to assist with visual location. Often there will be a larger field of view picture for this purpose, with a smaller field one for a detailed look, with field size in degrees noted.

The Pluto finder chart includes the source details on the chart.

Formal acknowledgement for these photos: "This research made use of hips2fits, <https://alaska.cds.unistra.fr/hips-image-services/hips2fits>, a service provided by CDS.

A good amount of information is included below. However, as an advanced list, prior research is very likely required to observe these objects. This can serve as the start of that.

I have viewed several of these objects in the past, and some just recently (but not all). I'll include any hints learned from those observations, and the challenge of seeing them in a 10" dob. This may help you locate the objects. It may also help you decide which ones to try first.

There are a large number of objects to choose from to suit your interest, and equipment capability, and many more than needed to earn a pin (10 needed of 20). I hope you find them interesting and rewarding. Have fun!

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Oregon Star Party Observing Programs

v1.0 06252026

## 1. Hadinger's Brush

This phenomena is a characteristic of the human eye that allows sensing the direction of linear polarization. I'm adding some detailed explanation here so you be more likely to experience this fascinating capability of the eye. (Most people have not noticed this, or if they have, don't know what it is.)

This "object" appeared in the 2012 Advanced list which focused on naked-eye objects and phenomena. For me, the phenomena manifests (against a white polarized background) as two faint yellow 80 degree pie-shaped "fans" or "brushes" that fade progressively away from the center, with a size somewhere between half and one fist wide at arms' length. Much fainter bluish projections are visible perpendicular to the fans, perhaps 45 degrees wide. Evidently this varies from person to person.

To learn how to see this, I started by looking at a white background through polarized sunglasses. The orientation of the "brushes" will track the tilt of your sunglasses. An alternative is looking for this artifact against an LCD computer screen (which typically are polarized). Then, practice against the sky with polarized sunglasses.

Finally, look for the artifact against the daytime sky, without any polarization. The "brush" will track the direction of the sun (since the blue sky has polarization oriented relative to the Sun). For me, against a blue sky, the yellowish part is also slightly darker, and the blue portion is basically invisible. Though visible mid-day, it is more prominent when the sun is lower in the sky.

Final tip – the effect becomes less prominent after a few second "stare". Blink for a couple of seconds or rotate your head angle against your view to "reset".

I'll let you discover how the brush orients relative to the position of the sun for yourself. This will be needed to earn the object.

Good luck!

## 2. Venus in the daytime

This is another fun one from 2012. Turns out, Venus is surprisingly visible in the daytime. When you actually get your eye on it, it's obvious. But, that's harder than it sounds. I'm adding some detailed explanation here on this one as well, so you have a better opportunity to see it. It's really fascinating to pull off this feat.

Our night vision is well adapted to finding tiny specs of light away from our center of vision. That capability helped our ancestors stay safer and survive the night.

Our daytime vision is different. Most of our field of view is low-resolution (too low to detect a speck like Venus), while the center (actually a rather small area) is very high resolution. We see detail by constantly moving around this hi-res portion of our visual field, without really realizing it. Our perceived view is made up by real-time memory of this rapid scanning (well, more like all the gazes based on what we were looking at than scanning.)

The trick with finding Venus in the daytime is getting that high-res center area of our visual field to land on it, then keeping it there. Look away after finding it, it will literally disappear, until you can re-acquire. With practice, one gets better at it, but it's surprisingly challenging. The first time I found it, I took a photo of it to prove it was really there – it initially was so fleeting I had my doubts. It was really there. (Perhaps that is another way to determine the place to gaze?)

First step is to get a clear view of the sky where it should be, with blocking/shading to get the Sun out of your field of view. Second is figuring out where it's supposed to be – where to gaze. On 7/16 and 7/17, there is an excellent object in the sky to help "anchor" your search - the thin crescent Moon, which is relatively close to Venus in the sky then. (Exactly where will take a little research). As a final tip.... polarized sunglasses, with your head angled so the sky looks darkest, can increase contrast of both the Moon and Venus against the sky. Give it a try!

### 3. Sharpless/Sh2-155

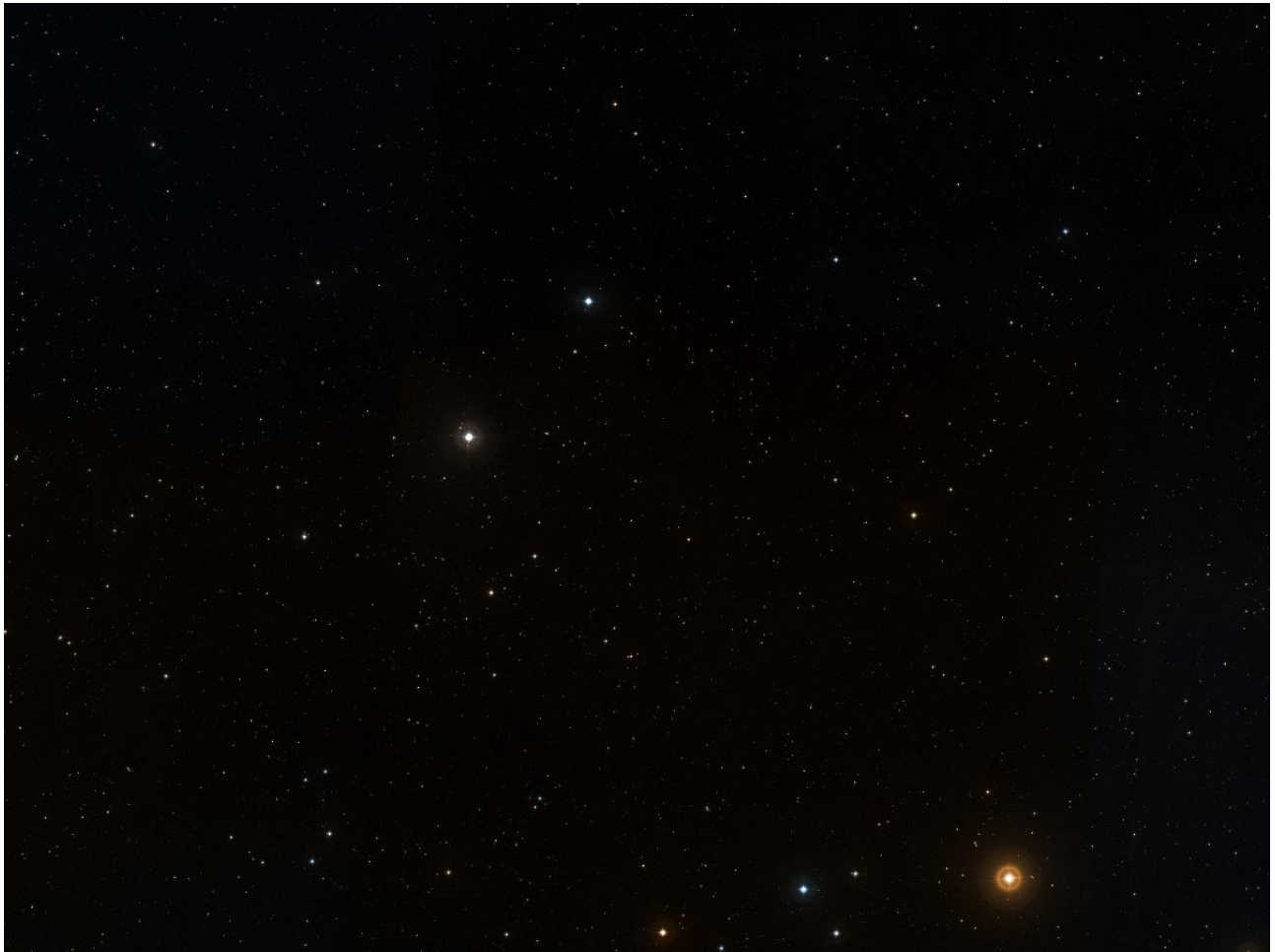
This object is known as the “Cave Nebula”. It is a dark nebula against a large HII emission nebula field. It is very large – nearly a degree. The mag 7.7 is for the entire large emission nebula, so low surface brightness. Use minimum power, and a filter is very likely required visually. (Similar to Horsehead Nebula). UHC and OIII are recommended online. Since H-alpha is highly recommended online for imaging, an H-beta filter may also work well if you have one. This one has appeared on Intermediate lists in the past but is a better fit for a lower-range Advanced list item. I have not seen this one in the 10” yet. Photo shows a 2 degree field.



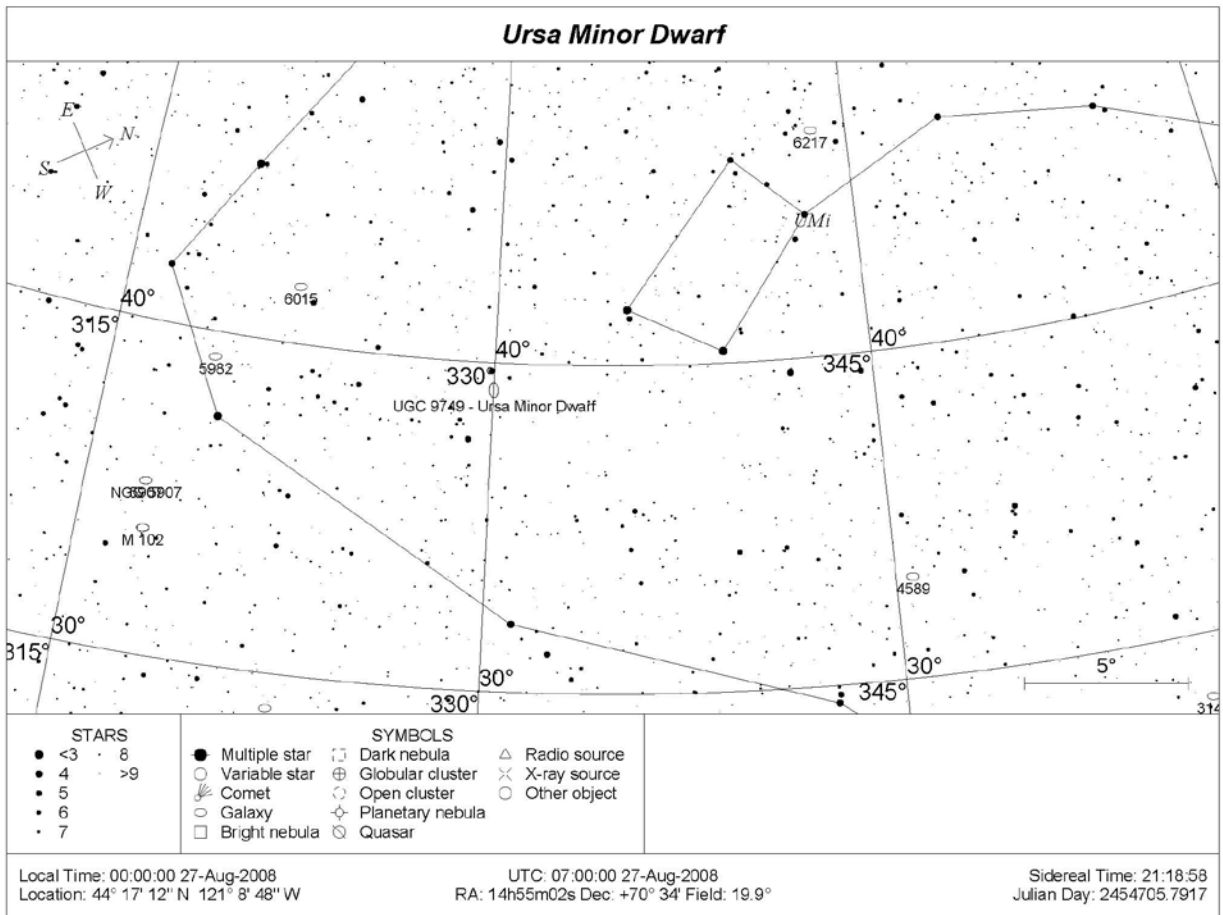
#### 4. UMi Dwarf Galaxy

This was one of the most challenging dwarf galaxies on the “Snow White and Seven Dwarves” list in 2008 and was also on the 2018 Advanced list. It orbits the Milky Way about 225,000 light years away. Magnitude 11.3 doesn’t seem that bad, until you consider the 0.5 degree size. This means very low surface brightness. In fact, the galaxy is **in the exact center** of the photo below – i.e. “no show” on DSS2. However, it does give you some context as to the positioning. That said, I have seen it with averted vision in a 10” scope. Use the lowest power you can. Object is also known as UGC9749.

The photo below should help with location. It shows a 4 degree field. The triangle of bright stars is the key to location. Object is at the center of the photo but not visible here.



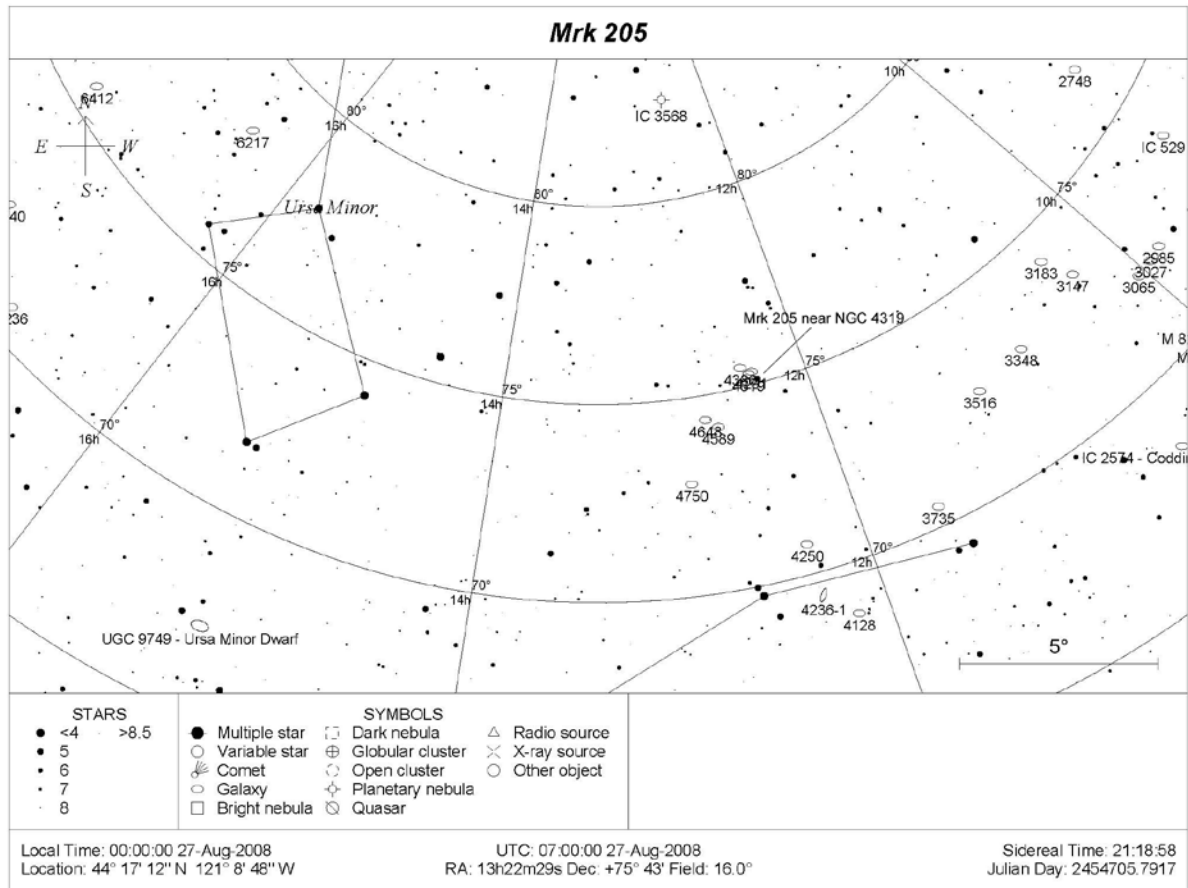
To help, the finder chart from 2008 is included, below.

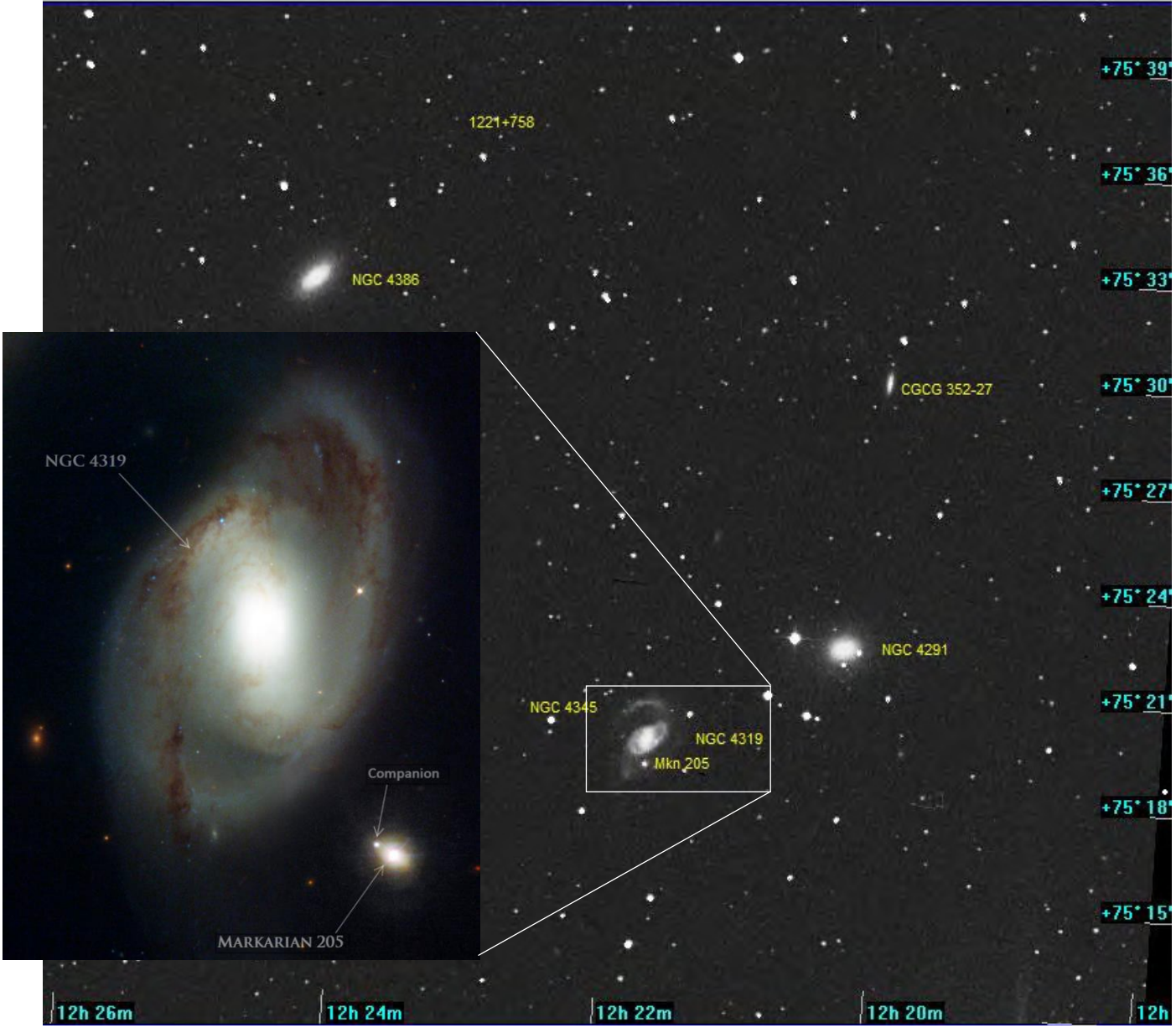


**5. Markarian 205 and NGC4319; need BOTH**

This was “Snow White” on the “Snow White and the Seven Dwarves” list in 2008, and was also on the 2016 Advanced List. It appears as a star within/near the edge of NGC4319. It’s actually not part of the galaxy – it is an active quasar about 1 billion light years away – way, way behind it. To date it’s the farthest away thing I’ve seen with my 10” scope. NGC4319 is a decent Intermediate List level item. Mrk 205 takes more work to detect.

Finder chart is from the 2008 list. Photo with close-up inset is from the 2016 list. Photo (not the inset) shows an approximate 0.5 degree field.





Inset photo: HST image of Markarian 205. The small oval galaxy at lower right is Mrk 205 and the star-like point on its left edge is its companion. The large galaxy in the center is NGC 4319.

**6. Three or more of the 10 NGC regions within M101**

This one is from the 2007 “Messier’s Revenge” Advanced List. The photo below should allow you to research and mark the NGC regions in advance so you can work to locate them at the telescope. Three are required to earn the object. The photo shows a 0.5 degree field.



**7. Three or more NGC, IC or stellar associations within M33**

This one is also from the 2007 "Messier's Revenge" Advanced List. The photo below should allow you to research and mark the NGC, IC and stellar association regions in advance so you can work to locate them at the telescope. Three are required to earn the object. The photo shows a 1.5 degree field.



**8. Andromeda Galaxy Globulars: G1/Mayall II "dim" and challenge G2/Mayall III "dimmer"; need BOTH**

These objects are also from the 2006 "Dim and Dimmer" Advanced List, and are globular clusters orbiting the Andromeda Galaxy. I've been able to see G1/Mayall II with my 10", and it appears just barely non-stellar bracketed by two close stars at about a 90 degree angle. I have not yet attempted G2/Mayall III.



G2/Mayall III on left, G1/Mayall II on right. The two galaxies up and to the left are UGC 330 (closest) and UGC 338.

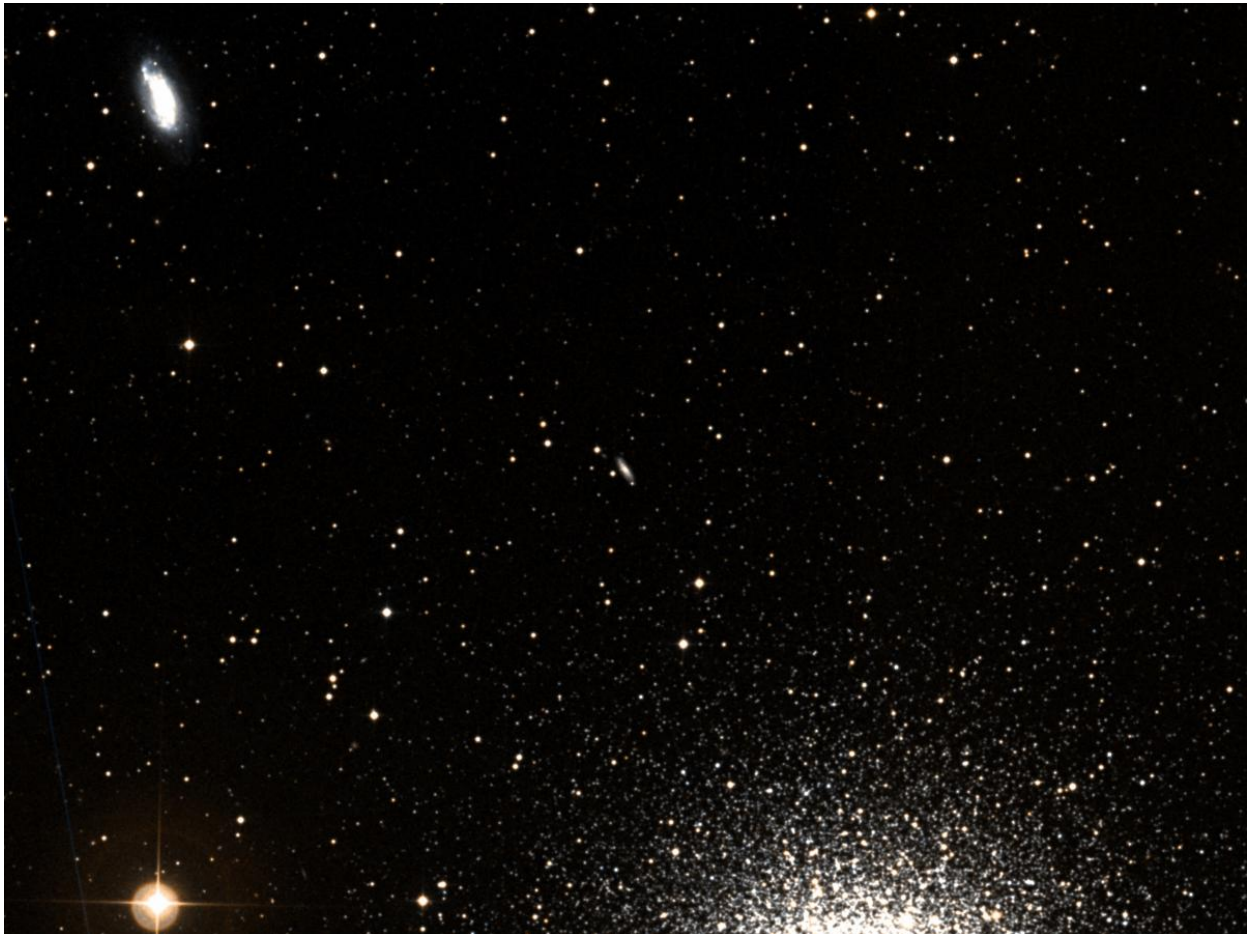
### 9. Palomar 6

This is a dim and relatively sparse/less prominent core globular cluster from the 2019 Advanced list. The photo shows at 0.5 degree field. I have not yet attempted this one.



**10. NGC6207 near M13 "dim" and IC4617 near M13 "dimmer"; need BOTH**

NGC6207 you've likely already seen when viewing M13, off towards the perimeter of a good view, and is in the upper left-hand corner in the photo below. IC4617 is right near the edge of M13 and is tiny and dim. It is in the center of the photo below. There are two adjacent pairs of stars that can help with visual location. I was able to get this in my 10" scope, but IC4617 is right at the edge of averted vision detectability for me. Though the source I used for the list details claims the magnitude for this one at 16, others show slightly brighter at 15.2. The photo shows a 0.5 degree field.



### 11. NGC6118

This one has appeared on Intermediate lists in the past but is a better fit for a lower-range Advanced list item. Dubbed the “blinking galaxy”, it is a low surface brightness spiral, with a 12.44 magnitude but 4.5' size. The triangles of slightly brighter stars on either side can help with location. Photo shows a 0.5 degree field.



**12. IC1296**

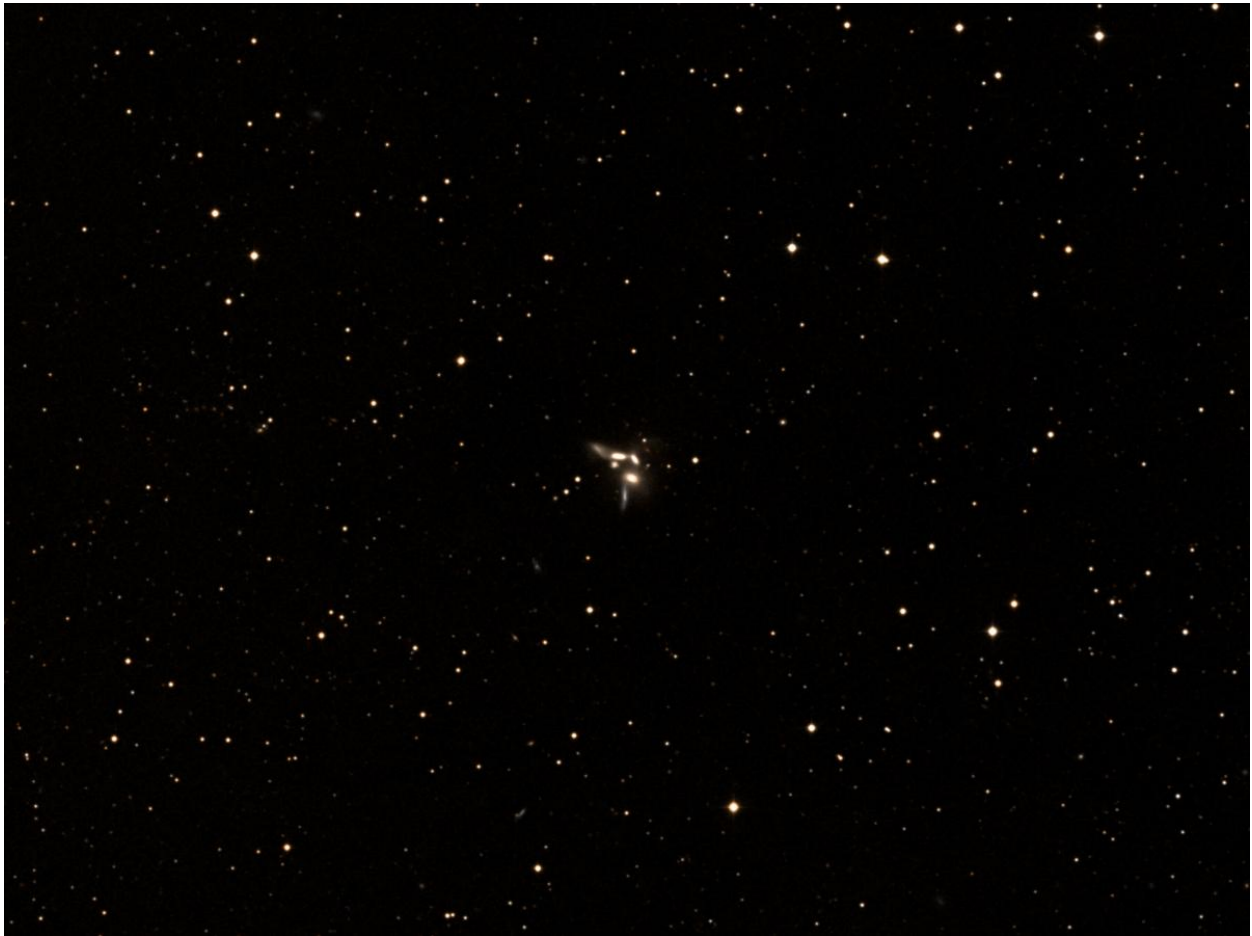
This one comes from the 2019 Advanced list. Very dim, very small, but location is easy due to proximity to M57 (the overexposed nebula at lower left). If you can detect both spiral arms, you earn a second item. The core is just detectable in my 10", but not the spiral arms. Photo shows a 0.2 degree field.



**13. Hickson79, Seyfert's Sextet, aka NGC6027 and nearby group**

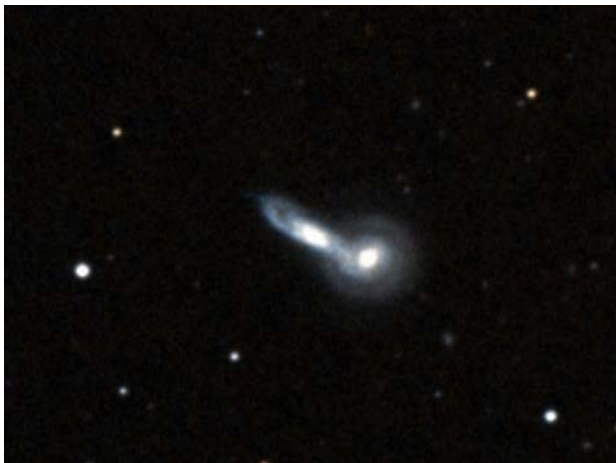
This one comes from the 2006 "dim and dimmer list". The whole group is "dim", individual objects are "dimmer". Need to see 3 of the 6 for the item this year.

This year during my preview I was able to detect the whole group in my 10" but conditions degraded (and twilight started) before I could identify individuals. I think it may be possible to detect a few individuals with careful observation under better conditions in the 10". Main photo shows a 0.5 degree field, close-up is 0.1 degrees.



#### 14. NGC5545 & 5544

This pair of colliding galaxies come from the 2017 Advanced List. Dim, and very small. But unique! I was able to see these in the 10", and determine which galaxy was face-on and which was edge-on. The main photo is a 0.5 degree field, the close-up is 0.1 degrees.



**15. NGC507 group, see at least three of the five nearby galaxies**

This galaxy group is from the 2009 Advanced List. I have yet to try it... likely easier to see these than Hickson 55. Need to see at least three of the five galaxies. Photo shows a 0.5 degree field.



**16. Hickson55, ARP329, UGC6514**

Like the above item, this galaxy group is from the 2009 Advanced List. I have yet to try it... it is possibly the most challenging item on this list. If you can make out a faint "line" in the correct position instead of five separate galaxies, you still earn the object. Main photo is a 0.5 degree field; close-up is 0.1 degrees.



**17. NGC7048**

This one has appeared on Intermediate lists in the past but is a better fit for a lower-range Advanced list item. I've not yet tried this one. Photo shows a 2 degree field.



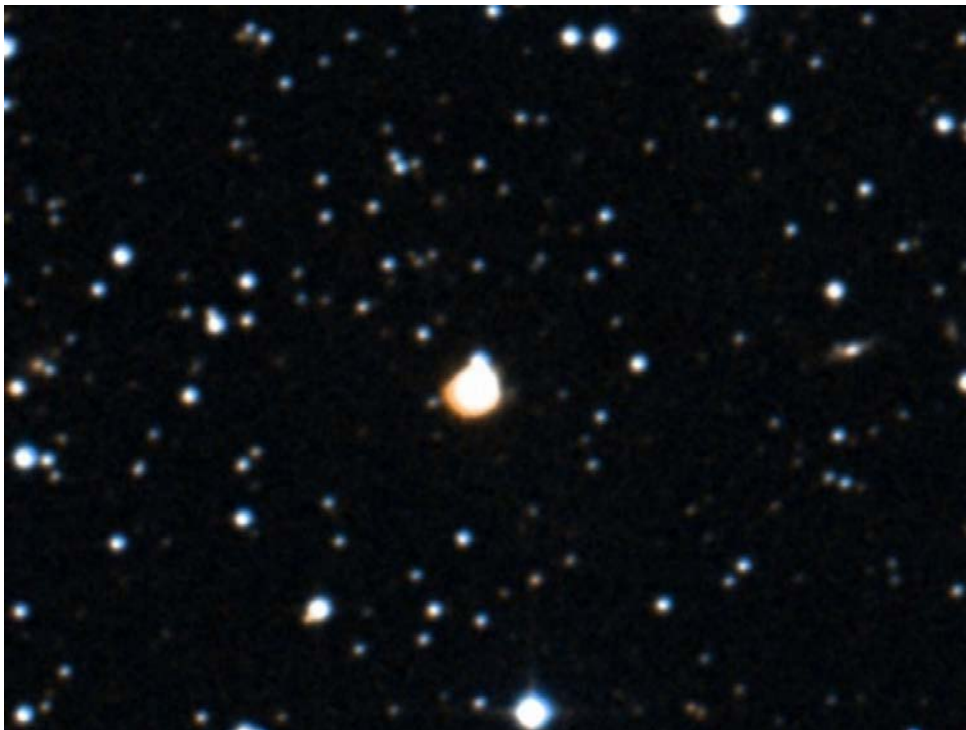
**18. Jones 1**

This one is from the 2017 Advanced List. I was able to see it in the 10" back then. Relatively large for a planetary nebula, and very dim. Filter highly recommended – I believe I used a UHC. Upper photo is a 1.5 degree field, lower one is 0.5 degrees.



**19. Minkowski 1-64**

The other ring nebula in Lyra. Smaller, dimmer. Blue circle in the upper photo is an artifact. I've not yet attempted this one. Upper photo shows a 0.5 degree field. Lower is 0.1 degrees.



## 20. Pluto

This one comes from the 2011 multi-contributor Advanced list. Pluto appears as 14.4 magnitude star (according to Starry Night 8 – finder below claims 15). You need to sketch (or photo for Astrophoto List) the planet with the background stars on multiple nights (and note data and time) to validate it moved, and is the “star” you think it is. You can “blink compare” just like Tombaugh did. I’ve seen this in a 10”, and yes, confirmed by blink-comparing (flipping sketches back and forth). Key to the find (unless you have go-to) is knowing in advance where the planet is in the pattern of background stars at the time you are observing. The finder chart below should be helpful.

