



## Small Wonders: Canis Major

**A monthly sky guide for the beginning to intermediate amateur astronomer**

Tom Trusock

18-February-2007



**Figure 1: Canis Major – Image courtesy Jeremy Perez**

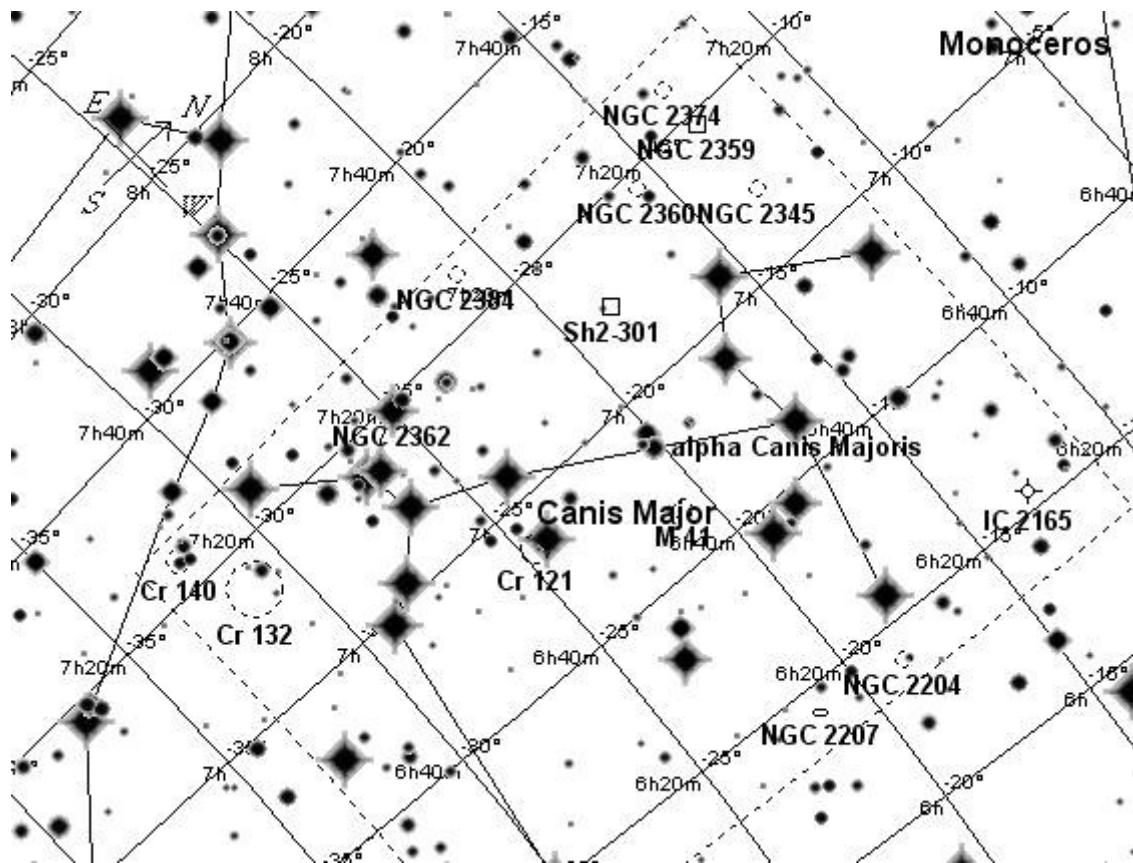


Figure 2: Canis Major Widefield Chart

### Target List

Name	Type	Size	Mag	RA	DEC
Sirius (Alpha)	Star		-1.4	06 <sup>h</sup> 45 <sup>m</sup> 29.0 <sup>s</sup>	-16° 43' 37"
Cr 121	Open Cluster	50.0'	2.6	06 <sup>h</sup> 54 <sup>m</sup> 31.0 <sup>s</sup>	-24° 38' 37"
Cr 132	Open Cluster	95.0'	3.6	07 <sup>h</sup> 14 <sup>m</sup> 41.8 <sup>s</sup>	-31° 10' 49"
Cr 140	Open Cluster	42.0'	3.5	07 <sup>h</sup> 24 <sup>m</sup> 11.7 <sup>s</sup>	-32° 12' 55"
IC 2163	Galaxy	3.0'x1.2'	11.7	06 <sup>h</sup> 16 <sup>m</sup> 47.4 <sup>s</sup>	-21° 22' 48"
M 41	Open Cluster	39.0'	4.5	06 <sup>h</sup> 46 <sup>m</sup> 19.5 <sup>s</sup>	-20° 45' 46"
NGC 2204	Open Cluster	10.0'	8.6	06 <sup>h</sup> 15 <sup>m</sup> 52.1 <sup>s</sup>	-18° 40' 09"
NGC 2207	Galaxy	3.9'x2.2'	11	06 <sup>h</sup> 16 <sup>m</sup> 41.2 <sup>s</sup>	-21° 22' 35"
NGC 2345	Open Cluster	12.0'	7.7	07 <sup>h</sup> 08 <sup>m</sup> 39.8 <sup>s</sup>	-13° 12' 20"
NGC 2359	Bright Nebula	9.0'x6.0'		07 <sup>h</sup> 18 <sup>m</sup> 51.2 <sup>s</sup>	-13° 14' 19"
NGC 2360	Open Cluster	14.0'	7.2	07 <sup>h</sup> 18 <sup>m</sup> 03.8 <sup>s</sup>	-15° 39' 18"
NGC 2362	Open Cluster	6.0'	3.8	07 <sup>h</sup> 19 <sup>m</sup> 00.5 <sup>s</sup>	-24° 58' 06"
NGC 2374	Open Cluster	12.0'	8	07 <sup>h</sup> 24 <sup>m</sup> 17.2 <sup>s</sup>	-13° 16' 41"
NGC 2383	Open Cluster	5.0'	8.4	07 <sup>h</sup> 24 <sup>m</sup> 59.8 <sup>s</sup>	-20° 57' 45"
NGC 2384	Open Cluster	5.0'	7.4	07 <sup>h</sup> 25 <sup>m</sup> 31.7 <sup>s</sup>	-21° 02' 18"

### Challenge Objects

Name	Type	Size	Mag	RA	DEC
IC 2165	Planetary Nebula	28"	10.5	06 <sup>h</sup> 22 <sup>m</sup> 03.6 <sup>s</sup>	-12° 59' 27"
Sh2-301	Bright Nebula	8.0'x7.0'		07 <sup>h</sup> 10 <sup>m</sup> 08.2 <sup>s</sup>	-18° 29' 45"

## Canis Major

Check that thermometer and bundle up tonight, because it's time for the Dog Da... uh... Nights of winter! This month we'll focus on Canis Major, Orion's faithful hound. The big dog shares the sky with at least three other mutts - Canis Minor, Chara and Asterion (Canes Venatici). Those last two are still registered to Bootes - at least they were the last time I looked. Canis Major is handed down to us from antiquity - in fact, even Homer refers to him as Orion's dog. But even so, the big puppy hasn't always belonged to Orion - nor has it always been a dog. At various times, across various cultures, it's also represented Actaeon's pooch - Laelap, belonged to Cephalus, and in the Roman culture was even depicted as Orion's child.

Sitting on the edge of the winter Milky Way, Canis Major is an interesting constellation. You'll find a plethora of different objects; galaxies, planetaries and reflection nebulae to double stars and open clusters. There's something here for everyone.

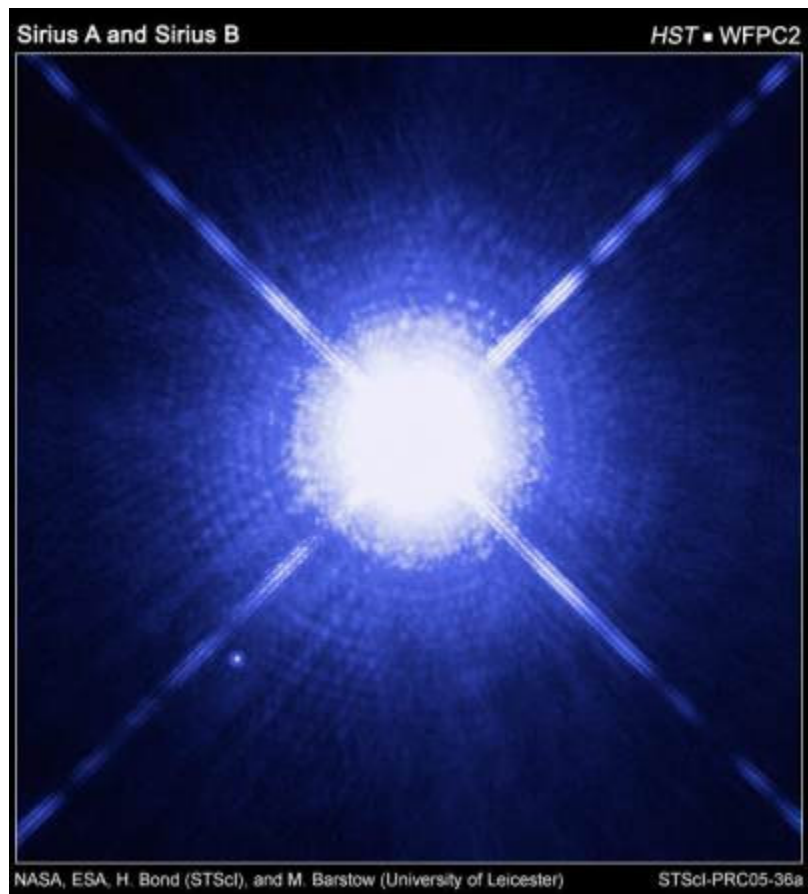
DSO's aside, the most conspicuous feature of the constellation is undoubtedly Sirius - the dog star. The brightest star in the night sky, Sirius can be seen in nearly every inhabited location on the surface of the earth.

## Sirius

A binary star system that lies around 8.6 light years distant the primary Sirius A, is around twice the mass of the sun. Sirius B, or "The Pup", is a white dwarf that weighs in at 99% of Sol's mass, but measures the diameter of earth. Bessel was first to suspected the presence of a companion in 1844 because of variations in Sirius's proper motion. The first to directly observe the pup was Alvin Clark in 1862 while testing an 18" objective. Sirius A has an apparent magnitude of -1.47 (the sun is around -26.7, the moon -12.6, and Venus, Mars, Jupiter and Mercury weigh in at -4.7, -2.9, -2.8, and -1.9 respectively), while Sirius B has a magnitude of 8. This means the pup is about 10,000 times dimmer than its parent!

With Sirius so bright, it's of little surprise that ancient cultures attached a special significance to it. For the Egyptians, its appearance signified the rising of the Nile and the approach of the summer solstice. The Greeks referred to it as Orion's dog and associated its appearance with the hottest days of summer (hence the "Dog Days" of August).

No mention of Sirius would be complete with out reference to the Dogon - an isolated tribal culture from Africa. In the early part of the 20<sup>th</sup> century, visiting anthropologists reported the Dogon had a rather unexpected and detailed knowledge of Sirius B and its ~50 year period. Further, they'd known this centuries before modern science! In the Von Dankien crazed 70's this fueled the



**Figure 3: Sirius A & B - Hubble Space Telescope**

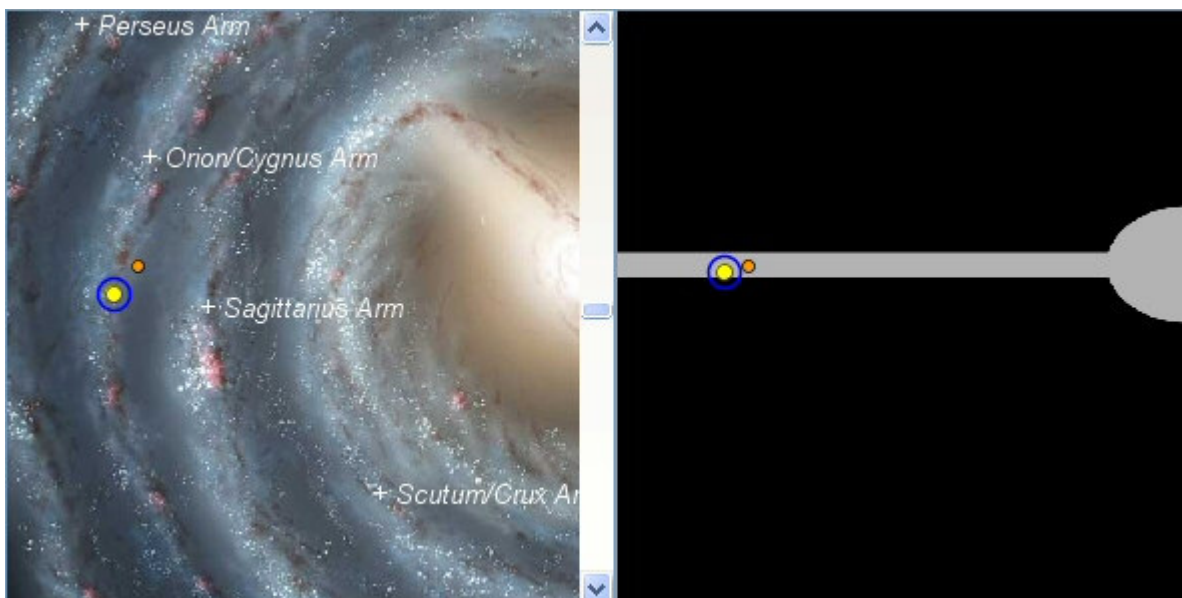
book *The Sirius Mystery*, in which Robert Temple claims that the knowledge of the Dogon was granted to them by alien visitors from the Sirius system. In the fall 1978 edition of the *Skeptical Inquirer*, Ian Ridpath handily debunked the *Sirius Mystery*. In part, the “knowledge” may have been due to cultural contamination from astronomers who’d come to witness a transit of Venus. Curious readers can view the entire article at <http://www.csicop.org/si/7809/sirius.html>

The Dogon and their visitors aside, it is possible to see the pup with amateur telescopes. In fact, I’ve heard of scopes as small as 5” separating the pup from its parent, but that’s rare. It’s not the separation that’s the problem so much as the glare from Sirius A. It takes an exceptional optic to eek out a glimpse. I’ve observed it in a 10” scope and noted an apparent green cast to the pup - but most likely this is a trick of perception. I suspect Sirius A is such a bright blue white that in contrast the white of the pup looks green.

Let’s drop four degrees south of Sirius and look at the only Messier object in Canis Major.

### ***M41 - The Heart of the Dog***

One of the showpieces of the winter sky, historians aren’t sure if M41 was known to Aristotle or not. While he records something in the area, some believe he saw a knot in the winter Milky Way and not the cluster itself. If it was known to him, it was most likely the faintest deep sky object known in antiquity. Officially, it was probably first discovered by Giovanni Hodierna in 1645, and added to the Messier catalog in 1765.



**Figure 4: Location of M 41 - Image courtesy “Where is M13” by Bill Tschumey**

M41 has about 100 stars distributed over a 26 light year volume. The cluster lies 2300 light years distant and is somewhere around 210 million years old. In the book *Star Clusters*, Arachinal and Hynes speculate that there may be an apparent relationship between M41 and the less showy Cr 121 which lies some 4.5 degrees south.

M41 gives a spectacular view in nearly any size optic. Personally, I’ve seen it in everything from 12x36mm binoculars all the way up to 18” telescopes, but I think a 4-8” instrument gives the best mixture of aperture and field of view. In my 4” apo at 44x, one of the center members of the cluster has a distinct reddish cast, but in other instruments it’s seemed more orange - what do you see? In Jason Aldridge’s sketch below it appears more yellow.

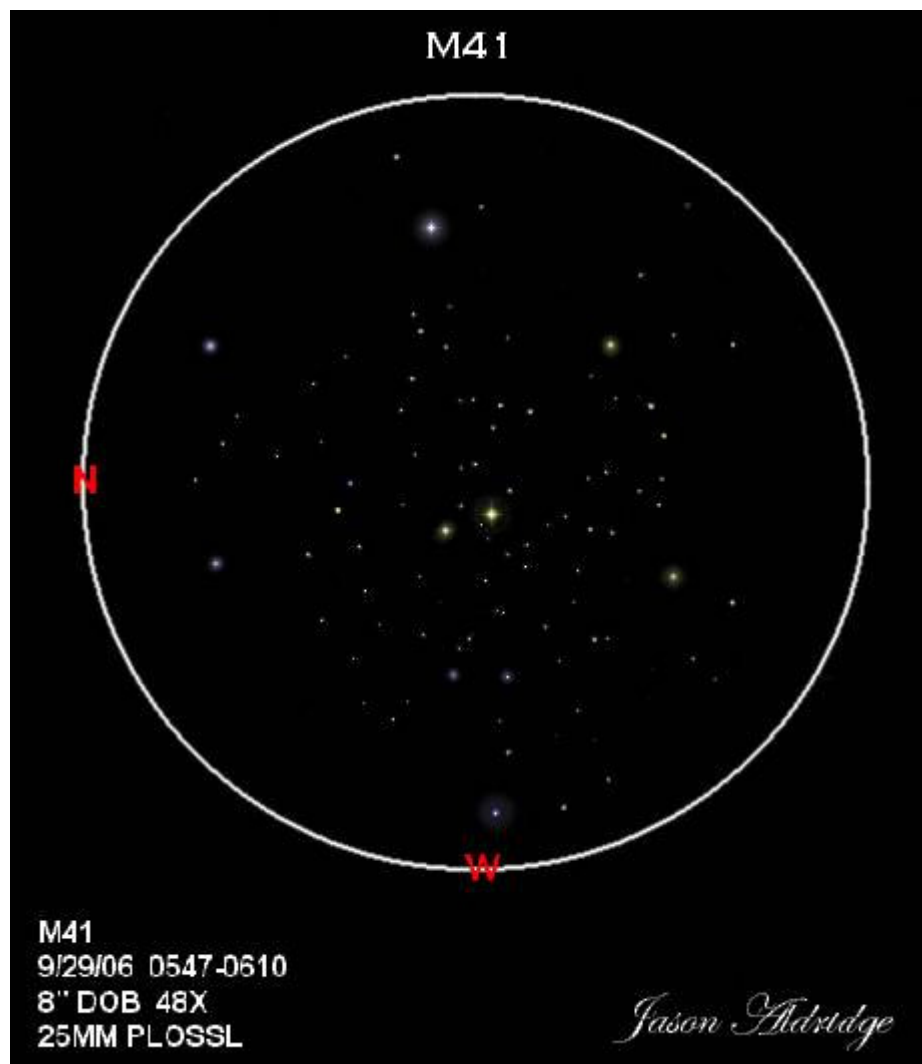


Figure 5: M41 - Sketch courtesy Jason Aldridge

### NGC 2207 / IC 2163

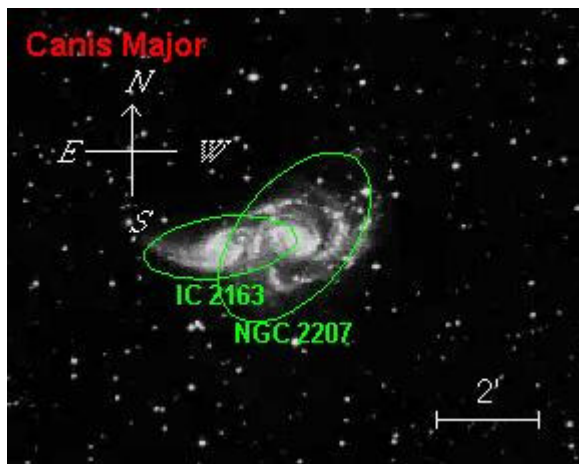


Figure 6: NGC 2207 & IC 2163

With gas, dust and stars flung every which way, gravity's created a 100,000 light year bridge between these two galaxies that pass in the night. Unfortunately, we missed closest approach by a mere 40 million years. Don't worry though, computer simulations conducted on data gathered by a team using the VLA radio telescope in New Mexico reveal that IC 2163 isn't moving fast enough to escape NGC 2207's gravitational pull - so if we keep an eye out we'll see another close approach in the future. Well, someone may anyway. On these time scales, I'm probably not going to be around, and I suspect you won't either. Eventually, a few billion years down the line they'll merge, and generations of future astronomers will have to figure out what they'll catalog the new object. You might want to look at it before that happens. I think you've got some time though - this doesn't appear to be filled in the "don't blink or you'll miss it" category.

As with most galaxies, the more aperture you can throw at them the better. Both should be visible in a 12 inch scope, but the real question is: what's the smallest aperture that can make out both of them?

Don Pensack, with a 12 inch scope, writes -

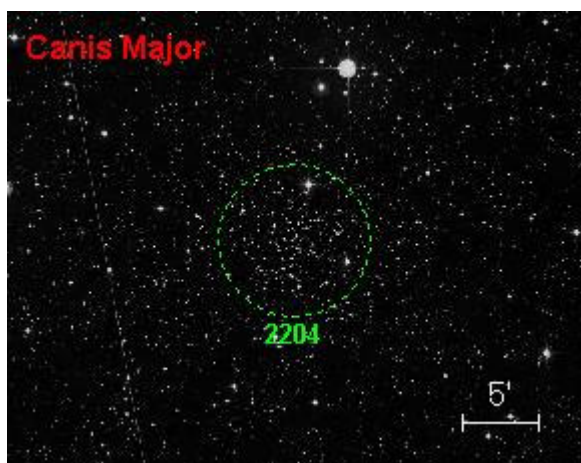
*2207 is sml, v.faint, diffuse, no detail, several superimposed \*'s, and IC 2163 is an amorph.smudge next to 2207*



**Figure 7: NGC 2207 & IC 2163 – Hubble Space Telescope**

## NGC 2204

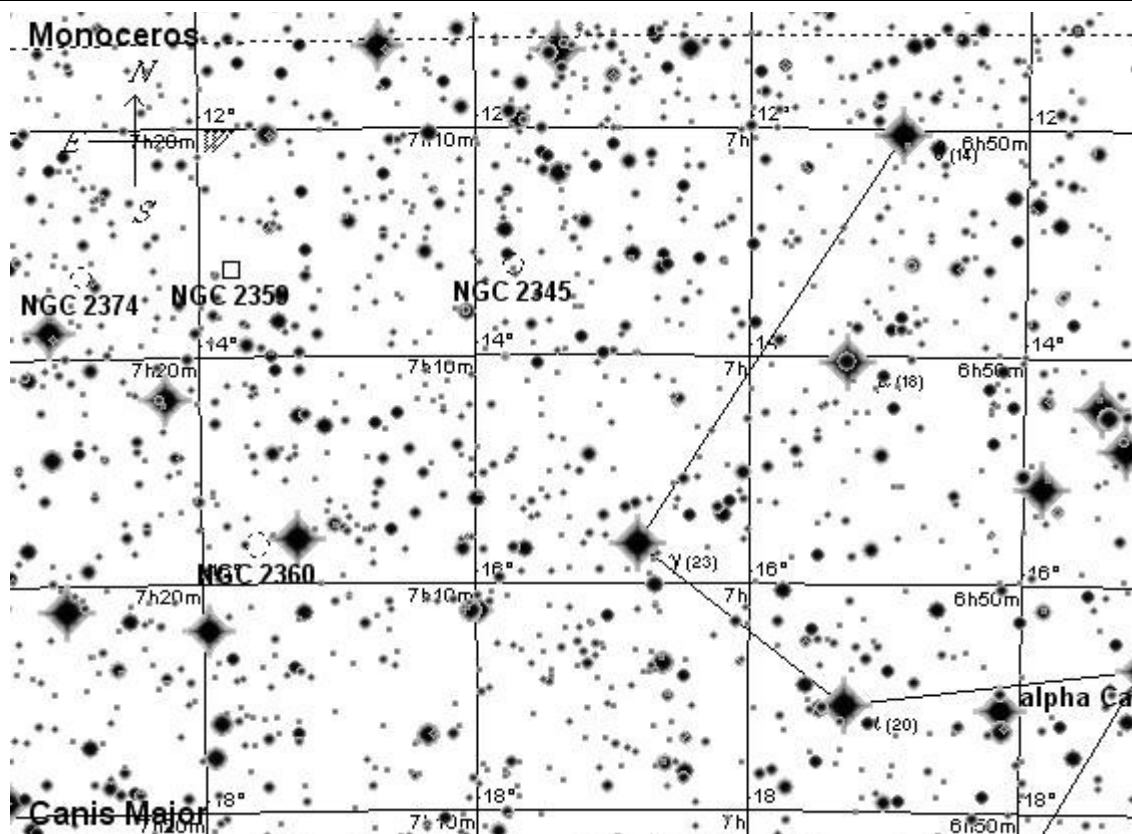
Discovered by William Herschel in 1785, NGC 2204 lies some 8600 light years away and visually, is a faint, sparse and scattered cluster - at least in smaller apertures. Use higher magnification to bring out a few more members. Larger scopes help it to stand out fairly well from the background and reveal even more stars.



**Figure 8: NGC 2204**



**Figure 9: NGC 2204 image  
courtesy Jim Thommes**



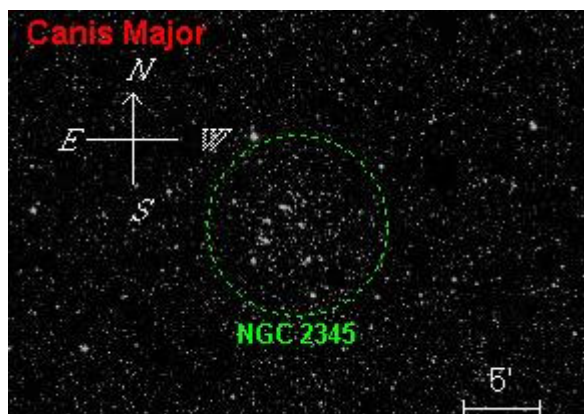
**Figure 10: Finder Chart #1 (NGC 2345, 2359, 2374, 2360)**

### NGC 2345

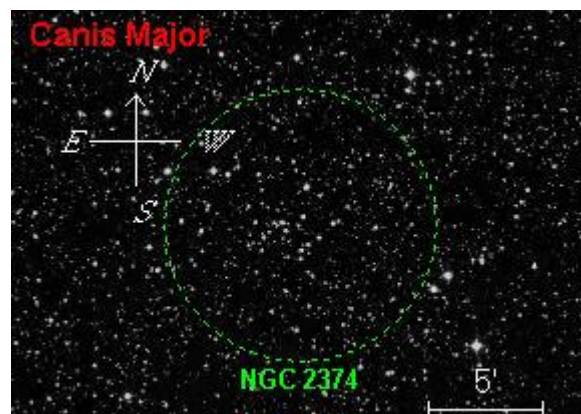
According to a paper by Moffat, NGC 2345 is one of the more recently formed galactic clusters, being slightly younger than M45. This is another sparse cluster that really takes an 8 to 10 inch (or larger) scope to appreciate. In 8 inches or so of aperture, look for several mag 9 and fainter stars scattered about.

### NGC 2374

This one's a little better for small telescopes, as NGC 2374 yields a couple dozen stars fairly easily. Note the line of "bright" stars to the southwest. Large binoculars or very small telescopes will show an unresolved haze in the area. In larger scopes, look for two apparent halves to the cluster, the second half being centered around the line of stars previously mentioned - do you see them? Two halves of a cluster or an optical illusion?

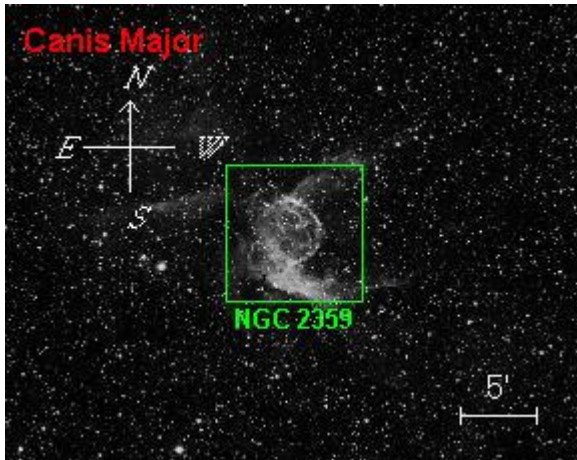


**Figure 11: NGC 2345**



**Figure 12: NGC 2374**

## NGC 2359 - “The Duck” / “Thor’s Helmet”



**Figure 13: NGC 2359**

Here we have a rare Wolf-Rayet star that has created this nebula by blowing off its outer layer of gas. The material leaves the surface at thousands of kilometers per second, and creates this bubble in space which is illuminated by the parent star. Although NGC 2359 is a popular target for winter astrophotographers, it's apparently less known among visual observers. I find this somewhat surprising as it's a spectacular target in moderate or large instruments, especially when coupled with a UHC or OIII filter. My most memorable view of this object came one crisp morning through an 18" scope.

Among visual observers, it's earned the moniker “The Duck” as the most visible parts are the round central portion which makes up the body, and the brighter extension forming the bill.

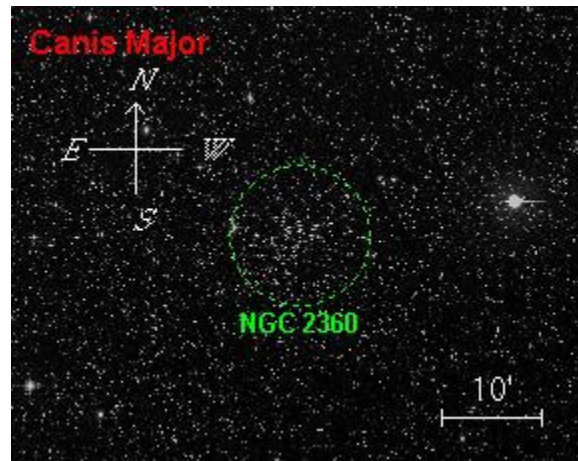
As Jim Thommes excellent photograph shows below, a camera sees a bit more and explains how it's picked up the moniker “Thor’s Helmet”.



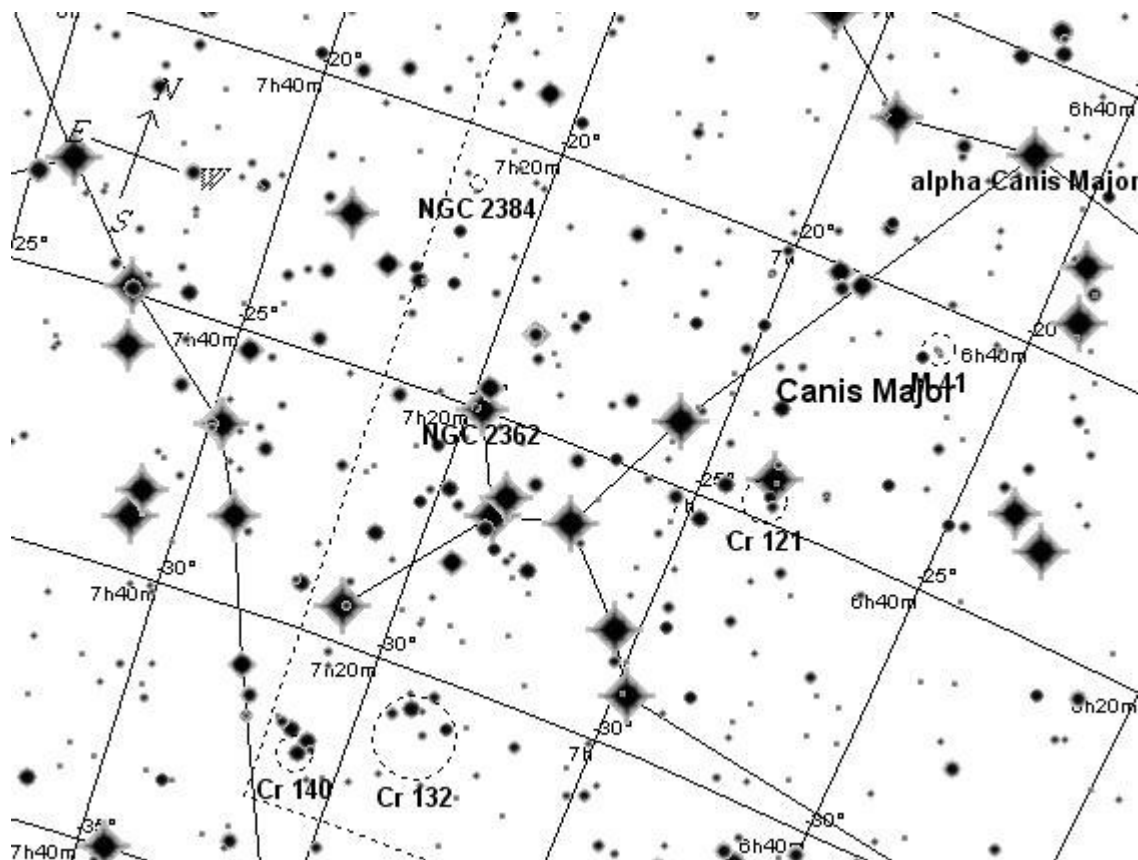
**Figure 14: NGC 2359 - The Duck / Thor’s Helmet. Image courtesy Jim Thommes**

**NGC 2360**

In a moderate scope, this cluster is a nice sight with 75-100 stars speckled across the field. Some observers have noted a dark area devoid of stars off to one side of the cluster. Is this a dark nebula? Or simply an area fairly devoid of stars? Take a look and tell me what you think. This one is a good challenge object for a small scope or a large set of binoculars - look for a small unresolved haze of stars.

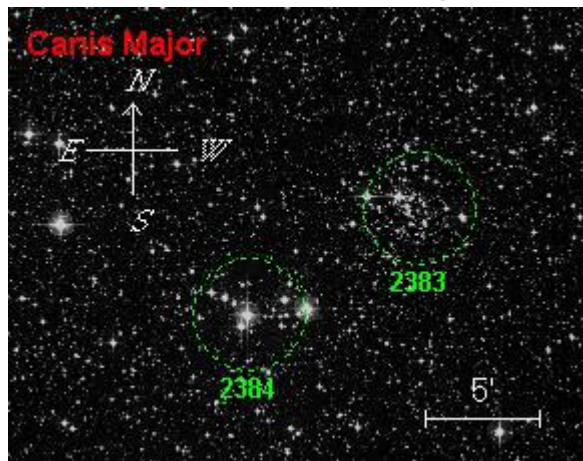


**Figure 15: NGC 2360**



**Figure 16: Finder Chart #2 (NGC 2362 & 2383/2384; Cr 121, 132 & 140)**

## NGC 2383/2384 - The Dog's Double



**Figure 17: NGC 2383/2384**

Here's a nice twofer that's almost reminiscent of the classic double cluster in Perseus. Of course, you're probably going to want a little more aperture. Make that a LOT more aperture - note the scale in the DSS image above.

Although they're close enough to make you wonder if they are a true binary cluster, a paper by Kopchev, Petrov and Nedialkov finds the ages too different to have been formed by the same cloud.

Don Pensack has this to say about 2384 -

| *sml, sparse, group of only a few \*'s*

and makes no mention of NGC 2383. Jim Thommes has provides us with the nice image below.



**Figure 18: NGC 2383 / 2384 – Image courtesy Jim Thommes**

## Cr 140 / Cr 132 - The Tuft in the Tail of the Dog

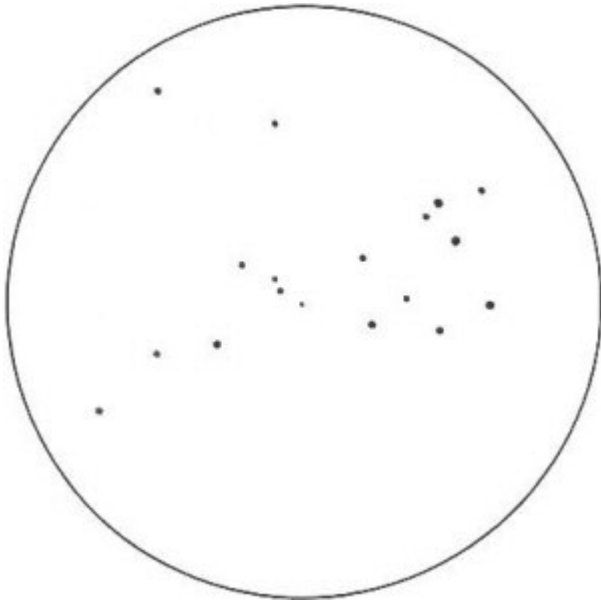
Just under the tail of the dog lie two large open clusters in the Collinder catalogue – Cr 132 and Cr 140. Most Collinders are large and scraggly, but Cr 132 takes the cake. It's in the same binocular field as Cr 140, but is just a smattering of stars across the field. Still, the area provides a nice view for those with wide field instruments like a fast 4" scope refractor or better still, a good set of binoculars.

Cr 140 is a little richer and is a fairly easy catch with the naked eye. Iiro Sairanen sketched the following with a 4.5" f7.3 newt at 32x from Spain - the field size is just under a degree.

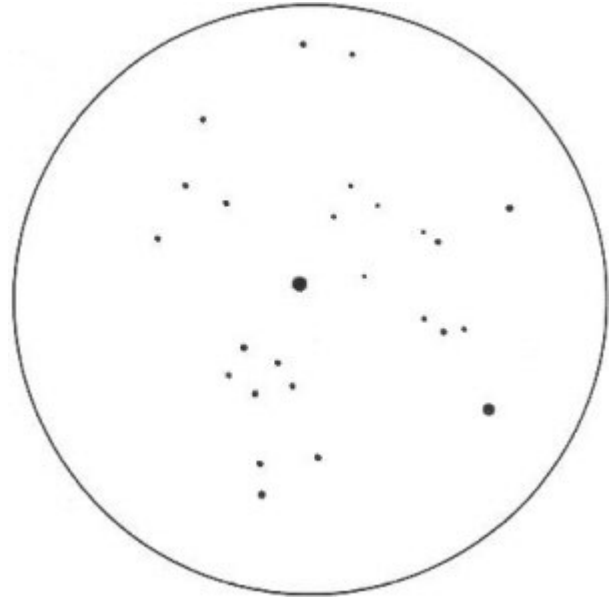
## Cr 121

This is another one that's probably best seen in binoculars - or at least a wide field scope. Cr 121 is around 3800 light years distant, and reportedly a very young cluster- some estimates put it at only 1.5 million years old.

Iiro Sairanen contributed the following with a 4.5" f7.3 newt at 47x from Spain - the field size is 64'.

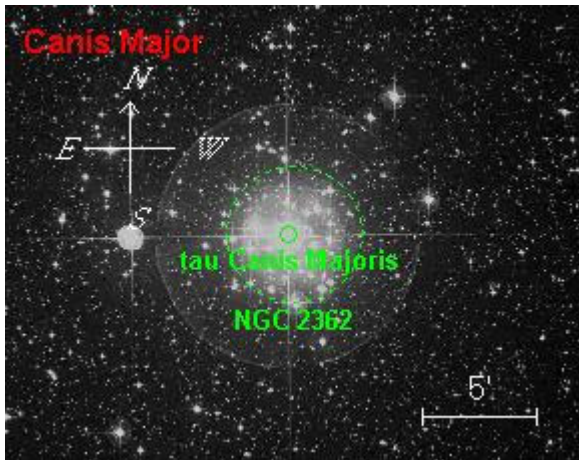


**Figure 19: Cr 140 Sketch**  
Courtesy Iiro Sairanen



**Figure 20: Cr 121 Sketch**  
Courtesy Iiro Sairanen

## NGC 2362 - The Tau Canis Majoris Cluster - Hodierna's Cluster



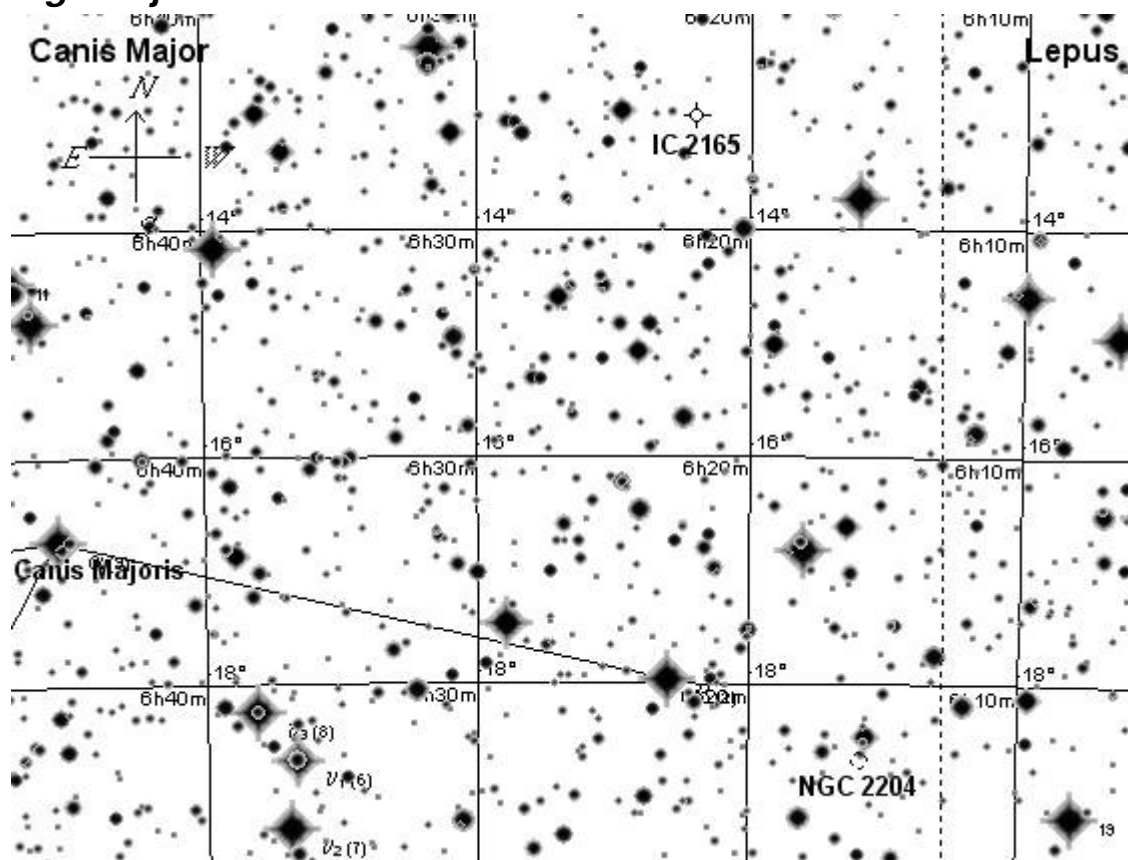
**Figure 21: NGC 2362**

If you weren't too impressed with the last couple of open clusters, here's one to rekindle your interest. Blue-white Tau is a member of this group (and not just a foreground star), so you'll probably want to bump up the magnification a bit in order to reduce its glare. Tau is a blue supergiant that shines at an apparent magnitude of 4.5 and many sources give the cluster a distance somewhere between 3,200 and 5000 light years. In her *Celestial Sampler*, Sue French lists the Tau Cluster at 4,800 light years and remarks if this is the case, then Tau shines with the light of 50,000 suns!

SEDs lists the age of the cluster at around 25 million years, and notes there's still some nebulosity associated with it - so as things go, it's fairly young yet.

Giovanni Batista Hodierna apparently discovered NGC 2362 sometime before 1654, but unfortunately his observations were "lost" until the 1980's. William Herschel independently rediscovered it on March 4<sup>th</sup>, 1783 and eventually added it to his catalog.

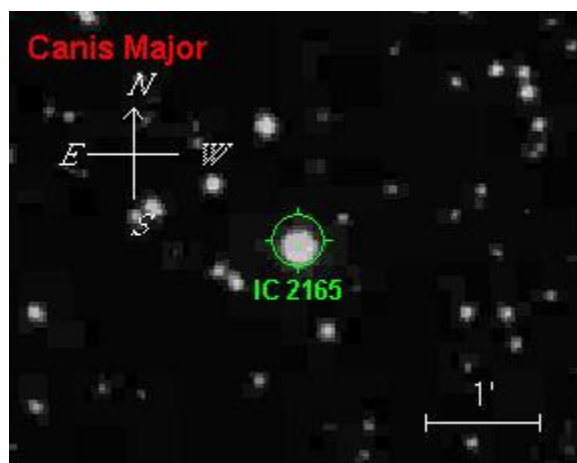
## Challenge Object: IC 2165



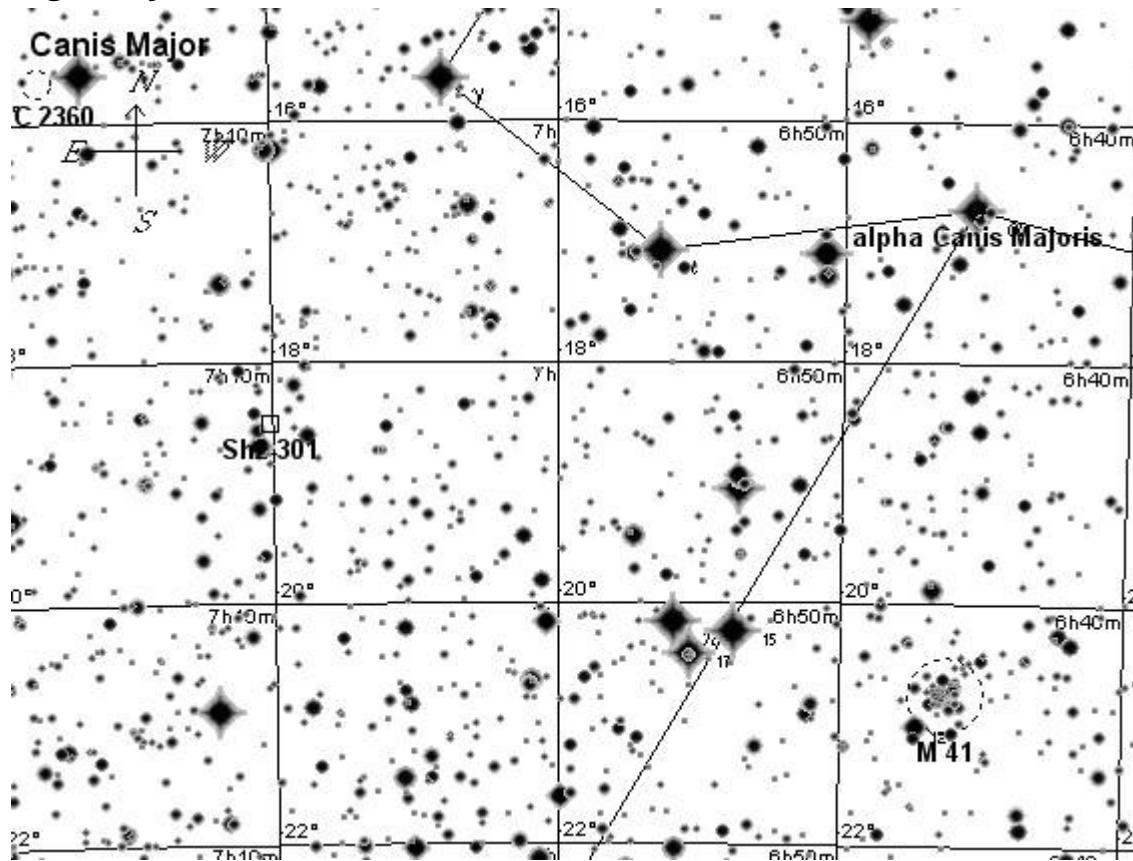
**Figure 22: IC 2165 Finder Chart**

And now, on to our challenge objects for the evening. The first, IC 2165 can actually be caught in small instruments; the challenge here is identifying the field and determining which one is the planetary. In general I tend to find IC objects a tad bit harder than their NGC counterparts and this one's no exception. While bright enough, it's stellar at all but high magnification. This makes trying to find it like looking for a needle in a haystack.

Narrow the field using the charts given, then try blinking an OIII filter in and out of the field. IC 2165 should be the only star that doesn't dim with the filter in place. At 150x this is still a stellar object, so now is the time to bump that magnification up - WAY up to 450x or higher as long as you have enough light grasp to support it (don't worry so much about the seeing in this case). I know, I know, your mamma told you that high magnifications were for those Tasco telescopes. Yeah, the one with the Hubble photos on the box. But there are times it's ok to break some rules. This is one of those times.



**Figure 23: IC 2165**

**Challenge Object: Sh 2-301****Figure 24: Sh 2-301 Finder Chart**

If you're a longtime reader of this series, then you know I like to close with a "different" object - something a little out of the ordinary. Messiers and NGC's are all well and good, but they're the staple of today's observer and it's nice to see something different for a chance. My favorite challenge objects are frequently from the Hickson or Abell catalogs, but once in a while a Sharpless object will rear its head. There are 313 entries in the Sharpless catalog, mostly star forming regions. This catalog only contains objects above -27 deg, and further, most of the objects are photographic targets. There are a few however, which are suitable for observation in moderate to large amateur telescopes. This is one such object.

This HII region is Sh 2-301 and is also cataloged as RCW 6 and Gum 5. Sh 2-301 lies around 19,000 light years from us and spans a volume of space measuring some 50 light years in diameter.

I've heard of people counting coup on this one with as little as an 8" scope, but you'll have a much better view with a 15 or 20 inch. Be sure to use an OIII or UHC filter to bring out the details. Without a filter, even in a large scope, it's tough to pick out. A filter improves things dramatically. With a filter from a dark sky, Sh 2-301 has a rough triangular appearance with one of the points being towards the north as you might guess from the DSS photo.

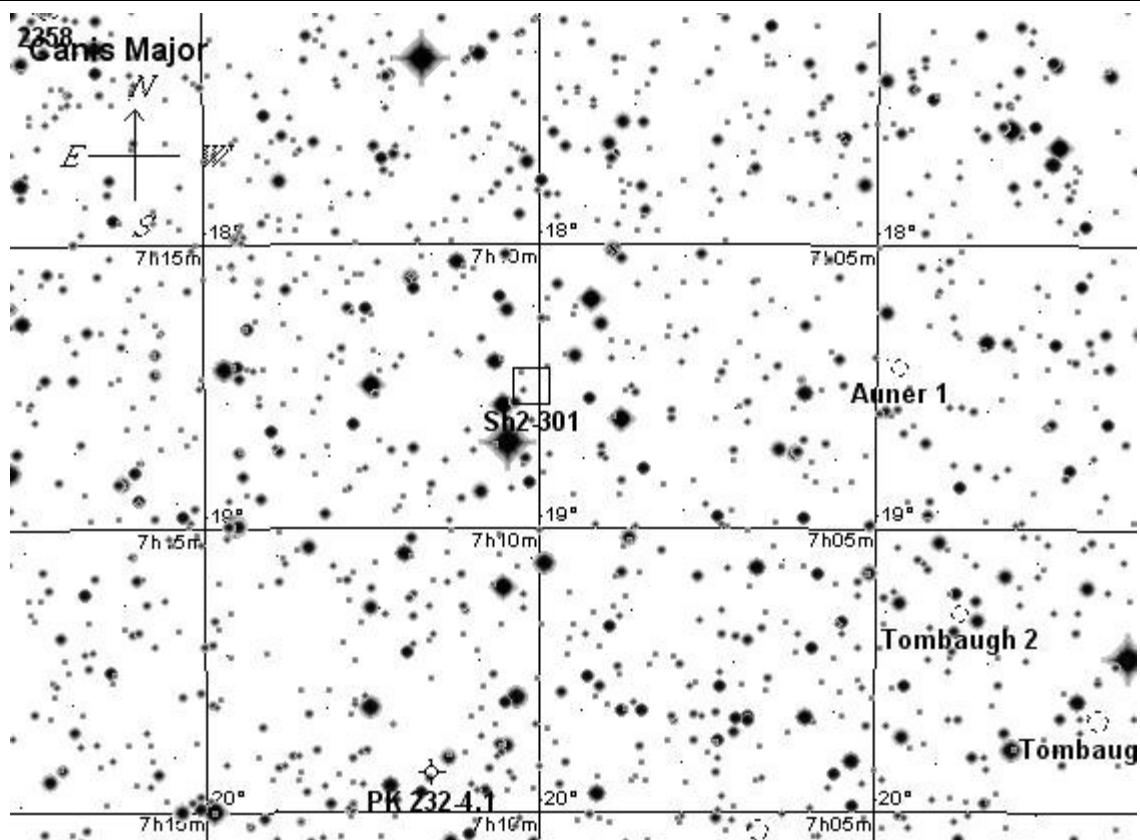


Figure 25: Sh 2-301 Eyepiece Finder

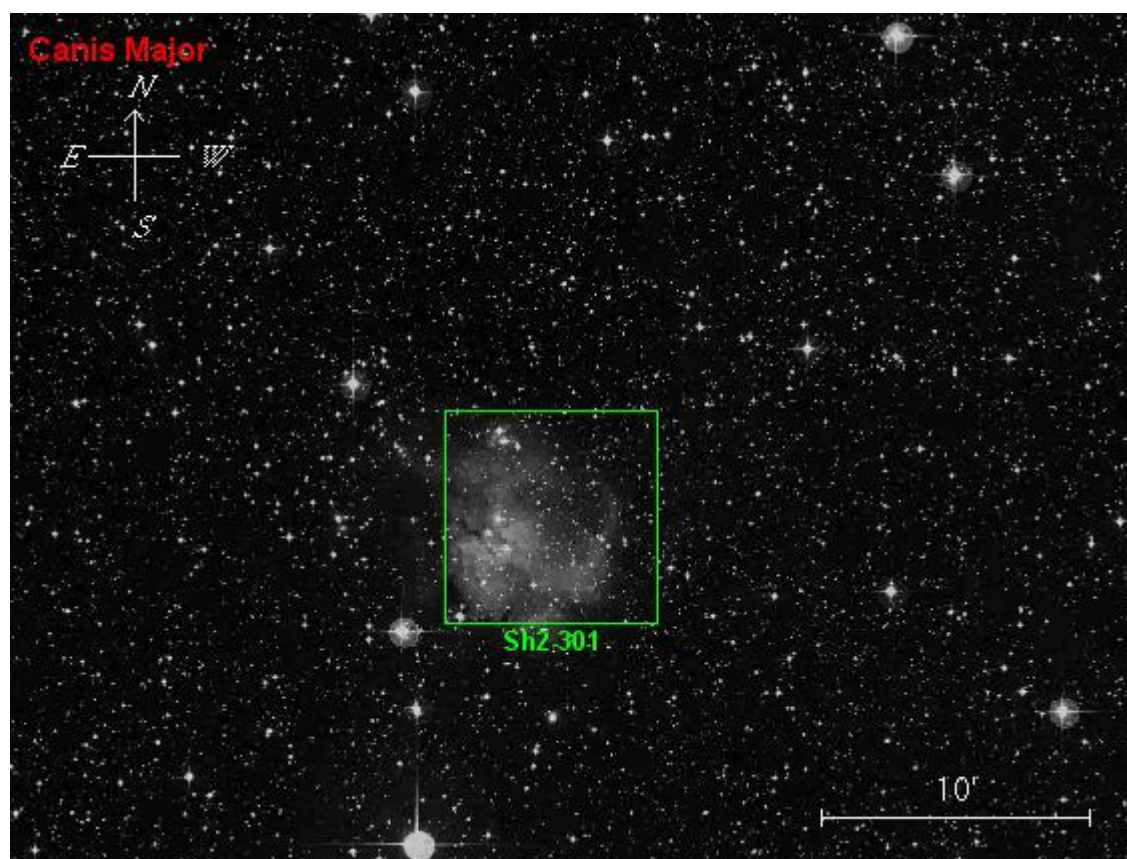


Figure 26: Sh2-301

And with that, that's it for this month. Once again, thanks to the readers who submitted observations, sketches and photos. Your contributions greatly enrich these articles.

As always, I'm gratified if folks find my meanderings useful.

Till next time -

- Tom T.

## Additional Resources

- **Galaxy Map**  
Kevin Jardine  
<http://galaxymap.org/>
- **Wikisky.Org**  
An online, browser based sky map that is capable of using imagery from the Sloan DSS (Great way to waste a few hours...)  
<http://www.wikisky.org/>
- **Catalog of CO radial velocities toward galactic H II regions**  
Blitz, L.; Fich, M.; Stark, A. A.  
[http://adsabs.harvard.edu/cgi-bin/nph-bib\\_query?bibcode=1982ApJS...49..183B](http://adsabs.harvard.edu/cgi-bin/nph-bib_query?bibcode=1982ApJS...49..183B)
- **The region of NGC 2287 and CR 121**  
By: Eggen, O. J.  
<http://adsabs.harvard.edu/abs/1981ApJ...247..507E>
- **Age determination of possible binary open clusters NGC 2383/2384 and Pismis 6/Pismis 8**  
[http://www.astro.bas.bg/~petrov/papers/06kpn\\_bjp33p68.pdf](http://www.astro.bas.bg/~petrov/papers/06kpn_bjp33p68.pdf)
- **A grazing encounter between two spiral galaxies - Hubble - STSCI**  
(NGC 2207/IC 2163)  
<http://heritage.stsci.edu/1999/41/caption.html>
- **NGC 2345, A moderately Young Open Cluster in Canis Major**  
By: A F J Moffat
- **Observing Handbook and Catalog of Deep-Sky Objects**  
By Luginbuhl and Skiff  
Available From: Several Sources

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*I'd love to hear of your experiences under the night sky — please feel free to*

*e-mail me or send any observing reports to: [tomt@cloudynights.com](mailto:tomt@cloudynights.com)*

*Please indicate if I can cite your observations in future columns.*

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***Locational Images Courtesy Bill Tschumy, Where is M13? Used with Permission***

<http://www.thinkastronomy.com/>

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