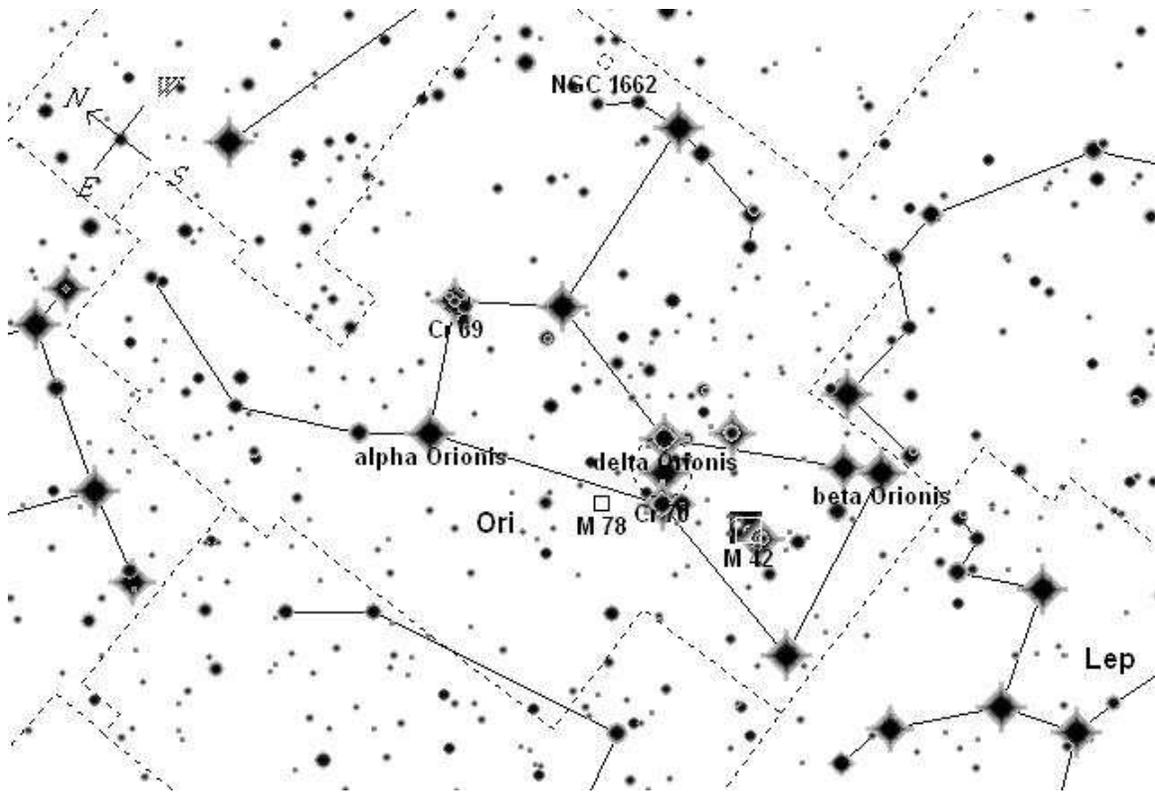


Small Wonders: Orion

by [Tom Trusock](#)





Widefield Chart

| Target List | Name | Type | Size | Mag | RA | DEC |
|------------------|---------------|------------------|-------------|------|---------------|--------------|
| | alpha Orionis | Star | | 0.5 | 05h 55m 27.5s | +07° 24' 33" |
| | beta Orionis | Double Star | | 0.2 | 05h 14m 47.6s | -08° 11' 44" |
| | delta Orionis | Star | | 2.3 | 05h 32m 16.6s | -00° 17' 41" |
| | Cr 69 | Open Cluster | 65.0' | 2.8 | 05h 35m 23.4s | +09° 56' 17" |
| | Cr 70 | Open Cluster | 150.0' | 0.4 | 05h 36m 16.2s | -00° 59' 46" |
| | M 42 | Bright Nebula | 65.0'x60.0' | 4.0 | 05h 35m 32.8s | -05° 23' 11" |
| | M 43 | Bright Nebula | 20.0'x15.0' | 9.0 | 05h 35m 47.0s | -05° 15' 49" |
| | M 78 | Bright Nebula | 8.0'x6.0' | 8.0 | 05h 47m 02.1s | +00° 04' 20" |
| | NGC 1662 | Open Cluster | 12.0' | 6.4 | 04h 48m 44.2s | +10° 57' 15" |
| | NGC 1981 | Open Cluster | 28.0' | 4.2 | 05h 35m 25.3s | -04° 25' 16" |
| | NGC 2071 | Bright Nebula | 7.0'x5.0' | 8.0 | 05h 47m 23.5s | +00° 17' 49" |
| Challenge Object | Name | Type | Size | Mag | RA | DEC |
| | NGC 2022 | Planetary Nebula | 39" | 11.6 | 05h 42m 23.5s | +09° 05' 25" |

A SkyMap Pro Target List for these objects is [available](#).



There were so many great image submissions this month you made it very difficult to choose between them. Before I start, I'd like to take a moment and thank everyone who submitted.

Thank you.

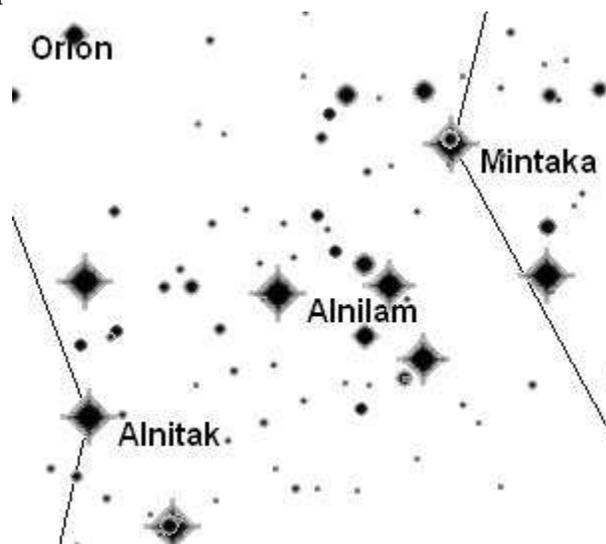
I wish I could have found a way to use them all.

And now, on with our regularly scheduled programming.

If there's one constellation known to astronomer and non astronomer, young and old, it would have to be Orion. It was the first constellation that I learned to pick out of the night sky. I'm not exactly sure where I first learned about this celestial nimrod, but I have dim recollections of being on a camping trip, and my father guiding my gaze into the cool late winter / early spring sky while talking about Orion's belt.

Of course, Orion's belt is only one small portion of the Hunter that has found it's way into the night sky. The figure of Orion holding a shield while raising a club is pretty easy to see, so it's no surprise that the history of this constellation goes back a long way. The great celestial hunter is doomed to do constant battle with Taurus the bull while Lepus the hare crouches at his feet, and his dogs are off getting into the trouble you would expect dogs to get into. I suspect if you look closely enough, they are probably eyeing Pisces - many's the dog whose come home smelling of dead fish, and I wouldn't expect these celestial hounds to be any different. (As an aside, I've always had half a thought we should rename Lepus, Orion's Lunch - but I digress.) In another version of the Orion Mythos, Orion was placed in the sky in an act of pity by Zeus, after being stung to death by Scorpius - the Scorpion. In the tradition of gun shy heroes everywhere, Orion now flees from the scorpion night after night (or chases the creature if you prefer your heroes valiant.)

Today, I know a little bit more about Orion than I did the first time I saw him, but he and his belt are no less impressive. Especially when you consider that the three stars that make up the belt - Alnitak, Alnilam and Mintaka (labeled as delta on our widefield chart above) are all members of the same cluster (Cr 70), which resides 1500 or so light years distant, and each of these three are somewhere

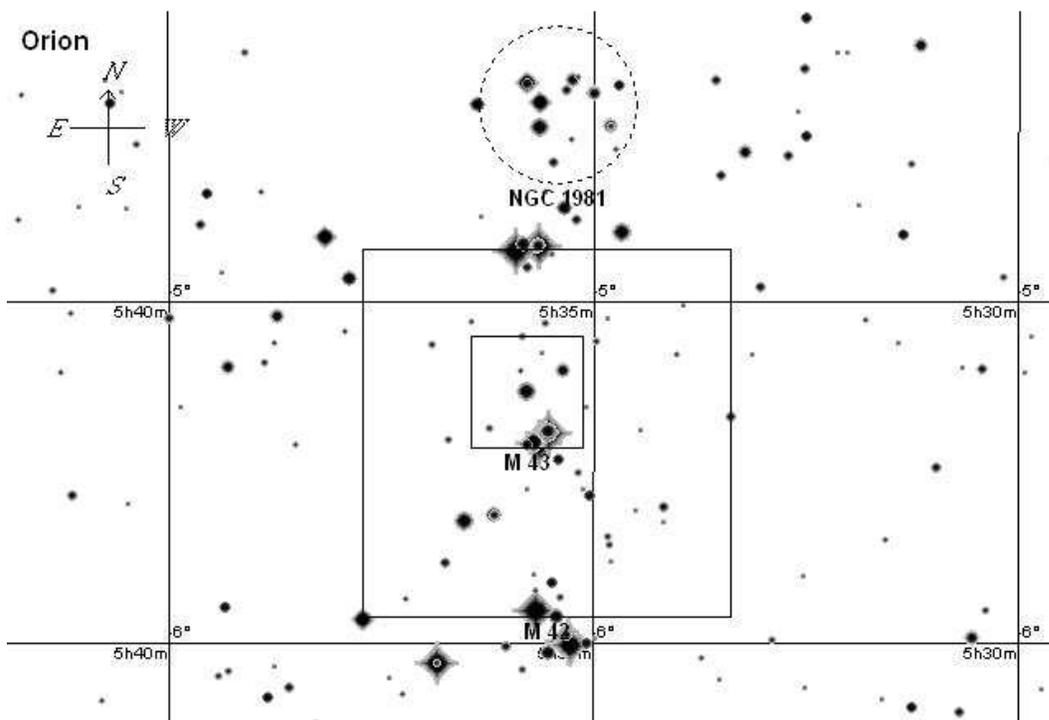


around 20,000 to 40,000 times as bright as our sun. These three blue white stars and the associated cluster are a signpost for any amateur learning their way around the night sky.

Two other stars of note (and worth a glance) are alpha Orionis and beta Orionis. Alpha, is more commonly known as Betelgeuse and is one of the true giants of the night. This bright orange supergiant, lies 425 light years away and has a diameter of nearly 270 million miles. If placed at the center of our solar system, it would eat up the inner solar system without batting an eyelash. Depending on whom you listen to, Betelgeuse is a corruption of the Arabic for Armpit of the Giant or Hand of the Giant.

Rigel, on the other hand, is a blue supergiant. Although it's designated Beta, Rigel is the brightest star in Orion, and the 7th brightest star in the night sky. Rigel is accompanied by a companion star of 7th magnitude, but it can be somewhat difficult to detect visually because of it's proximity to the super bright Rigel (it's around 400x dimmer). It's a good test of a small scope, and a fine sight. The best I've managed with this celestial odd couple was splitting it with an 80 mm APO at around 90x under decent seeing conditions. I suspect I would have been able to go a bit lower if I had the appropriate eyepiece, and I've heard of a Pronto owner splitting it at ~68x. Don't be distressed if it takes significantly higher power to split - some observers from the 33 Doubles Observing Project report it required powers in excess of 150x.

Orion is such a well known constellation, it's almost hard to pick a place to start this month's tour. He's home to open clusters, reflection nebula, supernova remnants (the famous Barnards Loop), dark nebula, planetary nebula, galaxies (some 3000 turn up in a quick search), more than a dozen galaxy clusters (Hickson 34 is probably the best known) and just about every example of the celestial zoo you could imagine. However, without a doubt, the best known target in this heavenly nimrod has to be his namesake nebula.



M42/43 - John Krawczyk

M 42 / 43

Marking the middle of Orion's sword, the M 42 region is visible to the naked eye, obvious in binoculars, and spectacular in nearly any size telescope. This is one of the few nebulae that you can actually see color in - assuming you have a large enough telescope. I've caught glimpses of pink and salmon in an 18" - the only time I've ever seen that hue in the night sky.

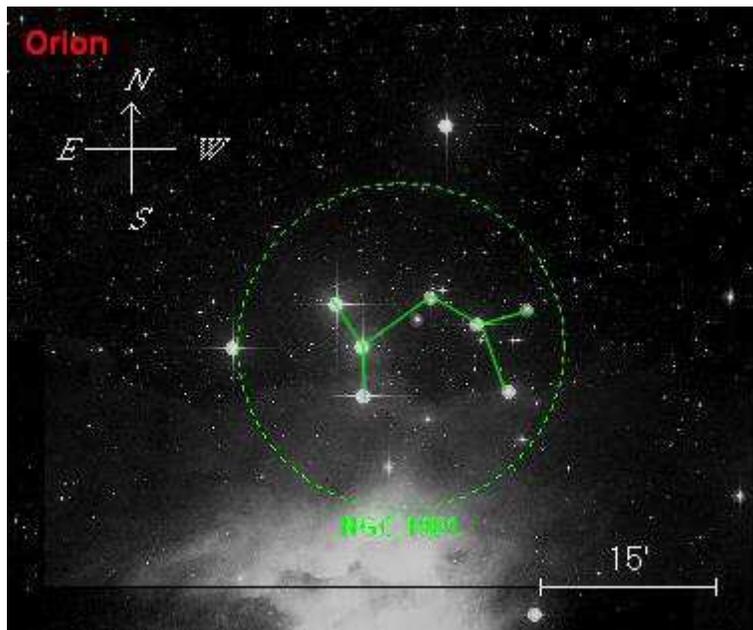
Irregardless - if you are looking at it in a 3" scope or a 30" scope, it's still an awe inspiring sight. At moderate powers in my 4" refractor, it fills the field - wisps of nebulae reaching to and fro across the field of view (east being to and west being fro - technical terms don'tcha know).

I have spent many many hours in the cold of winter just staring at the Great Orion Nebula. No matter the telescope, this stellar nursery never seems to lose its magic. In many ways, a visual view is more appealing than a photograph, because the increased dynamic response of the eye enables you to make out details that would often be overexposed in a camera. Case in point, Orion's celebrated multiple star system located in the heart of M 42 - the Trapezium (theta Orionis). There are four bright components, at least two dimmer ones that are visible in moderate to small apertures. Named not for

their magnitudes but their order in right ascension, A, B, C, and D are visible nearly every clear night, but I've found that I need a magnification of at least 21x to split the trap into its four main components. On a night of good seeing you may be able to pull out the E and F stars - at 11th magnitude, they really aren't all that dim, but the combination of the bright background of the nebula and the close proximity of the stars make it a rather tricky proposition with small apertures. While they are easy in a ten inch scope, I've heard of folks pulling out the E star with apertures as small as 85 mm. I've never managed it with a scope this small, but it has been my experience that E is easier than F.

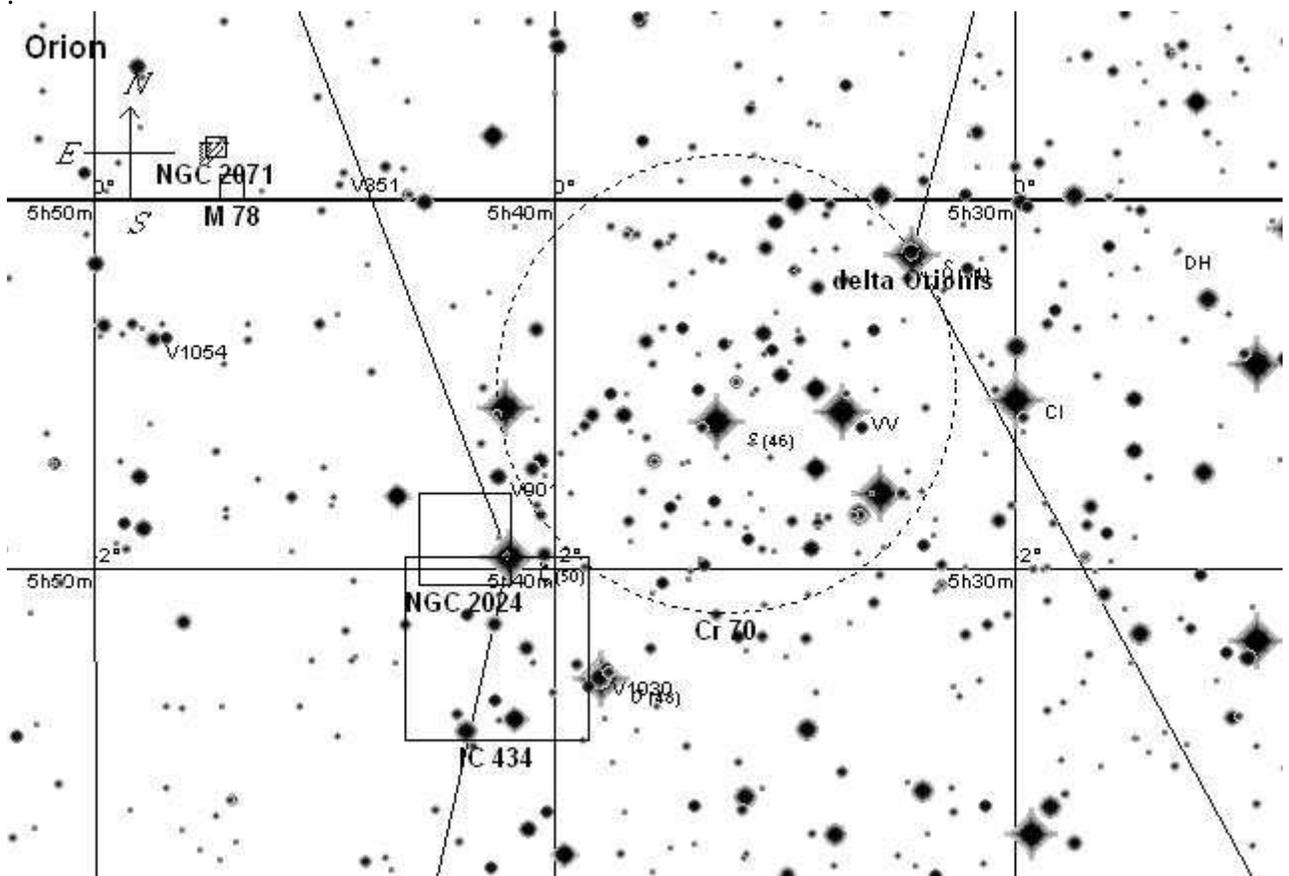
While you are staring at M 42, look slightly northwards (to the above in most cases) to see M 43, the smaller wisp of nebula that separated from the main body by a tiny patch of black (at least in smaller scopes). Then move slightly north again to glimpse Orion's Crown.

NGC 1981



Why Orion insists on wearing his crown on his sword is beyond me, but I can see it clearly in the open cluster NGC 1981. A moderate power view reveals this nice asterism enclosed in the open cluster NGC 1981. I've yet to hear anyone else referring to this as Orion's Crown, but it's such an obvious asterism so close to one of the most viewed treasures of the night sky, that in all honesty I can't believe that I'm the first one to name it thus.

While there's no paucity of material in this area of the constellation, it's now time for us to move north a bit and focus on a new area - Orion's belt.



There are multiple targets of interest in this area, but as visual observers, our main ones for the evening are M 78, NGC 2071, and Cr 70. NGC 2024 and IC 434 are spectacular and well known, but probably out of the reach of the small scope owner.

In the region I've always thought of as Orion's Dagger, we find NGC 2024 (the Flame Tree nebula), and IC 434. IC 434 serves as the backdrop for B33 - possibly the most famous dark nebula in existence - the Horse head. While it's not really much of a visual target for the typical small scope owner it's well known to nearly everyone who has ever shown the remotest interest in astronomy. Pictures abound. The accompanying H beta photo of this region was taken by Jeff Thrush through a 70 mm Pronto. To be frank, while I've seen better pictures, I've never seen one this good through a scope this small.



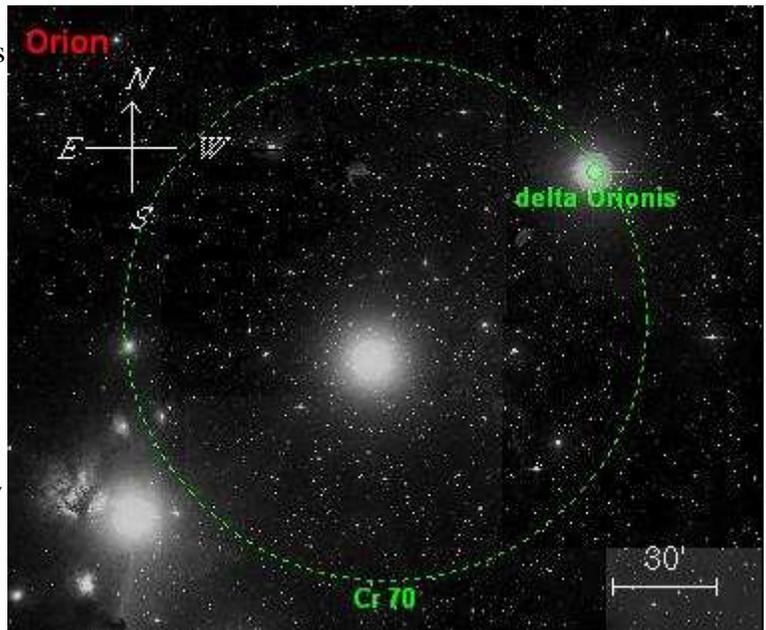
B33 - Jeff Thrush

While they aren't on our target list for the evening, you might as well take a gander at the areas labeled on the map for 2024 and IC 434 - just in case. I've often wondered what is the smallest aperture that will allow a glimpse of the Flame Tree and/or Horse Head. I've heard vastly differing sizes, and am curious to hear what, you, the readers have to say. Collin Smith informs me he's caught the Flame Tree in his 6" dob. I've never really tried for either in anything less than 10". My notes indicate that the Flame Tree was visible in my 10", but the Horse Head was not. I suspect you need 16+ inches and good skies to grab B33. Even though it's not a Small Wonder, consider these "extra-curricular" assignments. IC 434 (the backdrop for the Horse Head) is one of two regions an Hb filter is said to be helpful to visual observers (the other is the California nebula).

Collinder 70

For this next target, we need to pull back. WAAAAYYYYYY back. This is probably one of the few targets I'll cover in this column that actually looks better in binoculars or naked eye than with a telescope.

When you are pointing out Orion's belt to your children what you are actually pointing to is the open cluster Collinder 70 (CR 70). I've scanned this area many many times with a small telescope and always been pleased by the view, but never actually saw this as a cluster until I pointed an inexpensive set of 8x40 binoculars at it. While the richness of the star field makes for an interesting sight in a small scope, the extremely wide 6-7 deg field of view of the binoculars sets it off as a star cluster in it's own right, rather than a star rich region of the night sky.



The three bright stars in the accompanying DSS image are of course, Alnitak, Alnilam and Mintaka (delta), note the Flame Tree and a hint of the Horse Head at the bottom left.

With a widefield eyepiece, now scan up and just to the east of Orion's belt for our last Messier object in Orion and it's companion.

M 78 and NGC 2071

While M 78 and NGC 2071 look spectacular in the accompanying photo, I've never found them to be all that visually interesting. They can be difficult to locate in a 3 inch scope under a half moon, yet they none the less stand out in larger scopes under darker skies. I've found that light pollution is the real killer for these two - however, seldom have I looked for 78 and not been able to see NGC 2071.

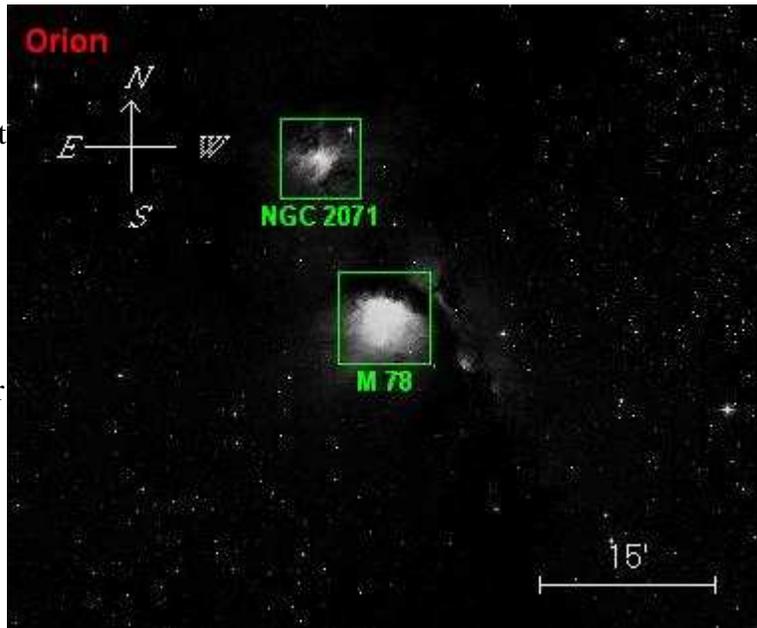
Both look like small featureless wisps of light, but 2071 is smaller and marked by an off center but fairly bright star.

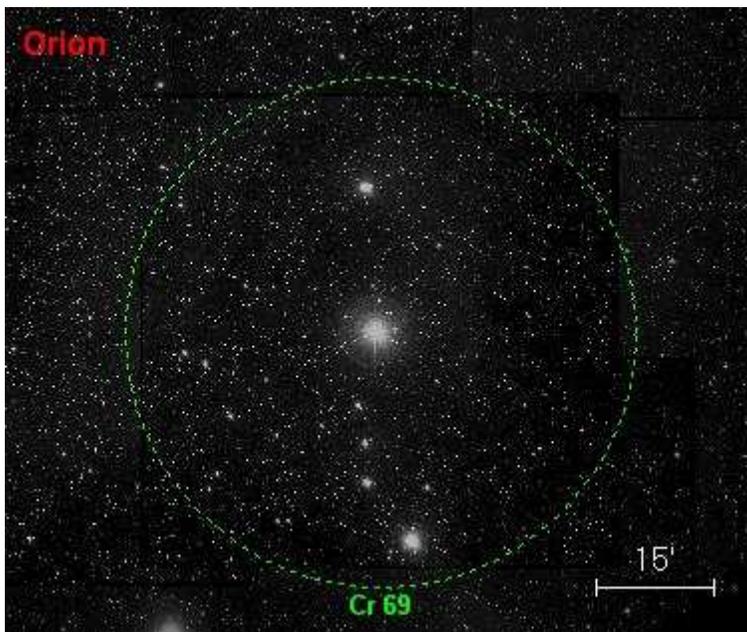
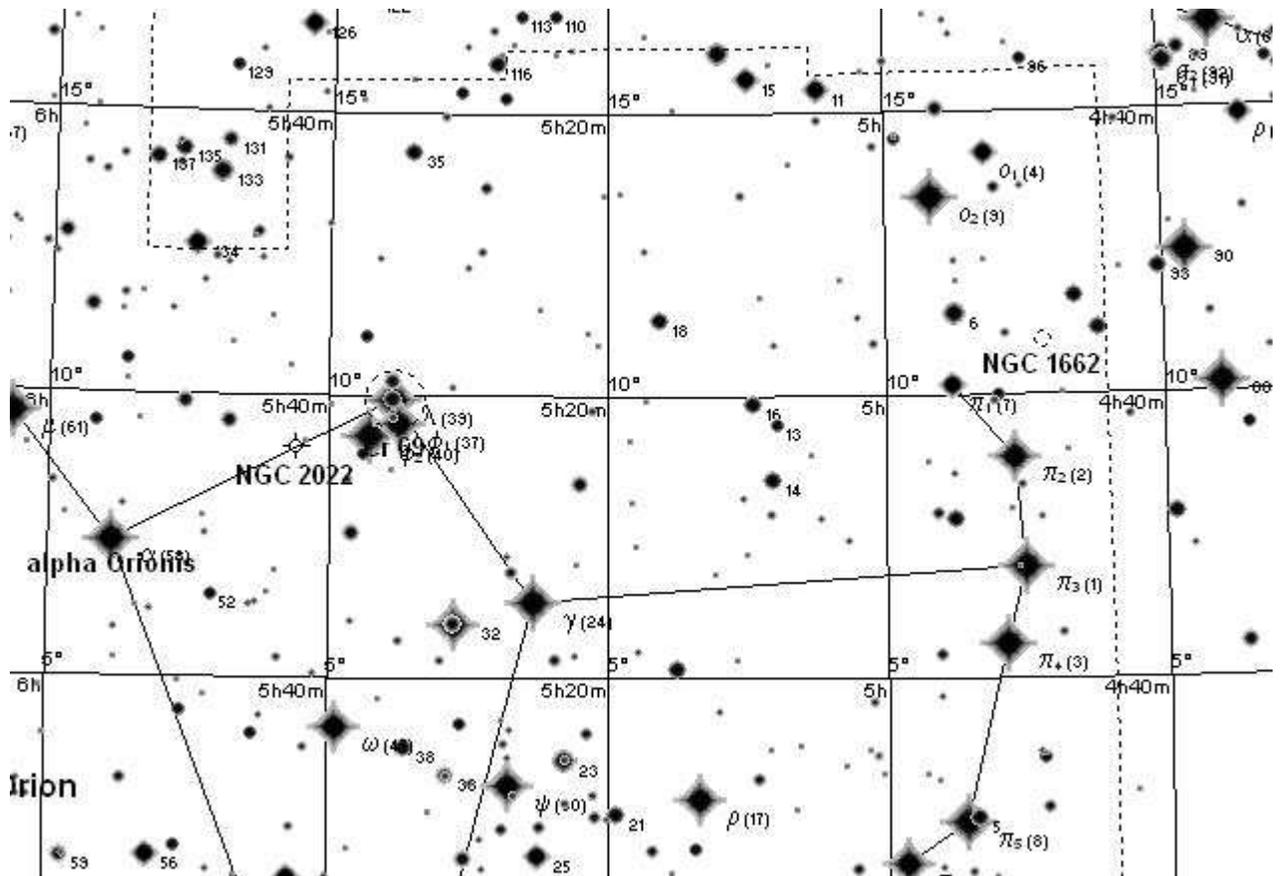
The proximity of the two makes for a pleasing sight in the eyepiece.

In contrast to my views of the pair, Steven James O'Meara finds a fair amount of detail in this neglected object. Spend some time and make your own detailed investigation. Try using different powers and filter combinations. What features can you see in M 78?

I've found that I need to use moderate to low powers with small scopes as more magnification simply makes both nebula vanish. An interesting challenge would be to see if you can pick these up in a standard set of binoculars - say 8x40. If you can, I'd be most interested in hearing about it.

At this point, we're done with our investigations of Orion's belt, so let's mosey up his body once again.





Collinder 69

This is a wonderful and yet woefully neglected cluster for small telescopes. I've found many of the Cr clusters to be particularly suited to small telescopes. They tend to be large scraggly things without much central condensation, and like Cr 70, Cr 69 follows that pattern quite well.

It's an easy naked eye object from a moderately decent site, and thus particularly easy to find - just point your telescope at the fuzzy patch that makes up Orion's (somewhat undersized but we won't hold

that against him) head.

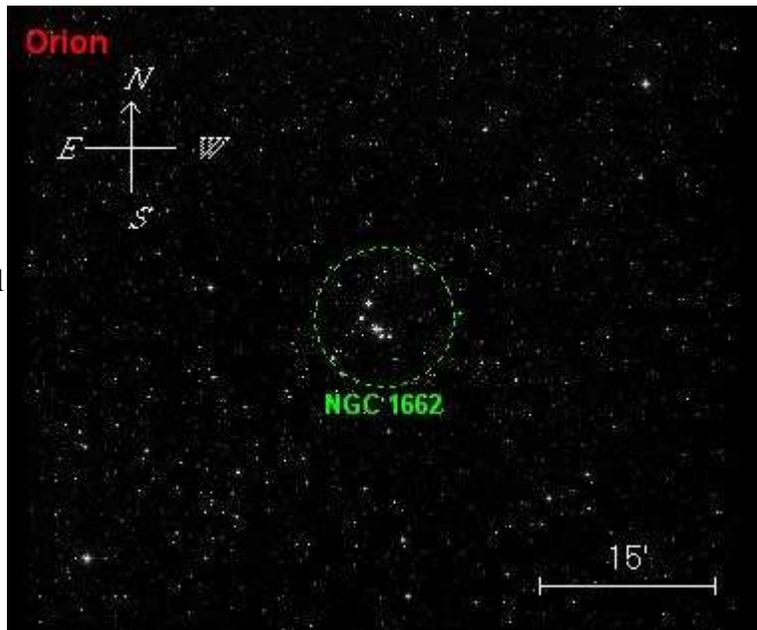
It's not that it's particularly rich - it's not. Nor is it particularly colorful - it's not that either.

It is, however, striking. There are six bright stars that stand out from the field well in a small telescope. Three bright ones in a line, and then a smaller set of three with similar orientation and spacing - but slightly smaller to match the decreased magnitude of the stars. If you turn your head just right, it may remind you of the binocular view of Cr 70 further south.

NGC 1662

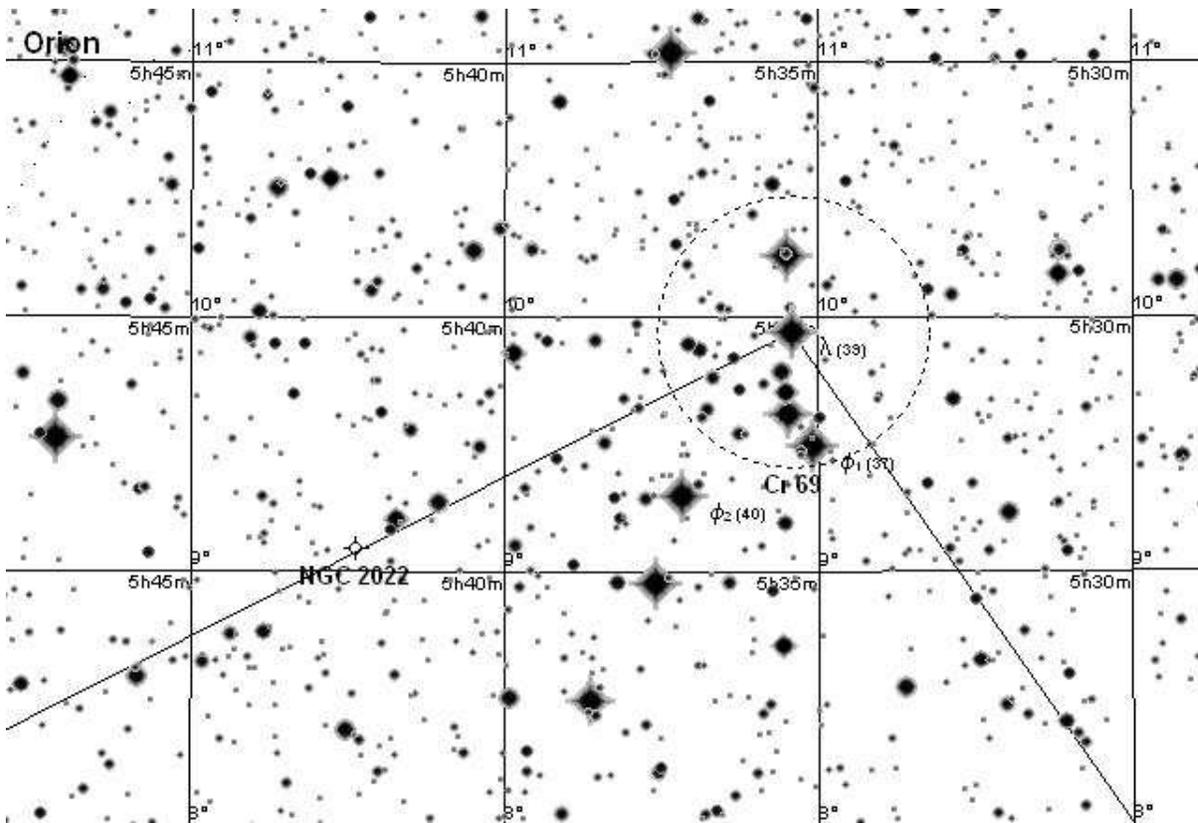
Our last NGC cluster on the list this month, 1662 is an easy find at the tip of Orion's shield (or bow - your choice).

With a wide field eyepiece, simply scan up the shield until you see 1662 just off the tip. This cluster easily stood out from the background in an 80 mm scope working at a mere 14x. Larger scopes might have more of a problem pulling it out from the background so you may want to pinpoint it's location with an optical finder or a set of binoculars first.

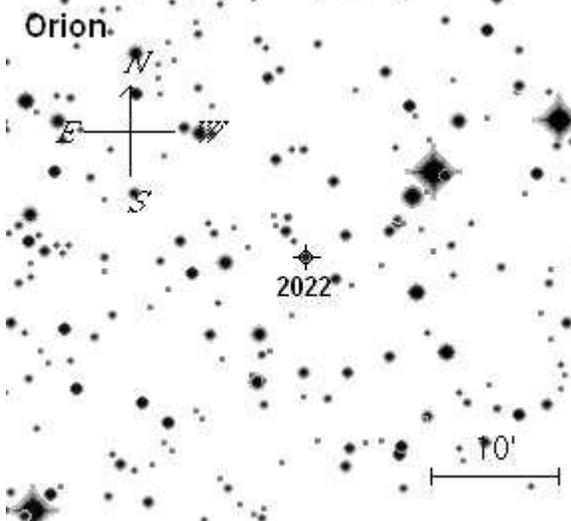


I found that I preferred low magnifications when viewing this cluster. My best views in the 80 mm were at 14x and 28x.

While it's not a particularly rich cluster, it is a rather nice loose grouping of a dozen or so stars in a small scope, and well worth a look.



Challenge Object - NGC 2022



Did you know there's a fairly bright planetary nebula in Orion? It's our challenge object for this month. And resides just south west of Cr 69 (Orion's head) and is roughly located in Orion's right shoulder.

It's relatively bright and should be an easy catch in a 6 or 8 inch telescope under dark skies, but it is very small. Once you've hopped to the correct area use the eyepiece chart to confirm your location and then bump up the magnification to spot the planetary. You may want to try an OIII filter if you have one in your stable.

Planetary nebula usually respond well to that type of line filter.

I received a plethora of images for this particular column, and there was one in particular that stands out that I'd like to leave you with. Jeff Charles was kind enough to send me this image of Orion Rising amidst the backdrop of a northern Michigan aurora.



Recommended Resources:

In the tradition of trying to do things a little different, this month I'll recommend a few of my favorite pieces of observation planning software.

Chris Marriott's - <http://www.skymap.com/>

Greg Crinklaw's SkyTools 2 - <http://www.skyhound.com/>

Steve Tuma's DeepSky - <http://www.deepsky2000.com/>

Paul Roadman's AstroPlanner - <http://www.ilangainc.com/astroplanner/>

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

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