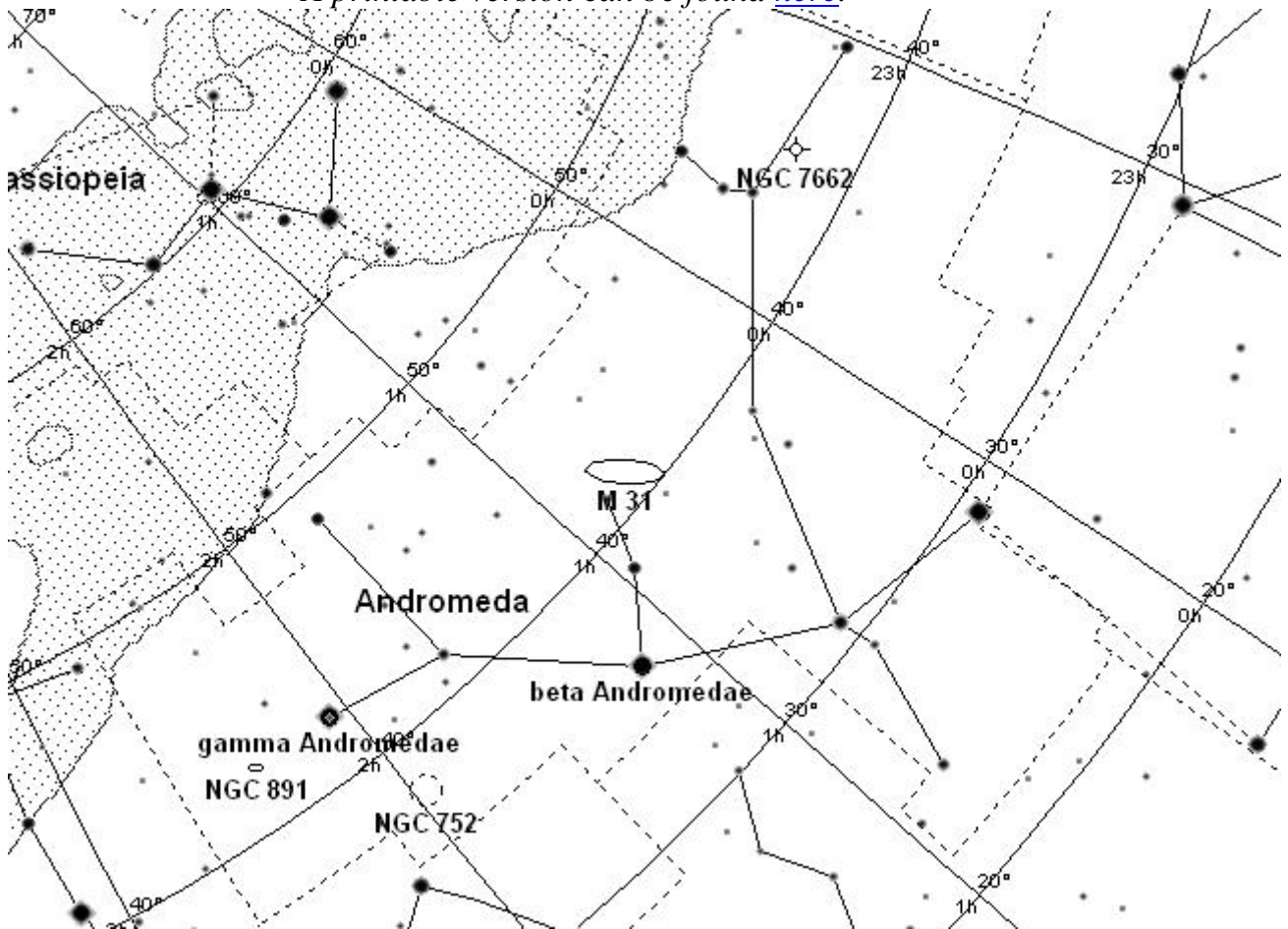


CloudyNights Presents - Small Wonders: Andromeda

A Monthly Beginners Guide to the Night Sky

by Tom Trusock

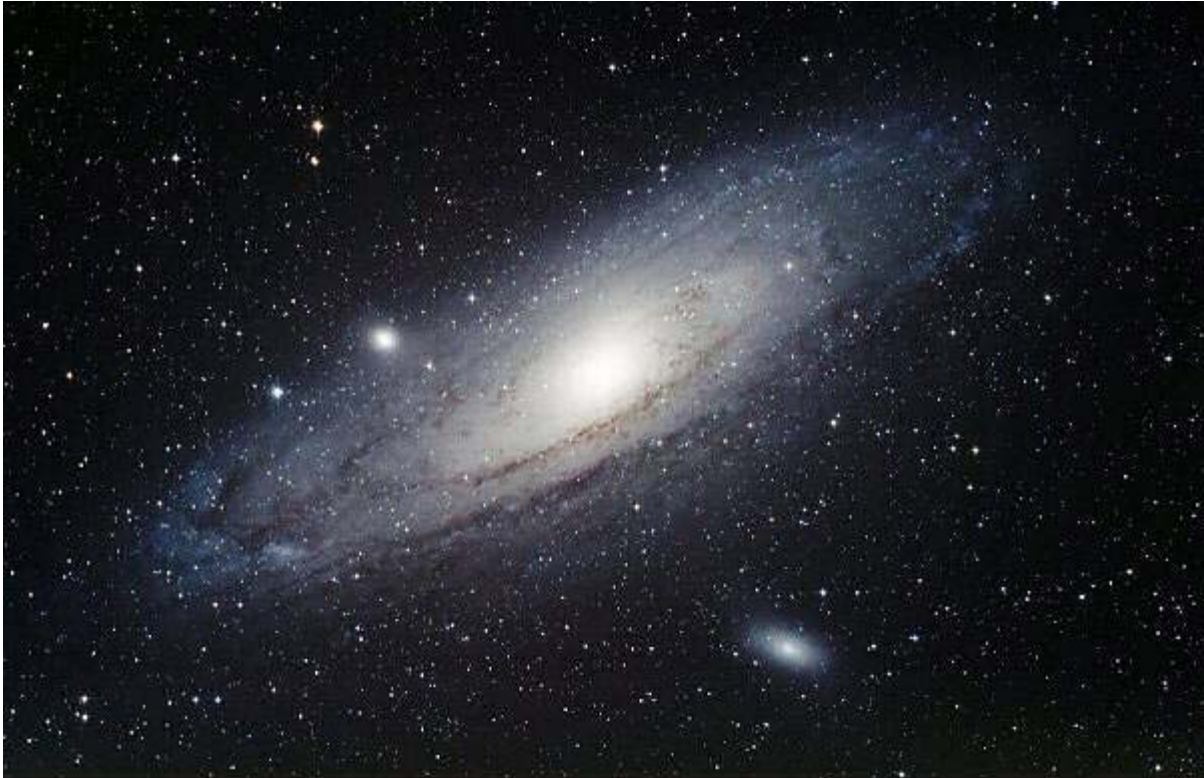
A printable version can be found [here](#).



Widefield Chart

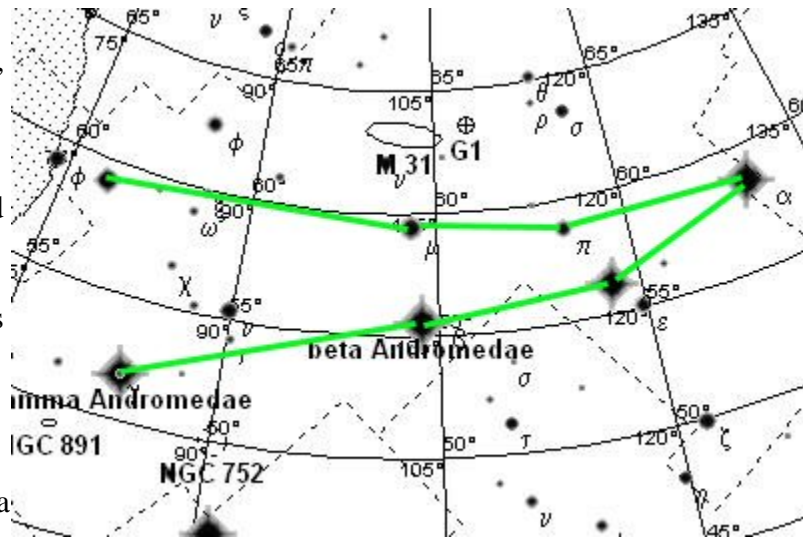
Target List	Name	Type	Size	Mag	RA	DEC
	beta	Star		2.1	01h 09m 59.9s	+35° 38' 41"
	gamma	Star		2.1	02h 04m 11.9s	+42° 21' 08"
	M 31	Galaxy	189.1'x61.7'	3.5	00h 43m 00.0s	+41° 17' 36"
	M 32	Galaxy	8.5'x6.5'	8.1	00h 42m 57.5s	+40° 53' 26"
	M 110	Galaxy	19.5'x11.5'	7.9	00h 40m 37.8s	+41° 42' 36"
	NGC 404	Galaxy	3.5'x3.5'	10.0	01h 09m 42.8s	+35° 44' 33"
	NGC 752	Open Cluster	75.0'	5.7	01h 57m 51.7s	+37° 51' 19"
	NGC 7662	Planetary Nebula	37"	8.3	23h 26m 08.1s	+42° 33' 38"

Challenge Object	Name	Type	Size	Mag	RA	DEC
	NGC 891	Galaxy	11.7'x1.6'	10.1	02h 22m 50.5s	+42° 22' 02"
	G1/Mayall II	Globular Cluster	10"	13.7	00h 33m 02.6s	+39° 36' 16"



M31 image courtesy Rick Krejci

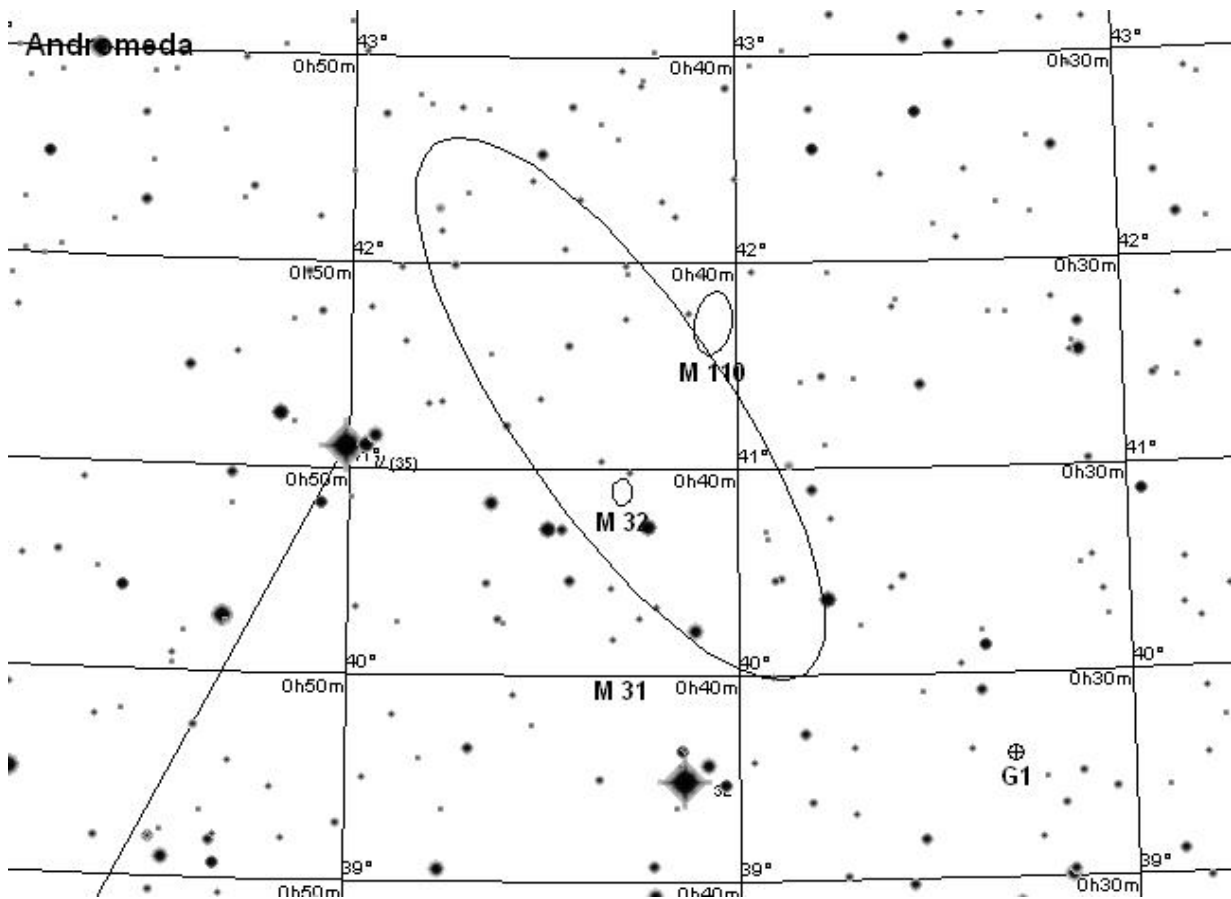
Andromeda, the daughter of Cassiopeia and Cepheus, was condemned to be sacrificed to Poseidon and bound to a rock near the shore. Just having returned after slaying the Gorgon, Perseus found, freed and married her. Andromeda is the 19th largest constellation in the night sky, now joins her mother, father, husband and his winged horse (Pegasus) in a seasonal procession around the pole.



Far from resembling a Princess, I've always seen Andromeda as a cornucopia arriving just in time for harvest - whichever way you see it, it contains a wealth of spectacular deep sky objects.

Mention Andromeda to nearly any amateur astronomer, and immediately an image of the stately Andromeda galaxy and it's companions comes to mind. While there's much more in this constellation, there's no denying this is one of the all time best showpieces in the night sky.

M31 the Great Galaxy in Andromeda and close satellites...



The Andromeda Galaxy(also known as M31) is notable for several reasons - recently, perhaps it's best known for being one of the keystones in resolving the Island Universe debate (are there many galaxies or just one?) , and determining interstellar distances by the use of Cepheid variables.

At the turn of the century, astronomers questions if the spiral nebula like M31 were

located inside the milky way galaxy or external to it. Then, in 1923, working with the 100 inch telescope at Mt Wilson, Edwin Hubble imaged stars in the halo of M13, discovered the existence of Cepheid variables among them and came up with a distance of 900,000 light years - far beyond what we believed the limits of our galaxy to be at the time.

In 1944, German born astronomer Walter Baade - who had been classified as an enemy



M31 image courtesy Tony Licata

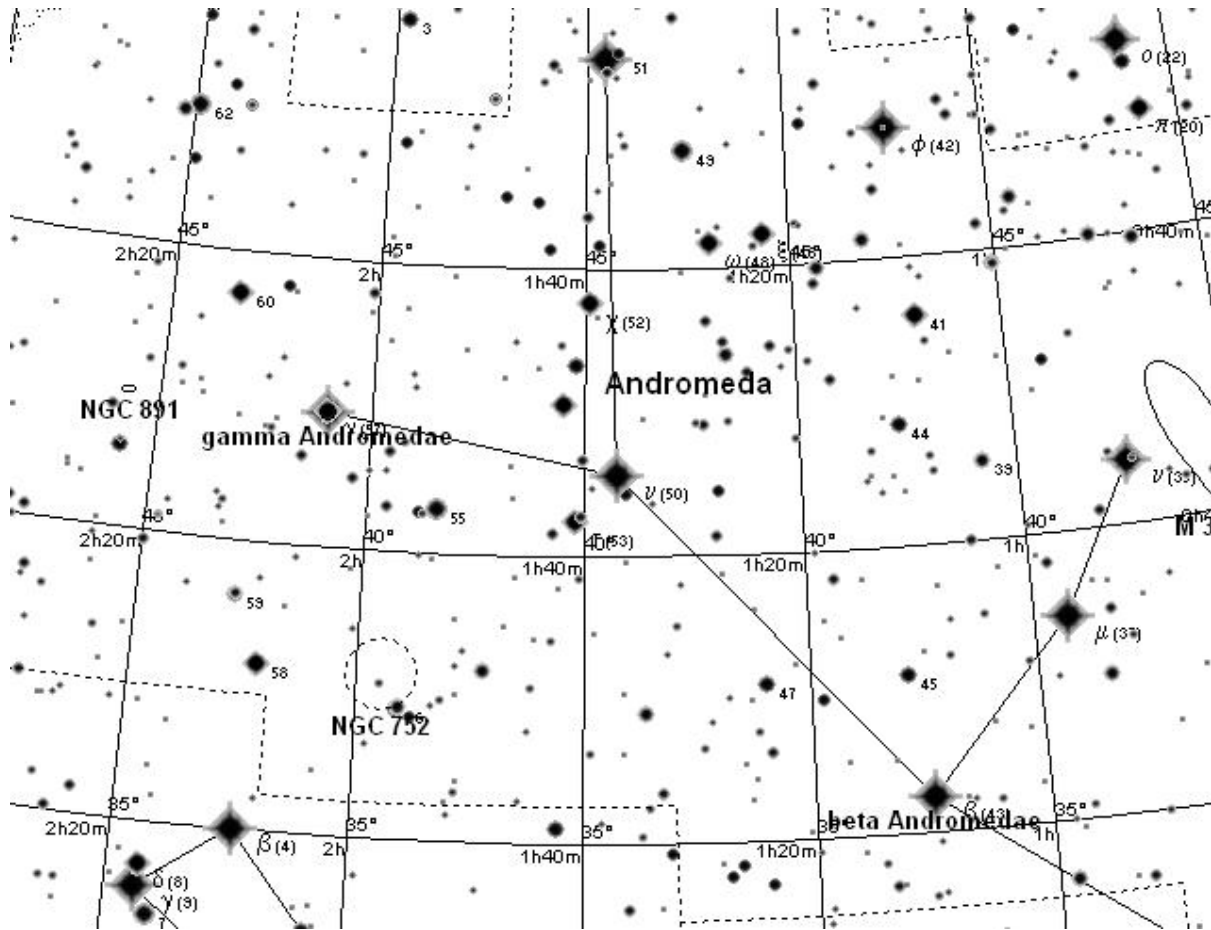
alien and thus not able to work on defense projects, was "stuck" working at Mt Wilson. Due to the wartime blackouts of Los Angeles, Baade was able to make good use of the blackest skies Mt. Wilson will probably ever see to resolve the individual stars throughout M31. Although these astronomers studied M31 with the most powerful telescopes of the time, it's visible to the naked eye under all but the worst conditions of light pollution, Andromeda - the 31st entry in Messiers catalog, spans around

5 degrees under the most careful measurements, and is an astounding 2.2 to 2.9 million light years away, and is in close attendance by m32 and m110. Somewhat farther out, in Cassiopeia, can be found two more bright Andromedan satellite galaxies - NGC185 and NGC147.

It's fun to experiment with different optical aid on Andromeda - it's so large, it makes an excellent binocular target, but I've often found the best views to be in a 4" scope - this tends to frame the brighter portions quite nicely, and reveal M32 and M110 as well. When looking for M32, look for a brighter tighter puff closer into M32 itself, while in a small scope M110 is far more ephemeral puff of smoke. My 8" reflector on a decent night easily pulls in one of the dark lanes visible in photographs, and a larger scope will show both dust lanes.

We aren't completely done with the Andromeda galaxy - we'll return to visit it's brightest globular cluster in the form of our challenge object this month but for now, lets move on.

Gamma, NGC752, Beta and the Ghost...



Gamma Andromeda

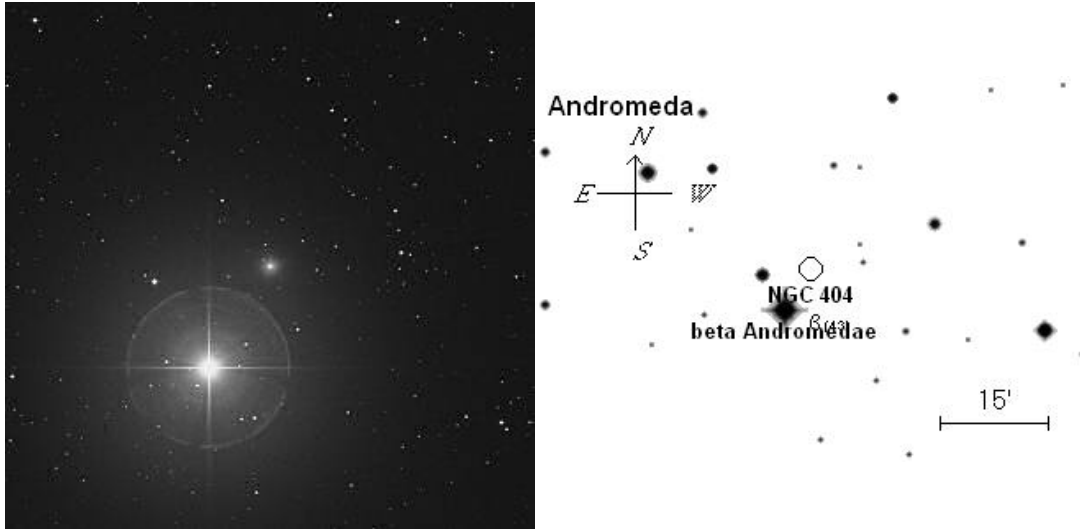
First, let's start way out on the tip of the horn - consult your wide field chart to find Gamma Andromeda. This is a nice bright double that easily shows up in a small scope. Even though you might split it with a low power, be sure to try a succession of higher powers. One thing that I've found is that star colors often seem to change a bit with the magnifications used. Gamma is a good example of this effect. At lower powers I found both stars to have an orange hue, but when I increased the magnification to 70 power in my 4" refractor, I found the brighter one remained orange while the dimmer one took on a whitish hue. What do you see?

NGC752

Next, with your widest field eyepiece, scan eastward from gamma and look for a large open cluster. This is NGC752, and it's best seen in binoculars or a wide field scope due to its large size. In my 4" scope, I found my best views at 36x where I counted a couple of dozen stars. Look for two bright golden stars in the field lying just outside the cluster

proper. Similar magnitude and coloration stars such as these two often remind me of eyes peering back at me out of the night.

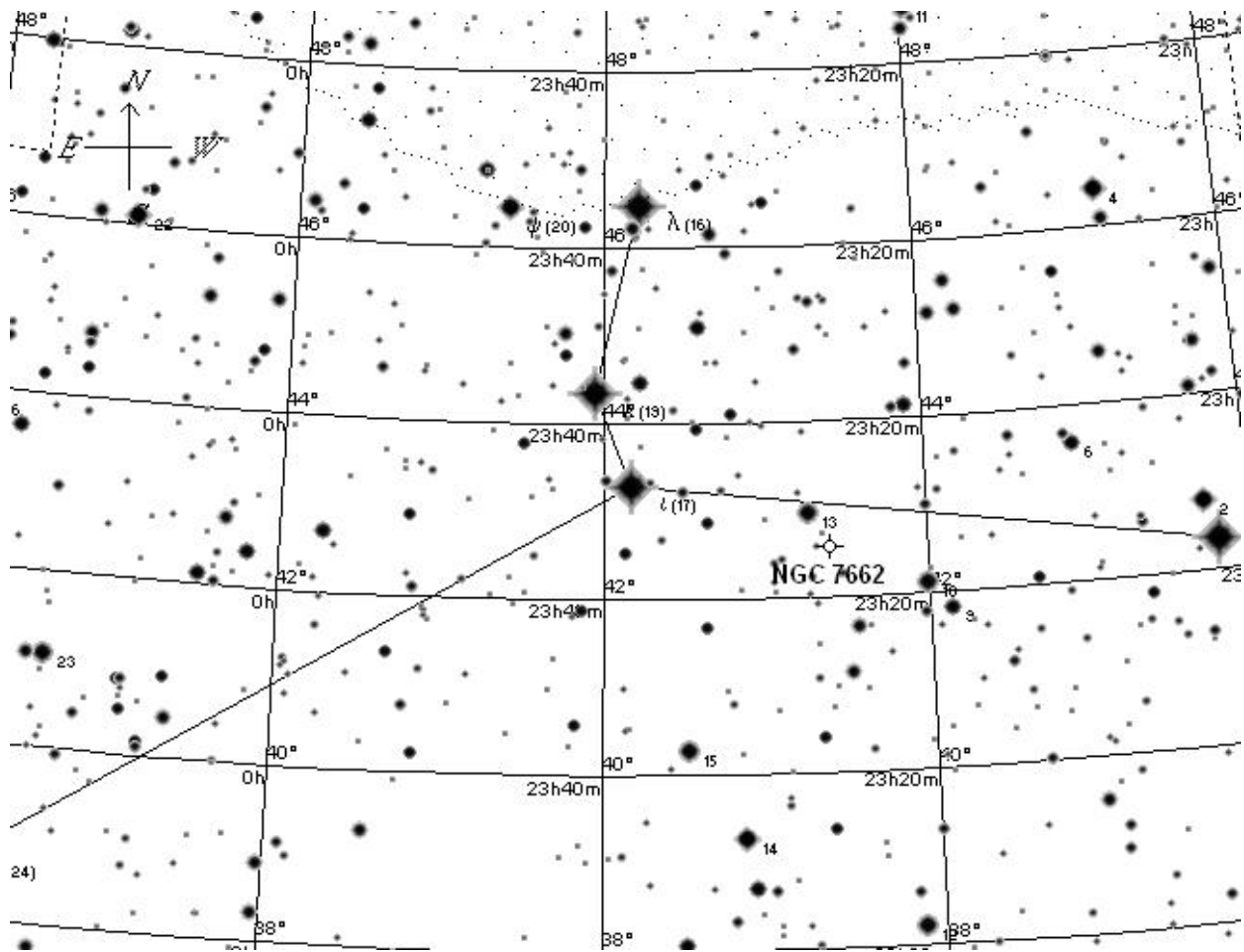
Beta Andromeda (Mirach) and Mirach's Ghost (NGC404)



Now head back up the base of Andromeda, till you come to beta. Take a moment and study beta carefully - you'll notice something that looks like a reflection on the lens of your eyepiece. Unless you are looking very closely for it, you might miss it completely.

This is Mirach's Ghost - NGC404. More advanced observers might decry the fact that it's next to impossible to separate NGC404 from the glare of beta - unfortunately, they are quite right. Fortunately for us tho, there's not much to see in any size scope. The success here lies in finding the galaxy and recognizing it for what it is rather than discarding it as a reflection or trick of the light.

The Blue Snowball...

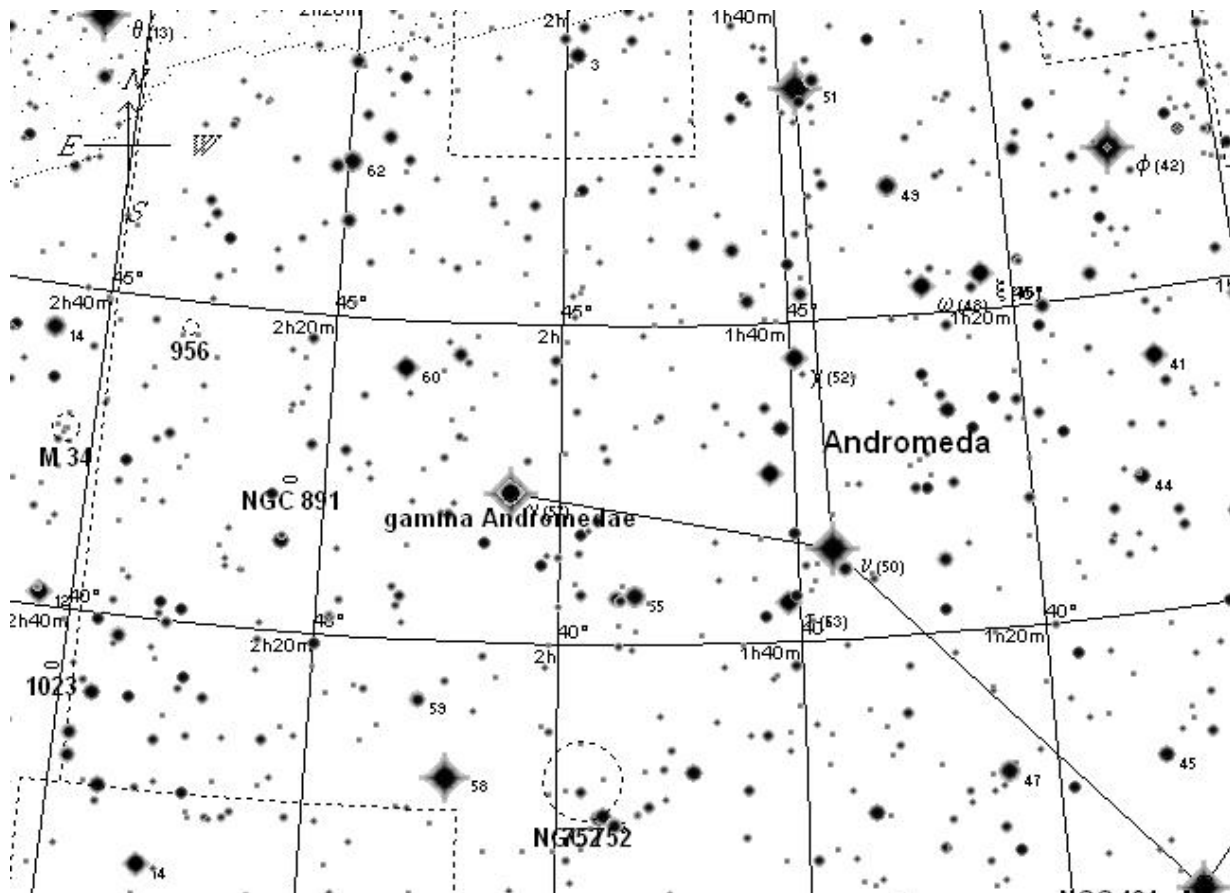


This one is a bit more difficult to hop to. The key lies in the three bright stars that are oriented mostly North to South in the above map. From a semi-dark site, they are naked eye stars. If you can see them, the hop shouldn't be that bad. If you can't, you'll have to get to the area using the widefield map, then narrow in with the above one.

7662 - the Blue Snowball is CERTAINLY worth the effort. I noted that it was non-stellar at 37x in my 4" refractor, and recall it as being an amazing shade of blue in both my 8" and 4" scopes. It's a planetary nebula, and remember these can support high powers so now's the time to pour it on. You

may also want to haul out a UHC or OIII filter as well to increase contrast and see how the image changes - don't expect a lot with this particular target and a small scope, but it's a good habit to get into.

NGC891 - The Outer Limits Galaxy



While I've spotted 891 in my 4" scope, it takes an 8" or larger scope to really begin to appreciate it. One of the first TV stars (It was in the opening of the show "The Outer Limits" hence the name) it's a truly spectacular galaxy in a larger scope.

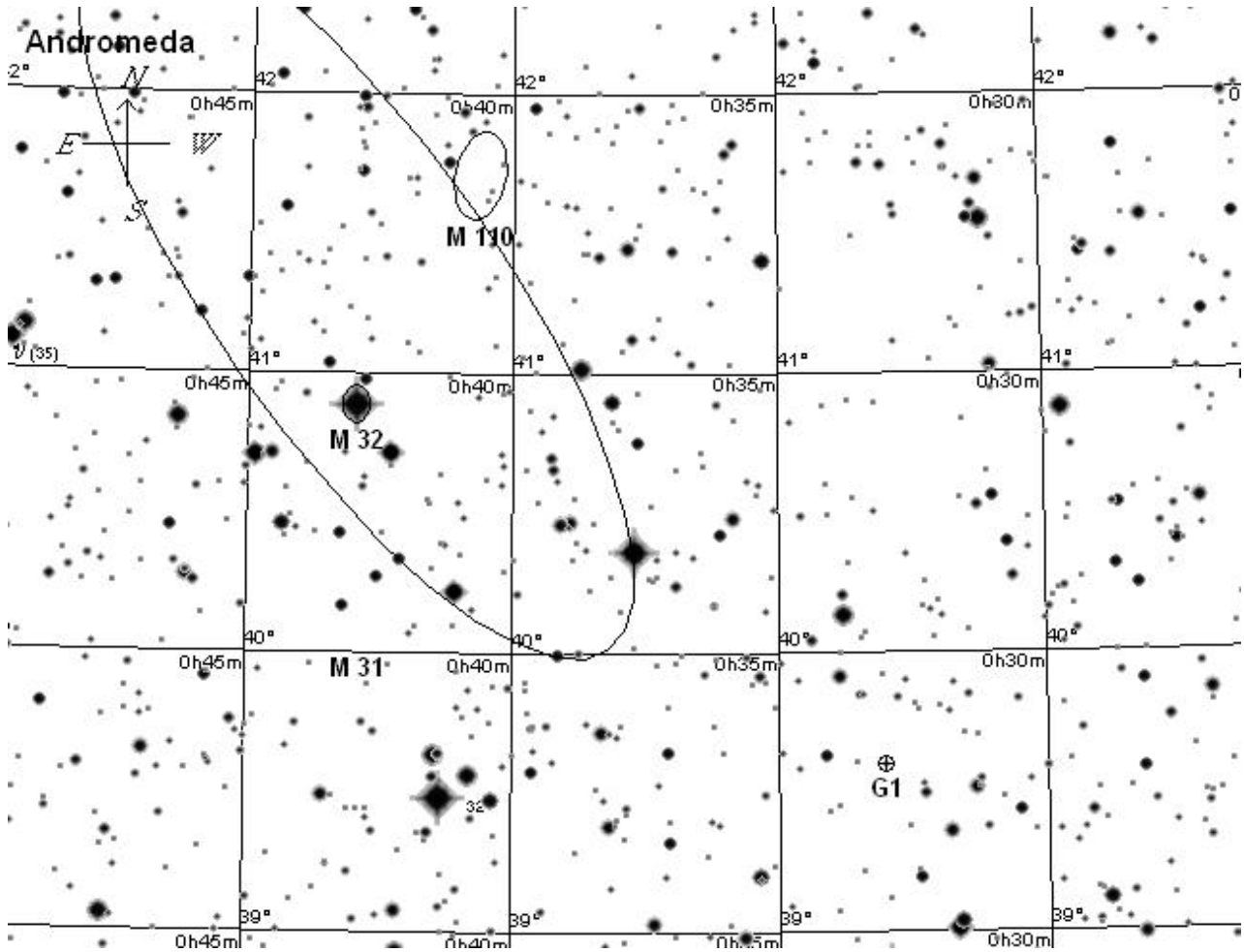
In my 8", it's typically a nice spindle of a galaxy, with the dust lane only beginning to show itself when I'm under the best sky conditions.



In a 15"-20" scope, it begins to look like the picture to the left.

Because it's an edge on galaxy, it's one of the few galaxies that respond well to the Collins I3 image intensified eyepiece and is simply spectacular.

G1/Mayall II



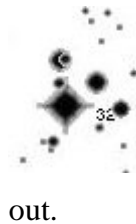
While it's not a toughie to see - if you have sufficient aperture, it can be a real toughie to find.

Conceptually, this is a spectacular target. Visually, it's something less than impressive. We've looked at several globulars in our own galaxy at this point - now it's time to take a peek at the brightest globular in the local group. The catch? It's not in our galaxy. It's in Andromeda. The shot to the left was taken by the Hubble Space Telescope.

It's called G1 or Mayall II and orbits the Andromeda Galaxy at a distance of 130 thousand light years from Andromeda's center

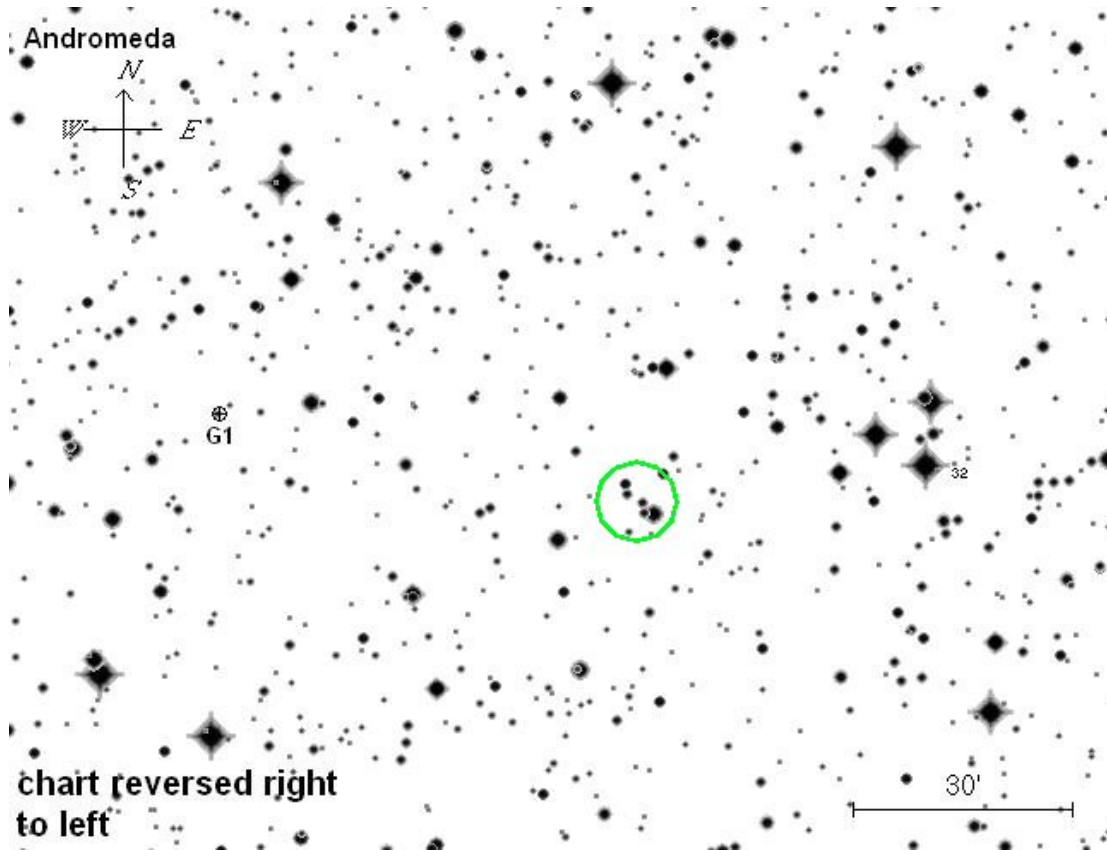
What's truly amazing is that you can actually make out some extent to G1 through a moderate sized back yard telescope and *it's not just a point source*. While you are a long

long way from resolving any individual stars, you can clearly see that there is something there - especially when you compare it to the two foreground stars that flank it. At mag 13.7, it's a somewhat dim target tho, so the more aperture you can throw at this, the better your chances of finding it. It's certainly doable in a 10" scope from a decent site, and more than likely is catchable in an 8" scope from a very dark site. I've even heard rumors of folks grabbing it in a 6" scope.



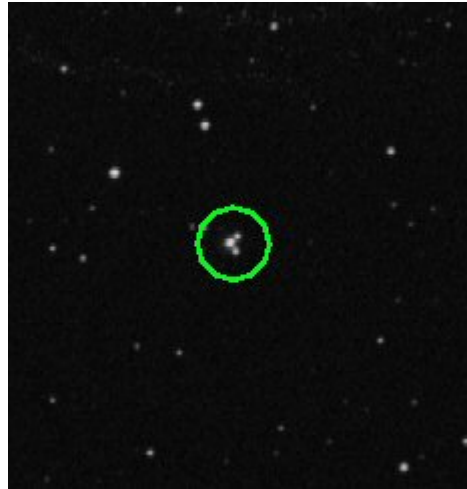
I always start my star hop at M32, and work straight down to the very recognizable asterism shown at left. Then I work my way over towards G1. Once I know I'm in the right area, I crank up the power and begin inspecting multiple stars in the area. G1 lies almost in the middle of two similar magnitude foreground stars, and that's a big help when it comes to fishing it out.

Here is a finder chart that may help. I've flipped the image in this chart to aid starhopping at the eyepiece.



Note the circled grouping of stars in the chart above - in a moderately large size scope, this grouping bears a strong resemblance to Cassiopeia. Once you are in the right area, look for three stars at the position marked G1 on the charts. Under high magnification, it will resemble Micky Mouse - the two foreground stars are the ears, and Micky's head is G1.

The DSS image to the right should resemble what you see. Be sure to pump up the magnification, and you can see that it's not quite a stellar point. Not very spectacular visually, but it blows my mind when I think about what, exactly I'm looking at.



While I've caught it in my 10" and seen extent in my 15", the best view I've ever had of this object was when I was observing with Gary Gibs in his 20" with a Collins I3 image intensified eyepeice. You could obviously see that it wasn't a star - in fact, it had a starlike core with a dimmer coma around the outside and reminded me of tiny dim globulars caught in a small scope.

If you grab this one, you can rest assured that your star hopping skills are getting quite good, and you've seen a target very few others have.

*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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