The Sky at Night

The Moore Winter Marathon - Observing Guide (Items 26-50: Telescope)

Written and illustrated by Pete Lawrence

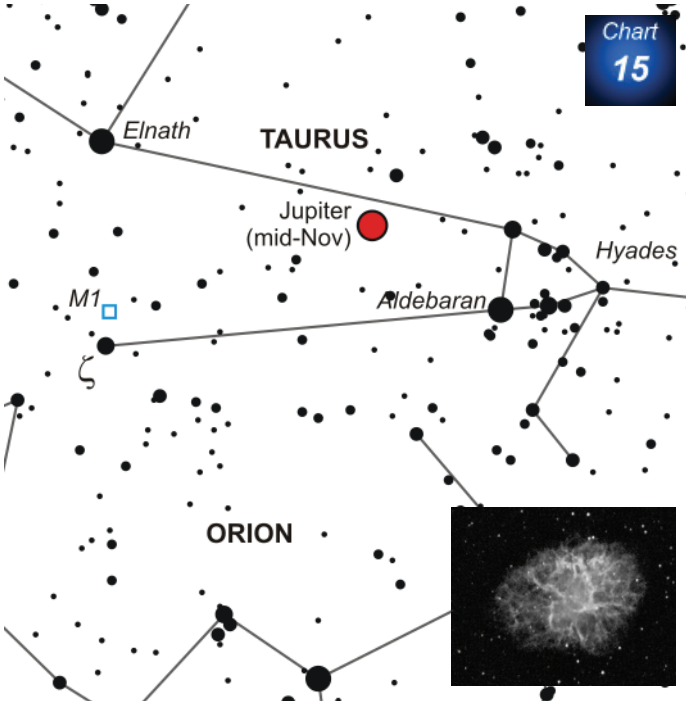
26 Crab Nebula (M1) in Taurus

Rating - *Medium*

Visibility - *Visible most of the night*

Item **[26]** is the first entry in Charles Messier's famous catalogue of deep sky objects. Known as Messier 1 (M1 for short), The Crab Nebula, this is the remnant of a supernova explosion which was witnessed by Chinese, Arabic and Japanese astronomers in 1054AD. The original star is no longer intact, with its inner layers expanding out into space. The core of the star imploded into a dense body which has a strong magnetic field and rapid rotation. With a diameter about the same as a city, this exotic object is known as a pulsar because as it rotates, approximately 30 times per second, we get to see a hotspot caused by material being channelled down one of its magnetic poles, a bit like a cosmic lighthouse. The pulsar is the powerhouse of the nebula, bathing it in high-levels of energetic radiation.

The Crab Nebula is located just over a degree to the northwest of the star Zeta (ζ) Tauri which marks the southern bull's horn tip of Taurus the Bull. Use a low power to locate its faint misty smudge then gradually up the magnification to see if you can see some detail. With a small scope it definitely looks elongated in shape, while larger instruments start to show some of the filamentary cage which surrounds the pulsar within.

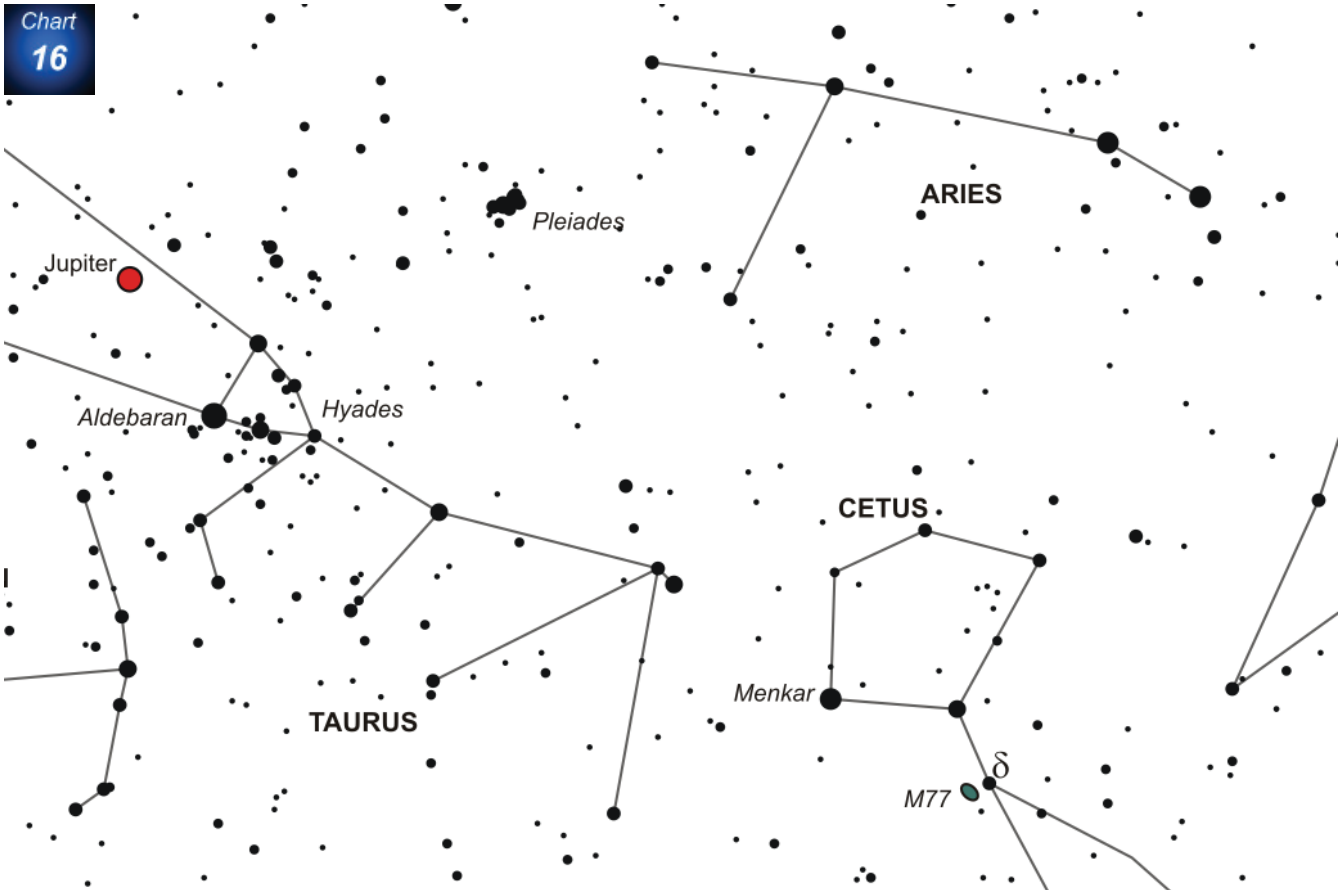


27 Messier 77, galaxy in Cetus

Rating - *Hard*

Visibility - *Nov best seen 21:00-01:00, Dec 19:00-23:00, Jan 19:00-21:00*

The Crab Nebula lies within our own Milky Way Galaxy but our next object is well outside. Marathon entry **[27]** is an object known as M77, a spiral galaxy in the constellation of Cetus the Whale. It's estimated to be 60 million light years distant but is actually reasonably bright. It's located just under a degree southeast of the fourth magnitude star Delta (δ) Ceti. The galaxy is particularly remarkable because it contains a bright active galactic nucleus (AGN). An AGN will typically show a higher than normal luminosity over part or all of the electromagnetic spectrum. This will be caused by an immense energy source within the core of the galaxy. Use a wide-angle eyepiece to locate M77 and then apply more power to see whether you can pick out any detail.



28 Jupiter's Great Red Spot (GRS)

Rating - *Easy*

Visibility - *Jupiter's up for most of the night. For timings see below...*

We swing right back into the Solar System for item **[28]**. We've already mentioned Jupiter as a naked-eye/binocular object in the first part of the Marathon (item **[7]**) but for the telescope section we're concentrating on identifying a feature within the planet's atmosphere. This is the most famous storm in the entire Solar System, an atmospheric disturbance known as the Great Red Spot (GRS). With a width roughly 2-3 times the size of the Earth, the GRS has persisted in Jupiter's atmosphere for probably longer than 200 years. It's not too hard to see so long as you have good steady skies and a decent magnification – say 200x or higher. Having said this, the GRS has been seen to fade from time to time so it may or may not be prominent when you try and find it. The only way to tell is to set up and go and look yourself.

Jupiter rotates very quickly, completing a full rotation in less than 10 hours. Below is a table of times when the GRS is on the centreline of the planet's disc as seen from Earth. Sometimes this occurs twice in one day, hence two times being shown against certain dates. It's typically visible for 2 hours before and 2 hours after this time (i.e. visible for about 4 hours at a go). All times are GMT.

October 2012			November 2012			December 2012			January 2013		
2012 Oct 01	04:43		2012 Nov 01	05:16		2012 Dec 01	19:50		2013 Jan 01	00:31	20:22
2012 Oct 02	00:35	20:26	2012 Nov 02	01:07	20:58	2012 Dec 02	05:45		2013 Jan 02	16:13	
2012 Oct 04	02:13	22:04	2012 Nov 03	06:54		2012 Dec 03	01:37	21:28	2013 Jan 03	02:09	22:00
2012 Oct 06	03:51	23:42	2012 Nov 04	02:45	22:36	2012 Dec 04	07:23	17:19	2013 Jan 04	17:52	
2012 Oct 08	05:29		2012 Nov 05	18:27		2012 Dec 05	03:15	23:06	2013 Jan 05	03:47	23:39
2012 Oct 09	01:21	21:12	2012 Nov 06	04:23		2012 Dec 06	18:57		2013 Jan 06	19:30	
2012 Oct 11	02:59	22:50	2012 Nov 07	00:14	20:05	2012 Dec 07	04:53		2013 Jan 08	01:17	21:08
2012 Oct 13	04:37		2012 Nov 08	06:01		2012 Dec 08	00:44	20:35	2013 Jan 09	17:00	
2012 Oct 14	00:28	20:20	2012 Nov 09	01:52	21:43	2012 Dec 09	06:31	16:26	2013 Jan 10	02:55	22:47
2012 Oct 15	06:15		2012 Nov 10	17:34		2012 Dec 10	02:22	22:13	2013 Jan 11	18:38	
2012 Oct 16	02:06	21:58	2012 Nov 11	03:30	23:21	2012 Dec 11	18:04		2013 Jan 12	04:34	
2012 Oct 18	03:45	23:36	2012 Nov 12	19:12		2012 Dec 12	04:00	23:51	2013 Jan 13	00:25	20:17
2012 Oct 19	19:27		2012 Nov 13	05:08		2012 Dec 13	19:42		2013 Jan 15	02:04	21:55
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2012 Oct 21	01:14	21:05	2012 Nov 15	06:46		2012 Dec 15	01:29	21:20	2013 Jan 17	03:42	23:34
2012 Oct 23	02:52	22:43	2012 Nov 16	02:37	22:28	2012 Dec 16	17:12		2013 Jan 18	19:25	
2012 Oct 25	04:30		2012 Nov 17	18:20		2012 Dec 17	03:07	22:59	2013 Jan 20	01:12	21:04
2012 Oct 26	00:21	20:13	2012 Nov 18	04:15		2012 Dec 18	18:50		2013 Jan 21	16:55	
2012 Oct 27	06:08		2012 Nov 19	00:06	19:58	2012 Dec 19	04:46		2013 Jan 22	02:51	22:42
2012 Oct 28	01:59	21:51	2012 Nov 20	05:53		2012 Dec 20	00:37	20:28	2013 Jan 23	18:34	
2012 Oct 30	03:38	23:29	2012 Nov 21	01:44	21:35	2012 Dec 21	06:24	16:19	2013 Jan 25	00:21	20:13
2012 Oct 31	19:20		2012 Nov 22	07:31	17:27	2012 Dec 22	02:15	22:06	2013 Jan 27	02:00	21:51
			2012 Nov 23	03:22	23:13	2012 Dec 23	17:58		2013 Jan 28	17:43	
			2012 Nov 24	19:05		2012 Dec 24	03:53	23:44	2013 Jan 29	03:38	23:30
			2012 Nov 25	05:00		2012 Dec 25	19:36		2013 Jan 30	19:21	
			2012 Nov 26	00:51	20:43	2012 Dec 26	05:31				
			2012 Nov 27	06:38	16:34	2012 Dec 27	01:23	21:14			
			2012 Nov 28	02:29	22:21	2012 Dec 28	17:05				
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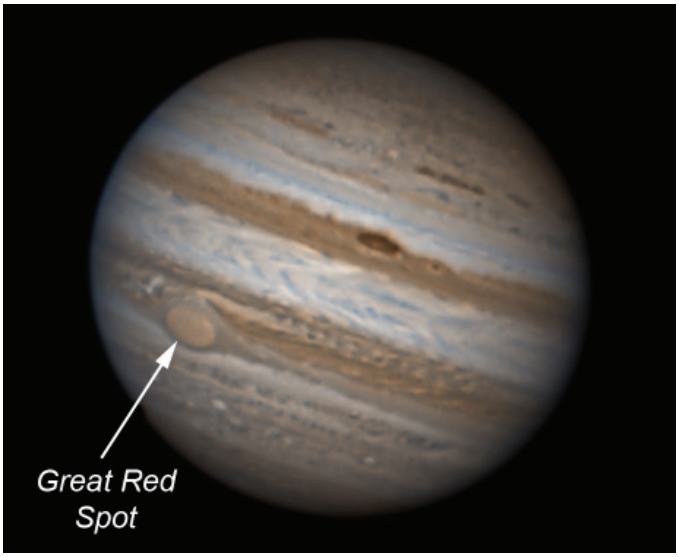
						2012 Dec 31	04:39				



29 Little Dumbbell (M76) in Perseus

Rating - *Medium*

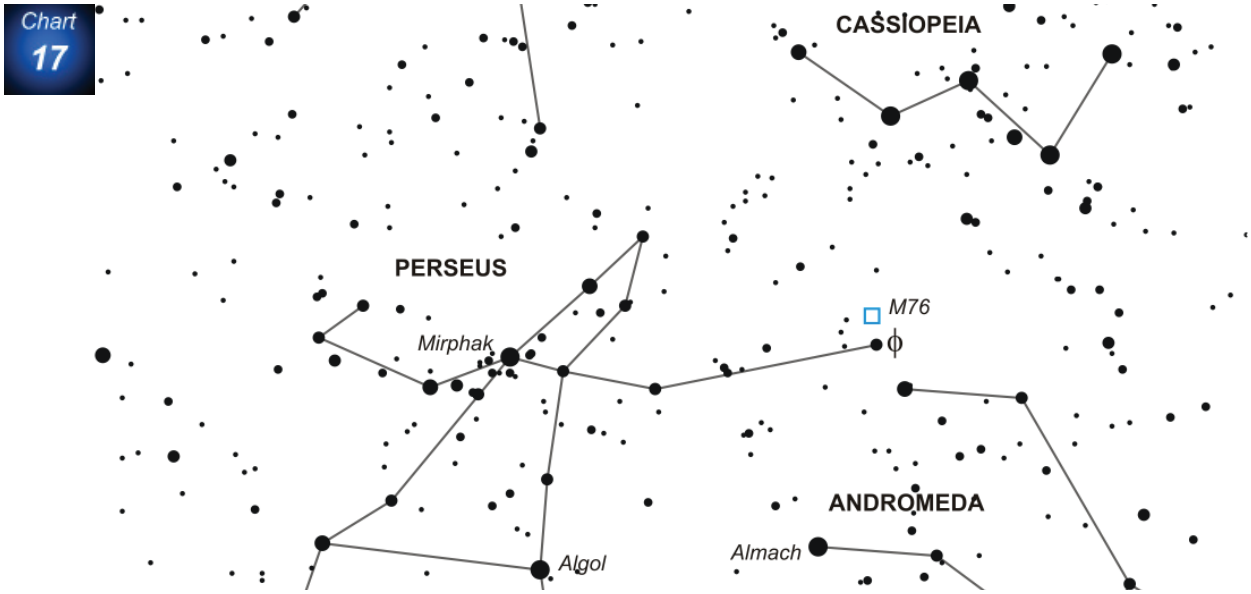
Visibility - *Nov - well placed all night, Dec-Jan best seen after night falls*

Jupiter is a planet in our Solar System so it seems fitting that as we head back out into the Milky Way Galaxy, our next two items are what are known as planetary nebulae. Despite their name, planetary nebulae have nothing to do with planets at all but are named after them by virtue that some look like ghostly planetary discs hanging in space. In reality, a planetary nebula is the result of an intermediate or low mass star coming to the end of its life. When this happens the outer layers of the star get ejected off into space, forming beautiful shells of glowing gas around the remains of the parent star.

Some planetary nebulae resemble circular discs, some have holes in them, some are elongated and others have definite and rather exotic structure. The Little Dumbbell, M76 (item **[29]**) is of the small and elongated variety. It's actually quite faint too making it a bit harder than most of the objects on our list. It lies in the constellation of Perseus the Greek Hero a degree to the north of the star Phi (ϕ) Persei.

Use a low power to locate the field but beware that small planetary nebulae do have the rather unfortunate trait of looking just like stars! Don't be afraid of piling on the power once you think you've found it. Its name comes from the fact that it looks a bit like another Messier planetary nebula known as M27, The Dumbbell Nebula, which is located in the constellation of Vulpecula, The Fox.

M76 looks somewhat rectangular with a pinch in the middle. It's also known by other names such as The Cork Nebula, Barbell Nebula and Butterfly Nebula. Amazingly, although there are plenty of beautiful examples of planetary nebulae in the night sky, there are only four listed in the whole of the Messier catalogue; M27 (Dumbbell Nebula), M57 (Ring Nebula), M76 (Little Dumbbell Nebula) and M97 (Owl Nebula - not to be confused with the Owl Cluster, item **[35]**!).



30 Eskimo Nebula, Gemini (Caldwell 39)

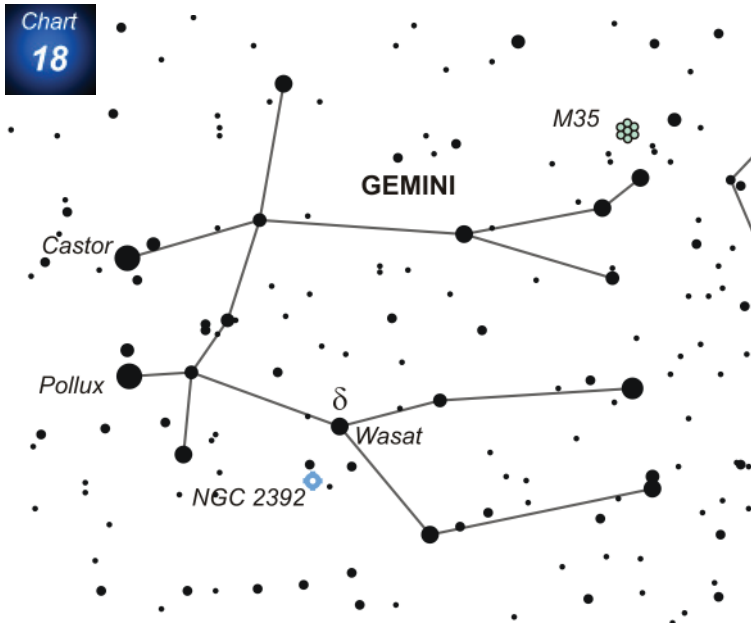
Rating - *Medium*

Visibility - *Up for most of the night*

Our next object (item **[30]**) is an example of a pretty planetary nebula which is not in Messier's catalogue. The Eskimo Nebula, also known as NGC 2392 or Caldwell 39, is a planetary nebula in the constellation of Gemini the Twins. It lies a little over 2 degrees to the southeast of the star Delta (δ) Geminorum, or Wasat, and has an eighth magnitude star right next to it.

Once found, it's definitely worth piling the power on with this object as it starts to show some interesting structure. Look carefully and you'll see a central disc which looks distinctly mottled when seen through larger instruments.

Around the edge of the disc is an outer halo which has a fur-like appearance when seen through a large scope or via long exposure photography. The central star of the nebula looks a bit like a nose on a face, the disc being the face. The outer halo gives the appearance of a fur-lined hood, a characteristic which gives the nebula its informal name of The Eskimo Nebula.



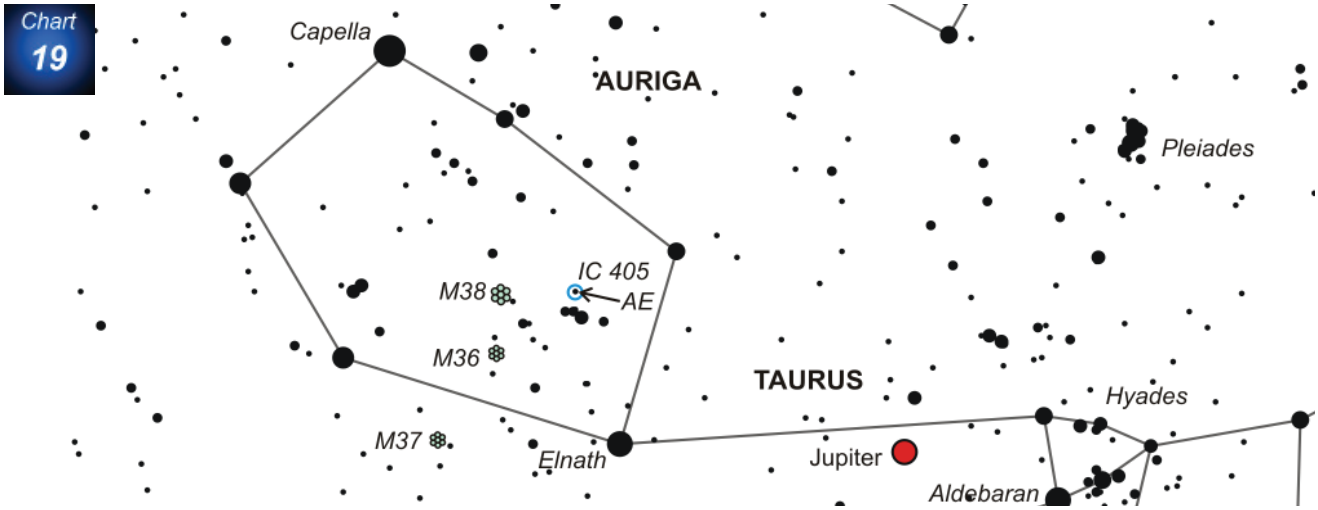
31 Flaming Star Neb, Auriga (Caldwell 31) **Rating -** *Hard*

Visibility - *Up for most of the night*

The next object is also a nebula but not a planetary one. This is probably the hardest object to see visually in the marathon so make sure you have really dark, clear skies when you look for it. It's also essential to make sure you've given your eyes at least 20 minutes in total darkness to properly dark adapt.

Known as IC 405 or Caldwell 31, item **[31]** is an emission and reflection nebula energised by a variable star known as AE Aurigae. To stand a chance of seeing something in the region try using the technique of averted vision, where you look slightly out of the corner of your eye. This places the dim light from the nebula on a more sensitive part of your eye, giving you the best possible chance of seeing the nebula's misty light.

As an aside, AE Aurigae, which hovers on the threshold of naked eye visibility, is thought to be a runaway star - a star that has been ejected the cluster where it was born. In this case it's thought that AE Aurigae may have been ejected from the Trapezium Cluster at the heart of the Orion Nebula a couple of million years ago. The Trapezium Cluster is item number **[33]** in the marathon so remember AE Aurigae when you look at it.



32 Fish's Mouth, part of Orion Nebula **Rating -** *Easy*

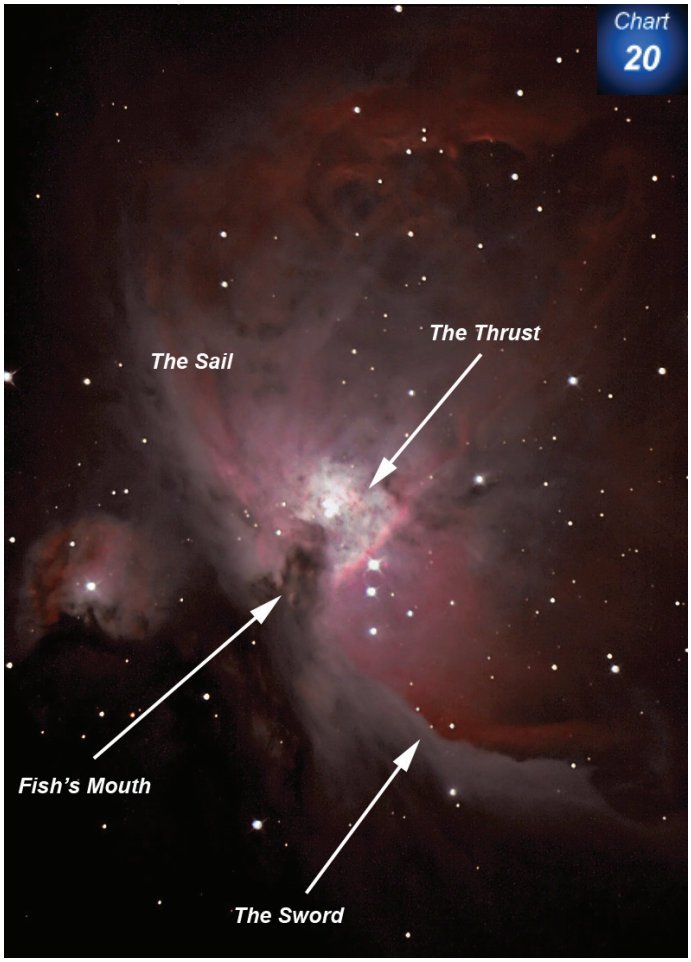
Visibility - Nov best seen 23:00-04:00, Dec 21:00-02:00, Jan 19:00-midnight

We stick with a nebula for the next pair of objects but this time there should be no problem locating it as it's one of the brightest in the sky

The Orion Nebula, M42, sits within Orion's Sword (that's item **[22]** in the naked-eye/binocular part of the marathon). Once you've found it, study its shape. You'll see that it has a bright patch in the middle (that's called *The Thrust*) and two swept back regions of nebulosity.

The northern swept back portion is called *The Sail* while the southern one is called *The Sword* because it shows a relatively sharp edge. The dark 'inlet' to the north east of the bright patch is what's known as the Fish's Mouth and this is item **[32]** in the marathon.

If you're a bit confused at the sharp edge sweep back region being called *The Sword* because the Orion Nebula is in a region of the constellation already called *The Sword*, we can add to your confusion a bit more by pointing out that the main constellation in the bottom left hand corner of Orion (seen from the UK) is called Saiph. Yes, you've probably guessed what's coming - Saiph means "Sword of the Giant". So in total Orion's got no fewer than 3 swords!

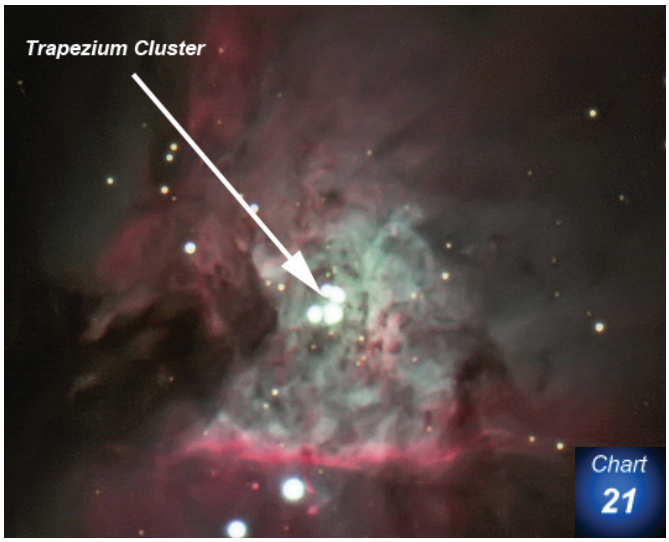


33 Trapezium Cluster in Orion Nebula

Rating - *Easy*

Visibility - *Nov best seen 23:00-04:00, Dec 21:00-02:00, Jan 19:00-midnight*

Staying with the Orion Nebula and looking into the bright region at its heart which is known as *The Thrust*, you should be able to locate a beautiful pattern of four (or possibly more if you have a big scope) stars which is known as The Trapezium Cluster. Identify this and you can tick off item **[33]** in the marathon list. The young hot stars that form the cluster have formed from the gas in the nebula.



34 Hind's Crimson Star (R Leporis)

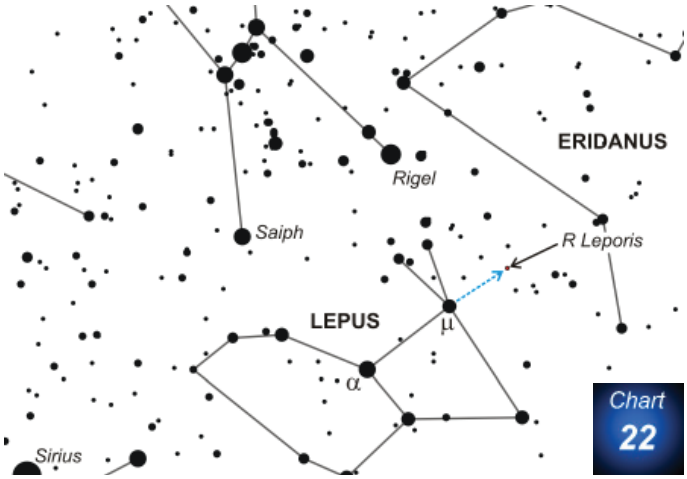
Rating - *Medium*

Visibility - *Nov best seen 23:00-04:00, Dec 21:00-02:00, Jan 19:00-midnight*

Orion the mighty hunter's main prey in the night sky is, located just below his legs. Here we find the constellation of Lepus the Hare, the pattern of which looks a bit like an infinity sign – a number eight on its side – with what can be best described as ears coming off the pattern close to the bright star Rigel in Orion.

A bit further to the west, pointed at by a line from Alpha (α) through Mu (μ) Leporis, is a variable star known as R Leporis or *Hind's Crimson Star*. This star varied in brightness from magnitude +5.5 (just naked eye) to +11.7 (telescope only) over a period of about 14.5 months.

When close to minimum, the direction it's now heading towards, it takes on a distinctly red colour and is well worth a look. If you can see it, you can tick off item number **[34]** on our list.



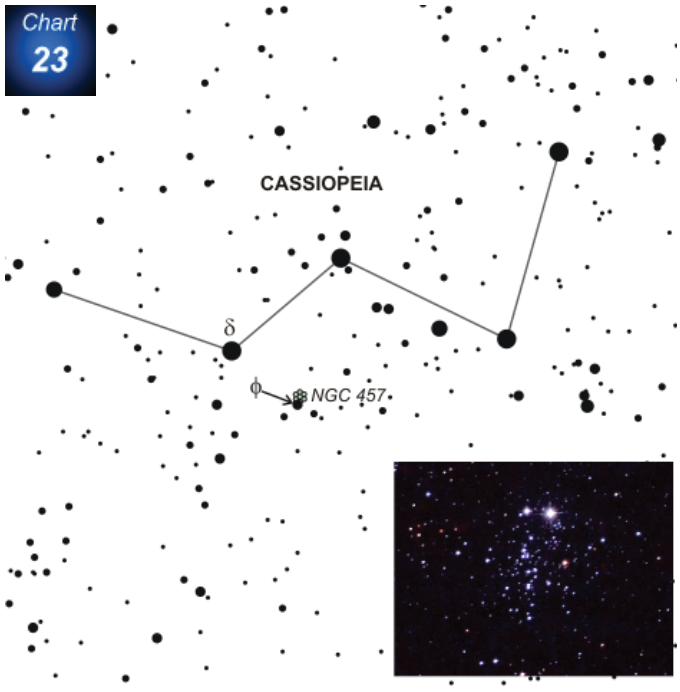
35 Owl Cluster, Cassiopeia (Caldwell 13)

Rating - *Easy*

Visibility - *Visible all night*

R Leporis is actually quite a low target as seen from the UK so for our next marathon entry, we'll head back up the sky into the "W" shaped constellation of Cassiopeia, the Seated Queen. This time you're looking for the star Phi (ϕ) Cassiopeiae which is located 2 degrees south(ish) of the star, Delta (δ) Cassiopeiae, or Ruchbah – that's the star which is to the left of the middle star of the "W" if you imagine the "W" the right way up.

Look at the star Phi Cassiopeiae through a low power eyepiece and you'll see that it's not alone. There's a brightish star next to it, called Phi-2 Cassiopeiae, the original Phi being known as Phi-1. Other stars can be seen around the area with a line of fainter stars running parallel to Phi-1 and Phi-2. The collection of stars here forms NGC 457 otherwise known as The Owl Cluster or Caldwell 13. The reason why it's named after an owl is because Phi-1 and Phi 2 look like eyes on the face of an owl. It may take a leap of imagination to see this but look out for its alter ego too, for this cluster also goes by the name of The ET Cluster. Here again the Phi pair represent eyes with the line of fainter stars running parallel with them, the arms of an outstretched alien running towards you. If you've seen the Owl/ET, don't forget to tick item **[35]** off our list.

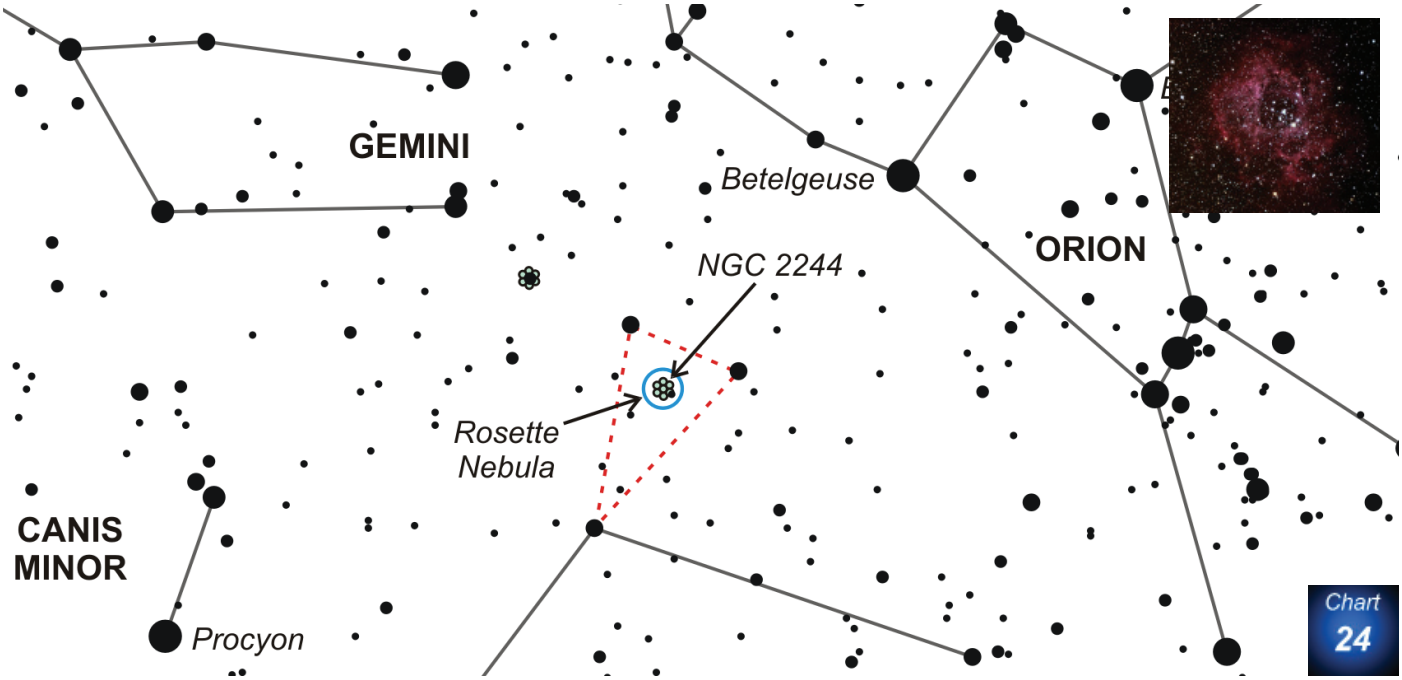


36 Caldwell 50, cluster in Monoceros

Rating - *Easy*

Visibility - *Up most of the night*

Item **[36]** is an open cluster called NGC 2244 or Caldwell 50 in the constellation of Monoceros the Unicorn. Through a telescope it sort of resembles the number six on a dice. It's actually quite easy to find sitting in the middle of a faint triangle of stars that marks the head region of the unicorn. The cluster is actually at the heart of the famous Rosette Nebula, the stars having formed out of the nebula gas. If you can't see the Rosette, don't worry (it's not one of our entries!) because it's quite faint visually. It can be detected using a lowish power if you have high contrast or nebula filters, but be warned that it's a large object.

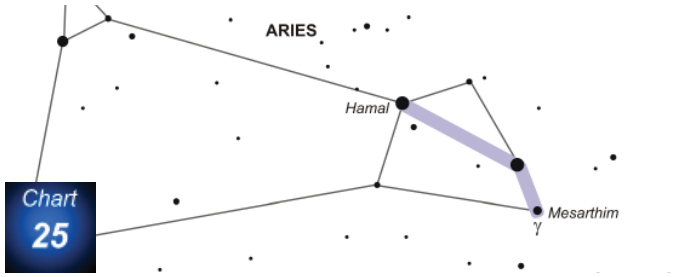


37 Gamma Arietis, binary star

Rating - *Easy*

Visibility - *Up most of the night*

Our next two objects both contain a pair of stars which have roughly equal brightness. Gamma (γ) Arietis is a binary star system in the constellation of Aries the Ram. It goes by the name of Mesarthim and comprises two more-or-less equal brightness white (or blue-white) stars. A fairly easy target this one as it lies on the western (rightmost as see from the UK) end of the bent line that makes up the main part of Aries the Ram. Locate this easy binary and that's item **[37]** ticked off the list.



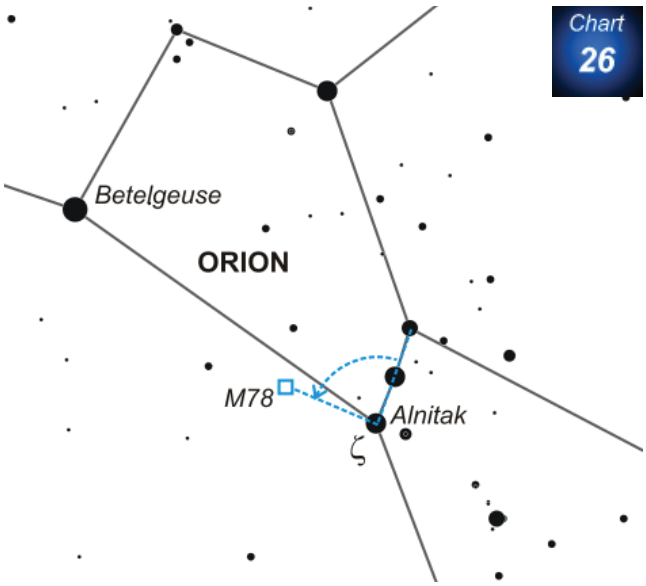
38 M78, nebula in Orion

Rating - *Medium*

Visibility - *Nov best seen 23:00-04:00, Dec 21:00-02:00, Jan 19:00-midnight*

Item number **[38]** is another nebula located within Orion the Hunter. It's relatively easy to find as you simply have to point your telescope at the location pointed at by taking the line drawn by the belt stars of Orion and rotating it anti-clockwise about the eastern most star, Alnitak or Zeta (ζ) Orionis.

If you imagine the line rotated by 90 degrees about this point the free end of the line will point to the location of M78. With a small telescope this nebula reveals itself as containing two roughly equal brightness stars eerily staring back at you. As you discover the mistiness which is M78 surrounding both stars, they look a bit like car headlights seen through fog.



39 Hubble's Variable Nebula (Caldwell 46)

Rating - *Hard*

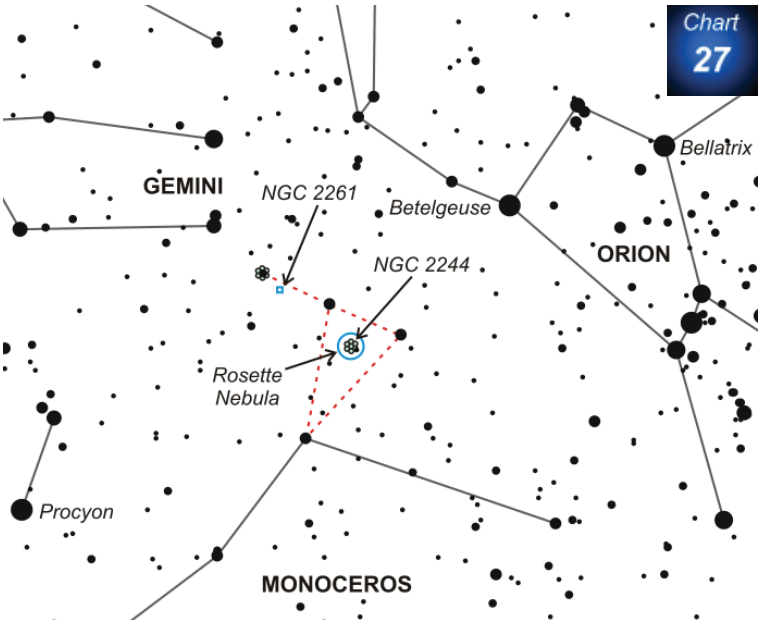
Visibility - *Up for most of the night*

Items **[39]**, **[40]** and **[41]** are rated hard but can be seen with small telescopes with care. First up is item **[39]**, Hubble's Variable Nebula, also known as Caldwell 46 or NGC 2261.

It sits in a rich area of the sky just over 1 degree to the southwest of the Christmas Tree Cluster in Monoceros. It's a very small object, appearing triangular in shape.

A four-inch scope will show it under very good conditions. Use low power to locate the field of view, then up the magnification to reveal its shape.

Hubble's Variable Nebula is associated with the variable star R Monocerotis which sits at the pointed end of the nebula. Its name comes from the fact that the nebula's brightness varies over time. The reason for this is thought to be down to huge clouds of material which intermittently block the light from the illuminating star, effectively darkening the nebula.



40 Messier 74, galaxy in Pisces

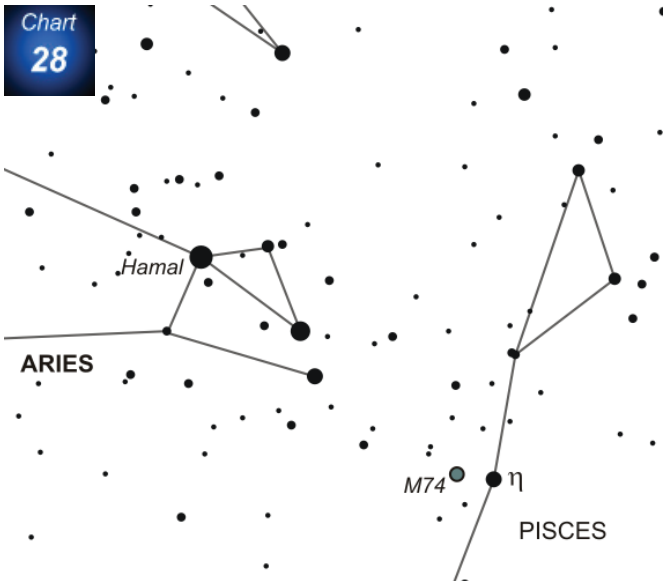
Rating - *Hard*

Visibility - *Nov best seen 21:00-01:00, Dec 19:00-23:00, Jan 19:00-21:00*

Item **[40]** is a bit easier than **[39]** to see as long as you remember to look for it with a low power eyepiece. M74 is a face on spiral galaxy in the constellation of Pisces the Fishes. It's located a degree to the east of the star Eta (η) Piscium , actually slightly south of this position too.

It's approximately circular in shape and quite large with a diameter equal to 1/3rd that of the full Moon. It's rated as hard to see because its surface brightness is quite low – hence the need to use a low power eyepiece to initially locate it.

Look for the brighter smudge which is the core of the galaxy and then, using averted vision, see if you can see the outer spiral arms. It's been described as looking a bit like a broken plate. This is a reference to the fact that when you do see the arms, they appear blotchy and knotted due to the bright star forming regions within them.



41 NGC 604, nebula in Messier 33

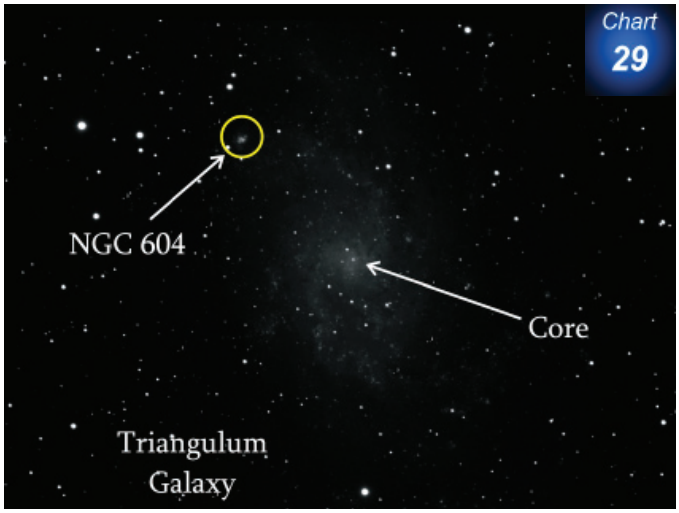
Rating - *Hard*

Visibility - *Up for a large part of the night Nov-Dec, best viewed just after darkness falls during Jan*

The next object is quite impressively located. Item **[41]** is a nebulous star forming region which is located in another galaxy around 3 million light years away!

Known as NGC 604, this region is located in the Triangulum Galaxy, Messier 33 (that's item **[3]** in the marathon). It's positioned approximately 1/3rd a full Moon diameter to the northeast of the core of the galaxy and is bright enough to be seen with small scopes.

This is a massive and very bright region of star formation. It's said that if you replaced our own galaxy's famous Orion Nebula with NGC 604, in other words, you placed NGC 604 just 1,350 light years away, it would shine brighter than the planet Venus!



42 Beta Monocerotis - triple star

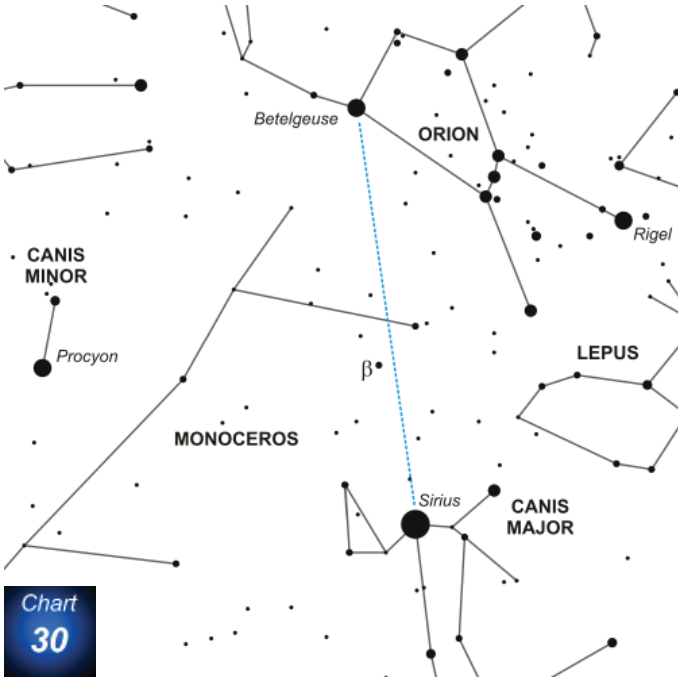
Rating - *Medium*

Visibility - *Up for most of the night*

Although on paper, item **[42]** sounds much less impressive than item **[41]** (NGC 604), it is easier to see and quite a catch once you have it in the eyepiece.

Item **[42]** is the star Beta (β) Monocerotis which lies approximately 2/5ths of the way along a line from Sirius in Canis Major to Betelgeuse in Orion.

Use a low power first and then increase the magnification. What you're looking for here are three stars because this is what's known as a triple star system.



43 NGC 1647, cluster in Taurus

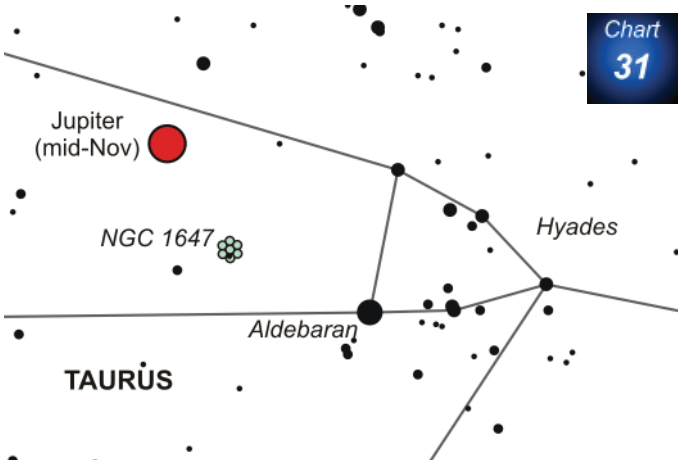
Rating - *Medium*

Visibility - *Up for most of the night*

Next we go for more stars than just three, in the form of an open cluster known as NGC 1647. This one is best seen with a low power eyepiece once again and really suits a small telescope.

To locate it, first find the Hyades cluster in Taurus, that's marathon item **[2]**. Imagine a line between the two stars that mark the tips of the Hyades's V-shaped pattern as a mirror. Now imagine where the pointed part of the "V" would sit if reflected in that mirror. This location is where NGC 1647 is located and will earn you item number **[43]** on the marathon list.

The position of Jupiter is shown for mid-November. It should be noted that the planet does move around within Taurus throughout the period covered by the marathon.



44 M79, globular cluster in Lepus

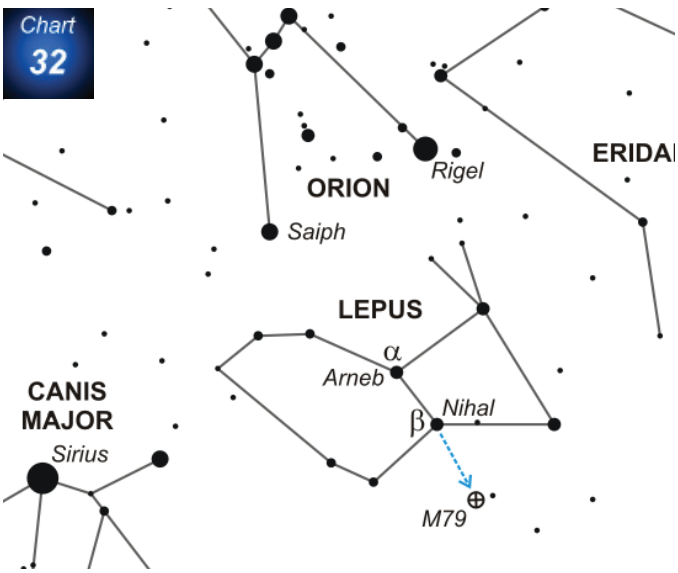
Rating - *Medium*

Visibility - *Nov best seen 23:00-04:00, Dec 21:00-02:00, Jan 19:00-midnight*

Next up is a globular cluster known as M79. Globular clusters are huge conglomerations of typically hundreds of thousands of gravitationally bound stars packed into a relatively small volume of space.

They are ancient star collections which orbit the core of a galaxy. M79 is a bit different as it's an object which has been captured by the Milky Way Galaxy from another galaxy.

Being an estimated 41,000 light years away, it's a very distant object so don't be too disappointed if you can't resolve it into stars. As long as you can spot its misty form, four degrees south of the star Beta (β) Leporis, or Nihal, then you're able to tick item **[44]** on the marathon list.



45 NGC 1535, planetary in Eridanus

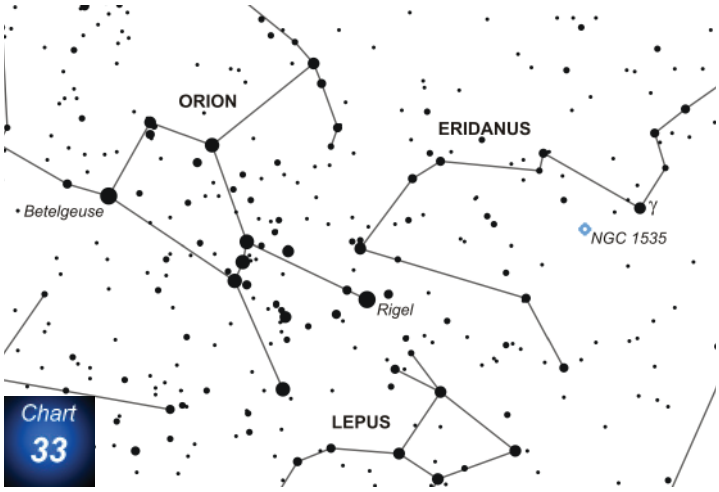
Rating - *Hard*

Visibility - *Nov best seen 23:00- 01:00, Dec 21:00-23:00, Jan 19:00-21:00*

Item **[45]** requires you to dive into the longest constellation in the night sky – Eridanus the River. To be honest as rivers go, Eridanus isn't the easiest to navigate and the key to finding the faint planetary nebula, NGC 1535, is to first locate the star Gamma (γ) Eridani using our chart.

NGC 1535 is located 4 degrees (8 full Moon diameters) to the east (left as seen from the UK) of the star. You should be able to see the planetary even with a small scope and once found by using a low power eyepiece, don't be afraid to pile on the magnification to try and see detail.

Larger instruments will reveal structure in the planetary which some have described as resembling a ghostly eye staring back at you.



46 NGC 1514, planetary in Taurus

Rating - *Medium*

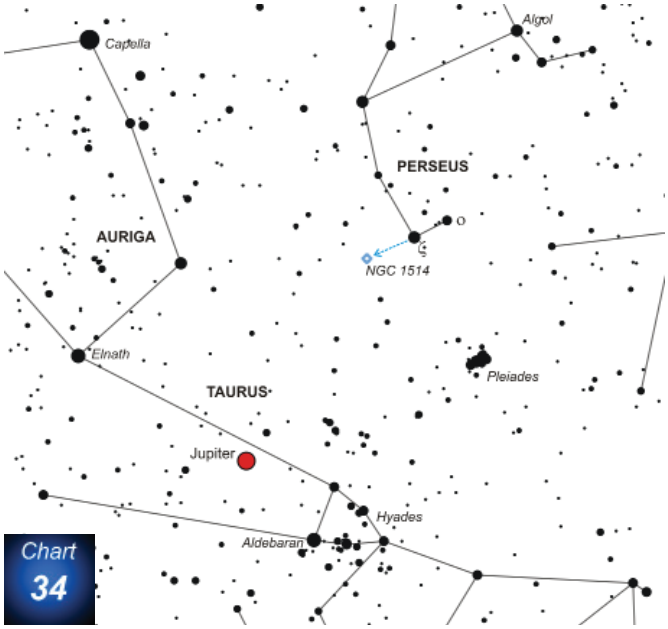
Visibility - *Up for most of the night*

Another planetary takes up the number **[46]** slot in our marathon. This time we find ourselves back in Taurus the Bull, right at the top of the constellation.

NGC 1514 is sometimes called the Crystal Ball Nebula because its disc is irregular, similar to the mists swirling in a fortune teller's crystal ball. The central star of this planetary is quite bright and this can make the delicate misty halo that surrounds it hard to see.

We'd recommend at least a six-inch scope here. Use a low power to locate the 9th magnitude central star and then up the magnification. At x150 you should start to see a halo around the star. Larger instruments will reveal plenty of structure here.

This object was discovered by William Herschel who described it as *"a most singular phenomenon"*. He was referring to the fact that the mistiness looked like the atmosphere of the central star. Up until the point of discovery of NGC 1514, such objects were thought to be composed of swarms of faint stars, but the obvious gaseous nature seen here caused Herschel to rethink this belief. To locate it, use the stars Omicron (ο) and Zeta (ζ) Persei as pointers.



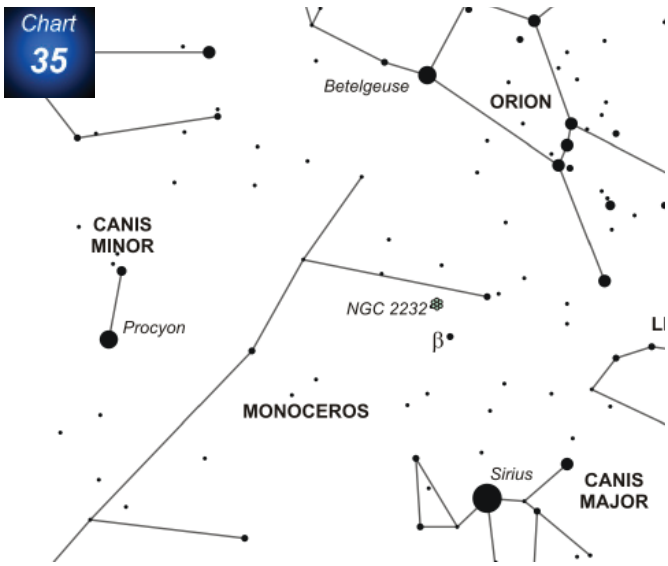
47 NGC 2232, cluster in Monoceros

Rating - *Easy*

Visibility - *Up for most of the night*

Item **[47]** is an open cluster called NGC 2232 in the constellation of Monoceros the Unicorn. It consists of around 20 stars close to the fifth magnitude star 10 Monocerotis.

It's relatively easy to locate being just over 3 degrees to the north of the triple star Beta (β) Monocerotis which is itself item number **[42]** on our list.



48 Caldwell 56, planetary in Cetus

Rating - *Medium*

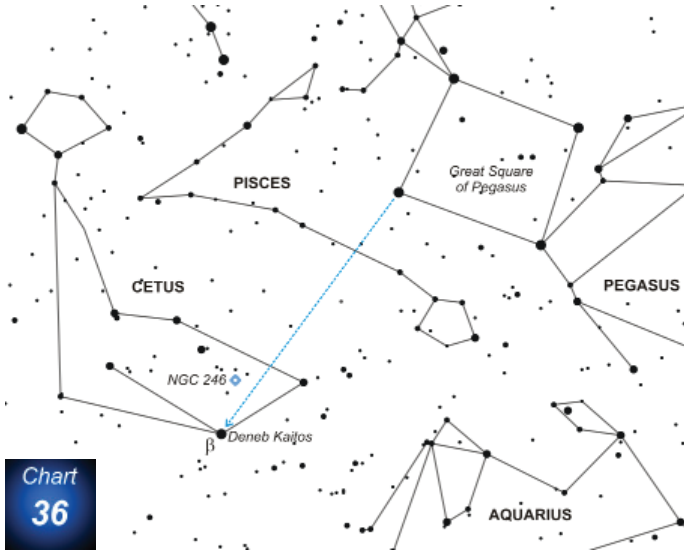
Visibility - *Nov best seen 19:00-22:00, Dec 17:00-20:00, not well seen in January*

Nearly there and we have a good variety of objects as our last three entries in the Moore Winter Marathon. Item **[48]** is another planetary nebula in the constellation of Cetus the Whale.

Known as NGC 246 or Caldwell 56, this one is actually fairly easy to see because it's quite bright and large. It can be picked up in a four-inch scope but a six-inch is a better prospect.

Visually it looks like a disc roughly one-quarter the size of the full Moon in the sky.

With a reasonable magnification between 50x-150x you should be able to see that the disc is mottled in appearance. To locate it first find the star Beta (β) Ceti or Deneb Kaitos. NGC 246 lies 6 degrees to the north of this star.



49 Mirach's Ghost (NGC 404)

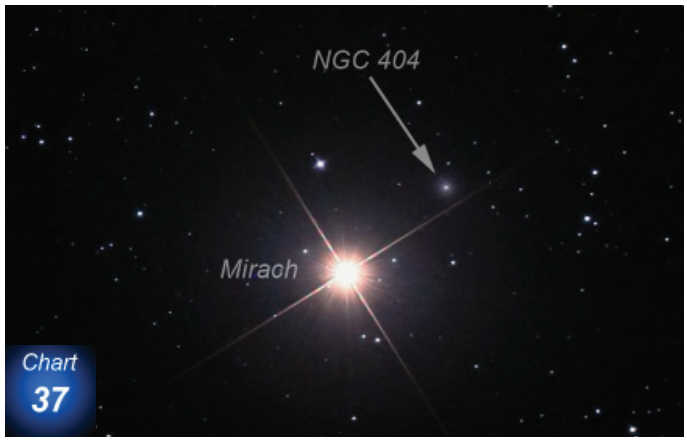
Rating - *Medium*

Visibility - *Up for a large part of the night Nov-Dec, best viewed just after darkness falls during Jan*

Item **[49]** has the reputation of being quite hard to see but actually, it's not that bad. It's certainly very easy to find by virtue of lying really close to a bright star in the constellation of Andromeda the Chained Princess. The star is Beta (β) Andromedae or Mirach, and the object is NGC 404, a small lenticular galaxy located 7 arcminutes (that's one-quarter the apparent diameter of the full Moon) from the star.

It looks like a round smudge when seen visually and has a reputation for being tricky because of the bright glare from nearby Mirach. Some have described it as looking remarkably like a lens flare from Mirach itself and this gives the object its informal name of *Mirach's Ghost*.

The location of Mirach is shown on chart 2 in the Naked-eye/Binocular Guide.



50 Messier 52, cluster in Cassiopeia

Rating - *Easy*

Visibility - *Up all night*

We end the marathon with a nice cluster in the "W" shaped constellation of Cassiopeia. Item **[50]** is the open cluster M52. It can be easily located by extending a line from Alpha (α) to Beta (β) Cassiopeiae and extending it for the same distance again.

Nicknamed *The Salt and Pepper Cluster*, this is an easy object to see in a small telescope. Some of the many stars visible here appear to form lines or curves and it's a pleasure to try and trace these on a cold dark winter's night.

If you've arrived at the end of our marathon wanting more, M52 is a good place to start from because there are lots of other clusters and regions of nebulosity nearby. One example is the Bubble Nebula, NGC 7635, which sits just over half a degree to the southwest of M52.