

The Sky at Night 55

Moore Marathon - Observing Guide...

Thanks for taking part in the Sky at Night's Moore Marathon - our 55th anniversary challenge. This guide has been designed to help you find the 55 selected objects in the marathon.

We would like you to tell us which of our 55 selected objects you've managed to find. If you've managed to grab any images of them, then you can share them via our Flickr group at...

www.flickr.com/groups/bbcskyatnight

Remember too that you can keep up with the programme itself at...

www.bbc.co.uk/skyatnight

The guide has been written for the month of April, when British Summer Time is in force.

When we talk about time in the marathon, we mean British Summer Time (BST) - that's the same time as shown on your clock or watch. BST comes into force during 2012 on March 25th.

On this day the clocks go forward by one hour.

Please remember that for programme inclusion, we need your completed QUICK or DETAILED forms back by April 24th.

Object No.	Guide Page	Object No.	Guide Page	Object No.	Guide Page
1	2	21	4	41	4
2	2	22	11	42	4
3	2	23	15	43	2
4	2	24	15	44	8
5	4	25	4	45	9
6	4	26	11	46	9
7	8	27	14	47	9
8	8	28	14	48	9
9	8	29	14	49	4
10	4	30	9	50	2
11	4	31	15	51	4
12	9	32	11	52	15
13	10	33	4	53	15
14	10	34	13	54	13
15	10	35	2	55	11
16	10	36	4		
17	13	37	2		
18	11	38	4		
19	14	39	4		
20	13	40	11		

1 The Moon

Rating - *Easy*

Best seen with - *Naked Eye*

Visibility - 1-9 April before midnight, 10-17 early hours, 22-30 early evening (programme deadline 24th April)

The first object is our very own Moon. This is an easy thing to spot as long as it's above the horizon. The visibility dates above will tell you when to look.

The Moon is the Earth's nearest natural neighbour in space, roughly 250,000 miles away (400,000km).



2 The Plough (part of the Great Bear)

Rating - *Easy*

Best seen with - *Naked Eye*

3 Polaris (star)

Rating - *Easy*

Best seen with - *Naked Eye*

4 Cassiopeia (constellation)

Rating - *Easy*

Best seen with - *Naked Eye*

35 Mizar & Alcor (double star)

Rating - *Easy*

Best seen with - *Naked Eye/Bins.*

37 La Superba (very red star)

Rating - *Hard*

Best seen with - *Bins./Telescope*

43 Whirlpool Galaxy (face on galaxy)

Rating - *Medium*

Best seen with - *Telescope*

50 Messier 81 & 82 (pair of galaxies)

Rating - *Medium*

Best seen with - *Telescope*

All of the above items are visible all night long.

Here's your chance to tick off no fewer than seven Moore Marathon entries in a single go! The first four are easy. Item **2** is the familiar pattern of seven stars known as the Plough. Face north and look up to see the pattern virtually overhead during April. The two stars furthest from the handle of the Plough are called the "Pointers" because they point the way to item **3** - Polaris, also known as the North Star.

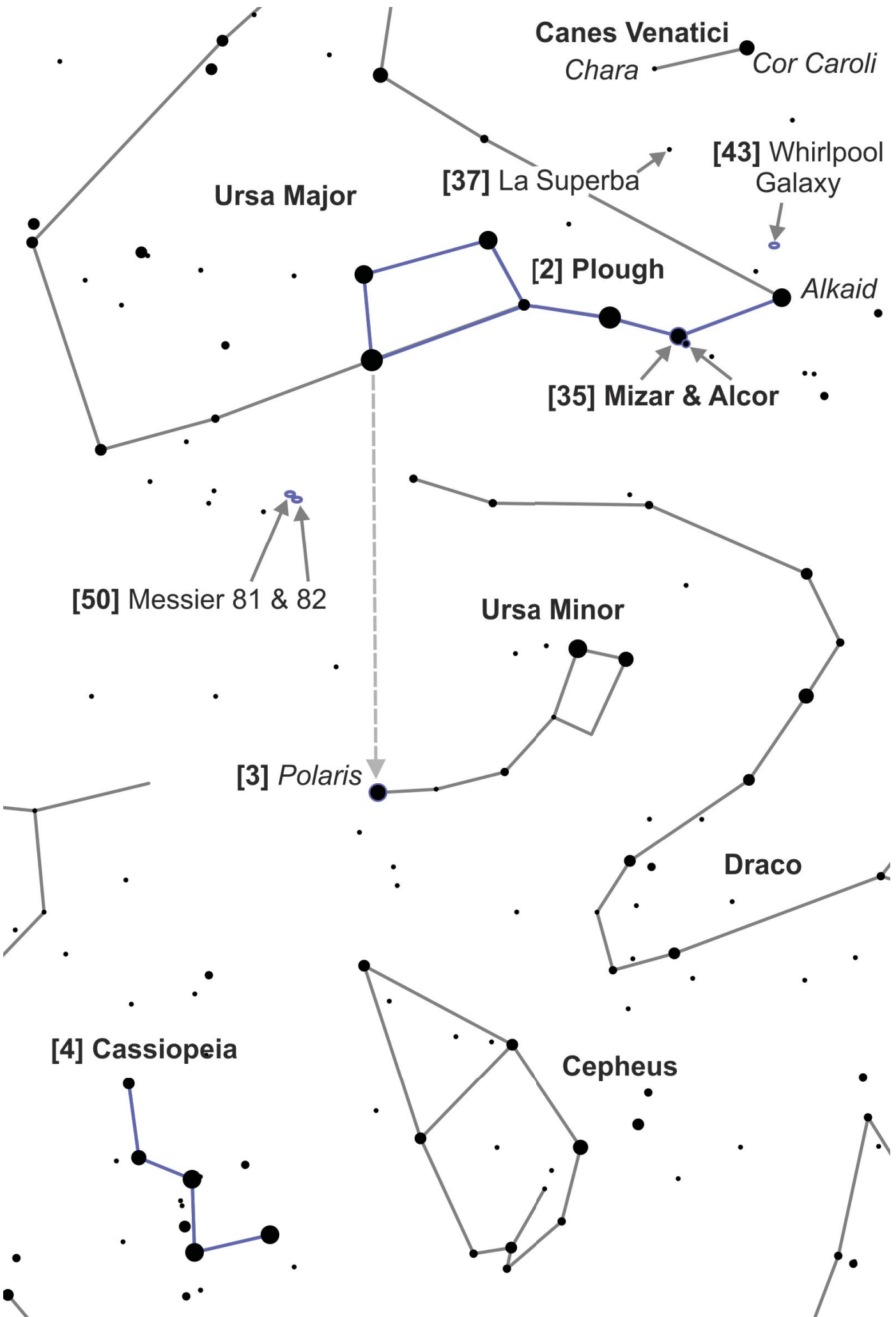
Draw a line from the star which marks the point where the handle joins the blade of the plough and extend it through Polaris and on for the same distance again to arrive at the "W" shaped constellation of Cassiopeia - item **4** in the marathon.

Look carefully at the second star in from the tip of the handle of the Plough and see if you can spot its fainter companion. If you can, then that's item **35** - Mizar & Alcor ticked off the list. This is the only double star in the entire sky for which both companions have names. If you have a telescope, you can see that Mizar, the brighter one, is a double in its own right. Although they can't be seen without specialist equipment, both of the Mizar stars are also double. If that's not enough to send your head spinning, Alcor is itself a double too, so in total, there are six stars in the Mizar-Alcor system, something known as a sextuplet system.

Imagine the handle of the Plough as part of a circle and you should be able to identify the star which approximately marks the centre of the circle. This is the brightest star in a small constellation known as Canes Venatici, the Hunting Dogs. The star is called Cor Caroli, a name which means "Charles' Heart" in honour of King Charles I. Using our chart, locate the other main star in Canes Venatici, called Chara. Now imagine a line drawn from Chara to Cor Caroli. Rotate that line about Chara by 90 degrees in a clockwise fashion and the end of the line will point at a variable star called Y Canum Venaticorum or informally as "La Superba" - that's item **37** in the marathon. La Superba is right on the threshold of visibility given a clear dark sky, but easily seen with binoculars or a small telescope. A telescope should be able to show the star's speciality - its strikingly red colour. In fact La Superba is one of the reddest stars in the entire sky!

Item **43**, is a face on spiral galaxy known as The Whirlpool Galaxy or Messier 51 and also lies in the constellation of Canes Venatici. It lies close to the star Alkaid - that's the star at the end of the handle of the Plough. Binoculars can show the galaxy but a telescope is probably the best bet for a guaranteed view. The galaxy is notable because it's the first to be identified as having a spiral structure, a observation made by Lord Rosse in 1845. The main galaxy is gravitationally interacting with a smaller object known as NGC 5195 and together, both look a bit like a question mark, with NGC 5195 being the punctuation dot.

Finally, if you draw a diagonal line out of the blade of the Plough as shown in our chart, this points to a pair of galaxies known as Messier 81 (Bode's Galaxy) and Messier 82 (The Cigar Galaxy). Through a telescope with a low power it's obvious that both have completely different shapes. If you spot both galaxies, you can tick off item **50** in the marathon.



5	Regulus & Sickle (part of Leo)	Rating - <i>Easy</i>	Best seen with - <i>Naked Eye</i>
10	Spica (brightest star in Virgo)	Rating - <i>Easy</i>	Best seen with - <i>Naked Eye</i>
25	Alphard (star in Hydra)	Rating - <i>Medium</i>	Best seen with - <i>Naked Eye</i>
<i>Visibility - visible for most of the night but does set in the early hours</i>			
33	Beehive Cluster (open cluster)	Rating - <i>Easy</i>	Best seen with - <i>Binoculars</i>
<i>Visibility - best seen before 1am BST</i>			
21	55 Cancri (star in Cancer)	Rating - <i>Medium</i>	Best seen with - <i>Binoculars</i>
<i>Visibility - best seen before 1am BST</i>			
51	Leo Triplet (trio of galaxies)	Rating - <i>Hard</i>	Best seen with - <i>Telescope</i>
41	Sombrero Galaxy (edge on galaxy)	Rating - <i>Hard</i>	Best seen with - <i>Telescope</i>
6	Mars (planet - currently in Leo)	Rating - <i>Easy</i>	Best seen with - <i>Naked Eye</i>
38	North Polar Cap of Mars	Rating - <i>Medium</i>	Best seen with - <i>Telescope</i>
49	Syrtis Major (dark feature on Mars)	Rating - <i>Hard</i>	Best seen with - <i>Telescope</i>
<i>Visibility - 1-11 April around midnight BST, 12-17 April around 3am BST</i>			
11	Saturn (planet in Virgo)	Rating - <i>Easy</i>	Best seen with - <i>Naked Eye</i>
39	Rings of Saturn	Rating - <i>Easy</i>	Best seen with - <i>Telescope</i>
36	Titan (moon of Saturn)	Rating - <i>Medium</i>	Best seen with - <i>Bins./Telescope</i>
<i>Visibility - visible all month long, furthest from Saturn on mornings of April 7th, 15th and April 23rd</i>			
42	Iapetus (moon of Saturn)	Rating - <i>hard</i>	Best seen with - <i>Telescope</i>
<i>Visibility - visible all month long, furthest from the planet on April 26th (western elongation)</i>			

All of the above entries are visible all night long unless otherwise indicated. See page 7 for the star chart which accompanies the descriptive text below.

The two stars closest to the handle of the Plough can be used to locate marathon entry **5** - the star Regulus which sits at the bottom of a backward question mark pattern of stars known as the "Sickle". Locate both stars in the Plough pattern and follow the line they make away from Polaris. Regulus and the Sickle represent the head of Leo the Lion.

The Plough is a great signpost. Follow the natural curve of its handle away from the blade and eventually you'll arrive at an orange coloured star called Arcturus. Keep going around the curve to arrive at white coloured Spica, the brightest star in the constellation of Virgo the Virgin, and item **10** in the marathon.

Sticking with the stars, if you return to the Sickle, locate the star two up in the pattern from Regulus (a star called Algieba) and draw a line from it to Regulus and keep going for approximately 2.5x the distance again. Here you'll come to a lonely looking red coloured star known as Alphard. This is the brightest star in the rather sprawling constellation of Hydra, the Watersnake. The name Alphard means "Solitary One" and reflects the fact that there's not much in the sky around it to keep it company. Alphard is number **25** in the marathon.

Head up and to the right from Alphard and you'll come to a sideways teardrop of stars which represents the head of Hydra. Above this you're in a region to the right, as seen from the UK, of the Sickle pattern which contains a faint inverted "Y" pattern of stars known as Cancer the Crab. At the centre of the upside down "Y" lies a lovely open cluster known as the Beehive Cluster or Messier 44. In fact this object has several names including Praesepe which means "manger". Ancient Chinese astronomers knew it as the "Exhalation of piled up corpses"! If you've seen it, that's item number **33** ticked off the list.

The top of the upside down "Y" of Cancer is marked by a faint star known as Iota Cancri. A little to the left of this star is a close pair of stars, probably best seen with binoculars. The upper star of the pair is known as 55 Cancri and although it looks just like any other star in the night sky, it's known to have a family of 5, possibly more, planets orbiting it. There aren't currently many stars known with multiple planetary systems, so 55 Cancri is indeed rather special. If you've managed to see it, that's item **21** done too. The planets by the way, won't be visible!

We'll stay out with the stars for our next couple of items. Located in the back leg of Leo the Lion, lie three galaxies all sitting pretty close to one another. Known as the Leo Triplet, the group consists of Messier 65 & 66 together with NGC 3628. If you manage to see the group with a telescope, you can tick item **51** off the list.

If the Leo Triplet gives you a taste for galaxy hunting, the next one to try for in this patch of sky is Mesier 104, also known as the Sombrero Galaxy. There are two ways to locate this. Either find the star Kappa Virginis to the left of Spica (Spica is item **10** on the list) and draw a line from it, through Spica and extend the line for the same distance again. Alternatively, look for the fairly distinctive quadrilateral of stars below and left of Spica, that forms the body of the constellation Corvus, the Crow. See if you can then use the chart on page 7 to find the galaxy. The Sombrero Galaxy is item **41** on the marathon list.

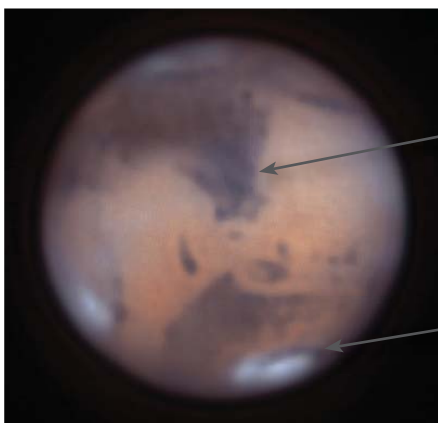
If you managed to find Regulus and the Sickle (item **5**), and identified Leo from our chart, the bright 'star' in the lower part of the constellation is not a star at all - it's the planet Mars, item **6**. You'll need a telescope for item's **38** and **49**. The Martian North Polar Cap (item **38**) should be visible as a white patch close to the northern edge of Mars. Syrtis Major (item **49**) is a dark 'V'-shaped marking on the planet which will be visible from the UK around midnight BST between 1st-11th April and 3am BST between the 12th-17th.

These times are approximate guides and the feature is visible at other times too. Below is a table which indicates when the Syrtis Major is in the centre of the Martian disc as seen from the UK. For guidance you can see the feature clearly approximately 3.5 hours either side of the times listed. If you manage to see the Syrtis Major, that's item **49** done.

Times when the Syrtis Major is in the centre of the Martian disc as seen from the UK during April 2012

The feature is clearly visible for approximately 3.5 hours either side of the times given. All times are BST.

2012 Apr 01	21:00
2012 Apr 02	21:36
2012 Apr 03	22:13
2012 Apr 04	22:50
2012 Apr 05	23:27
2012 Apr 07	00:04
2012 Apr 08	00:41
2012 Apr 09	01:18
2012 Apr 10	01:55
2012 Apr 11	02:32
2012 Apr 12	03:09
2012 Apr 13	03:47
2012 Apr 14	04:24



[49] Syrtis Major

[38] North Polar Cap

South is up in this image to simulate the view through an inverting astronomical telescope



This is a more realistic impression of how Mars may look though a telescope eyepiece

The planet Saturn is next on our list and fairly easy to locate thanks to the bright star Spica (item **10**). If you can locate Spica using the instructions above, Saturn is the slightly yellowish and slightly brighter star sitting above Spica in the sky. So by finding Spica, you've now been able to cross Saturn, item **11**, off your list too.

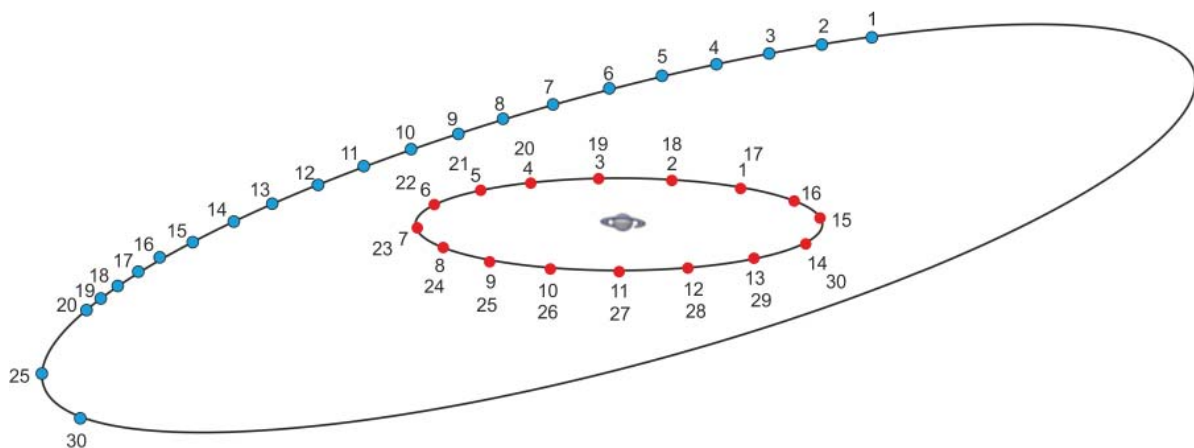
If you have a telescope, use it to look at Saturn and there you'll see one of the most beautiful objects in the sky - a gas giant planet surrounded by a stunning ring system. If you can get a look at the rings of Saturn, that's item **39** done too.

The next target is Saturn's largest moon, Titan. This is easy to see with a telescope but can also be seen with a pair of binoculars. To achieve this, you'll need to hold the binoculars very steady. The best times to try are when Titan is furthest from the planet - that's on April 7th, 15th and 23rd.

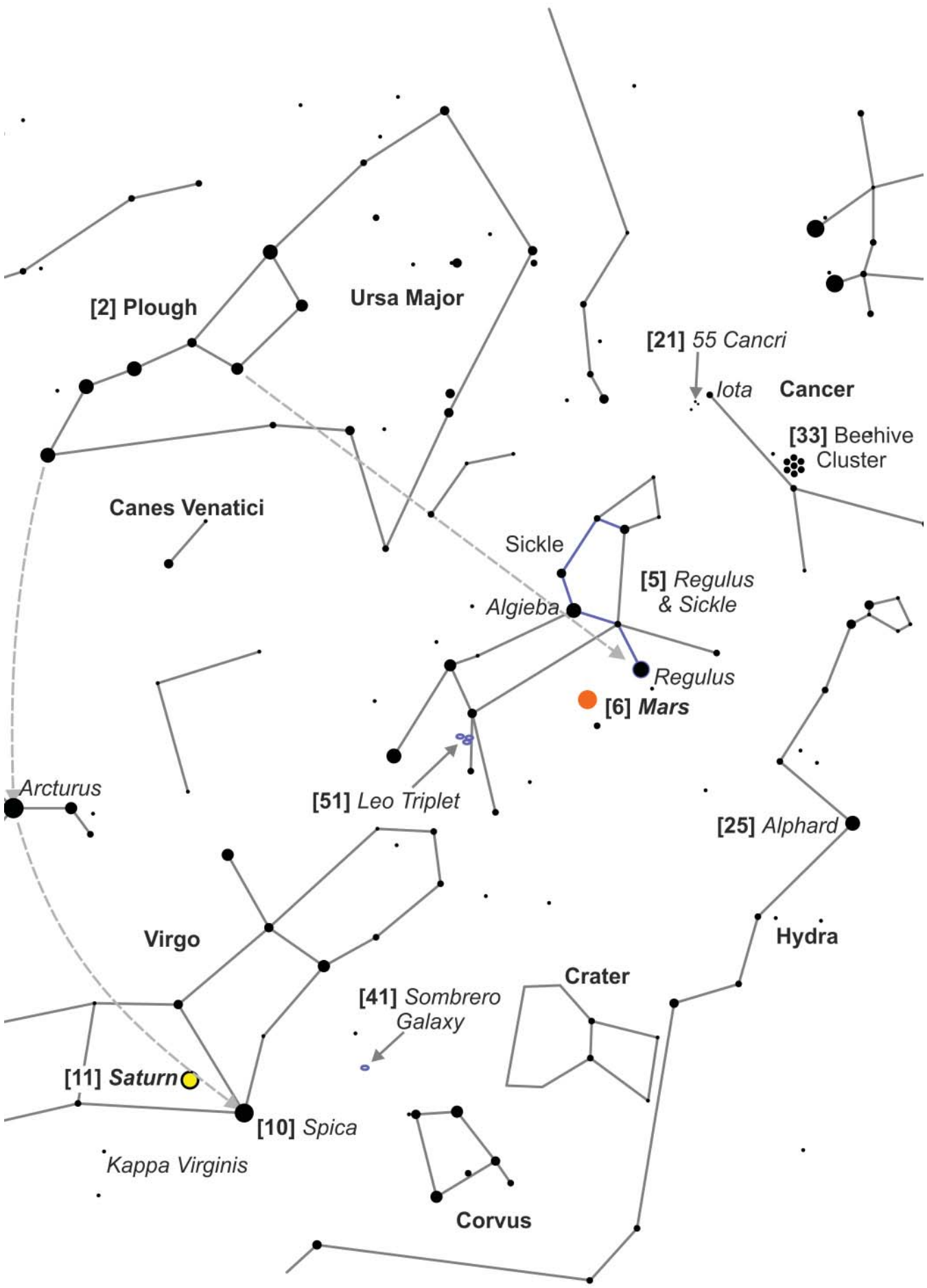
If you're wondering what it looks like, through a telescope you'll see a number of the brighter moons of Saturn. The brightest one will be Titan and spotting it will give you item number **36** in the marathon list!

Iapetus is another of Saturn's moons, but this one is quite challenging to find. Again you'll need a telescope and again, the easiest time to spot it is when it's furthest from the planet's disc. Just to make things interesting, Iapetus varies in brightness between when it's to the west (right as seen from the UK when viewed with north up) of the planet and to the east. It's brightest when to the west and fortunately for us, this occurs on the 26th of April.

If you can grab yourself a view of Iapetus, then you will be able to tick item **42** off the list.



Positions of Titan (red) and Iapetus (blue) during April. The numbers represent the days of the month. Titan is considerably brighter than Iapetus. The view shows Saturn as it would be seen through an inverting telescope with south up and west to the left.



7 Venus (planet)

Rating - *Easy*

Best seen with - *Naked Eye*

44 Crescent of Venus

Rating - *Easy*

Best seen with - *Telescope*

Visibility - *visible after sunset in the west/northwest*

Planet Venus will be a dazzling beacon, visible all month in the west/northwest as the sky darkens after sunset, making item 7 an easy one to tick off the list.

If you can, look at Venus through a telescope and here you'll discover that Venus shows phases, just like the Moon. During the month of April, the planet's phase will be a crescent. See this and that's item 44 done.



9 Belt of Venus

Rating - *Easy*

Best seen with - *Naked Eye*

Visibility - *just before sunrise or after sunset along the opposite horizon to the Sun's location*

Strangely, the Belt of Venus has nothing directly to do with the planet. You might have already seen this and not realised what it was. It's best seen from a location with a relatively flat horizon when the sky is nice and clear. Just after sunset, look low down in the opposite direction to where the Sun went down and here you might see a dark grey band running along the horizon with a pink band on top of the grey.

This, believe it or not, is the shadow of the Earth creeping up in altitude as the Sun sets. It's like a blanket of dark being drawn over the sky. The pink band is the red light from the sunset which is occurring behind you as you face the belt. The sunset illuminates the atmosphere above the main shadow.

The effect can also be seen in the morning sky in the opposite direction to where the Sun's about to appear just before sunrise. If you see the Belt of Venus, you can cross item 9 off the list.



8 Earthshine

Rating - *Easy*

Best seen with - *Naked Eye*

Visibility - *before sunrise 16-19 April, after sunset 22-25 April*

This is another easy thing to see but you do need to get your timing right. Earthshine is the name given to the effect which makes the dark portion of a crescent Moon appear visible. When seen with the evening Moon the effect is sometimes called; "The old Moon in the young Moon's arms". It can be seen when the 'old' Moon is in the early morning sky too.

The effect is caused by light from the Sun reflecting off the Earth and illuminating the night portion of the Moon's disc. To think about it another way, if you were standing on the dark (night) portion of the Moon's disc and looking up, the Sun would be below the horizon but the Earth would be big, bright and almost full in the lunar sky. Tick item 8 off the marathon list if you've managed to see earthshine.



12 Mare Crisium Rating - *Easy* Best seen with - *Naked Eye*

Visibility - *1-6 April and 26-30 April (programme submission deadline 24th April)*

30 Tycho (lunar crater) Rating - *Easy* Best seen with - *Binoculars*

Visibility - *1-12 April (programme submission deadline 24th April)*

45 Alpine Valley (lunar feature) Rating - *Easy* Best seen with - *Telescope*

Visibility - *1-12 April and 28-30 April (programme submission deadline 24th April)*

46 Clavius (lunar crater) Rating - *Easy* Best seen with - *Telescope*

Visibility - *1-13 April and 30 April (programme submission deadline 24th April)*

47 Aristarchus (lunar crater) Rating - *Easy* Best seen with - *Telescope*

Visibility - *3-16 April*

48 Plato (lunar crater) Rating - *Easy* Best seen with - *Telescope*

Visibility - *1-13 April and 29-30 April (programme submission deadline 24th April)*

The Moon provides the source for the next six items in the Marathon Guide. The Mare Crisium, or Sea of Crises, is a distinct circular feature in the north eastern 'corner' of the Moon. It's also large enough to be seen with nothing more than just your eyes as long as the phase is right. Once spotted, that's item **12** ticked off the list.

Most lunar features are best seen when the Moon isn't full. The crater Tycho is an exception to this rule and looks magnificent when the Moon is full, sitting at the heart of an impressive system of bright rays which extend across most of the visible lunar disk. Tycho is number **30** on the marathon list.

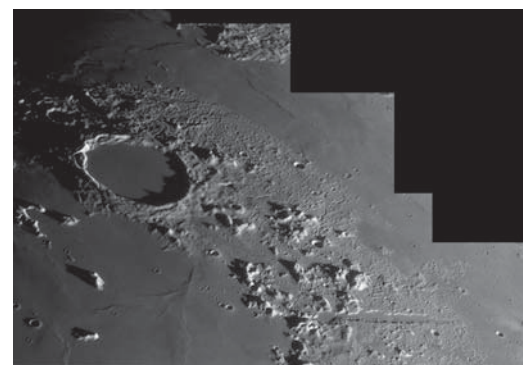
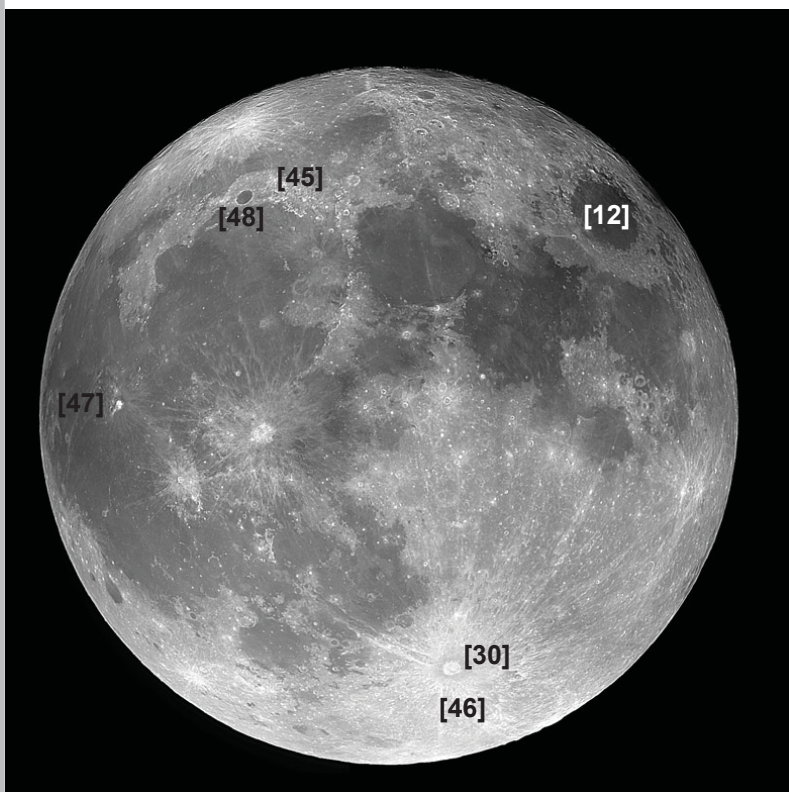
The Alpine Valley requires a telescope to see properly. When visible it looks like a gap in the bright mountains to the northeast of the giant Imbrium Basin. It's also number **45** on our list.

The giant crater Clavius is a magnificent crater in the southern part of the Moon. Filled with smaller craters and craterlets, Clavius is item number **46** on the marathon list.

Crater Aristarchus may be small but it's also the brightest feature on the earth facing side of the Moon. An easy way to tick off another marathon item - this time number **47**.

The last of our lunar targets is the large, dark walled plain which represents the crater Plato, to the north of Mare Imbrium and close to the Alpine Valley. Plato is item **48**.

Check the visibility guides for all of our lunar features to ensure you don't miss an opportunity to spot them.



[48] Plato and [45] Alpine Valley



[46] Clavius

15 International Space Station (ISS)Rating - *Medium*Best seen with - *Naked Eye*Visibility - *see below...***16 Artificial Satellite**Rating - *Medium*Best seen with - *Naked Eye*Visibility - *at any time of night in clear, dark skies*

Artificial satellites can be interesting to watch as they pass overhead during the dark of night. One of the brightest is the International Space Station, also known as the ISS. To see it, you'll need to be outside, looking up at the right time. A good pass will have the ISS passing high across the sky from west to east, typically taking several minutes to do so.

The easiest way to find when the ISS is going to be visible for you is to visit the website at

www.heavens-above.com and select your location via one of the options available on the site. Once done, click on the link on the main page that says "**10 day predictions for: ISS**".

The result will be a table of visible passes for your location over the next 10 days. The table shows the date of the pass, it's brightness as a magnitude (anything with a minus sign in front of it will be quite bright!) and details about the start point, highest point and end point of the ISS's passage across the sky. These are described by giving the time when the ISS is at the point indicated, the altitude it will be at this point and the direction in which to look. Altitude is given in degrees; the altitude of the horizon is 0 degrees while the point directly overhead is 90 degrees. Direction is given as a compass direction - e.g. WSW would mean west-southwest.

In addition to the ISS, there are many other satellites visible in the night sky. If you simply lie back and gaze up at the beauty of a dark, star filled sky, the chances are that a satellite will pass before you as a dot, typically taking several minutes to complete it's journey. If the dot has red, green or flashing lights close to it, it's probably a plane!

If you see the ISS and another non-ISS satellite, you can tick off items **15** and **16** from the marathon list.

13 Hyades (open cluster in Taurus)Rating - *Easy*Best seen with - *Naked Eye*Visibility - *low in the west as the sky darkens, easier at the start of April***14 Pleiades (open cluster in Taurus)**Rating - *Easy*Best seen with - *Naked Eye*Visibility - *low in the west-northwest as the sky darkens, easier at the start of April*

The constellation of Orion is really past its best by the time that April has come around. However, at the start of the month, the mighty hunter can still be seen low in the western part of the sky as darkness falls. Locate the three stars that form his belt and follow their line to the right to eventually meet Aldebaran, the brightest star in Taurus the Bull. Adjacent to Aldebaran is the 'V'-shaped Hyades star cluster, item number **13** on our list.

Using Orion's belt again, follow it's line to the right, through Aldebaran and keep going until you arrive at the wonderful Pleiades open cluster, a much more compact collection of stars than the Hyades. Just to make things easier, Venus actually passes through the southern regions of the Pleiades during early April. Also known as the Seven Sisters, spotting the Pleiades will allow you to tick off item **14** on our list.



18	Cygnus (constellation)	Rating - Easy	Best seen with - Naked Eye
<i>Visibility - east at 4am BST at the start of April or 1am BST at the end</i>			
22	The Summer Triangle (asterism)	Rating - Easy	Best seen with - Naked Eye
<i>Visibility - after 2am BST at the start of April, after midnight by the end of the month</i>			
55	Albireo (colourful double star)	Rating - Easy	Best seen with - Telescope
<i>Visibility - rises at 11pm BST at the start of the month, visible all night by the end of April</i>			
26	Coathanger Cluster (asterism)	Rating - Medium	Best seen with - Binoculars
<i>Visibility - early morning</i>			
32	Dumbbell Nebula (planetary nebula)	Rating - Medium	Best seen with - Bins./Telescope
<i>Visibility - best seen in the early hours before dawn during April</i>			
40	Ring Nebula (planetary nebula)	Rating - Medium	Best seen with - Telescope
<i>Visibility - best seen after midnight at the start of April, or as the sky gets dark by the end of the month</i>			

You'll have to set the alarm clock for our next set of marathon items because during the month of April, they are all located in the morning sky, best seen before the sky starts to get light due to the onset of dawn.

The central part of the constellation of Cygnus the Swan looks like an enormous cross in the sky and goes by the unofficial name of the "Northern Cross". If you have a clear, dark sky, the Milky Way can be seen 'flowing' down the spine of the cross. Very clear skies will show the Milky Way to appear to split in this region due to an intervening dark cloud of galactic dust known as the Cygnus Rift. Whether you can see the Milky Way or not, spotting the constellation of Cygnus itself will earn you item **18** to tick off the marathon list.

The top star of the Northern Cross is called Deneb. This is the brightest star in Cygnus and forms the top left 'corner' of a large pattern of stars which are known as the "Summer Triangle". The upper right star in the pattern is slightly brighter than Deneb and goes by the name of Vega. You can confirm you've got Vega by noticing the fainter, squashed diamond pattern below it which is part of the constellation of Lyra the Lyre. Once Vega and Deneb have been identified, the third member of the Summer Triangle, Altair in the constellation of Aquila the Eagle, should be fairly easy to locate using our chart on page 12. Look out for the two fainter stars that sit either side of Altair. With Altair, Vega and Deneb located, that's item **22**, the Summer Triangle, done.

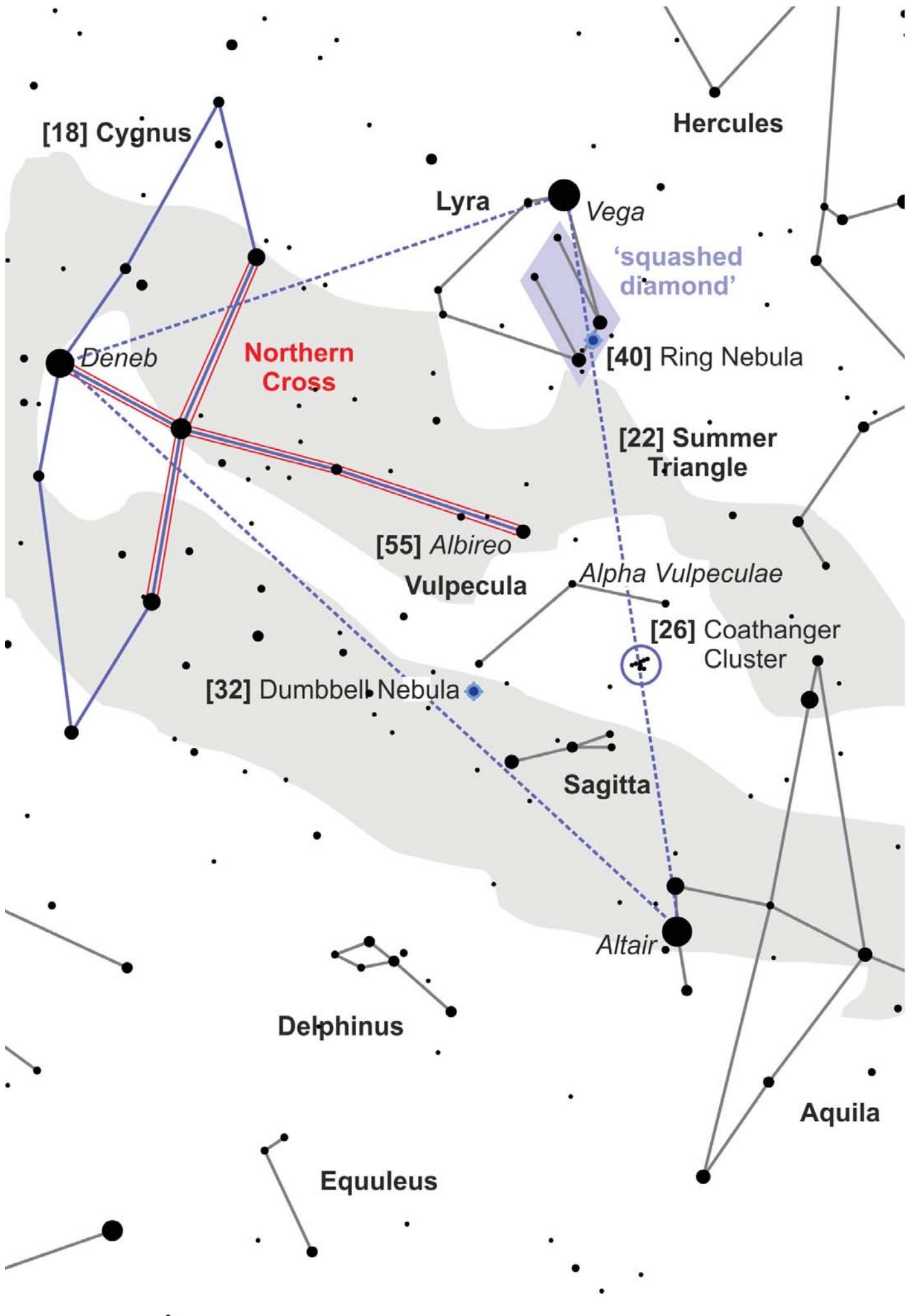
The star at the foot of the Northern Cross is called Albireo, a name which means "hen's beak". Look at this star through a telescope and it'll reveal itself to be a beautiful double star - the brightest component being yellow in colour, the other star appearing distinctly blue in comparison. This is one of the most beautiful sights in the sky and spotting it will allow you to tick off item **55** in the marathon list.

If you imagine how the Northern Cross would look if it were upright, just below Albireo lies a faint star known as Alpha Vulpeculae. Draw a line from Albireo through Alpha Vulpeculae and extend it for nearly two times to arrive at a pattern of stars known as Brocchi's Cluster or Collinder 399. Just about visible with the naked eye, binoculars will reveal this pattern of stars to look just like a coathanger and this fact gives the pattern its informal name of the Coathanger Cluster. This isn't a real cluster of stars in the physical sense, but rather a chance alignment as seen from the Earth. Spotting the Coathanger Cluster also allows you to tick off item **26** from the list.

Remember the squashed diamond pattern mentioned in connection with Vega above? Well if you draw a line from the bottom-left star in the squashed diamond through Albireo and keep going for the same distance again, you'll end up looking at an object called the Dumbbell Nebula, Messier 27. Some describe this as looking like an apple core, pinched in the middle when seen with binoculars or a telescope.

This is the remains of a star which has shed its outer layers and it's the gently glowing outer layers you can see with binoculars. If you look at it with a telescope, see if you can see the star which shed its layers; it lies at the heart of the nebula. However, you see it, once spotted, that's item number **32** ticked off the list.

The Dumbbell is a class of object known as a planetary nebula because through a telescope they show a small disc just like a ghostly planet. There's another example of this type of object approximately mid-way between the two bottom stars in the squashed diamond in Lyra (actually it's marginally closer to the right hand star and slightly below the line joining both stars together). Known as the Ring Nebula, Messier 57, this is harder to spot than the Dumbbell because it's smaller and easily confused as a star using low magnification. With high power, M57 looks like a ghostly smoke ring hanging in the sky. If you manage to locate it, you can tick item **40** off the list too.



20	Corona Borealis (constellation)	Rating - <i>Medium</i>	Best seen with - <i>Naked Eye</i>
34	Messier 13 (globular cluster)	Rating - <i>Medium</i>	Best seen with - <i>Binoculars</i>
54	Messier 5 (globular cluster)	Rating - <i>Hard</i>	Best seen with - <i>Telescope</i>
Visibility - <i>items 20, 34 and 54 are visible all night long</i>			
17	Zubeneschamali (star in Libra)	Rating - <i>Medium</i>	Best seen with - <i>Naked Eye</i>
Visibility - <i>visible low in the southeast around 11pm BST, then up for the rest of the night</i>			

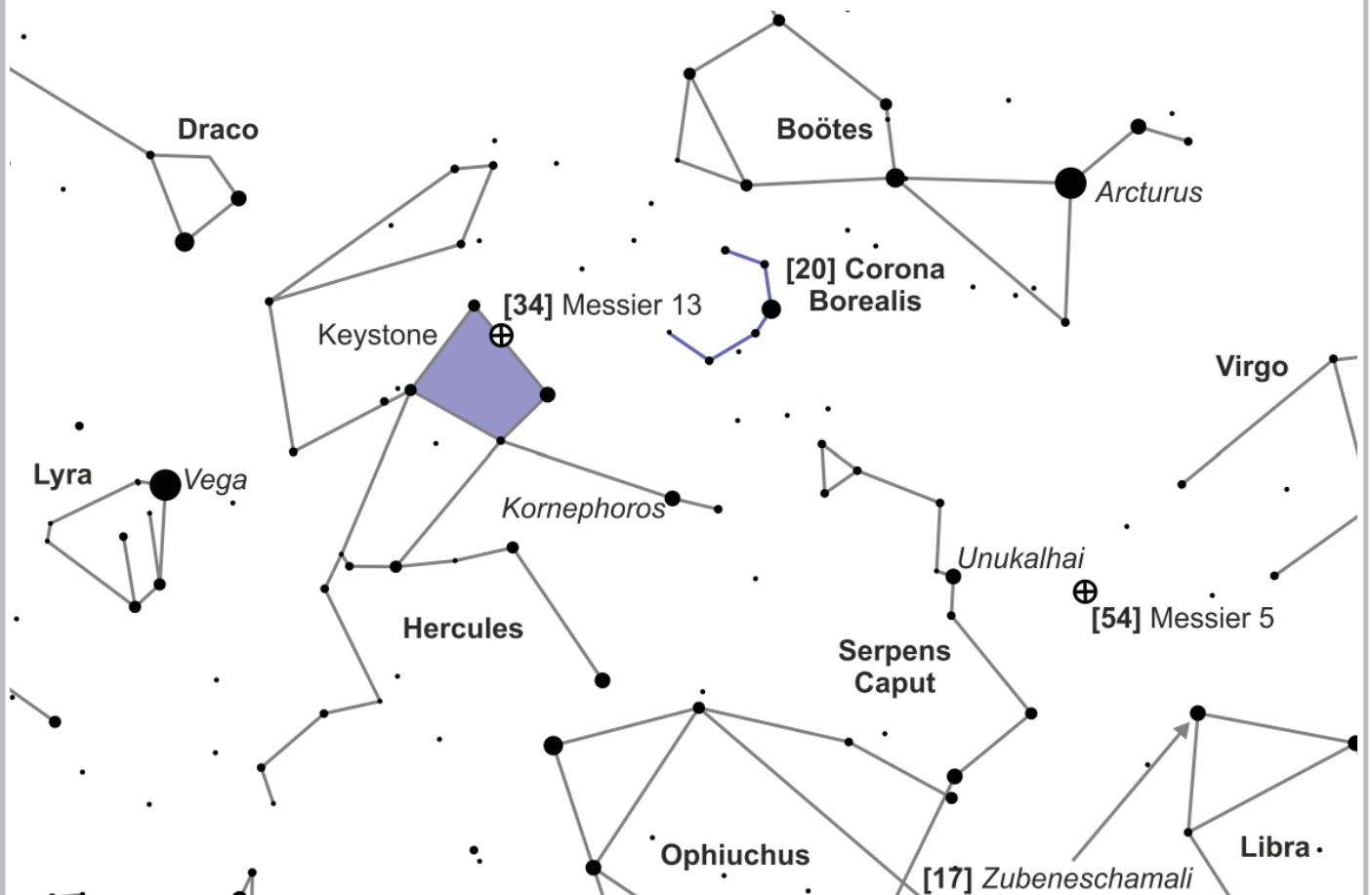
You now know how to locate the star Vega (see page 11) and Arcturus (see page 4). If you draw a line between these two bright stars, they can help you locate two more items on our marathon list.

One third of the way from Arcturus towards Vega lies a beautiful little semi-circle of stars known as Corona Borealis, the Northern Crown. Spot this backwards “C” of stars and that’s item **20** ticked off the list.

Two thirds of the way along the line from Arcturus towards Vega lies a distinctive pattern of faintish stars known as the Keystone because of its similarity to the keystone that was used at the top of in old stone bridges. One third of the way down the line joining the upper right star of the Keystone to the one in the lower right corner, lies an object that looks like a fuzzy star through binoculars. A small telescope shows it to be a glowing ‘nest’ of stars, and larger instruments will start to resolve the object into individual stars. It’s estimated that there are between 100,000 and 1,000,000 stars in this cluster. The object itself is known as a globular cluster and this one sits in the constellation of Hercules, the Strongman, going by the name of the *Great Globular in Hercules*. Also known as Messier 13, this is item **34** on our list.

Using our chart, locate the star Beta Herculis below the Keystone. This star goes by the rather wonderful name of Kornephoros and is a guide to our next target, yet another globular cluster known as Messier 5. Draw a line from the bottom left star in the Keystone, through Kornephoros and keep going for the same distance again to locate the star Alpha Serpentis or Unukalhai. Messier 5 sits below and to the left of this star when seen in the sky from the UK. This globular is marginally brighter than Messier 13 and again best seen through a telescope. Once seen, tick off item **54** on the marathon list.

If you draw a line between Kornephoros and Unukalhai and keep going for the same distance again, you’ll arrive at yet another exotically named star called Zubenelshamali (Beta Librae). This is one of the only stars in the sky which has been described, on occasion, as looking green. Take a look and see what you think. Once you’ve done that, don’t forget to tick off item **17** on the marathon list.



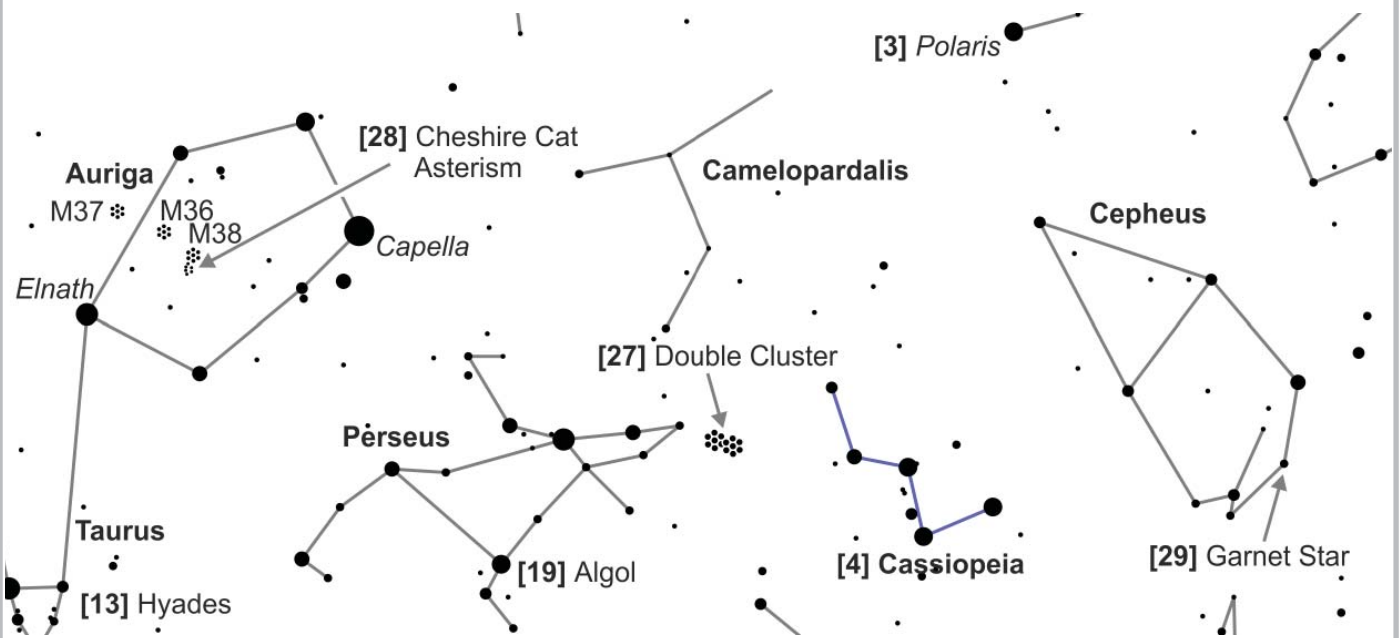
19 Algol (variable star in Perseus)Rating - *Medium*Best seen with - *Naked Eye*Visibility - *low in the northwest at 10pm BST at the start of April, very low in the north at the end of April***27 Double Cluster (open clusters)**Rating - *Easy*Best seen with - *Binoculars*Visibility - *low in the northern part of the sky but visible all night long***28 Cheshire Cat (asterism)**Rating - *Hard*Best seen with - *Binoculars*Visibility - *best seen as soon as the sky darkens - gets harder towards the end of the month***29 Garnet Star (variable star)**Rating - *Medium*Best seen with - *Binoculars*Visibility - *Visible all night long*

For our next batch of marathon items, we swing our gaze around to the northern part of the sky. Our first item is a variable star called Algol in the constellation of Perseus, the Greek Hero. Although this star doesn't actually set from the UK, it does get very low so pay attention to the visibility statement for this item. This is what's called an eclipsing binary star, a pair of stars where one is bright and the other dim. The orbit of the system is such that every 2 days, 20 hours and 49 minutes, the dimmer star blocks some of the light from the brighter one and Algol appears to fade for around 10 hours. Algol or Beta Persei is item number **19** on our list.

Our next item is also in Perseus but easier to see as it'll be higher up above the horizon. The best way to locate the Double Cluster is to identify the constellation of Cassiopeia, the Seated Queen (item number **4**). Once you've found the "W" of Cassiopeia, take the middle star of the "W" and the next one in the letter to the left. Extend the line from the middle star to the one to its left by 1.5x and there you'll find two rich clusters of stars which are collectively known as the Double Cluster. To be honest, even though they are well above the horizon, they won't be at their best at this time of year. Binoculars should find them easily but don't forget to revisit them when they are higher up in the autumn. Once seen, that's item **27** ticked off the list.

The constellation to the left of Perseus is called Auriga, the Charioteer, and is easily identified by its brightest star Capella. Another way to locate Capella is to draw a line from Vega mentioned on page 11, through item **3** Polaris, and extend it for the same distance again. The constellation of Auriga looks a bit like a mishapen pentagon. Close to the bottom of the pentagon, not too far from a star called Beta Tauri or Elnath, is a lovely collection of open clusters known as M36, M37 and M38. Looking at them through binoculars is a real treat. If you can identify M38, look out for the curved line of stars which, at this time of year, will curve to the left and down of the cluster. To the right of them is a pair of stars which are supposed to represent the eyes of a face, the curved line representing the mouth. Taken together, this is another unofficial pattern of stars known as the Cheshire Cat asterism (asterism simply means an unofficial pattern of stars). If you see the smiling cat, that's item **28** ticked off the list.

Finally, look out for the constellation of Cepheus, The King, on the opposite side of Cassiopeia to Perseus. Cepheus is the husband of Queen Cassiopeia and is best described as looking like a child's drawing of a house - basically a box with a pointed roof. Below the mid-point of the bottom of the house sits a distinctly orange variable star known as Mu Cephei or Herschel's Garnet Star. This is visible with just your eyes but binoculars will show it better. If you can see it, you're looking at a monster star estimated to be 1,650x the size of our own Sun! Once spotted you can tick off item **29** on the marathon list.



23 Antares (star in Scorpius)	Rating - <i>Easy</i>	Best seen with - <i>Naked Eye</i>
--------------------------------------	----------------------	-----------------------------------

Visibility - *after 2am BST at the start of April, after midnight by the end of the month*

24 The Teapot (asterism)	Rating - <i>Medium</i>	Best seen with - <i>Naked Eye</i>
---------------------------------	------------------------	-----------------------------------

Visibility - *rising in the south-southeast at 4:30am at the start of April, low down at 3:30am BST by the end*

52 Lagoon Nebula (emission nebula)	Rating - <i>Medium</i>	Best seen with - <i>Bins./Telescope</i>
---	------------------------	---

31 Wild Duck Cluster (open cluster)	Rating - <i>Medium</i>	Best seen with - <i>Binoculars</i>
--	------------------------	------------------------------------

53 Swan Nebula (emission nebula)	Rating - <i>Hard</i>	Best seen with - <i>Telescope</i>
---	----------------------	-----------------------------------

Visibility - *items 31, 52 and 53 are best seen just before the sky starts to brighten before dawn*

Our final outing gives us a taste of summer. Best seen over the short nights of April, May, June and July, these items are to be found in the direction that points us towards the heart of our own Milky Way Galaxy. The first object is a red supergiant star known as Antares. The name means “rival of Mars” and is well chosen because Antares definitely has a look of the Red Planet about it. It lies at the heart of Scorpius the Scorpion, is bright and easily recognised thanks to two fainter stars either side of it. Once you’ve seen Antares, item **23** can be ticked off.

Next up is a pattern of stars that will need careful timing to catch properly during April (see the visibility statement). This is a pattern of stars in the constellation of Sagittarius the Archer which goes by the name of the Teapot because it looks just like one! If you can identify the stars of the teapot, that’s item **24** ticked off the list but more importantly it gives you the means to locate the fabulous Lagoon Nebula which sits in the region where the steam would be rising out of the teapot’s spout.

There are lots of stars, clusters and nebulae (regions of glowing gas) in this part of the sky. If you have a pair of binoculars it’s really worth taking your time and sweeping around. The Lagoon Nebula, also known as Messier 8, is quite recognisable as a misty patch and once seen means you can tick item **52** off the list.

For the last two objects, you’ll have to identify the star Altair, first mentioned on page 11. Altair is the brightest star in Aquila the Eagle and has two fainter stars either side of it. Once you’ve found these, use our chart to identify the rest of the constellation and the two stars Delta and then Lambda Aquilae. Close to Lambda lies a small curve of stars which points to a rather lovely cluster known as Messier 11, the Wild Duck Cluster. This looks great through binoculars and using a low power eyepiece on a telescope, the number of stars in the view is breathtaking. This is item **31** on the list.

Finally, draw a line from Altair to Lambda Aquilae and extend it for the same distance again to locate our last object, a patch of nebulosity known as Messier 17, or the Swan Nebula. Actually, it goes under many different names including the Omega Nebula, Lobster Nebula and Horseshoe Nebula. Have a look at it through a telescope and see what you think it looks like. Once you’ve seen it, that’s item **53** ticked off the list.

So there they are - all 55 entries in the Moore Marathon. We wish you good luck, clear skies and most of all hope you have lots of fun trying to see them all. Finally, don’t forget to send your results back before April 24th!

