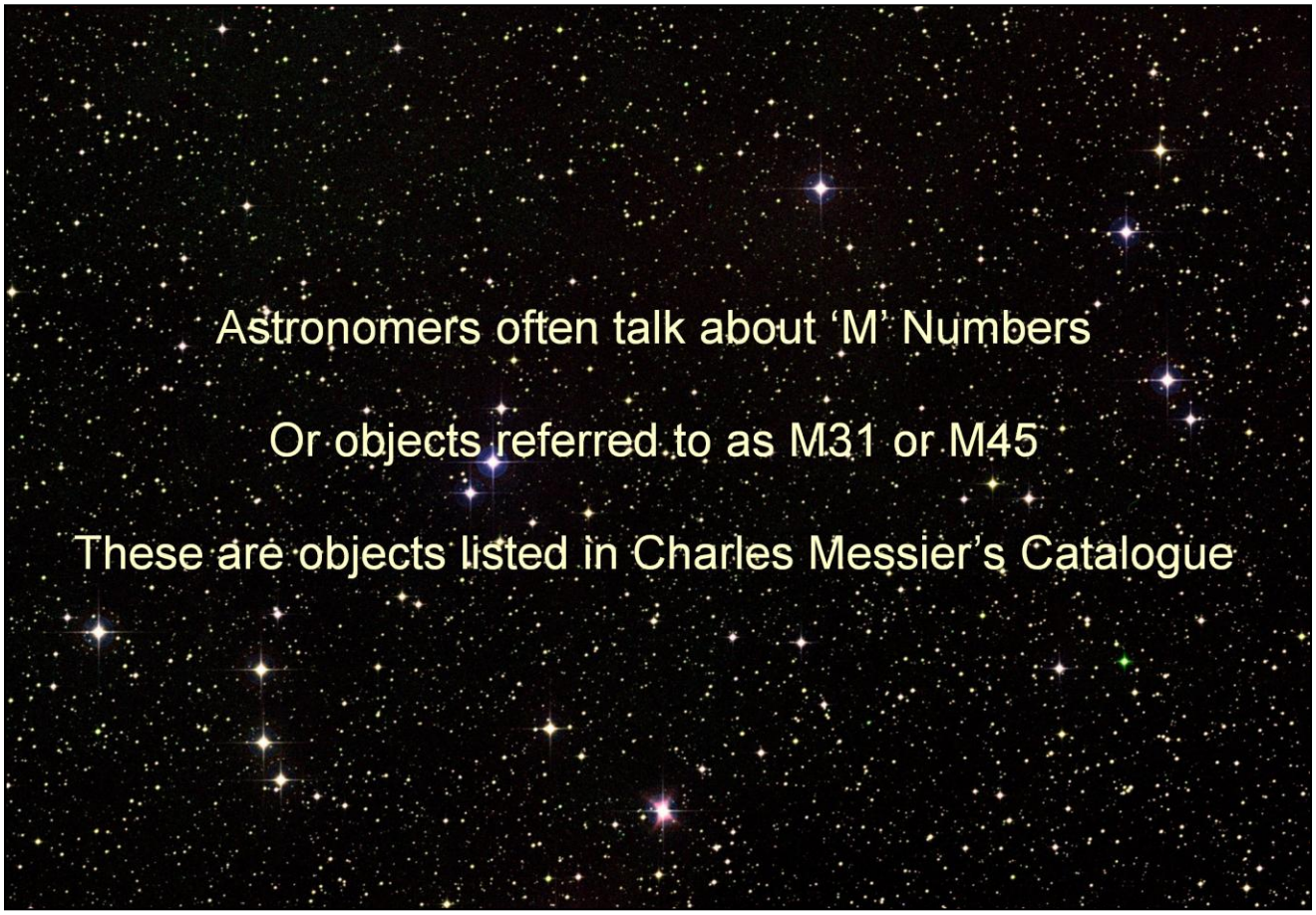
In view of the cancellation of the March Beginners meeting this presentation has been extended to include the spoken parts as well.



As a newcomer to astronomy it can be confusing when more advanced astronomers talk about things they are familiar with but newcomers may have never heard about. One of the common terms used is the prefix ‘M’ when talking about certain objects in the night sky. These are actually Messier Deep Sky Objects.

Charles Messier

Born 26th June 1730 – Died 12th April 1817

Messier was born in Badonviller in the Lorraine region France
He was the tenth of twelve children

Charles Messier was a famous astronomer in late eighteenth century France.

Charles Messier became interested in astronomy when he saw Comet C/1743 X1 and the Annular Solar Eclipse of 1744

The six tails of Comet C/1743 X1, the Great Comet were seen extending above the horizon before sunrise on 9th March 1744

Charles Messier became famous as a discoverer of Comets. Comets are large lumps of mainly water ice that orbit the Sun beyond the orbit of the outer planet Neptune. These comets that are lumps of ice varying in size from a few metres to tens of kilometres sometimes have their orbit perturbed by a close encounter with another object. This may cause the comet to begin to spiral in towards the Sun. As they approach the Sun they are heated and the ice begins to melt. Water vapour along with other trapped frozen materials may form a very large tail behind the lump of ice. This tail may grow to millions of kilometres long and makes the comet much easier to find by astronomers.

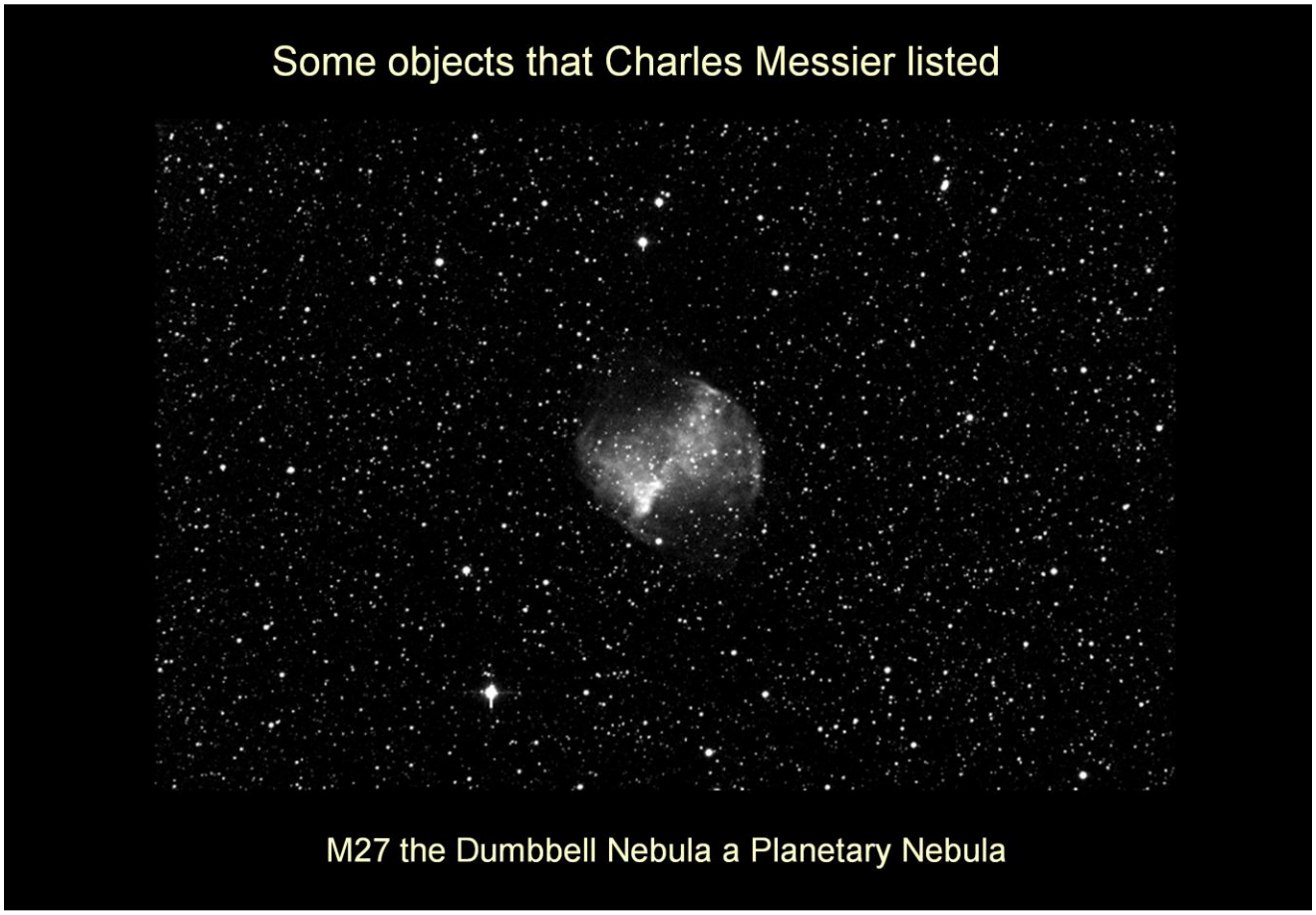
Charles Messier became a Comet Hunter

Messier discovered 13 comets:

C/1760 B1 (Messier)
C/1763 S1 (Messier)
C/1764 A1 (Messier)
C/1766 E1 (Messier)
C/1769 P1 (Messier)
D/1770 L1 (Lexell)
C/1771 G1 (Messier)
C/1773 T1 (Messier)
C/1780 U2 (Messier)
C/1788 W1 (Messier)
C/1793 S2 (Messier)
C/1798 G1 (Messier)
C/1785 A1 (Messier- Mechain)

Messier discovered a number of comets himself but he was also interested in other astronomers findings and included them in his catalogue.

Messier discovered a number of comets himself but he also found lots of fuzzy objects that looked like comets but did not move like comets. This was confusing so Charles made a list of these ‘not comet’ objects found by himself and others. Using this list he could quickly discount these object if he found them by accident. The image above shows how similar comets and deep sky objects like galaxies can appear. There are many kinds of objects that are outside our Solar System and not associated with our Solar System. Some of these objects are very far away but within our galaxy. Others are galaxies far beyond our Galaxy that we call the Milky Way. All these objects that reside beyond our Solar System we call Deep Sky Objects so these are what Messier listed in his famous catalogue.



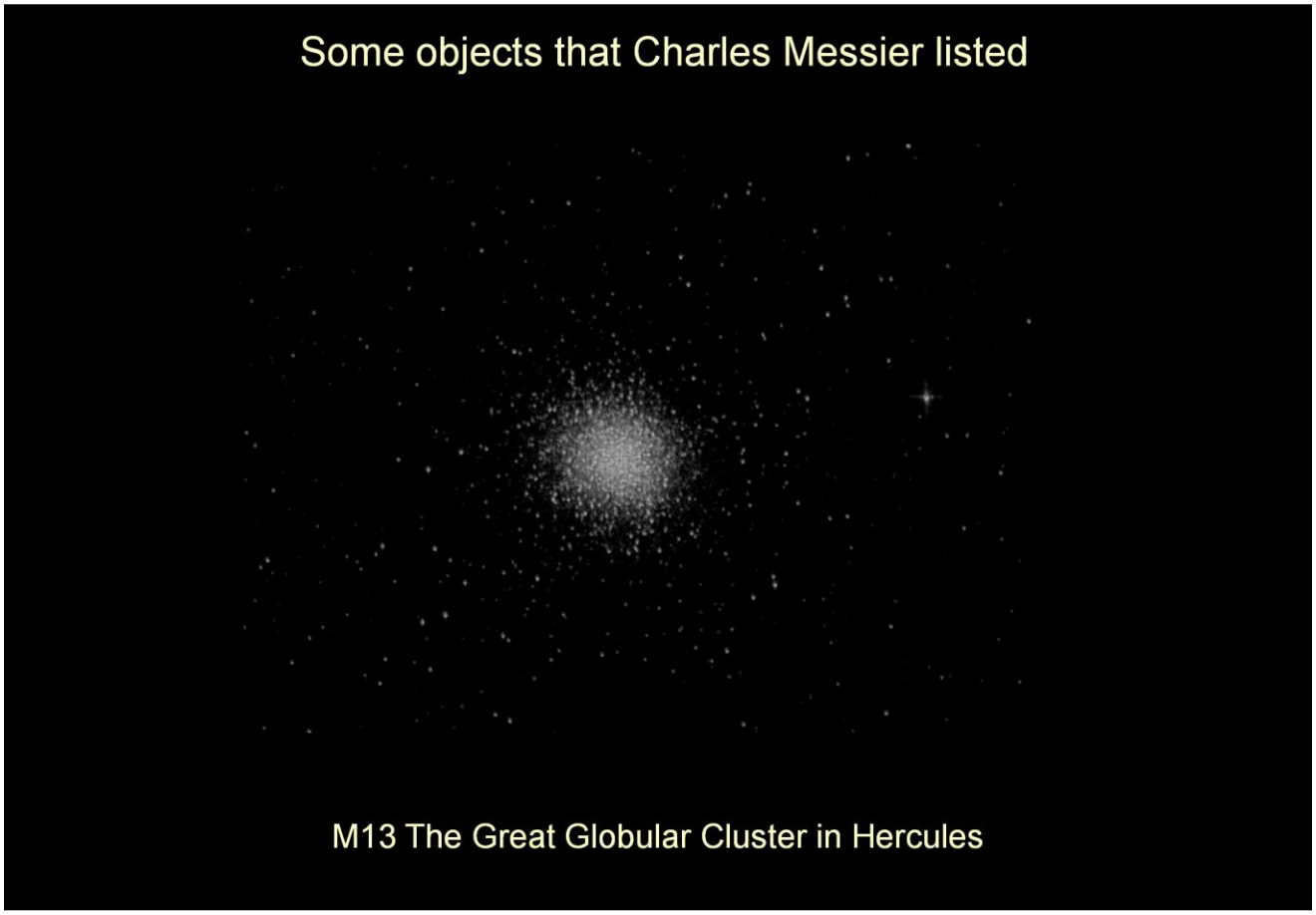
There are four types of deep sky object that can be found within our galaxy. The first is a Planetary Nebula (the plural is Nebulae). These are nothing to do with planets but are the remains of a star similar to our Sun that has reached the end of its existence as a normal star. When a star like our Sun begins to exhaust its Hydrogen fuel supply it first expands to become a Red Giant Star. As the Hydrogen finally runs out the energy produced in its core can no longer push out against the force of its own gravity and it gentally collapses to form into a small but very dense White Dwarf star. The outer regions of the Red Giant drift off and away from the star to form a 'bubble' of gas and dust. This 'bubble' can be seen looking a little like a planet especially when viewed through a comparatively primitive telescopes of the late eighteenth century, like Charles Messier's.

The second type of object found within our Galaxy is known as a Nebula or Nebulae (plural). This is a vast cloud of mainly Hydrogen gas that has been illuminated by stars in its vicinity. As the atoms of gas in these Nebulae are drawn together they form into denser clumps that have more combined gravity so pull in even more atoms. Eventually these dense clumps of gas are drawn into the most compact and very dense spherical shape. The pressure at the centre of the sphere becomes very high and the temperature rises to millions of degrees until Nuclear Fusion begins. Hydrogen atoms are forced together and fuse into heavier atoms of Helium. This Nuclear Fusion produces enormous amounts of energy in the form of X-Rays. These heat the sphere and it begins to shine as a new star. The Nebula around the new star is illuminated by the new star and we are the able to see this part of the nebula. We can see the star's light reflected off the nebula and we can also see the gas itself glow as its atoms are excited by the radiation from the new star we call this emission light.

Some objects that Charles Messier listed

M35 an Open Star Cluster in Gemini

As stars form within a Nebula, the intense radiation from the new stars begins to drive the remaining gas away to reveal the young stars within. As the gas is driven away a cluster of newly formed stars is revealed. We call this type of cluster an ‘Open Cluster’.



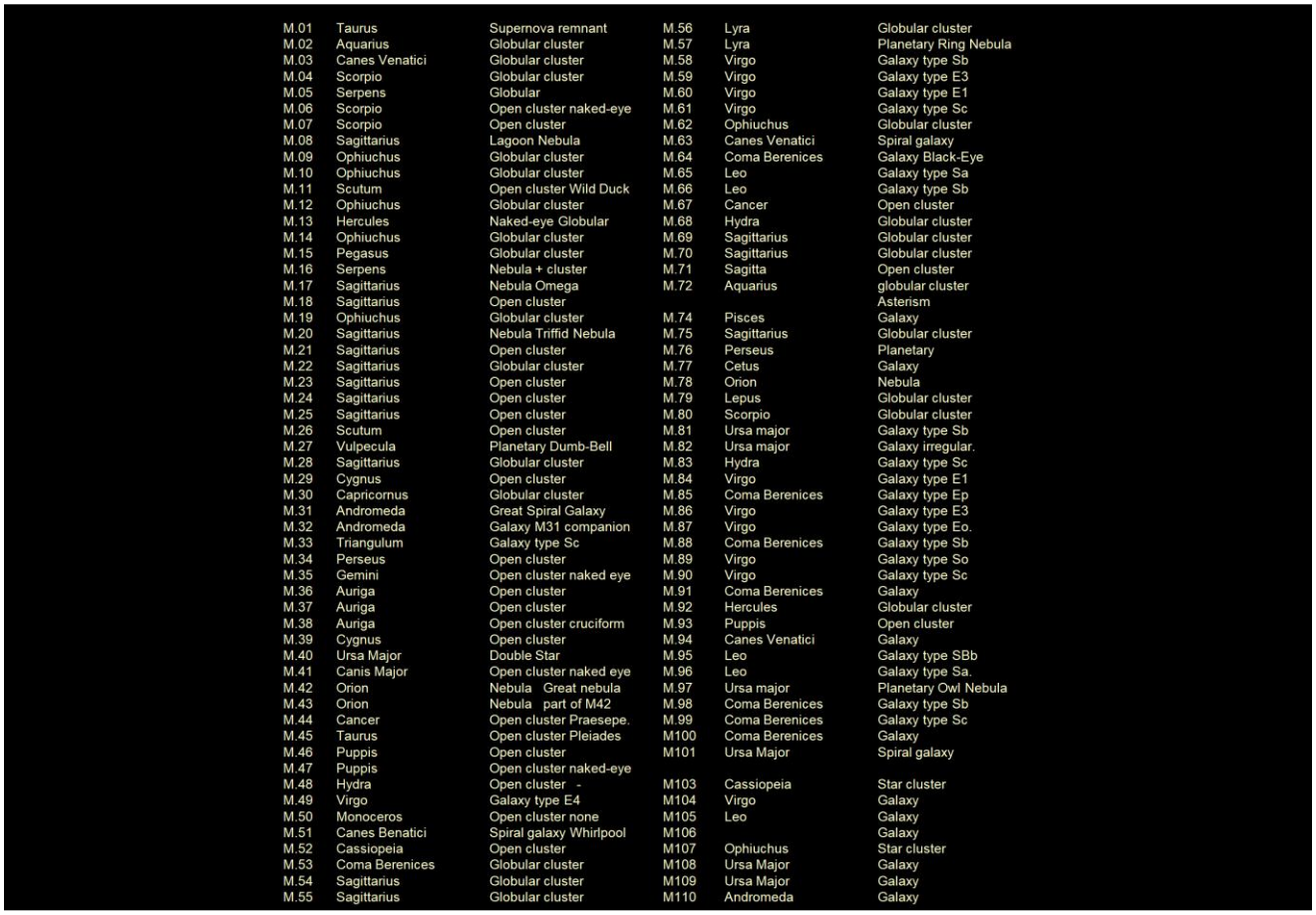
There is another completely different type of star cluster called a ‘Globular Cluster’. These are typically a spherical ball of between 10,000 and a million very old stars. They are thought to be the dense inner core of a small galaxy that had ventured too close to our Giant Spiral Galaxy. The powerful gravity of our Milky Way has pulled off all the outer stars but the central stars that were more closely bound by their mutual gravity survived. There are thought to be about 90 Globular Clusters circling our Galaxy.

Some objects that Charles Messier listed

M33 A ‘face on’ Galaxy in Triangulum

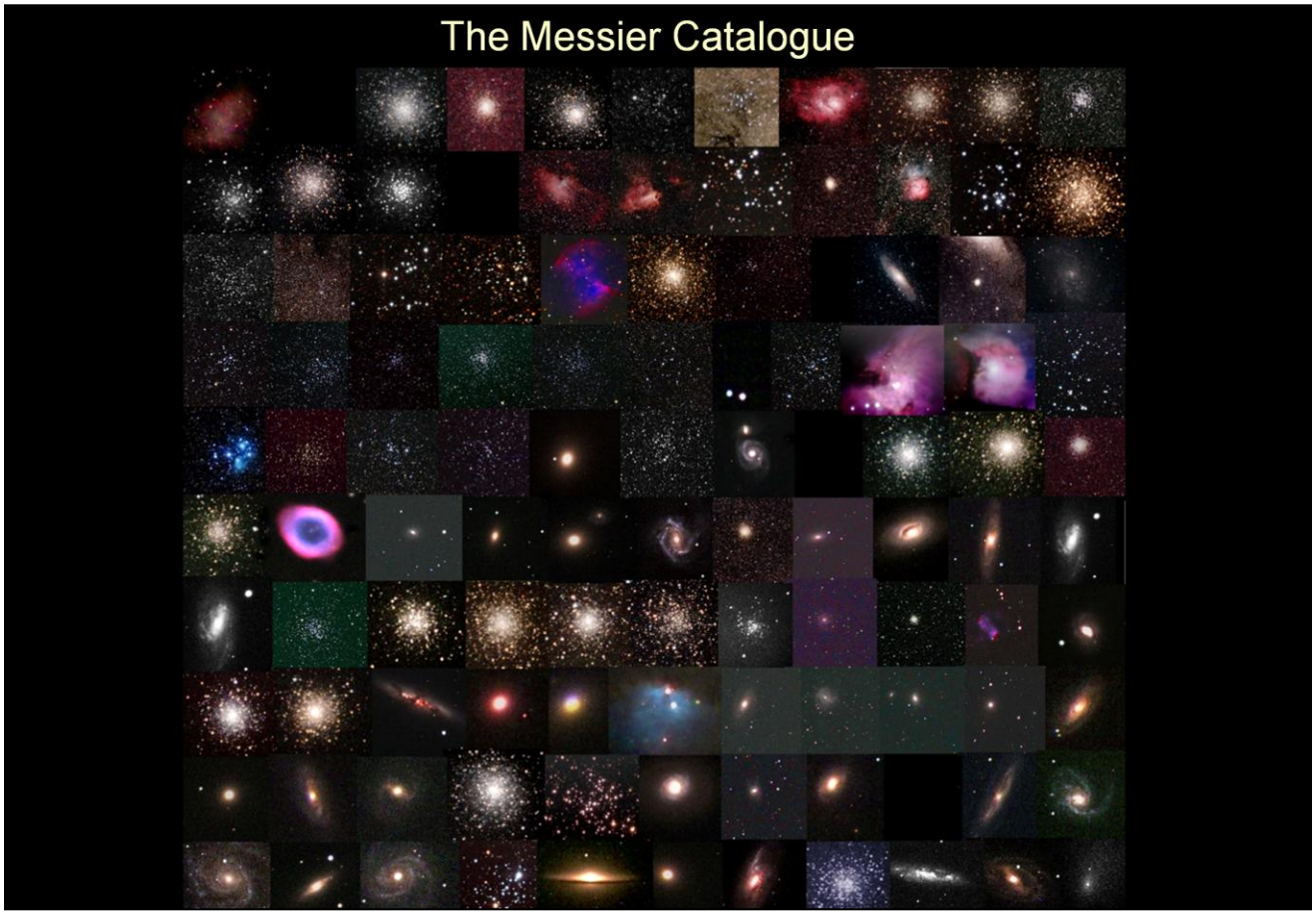
We can also see other galaxies that are relatively close to us and the Messier catalogue includes a number of them.

There are 110 objects in Charles Messier’s Catalogue



M.01	Taurus	Supernova remnant	M.56	Lyra	Globular cluster
M.02	Aquarius	Globular cluster	M.57	Lyra	Planetary Ring Nebula
M.03	Canes Venatici	Globular cluster	M.58	Virgo	Galaxy type Sb
M.04	Scorpio	Globular cluster	M.59	Virgo	Galaxy type E3
M.05	Serpens	Globular	M.60	Virgo	Galaxy type E1
M.06	Scorpio	Open cluster naked-eye	M.61	Virgo	Galaxy type Sc
M.07	Scorpio	Open cluster	M.62	Ophiuchus	Globular cluster
M.08	Sagittarius	Lagoon Nebula	M.63	Canes Venatici	Spiral galaxy
M.09	Ophiuchus	Globular cluster	M.64	Coma Berenices	Galaxy Black-Eye
M.10	Ophiuchus	Globular cluster	M.65	Leo	Galaxy type Sa
M.11	Scutum	Open cluster Wild Duck	M.66	Leo	Galaxy type Sb
M.12	Ophiuchus	Globular cluster	M.67	Cancer	Open cluster
M.13	Hercules	Naked-eye Globular	M.68	Hydra	Globular cluster
M.14	Ophiuchus	Globular cluster	M.69	Sagittarius	Globular cluster
M.15	Pegasus	Globular cluster	M.70	Sagittarius	Globular cluster
M.16	Serpens	Nebula + cluster	M.71	Sagitta	Open cluster
M.17	Sagittarius	Nebula Omega	M.72	Aquarius	globular cluster
M.18	Sagittarius	Open cluster			Asterism
M.19	Ophiuchus	Globular cluster	M.74	Pisces	Galaxy
M.20	Sagittarius	Nebula Triffid Nebula	M.75	Sagittarius	Globular cluster
M.21	Sagittarius	Open cluster	M.76	Perseus	Planetary
M.22	Sagittarius	Globular cluster	M.77	Cetus	Galaxy
M.23	Sagittarius	Open cluster	M.78	Orion	Nebula
M.24	Sagittarius	Open cluster	M.79	Lepus	Globular cluster
M.25	Sagittarius	Open cluster	M.80	Scorpio	Globular cluster
M.26	Scutum	Open cluster	M.81	Ursa major	Galaxy type Sb
M.27	Vulpecula	Planetary Dumb-Bell	M.82	Ursa major	Galaxy irregular.
M.28	Sagittarius	Globular cluster	M.83	Hydra	Galaxy type Sc
M.29	Cygnus	Open cluster	M.84	Virgo	Galaxy type E1
M.30	Capricornus	Globular cluster	M.85	Coma Berenices	Galaxy type Ep
M.31	Andromeda	Great Spiral Galaxy	M.86	Virgo	Galaxy type E3
M.32	Andromeda	Galaxy M31 companion	M.87	Virgo	Galaxy type Eo.
M.33	Triangulum	Galaxy type Sc	M.88	Coma Berenices	Galaxy type Sb
M.34	Perseus	Open cluster	M.89	Virgo	Galaxy type So
M.35	Gemini	Open cluster naked eye	M.90	Virgo	Galaxy type Sc
M.36	Auriga	Open cluster	M.91	Coma Berenices	Galaxy
M.37	Auriga	Open cluster	M.92	Hercules	Globular cluster
M.38	Auriga	Open cluster cruciform	M.93	Puppis	Open cluster
M.39	Cygnus	Open cluster	M.94	Canes Venatici	Galaxy
M.40	Ursa Major	Double Star	M.95	Leo	Galaxy type SBb
M.41	Canis Major	Open cluster naked eye	M.96	Leo	Galaxy type Sa.
M.42	Orion	Nebula Great nebula	M.97	Ursa major	Planetary Owl Nebula
M.43	Orion	Nebula part of M42	M.98	Coma Berenices	Galaxy type Sb
M.44	Cancer	Open cluster Praesepe.	M.99	Coma Berenices	Galaxy type Sc
M.45	Taurus	Open cluster Pleiades	M100	Coma Berenices	Galaxy
M.46	Puppis	Open cluster	M101	Ursa Major	Spiral galaxy
M.47	Puppis	Open cluster naked-eye			
M.48	Hydra	Open cluster -	M103	Cassiopeia	Star cluster
M.49	Virgo	Galaxy type E4	M104	Virgo	Galaxy
M.50	Monoceros	Open cluster none	M105	Leo	Galaxy
M.51	Canes Benatici	Spiral galaxy Whirlpool	M106		Galaxy
M.52	Cassiopeia	Open cluster	M107	Ophiuchus	Star cluster
M.53	Coma Berenices	Globular cluster	M108	Ursa Major	Galaxy
M.54	Sagittarius	Globular cluster	M109	Ursa Major	Galaxy
M.55	Sagittarius	Globular cluster	M110	Andromeda	Galaxy

Here is a list of all the objects listed in Charles Messier’s catalogue.



The image above shows a wall chart that includes images of all the Messier objects in numerical order from the top left (M1) across right and down row by row and left to right to M110.

There are a few anomalies in Charles Messier's Catalogue but generally they are great objects to start out in astronomy and find.

The Messier Mini Marathon
25 Deep Sky Objects

Session 1 Dusk until about 21:00 (9 o'clock)

M31	The Andromeda Galaxy
M34	An Open Star Cluster near M31
M45	The Pleiades Cluster in Taurus
M42	The Great Nebula in Orion's Belt
M35	In the neighbouring cluster in Gemini
M36	The second in the line of clusters in Auriga
M37	The first in the line of clusters in Auriga
M38	The third in the line of clusters in Auriga
M41	An Open Cluster near to Sirius the Dog Star

Session 2 22:00 (10 o'clock) until Midnight

M44	The 'Beehive' cluster in Cancer
M81	A bright Galaxy in Ursa Major
M82	A second bright Galaxy close to M81
M65	A bright Galaxy below Leo
M66	A second bright Galaxy close to M65
M104	The 'Sombrero' Galaxy in Virgo

Session 3 02:00 until about 04:00

M13	The Great Globular Cluster in Hercules
M92	A smaller and fainter Globular in Hercules
M57	The Ring Nebula (planetary) in Lyra
M27	The Dumbbell Nebula in Vulpecula

Session 4 05:00 until dawn

M4	Globular Cluster close to Antares in Scorpio
M22	Globular Custer in Sagittarius
M11	The Wild Duck Cluster
M5	Globular Cluster in Pegasus
M15	Globular Cluster in Virgo
M71	Open Cluster in Sagitta

Sessions 3 and 4 can be combined if required

The Messier Marathon is a term describing the attempt by amateur astronomers to find as many Messier objects as possible in one night. Depending on the location of the observer and the season there are a different number of them visible, as they are not evenly distributed in the celestial sphere. The best latitudes to attempt the marathon are around 25 degrees North but from the UK it is still possible to observe all 110 Messier objects in one night. This opportunity occurs once every year, around the middle to end of March and the best time to try is of course when the Moon is near its new phase.

All this sounds very ambitious for the beginner to astronomy but there is an easier marathon. This is called the Mini Messier Marathon and has just 25 objects to find. The objects are the better known members of the Messier catalogue so they are brighter and easier to find. The Mini Marathon can be divided into three or four sessions from dusk to dawn. Here is a list of the Mini Marathon Objects

Observing the Messier Objects

Make sure you are wearing warm clothes and hat

Using 9 x 50 Binoculars

Use a garden reclining chair or sun bed

Using a telescope

Make sure the finder is aligned with the telescope

Fit a low power eyepiece into the focuser (25mm)

Focus the eyepiece on a bright star

Use the finder to point the telescope

(The Messier object may be seen in a 50mm finder)

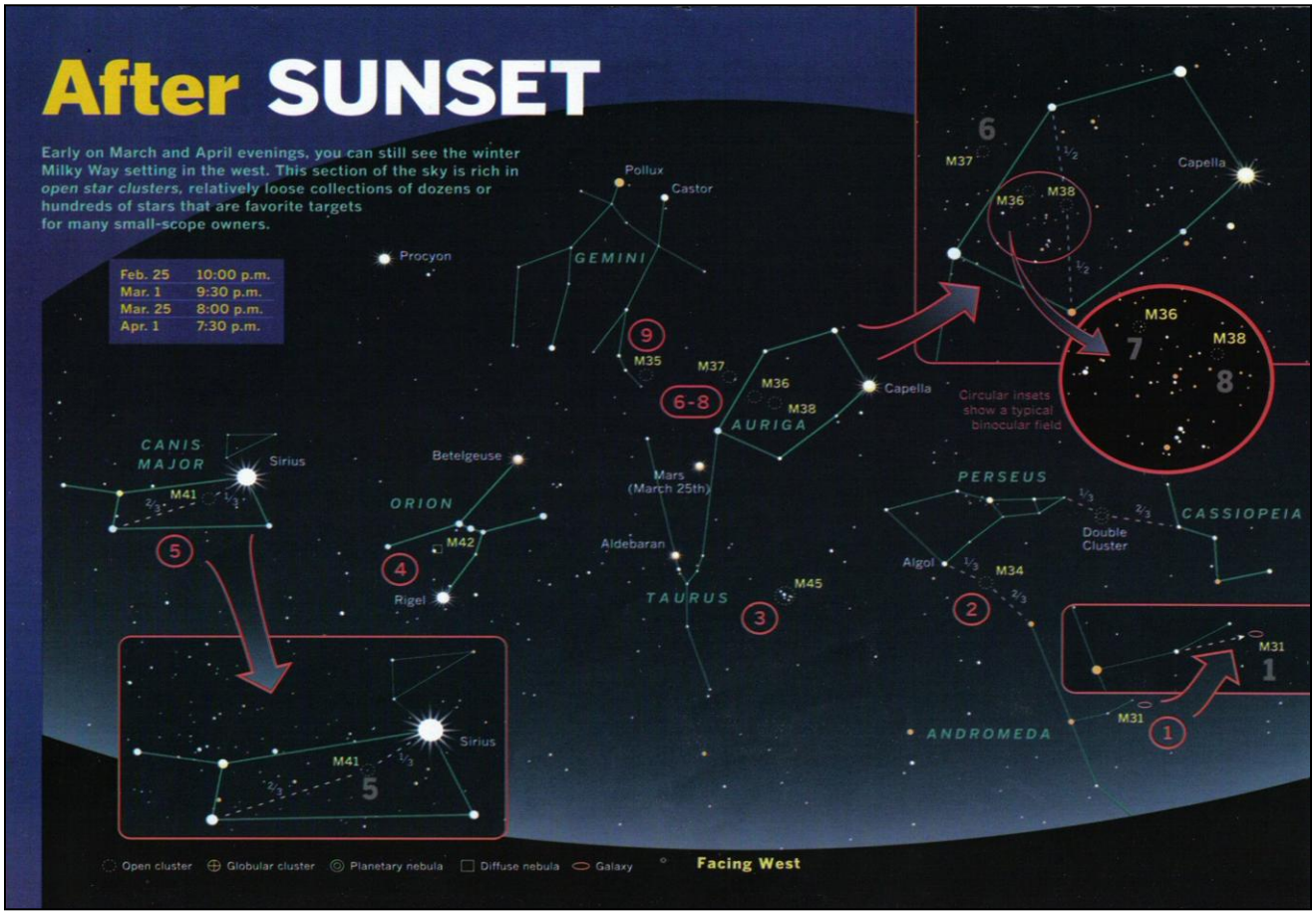
If not move the telescope slowly to locate it

Study the object for a few minutes

Carefully fit a higher power eyepiece (10mm)

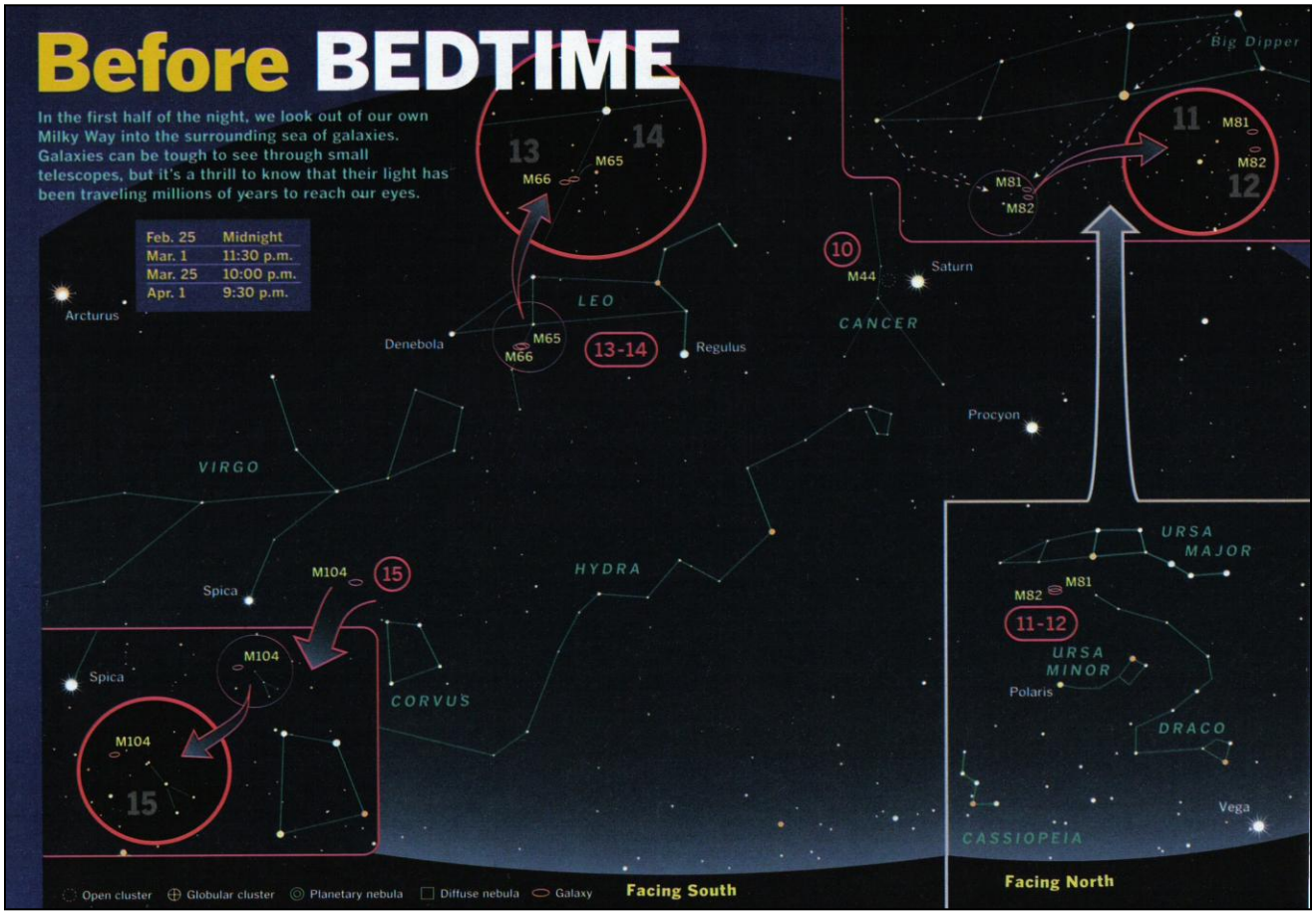
Focus the eyepiece and view the Object

Here is some advise for the Messier Mini Marathon



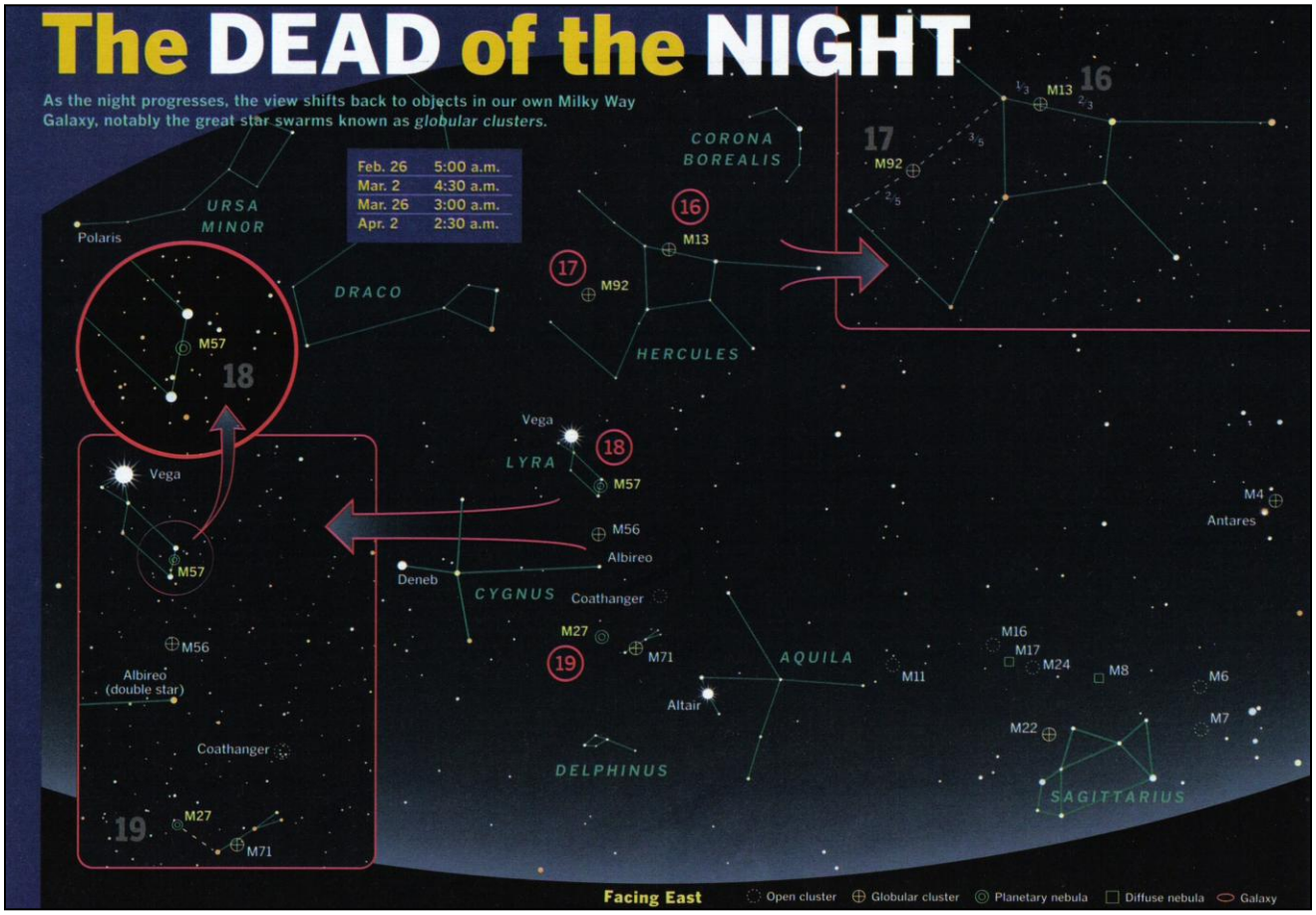
The chart above is one of four charts produced a number of years ago to help new astronomers in the USA through the Messier Mini Marathon. This is Session 1 early evening.

The more traditional charts on pages 22, 23 and 24 have been produced for our Newbury Beginners Section to use.



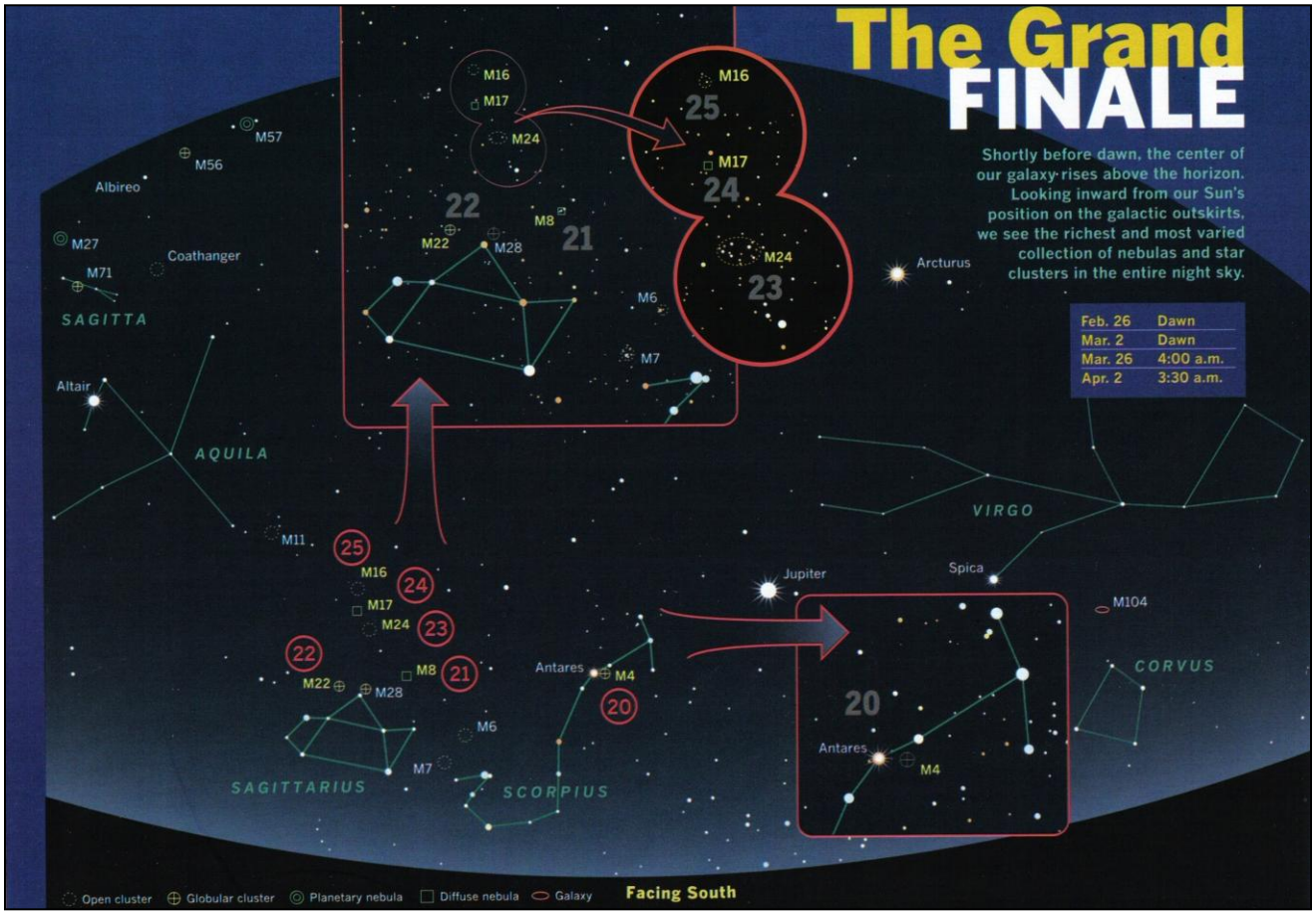
The chart above is one of four charts produced a number of years ago to help new astronomers in the USA through the Messier Mini Marathon. This is Session 2 late evening.

The more traditional charts on pages 22, 23 and 24 have been produced for our Newbury Beginners Section to use.



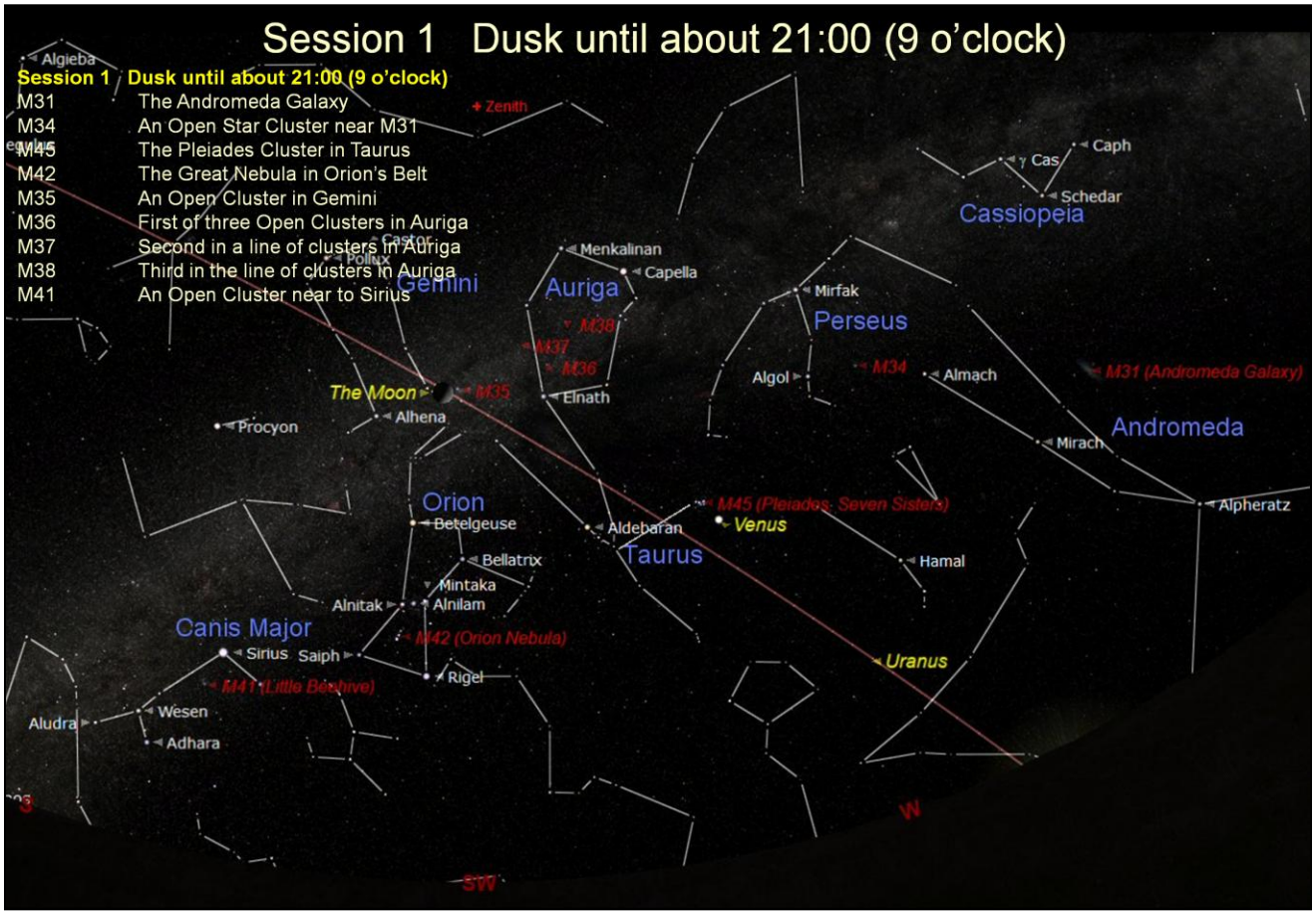
The chart above is one of four charts produced a number of years ago to help new astronomers in the USA through the Messier Mini Marathon. This is Session 3 early morning.

The more traditional charts on pages 22, 23 and 24 have been produced for our Newbury Beginners Section to use.



The chart above is one of four charts produced a number of years ago to help new astronomers in the USA through the Messier Mini Marathon. This is Session 4 just before sunrise.

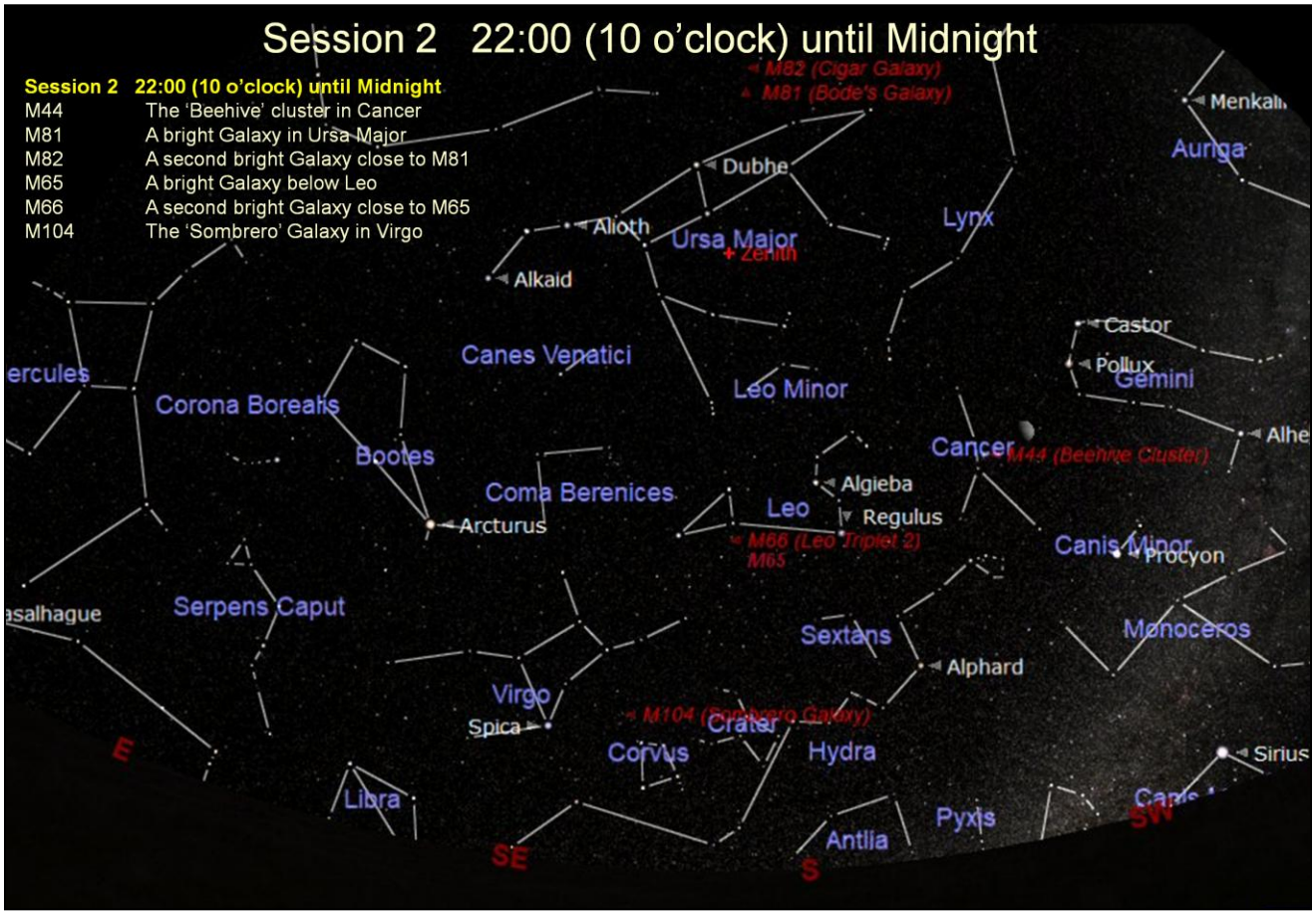
The more traditional charts on pages 22, 23 and 24 have been produced for our Newbury Beginners Section to use.



The chart above shows the first nine Messier Objects to find in the first session. We need to start as soon as it is dark to make sure we have set everything up and we have plenty of time for the search. Remember if it does cloud over we can start where we left off when the sky clears or on the next clear night.

Some of the Mini Messier Objects can be seen using just binoculars but the fainter objects will need a telescope and a dark unpolluted night sky.

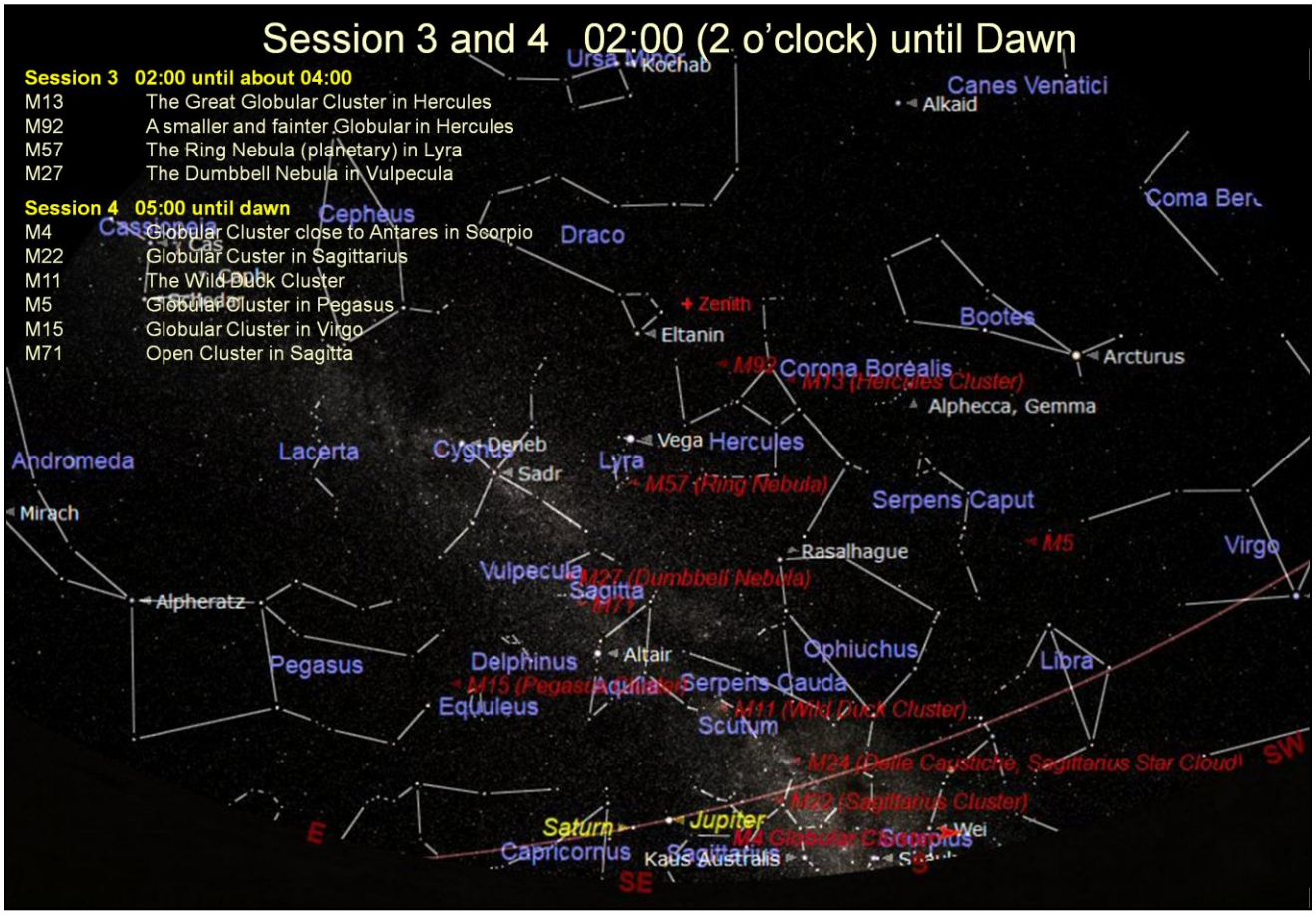
The chart above shows the very early evening sky as the Sun sets over the western horizon and the sky is beginning to darken. If the Moon is in the sky it will be the first night sky object to be seen and the second will be the planet Venus. It will be high in the south west and is so bright it can't be missed.



The chart above shows the next six Messier Objects to find in this 'midnight' session. We can start observing around 10 o'clock to make sure we have enough time to find everything. Remember if it does cloud over we can resume where we left off when the sky clears or on the next clear night.

In this session one of the Mini Messier Objects 'M44' can be seen using just binoculars, in fact binoculars are best. However the other fainter objects will need a telescope and a dark unpolluted night sky.

The chart above shows the sky at about midnight. The early evening objects have moved towards and over the western horizon. If the Moon is in the sky the fainter objects may be more difficult to find. If the Moon is close to a target it may have to be postponed until another night when the Moon has moved on.

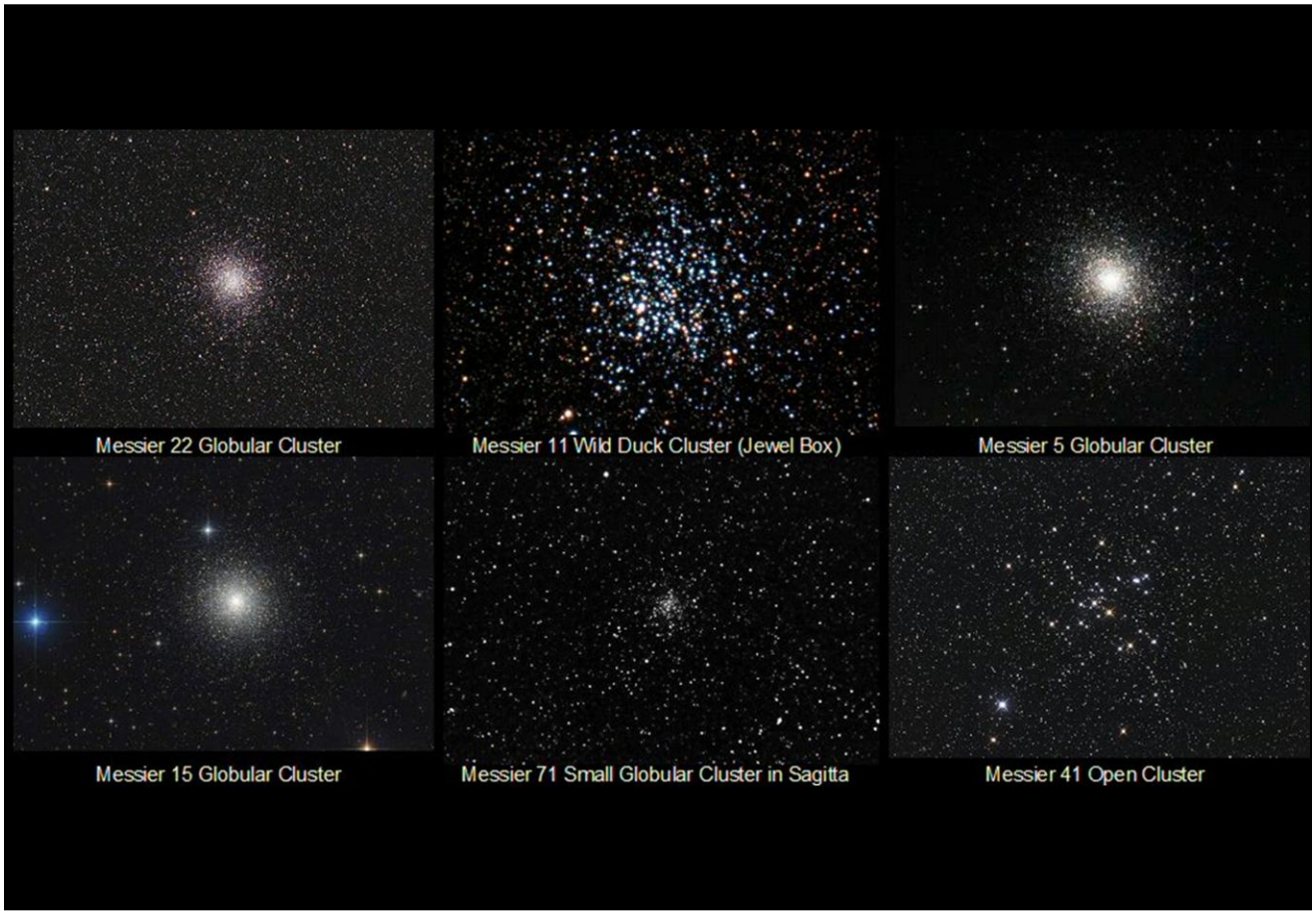


The chart above shows the final 10 Messier Objects to find in this 'midnight' session to dawn. We can start observing some time between midnight and 02:00 to make sure we have enough time to find everything. Remember we do not really need to do it all in one night. We can resume where we left off on the next clear night.

Images of the Messier Mini Marathon objects (page 1 of 3)

Images of the Messier Mini Marathon objects (page 2 of 3)

M95 and M96 are additional targets for the enthusiastic observer.



Images of the Messier Mini Marathon objects (page 3 of 3)
(M41 was accidently missed from page 1 and added here)

Object	Image	Directions to the object
Messier 31 (M31) The Great Spiral Galaxy Constellation of Andromeda This is a giant spiral galaxy similar to our own Milky Way Galaxy. It is thought to be about 2.4 million light years from us and about the same size. It can just be seen with the naked eye in a dark and clear sky. A pair of binoculars will show it as a small 'fuzzy' patch of light. A telesope will reveal an elliptical patch of light with a bright core at the centre.		Find the constellation of Andromeda Look for the star Alpheratz which is the top eastern (left) star of the Great Square of Pegasus. Follow the lower line of stars to the east (left) of Alpheratz and count two stars to Mirach. Then count two stars up from Mirach to a fainter star with a fuzzy patch or light close to it. This is M31 the Great Spiral Galaxy
Messier 34 (M34) A small and sparce Open Cluster Constellation of Perseus This is a custer of of relatively young stars that have formed from the gas and dust in a Nebula (a cloud of gas and dust in a galaxy). There are about 80 starsin total in this cluster.		Find the constellations of Andromeda and the neigbouring constellation of Perseus Look for the star Aldebaran which is the top eastern (left) star of the Great Square of Pegasus. Follow the lower line of stars of Andromeda to the east (left) of Alpheratz to the end of the line. Look half way between the star at the end of the line (called Alamak) and Algol in Perseus. M34 is just above a direct line between Alamak and Algol.
Messier 45 (M45) the Pleiades also called The Seven Sisters A beautiful 'naked eye' Open Cluster Constellation of Taurus This is a cluster of bright young stars with the seven brightest stars visible and able to be counted with the naked (unaided) eye. It is best seen using binoculars or a small telescope and a low magnification eyepiece.		Find the constellations of Taurus Look for the star Aldebaran which is a bright orange looking star between Perseus to the north west and Orion to the south east. Aldebaran is the star at the centre of a squashed 'X' shape of stars that constitutes the constellation of Taurus (the Bull). It is located at the centre of a large and dispursed Open Cluster of stars called the Hyades. Look to the upper right of Aldebaran and a fuzzy patch of light will be seen. Closer examination will reveal a cluster of six or seven stars, this is M45 the Pleiades (the Seven Sisters).

Detailed information for finding the objects is available on the beginners website.

The extract above shows the first part of the table.