



IRISH FEDERATION OF ASTRONOMICAL SOCIETIES

THE
MESSIER OBJECTS
OBSERVING CHALLENGE

HANDBOOK AND LOGBOOK

THE OBSERVING CERTIFICATES WORKING GROUP

Working under the Irish Federation Of Astronomical Societies

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OBSERVING PROGRAMME REGULATIONS

- 1) To take part in the Observation Challenges Programme you must be a member of one of the member clubs or societies of the IFAS. Check out the list of clubs and links to their websites at the IFAS webpage, www.irishastronomy.org, or on the following page of this handbook.
- 2) Observations must be made after the 18th September 2004.
- 3) You must either post or hand this Handbook to the Observations Secretary who will then verify your recordings. Your Handbook must be received at least 28 days before the star party at which you wish to receive your certificate.
- 4) Duplicate observations must be made for each Observing Challenge. If, for example, you observe M31, the Andromeda Galaxy for the *Messier Objects Observing Challenge*, you cannot use the same observation for the *Binocular Sky Observation Challenge*.
- 5) Please remember that the people involved in this project are volunteers who are giving their time freely to run and maintain this programme. The purpose behind the Observation Certificates Programme is to encourage better, more systematic, and more organised observation of the night sky. These rules are there to help the programme run smoothly and should not be seen as restrictive or harsh. We're just trying to be fair.

NO PERSON OR ORGANISATION PROFITS FINANCIALLY FROM THIS OBSERVATION CHALLENGES PROGRAMME.

THE COST OF THESE HANDBOOKS IS TO STRICTLY COVER THEIR PRINTING AND BINDING.



www.irishastronomy.org

The IFAS is made up by membership of the following National Amateur Astronomical Societies & their members:

Astro 2 (NUI Maynooth)
(<http://astro2.iwarp.com/>)



Bausch & Lomb Astronomy Society
(www.geocities.com/bauschandlombastronomysociety/BLAS.html)

**Bausch & Lomb
Astronomy Society**

Cork Astronomy Club
(www.qsl.net/ei5fk/astronomy.html)

East Antrim Astronomical Society
(www.eaas.co.uk)



Galway Astronomy Club
(<http://homepage.eircom.net/~galwayastronomyclub>)



Kerry Astronomy Club
(<http://homepage.eircom.net/~kerryac>)



Irish Astronomical Association
(www.btinternet.com/~jimmyaquarius)



Irish Astronomical Society
(www.irishastrosoc.org)



Shannonside Astronomical Club
(<http://go.to/sac>)



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Tullamore Astronomical Society
(www.tullamoreastronomy.com)



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INTRODUCTION

Welcome to the Irish Federation of Astronomical Societies Messier Objects Observing Challenge. This challenge is designed to introduce you to 110 of the most wonderful showpiece objects in the night sky. This handbook consists of a beginners guide to the deep sky and an introduction to the most famous catalogue of deep sky objects – The Messier Catalogue. It is hoped that this guide will provide a reference point for all Irish astronomers to start their exploration of the night sky as they begin their personal quest to observe and understand the beauty of the sky above them.

IFAS

IFAS, The Irish Federation of Astronomical Societies, is the national organisation of participating amateur astronomy clubs in Ireland, North and South. The aim of the Federation is to promote the interests and development of amateur astronomical societies in Ireland. IFAS is proud to support this initiative to encourage Irish astronomers to observe the Messier catalogue and is honoured to officially record and reward those who document their observations in accordance with the guidelines as discussed below. A list of participating clubs, the IFAS constitution and an online discussion forum can be found at www.irishastronomy.org

THE OBSERVING CHALLENGES PROGRAM

We all like to be rewarded and it's nice to have ones achievements recognised. The Observing Challenges Program is neither a competition nor a test and shouldn't be looked on like that. It is simply a way to encourage you to observe and to become a better observer. Although successful completion of the program will result in the presentation of a certificate, it is hoped that the real award will be the participation and learning gained in undertaking this exercise.

This booklet provides you with all of the necessary information to complete this part of the Observing Challenges Programme. Contained within are concise descriptions of what it is you are looking at, as well as clear instructions on how to locate these objects. Other booklets of the Observing Challenges Programme are available and introduce the observer to such diverse topics as the Moon, our Solar System, Double Stars and the Binocular Sky. We encourage people who engage in the Messier Objects Observation Challenge to take part in the other challenges and to become well rounded visitors to the night sky. If at any stage you find yourself getting stuck or just needing advice, please feel free to log onto the IFAS website and check out the bulletin board. There, you will find hundreds of Irish astronomers who will be more than happy to help you out or just offer a word of encouragement.

CERTIFICATES AND AWARDS

There are three levels of award available for the Messier Objects Observing Challenge. These levels, and their requirements are listed below;

Bronze Standard	Observe 50 Messier Objects Sketch 15 Messier Objects
Silver Standard	Observe 75 Messier Objects Sketch 25 Messier Objects
Gold Standard	Observe 100 Messier Objects Sketch 50 Messier Objects

These may be any Messier objects, in any order. The observations may also be cumulative enabling the observer to obtain all three certificates over a period of time. You will only need one Handbook to complete the requirements for all three certificates. Please note also that you do not need to observe all of the Messier objects for the Gold Certificate, just 100 of them.

The Messier Observing Secretary is: Michael O'Connell.

E-mail address: michaeloconnell78@yahoo.co.uk

You may submit your handbook in person to the Messier Observing Secretary at any of the IFAS star parties. Alternatively, you may contact the observing secretary by e-mail and submit your handbook via post.

Once your observations have been verified, your certificate will be presented to you at either the Whirlpool Star Party, COSMOS or the Galway Star Party and this Handbook will be returned to you. If you prefer, your certificate will be posted to you along with this Handbook. Your name and club will also be listed in the relevant section of the IFAS website. If you prefer to remain anonymous, please indicate accordingly and just your club name will be listed. Remember though that the Certificate is not the ultimate prize on offer here; becoming familiar with the great range of objects in the Messier Catalogue is the real prize. Best of luck, clear skies, and enjoy the hunt.

THE DEEP SKY

The expression "Deep Sky" or "Deep Sky Objects" is used to describe diffuse objects which appear in the night sky. To the human eye, stars appear to have light emitting from a point source and, with the aid of a telescope, planets in our solar system reflect light from an apparently small disc. However deep sky objects (DSOs) usually appear significantly bigger and their shape and structure are often evident with the aid of optical equipment and sometimes even to the naked eye. There are 3 basic types of deep sky objects; galaxies, nebulae and star clusters. However, this can be

further broken down again to reveal a total of 8 types of deep sky objects, each of which are described below;

GLOBULAR CLUSTERS

Globular clusters are tightly knit groups of stars all gravitationally bound to each other. These groups may consist of anything from ten thousand to millions of stars and are usually all of approximately of the same age. They can vary in size from tens of light years across to hundreds of light years in diameter. Globular clusters can be found randomly scattered within our own galaxy. An example of a globular cluster is M13 in Hercules.

OPEN CLUSTERS

Open clusters are basically smaller less congested clusters of stars. They are usually only gravitationally bound for a short length of time before they scatter and become loose individual stars. They are also all of a similar age and chemical composition as they usually form from the same condensed nebula, just like the globular clusters. However, they are usually found in the plane of our own galaxy. An example of an open cluster is M35 in Gemini.

GALAXIES

Rather than our Universe being filled with randomly scattered stars, they tend to stay in groups of several million called galaxies. Galaxies form from huge regions of gas colliding with each other to form one condensed gravitationally-bound mass. Due to the large quantities of mass, the galaxy starts to rotate. Meanwhile within the galaxy, clusters of stars are born creating the illuminated spiral arms we traditionally associate with galaxies. Our own galaxy, the Milky Way, is estimated to hold 250,000 million stars and is thought to be 100,000 light years in diameter!

PLANETARY NEBULAE

When stars like our own Sun get old, the nuclear processes within their core start to change. The star's core has at that stage burnt up all its hydrogen. This causes the star to slowly contract, which reduces the star's temperature. This contraction pulls some hydrogen-rich material within the star to fall into the core, causing it to start new hydrogen-fuelled nuclear reactions resulting in an increase in temperature and a re-expansion of the star. After a while the recent influx of hydrogen into the core is all burnt out and the cycles repeats. This cyclic pulsating effect can cause the star's outer layers to blow off, forming a shell around the star. This shell can only be seen due to the reflection of light from the associated star illuminating this shell of gas. The term "planetary" nebula dates back to 1785 when William Herschel looked at these objects through his telescope and thought they looked similar to planets. An example of a planetary nebula is M57, The Ring Nebula in Lyra.

EMISSION NEBULAE

Emission nebulae are clouds of dust and gas which are visible to us due to self-illumination. The elements within the cloud of gas become active due to the energy of nearby hot stars, which causes the gas to glow.

As a result, emission nebulae usually appear slightly red similar due to the similar reactions which take place in a neon light. Often, young stars are born within these clouds of gas resulting in a spectacular display of stars with surrounded by clouds of gas and dust. An example of an emission nebula is M42, The Orion Nebula.

REFLECTION NEBULAE

Reflection nebulae are clouds of gas and dust which simply reflect light from nearby stars without any significant activity within the cloud. As the light travels through the nebula, it gets scattered by the tiny particles of dust. This results in the nebula taking on a slight blue colour, similar to the way the daytime sky also appears blue. Reflection nebulae and emission nebulae are often seen in close proximity as they can often form from the same larger cloud of gas and dust. A good example of this is M20, The Trifid Nebula in Sagittarius which actually consists of both a pink emission nebula and a blue reflection nebula adjacent to each other.

DARK NEBULAE

Dark nebula are clouds of gas and dust which, from our vantage point, block light shining behind it. They are typically very similar to reflection nebulae and are often seen in close proximity to reflection and emission nebulae. An example is the Horsehead Nebula in Orion. Dark Nebulae are the only type of deep sky objects (DSOs) not found on the Messier List.

SUPERNOVAE REMNANTS

When very massive stars (more than 8 times heavier than our own Sun) die, they usually go with a bang. As the material in the star starts to run out, the star begins to contract and the star's temperature increases. Once the star has developed an iron-rich core, the core contracts very rapidly, such that the core's temperature suddenly increases to 5×10^9 K within 0.1 seconds. After approx 0.25 seconds, the core has collapsed to a diameter of only 20 km and it's density has skyrocketed to approx 4×10^{17} kg/m³ (approx 35 trillion times more dense than lead!).

Suddenly, this rapid compression reaches a critical point, called the nuclear density. When the density of the core tries to exceed the nuclear density, the core suddenly becomes very solid. The core's contraction abruptly stops and the innermost core actually rebounds back out. This shockwave suddenly meets material which is rushing inwards at up to 15% the speed of light. The result of this

collision is a tidal wave rushing outward at a speed greater than that of sound. Within a few hours, the pressure wave hits the surface of the star resulting in a cataclysmic explosion of bewildering proportions. The energy released in this event is over one hundred times more than all the energy our Sun has ever released over the past 4.6 billion years! This gigantic eruption, called a Supernova, blows vast quantities of material into space creating a shell of material surrounding the now much smaller star. An example of a supernova remnant is M1, The Crab Nebula in Taurus.

CHARLES MESSIER



Charles Messier was born in Lorraine, France on June 26th 1730. Son of a tax collector, he was one of 12 children who grew up in a working-class family. Six of his brothers and sisters died at a young age and when Charles was only 11 his father died also. It is reported that Charles first became interested in astronomy when he was 14 years old. In that year Comet De Cheseaux appeared in the sky which featured up to 11 tails in a fan-like shape and was bright enough to see during daylight hours (Mag. -3). Only 4 years later an annular solar eclipse was visible from Charles' home town. These two events helped to inspire one young boy to become one of the most famous astronomers of all time.

In October 1751 Charles left home for Paris. He went to work for Joseph Nicolas Delisle, the Navy's astronomer. Delisle hired Charles not so much for his observing skills but rather his fine writing abilities to work on the cartography of the various countries under exploration by the French Navy at the time. While in Paris, Charles stayed in the Hotel de Cluny with Delisle which also had an observatory. Here Charles began some detailed astronomical studies with Delisle and his first documented observation was of the Mercury transit of 1753. In 1757, Charles started to look for Comet Halley. Delisle had calculated the return orbit of the comet and Messier plotted these positions on a star chart. Unfortunately for Messier, Delisle had made an error in his calculations and so he spent that year searching for Comet Halley in the wrong location. However, his efforts weren't

completely in vain. Despite not finding Comet Halley until too late, Charles continued his hunt for comets and in 1758 had discovered his own.

While searching for comets, Charles came across several diffuse objects with his little telescope. The first of these was in Taurus. When he realised this was not a comet due to it remaining in the same location night after night, Charles started what has now become known to us all as the Messier Catalogue. The purpose of this catalogue was not to identify interesting objects in the night sky, but rather to tabulate the objects which Messier saw which could be confused as a comet. His first one to record was M1 in Taurus – what has now more recently been understood to be a supernova remnant. In 1769, Charles published the first version of his catalogue of comet-like objects. This was further revised in 1771 when it was called the “Catalog of Nebulae and Clusters of Stars”. This detailed the first 45 objects in his catalogue.

Charles continued his comet hunting for many years and at the age of 71 he found his final comet in 1801. This led to a total of 20 comet discoveries – 13 his own and 7 independent co-discoveries. Charles didn’t quit observing altogether. However, with deteriorating eyesight and old age, his level of work slowly diminished. In 1815, Charles suffered a massive stroke which left him partly paralysed. He never fully recovered from this and eventually died in 1817, age 87. Although he was a discoverer of comets, he is remembered by most today for creating the now famous Messier Catalogue. He has also been further honoured with two small craters on the Moon named in his honour.

THE MESSIER CATALOGUE

The Messier objects are not arranged in any kind of order. Messier simply noted them down as he found them. For example, you may be looking at M44, the Beehive cluster in Cancer, then you move on to the nearest object, M67, which is also in Cancer. The list contains almost the full range of deep-sky object types, as well as a few mistakes. The only type of deep-sky object not represented on Messier’s list are Dark Nebulae.

The list has 40 galaxies, 28 globular clusters, 25 open clusters, 6 open clusters with a surrounding nebula, 4 planetary nebulae, 2 bright nebulae, 1 supernova remnant and 4 mistakes. These mistakes are also interesting;

M24 is a bright patch in the Summer Milky Way. M40 is a double star with no associated nebulosity. M73 is an asterism of four stars while M102 is a duplicate entry of M101.

It could be argued that the Messier Catalogue contains the best examples of each type of deep-sky object. M31, the Andromeda Galaxy, is potentially the best galaxy in the sky, while M13 is regarded by many observers, in the Northern Hemisphere anyway, as the best globular cluster. M45,

the Pleiades, contends with M44, the Beehive cluster, for the title of best open cluster while M42, The Orion Nebula is often regarded as simply the best deep-sky object of all.

One difficulty for Irish observers is the low declination of some of the Messier objects, particularly objects round the Sagittarius area. Keep in mind though that Messier observed all of these objects from Paris, so it might be an idea to pack your binoculars next time you head off on holidays.

THE MESSIER MARATHON

At the time of the new Moon near the end of March every year, something magical happens. On those nights every Messier object is visible in the night-sky on the same night. Many amateur astronomers since the 1960s have taken part in what has been dubbed the Messier Marathon, a race to view all the objects on the list in one session. This is not a time for relaxing your eyes and soaking up the view through your eyepieces, but instead a chance to practice and perfect your skills at hunting down these objects. The rewards are simply completing the list and ease at locating the objects at later stages. It's not for everyone, and certainly not for the novice.

For this observing program however, it is strongly recommended that the observer should pace themselves to undertake their observations throughout the course of one year. Multiple observations of the same target are also encouraged as the more time spent at the eyepiece, the easier it becomes to detect faint detail.

OBSERVING LOG

We request you fill out the following form prior to submitting your Messier Handbook for certification. We can assure you that any personal information you submit will only be used for purposes of this observing challenge and will not be passed on to any third parties.

Please complete all parts of the following list

PERSONAL DETAILS

Name: _____

Address: _____

Phone Number: _____

Mobile Number: _____

E-mail address: _____

IFAS Club: _____

How would you like to receive your Observing Certificate? (*Tick your preference*)

Presentation at Whirlpool? []

Presentation at COSMOS? []

Presentation at Galway Star Party? []

Postal Delivery? []

Do you want your name entered on the IFAS website? Don't mind [] No thanks! []

Part 2: Location.

Please provide details of the locations used by you to complete this Handbook. Please include details such as the latitude and longitude of the site as well as the limiting magnitude of the sky.

Part 3: Equipment.

Please give details of all equipment used to complete your observations of the Messier objects including eyepieces, filters and different types of telescopes and binoculars if applicable.

COMPLETING THE LOG SHEETS

The Messier Log Sheets provide you with all of the information necessary for your observation of these deep-sky glories. The first thing it shows you is the M number of the object, as well as any common names, and it's reference in the NGC (New General Catalogue). Other information in the first section includes what type of object it is, the Constellation you can find the object in, the Right Ascension of the object (equivalent to Longitude in the sky), and the Declination of the object (equivalent to Latitude). Also included are details of the Magnitude of the object, as well as its size.

(Please see the example overleaf)

For example;

M 42

The Orion Nebula	NGC 1976
Type:	Emission & Reflection Nebulae
Constellation:	Orion
Right Ascension:	5h 35.4m
Declination:	-5° 27'
Magnitude:	4
Size:	66 x 60 arc min.

This gives us all of the information we need to know about M42, The Orion Nebula. A quick check with a planisphere or a planisphere program will tell us if the Orion Nebula is visible on the night we hope to look for it, and what time we can expect to see it at. The Magnitude and Size are also important as they will help us to anticipate what we shall see through the eyepiece.

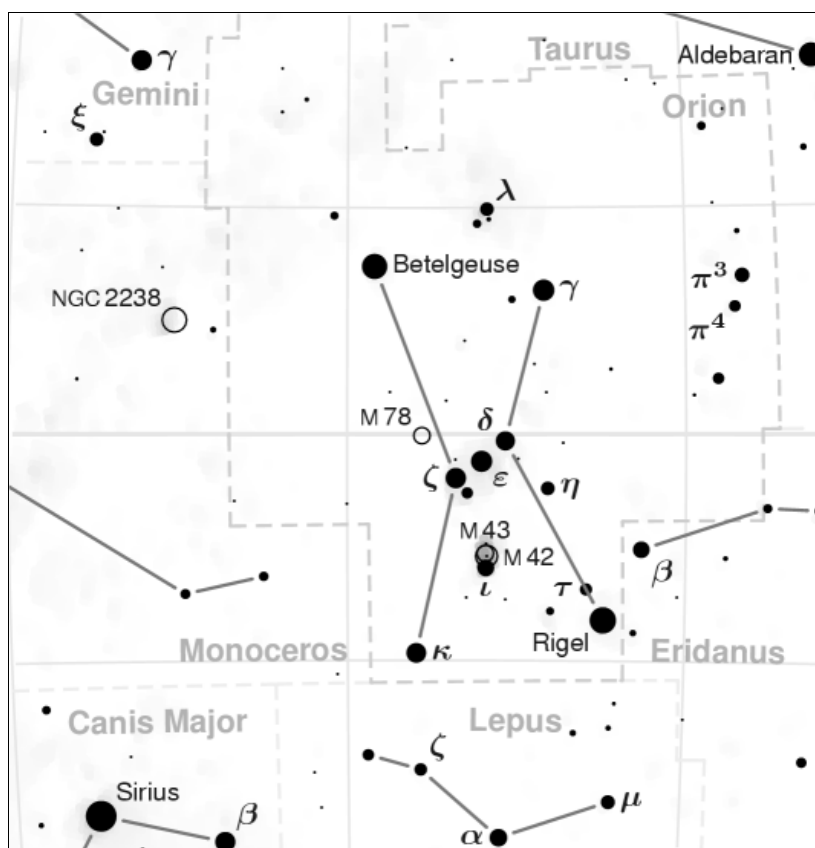
Magnitude for non-stellar objects is usually derived by combining the diffuse light of the deep sky object (DSO) into a point and then working out the magnitude. It is important to remember that it is the *equivalent* magnitude of the object if that object was a point of light. This can lead to problems with large bright objects such as M 33, The Triangulum Galaxy, which is listed as a magnitude 5.7 object. However, due to its large size, it's much more difficult to detect than a star of similar magnitude.

Also provided for each object is a finder chart (right) to help locate what it is you are trying to track down. Each of the provided finder charts is to the same scale to make them easier to use (with the exception of those members of the Virgo Cluster of Galaxies), and all of them feature North at the top and West to the right.

(Majority of star charts produced by Al White using PP3 software. PP3 software written by Torsten Bronger.

<http://pp3.sourceforge.net/>

Remainder created in Starry Night Pro)



You will notice that this chart for M42 also contains M43 and M78. This will also help to plan a night's observing as all of these objects can be observed during one observing session. Some charts are quite crowded and some are also duplicated, but only for clarity. The Virgo Cluster of Galaxies can be an intimidating prospect for any astronomer. To make navigation of this densely crowded area special large charts have been provided in Appendix B.

There are also details provided on the Observing Log Sheets regarding the visibility of the objects through Binoculars and Telescopes (we assume the use of small to medium apertures) as well as the kind of skies necessary to view the objects satisfactorily.

The next section contains details that must be completed by you. They are;

Date and Time:

Please use Universal Time, the standard time for astronomers. UT is our winter time or summer time *minus* one hour.

Location

Just a brief note to supplement your earlier description of location.

Equipment

What telescope, binoculars, eyepieces, filters, or other pieces of equipment were used for this observation. Naked-eye is also a valid entry here.

Transparency

Transparency provides a means for us to reduce down a number of factors to a single number. Transparency concerns cloud cover, limiting magnitude, and light pollution and can actually vary from place to place in the sky. 1 represents excellent transparency and would indicate that you are observing from a perfectly dark site on a night without clouds or haze. A person observing on the same night from a light-polluted site may only have a transparency of 3; good transparency. 4 is poor transparency and 5 is bad transparency.

Limiting Magnitude describes the brightness of your observing site. It is the magnitude of the faintest star that can be seen with ease from that site. Our dark site observer would probably have a Limiting Magnitude of 6, while our suburban observer might have to contend with a Limiting Magnitude of 3.5 or 4. Many astronomers use Ursa Minor as their reference for the Limiting Magnitude of their site.

Seeing

Seeing is a concept used by astronomers to describe and quantify the stability of the atmosphere. Many different scales are used worldwide but for simplicity's sake the scale used here is from 1 to 5. 1 represents a night of excellent seeing. These nights are rare so make the most of them. 2 and 3 are the most common nights and they represent nights of very good and good seeing

respectively, or nights with bad seeing with moments of better stability. 4 is poor seeing, while 5 is simply bad seeing.

Ideally, we'd all like nights with both good seeing and good transparency. The best time of year when these two factors combine is usually in the Autumn. During the Winter and Spring, the turbulence and water vapour in the atmosphere can often provide poor seeing. However, due to the rain washing the dust from the atmosphere, this can also yield to excellent transparency. As the Summer starts, the rain eases and the upper atmosphere winds tend to slow down. This can result in excellent seeing conditions but the build-up of dust in the earth's atmosphere can impede on the sky transparency.

For DSOs, transparency is the most critical. High magnification is usually not necessary for observing diffuse objects due to their large size therefore the effects of poor seeing aren't as apparent. The opposite is the case though for studying planets where seeing is the more critical of the two.

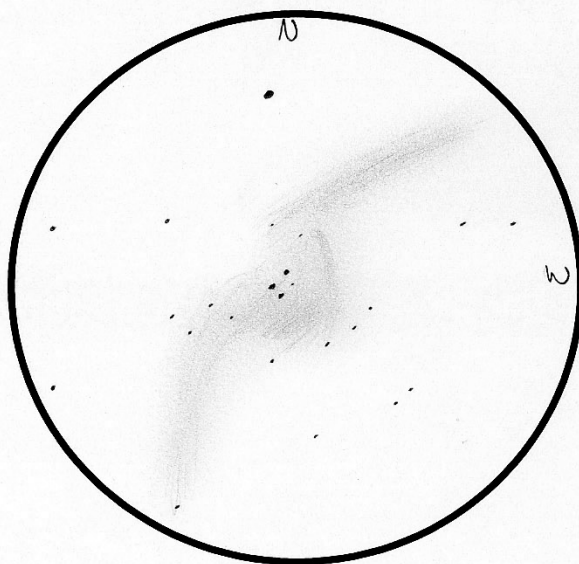
Drawing Circle

Sketches of objects must be provided to qualify for the various levels of certificate on offer. These need not be works of art but should represent as closely as possible what you see through the eyepiece. If you are concerned about sketching, seeing Appendix A. Always ensure you note cardinal directions on your sketches.

Comments

Treat this section as your personal journal of your discovery of the Messier objects. Its value will be obvious in later years when you look back. See the example for M42, The Orion Nebula on the right.

Date: 18 September 04 Time: 04:30 UT.
 Location: Birr Castle grounds after WSPA
 Equipment: 8" f10 SCT 15mm Aposl.
 Transparency: One (Please rate from 1 excellent to 5 poor.)
 Seeing: Two (Please rate from 1 excellent to 5 poor.)



Comments

Glorious views of the Orion
Nebula here in the shadow of
the Leviathan with alot of
structure visible in the nebula and
excellent views of the Trapezium

THE MESSIER OBJECTS LOG SHEETS

M 1

The Crab Nebula NGC 1952

Type: Supernova Remnant

Constellation: Taurus

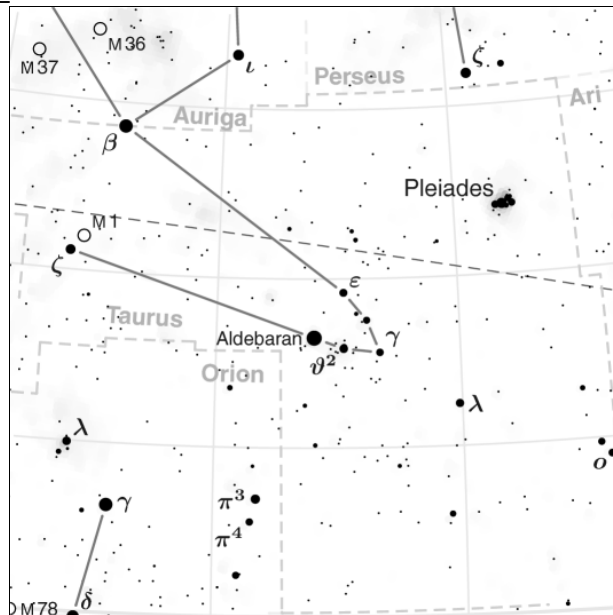
Right Ascension: 5h 34.5m

Declination: +22° 01'

Magnitude: 8.4

Size: 6x4 arc min.

Finder chart



Binoculars: Challenge

Telescope: Easy

Skies: Dark

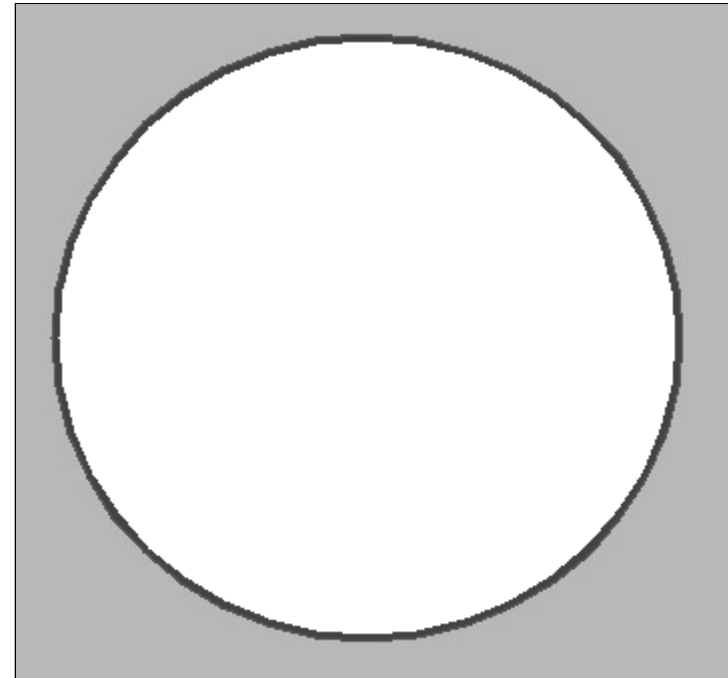
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

The Irish Connection!

The name, the “Crab Nebula”, was given to this deep-sky delight because of a sketch by Lord Rosse of Birr in 1844. His sketch of M1 resembled a horseshoe crab, and although Rosse didn’t like the resemblance, the name stuck.

M 2

NGC 7089

Type: Globular Cluster

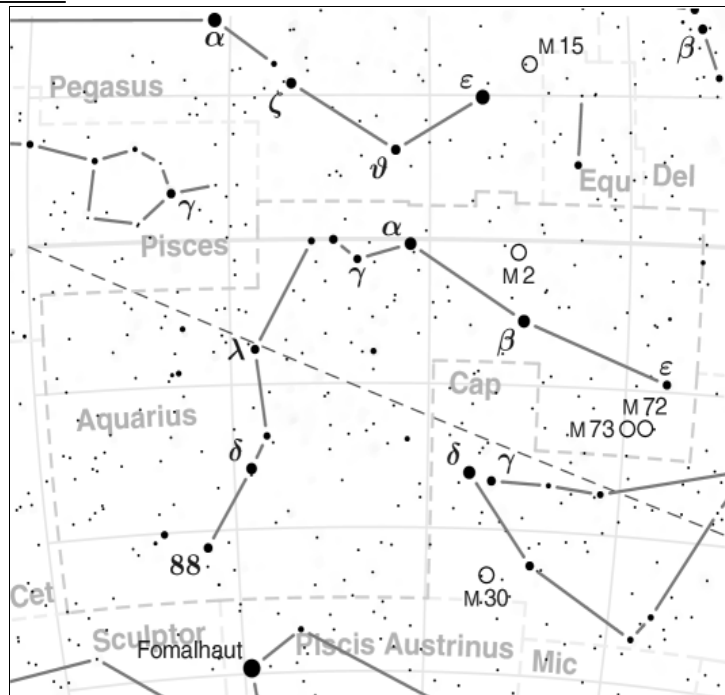
Constellation: Aquarius

Right Ascension: 21h 33.4m

Declination: $-0^{\circ} 49'$

Magnitude: 6.5

Size: 13 arc min.

Finder chart

Binoculars: Easy

Telescope: Easy

Skies: Dark

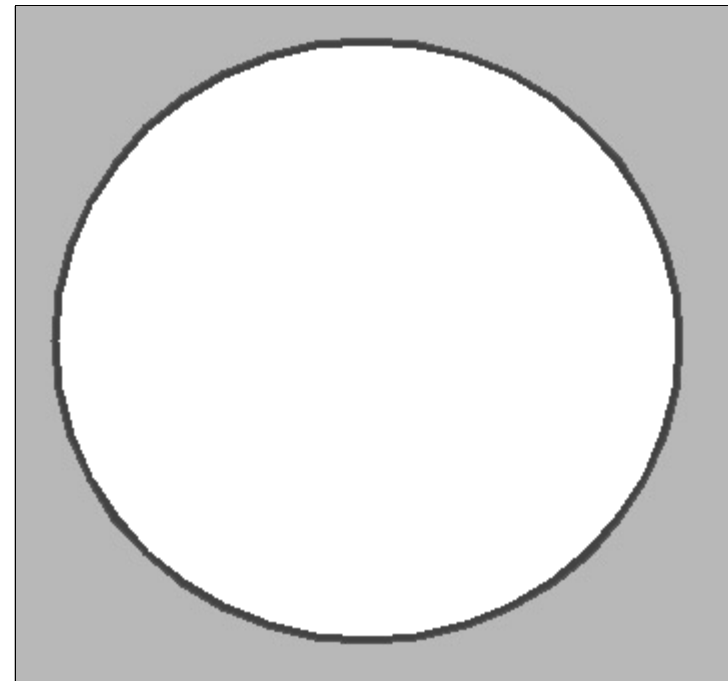
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

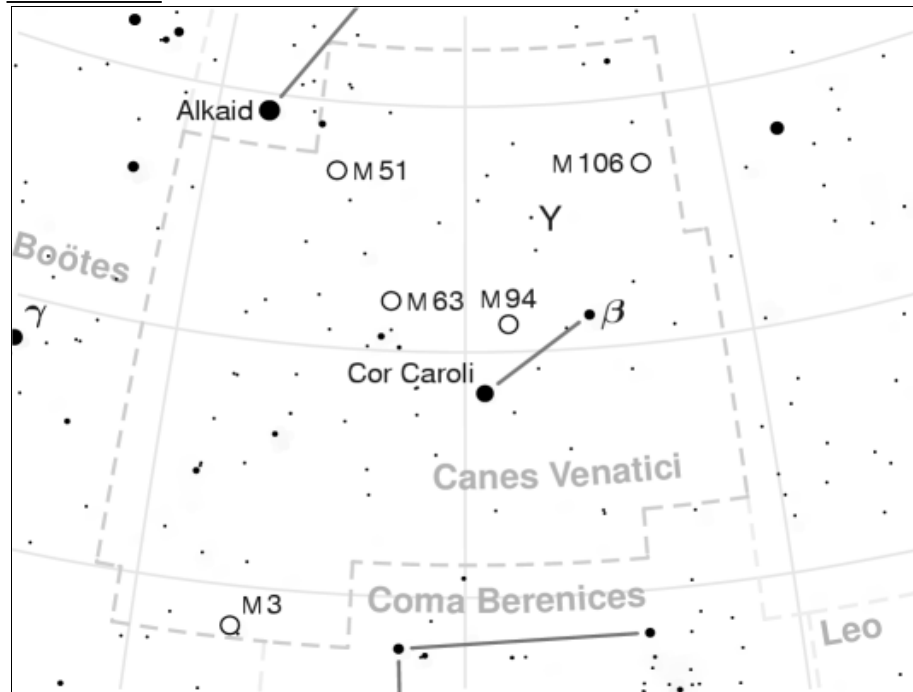


Comments

M 3

NGC 5272

Type: Globular Cluster
 Constellation: Canes Venatici
 Right Ascension: 13h 42.2m
 Declination: +28° 23'
 Magnitude: 6.4
 Size: 16 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

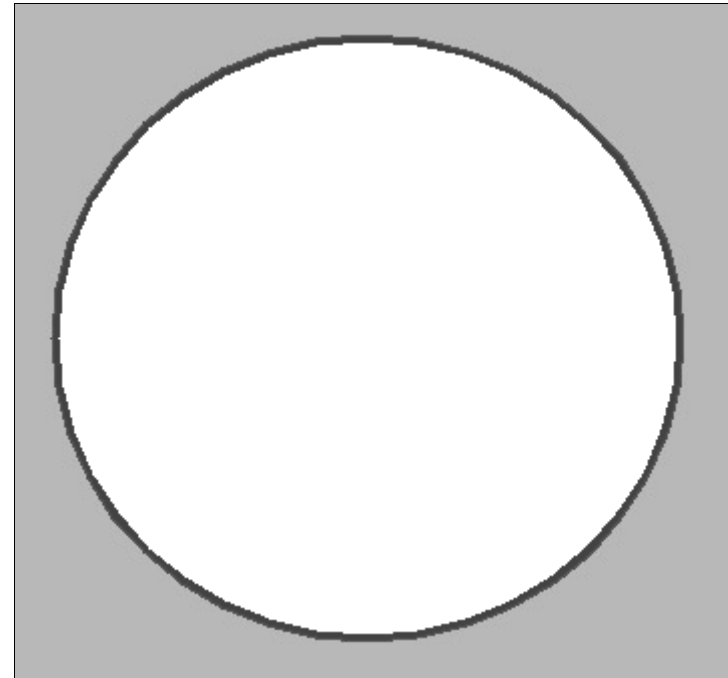
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

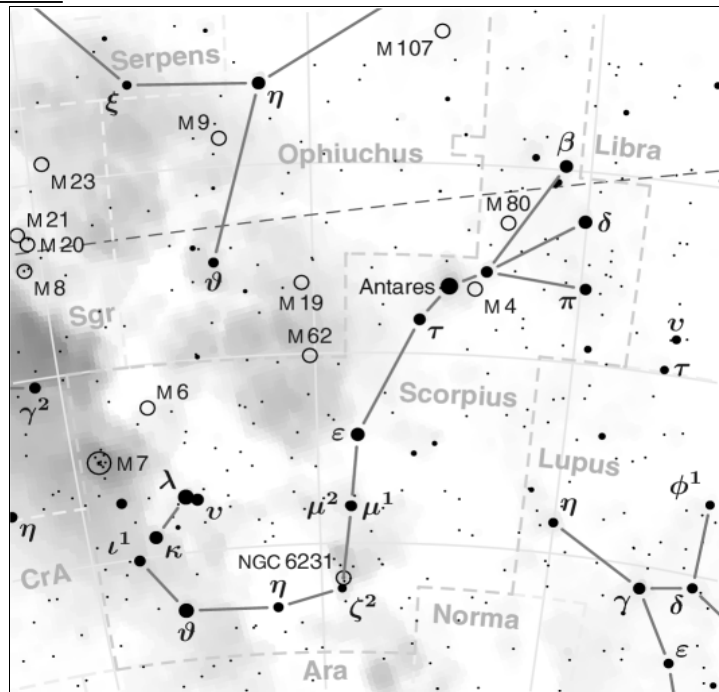
The Irish Connection!

In the nucleus of M3, dark spots can be detected in high resolution images. These were first noted by Lord Rosse who described them as “small, dark

M 4

Cat's Eye NGC 6121

Type: Globular Cluster.
 Constellation: Scorpius
 Right Ascension: 16h 23.6m
 Declination: $-26^{\circ} 32'$
 Magnitude: 5.6
 Size: 36 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

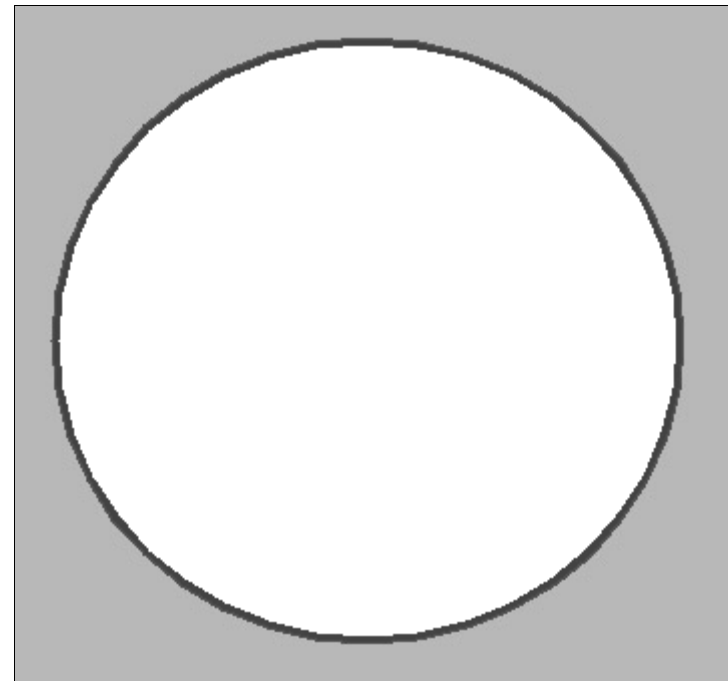
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

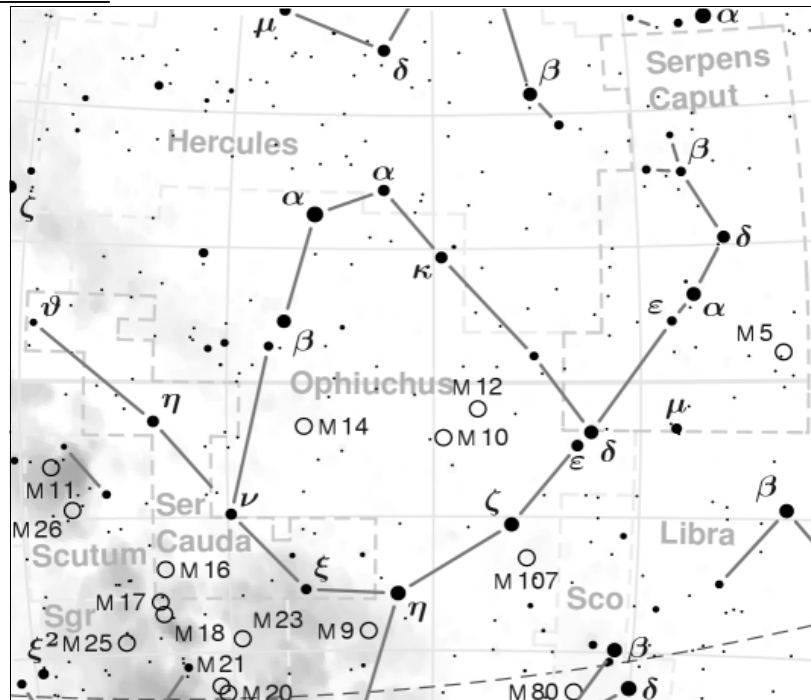


Comments

M 5

NGC 5904

Type: Globular Cluster
 Constellation: Serpens
 Right Ascension: 15h 18.6m
 Declination: +2° 05'
 Magnitude: 5.8
 Size: 17 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

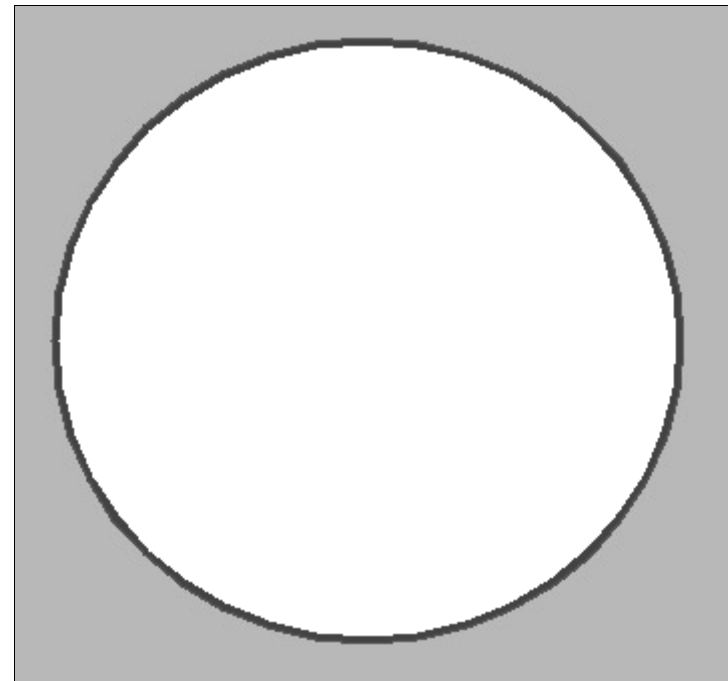
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 6

Butterfly Cluster NGC 6405

Type: Open Cluster

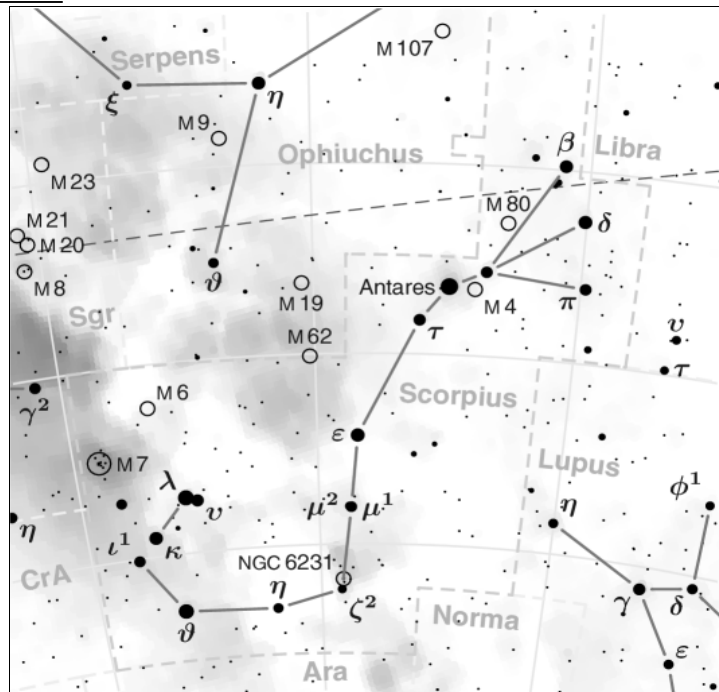
Constellation: Scorpius

Right Ascension: 17h 40.1m

Declination: $-32^{\circ} 13'$

Magnitude: 4.2

Size: 25 arc min.

Finder chart

Binoculars: Easy

Telescope: Easy

Skies: Dark

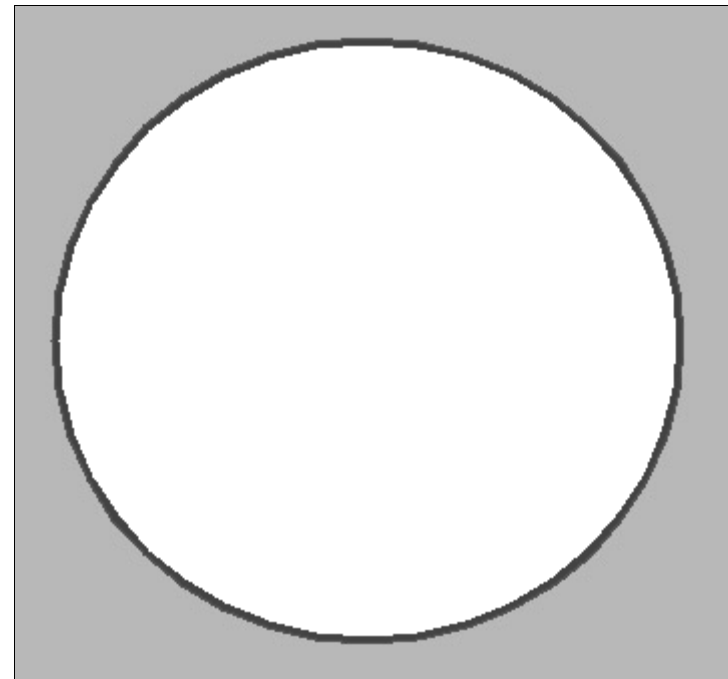
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 7

Ptolemy's Cluster NGC 6475

Type: Open Cluster

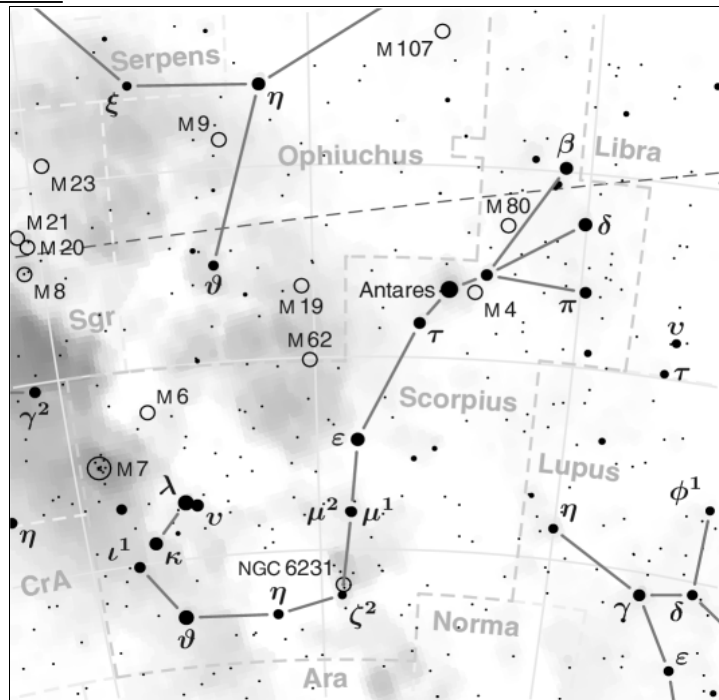
Constellation: Scorpius

Right Ascension: 17h 53.9m

Declination: $-34^{\circ} 49'$

Magnitude: 3.3

Size: 80 arc min.

Finder chart

Binoculars: Difficult – Note Declination

Telescope: Difficult – Note Declination

Skies: Dark, and Southern

The Messier Objects Observing Challenge

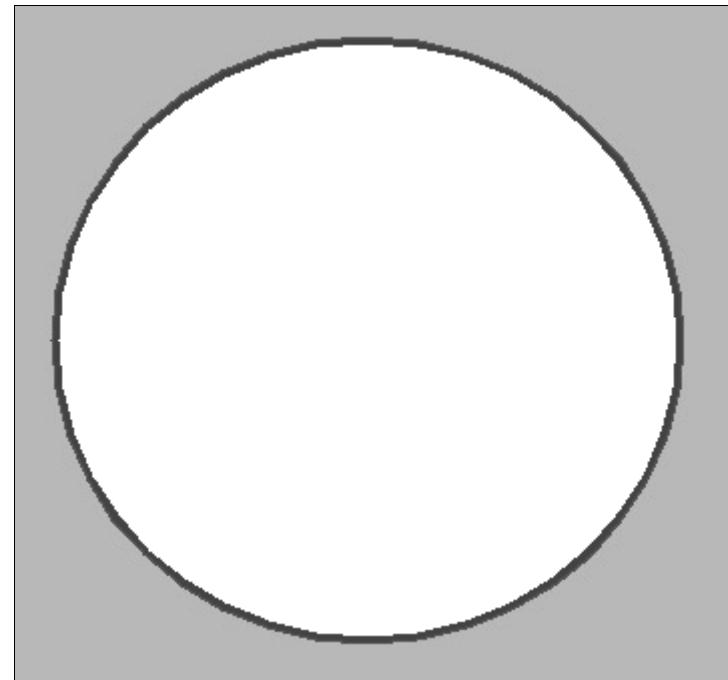
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

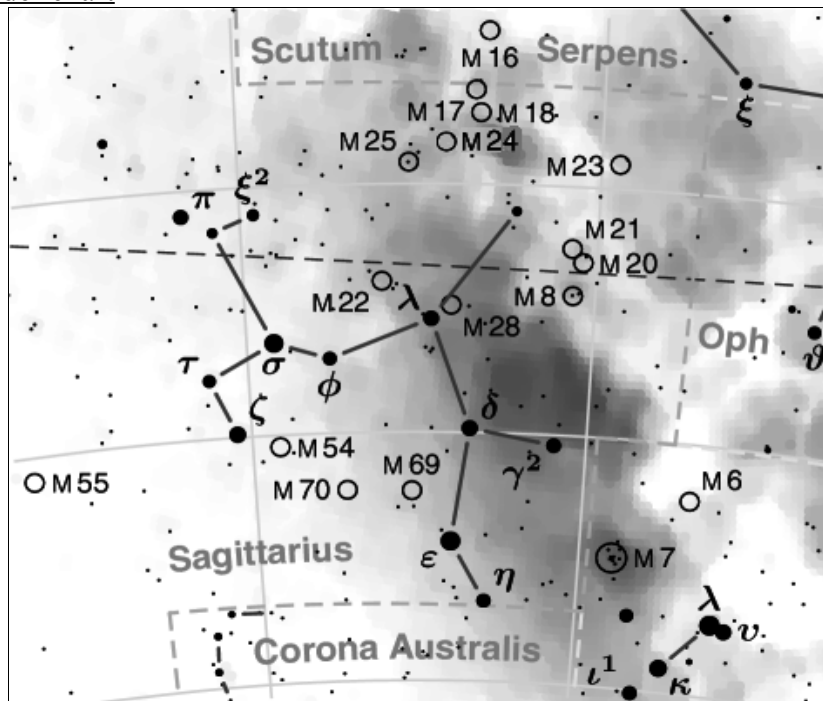
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 8**The Lagoon Nebula NGC 6523**

Type: Emission Nebula
 Constellation: Sagittarius
 Right Ascension: 18h 03.8m
 Declination: $-24^{\circ} 23'$
 Magnitude: 6.0
 Size: 90 x 40 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

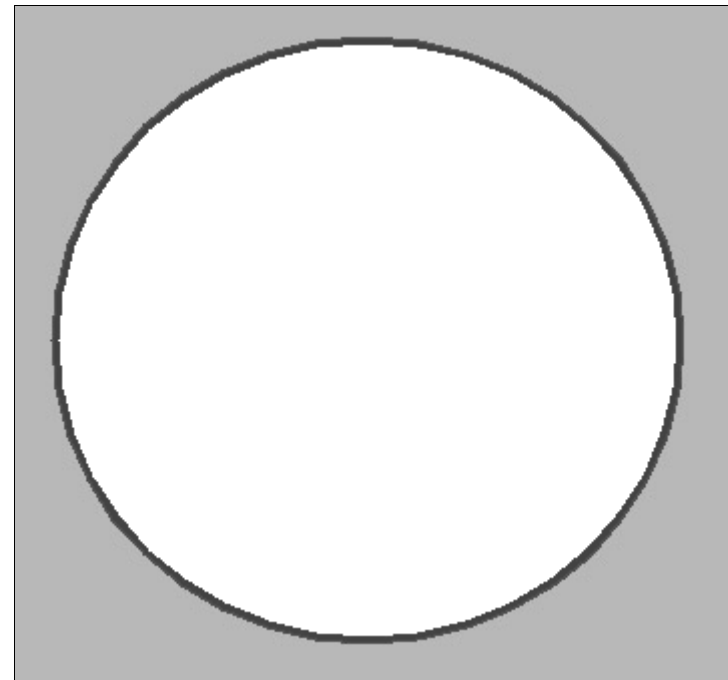
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 9

NGC 6333

Type: Globular Cluster

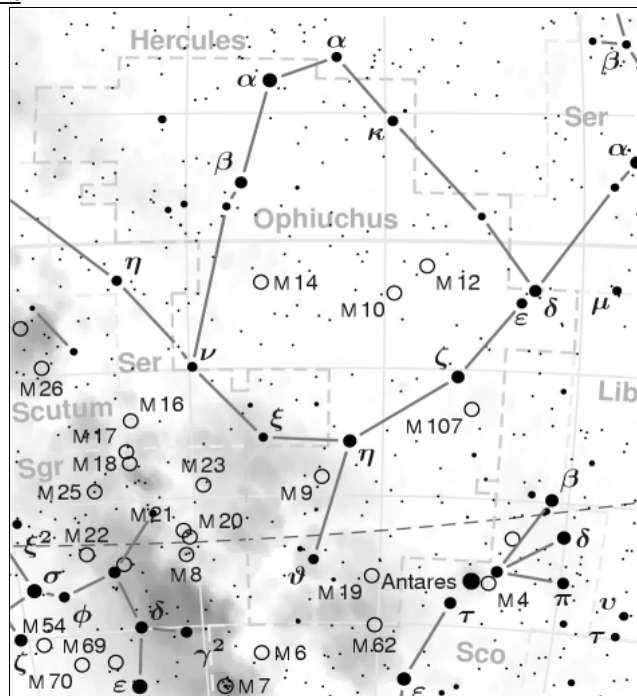
Constellation: Ophiuchus

Right Ascension: 17h 19.2m

Declination: $-18^{\circ} 31'$

Magnitude: 7.7

Size: 12 arc min.

Finder chart

Binoculars: Challenge

Telescope: Tough

Skies: Dark

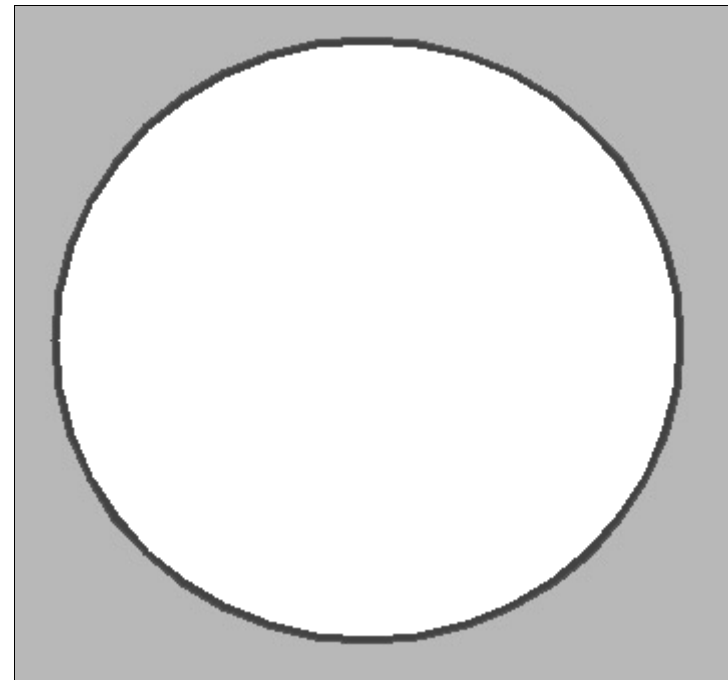
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 10

NGC 6254

Type: Globular Cluster

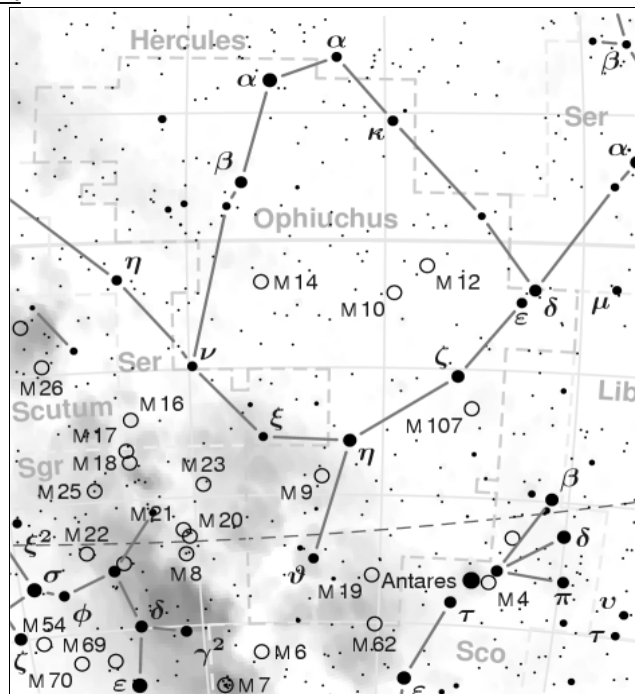
Constellation: Ophiuchus

Right Ascension: 16h 57.1m

Declination: $-4^{\circ} 06'$

Magnitude: 6.6

Size: 20 arc min.

Finder chart

Binoculars: Easy

Telescope: Easy

Skies: Dark

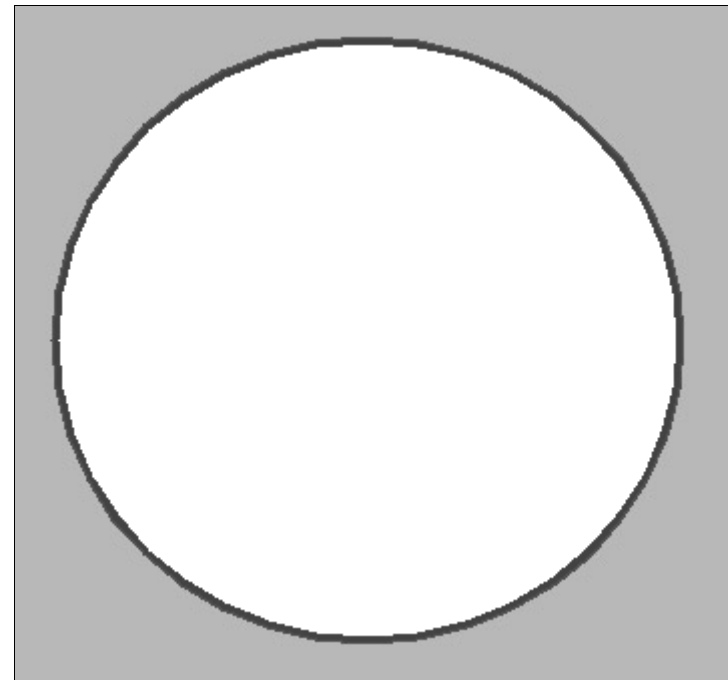
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

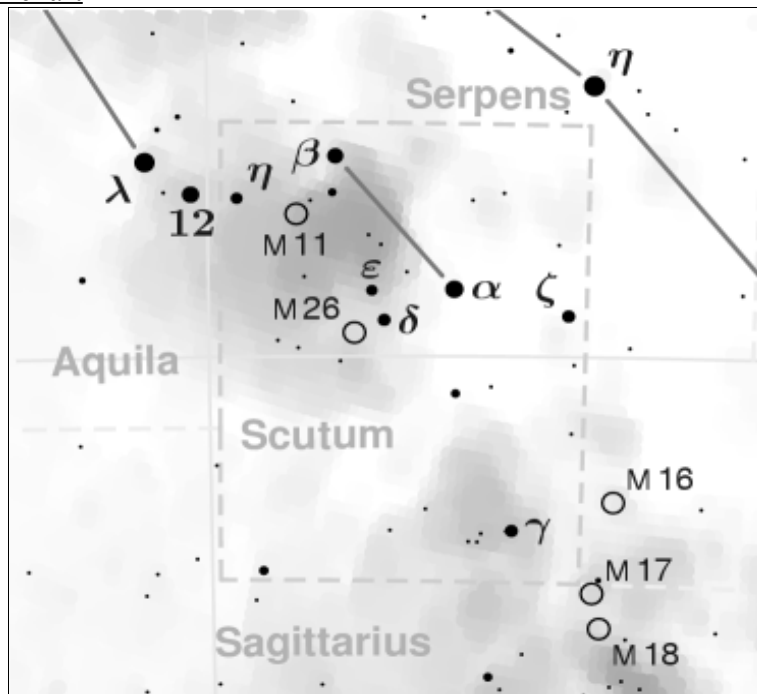
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 11**The Wild Duck Cluster NGC 6705**

Type: Open Cluster
 Constellation: Scutum
 Right Ascension: 18h 51.1m
 Declination: $-6^{\circ} 16'$
 Magnitude: 56.3
 Size: 14 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

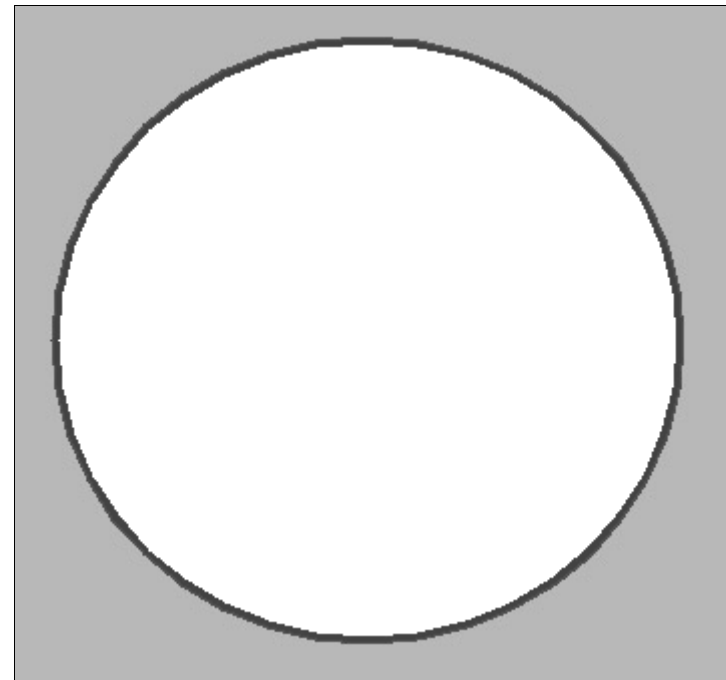
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 12

Gumball Globular NGC 6218

Type: Globular Cluster

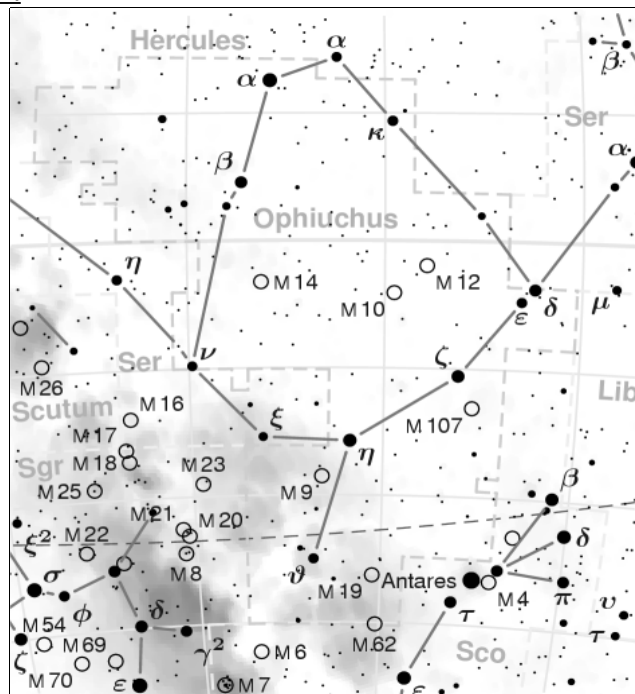
Constellation: Ophiuchus

Right Ascension: 16h 47.2m

Declination: $-1^{\circ} 57'$

Magnitude: 6.6

Size: 14 arc min.

Finder chart

Binoculars: Easy

Telescope: Easy

Skies: Dark

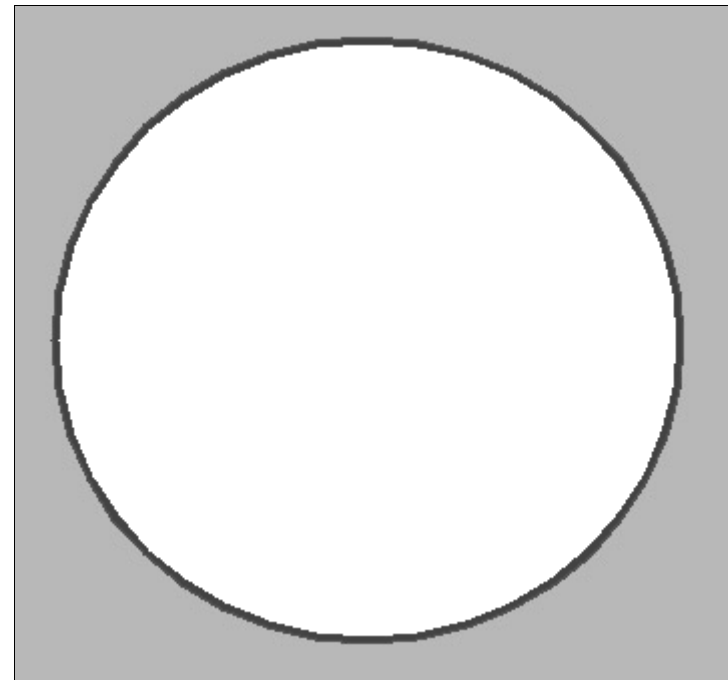
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

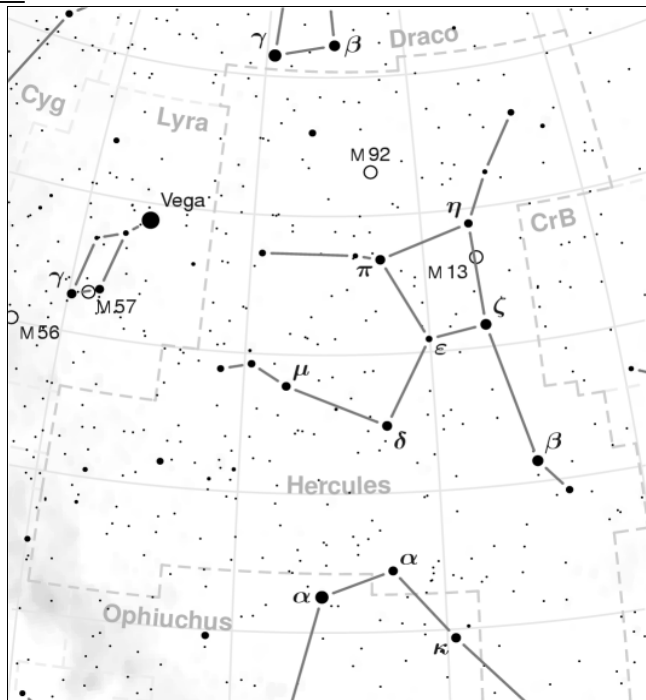
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 13**The Hercules Cluster NGC 6205**

Type: Globular Cluster
 Constellation: Hercules
 Right Ascension: 16h 41.7m
 Declination: +36° 28'
 Magnitude: 5.9
 Size: 17 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Any

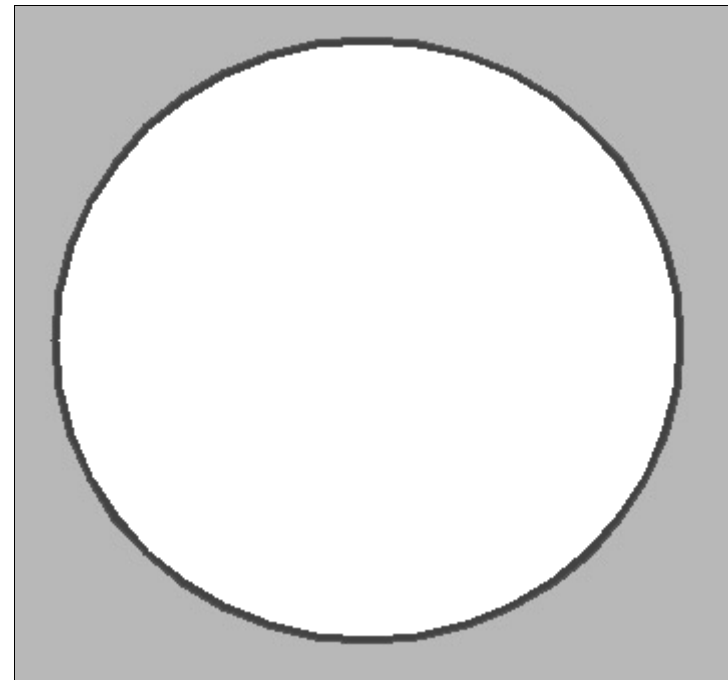
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 14

NGC 6402

Type: Globular Cluster

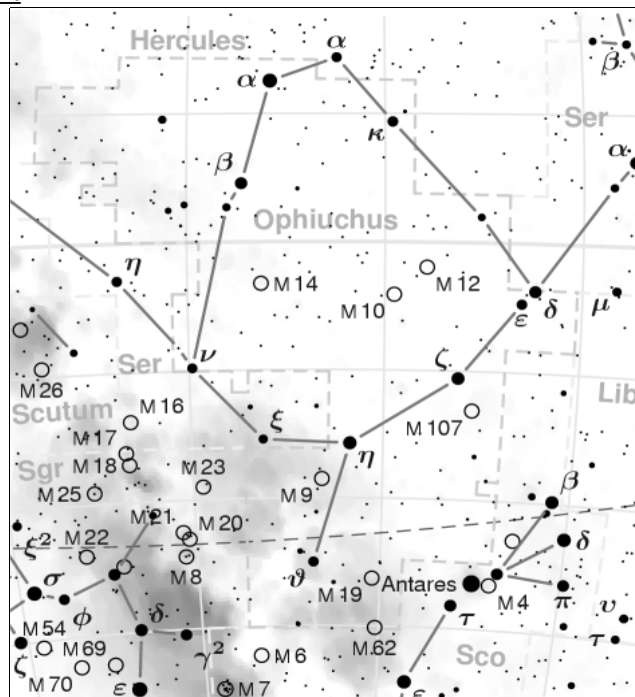
Constellation: Ophiuchus

Right Ascension: 17h 37.6m

Declination: $-3^{\circ} 15'$

Magnitude: 7.6

Size: 12 arc min.

Finder chart

Binoculars: Tough

Telescope: Easy

Skies: Very Dark

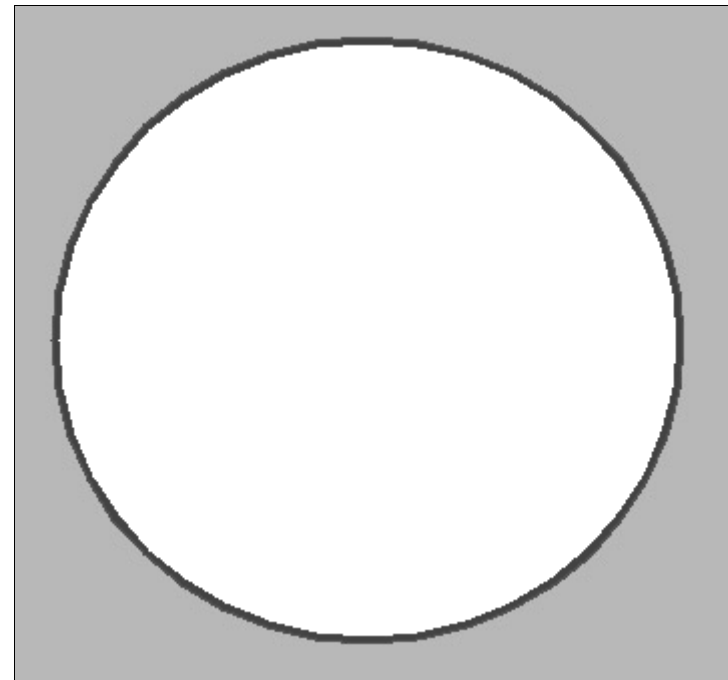
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

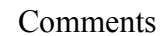


Comments

Pegasus Cluster NGC 7078

Date: _____ Time: _____ UT.
 Location: _____
 Equipment: _____
 Transparency: _____ (Please rate from 1 excellent to 5 poor.)
 Seeing: _____ (Please rate from 1 excellent to 5 poor.)

A large white circle is centered on a gray background. The circle is perfectly round and has a thick black outline. It occupies most of the frame.



M 16

The Eagle Nebula NGC 6611

Type: Open Cluster

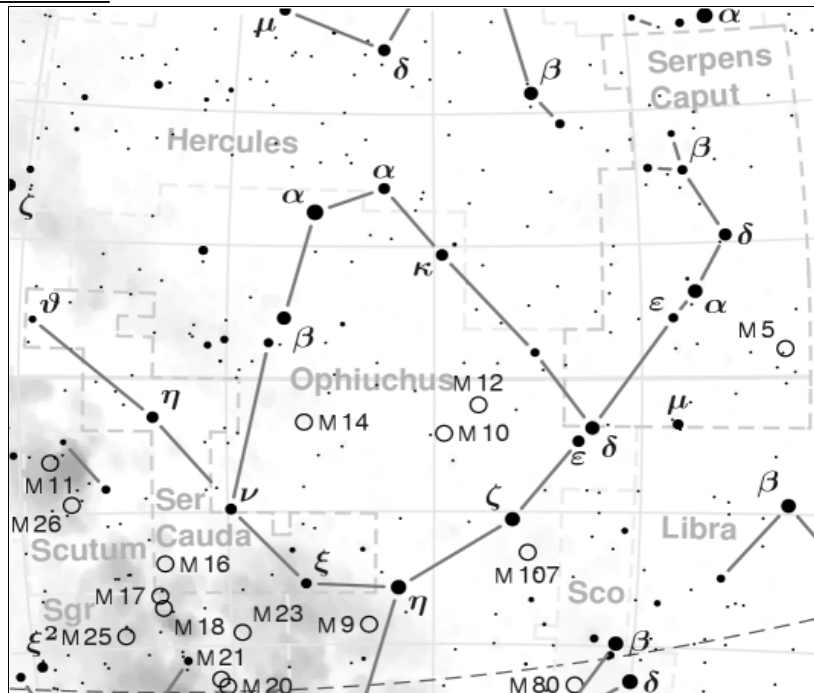
Constellation: Serpens

Right Ascension: 18h 18.8m

Declination: $-13^{\circ} 47'$

Magnitude: 6

Size: 7 arc min.

Finder chart

Binoculars: Easy

Telescope: Easy

Skies: Any

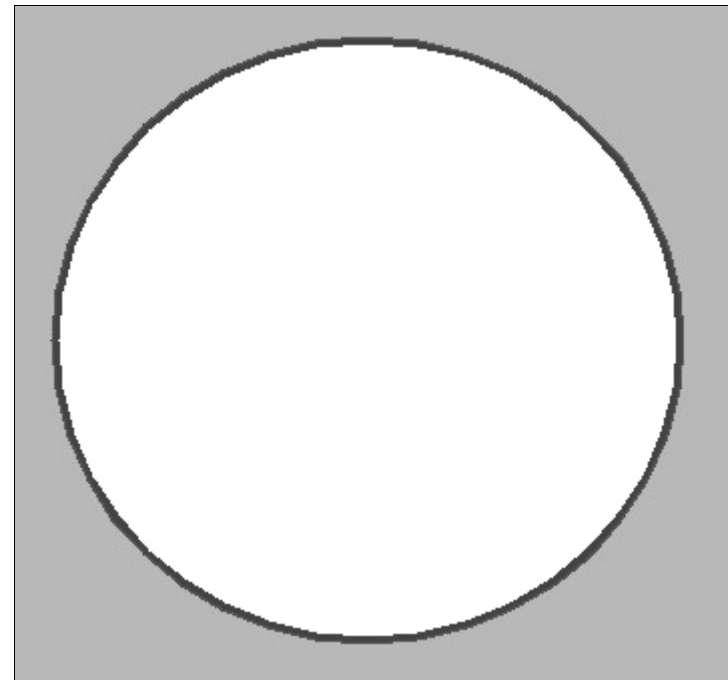
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

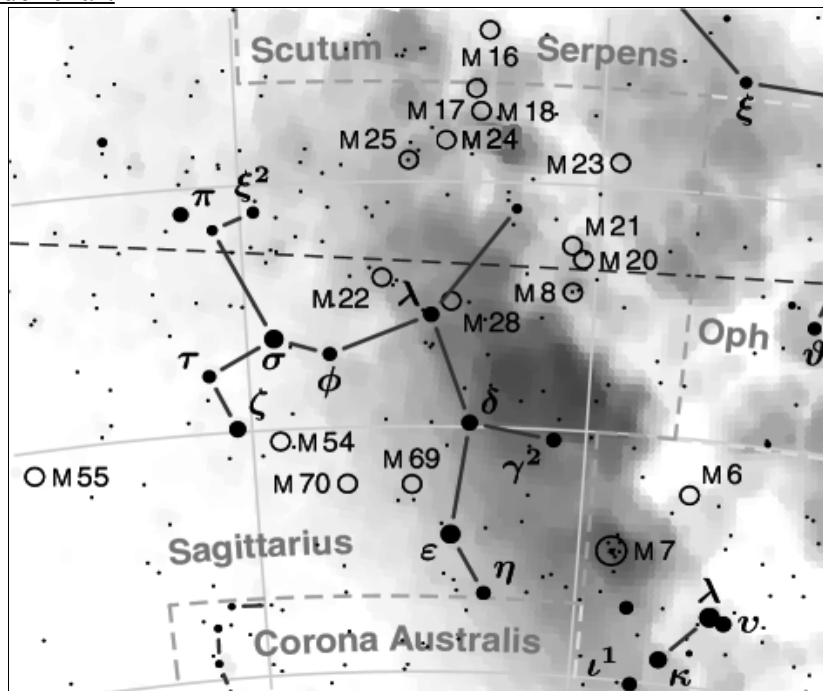
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 17**The Omega Nebula NGC 6618**

Type: Emission Nebula
Constellation: Sagittarius
Right Ascension: 18h 20.8m
Declination: $-16^{\circ} 11'$
Magnitude: 6.0
Size: 11 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

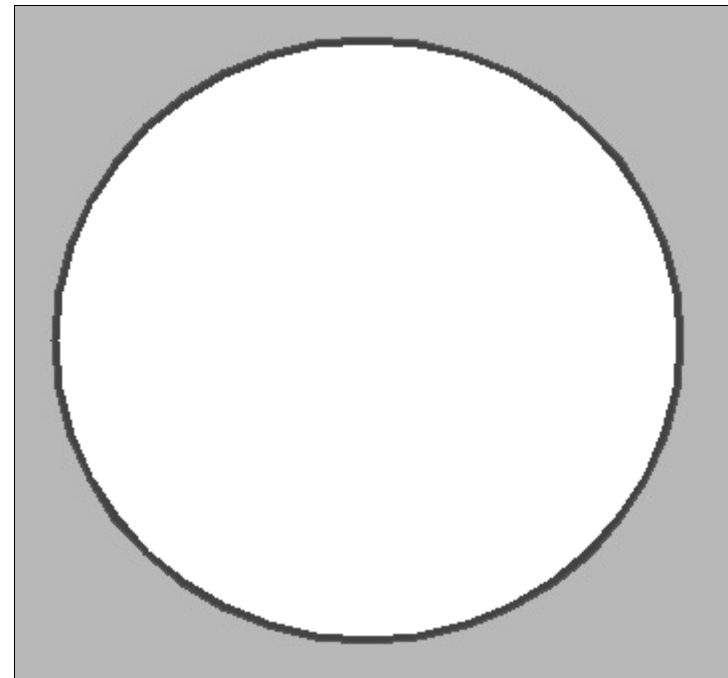
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 18

Black Swan NGC 6613

Type: Open Cluster

Constellation: Sagittarius

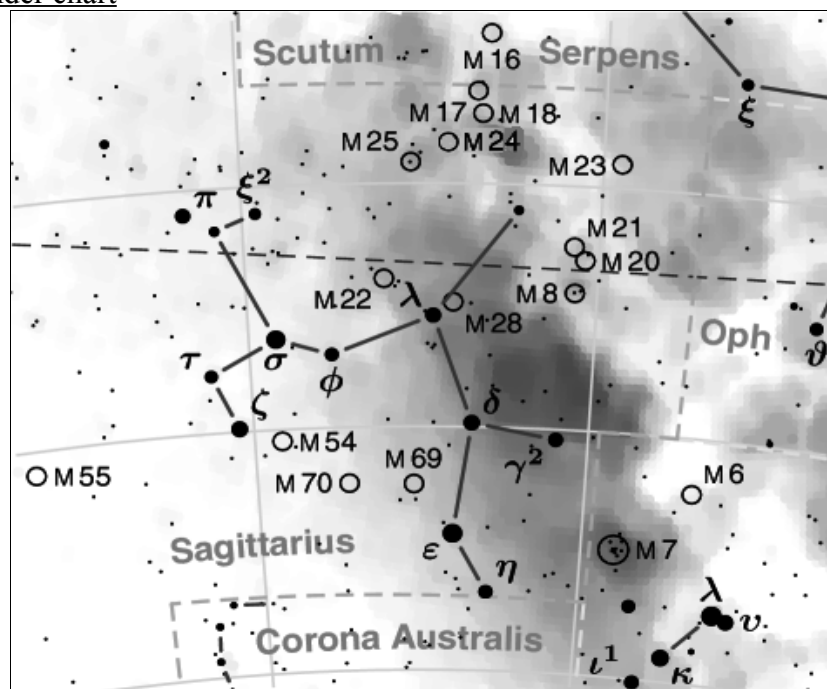
Right Ascension: 18h 19.9m

Declination. $-17^{\circ} 08'$

Magnitude: 7.5

Size: 9 arc min.

Finder chart



Binoculars: Easy

Telescope: Easy

Skies: Dark

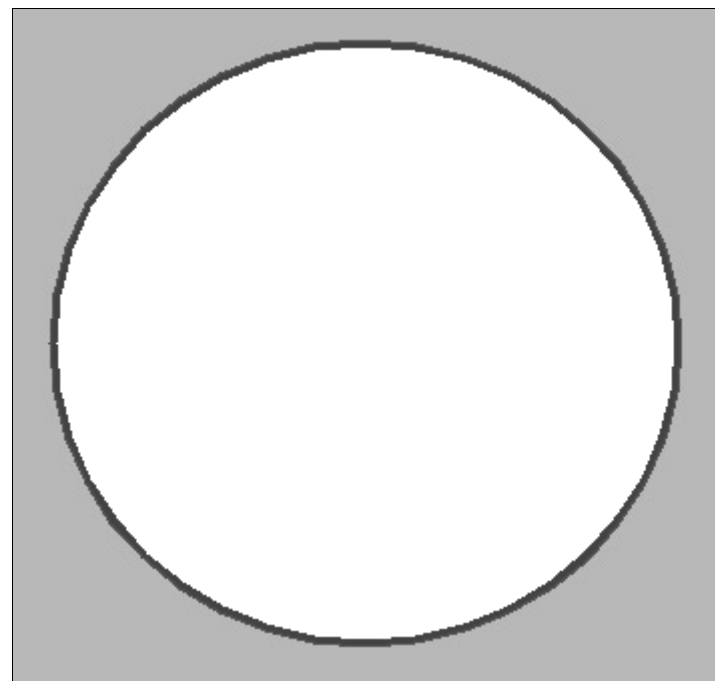
Date: _____ Time: _____ UT. _____

Location:

Equipment:

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 19

NGC 6273

Type: Globular Cluster

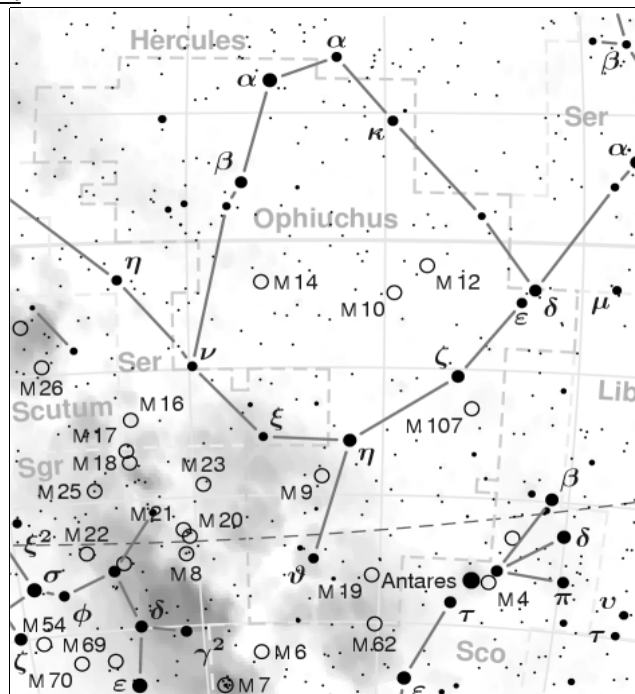
Constellation: Ophiuchus

Right Ascension: 17h 02.6m

Declination: -26° 16'

Magnitude: 7.2

Size: 14 arc min.

Finder chart

Binoculars: Tough

Telescope: Easy

Skies: Dark

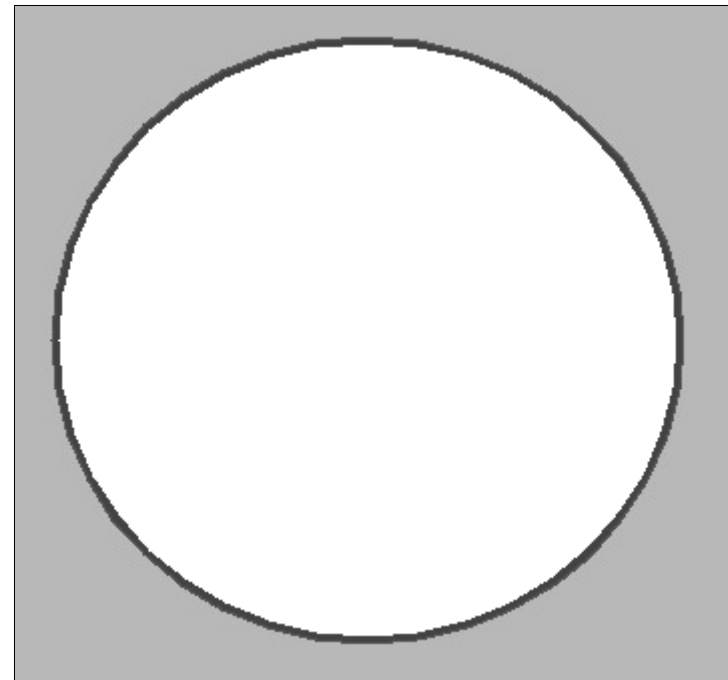
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

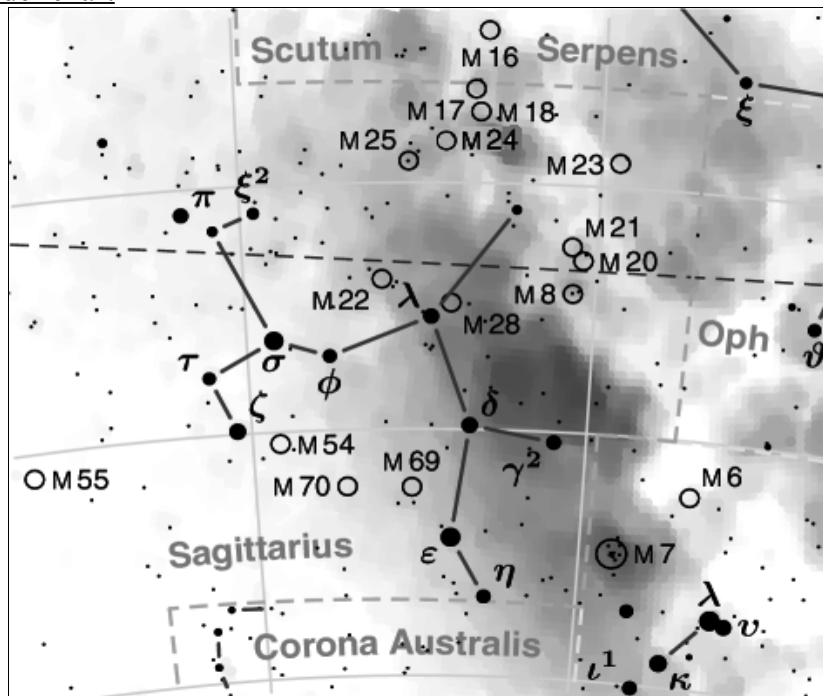
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 20**The Trifid Nebula NGC 6514**

Type: Emission (&Reflection) Nebula
 Constellation: Sagittarius
 Right Ascension: 18h 02.6m
 Declination: $-23^{\circ} 02'$
 Magnitude: 8
 Size: 29 x 27 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Dark

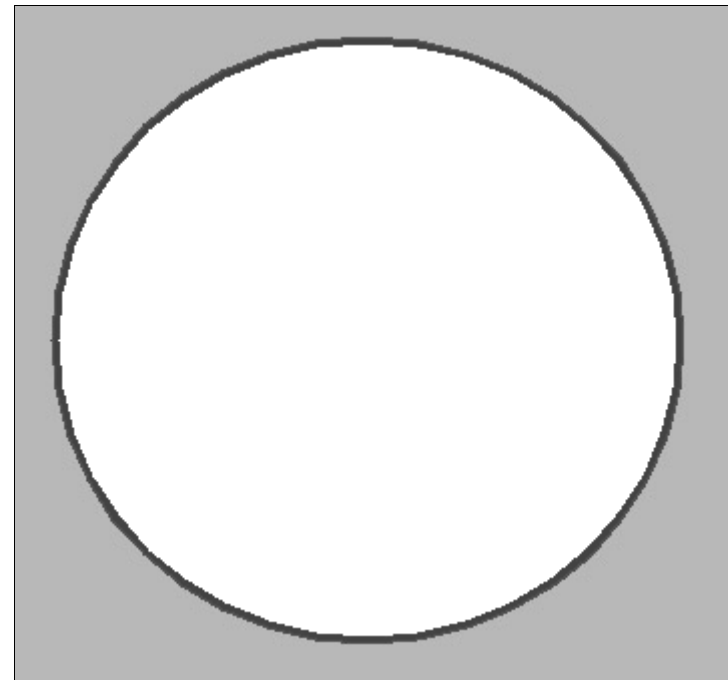
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

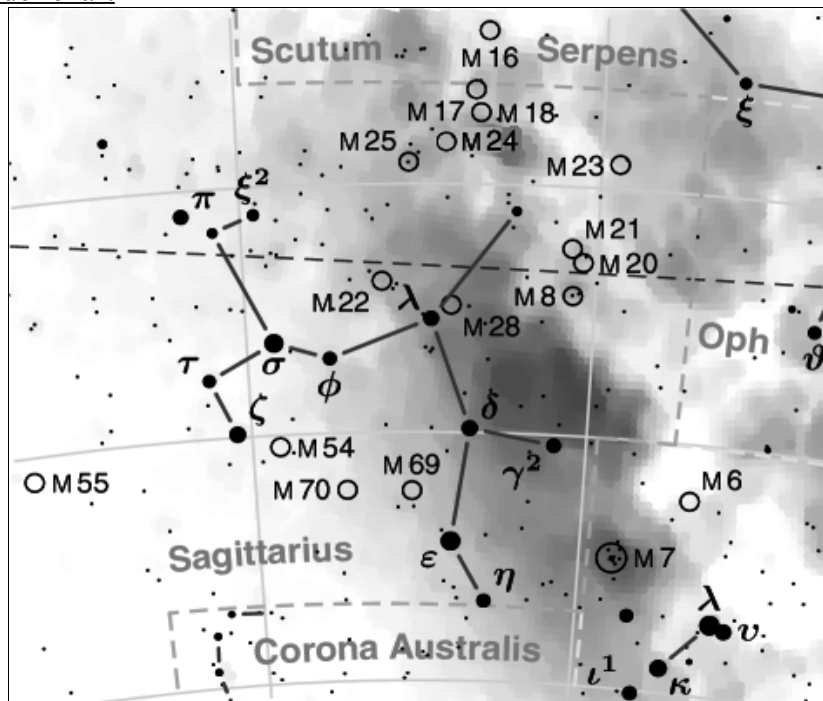


Comments

M 21

NGC 6531

Type: Open Cluster
 Constellation: Sagittarius
 Right Ascension: 18h 04.6m
 Declination: $-22^{\circ} 30'$
 Magnitude: 6.5
 Size: 13 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Dark

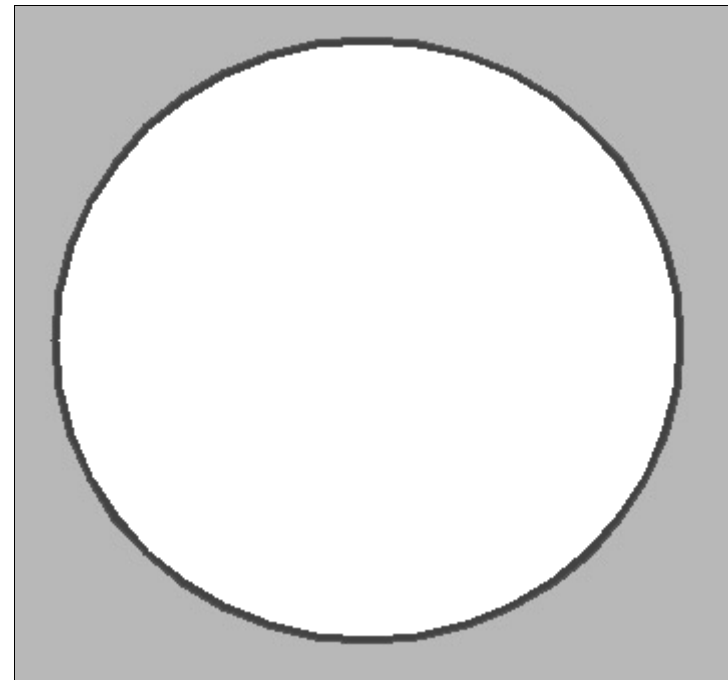
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 22

Sagittarius Cluster NGC 6656

Type: Globular Cluster

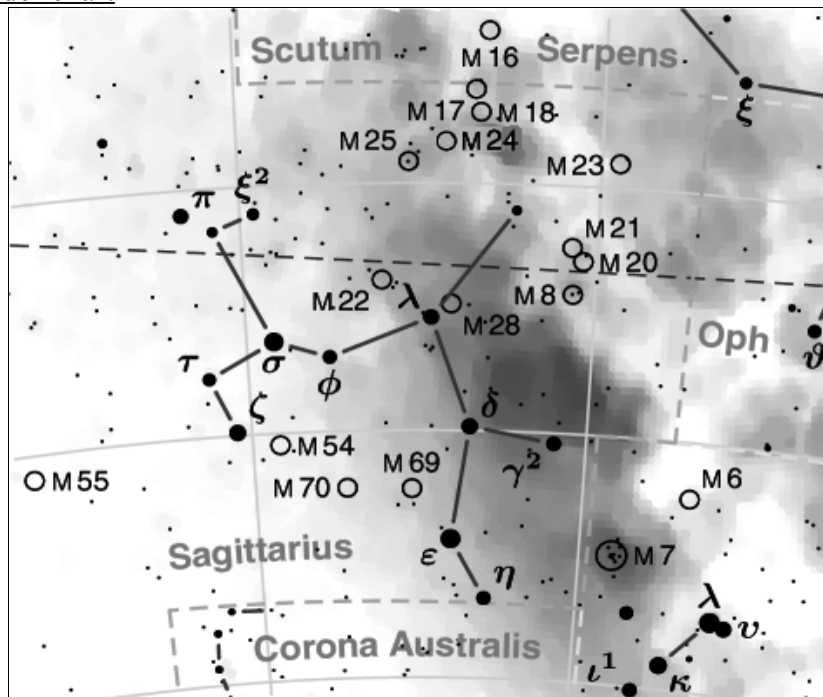
Constellation: Sagittarius

Right Ascension: 18h 36.4m

Declination: $-23^{\circ} 54'$

Magnitude: 5.1

Size: 32 arc min.

Finder chart

Binoculars: Easy

Telescope: Easy

Skies: Dark

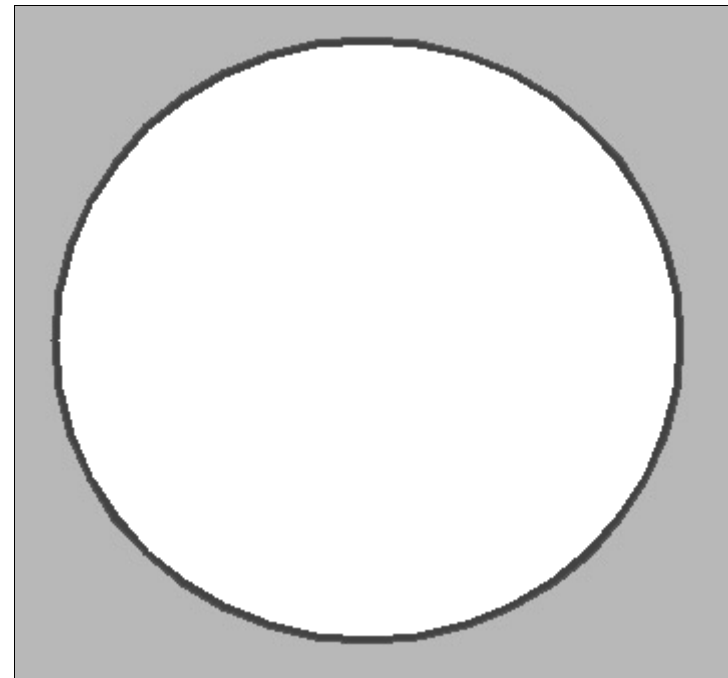
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

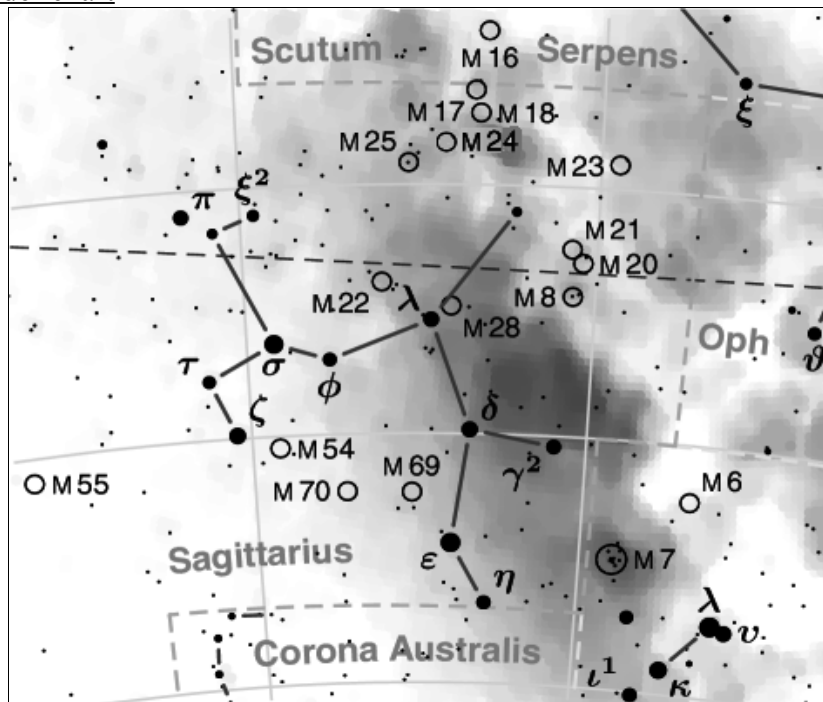


Comments

M 23

NGC 6494

Type: Open Cluster
 Constellation: Sagittarius
 Right Ascension: 17h 56.8m
 Declination: $-19^{\circ} 01'$
 Magnitude: 6.9
 Size: 27 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

The Messier Objects Observing Challenge

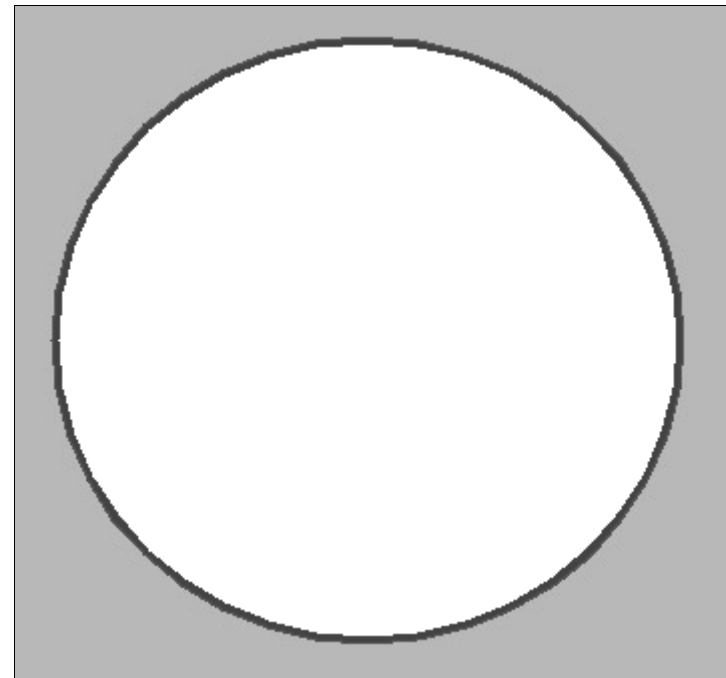
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

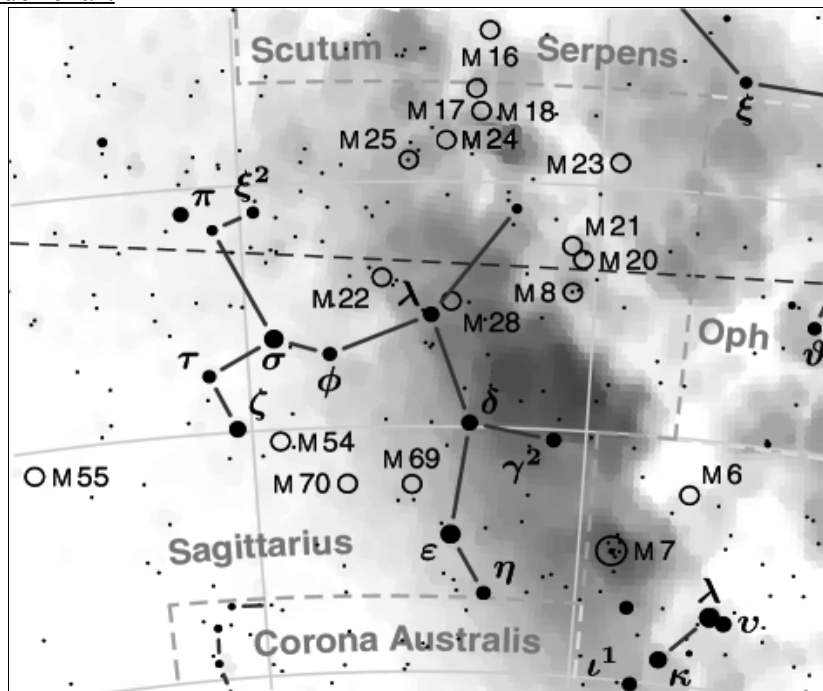
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 24**Sagittarius Star Cloud NGC 6603**

Type: Milky Way Star Cloud
Constellation: Sagittarius
Right Ascension: 18h 16.9m
Declination: $-18^{\circ} 29'$
Magnitude: 4.6
Size: 90 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

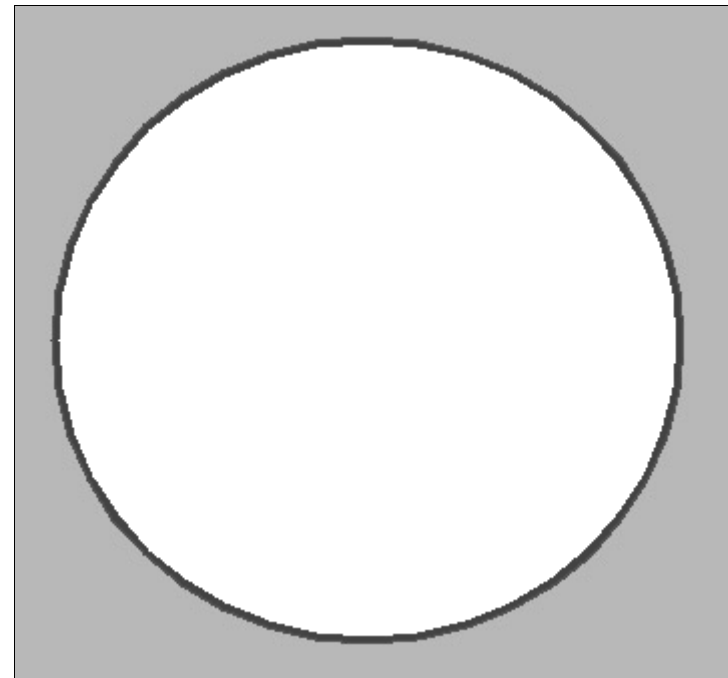
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

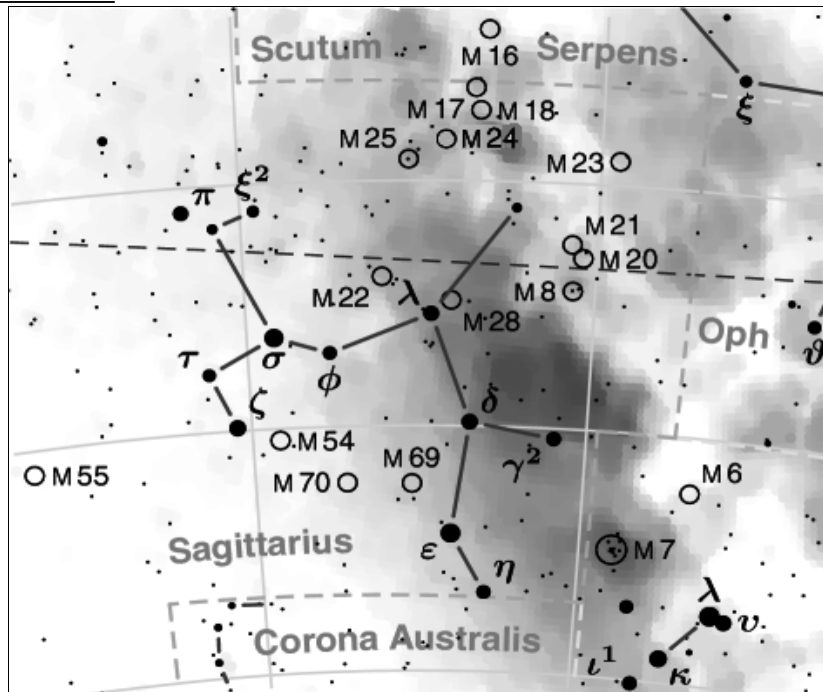


Comments

M 25

IC 4725

Type: Open Cluster
 Constellation: Sagittarius
 Right Ascension: 18h 31.6m
 Declination: $-19^{\circ} 15'$
 Magnitude: 6.5
 Size: 40 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

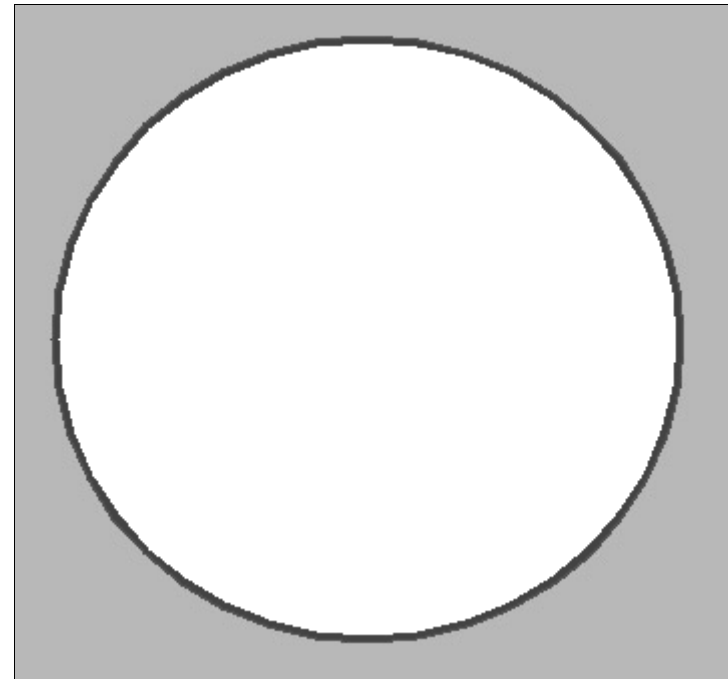
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

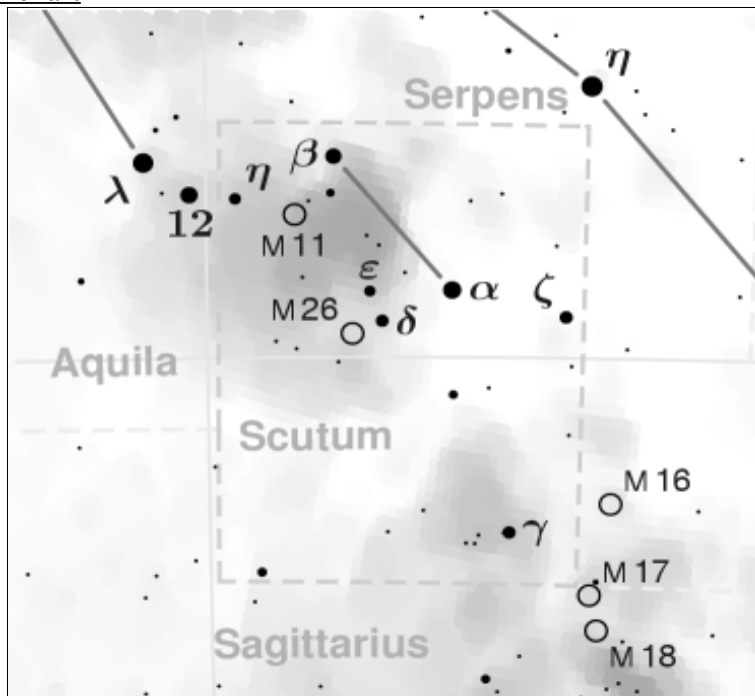


Comments

M 26

NGC 6694

Type: Open Cluster
Constellation: Scutum
Right Ascension: 18h 45.2m
Declination: $-9^{\circ} 24'$
Magnitude: 8.0
Size: 15 arc min.

Finder chart

Binoculars: Challenge
Telescope: Tough
Skies: Very Dark

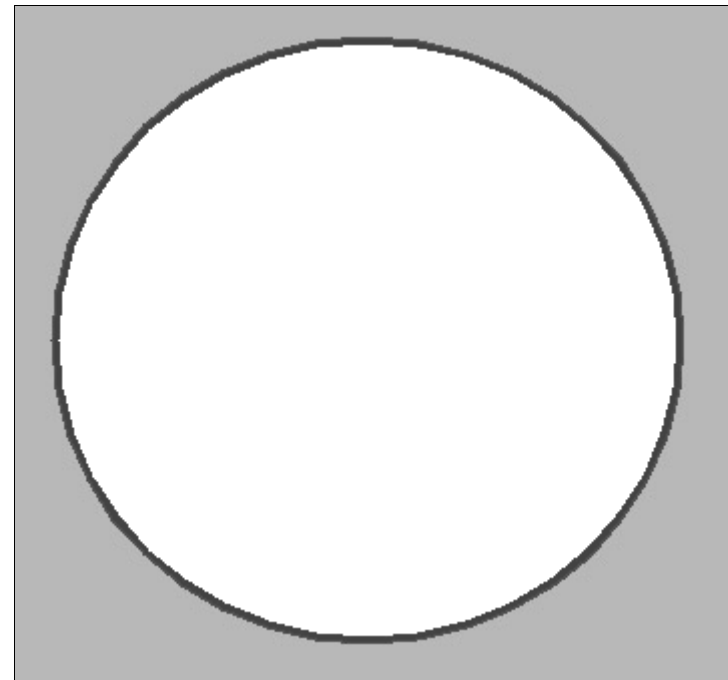
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

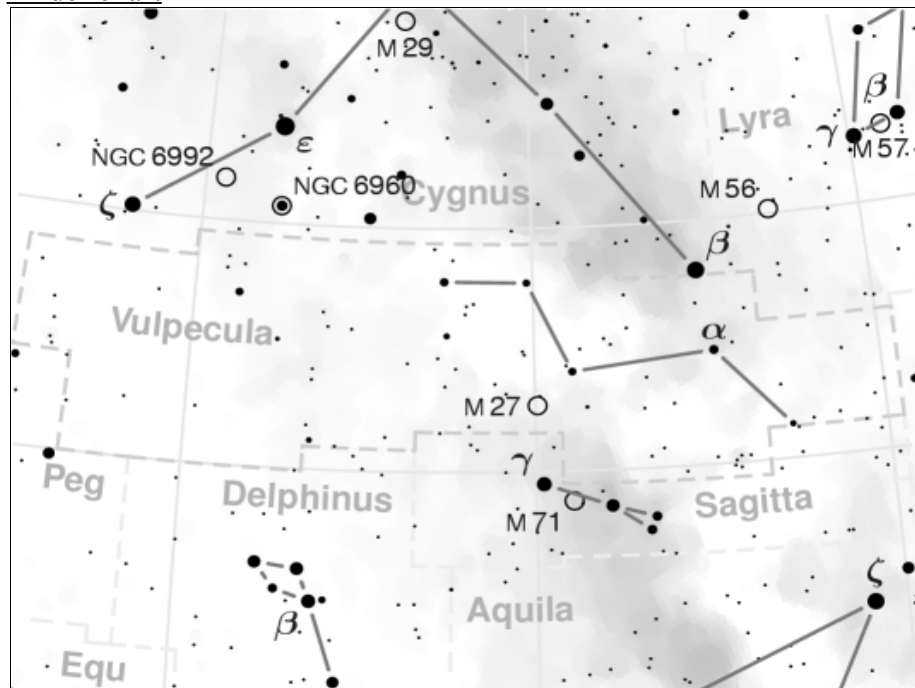
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 27**The Dumbbell Nebula NGC 6853**

Type: Planetary Nebula
 Constellation: Vulpecula
 Right Ascension: 19h 59.6m
 Declination: +22° 43'
 Magnitude: 7.4
 Size: 8 x 5.7 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

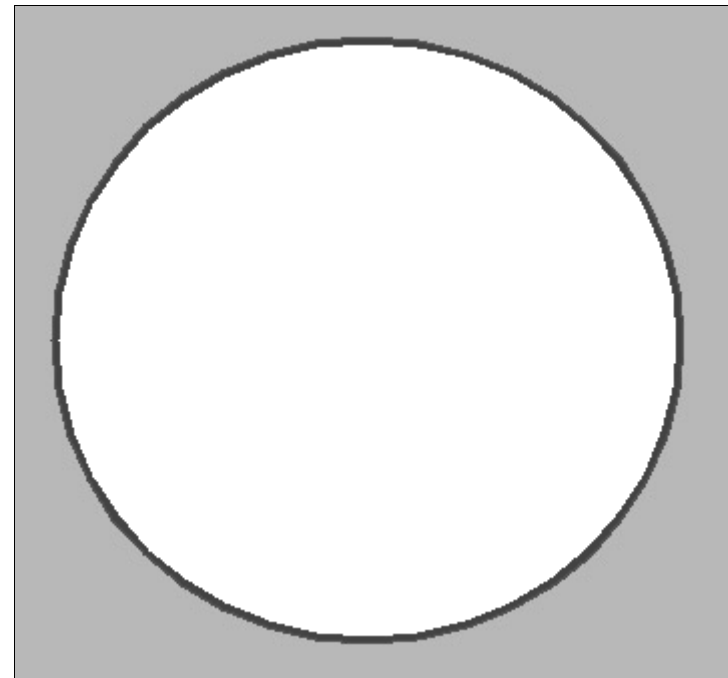
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

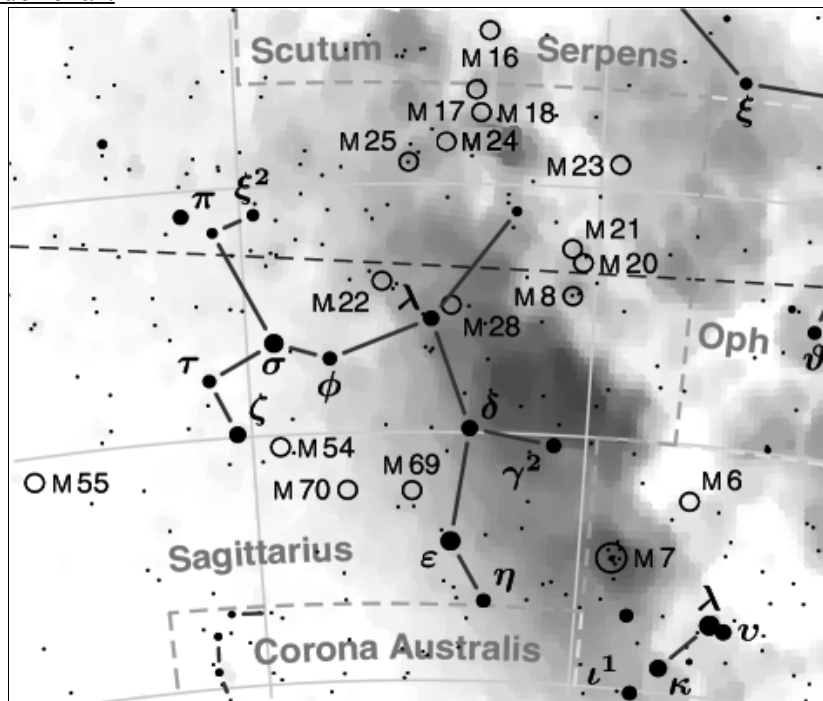


Comments

M 28

NGC 6626

Type: Globular Cluster
Constellation: Sagittarius
Right Ascension: 18h 24.5'
Declination: -24° 52'
Magnitude: 7
Size: 11 arc min.

Finder chart

Binoculars: Tough
Telescope: Easy
Skies: Dark

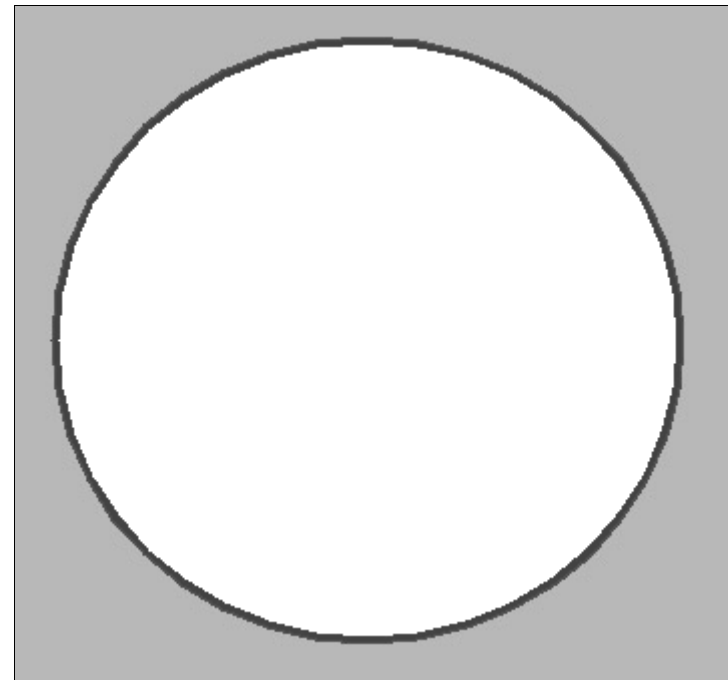
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

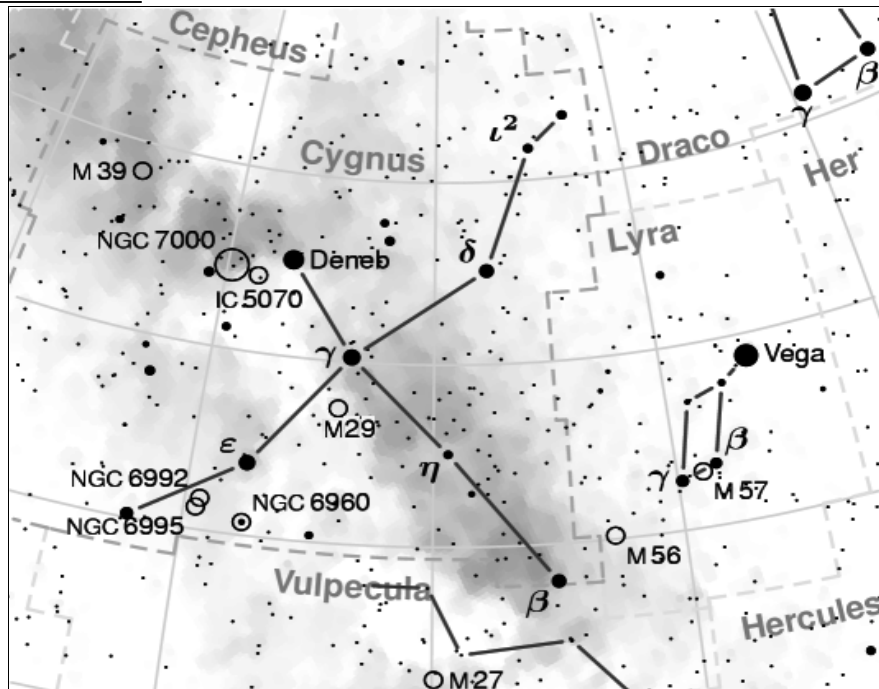


Comments

M 29

NGC 6913

Type: Open Cluster
Constellation: Cygnus
Right Ascension: 20h 23.9m
Declination: +38° 32'
Magnitude: 7.1
Size: 7 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

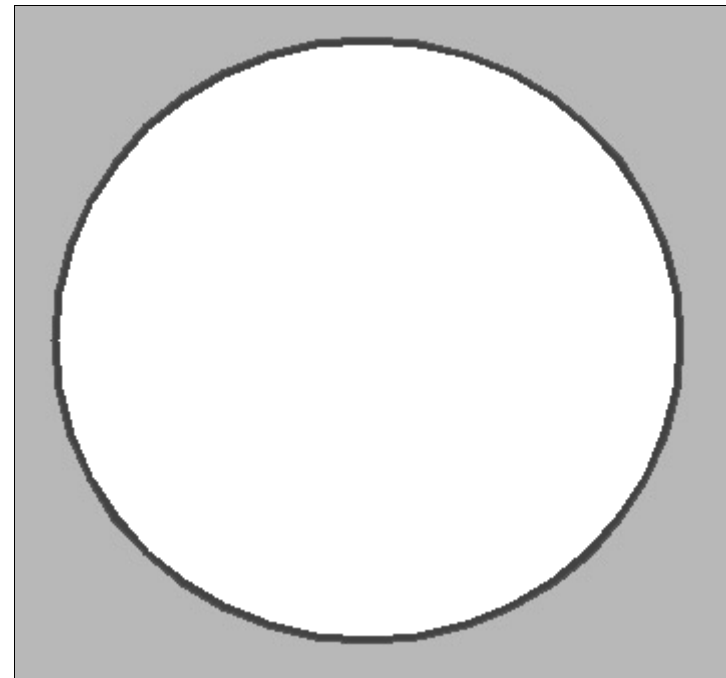
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



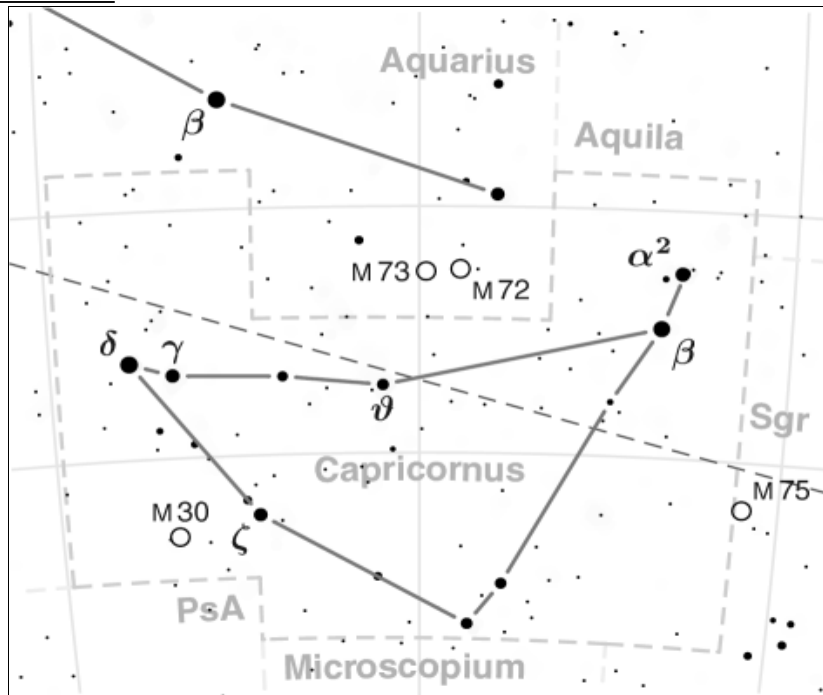
Comments

M 30

NGC 7099

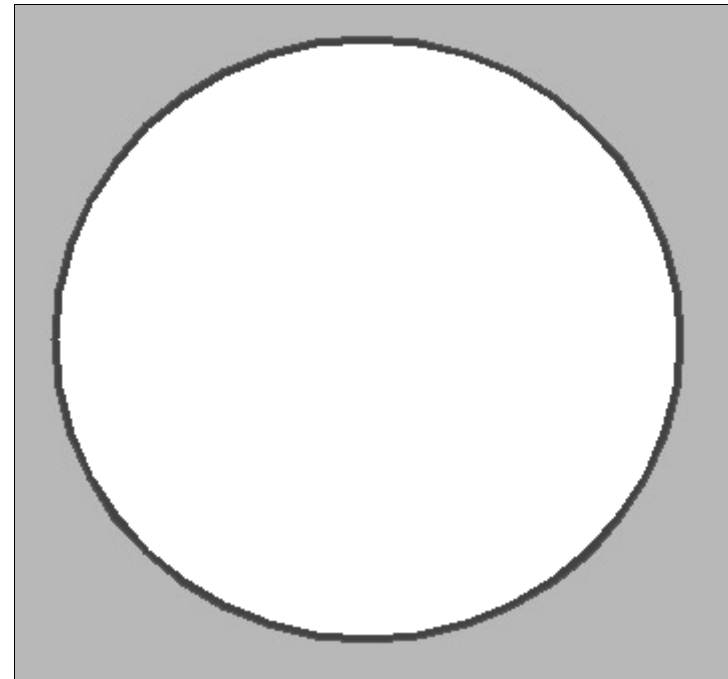
Type: Globular Cluster
 Constellation: Capricornus
 Right Ascension: 21h 40.4m
 Declination: -23° 11'
 Magnitude: 7.5
 Size: 11 arc min.

Finder chart



Binoculars: Tough
 Telescope: Tough
 Skies: Very Dark

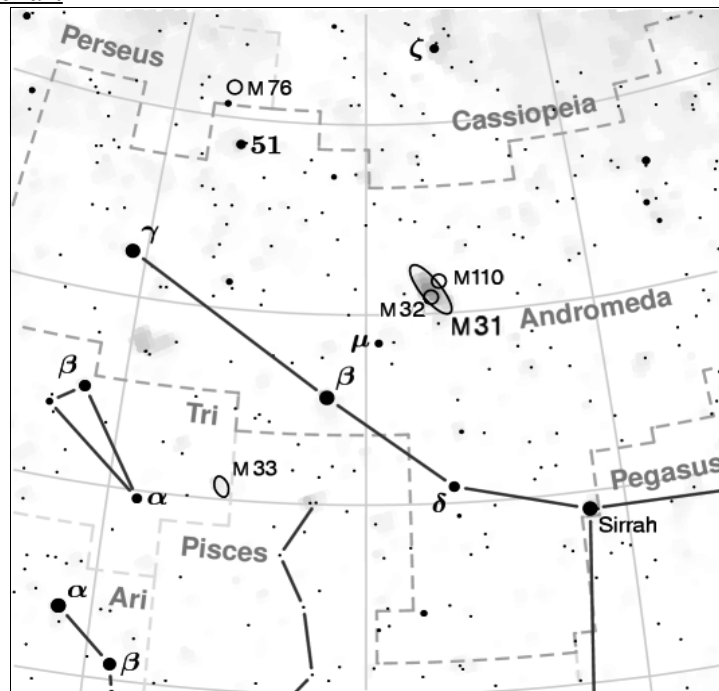
Date: _____ Time: _____ UT.
 Location: _____
 Equipment: _____
 Transparency: _____ (Please rate from 1 excellent to 5 poor.)
 Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 31**The Andromeda Galaxy NGC 224**

Type: Galaxy (Spiral)
 Constellation: Andromeda
 Right Ascension: 0h 42.7m
 Declination: +41° 16'
 Magnitude: 3.4
 Size: 178 x 63 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Any

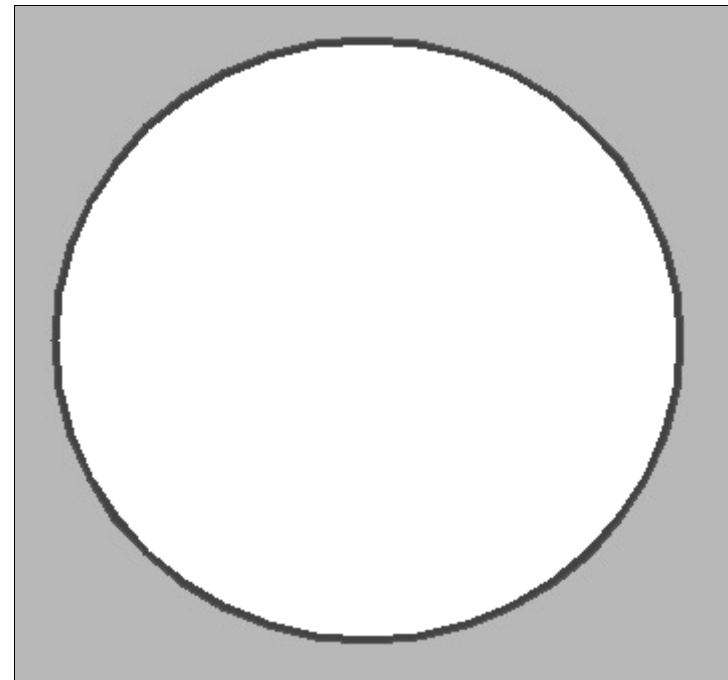
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 32

NGC 221

Type: Galaxy (Elliptical)

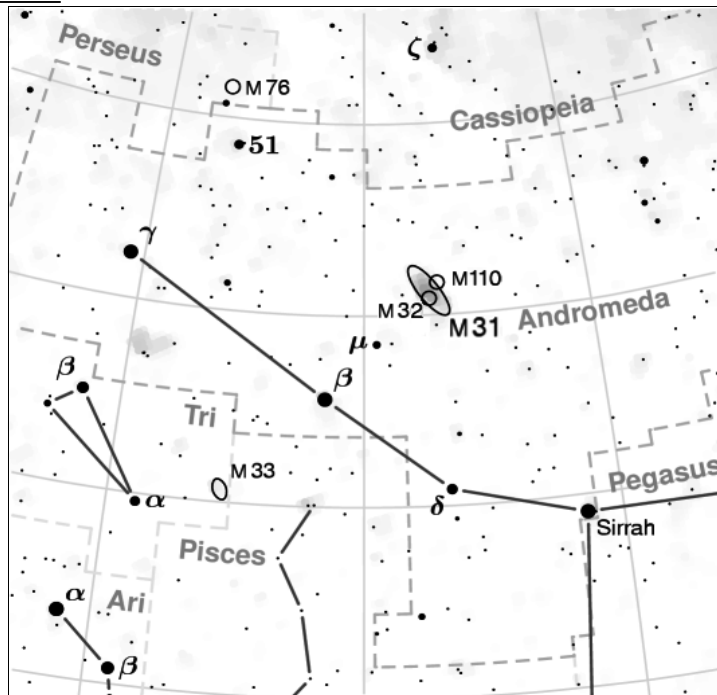
Constellation: Andromeda

Right Ascension: 0h 42.7m

Declination: +40° 52'

Magnitude: 8.2

Size: 8 x 6 arc min.

Finder chart

Binoculars: Challenge

Telescope: Tough

Skies: Dark

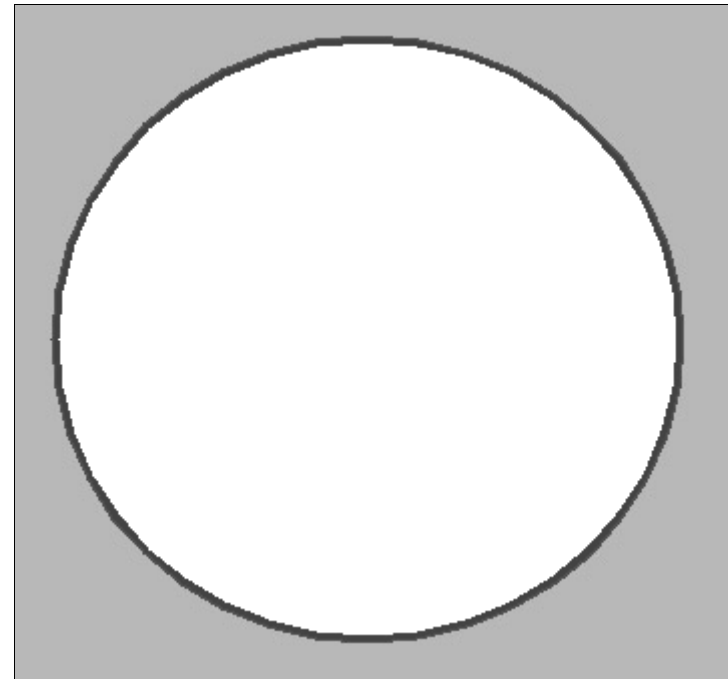
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



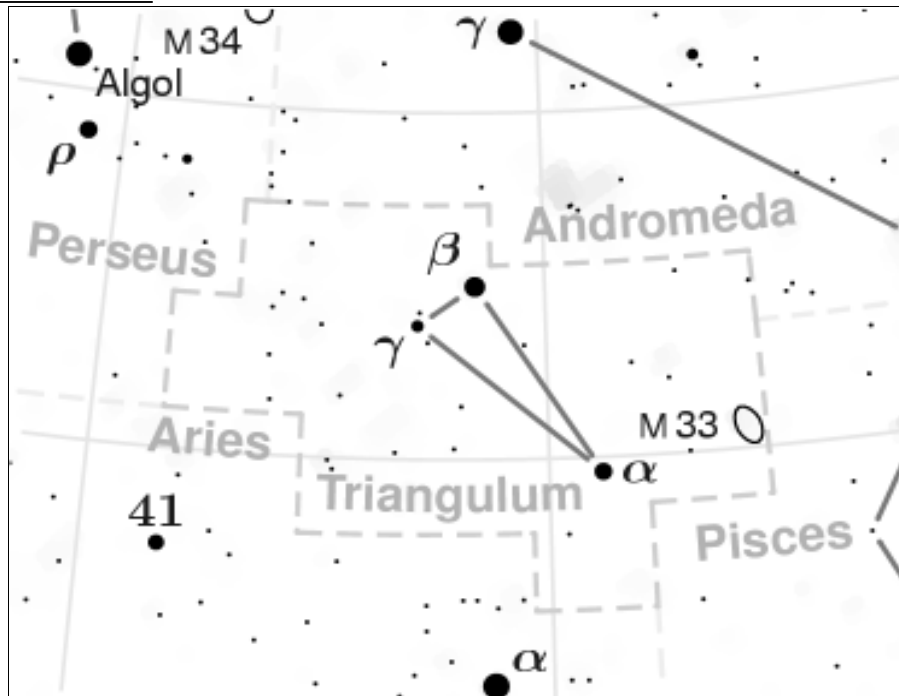
Comments

M 33

The Triangulum Galaxy NGC 598

Type: Galaxy (Spiral)
 Constellation: Triangulum
 Right Ascension: 1h 33.9m
 Declination: +30° 39'
 Magnitude: 5.7
 Size: 73 x 45 arc min.

Finder chart



Binoculars: Easy
 Telescope: Challenge
 Skies: Very Dark

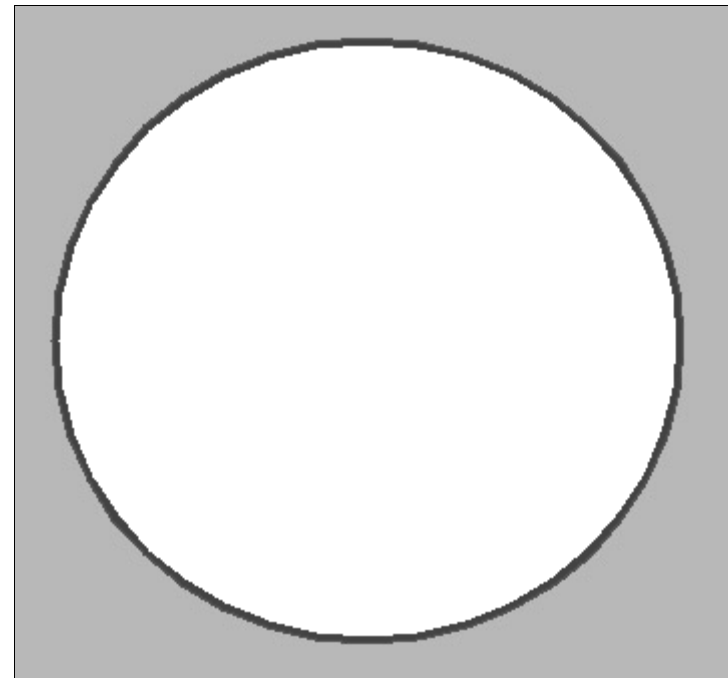
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

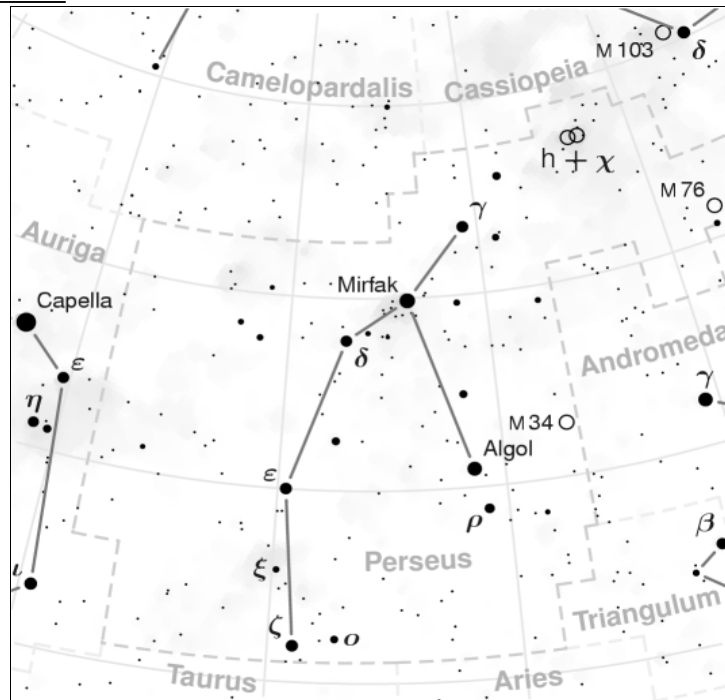


Comments

M 34

NGC 1039

Type: Open Cluster
 Constellation: Perseus
 Right Ascension: 2h 42m
 Declination: +42° 47'
 Magnitude: 5.2
 Size: 35 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

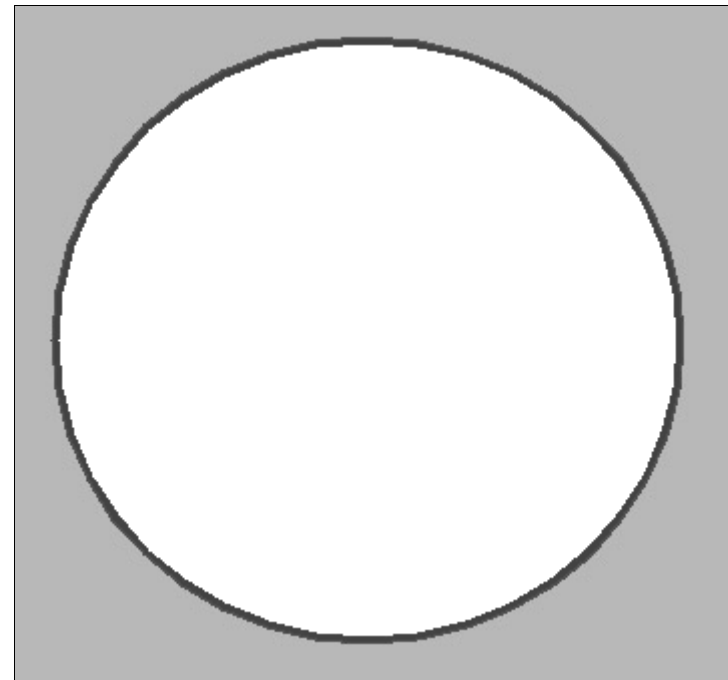
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



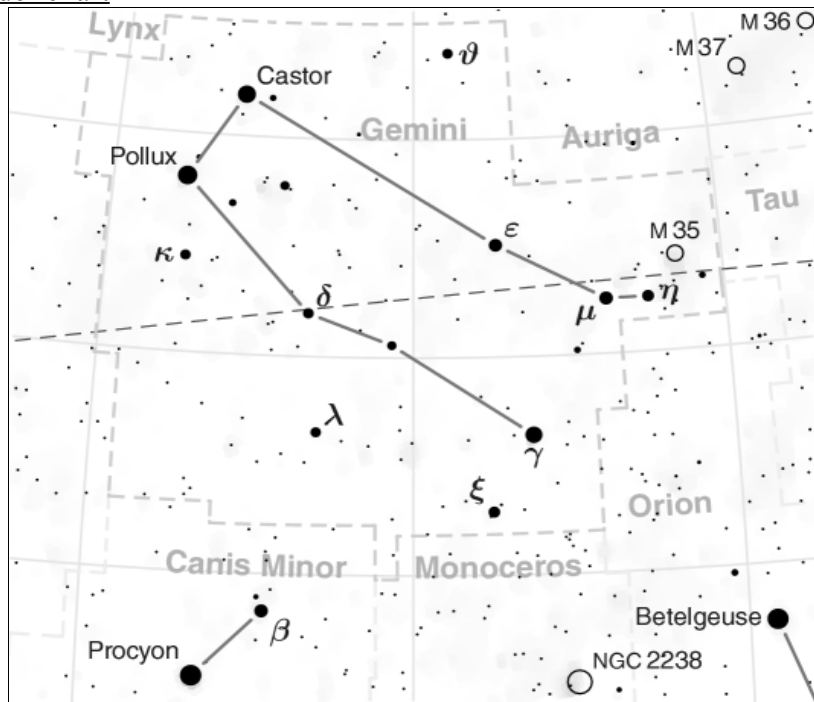
Comments

M 35

NGC 2168

Type: Open Cluster
 Constellation: Gemini
 Right Ascension: 6h 08.9m
 Declination: +24° 20'
 Magnitude: 5.1
 Size: 28 arc min.

Finder chart



Binoculars: Easy
 Telescope: Easy
 Skies: Dark

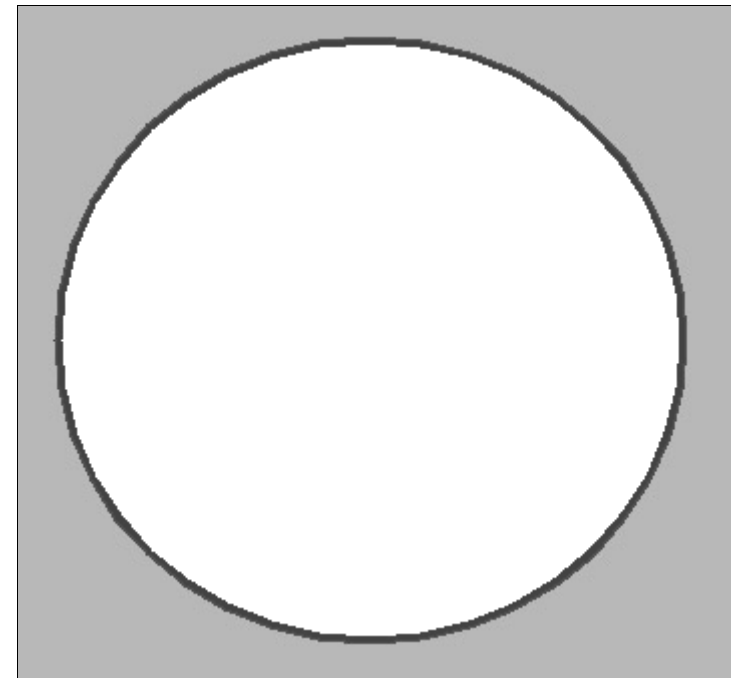
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



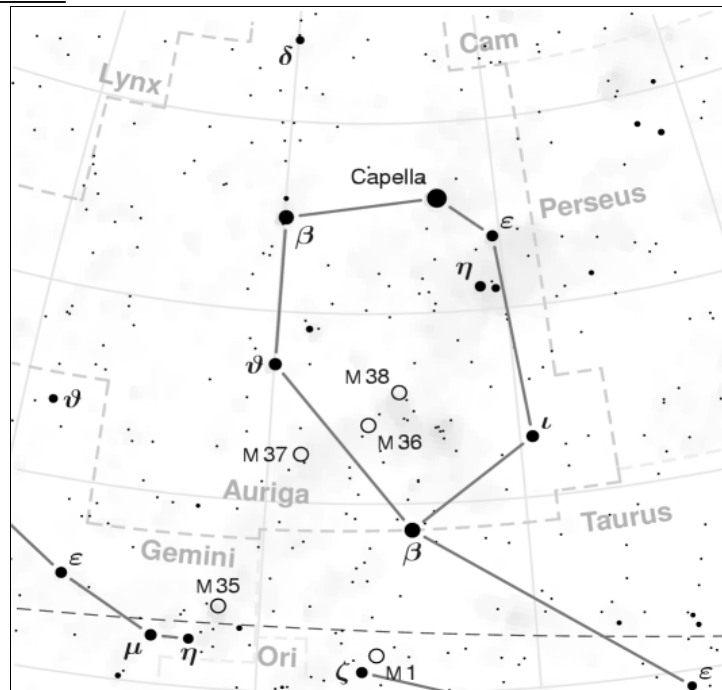
Comments

M 36

NGC 1960

Type: Open Cluster
 Constellation: Auriga
 Right Ascension: 5h 36.1m
 Declination: +34° 08'
 Magnitude: 6.3
 Size: 12 arc min.

Finder chart



Binoculars: Easy
 Telescope: Easy
 Skies: Dark

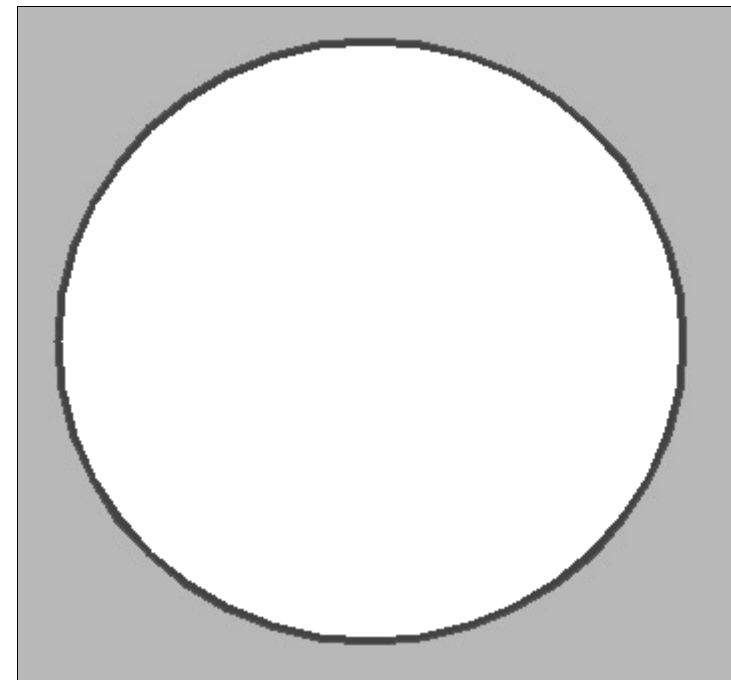
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

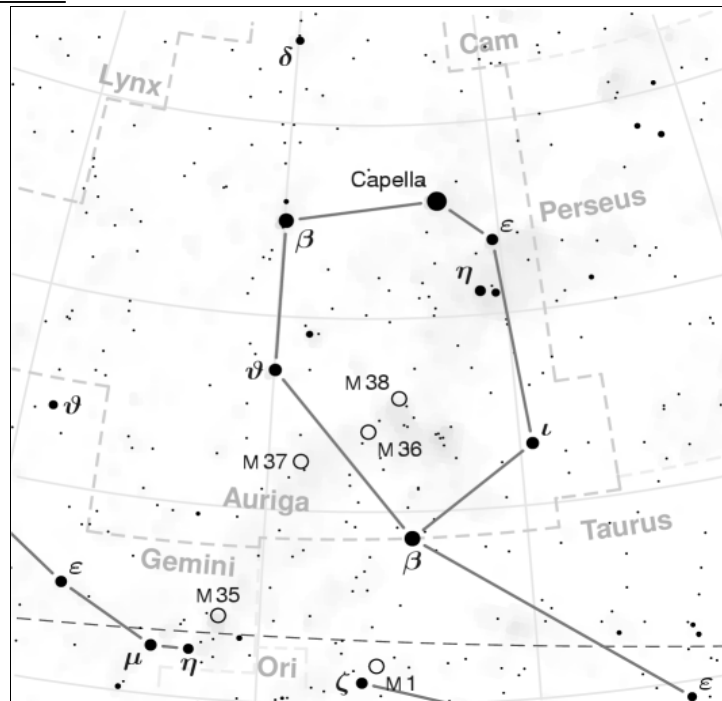


Comments

M 37

NGC 2099

Type: Open Cluster
 Constellation: Auriga
 Right Ascension: 5h 52.4m
 Declination: +32° 33'
 Magnitude: 6.2
 Size: 24 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

The Messier Objects Observing Challenge

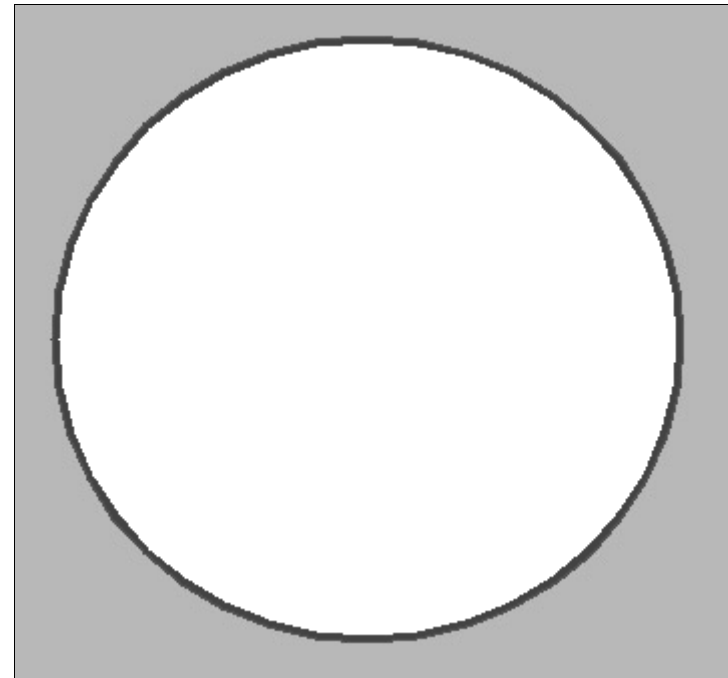
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



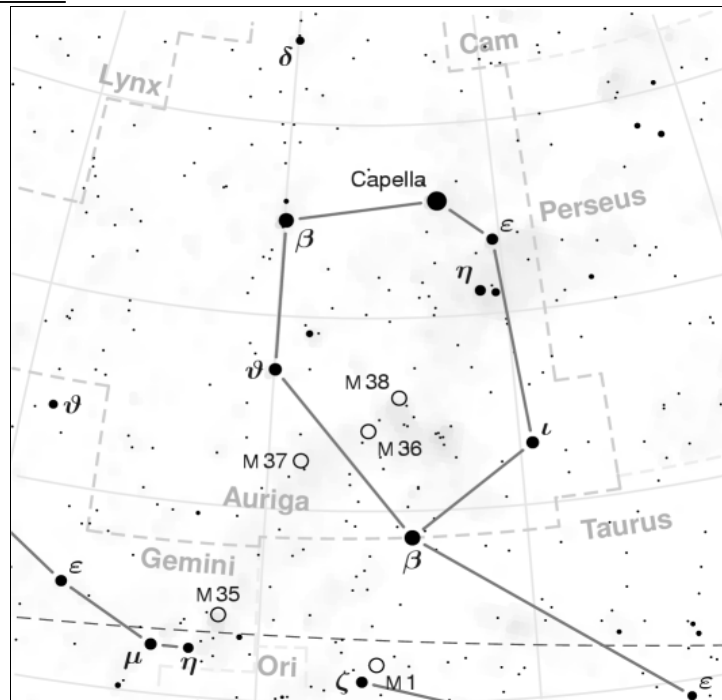
Comments

M 38

NGC 1912

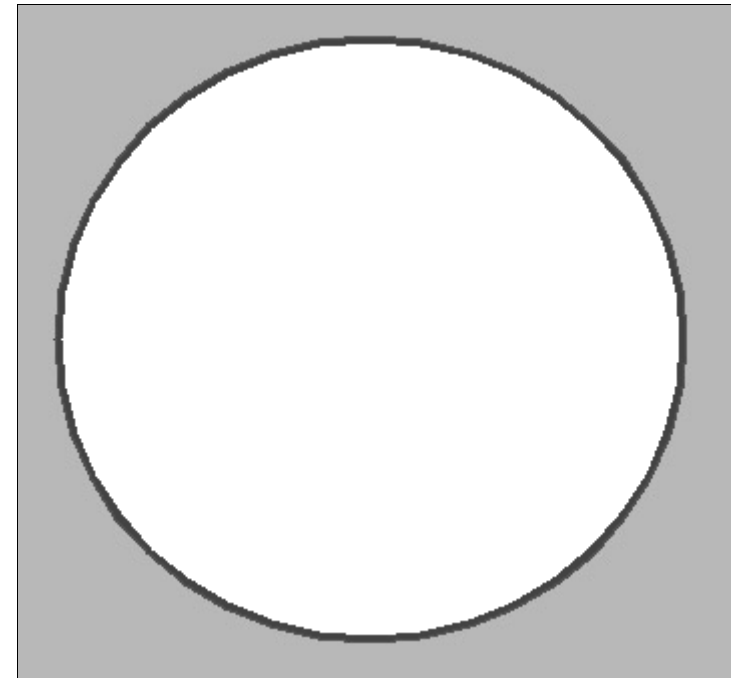
Type: Open Cluster
 Constellation: Auriga
 Right Ascension: 5h 28.7m
 Declination: +35° 50'
 Magnitude: 7.4
 Size: 21 arc min.

Finder chart



Binoculars: Easy
 Telescope: Easy
 Skies: Dark

Date: _____ Time: _____ UT.
 Location: _____
 Equipment: _____
 Transparency: _____ (Please rate from 1 excellent to 5 poor.)
 Seeing: _____ (Please rate from 1 excellent to 5 poor.)

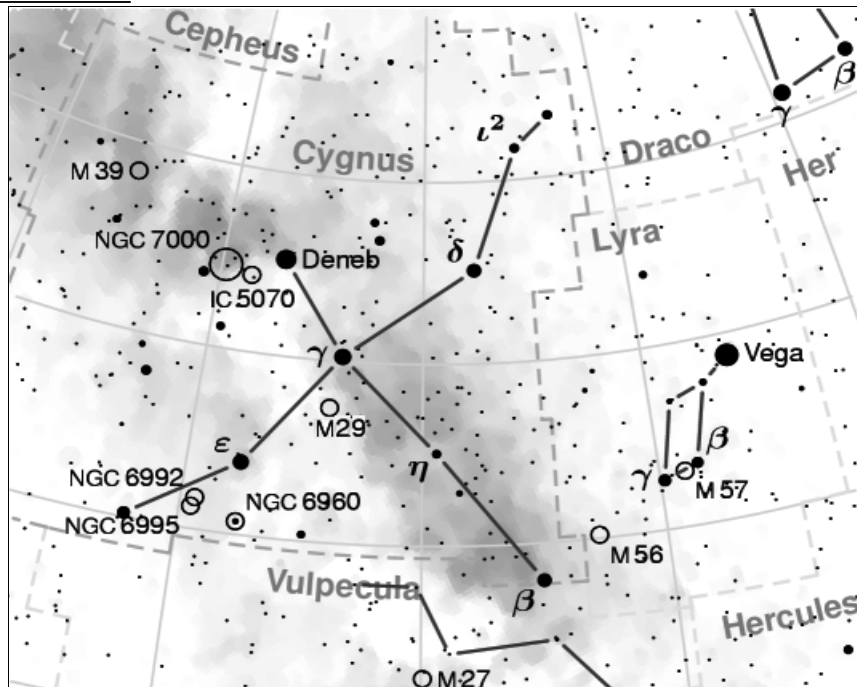


Comments

M 39

NGC 7092

Type: Open Cluster
Constellation: Cygnus
Right Ascension: 21h 32.2m
Declination: +48° 26'
Magnitude: 4.6
Size: 32 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

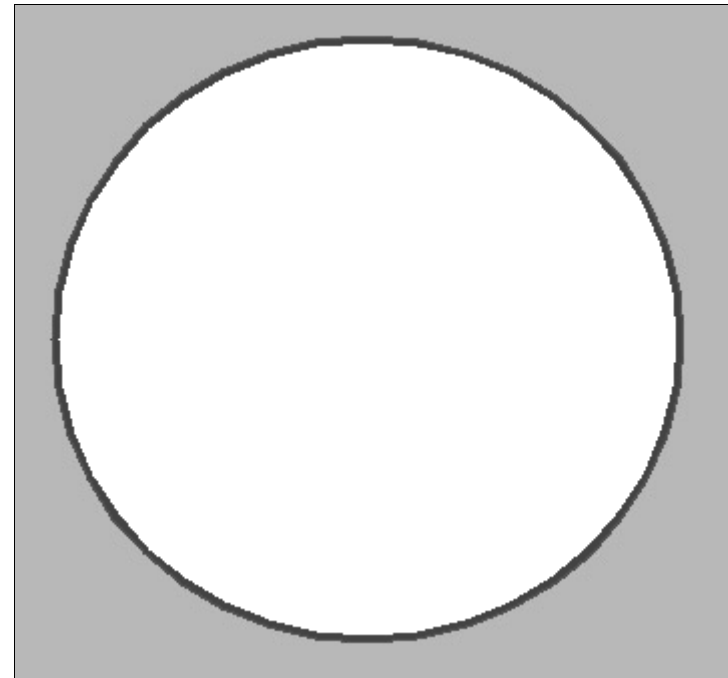
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

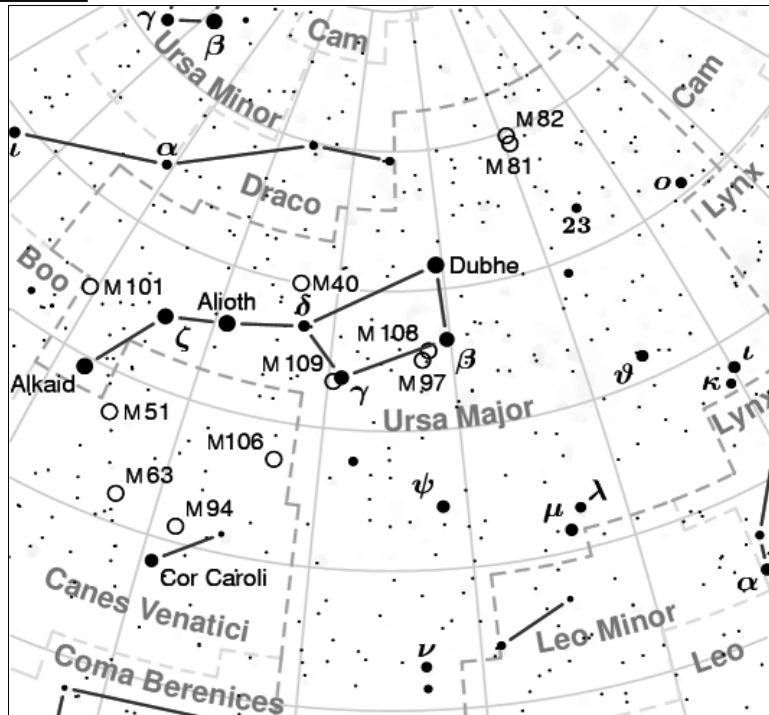


Comments

M 40

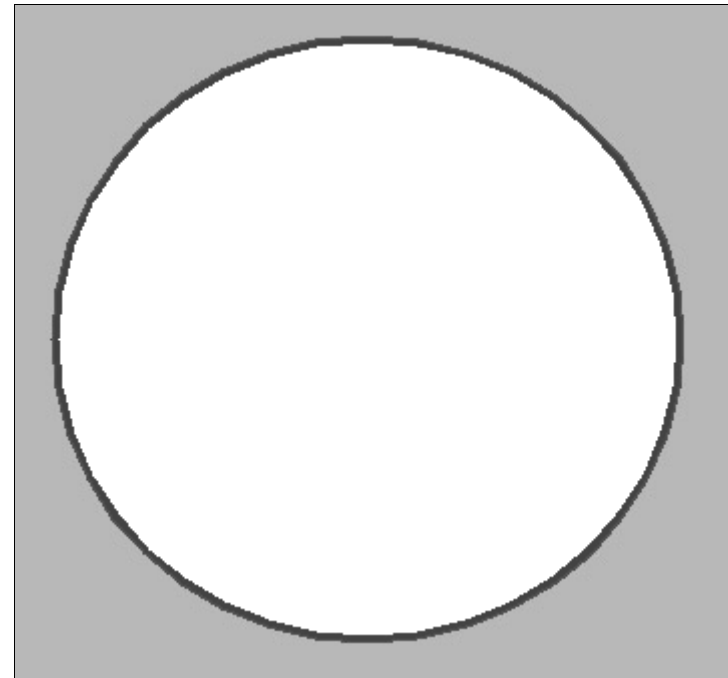
Type: Double Star
 Constellation: Ursa Major
 Right Ascension: 12h 22.4m
 Declination: +58° 05'
 Magnitude: 8
 Separation: 0.82 arc sec.

Finder chart



Binoculars: Tough.
 Telescope: Easy.
 Skies: Very Dark.

Date: _____ Time: _____ UT.
 Location: _____
 Equipment: _____
 Transparency: _____ (Please rate from 1 excellent to 5 poor.)
 Seeing: _____ (Please rate from 1 excellent to 5 poor.)

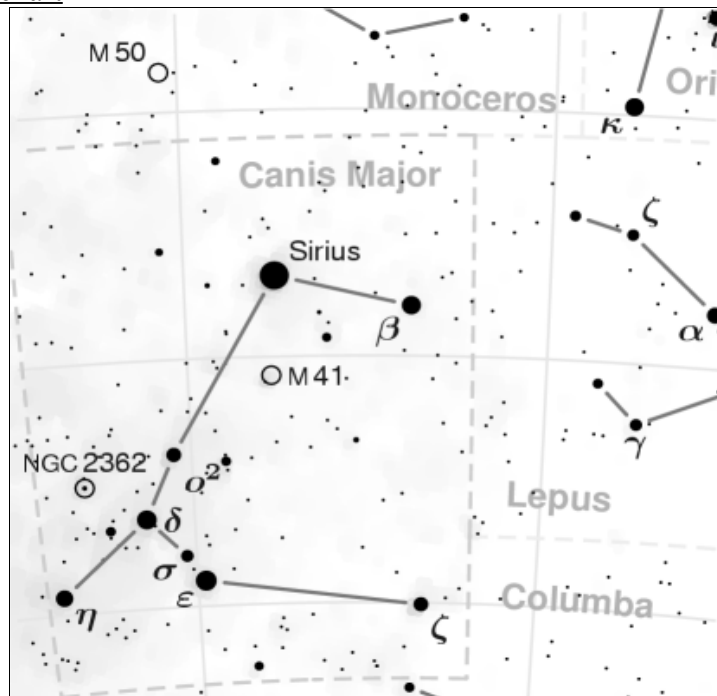


Comments

M 41

NGC 2287

Type: Open Cluster
Constellation: Canis Major
Right Ascension: 6h 46m
Declination: $-20^{\circ} 44'$
Magnitude: 4.5
Size: 38 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

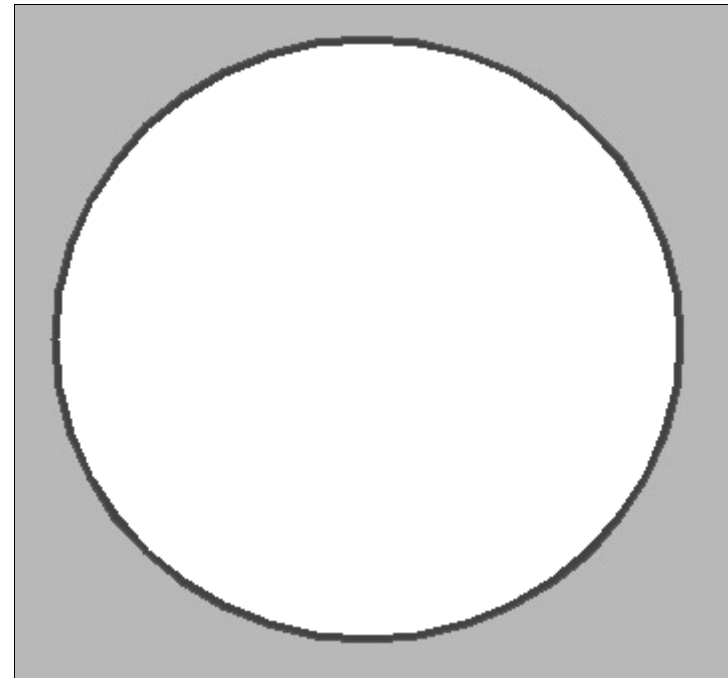
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

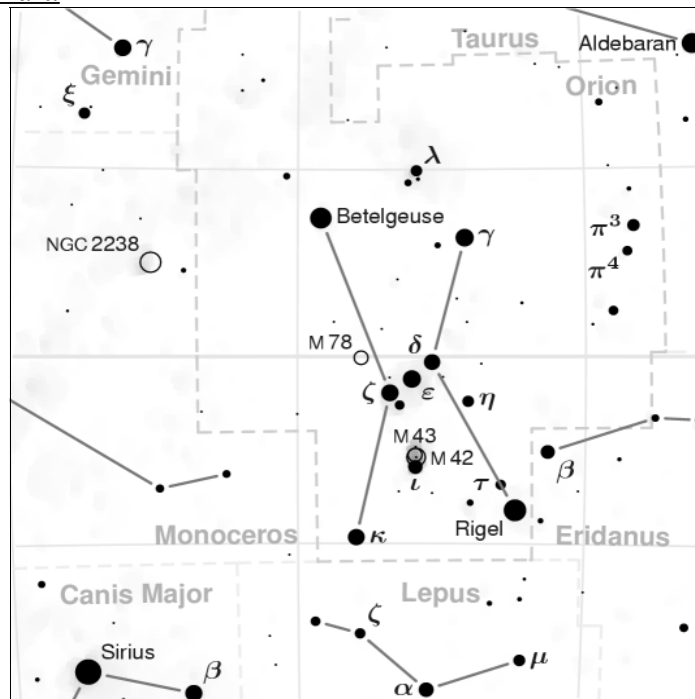
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 42**The Orion Nebula NGC 1976**

Type: Emission & Reflection Nebulae
 Constellation: Orion
 Right Ascension: 5h 35.4m
 Declination: $-5^{\circ} 27'$
 Magnitude: 4.0
 Size: 85 x 60 arc min..

Finder chart.

Binoculars: Easy
 Telescope: Easy
 Skies: Any

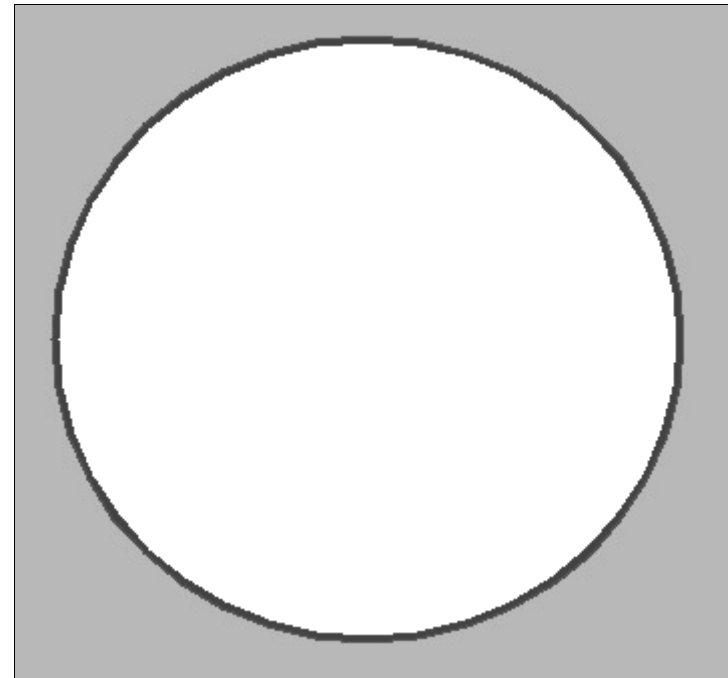
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

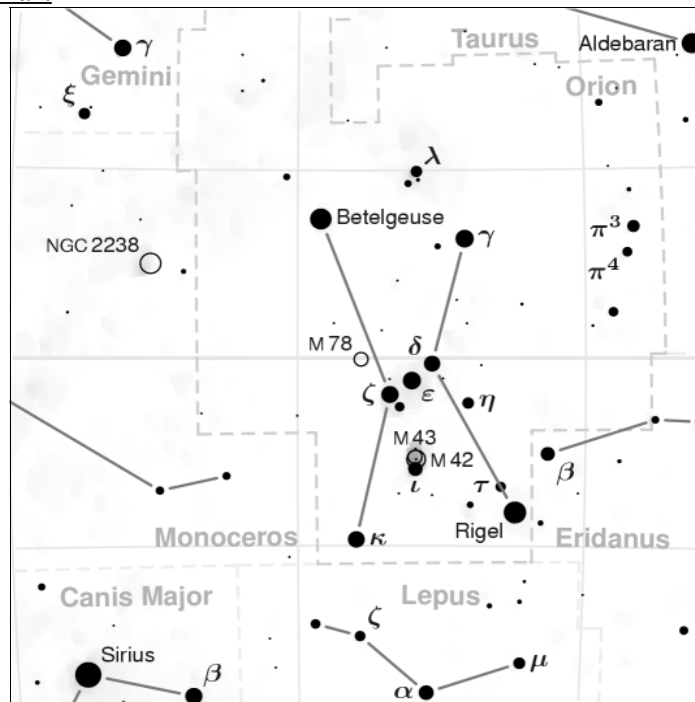
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 43**De Mairan's Nebula NGC 1982**

Type: Emission Nebula
 Constellation: Orion
 Right Ascension: 5h 35.6m
 Declination: $-5^{\circ} 16'$
 Magnitude: 9.0
 Size: 20 x 15 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Easy
 Skies: Any

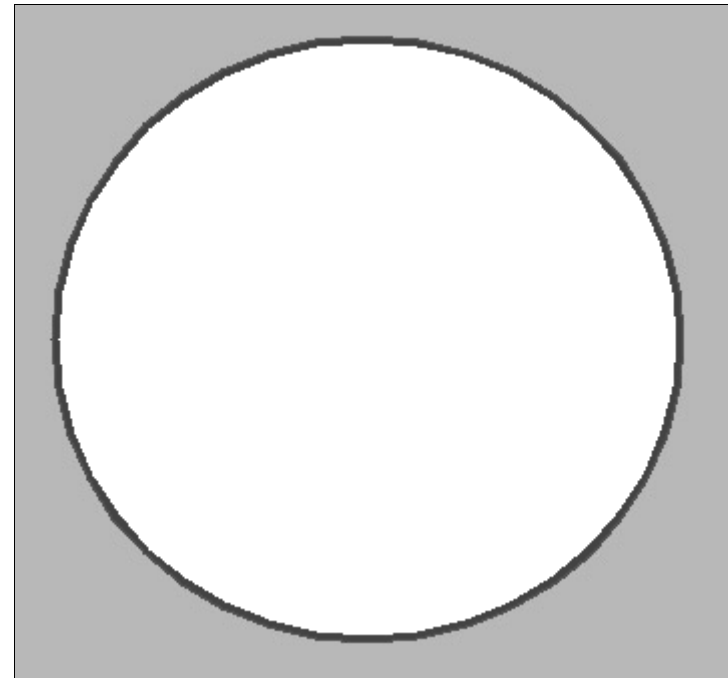
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

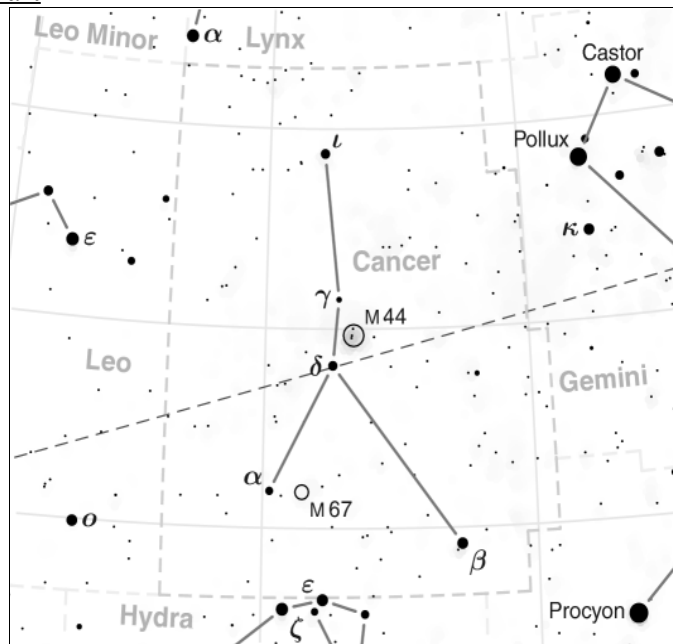
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 44**The Beehive Cluster NGC 2632**

Type: Open Cluster
 Constellation: Cancer
 Right Ascension: 8h 40.1m
 Declination: +19° 59'
 Magnitude: 3.7
 Size: 95 arc min.

Finder chart

Note – The Beehive Cluster is a naked-eye sight.

Binoculars: Easy
 Telescope: Easy
 Skies: Any

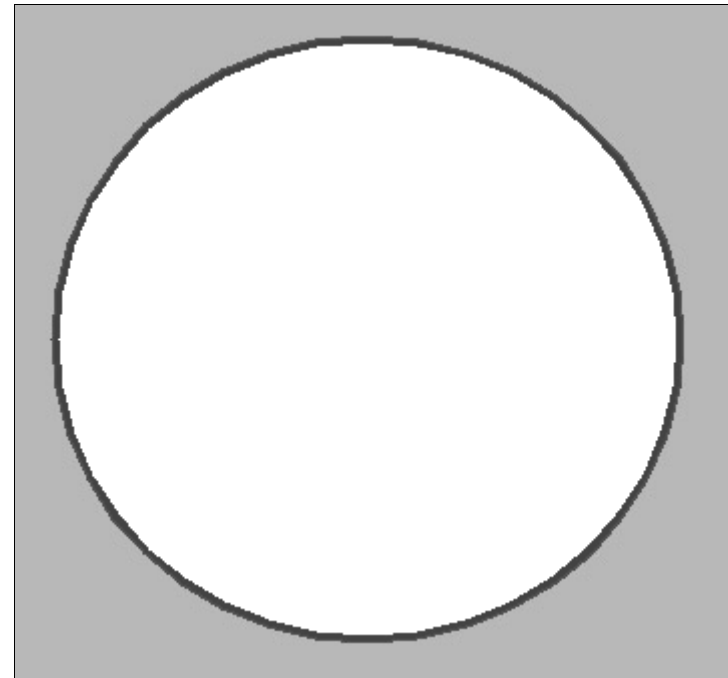
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

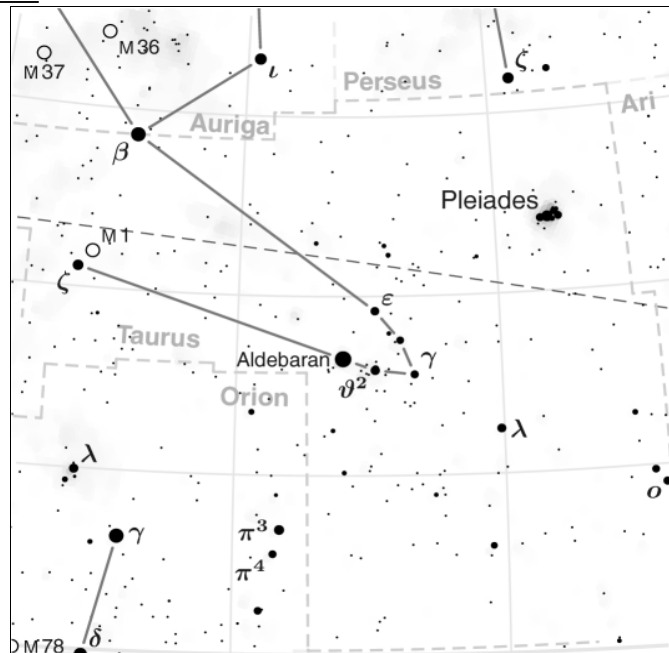
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 45**The Pleiades**

Type: Open Cluster
 Constellation: Taurus
 Right Ascension: 3h 47m
 Declination: +24° 07'
 Magnitude: 1.6
 Size: 110 arc min.

Finder chart

Note – The Pleiades are a naked-eye sight

Binoculars: Easy.
 Telescope: Too narrow field of view
 Skies: Any

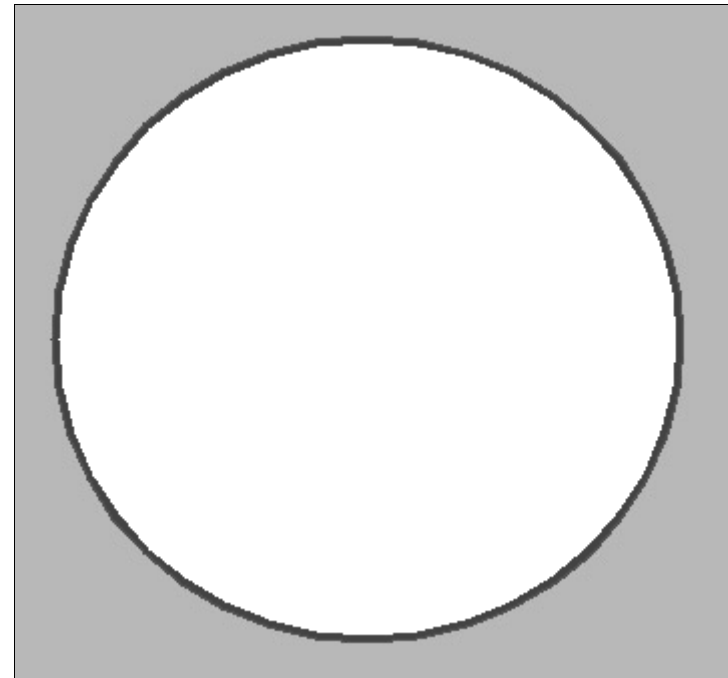
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



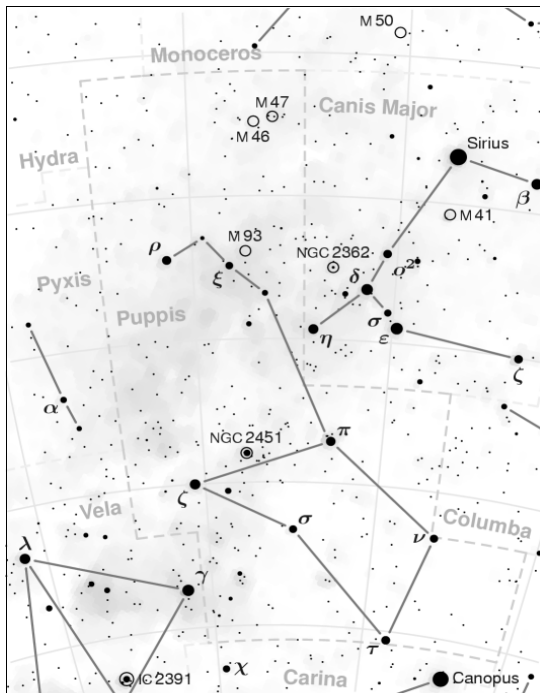
Comments

M 46

NGC 2437

Type: Open Cluster
 Constellation: Puppis
 Right Ascension: 7h 41.8m
 Declination: -14° 49'
 Magnitude: 6.1
 Size: 27 arc min.

Finder chart



Binoculars: Easy
 Telescope: Easy
 Skies: Dark

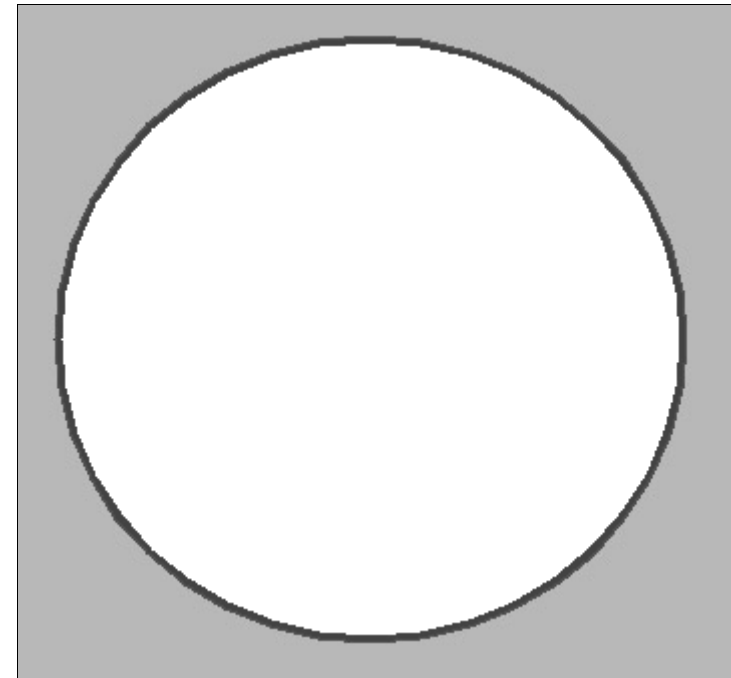
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

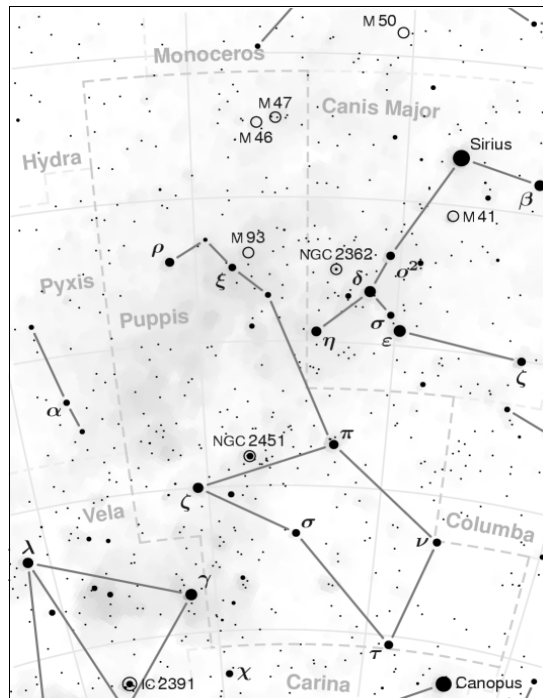


Comments

M 47

NGC 2422

Type: Open Cluster
Constellation: Puppis
Right Ascension: 7h 36.6m
Declination: $-14^{\circ} 30'$
Magnitude: 5.2
Size: 30 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

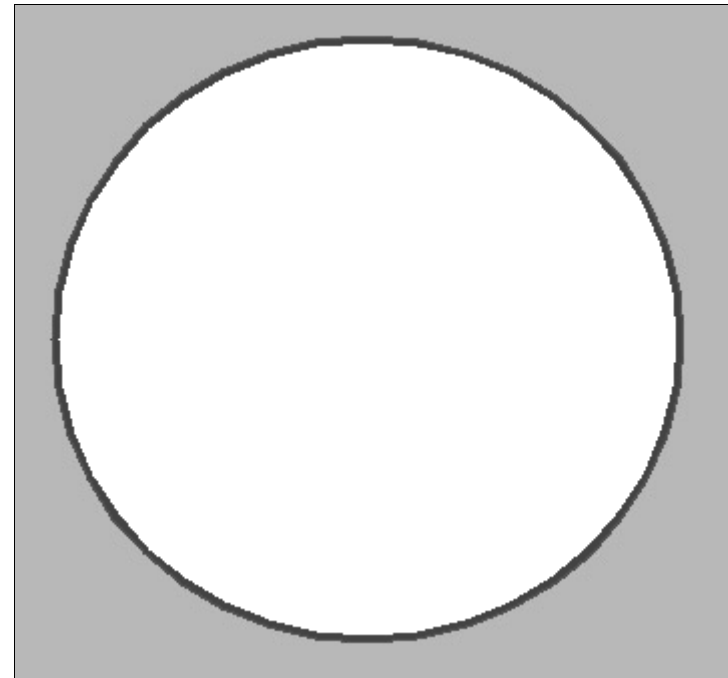
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

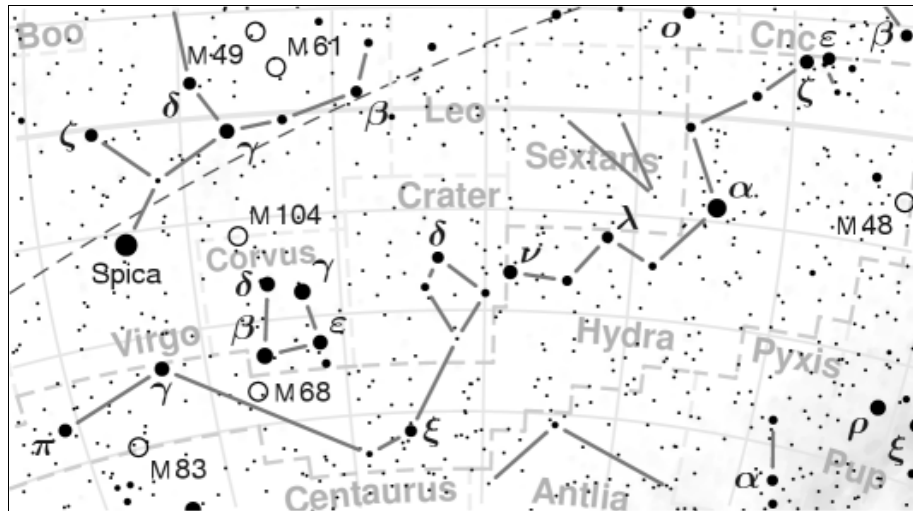


Comments

M 48

NGC 2548

Type: Open Cluster
 Constellation: Hydra
 Right Ascension: 8h 13.8m
 Declination: $-5^{\circ} 48'$
 Magnitude: 5.8
 Size: 54 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

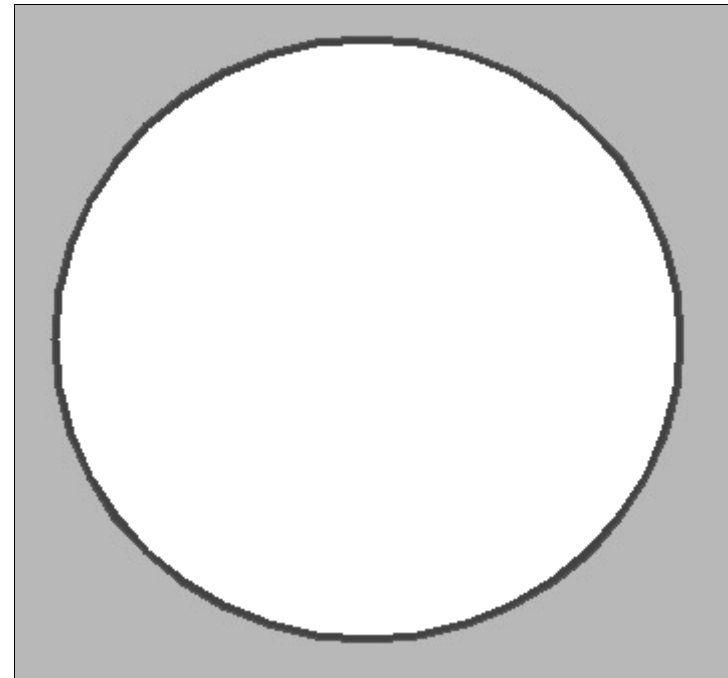
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 49

NGC 4472

Type: Galaxy (Elliptical)

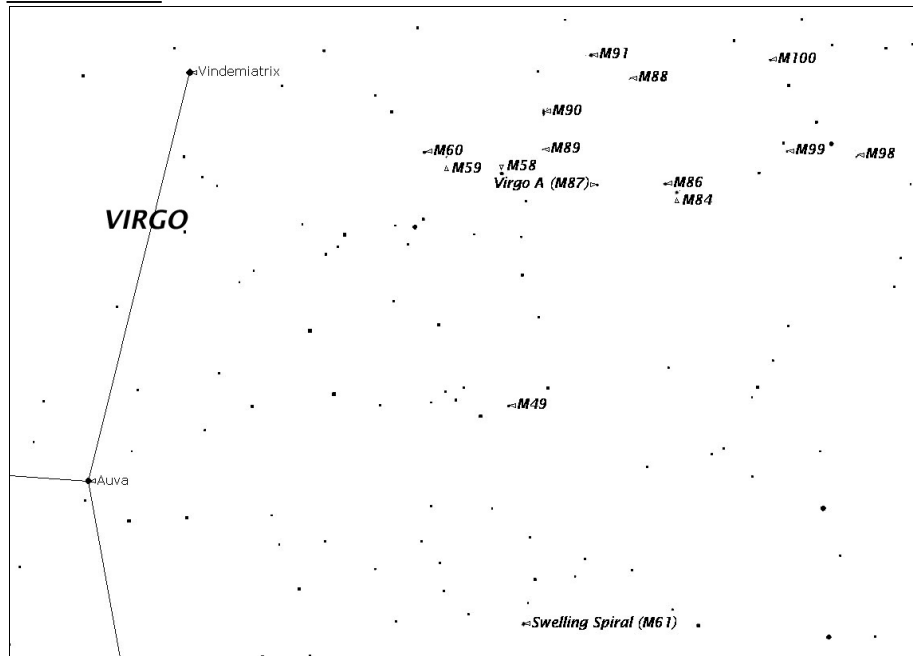
Constellation: Virgo

Right Ascension: 12h 29.8m

Declination: +8° 00'

Magnitude: 8.4

Size: 9 x 7 arc min.

Finder chart**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Tough

Telescope: Tough

Skies: Very Dark

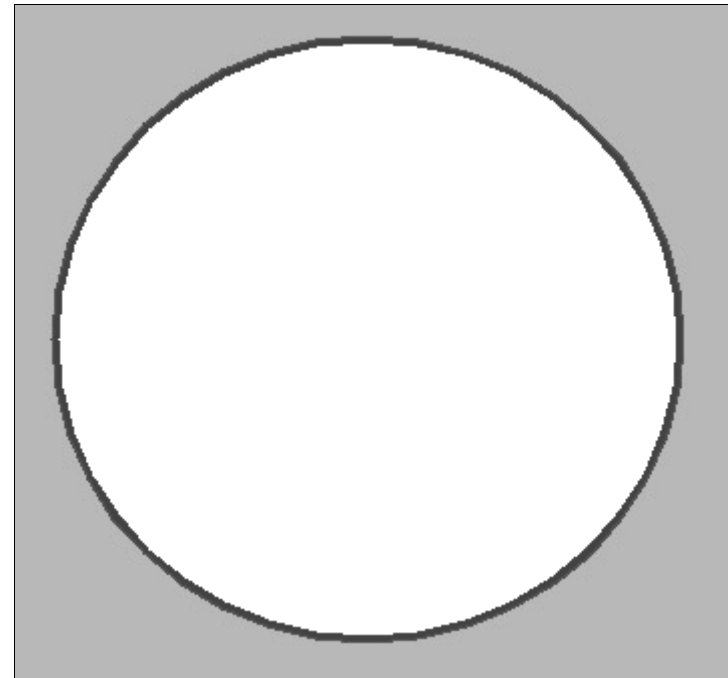
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

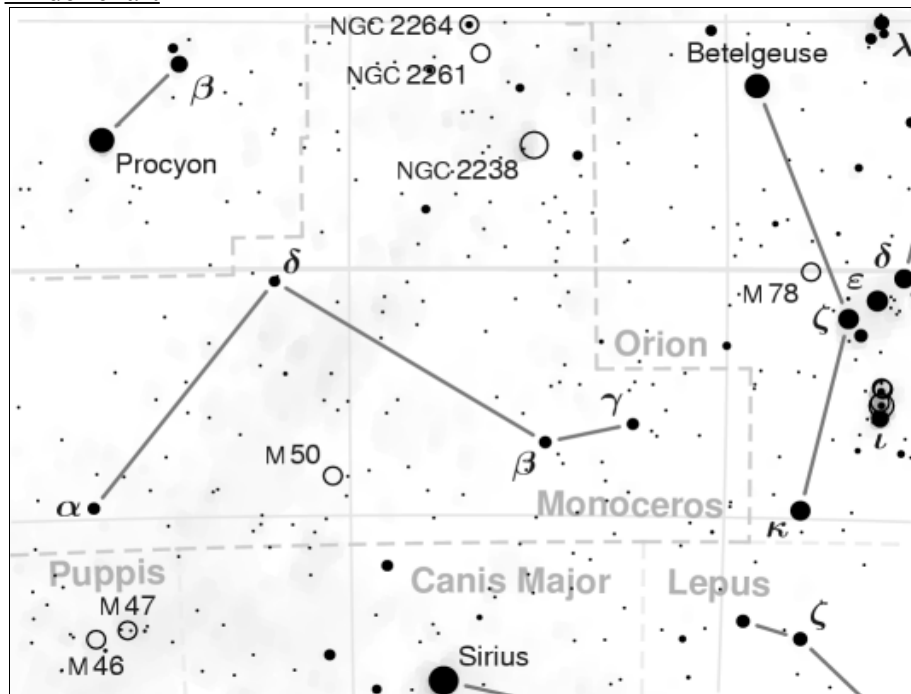


Comments

M 50

NGC 2323

Type: Open Cluster
 Constellation: Monoceros
 Right Ascension: 7h 02.8m
 Declination: $-8^{\circ} 23'$
 Magnitude: 6.3
 Size: 16 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

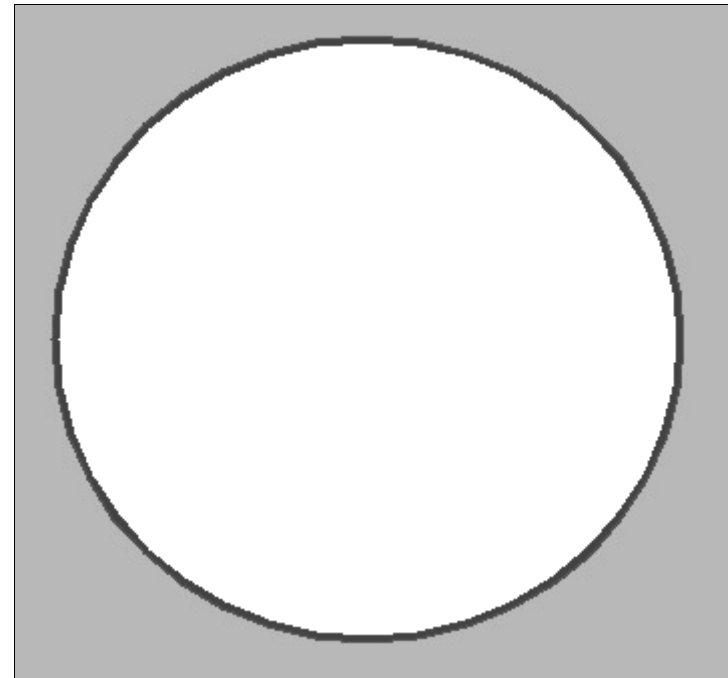
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

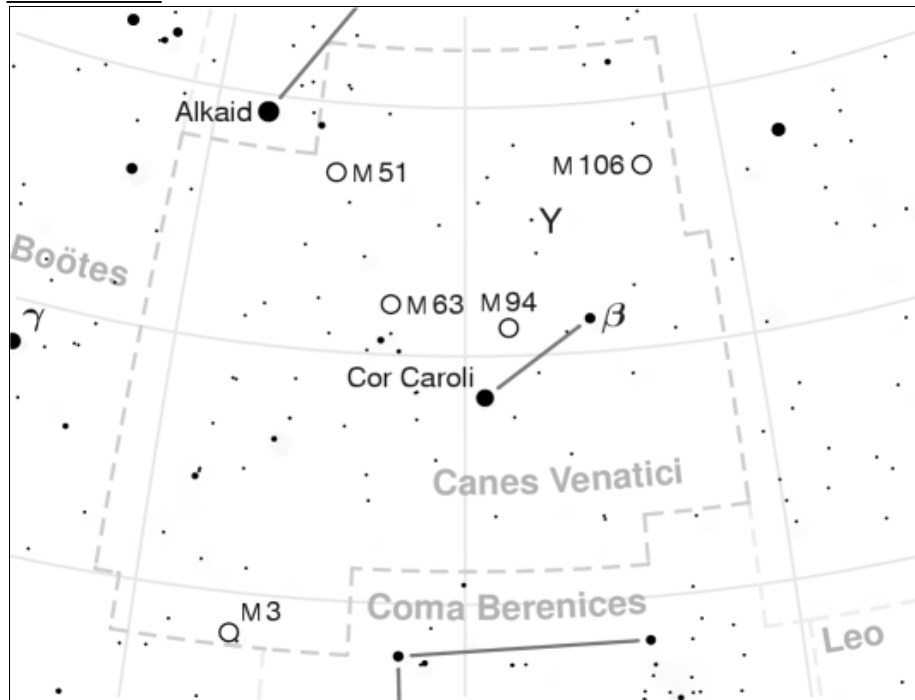
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 51**The Whirlpool Galaxy NGC 5194-5**

Type: Galaxy (Spiral).
 Constellation: Canes Venatici.
 Right Ascension: 13h 29.9m
 Declination: +47° 12'
 Magnitude: 8.4
 Size: 11 x 7 arc min.

Finder chart

Binoculars: Challenge
 Telescope: Tough
 Skies: Very Dark

The Messier Objects Observing Challenge

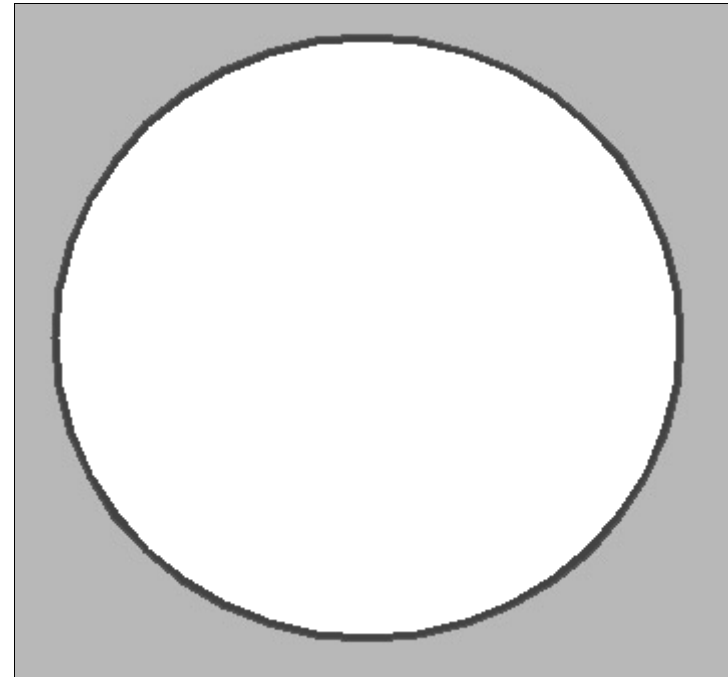
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



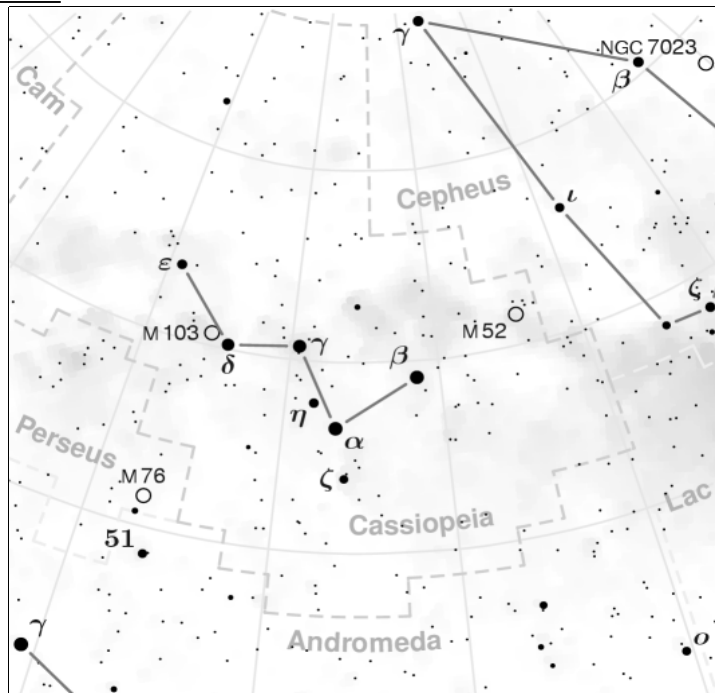
Comments

An Irish Galaxy!

Lord Rosse used his *Leviathan* telescope in the 19th century to resolve the spiral shape in this galaxy, a discovery which had great implications for astronomy and cosmology.

M 52**The Scorpion NGC 7654**

Type: Open Cluster
Constellation: Cassiopeia
Right Ascension: 23h 24.2m
Declination: $+61^{\circ} 35'$
Magnitude: 7.3
Size: 13 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

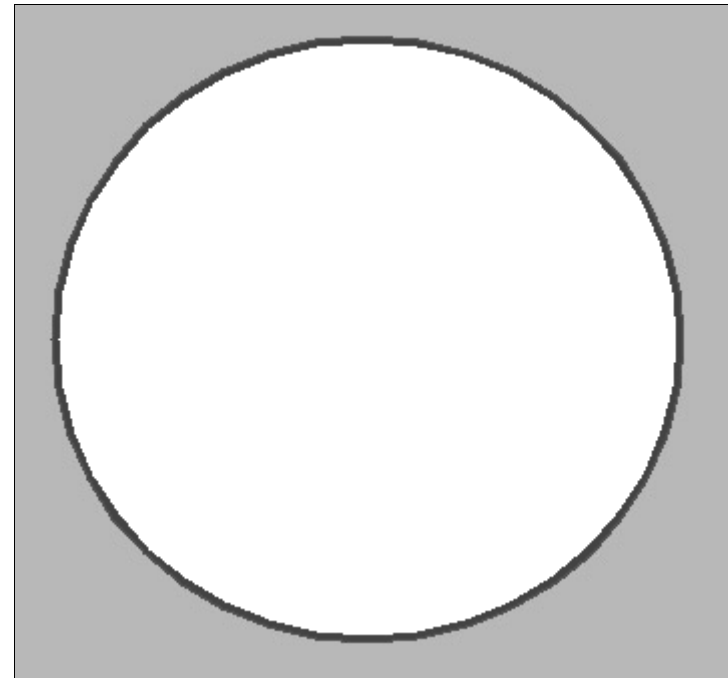
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



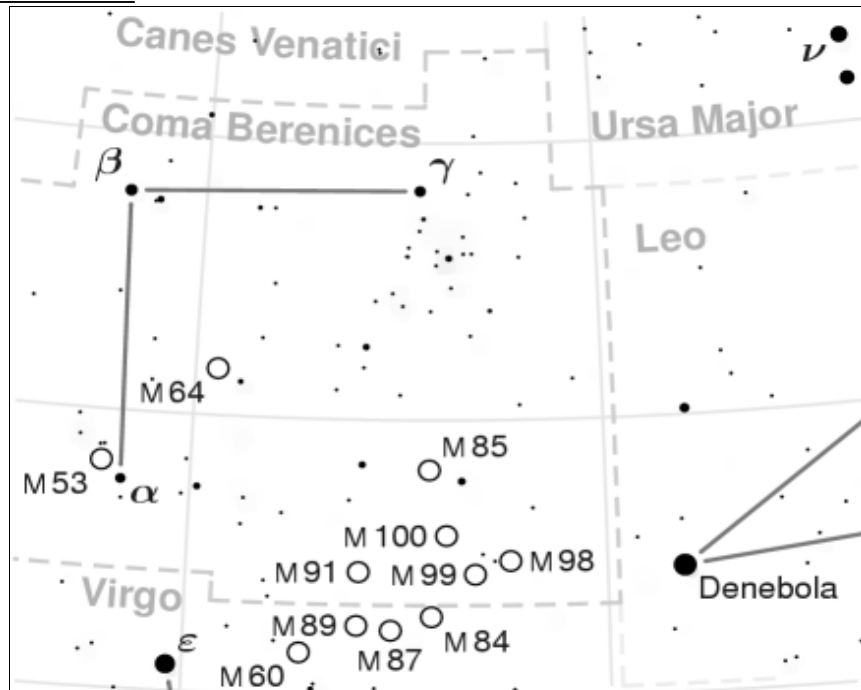
Comments

M 53

NGC 5024

Type: Globular Cluster
 Constellation: Coma Berenices
 Right Ascension: 13h 12.9m
 Declination: +18° 10'
 Magnitude: 7.7
 Size: 13 arc min.

Finder chart



Binoculars: Tough
 Telescope: Tough
 Skies: Dark

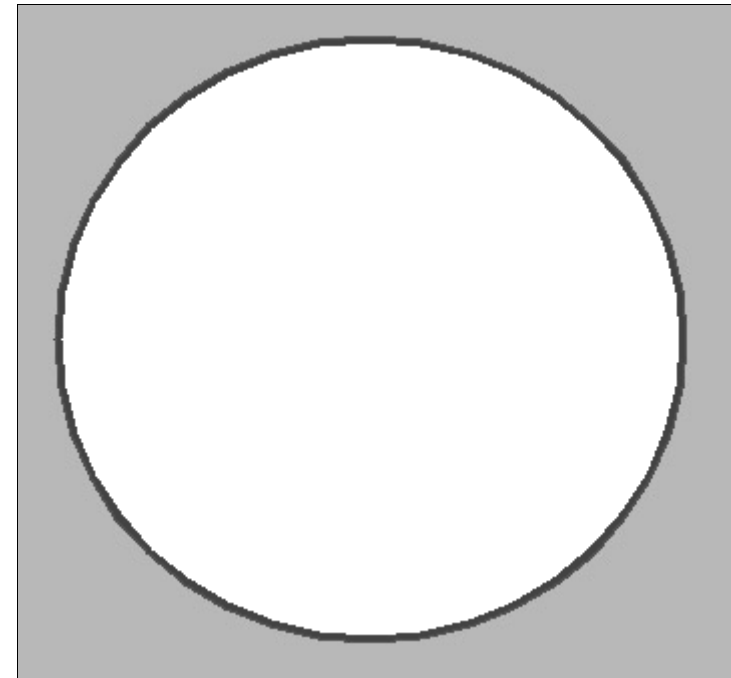
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

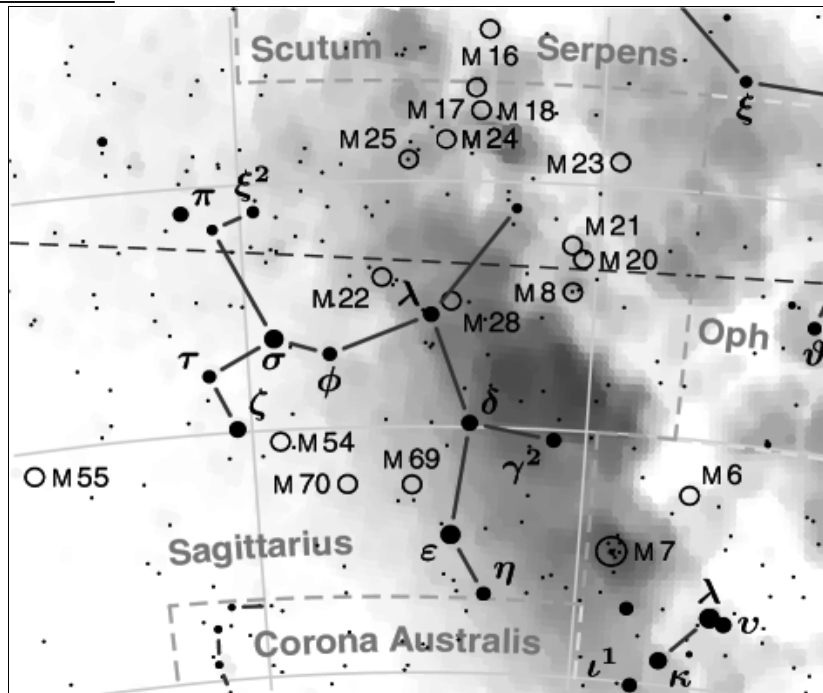


Comments

M 54

NGC 6715

Type: Globular Cluster
 Constellation: Sagittarius
 Right Ascension: 18h 55.1m
 Declination: $-30^{\circ} 29'$
 Magnitude: 7.7
 Size: 12 arc min.

Finder chart

Binoculars: Challenge
 Telescope: Tough
 Skies: Very Dark

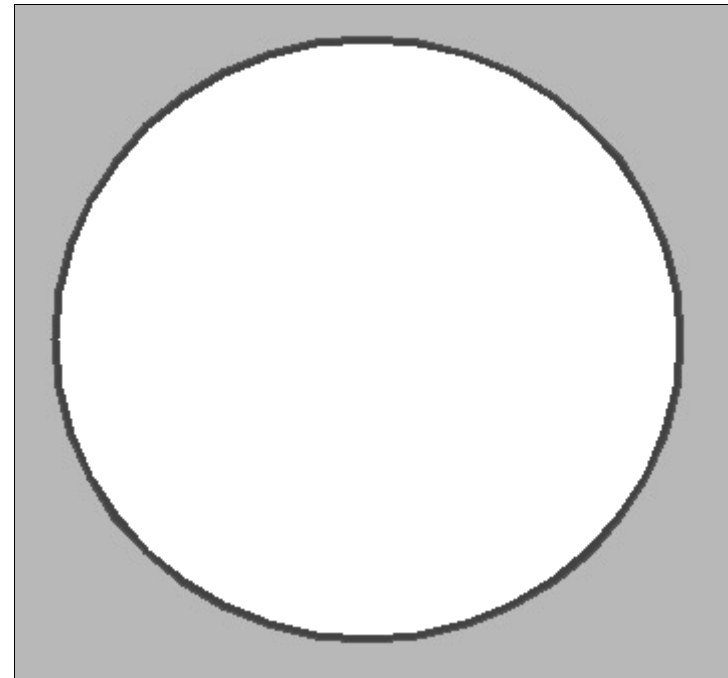
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

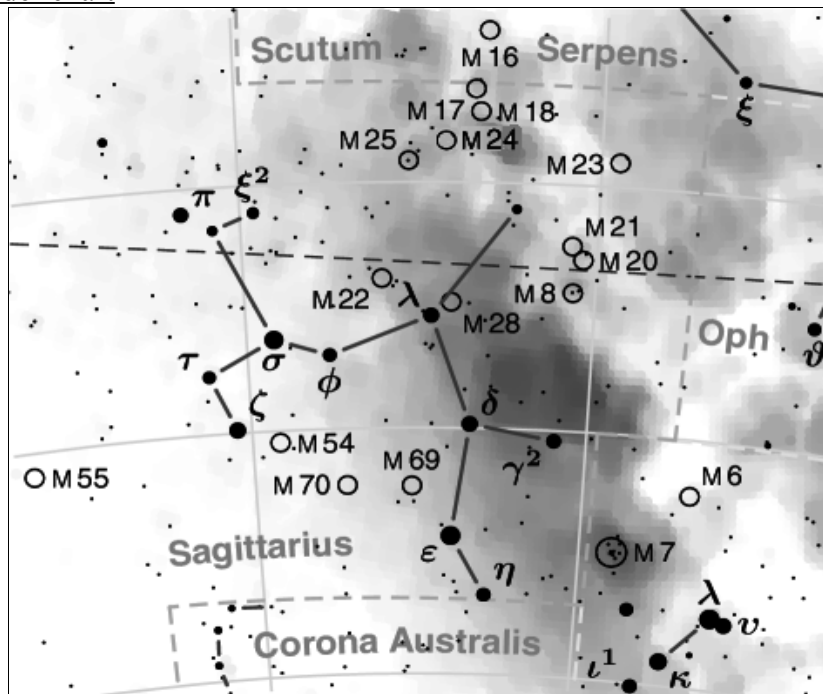


Comments

M 55

NGC 6809

Type: Globular Cluster
 Constellation: Sagittarius
 Right Ascension: 19h 40m
 Declination: $-30^{\circ} 58'$
 Magnitude: 6.3
 Size: 19 arc min.

Finder chart

Binoculars: Easy
 Telescope: Easy
 Skies: Dark

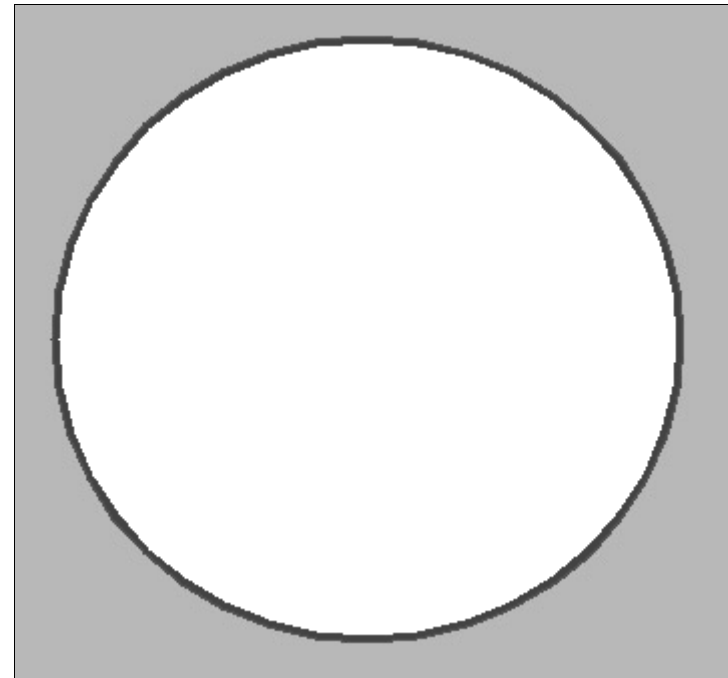
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



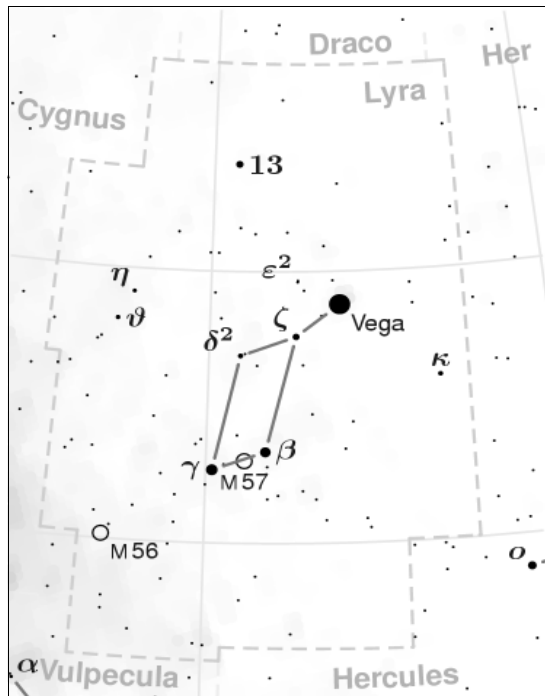
Comments

M 56

NGC 6779

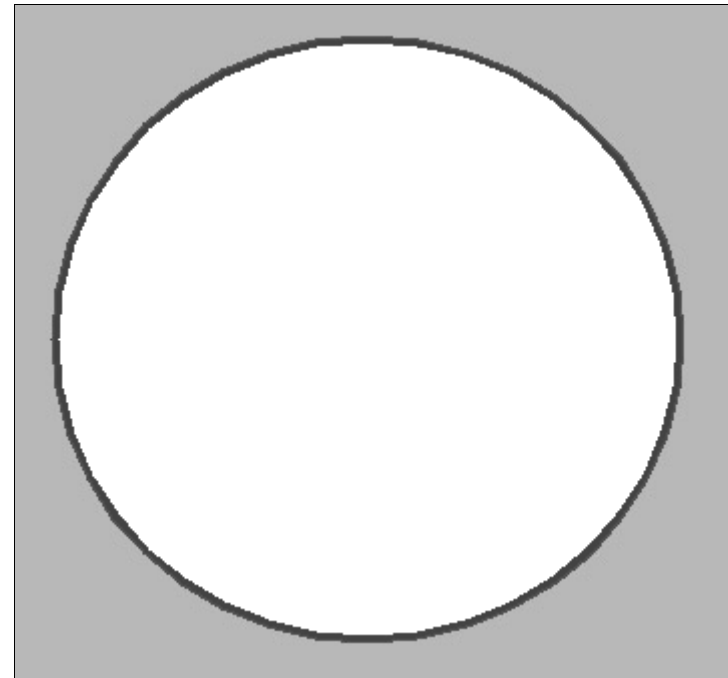
Type: Globular Cluster
 Constellation: Lyra
 Right Ascension: 19h 16.6m
 Declination: +30° 11'
 Magnitude: 8.2
 Size: 8.8 arc min.

Finder chart



Binoculars: Challenge
 Telescope: Tough
 Skies: Dark

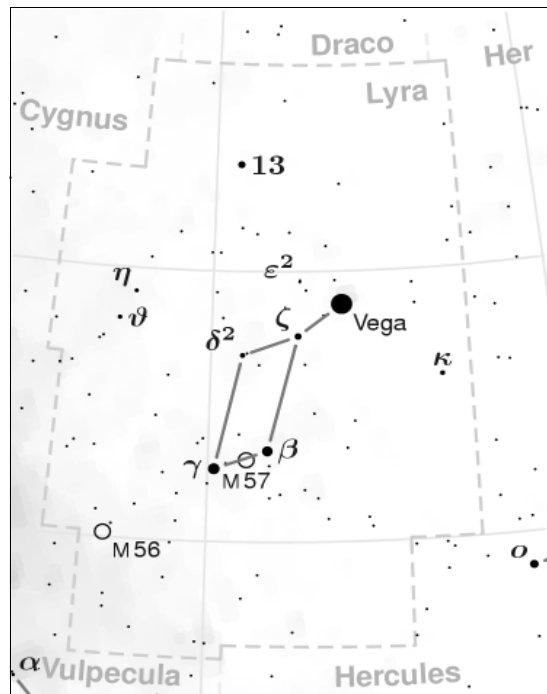
Date: _____ Time: _____ UT.
 Location: _____
 Equipment: _____
 Transparency: _____ (Please rate from 1 excellent to 5 poor.)
 Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 57**The Ring Nebula NGC 6720**

Type: Planetary Nebula
 Constellation: Lyra
 Right Ascension: 18h 53.6m
 Declination: +33° 02'
 Magnitude: 8.8
 Size: 1.4x1.0 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Easy
 Skies: Any

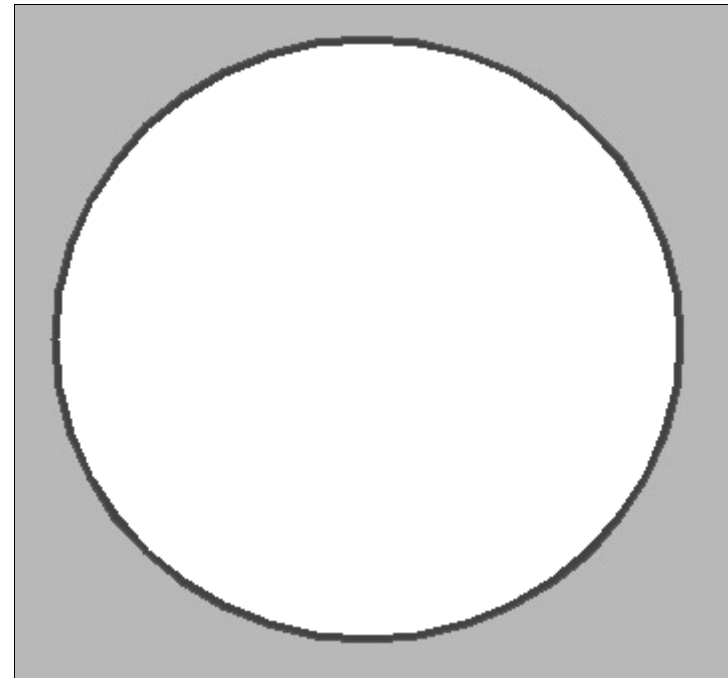
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

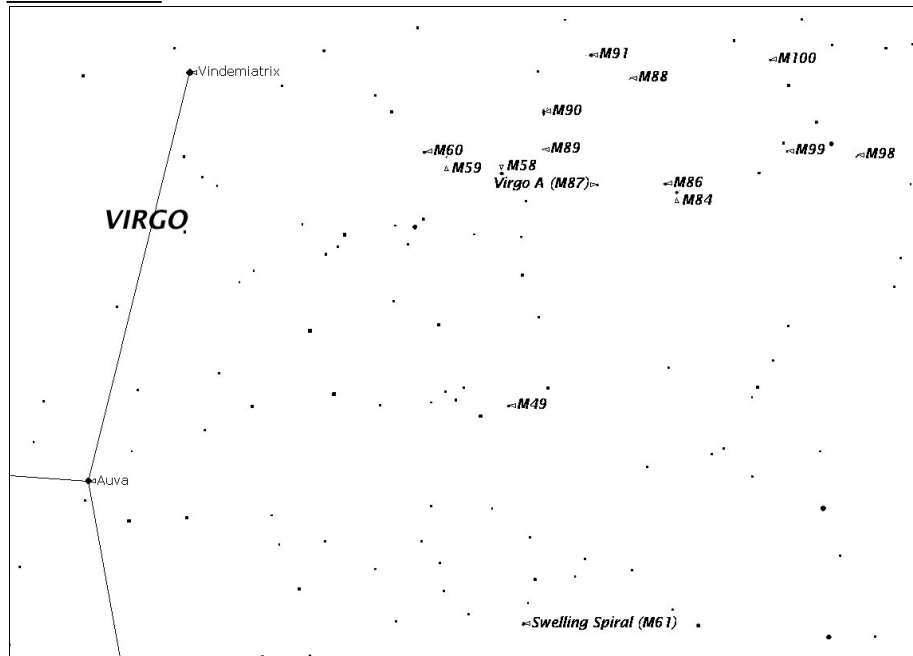
Seeing: _____ (Please rate from 1 excellent to 5 poor.)

Comments

M 58

NGC 4579

Type: Galaxy (Spiral)
Constellation: Virgo
Right Ascension: 12h 37.7m
Declination: +11° 49'
Magnitude: 9.8
Size: 5 x 4 arc min.

Finder chart**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

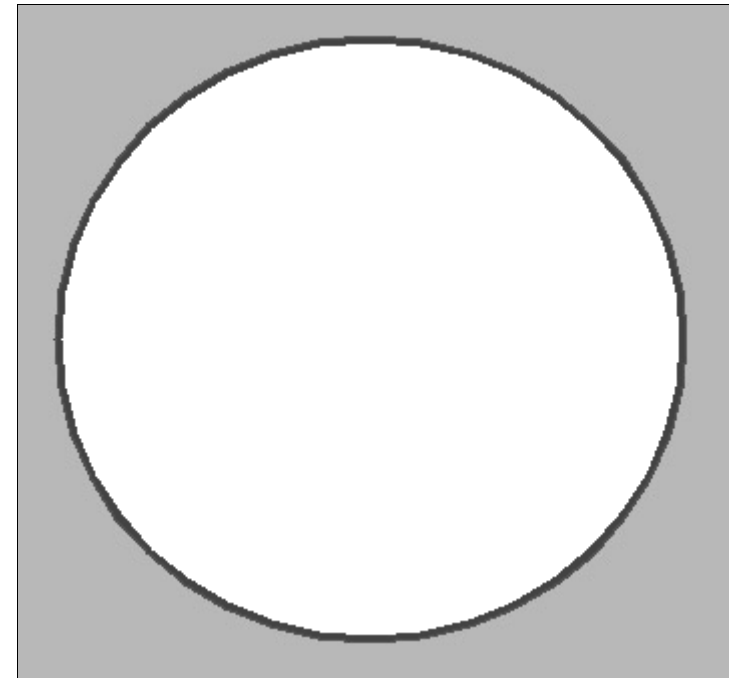
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

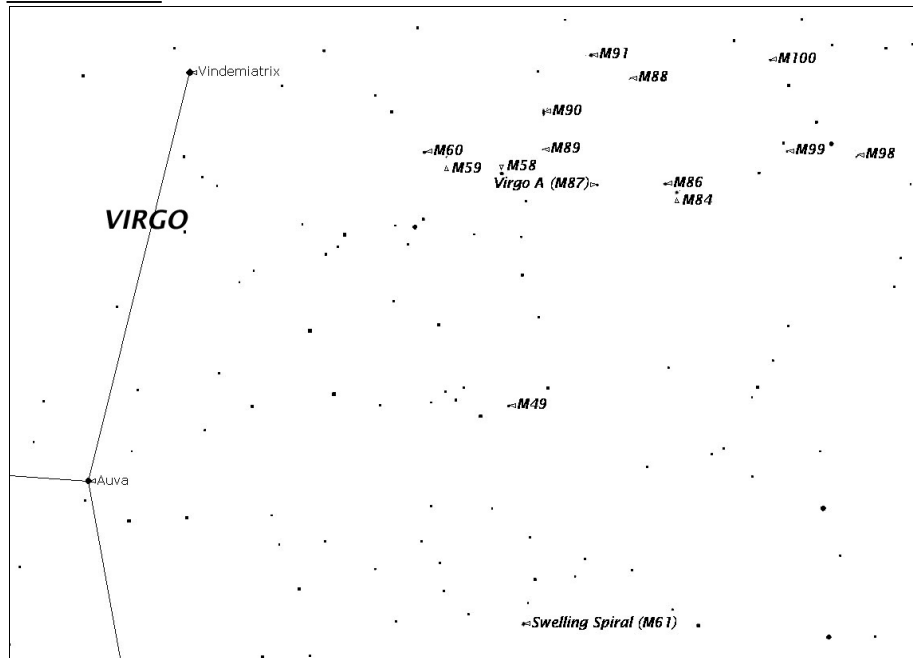


Comments

M 59

NGC 4621

Type: Galaxy (Elliptical)
 Constellation: Virgo
 Right Ascension: 12h 42m
 Declination: +11° 39'
 Magnitude: 9.8
 Size: 5 x 3 arc min.

Finder chart

See Larger Chart of Virgo Cluster in Appendix A

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

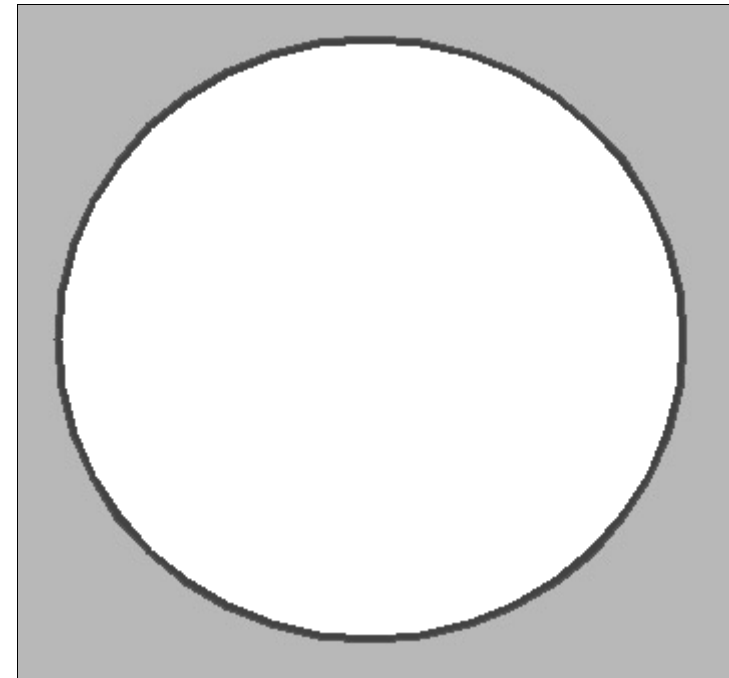
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

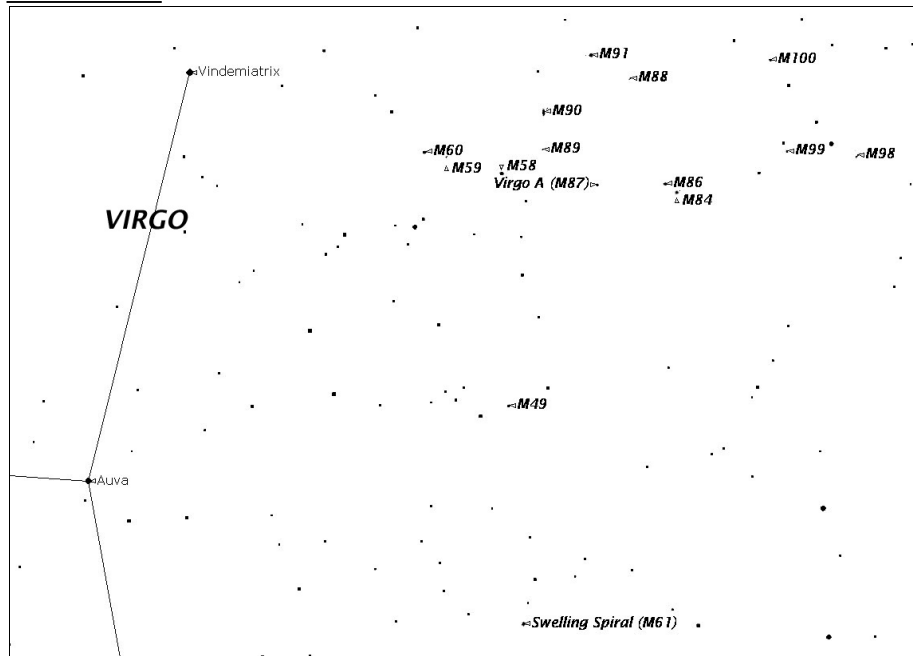


Comments

M 60

NGC 4649

Type: Galaxy (Elliptical)
Constellation: Virgo
Right Ascension: 12h 43.7m
Declination: +11° 33'
Magnitude: 8.8
Size: 7 x 6 arc min.

Finder chart**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

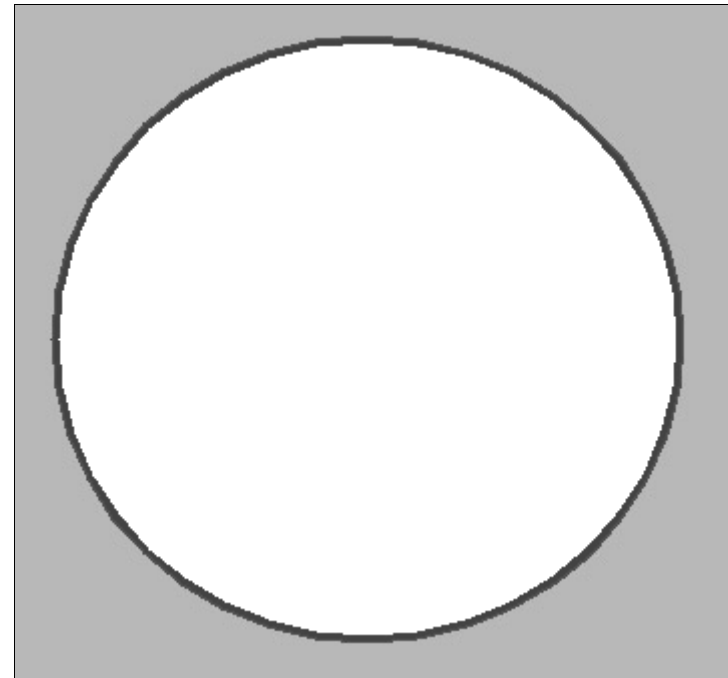
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

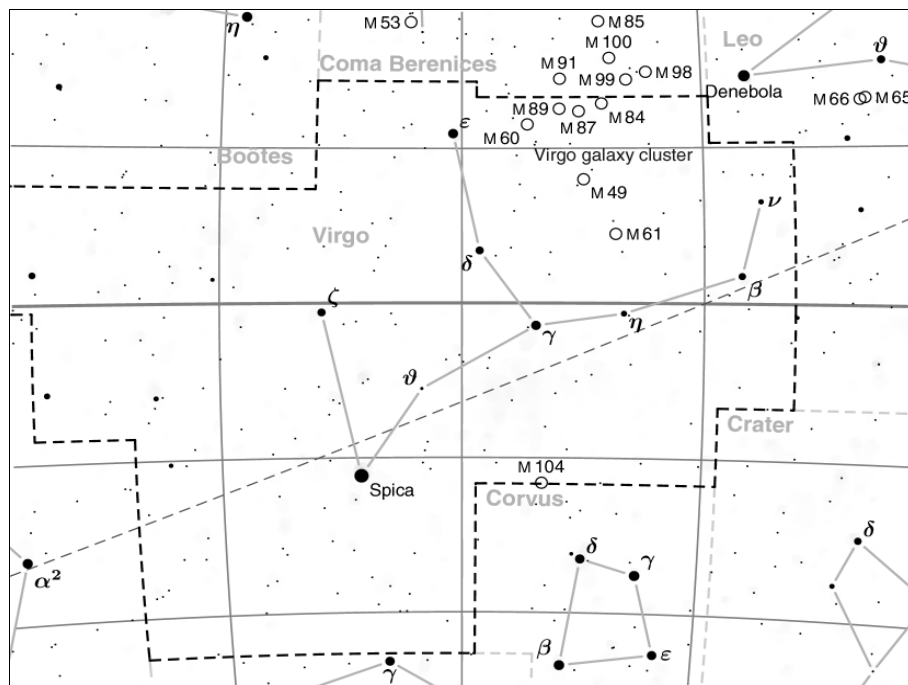
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 61**The Swelling Spiral NGC 4303**

Type: Galaxy (Spiral)
 Constellation: Virgo
 Right Ascension: 12h 21.9m
 Declination: +4° 28'
 Magnitude: 9.7
 Size: 6 x 5 arc min.

Finder chart

Binoculars: Not Visible

Telescope: Tough

Skies: Very Dark

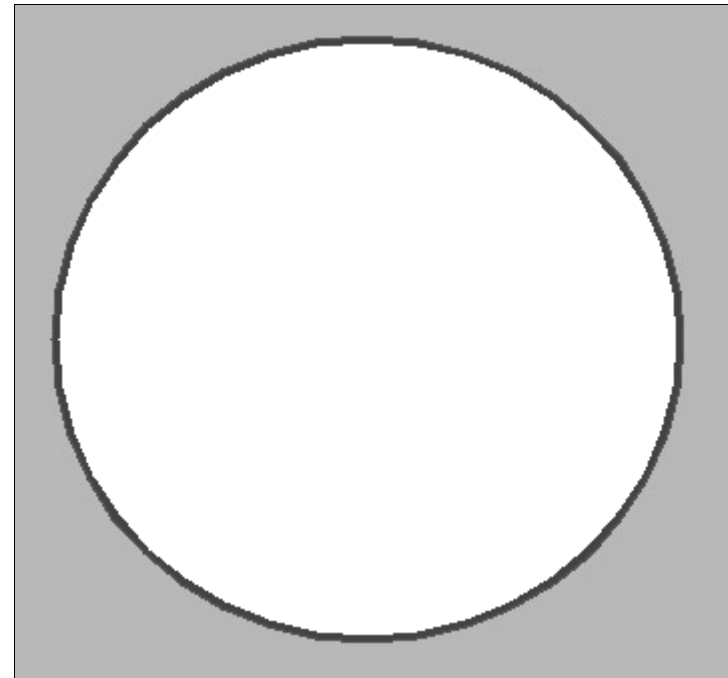
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

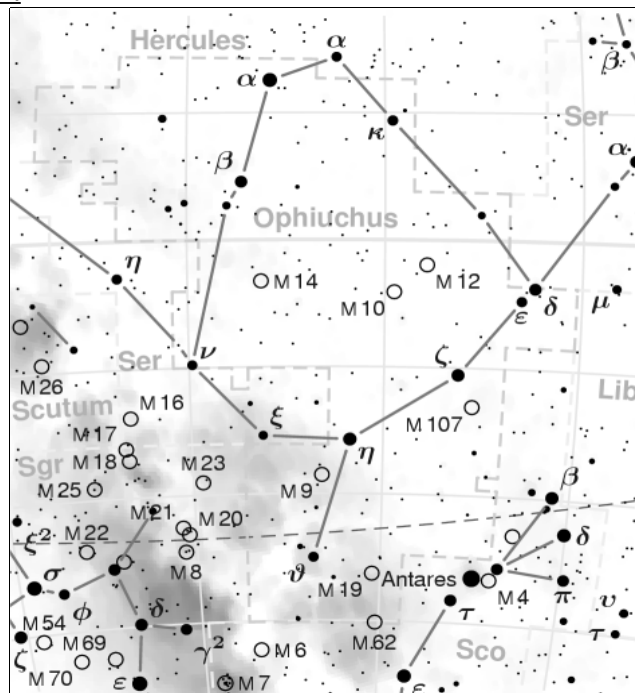
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 62**Flickering Globular NGC 6266**

Type: Globular Cluster
 Constellation: Ophiuchus
 Right Ascension: 17h 01.2m
 Declination: -30° 07'
 Magnitude: 6.6
 Size: 14 arc min.

Finder chart

Binoculars: Tough
 Telescope: Easy
 Skies: Dark

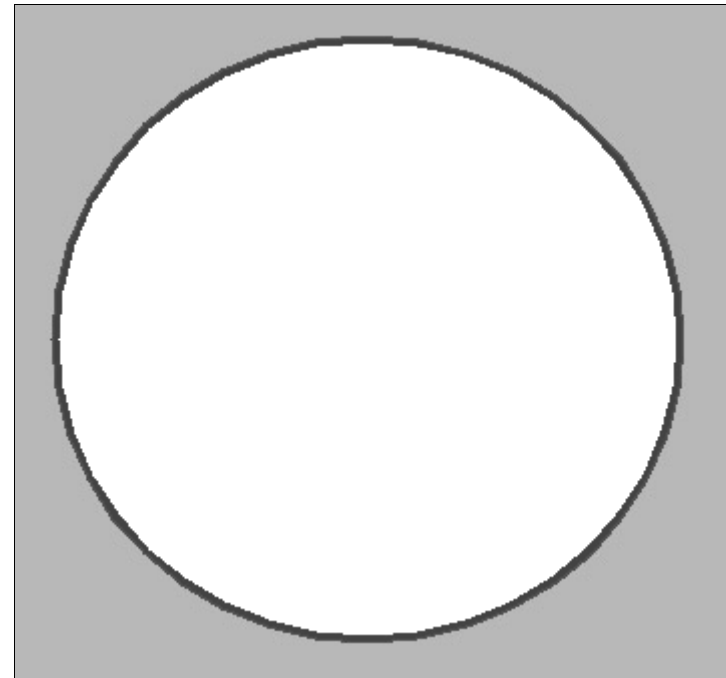
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

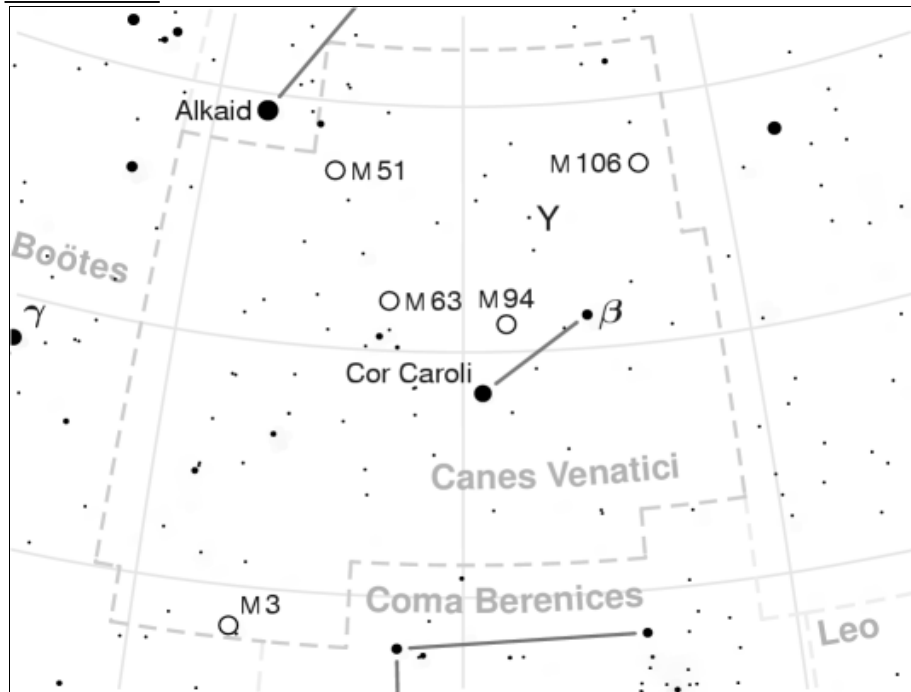
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 63**The Sunflower Galaxy NGC 5055**

Type: Galaxy (Spiral)
Constellation: Canes Venatici
Right Ascension: 13h 15.8m
Declination: +42° 02'
Magnitude: 8.6
Size: 12 x 8 arc min.

Finder chart

Binoculars: Tough
Telescope: Tough
Skies: Very Dark

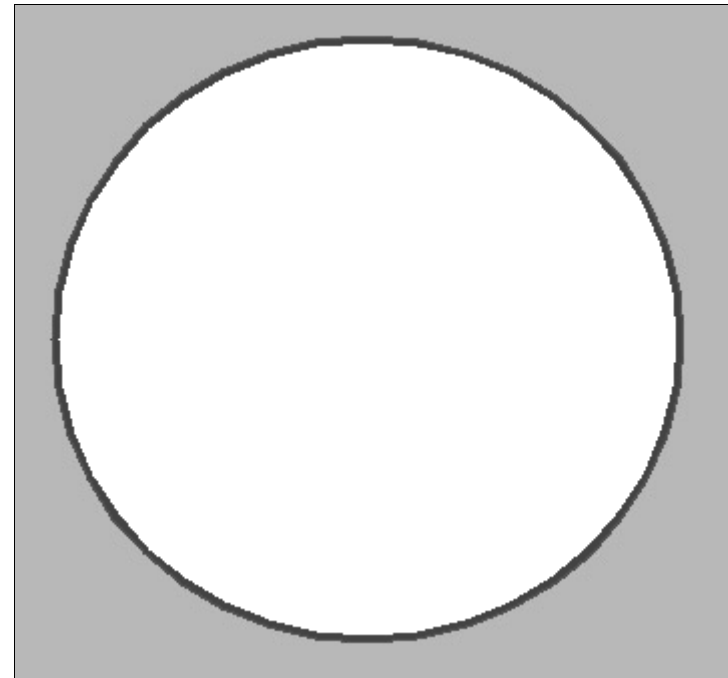
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



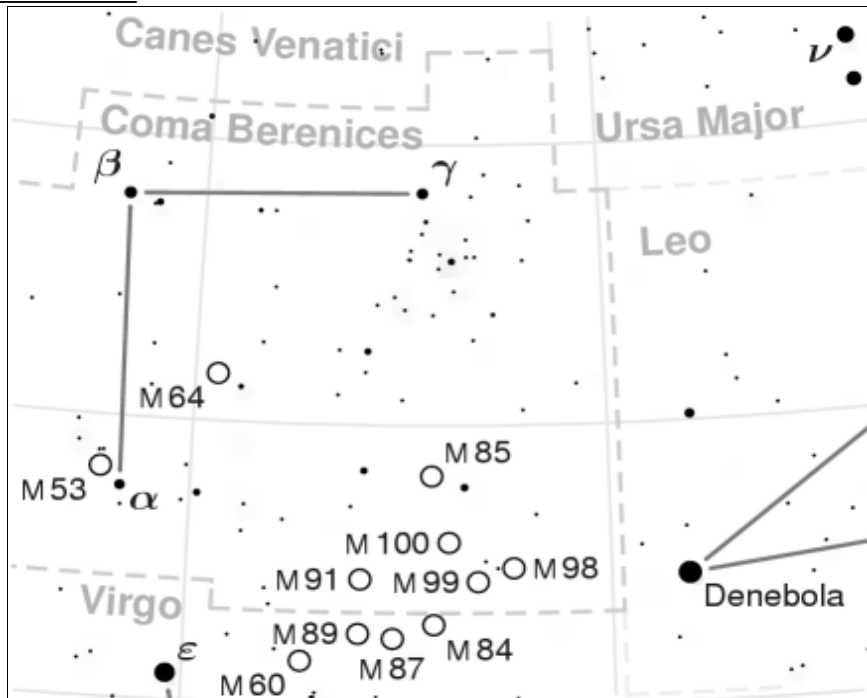
Comments

M 64

The Blackeye Galaxy NGC 4826

Type: Galaxy (Spiral)
 Constellation: Coma Berenices
 Right Ascension: 12h 56.7m
 Declination: +21° 41'
 Magnitude: 8.5
 Size: 9 x 5 arc min.

Finder chart



Binoculars: Tough
 Telescope: Tough
 Skies: Very Dark

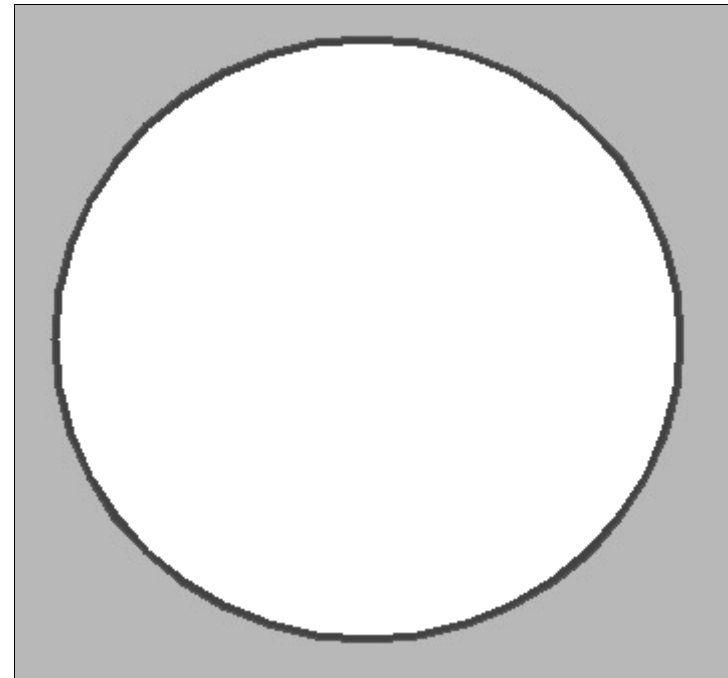
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

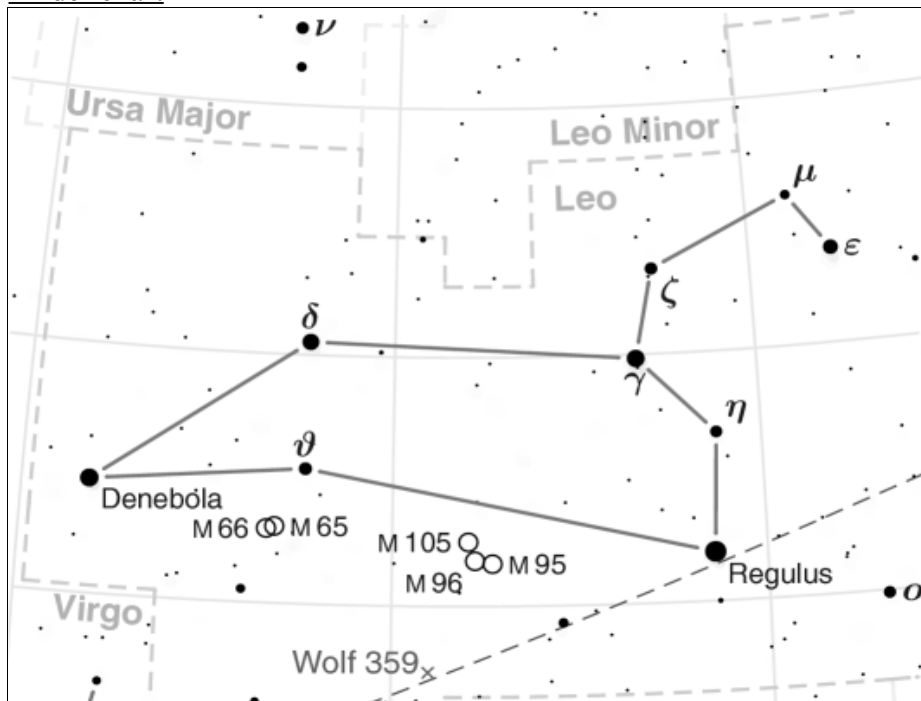


Comments

M 65

NGC 3623

Type: Galaxy (Spiral)
 Constellation: Leo
 Right Ascension: 11h 18.9m
 Declination: +13° 05'
 Magnitude: 9.3
 Size: 10 x 3 arc min.

Finder chart

Binoculars: Challenge
 Telescope: Easy
 Skies: Very Dark

The Messier Objects Observing Challenge

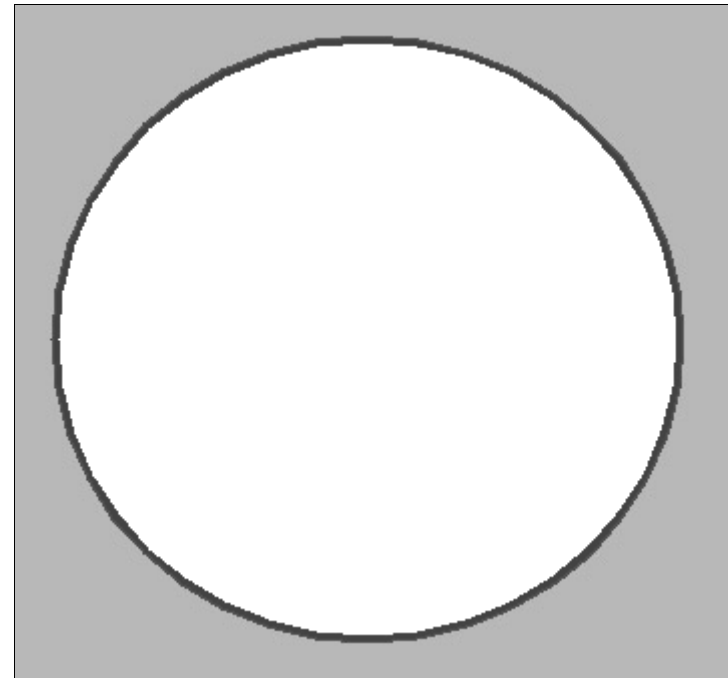
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

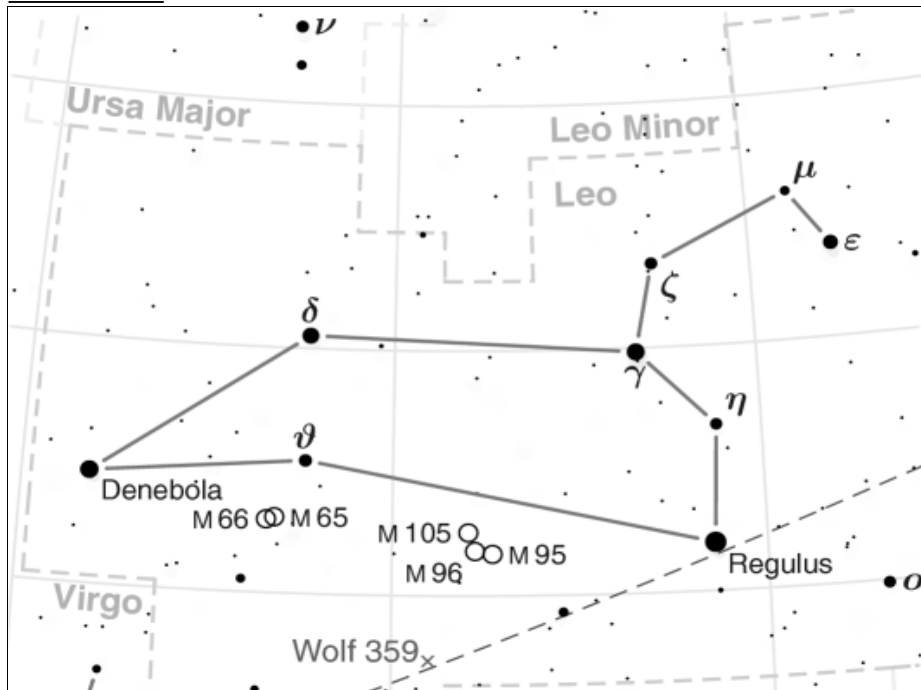


Comments

M 66

NGC 3627

Type: Galaxy (Spiral)
 Constellation: Leo
 Right Ascension: 11h 20.2m
 Declination: +12° 59'
 Magnitude: 9
 Size: 9 x 4 arc min.

Finder chart

Binoculars: Challenge
 Telescope: Easy
 Skies: Very Dark

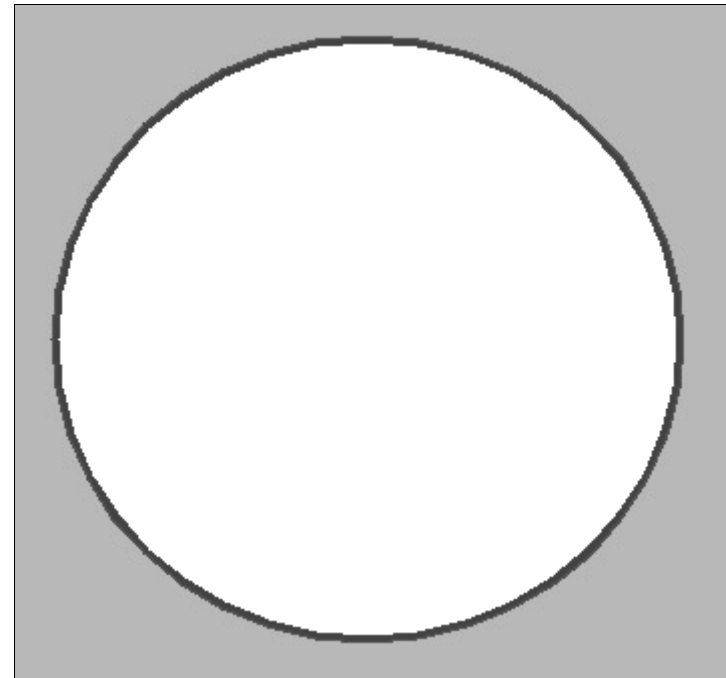
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

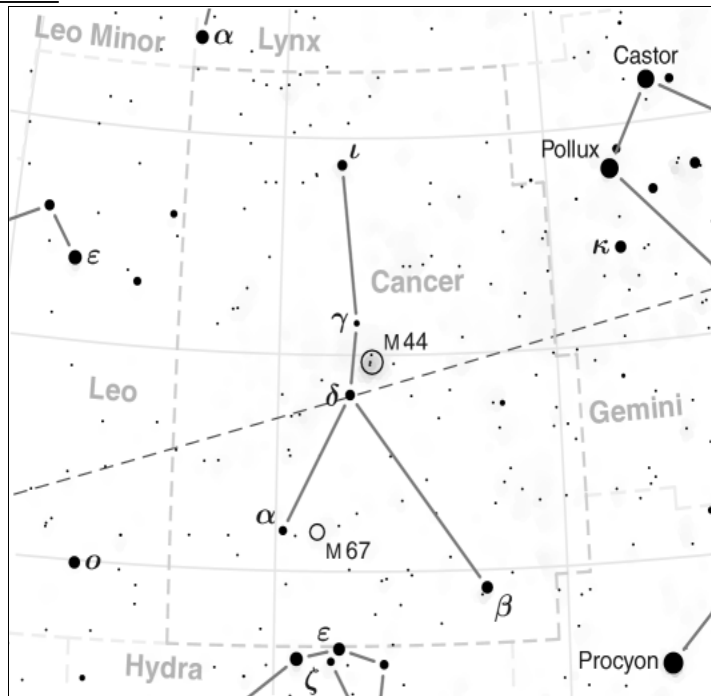
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 67**King Cobra NGC 2682**

Type: Open Cluster
Constellation: Cancer
Right Ascension: 8h 51.4m
Declination: +11° 49'
Magnitude: 6.1
Size: 30 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

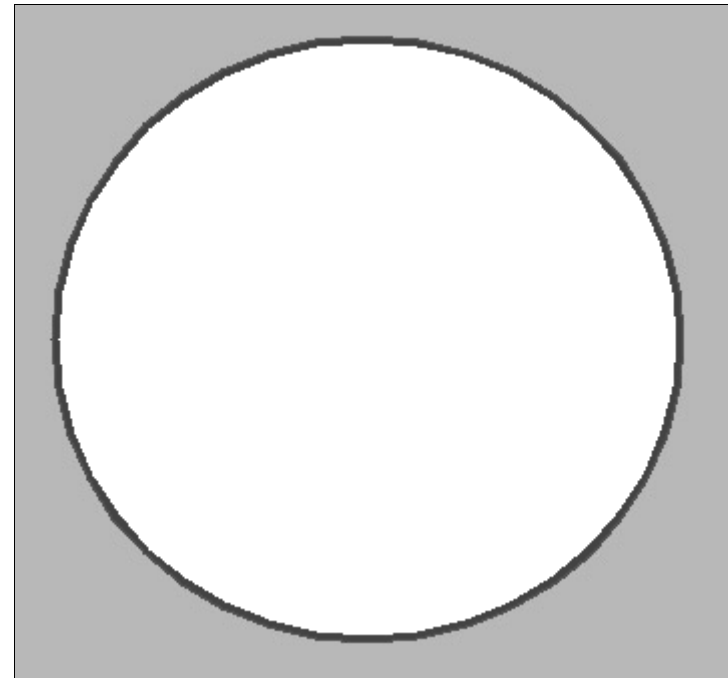
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 68

NGC 4590

Type: Globular Cluster

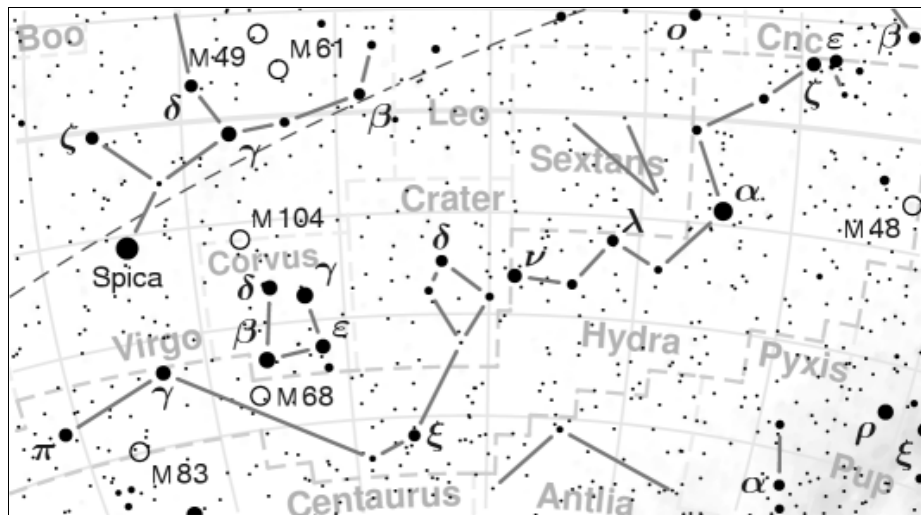
Constellation: Hydra

Right Ascension: 12h 39.5m

Declination: $-26^{\circ} 45'$

Magnitude: 7.8

Size: 12 arc min.

Finder chart

Binoculars: Challenge

Telescope: Tough

Skies: Dark

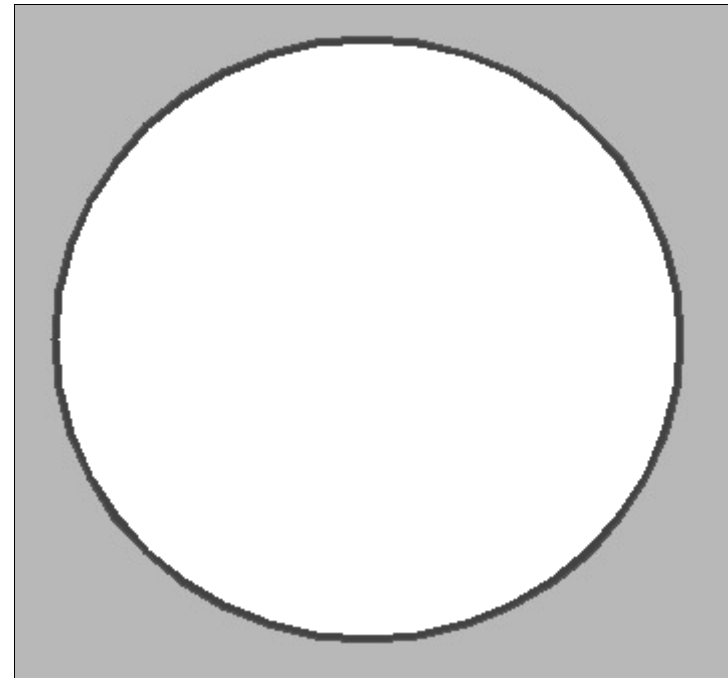
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

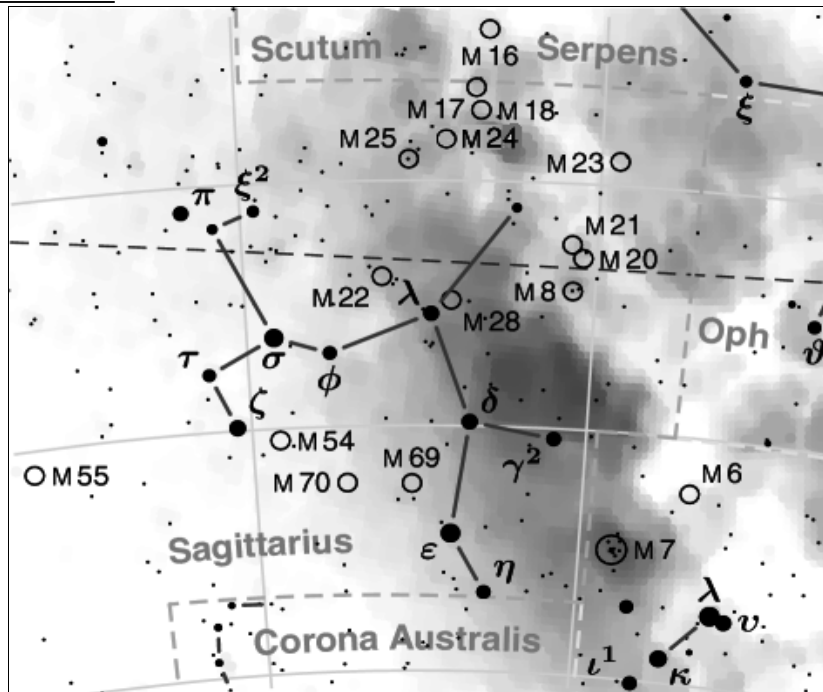


Comments

M 69

NGC 6637

Type: Globular Cluster
 Constellation: Sagittarius
 Right Ascension: 18h 31.4m
 Declination: $-32^{\circ} 21'$
 Magnitude: 7.7
 Size: 9.8 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Dark

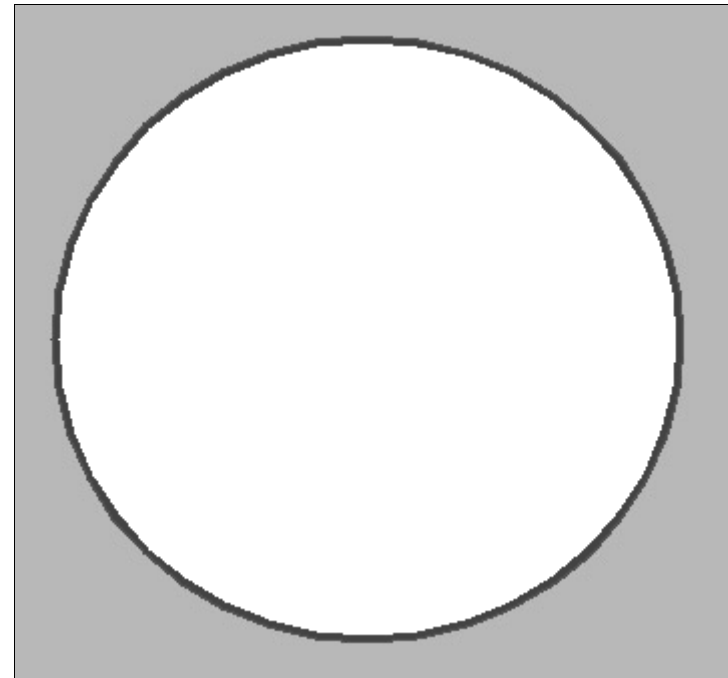
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

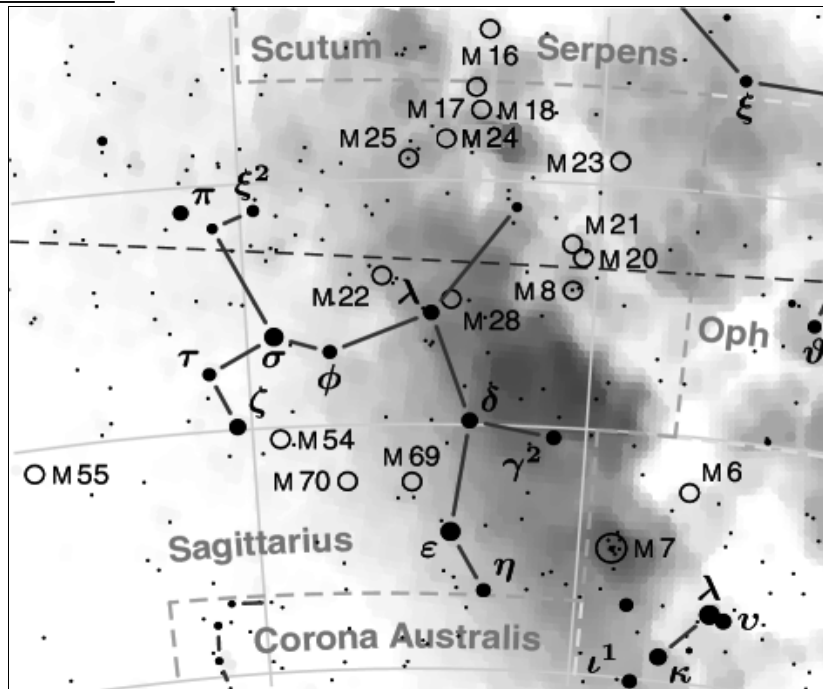


Comments

M 70

NGC 6681

Type: Globular Cluster
Constellation: Sagittarius
Right Ascension: 18h 43.2m
Declination: $-32^{\circ} 18'$
Magnitude: 8.1
Size: 8 arc min.

Finder chart

Binoculars: Not Visible
Telescope: Tough
Skies: Dark

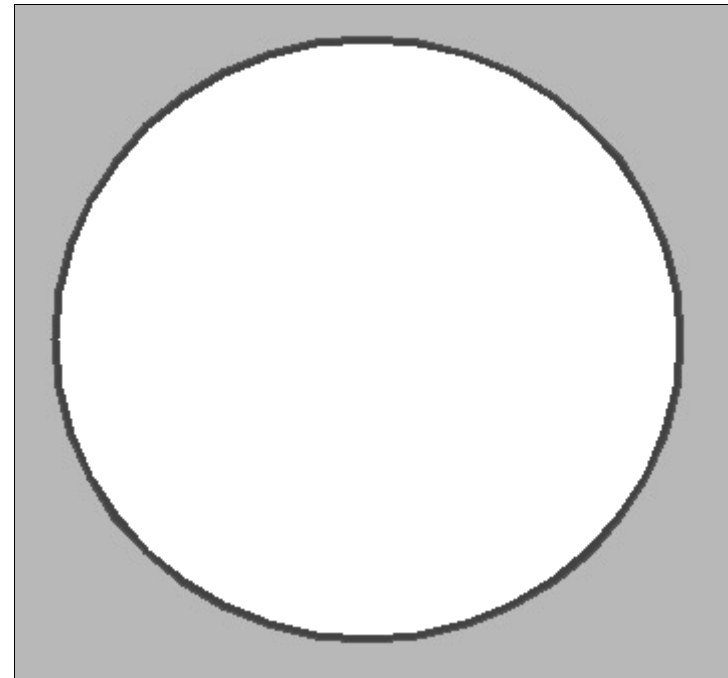
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



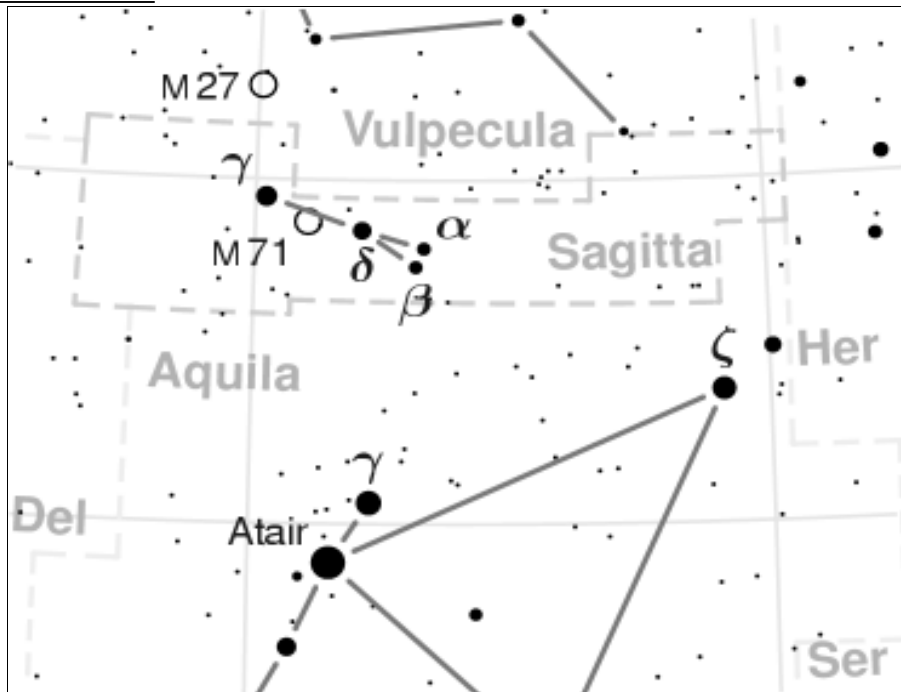
Comments

M 71

NGC 6838

Type: Globular Cluster
 Constellation: Sagitta
 Right Ascension: 19h 53.8m
 Declination: +18° 47'
 Magnitude: 8.3
 Size: 7 arc min.

Finder chart



Binoculars: Challenge
 Telescope: Tough
 Skies: Dark

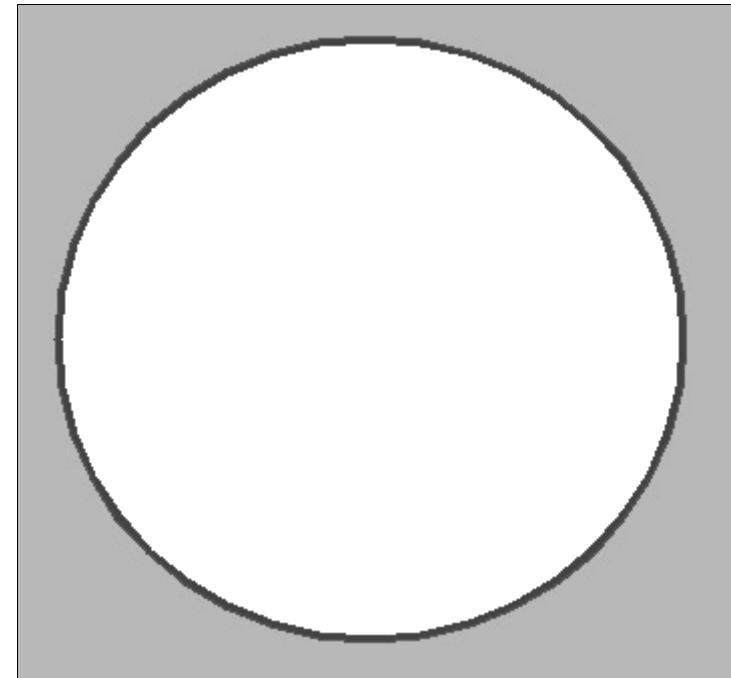
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

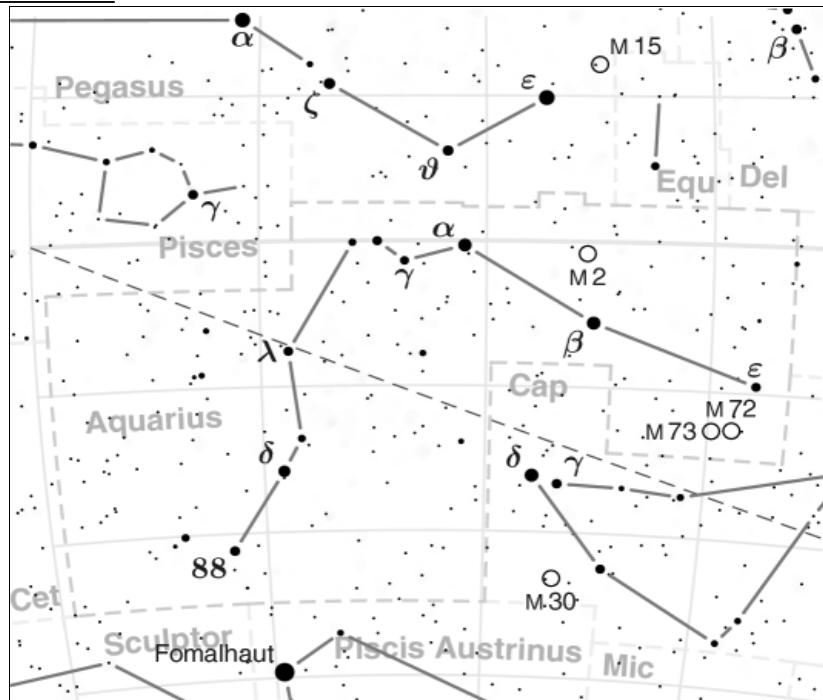


Comments

M 72

NGC 6981

Type: Globular Cluster
Constellation: Aquarius
Right Ascension: 20h 53.5m
Declination: $-12^{\circ} 32'$
Magnitude: 9.4
Size: 6 arc min.

Finder chart

Binoculars: Not Visible
Telescope: Easy
Skies: Dark

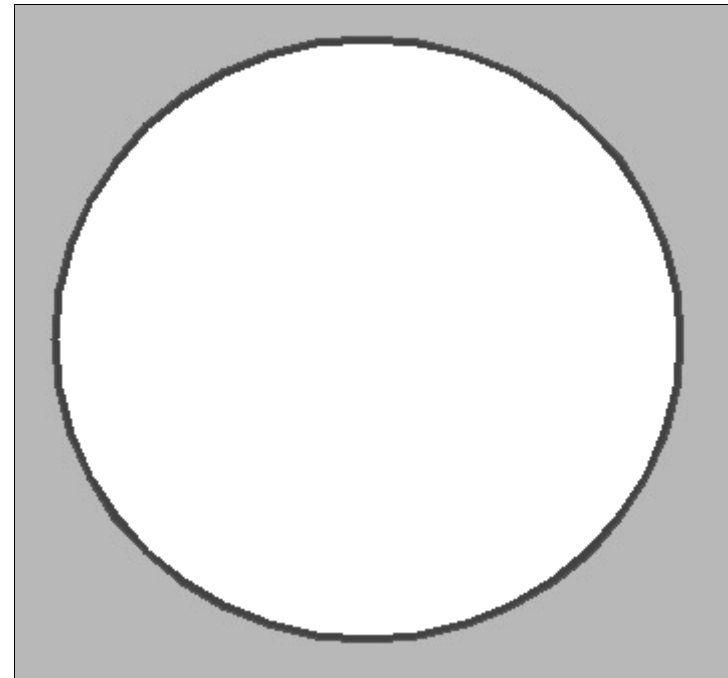
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

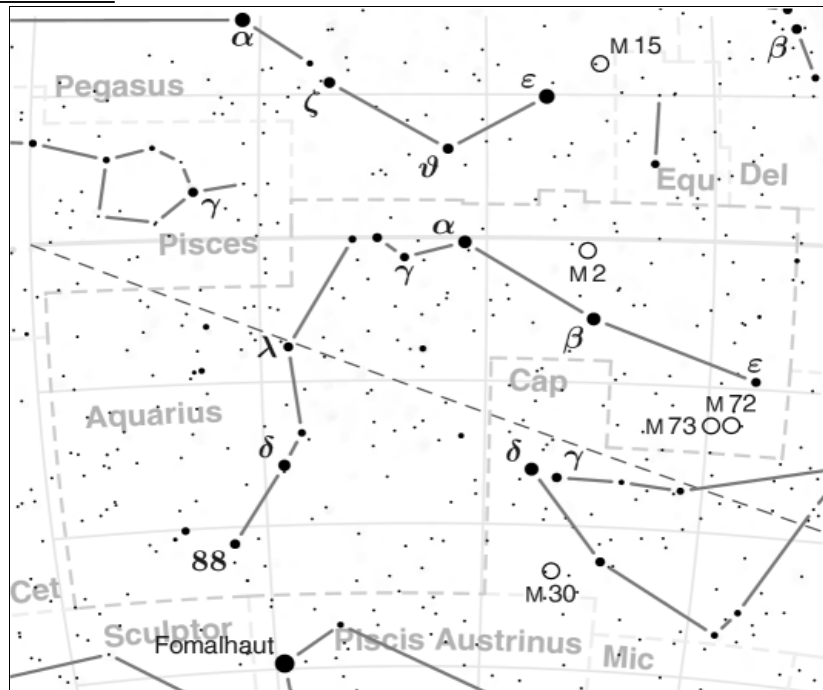


Comments

M 73

NGC 6994

Type: Asterism
 Constellation: Aquarius
 Right Ascension: 20h 58.9m
 Declination: $-12^{\circ} 38'$
 Magnitude: 9.0
 Size: 2.1 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Easy
 Skies: Any

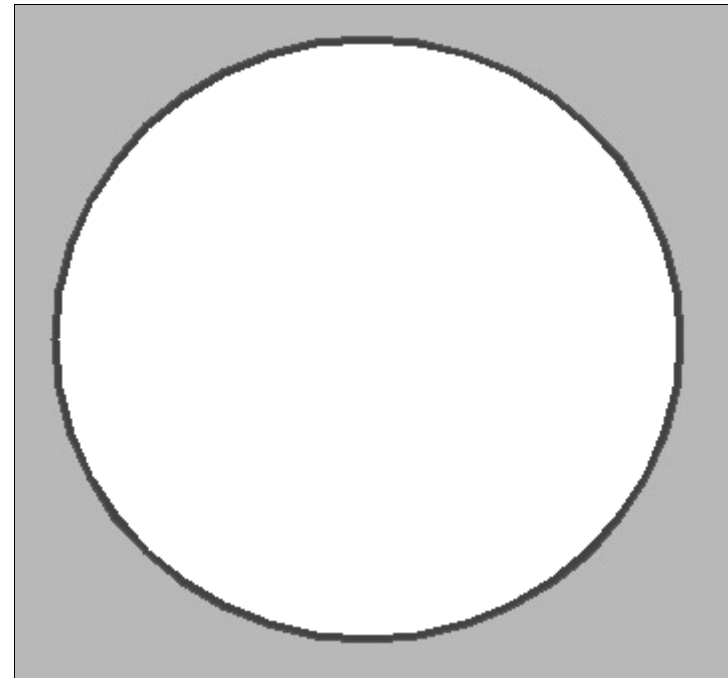
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

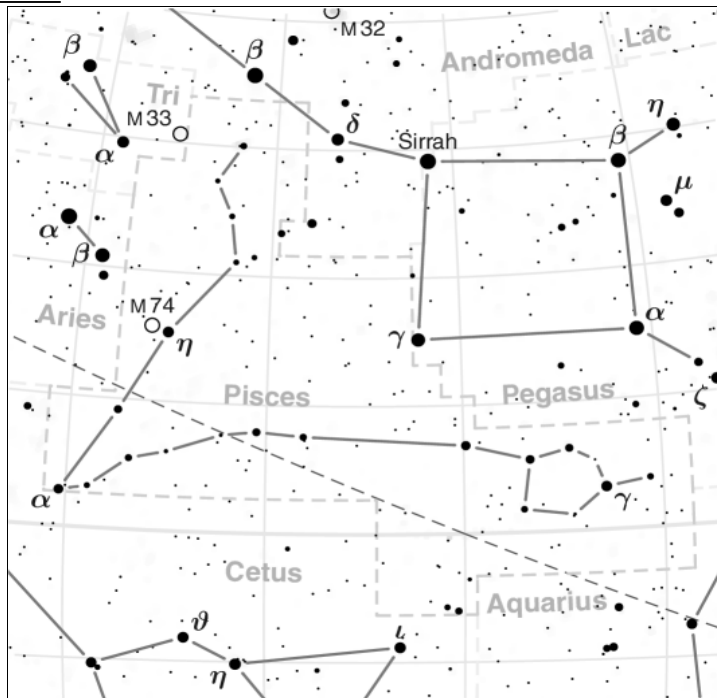
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 74**The Phantom NGC 628**

Type: Galaxy (Spiral)
 Constellation: Pisces
 Right Ascension: 1h 36.7m
 Declination: +15° 47'
 Magnitude: 9.2
 Size: 10 x 9 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

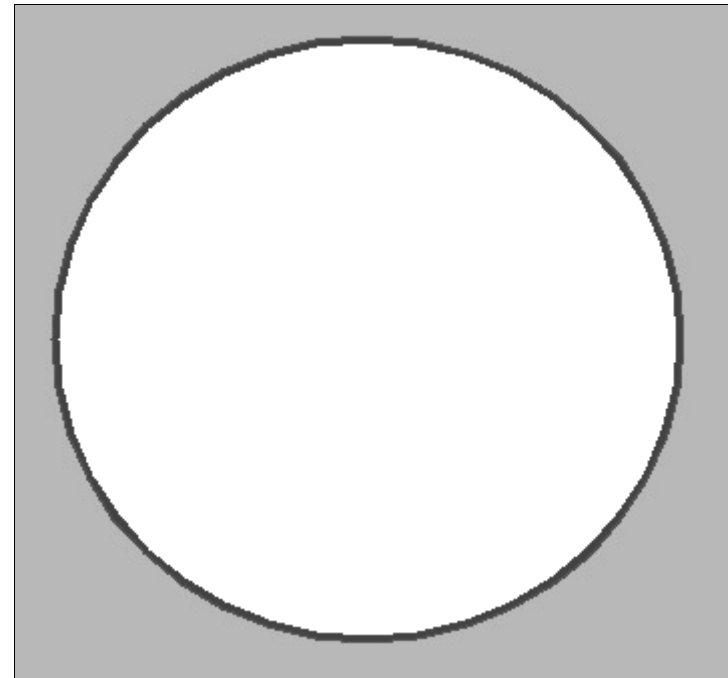
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



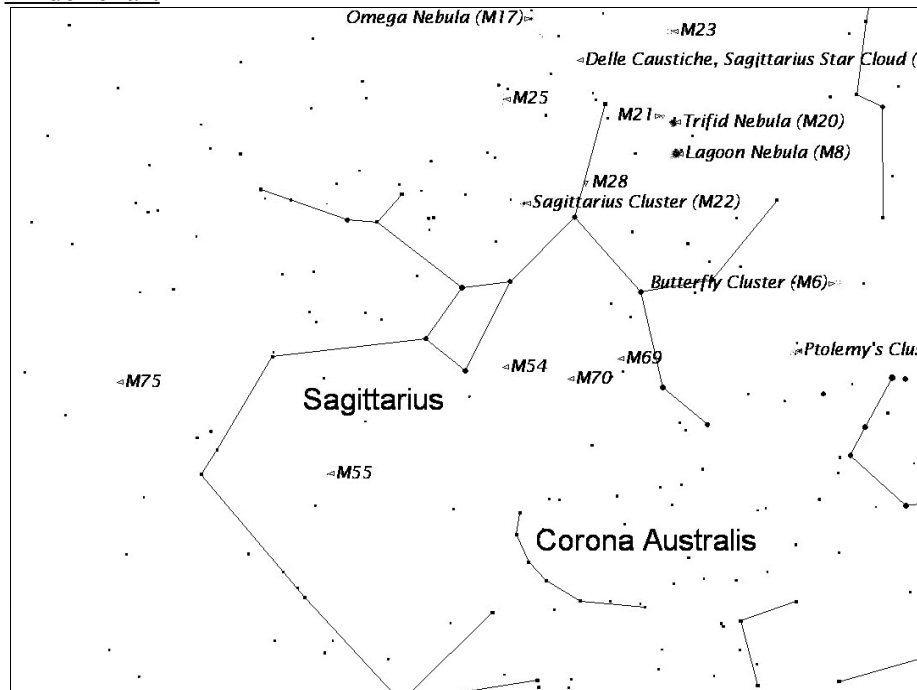
Comments

M 75

NGC 6864

Type: Globular Cluster
 Constellation: Sagittarius
 Right Ascension: 20h 06.1m
 Declination: -21° 55'
 Magnitude: 8.6
 Size: 6 arc min.

Finder chart



Binoculars: Challenge
 Telescope: Tough
 Skies: Dark

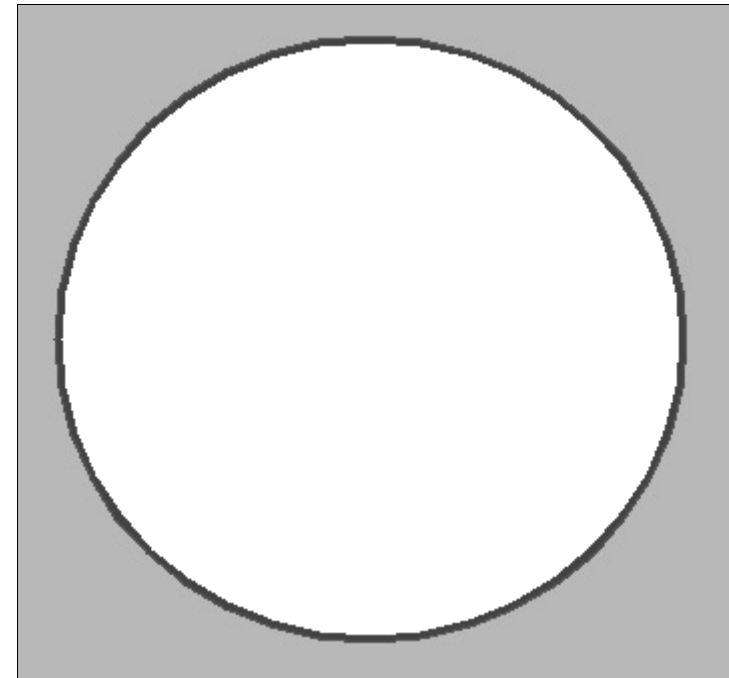
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

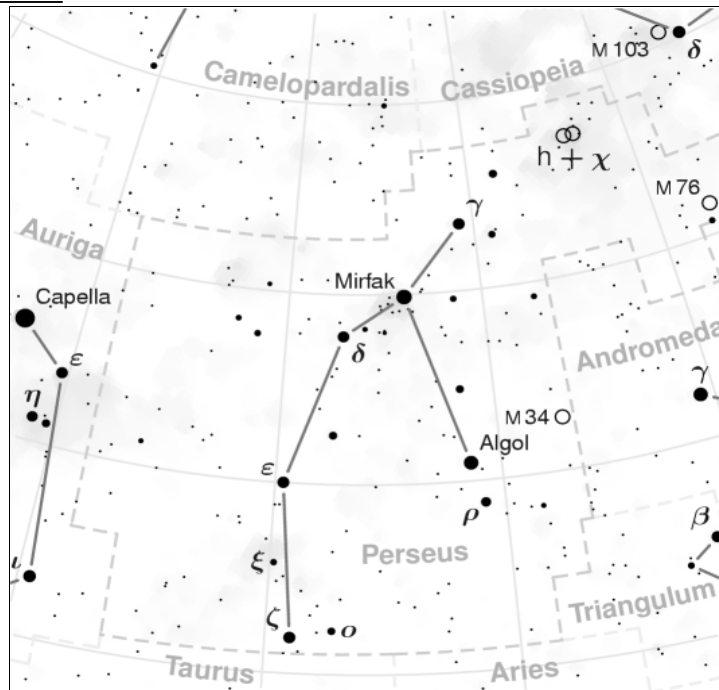
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 76**The Little Dumbbell NGC 650-1**

Type: Planetary Nebula
Constellation: Perseus
Right Ascension: 1h 42.4m
Declination: +51° 34'
Magnitude: 10.1
Size: 2 x 1 arc min.

Finder chart

Binoculars: Not Visible
Telescope: Easy
Skies: Dark

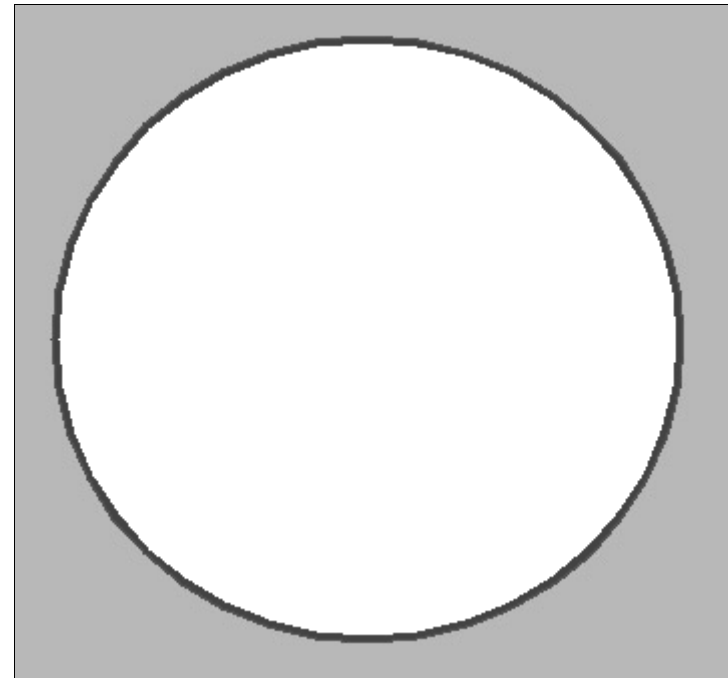
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

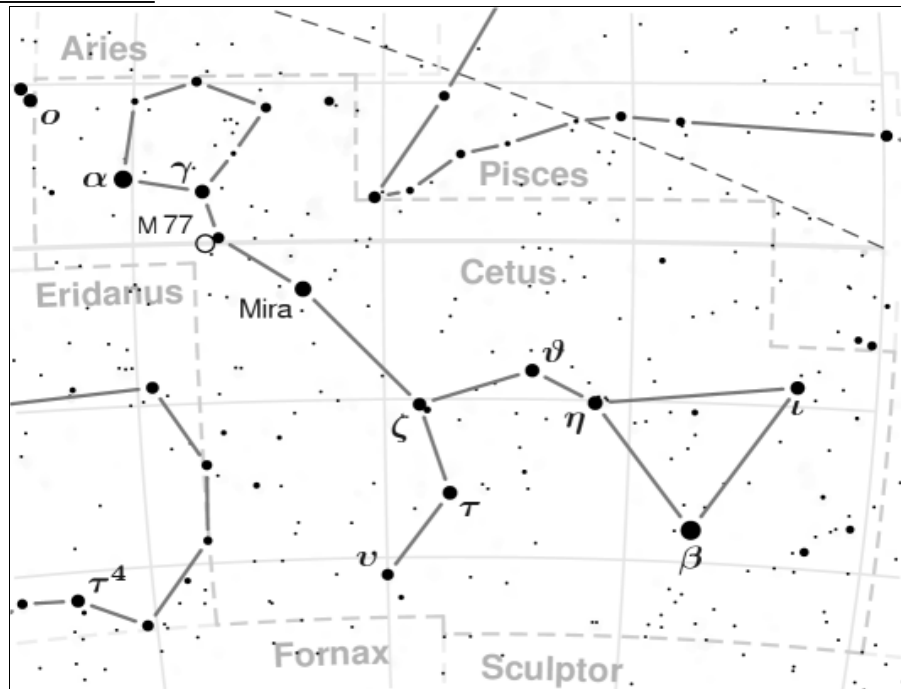


Comments

M 77

NGC 1068

Type: Galaxy (Spiral)
 Constellation: Cetus
 Right Ascension: 2h 42.7m
 Declination: $-0^{\circ} 01'$
 Magnitude: 8.8
 Size: 7 x 6 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

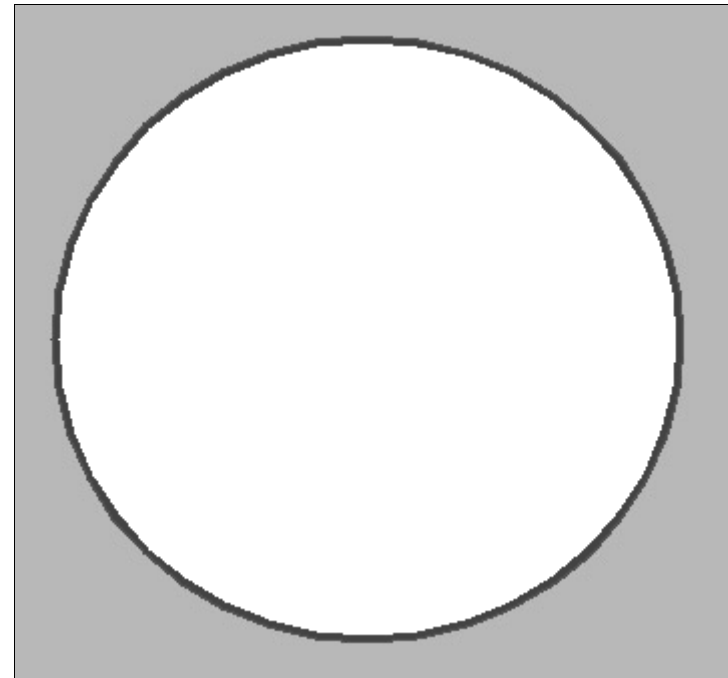
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

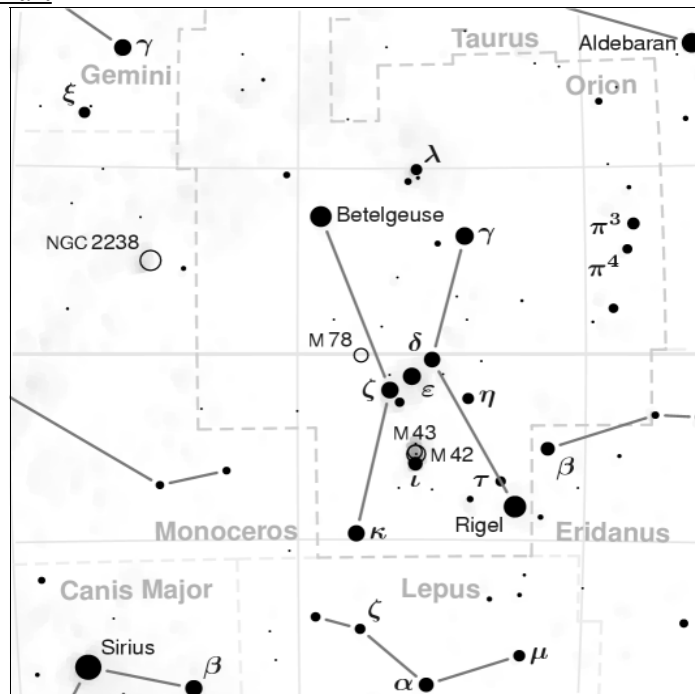


Comments

M 78

NGC 2068

Type: Reflection Nebula
 Constellation: Orion
 Right Ascension: 5h 46.7m
 Declination: +0° 03'
 Magnitude: 8.
 Size: 8 x 6 arc min.

Finder chart

Binoculars: Tough
 Telescope: Easy
 Skies: Dark

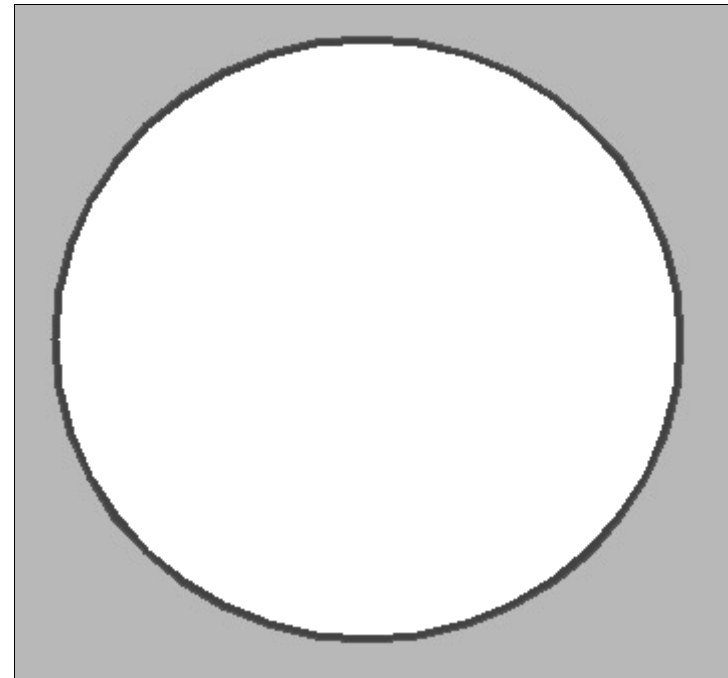
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

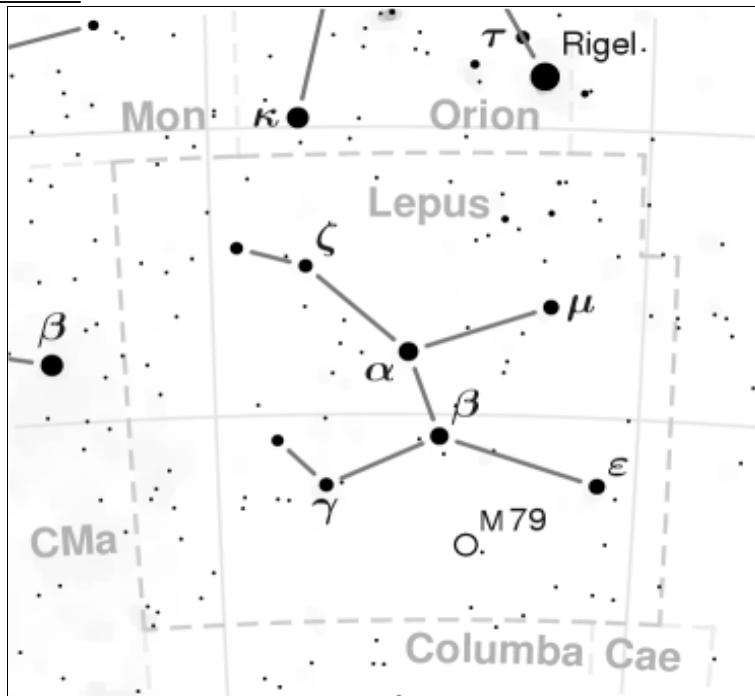


Comments

M 79

NGC 1094

Type: Globular Cluster
Constellation: Lepus
Right Ascension: 5h 24.5m
Declination: $-24^{\circ} 33'$
Magnitude: 8
Size: 9 arc min.

Finder chart

Binoculars: Tough
Telescope: Easy
Skies: Dark

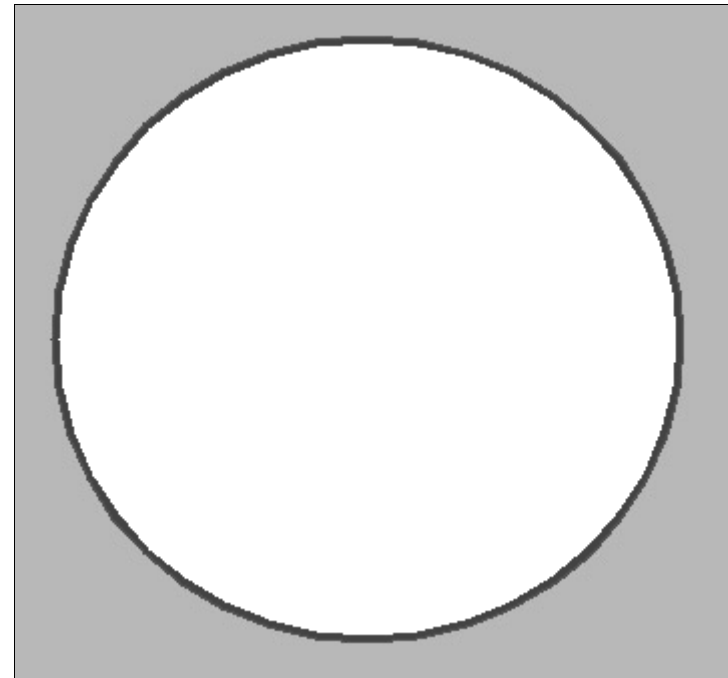
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 80

NGC 6093

Type: Globular Cluster

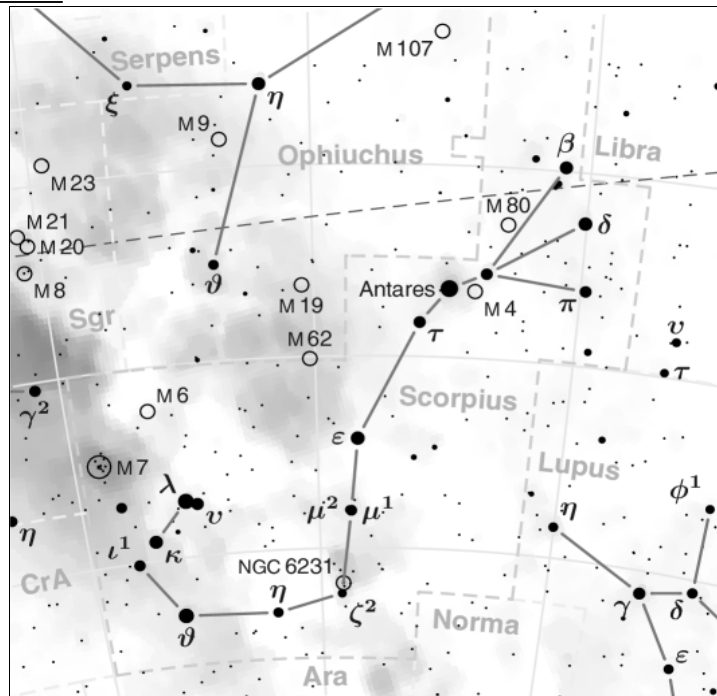
Constellation: Scorpius

Right Ascension: 16h 17m

Declination: $-22^{\circ} 59'$

Magnitude: 7.2

Size: 9 arc min.

Finder chart

Binoculars: Tough

Telescope: Easy

Skies: Dark

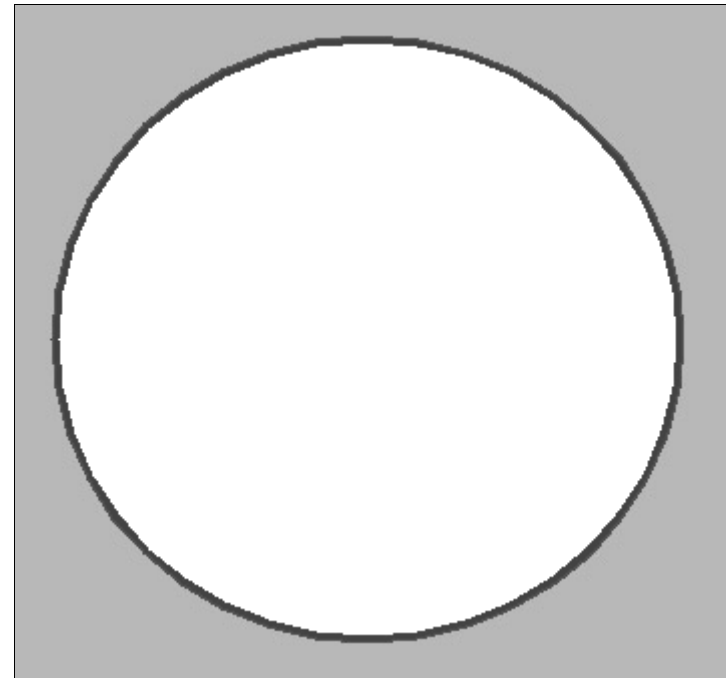
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 81

Bode's Galaxy NGC 3031

Type: Galaxy (Spiral)

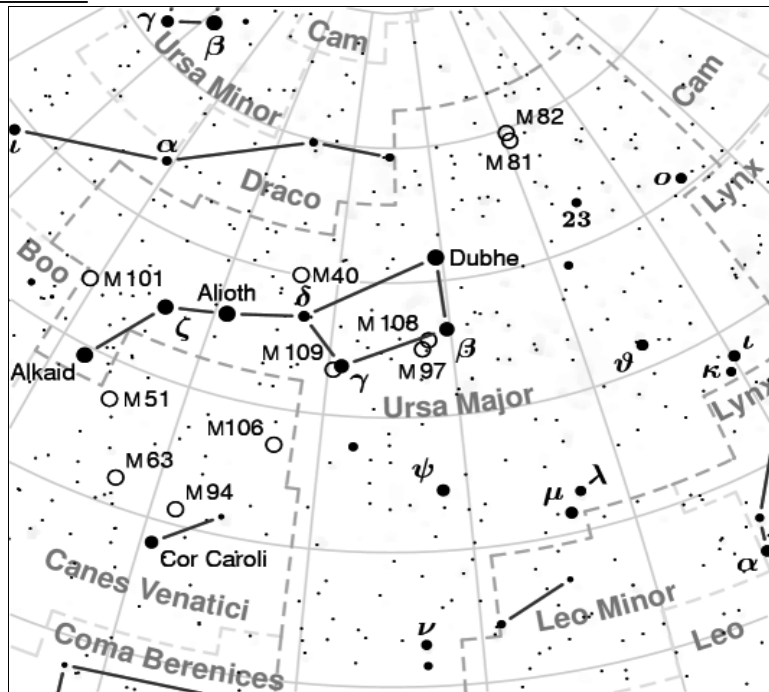
Constellation: Ursa Major

Right Ascension: 9h 55.6m

Declination: +69° 04'

Magnitude: 6.8

Size: 26 x 14 arc min.

Finder chart

Binoculars: Tough

Telescope: Easy

Skies: Very Dark

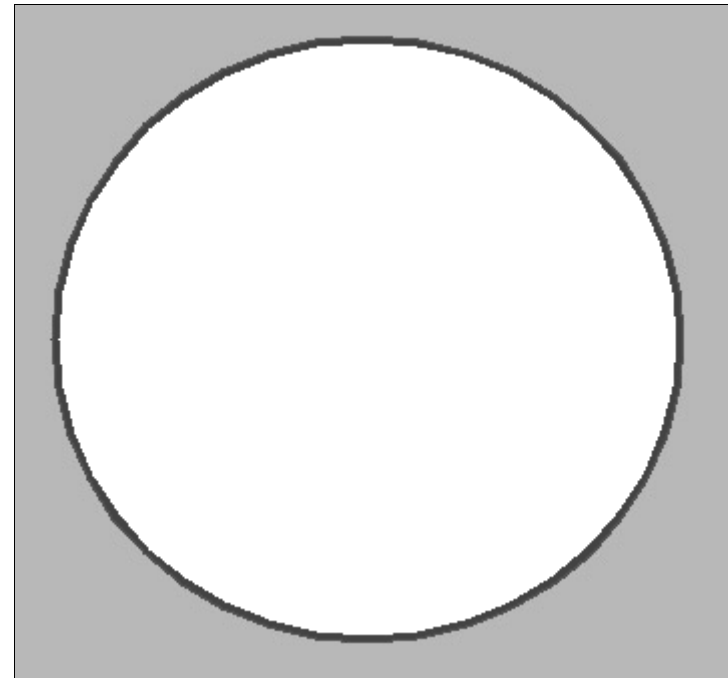
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

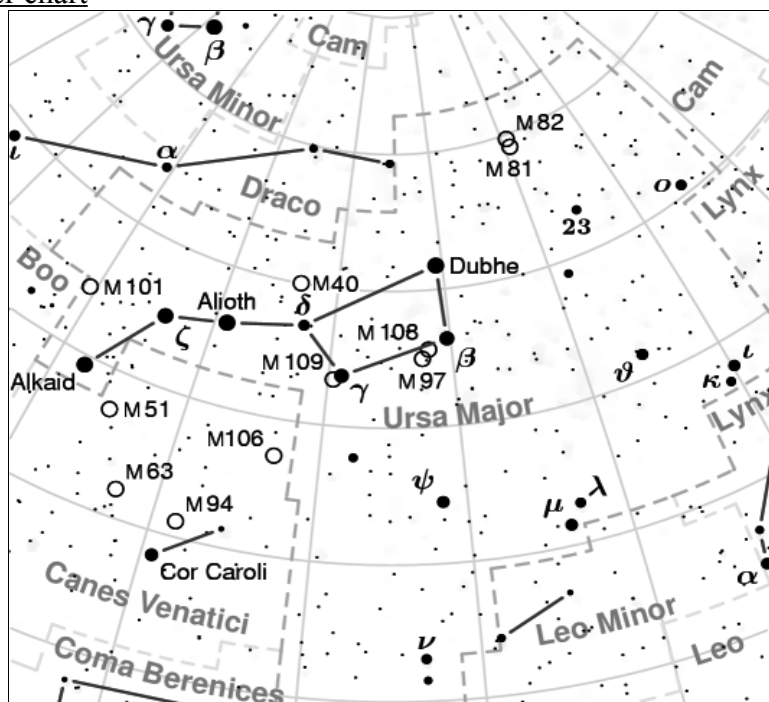
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

The Cigar Galaxy NGC 3034

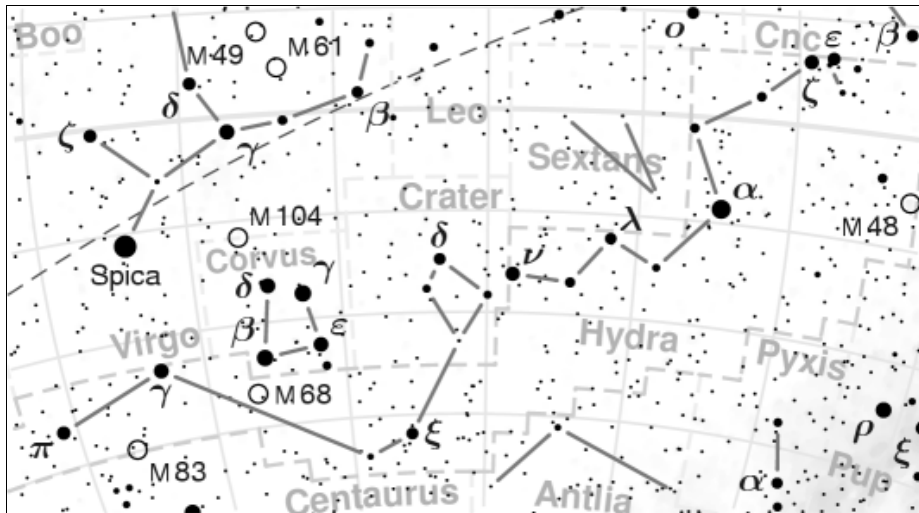
Date: _____ Time: _____ UT.
 Location: _____
 Equipment: _____
 Transparency: _____ (Please rate from 1 excellent to 5 poor.)
 Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 83**The Southern Pinwheel Galaxy NGC 5236**

Type: Galaxy (Spiral)
Constellation: Hydra
Right Ascension: 13h 37m
Declination: $-29^{\circ} 52'$
Magnitude: 8
Size: 11 x 10 arc min.

Finder chart

Binoculars: Tough
Telescope: Tough
Skies: Very Dark

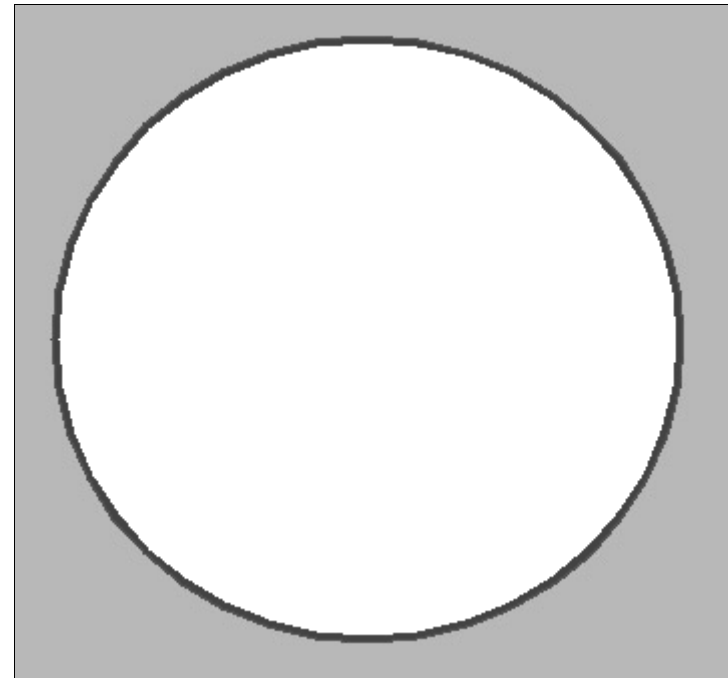
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

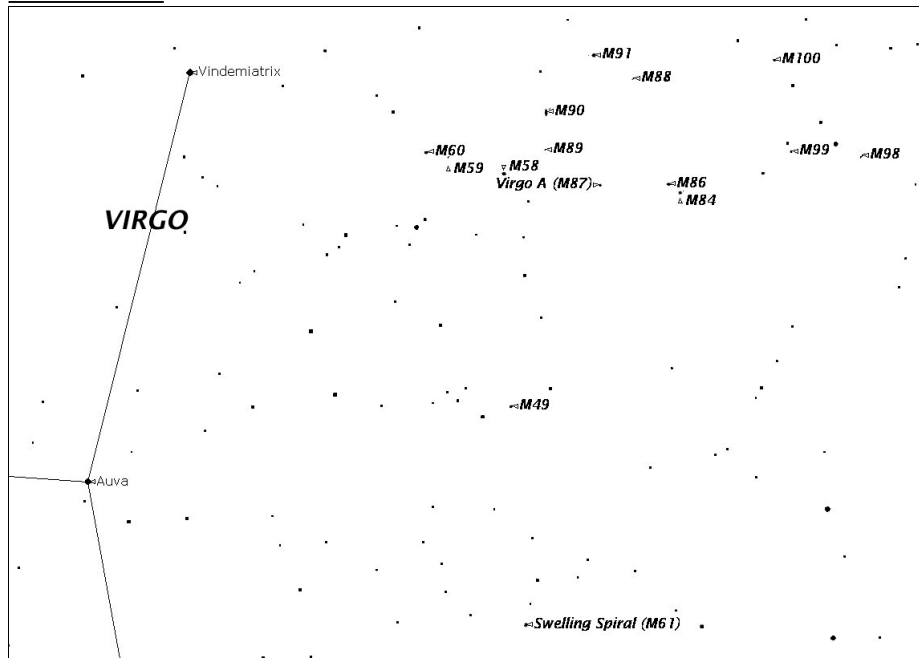


Comments

M 84

NGC 4374

Type: Galaxy (Elliptical)
Constellation: Virgo
Right Ascension: 12h 25.1m
Declination: +12° 53'
Magnitude: 9.3
Size: 5 x 4 arc min.

Finder chart**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

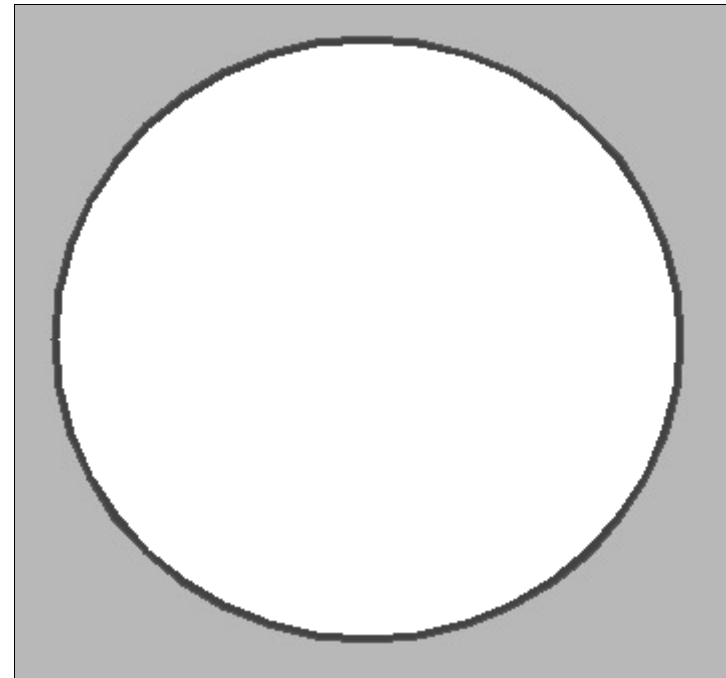
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



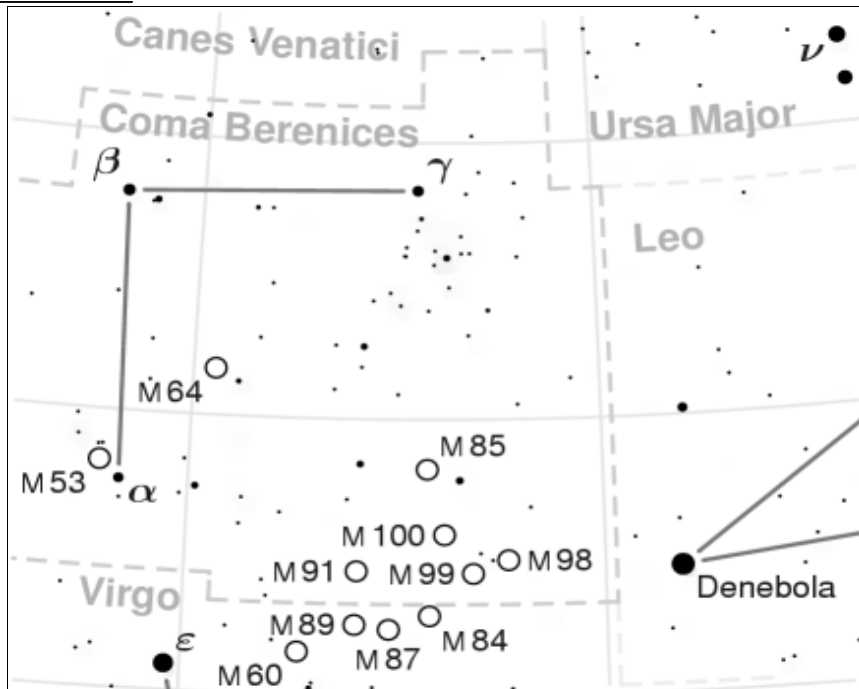
Comments

M 85

NGC 4382

Type: Galaxy (Elliptical)
 Constellation: Coma Berenices
 Right Ascension: 12h 25.4m
 Declination: +18° 11'
 Magnitude: 9.2
 Size: 7 x 5 arc min.

Finder chart



Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

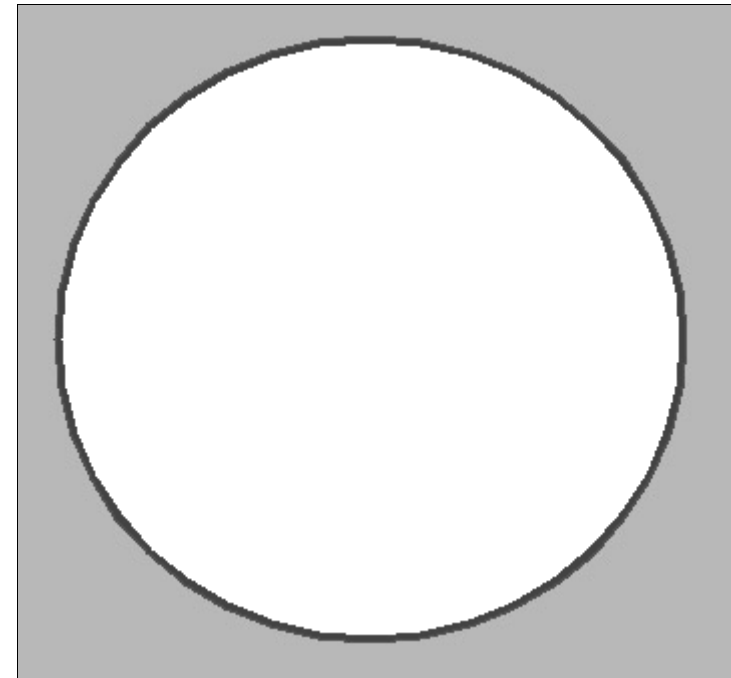
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

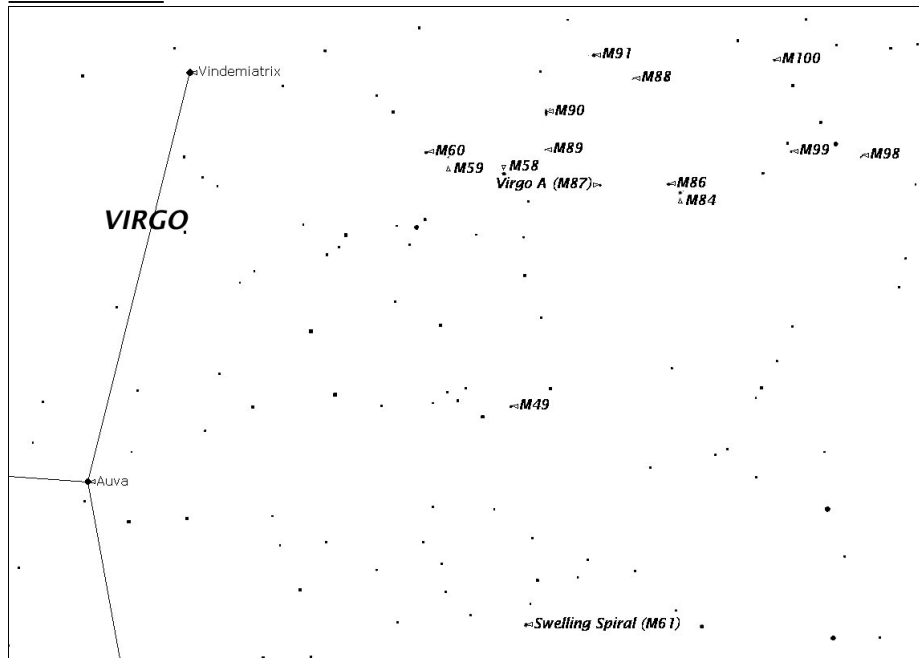


Comments

M 86

NGC 4406

Type: Galaxy (Elliptical)
Constellation: Virgo
Right Ascension: 12h 26.2m
Declination: +12° 57'
Magnitude: 9.2
Size: 7 x 5 arc min.

Finder chart**See larger chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

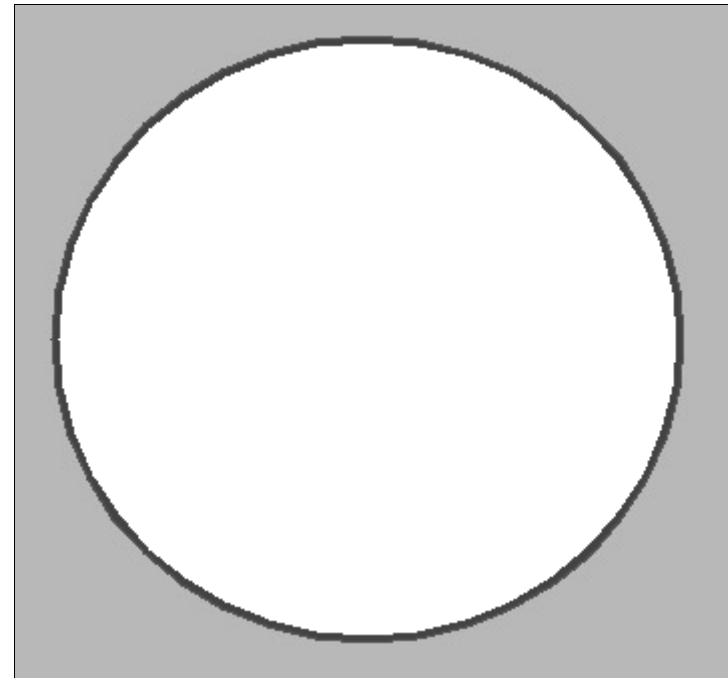
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 87

NGC 4486

Type: Galaxy (Elliptical)

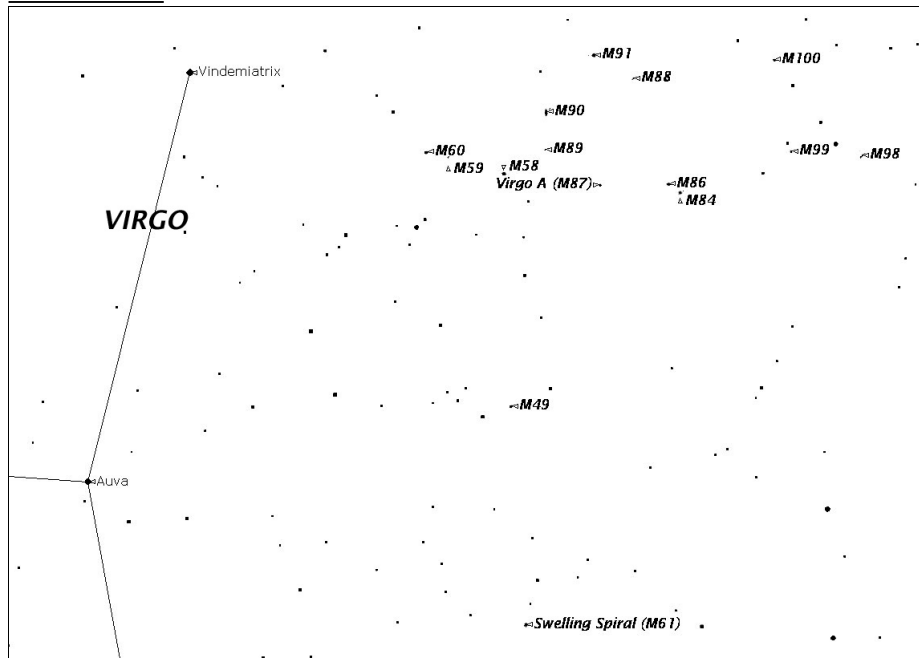
Constellation: Virgo

Right Ascension: 12h 30.8m

Declination: +12° 24'

Magnitude: 8.6

Size: 7 arc min.

Finder chart

See larger chart of Virgo Cluster in Appendix A

Binoculars: Not Visible

Telescope: Tough

Skies: Very Dark

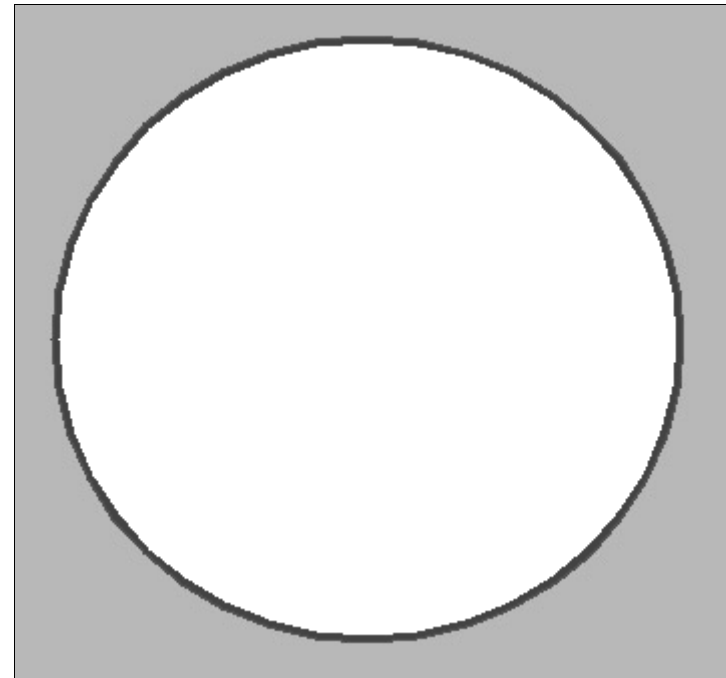
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

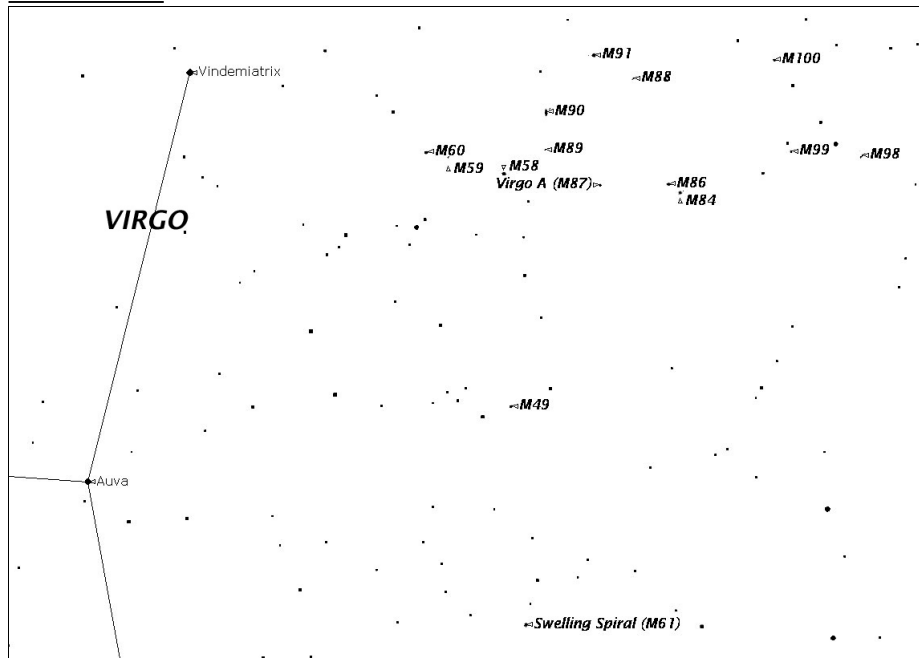


Comments

M 88

NGC 4501

Type: Galaxy (Spiral)
Constellation: Coma Berenices
Right Ascension: 12h 32m
Declination: +14° 25'
Magnitude: 9.5
Size: 7 x 4 arc min.

Finder chart**See larger chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

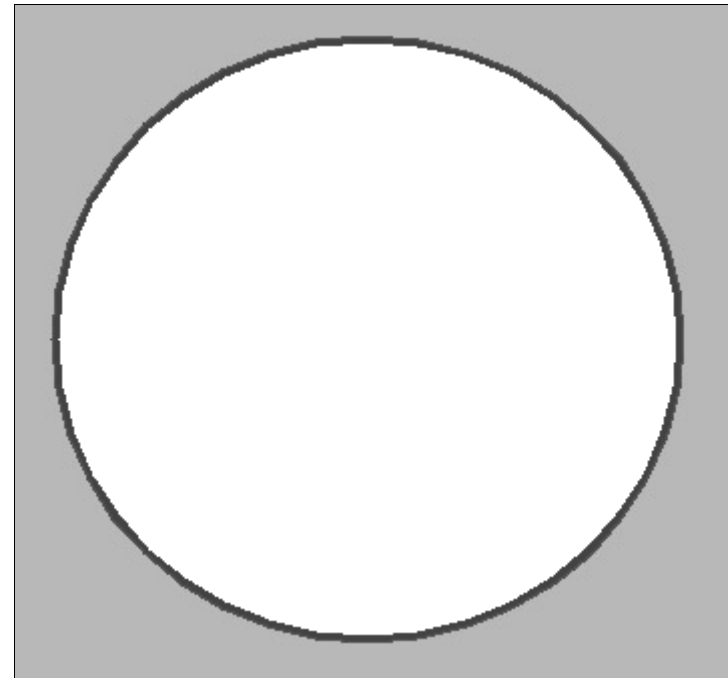
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 89

NGC 4552

Type: Galaxy (Elliptical)

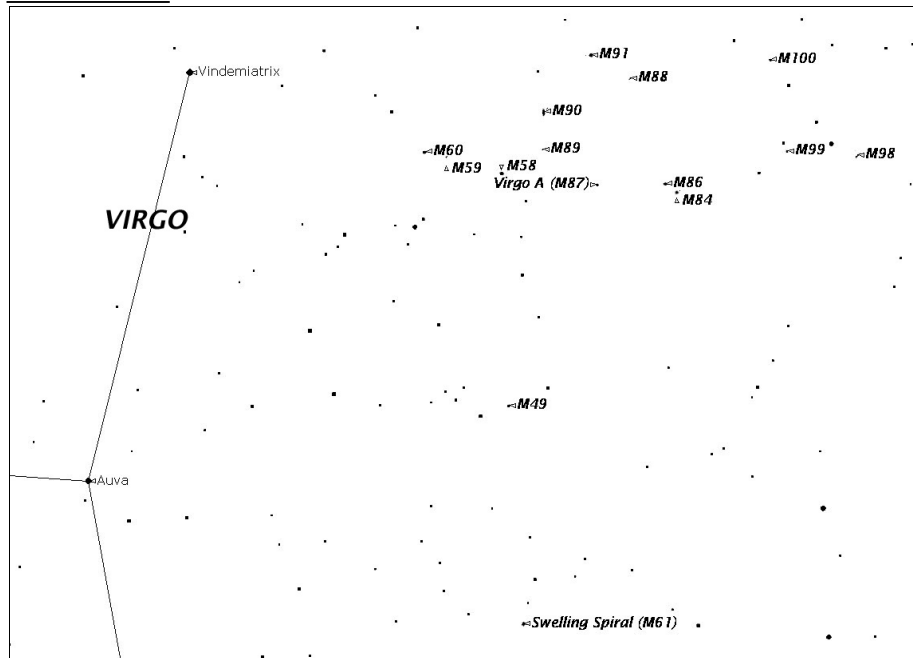
Constellation: Virgo

Right Ascension: 12h 35.7m

Declination: +12° 33'

Magnitude: 9.8

Size: 4 arc min.

Finder chart.**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible

Telescope: Tough

Skies: Very Dark

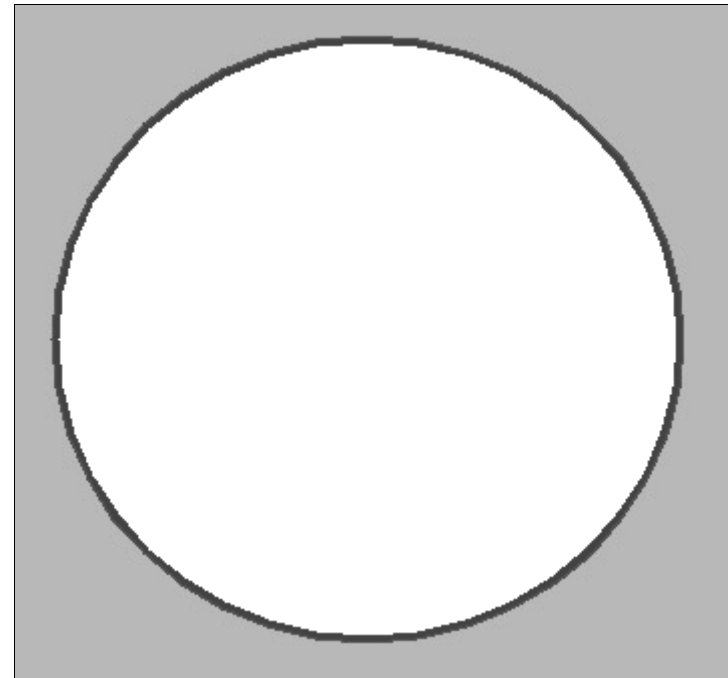
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

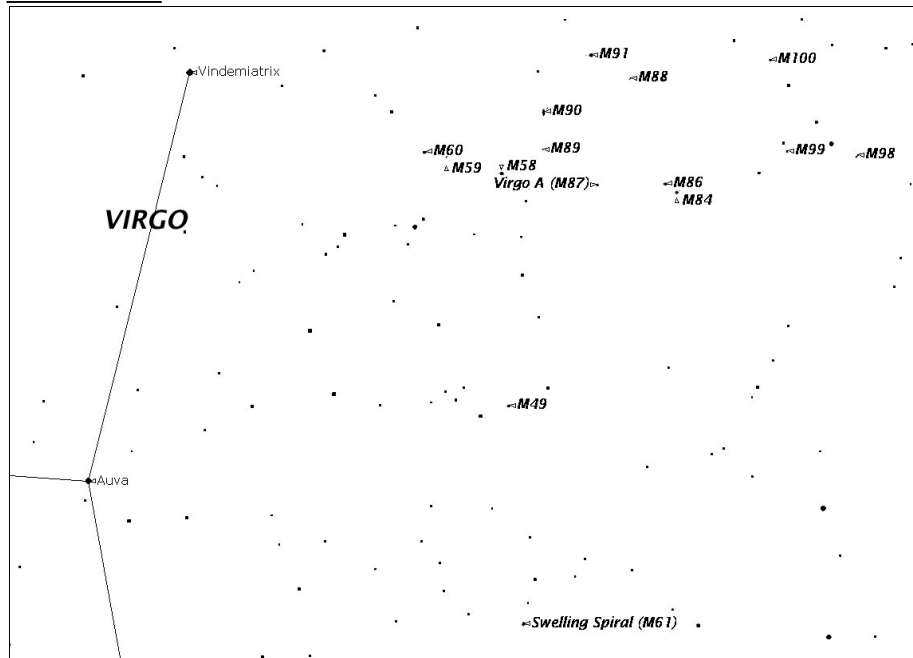


Comments

M 90

NGC 4569

Type: Galaxy (Spiral)
Constellation: Virgo
Right Ascension: 12h 36.8m
Declination: +13° 10'
Magnitude: 9.5
Size: 10 x 5 arc min.

Finder chart**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

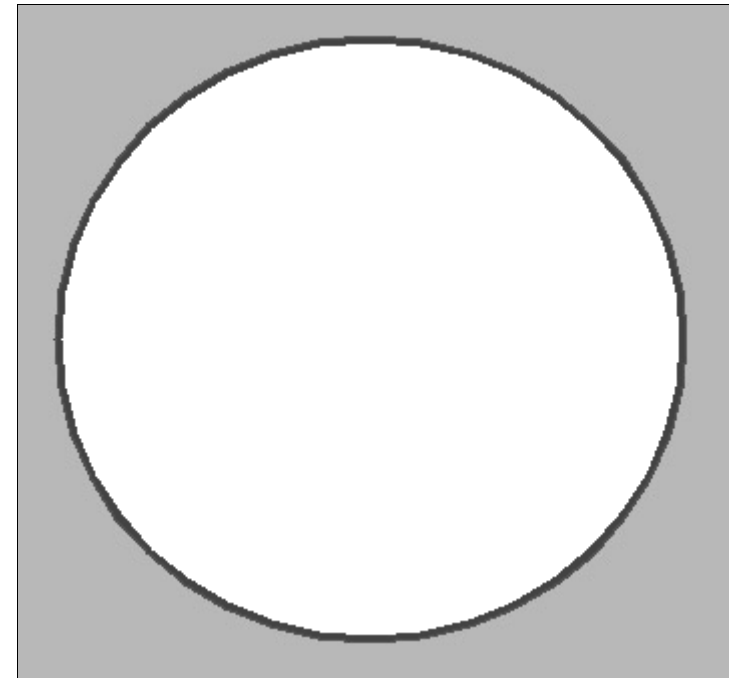
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

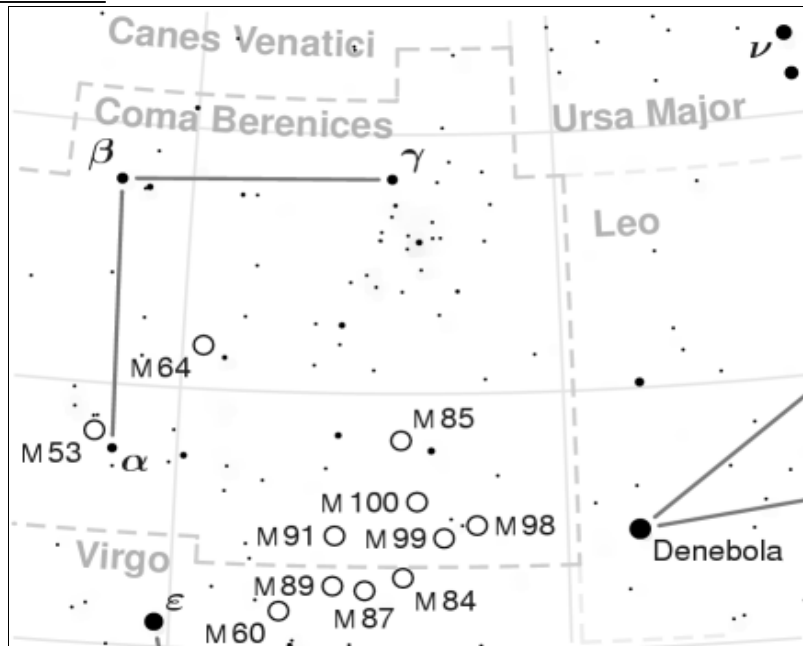


Comments

M 91

NGC 4548

Type: Galaxy (Spiral)
 Constellation: Coma Berenices
 Right Ascension: 12h 35.4m
 Declination: +14° 30'
 Magnitude: 10.2
 Size: 5 x 4 arc min.

Finder chart

See Larger Chart of Virgo Cluster in Appendix A

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

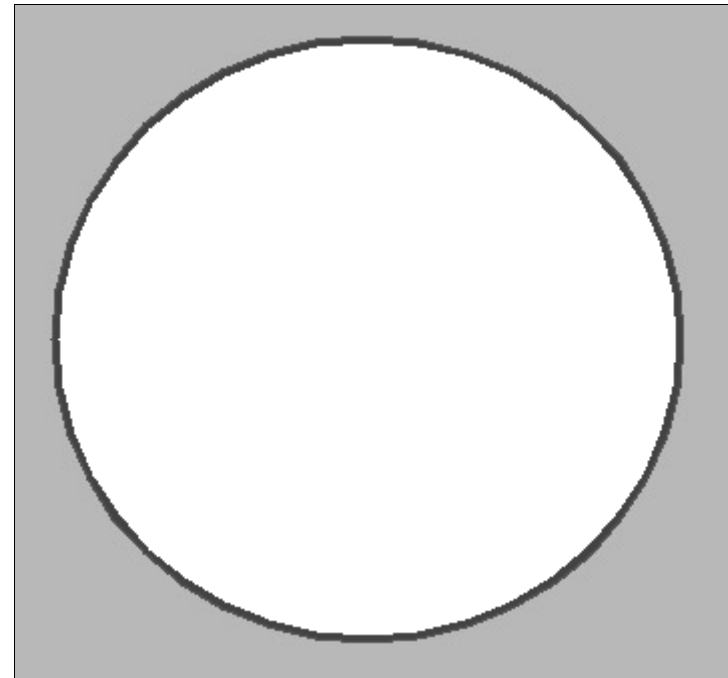
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 92

NGC 6341

Type: Globular Cluster

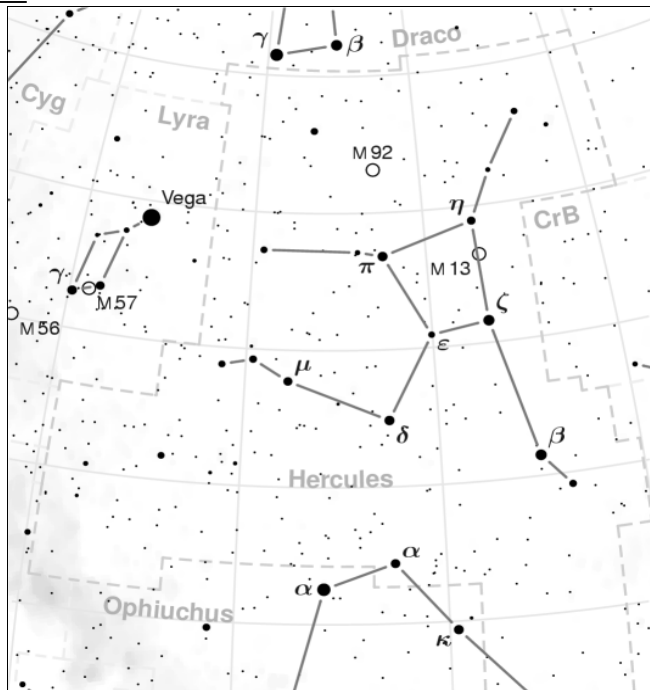
Constellation: Hercules

Right Ascension: 17h 17.1m

Declination: +43° 08'

Magnitude: 6.5

Size: 11 arc min.

Finder chart

Binoculars: Easy

Telescope: Easy

Skies: Dark

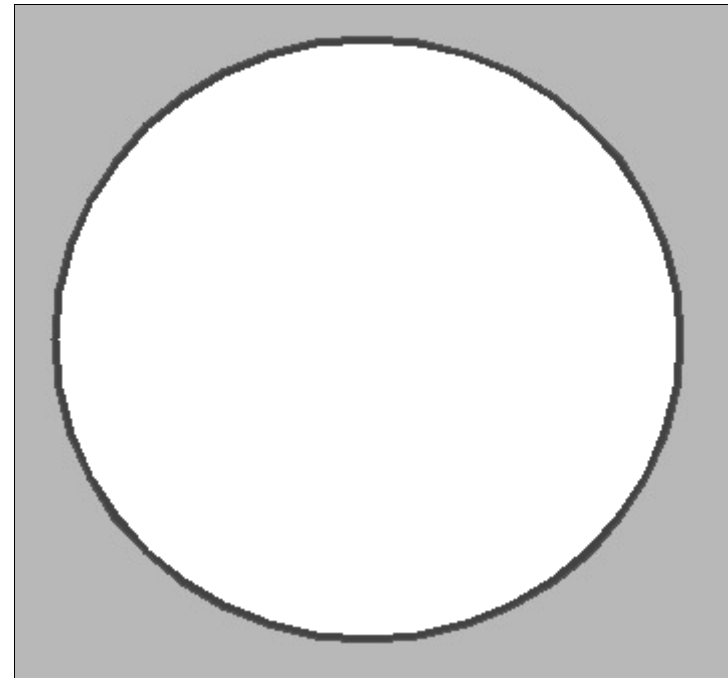
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

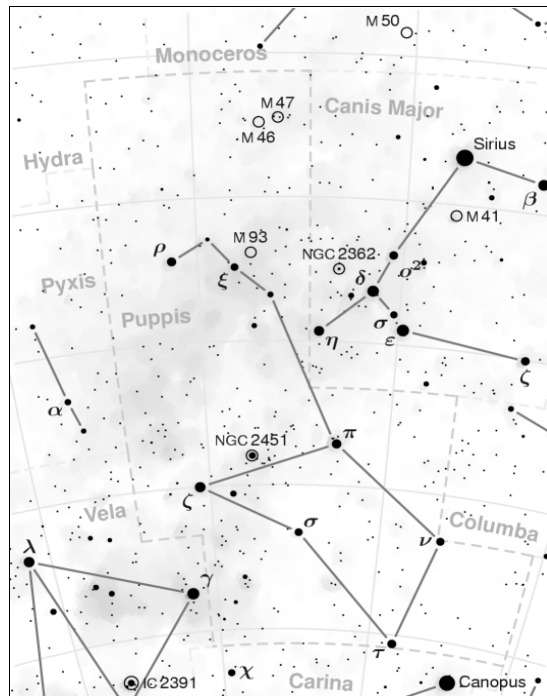


Comments

M 93

NGC 2447

Type: Open Cluster
Constellation: Puppis
Right Ascension: 7h 44.6m
Declination: $-23^{\circ} 52'$
Magnitude: 6
Size: 22 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

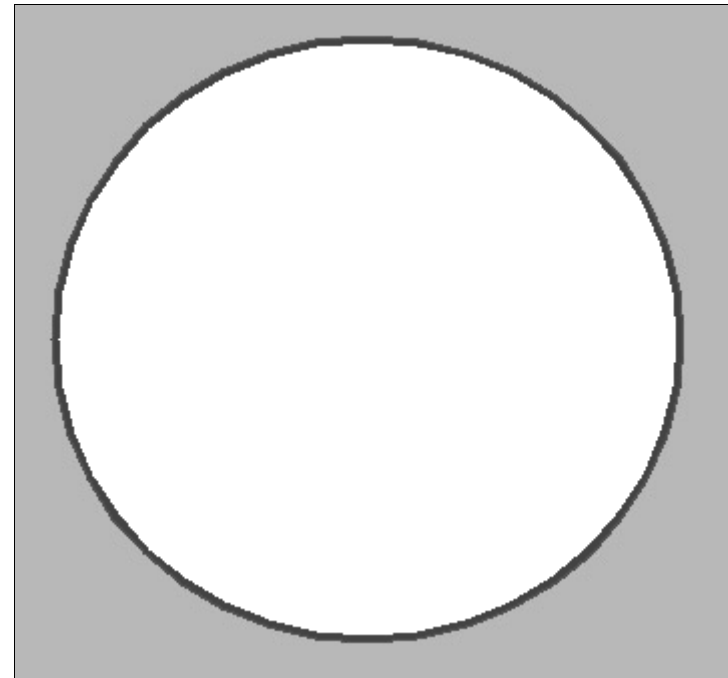
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

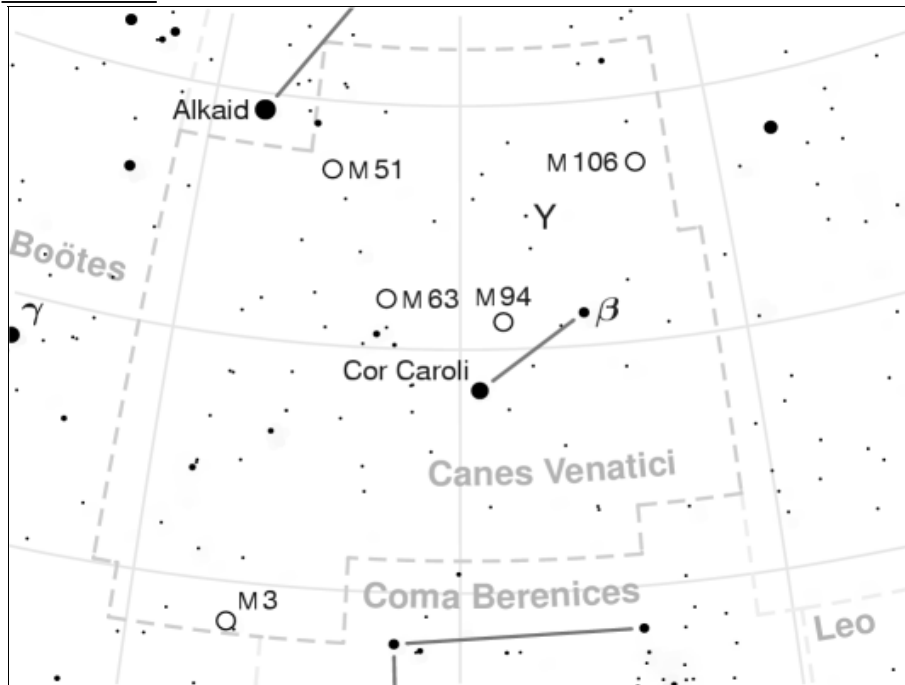


Comments

M 94

NGC 4736

Type: Galaxy (Spiral)
Constellation: Canes Venatici
Right Ascension: 12h 50.9m
Declination: +41° 07'
Magnitude: 8.1
Size: 7 x 3 arc min.

Finder chart

Binoculars: Tough
Telescope: Tough
Skies: Very Dark

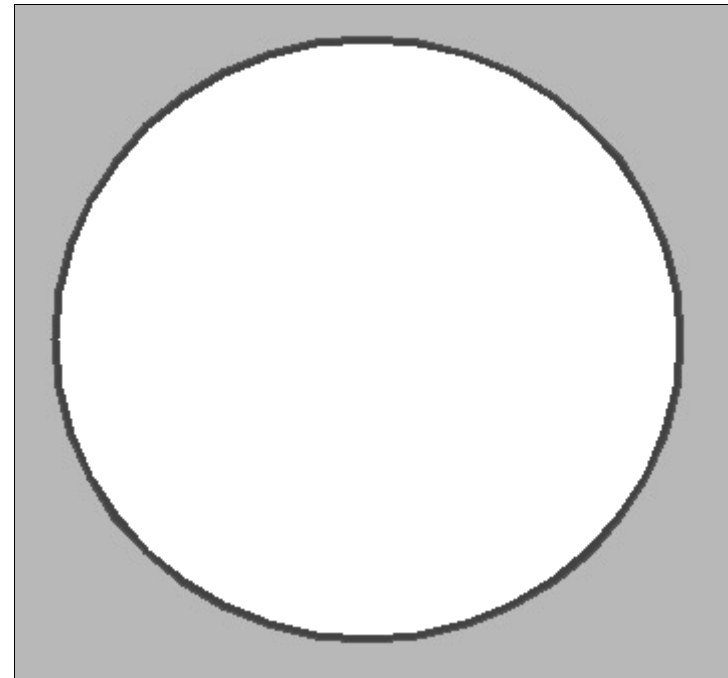
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

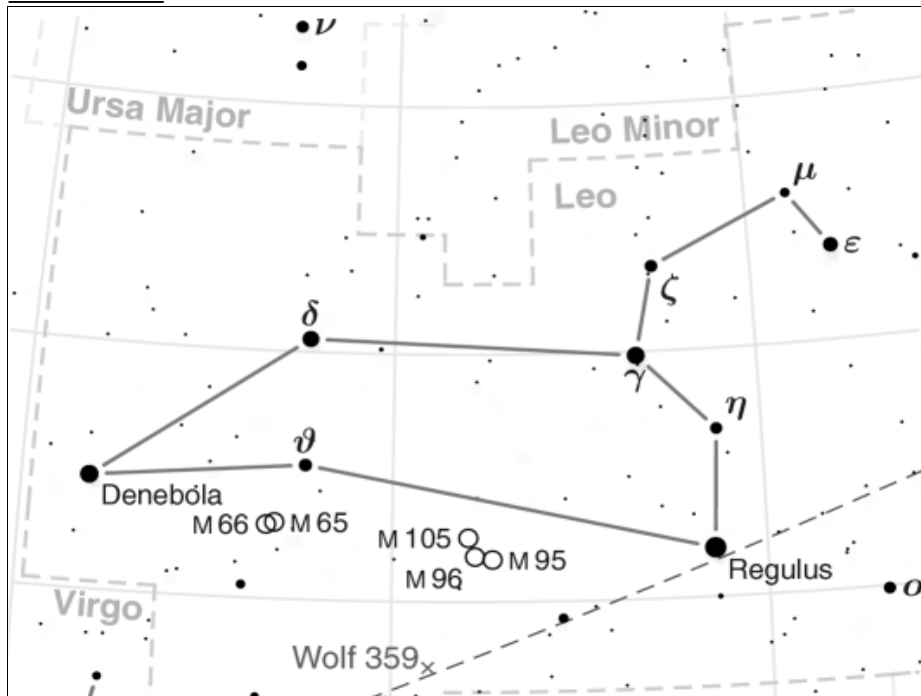


Comments

M 95

NGC 3351

Type: Galaxy (Spiral)
 Constellation: Leo
 Right Ascension: 10h 44m
 Declination: $+11^{\circ} 42'$
 Magnitude: 9.7
 Size: 7 x 5 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Easy
 Skies: Very Dark

The Messier Objects Observing Challenge

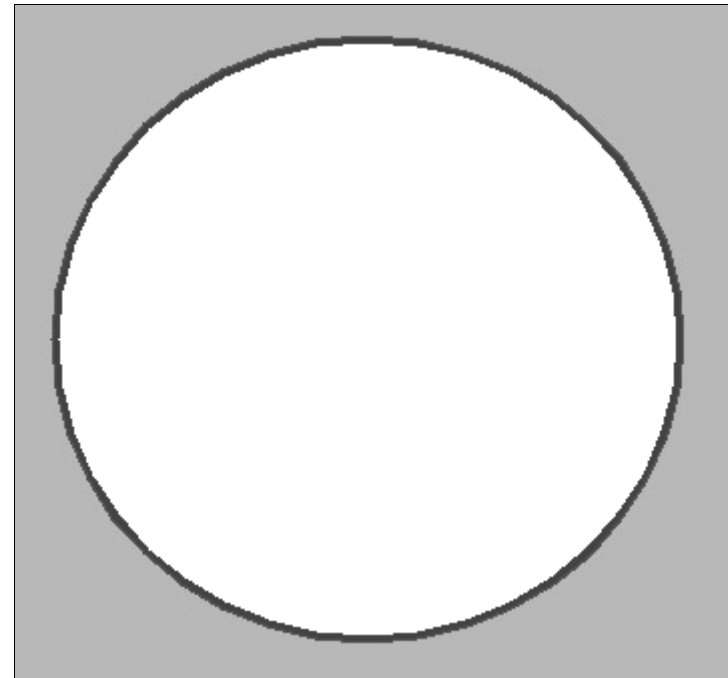
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

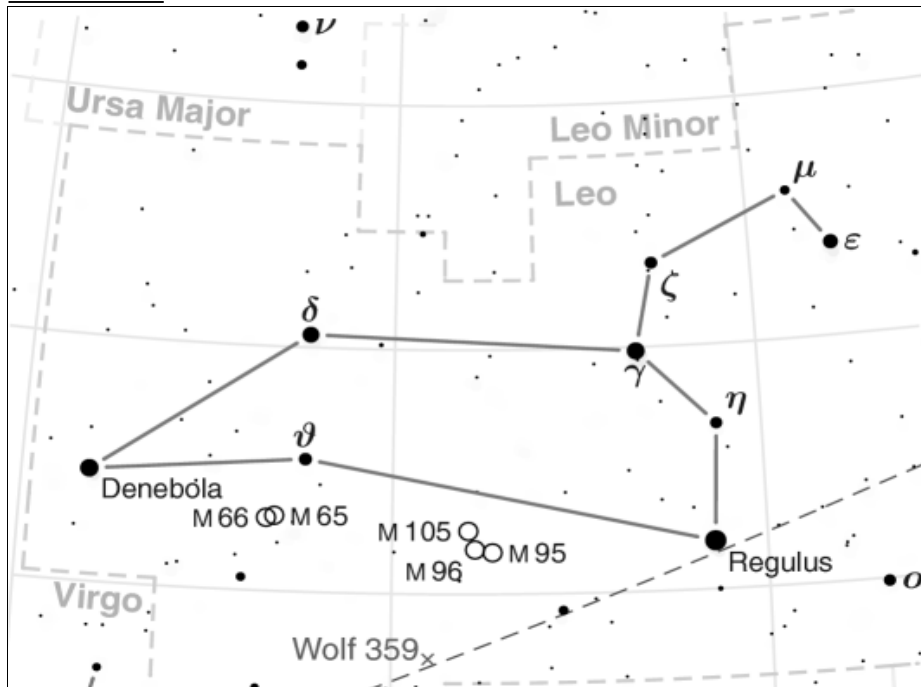


Comments

M 96

NGC 3368

Type: Galaxy (Spiral)
 Constellation: Leo
 Right Ascension: 10h 46.8m
 Declination: +11° 49'
 Magnitude: 9.2
 Size: 7 x 5 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

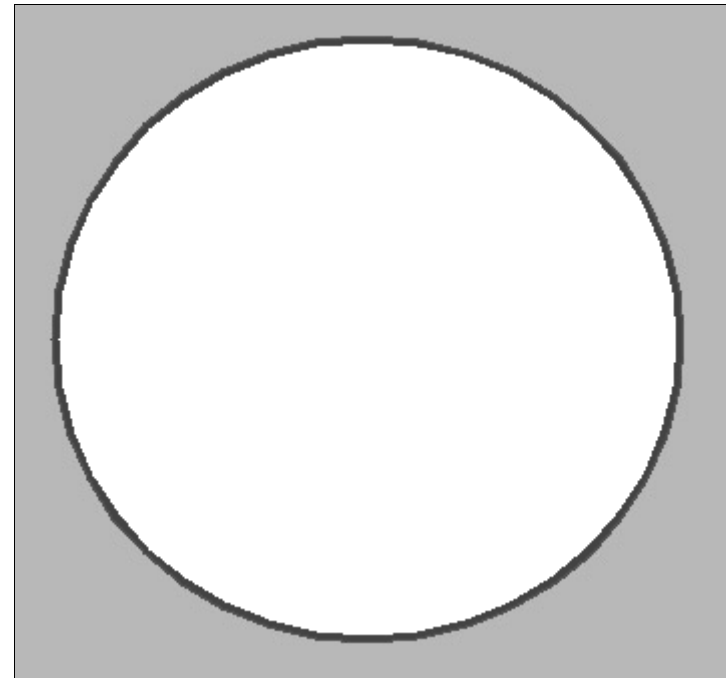
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

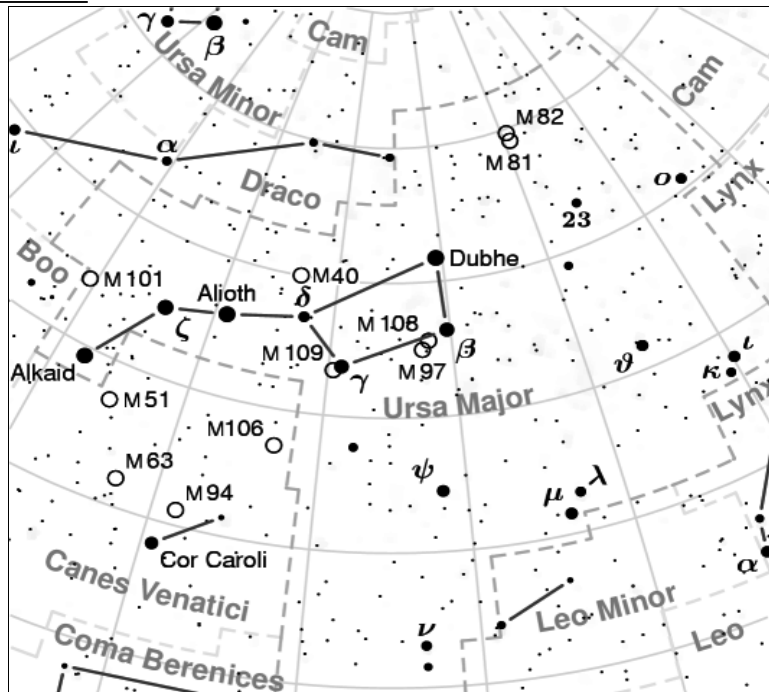
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 97**The Owl Nebula NGC 3587**

Type: Planetary Nebula
 Constellation: Ursa Major
 Right Ascension: 11h 14.8m
 Declination: +55° 01'
 Magnitude: 11
 Size: 3 arc min.

Finder chart

Binoculars: Challenge
 Telescope: Tough
 Skies: Very Dark

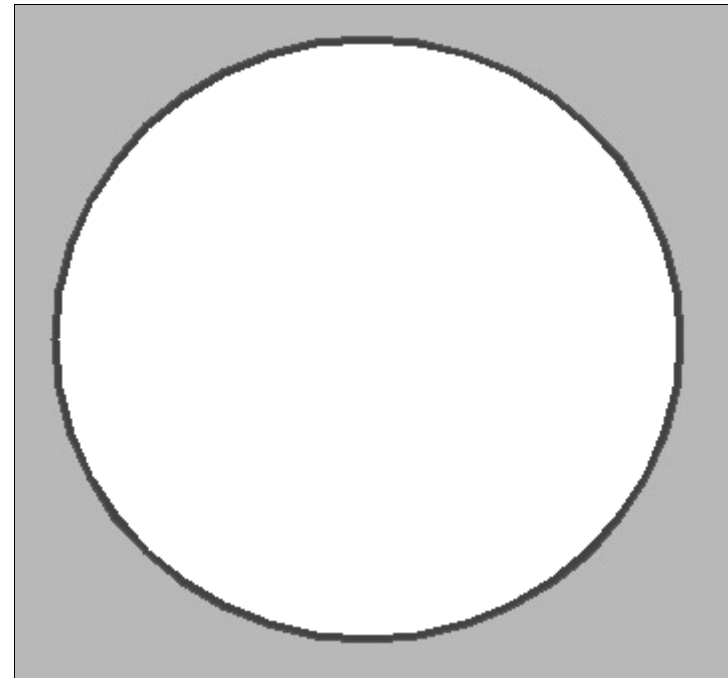
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

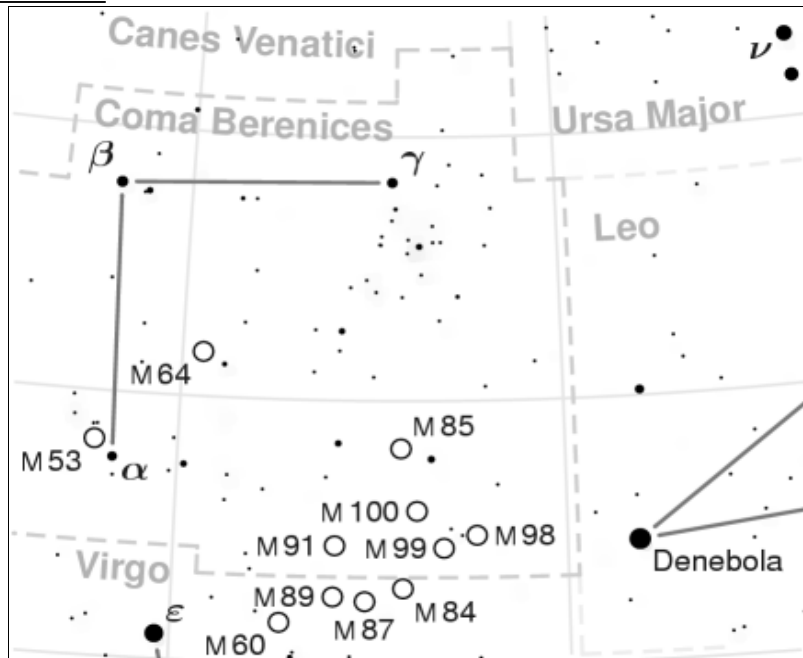


Comments

M 98

NGC 4192

Type: Galaxy (Spiral)
Constellation: Coma Berenices
Right Ascension: 12h 13.8m
Declination: +14° 54'
Magnitude: 10
Size: 10 x 3 arc min.

Finder chart**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

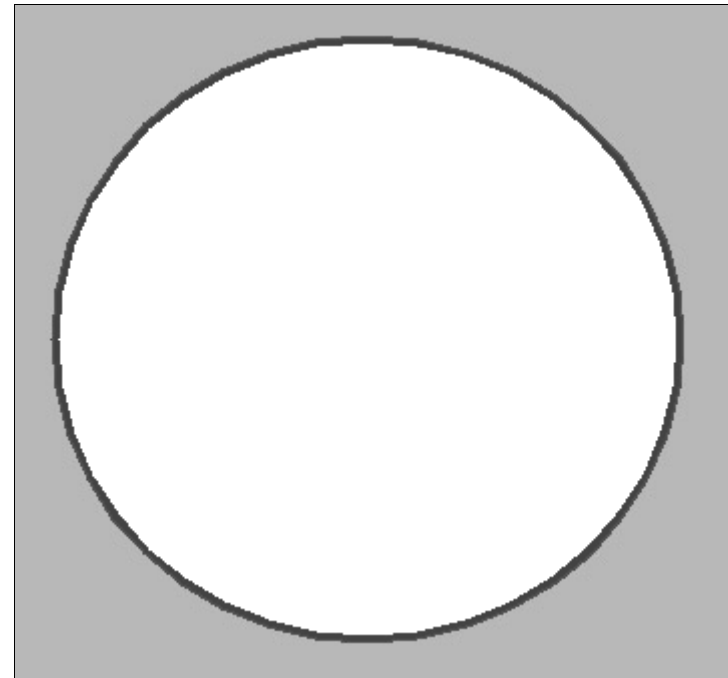
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



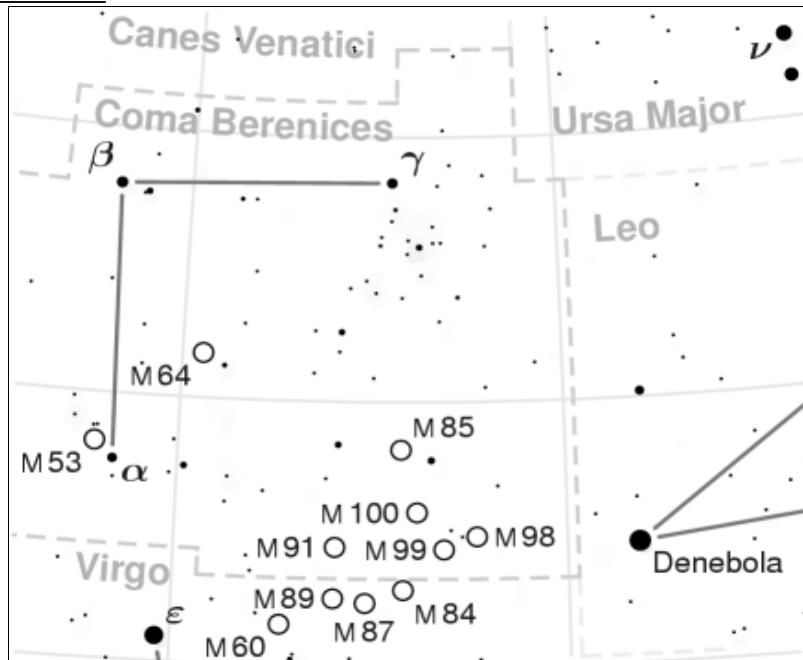
Comments

M 99

NGC 4254

Type: Galaxy (Spiral)
 Constellation: Coma Berenices
 Right Ascension: 12h 18.8m
 Declination: +14° 25'
 Magnitude: 9.8
 Size: 5 arc min.

Finder chart



See Larger Chart of Virgo Cluster in Appendix A

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

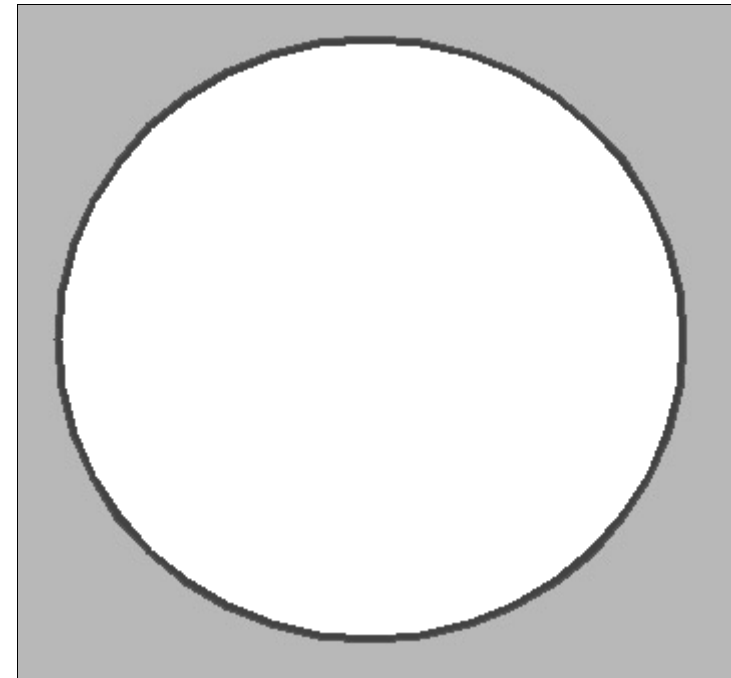
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

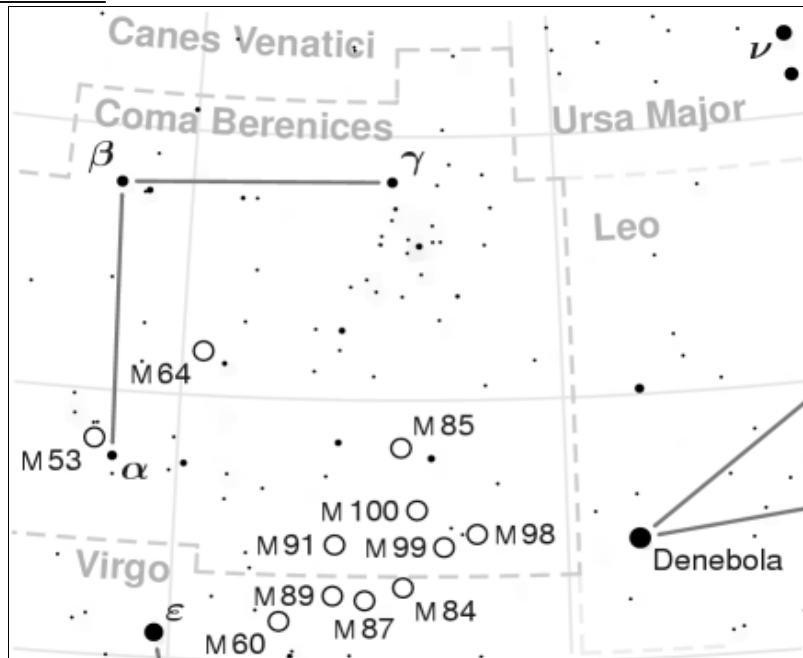


Comments

M 100

NGC 4321

Type: Galaxy (Spiral)
Constellation: Coma Berenices
Right Ascension: 12h 22.9m
Declination: +15° 49'
Magnitude: 9.4
Size: 7 x 6 arc min.

Finder chart**See Larger Chart of Virgo Cluster in Appendix A**

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

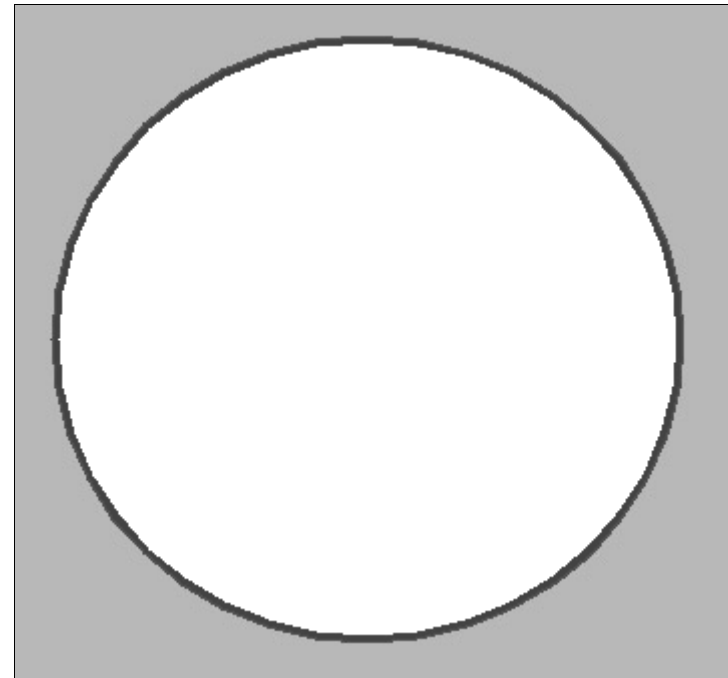
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

The Pinwheel Galaxy NGC 5457

Constellation: Ursa Major

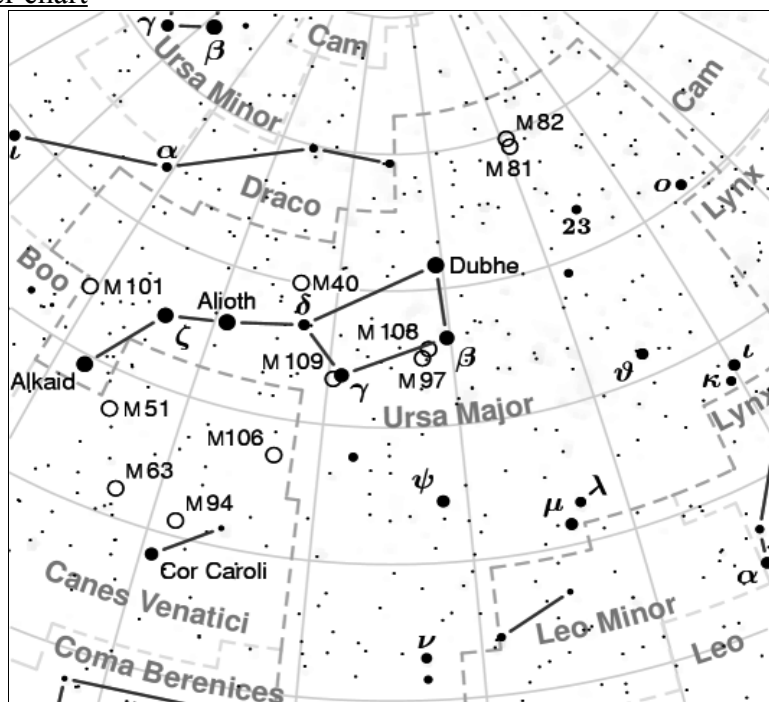
Right Ascension: 14h 03.2m

Declination. $+54^{\circ} 21'$

Magnitude: 7.7

Size: 27 x 26 arc min.

Finder chart



Binoculars: Not Visible

Telescope: Easy

Skies: Very Dark

The Messier Objects Observing Challenge

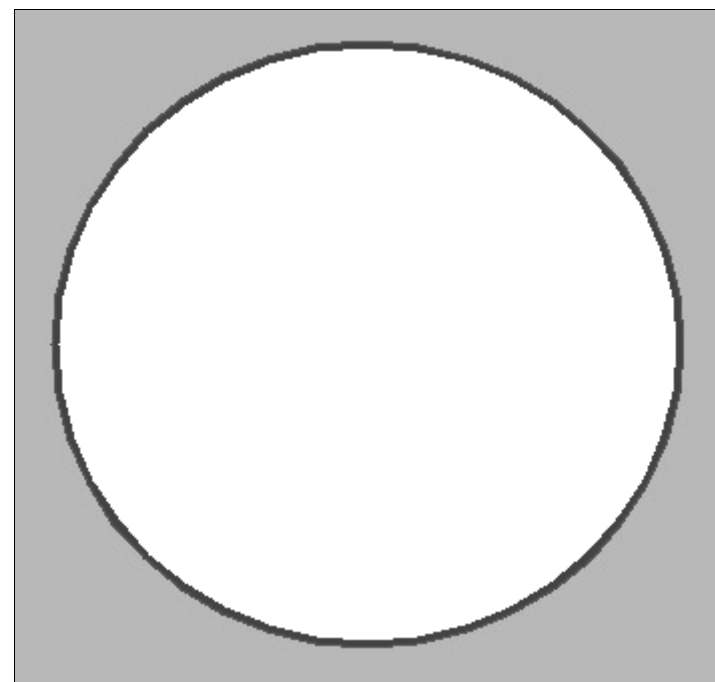
Date: _____ Time: _____ UT. _____

Location:

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

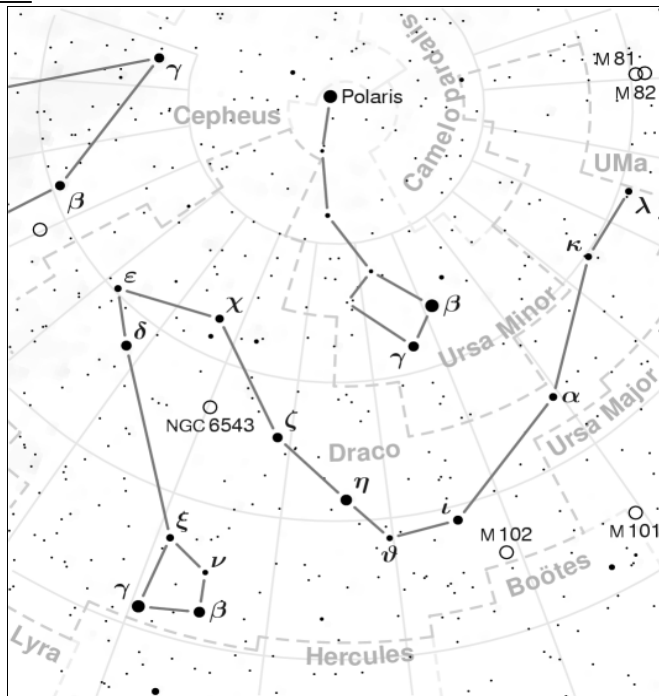
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 102**The Spindle Galaxy NGC 5866**

Type: Galaxy (Spiral)
 Constellation: Draco
 Right Ascension: 15h 06.5m
 Declination: 55° 45'
 Magnitude: 10.5
 Size: 5 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Dark

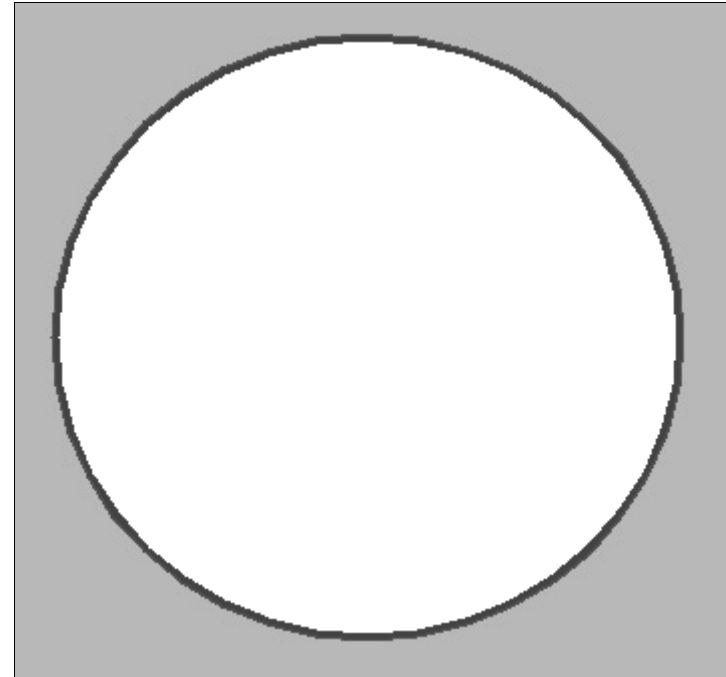
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

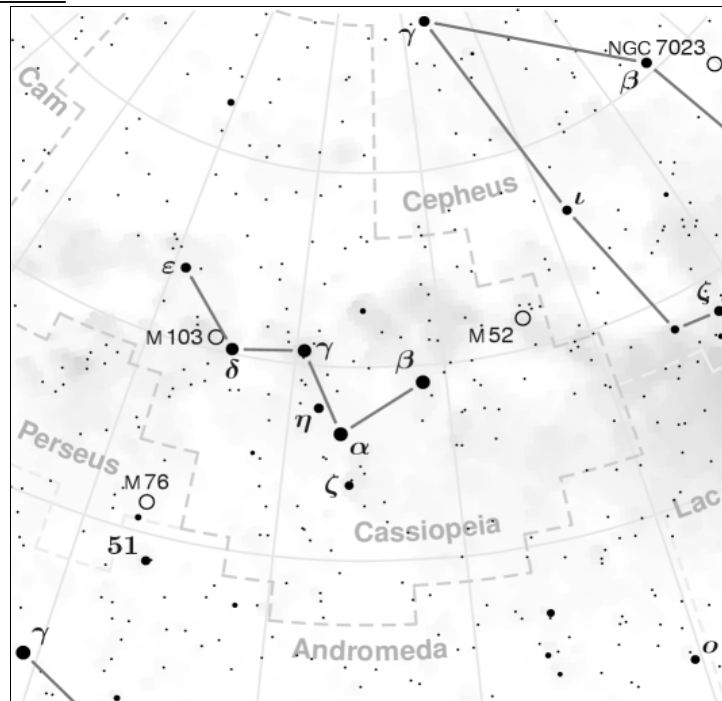
Seeing Double!

M102 was actually a duplicate observation of M101 on Messier's original list. NGC 5866 is nowadays accepted as an alternative by most astronomers.

M 103

NGC 581

Type: Open Cluster
Constellation: Cassiopeia
Right Ascension: 1h 33.2m
Declination: +60° 42'
Magnitude: 7
Size: 6 arc min.

Finder chart

Binoculars: Easy
Telescope: Easy
Skies: Dark

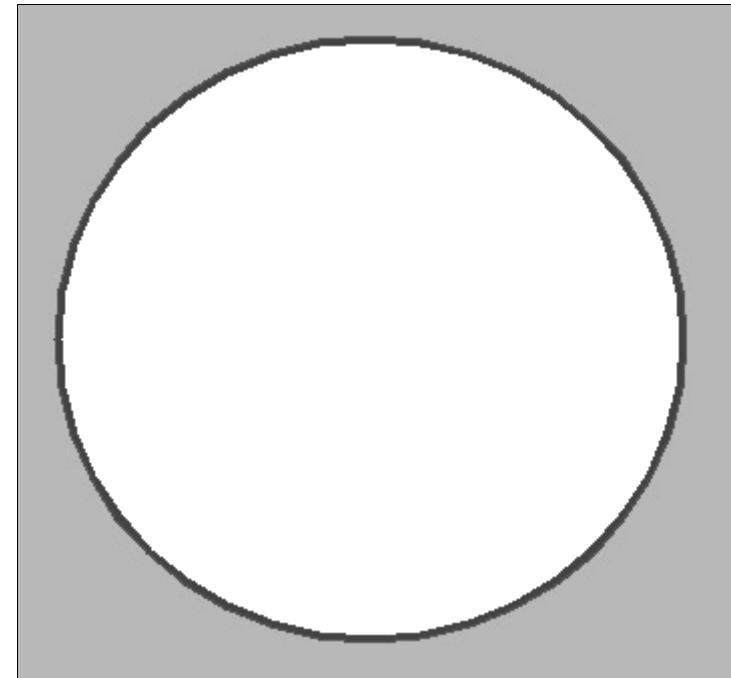
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

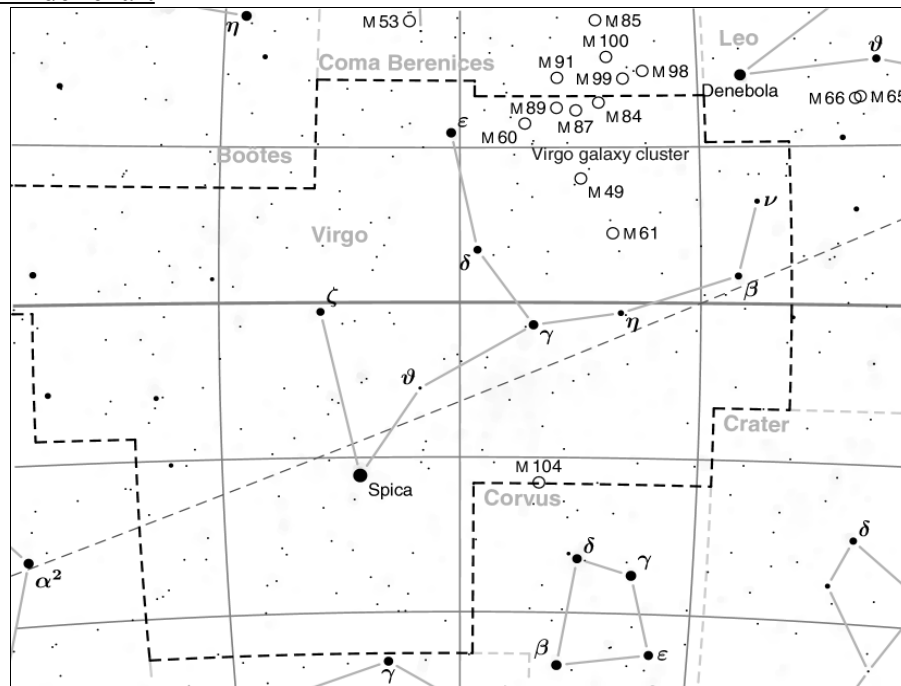
Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

M 104**The Sombrero Galaxy NGC 4594**

Type: Galaxy (Spiral)
 Constellation: Virgo
 Right Ascension: 12h 40m
 Declination: $-11^{\circ} 37'$
 Magnitude: 8.3
 Size: 9 x 4 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

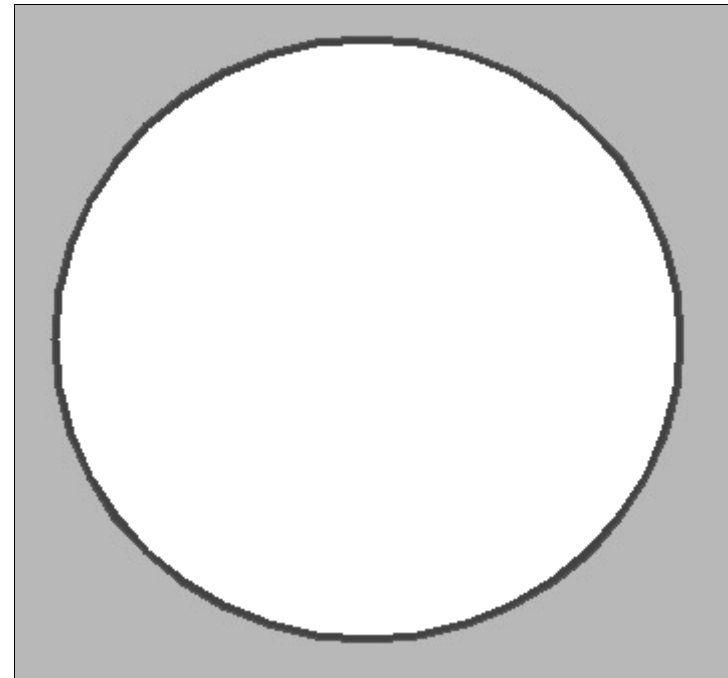
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

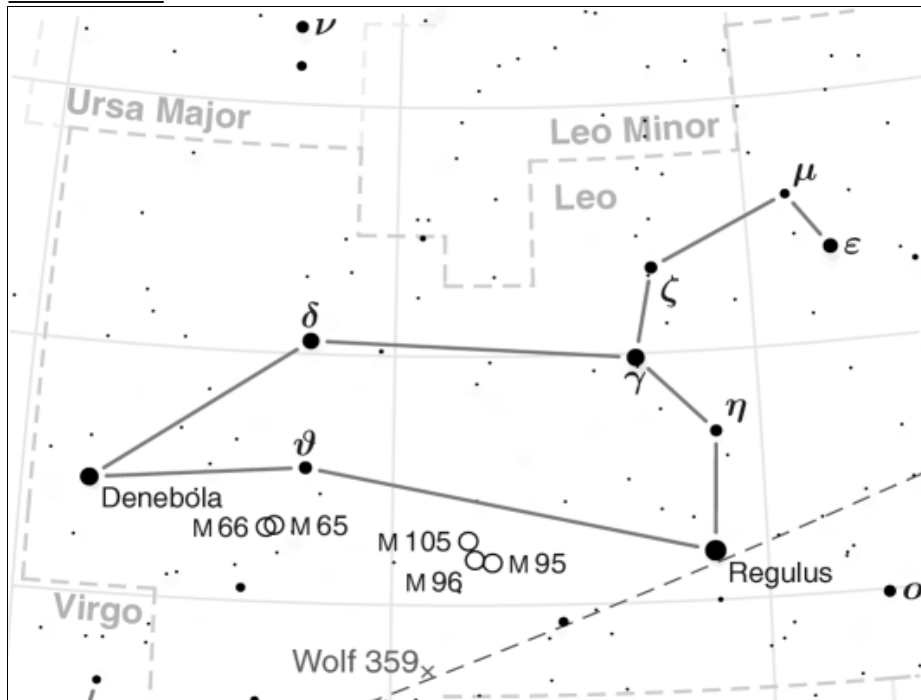


Comments

M 105

NGC 3379

Type: Galaxy (Elliptical)
 Constellation: Leo
 Right Ascension: 10h 47.8m
 Declination: +12° 35'
 Magnitude: 9.3
 Size: 5 x 4 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Easy
 Skies: Very Dark

The Messier Objects Observing Challenge

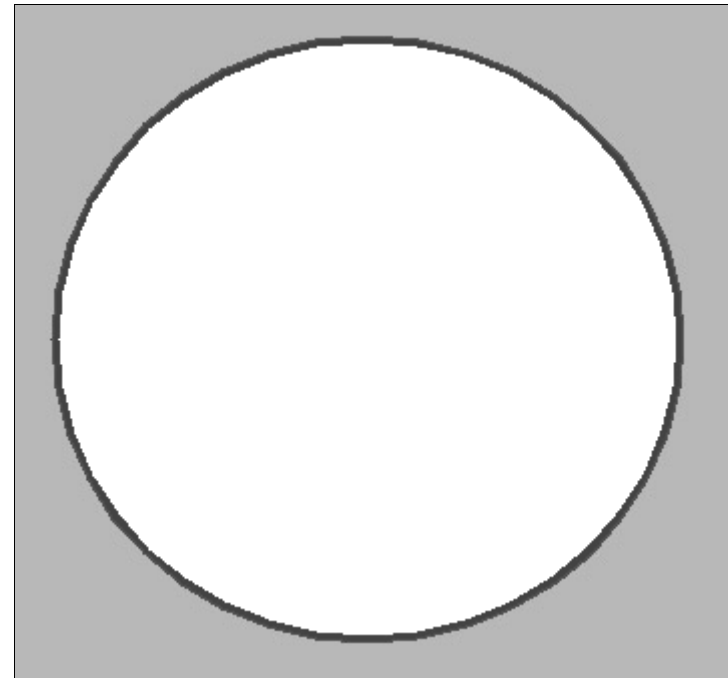
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

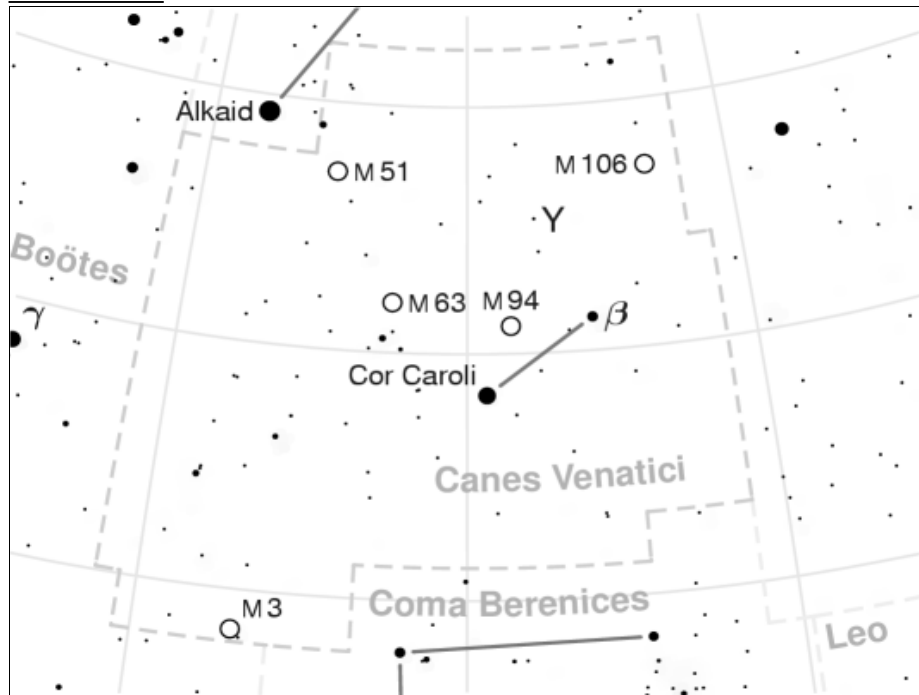


Comments

M 106

NGC 4258

Type: Galaxy (Spiral)
Constellation: Canes Venatici
Right Ascension: 12h 19m
Declination: +47° 18'
Magnitude: 8.3
Size: 18 x 8 arc min.

Finder chart

Binoculars: Not Visible
Telescope: Tough
Skies: Very Dark

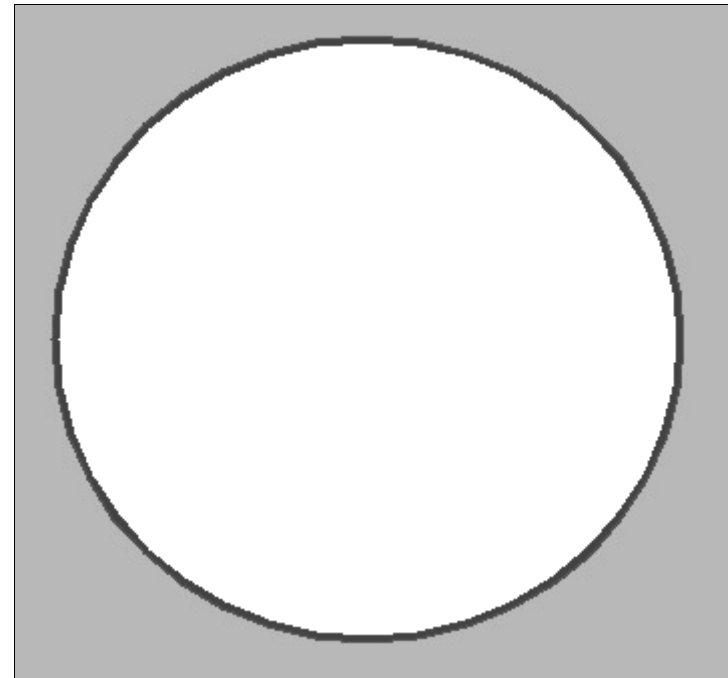
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

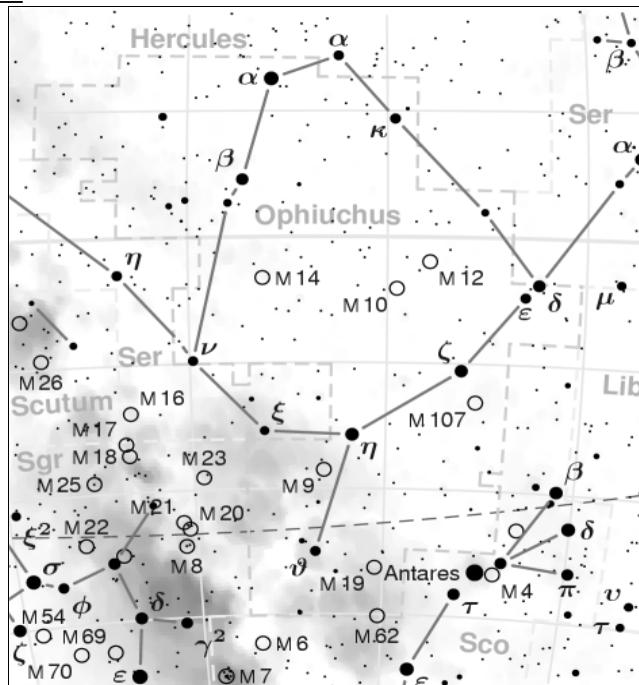


Comments

M 107

NGC 6171

Type: Globular Cluster
 Constellation: Ophiuchus
 Right Ascension: 16h 32.5m
 Declination: $-13^{\circ} 03'$
 Magnitude: 8
 Size: 10 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

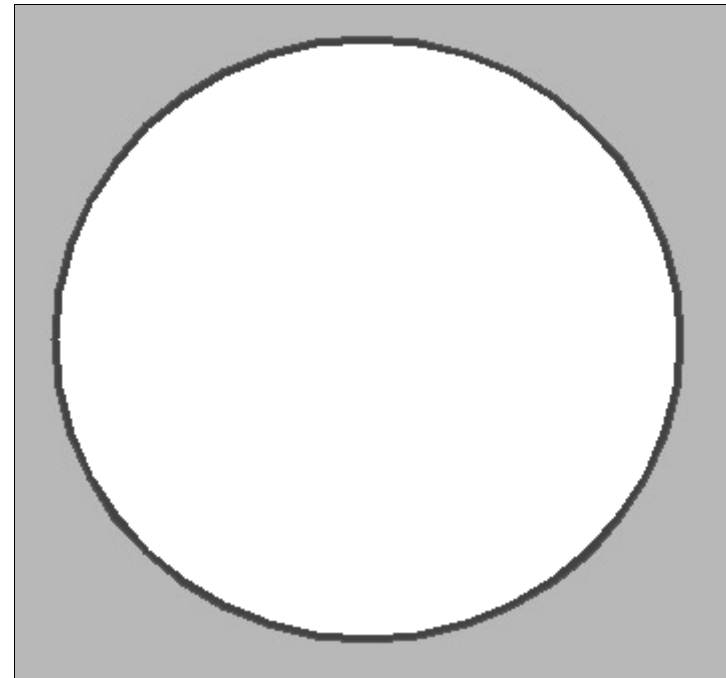
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

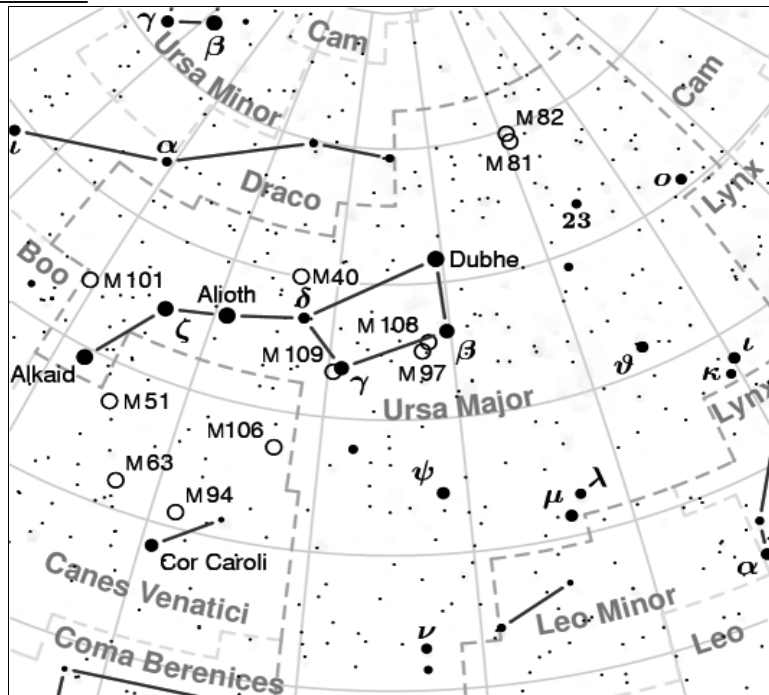


Comments

M 108

NGC 3556

Type: Galaxy (Spiral)
 Constellation: Ursa Major
 Right Ascension: 11h 11.5m
 Declination: +55° 40'
 Magnitude: 10
 Size: 8 x 2 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

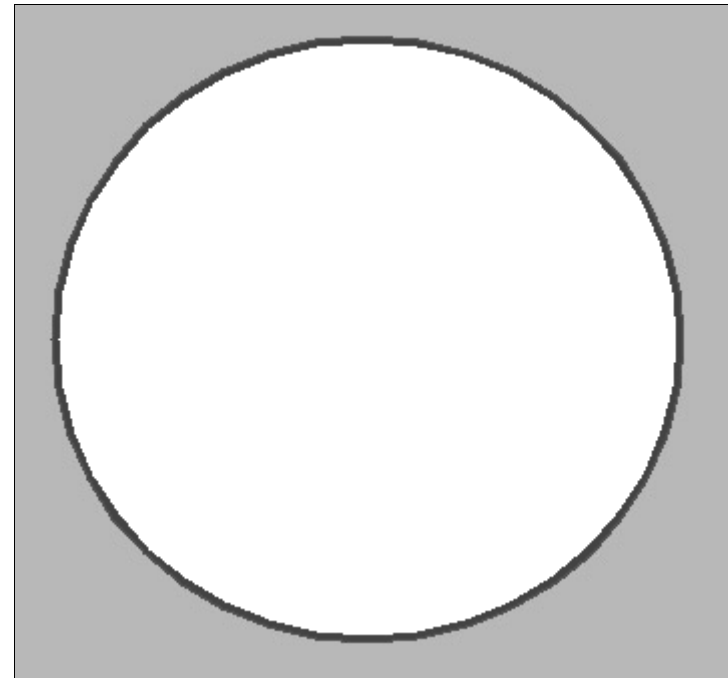
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

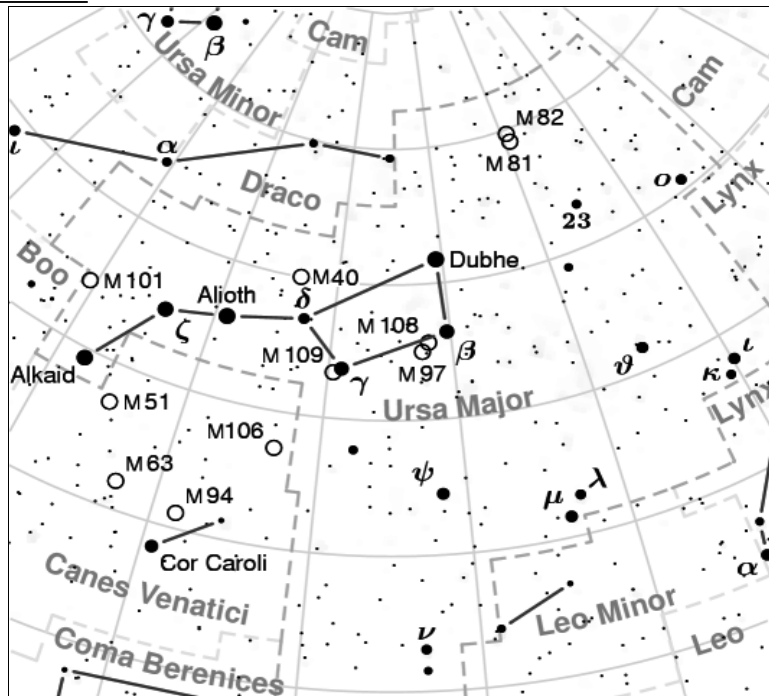


Comments

M 109

NGC 3992

Type: Galaxy (Spiral)
 Constellation: Ursa Major
 Right Ascension: 11h 57.6m
 Declination: +53° 23'
 Magnitude: 9.8
 Size: 8 x 5 arc min.

Finder chart

Binoculars: Not Visible
 Telescope: Tough
 Skies: Very Dark

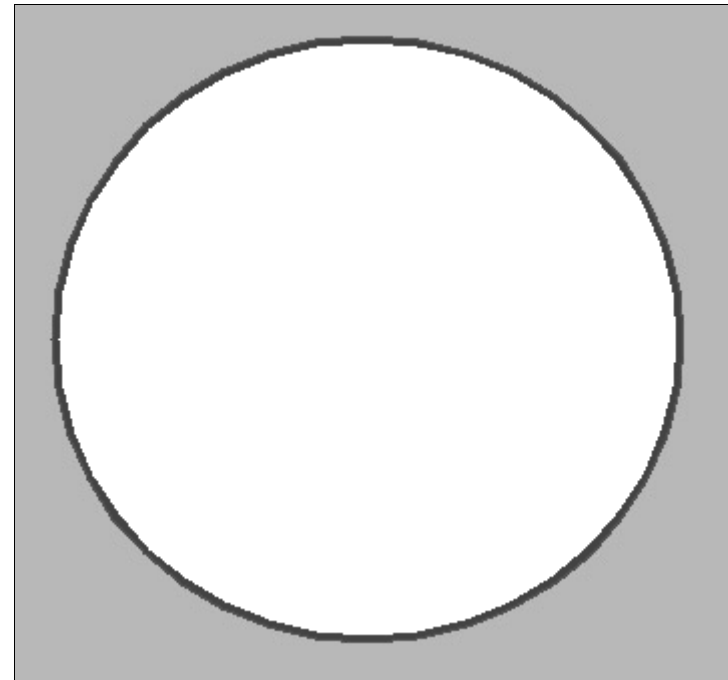
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)

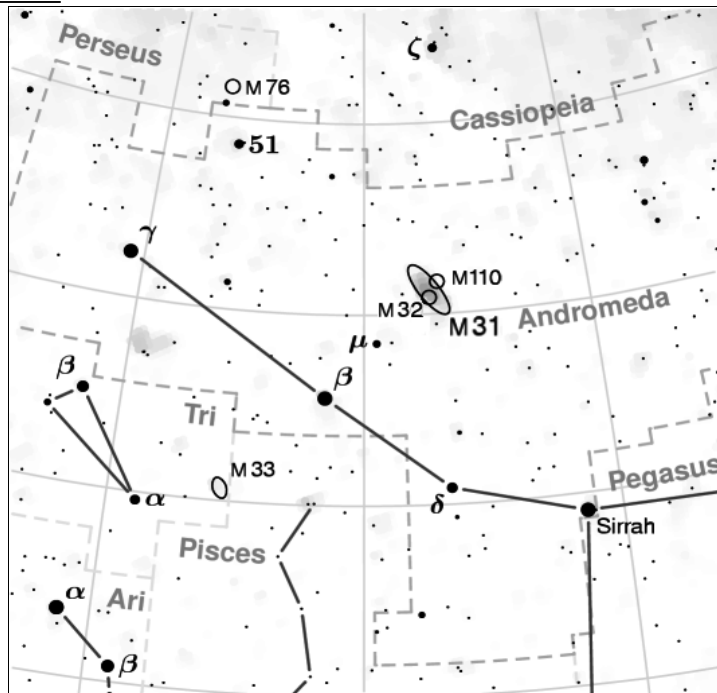


Comments

M 110

NGC 205

Type: Galaxy (Elliptical)
Constellation: Andromeda
Right Ascension: 0h 40.4m
Declination: +41° 41'
Magnitude: 8
Size: 17 x 10 arc min.

Finder chart

Binoculars: Not Visible
Telescope: Easy
Skies: Dark

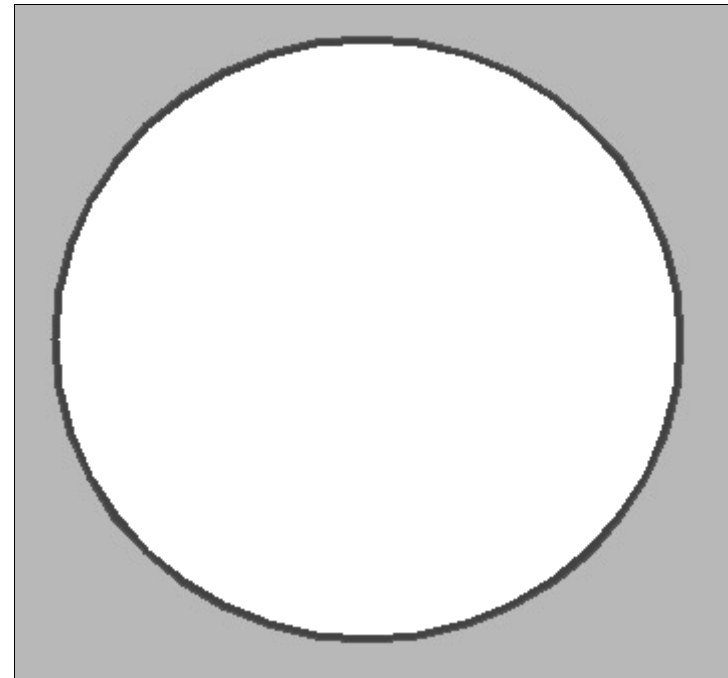
Date: _____ Time: _____ UT.

Location: _____

Equipment: _____

Transparency: _____ (Please rate from 1 excellent to 5 poor.)

Seeing: _____ (Please rate from 1 excellent to 5 poor.)



Comments

APPENDIX A – VIRGO CLUSTER NAVIGATION GUIDE

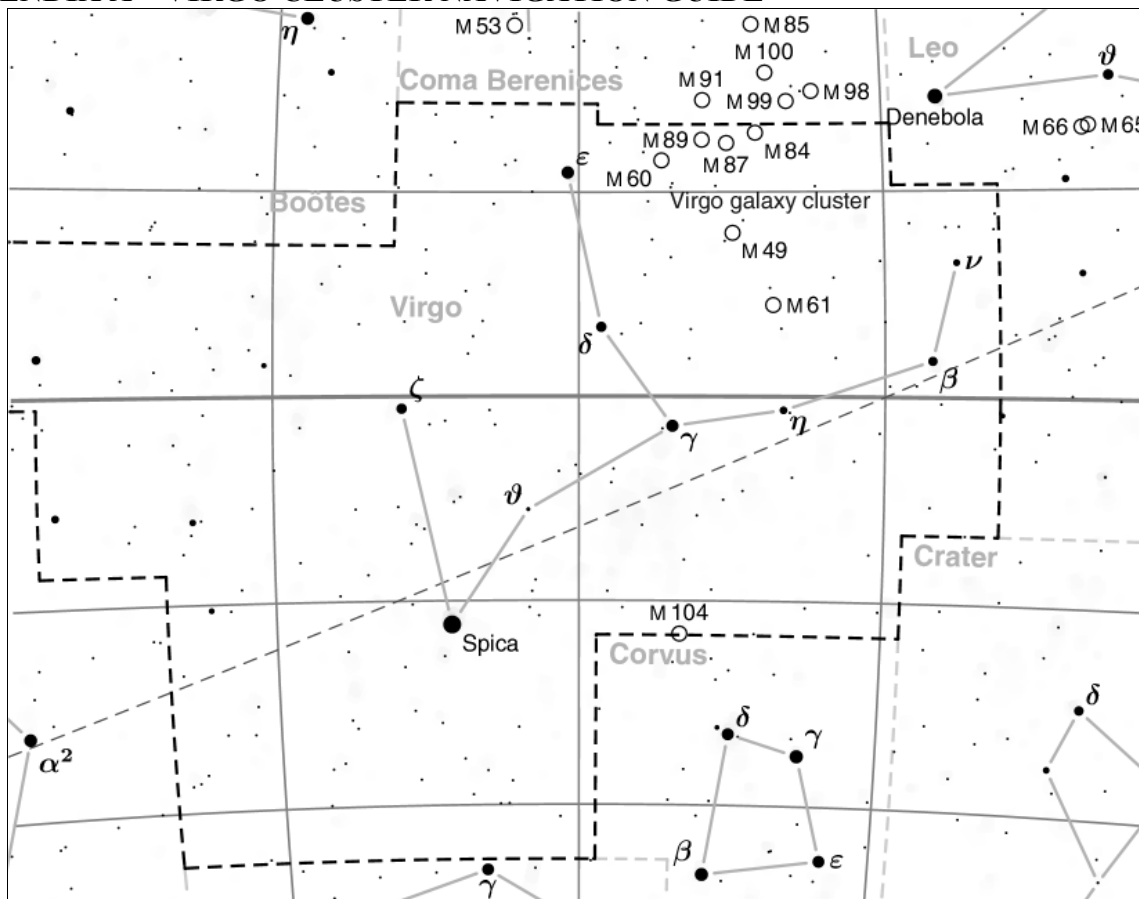


Chart 1 – Map of Virgo and nearby Constellations showing location of Virgo Cluster

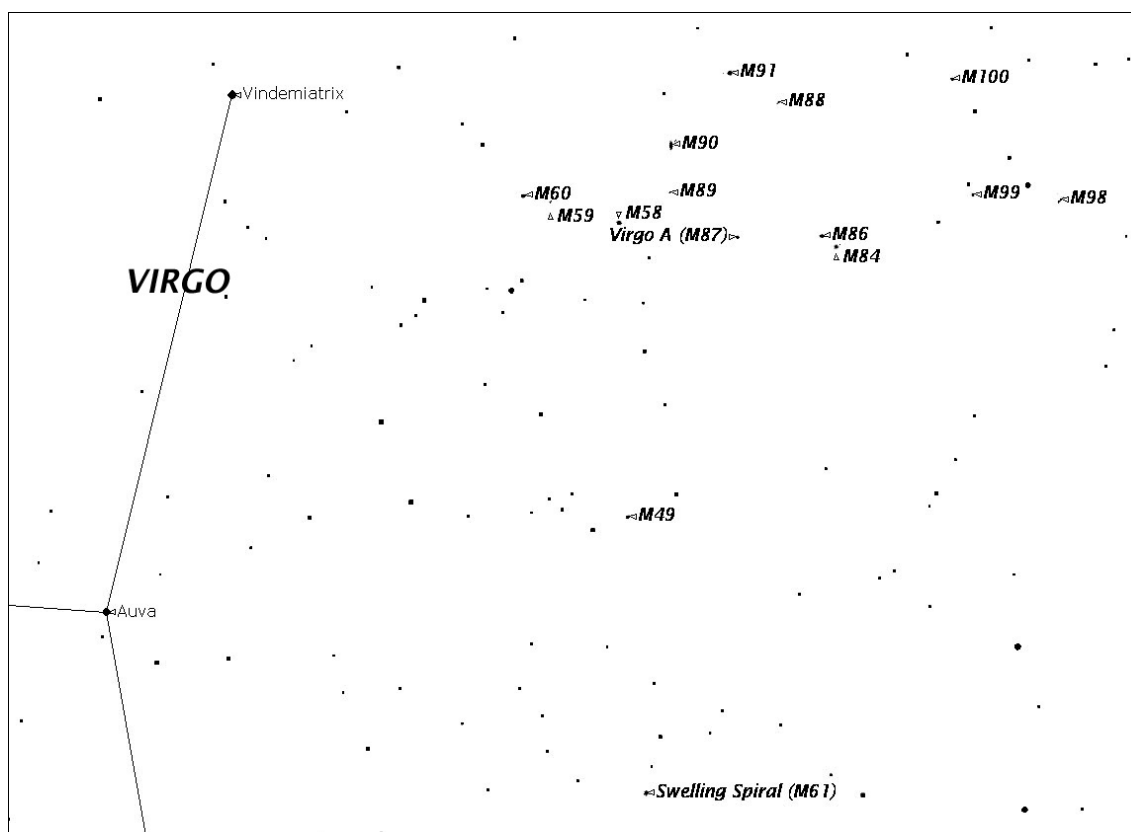


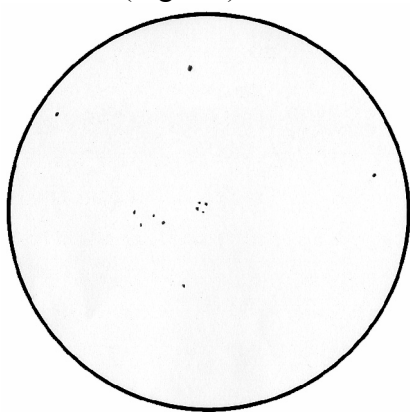
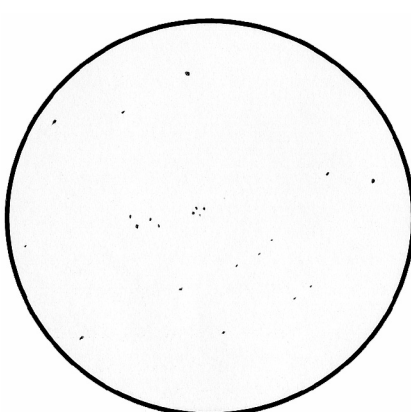
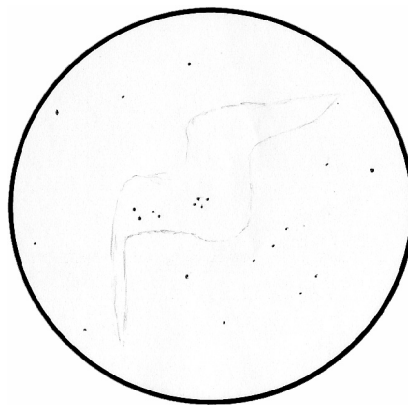
Chart 2 – Detailed Map of Virgo Cluster showing Messier Objects

APPENDIX B SKETCHING - A BEGINNER'S GUIDE

Firstly, sketching isn't as difficult as it may seem. We don't expect you to be the next Michelangelo in order to draw a few sketches. Once you try your best, that's all that matters. All that's needed is your logbook and a pencil, preferably a HB pencil. Softer pencils, such as a 2B, can create a very dark image and can also smear easily. Harder pencils, such as a 2H, may be a little too light.

Outlined below is a six step process which we hope will help guide you to create better sketches.

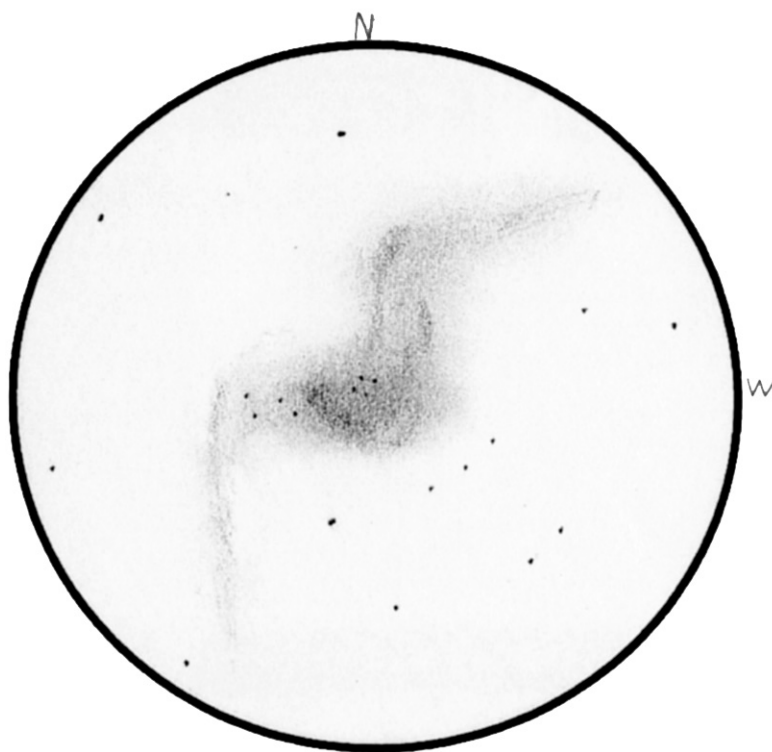
1. Take plenty time looking at the object before trying to sketch. Try to spend at least 15 full minutes looking and studying the target before you attempt to sketch. This will improve your observing skills and gradually you'll be able to see more and more detail. Veteran astronomers like Stephen James O'Meara often spend several hours looking at the same object! Consequently, he can see detail few others can detect under similar conditions.
2. Next, take your time and plot the brightest stars in the field of view. This will help provide a sense of scale to the whole image and make it much easier to draw the Messier object later. I have included an example here (Fig. B1) to provide a guide. Here, I hope to draw a very simple sketch of M42, The Orion Nebula and the surrounding stars.
3. Carefully, plot the fainter stars in the field of view. This should result in an image similar to the one below (Fig. B2).
4. Now draw the outline of the Messier object in the drawing circle. For example, here is what might result with our sketch of M42. Try to keep this edge as light as possible such that you can only barely see it. This will reduce or even eliminate the amount of erasing you will need to do at the end (Fig. B3)

**Fig. B1****Fig. B2****Fig. B3**

5. Now complete the detail in the Messier object. For something diffuse like M42, lightly shade in the remainder of the object with the side of the pencil. Then, with your finger, lightly rub this area to smoothen the shading. If the shading appears too light, try adding some more pencil and

rub it again gently with your finger. Then, check to see if any parts of the object appear brighter than others. If they do, add a bit more pencil to these areas until you get the image you want.

6. Finally, when you're happy with the result do a quick check to see if you've forgotten anything. If any parts of the outline are still apparent, try erasing them and re-shading the adjacent area to ensure you're sketch best matches what you see in the eyepiece. To finish off, add 2 cardinal points to your image, allowing for the design of your telescope. Different types of telescopes will either horizontally and/or vertically switch the orientation of the view by the time it exits the eyepiece. If you're unsure as to orientation of the image in your telescope, either contact your local astronomy club where they'll gladly assist you in any way they can or alternatively, you can log onto the IFAS website www.irishastronomy.org and ask members on the online forum who will gladly help. Below is the finalised sample sketch of M42. It's not a masterpiece by any means, but it doesn't need to be either.



Simply try and sketch as best you can and you'll be surprised as to how it helps improve your ability to detect faint detail in deep sky objects. With a little effort you'll notice remarkable improvements in your sketching and observing abilities over a short period of time.

APPENDIX C – RECOMMENDED READING & REVIEWS***Deep Sky Companions: The Messier Objects***

Stephen James O'Meara; Sky Publishing & Cambridge

308 pages with pictures, charts and diagrams

This is the first volume in Sky & Telescope's *Deep-Sky Companions* series. The book is arranged with a large and interesting introductory segment, followed by numerical entries for each of the objects.

O'Meara's conversational tone and accessible style are a great bonus to this book, and his introduction, which contains a lot of simple observing advice is well worth reading. A lot of the background detail is quite 'biographical' and helps to understand many of the observations made by O'Meara.

The entries on each of the objects form the main body of this book. Arranged numerically, they give details of the object type, location, co-ordinates, magnitude (including a revised estimate by the author), NGC/IC number and references to the objects as made by Messier and his observing partner Pierre Mechain. All entries are accompanied by a photograph of the object, a finder-chart, and a drawing of the object by the author. Many of these drawings are quite subjective however. What one observer may see as the streetlights of some vast and distant city, O'Meara sees, and draws, as the back of a glistening spider! The entries for each of the objects are well presented with a combination of hard scientific data, observing anecdotes and advice on how to track the object down. These entries can be really helpful in planning an assault on a series of deep-sky fuzzies, and can even inspire you to greater effort. This is a book that looks nice, and would look well on a coffee table or an ornate bookshelf. It isn't the kind of book that you tuck under your arm and use at the 'scope. It's just too nice! Extra articles include a biographical essay on Messier sharing some of the authors thoughts about the great 'ferret of comets', and a list of some twenty other great deep-sky objects that are not found on the Messier list.

Overall, this is a very interesting and eminently readable book and one that will certainly give you value for money. The object entries alone are riveting, and you will find yourself referring to it again and again.

The Year-Round Messier Marathon Field Guide

Harvard Pennington; Willman-Bell

200 pages with pictures, charts and diagrams

This is the 'desert-island disks' of Messier objects observers guides. Pennington's book has everything needed by anyone who wishes to track down these 109 beauties, any night of the year, not just marathon night. The main part of the book is made up of several beautiful A4-size charts showing a region containing a number of Messier objects. These maps are of a medium scale, not too close so you've no naked-eye reference, and not too far so you might as well be naked-eye viewing. The charts are a work of genius, allowing Telrad users to hone in on their target, while others star-hop their way to their destination and a few others try this 'geometric finding' proposed by Pennington. The charts are drawn by Will Tirion, one of the most gifted stellar cartographers, and contain a wealth of detail, and yet no cluttering. On the page facing these charts can be found all the data required, as well as a finderscope field of view to confirm your location, and an eyepiece view which aims to accurately depict what it is you're looking at.

This is the ideal book to bring out in the night air. As well as that, it's also an interesting book to peruse on a cloudy night. It has the usual prerequisite biography of Messier as well as an overview of the list, but Pennington also gives some very sound observing advice that is well worth reading over. Overall, this is a gem, a really useful book to shine your red torch on as you check and make sure that yes, that's it, you've found M 71.

The Observing Guide to the Messier Marathon

Don Macholz.; Cambridge

168 pages with pictures, charts and diagrams

This is a very readable book that presents the Messier object in the order many people would use when running the Messier Marathon. The charts are computer generated, and look it. While they are quite easy to use, they do not tell you what to expect and do not really help to confirm your sighting. This book's strength is in its excellent introduction, which gives details of Messier and his life, and overview of the list and plenty of advice on running the marathon. It is a very enjoyable book, although since most of the book is taken up by charts, it's very quick to read. This is also the kind of book that you would need to become very familiar with before you take it outside with your telescope.

Sky & Telescope's Messier Card.

This card is available in laminated or unlaminated versions and comprises a single sheet of A4 paper. On one face is a map of the night sky with constellation markings, RA and DEC grid markings, symbols and numbers for the Messier objects and a key to explain what each object is. On the reverse is a listing of all the Messier objects showing type, co-ordinates, and common names, if any. There are also two close-up maps, one showing the Northern polar region, while the other is a close up of the Virgo clump of galaxies.

Is it worth getting? A lot of that depends on what you want. If you're looking for a chart showing the *exact* positions of these deep-sky objects, then this won't be for you. On the other hand, if you're

looking for a handy reference map, which could be used with a planisphere, and which gives co-ordinates, then this will do nicely.

Computer Software

There are lots of websites which also contain observing information for the Messier objects. These are too numerous to list here. A simple search for "Messier objects" will yield many useful results.

However, one program worth noting is called *TUMOL; The Ultimate Messier Observing Log*. Created by David Paul Green of Los Angeles, California, this program provides a great way to record your observations on your desktop. The interface is very intuitive and the presentation is glorious. This program is free to download and is highly recommended. For more information and to download a free copy, visit: www.davidpaulgreen.com

Another program worth exploring is *MessMara* which gives details of the visibility of all the Messier objects on any given night, but is particularly geared towards Messier Marathon night.

Any planisphere program would also be a useful resource. The better brands include Redshift 5, Starry Night (Pro, Enthusiast, or Beginner versions are available), SkyMap and The Sky.

All of these books are available online from Amazon and other book-dealers, and many of them can be found in larger branches of Eason, Hodges & Figgis and Waterstones. Club libraries usually have at least one of the above books available for members.

APPENDIX D – THE MESSIER OBJECTS CATALOGUE

M No.	Con.	Right A	Dec	Type	Mag	Size	Notes
1	Tau	5h 34.5m	+22° 01'	SNR	8	6x4	Crab Nebula
2	Aqr	21h 33.5m	-0° 49'	GC	6	13	
3	CVn	13h 42.2m	+28° 23'	GC	6	16	
4	Sco	16h 23.6m	-26° 32'	GC	6	26	
5	Ser	15h 18.6m	+2° 05'	GC	6	17	
6	Sco	17h 40.1m	-32° 13'	OC	4	15	
7	Sco	17h 53.9m	-34° 49'	OC	3	80	
8	Sgr	18h 51.1m	-24° 23'	Neb	6	90x40	Lagoon Nebula
9	Oph	17h 19.2m	-18° 31'	GC	8	9	
10	Oph	16h 57.1m	-4° 06'	GC	7	15	
11	Scu	18h 51.1m	-6° 16'	OC	6	14	Wild Duck Cluster
12	Oph	16h 47.2m	-1° 57'	GC	7	14	
13	Her	16h 41.7m	+36° 28'	GC	6	17	
14	Oph	17h 37.6m	-3° 15'	GC	8	12	
15	Peg	21h 30m	+12° 10'	GC	6	12	
16	Ser	18h 18.8m	-13° 47'	OC	6	7	Eagle Nebula
17	Sgr	18h 20.8m	-16° 11'	Neb	7	46x37	Omega Nebula
18	Sgr	18h 19.9m	-17° 08'	OC	7	9	
19	Op	17h 02.6m	-26° 16'	GC	7	14	
20	Sgr	18h 02.6m	-23° 02'	Neb	8	29x27	Trifid Nebula
21	Sgr	18h 04.6m	-22° 30'	OC	6	13	
22	Sgr	18h 36.4m	-23° 54'	GC	5	24	
23	Sgr	17h 56.8m	-19° 01'	OC	5	27	
24	Sgr	18h 16.9m	-18° 29'		4	90	
25	Sgr	18h 31.6m	-19° 15'	OC	5	32	
26	Scu	18h 45.2m	-9° 24'	OC	8	32	
27	Vul	19h 59.6m	+22° 43'	PN	8	8x4	Dumbbell Nebula
28	Sgr	18h 24.5m	-24° 52'	GC	7	11	
29	Cyg	20h 23.9m	+38° 32'	OC	7	7	
30	Cap	21h 40.4m	-23° 11'	GC	8	11	
31	And	0h 42.7m	+41° 16'	Gal	3	178x63	Andromeda Galaxy
32	And	0h 42.7m	+40° 52'	Gal	8	8x6	
33	Tri	1h 33.9m	+30° 39'	Gal	6	62x39	
34	Per	2h 42m	+42° 47'	OC	5	35	

35	Gem	6h 08.9m	+24° 20'	OC	5	28	
36	Aur	5h 36.1m	+34° 08'	OC	6	12	
37	Aur	5h 52.4m	+32° 33'	OC	6	24	
38	Aur	5h 28.7m	+35° 50'	OC	6	21	
39	Cyg	21h 32.3m	+48° 26'	OC	5	32	
40	UMa	12h 22.4m	+58° 05'		8		Double Star
41	CMa	6h 46m	-20° 44'	OC	5	38	
42	Ori	5h 35.4m	-5° 27'	Neb	4	66x60	Orion Nebula
43	Ori	5h 35.6m	-5° 16'	Neb	9	20x15	
44	Cnc	8h 40.1m	+19° 59'	OC	3	95	Beehive Cluster
45	Tau	3h 47m	+24° 07'	OC	1	110	Pleiades / Subaru
46	Pup	7h 41.8m	-14° 49'	OC	6	27	
47	Pup	7h 36.6m	-14° 30'	OC	4	30	
48	Hyd	8h 13.8m	-5° 48'	OC	6	54	
49	Vir	12h 29.8m	+8° 00'	Gal	8	9x7	
50	Mon	7h 02.8m	-8° 23'	OC	6	16	
51	CVn	13h 29.9m	+47° 12'	Gal	8	11x8	Whirlpool Galaxy
52	Cas	23h 24.2m	+61° 35'	OC	7	13	
53	Com	13h 29.9m	+18° 10'	GC	8	13	
54	Sgr	18h 55.1m	-30° 29'	GC	8	9	
55	Sgr	19h 40m	-30° 58'	GC	7	19	
56	Lyr	19h 16.6m	+30° 11'	GC	8	7	
57	Lyr	18 h 53.6 m	+33° 02'	PN	9	1	Ring Nebula
58	Vir	12h 37.7m	+11° 49'	Gal	10	5x4	
59	Vir	12h 42m	+11° 39'	Gal	10	5x3	
60	Vir	12h 43.7m	+11° 33'	Gal	9	7x6	
61	Vir	12h 21.9m	+4° 28'	Gal	10	6x5	
62	Oph	17h 01.2m	-30° 07'	GC	7	14	
63	CVn	13h 15.8m	+42° 02'	Gal	9	12x8	
64	Com	12h 56.7m	+21° 41'	Gal	9	9x5	
65	Leo	11h 18.9m	+13° 05'	Gal	9	10x3	
66	Leo	11h 20.2m	+12° 59'	Gal	9	9x4	
67	Cnc	8h 51.4m	+11° 49'	OC	7	30	
68	Hyd	12h 39.5m	-26° 45'	GC	8	12	
69	Sgr	18h 31.4m	-32° 21'	GC	8	7	
70	Sgr	18h 43.2m	-32° 18'	GC	8	8	
71	Sgt	19h 53.8m	+18° 47°	GC	8	7	
72	Aqr	20h 53.5m	-12° 32'	GC	9	6	
73	Aqr	20h 58.9m	-12° 38'				Asterism
74	Psc	1h 36.7m	+15° 47'	Gal	9	10x9	
75	Sgr	20h 06.1m	-21° 55'	GC	9	6	
76	Per	1h 42.4m	+51° 34'	PN	11	2x1	Little Dumbbell
77	Cet	2h 42.7m	-0° 01'	Gal	9	7x6	
78	Ori	5h 46.7m	+0° 03'	Neb	8	8x6	
79	Lep	5h 24.5m	-24° 33'	GC	8	9	
80	Sco	16h 17m	-22° 59'	GC	7	9	
81	UMa	9h 55.6m	+69° 04'	Gal	7	26x14	
82	UMa	9h 55.8m	+69° 41'	Gal	8	11x5	
83	Hyd	13h 37m	-29° 52'	Gal	8	11x10	
84	Vir	12h 25.1m	+12° 53'	Gal	9	5x4	
85	Com	12h 25.4m	+18° 11'	Gal	9	7x5	
86	Vir	12h 26.2m	+12° 57'	Gal	9	7x5	
87	Vir	12h 30.8m	+12° 54'	Gal	9	7	
88	Com	12h 32m	+14° 25'	Gal	10	7x4	
89	Vir	12h 35.7m	+12° 33'	Gal	10	4	
90	Vir	12h 36.8m	+13° 10'	Gal	10	10x5	
91	Com	12h 35.4m	+14° 30'	Gal	10	5x4	
92	Her	17h 17.1m	+43° 08'	GC	7	11	
93	Pup	7h 44.6m	-23° 52'	OC	6	22	
94	CVn	12h 50.9m	+41° 07'	Gal	8	11x9	
95	Leo	10h 44m	+11° 02'	Gal	10	7x5	
96	Leo	10h 46.8m	+11° 49'	Gal	9	7x5	
97	UMa	11h 14.8m	+55° 01'	PN	11	3	Owl Nebula
98	Com	12h 13.8m	+14° 54'	Gal	10	10x3	
99	Com	12h 18.8m	+14° 25'	Gal	10	5	
100	Com	12h 22.9m	+15° 49'	Gal	9	7x6	
101	UMa	14h 03.2m	+54° 42'	Gal	8	27x26	
102	Dra						* See note below
103	Cas	1h 33.2m	+60° 42'	OC	7	6	
104	Vir	12h 40m	-11° 37'	Gal	8	9x4	
105	Leo	10h 47.8m	+12° 35'	GC	9	5x4	
106	CVn	12h 19m	+47° 18'	Gal	8	18x8	
107	Oph	16h 32.5m	-13° 03'	GC	8	10	
108	UMa	11h 11.5m	+55° 40'	Gal	10	8x2	
109	UMa	11h 57.6m	+53° 23'	Gal	10	8x5	
110	And	0h 40.4m	+41° 41'	Gal	8	17x10	

M 102 is a source of much controversy, if such a thing can exist in amateur astronomy. Many have argued for the consideration of NGC 5866, a galaxy in the constellation Draco, with RA 15h06.5m and Dec +55° 46' and a magnitude of 10. Why not have a look at it anyway? It can't hurt!

Sizes of objects are given in arc-seconds. Angles are normally expressed in degrees of which there are 360 in a circle. However, for deep sky objects, they usually appear much smaller. A degree can be broken into 60 arcminutes each of which can be further subdivided into 60 arcseconds.

Constellations are named with a three letter shorthand in the list above. The full meaning of this shorthand is explained below.

And	Andromeda	Gem	Gemini	Pup	Puppis
Aqr	Aquarius	Her	Hercules	Sct	Scutum
Aur	Auriga	Hya	Hydra	Ser	Serpens Caput
Cap	Capricornus	Leo	Leo	Sge	Sagitta
Cnc	Cancer	Lyr	Lyra	Sgr	Sagittarius
C Vn	Canes Venatici	Lep	Lepus	Sco	Scorpius
C Ma	Canis Major	Mon	Monoceros	Tau	Taurus
Cas	Cassiopeia	Oph	Ophiuchus	Tri	Triangulum
Cet	Cetus	Ori	Orion	UMa	Ursa Major
Com	Coma Berenices	Peg	Pegasus	Vir	Virgo
Cyg	Cygnus	Per	Perseus	Vul	Vulpecula
Dra	Draco	Psc	Pisces		

In the Messier Objects Catalogue table, each object above has been assigned a two-letter designation to indicate it's structure. The full meaning of this shorthand is explained below.

OC	Open Cluster	PN	Planetary Nebula
GC	Globular Cluster	SNR	Supernova Remnant
Neb	Nebula (emission or reflection)	Gal	Galaxy

[illegible]