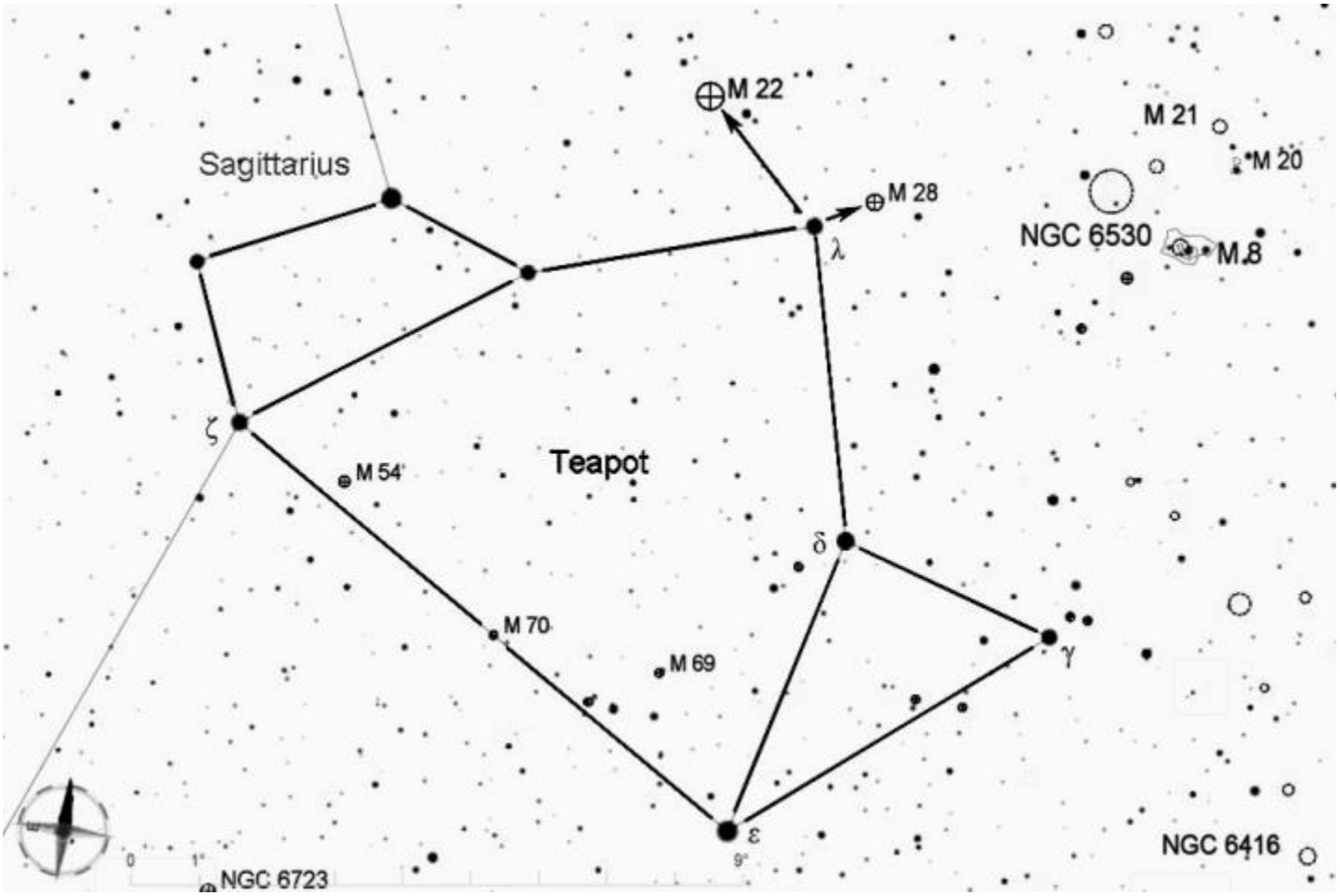
Star Hopper's Guide to the Universe

(Northern Hemisphere)



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About the Authors

Jim Mazur

As a dedicated member of the Astronomical Society of New Haven (ASNH), Jim has given many library presentations on astronomy over the years. These presentations often focused on teaching members how to locate good targets for a small telescope, especially since ASNH donated 4.5-inch Dobsonian telescopes to several local libraries for patrons to borrow. To complement these presentations, Jim created handouts that guide people in using star hopping techniques to find deep-sky objects.

He started by creating a few charts, and as the seasons changed, he continued to make more. Jim posted the charts on his website, and he was delighted to see that a growing number of people began downloading them. This motivated him to expand the collection. Now, with the charts at their current number, Jim is happy to see that people are using them to enhance their stargazing experiences.

Andrea Matthias

Andrea Matthias is an active member of the East Valley Astronomy Club, where she enjoys sharing her love of astronomy through outreach events and can often be found star hopping under dark skies at local star parties.

James Yoder

James is an active member of the East Valley Astronomy Club (EVAC) in the Phoenix metropolitan area of Arizona. He has developed a beginner-level astronomy course, offered by the club, that covers the fundamentals of observational astronomy and teaches beginners how to use a telescope.

Introduction

This collection features an extensive compilation of high-quality star hopping charts originally developed by Jim Mazur, available on his website Skyledge.net. The List of Star Hops includes hundreds of detailed charts, which we have consolidated into a single, comprehensive reference. We have also included supplemental material to enhance usability and provide additional information and background.

This book is primarily designed to be printed and carried out in the field; However, we also wanted to provide supplemental information for pre or post observation session research, so there are many online links throughout the book. We attempted to utilize the Skyledge.net website and Wikipedia for as many references and much information as possible. Jim's Skyledge website has excellent images, charts, and information. Wikipedia is a reliable source of up-to-date information.

The charts are systematically organized by constellation, encompassing close to 50 constellations, over 170 charts, and over 250 objects. Nearly every type of deep sky object is represented in this book including galaxy clusters (GX), galaxies (G), open clusters (OC), globular clusters (GC), emission nebulae (EN), dark nebulae (DN), multiple star systems (MS), and carbon stars (CS). All 110 Messier objects are represented within this compilation.

We extend our sincere thanks to Jim Mazur for his dedication and countless hours of work in creating these valuable charts and generously making them available to the public.

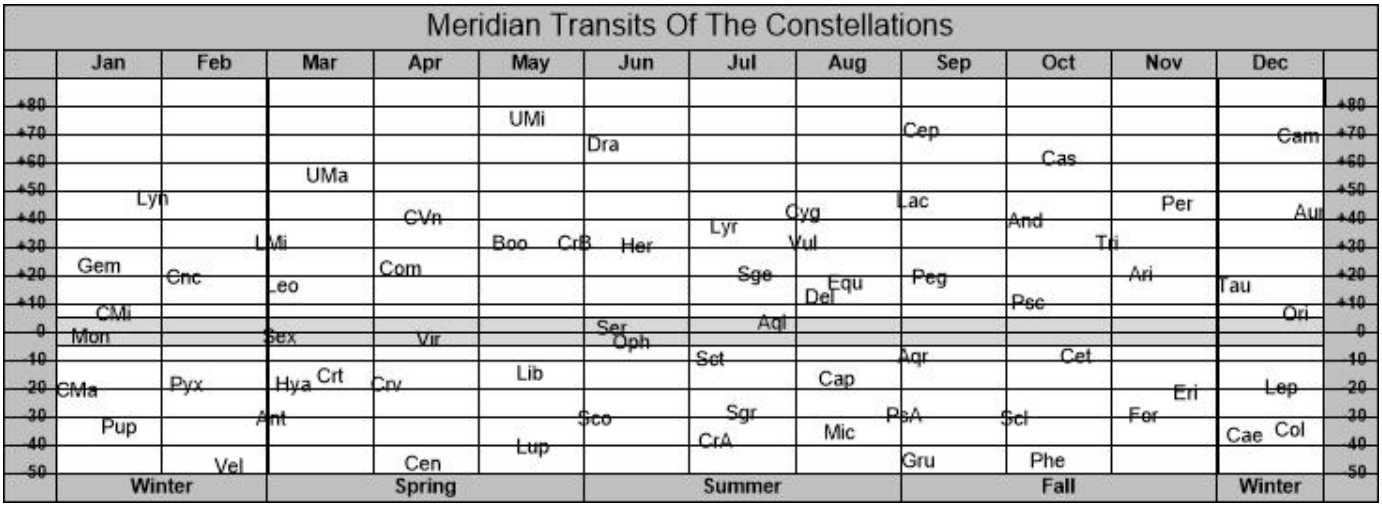
Special thanks to Jerry Hyman and Bill Dellinges for their input and contributions to the book.

James Yoder
Andrea Matthias

Constellations, Seasons and Greek Alphabet

Northern Hemisphere Constellations List (Alphabetical)								
Abr.	Constellation	Season	Abr.	Constellation	Season	Abr.	Constellation	Season
And	Andromeda	Fall	Crt	Crater	Spring	Peg	Pegasus	Fall
Ant	Antlia	Spring	Cyg	Cygnus	Summer	Per	Perseus	Fall
Aqr	Aquarius	Fall	Del	Delphinus	Summer	Phe	Phoenix	Fall
Aql	Aquila	Summer	Dra	Draco	Summer	Psc	Pisces	Fall
Ari	Aries	Fall	Equ	Equuleus	Summer	PsA	Pisces Austrinus	Fall
Aur	Auriga	Winter	Eri	Eridanus	Fall	Pup	Puppis	Winter
Boo	Bootes	Spring	For	Fornax	Fall	Pyx	Pyxis	Winter
Cae	Caelum	Winter	Gem	Gemini	Winter	Sge	Sagitta	Summer
Cam	Camelopardalis	Winter	Gru	Grus	Fall	Sgr	Sagittarius	Summer
Cnc	Cancer	Winter	Her	Hercules	Summer	Sco	Scorpius	Summer
CVn	Canes Venatici	Spring	Hya	Hydra	Spring	Scl	Sculptor	Fall
CMa	Canis Major	Winter	Lac	Lacerta	Fall	Sct	Scutum	Summer
CMi	Canis Minor	Winter	Leo	Leo	Spring	Ser	Serpens	Summer
Cap	Capricornus	Summer	LMi	Leo Minor	Spring	Sex	Sextans	Spring
Cas	Cassiopeia	Fall	Lep	Lepus	Winter	Tau	Taurus	Winter
Cen	Centaurus	Spring	Lib	Libra	Spring	Tri	Triangulum	Fall
Cep	Cepheus	Fall	Lup	Lupus	Spring	UMa	Ursa Major	Spring
Cet	Cetus	Fall	Lyn	Lynx	Winter	UMi	Ursa Minor	Spring
Col	Columba	Winter	Lyr	Lyra	Summer	Vel	Vela	Winter
Com	Coma Berenices	Spring	Mic	Microscopium	Summer	Vir	Virgo	Spring
CrA	Corona Australis	Summer	Mon	Monoceros	Winter	Vul	Vulpecula	Summer
CrB	Corana Borealis	Spring	Oph	Ophiucus	Summer			
Crv	Crovus	Spring	Ori	Orion	Winter			

This chart maps the declination of constellations and their date of opposition. It is a graphic representation of when a constellation and contained objects are best positioned for viewing.



Greek Alphabet																		
	Low	Up	Name		Low	Up	Name		Low	Up	Name		Low	Up	Name		Low	Up	Name
01	α	Α	alpha	06	ζ	Ζ	zeta	11	λ	Λ	lambda	16	π	Π	pi	21	φ	Φ	phi
02	β	Β	beta	07	η	Η	eta	12	μ	Μ	mu	17	ρ	Ρ	rho	22	χ	Χ	chi
03	γ	Γ	gamma	08	θ	Θ	theta	13	ν	Ν	nu	18	ς	Σ	sigma	23	ψ	Ψ	psi
04	δ	Δ	delta	09	ι	Ι	iota	14	ξ	Ξ	xi	19	σ	Τ	tau	24	ω	Ω	omega
05	ε	Ε	epsilon	10	κ	Κ	kappa	15	ο	Ο	omicron	20	τ	Υ	upsilon	25			

Conventions and Catalogs

Constellation Summary Sheet

Each featured constellation sheet includes the name of the constellation, the constellation abbreviation, the number of objects featured in the constellation, links to online information, and a summary table.

Example Constellation Summary Table

Object (Type)	Charts	Aliases	Stats
Almach (DS)	1, W1	SAO-037734, gamma Andromedae, And 57, STF-205, ADS-1530	| Mag=2.2, 2.0 | Sep=9.8" |
M-031 (G)	2, W2	Andromeda Galaxy, NGC-224, PGC-2557	| Mag=4.2 | SB= 23.1 | Size=189'x62' |
M-032 (G)	2, W2	NGC-221, PGC-2555	| Mag=9.1 | SB= 22.1 | Size=8.5'x6.5' |
M-110 (G)	2, W2	NGC-205, PGC-2429	| Mag=8.8 | SB= 23.4 | Size=19.5'x11.5'
NGC-404 (G)	3, W3	Mirach's Ghost, PGC-4126	| Mag=10 | SB= 24.3 | Size=4.4' |
NGC-752 (G)	4, W4	C-28	| Mag=9.1 | SB= 22.1 | Size=8.5'x6.5' |
NGC-7662 (PN)	5, W5	Blue Snowball, Snowball Nebula, C-22	| Mag=9.0 | SB= 19.3 | Size=2.2' |
NGC-891 (G)	6, W6	Silver Sliver Galaxy, Outer Limits Galaxy, C-23, PGC-9031	| Mag=9.9 | SB= 24.3 | Size=13.5' |

The summary table contains the following columns:

- **Object (Type)**: Name of the object along with the type of object. Object types include:

Abr	Object	Abr		Abr	
AS	Asterism	**DS**	Double Star system	**EN**	Emission Nebula
OC	Open Cluster	**MS**	Multiple Star System	**PN**	Planetary Nebula
GC	Globular Cluster	**CS**	Carbon Star	**RN**	Reflection Nebula
G	Galaxy	**DN**	Dark Nebula	**SNR**	Supernova Remnant
GX	Galaxy Cluster				

- **Charts**: Two links are provided in this column. The first link will take you to the chart within this document. The second link (proceeded with the letter W) will take you to the online chart on the SkyLedge.Net website.
- **Aliases**: Alternate identification(s) for the featured object.
- **Stats**: Further details on the object. Information is separated by the pipe (|) symbol. Stats include:
  - **Mag**: Magnitude of object. For multiple star systems, a magnitude is supplied for each component in the system.
  - **SB**: Surface Brightness is provided for most of the non-stellar objects to help indicate how easily the object is to distinguish from the background.
  - **Size**: For non-stellar objects the size of the object measured, in arcminutes (') or degrees (°).
  - **Sep**: Separation is provided for multiple star systems, these distances are provided in units of arcseconds (").
  - **Color Index**: A simple numerical expression that indicates the color of an object. The lower the color index, the bluer the object is, while higher values indicate redder color.

Stellar Naming Conventions

Stars may be identified on a map or in documentation in a number of ways. The most common methods, listed in order of preference are: proper names, Bayer designations, and Flamsteed designations.

- Proper Names: These are the traditional names assigned to bright stars through history, most have Arabic origins.
- Named After Individuals: A few select stars are named after people.
- Catalogue Designations: There are a number of catalogs used to identify stars. Two common catalogs and their methods include:
    - Bayer designation: Brighter stars in a constellation are assigned Greek letters beginning with the brightest, alpha (α), and decreasing in brightness to the final Greek letter, omega (ω).
    - Flamsteed designation: Lists stars by constellation, but by number rather than letter, ordering them by increasing right ascension rather than by decreasing brightness.

Astronomical Catalogs

Various astronomical catalogs are used to identify stars and other deep sky objects. Some of the most common catalogs, along with their object identification notations, include:

- Abell Catalog of Rich Clusters of Galaxies (**Abell**): A catalog of 4,073 rich clusters of galaxies.
- Aitken Double Star Catalog (**ADS**): A catalog of 17,180 double stars north of declination -30°.
- Barnard Catalogue (**B**): A catalog of 349 dark nebulae.
- Bright Star Catalogue (**BS**, **BSC**, **HR**): First published in 1930, lists stars down to magnitude 6.5 and contains 9,110 objects and 9,095 stars.
- Caldwell Catalogue (**C**): A catalog of 109 deep sky objects including star clusters, nebulae, and galaxies. Developed as a supplement to the Messier Catalog.
- Henry Draper Catalogue (**HD**): Named after Henry Draper, covers the entire sky and captures almost all stars down to an apparent photographic magnitude of about 9.
- Index Catalog (**IC**): The first major update to the NGC is the Index Catalogue of Nebulae and Clusters of Stars and serves as a supplement to the NGC, and contains an additional 5,386 objects.
- Hipparcos Catalogue (**HIP**) – A high-precision catalogue of more than 118,200 stars, published in 1997.
- Lynds' Catalogue of Dark Nebulae (**LDN**): Contains a list of 1802 dark nebulae.
- Messier Objects (**M**): A list of 110 astronomical objects catalogued by Charles Messier in his search for comets.
- Melotte Catalog (**Mel**): A catalog of 245 star clusters.
- New General Catalogue (**NGC**): List of 7,840 deep sky objects.
- Smithsonian Astrophysical Observatory Star Catalog (**SAO**): Initially compiled in 1966 and contains approximately 259,000 stars. Since most GoTo telescopes include this catalog, SAO numbers are provided for stars in this document whenever possible.
- Sharpless Catalog (**Sh**): A list of 313 emission nebulae.

Hints and Tricks

Units of Measure

Some of the most common units of measure used in astronomy include:

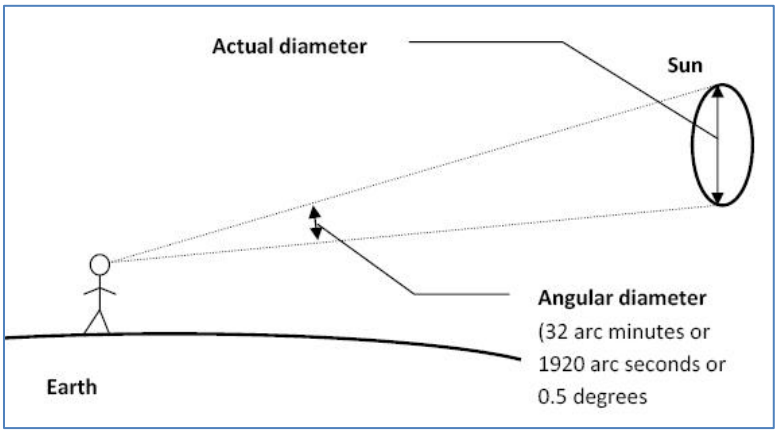
- Distances
  - Astronomical Unit (**AU**) – The Average Earth-Sun Distance. 1 AU is approximately 150 million kilometers or about 93 million miles. Light takes approximately 8 minutes to reach the earth from the sun.

    1 AU ≈ 150 million km **1 AU ≈ 93 million miles**

  - Light Year (**ly**) – The distance light travels in one year. 1 ly is approximately 9.46 trillion km or about 5.88 trillion miles. The closest sun to our own sun is Proxima Centauri at about 4.25 ly from earth.

    1 ly ≈ 9.46 trillion km **1 ly ≈ 5.88 trillion miles** **1 ly ≈ 63.2 thousand AU**

- Angular Diameter Also called angular size, apparent diameter, apparent size. The angular diameter of an object is how large an object appears from a point of view. We are interested in the angular diameter of celestial objects from earth.

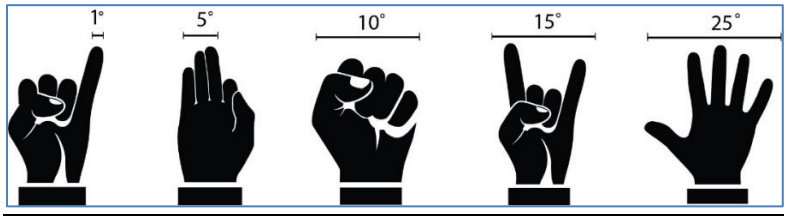


  - Degree (°) –Generally degrees are used to describe the size of larger objects in the sky such as open clusters or distances between constellations. 360° form a full circle. The Sun has an angular diameter of about ½° in the sky.
  - Arcminute (') – Also called minute of arc, arc minute, minute arc. The angular diameter of globular clusters, planets, nebulae and galaxies are usually expressed in arcminutes. There are 60 arcminutes in one degree.
  - Arcsecond (") – Also called second of arc, or arc second. Arcseconds are typically used to describe the apparent distance between stars in multiple star systems or the angular diameter of a planet in our solar system. There are 60 arcseconds in one arcminute; 1,800 arcseconds in one degree. Jupiter's angular diameter varies between about 30 arcsec to 60 arcsec.

    1° = 60' = 3,600" **1' = 60"**

Estimating Angular Distances

A convenient way of estimating large distances between objects in the sky is illustrated below. By extending your hand out at arm's length to the various configurations shown below you can estimate distances in the sky.



Framing Objects

The angular diameter of various deep sky objects and the apparent distance between stars (separation) in multiple star systems is provided for most objects (in this book in the constellation summary page in the stats column). It is important that the equipment you are using has an appropriate field of view to enable you to see the object(s) and details you would like to observe. There are online calculators that can help calculate the field of view for your specific equipment configuration. Understanding the angular diameter (or separation) of potential viewing targets and the field of view of your equipment will be informative when deciding the best eyepiece for viewing an object or if a pair of binoculars may be more appropriate to observe the object.

Log Book

Keeping a log book is a great way of keeping track of what objects you have observed and recording any notes that may prove helpful for future observations. In the Appendix of this book, you will find a Log Book Section that includes the following forms:

- Astronomy Observation Log Summary – Used as an index to summarize your log entries.
- Astronomy Observation Log – Where you can record your observations.
- Astronomy Sketch Log – Where you can record your observations and sketch what you see.

You can use these forms to create your own log book or print out copies that you can disperse throughout the book. You may want to consider placing the index pages at the end of the book and copies of the observation log and/or sketch log after each constellation summary page. Do what will work best for you.

Using Surface Brightness Values

The Magnitude of an object is a measure of the total light output from an object. Magnitude values can very useful when viewing point sources such as stars. However, for extended objects such as nebulae, open clusters, globular clusters and galaxies the magnitude of the object may be deceiving since this light is spread out over the size/area of the object. Surface Brightness values help address this problem in that these values represent the average brightness of an object in the area that the object covers in the sky. Once one becomes familiar with usage of surface brightness, it can be used as a guide to indicate how difficult it will be to distinguish the object from the background glow (light pollution). However, it should be remembered that most deep sky objects do not have a homogeneous illumination, so surface brightness values should be considered a rough guideline when trying to decide if you think you might be able identify an object in a field of view.

Multiple Star System Basics

It is estimated that approximately 50% to 85% of stars in the night sky are actually multiple star systems. These are systems with two or more stars gravitationally bound to each other. Most of these star systems are so far away from us and close to each other, that it is not possible to visually observe a separation between them. However, there still are many systems in the night sky that can be resolved (separated) by small telescopes.

There are a number of terms used to describe multiple star systems. The generic term **Double Star System** is commonly used to describe both **Optical Doubles** (stars that appear within the same line of site but are not gravitationally bound together) and **Binary Systems** (Two stars that are gravitationally bound to each other in an orbit). Technically the term **Multiple Star System** could be used to describe star systems that contain two or more stars that are gravitationally associated with each other, but generally the term Multiple Star System is reserved for physical star systems containing more than two stars. Multiple Star Systems can also be described as triple(3), quadruple(4), quintuple(5), sextuple(6), septuple(7) or octuple(8) based on how many stars are in the physical system. Systems with eight stars are very rare indeed.

One of the benefits of observing multiple star systems is that they are generally not impacted by light pollution, so this is a perfect hobby for the observer in a big city. However, navigating and locating theses stars can be more challenging in a bright night sky due to less stars overall being visible to the naked eye for navigation (GoTo mounts neglect this issue).

Two measurements utilized in the study of multiple star systems are the **Separation** (the apparent distance between stars measured in arc seconds) and **Position Angle** (PA) (the location of the secondary star relative to the primary star measured in degrees).

The technique of observing multiple star systems generally follows the sequence of utilizing the lowest power eyepiece to locate the system and progressing to higher power magnification to resolve the components of the system.

Carbon Stars

Carbon stars are large cool stars with temperatures of less than 4,000k at their surface and have an abundance of carbon in their atmosphere. As a result, the atmosphere contains many carbon compounds giving the star a red appearance. Carbon stars are near the end of their life cycle and tend to be variable stars - stars that vary in brightness over a period of time due to their instability. Carbon stars can range in color from a pale pink to blood red.

Since the appearance of these stars are generally not impacted by light pollution, they are well suited for in-city observing.

Online Resources

Below are some additional astronomy related resources.

- Skyledge.net website: Jim Mazur's website contains not only star hop charts but also many excellent examples of astrophotography.
    - Star Hopping
- ArtCentrics.com website: James Yoder's website contains astronomy and other hobby related resources.
    - Beginner's Guide to Small Telescopes: Course materials and Zoom meeting recordings for practical telescope use for people looking to purchase or who have just purchased a telescope.
- Stellarium Web: Free online planetarium program for planning your observation sessions.
- FreeStarCharts.com: Free online charts for constellations, select stars, Messier, NGC and IC catalogs.
- The Sky Live: Guide to the solar system and the night sky
- Astronomy Tools: Various online calculators.
- MoonConnection.com: All things related to the moon including a moon phase calendar.
- Carbon, Binary and Multiple Star Systems
    - Wikipedia: Star System
    - Cloudy Nights: Double Star Observing
    - Cloudy Nights: Double your pleasure (Sketches)
    - Stelle Doppie – Search engine to the Washington Double Star Catalog (WDS)
    - Bright Star Catalogue Online search for bright stars.
    - Wikipedia: Carbon Star
    - Mahoning Valley Astronomical Society: 116 Best Carbon Stars List (PDF).
- Additional Observing Resources
    - Astronomical League Log Books (PDF) complements of Mathew Wedel
        - Double Star Club
        - Deep Sky Binocular Observing Club
        - Binocular Messier Club
        - Binocular Double Star Club
- Deep-sky.co.uk: Observing Asterisms
- Stelle Doppie: Double Star Database, Search engine to the Washington Double Star Catalog

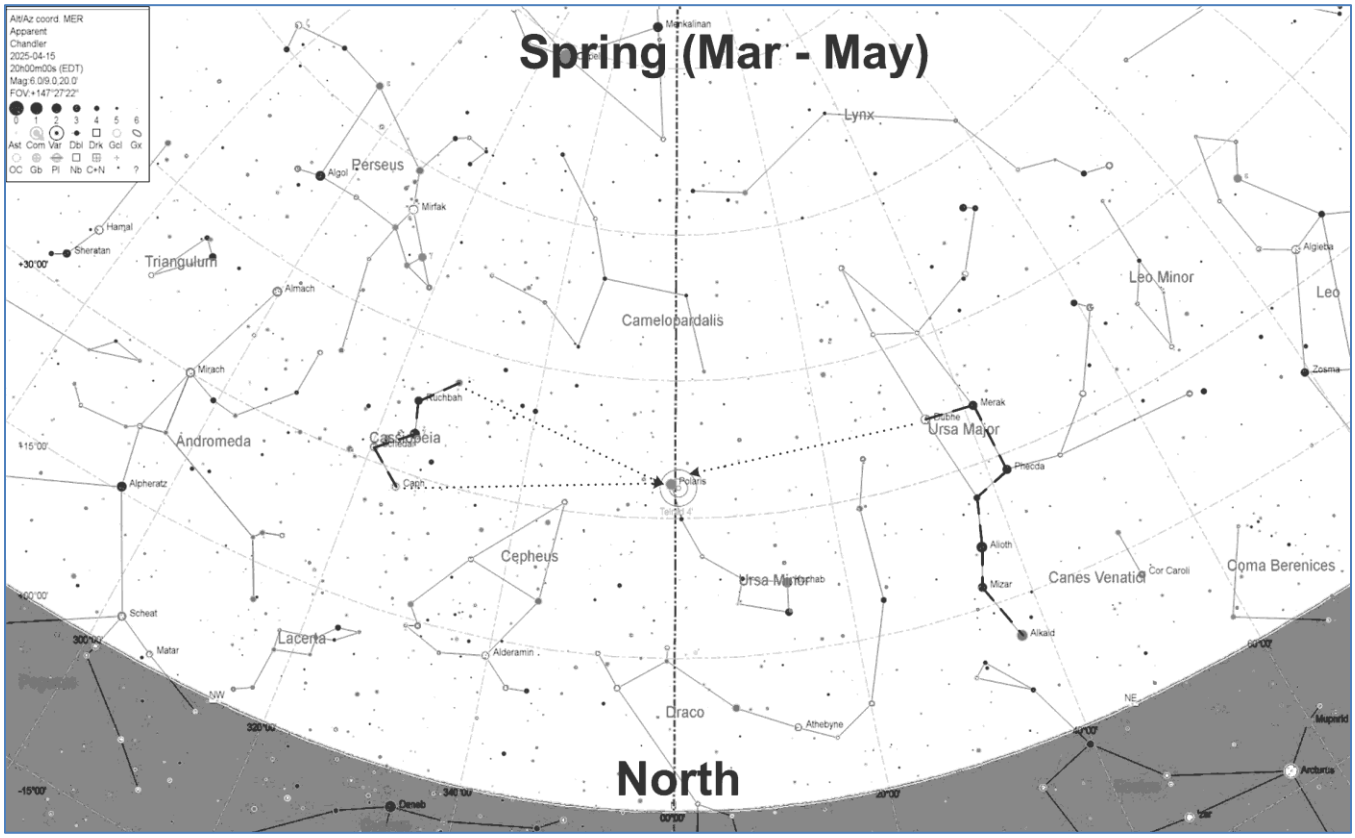
The Night Sky

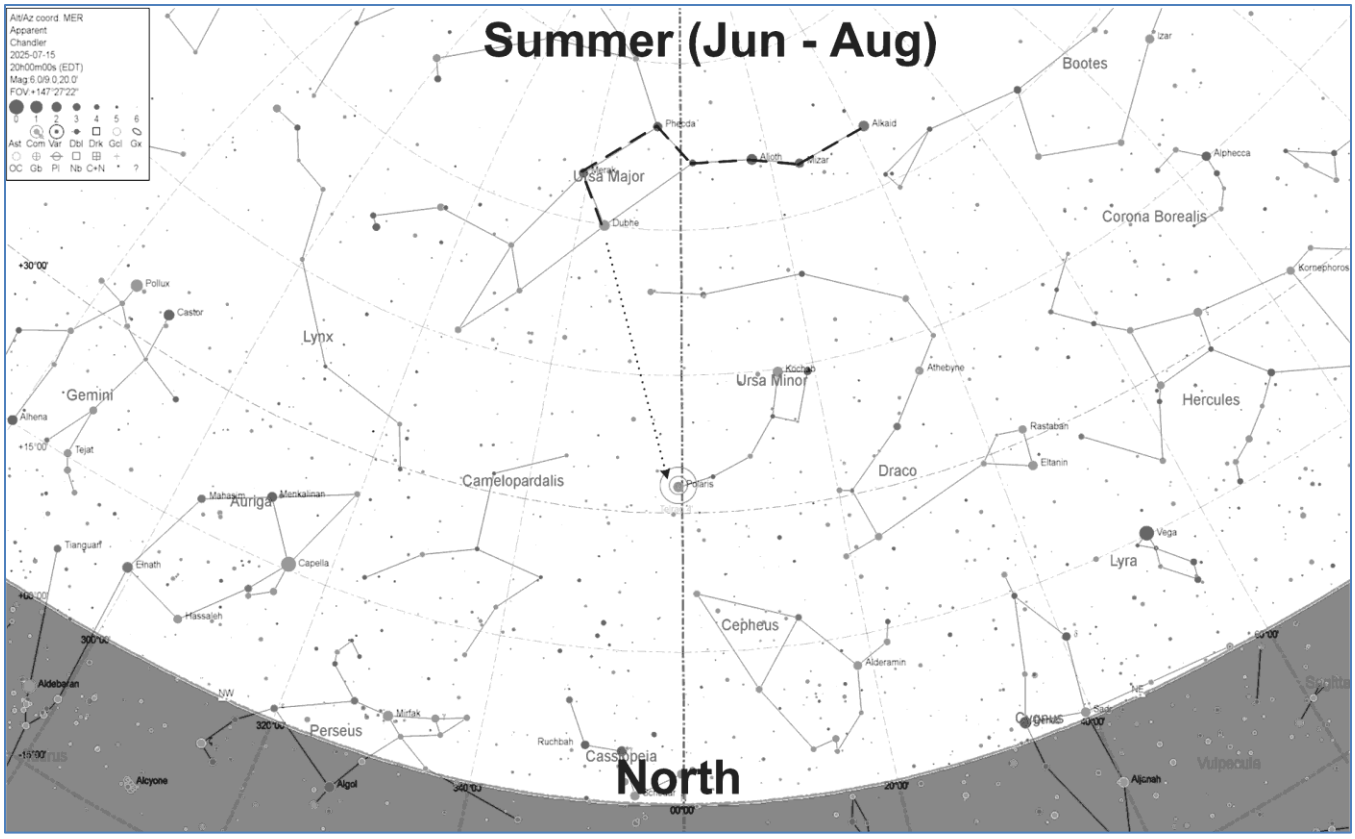
Before beginning an observation session, it is important to get oriented with the night sky. We have included seasonal charts with asterisms that will assist in understanding the night sky as it changes with each season. Take note that the outer ring of the bullseye in the center of each of the provided images has a 4-degree diameter to help provide a scale of distances in each of the diagrams.

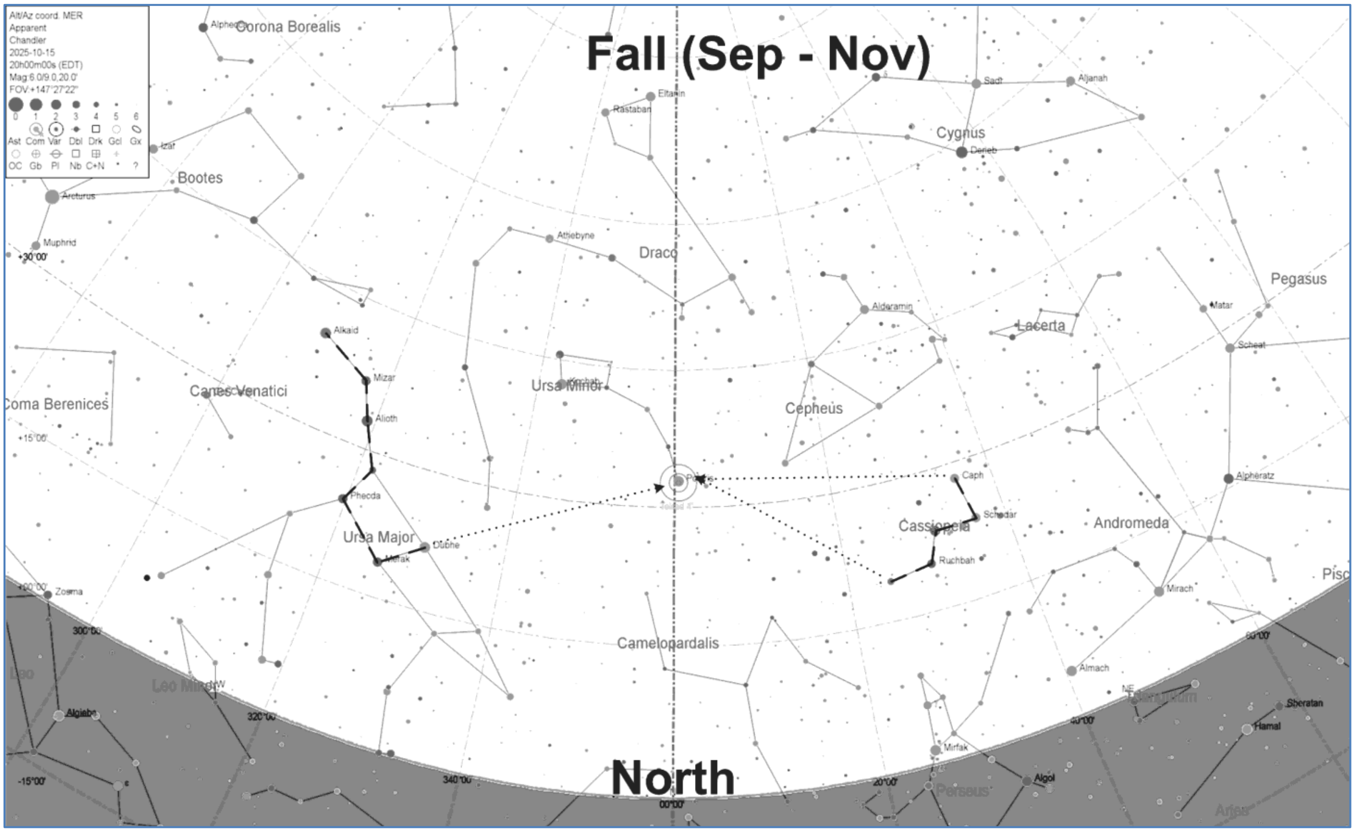
Orientation North

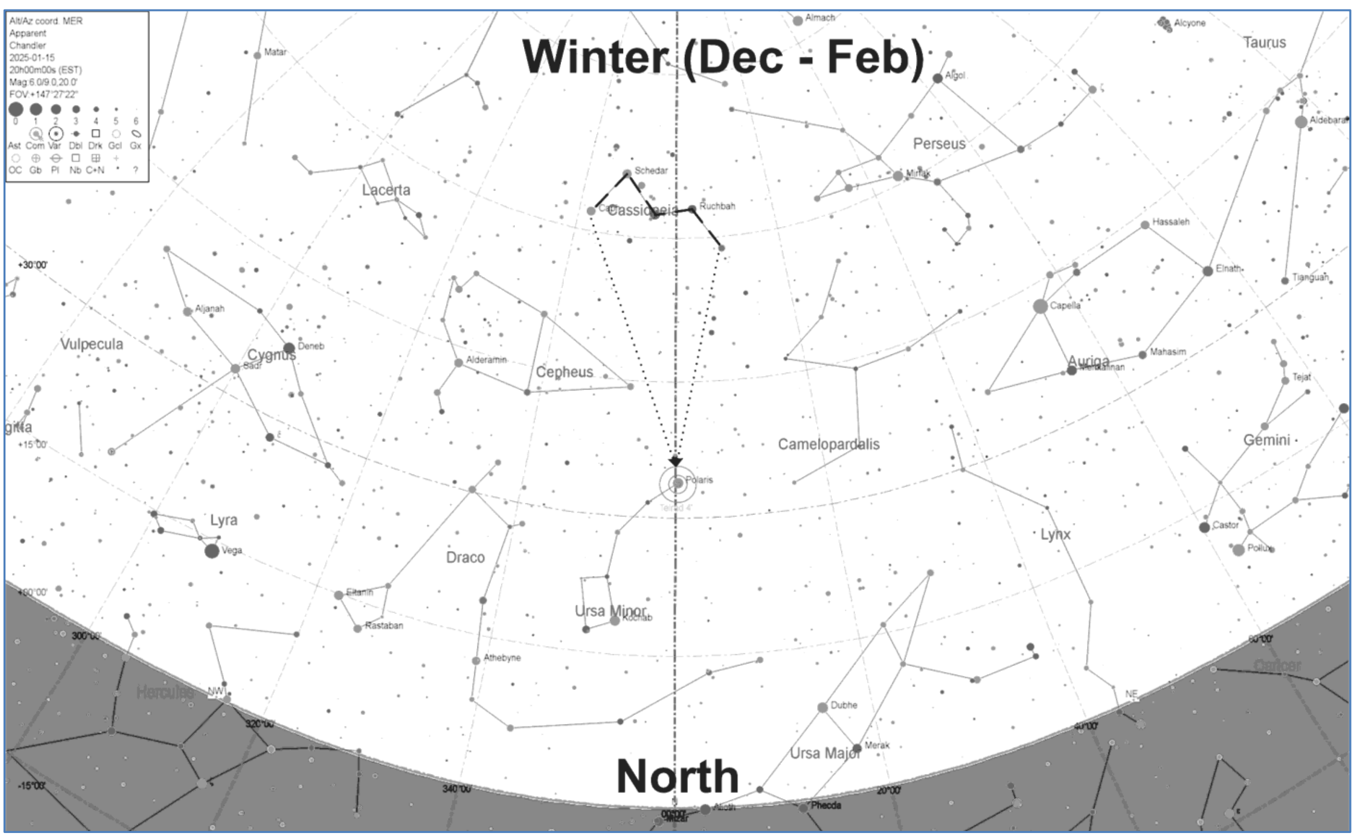
To find true north, first identify which direction faces north. Next, find Polaris (the North Star), which is the last star in the handle of Ursa Minor (the Little Dipper). In the Spring and Summer, the Big Dipper can help in locating the North Star. After finding the Big Dipper, locate the two pointer stars, Merak and Dubhe, found in the Dipper's scoop or bowl. Follow these two pointer stars approximately 30 degrees to Polaris.
Since the Big Dipper is near or below the horizon in Fall and Winter, Cassiopeia may be best for finding Polaris. To find Cassiopeia, look for an asterism in the north that looks like a "W" or "M". Locate the two stars, Caph and Segin, found at each of the ends of the constellation. Follow Caph and Segin until they meet at a point, creating a triangle with Polaris

Locating Polaris






Fall (Sep - Nov)
Corona Borealis
Bootes
Arcturus
Draco
Cygnus
Deneb
Pegasus
Lacerta
Canes Venatici
Coma Berenices
Alkaid
Mizar
Alioth
Phecda
Ursa Major
Dubhe
Merak
Ursa Minor
Cepheus
Alderamin
Caph
Schedar
Cassiopeia
Ruchbah
Andromeda
Alpheratz
Mirach
Almach
Camelopardalis
Mirfak
Algol
North

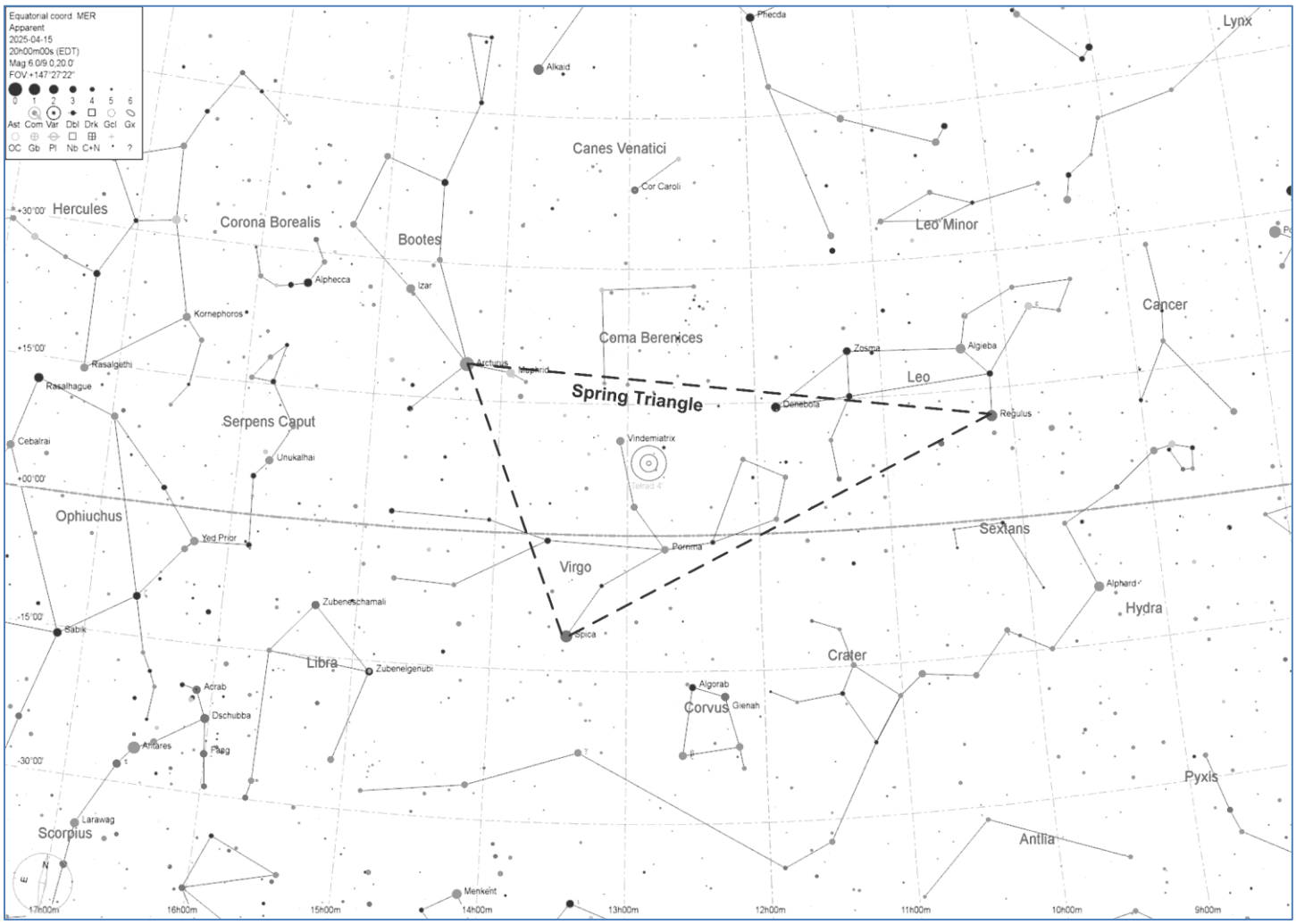

Winter (Dec - Feb)
Taurus
Algol
Perseus
Mirfak
Schedar
Cassiopeia
Ruchbah
Lacerta
Capella
Auriga
Vulpecula
Cygnus
Deneb
Cepheus
Alderamin
Camelopardalis
Gemini
Polaris
Lyra
Vega
Draco
Lynx
Castor
Pollux
Ursa Minor
Dubhe
Ursa Major
Merak
North

Seasonal Asterisms

An asterism is a recognizable pattern in the night sky that contains stars from one or more constellations. Asterisms can be easily located, even in locations with high light pollution, and they serve as reference points for navigating the night sky. As the seasons change, the asterism that appears prominent in the evening sky changes. The order of progression is from Spring (Spring Triangle), to Summer (Summer Triangle), to Fall (The Great Square), and finally to Winter (The Winter Hexagon).

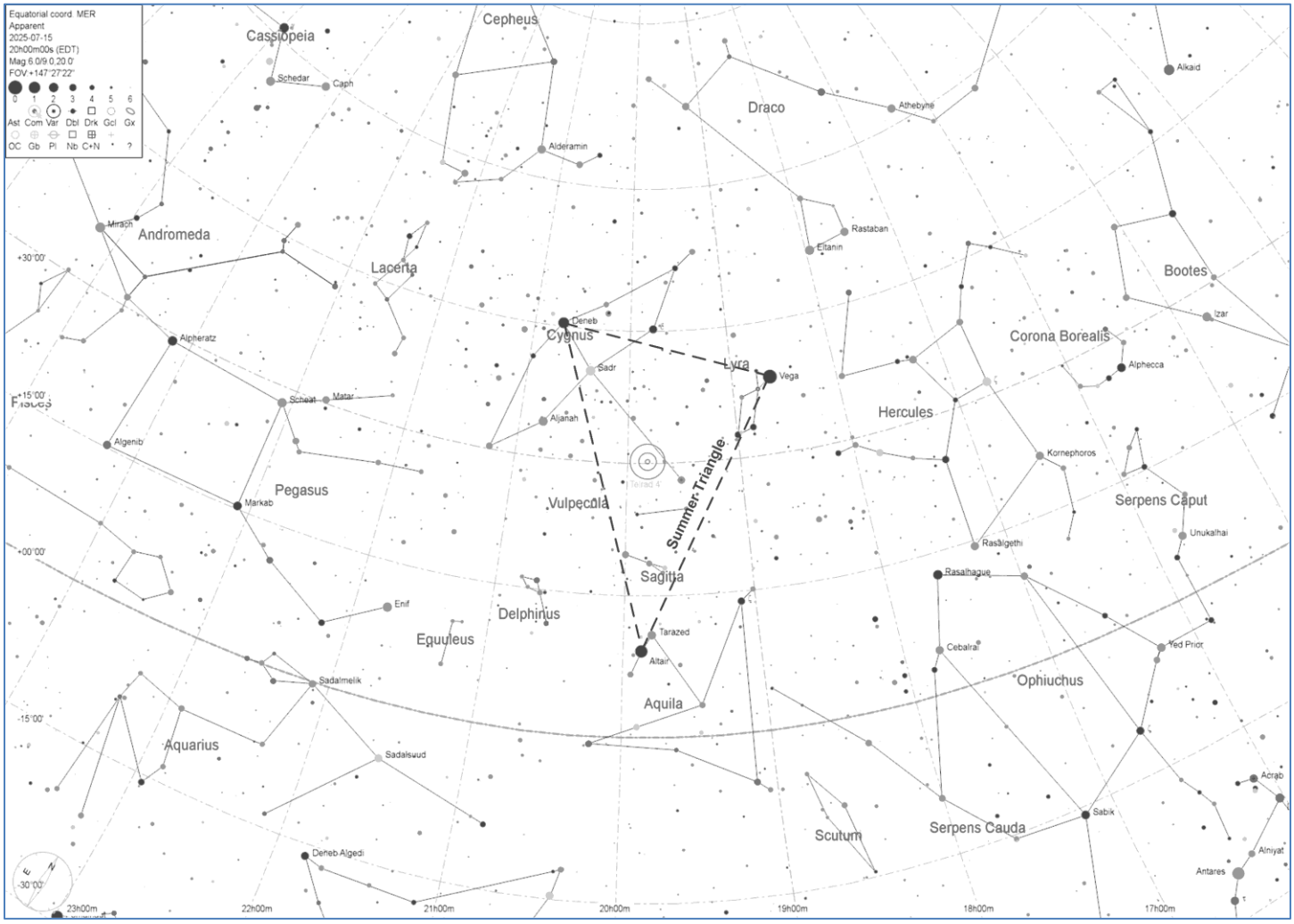
Spring Triangle

The Spring Triangle is easily identified from March through May and is composed of the brightest stars in each of the constellations: Arcturus in Bootes, Regulus in Leo, and Spica in Virgo.



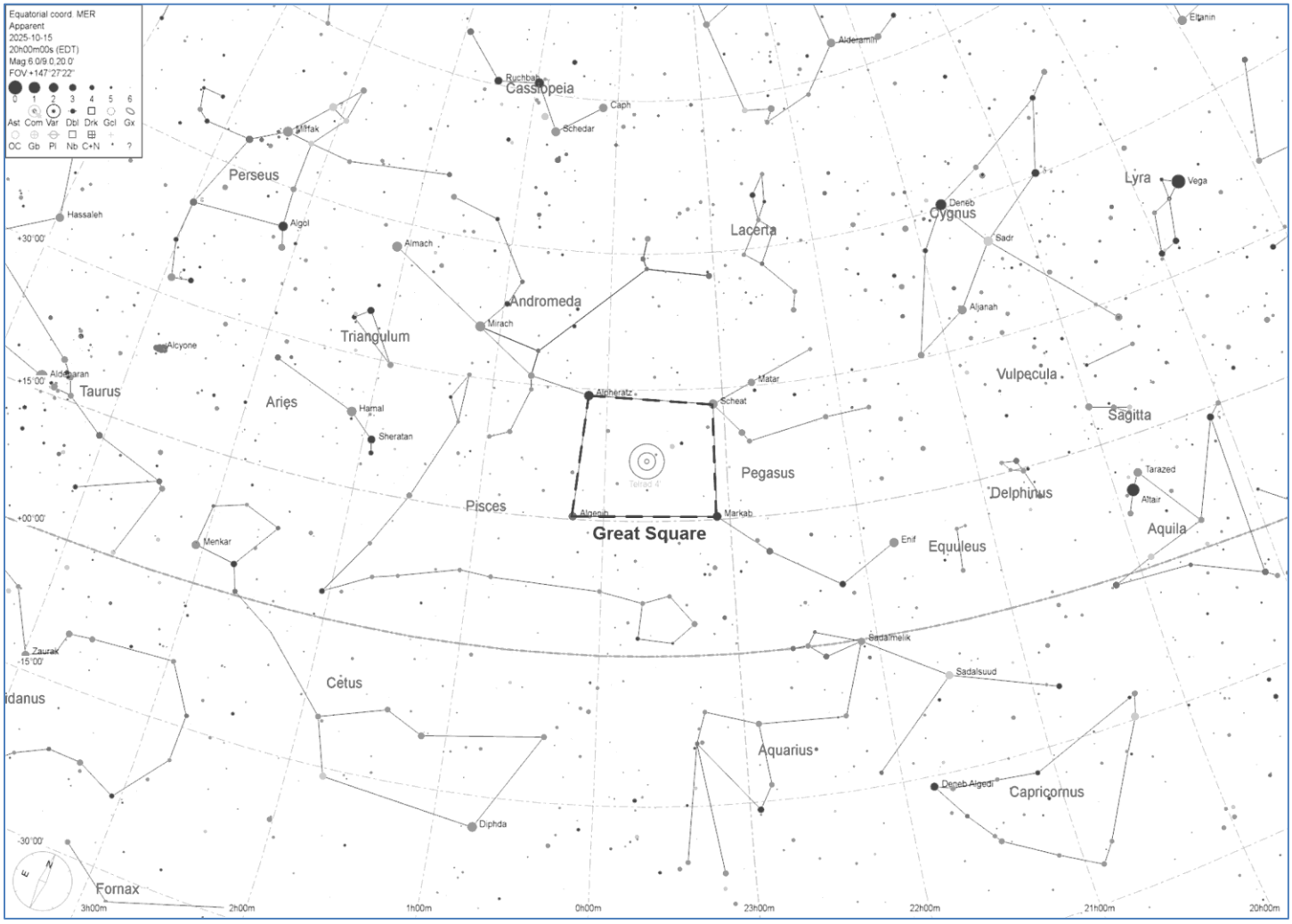
Summer Triangle

The Summer Triangle can be found from June through August. The three stars creating the Summer Triangle include Deneb from the constellation Cygnus, Vega from the constellation Lyra, and Altair, the brightest star in the constellation Aquila.



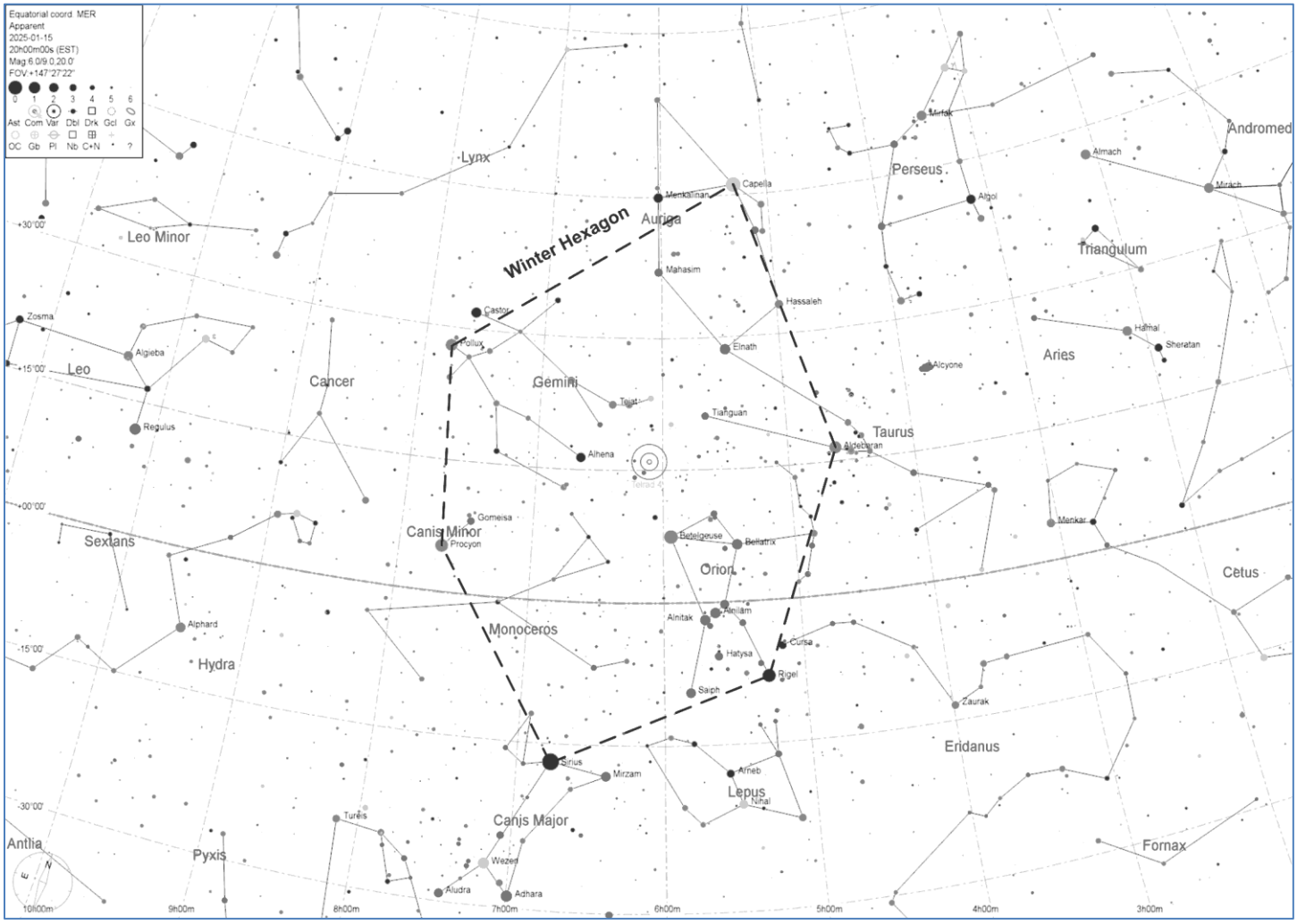
Fall - Great Square of Pegasus

The Great Square of Pegasus is an asterism found from September through November. The four stars that build the Great Square are Algenib, Markat, and Scheat from the constellation Pegasus, and Alpheratz from the constellation Andromeda. To determine how the Great Square is oriented, find the two stars outside the northwest corner of the square, forming a triangle with Scheat.



Winter Hexagon

The Winter Hexagon is prominent from December through February. This asterism forms a hexagon with the following stars: Rigel in Orion, Aldebaran in Taurus, Capella in Auriga, Pollux in Gemini, Procyon in Canis Minor, and Sirius in Canis Major. Sirius and Procyon also form the Winter Triangle with Betelgeuse, the brightest star in Orion.



Targets Index

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Messier Catalog

The Messier catalog was compiled by Charles Messier and contains 110 deep sky objects. Just about every type of deep sky object can be found in this list including galaxies (G), emission nebulae (EN), open clusters (OC), globular clusters (GC), supernova remnants (SNR), planetary nebulae (PN), and dark nebulae (DN). All 110 objects are included in this document.

M-001 (SNR)	M-023 (OC)	M-045 (OC, RN)	M-067 (OC)	M-89 (G)
M-002 (GC)	M-024 (Star Cloud)	M-046 (OC, PN)	M-068 (GC)	M-90 (G)
M-003 (GC)	M-025 (OC)	M-047 (OC)	M-069 (GC)	M-091 (G)
M-004 (GC)	M-026 (OC)	M-048 (OC)	M-070 (GC)	M-092 (GC)
M-005 (GC)	M-027 (PN)	M-049 (G)	M-071 (GC)	M-093 (OC)
M-006 (OC)	M-028 (GC)	M-050 (OC)	M-072 (GC)	M-094 (G)
M-007 (OC)	M-029 (OC)	M-051 (G)	M-073 (AS)	M-095 (G)
M-008 (EN, OC)	M-030 (GC)	M-052 (OC)	M-074 (G)	M-096 (G)
M-009 (GC)	M-031 (G)	M-053 (GC)	M-075 (GC)	M-097 (PN)
M-010 (GC)	M-032 (G)	M-054 (GC)	M-076 (PN)	M-098 (G)
M-011 (OC)	M-033 (G)	M-055 (GC)	M-077 (G)	M-099 (G)
M-012 (GC)	M-034 (OC)	M-056 (GC)	M-078 (RN, DN)	M-100 (G)
M-013 (GC)	M-035 (OC)	M-057 (PN)	M-079 (GC)	M-101 (G)
M-014 (GC)	M-036 (OC)	M-058 (G)	M-080 (GC)	M-102 (G)
M-015 (GC)	M-037 (OC)	M-059 (G)	M-081 (G)	M-103 (OC)
M-016 (EN, OC)	M-038 (OC)	M-060 (G)	M-082 (G)	M-104 (G)
M-017 (EN, OC)	M-039 (OC)	M-061 (G)	M-083 (G)	M-105 (G)
M-018 (OC)	M-040 (AS)	M-062 (GC)	M-084 (G)	M-106 (G)
M-019 (GC)	M-041 (OC)	M-063 (G)	M-085 (G)	M-107 (GC)
M-020 (EN, OC, DN)	M-042 (EN, RN, OC)	M-064 (G)	M-086 (G)	M-108 (G)
M-021 (OC)	M-043 (EN, OC DN)	M-065 (G)	M-087 (G)	M-109 (G)
M-022 (GC)	M-044 (OC)	M-066 (G)	M-088 (G)	M-110 (G)

Caldwell Catalog

The Caldwell Catalog was compiled by Patrick Moore and contains 109 deep sky objects not included in the Messier catalogue. It is considered a complement to the Messier catalog of 110 objects. This document includes charts for 61 objects in the list. Objects that are not in this document are indicated in gray.

C-001 (OC)	C-023 (G)	C-045 (G)	C-067 (G)	C-089 (OC)
C-002 (PN)	C-024 (G)	C-046 (EN)	C-068 (EN)	C-090 (PN)
C-003 (G)	C-025 (GC)	C-047 (GC)	C-069 (PN)	C-091 (OC)
C-004 (EN)	C-026 (G)	C-048 (G)	C-070 (G)	C-092 (EN)
C-005 (G)	C-027 (EN)	C-049 (EN)	C-071 (OC)	C-093 (GC)
C-006 (PN)	C-028 (OC)	C-050 (OC)	C-072 (G)	C-094 (OC)
C-007 (G)	C-029 (G)	C-051 (G)	C-073 (GC)	C-095 (OC)
C-008 (OC)	C-030 (G)	C-052 (G)	C-074 (PN)	C-096 (OC)
C-009 (EN)	C-031 (EN)	C-053 (G)	C-075 (OC)	C-097 (OC)
C-010 (OC)	C-032 (G)	C-054 (OC)	C-076 (OC)	C-098 (OC)
C-011 (EN)	C-033 (SNR)	C-055 (PN)	C-077 (G)	C-099 (DN)
C-012 (G)	C-034 (SNR)	C-056 (PN)	C-078 (GC)	C-100 (OC)
C-013 (OC)	C-035 (G)	C-057 (G)	C-079 (GC)	C-101 (G)
C-014 (OC)	C-036 (G)	C-058 (OC)	C-080 (GC)	C-102 (OC)
C-015 (PN)	C-037 (OC)	C-059 (PN)	C-081 (GC)	C-103 (EN)
C-016 (OC)	C-038 (G)	C-060 (G)	C-082 (OC)	C-104 (GC)
C-017 (G)	C-039 (PN)	C-061 (G)	C-083 (G)	C-105 (GC)
C-018 (G)	C-040 (G)	C-062 (G)	C-084 (GC)	C-106 (GC)
C-019 (EN)	C-041 (OC)	C-063 (PN)	C-085 (OC)	C-107 (GC)
C-020 (EN)	C-042 (GC)	C-064 (OC)	C-086 (GC)	C-108 (GC)
C-021 (EN)	C-043 (G)	C-065 (G)	C-087 (GC)	C-109 (PN)
C-022 (PN)	C-044 (G)	C-066 (GC)	C-088 (OC)	

New General Catalogue (NGC)

The New General Catalogue of Nebulae and Clusters of Stars was compiled by John Dreyer in 1888 and contains 7,840 objects including galaxies, star clusters, and emission nebulae.

NGC 0000 – 2999

NGC-14 (G)	NGC-457 (OC)	NGC-1502 (OC)	NGC-2237,8,9 (G)	NGC-2451 (OC)
NGC-40 (PN)	NGC-559 (OC)	NGC-1514 (PN)	NGC-2244 (OC)	NGC-2477 (OC)
NGC-147 (G)	NGC-663 (OC)	NGC-1907 (OC)	NGC-2261 (EN, RN)	NGC-2506 (OC)
NGC-185 (G)	NGC-752 (OC)	NGC-1980 (OC)	NGC-2360 (OC)	NGC-2539 (OC)
NGC-188 (OC)	NGC-869 (OC)	NGC-2158 (OC)	NGC-2362 (OC)	NGC-2775 (G)
NGC-253 (G)	NGC-884 (OC)	NGC-2169 (OC)	NGC-2392 (PN)	
NGC-288 (GC)	NGC-891 (G)	NGC-2194 (OC)	NGC-2403 (G)	
NGC-404 (G)	NGC-1499 (EN)	NGC-2264 (OC, EN)	NGC-2419 (GC)	

NGC 3000 – 4999

NGC-3115 (G)	NGC-3242 (PN)	NGC-3628 (G)	NGC-4449 (G)	NGC-4627 (G)
NGC-3185 (G)	NGC-3599 (G)	NGC-4236 (G)	NGC-4656 (G)	NGC-4631 (G)
NGC-3187 (G)	NGC-3605 (G)	NGC-4244 (G)	NGC-4559 (G)	NGC-4872 (G)
NGC-3193 (G)	NGC-3607 (G)	NGC-4394 (G)	NGC-4565 (G)	NGC-4889 (G)
NGC-3226 (G)	NGC-3608 (G)	NGC-4435 (G)	NGC-4567 (G)	NGC-4914 (G)
NGC-3227 (G)	NGC-3626 (G)	NGC-4438 (G)	NGC-4568 (G)	

NGC 5000 - 7999

NGC-5005 (G)	NGC-6543 (PN)	NGC-6882 (OC)	NGC-6992-5 (SNR)	NGC-7293 (PN)
NGC-5024 (G)	NGC-6572 (PN)	NGC-6885 (OC)	NGC-6996 (OC)	NGC-7331 (G)
NGC-5033 (G)	NGC-6633 (OC)	NGC-6888 (EN)	NGC-7000 (EN)	NGC-7479 (G)
NGC-5248 (G)	NGC-6751 (PN)	NGC-6934 (GC)	NGC-7006 (GC)	NGC-7635 (EM)
NGC-6503 (G)	NGC-6781 (PN)	NGC-6939 (OC)	NGC-7009 (PN)	NGC-7662 (PN)
NGC-6522 (GC)	NGC-6822 (G)	NGC-6946 (G)	NGC-7023 (RN)	NGC-7789 (OC)
NGC-6528 (GC)	NGC-6826 (PN)	NGC-6960 (SNR)	NGC-7243 (OC)	NGC-7814 (G)

Index Catalogue (IC) Objects

The Index Catalogue is the first major update to the NGC and was published in two parts by Dreyer in 1895. This list serves as a supplement to the NGC and contains 5,386 objects.

IC-342 (G)	IC-4182 (G)	IC-4756 (OC)		
IC-405 (EN)	IC-4665 (OC)	IC-5146 (OC, EN)		

Star List

Some carbon stars, binary (double) stars, and multiple star systems have been identified in this document and are listed below.

Achird (DS)	Iota Cassiopeiae (MS)	Porrima (DS)
Albireo (DS)	Izar (DS)	Sigma Orionis (MS)
Algieba (DS)	Keid (MS)	Struve 761 (MS)
Almach (DS)	Mesarthim (DS)	T Lyrae (CS)
Asellus Tertius (DS)	Mizar and Alcor (DS)	U Hydrae (CS)
Beta Monoceros (TS)	Mu Cephei (CS)	V Aquilae (CS)
Cor Caroli (DS)	Omicron 1 Cygni (MS)	WZ Cassiopeia (DS, CS)
Epsilon Lyrae (MS)	Pi Bootis (DS)	Xi Bootis (DS)
Gamma Delphini (DS)	Polaris (DS)	Y Canum Venaticorum (CS)

Other Items

Items provided in the list below are not associated with any of the previous lists we have identified.

Collinder 399 (OC)	Melotte 20 (OC)	Perseus I (GC)
Engagement Ring (AS)	Melotte 25 (OC)	Sharpless 2-155 (EN)
Harrington 4 (AS)	Melotte 111 (OC)	
Kemble's Cascade (AS)		

Seasonal Highlights

Listed below are some highlights for each season. Items marked with * in the *Target* column are considered exceptional targets and should not be missed. Selection was based on ease of locating and/or viewing pleasure. Of course, this is a subjective list and what equipment you have will have great impact on your viewing experience. Each seasonal list is ordered according to what constellation is best positioned within the season from earliest to latest.

Spring (March – May)

Const	Target (Type)	Size / Sep	Comments
Leo	Leo Trio (G)	45’	M-65, M-66, NGC-3628 group of galaxies in close proximity
Hya	NGC-3242 (PN)	25”	Ghost of Jupiter. A planetary nebula roughly the size of Jupiter.
UMa	*Mizar & Alcor (MS)	709”, 14’	A splendid binocular pair and easily located; a telescope triple; Mizar is a double with 14’ separation between stars.
UMa	*M-81, 82 (G)	45’	Bode’s Galaxy & Cigar Galaxy, a pair of galaxies in close proximity.
UMa	M-101 (G)	29x27’	Pinwheel galaxy. Face-on galaxy nearly the size of the full moon. Large aperture is required to see any details on this object.
Com	Mel 111	7.5°	Coma Star Cluster. About 40 stars in a 4.5° area.
CVn	*M-003 (GC)	18’	A bright globular cluster with a very dense center.
CVn	M-094 (G)	11x9’	A bright face-on spiral galaxy. Large scopes show some detail in its spiral arms.
CVn	M-051 (G)	11x7’	Whirlpool Galaxy. Two interacting galaxies
Vir	M-104 (G)	9x4’	Sombrero Galaxy. Visible in small telescope with dark dust band.

Summer (June – August)

Const	Target (Type)	Size / Sep	Comments
Sco	M-006 (OC)	25’	Butterfly Cluster. Shape does resemble a butterfly
Sco	M004 (GC)	26’	Small globular with row of bright stars going through the middle.
Sgr	*M-008 (EN, OC)	90x40’	Lagoon Nebula. Large open cluster in nebula.
Oph	IC-4665 (OC)	40’	A large and sprawling open cluster, good for binoculars.
Her	*M-013 (GC)	20’	Hercules Cluster: Best globular cluster in the Northern Hemisphere.
Sct	M-011 (OC)	23’	Wild Duck Cluster. A rich very dense open cluster.
Lyr	*M-057 (PN)	1x1’	The Ring Nebula. Bright PN visible even in small telescopes.
Sgr	M-017 (EN, OC)	11’	Swan Nebula. Cluster of bright stars in faint nebulosity.
Sgr	M-022 (GC)	32’	One of the largest, brightest, and most impressive globular clusters in the sky.
Sgr	M-024 (Star Cloud)	2x1°	Sagittarius Star Cloud. Great binocular target.
Cyg	*Albireo (DS)	35”	The most celebrated double in the northern hemisphere.
Vul	M-027 (PN)	8x6’	Dumbbell Nebula. A large PN with hour-glass shape.
Vul	Collinder 399	60’	Coathanger Cluster. A great binocular target.

Fall (September – November)

Const	Target (Type)	Size / Sep	Comments
Aqr	NGC-7009 (PN)	41x35”	Saturn Nebula. The PN does have a shape similar to Saturn.
Peg	*M-015 (GC)	18’	One of the brightest Globular Clusters in the Northern Hemisphere.
Scl	NGC 253 (G)	27x7’	Silver Coin Galaxy. A nice galaxy with a GC nearby.
And	*M-031 (G)	3x2°	Andromeda Galaxy: Best galaxy in the Northern Hemisphere
And	NGC-752 (OC)	75’	A large open cluster of some 70 stars covering more than 1 degree of sky. Impressive at low power.
Cas	NGC-457	13’	Owl Cluster – Easily located; Owl with spread wings
Cas	Iota Cas (MS)	7.3”, 2.3”	Triple Star System | Mag 4.6, 6.9, 9.0 | An excellent triple star system
Cas	WZ Cas (DS)	57”	Red (Carbon Star) and blue pair in field of stars. Beautiful!
Tau	*M-045 (OC)	2°	The Pleiades: Famous Large open cluster best seen with binoculars.
Per	NGC 869 & 884 (OC)	30’	Perseus Double Cluster: Excellent binocular target
Per	Melotte 20 (AS)	5°	The Alpha Persei Association. Easily located and a nice binocular target.
Eri	Omicron 3 Eri (DS)	83”, 8”	Keid | Triple Star System | Mag 4.4, 9.5, 11.2

Winter (December – February)

Const	Target (Type)	Size / Sep	Comments
Tau	Melotte 25 (OC)	5°	The Hyades. Large open cluster.
Ori	*M 42 & 43 (EN, RN, OC)	65x60’	Orion Nebula: M-42 and M-43 make up the Orion Nebula; The best nebula in the Northern Hemisphere.
Ori	*Sigma Ori (MS)		A Quintuple Star System! Most telescopes can make out 3 or 4 stars in this system. The closest pair is a mere 0.25” apart.
Cam	Kemble’s Cascade (OC)	2.5°	A pretty string of stars stretching for 2.5 degrees and ending with the cluster NGG 1502.
Aur	M 36, 37 & 38 (OC)	12’, 24’, 21’	Pinwheel, Salt and Pepper, Starfish Clusters all in the same area.
CMa	M-041 (OC)	38’	Little Beehive Cluster. Just visible to the naked eye.
Gem	M-035 (OC)	28’	Shoe-Buckle Cluster. A large bright open cluster.
Gem	NGC-2392 (PN)	48”	Clown Face Nebula. Small but bright planetary nebula.
Mon	M-050 (OC)	16’	Heart-shaped Cluster. A bright cluster with various colored stars.
Pup	M-046 (OC, PN)	23’	Open cluster with planetary nebula. Larger aperture may be required to see the planetary nebula.
Cnc	M-044 (OC)	95’	Beehive Cluster. Twice the diameter of the full moon, Binocular target.

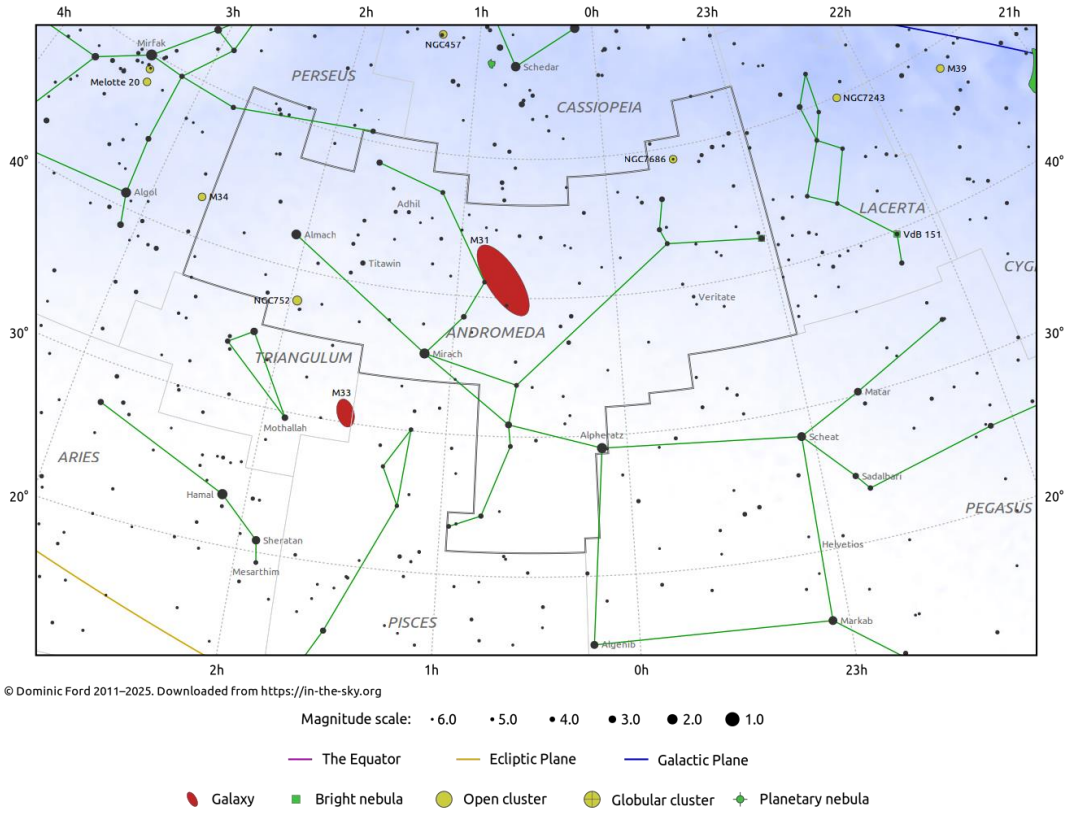
The Constellations

Blank

Andromeda (And)

Evening Visibility: **September – February**
Online Information: **Andromeda**
Charts: **6** Featured Objects: **8**
More Online Information: Almach, M-031, M-032, M-110, NGC-404, NGC-752, NGC-7662, NGC-891

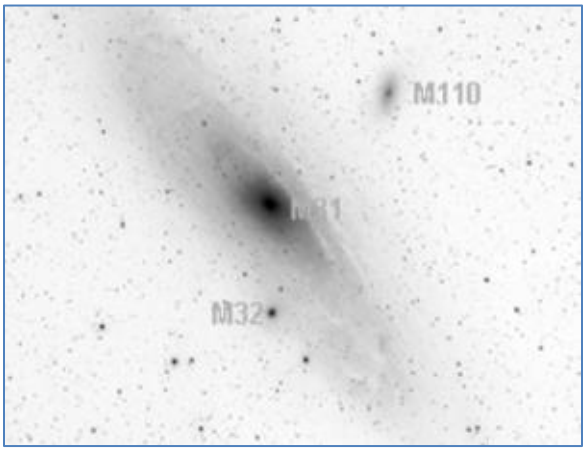
In-The-Sky.org Constellation Map



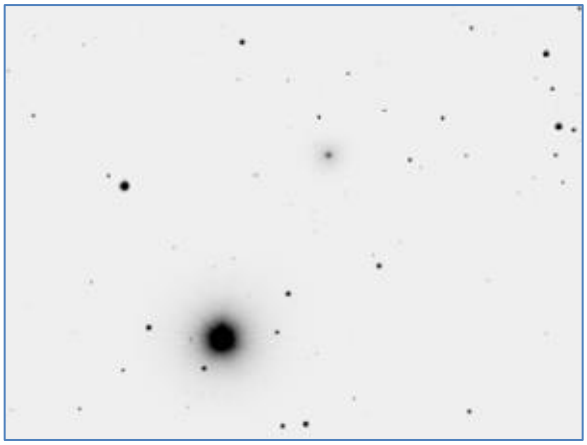
Object (Type)	Charts	Aliases	Stats
Almach (DS)	1, W1, SD	SAO-037734, HIP-9640, gamma Andromedae, And 57, STF-205, ADS-1530	| Mag=2.2, 5.0 | Sep=9.8” |
M-031 (G)	2, W2	Andromeda Galaxy, NGC-224, PGC-2557	| Mag=3.4 | SB= 23.1 | Size=189’x62’ |
M-032 (G)	2, W2	NGC-221, PGC-2555	| Mag=8.1 | SB= 22.1 | Size=8.7’x6.5’ |
M-110 (G)	2, W2	NGC-205, PGC-2429	| Mag=8.5 | SB= 23.4 | Size=22’x11’
NGC-404 (G)	3, W3	Mirach’s Ghost, PGC-4126	| Mag=11.2 | SB= 21.9 | Size=3.5’ |
NGC-752 (G)	4, W4	C-28	| Mag=5.7 | SB= 22.8 | Size=75’ |
NGC-7662 (PN)	5, W5	Blue Snowball, Snowball Nebula, C-22	| Mag=8.3 | SB= 19.3 | Size=32” x 28” |
NGC-891 (G)	6, W6	Silver Sliver Galaxy, Outer Limits Galaxy, C-23, PGC-9031	| Mag=10.8 | SB= 24.3 | Size=13.5’ x 2.5’ |

Image Gallery

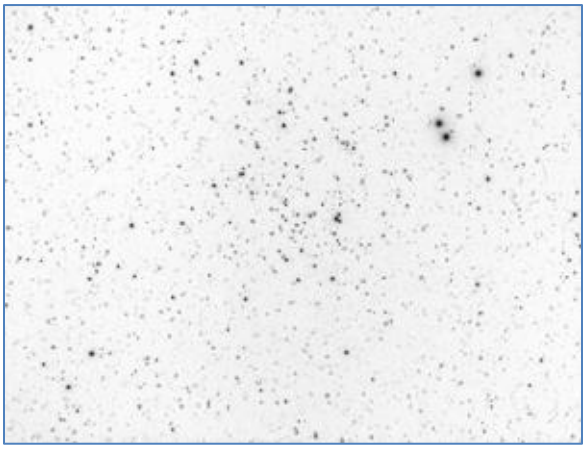
Almach (Gamma Andromedae)



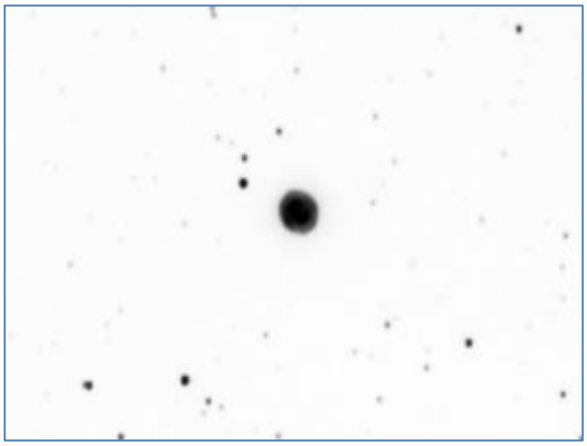
Messier 31, 32 and 110



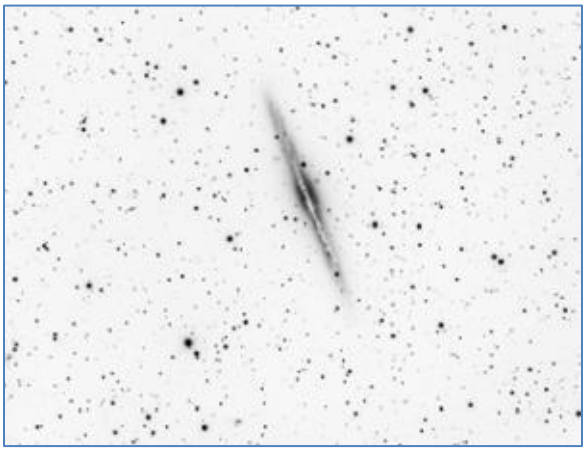
NGC 404, Mirach's Ghost



NGC 752 (C 28)



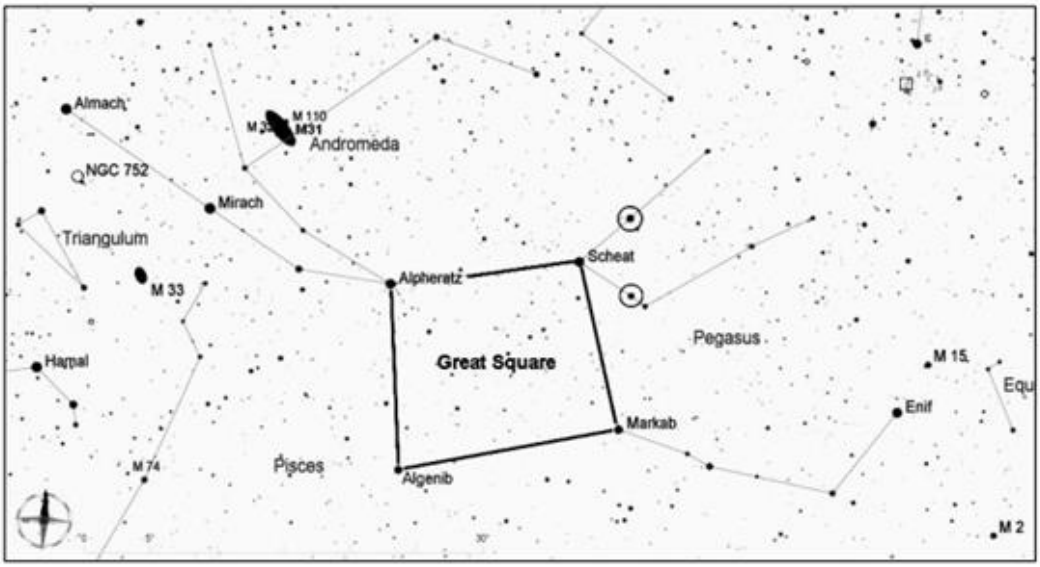
NGC 7662 (C 22) The Blue Snowball



NGC 891 (C 23)

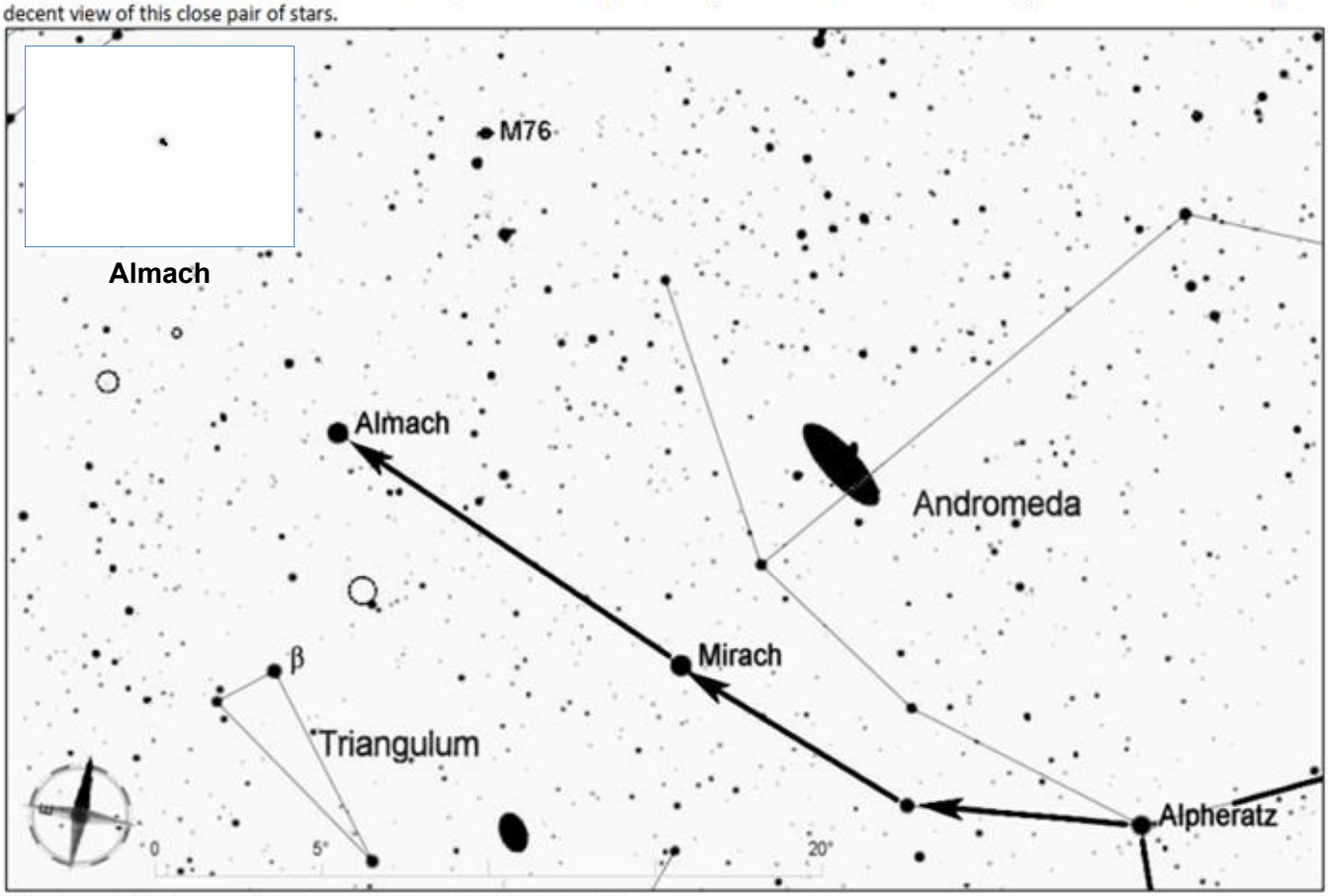
Almach (γ Andromeda), Double Star

Almach, or gamma Andromedae, is a pretty double star, about 390 light years away. The brighter of the pair is a yellow star of magnitude 2.2, and the dimmer is a blue star of magnitude 5.0. The two stars are separated by 9.8 arcseconds. The blue star itself is a close double, but its two components are very close (averaging 0.3 arcseconds as they orbit every 63 years). It would take a large telescope and excellent seeing conditions to split the two components of the blue star.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

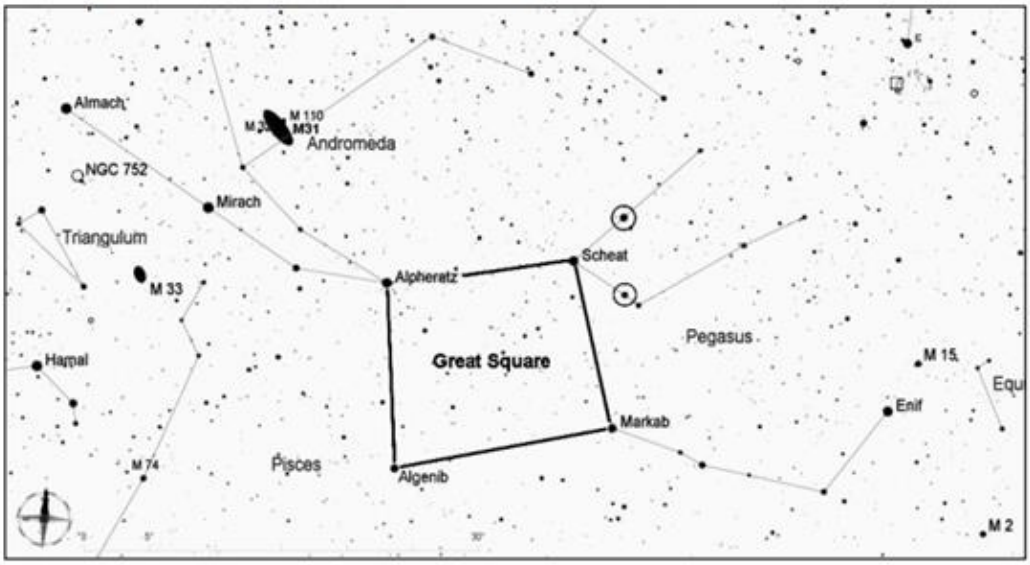
The constellation Andromeda stretches to the northeast from the Great Square, starting at the second-magnitude star Alpheratz. Using the naked eye, follow the stars of Andromeda east to Almach, which shines brightly at magnitude 2. Use a telescope with magnification of at least 50x to get a decent view of this close pair of stars.



From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

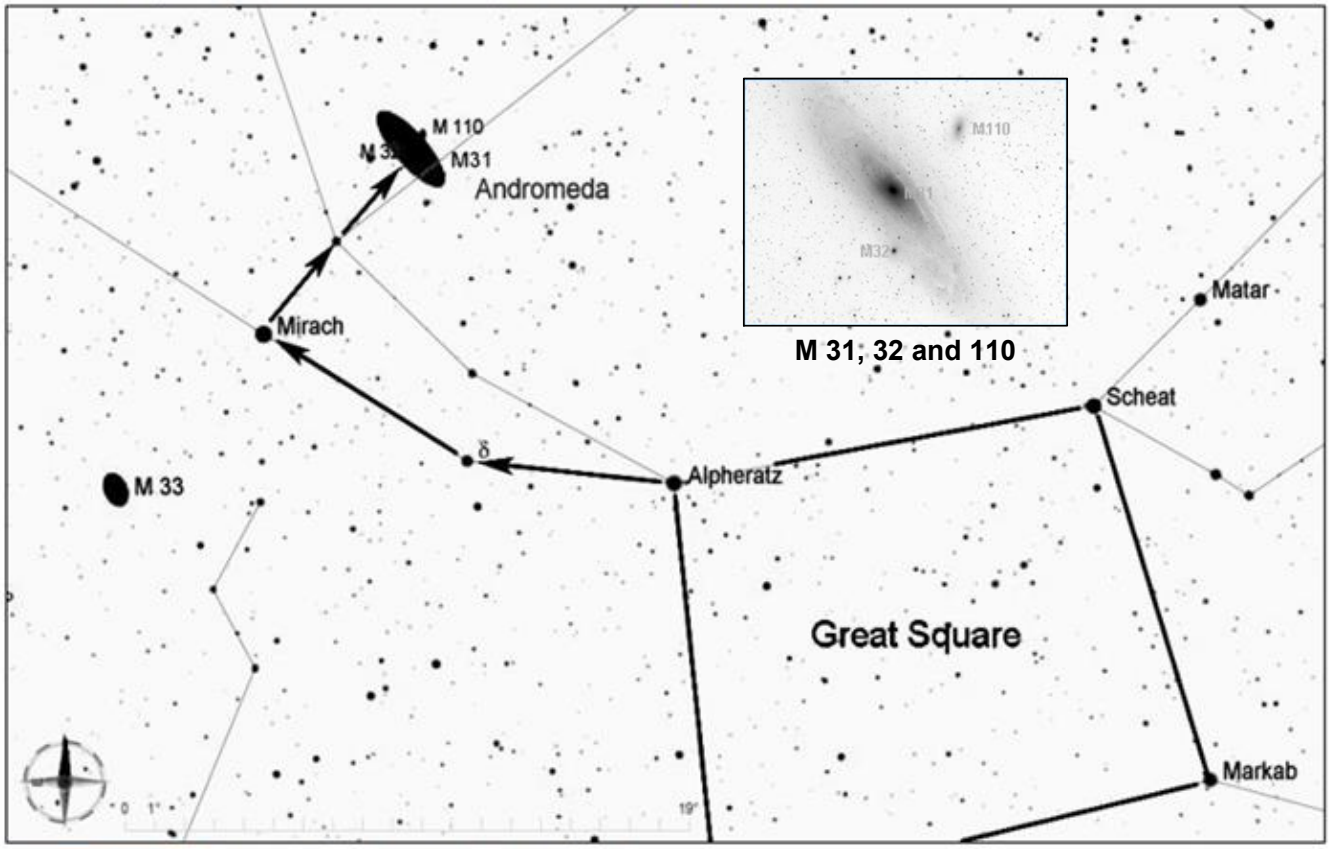
Messier 31, the Andromeda Galaxy (with M32 and M110)

The Andromeda Galaxy is the closest spiral galaxy to our own, about 2.2 million light years away. It is one of the few galaxies that can be seen with the naked eye, which is not difficult under a moderately dark sky. This is an excellent object to examine with binoculars or telescope. Through a telescope at low power, look for its two smaller companion galaxies, Messier 32 and Messier 110.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

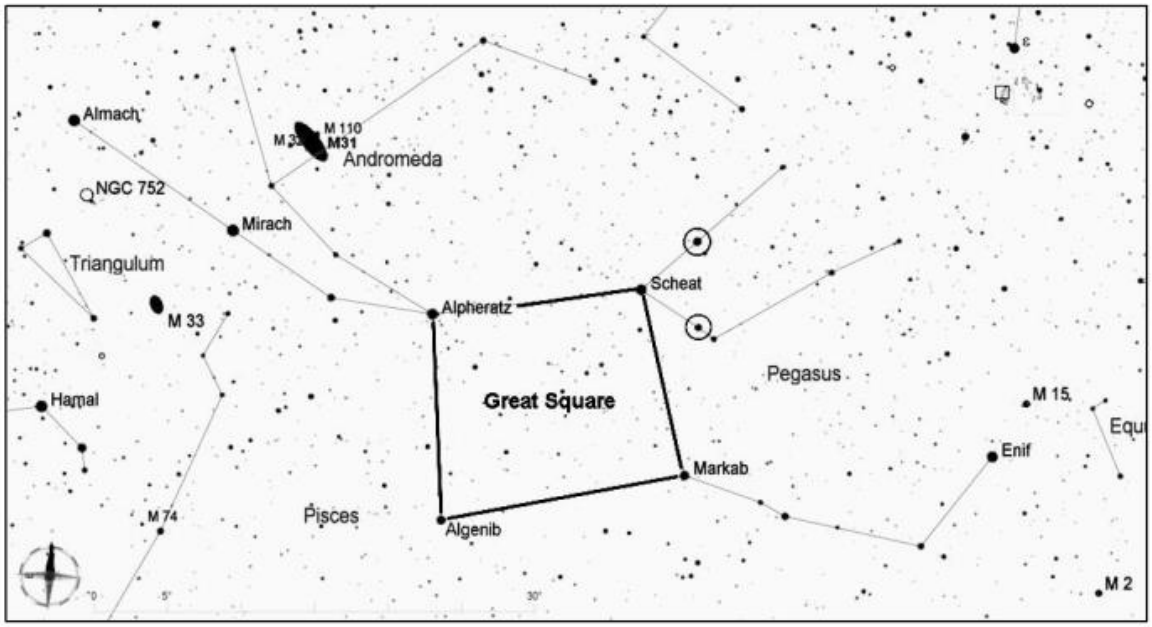
The constellation Andromeda stretches to the northeast from the Great Square, starting at the second-magnitude star Alpheratz. Using the naked eye, look to the east of Alpheratz for the star delta (δ) Andromedae, then move on to the brighter star Mirach. Take a right turn at Mirach to a slightly dimmer star, and then move that same distance again to reach the position of the Andromeda galaxy. If the sky is dark, the galaxy will be visible to the naked eye as an oval smudge of light. If not, it should be easy to see through binoculars. Through a telescope or large binoculars, its two smaller companion galaxies should also be visible, M32 to the south and M110 to the northwest.



From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

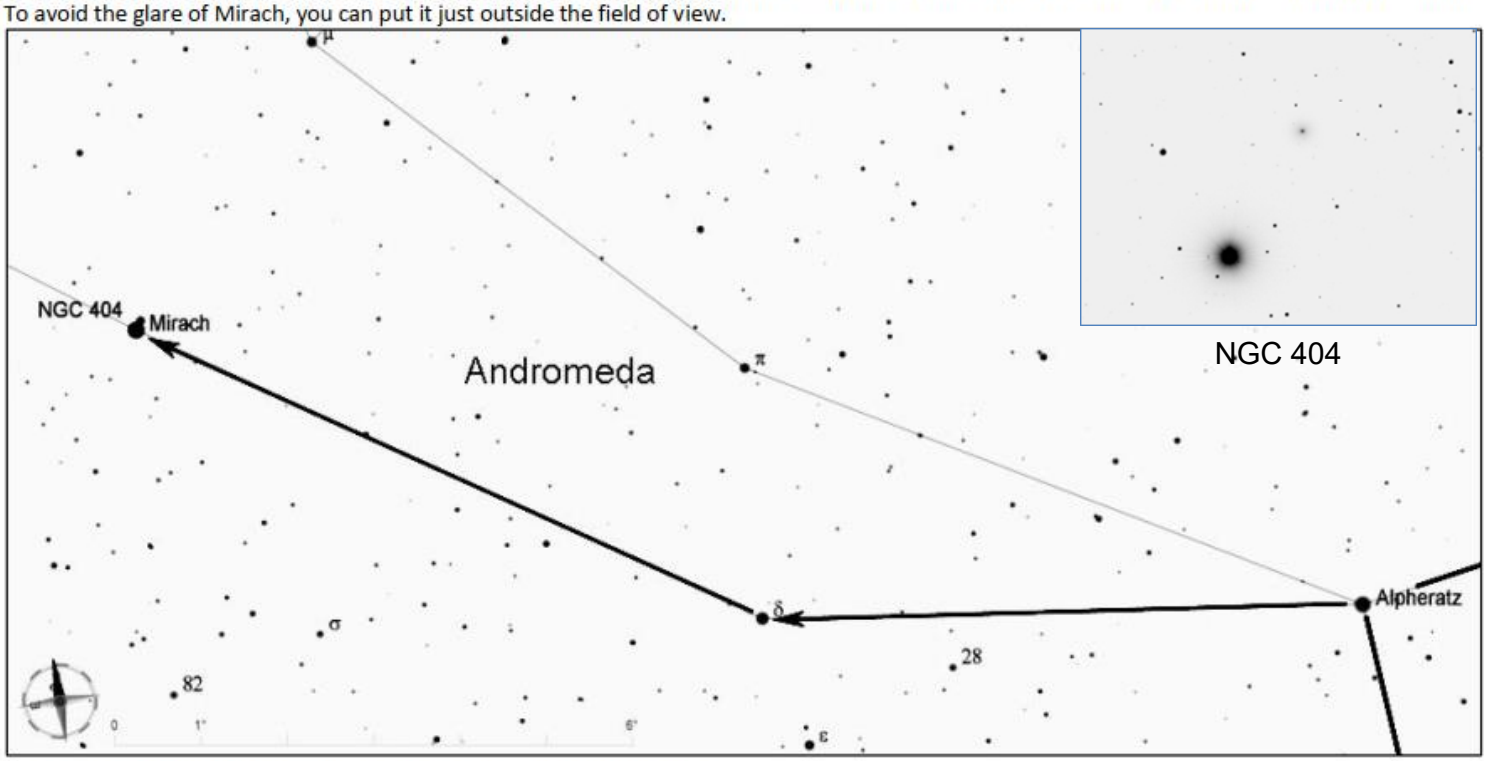
NGC 404, Mirach's Ghost, Galaxy in Andromeda

NGC 404 is classified as a lenticular galaxy, one that is somewhere between a spiral galaxy and an elliptical galaxy. It appears as a round glow with a much brighter center when viewed through a telescope at medium to high power. It is very easy to find because it is so close to the bright star Mirach (both seen in the picture here). Despite the presence of the bright star, the 10th magnitude galaxy is surprisingly easy to see through a telescope of medium or large aperture. The galaxy is about 10 million light years away.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

The constellation Andromeda stretches to the northeast from the Great Square, starting at the second-magnitude star Alpheratz. Using the naked eye, look to the east of Alpheratz for the star delta (δ) Andromedae, then move on to the brighter star Mirach. NGC 404 is just 7 arcminutes (about 1/10 of a degree) northeast of Mirach, so the bright star and dim galaxy should be visible together through a telescope, even at high magnification. To avoid the glare of Mirach, you can put it just outside the field of view.

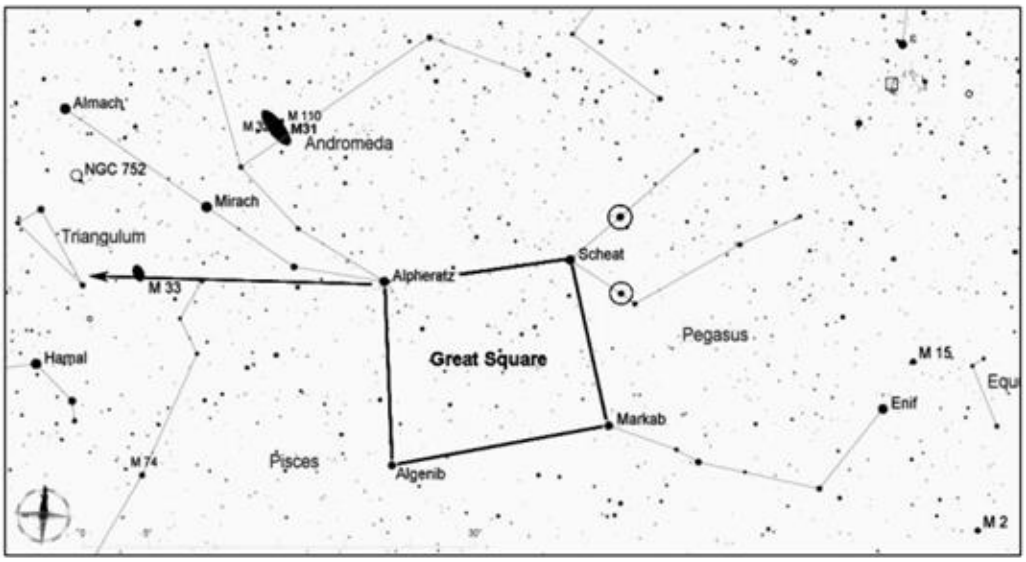


NGC 404

From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 752 (Caldwell 28), Open Cluster in Andromeda

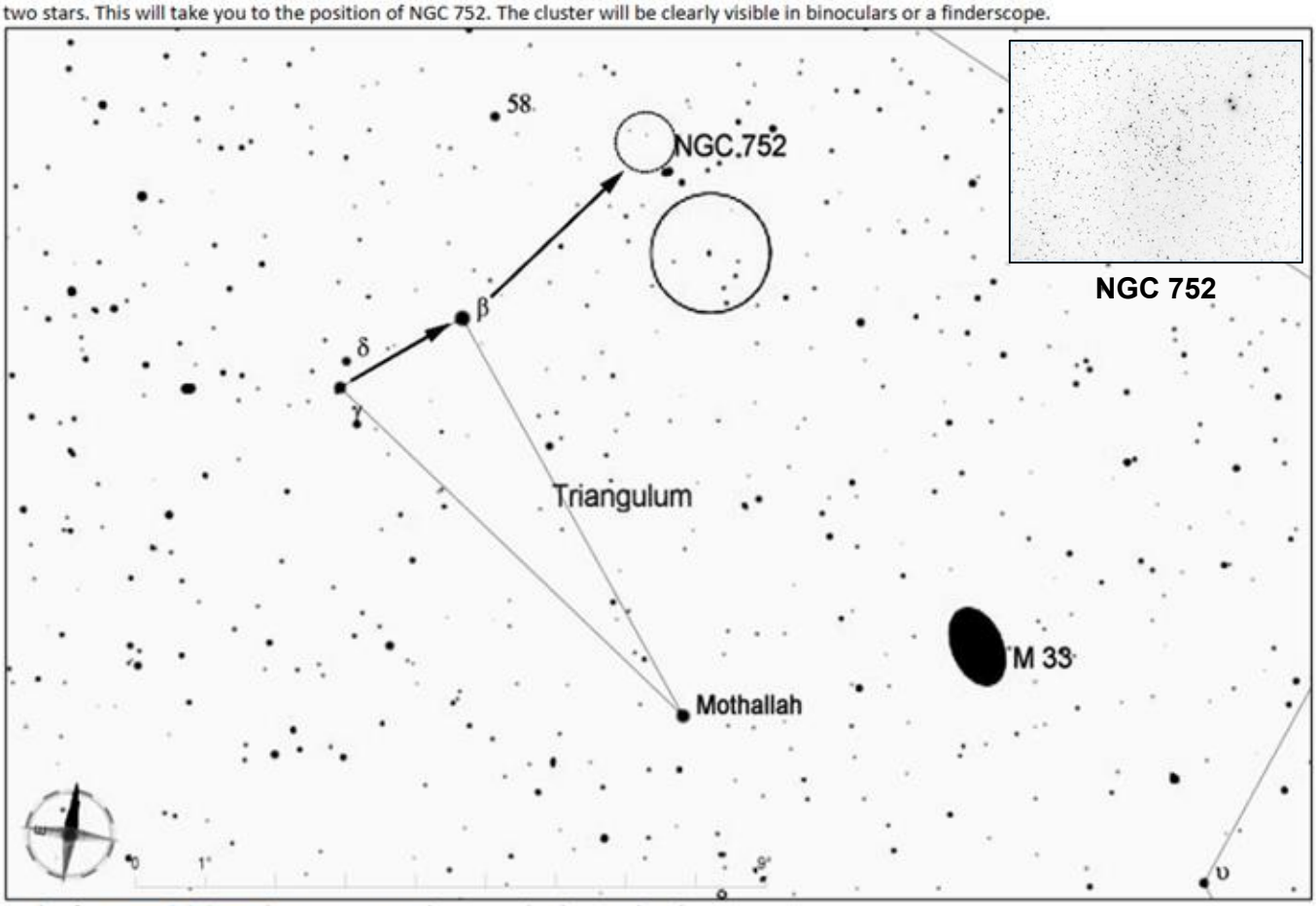
This is a large and fairly bright group of about 70 or 80 stars spread over nearly a degree of sky. It is a relatively nearby open cluster, about 1200 light years away. Because of its large size, it is best viewed either with binoculars or with a telescope at low magnification.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

Using the northern edge of the Great Square as a pointer, extend a line to the east about twice the size of the Square, and you will arrive in the vicinity of the constellation Triangulum, whose 3 brightest stars form a long and narrow triangle.

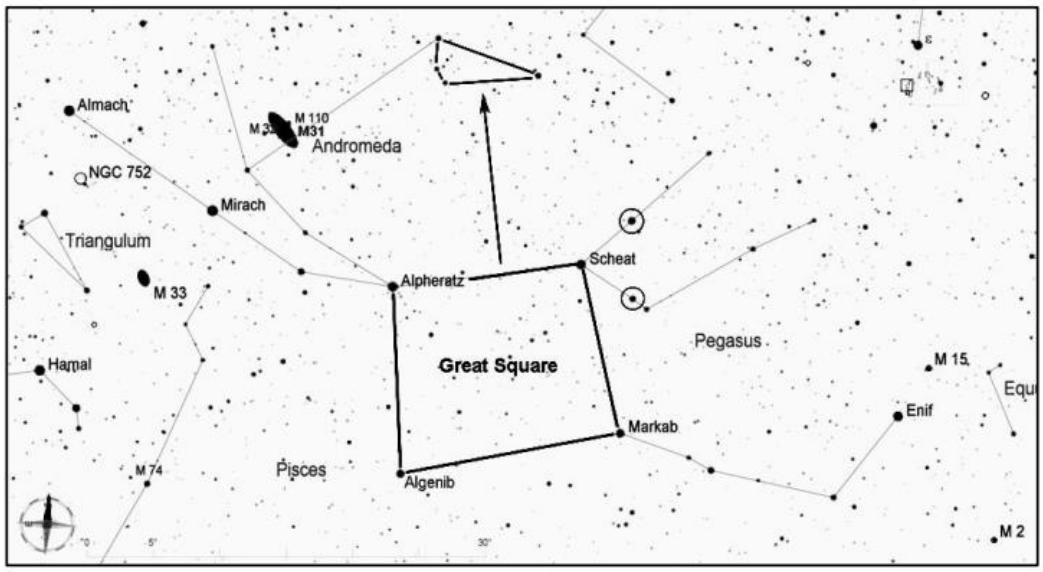
From the two stars at the short edge of Triangulum, move to the northwest about 3.5 degrees, which is about twice the distance between these two stars. This will take you to the position of NGC 752. The cluster will be clearly visible in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

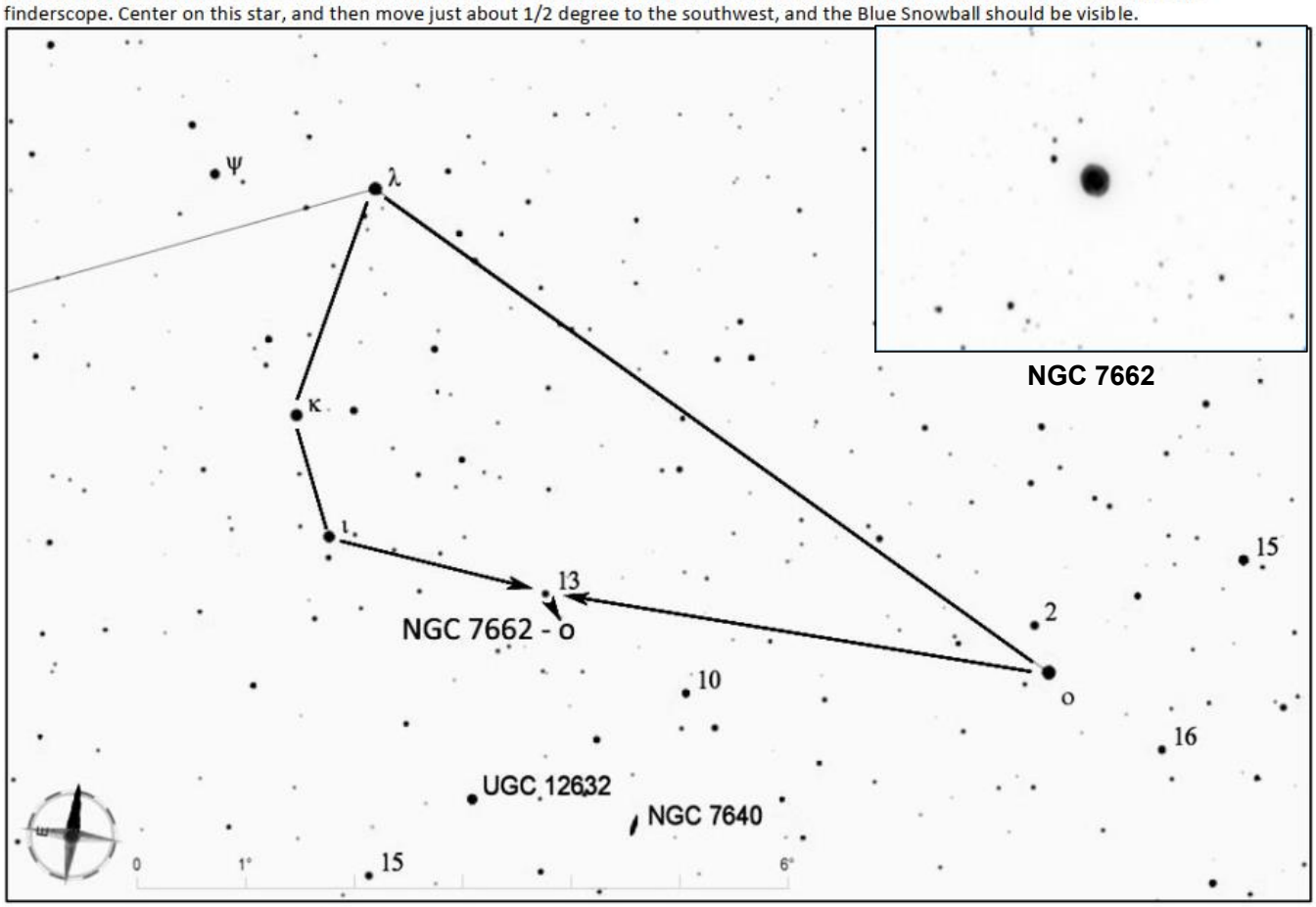
NGC 7662, the Blue Snowball Nebula in Andromeda

This bright planetary nebula definitely has a bluish tint when observed through most telescopes. Because of its high surface brightness it tolerates high magnification well, and can be seen as an oval disk in even small scopes. With medium or large amateur scopes, some detail can be seen in the disk. It is estimated to be about 3000 or 4000 light years away, which would make it about 0.5 light years in diameter.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat. Then, from the northern edge of the Great Square look about 15 degrees north for a group of 4 dim stars in the shape of a pie slice.

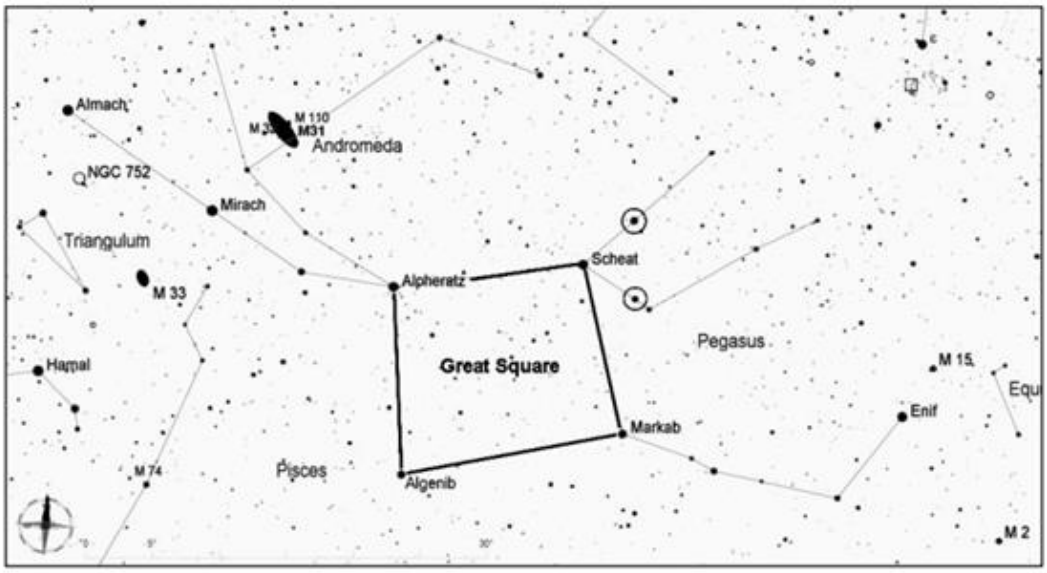
Look along the southern edge of the pie slice for the star 13 Andromedae. At magnitude 5.8, it should be easy to see with binoculars or a finderscope. Center on this star, and then move just about 1/2 degree to the southwest, and the Blue Snowball should be visible.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel.*

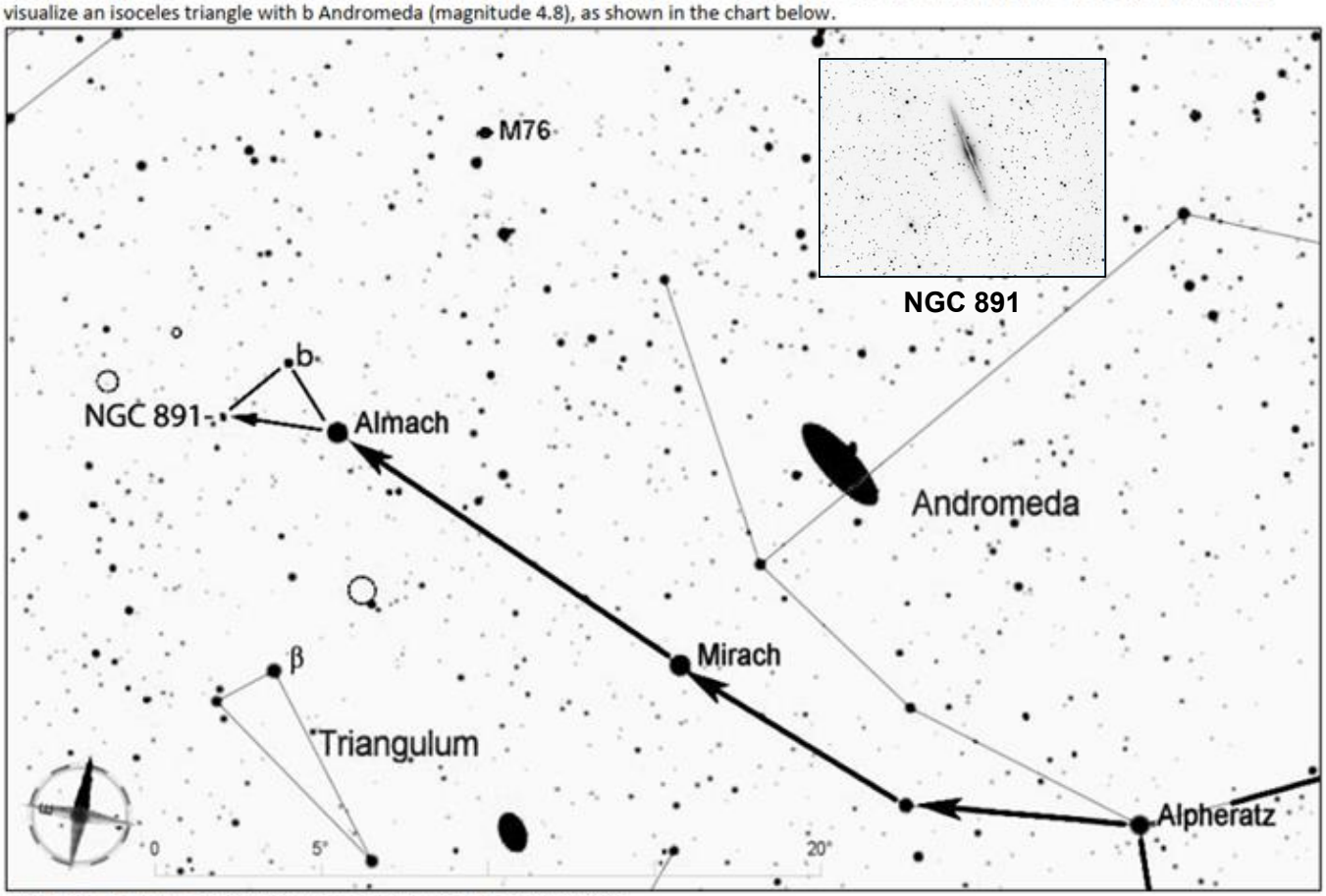
NGC 891 (Caldwell 23), Galaxy in Andromeda

NGC 891 is a nice spindle-shaped spiral galaxy viewed almost edge-on, about 27 million light years away. It is about magnitude 10.8 and more than 13 arcminutes in length (almost half the apparent diameter of the Moon). Its bright center is the easiest part to see, but an aperture of 8 inches or more is probably needed to see its faint pointy arms and dust lane. Using high magnification may help.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

The constellation Andromeda stretches to the northeast from the Great Square, starting at the second-magnitude star Alpheratz. Using the naked eye, follow the stars of Andromeda east to Almach, magnitude 2. NGC 891 is 3.5 degrees to the east of Almach. To find the spot, it may help to visualize an isoceles triangle with b Andromeda (magnitude 4.8), as shown in the chart below.

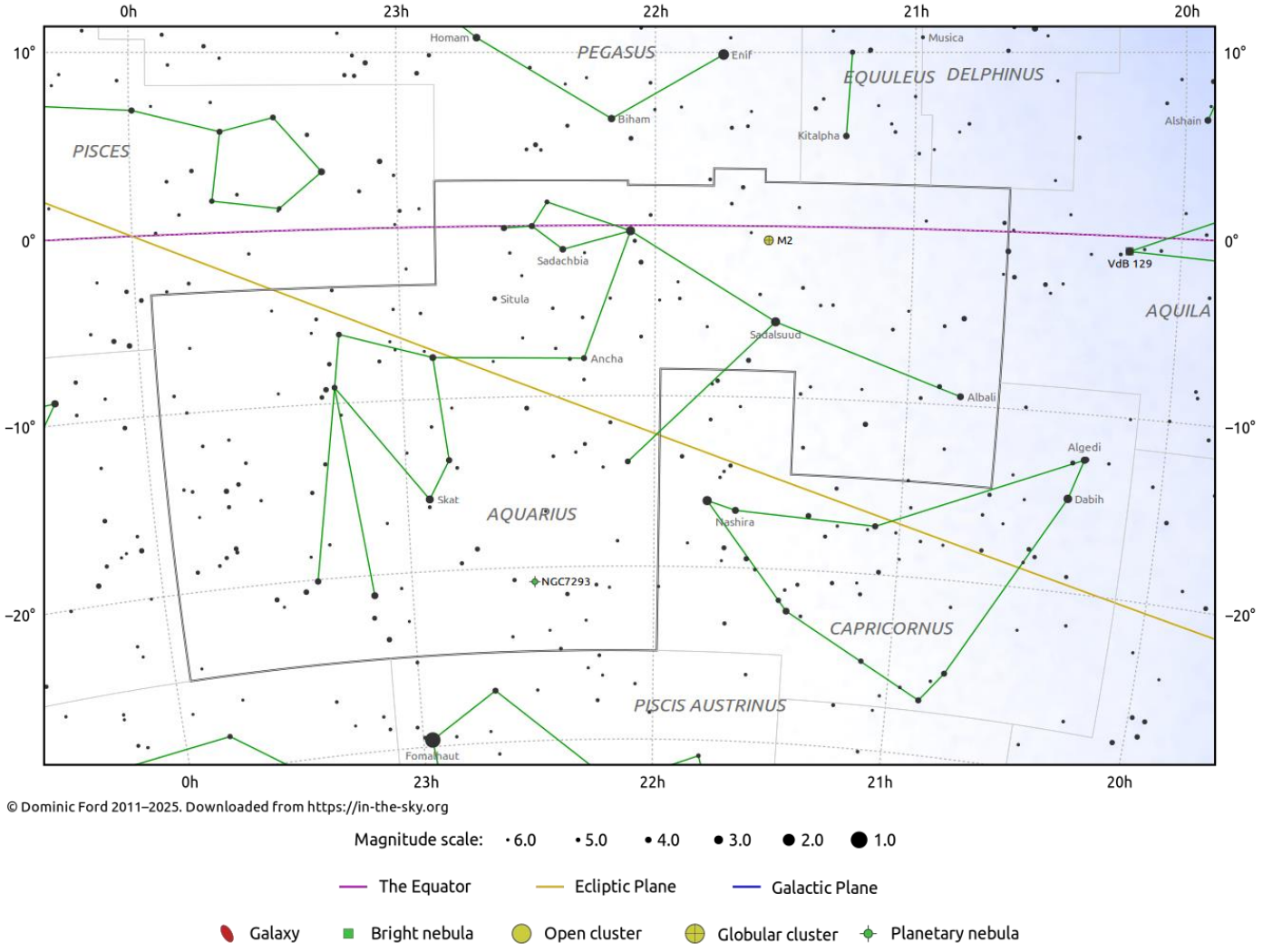


From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Aquarius (Aqr)

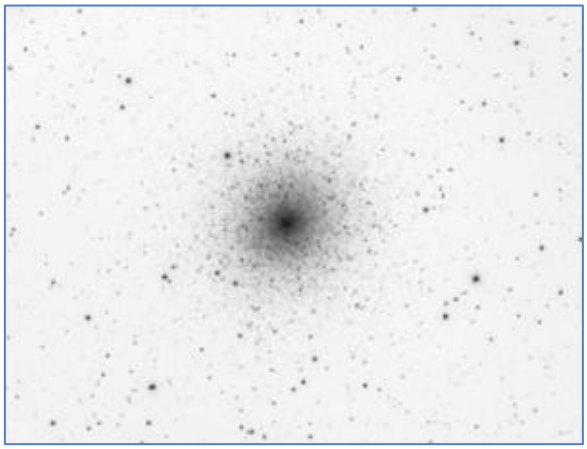
Evening Visibility: **August – November**
Online Information: **Aquarius**
Charts: **4** Featured Objects: **5**
More Online Information: M-002, M-072, M073, NGC-7009, NGC-7293

In-The-Sky.org Constellation Map

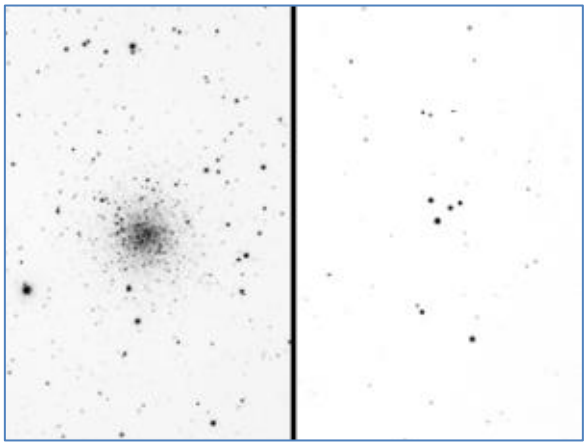


Object (Type)	Chart	Aliases	Stats
M-002 (GC)	1, W1	NGC-7089	| Mag=6.5 | SB=21.7 | Size=16' |
M-072 (GC)	2, W2	NGC-6981	| Mag=9.3 | SB=22.5 | Size=6.6' |
M-073 (AS)	2, W2	NGC-6994	| Mag=9.0 | SB=20.0 | Size=2.8' |
NGC-7009 (PN)	3, W3	Saturn Nebula, C-55	| Mag=8.0 | SB=17.8 | Size=41" x 35" |
NGC-7293 (PN)	4, W4	Helix Nebula, C-65	| Mag=7.6 | SB=?? | Size=25' |

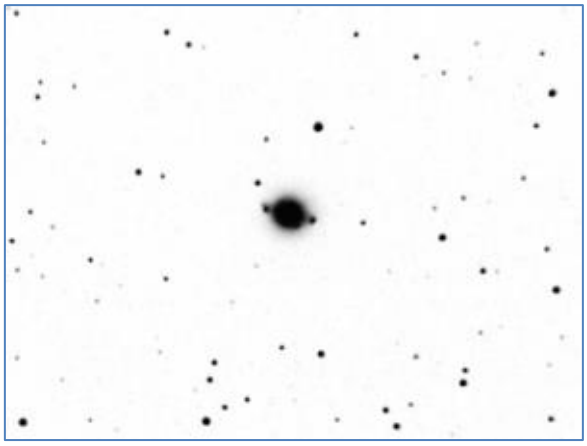
Image Gallery



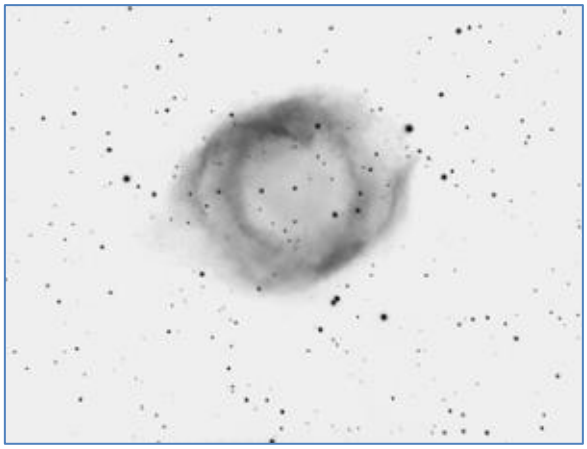
Messier 2



Messier 72, Messier 73



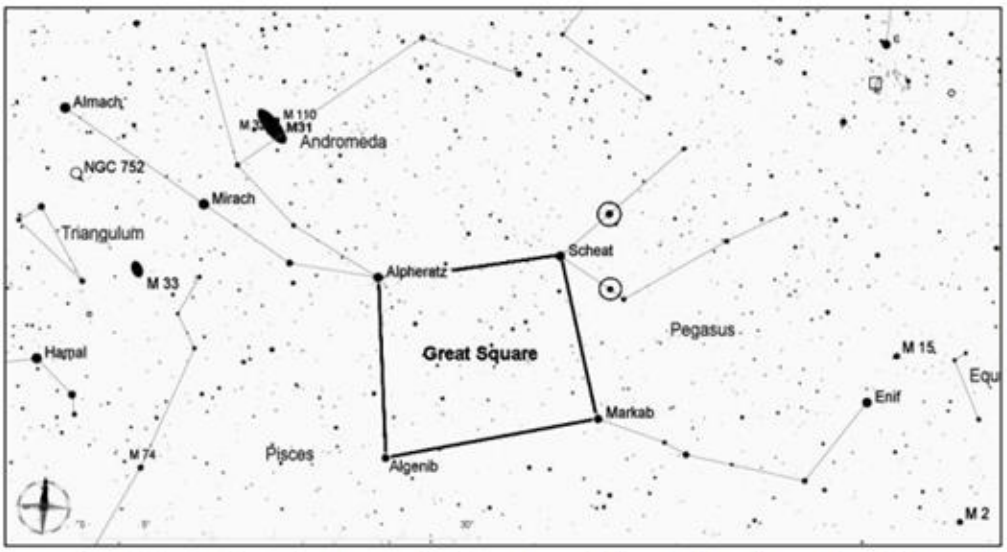
NGC-7009 (C 55) The Saturn Nebula



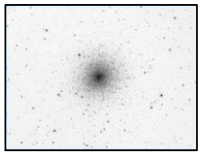
NGC 7293 (C 63) The Helix Nebula

Messier 2, Globular Cluster in Aquarius

At magnitude 6.6 and covering 1/4 degree of sky, Messier 2 is a nice view through a small telescope and a very impressive one through a larger telescope. It has a dense and bright center. It is tricky to find because there are no bright stars nearby, but it is worth the effort. This cluster contains about 150,000 stars, and it is about 38,000 light years away.

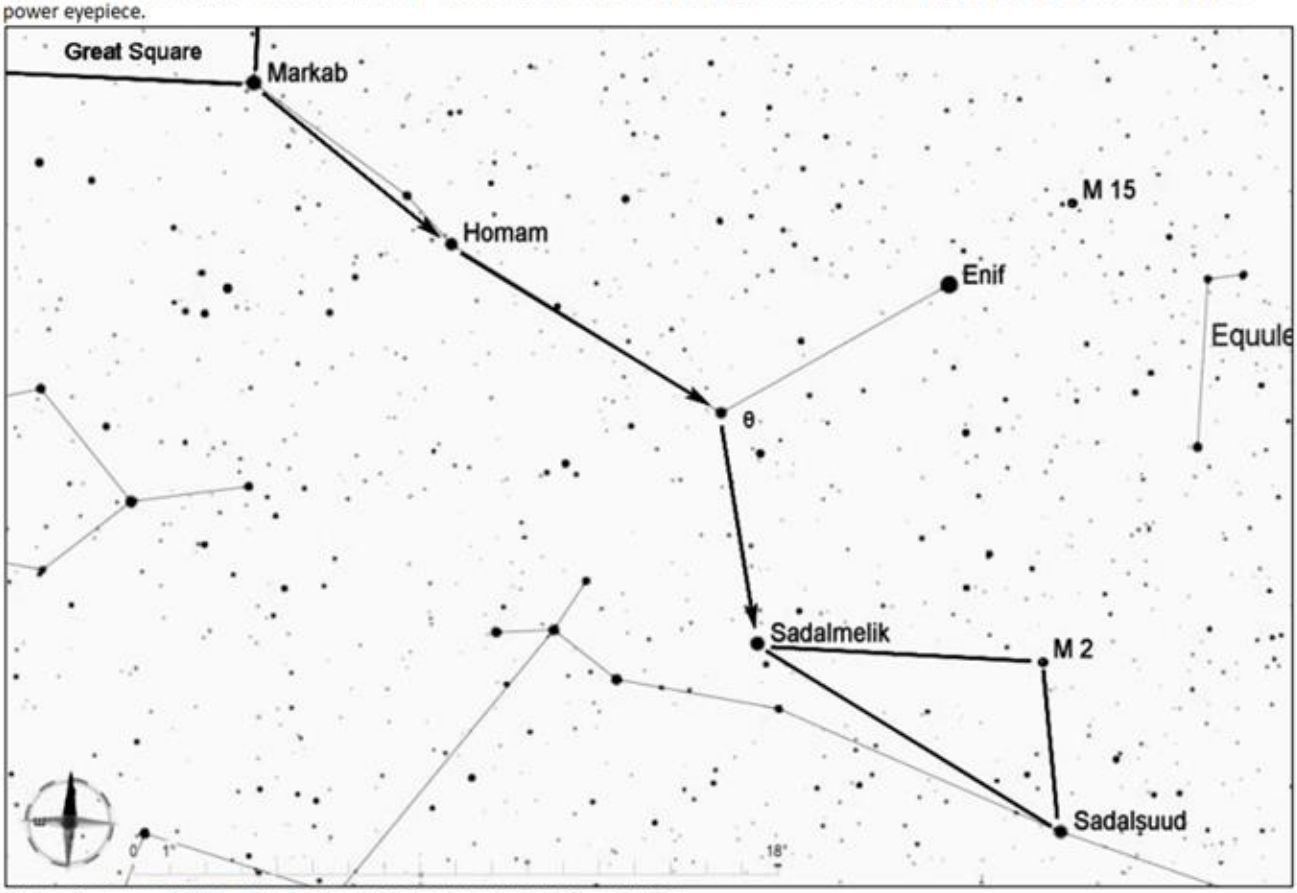


Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.



M 2

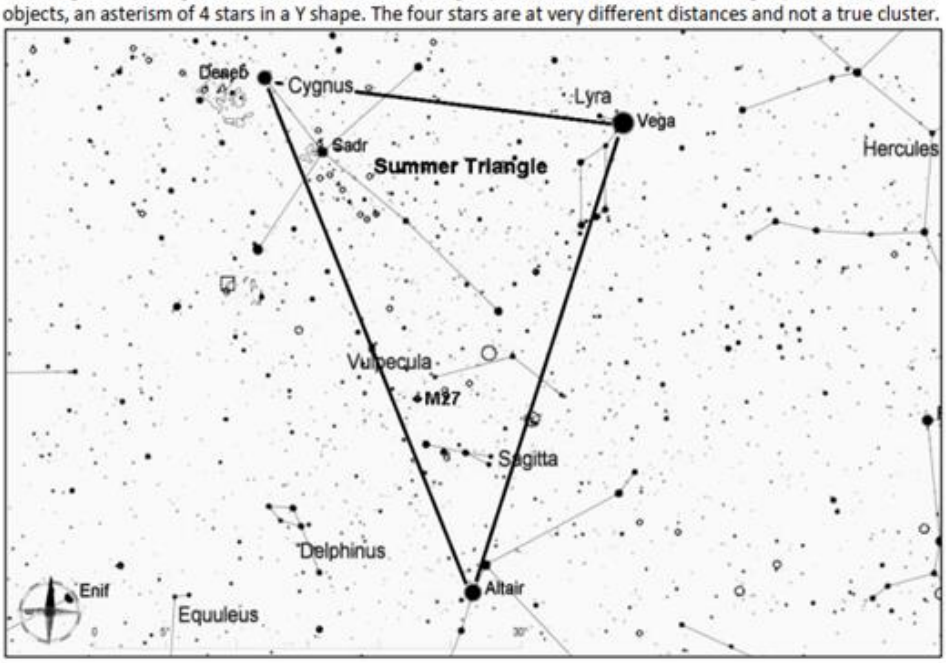
Starting from Markab at the southwest corner of the Great Square, follow the chain of stars to theta (θ) Pegasi, then take a right (south) to Sadalmelik, a magnitude 3.0 star in Aquarius. There are no bright stars near M2, but note in the chart below that M2 forms roughly a right triangle with Sadalmelik and Sadalsuud (magnitude 3.7). Note also that there is a chain of 4 or 5 dim stars to the northeast of M2 that should be visible in binoculars or finderscope, and this chain points in the direction of M2. Using all these landmarks should bring M2 into the field of view of a low-power eyepiece.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

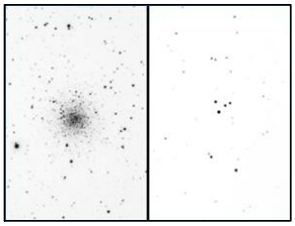
Messier 72, Globular Cluster, and Messier 73, Asterism in Aquarius

Messier 72 is a relatively dim cluster in the western part of Aquarius. At about magnitude 9.3, it is not difficult to see in even small telescopes, but resolving its 15th magnitude stars requires a fairly large aperture. It is a distant 55,000 light years away. M73 is one of the least interesting Messier objects, an asterism of 4 stars in a Y shape. The four stars are at very different distances and not a true cluster.



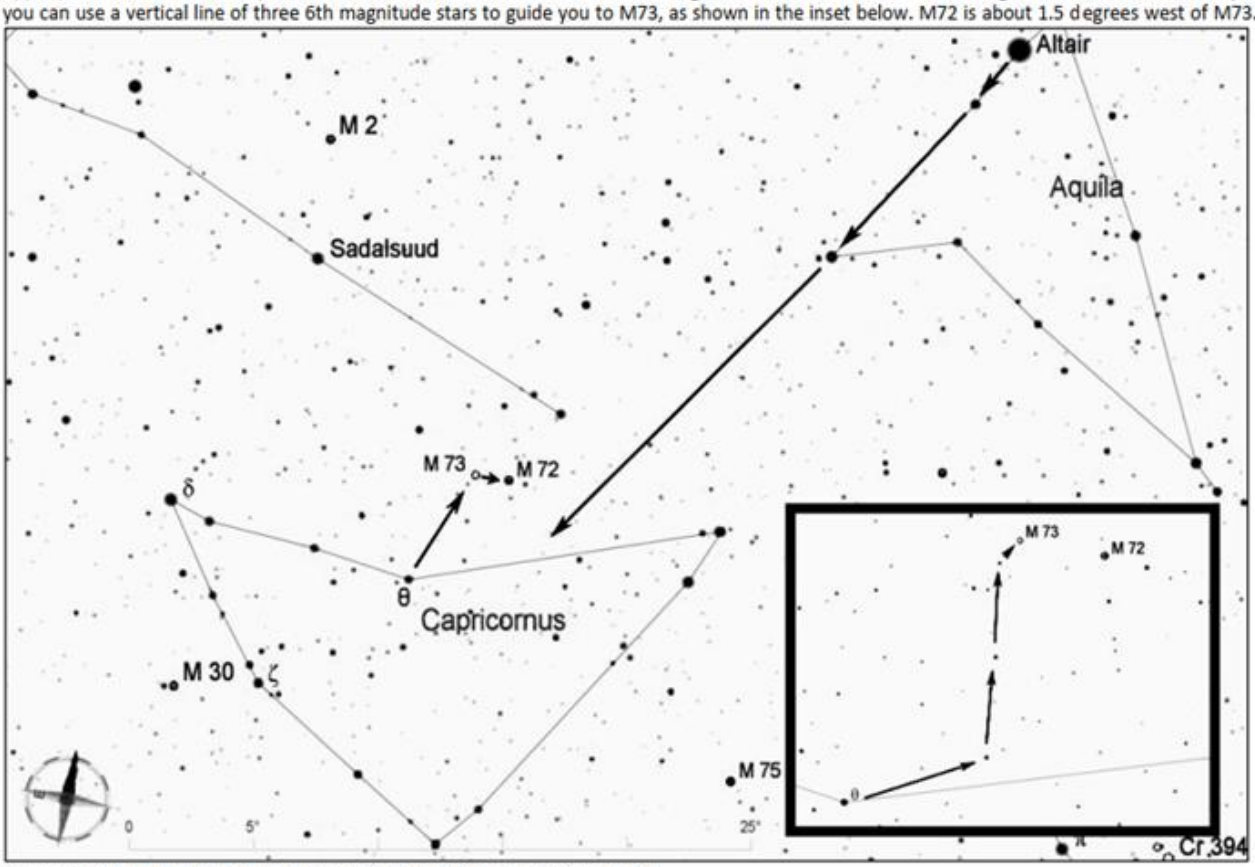
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Altair in the constellation Aquila, the eagle.



M 73, M73

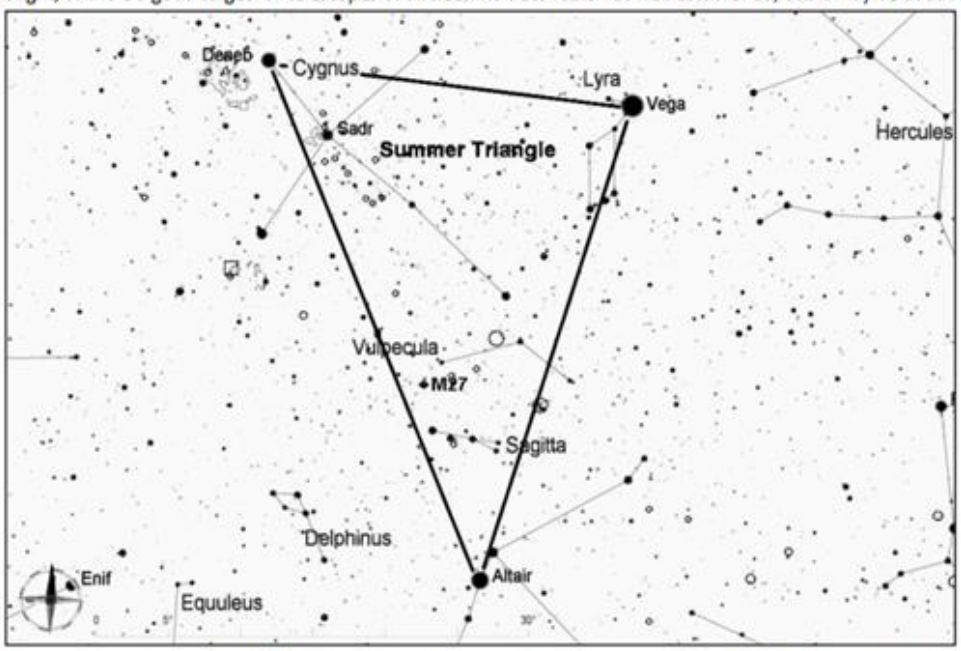
From Altair, follow the stars that form the upper edge of Aquila the eagle's east wing, and use these stars as a pointer to take you to the constellation Capricornus. To me, the stars of Capricornus form a large, open-mouthed smile. Once you locate Capricornus, look for θ (Theta) in the center of the upper portion of the smile shape. From θ, the small asterism of M73 is about 5 degrees to the north-northwest. Through binoculars or a finderscope, you can use a vertical line of three 6th magnitude stars to guide you to M73, as shown in the inset below. M72 is about 1.5 degrees west of M73.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

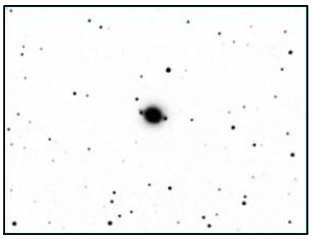
NGC 7009 (Caldwell 55), the Saturn Nebula in Aquarius

Planetary nebulae come in a variety of shapes, and NGC 7009 happens to have two thin projections that make it look a bit like the planet Saturn with its rings. The bright central region of this nebula has a distinct blue-green appearance. Also known as Caldwell 55, this nebula is small but bright, and it is a good target for telescopes of all sizes. Its distance is not well established, but it may be about 3000 light years away.



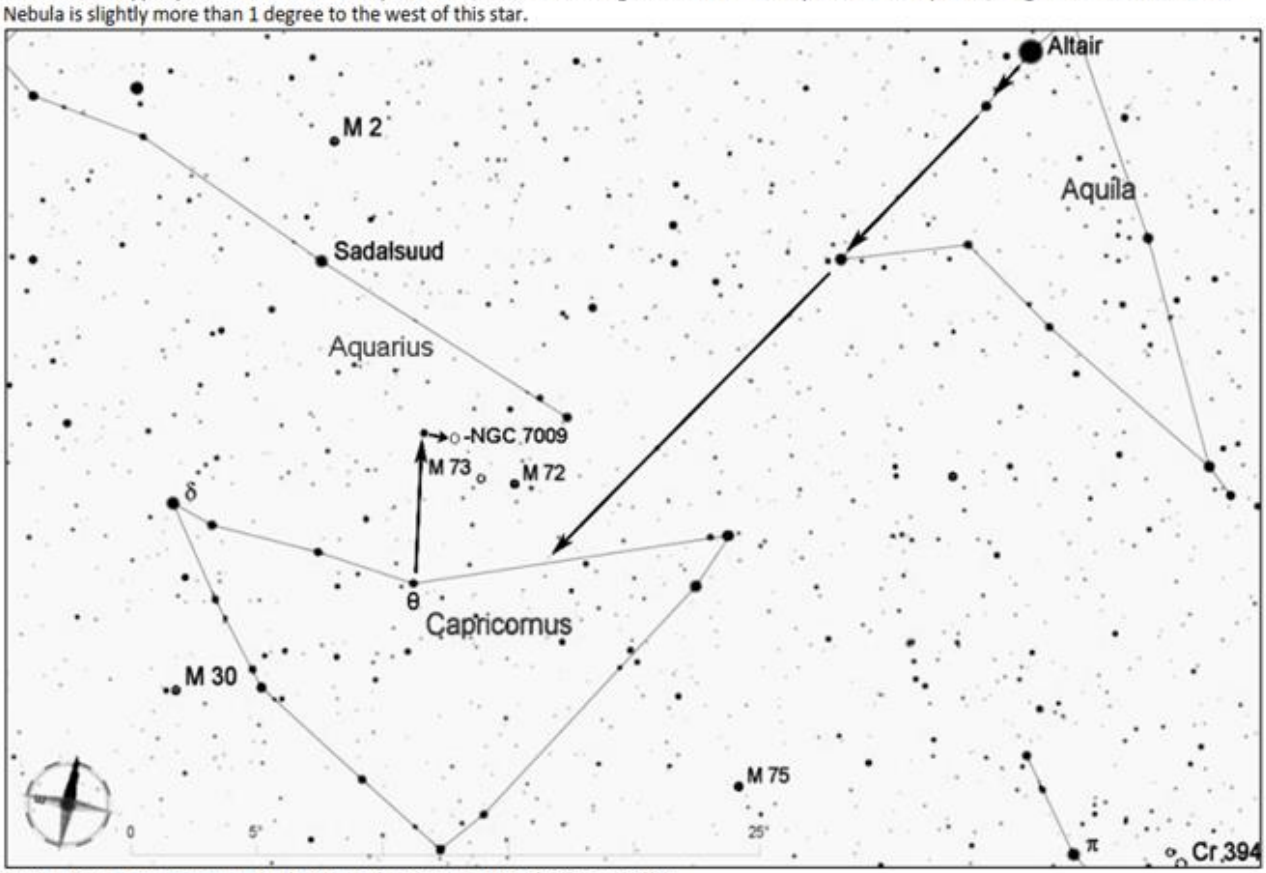
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Altair in the constellation Aquila, the eagle.



NGC 7009

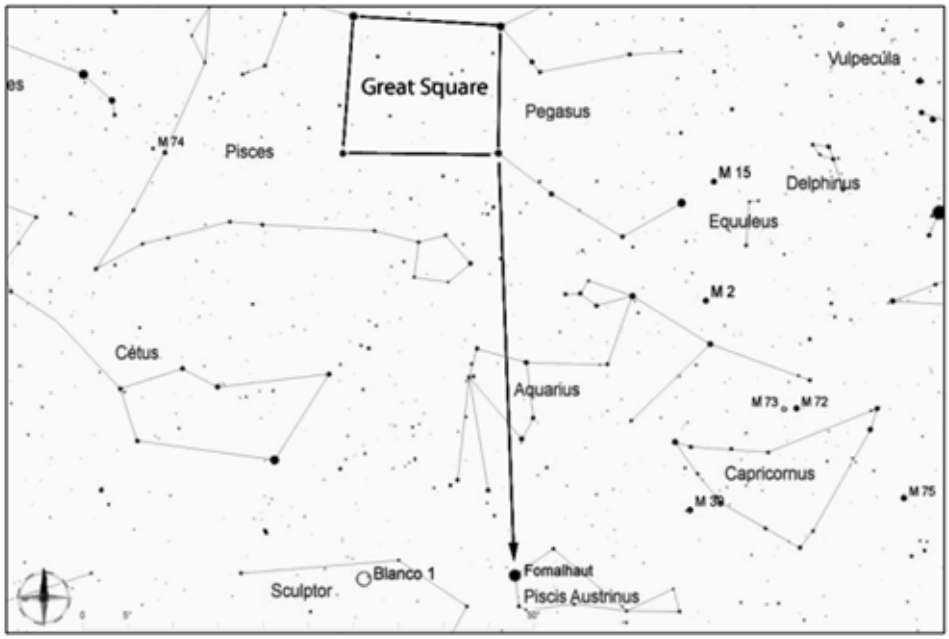
From Altair, follow the stars that form the upper edge of Aquila the eagle's east wing, and use these stars as a pointer to take you to the constellation Capricornus. To me, the stars of Capricornus form a large, open-mouthed smile. Once you locate Capricornus, look for θ (Theta) in the center of the upper portion of the smile shape. From θ, look about 5 degrees north for a fairly dim star in Aquarius, magnitude 4.5. The Saturn Nebula is slightly more than 1 degree to the west of this star.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

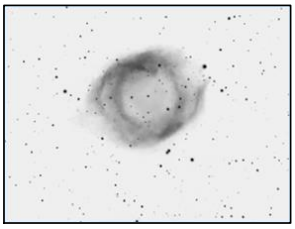
NGC 7293 (Caldwell 63), the Helix Nebula in Aquarius

The Helix Nebula is the closest planetary nebula to us, about 522 light years away. It is large and diffuse and has a low surface brightness, so it can be difficult to locate and to observe. Through a telescope at low power it will appear as a faint oval with a slightly darker center. But it is a large target with an overall magnitude of about 7.3, and it has often been seen in ordinary binoculars under dark skies.



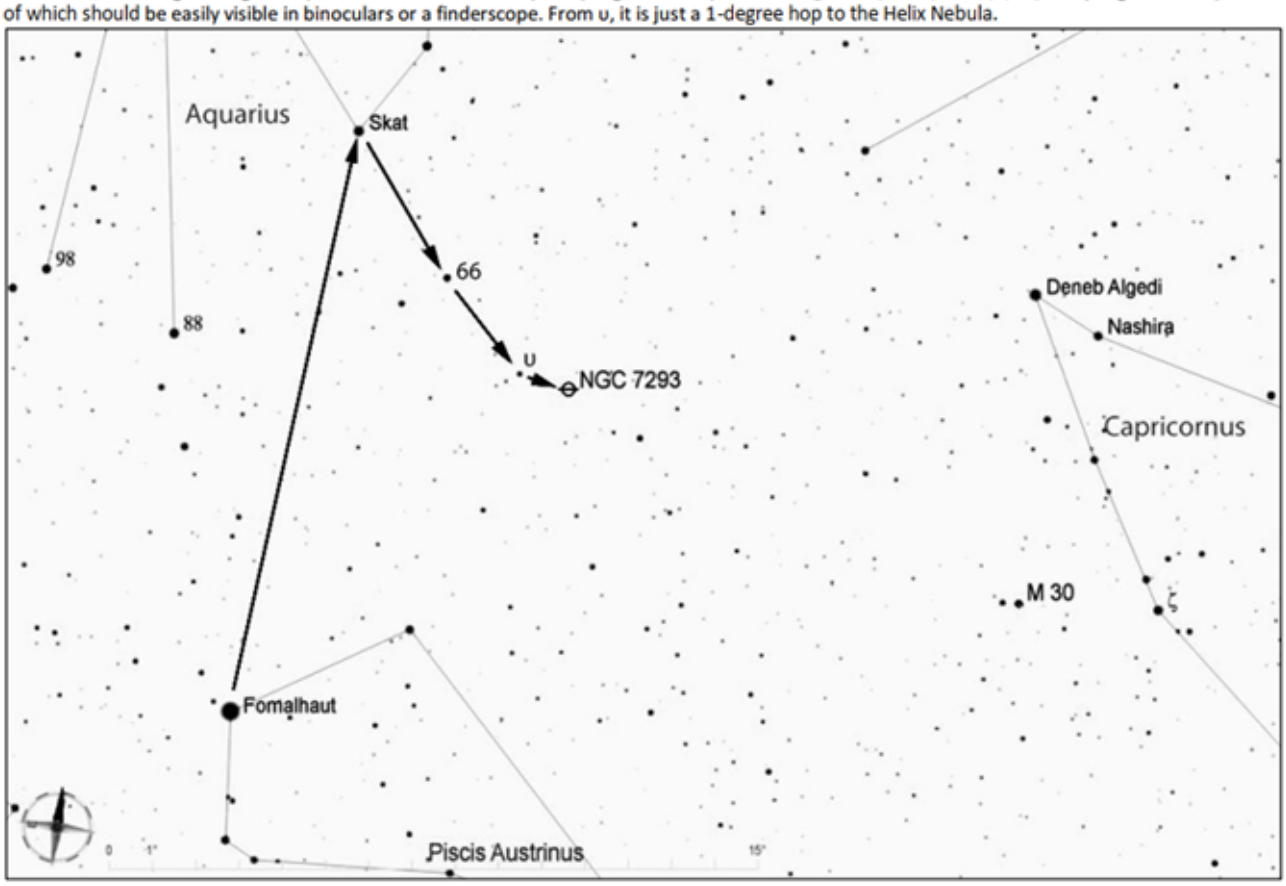
Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter.

Using the western edge of the Great Square as a pointer, extend a line to the south about 3 times the size of the Square, and you will arrive at bright Fomalhaut, the only first magnitude star in that region of the sky.



NGC 7293

From Fomalhaut, backtrack about 10 degrees to the north to find the star Skat, magnitude 3.3. Then follow a trail of dimmer stars to the southwest, including a 4-degree hop to the reddish star 66 Aquarii (magnitude 4.7) and a 3-degree hop to Upsilon (υ) Aquarii (magnitude 5.2), both of which should be easily visible in binoculars or a finderscope. From υ, it is just a 1-degree hop to the Helix Nebula.

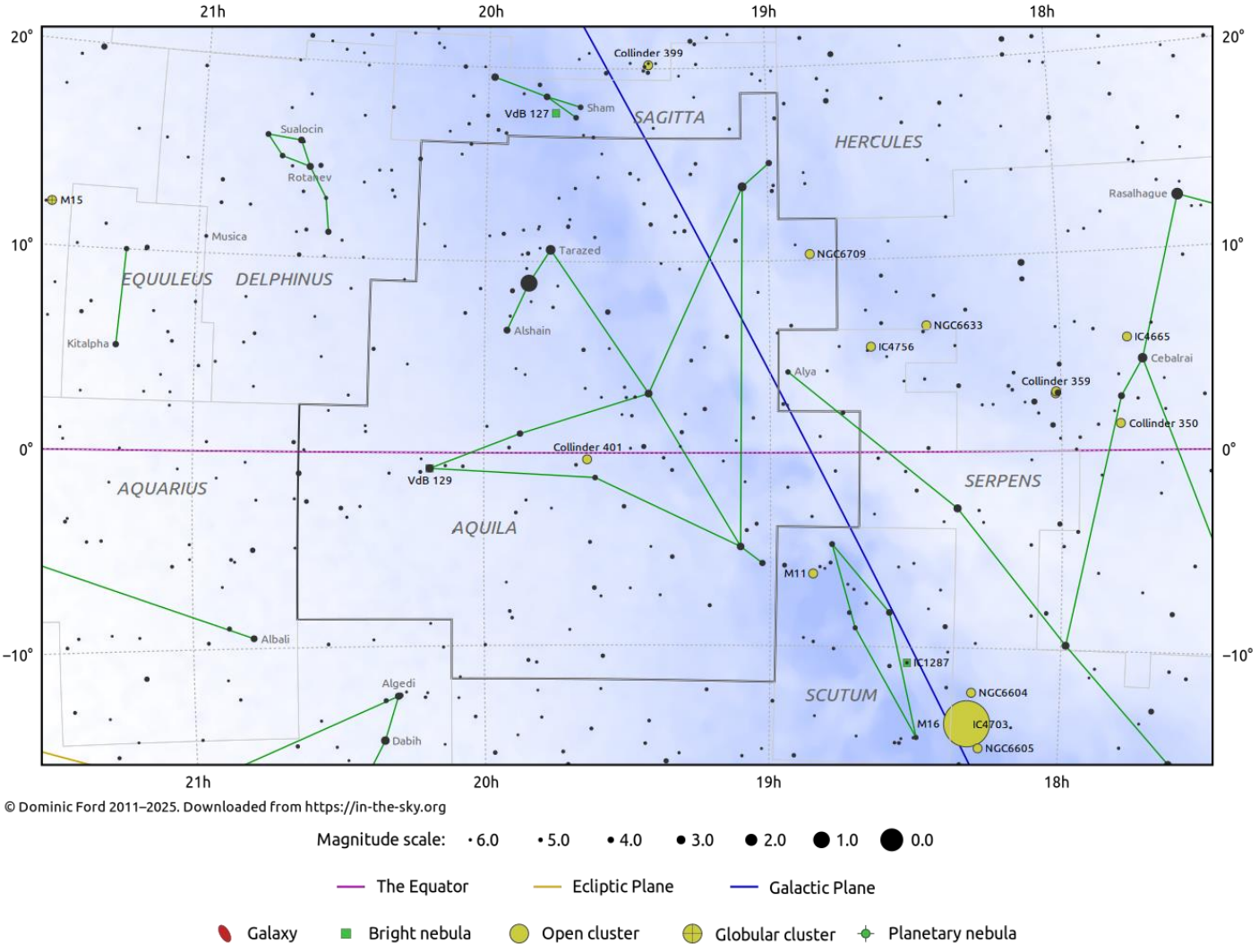


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Aquila (Aql)

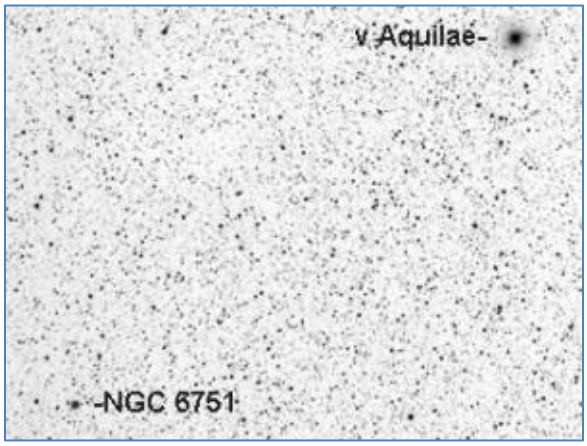
Evening Visibility: **June – October**
Online Information: **Aquila**
Charts: **2** Featured Objects: **3**
More Online Information: V Aquilae, NGC-6751, NGC-6781

In-The-Sky.org Constellation Map

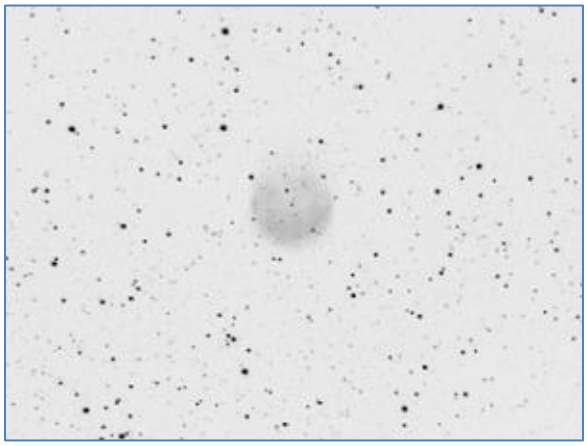


Object (Type)	Chart	Aliases	Stats
V Aquilae (CS)	1, W1	SAO-142985, HIP-93666, HD-177336	| Mag=6.6 – 8.4 | Color Index=+4.32 |
NGC-6751 (PN)	1, W1	Glowing Eye Nebula	| Mag=11.9 | SB=19.0 | Size=0.43'
NGC-6781 (PN)	2, W2	Snowglobe Nebula	| Mag=11.4 | SB=21.9 | Size=1.9' x 1.8' |

Image Gallery



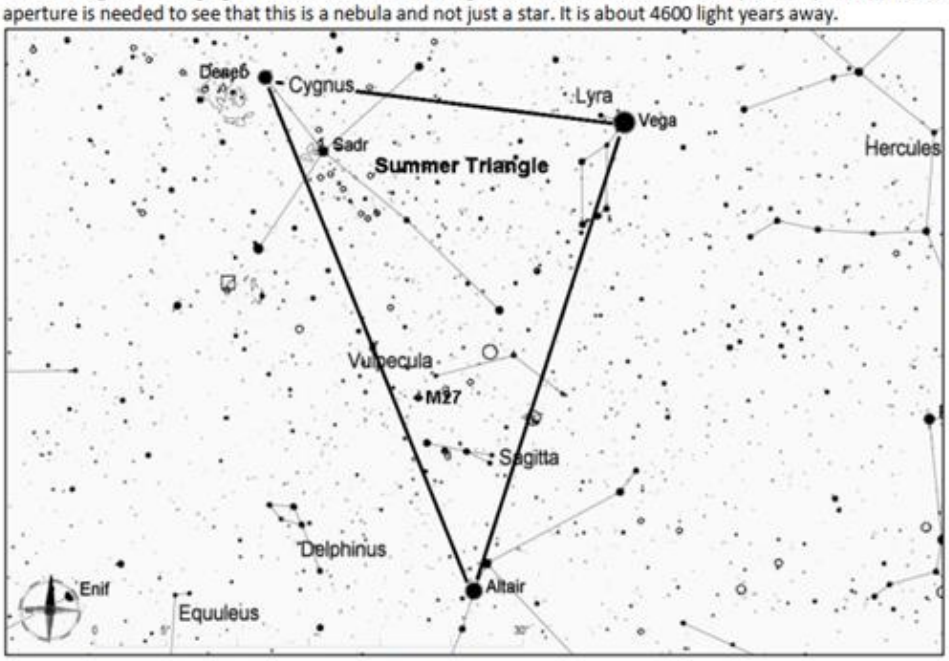
V Aquilae and NGC 6751



NGC 6781

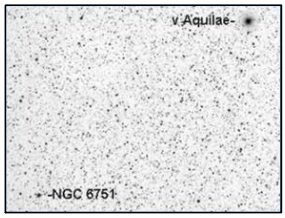
V Aquilae (Carbon Star) and NGC 6751 (Planetary Nebula)

V Aquilae is a nice example of a carbon star, a star that appears very red because of the presence of carbon in its atmosphere. It is a variable star, with its magnitude ranging from 6.6 to 8.4. Just 1/2 degree to the southwest is a small planetary nebula, NGC 6751. A telescope of medium to large aperture is needed to see that this is a nebula and not just a star. It is about 4600 light years away.



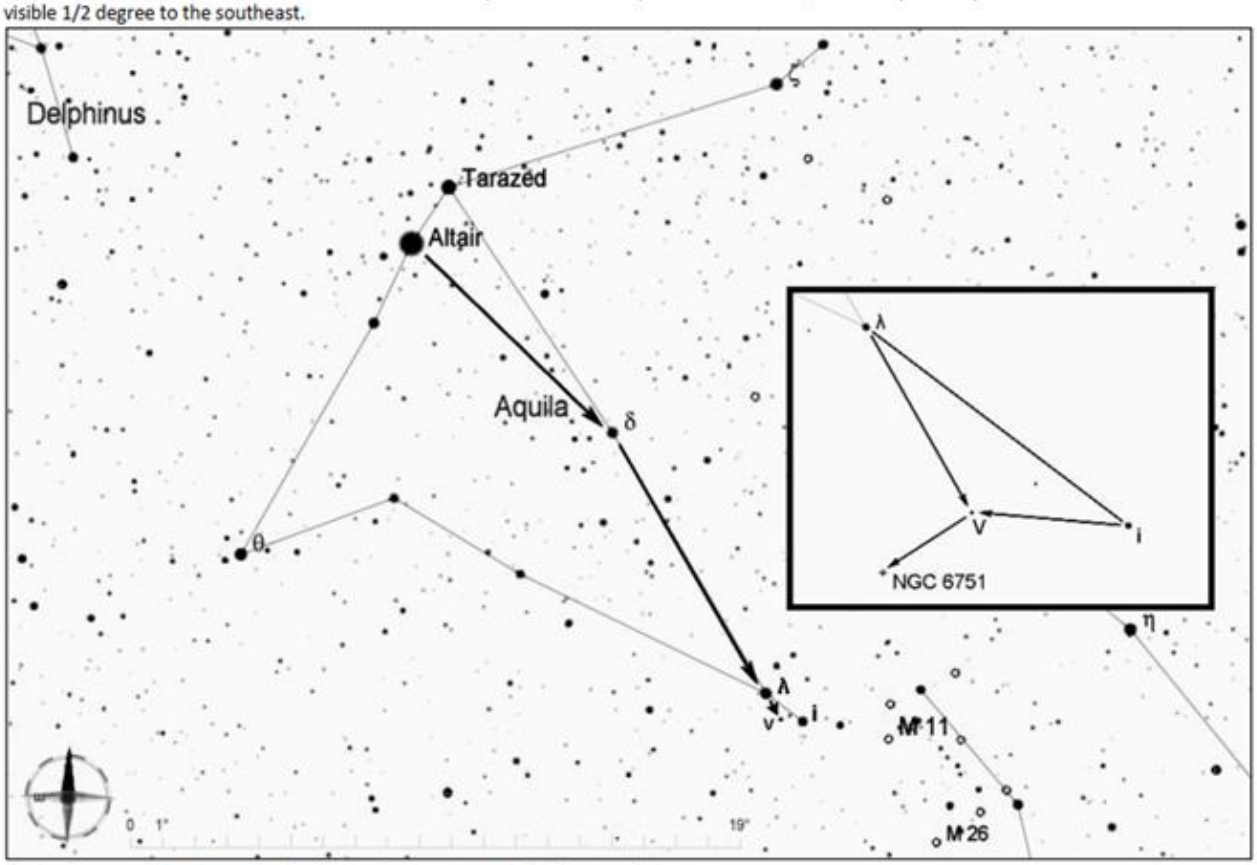
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Altair in the constellation Aquila, the eagle.



V Aql and NGC 6751

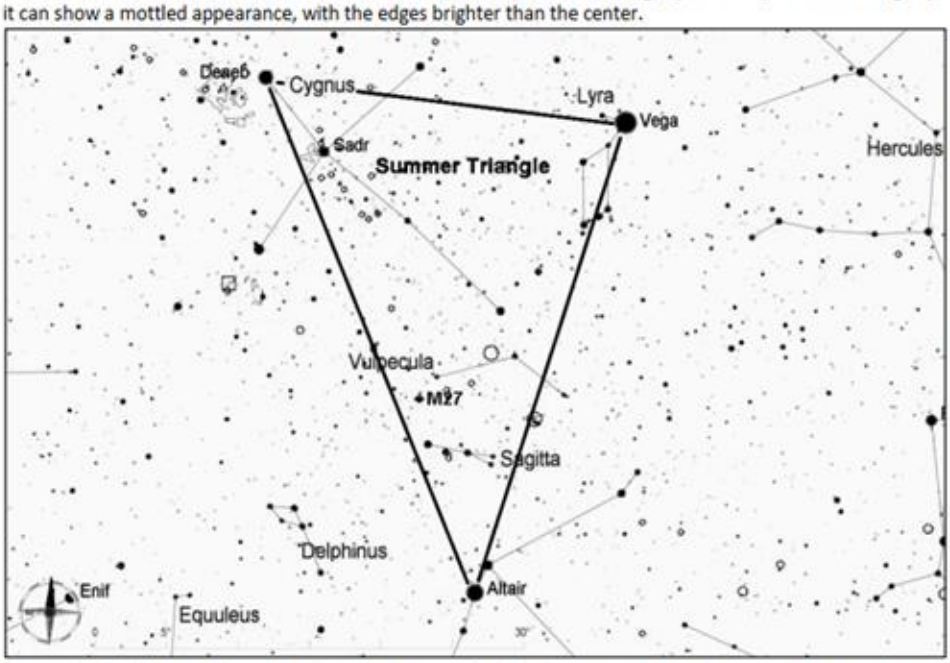
From Altair, follow the stars that form the middle of the eagle's body and end with three stars that form a slightly hooked "tail". The first two of these stars are λ (lamda) Aquilae and i Aquilae. As shown more clearly in the inset below, V Aquilae is about half-way between and below these two stars. It should be visible in binoculars or a finderscope. With a telescope of moderate size, the small planetary nebula NGC 6751 should be visible 1/2 degree to the southeast.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6781, Planetary Nebula in Aquila

This is a large but faint planetary nebula in the center of Aquila, the eagle. It is about 1.9' in diameter, roughly 50% larger than Messier 57, the Ring Nebula. Its distance is not well determined, but it is probably about 4,000 light years away and about 2 light years across. Through a large telescope it can show a mottled appearance, with the edges brighter than the center.



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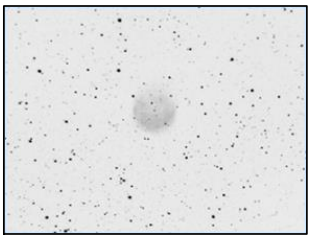
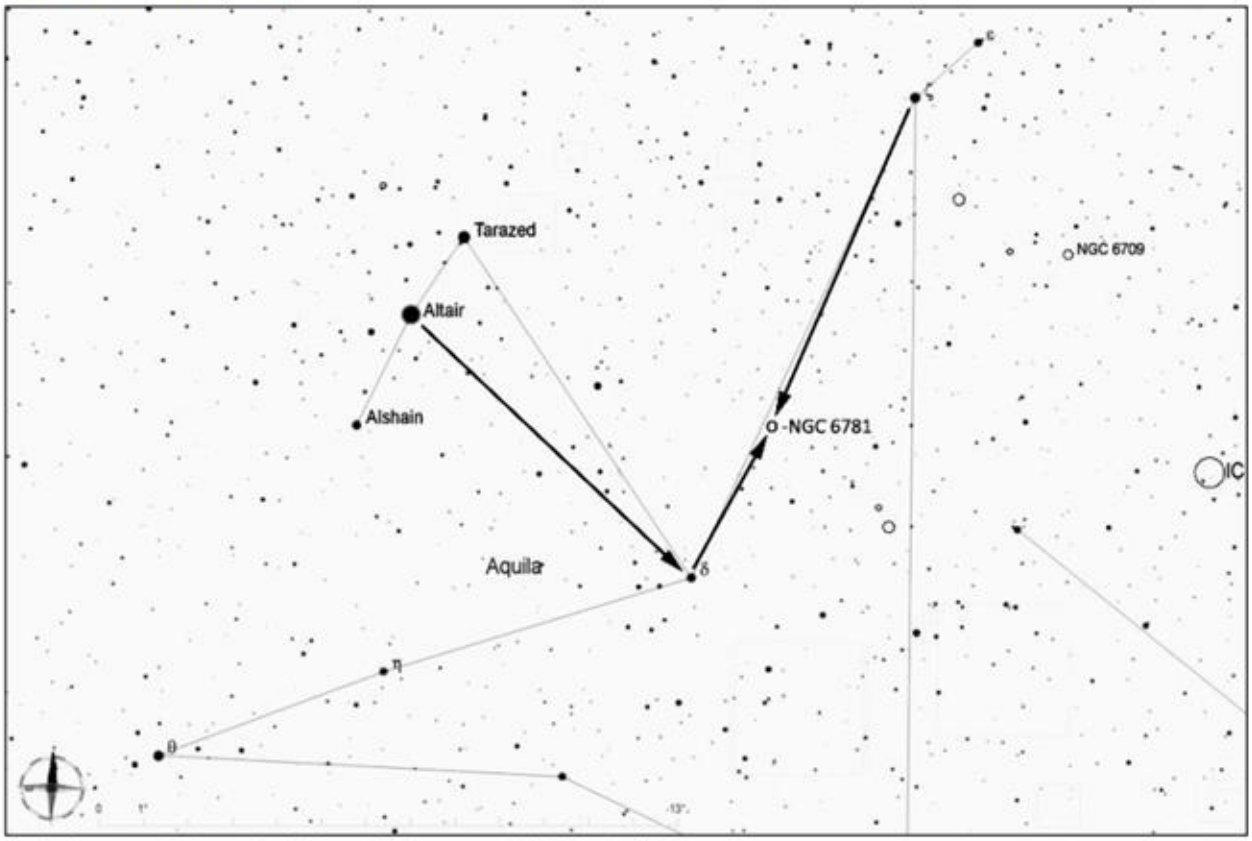
For this star hop, start from Altair in the constellation Aquila, the eagle.



NGC 6781

From Altair, look about 8 degrees to the southwest to find third-magnitude delta (δ) Aquilae in the middle of the eagle's body. To reach the location of NGC 6781, follow a line from δ one-third of the way toward zeta (ζ) on the eagle's right wing, as shown below. Finding the right location can be difficult because there are no bright stars in the vicinity. Look at low power for a round hazy patch, and once you find it try higher power to look for details within the nebula.

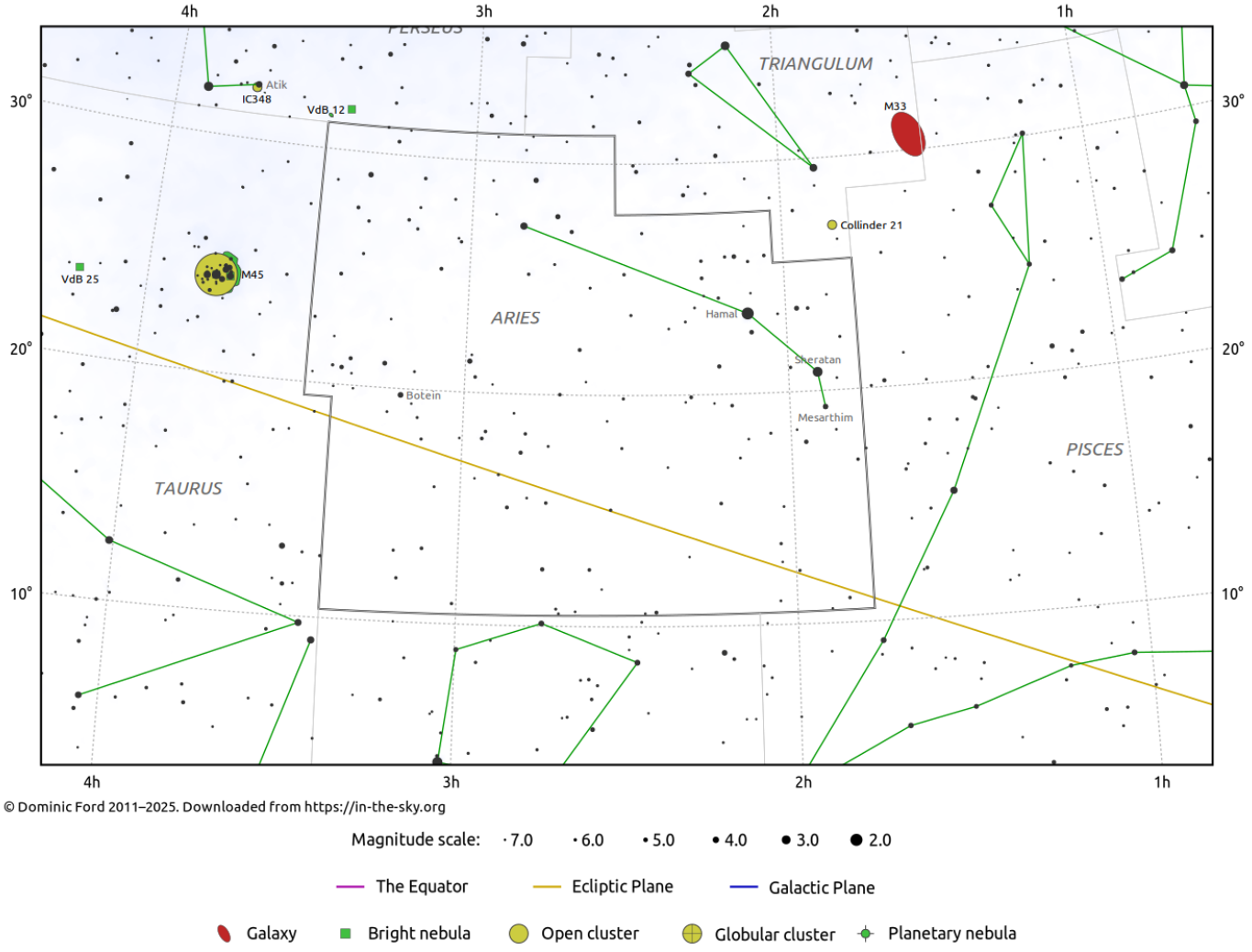


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Aries (Ari)

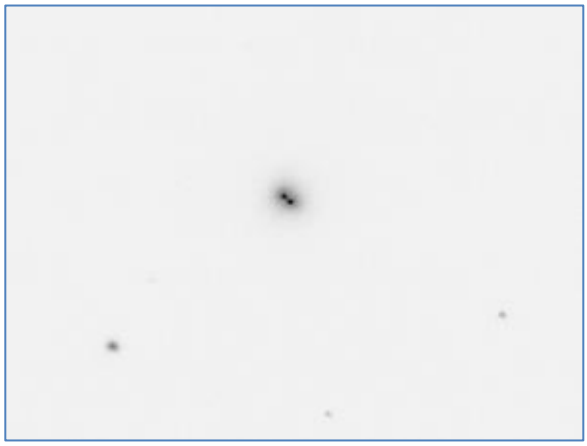
Evening Visibility: **September – February**
Online Information: **Aries**
Charts: **1** Featured Objects: **1**
More Online Information: Mesarthim

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
Mesarthim (DS)	1, W1, SD	SAO-092681 , HIP-8832, Gamma Arietis, 5 Ari, HD-11502	| Mag=3.9, 3.9 | Sep=7" |

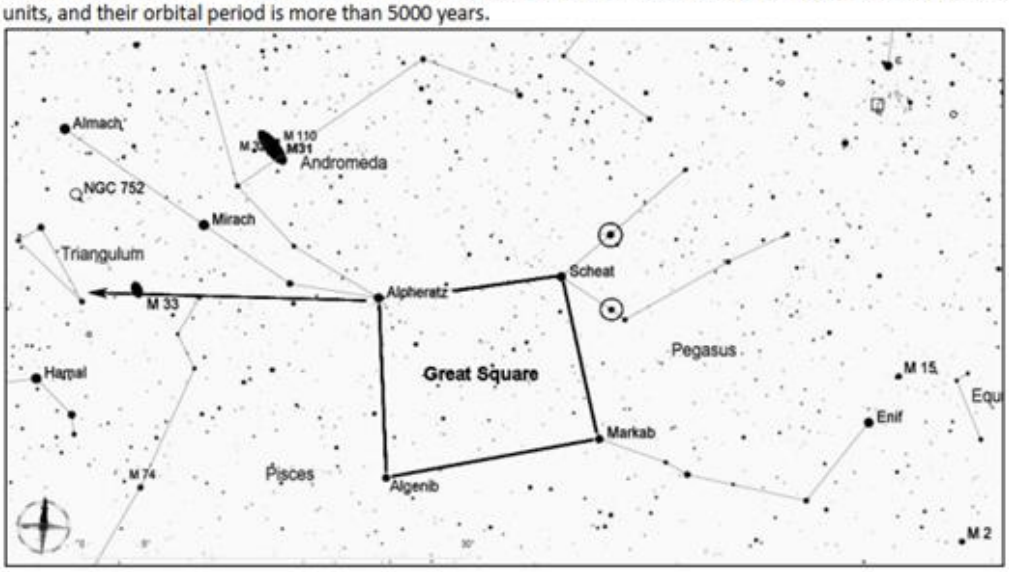
Image Gallery



Mesarthim (Gamma Arietis)

Mesarthim (Gamma Arietis), Double Star in Aries

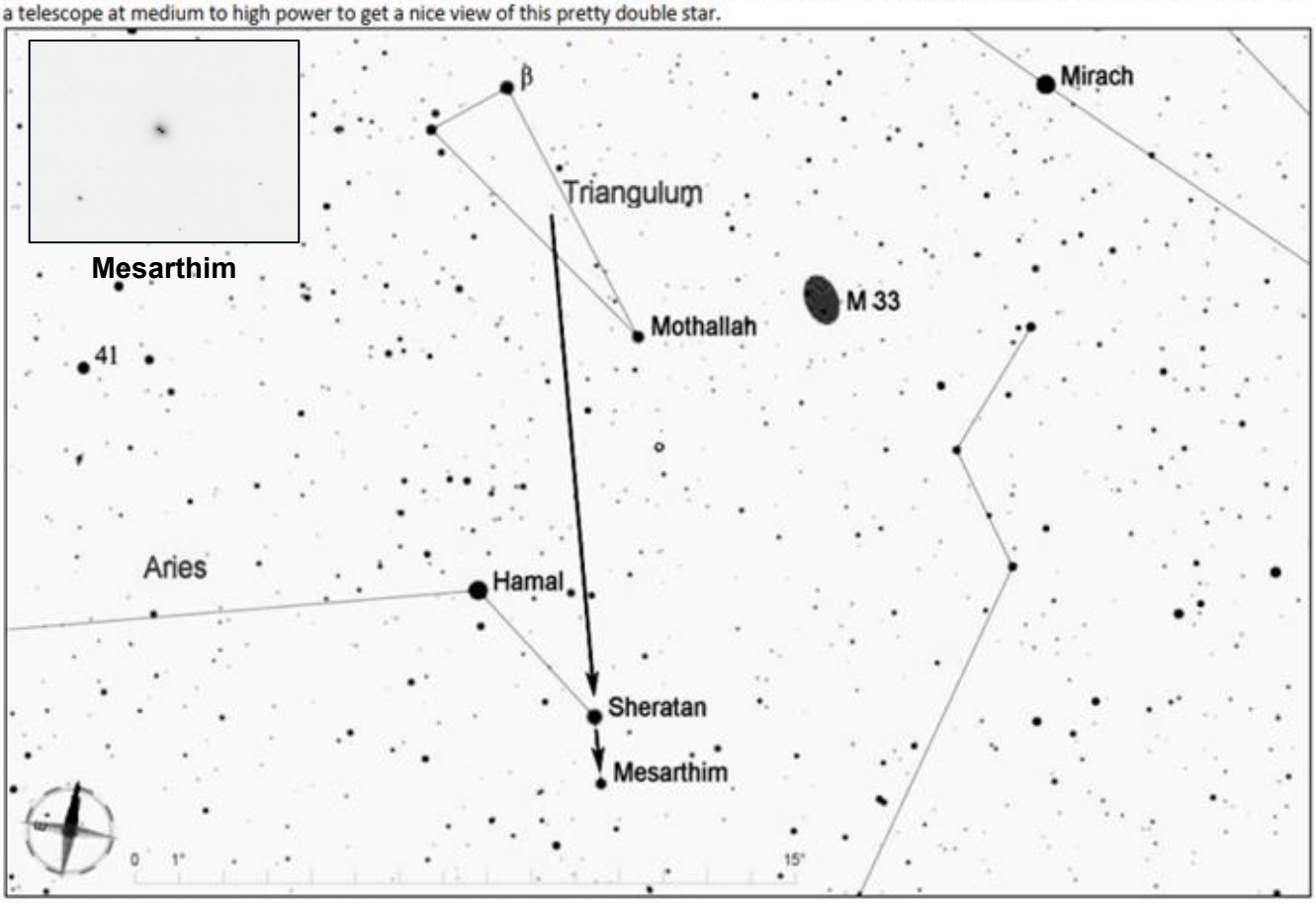
This is a pair of white or blue-white stars of about equal brightness and about 7 arcseconds apart, making a nice sight in even a small telescope. Both of these stars are more than twice as massive as our Sun and about 50 times as luminous. The distance between them is 357 astronomical units, and their orbital period is more than 5000 years.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

Using the northern edge of the Great Square as a pointer, extend a line to the east about twice the size of the Square, and you will arrive in the vicinity of the constellation Triangulum, whose 3 brightest stars form a long and narrow triangle.

From Triangulum, look about 10 degrees to the south for three bright stars in the constellation Aries--Hamal, Sheratan and, farthest to the southwest, Mesarthim. The combined magnitude of the two components of Mesarthim is about 3.9, making it easy to spot with the naked eye. Use a telescope at medium to high power to get a nice view of this pretty double star.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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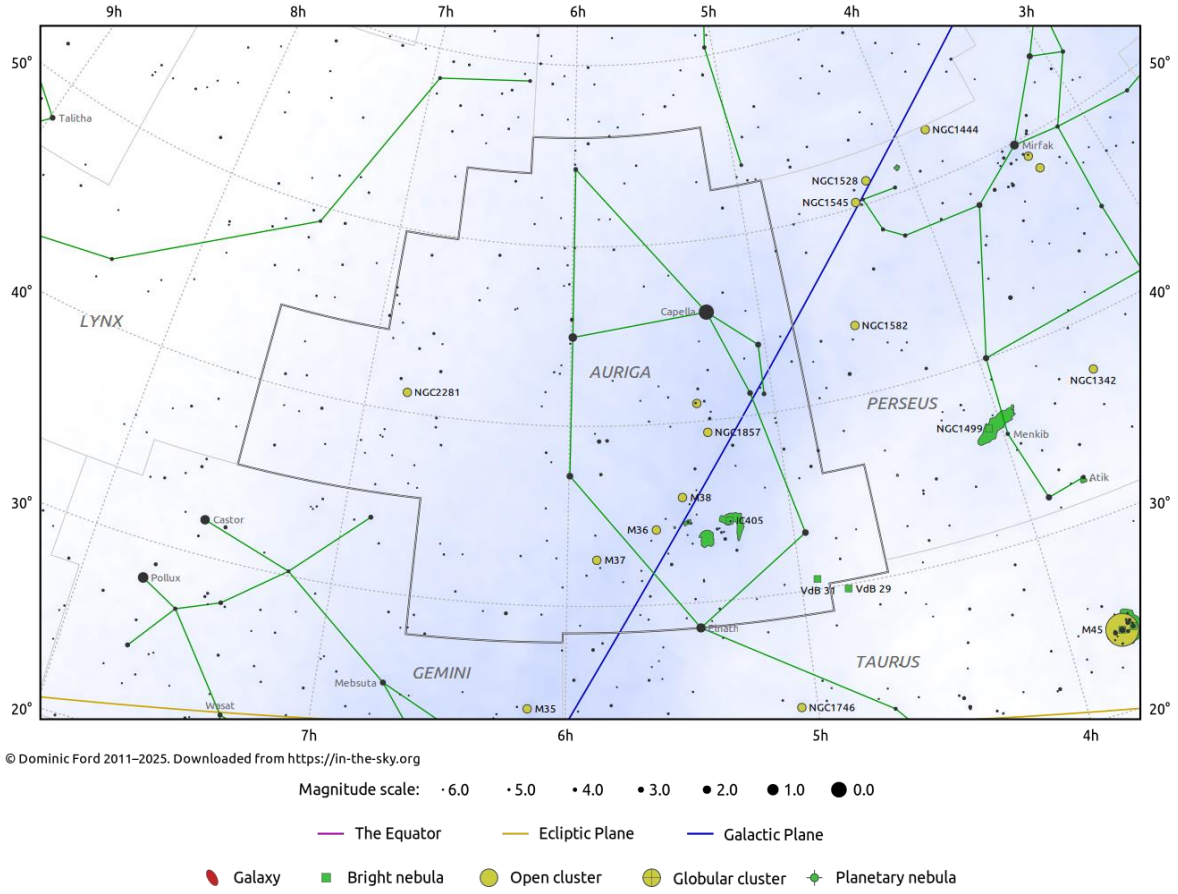
Auriga (Aur)

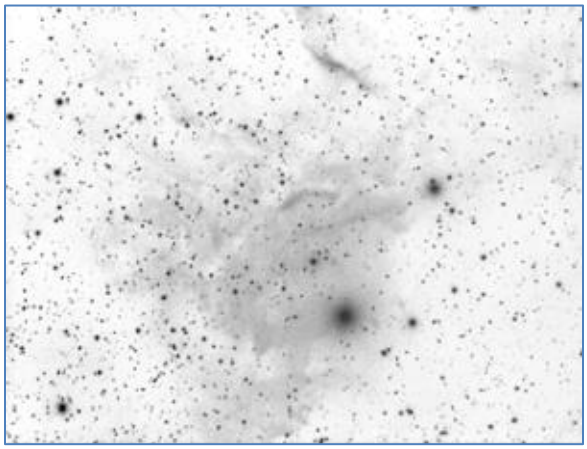
Evening Visibility: **November – April**
Online Information: **Auriga**
Charts: **2** Featured Objects: **6**
More Online Information: IC-405, Harrington 4, M-036, M-037, M-038, NGC-1907

In-The-Sky.org Constellation Map

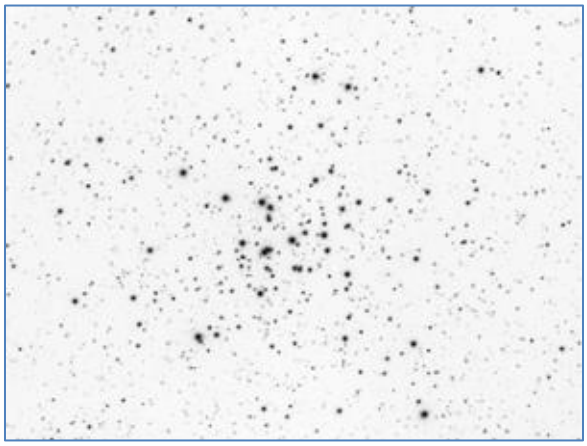


Object (Type)	Chart	Aliases	Stats
IC-405 (EN, RN)	1, W1	Flaming Star Nebula, SH 2-229, C-31	| Mag=6.0 | SB=?? | Size=37’ x 10’ |
Harrington 4 (AS)	1, W1		Stars form a shape of a staircase
M-036 (OC)	2, W2	Pinwheel Cluster, NGC-1960	| Mag=6.3 | SB=20.5 | Size=12’ |
M-037 (OC)	2, W2	Salt and Pepper Cluster, NGC-2099	| Mag=6.2 | SB=21.5 | Size=24’ |
M-038 (OC)	2, W2	Starfish Cluster, NGC-1912	| Mag=7.4 | SB=22.2 | Size=21’ |
NGC-1907 (OC)	2, W2		| Mag=8.2 | SB=21.1 | Size=7’ |

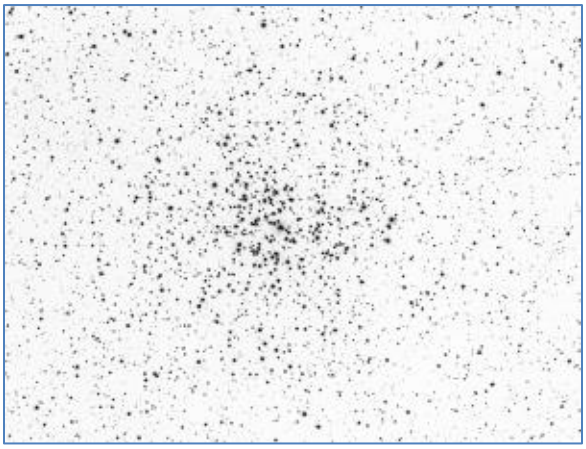
Image Gallery



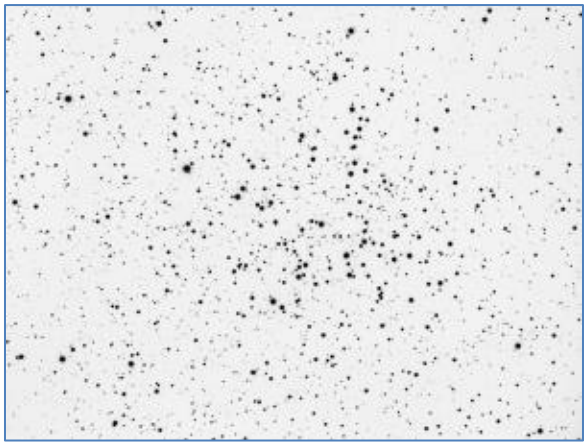
IC 405



Messier 36



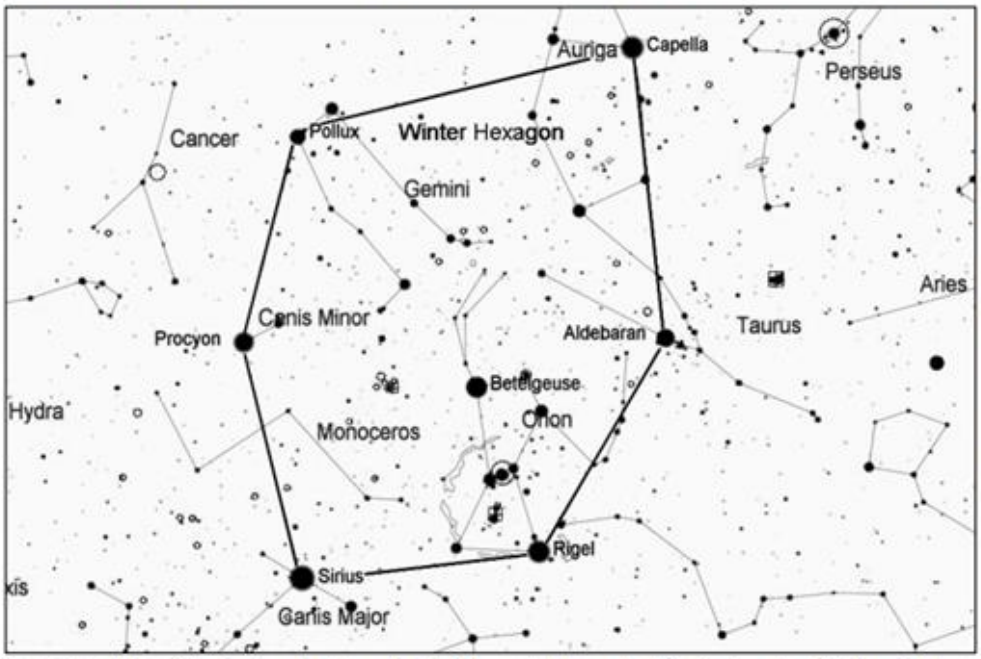
Messier 37, The Salt and Pepper Cluster



Messier 38, The Starfish Cluster

IC 405 (Caldwell 31), the Flaming Star Nebula, and Harrington 4

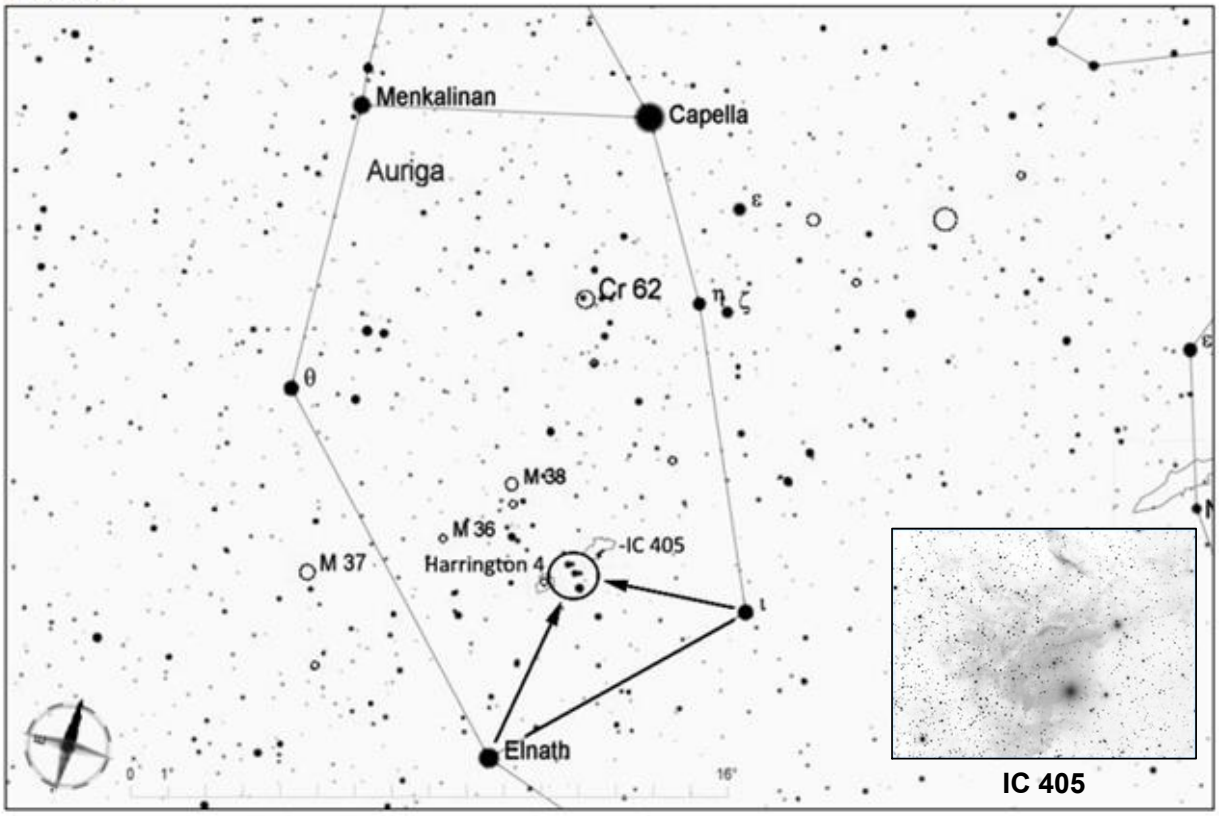
Harrington 4 is an asterism that is dimly visible to the naked eye and has the shape of a staircase when viewed through binoculars or a wide-field eyepiece. Less than a degree to the northwest is the 6th magnitude star AE Aurigae, which is surrounded by a large but dim nebula, IC 405. Portions of this nebula, especially those near AE, can be seen with even small telescopes, but a nebula filter can make it much easier to see.



Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Capella, the most northerly of the six stars in the Hexagon, and the brightest star in the constellation Auriga.

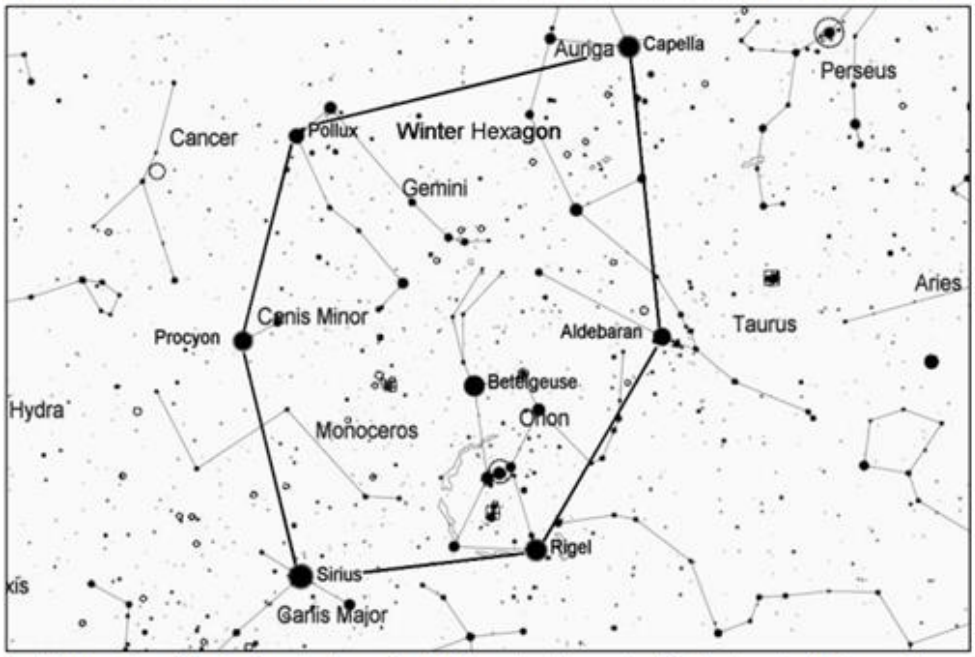
The brightest stars of Auriga form the shape of a slightly crooked house. Look for the two stars that form the base of this house (Elnath and ι). Use these two stars to form a triangle with the third point inside the house, as shown below. This point is the location of Harrington 4, which should appear as a hazy group of dim stars to the naked eye. Less than a degree to the northwest of this asterism is AE Aurigae and the surrounding nebula IC 405.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 36, 37, and 38, and NGC 1907, Open Clusters in Auriga

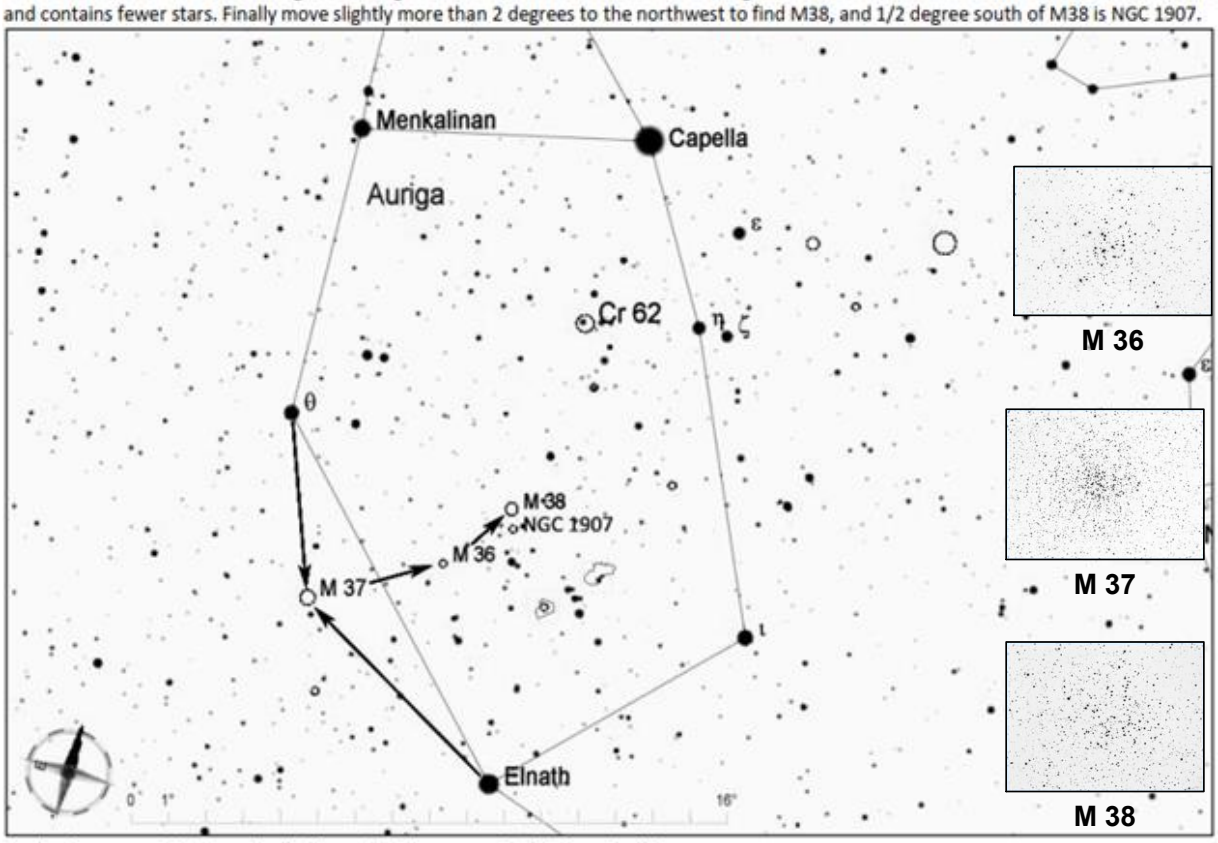
These attractive clusters present interesting variations in size and appearance. Messier 36 is about 12 arcminutes across. Messier 37 is about twice as large and is more densely packed with stars. Messier 38 is about as large as M37, but its stars are more widely spaced. NGC 1907 is about 6 arcminutes across, densely packed. All of these can be observed in succession by sweeping from one to the next, as described below.



Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Capella, the most northerly of the six stars in the Hexagon, and the brightest star in the constellation Auriga.

The brightest stars of Auriga form the shape of a slightly crooked house. Look for the two stars that are on the opposite side of this house from Capella (θ and Elnath). Use these two stars to form the base of a long, thin triangle, with the third point just outside the house, as shown below. This is the location of M37, the largest and brightest of these three clusters. Move 4 degrees to the west-northwest to reach M36, which is smaller and contains fewer stars. Finally move slightly more than 2 degrees to the northwest to find M38, and 1/2 degree south of M38 is NGC 1907.

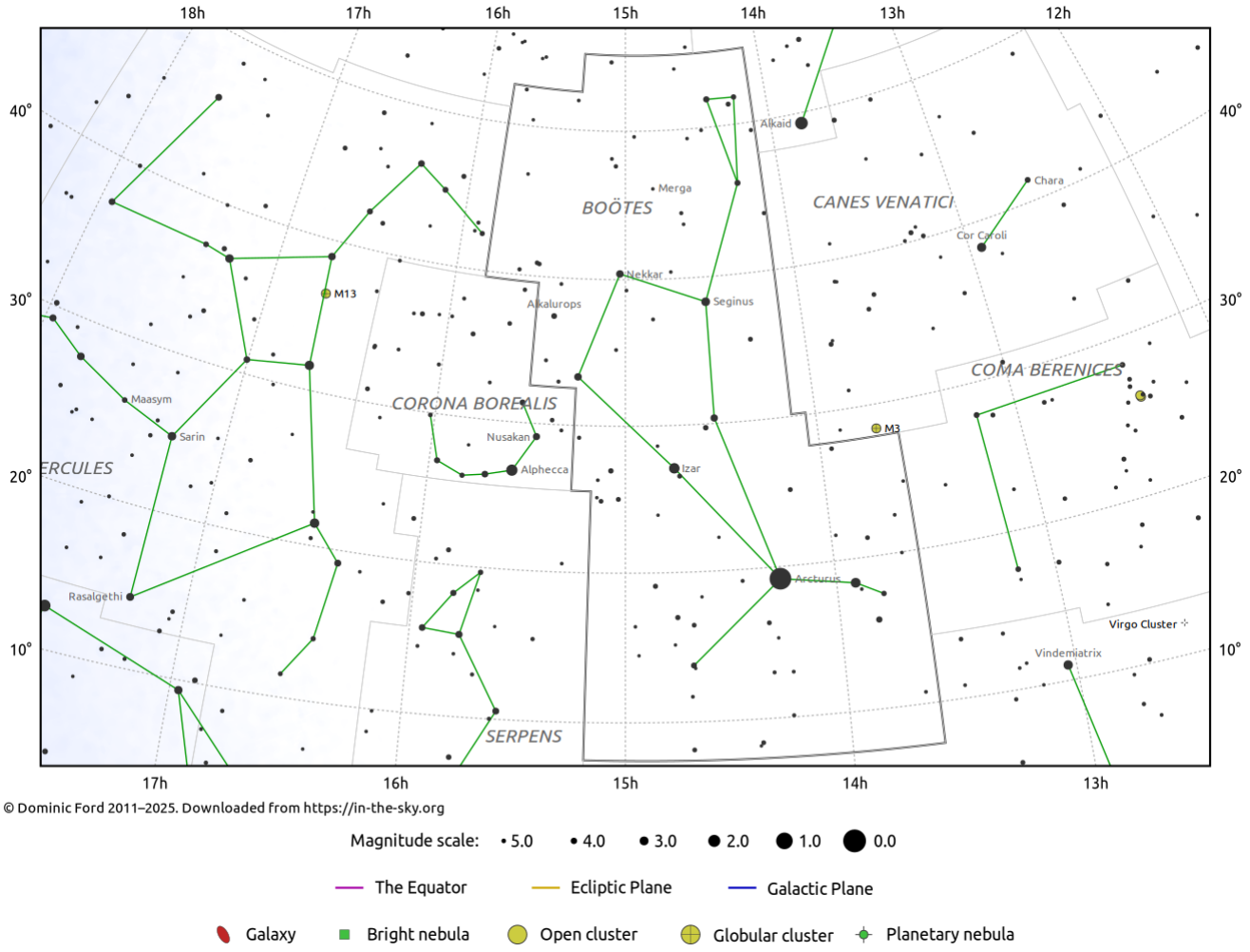


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Bootes (Boo)

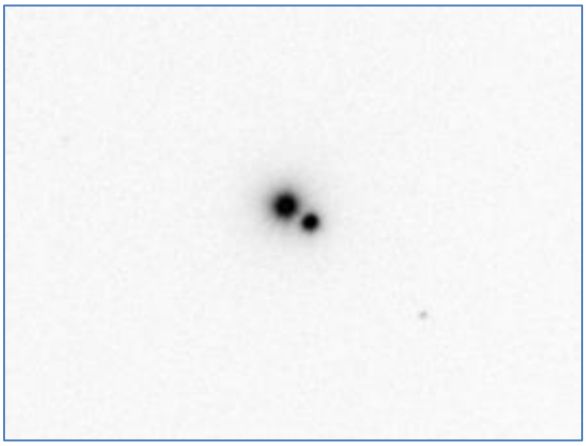
Evening Visibility: **April – August**
Online Information: **Bootes**
Charts: **3** Featured Objects: **4**
More Online Information: Asellus Tertius, NGC-5248, Pi Bootis, Xi Bootis,

In-The-Sky.org Constellation Map

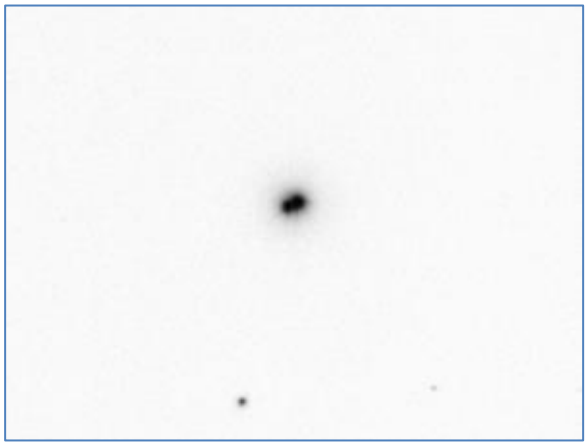


Object (Type)	Chart	Aliases	Stats
Asellus Tertius (DS)	1, W1, SD	SAO-029045, HIP-69481, Kappa Bootis, 17 Boo, HD-124674	| Mag=4.5, 6.6 | Sep=13.4" |
Izar (DS)	4, W4, SD	SAO83500, HIP-72105, Pulcherrima, HD129989, ε Boo, 36 Boo, HR5506	|| Mag= 2.5, 4.8 | Sep=2.9" |
NGC-5248 (G)	2, W2	C-45	| Mag=11.0 | SB=22.9 | Size=6.2' x 4.5' |
Pi Bootis (DS)	3, W3, SD	SAO-101138, 29 Boo, HD-1229174	| Mag=4.9, 5.8 | Sep=5.4" |
Xi Bootis (DS)	3, W3, SD	SAO-101250, 37 Boo, HD-131156	| Mag=4.7, 7.0 | Sep=5.3 |

Image Gallery



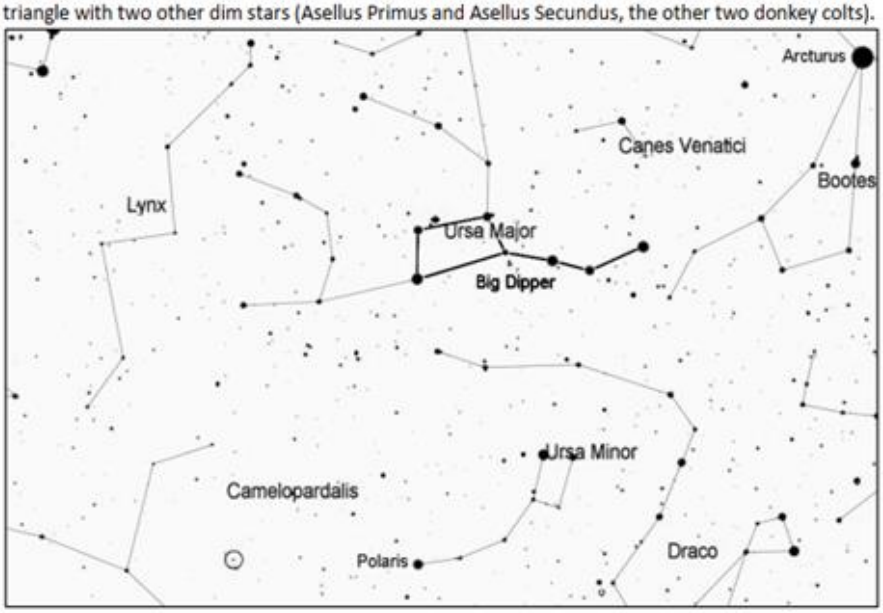
Asellus Tertius (Kappa Bootis)



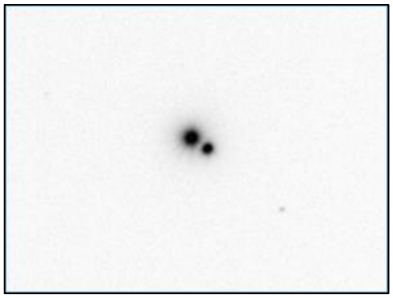
Pi Bootis

Asellus Tertius (Kappa Bootis), Double Star

With an angular separation of 13.4", this fairly bright pair is easy to split with just about any telescope. Their magnitudes are 4.5 and 6.6. Their orbital period is estimated to be over 6000 years. The name Asellus Tertius means "third donkey colt", and with the naked eye it forms a small triangle with two other dim stars (Asellus Primus and Asellus Secundus, the other two donkey colts).

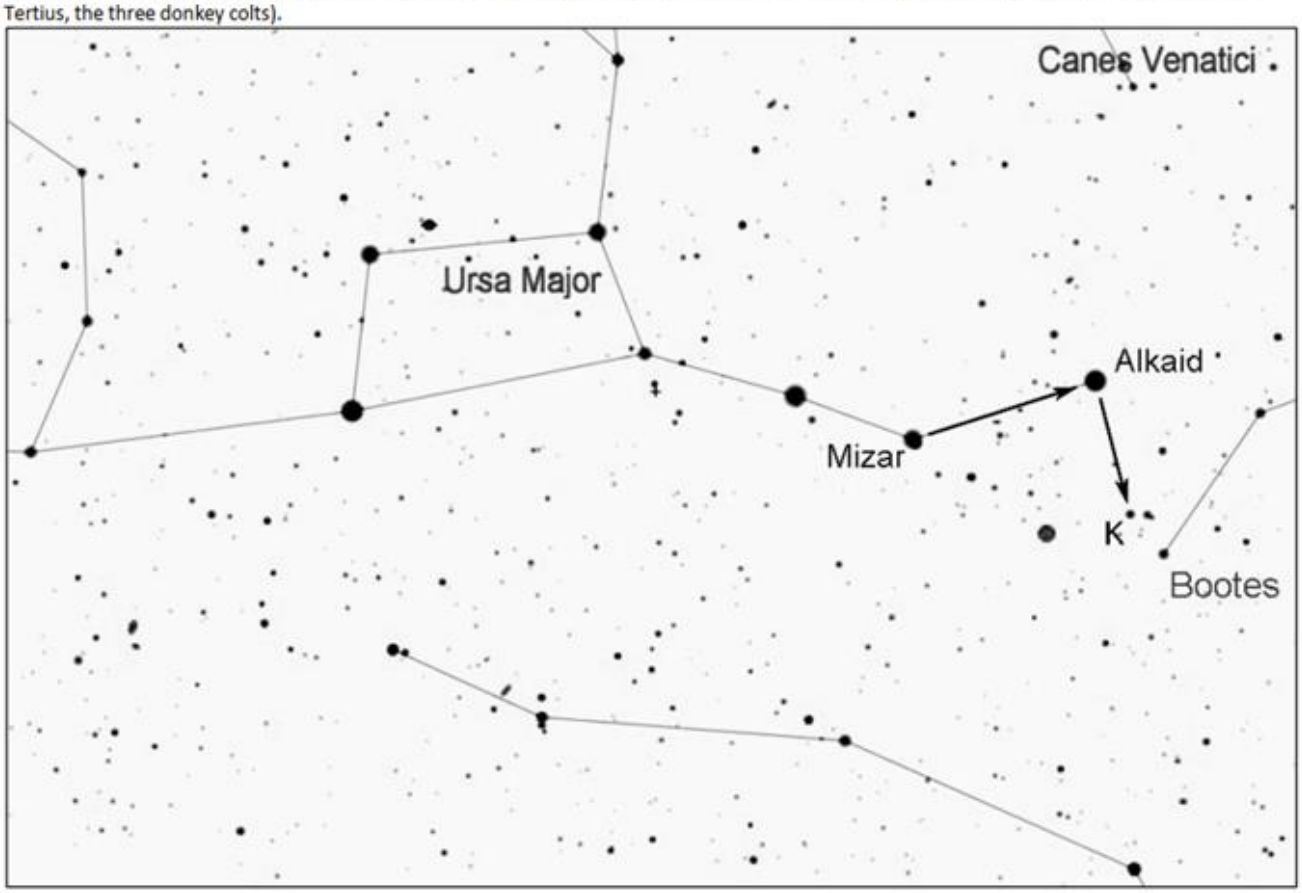


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



Asellus Tertius

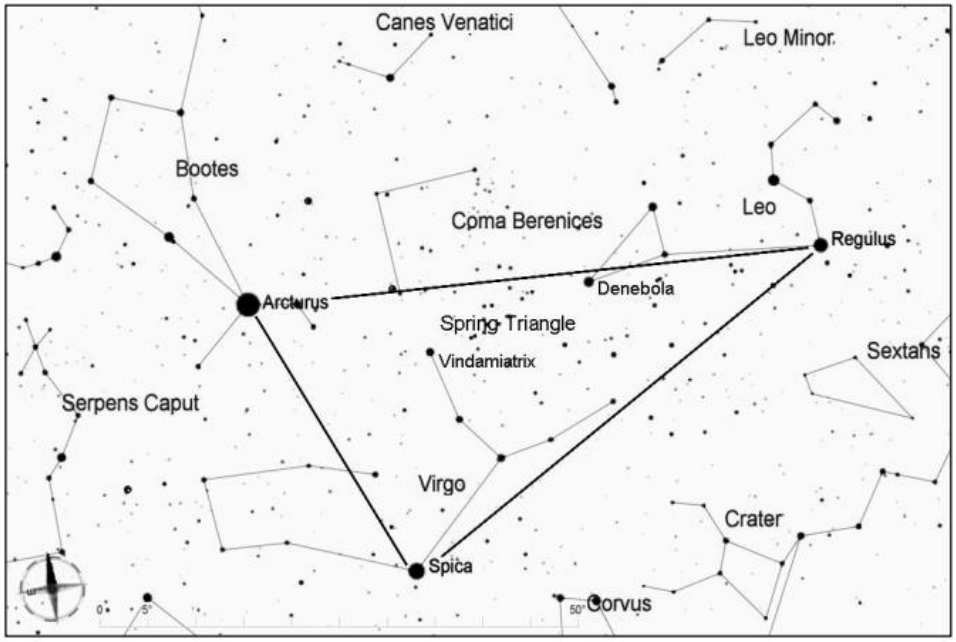
Note that north is to the bottom in this chart. Find Mizar, the middle star in the handle of the Big Dipper, and Alkaid, the star at the end of the handle. As shown in the chart below, Kappa (κ) Bootis forms a right triangle with Mizar and Alkaid. It will be dim to the naked eye but easily seen in binoculars or a finderscope. Note that this star is part of a small triangle of three dim stars (called Asellus Primus, Asellus Secundus, and Asellus Tertius, the three donkey colts).



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Izar (Epsilon Bootis), Double Star

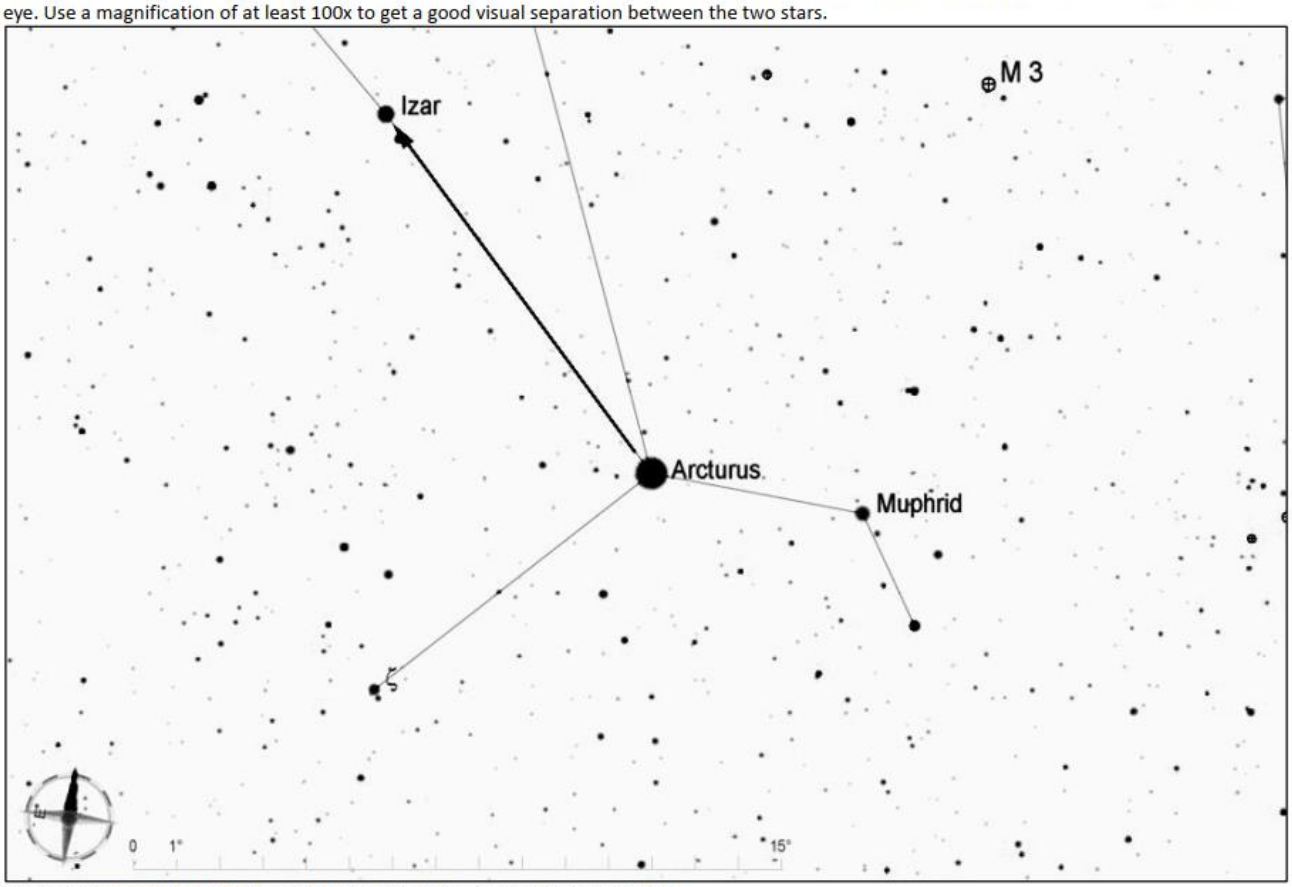
Izar (Epsilon Bootis) is a bright double star of beautifully contrasting colors. The brighter component is an orange giant star, magnitude 2.5. The dimmer star, magnitude 4.8, is white. The separation between the two stars is 2.9 arcseconds, and the actual distance between them is about 185 astronomical units. Their orbital period is uncertain, but it is more than 1000 years. The pair is about 200 light years away.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin from brilliant Arcturus (magnitude 0).

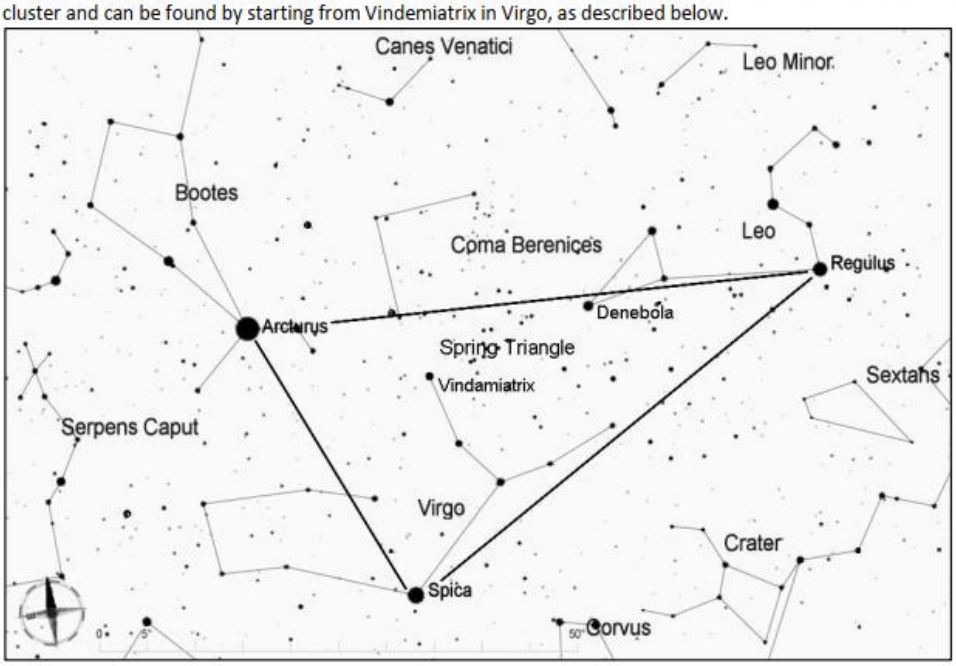
For this easy star hop, look 10 degrees to the northeast of Arcturus to find Izar, the second brightest star in Bootes and easily seen with the naked eye. Use a magnification of at least 100x to get a good visual separation between the two stars.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 5248 (Caldwell 45), Galaxy in Bootes

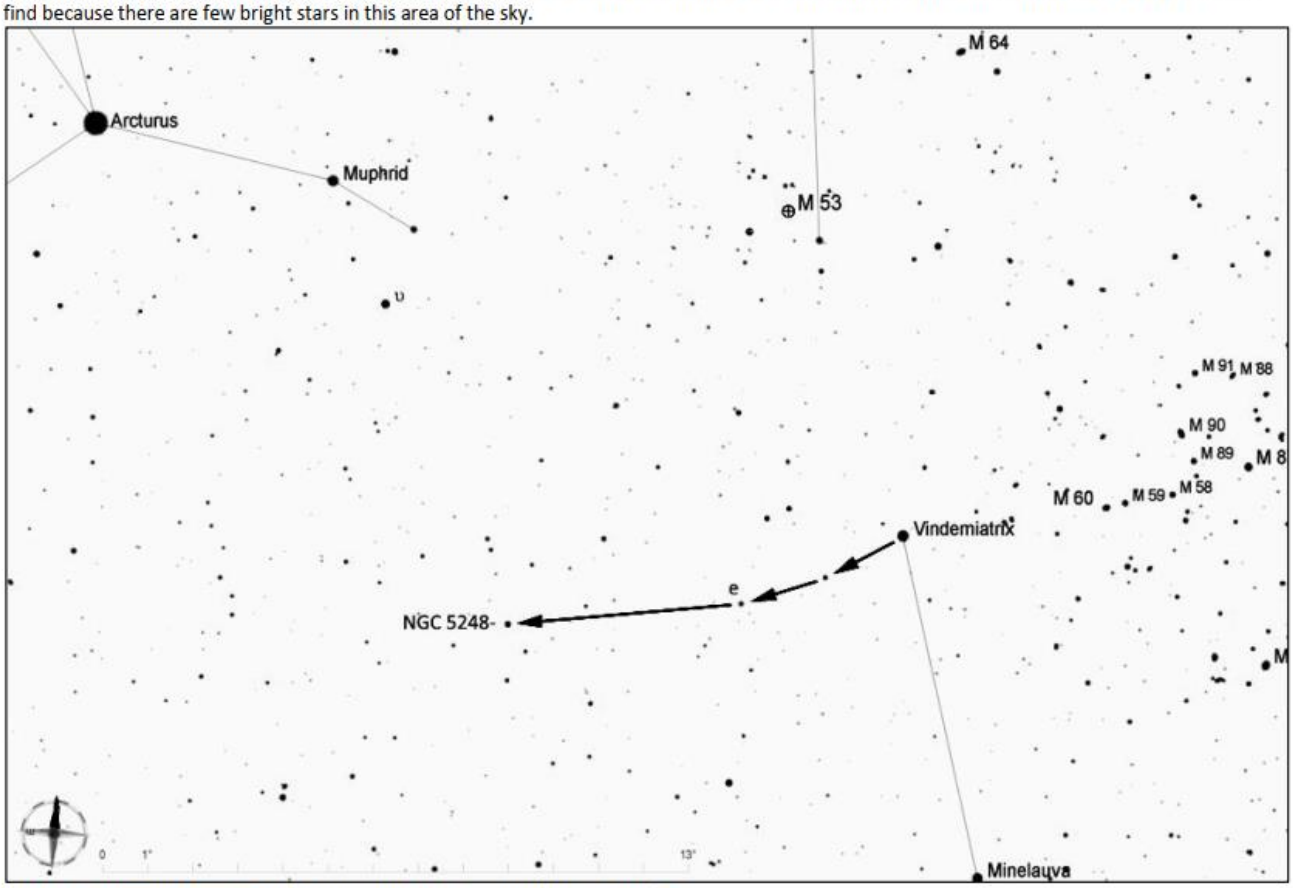
This is a 10th magnitude spiral galaxy that can be seen in small telescopes as an oval object with a brighter center. With larger telescopes, some details in the spiral structure of the galaxy are visible. Although it is technically in the constellation Bootes, this galaxy is actually part of the Virgo cluster and can be found by starting from Vindemiatrix in Virgo, as described below.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

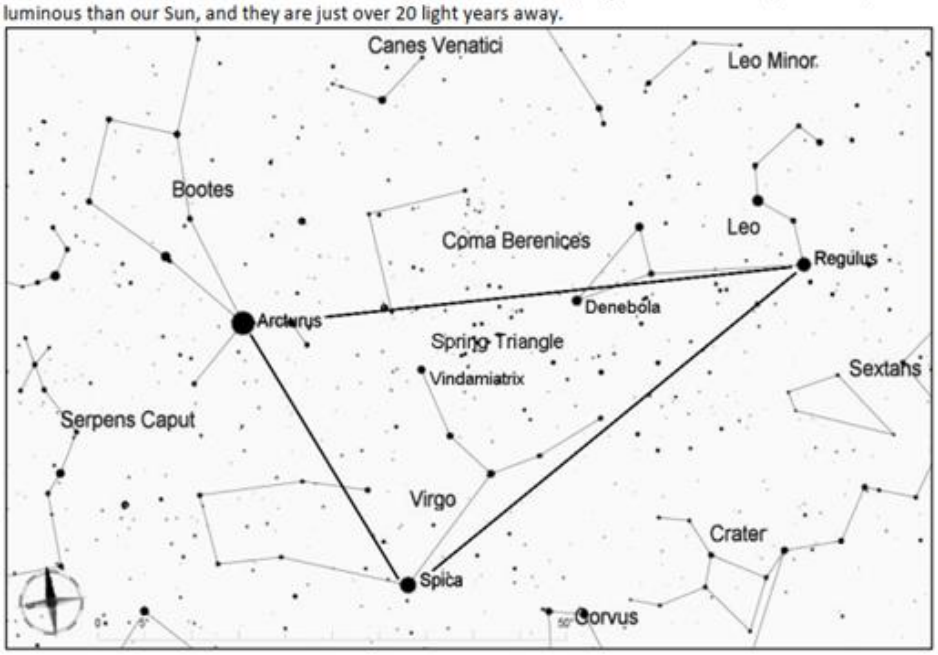
From Vindemiatrix, look 2 degrees to the east-southeast for a magnitude 6 star, and then another 2 degrees in the same direction for a magnitude 5 star (e Virginis). Then continue east another 5 degrees to the east and you will arrive at the location of NGC 5248. This can be a tricky object to find because there are few bright stars in this area of the sky.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Pi (π) Bootis and Xi (ξ) Bootis, Double Stars

Pi Bootis is a fairly close double star with two white components, magnitudes 4.9 and 5.8, separated by 5.4 arcseconds. The pair is about 320 light years away. The distance between the two stars is about 500 astronomical units. The separation of the two components of nearby Xi Bootis is similar, 5.3 arcseconds, but their difference in brightness is greater (magnitude 4.7 and 7.0). Both components of Xi Bootis are smaller and less luminous than our Sun, and they are just over 20 light years away.



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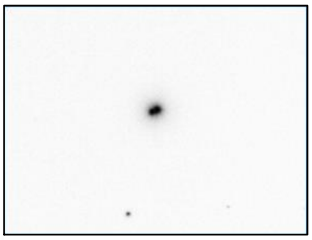
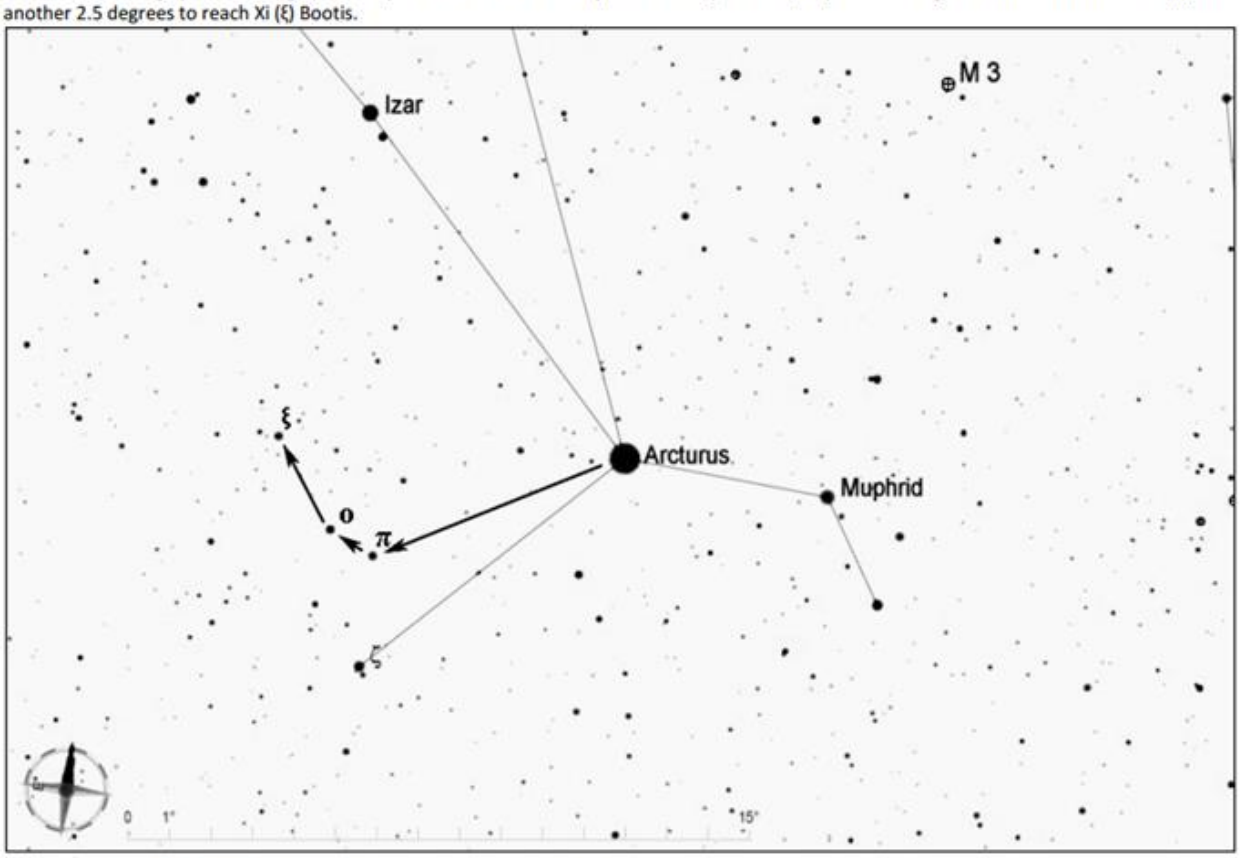
For this star hop, begin from brilliant Arcturus (magnitude 0).



Pi Bootis

From Arcturus, look about 6degrees to the southeast for Pi (π) Bootis, which is not hard to see with the naked eye with its combined magnitude of 3.9. Medium to high power through a telescope will show its two components nicely. From Pi, hop about 1 degree northeast to Omicron (o), then another 2.5 degrees to reach Xi (ξ) Bootis.

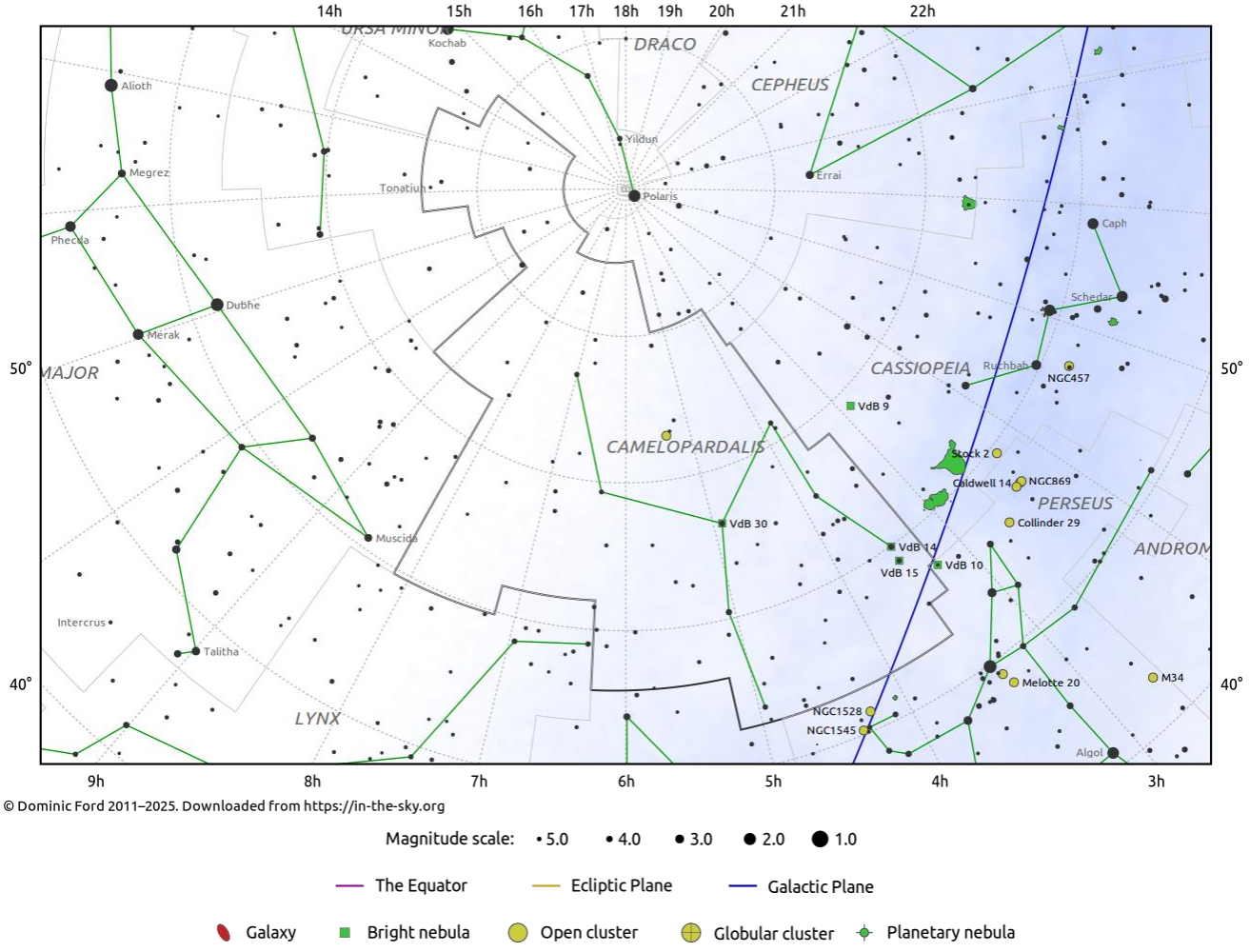


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Camelopardalis (Cam)

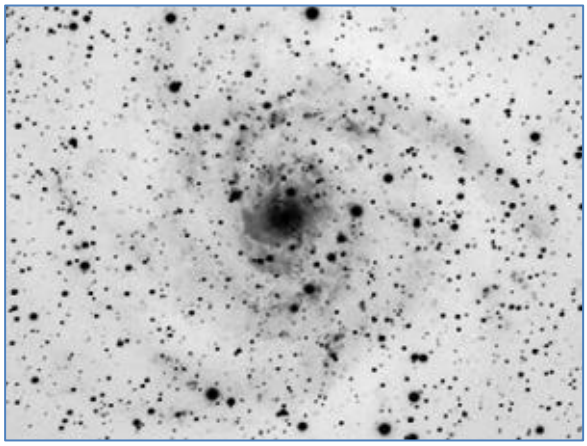
Evening Visibility: **September - April**
Online Information: **Camelopardalis**
Charts: **3** Featured Objects: **4**
More Online Information: Iota Cassiopeiae, IC-342, Kemble's Cascade, NGC-1502, NGC-2403

In-The-Sky.org Constellation Map

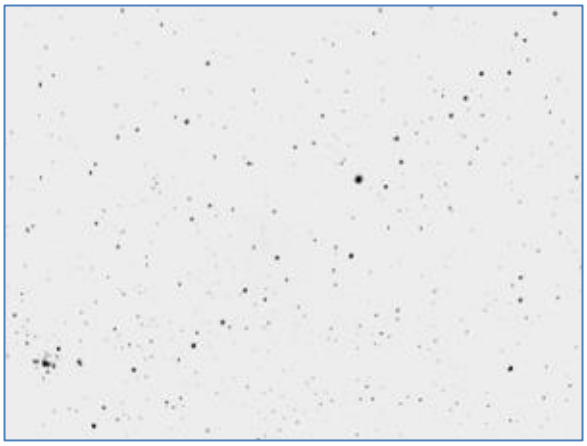


Object (Type)	Chart	Aliases	Stats
Iota Cassiopeiae (MS)	1, W1, SD	HIP-11569, STF-262, HIP-11569, ADS-1860	| Mag= 4.6, 6.9, 9.1 | Sep = 2.7", 7.3" | One of the finest triples in the northern sky
IC-342 (G)	1, W1	C-5, PGC 13826	| Mag=9.1 | SB=23.9 | Size=21.4' x 20.9' |
Kemble's Cascade (AS)	2, W2	Kemble 1	| Size = 2.5° |
NGC-1502 (OC)	2, W2	Golden Harp Cluster	| Mag=6.0 | SB=18.8 | Size=9.7' |
NGC-2403 (G)	3, W3	C-7, PGC-21396	| Mag=8.9 | SB=23.3 | Size=22' x 12' |

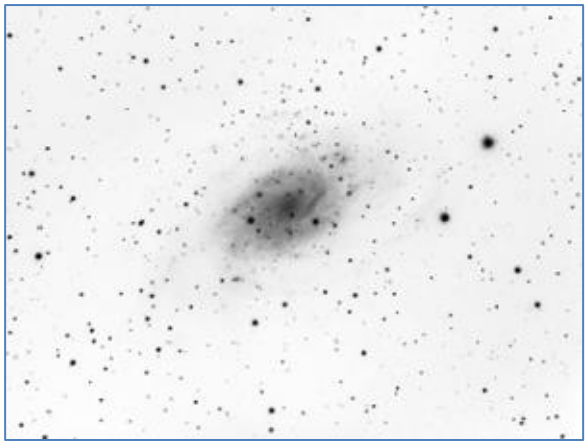
Image Gallery



IC 342



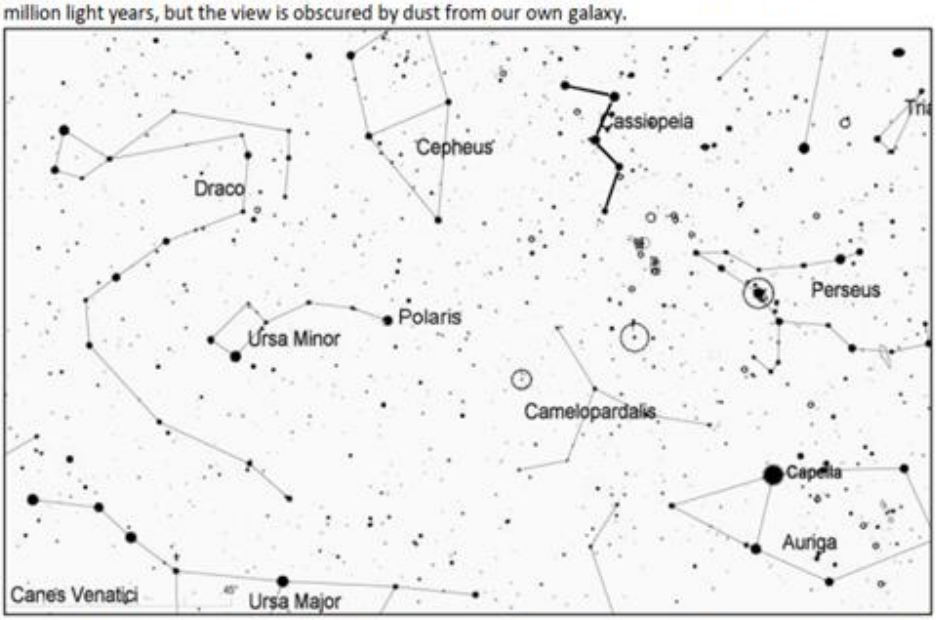
Kemble's Cascade and NGC 1502



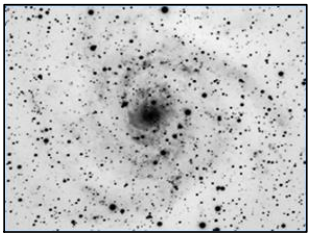
NGC 2403 (C 7)

Iota Cassiopeiae (Triple Star) and IC 342 (Caldwell 5) in Camelopardalis

Iota Cassiopeia is a beautiful triple star with components of different colors. The two closest stars are only 2.7" apart, so high magnification is needed to separate them. Across the constellation border in Camelopardalis, IC 342 is a large but dim face-on spiral. The galaxy's central core appears fairly bright, but its tenuous spiral arms have a low surface brightness and are difficult to discern. For a galaxy, it is relatively close at 11 million light years, but the view is obscured by dust from our own galaxy.

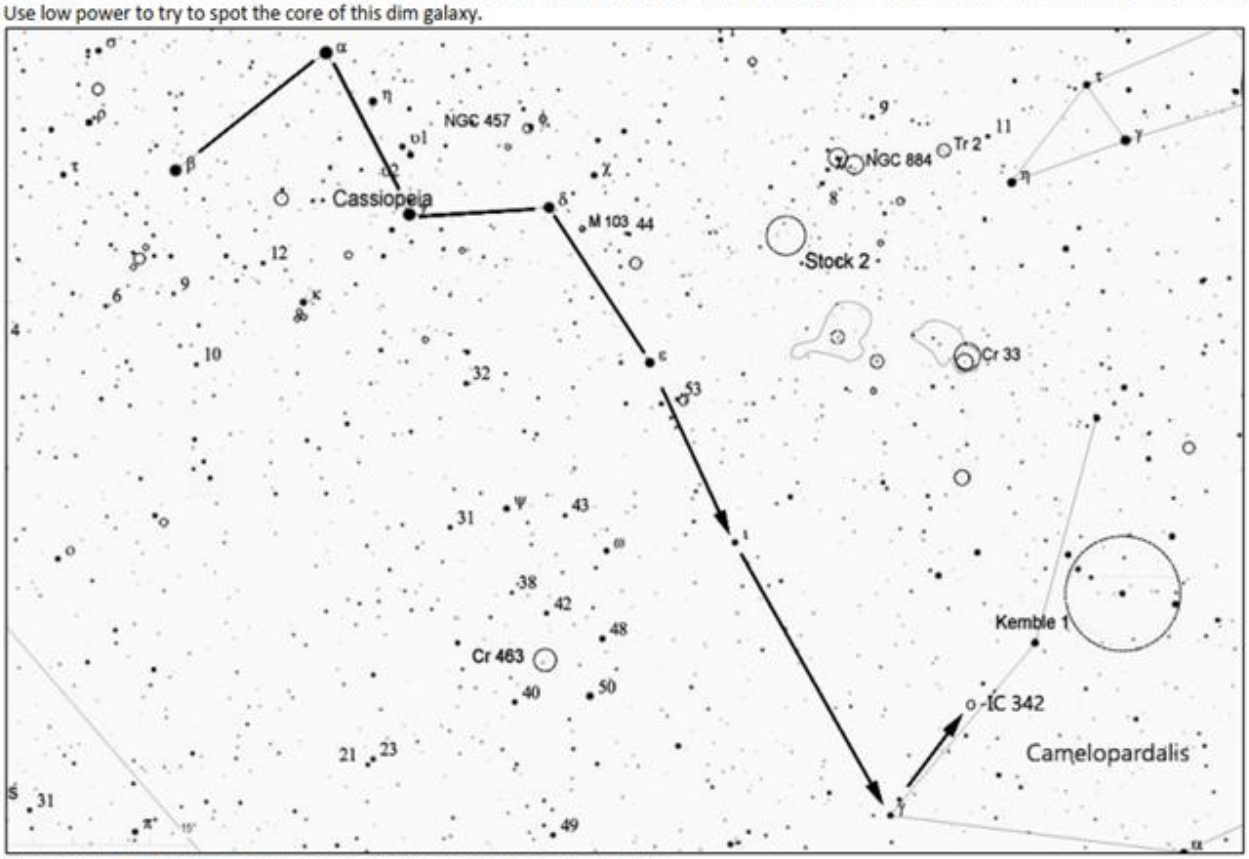


Find the constellation Cassiopeia, which can be recognized by its distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".



IC 342

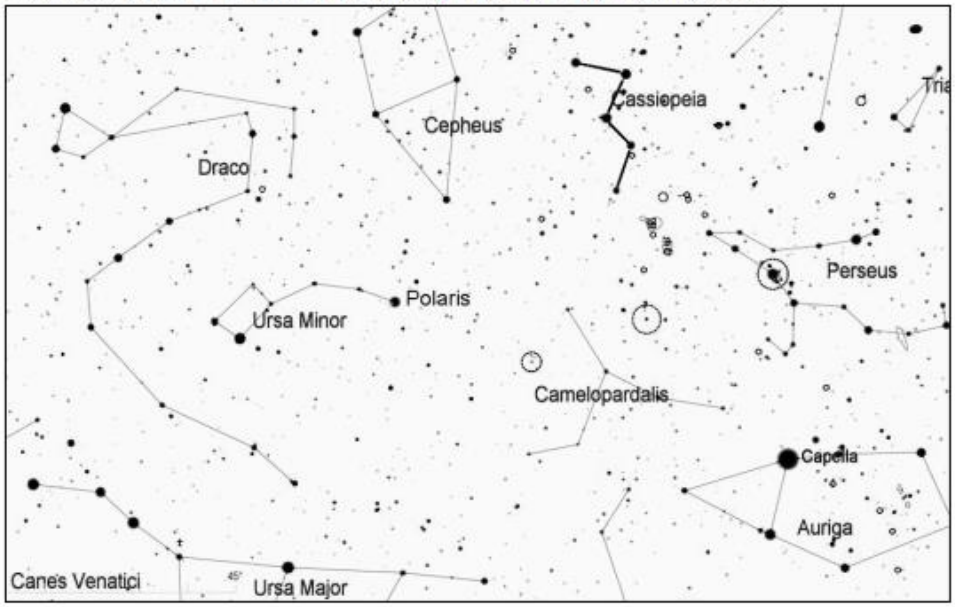
Once you have located Cassiopeia, extend the line made by the two stars of the first segment of the "W" about an equal distance away from them and you will arrive at 4th magnitude iota (ι) Cassiopeiae. Use high magnification to separate the components of this impressive triple star. Then extend the line again, about 1.5 times as far, and you will reach gamma (γ) Camelopardalis, a 4th magnitude star with a 5th magnitude star about 1/2 degree to its south. As shown below, make a sharp left turn (toward the 5th magnitude star) and move about 3 degrees south to reach IC 342. Use low power to try to spot the core of this dim galaxy.



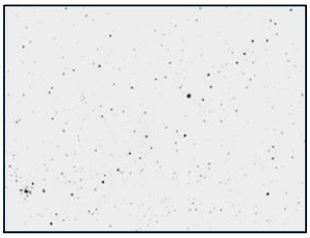
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Kemble's Cascade and NGC 1502 in Camelopardalis

Kemble's Cascade is an asterism that appears as a string of stars stretching across 2-1/2 degrees of sky and ending with a splash at the small open cluster NGC 1502. It was first noted by amateur astronomer Lucian J. Kemble. Because of its large size, this is a fine object to observe with binoculars. The cluster NGC 1502 is a nice telescopic object with a rough triangular shape.

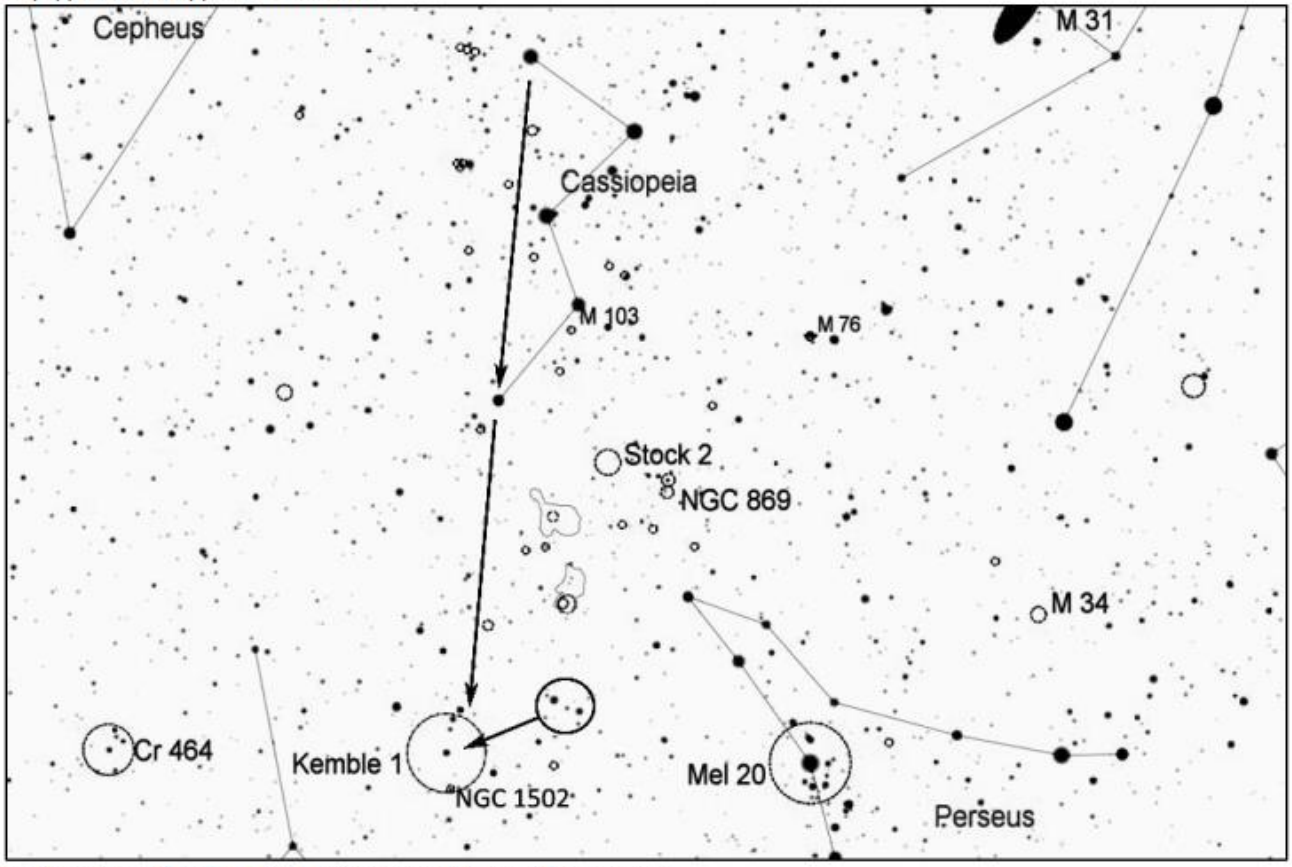


Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".



Kemble's Cascade & NGC 1502

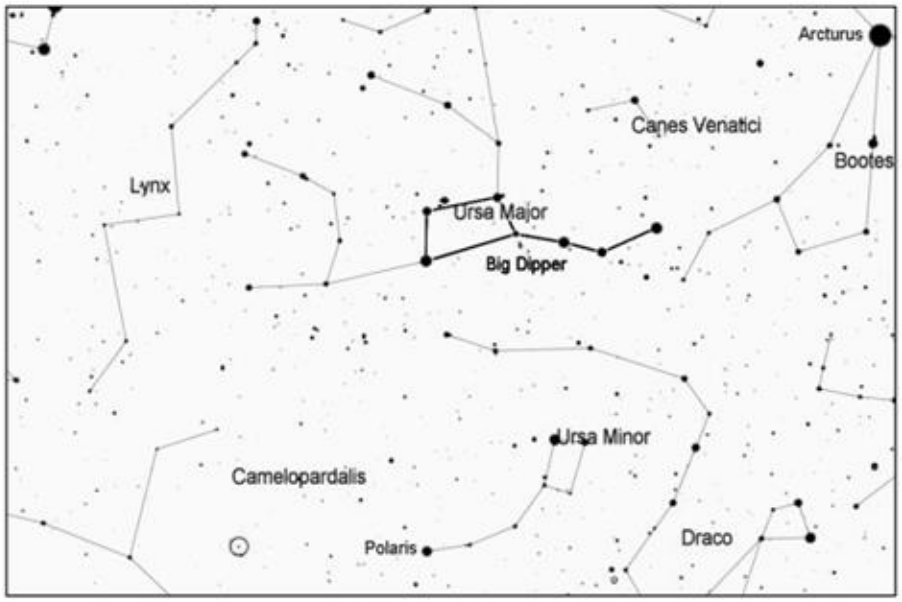
Once you have located Cassiopeia, imagine a line between the two stars at the ends of the W shape, and extend this line an equal distance to the east, as shown in the chart below. This will take you to the general area of Kemble's Cascade. To help you get oriented, look for a pair of 4th magnitude stars a few degrees to the south of Kemble's Cascade, which are circled in the chart. NGC 1502 is at the east end of the asterism, and may appear as a misty patch in binoculars.



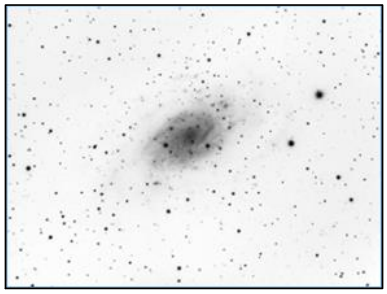
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 2403 (Caldwell 7), Galaxy in Camelopardalis

This is a large and bright spiral galaxy (magnitude 8.2) that is only about 8 million light years away. It can be spotted in a small telescope and even with binoculars if you can find it in a fairly empty region of the northern sky. In larger scopes, details can be seen it its spiral arms. This galaxy is thought to be part of a group that includes the better-known pair M81 and M82.

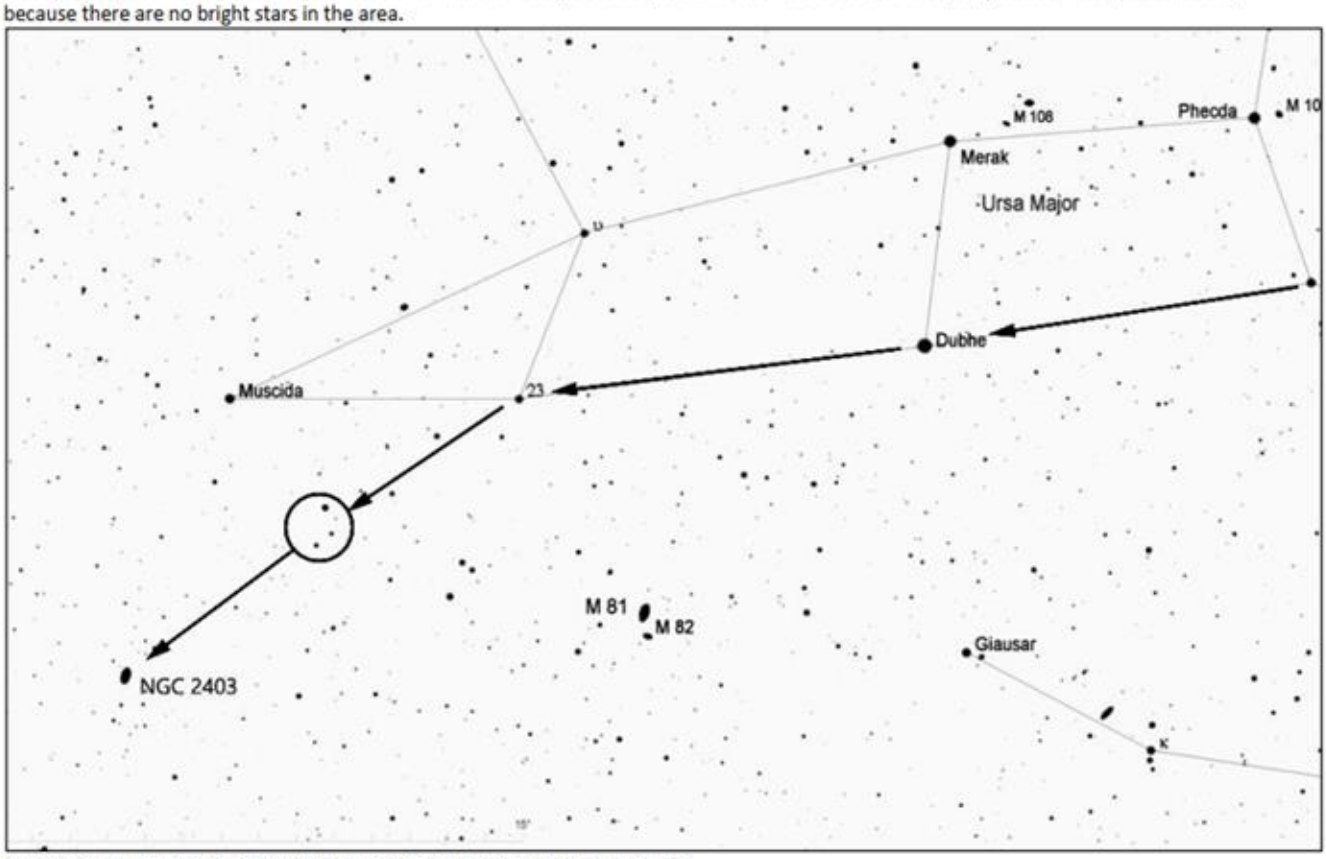


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



NGC 2403

Visualize a line across the rim of the Big Dipper's bowl, and extend this line a slighty longer distance outside the bowl, as shown below, to reach the 3rd magnitude star 23 Ursae Majoris. Then take a slight left turn and go about 6 degrees and you will come to a small triangle of 5th magnitude stars (circled). Continue in this same direction for another 6 degrees and you will reach NGC 2403. It is easy to get lost in this part of the sky because there are no bright stars in the area.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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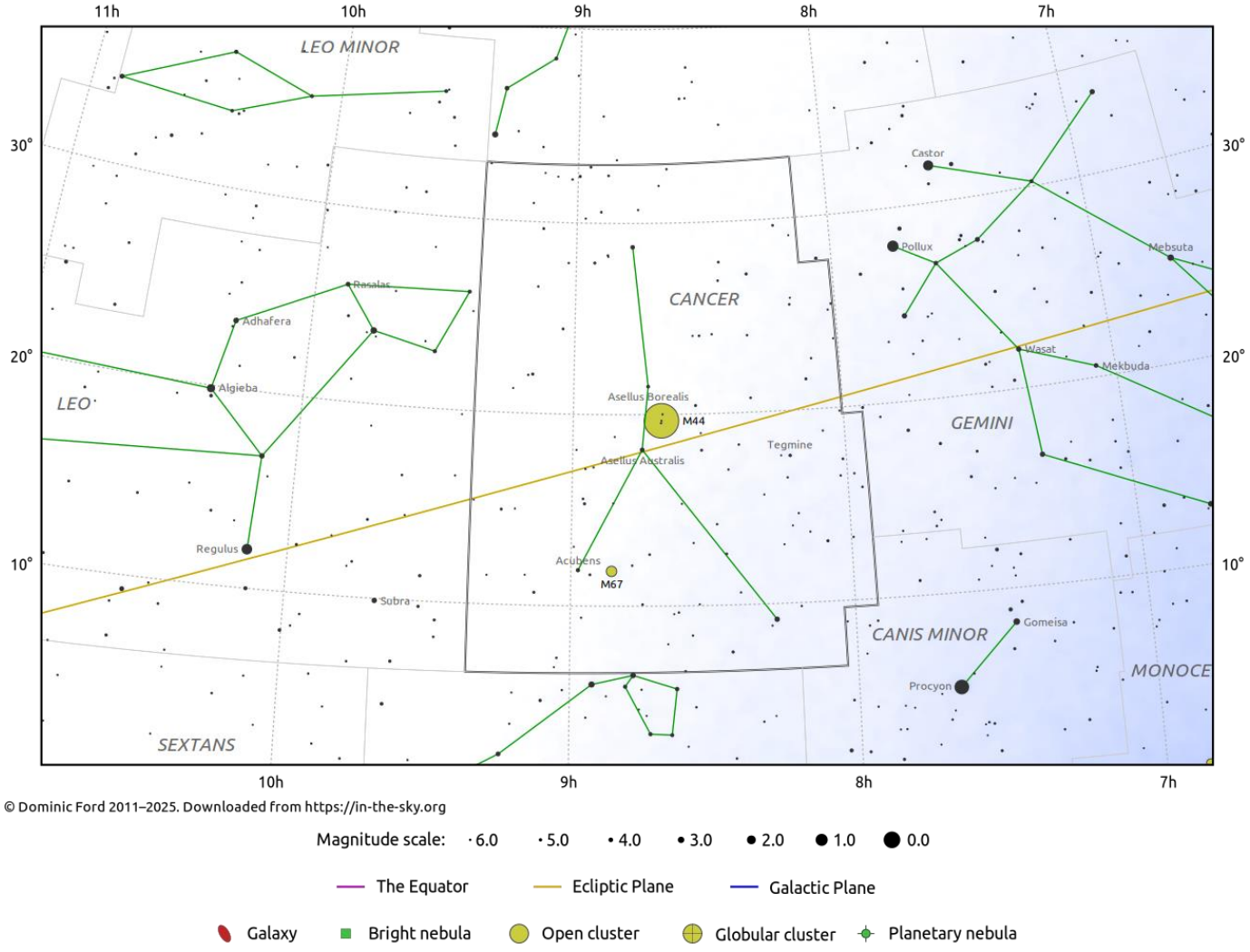
Cancer (Cnc)

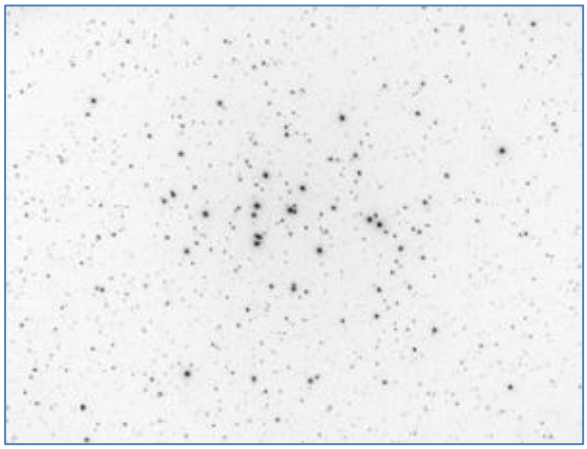
Evening Visibility: **February – June**
Online Information: **Cancer**
Charts: **3** Featured Objects: **3**
More Online Information: M-044, M-067, NGC-2775,

In-The-Sky.org Constellation Map

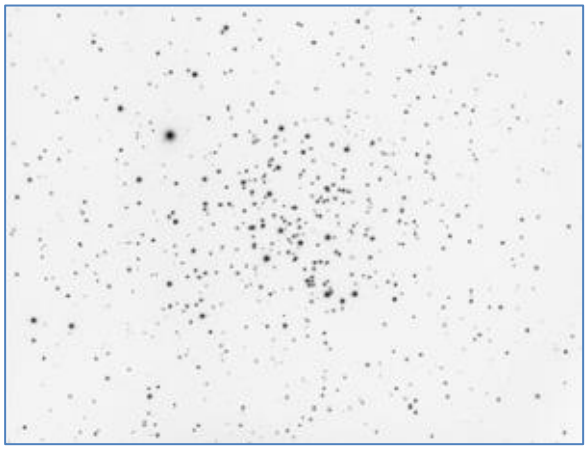


Object (Type)	Chart	Aliases	Stats
M-044 (OC)	1, W1	Beehive Cluster, Praesepe, NGC-2632	| Mag=3.7 | SB=22.5 | Size=95' |
M-067 (OC)	2, W2	King Cobra Cluster, NGC-2682, Golden Eye Cluster	| Mag=-6.1 | SB=23.5 | Size=30' |
NGC-2775 (G)	3, W3	C-48, PGC-25861	| Mag=10.4 | SB=22.2 | Size=4.3' x 3.3' |

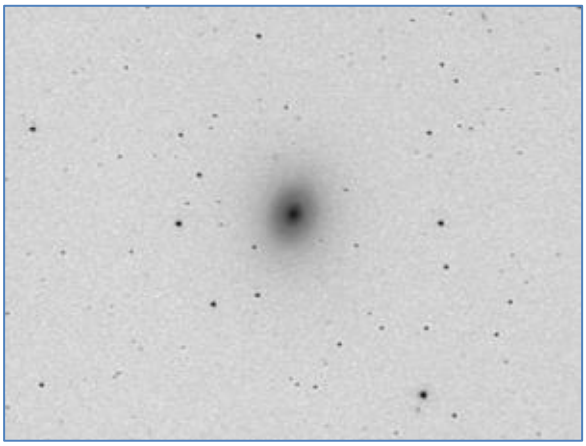
Image Gallery



Messier 44, The Beehive Cluster



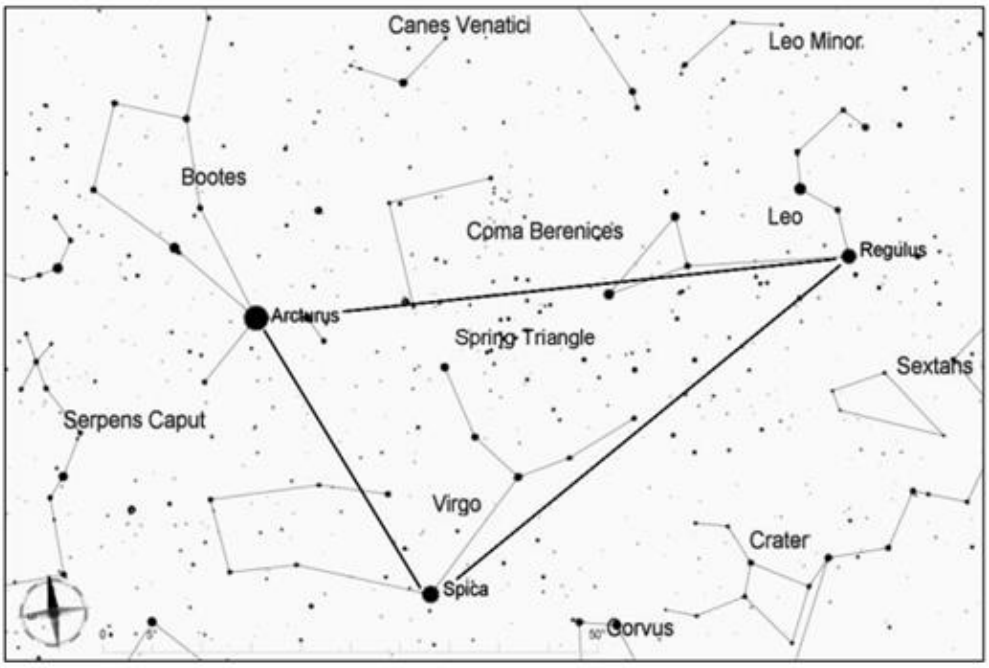
Messier 67



NGC 2775 (C 48)

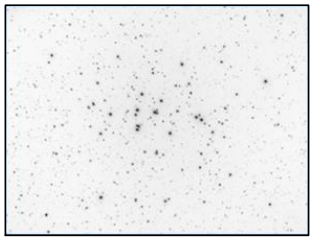
Messier 44, the Beehive Cluster

The Beehive is one of the nearest open clusters, about 610 light years away. It is visible to the naked eye as a large hazy patch in the center of the dim constellation Cancer, about twice the diameter of the full Moon. Because of its large size, it is best viewed through binoculars or a small telescope at low power.



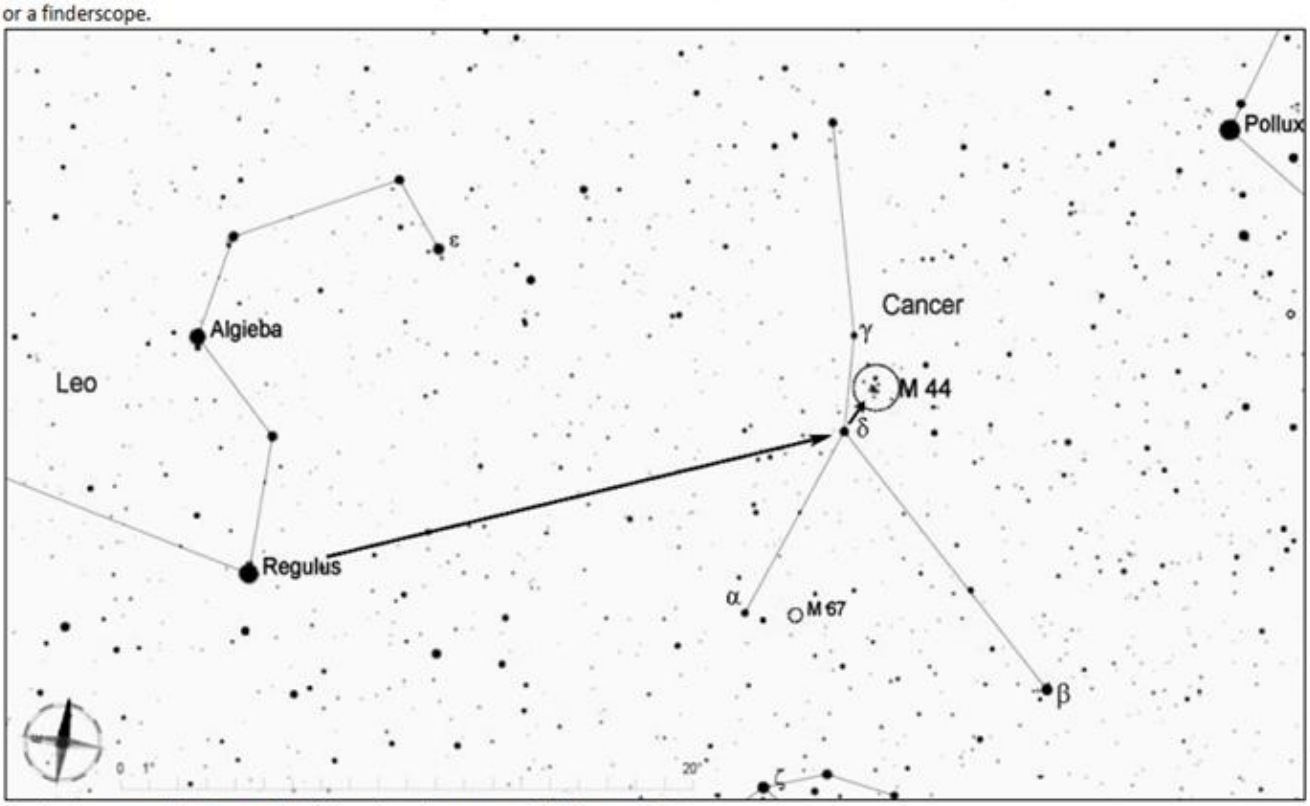
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



M 44

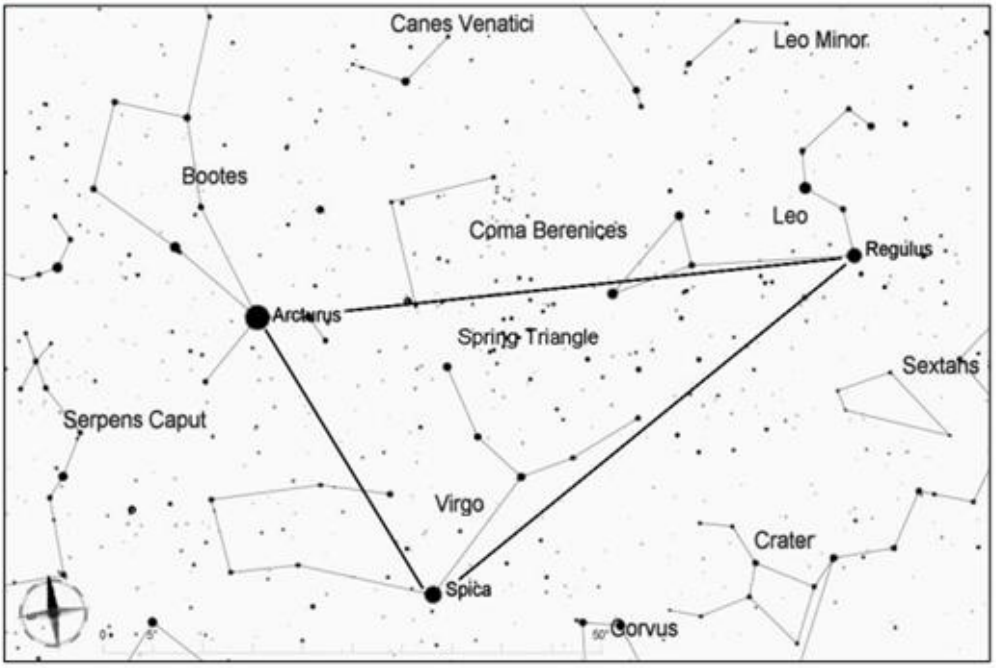
The dim constellation Cancer, the crab, has no stars brighter than magnitude 3.5. As shown below, the constellation is locasted about half way between Regulus and first-magnitude Pollux in Gemini. From Regulus, look about 15 degrees to the northwest to find δ Cancri, a magnitude 4 star in the center of Cancer. The Beehive is about a degree to the north of δ Cancri. If you can't see it with the naked eye, it will be obvious in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

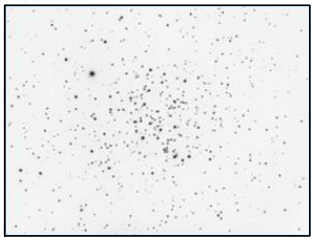
Messier 67, Open Cluster in Cancer

Messier 67 is a fairly bright open cluster of some 200 stars. It is estimated to be about 4 billion years old, making it one of the oldest known open clusters. It is not as well known as the nearby Beehive Cluster (Messier 44), but it is quite an attractive object when viewed with a small telescope at low power.



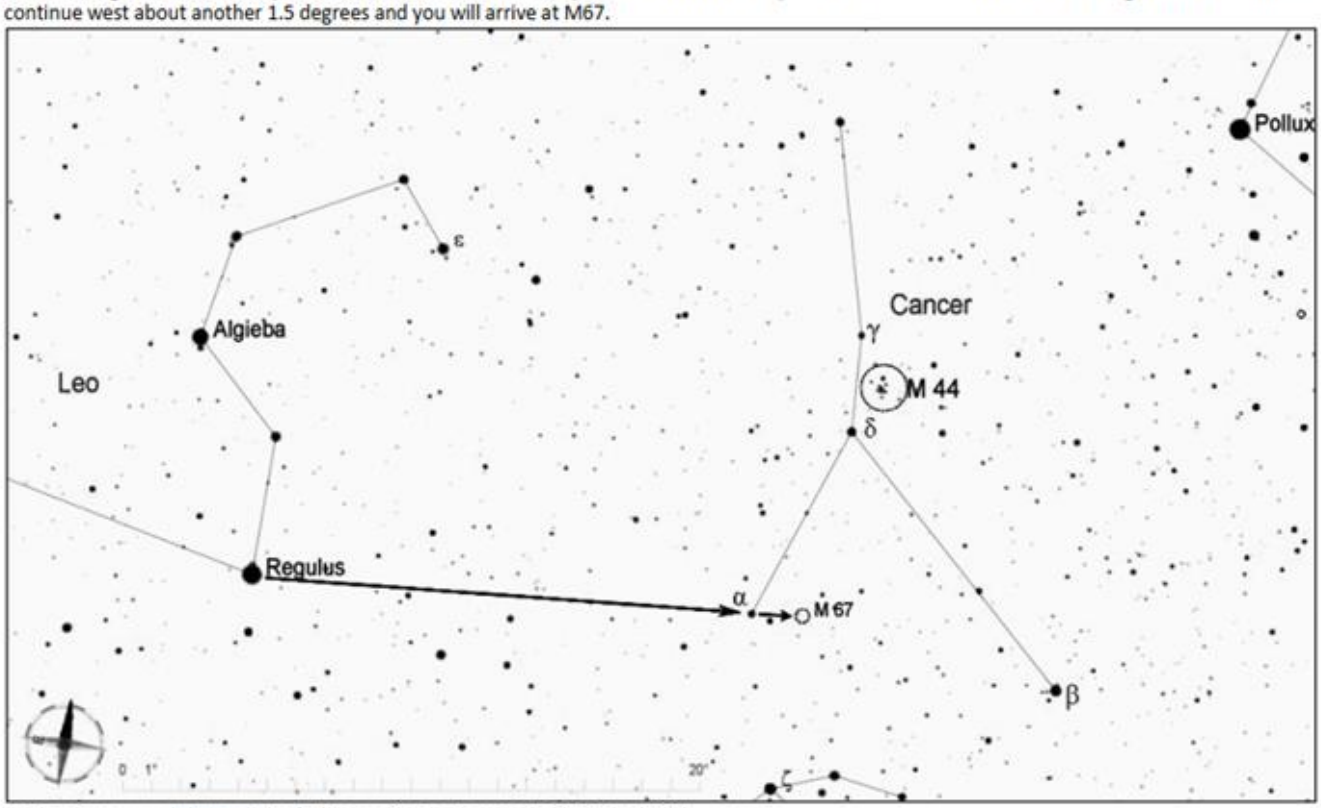
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



M 67

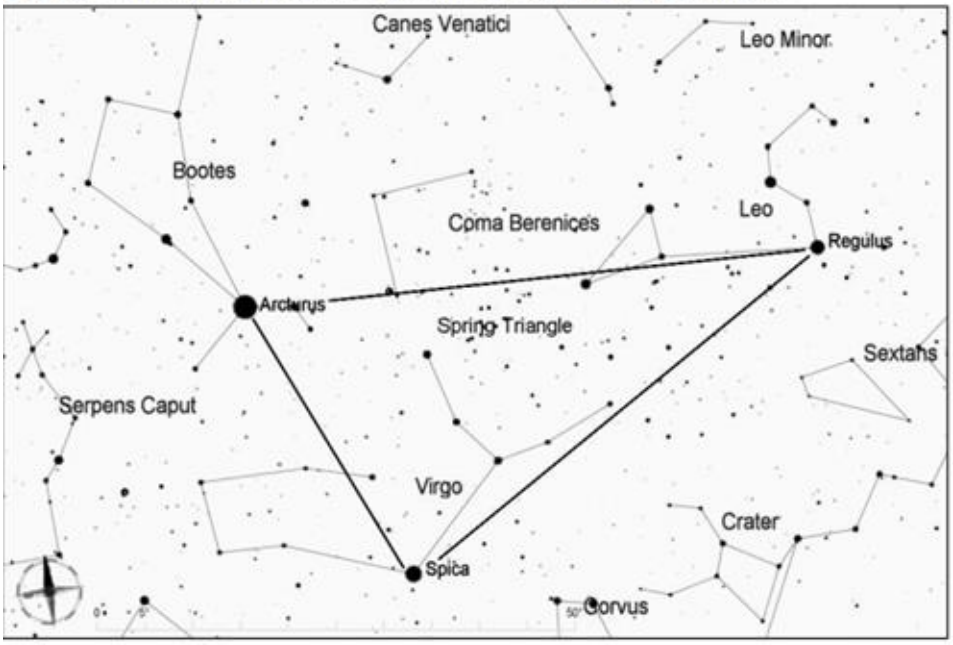
The dim constellation Cancer, the crab, has no stars brighter than magnitude 3.5. As shown below, the constellation is locasted about half way between Regulus and first-magnitude Pollux in Gemini. From Regulus, look about 15 degrees to the west to find α Cancri, a magnitude 4 star. Then continue west about another 1.5 degrees and you will arrive at M67.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

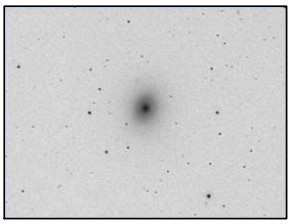
NGC 2775 (Caldwell 48), Galaxy in Cancer

NGC 2775 is a 10th magnitude spiral galaxy with a bright central bulge surrounded by a dimmer oval glow. High resolution images of this galaxy show that its spiral arms have a mottled texture--a very complex structure of alternating bright and dark patches--but it takes a large telescope to get glimpses of this mottling. The galaxy is estimated to be about 67 million light years away.



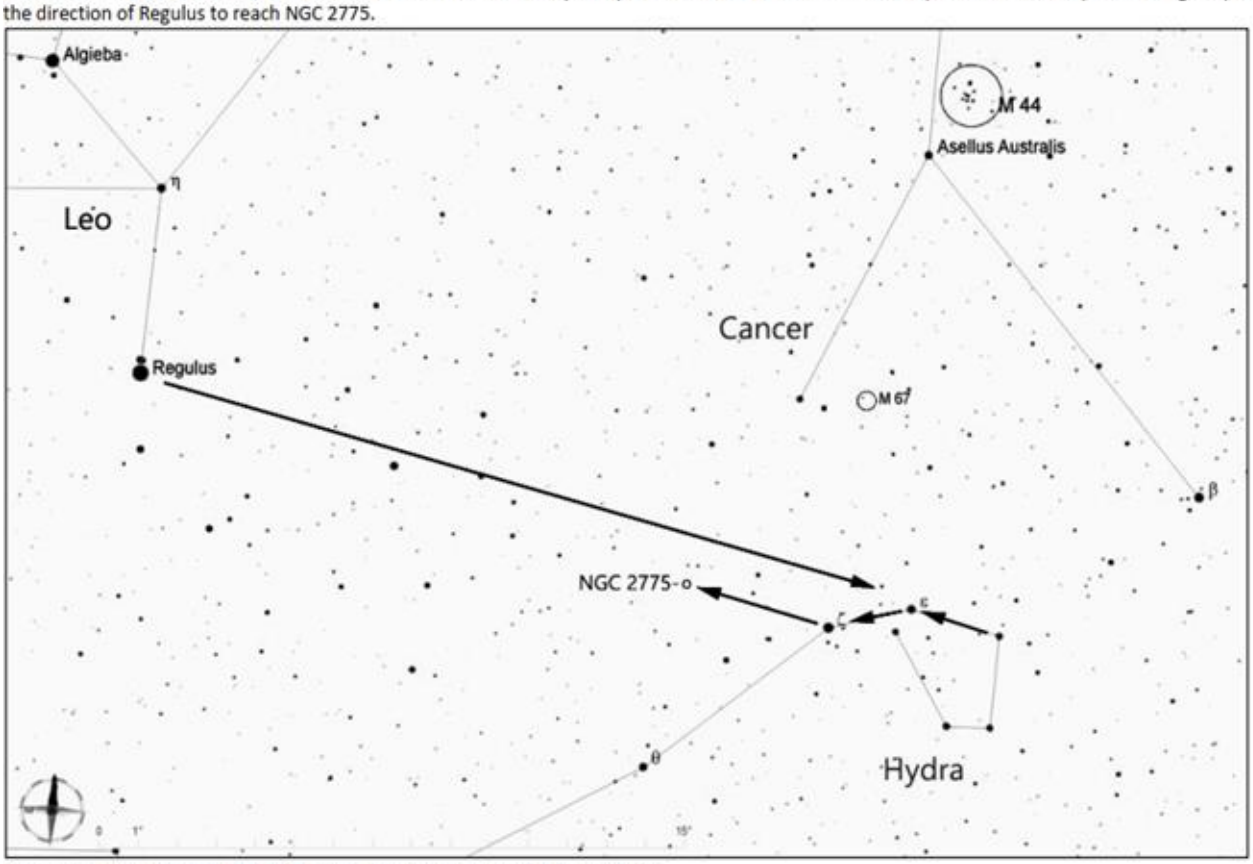
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



NGC 2775

From Regulus, look about 20 degrees to the west-southwest to find an irregular oval of dim stars that form the head of Hydra, the water snake. As shown in the chart below, find the crooked line of 3 stars at the top of Hydra's head and then look back an equivalent distance (about 4 degrees) in the direction of Regulus to reach NGC 2775.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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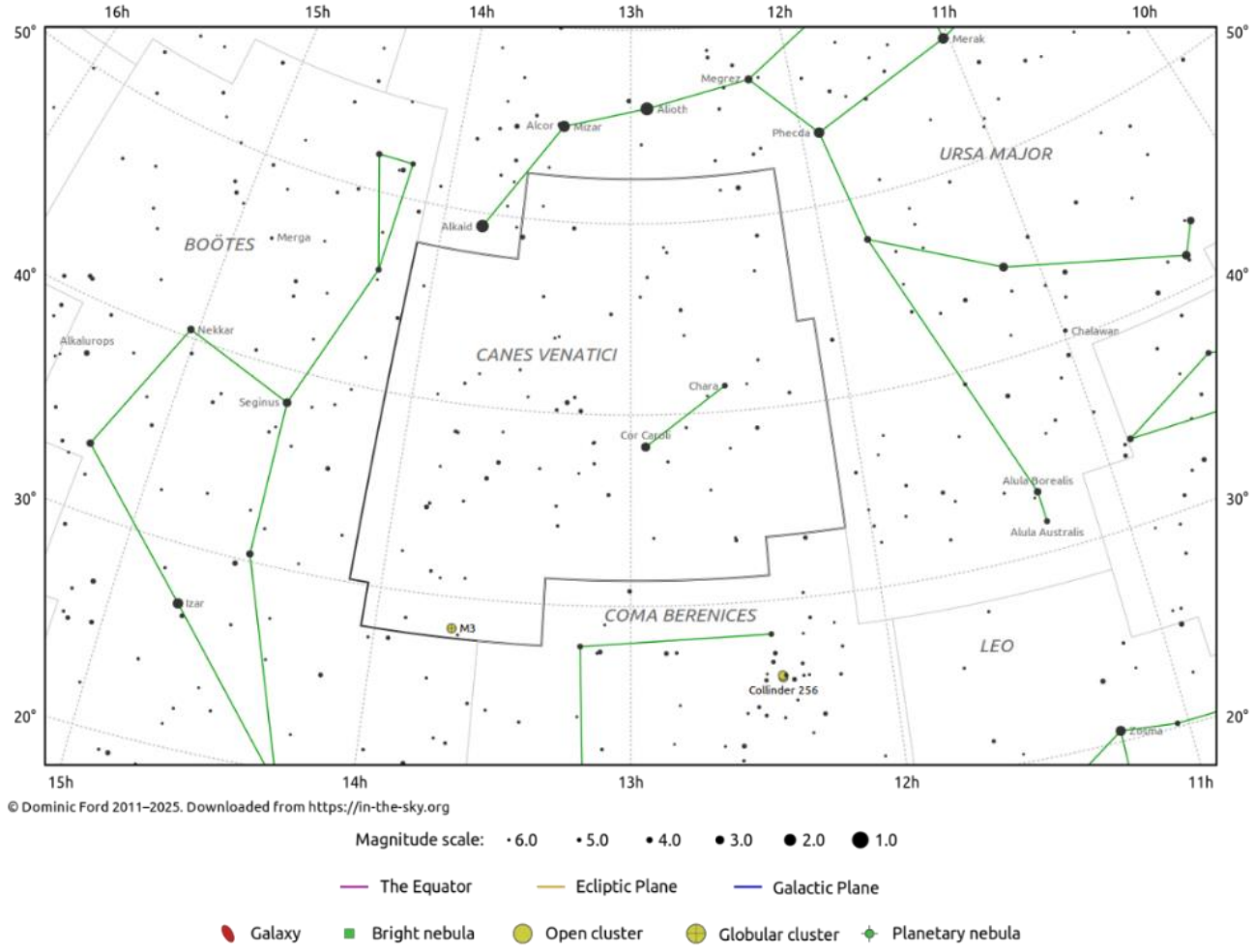
Canes Venatici (CVn)

Evening Visibility: **March – August**
Online Information: **Canes Venatici**
Charts: **10** Featured Objects: **16**
More Online Information: Cor Caroli, Y Canum Venaticorum, M-003, M-051, M-063, M-094, M-106, NGC-4449, NGC-4244, NGC-4631, NGC-4627, NGC-4656, NGC-5005, NGC-5033, NGC-4914, IC-4182

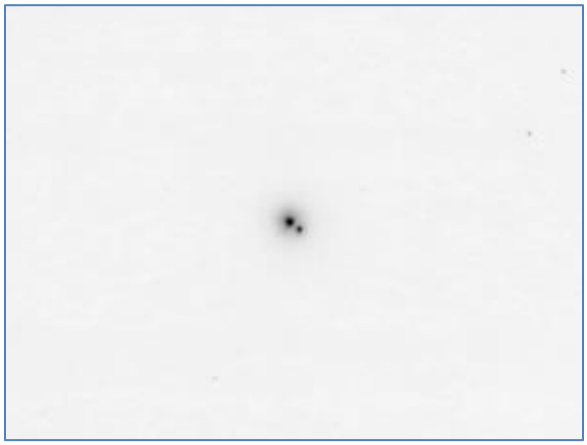
In-The-Sky.org Constellation Map



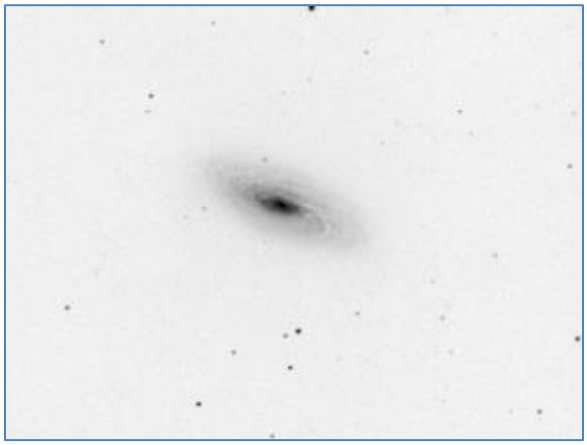
Object (Type)	Chart	Aliases	Stats
Cor Caroli (DS)	1, W1, SD	SAO-063256, HIP-63121, α CVn, 12 CVn, HR-4914, HD-112412, STF-1692	| Mag=2.9, 5.6 | Sep= 19.6" |

Object (Type)	Chart	Aliases	Stats
Y Canum Venaticorum (CS)	2, W2	SAO-044317, HIP-62223, La Superba, HR-4846, HD-110914, Y Canum Venaticorum	| Mag=4.9 – 7.3 | B-V Color Index=+2.5 |
M-003 (GC)	3, W3	NGC-5272	| Mag=6.4 | SB=21.7 | Size=18' |
M-051 (G)	4, W4	Whirlpool Galaxy, NGC-5194	| Mag=8.4 | SB=22.2 | Size=11.2' x 6.9' |
M-063 (G)	5, W5	Sunflower Galaxy, NGC-5055	| Mag=9.3 | SB=22.9 | Size=12.6' x 7.2' |
M-094 (G)	6, W6	Cat's Eye Galaxy, Crocodile Eye Galaxy, Croc's Eye Galaxy, NGC-4736	| Mag=8.2 | SB=22.8 | Size=11.2' x 9.1' |
M-106 (G)	7, W7	NGC-4258, PGC-39600	| Mag=8.4 | SB=22.9 | Size=18.6' x 7.2' |
NGC-4449 (G)	8, W8	C-21, PGC-40973	| Mag=10.0 | SB=21.6 | Size=6.2' x 4.4' |
NGC-4244 (G)	8, W8	C-26, Silver Needle Galaxy	| Mag=10.4 | SB=24.9 | Size=17.0' x 2.2' |
NGC-4631 (G)	9, W9	Whale Galaxy, C-32	| Mag=9.8 | SB=23.8 | Size=15.5' x 2.7' |
NGC-4627 (G)	9, W9	PGC-42620, UGC-7860	| Mag=13.1 | SB=23.1 | Size=2.6' x 1.8' | Just under Whale Galaxy
NGC-4656 (G)	9, W9	Hockey Stick Galaxy, Crowbar Galaxy	| Mag=11.0 | SB=24.7 | Size=12.9' |
NGC-5005 (G)	10, W10	C-29, PGC-45749	| Mag=10.6 | SB=22.1 | Size=5.8' x 2.8' |
NGC-5033 (G)	10, W10	PGC-45948	| Mag=10.7 | SB=23.8 | Size=10.7' x 5.0' |
NGC-4914 (G)	10, W10	PGC-44807, UGC-8125	| Mag=12.0 | SB=23.4 | Size=3.6' |
IC-4182 (G)	10, W10	PGC-45314, UGC-8188	| Mag=11.4 | SB=25.8 | Size=6.0' x 5.5' |

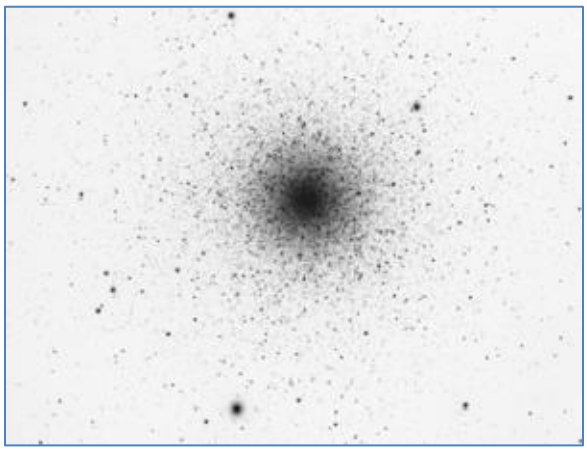
Image Gallery



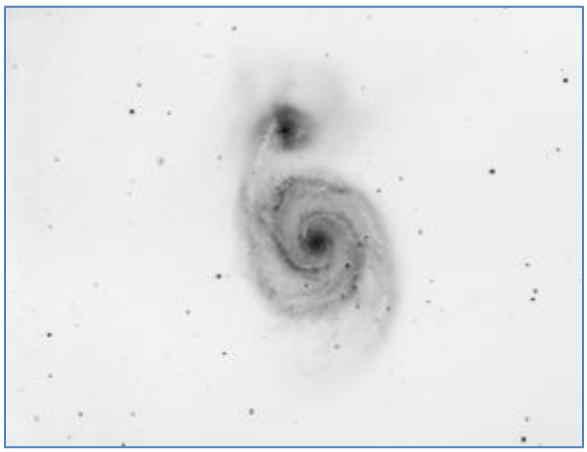
Cor Caroli



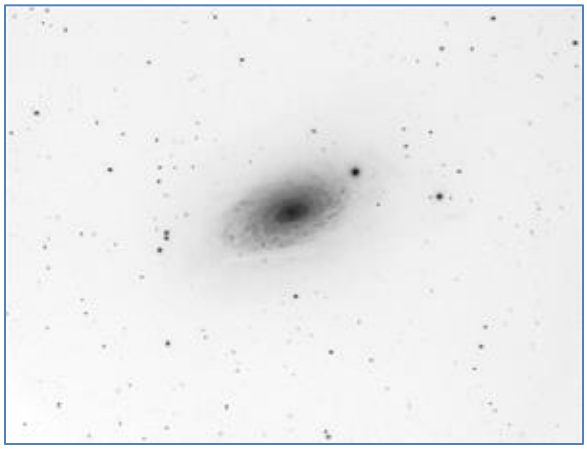
NGC 5005 (C 29)



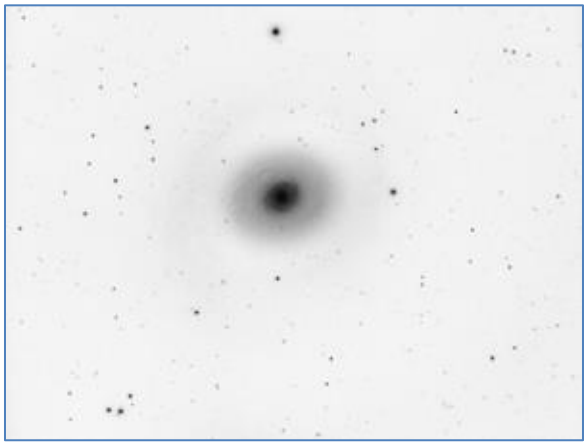
Messier 3



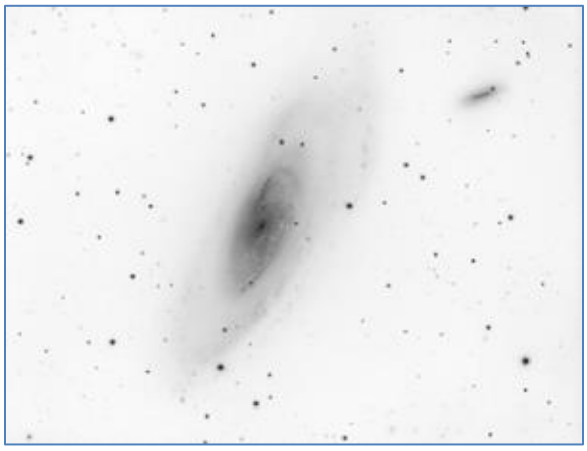
Messier 51, The Whirlpool Galaxy



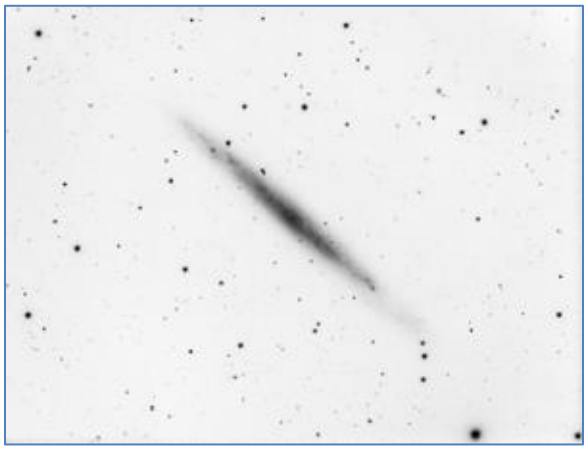
Messier 63, The Sunflower Galaxy



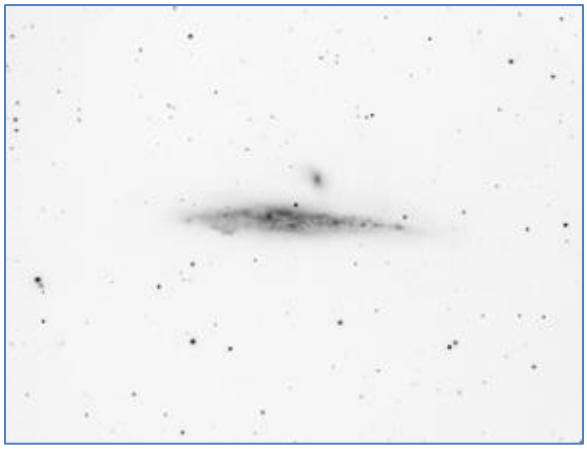
Messier 94



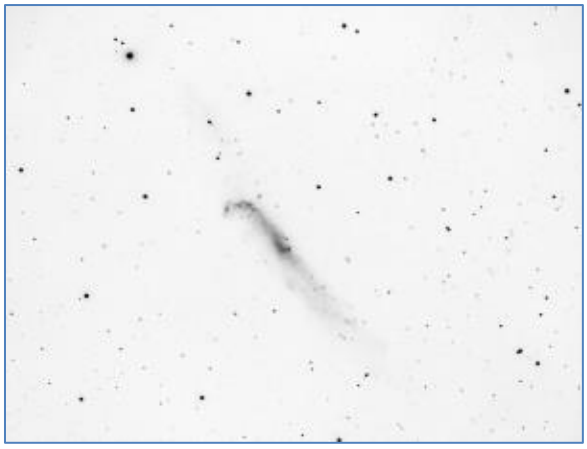
Messier 106 and NGC 4248



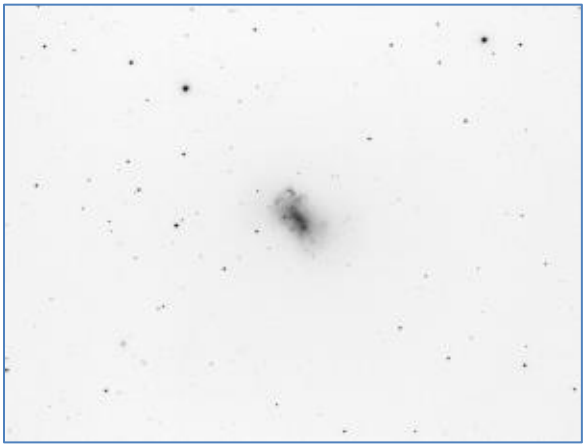
NGC 4244 (C 26) Silver Needle Galaxy



NGC 4631 (C 32) The Whale Galaxy



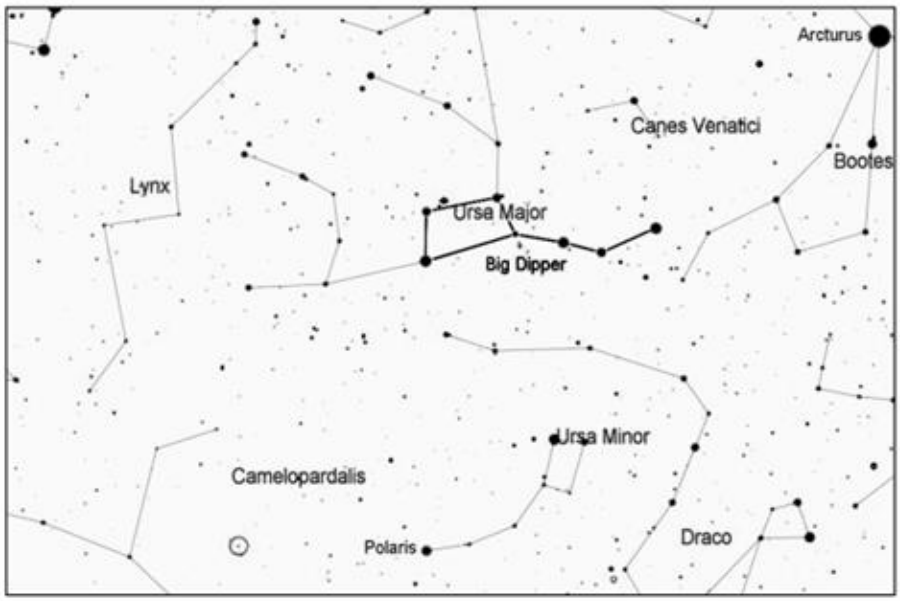
NGC 4565, The Hockey Stick



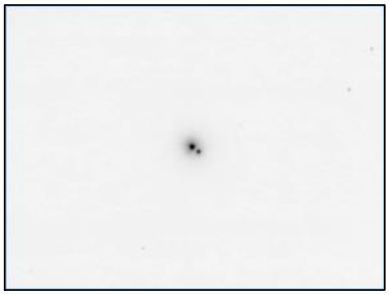
NGC 4449 (C 21)

Cor Caroli, Double Star in Canes Venatici

Cor Caroli is a wide double star, with a bright white primary star (magnitude 2.9) and a dimmer companion (magnitude 5.5). The brighter star is called a "magnetic star" because it has an intense magnetic field. It also varies slightly in brightness over a period of 5.5 days. The distance between these two stars is about 680 astronomical units, and they are about 115 light years away.

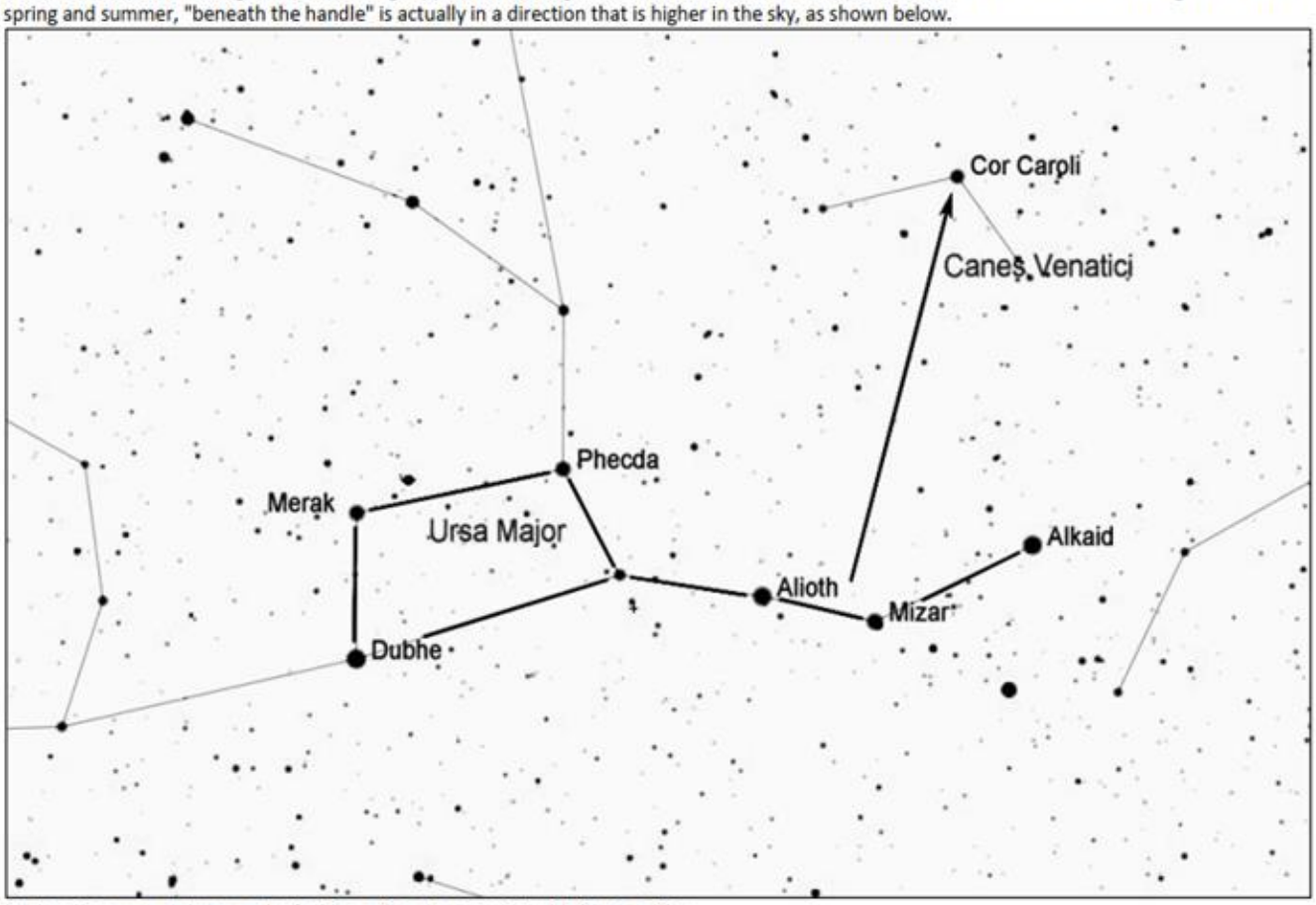


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



Cor Caroli

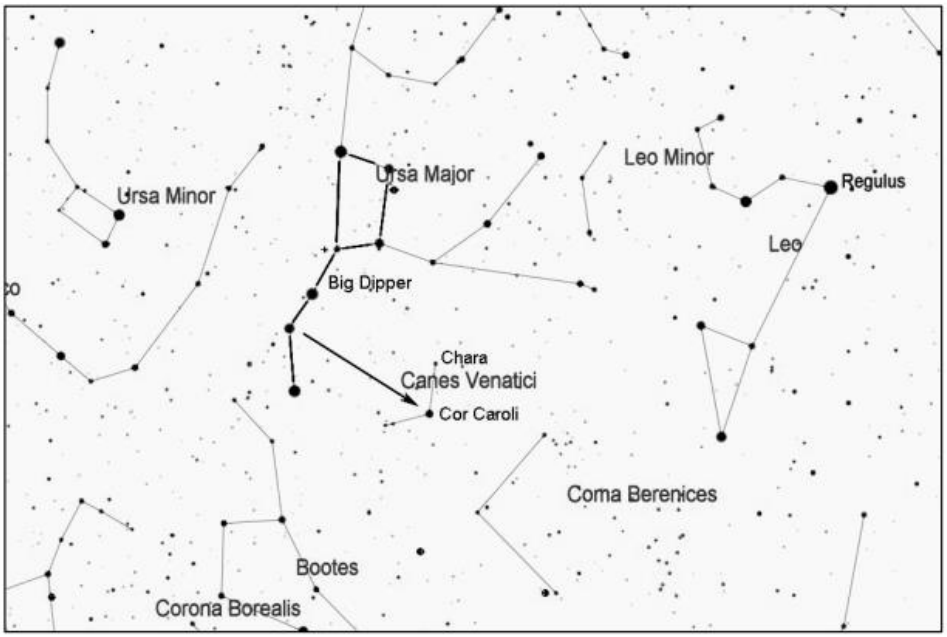
Look "beneath" the curving handle of the Big Dipper, for the brightest star in that area of the sky, which is Cor Caroli. Note that during much of the spring and summer, "beneath the handle" is actually in a direction that is higher in the sky, as shown below.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

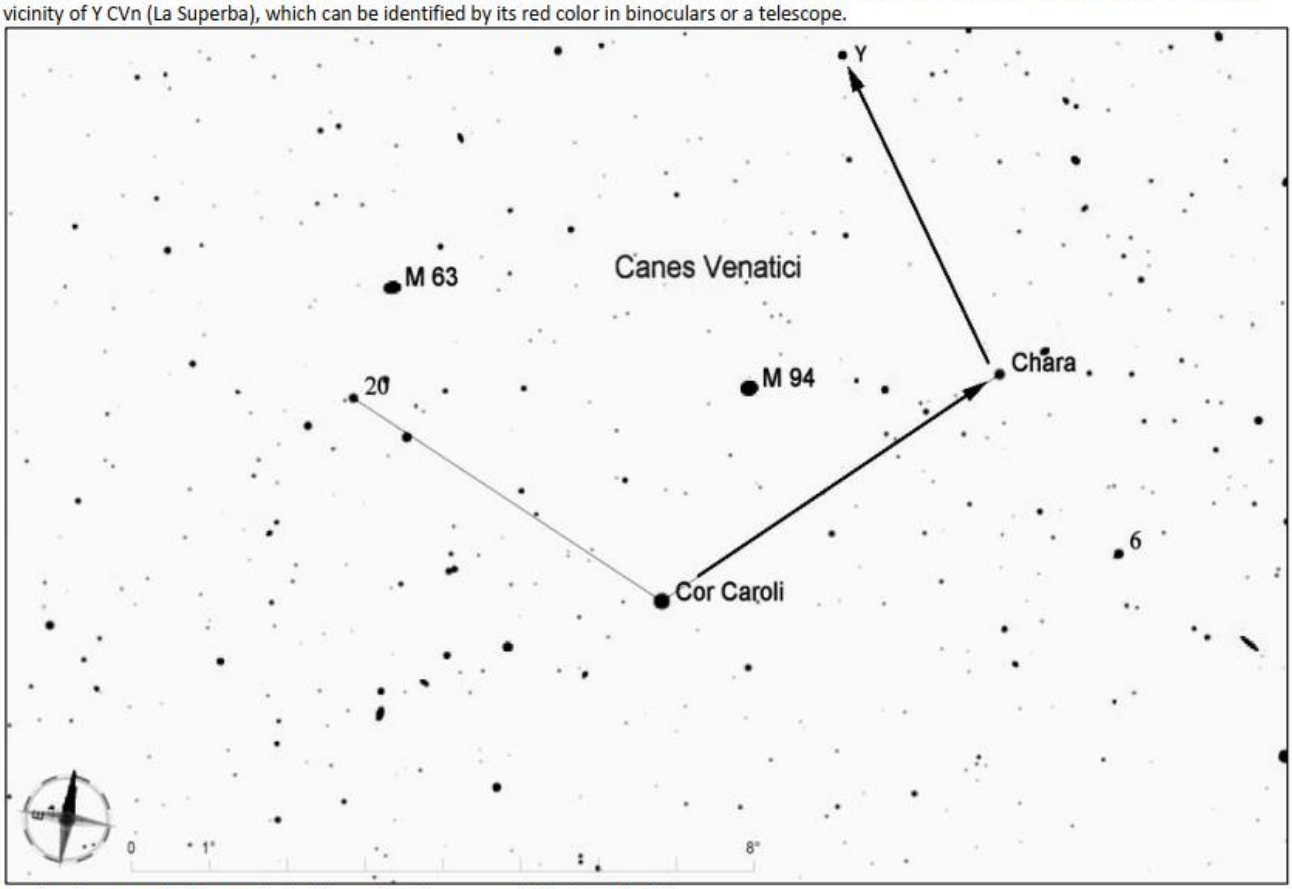
Y Canum Venaticorum (La Superba)

Y Canum Venaticorum is a carbon star, a red giant star that has abundant carbon in its atmosphere, which produces its red color. Carbon stars appear redder than any other stars. Y CVn was named La Superba by the Jesuit astronomer Angelo Secchi, and that name is now officially recognized by the International Astronomical Union. It varies in brightness between about magnitude 4.8 to 6.4 over a period of about 5 months.



Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here on its side as it appears on early spring evenings. For other seasons and times of night rotate the chart as needed to match what you see in the northern sky. Then look "underneath" the curved handle of the Big Dipper for Cor Caroli, the brightest star in the small constellation Canes Venatici at magnitude 2.8.

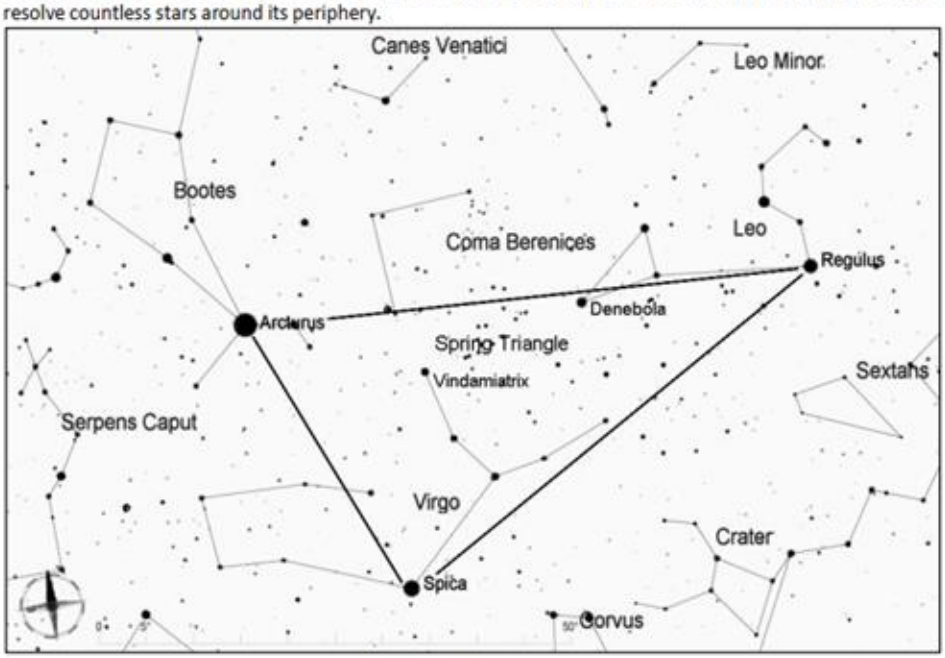
Visualize a line from Cor Caroli to Chara (magnitude 4), and another line of equal length at nearly a right angle to the left. This will take you to the vicinity of Y CVn (La Superba), which can be identified by its red color in binoculars or a telescope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

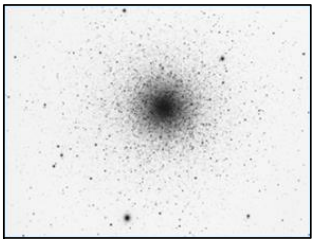
Messier 3, Globular Cluster in Canes Venatici

At magnitude 6.3, Messier 3 is one of the brightest globular clusters in the sky, and one of the most impressive to observe with an amateur telescope. It is about 33,000 light years away and contains about half a million stars. It has a very dense center. Medium to large telescopes will resolve countless stars around its periphery.



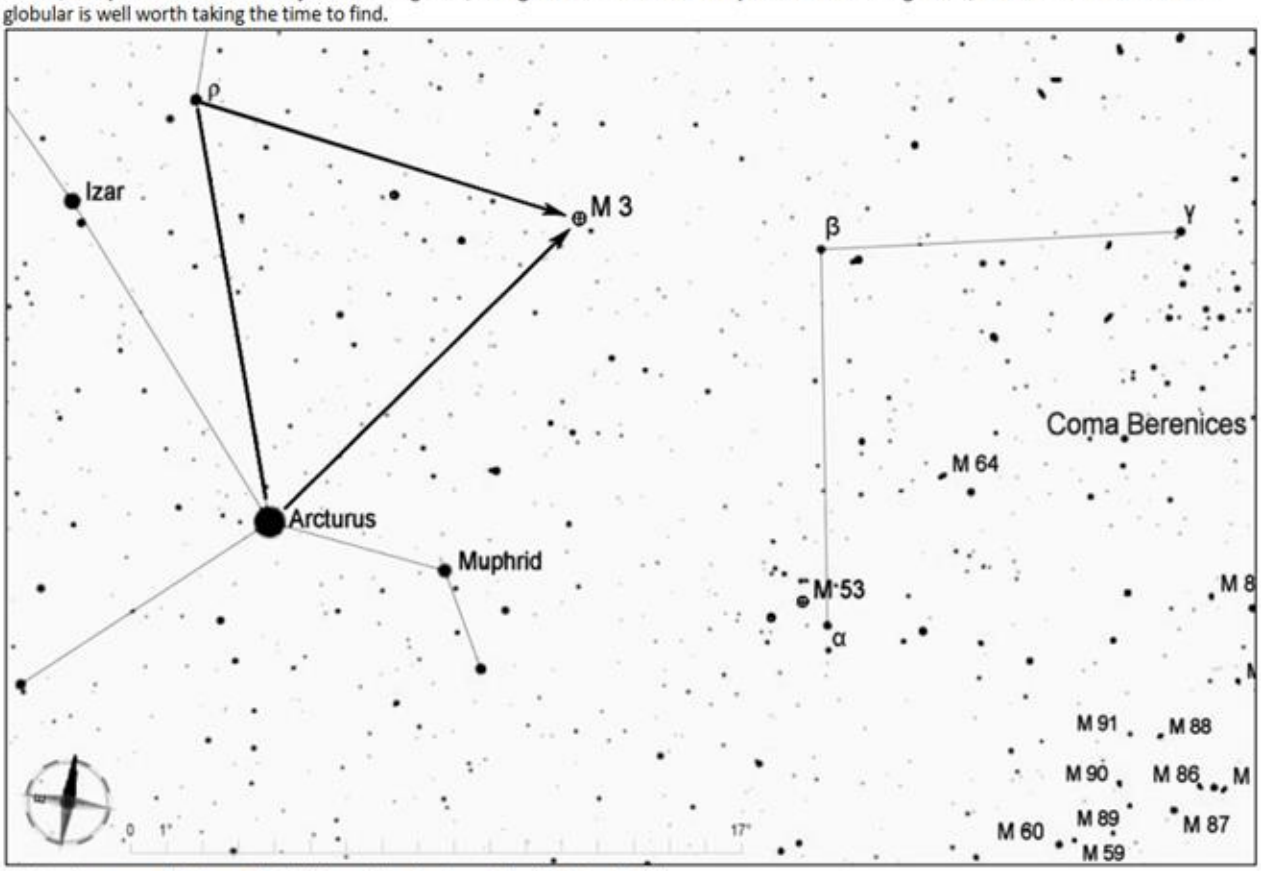
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin from brilliant Arcturus (magnitude 0).



M 3

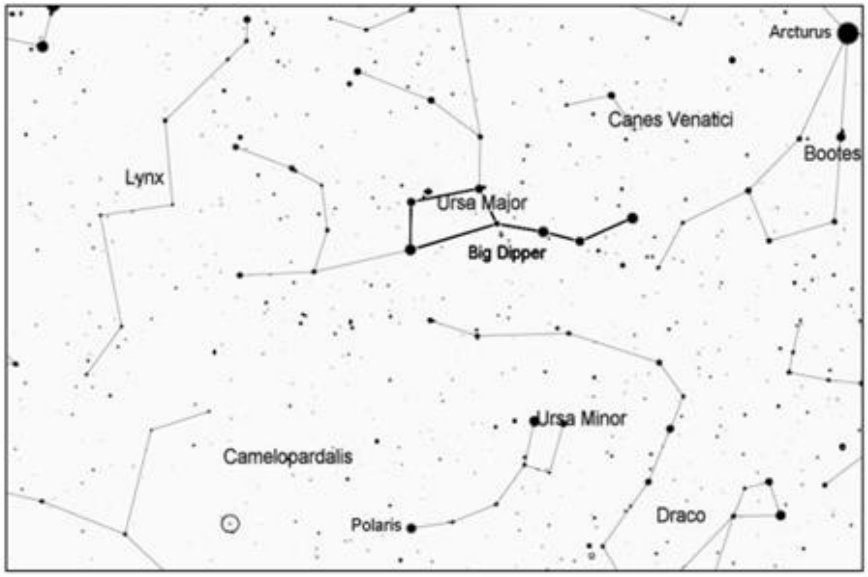
M3 can be tricky to locate by star-hopping because there are no bright stars nearby. One way to find it, as shown in the chart below, is to visualize an equilateral triangle with Arcturus, ρ (rho) Bootes, and M3 as the three corners. Point your binoculars or finderscope in the direction of this third corner, and you should see two objects close together, a magnitude 6 star and a "fuzzy star" of similar brightness, which is M3. This beautiful globular is well worth taking the time to find.



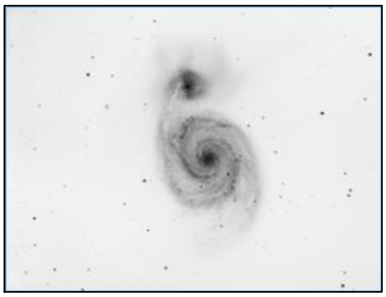
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 51, the Whirlpool Galaxy

The Whirlpool Galaxy is one of the brightest examples of a face-on spiral galaxy visible in our skies. It is about 23 million light years away. The irregular companion galaxy that appears to be connected to one of the spiral arms is NGC 5195. The companion is actually slightly farther away. The two bright nuclei of these galaxies can be seen in small telescopes, and larger scopes will show nice detail in the Whirlpool's spiral arms.

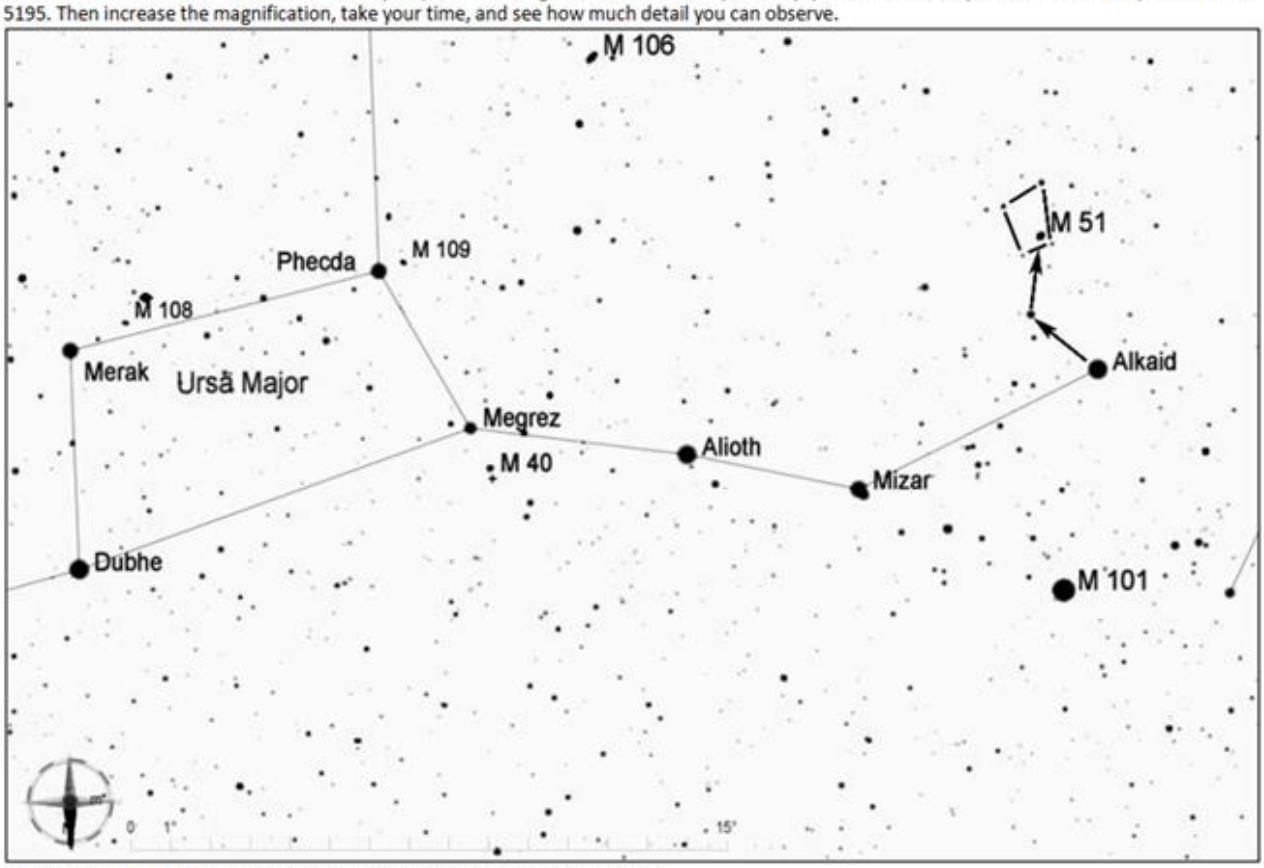


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



M 51

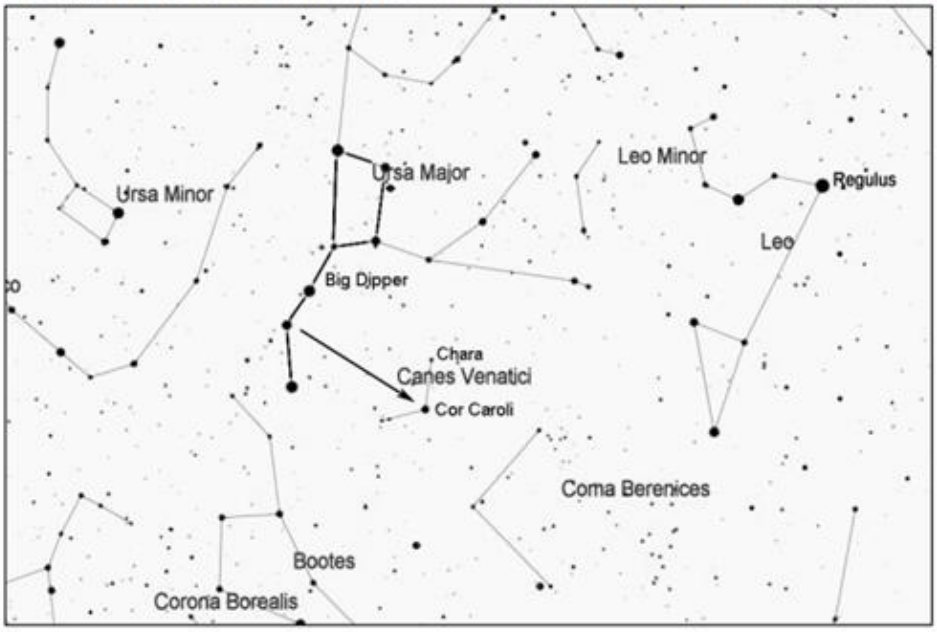
Note that north is to the bottom in this chart. Find Alkaid, the star at the end of the Big Dipper's handle. Using binoculars or a finderscope, look 2 degrees to the southeast (below the curve of the Dipper's handle) and you will see a star of magnitude 4.6, the brightest star in the vicinity. Then go another 2 degrees to the south, and you will be at the location of M51. Note in the chart below that M51 is located inside a keystone-shaped asterism of 4 dim stars. I find these stars very helpful in locating M51. Look in a low-power eyepiece for two fuzzy nuclei of the Whirlpool and NGC 5195. Then increase the magnification, take your time, and see how much detail you can observe.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 63, the Sunflower Galaxy

M63 is a bright galaxy, magnitude 8.6, and its diffuse oblong shape and stellar nucleus can be seen in even small telescopes. The many bright knots in its arms, surrounding a small and bright nucleus, give the Sunflower Galaxy its name. These tiny knots are difficult to see visually through a telescope, but the galaxy has a mottled appearance in large scopes. It is about 27 million light years away.



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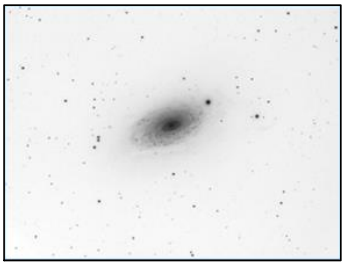
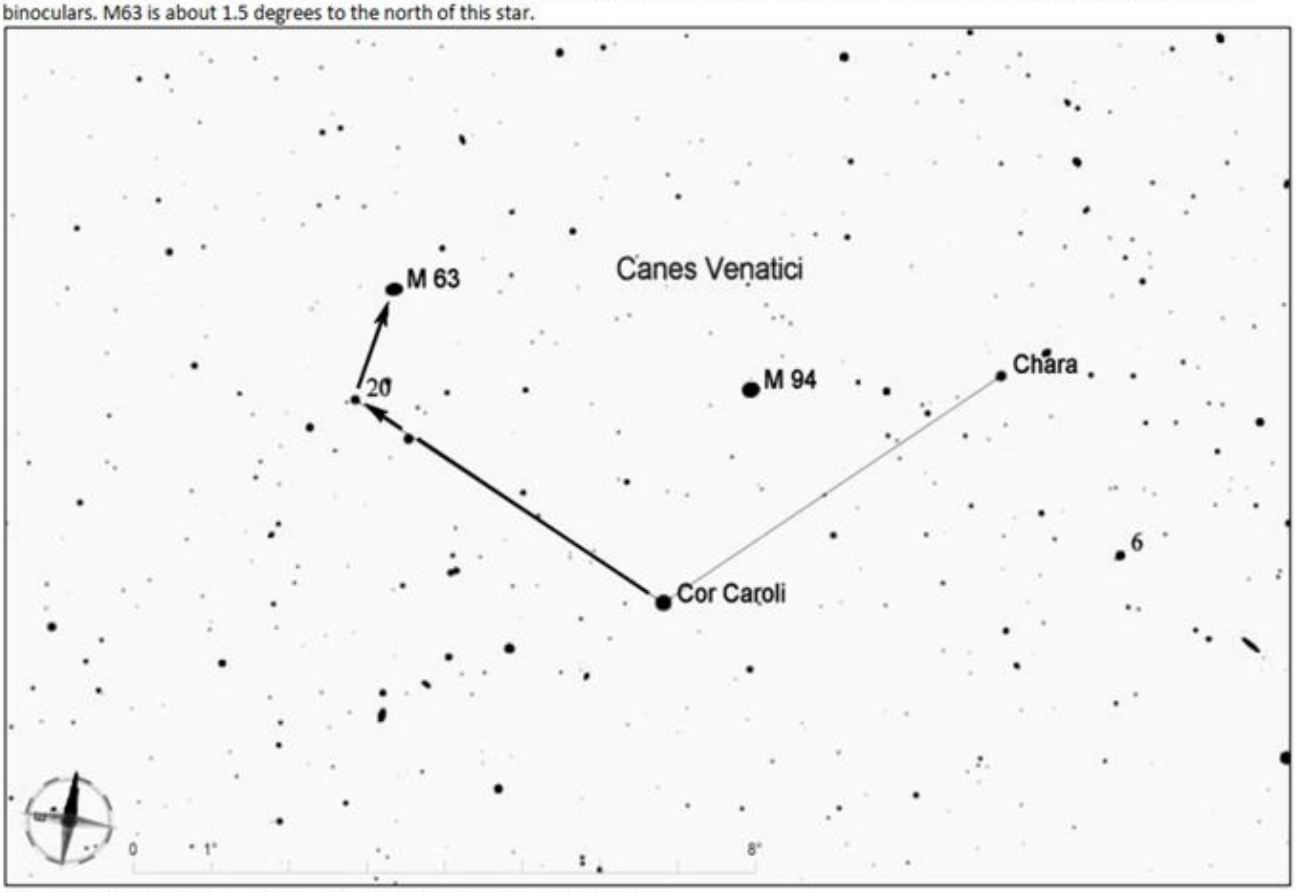


M 63

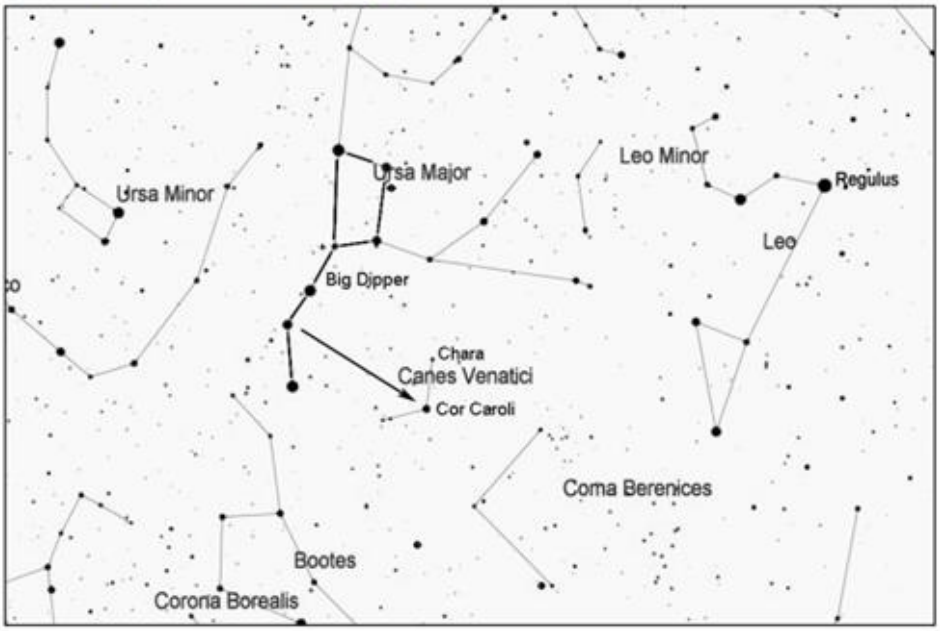
From Cor Corolli, move 5 degrees to the northeast to find the star 20 Canes Venatici (magnitude 4.7) which will be easy to see in a finderscope or binoculars. M63 is about 1.5 degrees to the north of this star.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cortes du Ciel*.

Messier 94, Galaxy in Canes Venatici

M94 is a fine target for any telescope. The central region of this spiral galaxy is very bright, making it easy to find in even a small telescope. The bright central region is surrounded by tightly wound arms, and some of the spiral detail can be seen through the eyepiece of a large scope. The galaxy is relatively close, about 16 million light years away.



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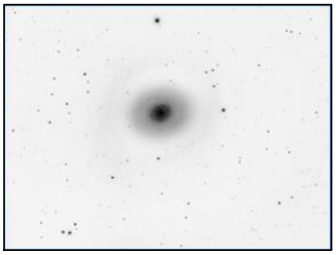
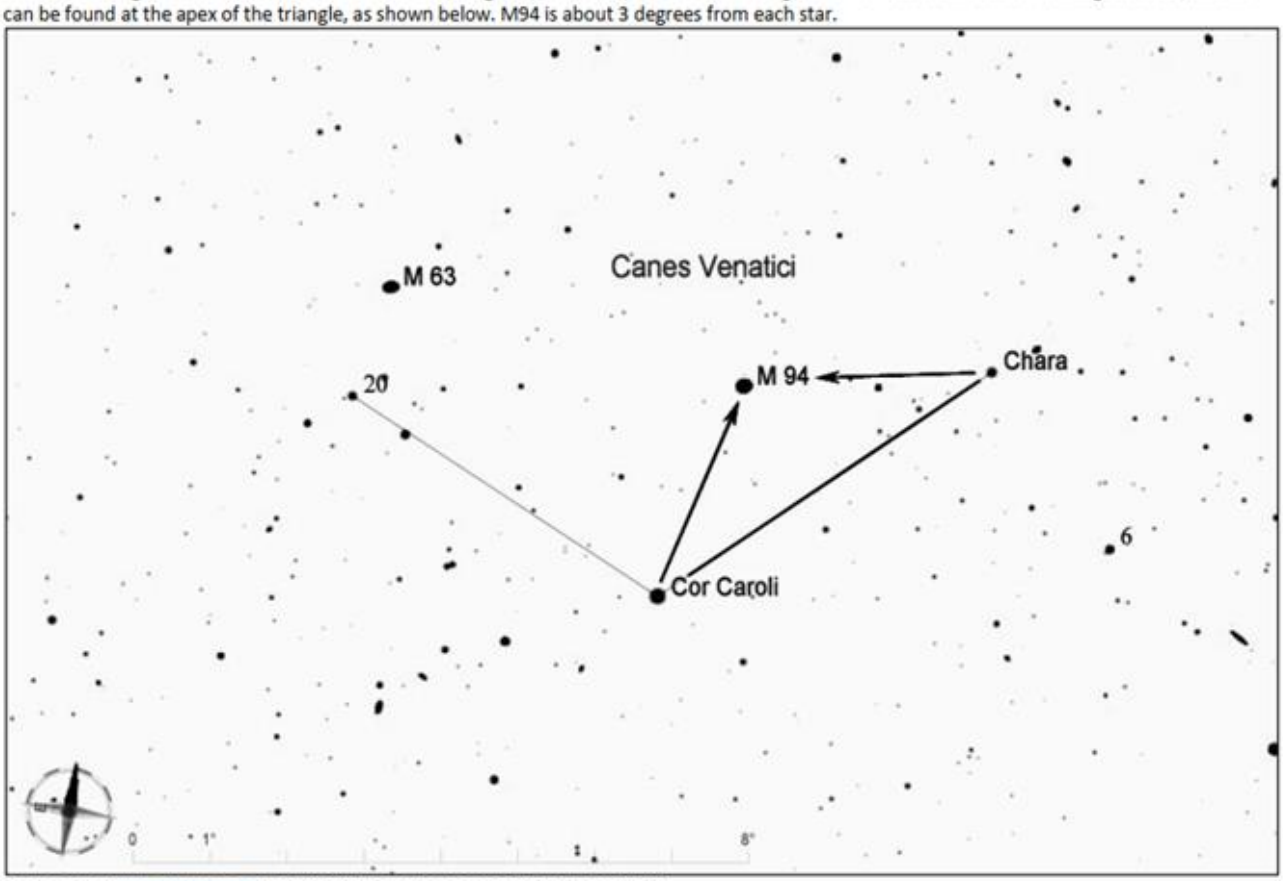


M 94

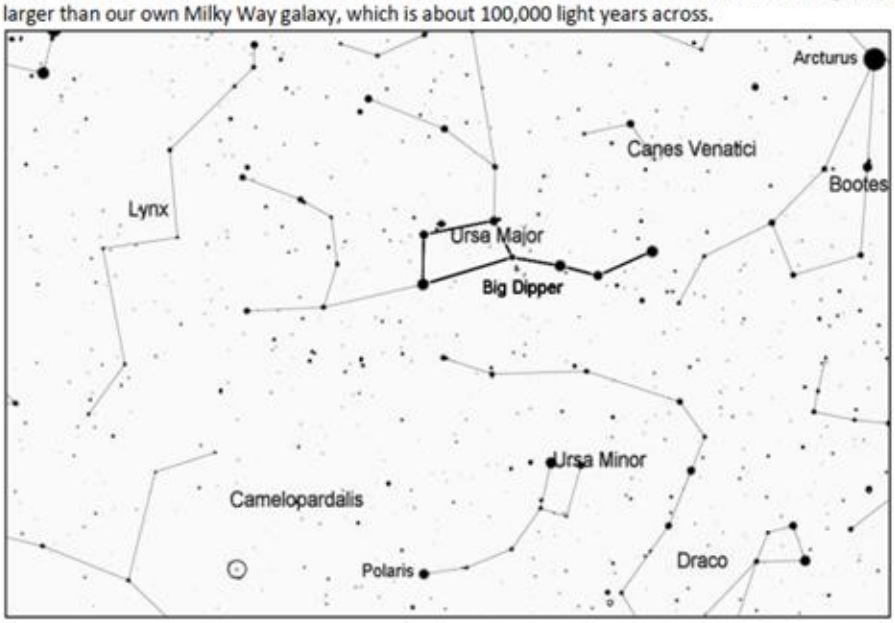
The second-brightest star in Canes Venatici is Chara, magnitude 4. Visualize a shallow triangle with Cor Caroli and Chara forming the base, and M94 can be found at the apex of the triangle, as shown below. M94 is about 3 degrees from each star.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 106, Galaxy in Canes Venatici

This bright spiral galaxy is about 25 million light years away. At magnitude 8.4, its oblong shape can be seen in just about any telescope, and large scopes will reveal some of the structure of its spiral arms and dust lanes. The diameter of this galaxy is about 125,000 light years, which makes it larger than our own Milky Way galaxy, which is about 100,000 light years across.



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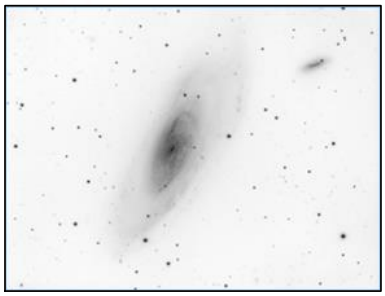
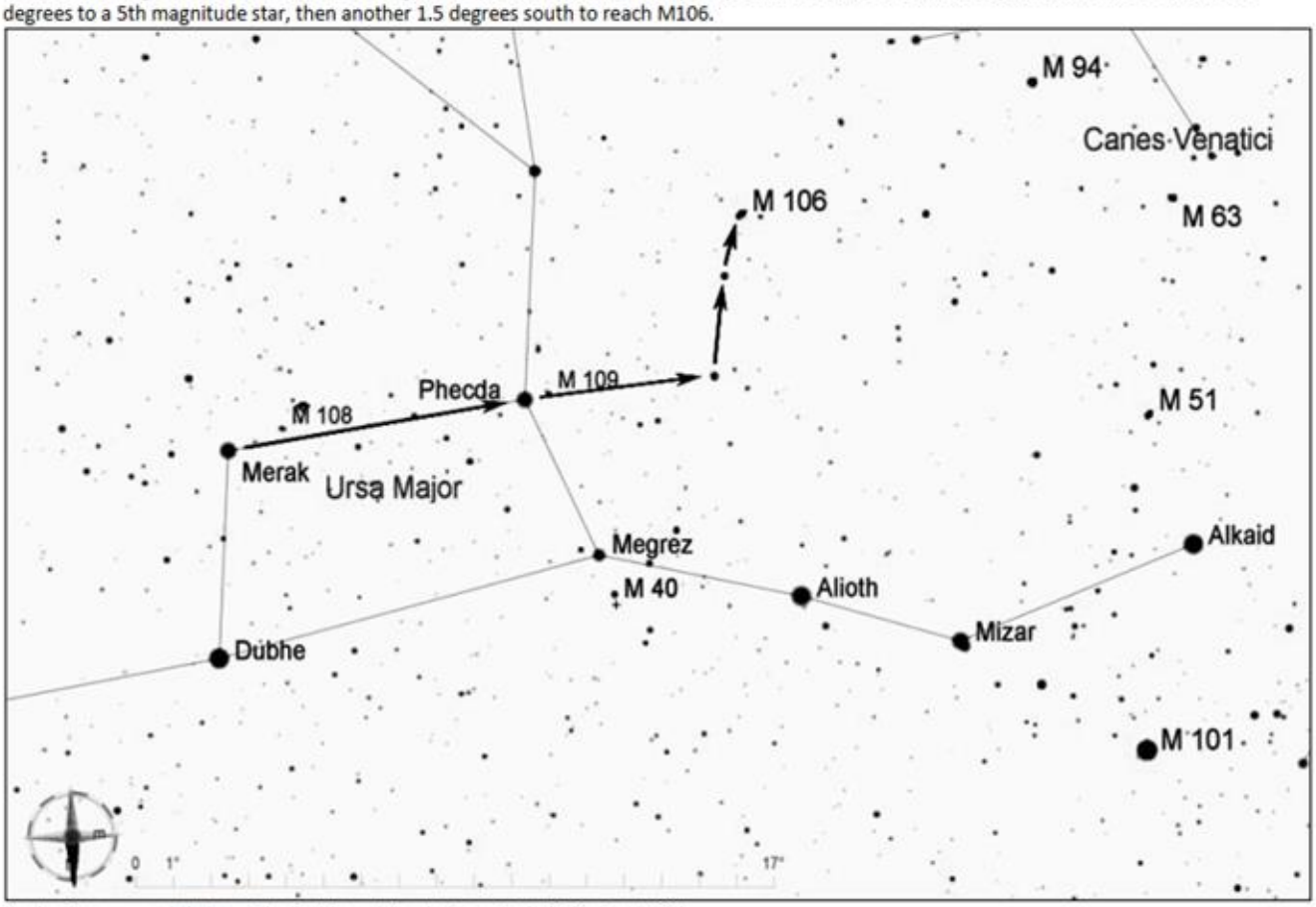


M 106

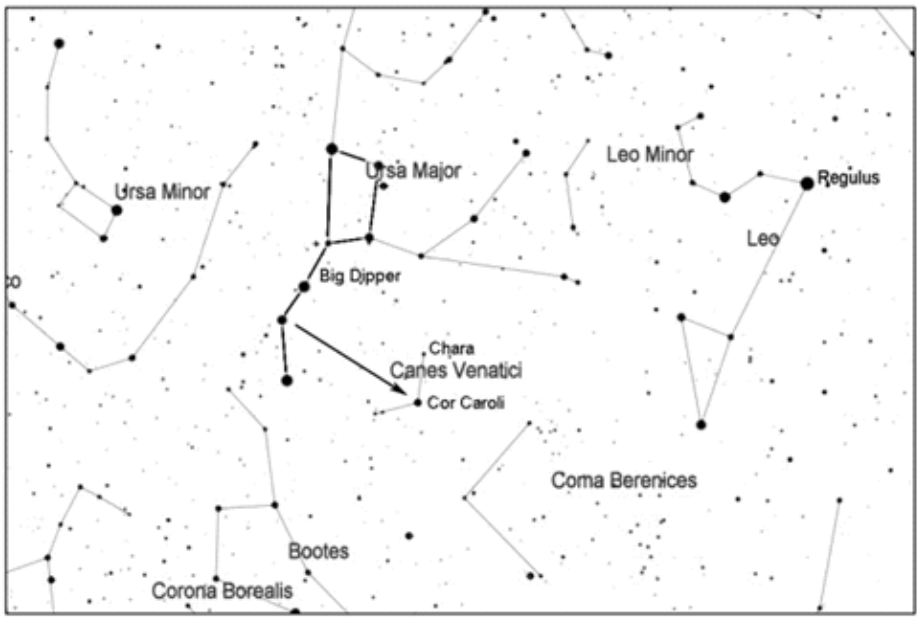
Note that north is to the bottom in this chart. Using the two stars on the bottom edge of the Big Dipper's bowl to guide you in the correct direction, look about 5 degrees east of Phecda for a magnitude 4.8 star that will be easy to spot in binoculars or a finderscope. Then move south about 3 degrees to a 5th magnitude star, then another 1.5 degrees south to reach M106.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 4449 (Caldwell 21) and NGC 4244 (Caldwell 26), the Silver Needle Galaxy

NGC 4449 is an irregular galaxy and NGC 4244 (known as the Silver Needle Galaxy) is a very pointy edge-on spiral galaxy. Both are about 14 million light years away. At magnitudes 9 and 10, respectively, they can be seen in even small telescopes under dark skies. Their differences in size and shape are worth examining. These relatively nearby galaxies are members of the Canes Venatici I galaxy cluster, which also includes nearby M94.



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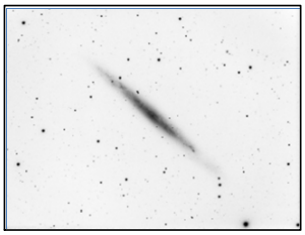
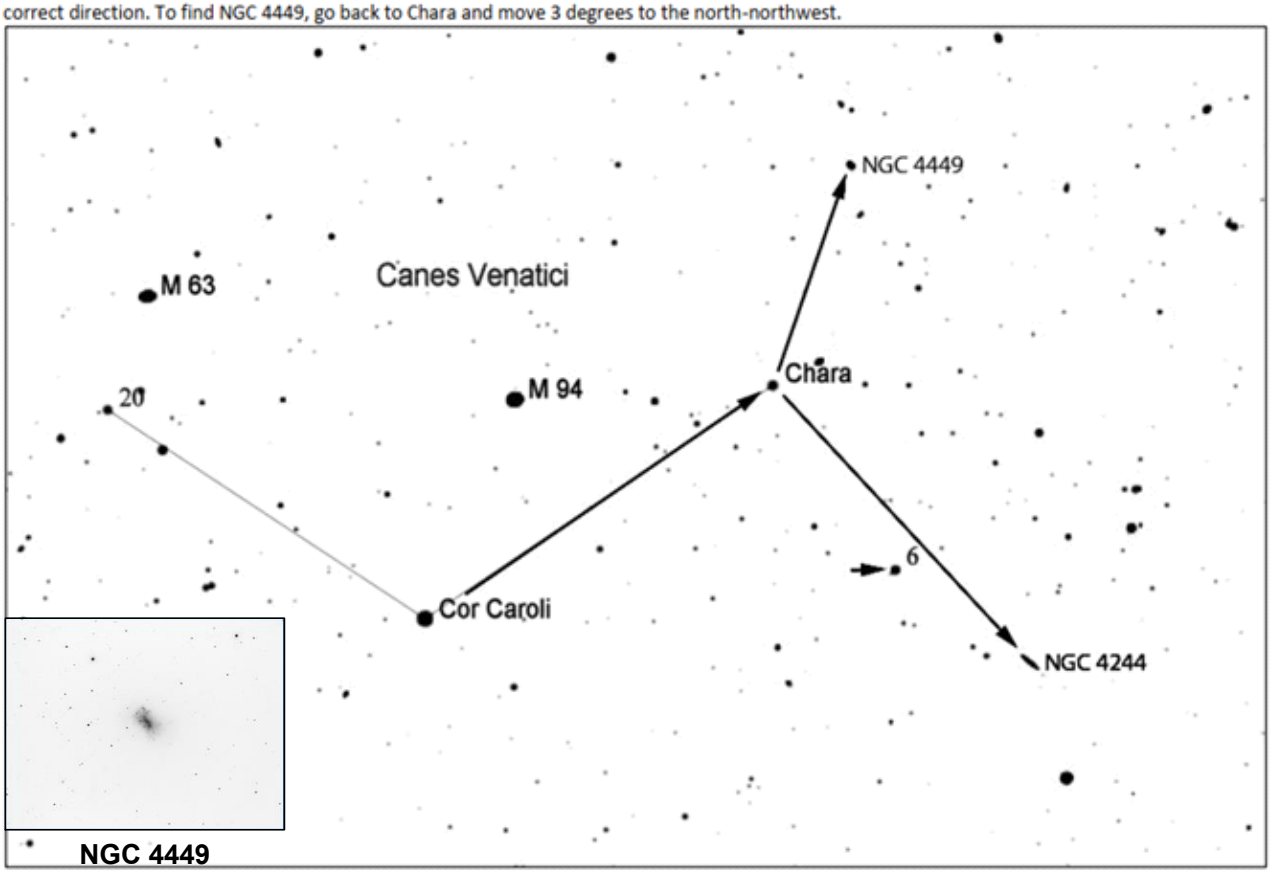


NGC 4244

From Cor Caroli, look 5 degrees to the northwest to find Chara (magnitude 4.2). Then take a right turn and go another 5 degrees to the southwest to reach the location of the Silver Needle Galaxy. About halfway there is the 5th magnitude star 6 Canes Venatici, which can help guide you in the correct direction. To find NGC 4449, go back to Chara and move 3 degrees to the north-northwest.

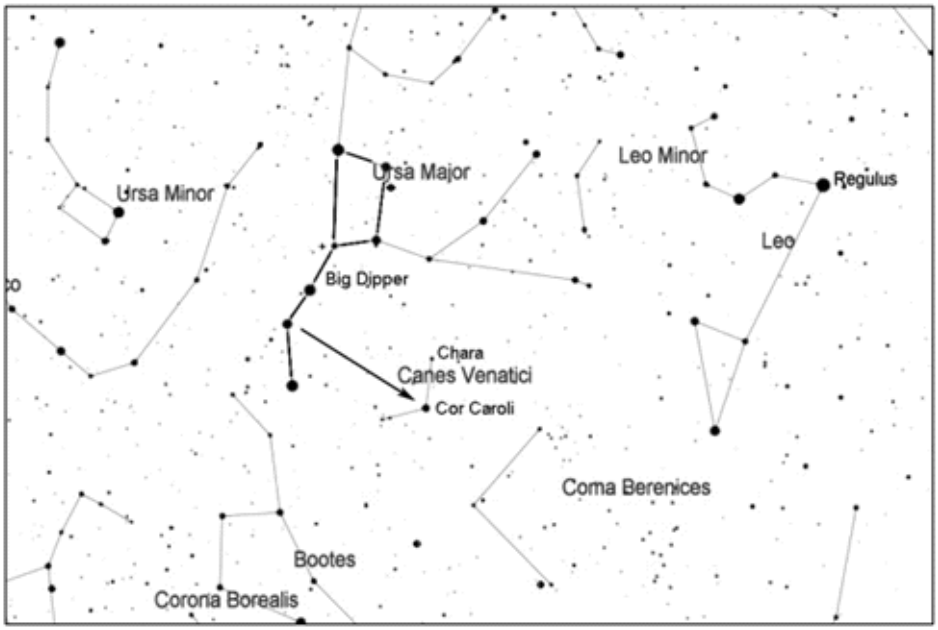


NGC 4449

Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 4631 (Caldwell 32, Whale Galaxy) and NGC 4656 (Hockey Stick Galaxy)

These are two large and fairly bright galaxies in Canes Venatici. Both have distinctive shapes. NGC 4631 is called the Whale Galaxy or Herring Galaxy because its edge-on shape resembles the profile of a sea creature. Just to its north is a dimmer companion galaxy, NGC 4627. NGC 4656 is an edge-on galaxy with a hook at one end that led to its nickname, the Hockey Stick. These galaxies are estimated to be about 25 million light years away.



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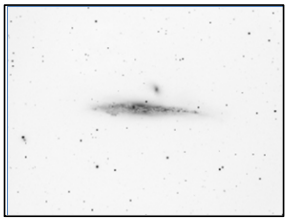
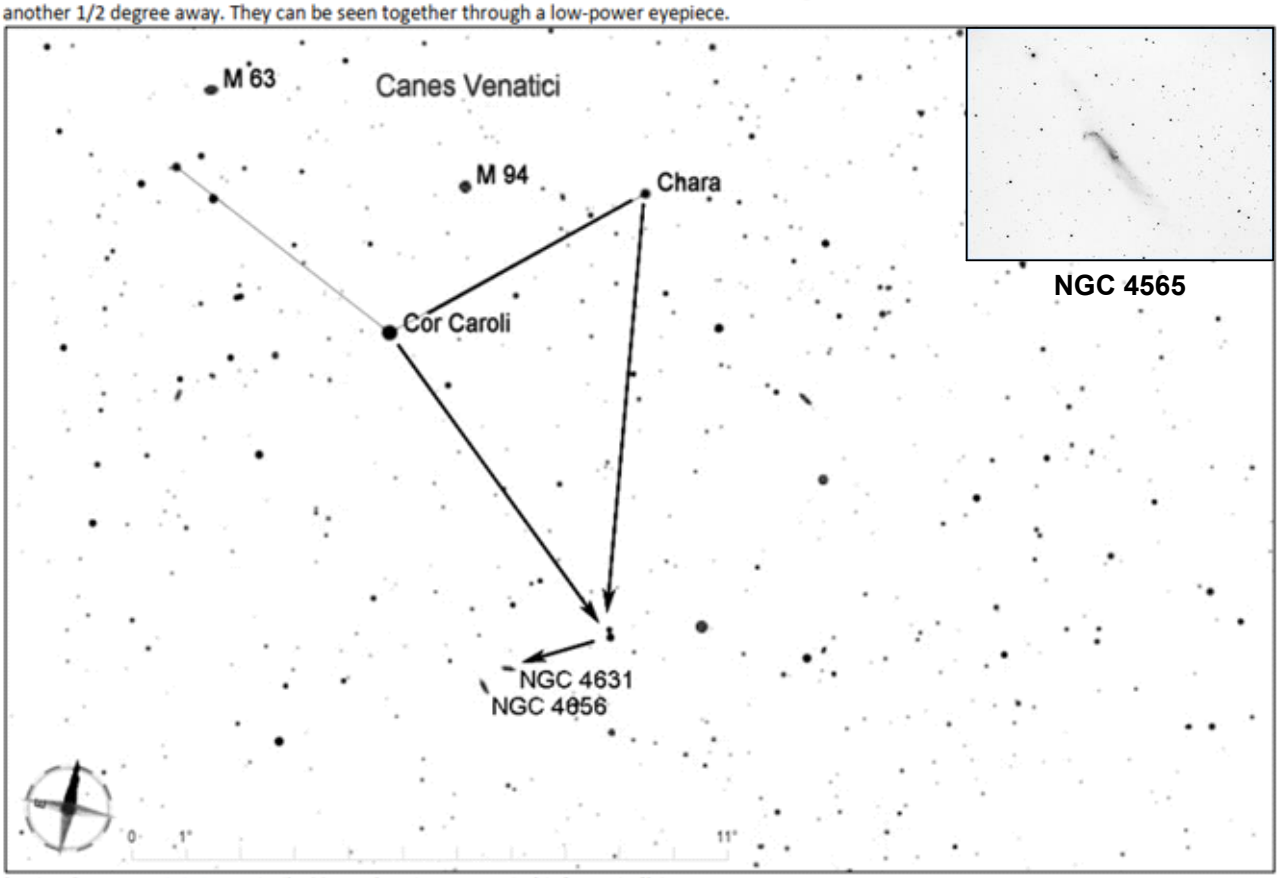


NGC 4631

The second-brightest star in Canes Venatici is Chara, magnitude 4. Visualize a right triangle pointing to the south with Cor Caroli and Chara forming the shorter edge, as shown in the chart below. At the third point of this triangle, about 7 degrees southwest of Cor Caroli, is a 5th magnitude double star that is easy to spot in a finder or a wide-field eyepiece. NGC 4631 is about two degrees southeast of this double star, and NGC 4656 is another 1/2 degree away. They can be seen together through a low-power eyepiece.

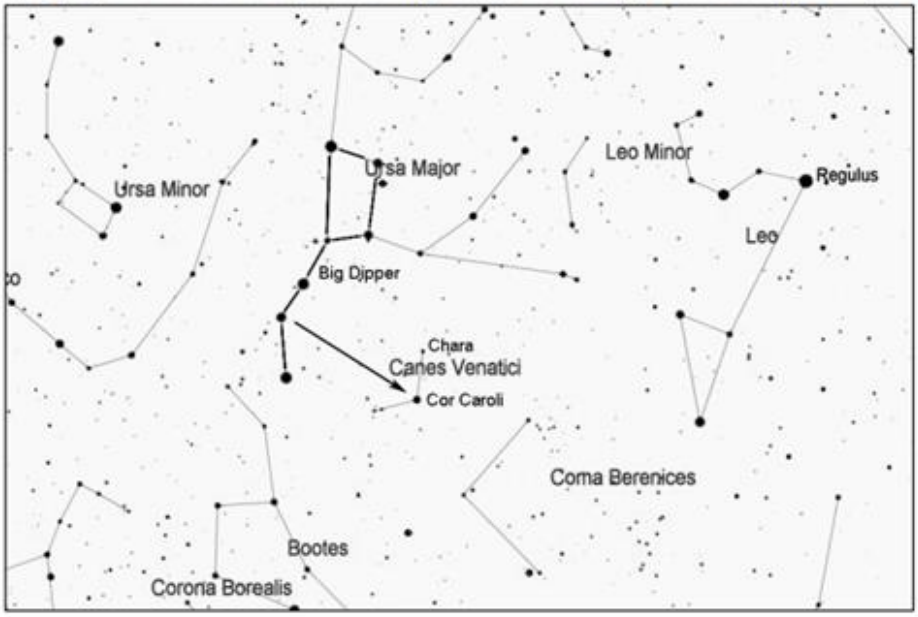


NGC 4565

Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 5005 (Caldwell 29), NGC 5033, NGC 4914, and IC 4182, Galaxies in Canes Venatici

NGC 5005 is a spiral galaxy with an oblong shape as seen from our perspective. At magnitude 9.7, it is bright enough to be seen in a small telescope. Through the eyepiece it has a bright central region surrounded by the fainter glow of its spiral arms. Just 1/2 degree away is NGC 5033, a spiral galaxy of similar size and brightness. For large scopes, a few fainter galaxies are nearby, including IC 4182 and NGC 4914.



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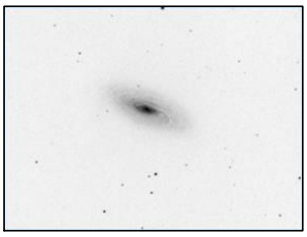
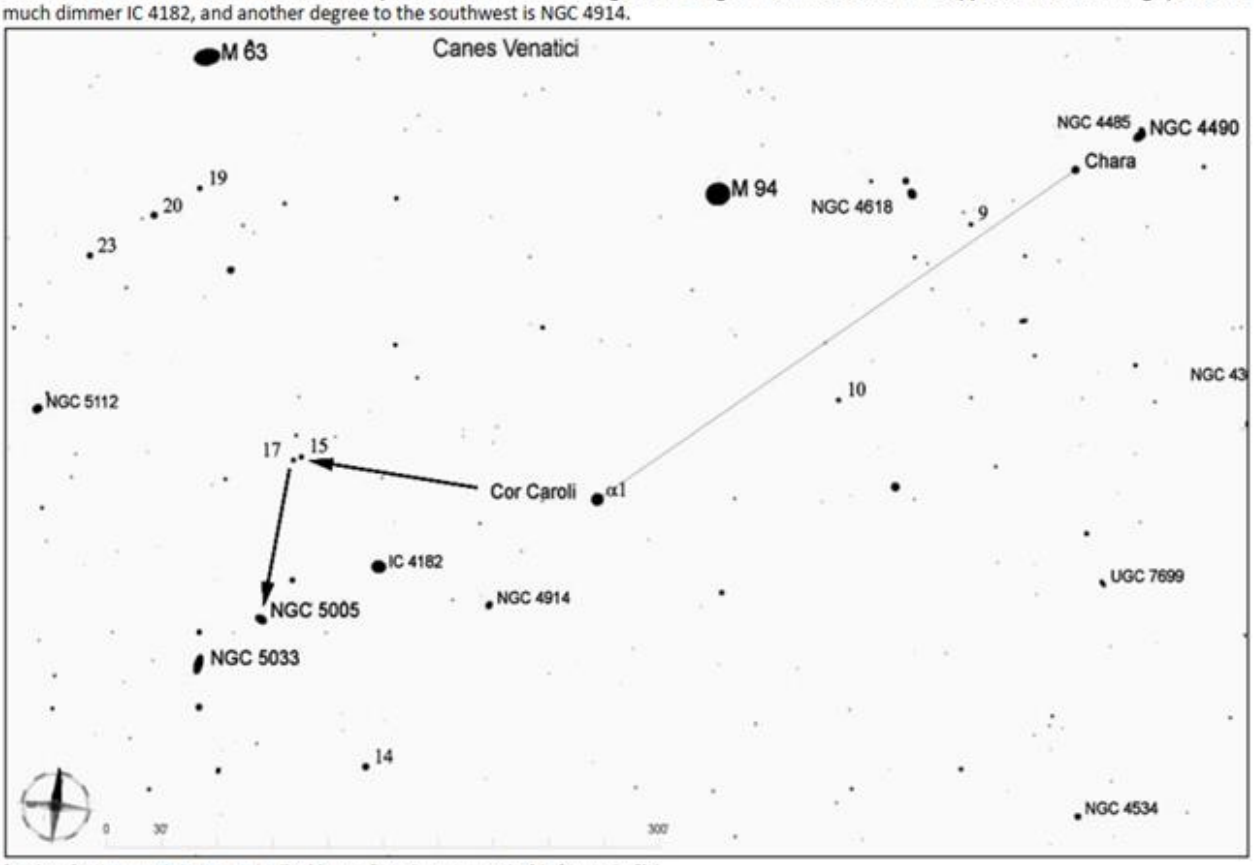


NGC 5005

From Cor Caroli, look 2.7 degrees to the west to find a close pair of stars, 15 and 17 Canes Venatici, which will be visible in a finderscope or binoculars. Once these are centered in your telescope eyepiece, move 1.5 degrees south to reach NGC 5005. NGC 5033 is 1/2 degree to the southwest and can be seen in the same low-power field of view. Looking about 1 degree from NGC 5005 in the opposite direction brings you to the much dimmer IC 4182, and another degree to the southwest is NGC 4914.

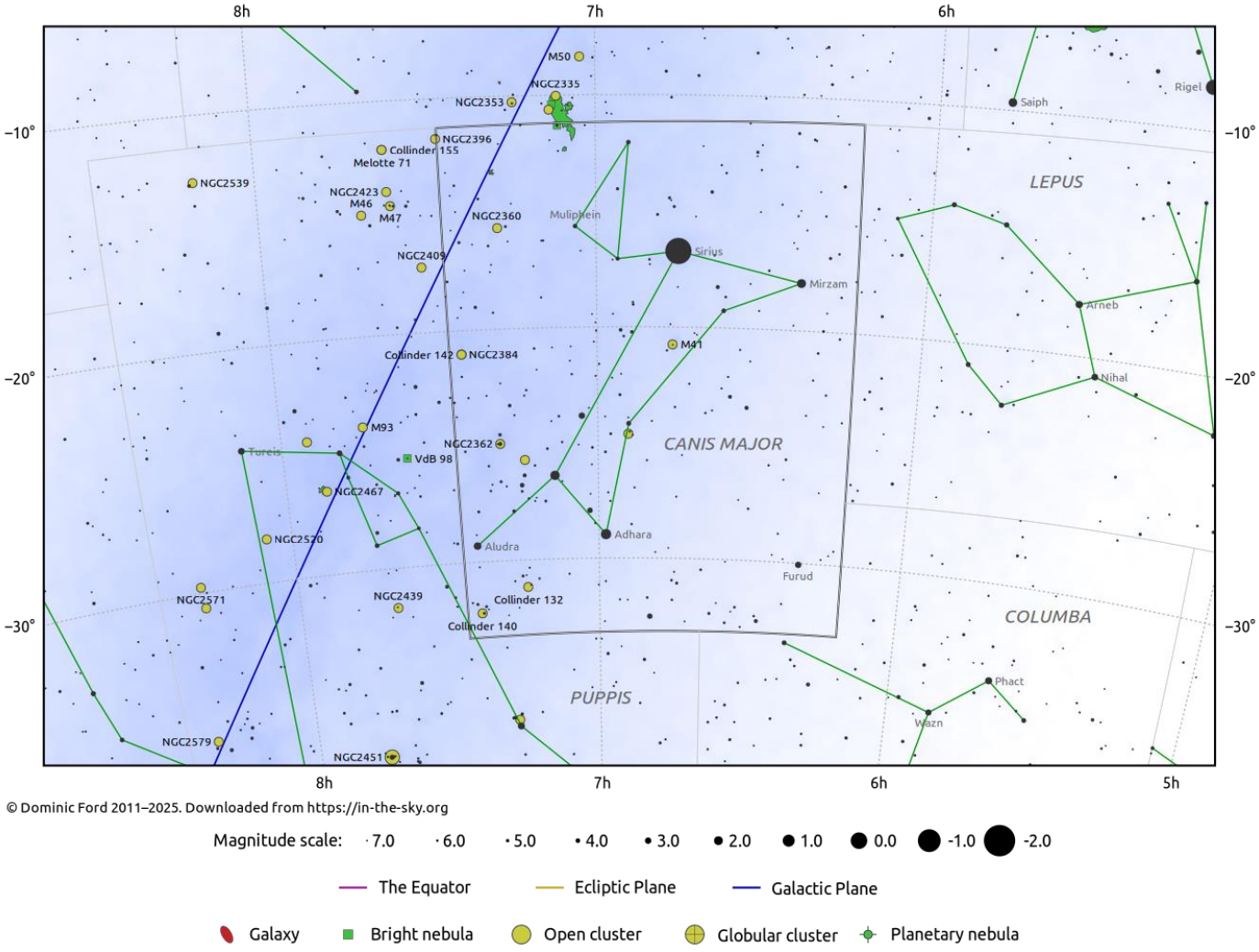


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Canis Major (CMa)

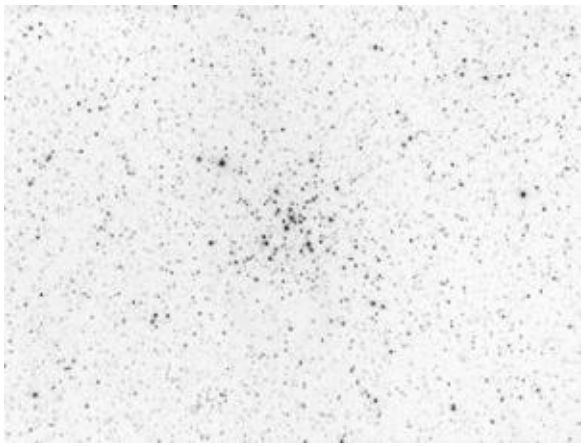
Evening Visibility: **January – April**
Online Information: **Canis Major**
Charts: **3** Featured Objects: **3**
More Online Information: M-041, NGC-2360, NGC-2362

In-The-Sky.org Constellation Map

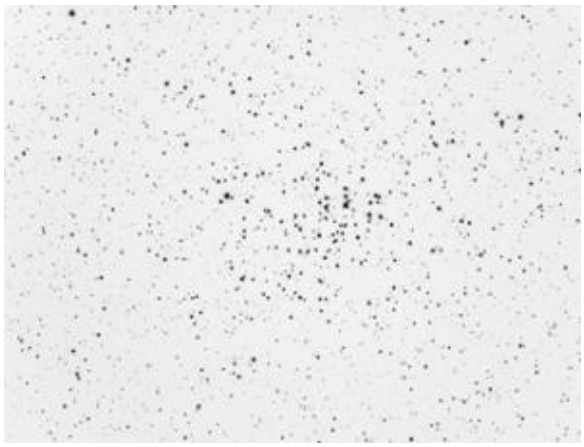


Object (Type)	Chart	Aliases	Stats
M-041 (OC)	1, W1	Little Beehive Cluster, NGC-2287	| Mag=4.5 | SB=21.5 | Size=38' |
NGC-2360 (OC)	2, W2	Caroline's Cluster, C-58	| Mag=7.2 | SB=21.4 | Size=13' |
NGC-2362 (OC)	3, W3	C-64, Mexican Jumping Star, Tau Canis Majoris Cluster	| Mag=3.8 | SB=17.2 | Size=6' |

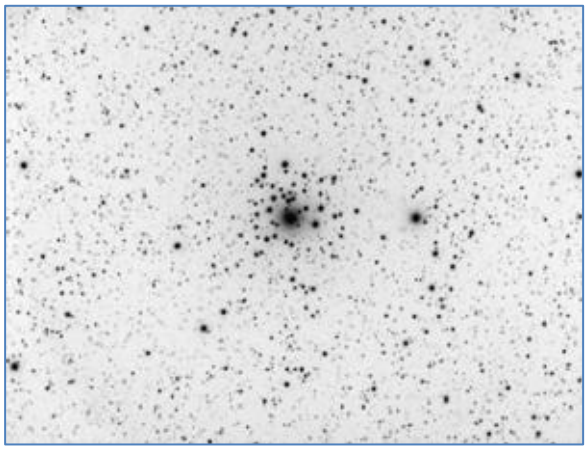
Image Gallery



Messier 41



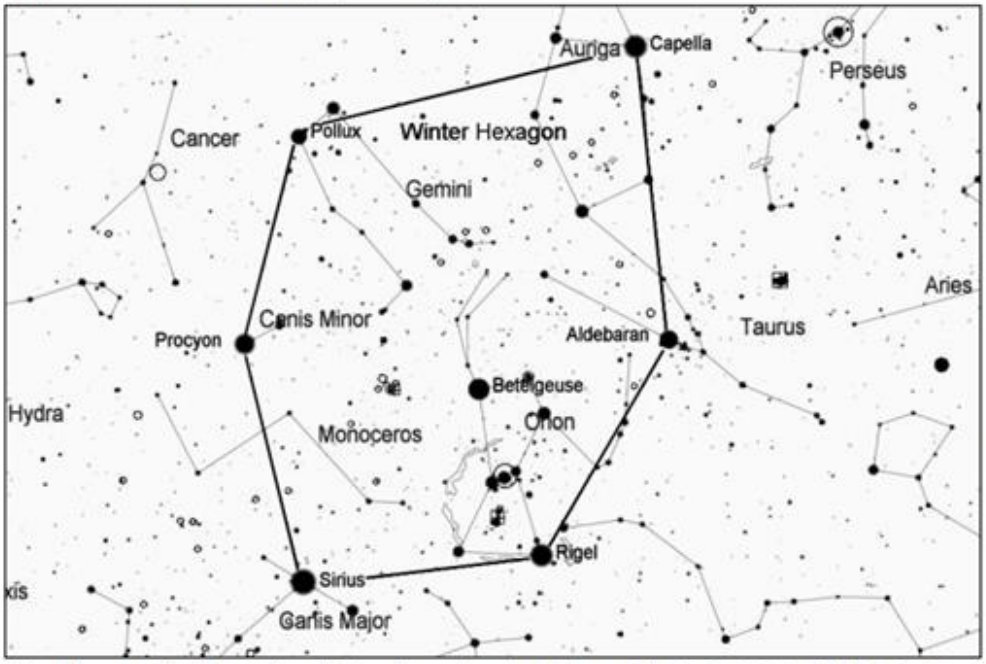
NGC 2360 (C 58)



NGC 2362 (C 64) Tau Canis Majoris Cluster

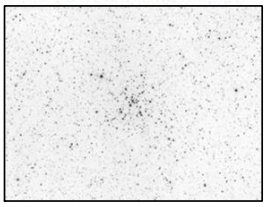
Messier 41, Open Cluster in Canis Major

At magnitude 4.5, Messier 41 is not too hard to spot with the naked eye as a hazy spot below brilliant Sirius. Through binoculars or a telescope, M41 is one of the more impressive open clusters in the winter sky. See if you can detect the color variations among its stars. This cluster is about 25 light years across and about 2300 light years away.



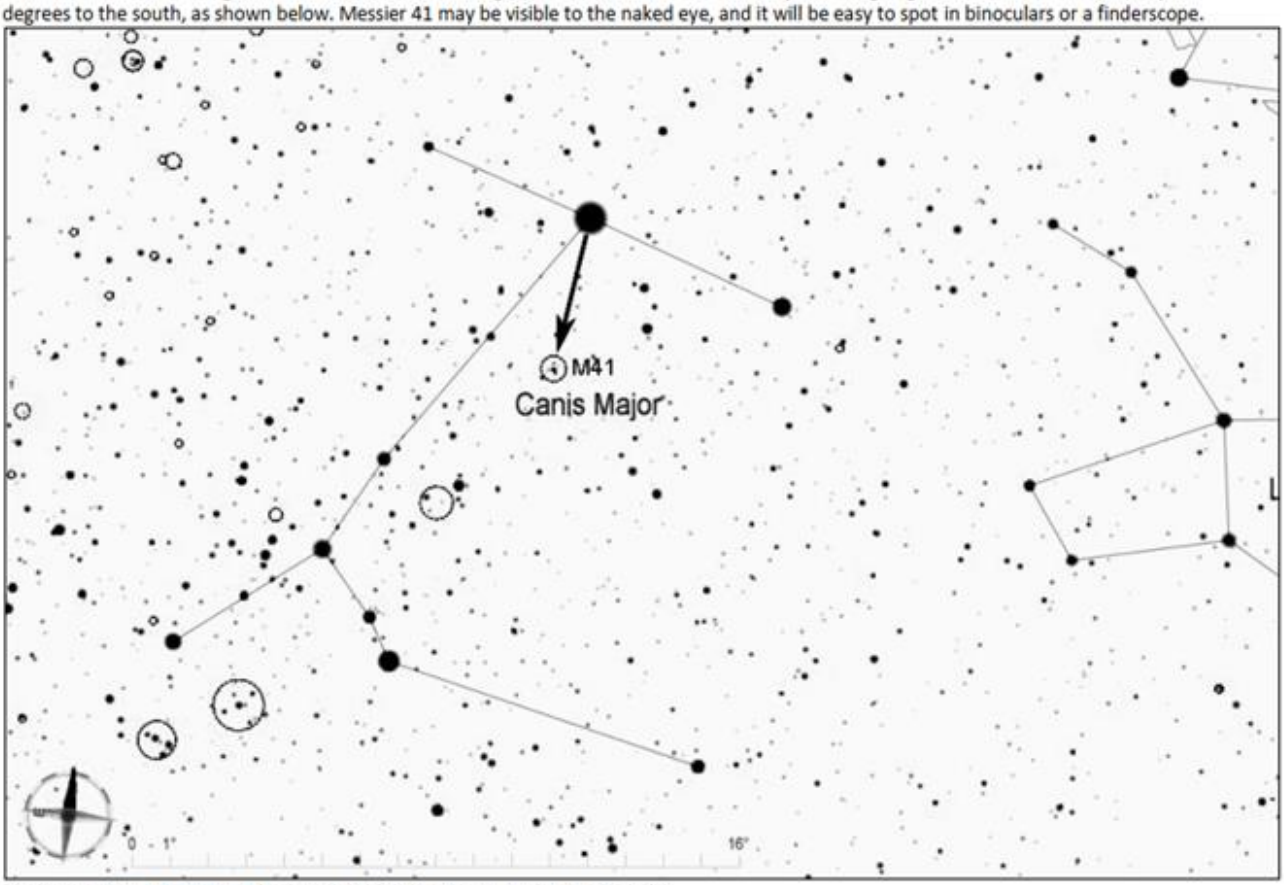
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



M 41

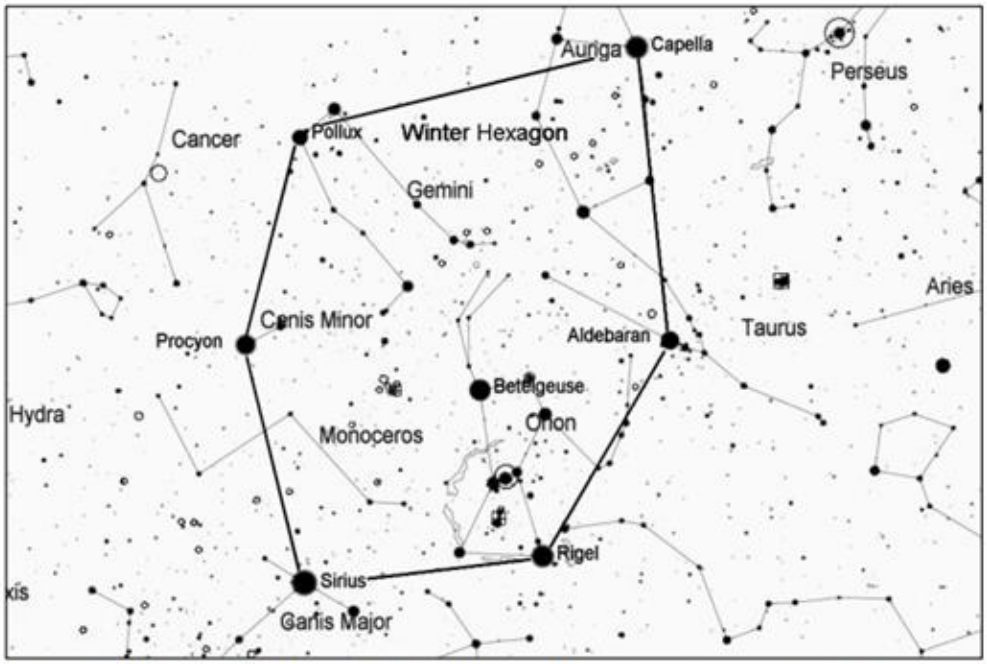
Sirius is known as the "dog star," and it forms the neck region of the constellation Canis Major, the big dog. From Sirius, look toward a point 4 degrees to the south, as shown below. Messier 41 may be visible to the naked eye, and it will be easy to spot in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

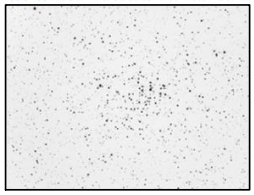
NGC 2360 (Caldwell 58), Open Cluster in Canis Major

This group, also called Caldwell 58, is a nice compact cluster of more than 100 stars that shows well in telescopes of all sizes. Many of the most prominent stars in this cluster appear similar in brightness. The group is about magnitude 7.2, 13 arcminutes in size, and about 3700 light years away.



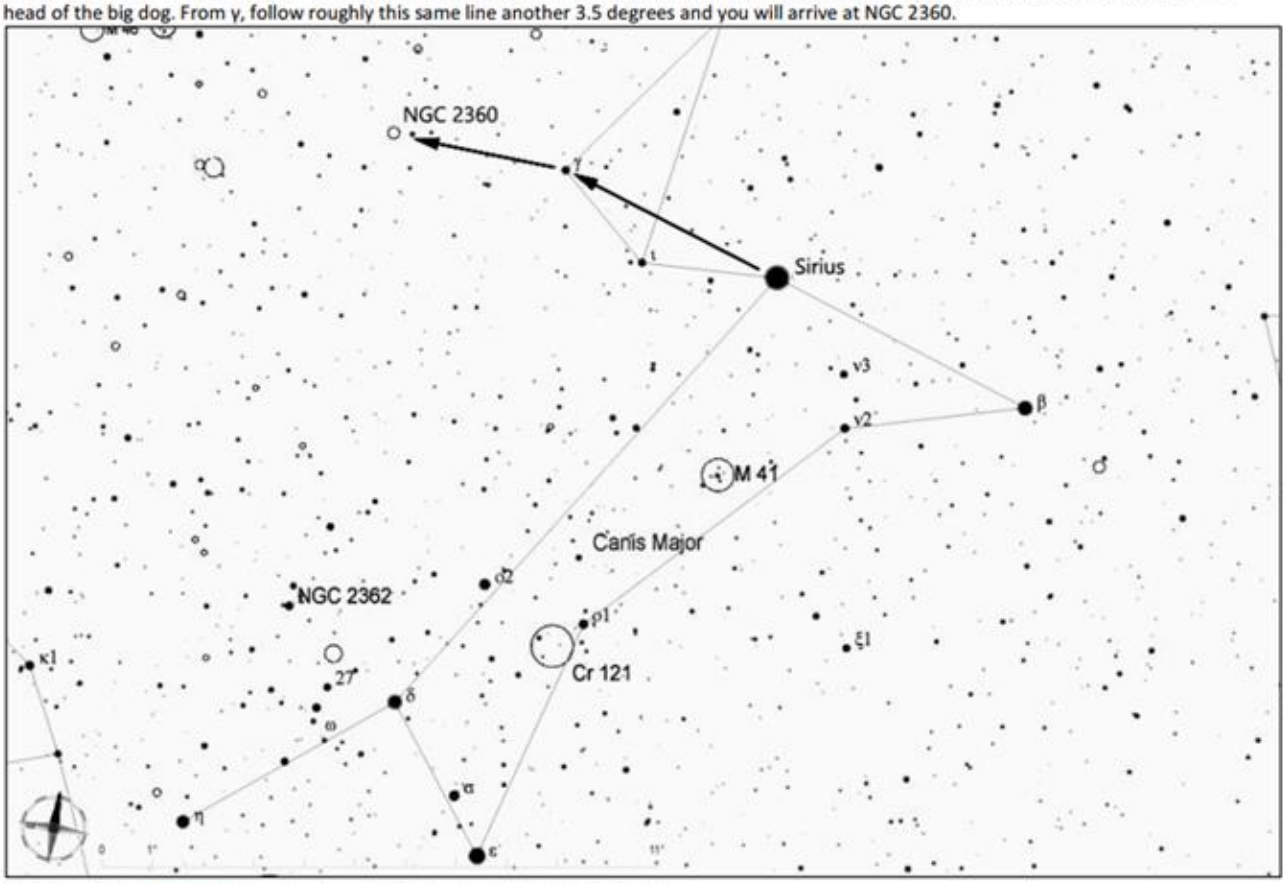
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



NGC 2360

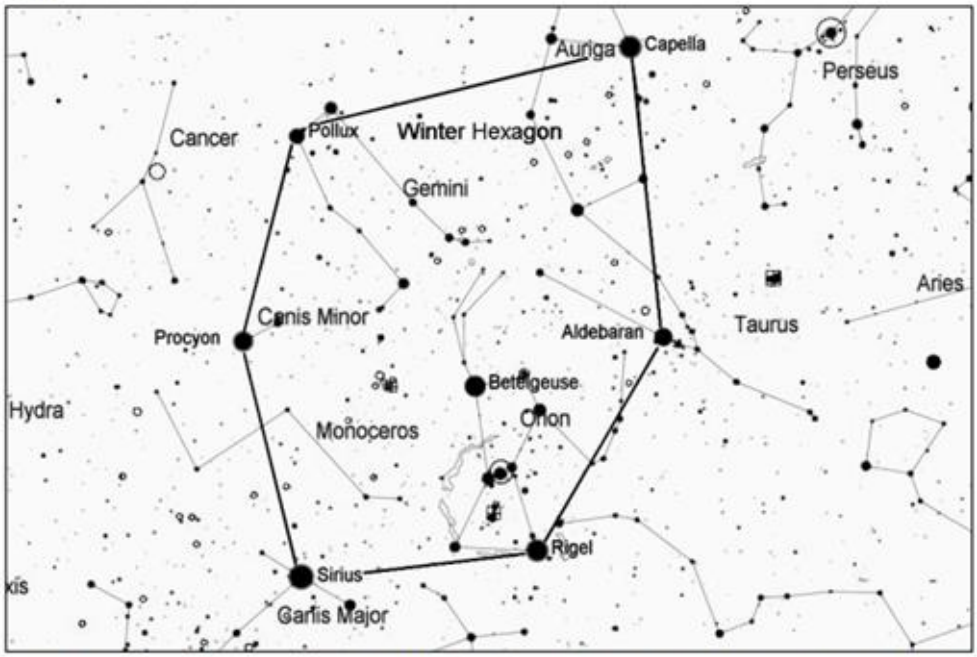
Look 5 degrees to the east-northeast of brilliant Sirius to find a much dimmer star, 4th magnitude γ Canis Majoris, which represents the eye or head of the big dog. From γ, follow roughly this same line another 3.5 degrees and you will arrive at NGC 2360.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

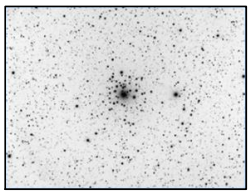
NGC 2362 (Caldwell 64), Tau Canis Majoris Cluster

NGC 2362 is a unique open cluster because in its center is the 4th magnitude Tau Canis Majoris, a star visible to the naked eye and much brighter than any other member of the cluster. Through binoculars, the cluster may look like a haze surrounding Tau. The cluster is about 4800 light years away.



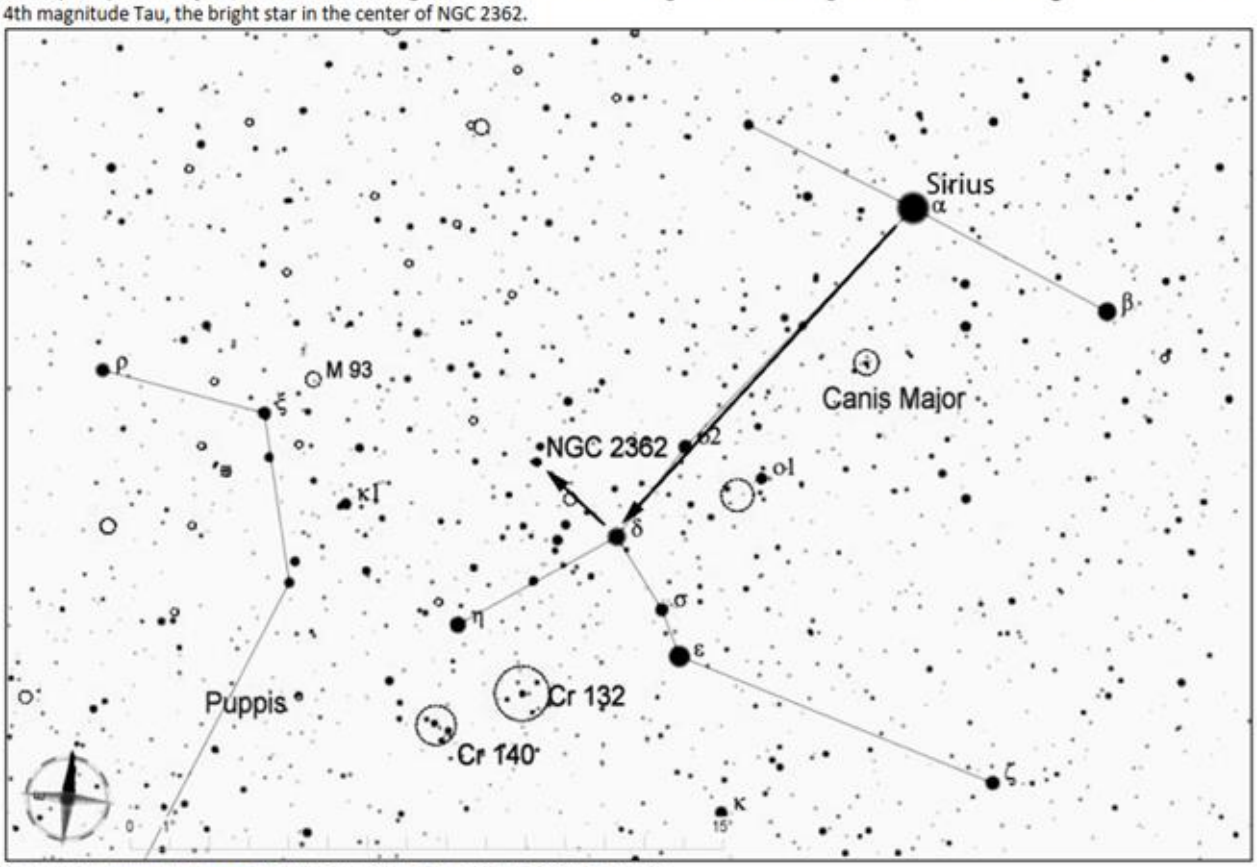
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



NGC 2362

Sirius is known as the "dog star," and it forms the neck region of the constellation Canis Major, the big dog. From Sirius, look to the southeast to find δ (delta) Canis Majoris, one of the three bright stars that form the back leg and tail of the dog. From δ, look about 3 degrees northeast to find 4th magnitude Tau, the bright star in the center of NGC 2362.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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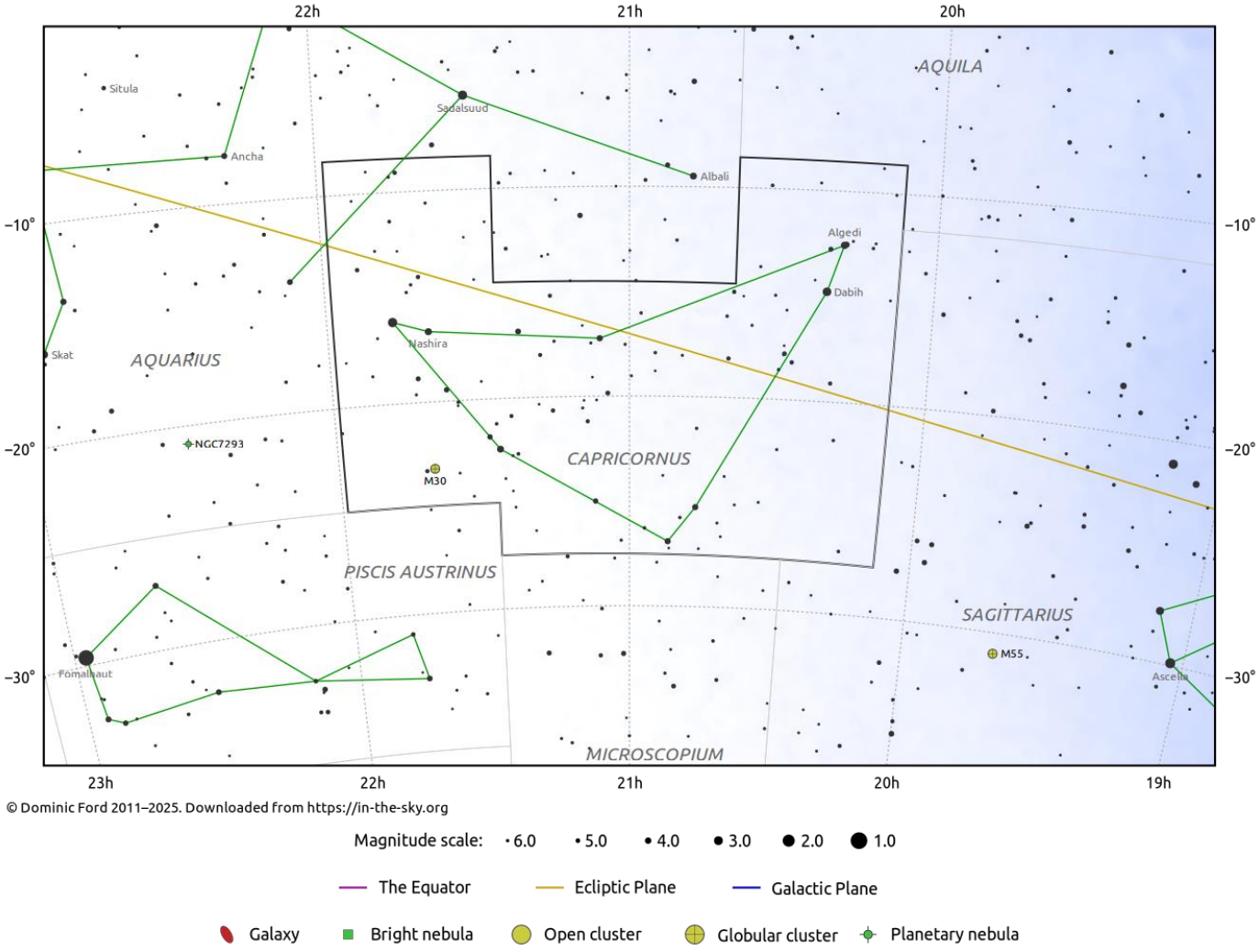
Capricornus (Cap)

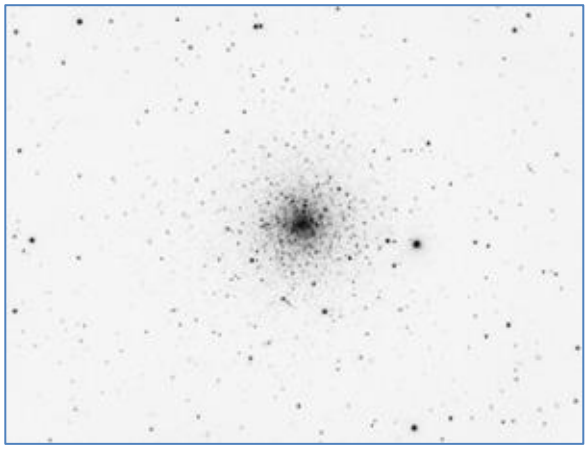
Evening Visibility: **August – November**
Online Information: **Capricornus**
Charts: **1** Featured Objects: **1**
More Online Information: M-030

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
M-030 (OC)	1, W1	Jellyfish Cluster, NGC-7099	| Mag=7.2 | SB=22.3 | Size=12' |

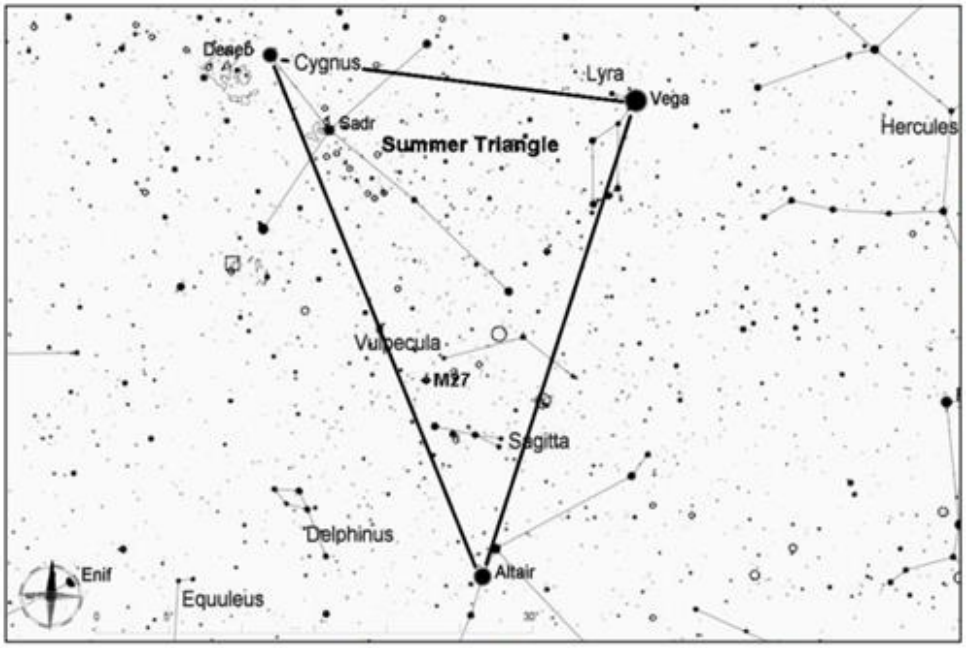
Image Gallery



Messier 30

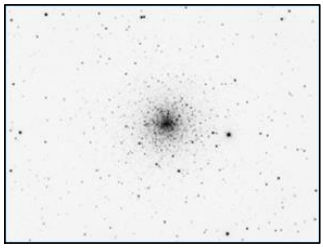
Messier 30, Globular Cluster in Capricornus

Messier 30 is a nice open cluster, about magnitude 7. Through an amateur telescope of modest size, many of its stars can be resolved, and there are two strings of bright stars stretching to the north. The center of the cluster is very dense. The cluster is about 26,000 light years away.



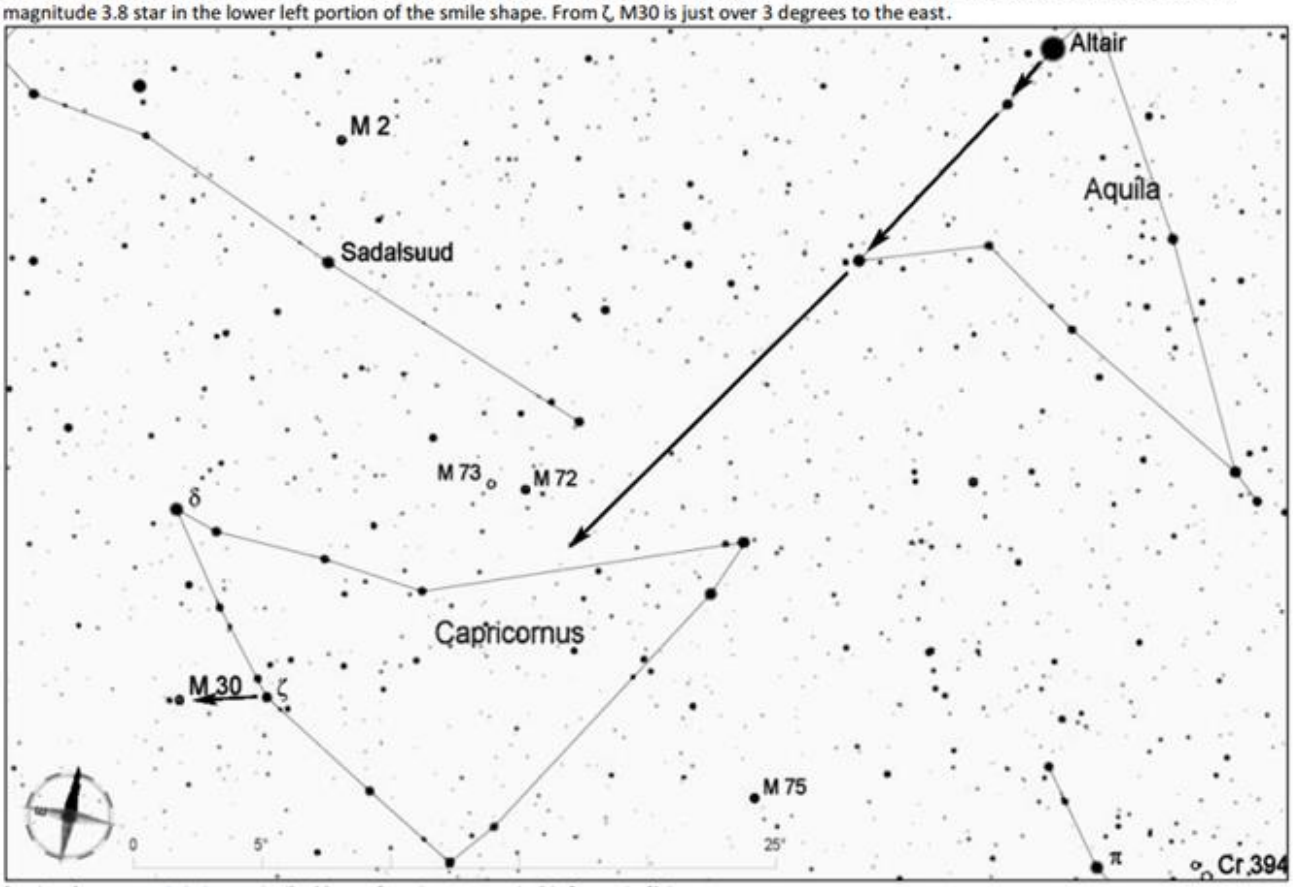
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Altair in the constellation Aquila, the eagle.



M 30

From Altair, follow the stars that form the upper edge of Aquila the eagle's east wing, and use these stars as a pointer to take you to the constellation Capricornus. To me, the stars of Capricornus form a large, open-mouthed smile. Once you locate Capricornus, look for ζ (Zeta), a magnitude 3.8 star in the lower left portion of the smile shape. From ζ, M30 is just over 3 degrees to the east.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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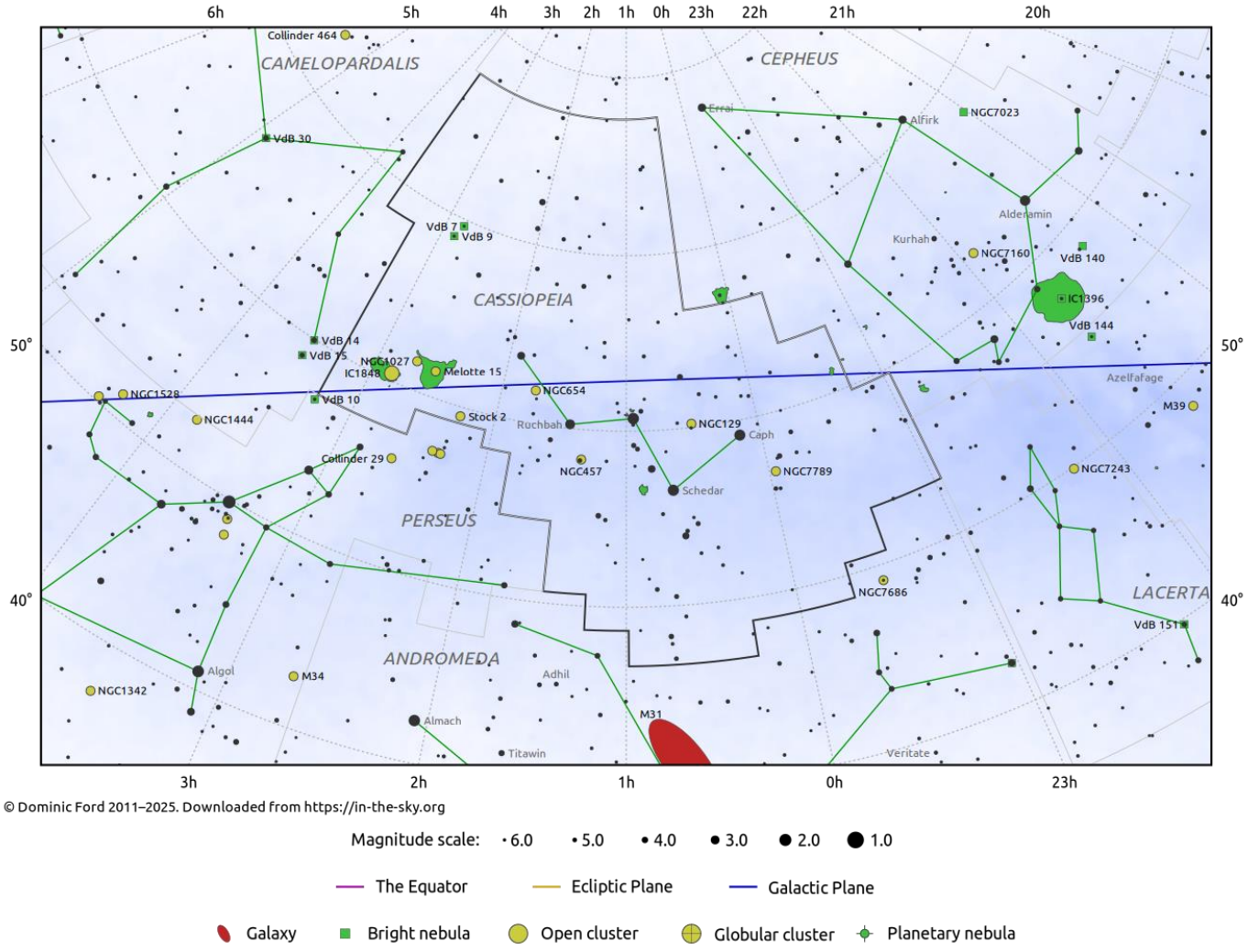
Cassiopeia (Cas)

Evening Visibility: **August – March**
Online Information: **Cassiopeia**
Charts: **9** Featured Objects: **13**
More Online Information: Achird, Iota Cassiopeiae, IC-342, M-052, M-103, NGC-663, NGC-147, NGC-185, NGC-457, NGC-436, NGC-559, NGC-7789 , WZ Cassiopeiae

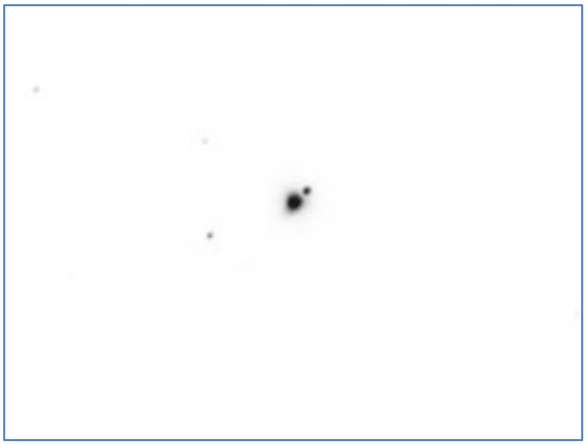
In-The-Sky.org Constellation Map



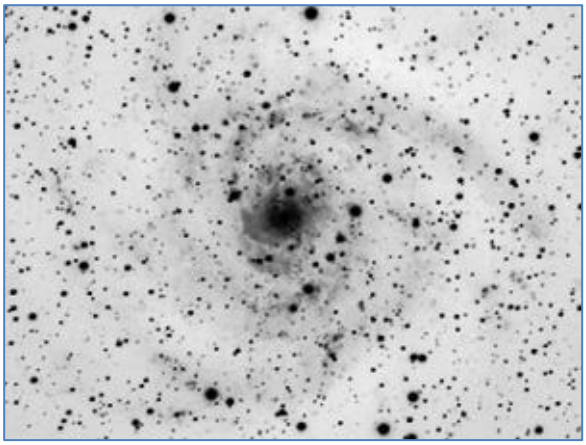
Object (Type)	Chart	Aliases	Stats
Achird (DS)	1, W1, SD	SAO-021732, HIP-3821, STF60, 24 Cas, HR-219, Eta Cassiopeiae	| Mag=3.4, 7.5 | Sep=13.6” |

Object (Type)	Chart	Aliases	Stats
Iota Cassiopeiae (MS)	2, W2, SD	SAO-012298, HIP-11569, STF-262, ADS-1860	| Mag=4.6, 6.9, 9.0 | Sep=7.3", 2.3" |
IC-342 (G)	2, W2	The Hidden Galaxy, C-5, PGC-13826	| Mag=9.1 | SB=23.9 | Size=21.4' x 20.9' |
M-052 (OC)	3, W3	Scorpion Cluster, NGC-7654	| Mag=7.3 | SB=22.2 | Size=13.0' |
M-103 (OC)	4, W4	NGC-581	| Mag=7.4 | SB=19.5 | Size=6.0' |
NGC-663 (OC)	4, W4	C-10	| Mag=7.1 | SB=21.7 | Size=16.0' |
NGC-147 (G)	5, W5	C-17, PGC-2004, UGC-326	| Mag=10.5 | SB=23.5 | Size=13.2' x 7.8' |
NGC-185 (G)	5, W5	C-18, PGC-2329, UGC-396	| Mag=10.1 | SB=23.1 | Size=11.7' x 10.0' |
NGC-457 (OC)	6, W6	Owl Cluster, E.T. Cluster, C-13, Dragonfly Cluster	| Mag=6.4 | SB=20.6 | Size=13.0' |
NGC-436 (OC)	6, W6		| Mag=8.8 | SB=21.3 | Size=5.0' |
NGC-559 (OC)	7, W7	C-8	| Mag=9.5 | SB=21.1 | Size=7.0' |
NGC-7789 (OC)	8, W8	Caroline's Rose, Caroline's Haystack, White Rose Cluster	| Mag=6.7 | SB=21.3 | Size=16' |
WZ Cassiopeiae (DS)	9, W9, SD	SAO-021002, HIP-99, HD 224855, STTA-254, SACDBL290	| Mag=7.6, 8.7 | Sep = 57" |

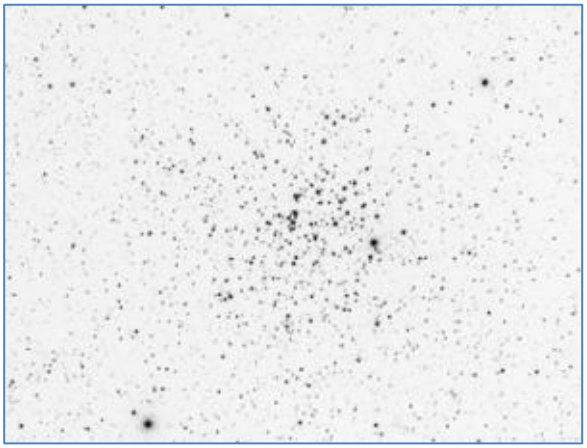
Image Gallery



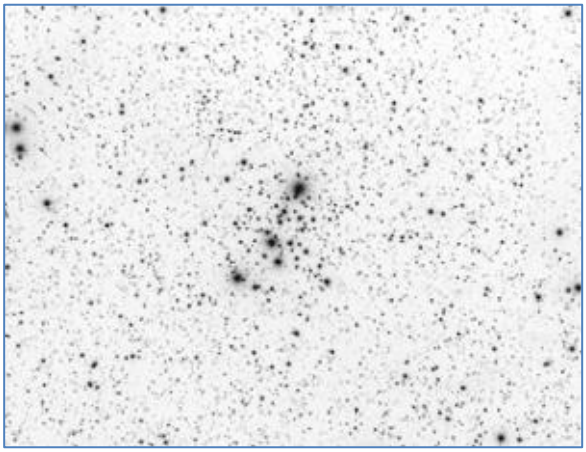
Achird (Eta Cassiopeiae)



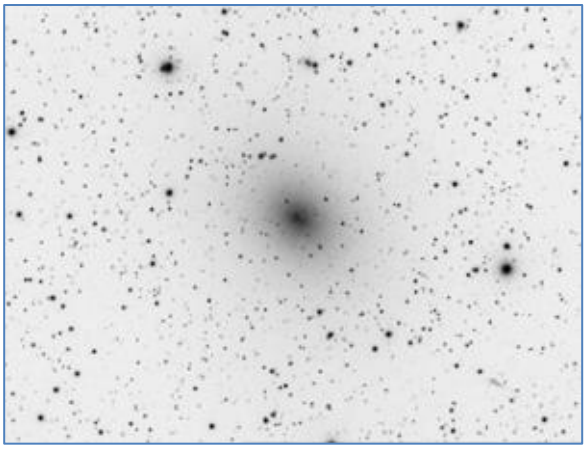
IC 342 (C 5)



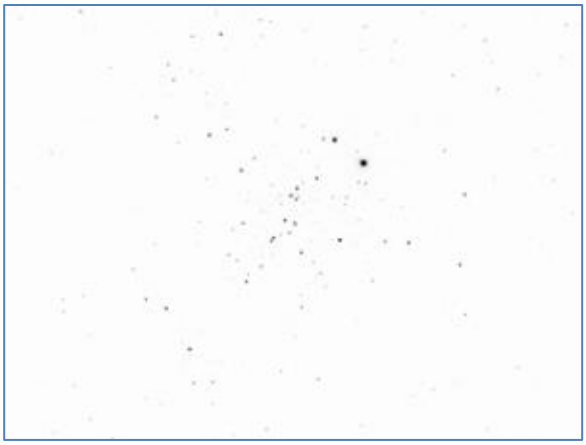
Messier 52



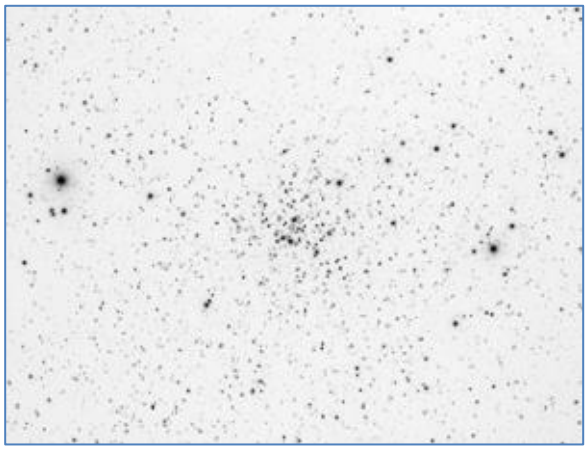
Messier 103



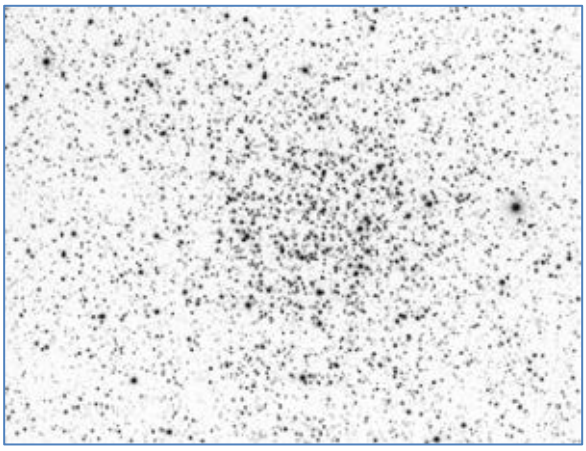
NGC 185 (C 18)



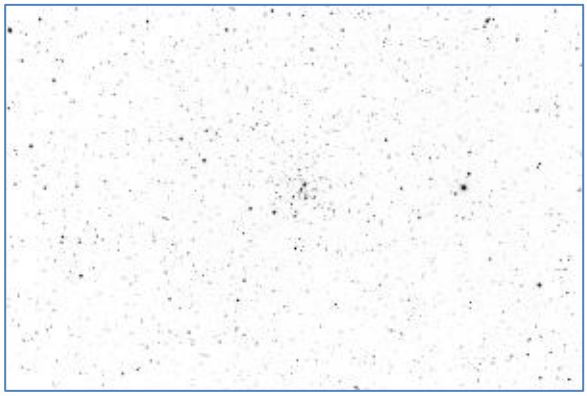
NGC 457 (C 13) Owl Cluster



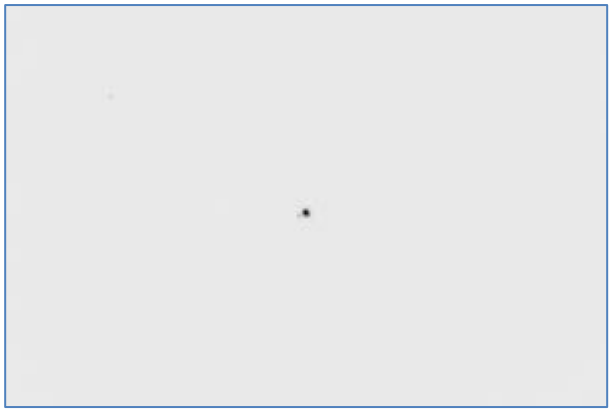
NGC 559 (C 8)



NGC 7789, Caroline's Rose Cluster



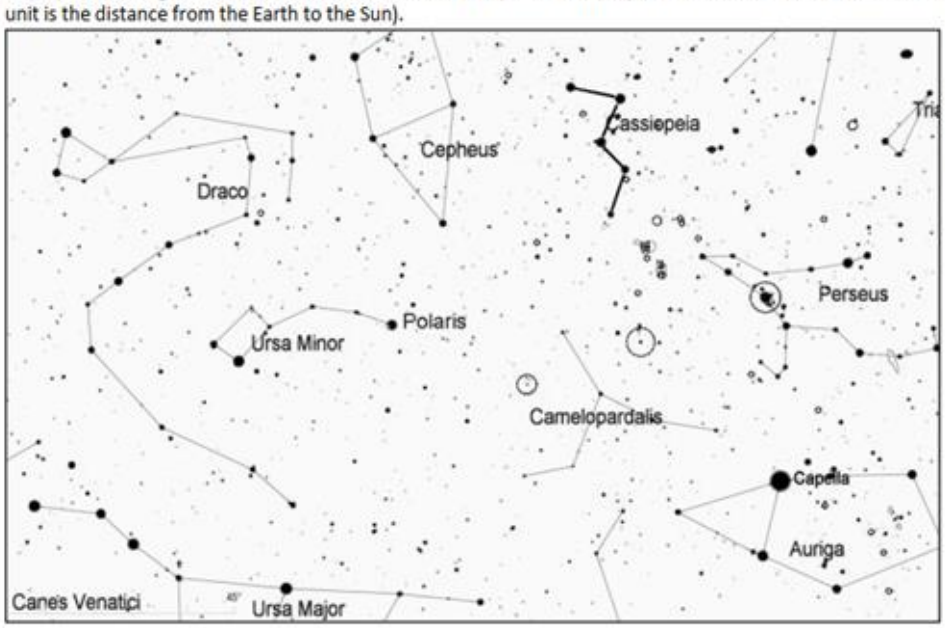
NGC 436



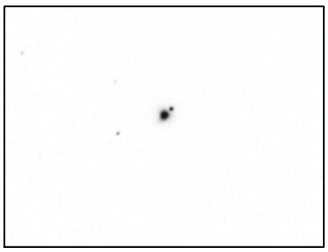
Iota Cassiopeiae

Achird (η Cassiopeiae), Double Star

Achird, or eta (η) Cassiopeiae, is an interesting double star for several reasons. First, it is relatively nearby at a distance of just 19.4 light years; only a few dozen stars are closer. Second, the brighter star of the pair is approximately the same size and brightness as our Sun. Third, the two stars display contrasting colors, which some have described as yellow and purple. The two stars are about 71 astronomical units apart. (An astronomical unit is the distance from the Earth to the Sun).

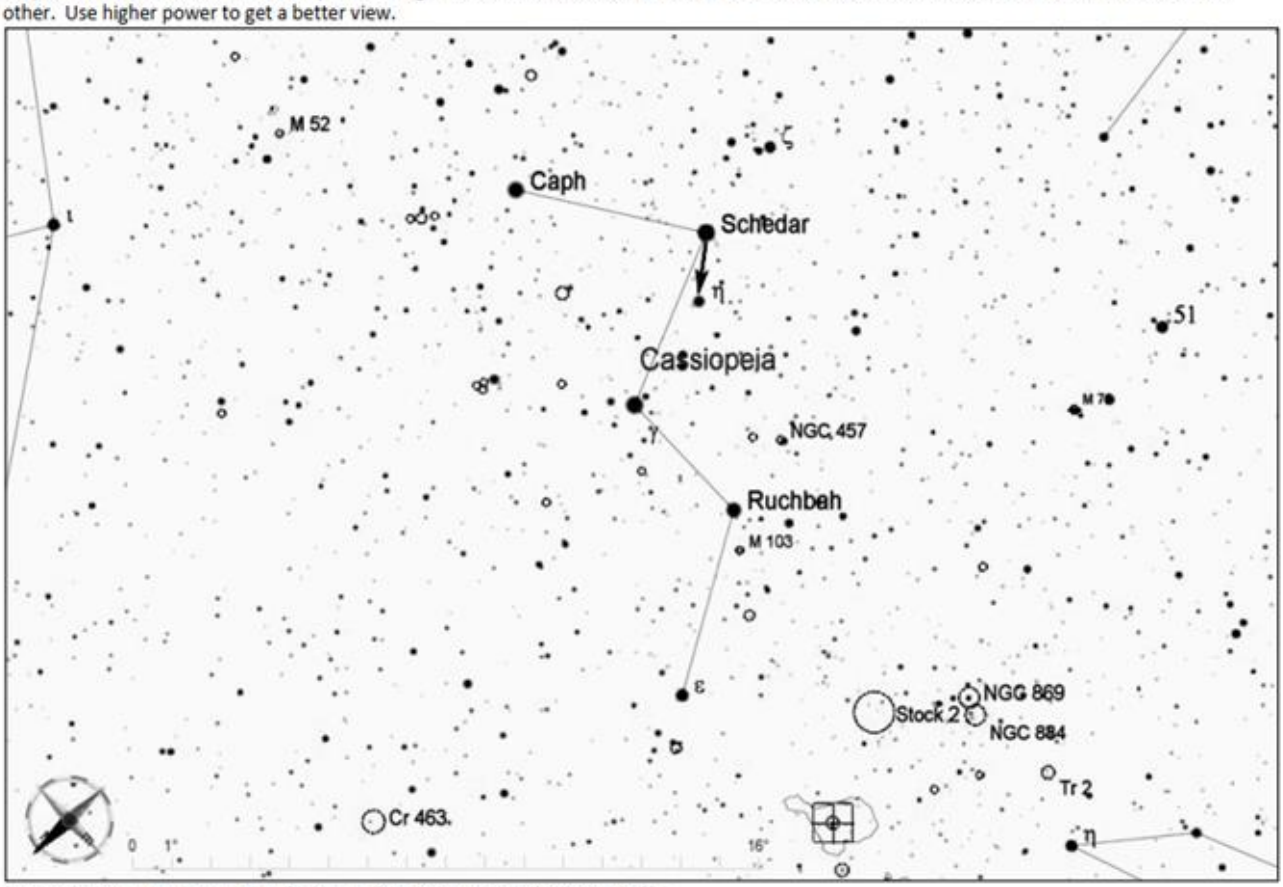


Find the constellation Cassiopeia, which can be recognized by its distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".



Achird

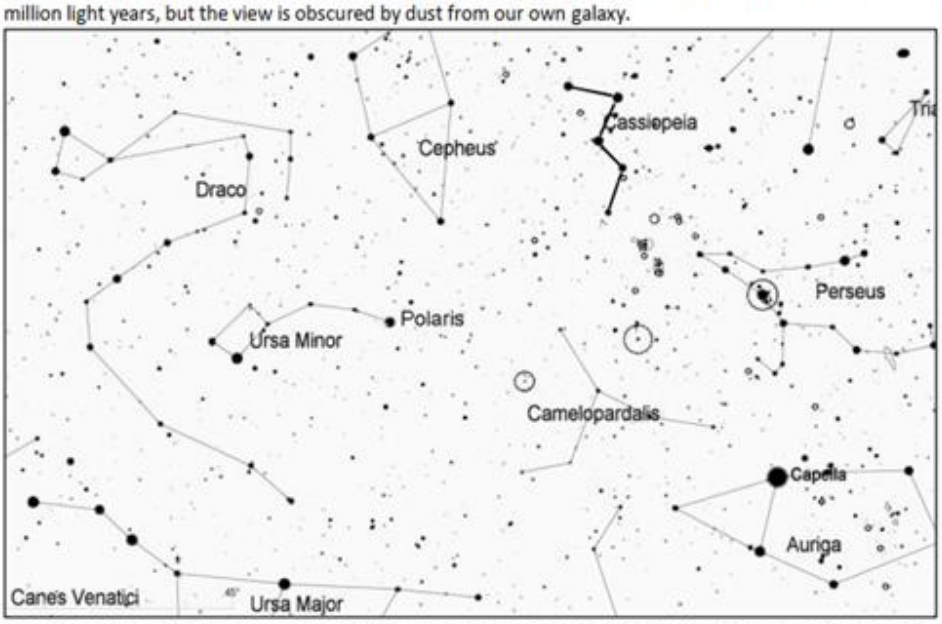
Once you have located Cassiopeia, Achird is easy to see with the naked eye. Look for a "sixth star" that is near the second angle of Cassiopeia's W shape, as indicated below. A telescope with magnification of at least 50x is needed to see that there are two stars, one much dimmer than the other. Use higher power to get a better view.



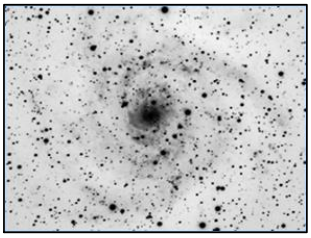
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Iota Cassiopeiae (Triple Star) and IC 342 (Caldwell 5) in Camelopardalis

Iota Cassiopeia is a beautiful triple star with components of different colors. The two closest stars are only 2.7" apart, so high magnification is needed to separate them. Across the constellation border in Camelopardalis, IC 342 is a large but dim face-on spiral. The galaxy's central core appears fairly bright, but its tenuous spiral arms have a low surface brightness and are difficult to discern. For a galaxy, it is relatively close at 11 million light years, but the view is obscured by dust from our own galaxy.

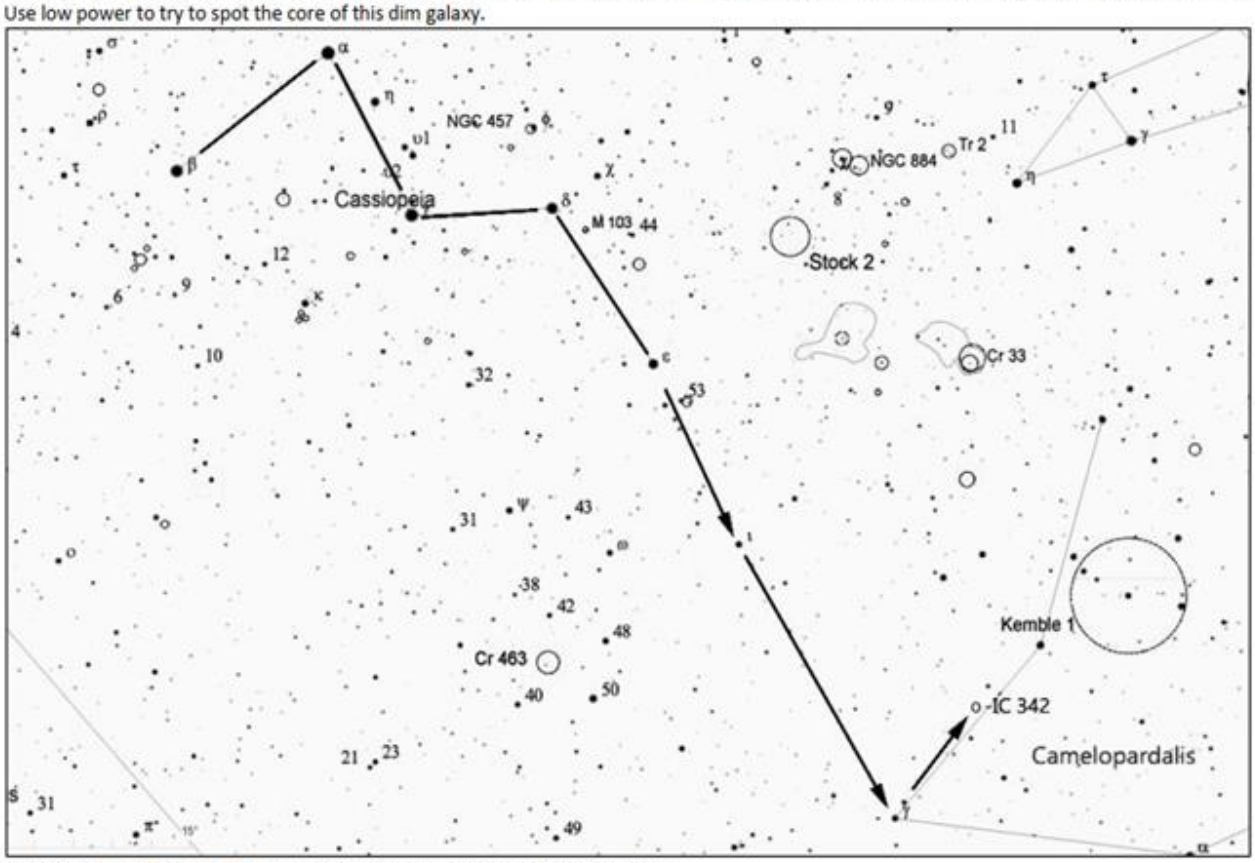


Find the constellation Cassiopeia, which can be recognized by its distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".



IC 342

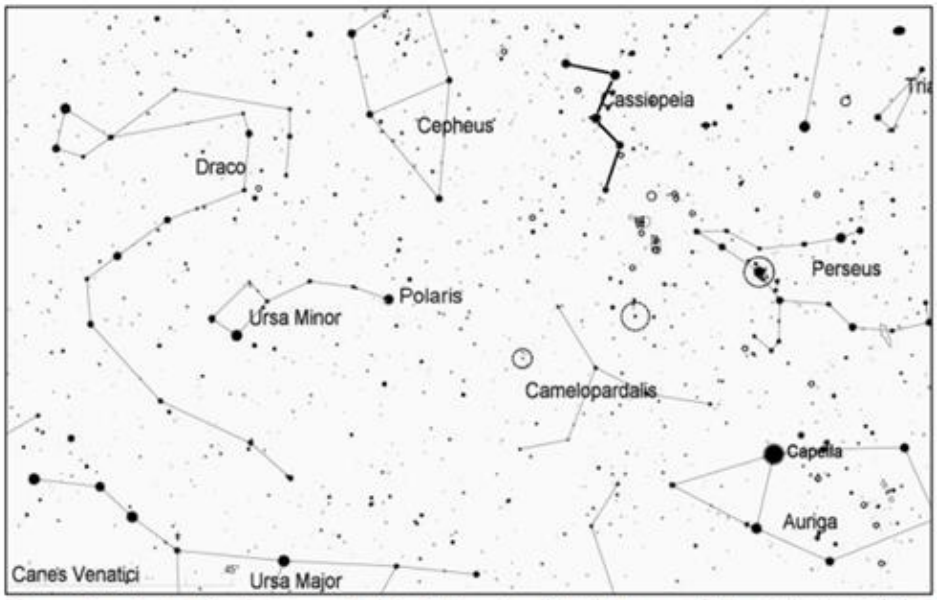
Once you have located Cassiopeia, extend the line made by the two stars of the first segment of the "W" about an equal distance away from them and you will arrive at 4th magnitude iota (ι) Cassiopeiae. Use high magnification to separate the components of this impressive triple star. Then extend the line again, about 1.5 times as far, and you will reach gamma (γ) Camelopardalis, a 4th magnitude star with a 5th magnitude star about 1/2 degree to its south. As shown below, make a sharp left turn (toward the 5th magnitude star) and move about 3 degrees south to reach IC 342. Use low power to try to spot the core of this dim galaxy.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 52 (Open Cluster) and NGC 7635 (Caldwell 11, Bubble Nebula)

Messier 52 is a rich open cluster of some 200 stars covering an area about 1/3 the size of the full Moon. The best view is through a telescope at low power, where the cluster will stand out nicely from the Milky Way background. Just about 1/2 degree away is NGC 7635, the Bubble Nebula, a large and faint nebula surrounding an 8th magnitude star. The nebula is much harder to see, but since it is so close to M52 it is worth an attempt.



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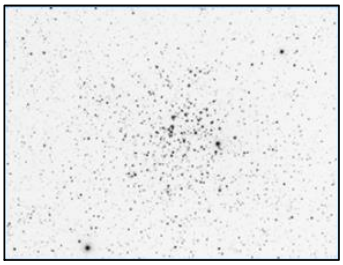
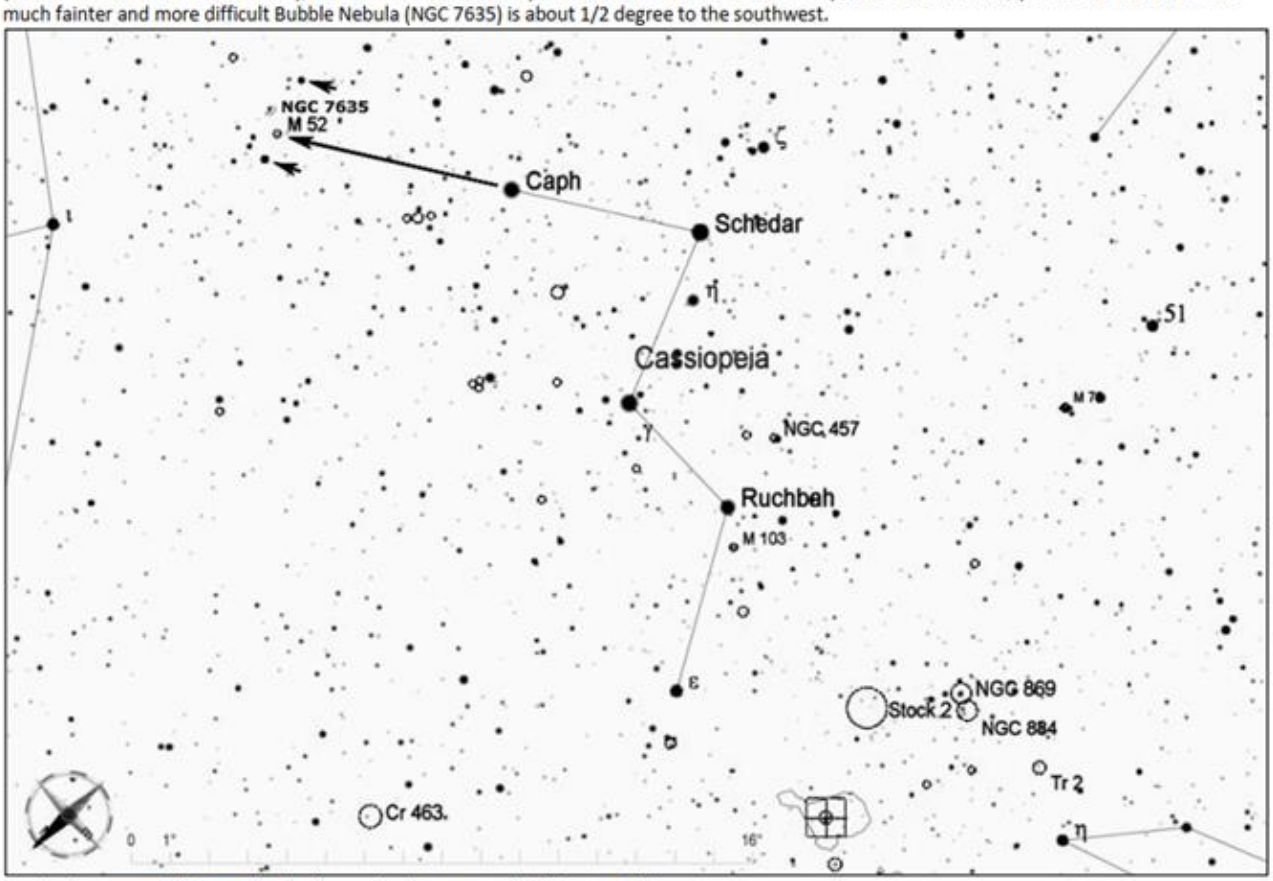


M 52

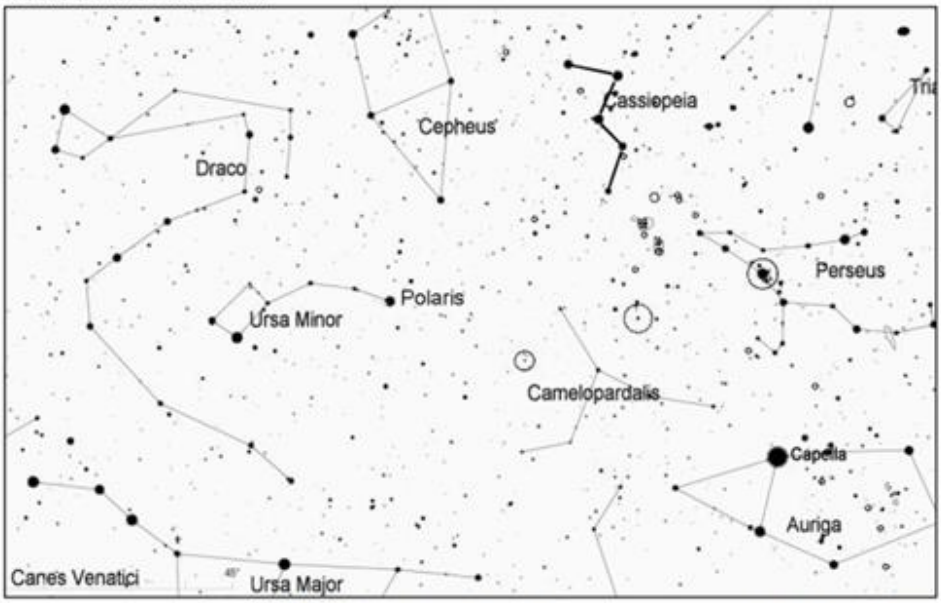
Once you have located Cassiopeia, note that the last two stars of the W shape point directly to Messier 52. Extend a line from these two stars that is just slightly longer than the distance between them. Notice that there is one 5th magnitude star just north of M52 and another just south of it (see the arrows in the chart below), and these should be easily visible in binoculars or a finderscope. In between them, you should find M52. The much fainter and more difficult Bubble Nebula (NGC 7635) is about 1/2 degree to the southwest.



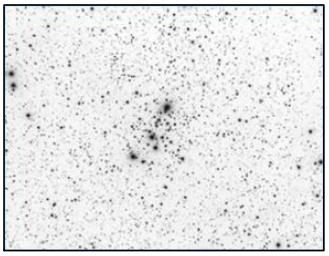
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 103 and NGC 663 (Caldwell 10), Open Clusters in Cassiopeia

Messier 103 is a small but distinct open cluster, just 5 arcminutes wide. Only a few stars may be visible through large binoculars or a small telescope. More are visible through a larger telescope, where the cluster assumes a triangular shape. Just about 1.5 degrees to the northeast is NGC 663, a larger open cluster with more stars that is also known as Caldwell 10. The distances of these two clusters are estimated to be 7200 and 7800 light years, respectively. This region of Cassiopeia contains many other star clusters that are worth exploring. Several of them are marked by the circles in the charts below.

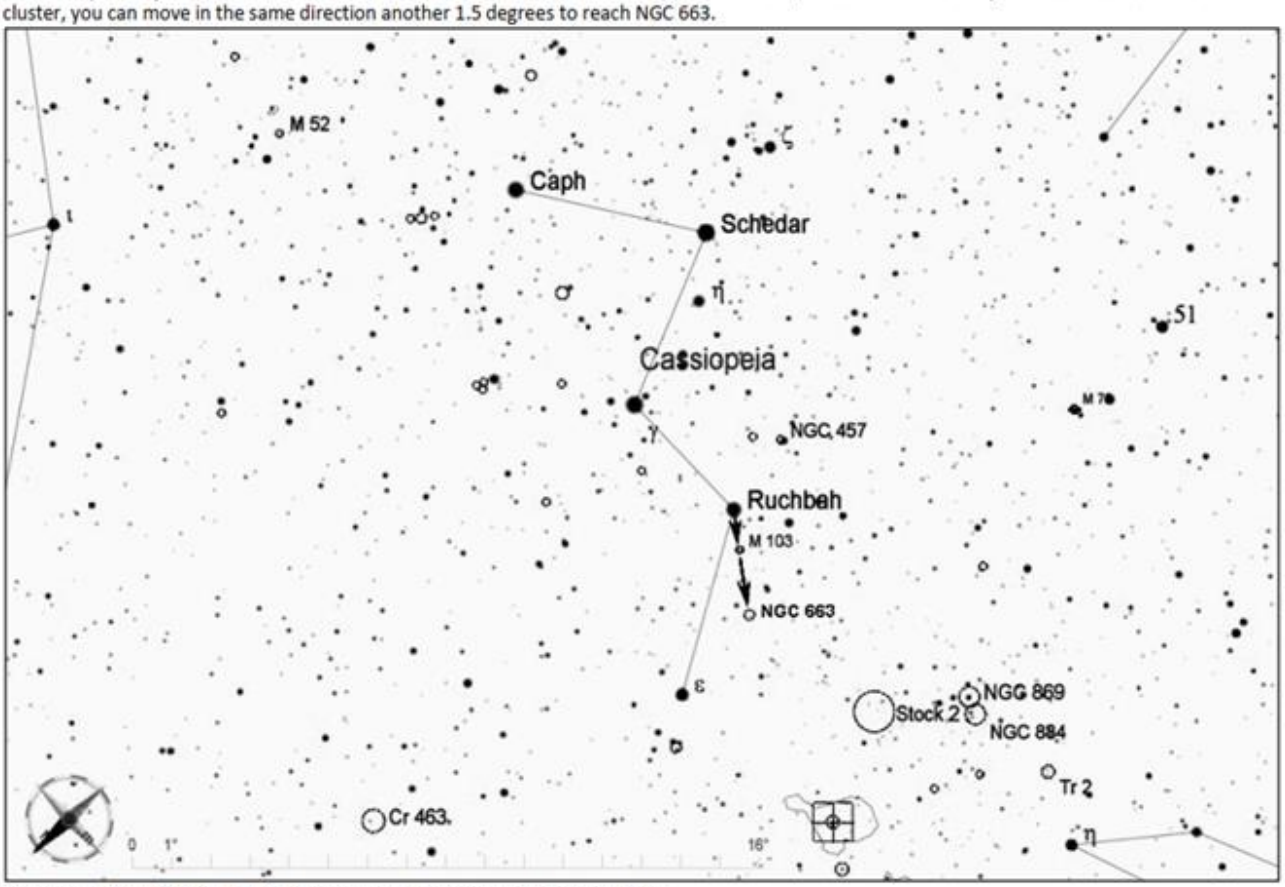


Find the constellation Cassiopeia, which can be recognized by its distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".



M 103

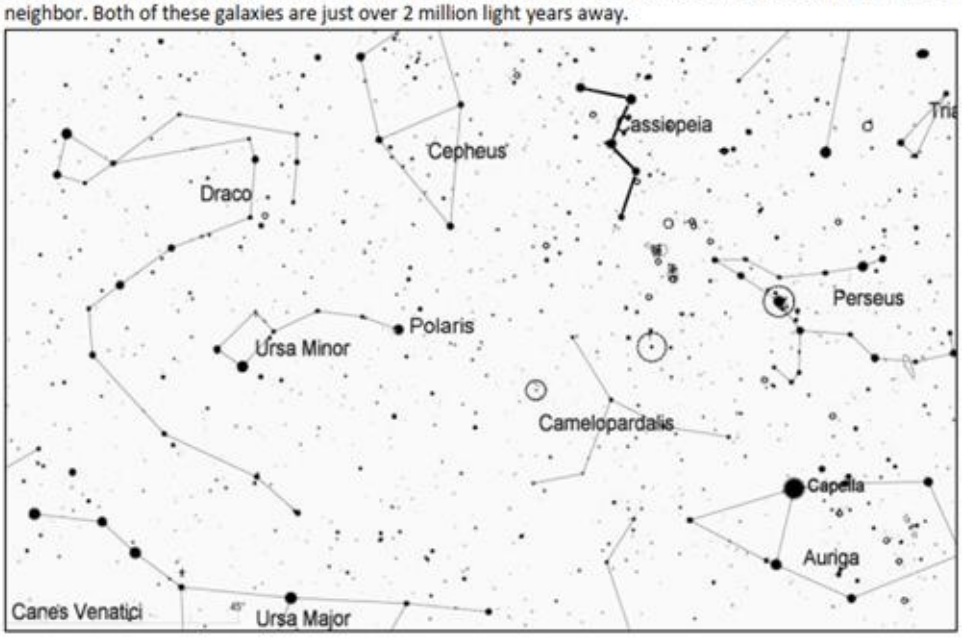
Once you have located Cassiopeia, begin at Ruchbah, the star that forms the first angle of the W shape. Move 1 degree back toward the first star of the W shape, but just a little off the line between the two stars, as shown in the chart below, to reach M103. Once you have observed this small cluster, you can move in the same direction another 1.5 degrees to reach NGC 663.



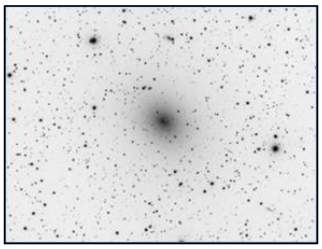
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 147 and 185 (Caldwell 17 and 18), Galaxies in Cassiopeia

These two dwarf elliptical galaxies are satellites of Messier 31, the Andromeda Galaxy, which is about 7 degrees away. They are both fairly large and diffuse and not that easy to see except under nice dark skies. NGC 185 has a brighter center that makes it a little easier to see than its neighbor. Both of these galaxies are just over 2 million light years away.

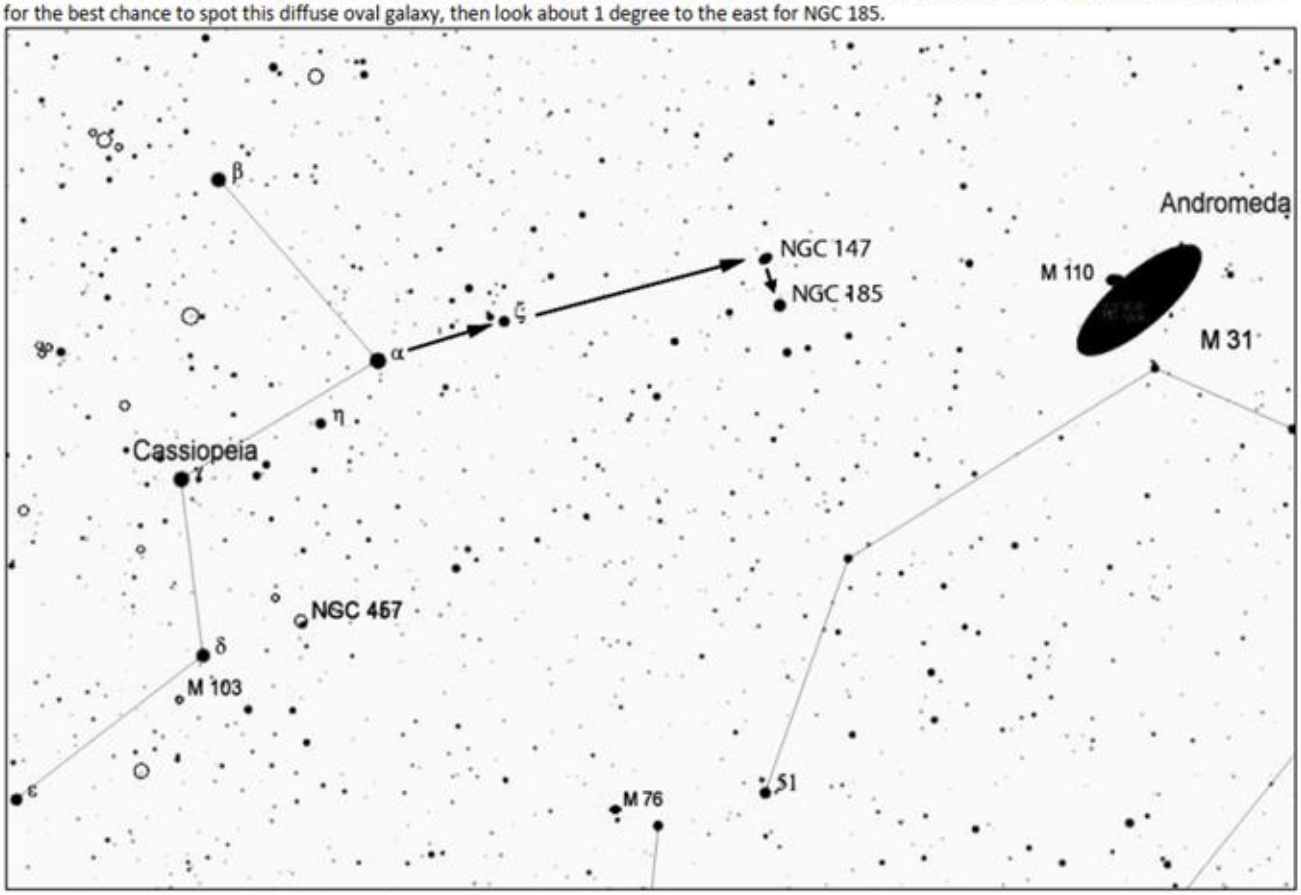


Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".



NGC 185

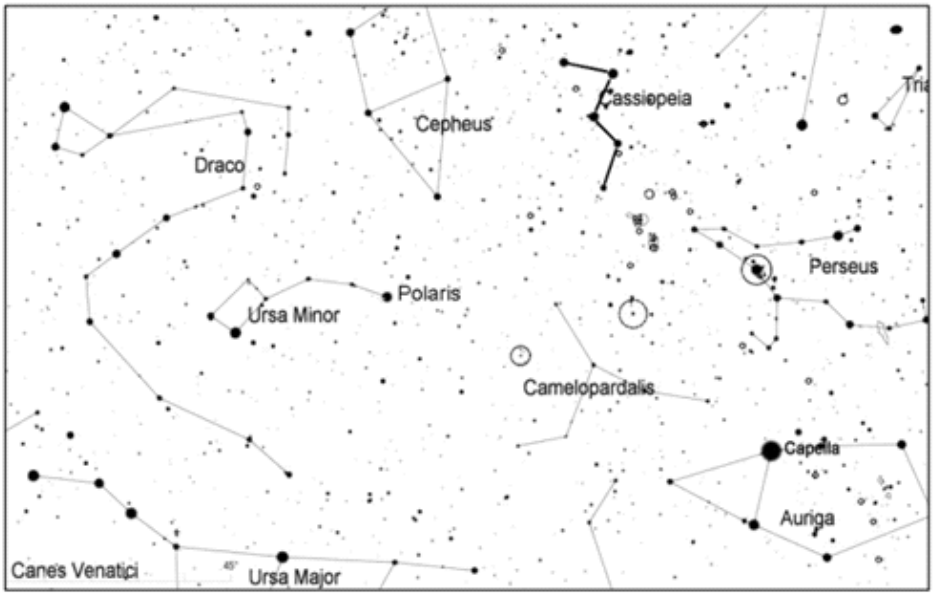
Once you have located Cassiopeia, use the star at the last angle in the W shape (α) to lead you to zeta (ζ) Cassiopeiae, about 3 degrees away. Continue in this direction about double the distance (5.5 degrees from ζ) and you will arrive at the location of NGC 147. Use a low power eyepiece for the best chance to spot this diffuse oval galaxy, then look about 1 degree to the east for NGC 185.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 457 (Caldwell 13, the Owl Cluster) and NGC 436 in Cassiopeia

Through a telescope at low magnification, the Owl Cluster resembles an owl on a perch with outstretched wings. Two bright stars form the eyes of the owl, with its body ending with four stars that form the owl's feet. Two curving chains of stars form the owl's outstretched wings. It is also known as the ET Cluster after the character in the movie. NGC 436 is a much smaller cluster of about 30 stars covering an area of about 5 arcminutes.



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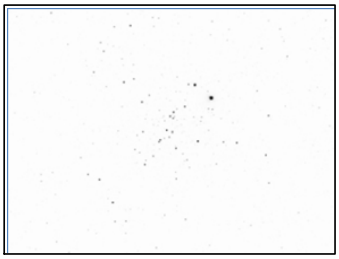
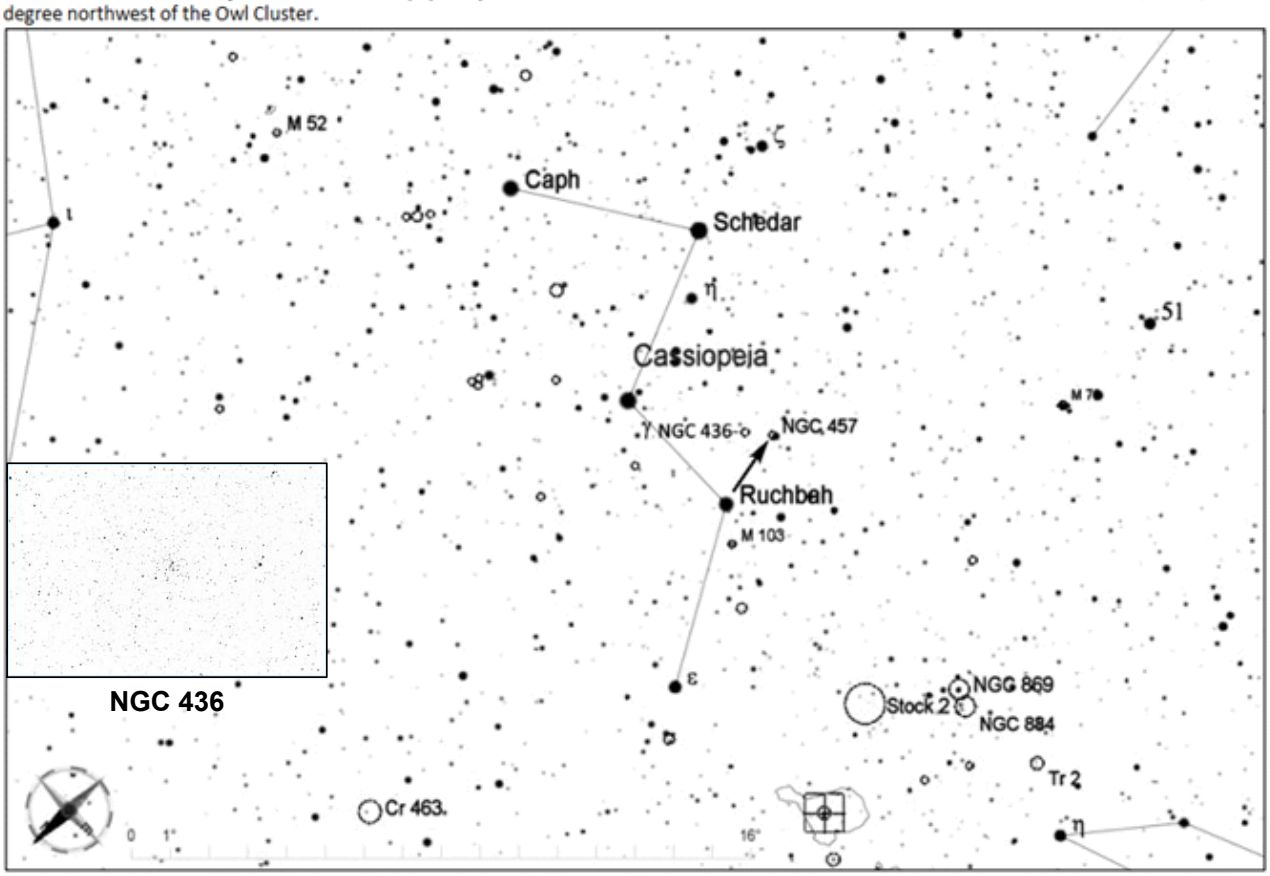


NGC 457

Once you have located Cassiopeia, begin at Ruchbah, the star that forms the first angle of the W shape. Move just 2 degrees south (in the direction shown in the chart below, just below the W shape) and you should arrive at the Owl Cluster. To find the smaller and dimmer NGC 436, look 2/3 degree northwest of the Owl Cluster.

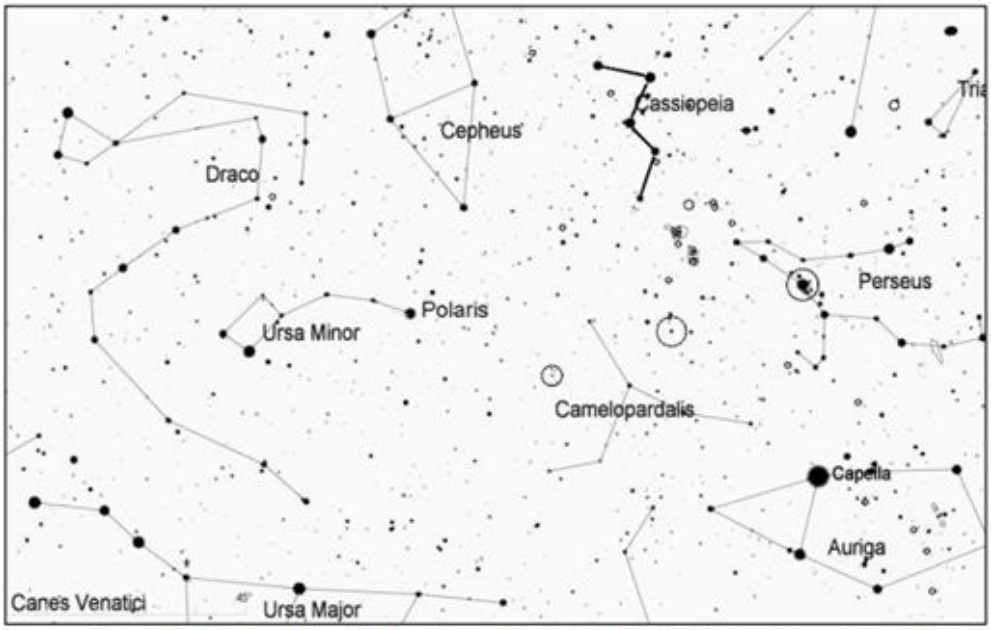


NGC 436

Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 559 (Caldwell 8), Open Cluster in Cassiopeia

NGC 559 is a small but rich open cluster in Cassiopeia, about 7 arcminutes in diameter. It includes about 150 stars, many of which can be seen in a typical amateur telescope. It stands out distinctly from the starry background. This cluster is 3700 light years away.



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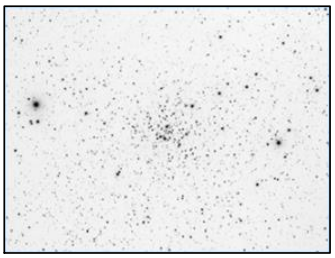
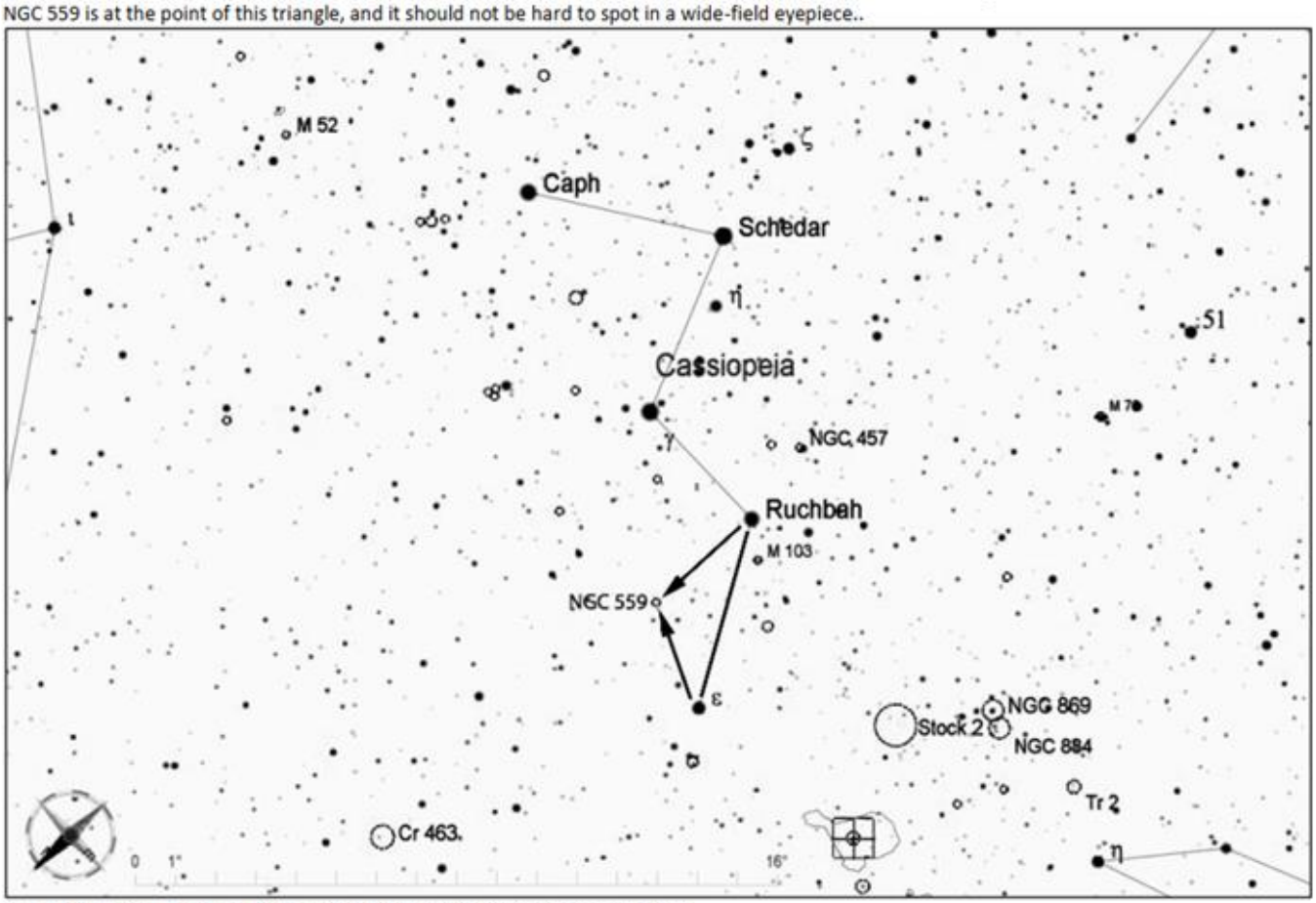


NGC 559

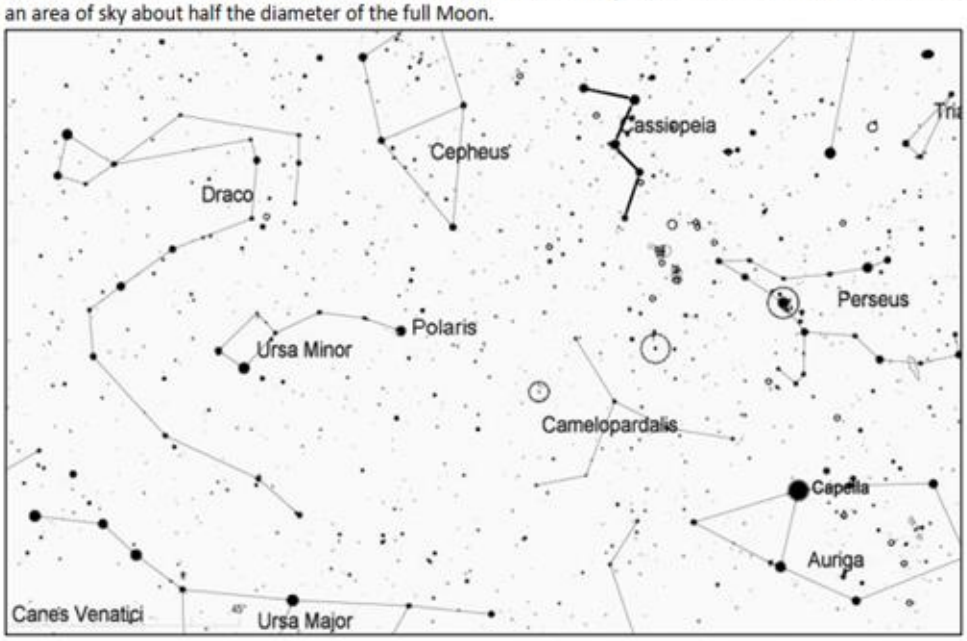
Once you have located Cassiopeia, use the two stars on the first leg of the "W" shape to imagine a shallow triangle to the north, as shown below. NGC 559 is at the point of this triangle, and it should not be hard to spot in a wide-field eyepiece..



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 7789 (Caroline's Rose), Open Cluster in Cassiopeia

This very rich and beautiful cluster was discovered by Caroline Herschel in 1783, and its informal name is in her honor. The strings of stars within the cluster resemble the petals of a flower. This cluster is a fascinating object to observe with a low-power eyepiece. It is magnitude 6.7 and covers an area of sky about half the diameter of the full Moon.



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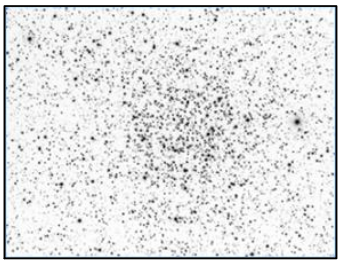
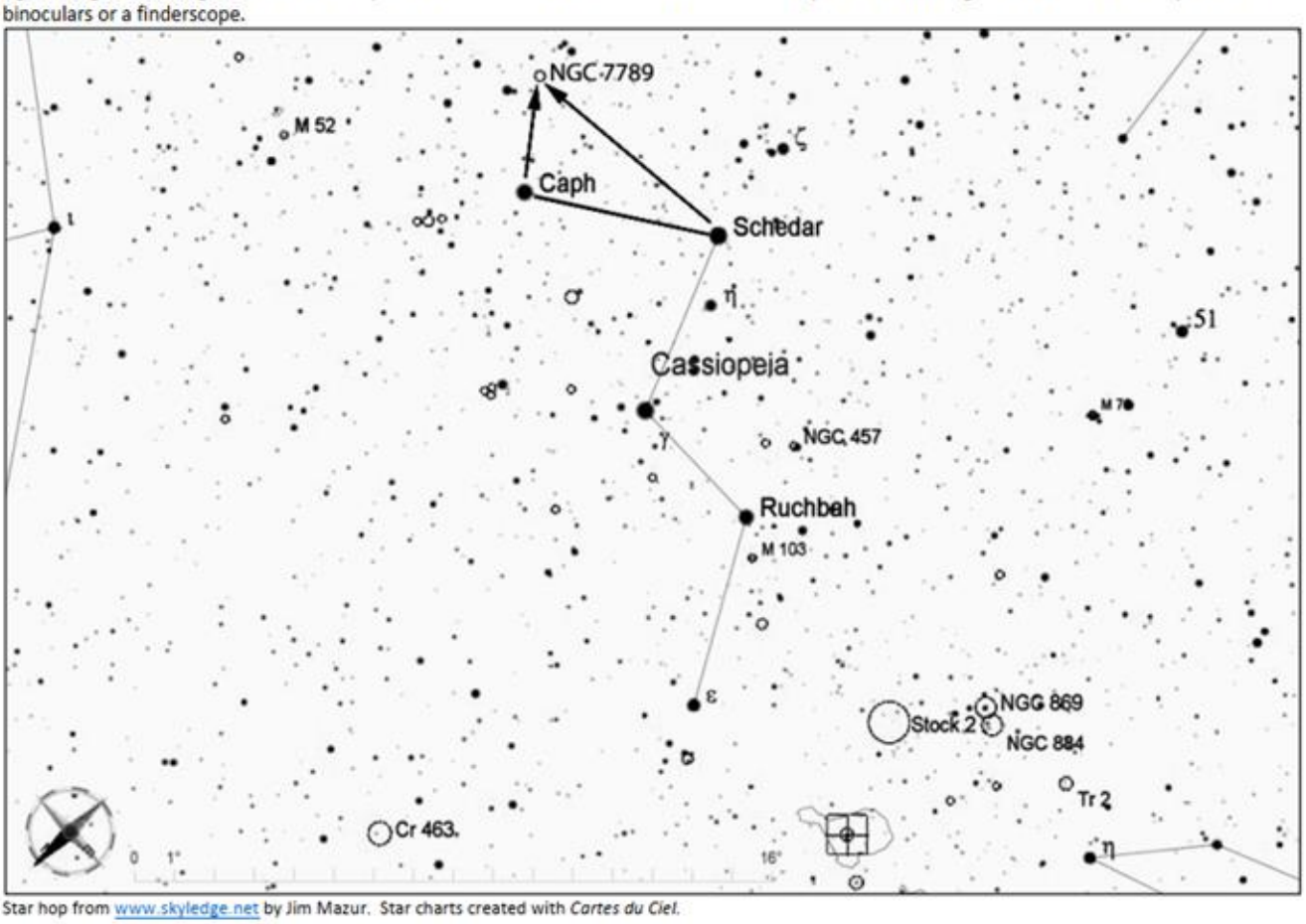


NGC 7789

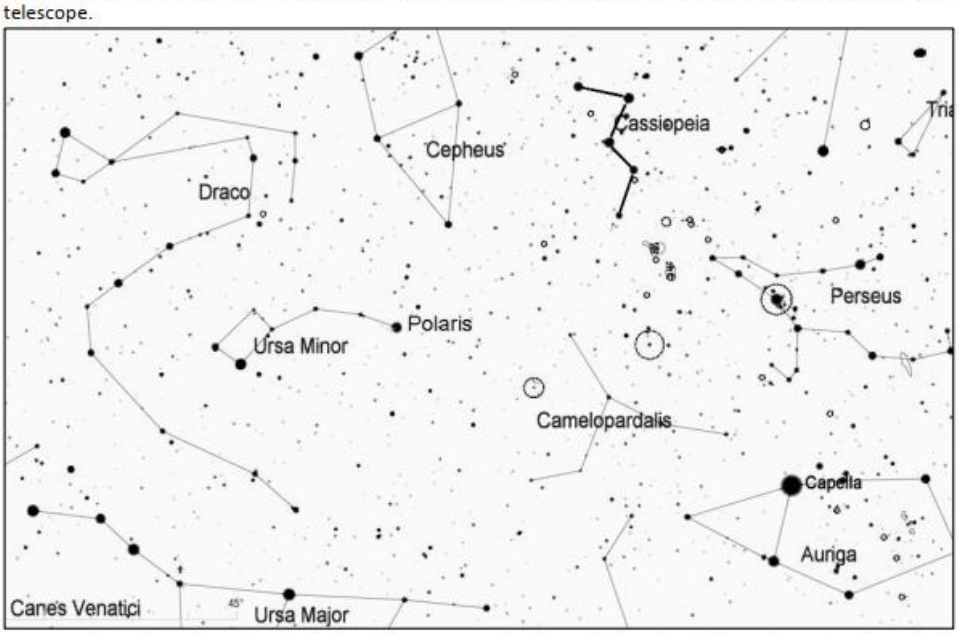
Once you have located Cassiopeia, look at the two stars that form the last line of the W shape (Caph and Schedar). Use these two stars to form a right triangle extending outside the W shape, as shown below. NGC 7789 will be at the third point of this triangle, and it should be easy to see in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

WZ Cassiopeiae, Variable Double Star

WZ Cas is a striking double star with contrasting colors. One component is a red carbon star that varies in magnitude from 6.3 to 8.8 over a period of 373 days. The second component is a blue star of magnitude 8.3. This pair is an optical double--although they look close together from our viewpoint, they are far apart and are not gravitationally connected. Still, they make a beautiful sight and can be resolved in even the smallest telescope.



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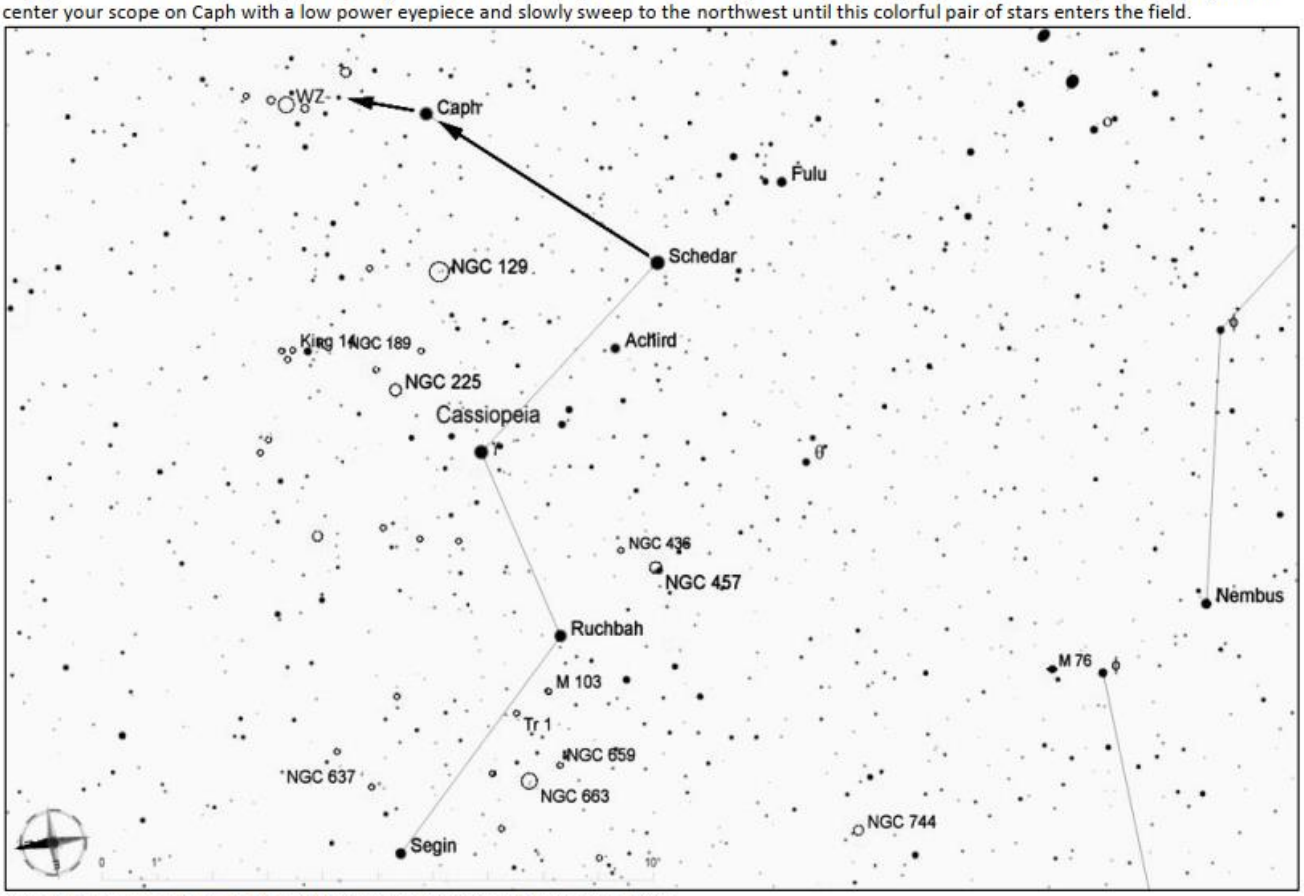
Once you have located Cassiopeia, look at the two stars that form the last line of the W shape (Caph and Schedar). Visualize a line from Schedar to Caph, and then extend this line past Caph by 1.5 degrees with a slight turn to the left (to the northwest) and aim your telescope there. Or you can center your scope on Caph with a low power eyepiece and slowly sweep to the northwest until this colorful pair of stars enters the field.



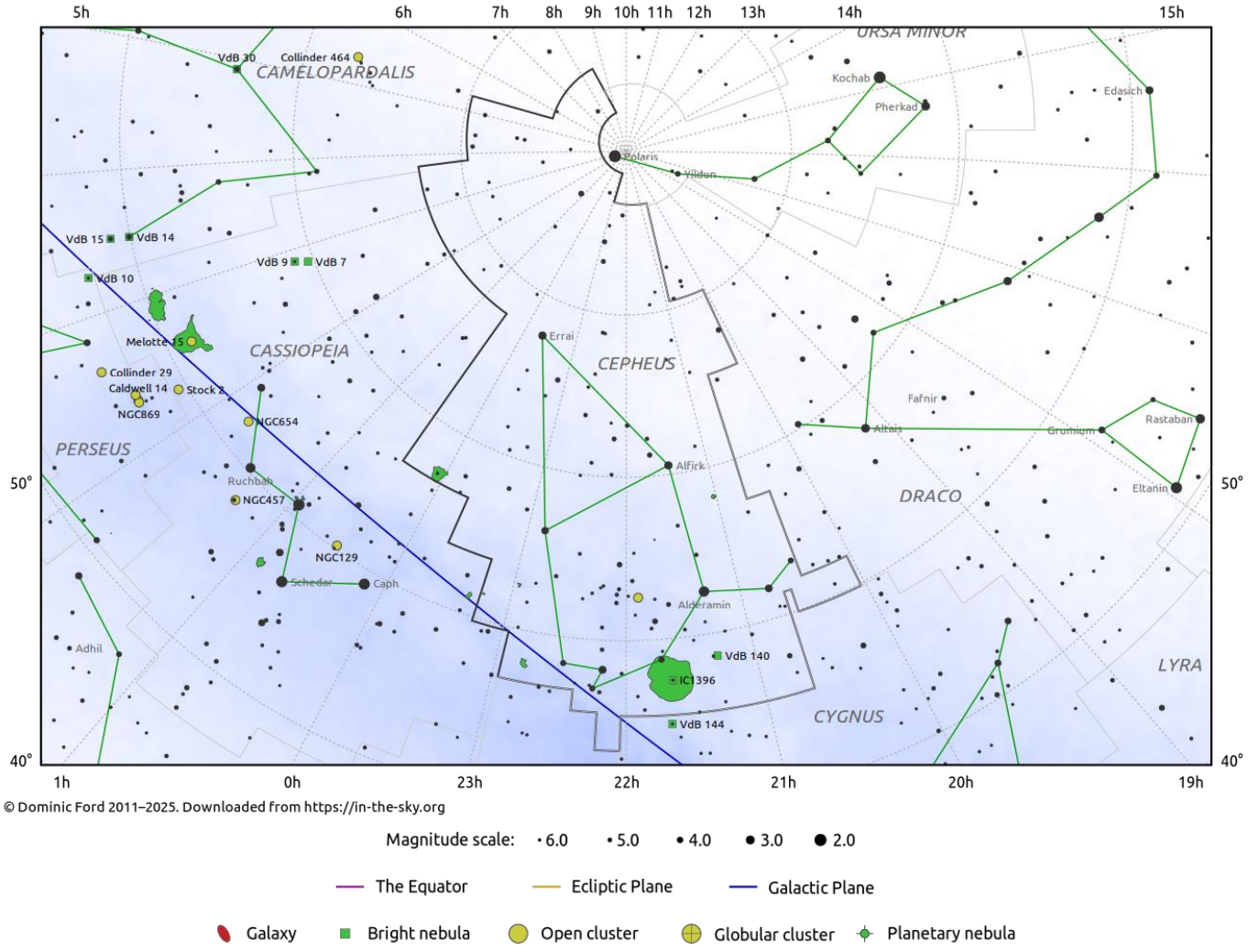
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Blank

Cepheus (Cep)

Evening Visibility: **July – January**
Online Information: **Cepheus**
Charts: **6** Featured Objects: **7**
More Online Information: Mu Cephei, NGC-40, NGC-188, NGC-6939, NGC-6946, NGC-7023, Sharpless 2-155

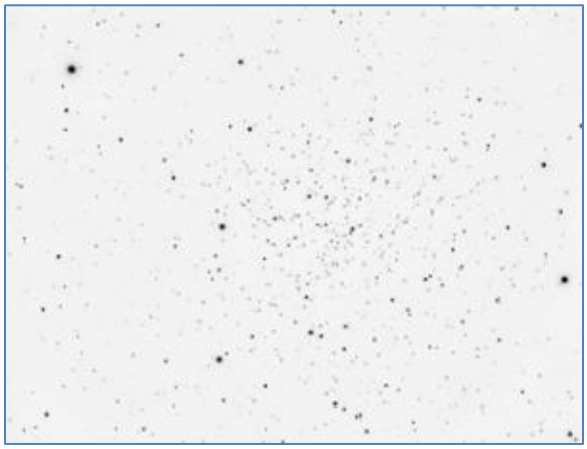
In-The-Sky.org Constellation Map



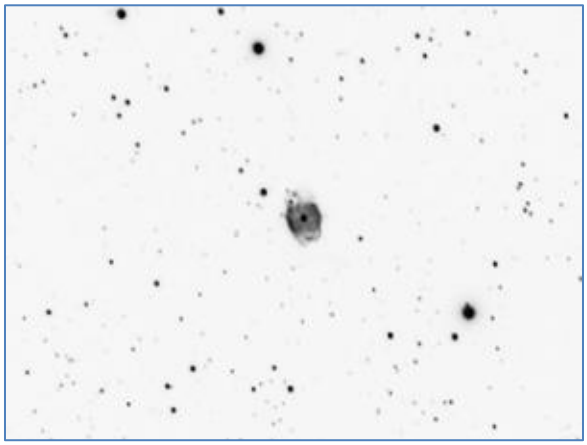
Object (Type)	Chart	Aliases	Stats
Mu Cephei (CS)	1, W1	SAO-033693, HIP-107259, Garnet Star, Erakis, ADS-15271	| Mag=4.1 | B-V Color Index = +2.35 |
NGC-40 (PN)	2, W2	Bow-Tie Nebula, C-2	| Mag=11.6 | SB=19.9 | Size=38” x 35” |

Object (Type)	Chart	Aliases	Stats
NGC-188 (OC)	3, W3	Polarissima Cluster, C-1	| Mag=10.0 | SB=22.5 | Size=15' |
NGC-6939 (OC)	4, W4		| Mag=7.8 | SB=20.9 | Size=7' |
NGC-6946 (G)	4, W4	Fireworks Galaxy, C-12	| Mag=9.6 | SB=22.6 | Size=16.0' x 11.2' |
NGC-7023 (RN)	5, W5	Iris Nebula, C-4, LBN487, CR429	| Mag=6.8 | SB=??? |Size=18' x 18' |
SH 2-155 (EN)	6, W6	Cave Nebula, C-9, Sharpless 2-155, S155, LBN529	(Cygnus)| Mag=7.7 | Size=50' x 30' |

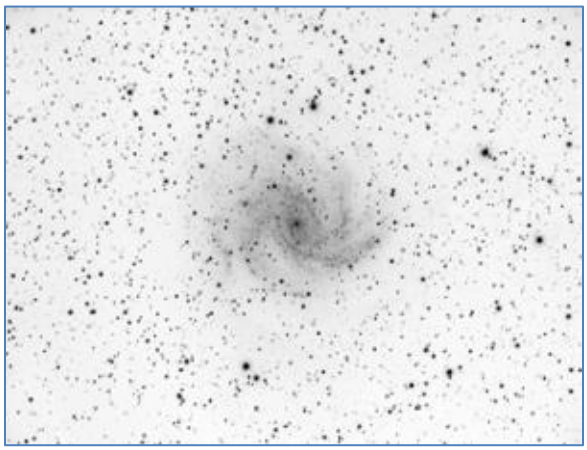
Image Gallery



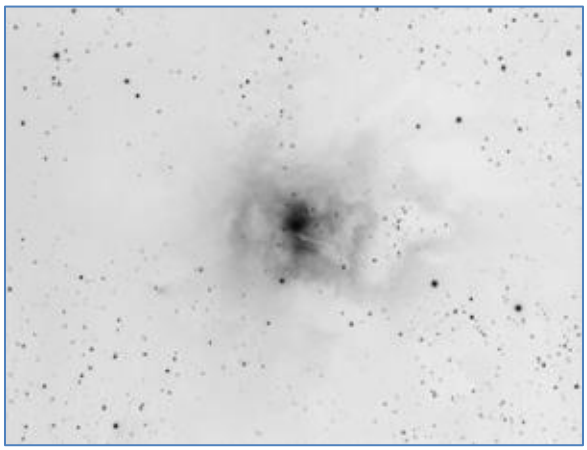
NGC 188 (C 1)



NGC 40 (C 2), The Bow Tie Nebula



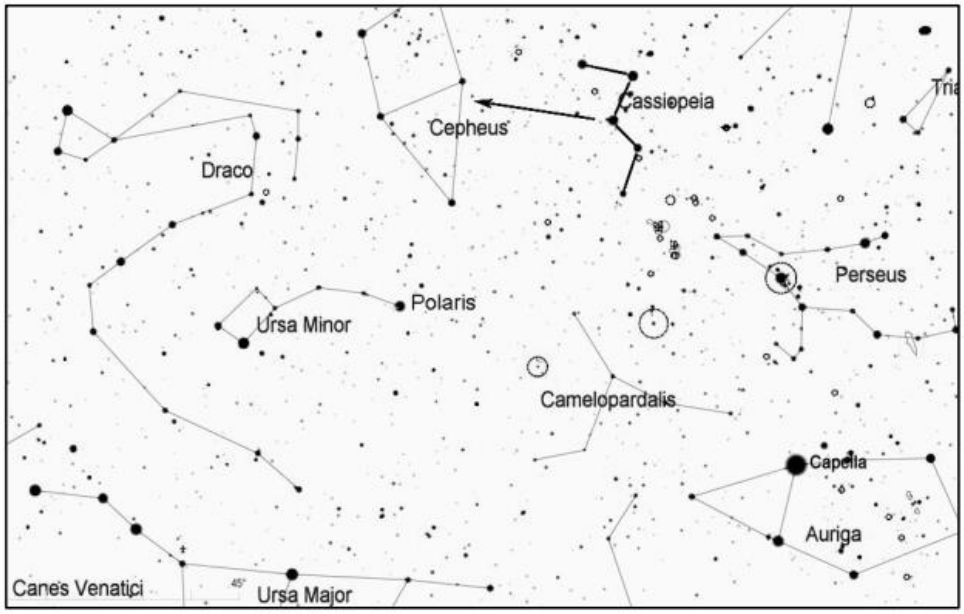
NGC 6946 (C 12) The Fireworks Galaxy



NGC 7023 (C 4) The Iris Nebula

Mu Cephei, Herschel's Garnet Star

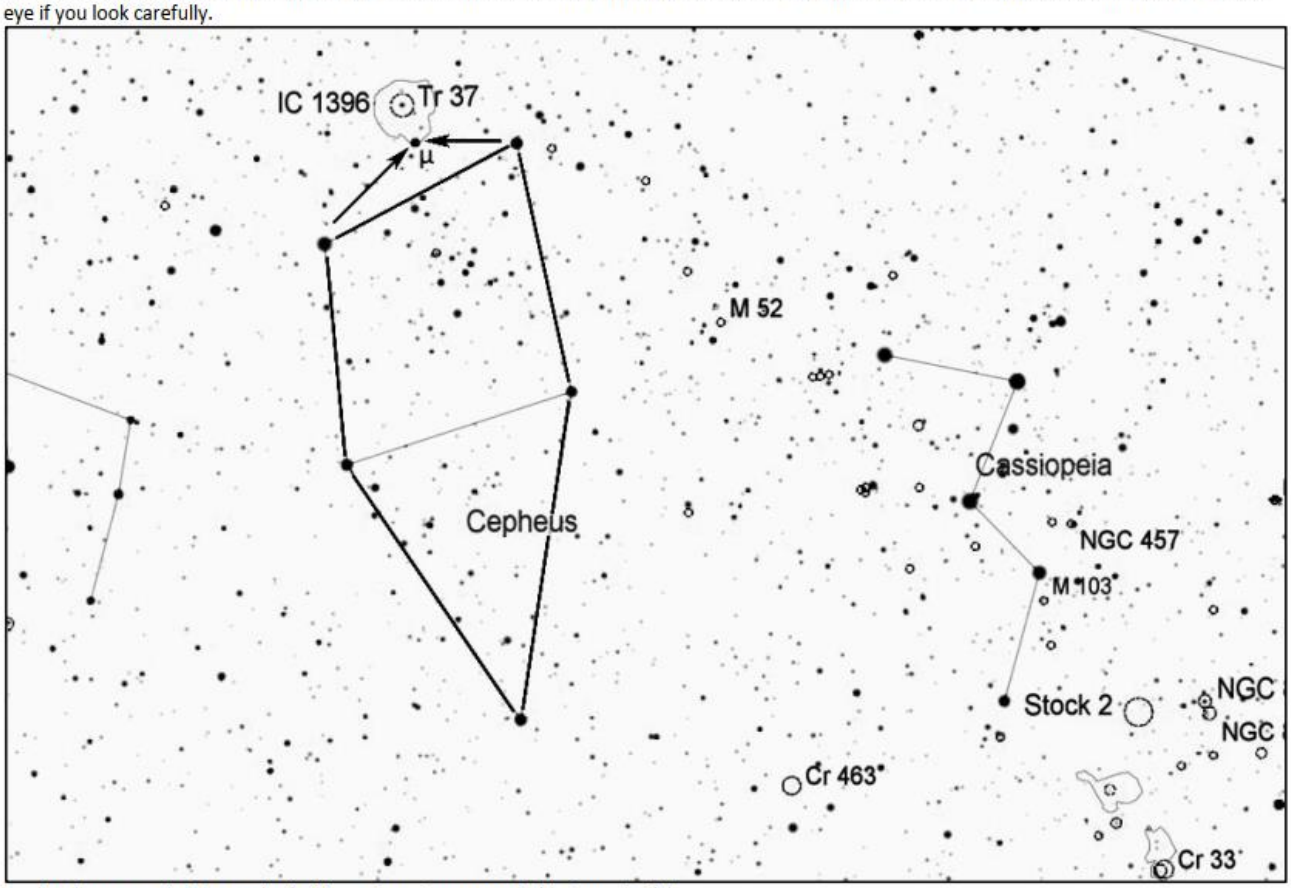
The Garnet Star is one of best-known red stars in the sky, and at magnitude 4 it is easily visible to the naked eye. It looks especially red through binoculars or a small telescope; in larger scopes its color can be muted because of the star's brightness. It is a red supergiant, one of the largest and most luminous stars known. It is larger in diameter than the orbit of Jupiter around the Sun!



Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".

As shown below, use the stars of Cassiopeia to direct you to the nearby constellation Cepheus. It has the shape of a house with a pointy roof, though the house appears upside down when Cepheus is high in the sky above Polaris.

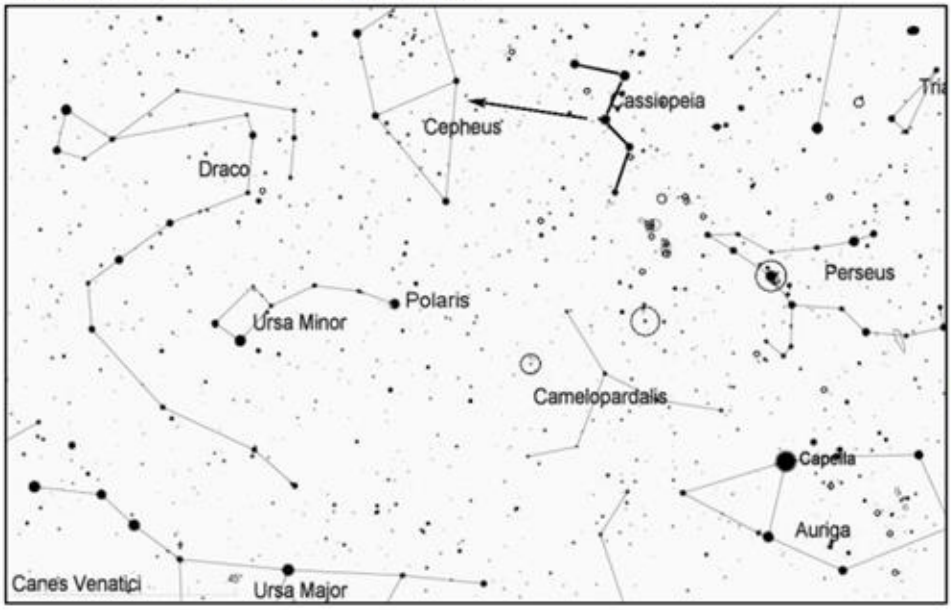
First locate the upside-down house formed by the five brightest stars of Cepheus. Mu (μ) Cephei is about half-way between the two stars that form the base of the house and a bit outside the house shape, as if it were marking the front steps of the house. Its red color is discernible to the naked eye if you look carefully.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 40 (Caldwell 2), the Bow Tie Nebula in Cepheus

Through a small telescope, the 9th magnitude central star of this planetary nebula is easy to see, but the faint nebula may not be obvious at first. With larger scopes, the oval nebula is seen in much more detail, and the brightest edges on each side give it a "bow tie" shape. Visually, NGC 40 has the blue-green color that is typical of planetary nebulae.



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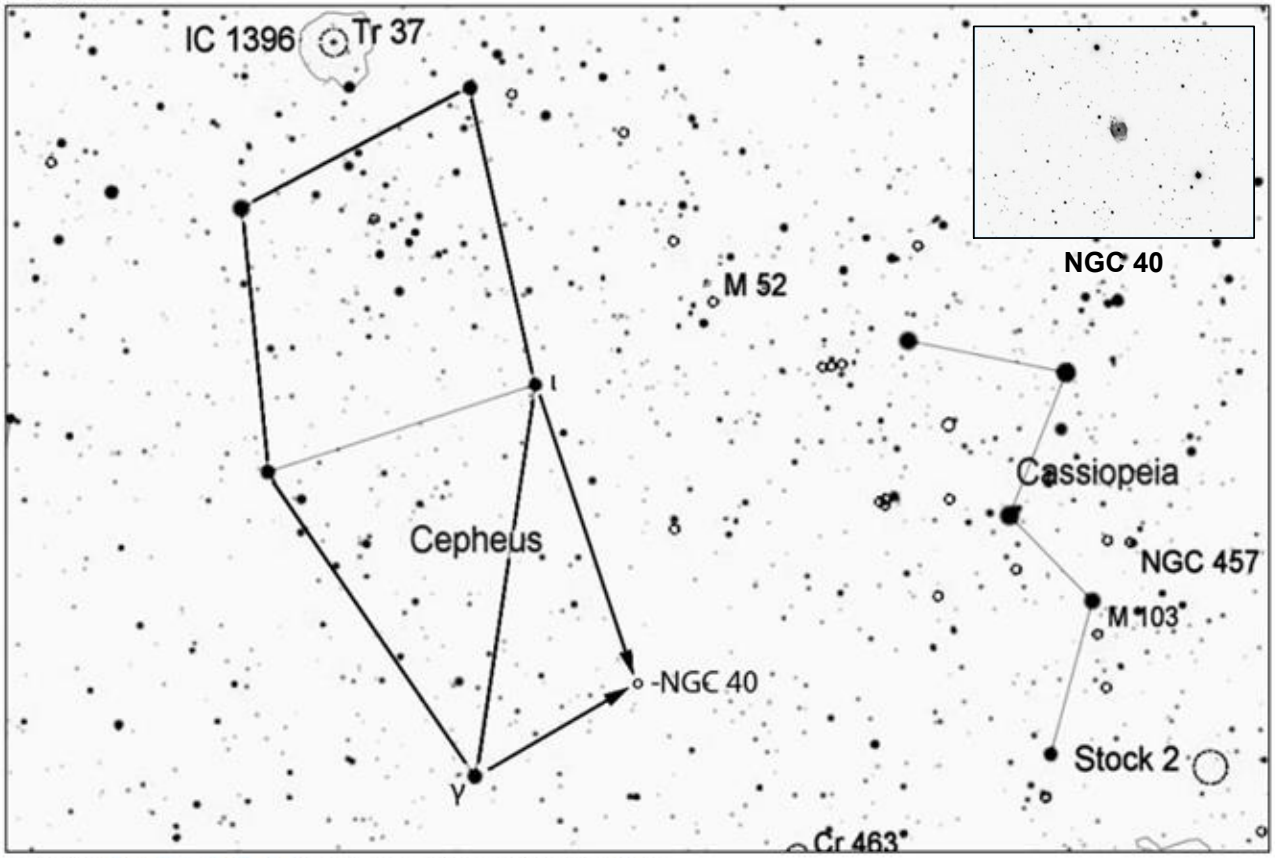
As shown below, use the stars of Cassiopeia to direct you to the nearby constellation Cepheus. It has the shape of a house with a pointy roof, though the house appears upside down when Cepheus is high in the sky above Polaris.

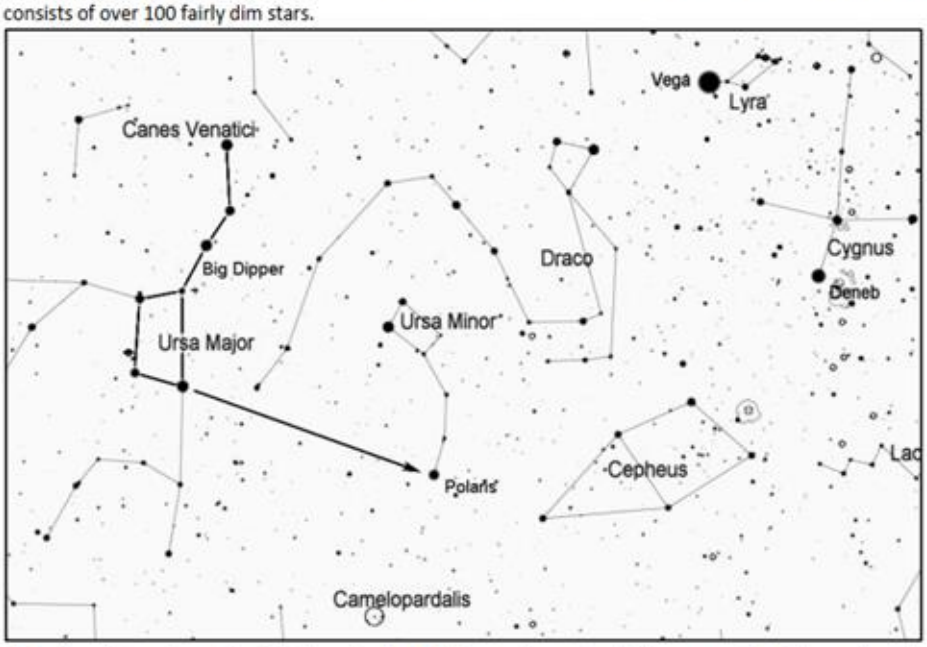
First locate the upside-down house formed by the five brightest stars of Cepheus. The peaked roof of this house is Gamma (γ) Cephei, and the Bow Tie Nebula is about 5 degrees to the southeast. You can locate it by visualizing a right triangle with γ Cephei and Iota (ι) Cephei, as shown in the chart below.



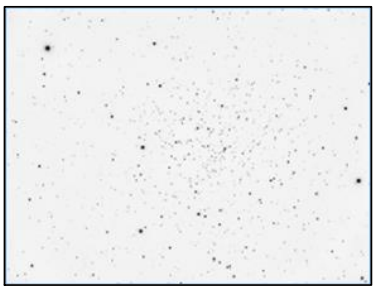
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 188 (Caldwell 1), Open Cluster in Cepheus

This is one of the oldest open clusters known, about 9 billion years old. It is just 4 degrees away from the North Star (Polaris), so it is visible all year throughout the northern hemisphere. The cluster is about 15 arcminutes in diameter (about half the apparent diameter of the full Moon), and consists of over 100 fairly dim stars.

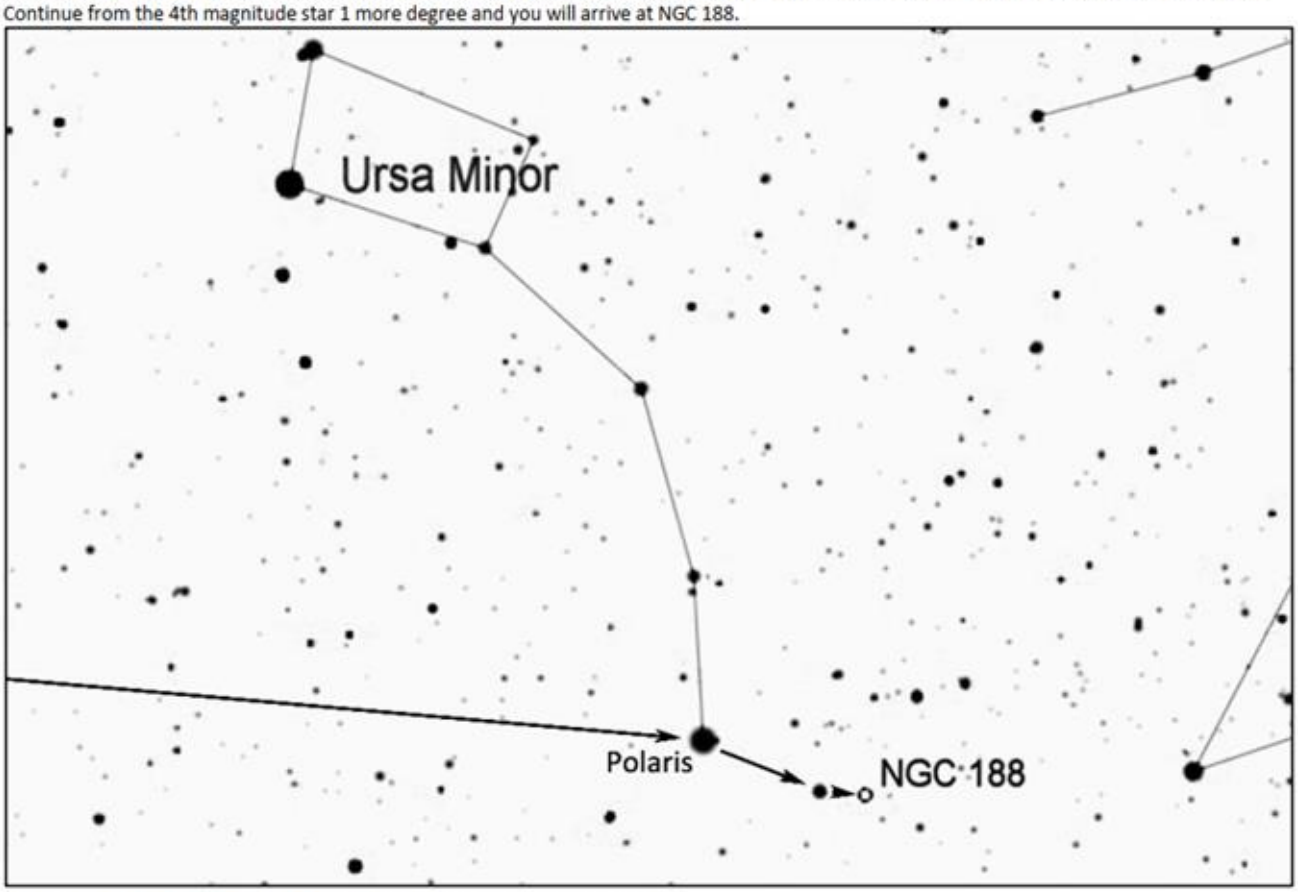


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here roughly as it is orinented in the evenings of late summer and fall. Use the two pointer stars in the bowl of the Big Dipper to find Polaris, the North Star.



NGC 188

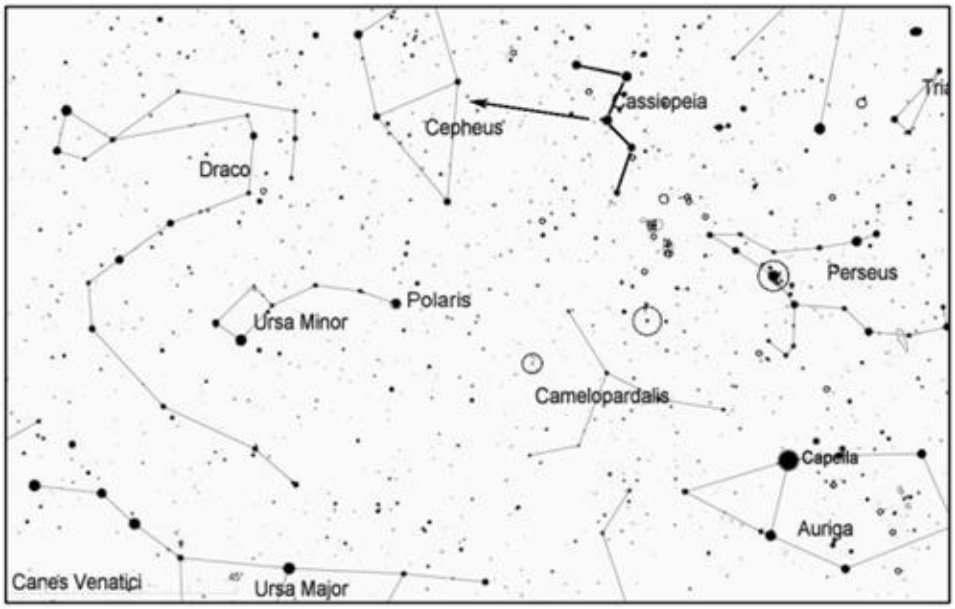
Using the pointer stars of the Big Dipper to find Polaris, continue about 3 degrees past Polaris on almost the same line to reach a 4th magnitude star, which will be visible to the naked eye in a reasonably dark sky (and easily seen through binoculars or finder as the brightest star in that area). Continue from the 4th magnitude star 1 more degree and you will arrive at NGC 188.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6939, Open Cluster, and NGC 6946 (Fireworks Galaxy) in Cepheus

This is a contrasting pair of objects about 2/3 degrees apart. NGC 6939 is a small open cluster about 5900 light years away. NGC 6949 (also known as Caldwell 12 or the Fireworks Galaxy) is a face-on spiral galaxy with a bright center and dim diffuse arms, about 25 million light years away. These objects can be seen together in the same low-power field of view, making an interesting juxtaposition of a distant open cluster and a very distant galaxy.



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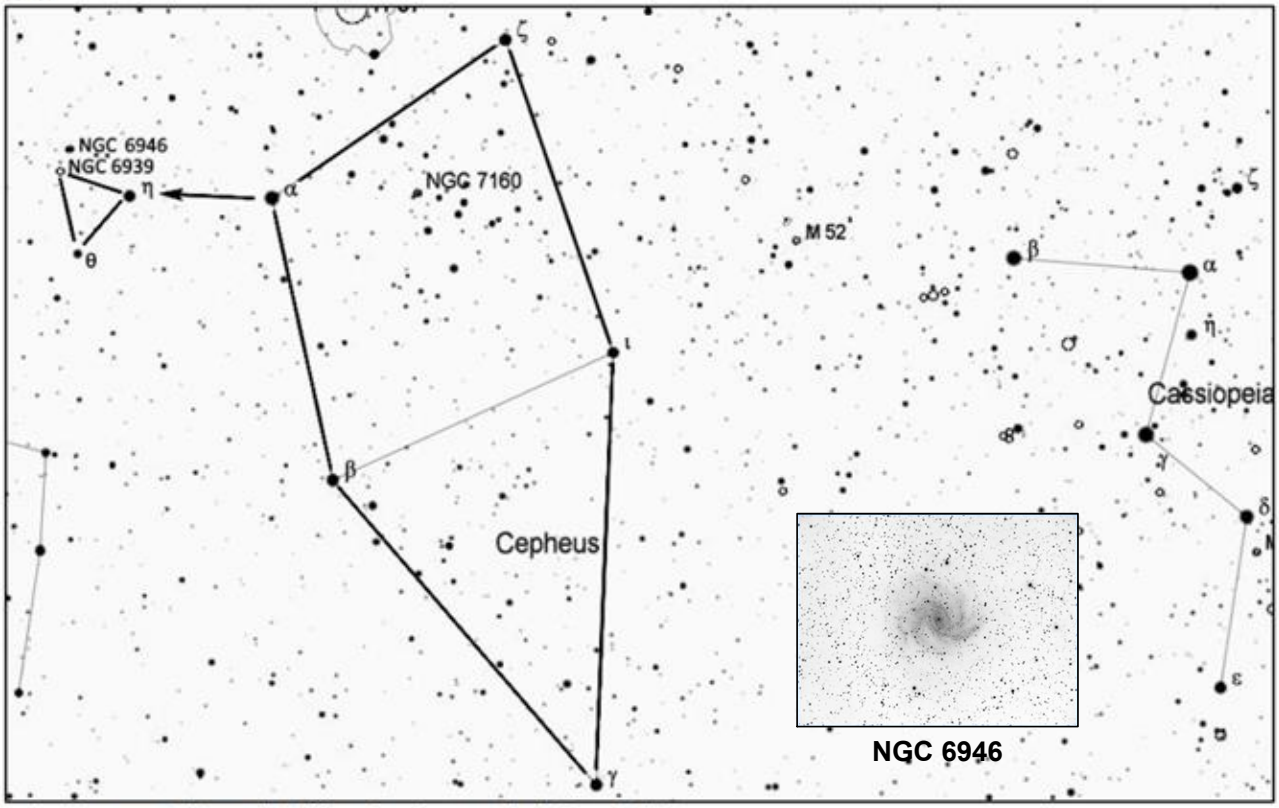
As shown below, use the stars of Cassiopeia to direct you to the nearby constellation Cepheus. It has the shape of a house with a pointy roof, though the house appears upside down when Cepheus is high in the sky above Polaris.

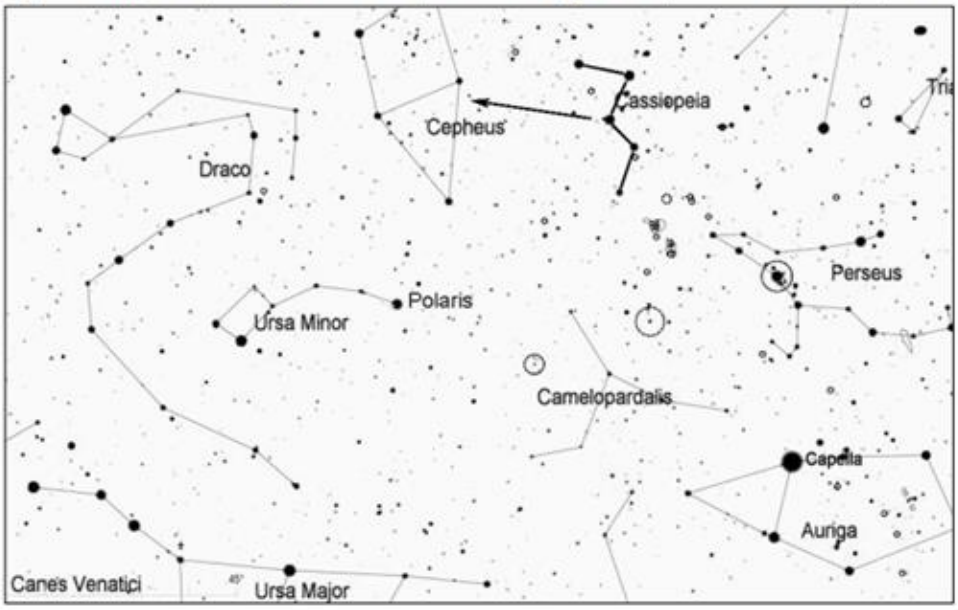
First locate the upside-down house formed by the five brightest stars of Cepheus. From alpha (α) Cephei, the brightest star at the base of the house, look 4 degrees away in the direction opposite from Cassiopeia for 3rd magnitude eta (η) Cephei and 4th magnitude theta (θ) Cephei. As shown in the chart below, visualize a triangle with η and θ, and the third point of the triangle is NGC 6939. About 2/3 degree to the south is NGC 6946.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 7023 (Caldwell 4), Iris Nebula in Cepheus

NGC 7023, sometimes called the Iris Nebula, is an example of a reflection nebula--the dust in this nebula shines simply by reflecting the light of the star its center (a magnitude 7 star that appears much brighter than the nebula through the eyepiece). The nebula is large in extent, more than 1/4 degree in width, but only the brighter center may be visible through a telescope. It is about 1300 light years away.



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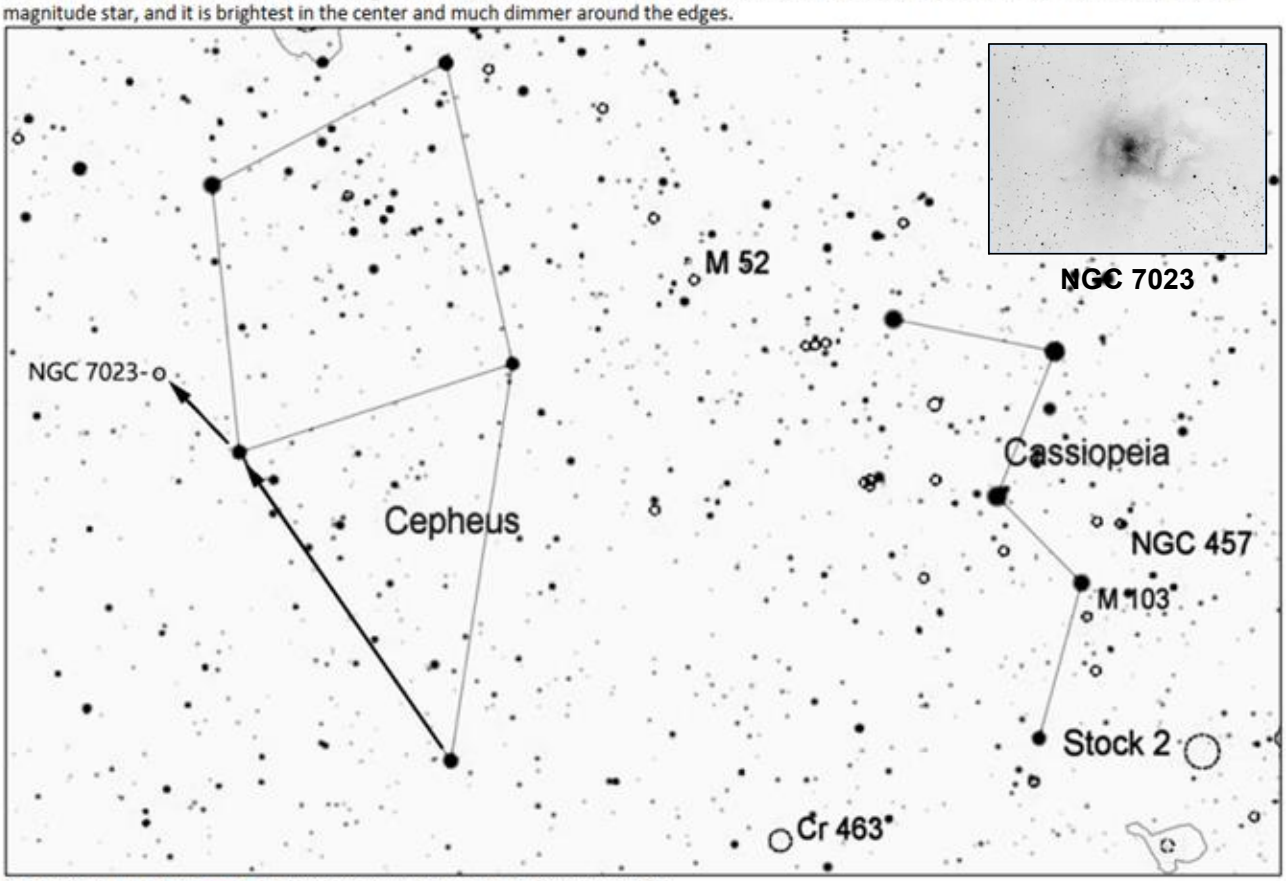
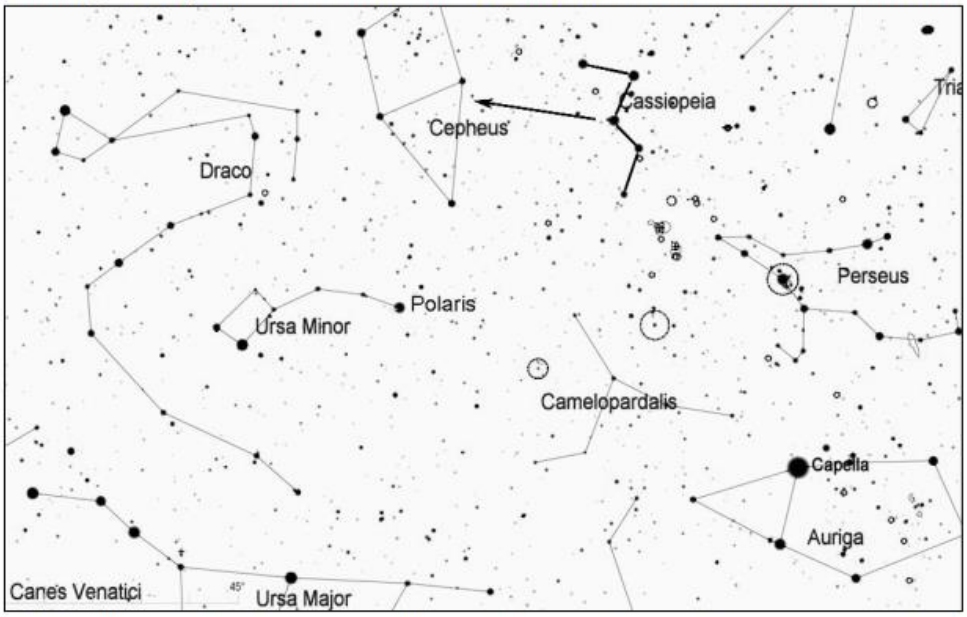
First locate the upside-down house formed by the five brightest stars of Cepheus. Visualize a line down the side of the pointy roof that is away from Cassiopeia, and extend this line about 3 degrees from the end of the roof. This is the location of the Iris Nebula. The nebula is centered on a 7th magnitude star, and it is brightest in the center and much dimmer around the edges.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Sharpless 2-155 (Caldwell 9), the Cave Nebula in Cepheus

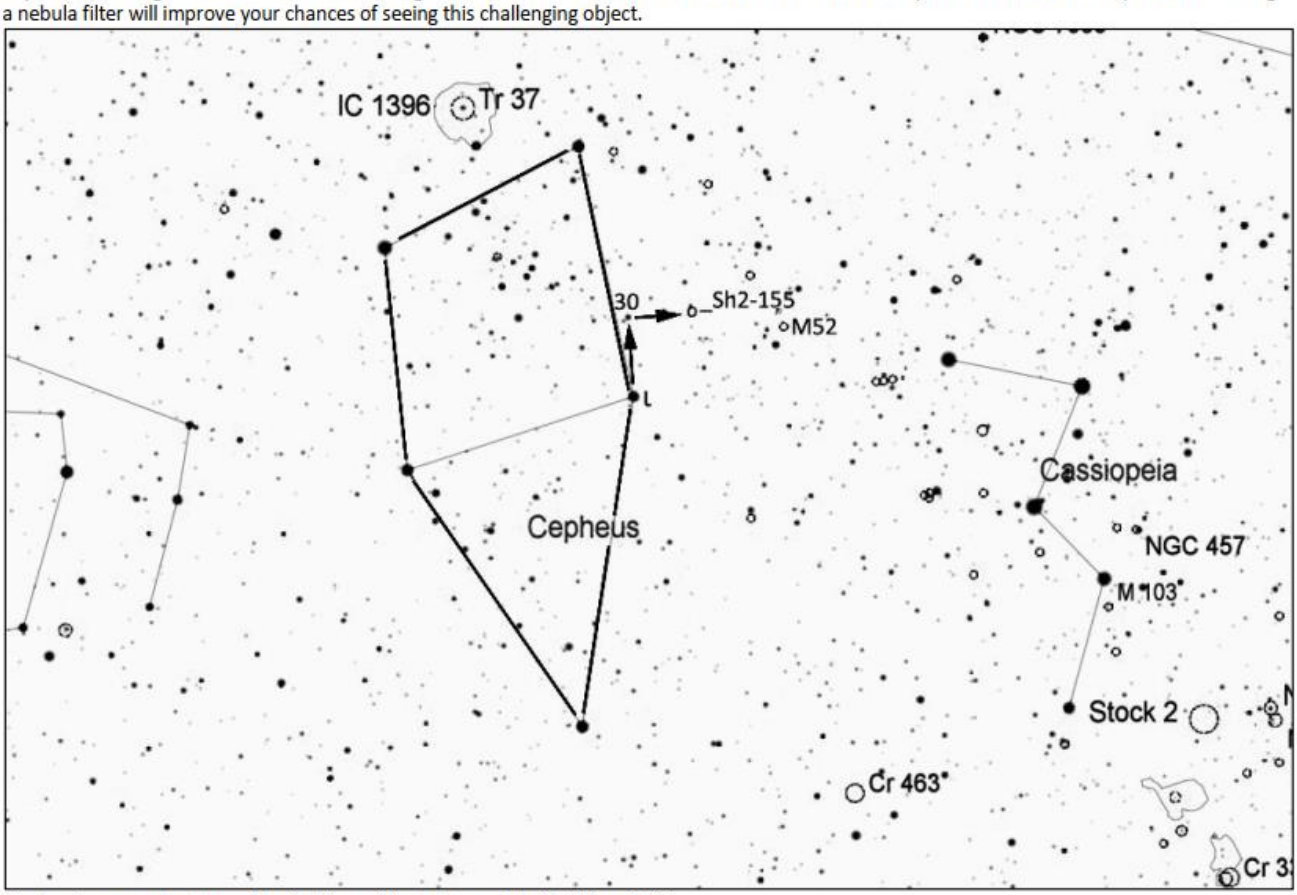
Although it is an attractive photographic target, Sh2-155 is one of the most difficult objects on the Caldwell list to see visually because of its low surface brightness. The part of this nebula complex called the Cave Nebula is a C-shaped arc with a dark center, and it resembles the entrance to a cave in long-duration photos. The cave section is about 12' in diameter, but the entire nebula is several times larger, and very dim.



Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".

As shown below, use the stars of Cassiopeia to direct you to the nearby constellation Cepheus. It has the shape of a house with a pointy roof, though the house appears upside down when Cepheus is high in the sky above Polaris.

First locate the upside-down house formed by the five brightest stars of Cepheus. Visualize a line down the side of the pointy roof that is closest to Cassiopeia, and extend this line about 3 degrees from the end of the roof. The brightest star in this area is 30 Cephei, magnitude 5.2. From 30 Cephei, make a right turn and move about 2 degrees to reach the area of the Cave Nebula. Look for a very faint nebula in the shape of a "C". Using a nebula filter will improve your chances of seeing this challenging object.

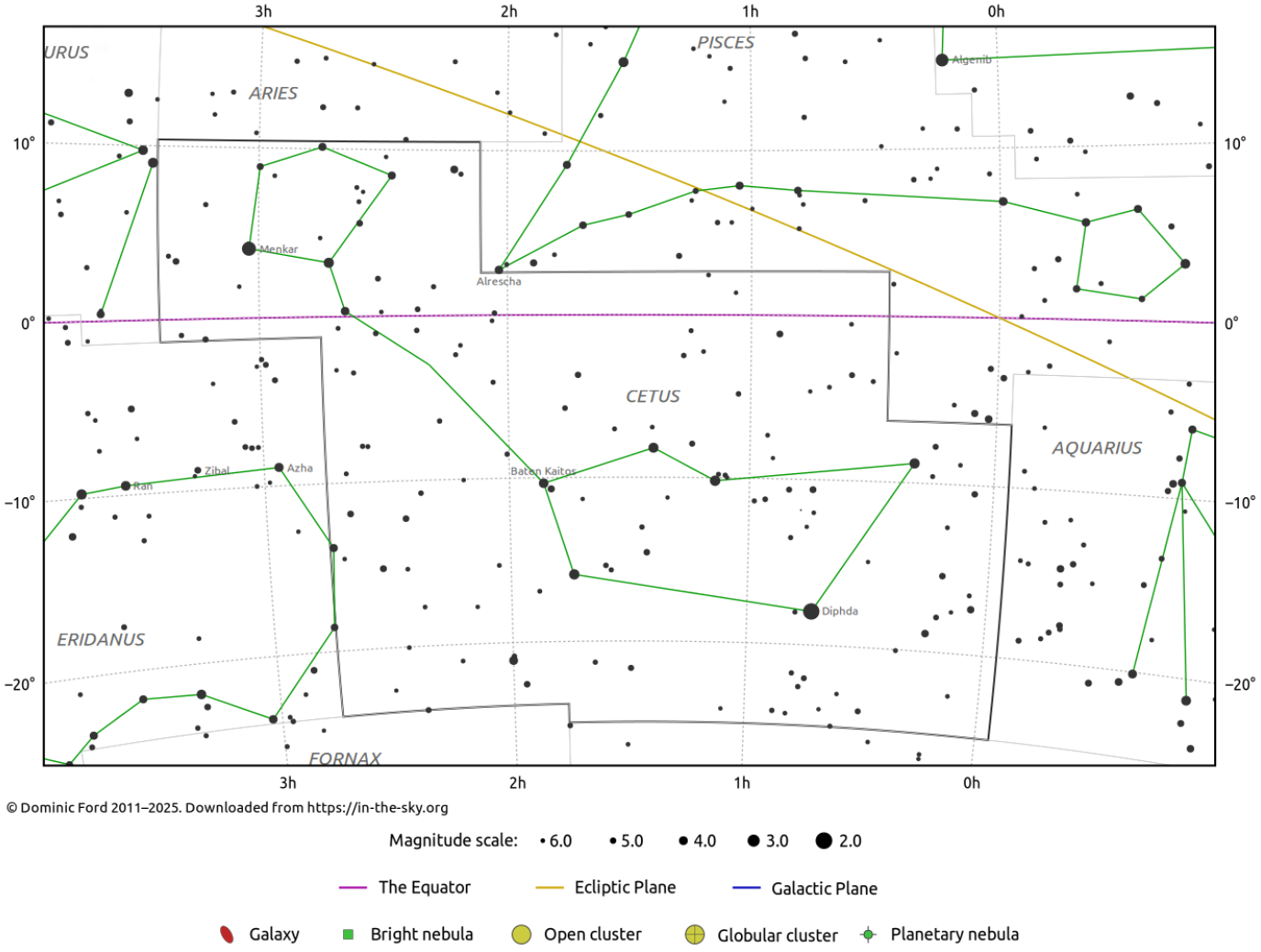


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Cetus (Cet)

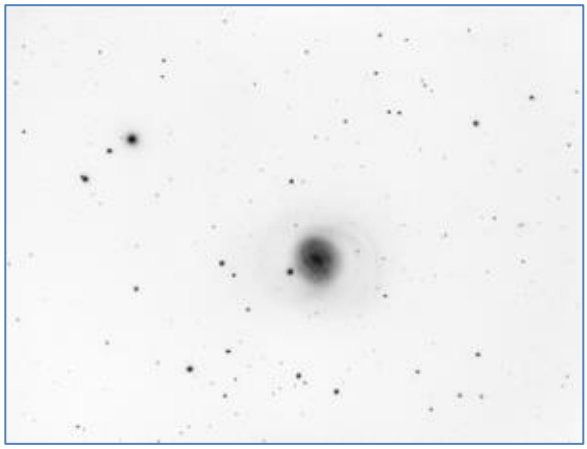
Evening Visibility: **October – February**
Online Information: **Cetus**
Charts: **1** Featured Objects: **1**
More Online Information: M-077

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
M-077 (G)	1, W1	Squid Galaxy, NGC-1068	| Mag=8.9 | SB=22.5 | Size=7.1' x 6.0' |

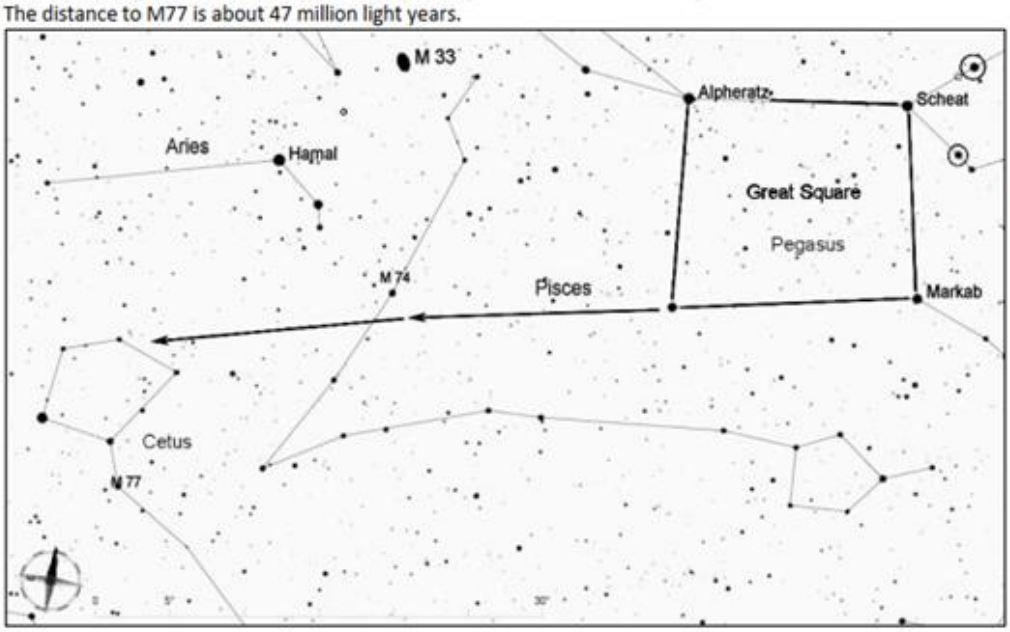
Image Gallery



Messier 77

Messier 77, Galaxy in Cetus

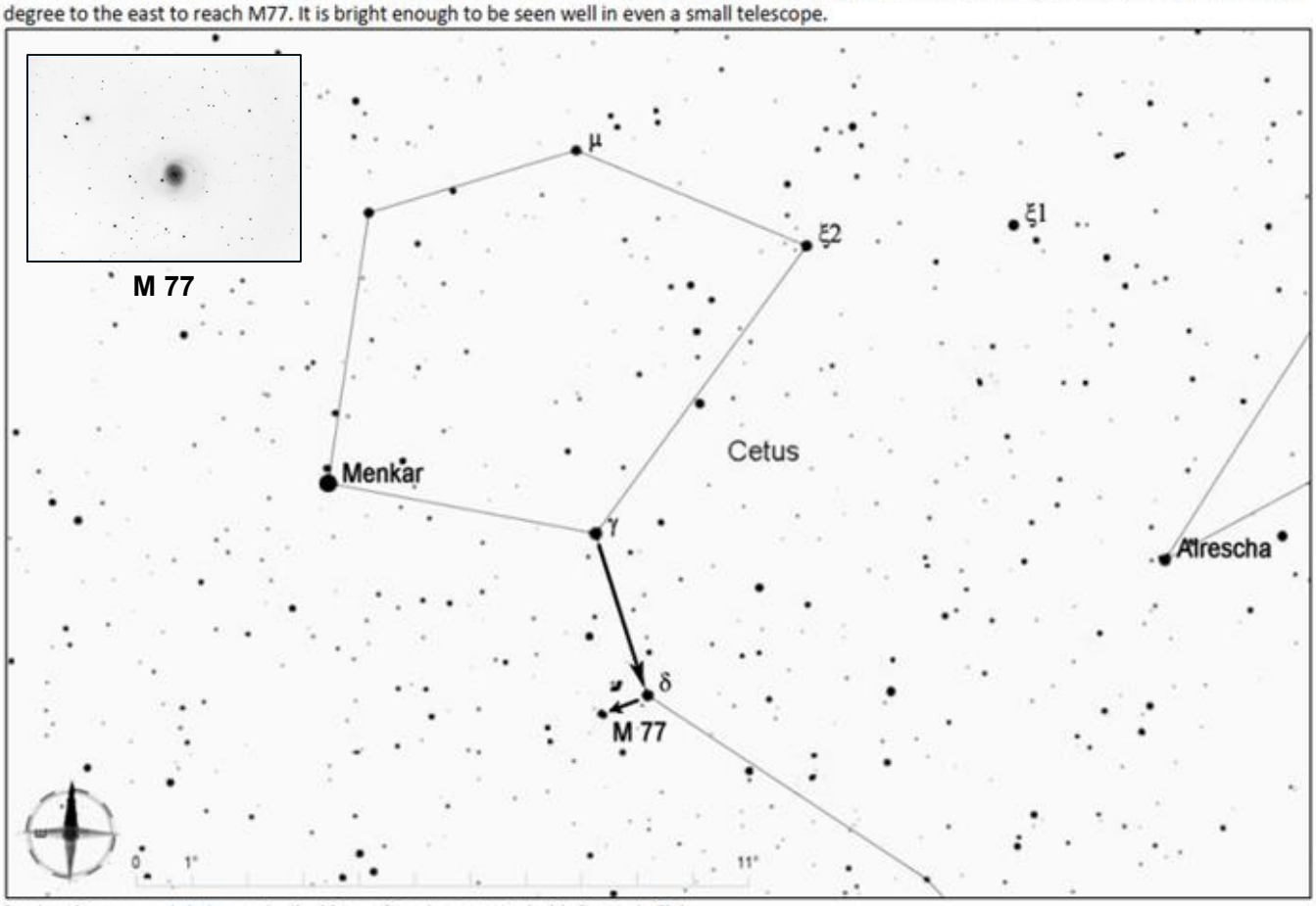
Messier 77, also known as Cetus A, is an example of a Seyfert galaxy--a galaxy with a bright and active nucleus that is a strong emitter of radio waves. This bright nucleus is quite noticeable through a telescope. With a large telescope, quite a bit of structure can be seen in this face-on galaxy. The distance to M77 is about 47 million light years.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart below) that form a small triangle with Scheat.

Using the southern edge of the Great Square as a pointer, extend a line to the east about twice the size of the Square, and you will arrive at a circle of dim stars that represent the head of Cetus, the whale.

From the head of Cetus, move south about 3 degrees to the 4th magnitude star delta (δ) Ceti. With δ centered in a low-power eyepiece, move 3/4 degree to the east to reach M77. It is bright enough to be seen well in even a small telescope.



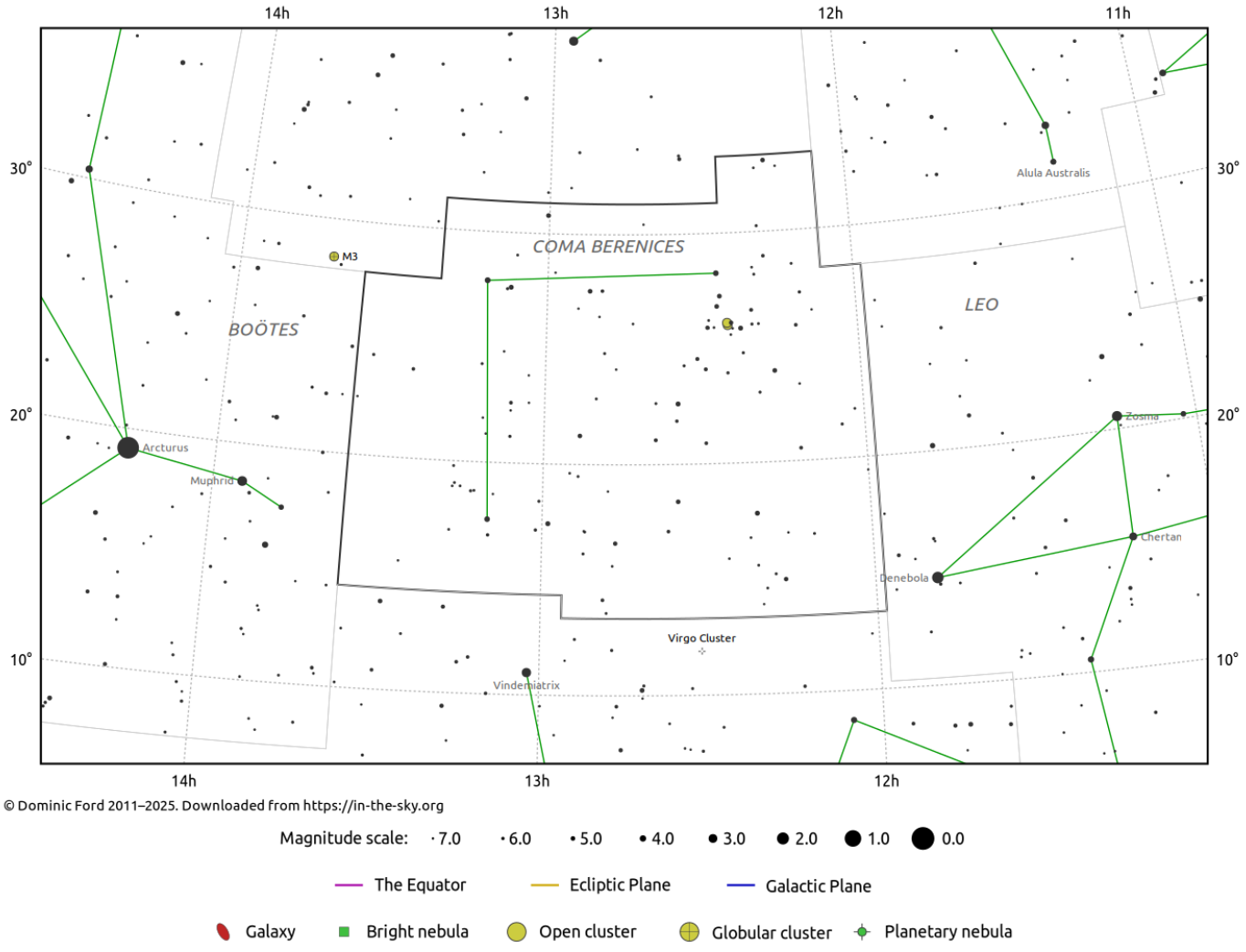
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Blank

Coma Berenices (Com)

Evening Visibility: **March – July**
Online Information: **Coma Berenices**
Charts: **9** Featured Objects: **18**
More Online Information: Melotte 111, M-053, M-064, M-084, M-086, M-087, M-098, M-099, M-100, M-085, NGC-4394, M-088, M-091, NGC-4435, NGC-4438, NGC-4565, NGC-4559, NGC-4889, NGC-4872

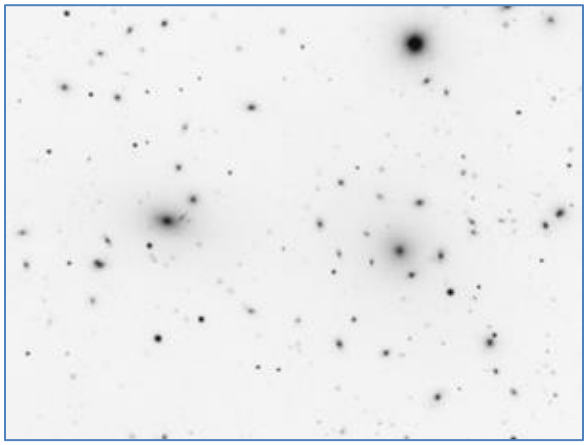
In-The-Sky.org Constellation Map



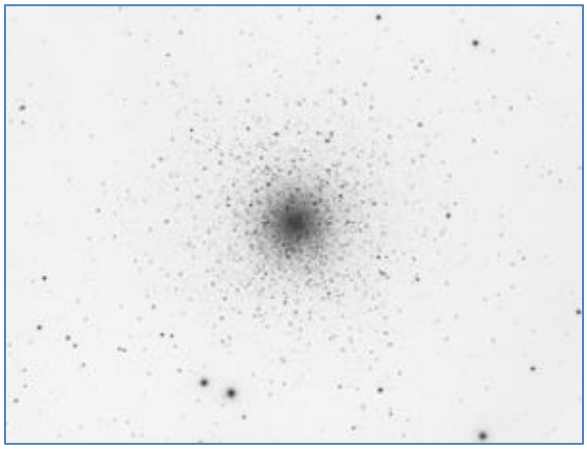
Object (Type)	Chart	Aliases	Stats
Melotte 111 (OC)	1, W1	Coma Star Cluster, Collinder 256, Mel 111	| Mag=1.8 | SB=22.6 | Size=7.5° |

Object (Type)	Chart	Aliases	Stats
M-053 (OC)	2, W2	NGC-5024	| Mag=7.6 | SB=22.6 | Size=13.0' |
M-064 (G)	3, W3	Black Eye Galaxy, NGC-4826	| Mag=8.5 | SB=22.2 | Size=10.7' x 5.1' |
M-084 (G)	4, W4	NGC-4374, UGC-7494, Markarian's Chain	| Mag=9.1 | SB=22.8 | Size=6.5' x 5.6' |
M-086 (G)	4, W4	NGC-4406, Markarian's Chain	| Mag=8.9 | SB=23.0 |Size=8.9' x 5.8' |
M-087 (G)	4, W4	Virgo A, NGC-4486	| Mag=8.6| SB=22.6 | Size=7.2' x 6.8' |
M-098 (G)	4, W4	NGC-4192	| Mag=10.1 | SB=22.9 | Size=9.8' x 2.8' |
M-099 (G)	4, W4	St. Catherine's Wheel, NGC-4254	| Mag=9.9 | SB=22.5 | Size=5.4' x 4.7' |
M-100 (G)	4, W4	Mirror Galaxy, NGC-4321	| Mag=9.3 | SB=22.9 | Size=7.4' x 6.3' |
M-085 (G)	5, W5	NGC-4382, PGC-40515	| Mag=9.1 | SB=22.7 | Size=7.1' x 5.5' |
NGC-4394 (G)	5, W5		| Mag=11.9 | SB=22.5 | Size=3.6' x 3.2' |
M-088 (G)	6, W6	NGC-4501	| Mag=9.6 | SB=22.3 | Size=6.9' x 3.7' |
M-091 (G)	6, W6	NGC-4548	| Mag=10.2 | SB=22.9 | Size=5.4' x 4.3' |
NGC-4435 (G)	7, W7	Eyes Galaxies, Arp 120, Markarian's Chain	| Mag=10.9 | SB=21.9 | Size=2.4' x 1.4' |
NGC-4438 (G)	7, W7	Eyes Galaxies, Markarian's Chain	| Mag=10.1 | SB=23.6 | Size=8.5' x 3.2' |
NGC-4565 (G)	8, W8	Needle Galaxy, C-38	| Mag=10.4 | SB=24.3 | Size=15.9' x 1.8' |
NGC-4559 (G)	8, W8	C-36	| Mag=10.4 | SB=23.6 | Size=10.7' x 4.4' |
NGC-4889 (G)	9, W9	C-35	| Mag=12.9 | SB=22.4 | Size=2.9' x 1.9' |
NGC-4872 (G)	9, W9		| Mag=15.2 | SB=22.3 | Size=0.6' x 0.37' |

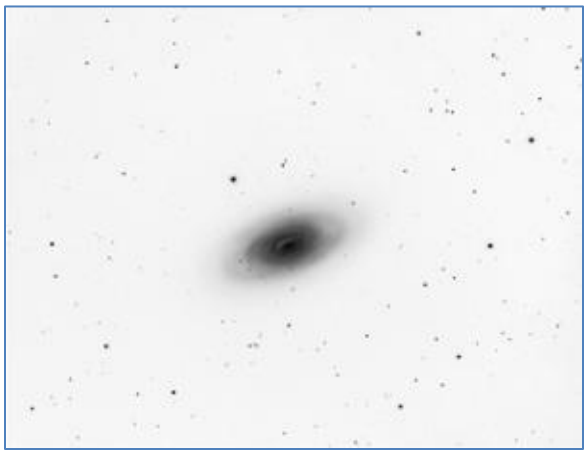
Image Gallery



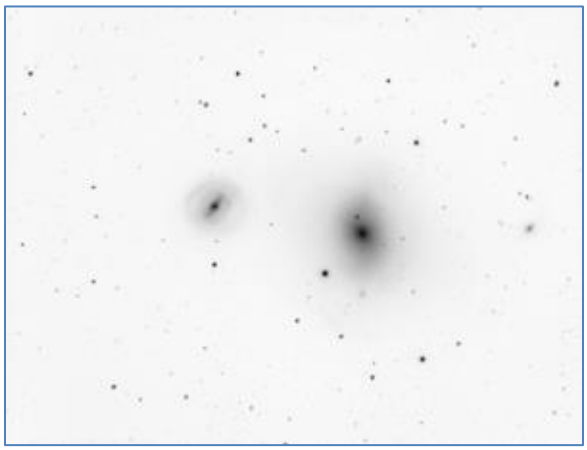
Abell 1656, Coma Galaxy Cluster



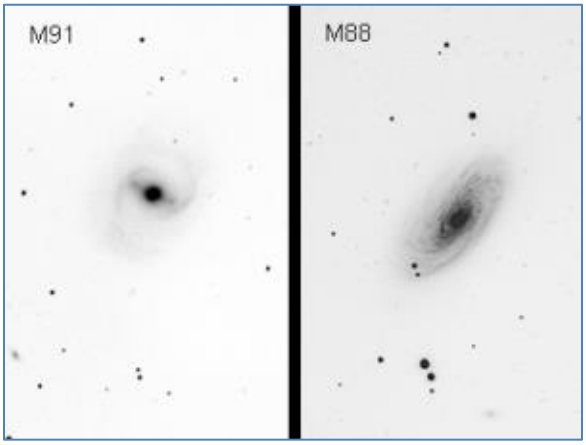
Messier 53



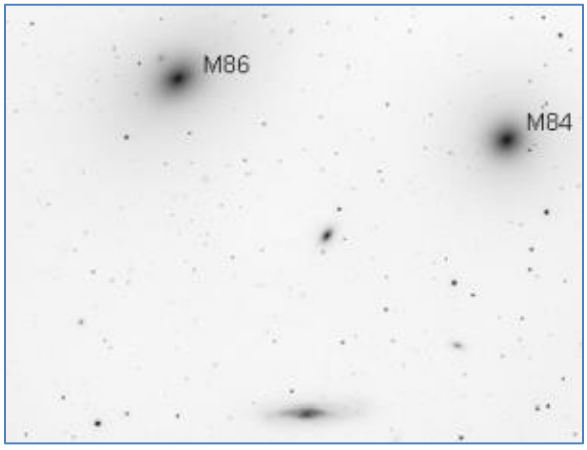
Messier 64, The Black-Eye Galaxy



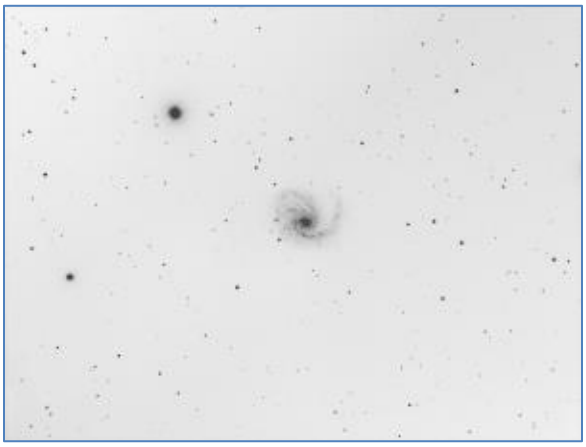
Messier 85 and NGC 4394



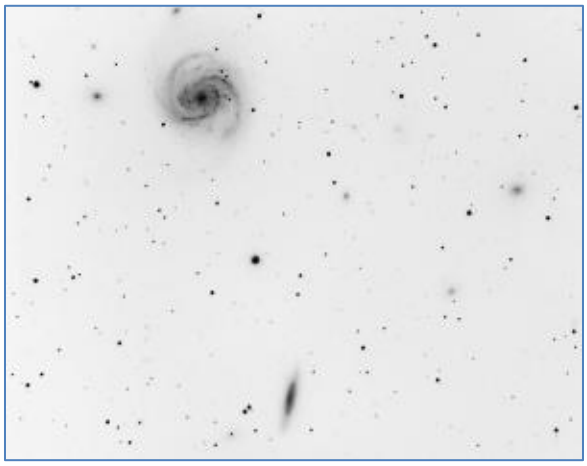
Messier 91 and Messier 88



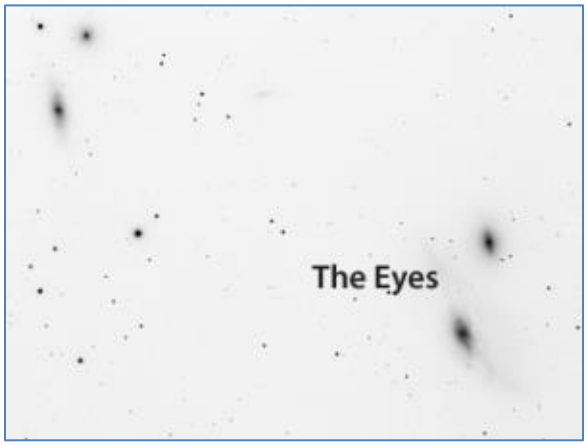
Messier 84 and 86 region



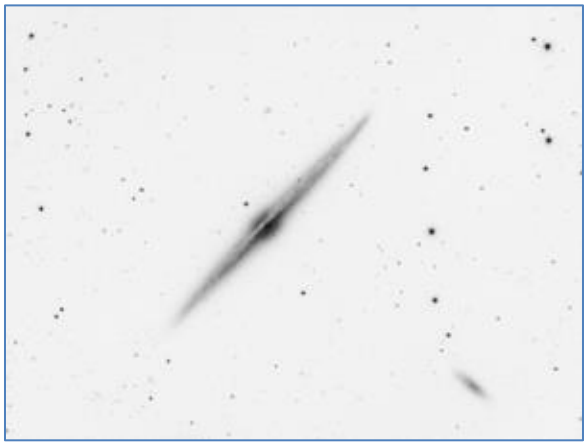
Messier 99, Coma Pinwheel Galaxy



Messier 100



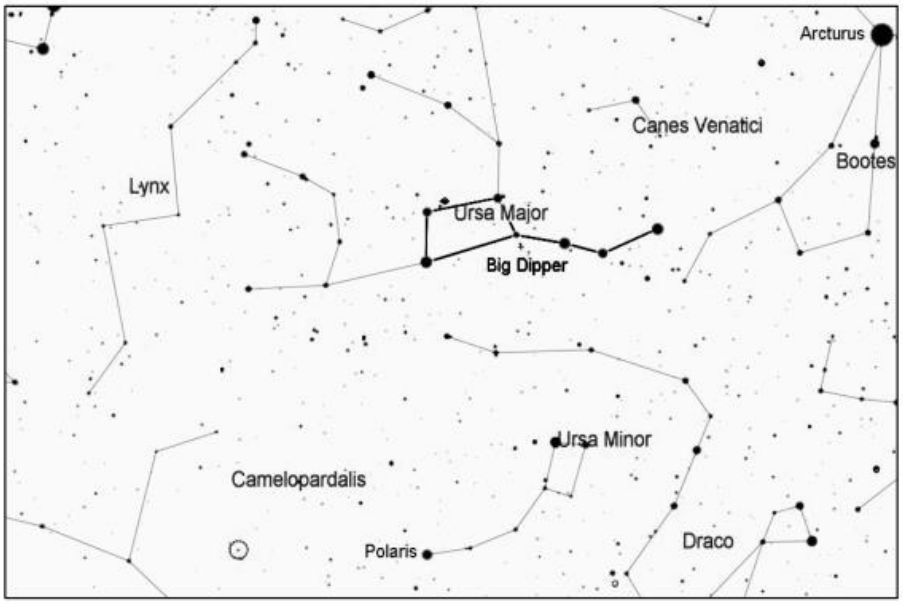
NGC 4435 and 4438, The Eyes



NGC 4565 (C 38), The Needle Galaxy

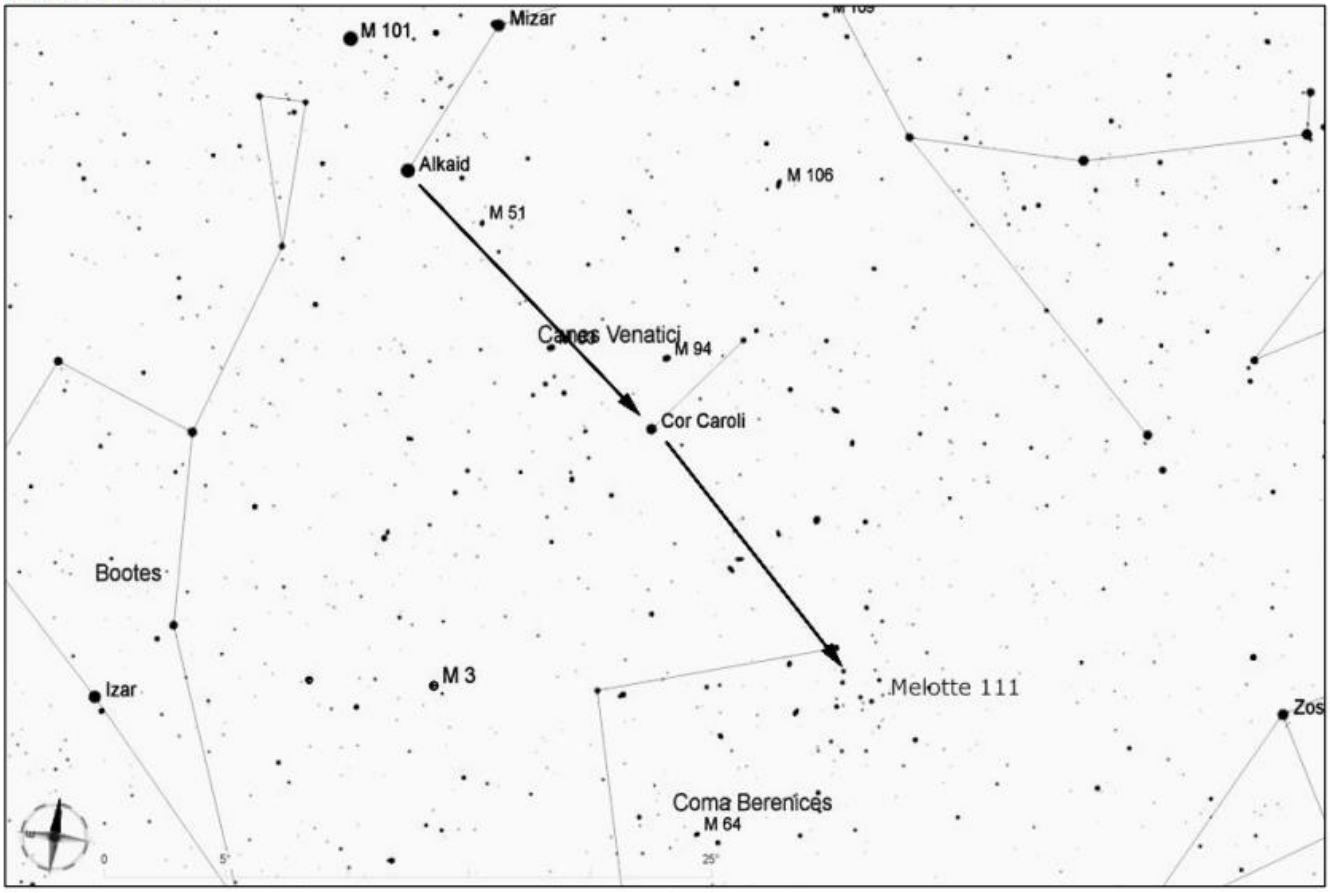
Melotte 111, the Coma Star Cluster

The Coma Star Cluster is one of the nearest open clusters, just 288 light years away, and it is not hard to see at least a few of its stars with the naked eye on a dark night. It is a group of about 40 stars spread over a 4.5-degree area of sky, and it is a fine target for binoculars.



Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.

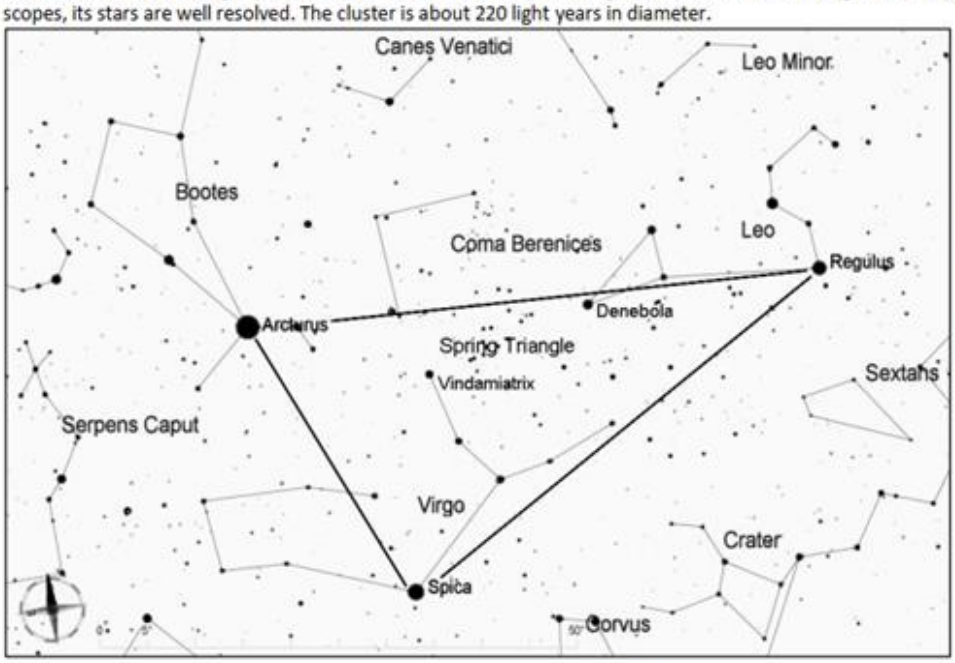
Start from Alkaid, the star at the end of the Big Dipper's handle, and look about 15 degrees below the curve of the handle for a bright star, Cor Caroli. Follow this line about another 15 degrees and you will arrive at the Melotte 111. If you can't see it with the naked eye, it should be easy to observe with binoculars.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

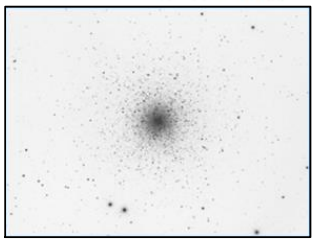
Messier 53, Globular Cluster in Coma Berenices

At an estimated 58,000 light years away, Messier 53 is a fairly distant globular cluster, but it is bright and easy to see. Through large amateur scopes, its stars are well resolved. The cluster is about 220 light years in diameter.



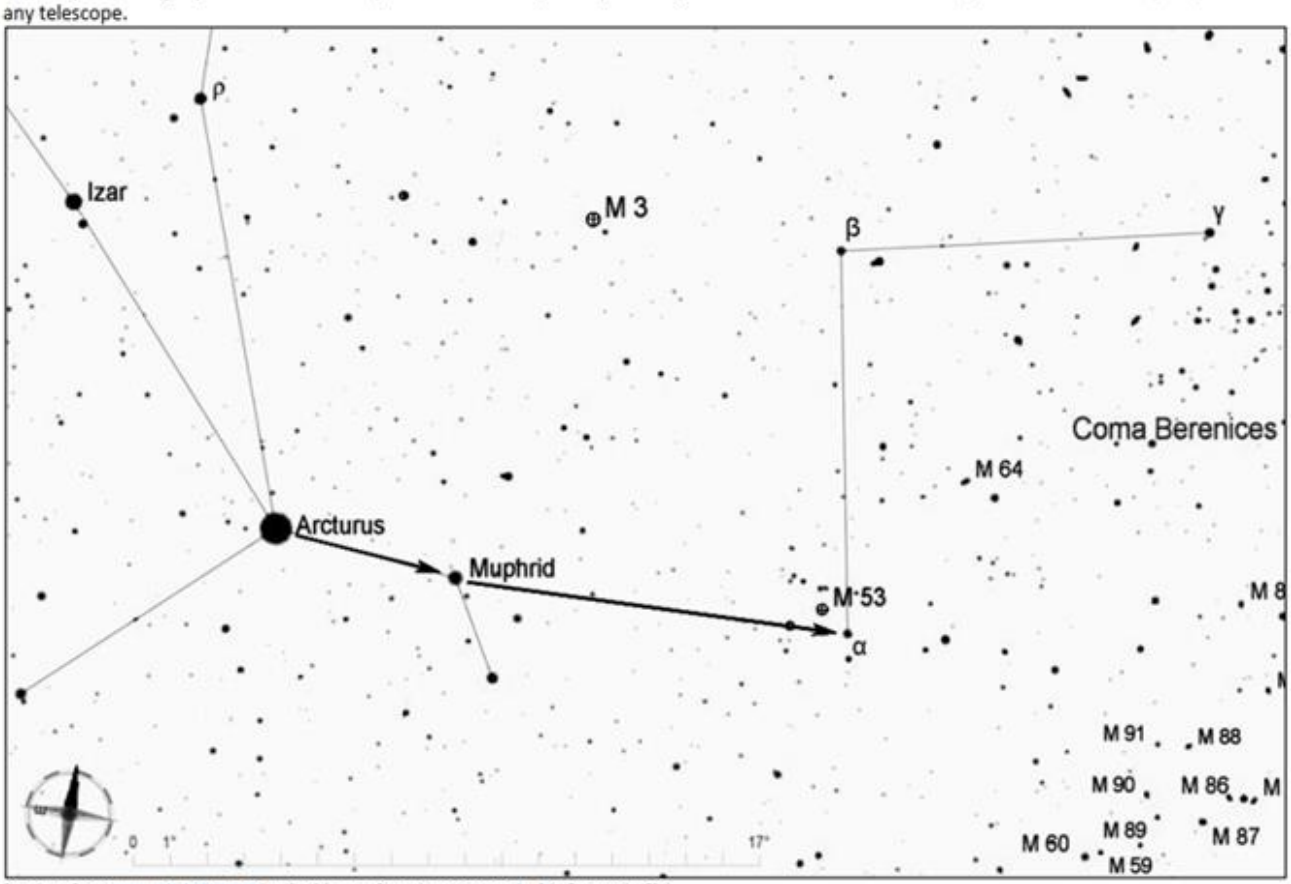
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin from brilliant Arcturus (magnitude 0).



M 53

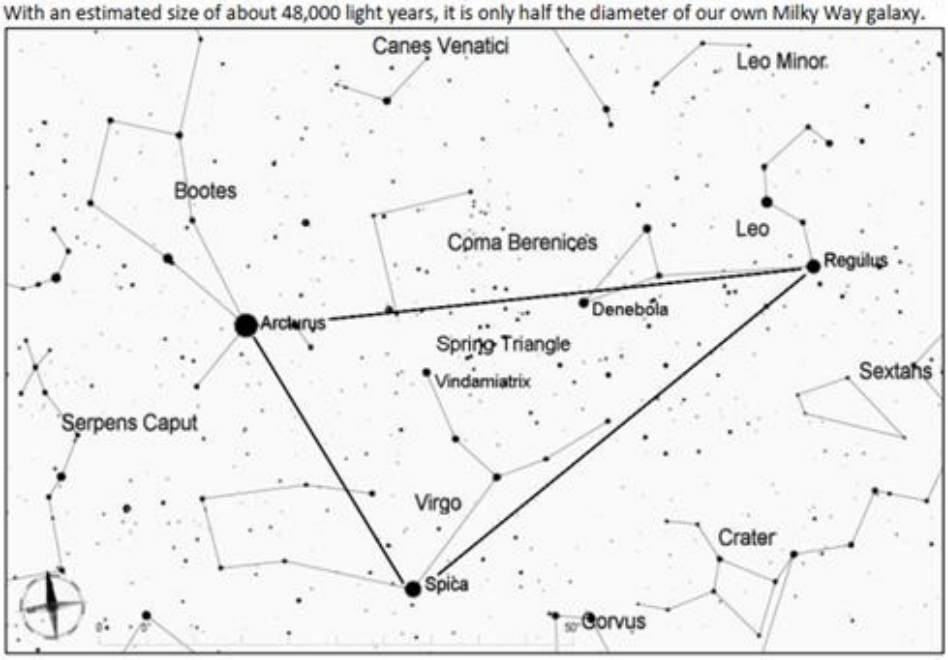
From Arcturus, look 5 degrees to the west to find 2nd magnitude Muphrid, then continue along this line twice that distance, and look for α (alpha) Coma Berenices. Although it is the brightest star in the constellation, α Coma Berenices is only magnitude 4.3, and it may be difficult to see with the naked eye under light polluted skies. Once you have located α, move just 1 degree to the northeast to find M53, which should be easy to spot in any telescope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

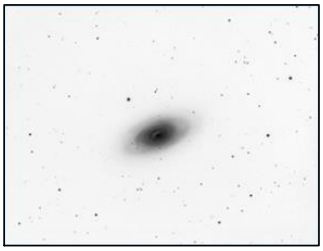
Messier 64, The Black Eye Galaxy

Messier 64 gets its name from the large dark semi-circular dust band that surrounds the galaxy's nucleus. The bright central region and the dark band are quite easy to see with most telescopes. The galaxy is relatively close to us, at about 14 million light years, but it is not especially large. With an estimated size of about 48,000 light years, it is only half the diameter of our own Milky Way galaxy.



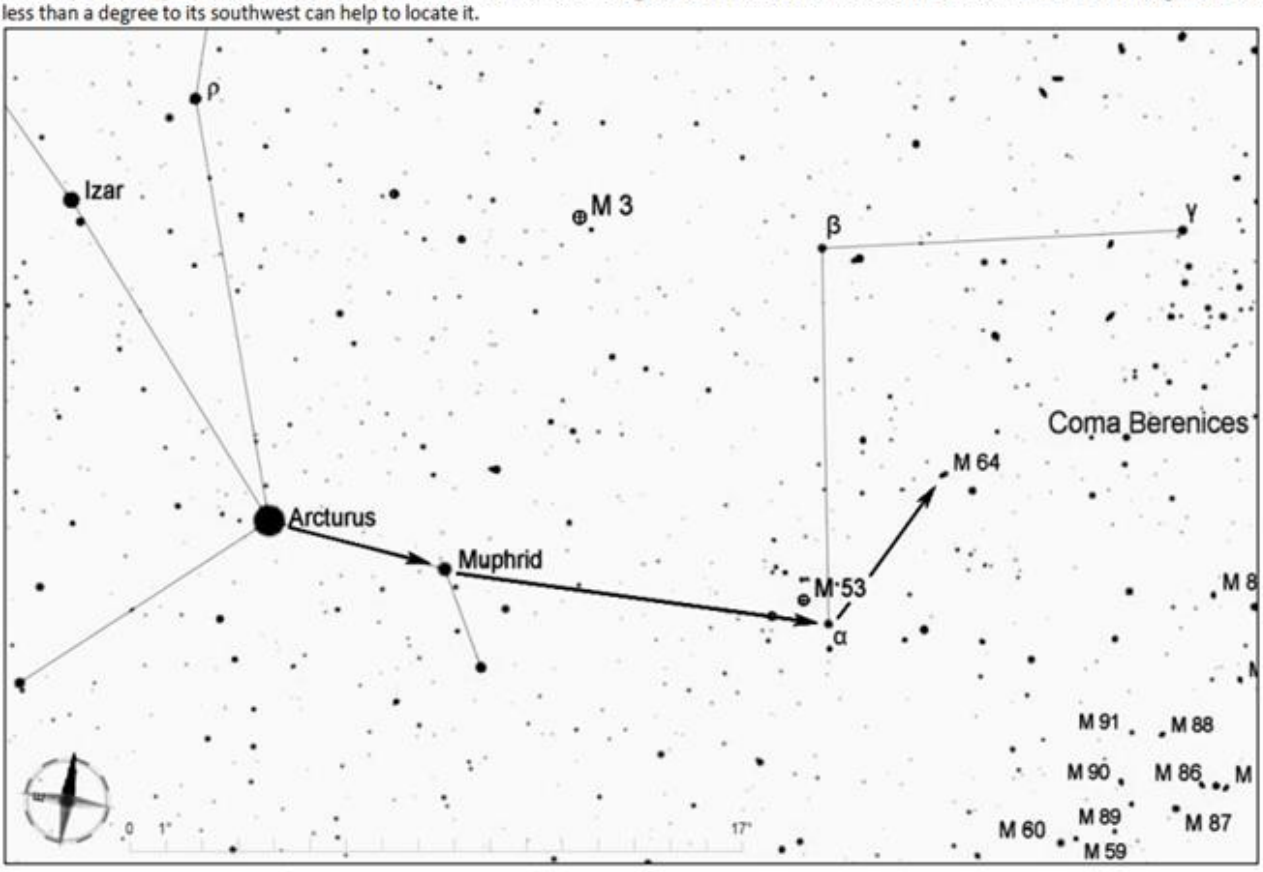
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin from brilliant Arcturus (magnitude 0).



M 64

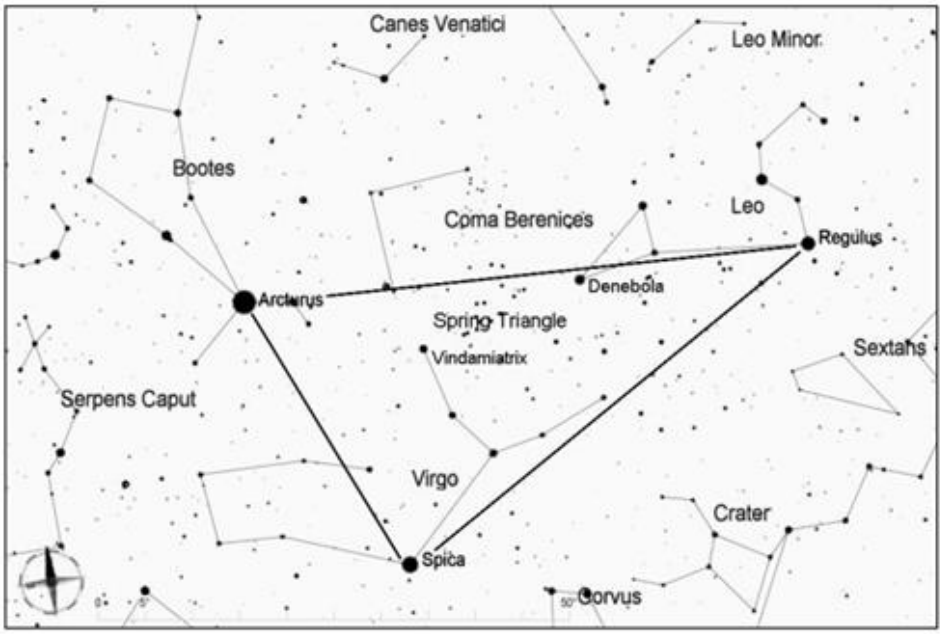
From Arcturus, look 5 degrees to the west to find 2nd magnitude Muphrid, then continue along this line twice that distance, and look for α (alpha) Coma Berenices. Although it is the brightest star in the constellation, α Coma Berenices is only magnitude 4.3, and it may be difficult to see with the naked eye under light polluted skies. Once you have located α, move 5 degrees to the northeast to reach the location of M64. A 5th magnitude star less than a degree to its southwest can help to locate it.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 84, 86, 87, 98, 99, and 100, Galaxies in Virgo and Coma Berenices

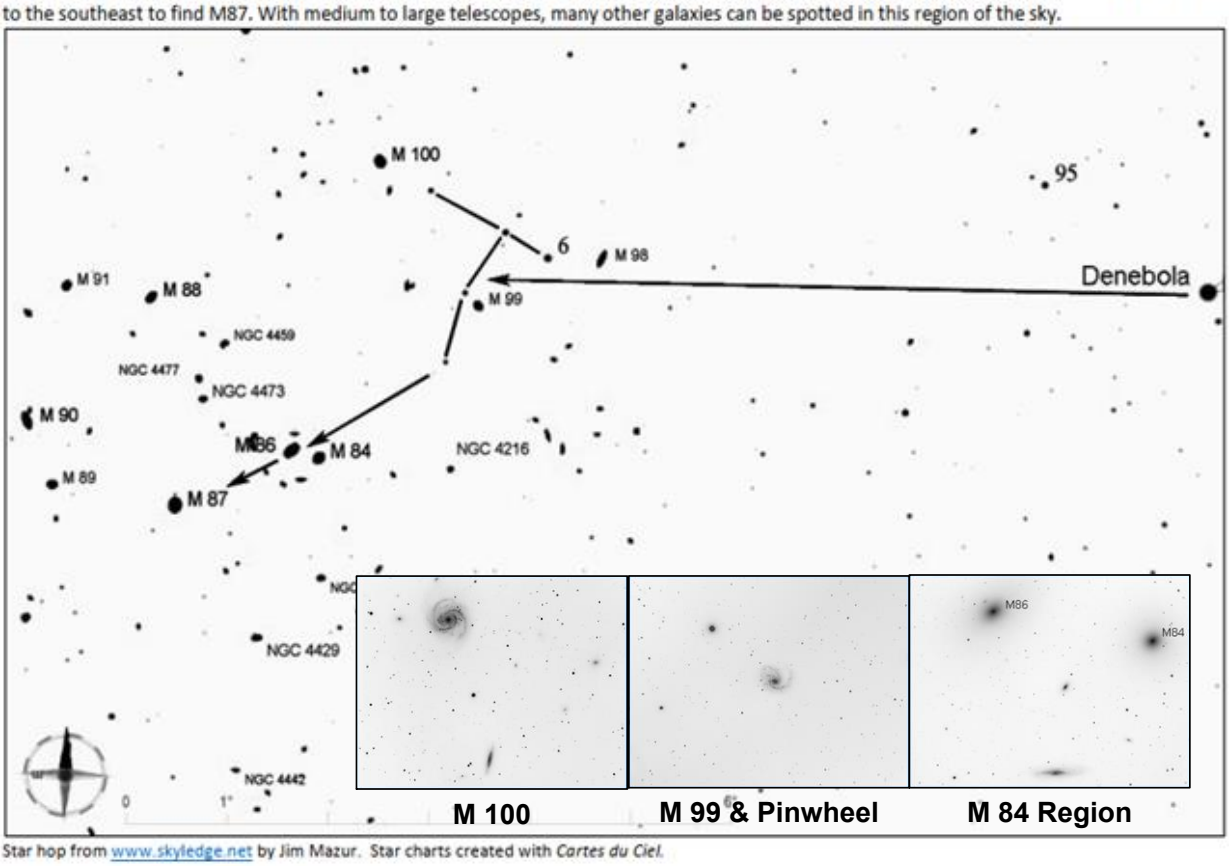
These are six of the many galaxies of the Coma-Virgo galaxy cluster, which is about 50 to 60 million light years away. Identifying specific galaxies in this cluster can be confusing because there are so many within the reach of typical amateur telescopes. Using the chart below carefully will help you determine which galaxy is which. M84, M86, and M87 are elliptical galaxies, and M98, M99, and M100 are spirals.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

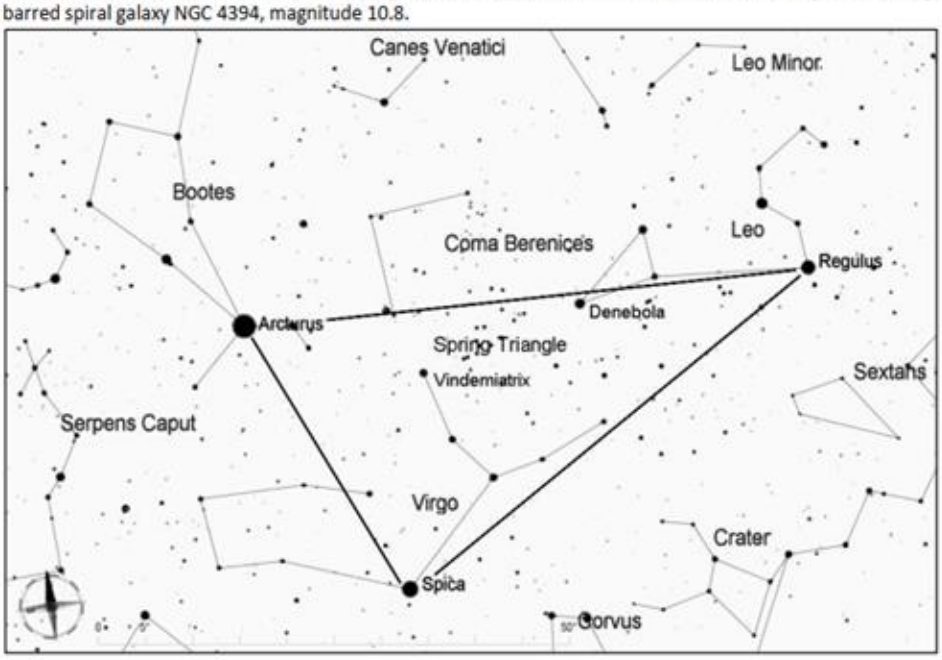
From Denebola, look 7 degrees east with a finderscope or binoculars to find a T-shaped asterism of five stars that includes 6 Virginis. As shown in the chart below, M98, M99, and M100 are each within 1/2 degree of one of the stars of the T shape, and this is a great help in finding them. Then move 2 degrees to southeast from the bottom of the T, and you will arrive at M84 and M86, which are just 1/4 degree apart. Move another degree to the southeast to find M87. With medium to large telescopes, many other galaxies can be spotted in this region of the sky.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 85 and NGC 4394, Galaxies in Coma Berenices

Messier 85 has been classified either as an elliptical galaxy or a lenticular (lens-shaped) galaxy. At magnitude 9, its oblong shape can be seen in even small telescopes. It is about 58 million light years away, and is a member of the Coma-Virgo Cluster of galaxies. Just to the east of M85 is the barred spiral galaxy NGC 4394, magnitude 10.8.



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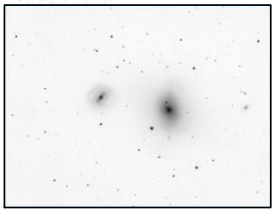
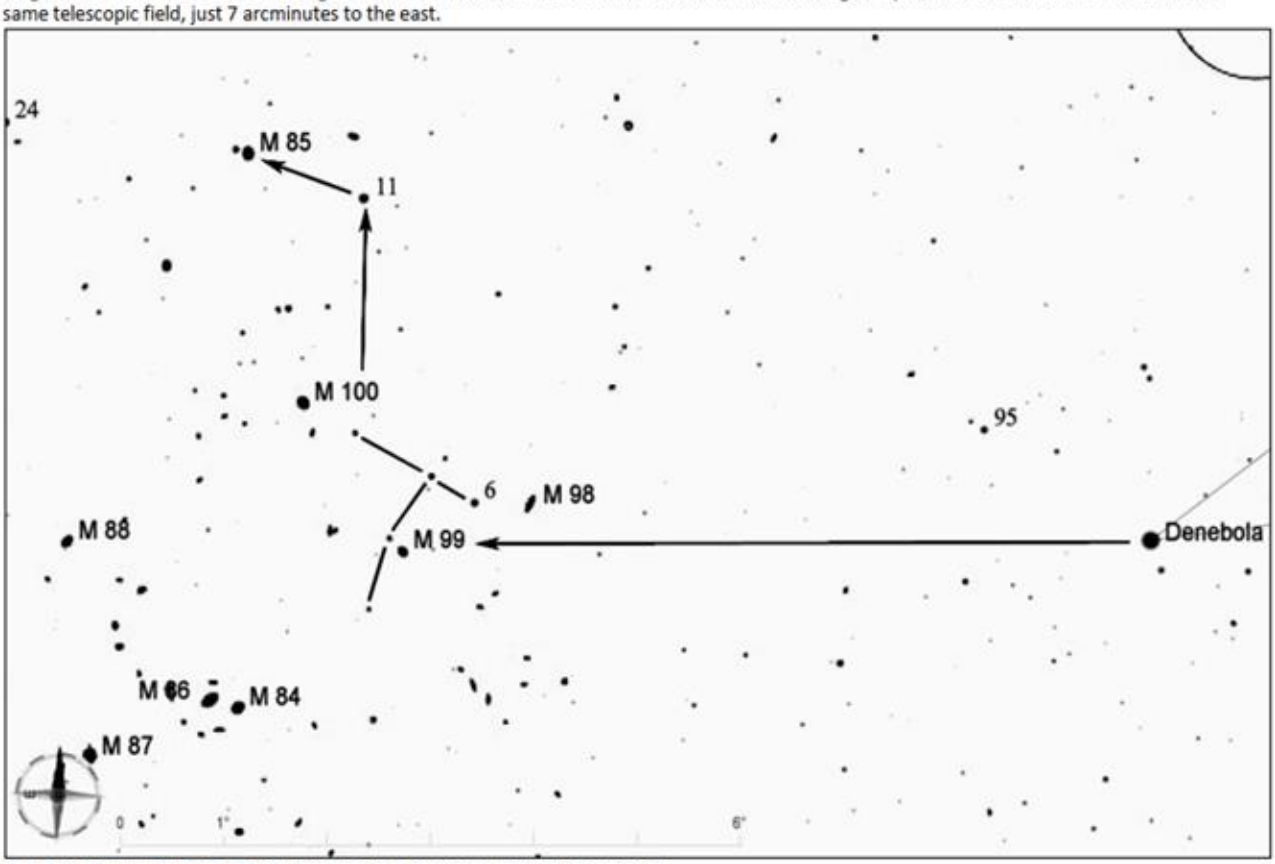
For this star hop, look inside the Spring Triangle for Denebola, the star representing the back end of Leo, the lion.



M 85 & NGC 4394

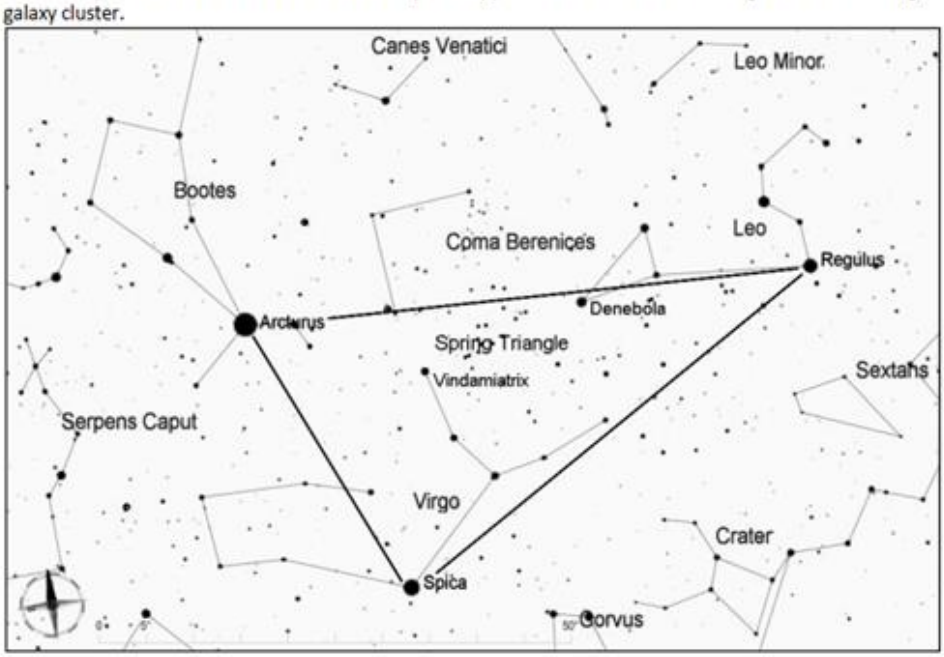
From Denebola, look 7 degrees east with a finderscope or binoculars to find a T-shaped asterism of five stars that includes 6 Virginis. There are several galaxies around this T-shape, but for this star hop, look about 2 degrees above the top of the T-shape to find 11 Coma Berenices, a star of magnitude 4.7. Then look about 1 degree to the east-northeast to reach M85. With medium to large scopes, NGC 4394 should be visible in the same telescopic field, just 7 arcminutes to the east.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cortes du Ciel*.

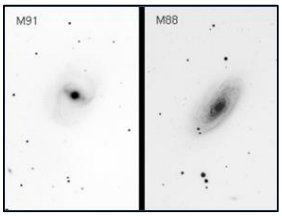
Messier 88 and 91, Galaxies in Coma Berenices

M88 is a nice spiral galaxy with a bright nucleus surrounded by tightly wound arms. Through large telescopes, some detail in the structure of these arms can be seen. Less than 1 degree to the east is M91, a barred spiral. At magnitude 10.2, it is the dimmest of the galaxies on Messier's list, but it is still easily within the reach of amateur telescopes. It appears as a faint oval with a brighter center. Both galaxies are part of the Coma-Virgo galaxy cluster.



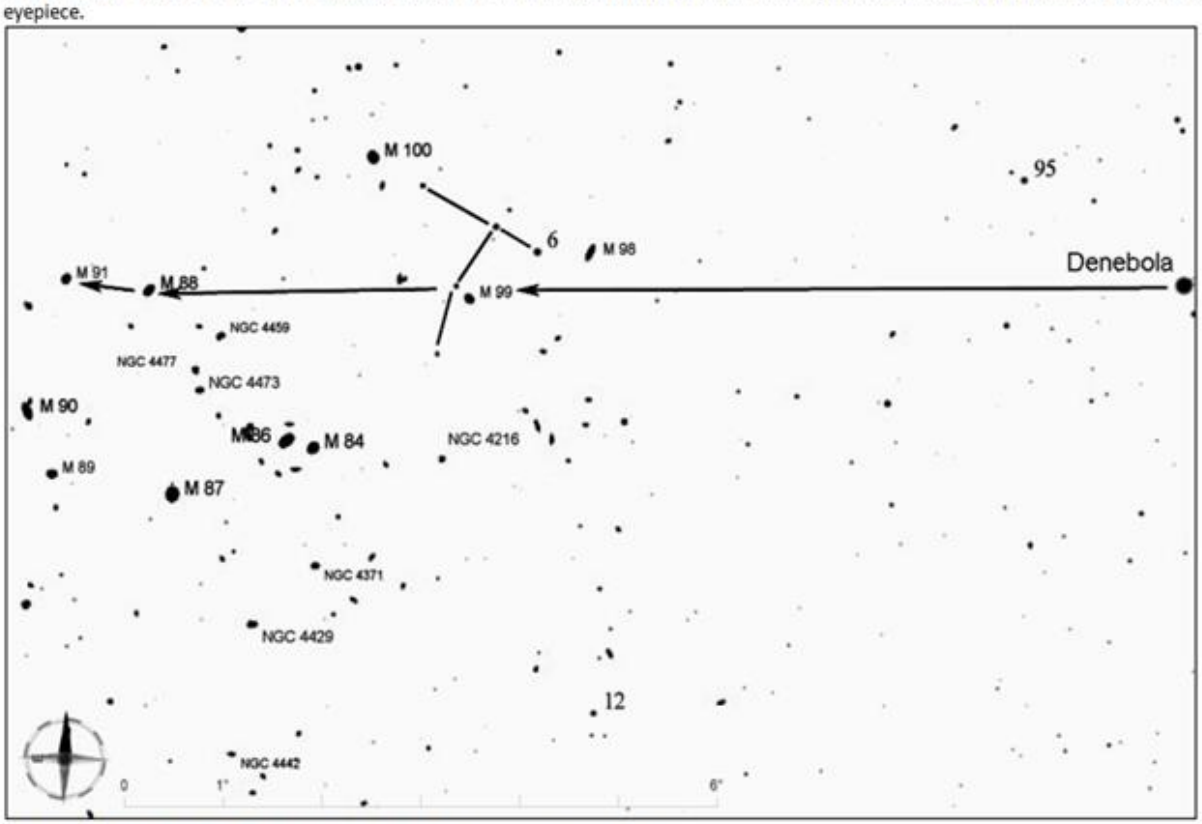
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look inside the Spring Triangle for Denebola, the star representing the back end of Leo, the lion.



M 91 & M 88

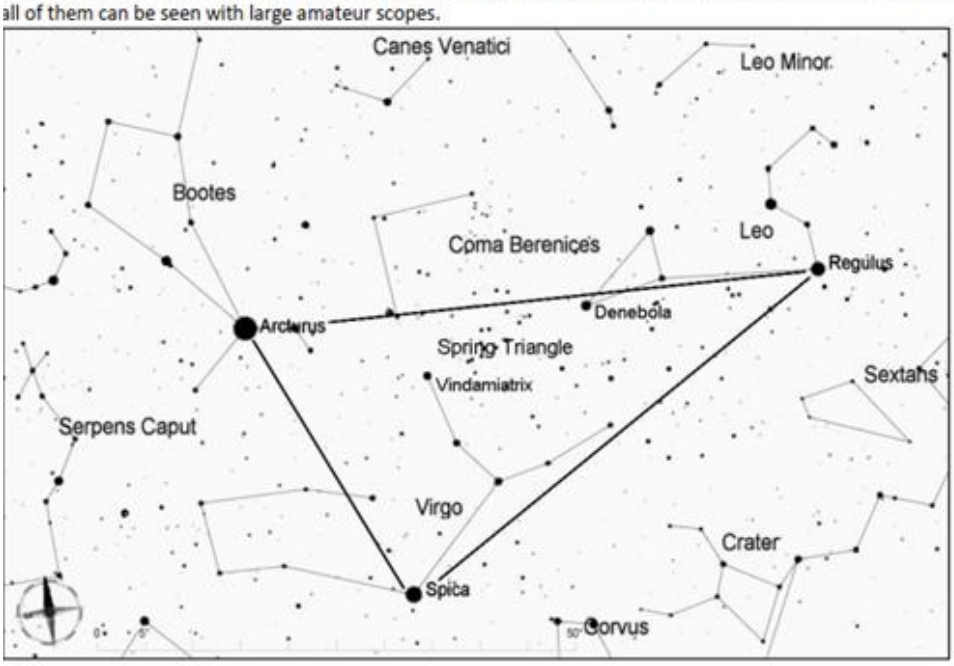
From Denebola, look 7 degrees east with a finderscope or binoculars to find a T-shaped asterism of five stars that includes 6 Virginis. There are several galaxies around this T-shape, but for this star hop, move another 3 degrees to the east to reach M88. Once you have located this galaxy, look less than 1 degree to the east to find M91. They are close enough that they can be seen together in the wide field of view of a low-power eyepiece.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 4435 and 4438 (the Eyes) and Markarian's Chain

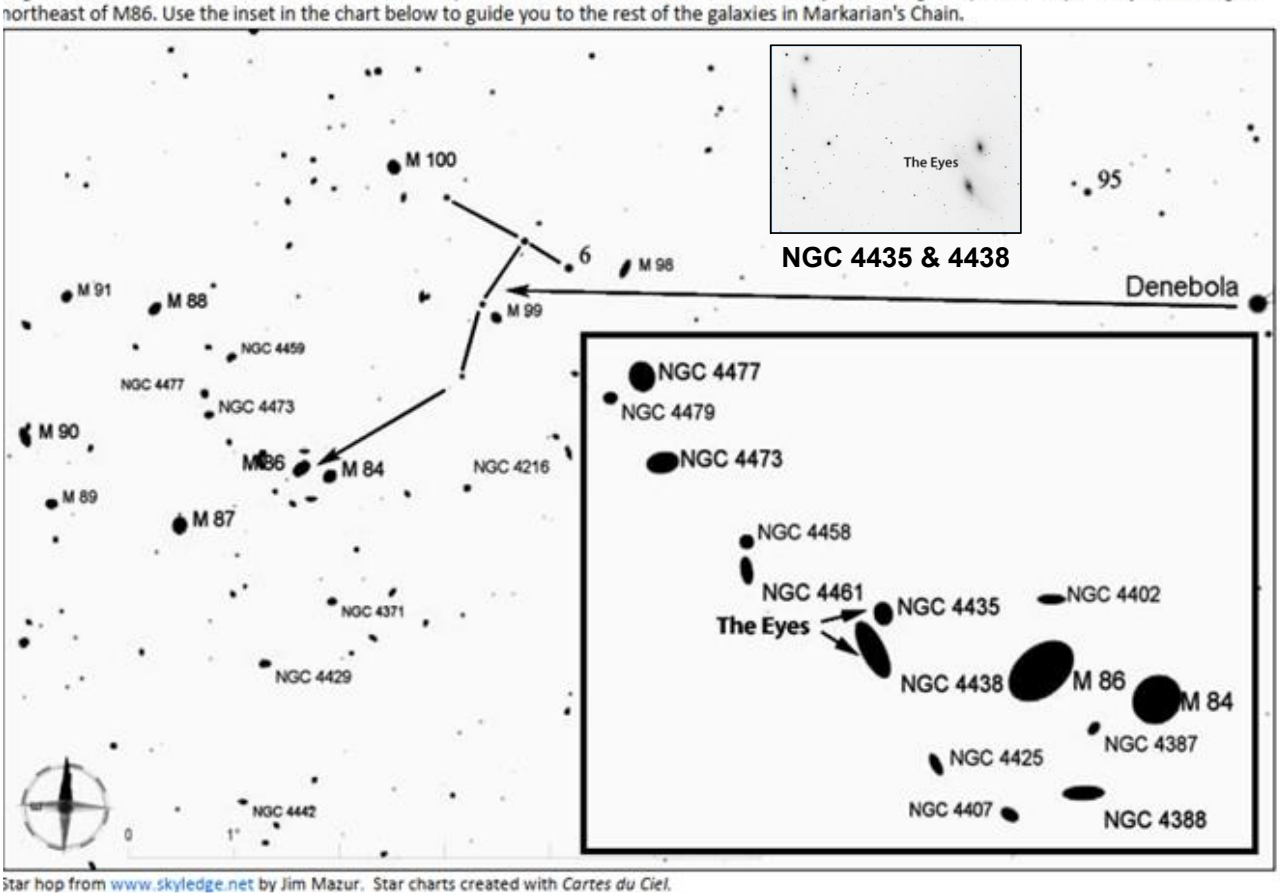
Markarian's Chain is a string of galaxies in the heart of the Coma-Virgo galaxy cluster, starting with the bright M84 and M86 to the west and stretching slightly more than 1 degree to NGC 4477. Just to the northeast of M86 is a pair of galaxies called "the Eyes" (NGC 4435 and 4438), and though a medium-sized telescope they do resemble a pair of eyes. Even small scopes can capture several of the galaxies in Markarian's chain, and all of them can be seen with large amateur scopes.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

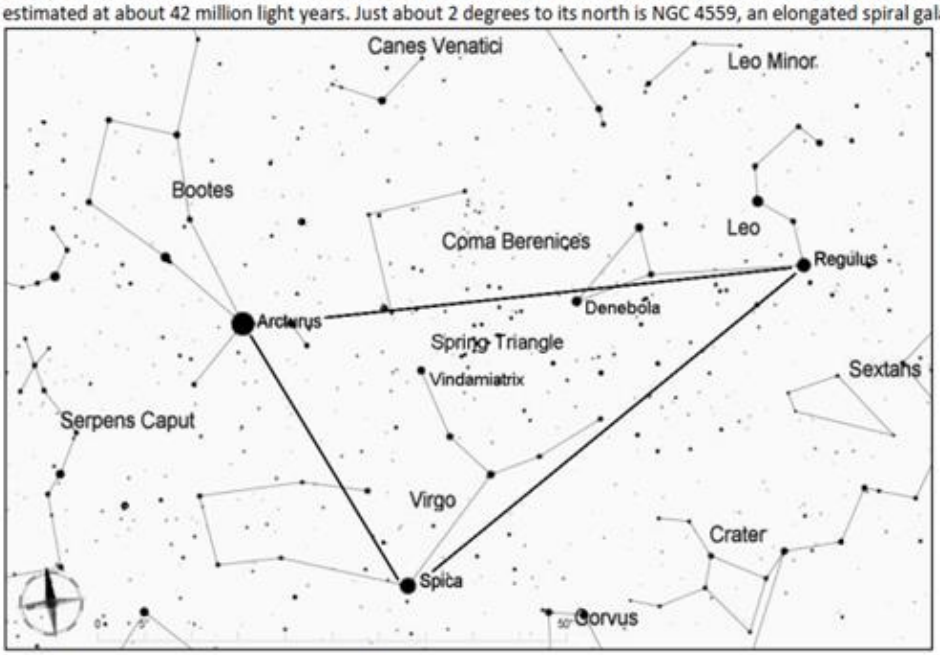
From Denebola, look 7 degrees east with a finderscope or binoculars to find a T-shaped asterism of five stars that includes 6 Virginis. Then move 2 degrees to southeast from the bottom of the T, and you will arrive at M84 and M86, which are just 1/4 degree apart. The Eyes are just 1/4 degree northeast of M86. Use the inset in the chart below to guide you to the rest of the galaxies in Markarian's Chain.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

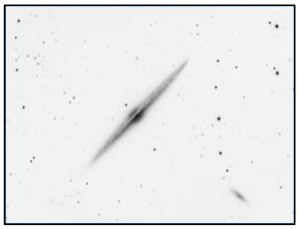
NGC 4565 (Caldwell 38, the Needle Galaxy) and NGC 4559 (Caldwell 36)

Through a telescope of medium or large aperture under dark skies, NGC 4565 is a very impressive sight. The long spindle shape of this edge-on galaxy can extend across the eyepiece's entire field of view, and its dark lane can be seen cutting through the bright nuclear region. Its distance is estimated at about 42 million light years. Just about 2 degrees to its north is NGC 4559, an elongated spiral galaxy that is about half as far away.



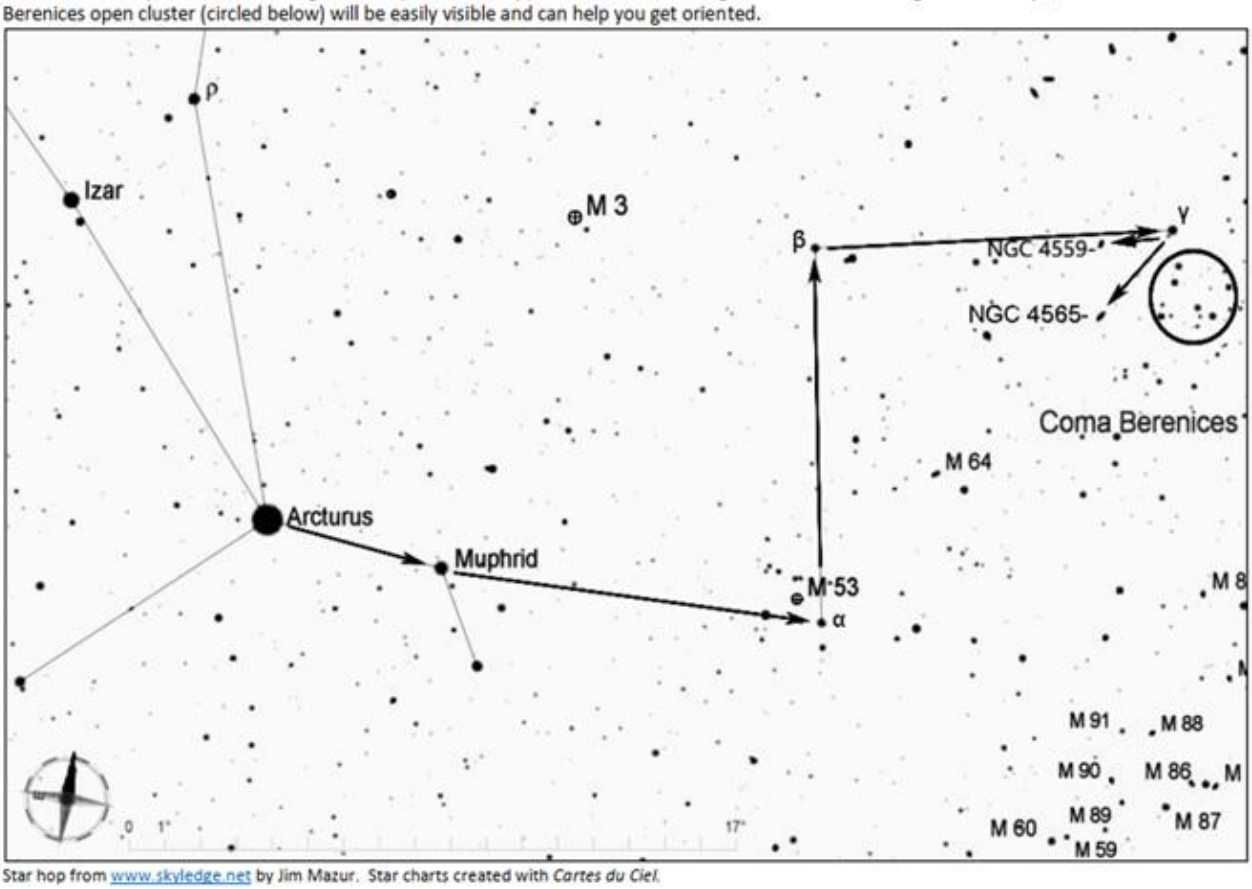
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin from brilliant Arcturus (magnitude 0).



NGC 4565

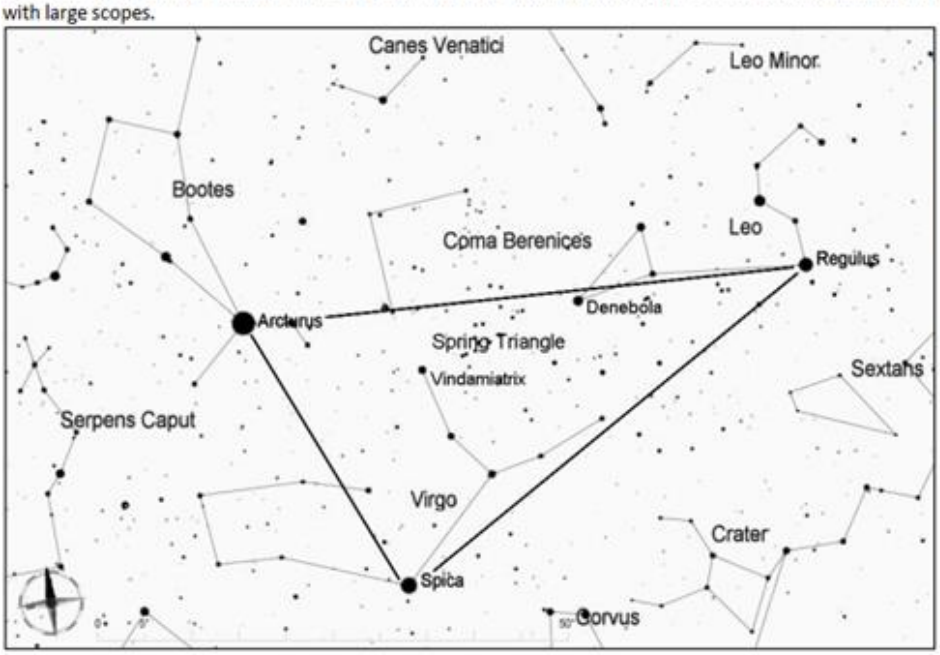
From Arcturus, look 5 degrees to the west to find 2nd magnitude Muphrid, then continue along this line twice that distance, and look for α (alpha) Coma Berenices, much dimmer at magnitude 4.3. Following the chart below, then find the equally dim stars β (beta) and γ (gamma) Coma Berenices. From γ, NGC 4559 is 2 degrees east (back toward β) and NGC 4656 is 3 degrees southeast. Through a finderscope, the stars of the Coma Berenices open cluster (circled below) will be easily visible and can help you get oriented.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 4889 (Caldwell 35) and NGC 4872 in the Coma Galaxy Cluster

11th magnitude NGC 4889 and NGC 4872 are two of the brightest objects in the Coma Galaxy Cluster (also known as Abell 1656). This is one of the richest galaxy clusters that can be observed with amateur telescopes (and the larger the telescope, the better). This group is roughly 250 million light years away, and it contains over 1000 galaxies. A few of the brightest can be seen with a medium-sized telescope, and many more can be seen with large scopes.



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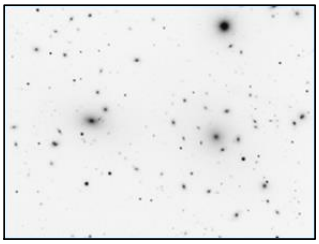
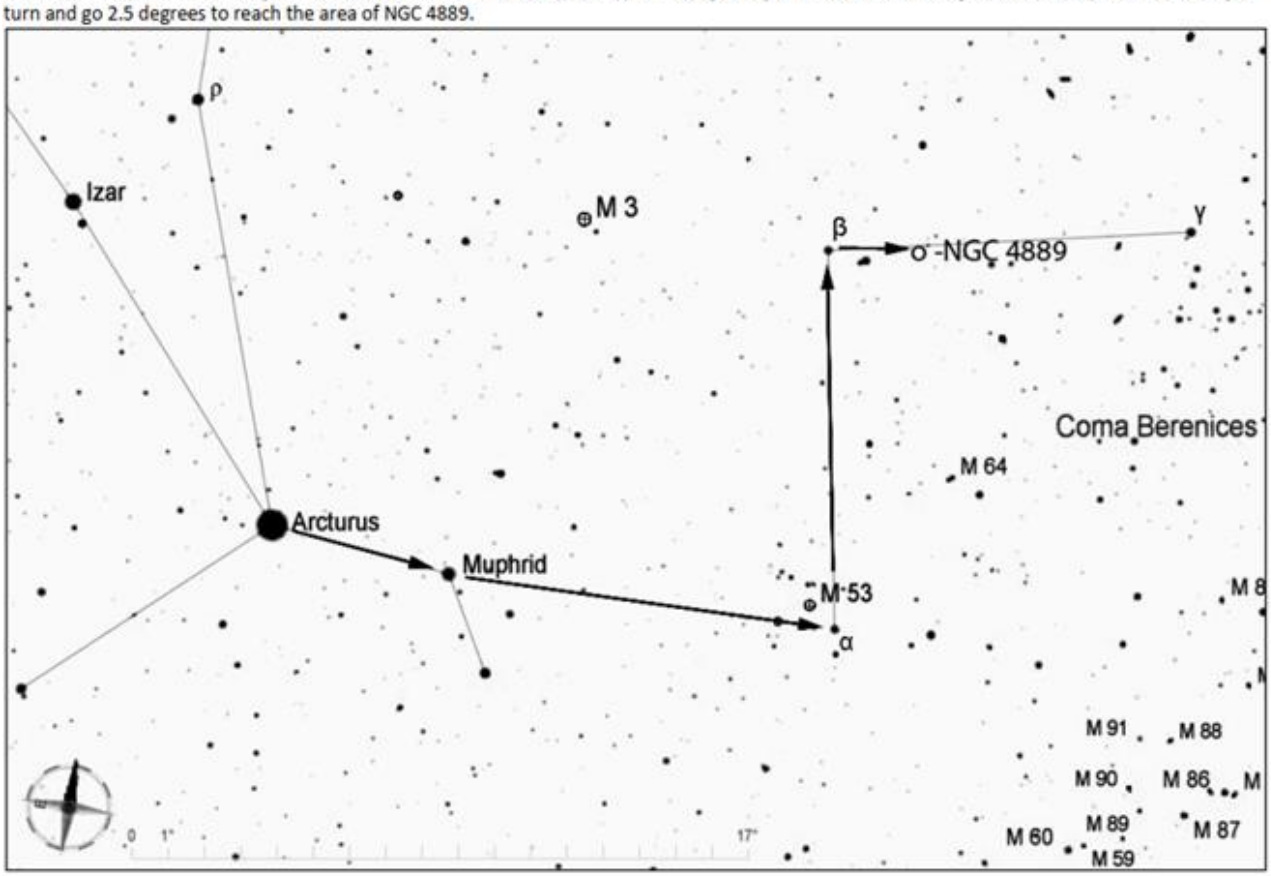
For this star hop, begin from brilliant Arcturus (magnitude 0).



Abell 1656

From Arcturus, look 5 degrees to the west to find 2nd magnitude Muphrid, then continue along this line twice that distance, and look for α (alpha) Coma Berenices. The three brightest stars of Coma Berenices (α, β, and γ) form a right angle. From α, look 10 degrees north for β, then take a right turn and go 2.5 degrees to reach the area of NGC 4889.



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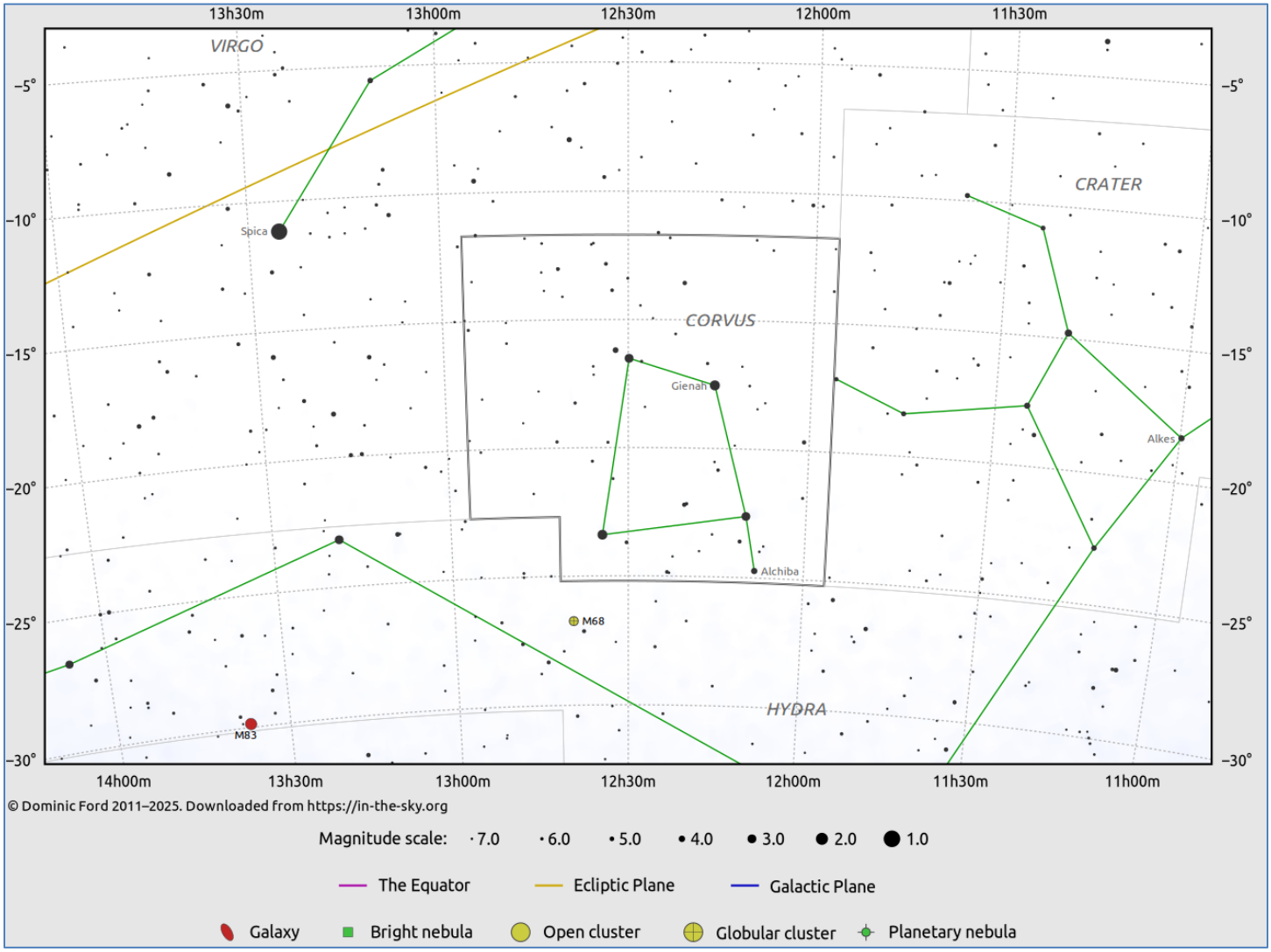
Corvus (Crv)

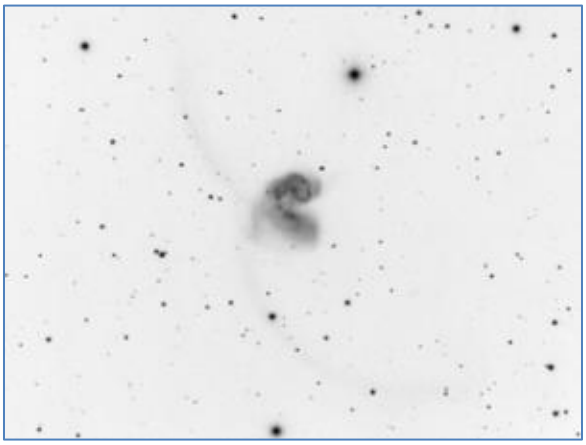
Evening Visibility: **April – June**
Online Information: **Corvus**
Charts: **1** Featured Objects: **2**
More Online Information: NGC-4038, NGC-4039

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
NGC-4038 (G)	1, W1	Antennae Galaxies, C-60, NGC-4038	| Mag=11.2 | SB=21.4 | Size=5.2’ x 3.1’ |
NGC-4039 (G)	1, W1	Antennae Galaxies, C-61, NGC-4039	| Mag=11.1 | SB=24.2 | Size=3.1’ x 1.6’ |

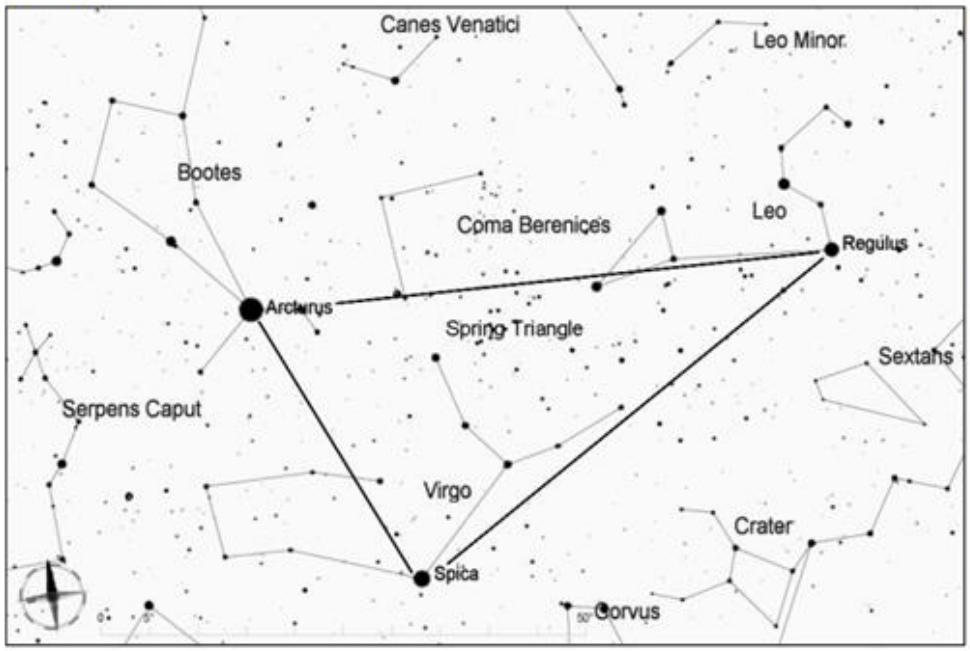
Image Gallery



NGC 4038, 4039
Antennae Galaxies

NGC 4038-9 (Caldwell 60 and 61), the Antennae Galaxies

This pair of interacting galaxies is also known as the Ring-Tail Galaxy. Through amateur telescopes, the two galaxies can appear as a single irregular shape with a notch in the center, or as two lobes with the northern one (NGC 4038) substantially brighter. They are about 43 million light years away. Long-duration photographs show two curving arcs of stars streaming away from the galaxies, a result of the gravitational interactions as the galaxies merge.



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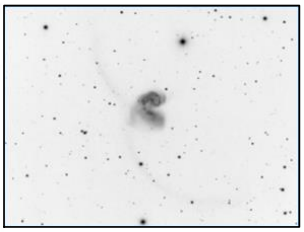
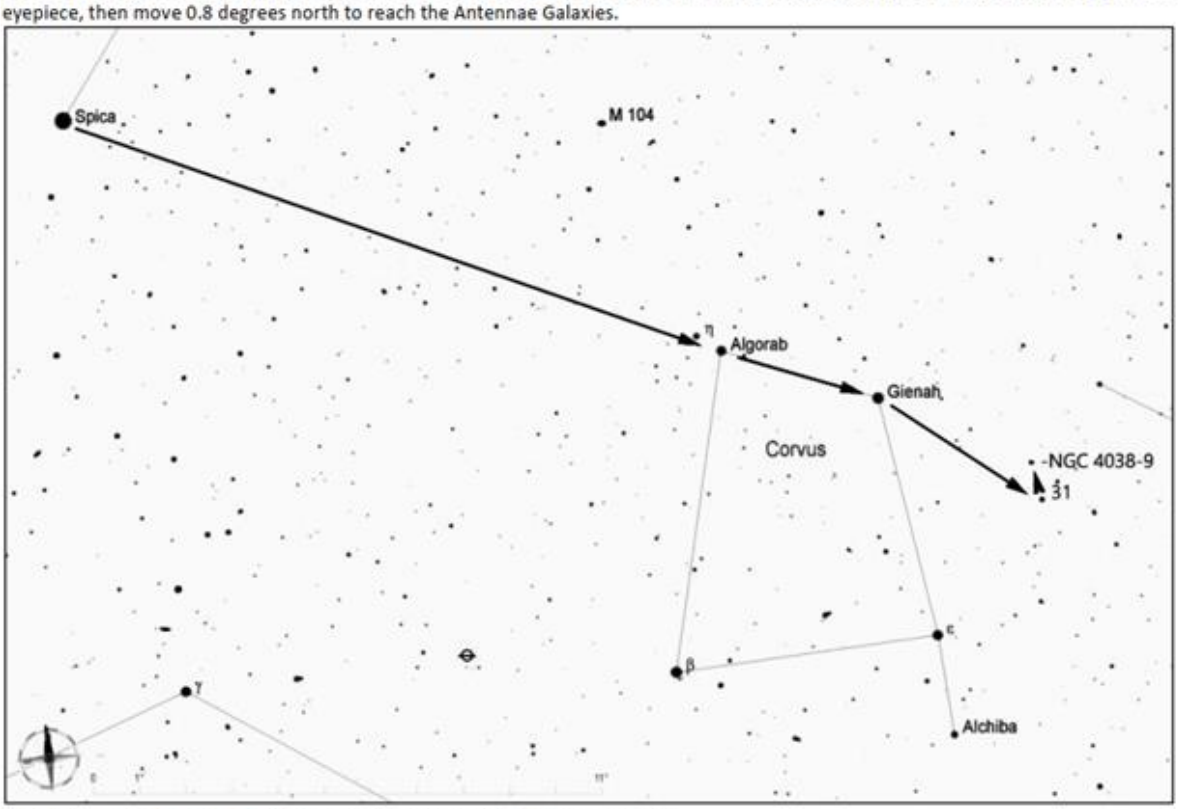
For this star hop, begin at Spica in the constellation Virgo.



NGC 4038 & 4039

Look about 20 degrees to the southwest of Spica to find the distinctive four-sided shape of Corvus, the crow. Follow the line formed by the upper two stars of Corvus (Algorab and Gienah) and extend this line the same distance to the southwest to find the star 31 Corvii. It is only magnitude 5.2 but it is the brightest star in the area and should be easy to spot in binoculars or a finderscope. Center this star in your telescope with a low-power eyepiece, then move 0.8 degrees north to reach the Antennae Galaxies.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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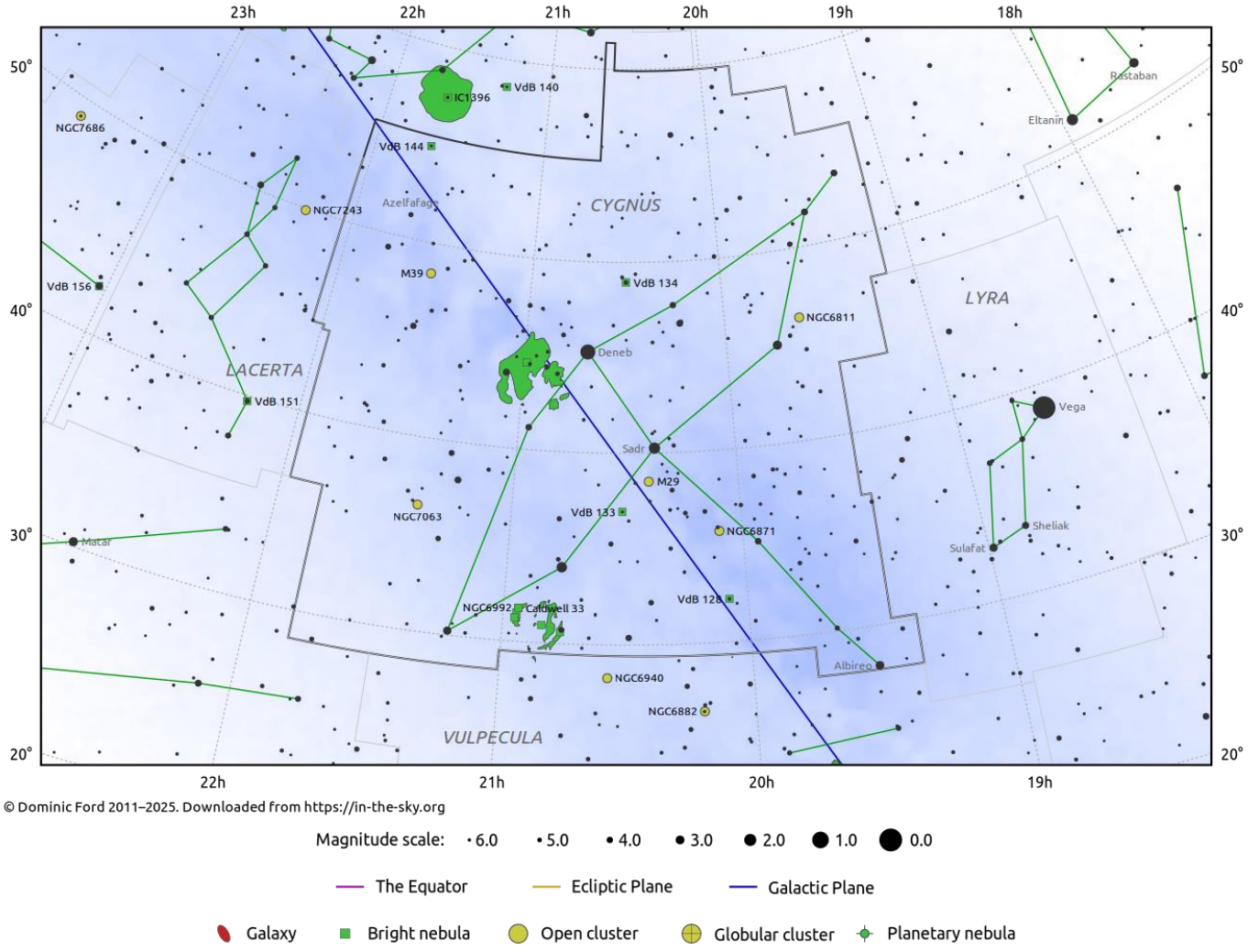
Cygnus (Cyg)

Evening Visibility: **June – December**
Online Information: **Cygnus**
Charts: **9** Featured Objects: **11**
More Online Information: Albireo, IC-5146, M-029, M-039, NGC-6826, NGC-6888, NGC-6960, NGC-6992-5, NGC-7000, NGC-6996, Omicron 1 Cygni

In-The-Sky.org Constellation Map

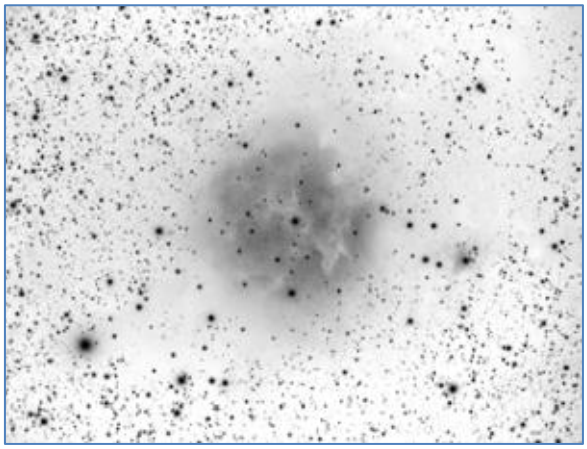


Object (Type)	Chart	Aliases	Stats
Albireo (DS)	1, W1, SD	SAO-087301, HIP-95947, Beta Cygni, 6 Cyg, HR7417, HD183912	| Mag=3.2, 5.8 | Sep=35" |
IC-5146 (EN)	2, W2	Cocoon Nebula, C-19, Sh 2-125	| Mag=7.2 | SB=21.2 | Size=12' |

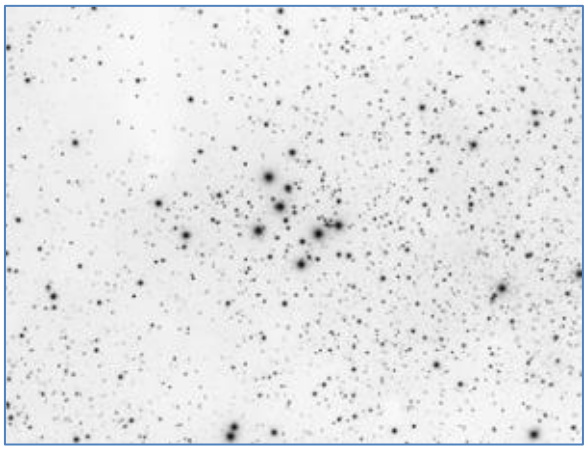
Object (Type)	Chart	Aliases	Stats
M-029 (OC)	3, W3	Cooling Tower Cluster, NGC-6913	| Mag=7.1 | SB=21.9 | Size=7.0' |
M-039 (OC)	4, W4	Pyramid Cluster, NGC-7092	| Mag=4.6 | SB=21.7 | Size=29' |
NGC-6826 (PN)	5, W5	Blinking Planetary, C-15	| Mag=8.8 | SB=20.4 | Size=27" x 24" |
NGC-6888 (EN)	6, W6	Crescent Nebula, C-27, Sh 2-105	| Mag=7.4 | SB=?? | Size=18' x 12' |
NGC-6960 (SNR)	7, W7	Veil Nebula, C-34	| Mag=7.0 | SB=?? | Size=3° | (Veil Nebula - West portion)
NGC-6992-5 (SNR)	7, W7	Cirrus Nebula, C-33, IC-1340, Eastern Veil Nebula	| Mag=7.0 | SB=?? | Size=3° | (Veil Nebula – East portion)
NGC-7000 (EN)	8, W8	North American Nebula, C-20	| Mag=4.0 | SB=?? | Size=2° x 1.7° |
NGC-6996 (OC)	8, W8		| Mag=10.0 8| SB=?? | Size=14' |
Omicron 1 Cygni (MS)	9, W9, SD	SAO-049337, HIP-99675, 31 Cyg, HD192577, HR7735	| Mag=3.8, 4.8 | Sep=337.5" |

Image Gallery

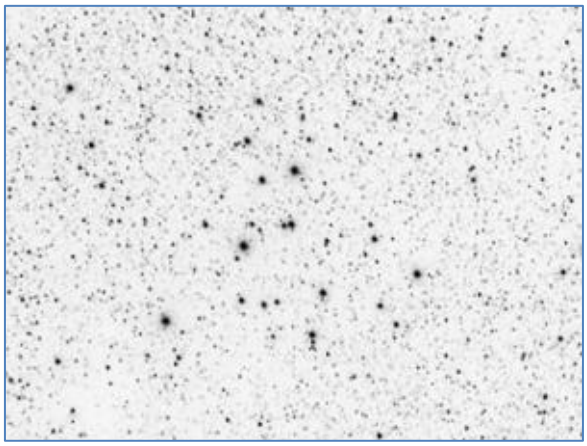
Albireo



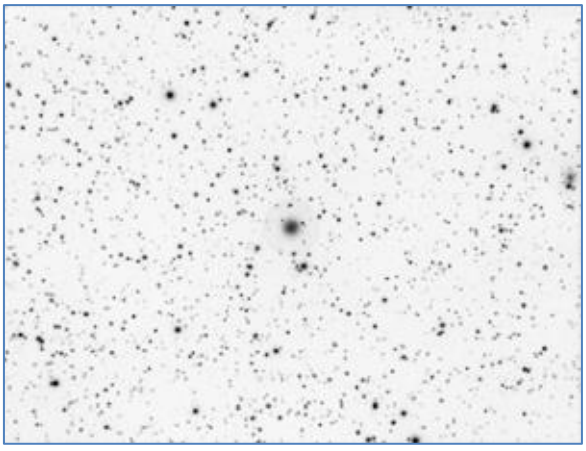
IC 5146 (C 19) Cocoon Nebula



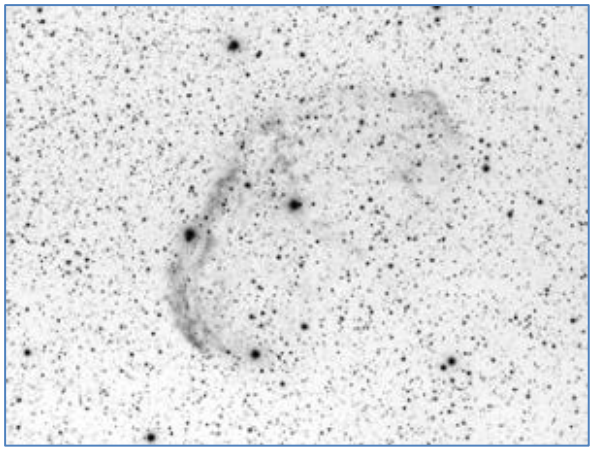
Messier 29



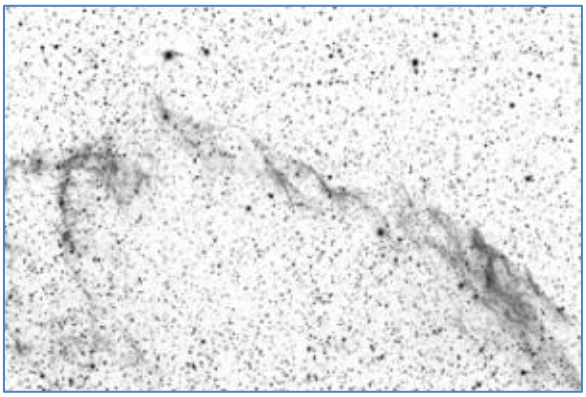
Messier 39



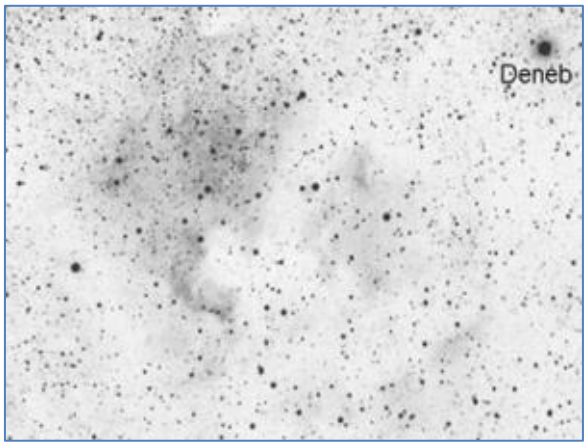
NGC 6826 (C 15) Blinking Planetary



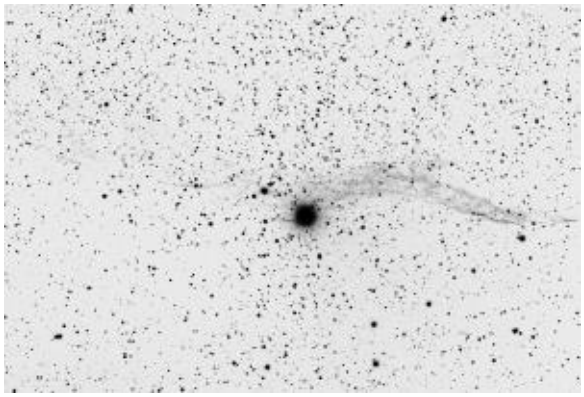
NGC 6888, The Crescent Nebula



NGC 6992 and 6995 Veil Nebula (East)



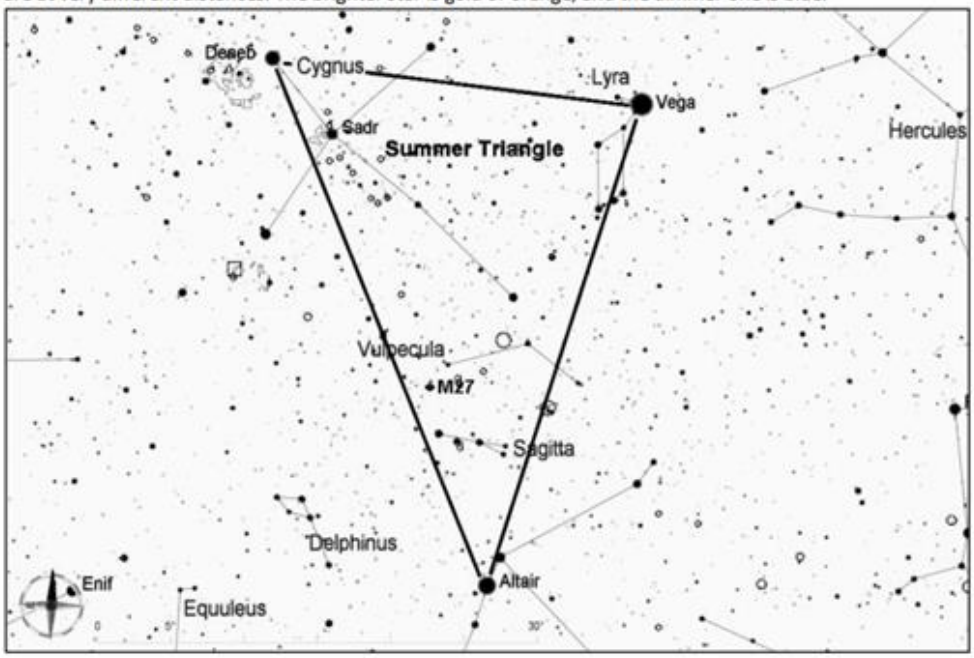
NGC 7000 (C 20), The North America Nebula



NGC 6960, Veil Nebula (West)

Albireo, Double Star in Cygnus

Albireo is one of the most famous double stars because it is easy to find, and because its stars feature beautifully contrasting colors. A telescope is needed to see that there are two stars, which are 35 arcseconds apart. It is not known whether the two stars are actually close together in space or are at very different distances. The brighter star is gold or orange, and the dimmer one is blue.

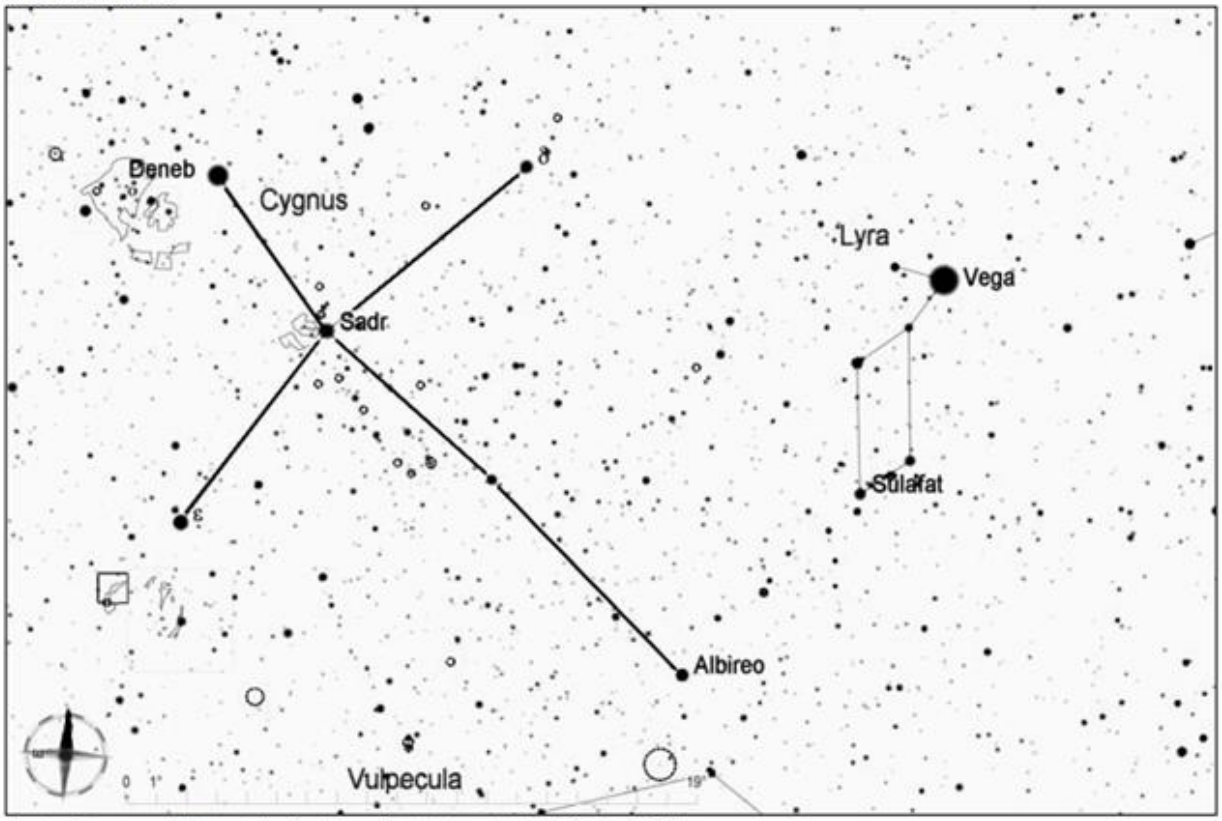


Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

Look at Deneb, which marks the tail end of the constellation Cygnus, the Swan.

Albireo

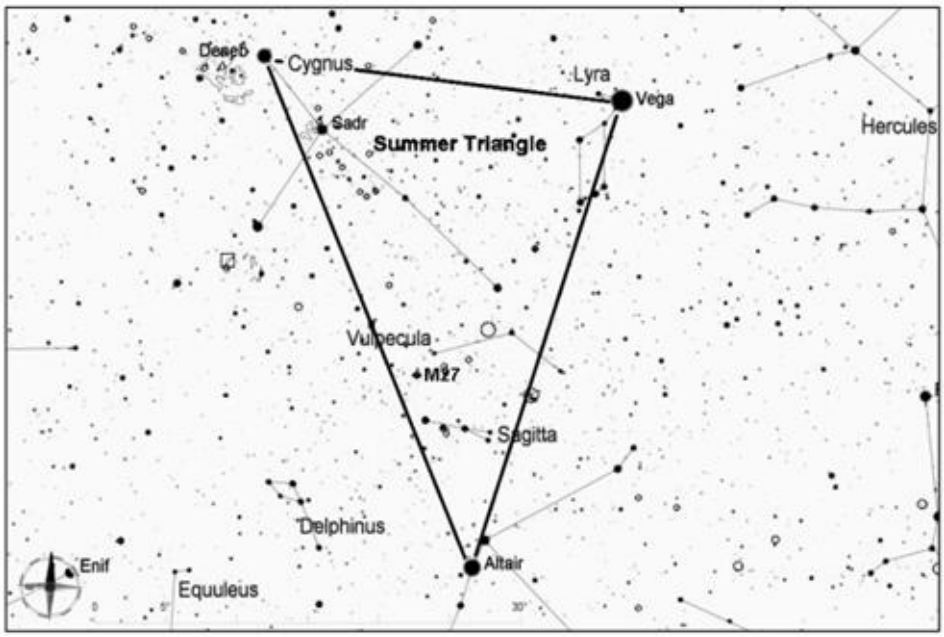
The brightest stars of Cygnus form a large cross shape, so it is also known as the Northern Cross. Albireo is the star at the base of the cross (or the head of the swan). At magnitude 3, it is easily seen with the naked eye. But a telescope at a magnification of 30x or more shows that it is actually a colorful double star. If you have trouble seeing the colors, try putting the stars slightly out of focus, which spreads out their light and makes the colors easier to see.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

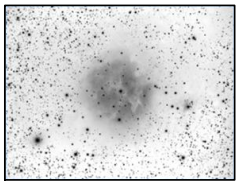
IC 5146 (Caldwell 19), Cocoon Nebula in Cygnus

The Cocoon Nebula is a star-forming region that includes a mixture of emission and reflection nebulae. The nebula is illuminated mainly by a 10th magnitude star in its center. The nebula is about magnitude 7.2 and about 12 arcminutes across, and it is not hard to spot in a telescope with a wide-field eyepiece. It is about 4000 light years away.



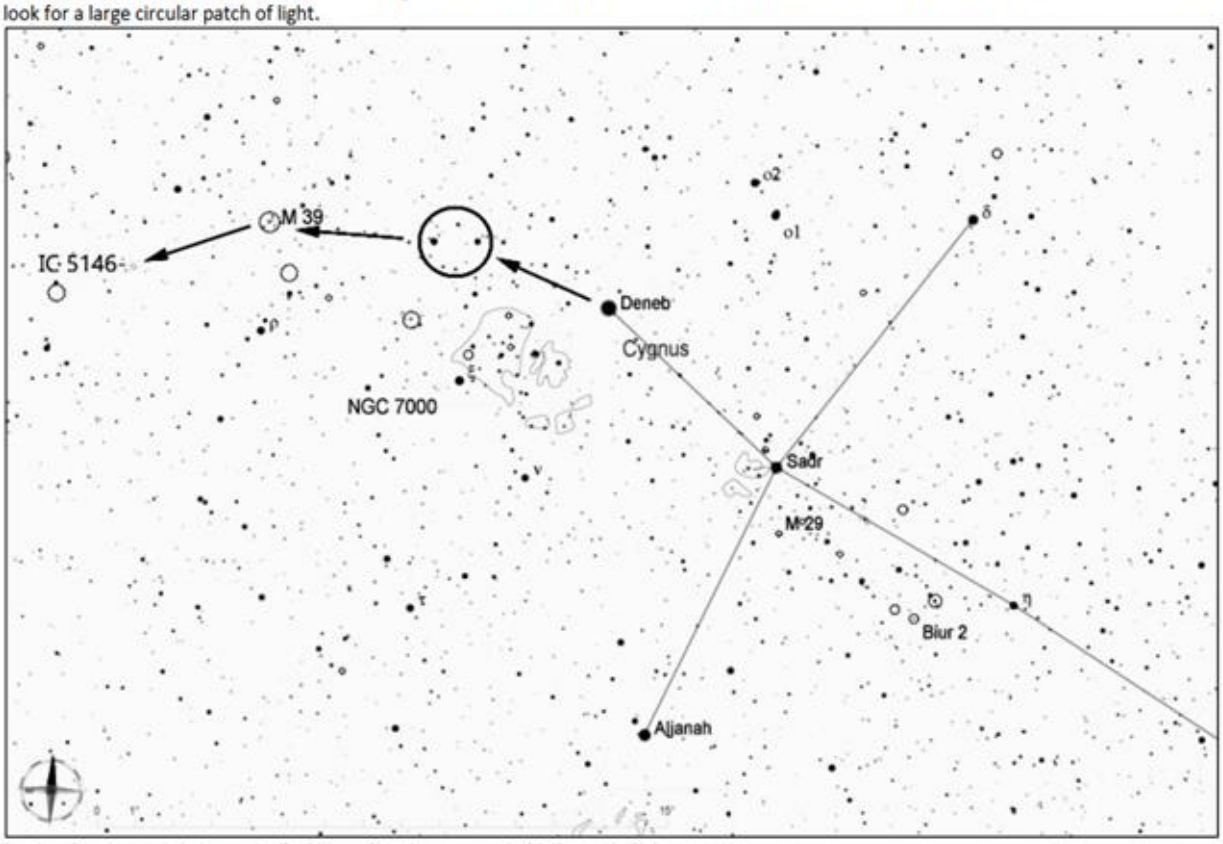
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Deneb, the first-magnitude star that forms the tail of Cygnus, the swan (or if you visualize the brightest stars of Cygnus as a cross shape, Deneb is at the top of the cross).



IC 5146

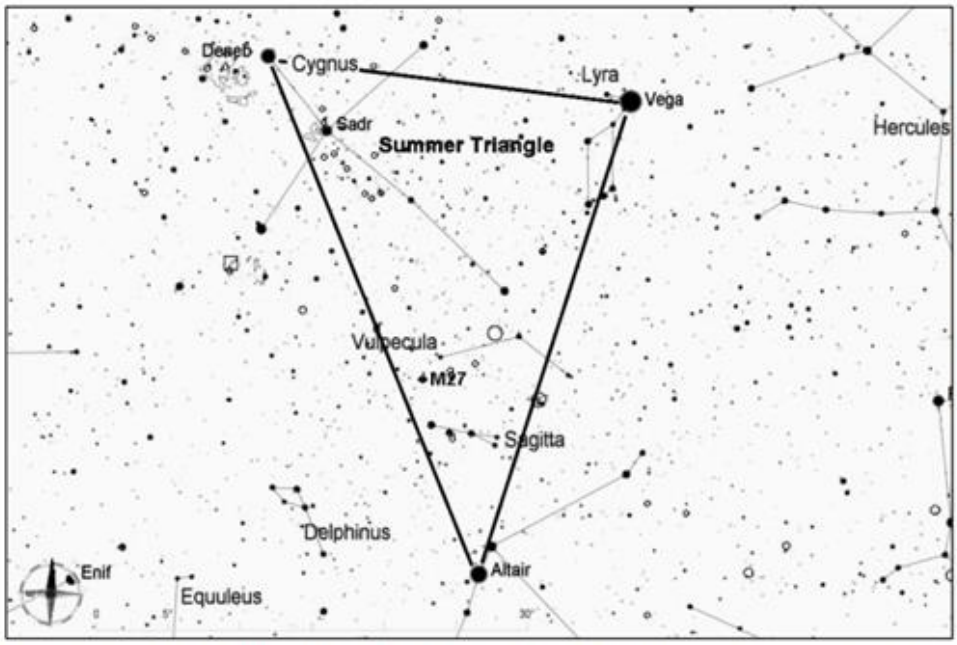
From Deneb, look about 5 degrees to the northeast for a pair of dim stars (about magnitude 4-5) that are circled in the chart below. Continue in roughly the same direction for another 5 degrees and you will reach M39, a bright open cluster that should be easily visible in binoculars or a finderscope. From M39, continue another 4 degrees to the east-southeast and you will be in the vicinity of IC 5146. Use a low-power eyepiece and look for a large circular patch of light.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 29, Open Cluster in Cygnus

This small but distinctive cluster contains about 8 bright stars and many dimmer ones. It is a nice object to view at low power because it stands out well against the background stars. The cluster lies about 5000 light years away. Through a telescope, the cluster can be seen against a background that is filled with stars from the Milky Way.



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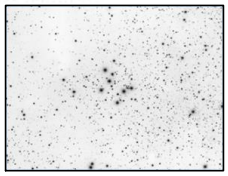
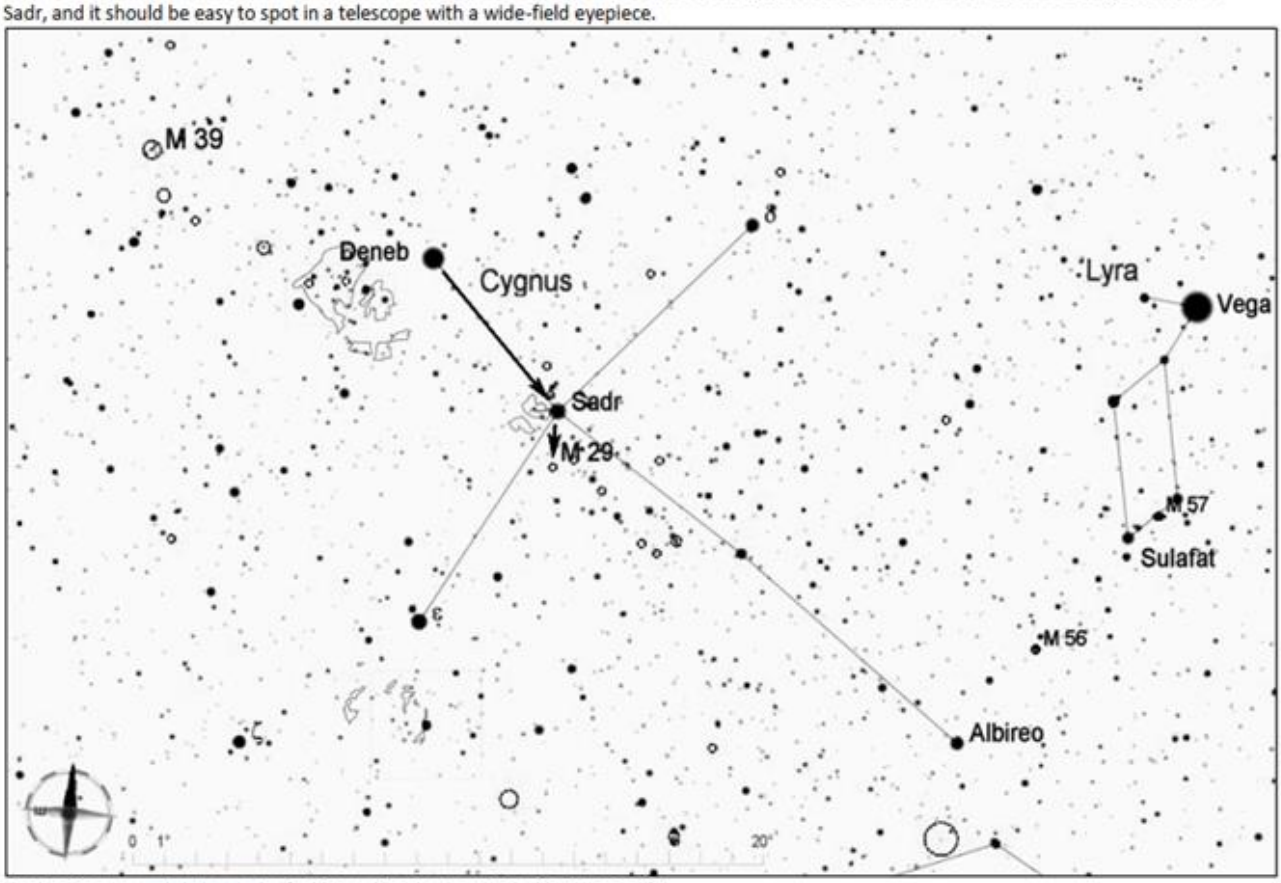


M 29

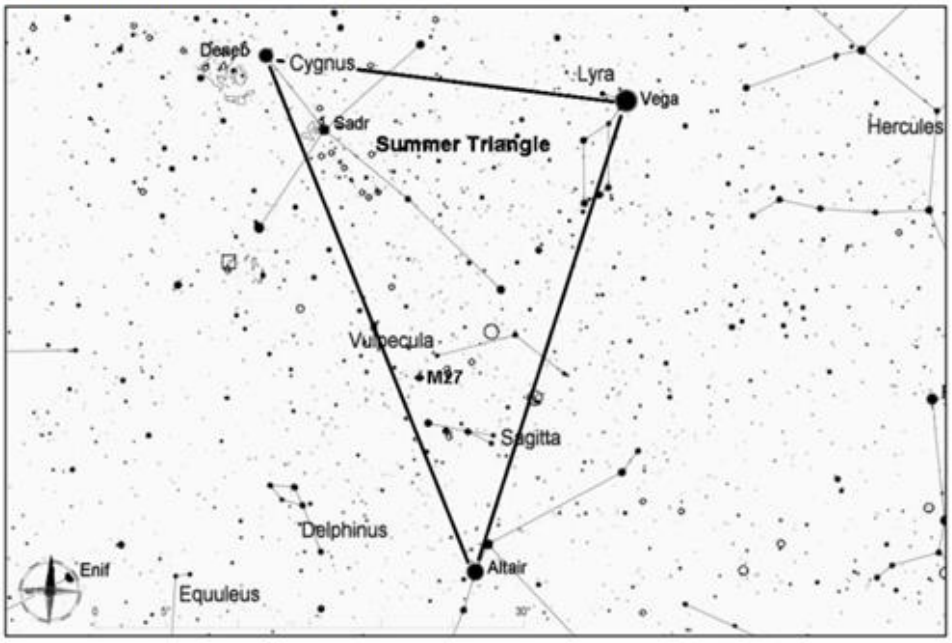
From Deneb, look to the southwest for Sadr, the magnitude 2 star at the center of the Cygnus cross shape. M29 is less than 2 degrees south of Sadr, and it should be easy to spot in a telescope with a wide-field eyepiece.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 39, Open Cluster in Cygnus

Messier 39 is a large, coarse open cluster of about 30 bright stars in a triangular shape, about 1000 light years away. It occupies an area of sky about the size of the full Moon, and it can be seen with the naked eye as a dim hazy patch about 10 degrees northeast of Deneb, the brightest star in Cygnus. Through binoculars, a dozen or so stars can be seen.



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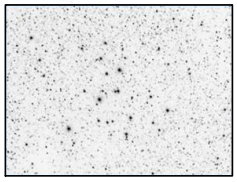
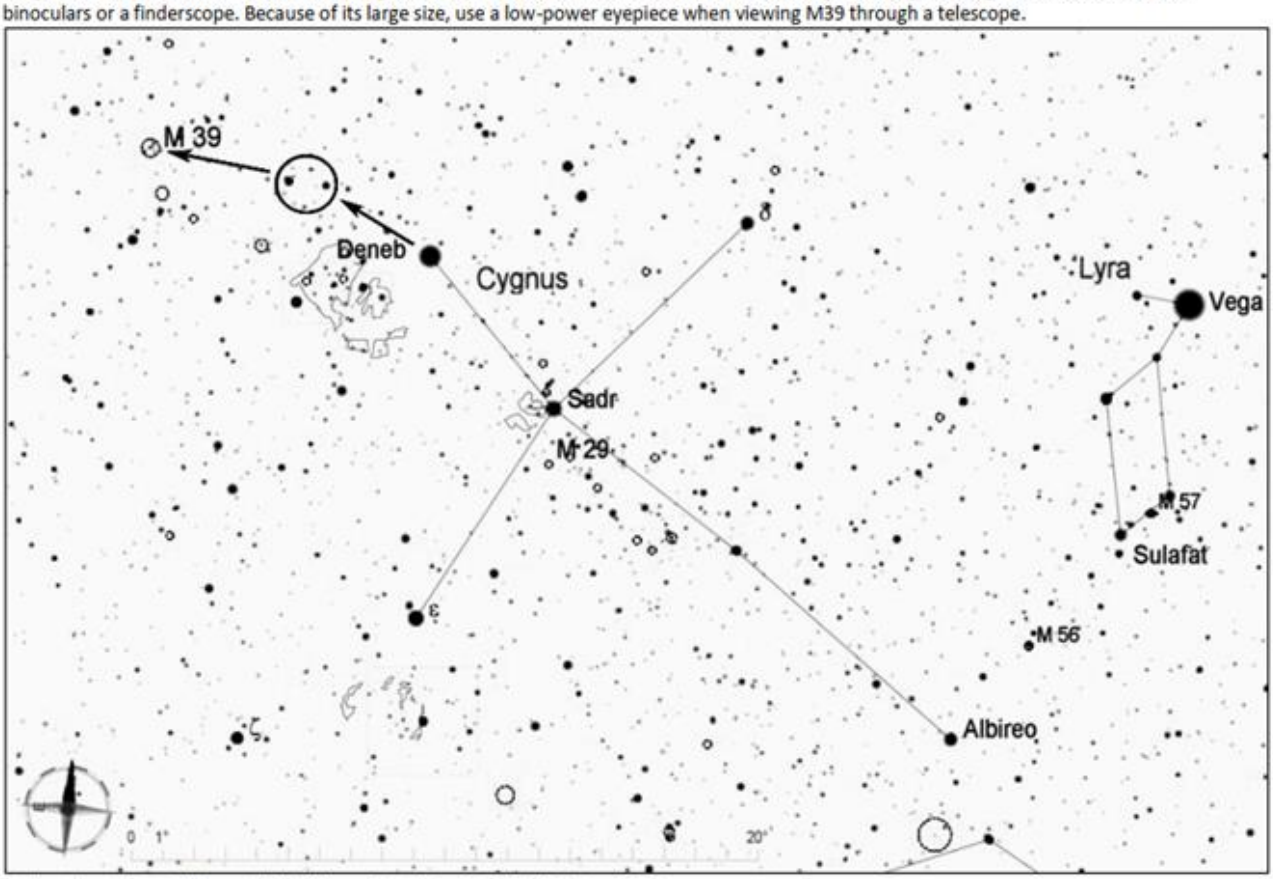
For this star hop, start from Deneb, the first-magnitude star that forms the tail of Cygnus, the swan (or if you visualize the brightest stars of Cygnus as a cross shape, Deneb is at the top of the cross).



M 39

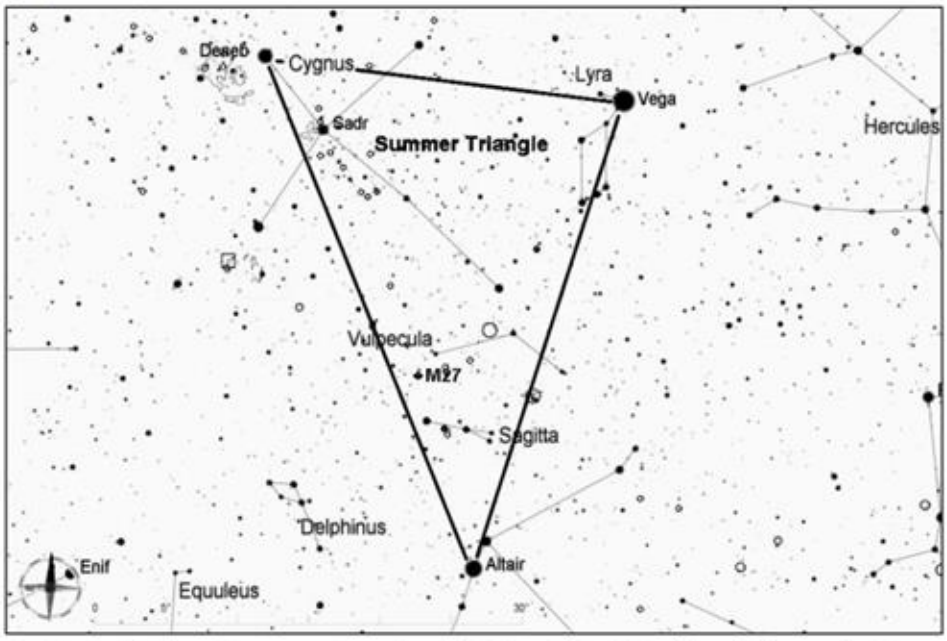
From Deneb, look about 5 degrees to the northeast for a pair of dim stars (about magnitude 4-5) that are circled in the chart below. Continue in roughly the same direction for another 5 degrees and you will reach the location of M39. It is large and bright enough to be easily visible in binoculars or a finderscope. Because of its large size, use a low-power eyepiece when viewing M39 through a telescope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

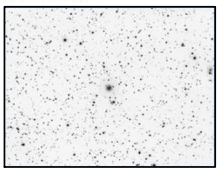
NGC 6826 (Caldwell 15), Blinking Planetary in Cygnus

If you look directly at the magnitude 10.6 star in the center of this nebula, it may be difficult to see the nebula itself. But look slightly to the side, and the hazy nebula suddenly "blinks" into view. (This is because our peripheral vision is more sensitive than central vision to dim light.) Looking back and forth can make the nebula appear to come and go, hence its nickname. The nebula is about 2 arcminutes in diameter, and it is about 4000 light years away.



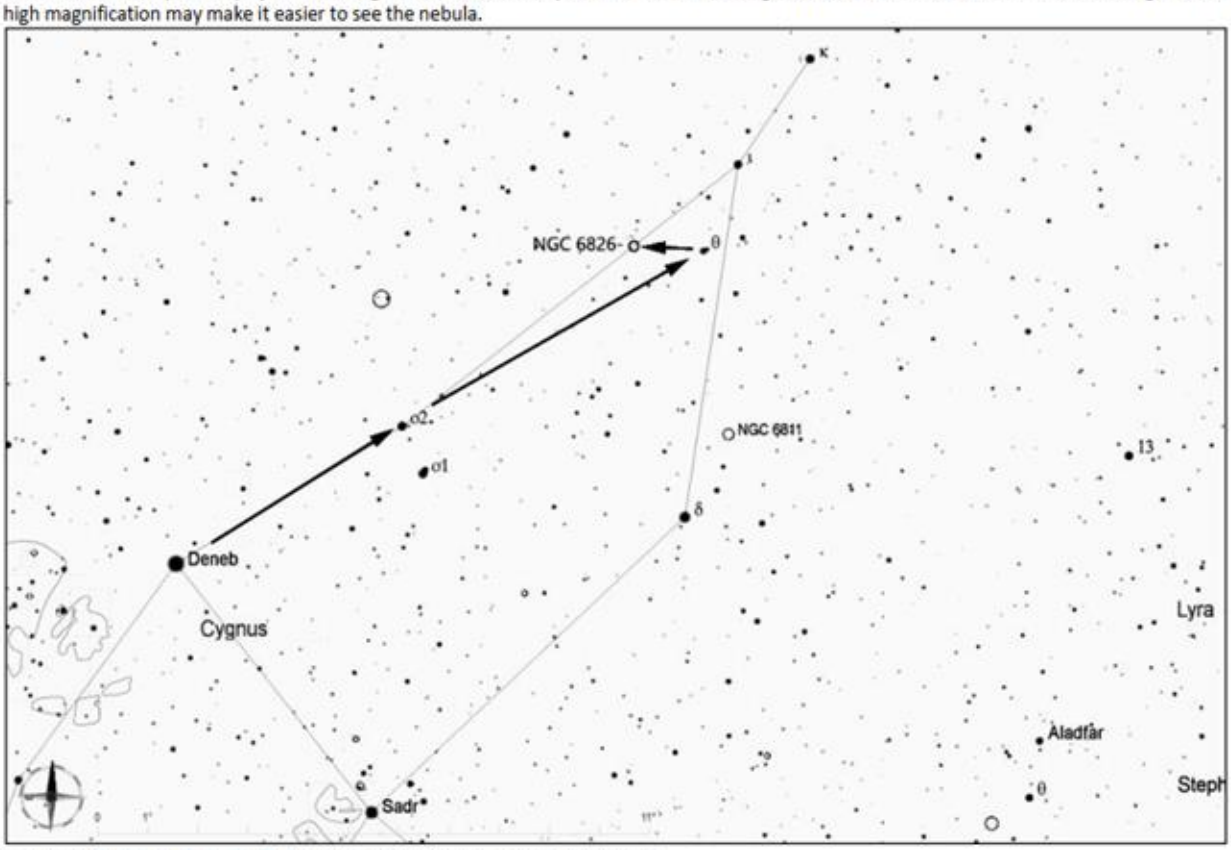
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Deneb, the first-magnitude star that forms the tail of Cygnus, the swan (or if you visualize the brightest stars of Cygnus as a cross shape, Deneb is at the top of the cross).



NGC 6826

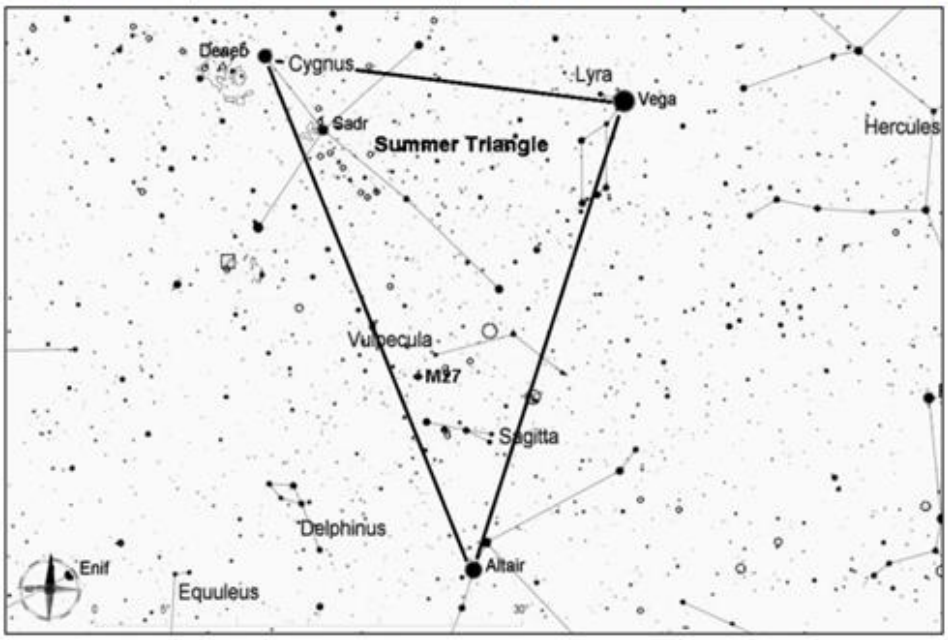
From Deneb, look about 5 degrees to the northwest for Omicron 2 Cygni, then follow this line another 7 degrees to Theta (θ) Cygni, magitude 4.5. From Theta, move your scope just 1-1/3 degrees to the east and you will see the 10th magnitude star at the center of the nebula. Using medium to high magnification may make it easier to see the nebula.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

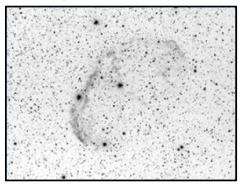
NGC 6888 (Caldwell 27), Crescent Nebula in Cygnus

This nebula forms a crescent shape roughly 18' x 12' elongated in the north-south direction. In the center of the crescent is a 7.5 magnitude star that is providing the energy that causes the nebula to glow. About 6' to the east of this star is another star of similar brightness (actually a double star if you look closely) through which the nebula appears to pass. The nebula is estimated to be about 5000 light years away.



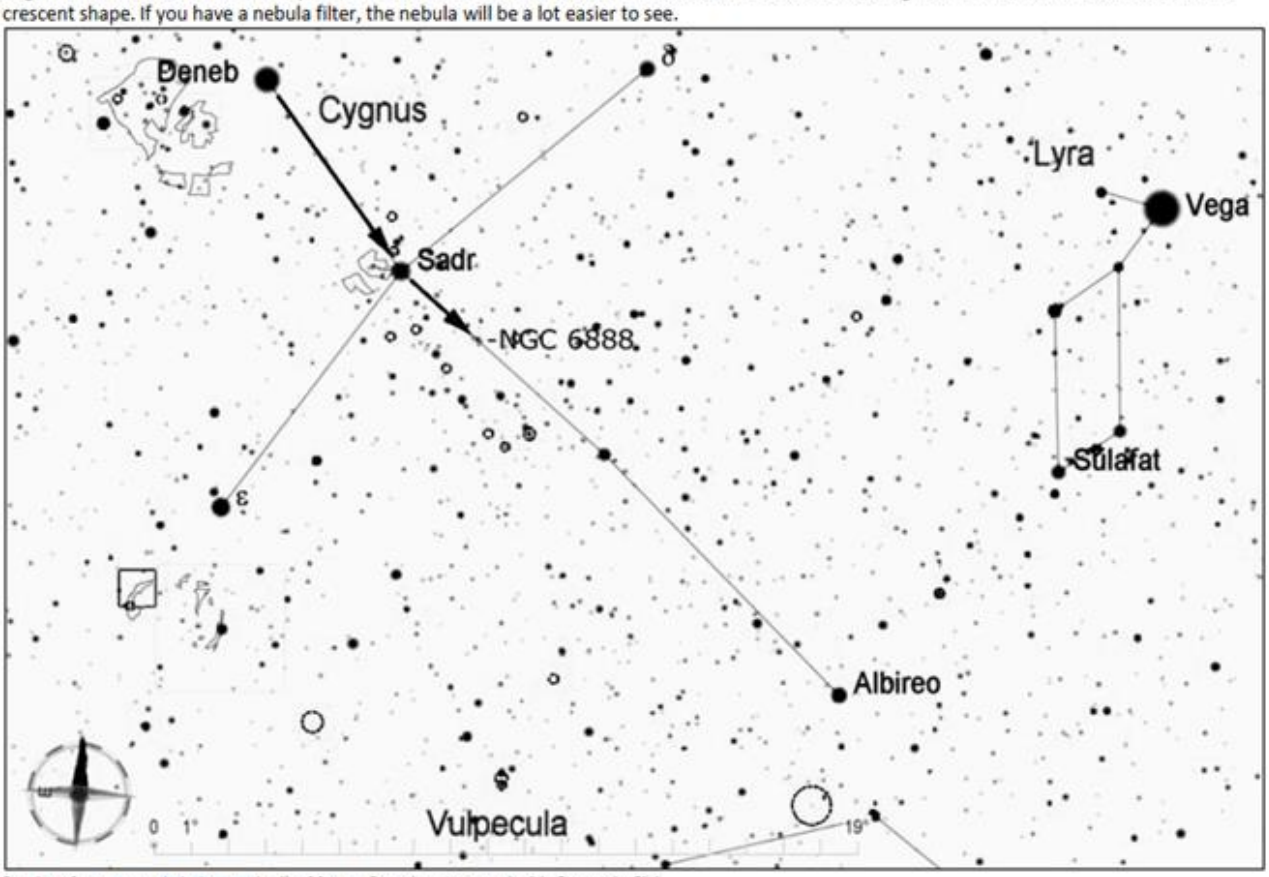
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Deneb, the first-magnitude star that forms the tail of Cygnus, the swan (or if you visualize the brightest stars of Cygnus as a cross shape, Deneb is at the top of the cross).



NGC 6888

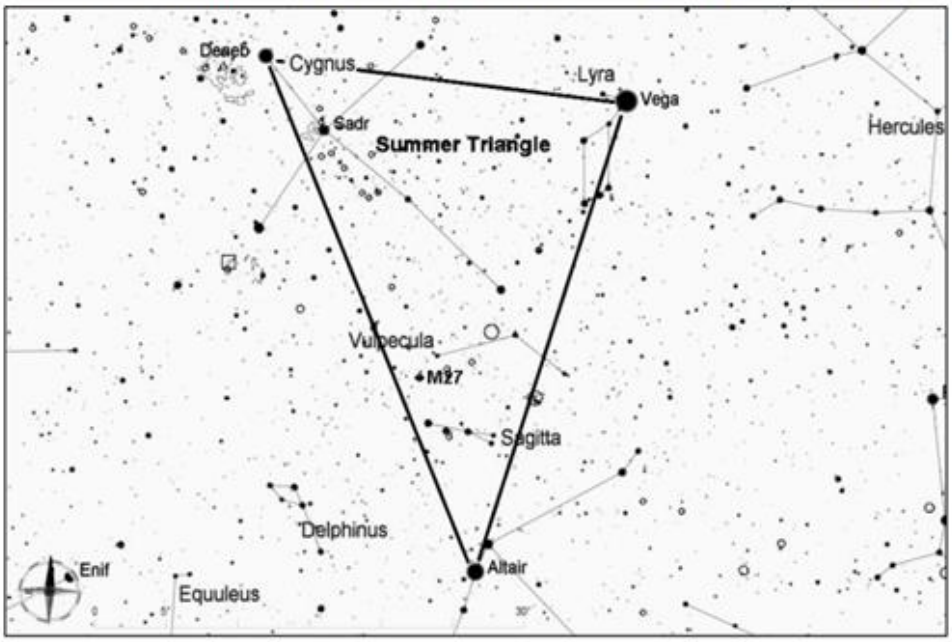
From Deneb, look to the southwest for Sadr, the magnitude 2 star at the center of the Cygnus cross shape. Continue past Sadr another 2-1/2 degrees in the same direction and you will arrive at the location of the Crescent Nebula. Look for a 7.5 magnitude star that is in the center of the crescent shape. If you have a nebula filter, the nebula will be a lot easier to see.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6960 (Caldwell 34) and NGC 6992-5 (Caldwell 33), Veil Nebula in Cygnus

The western section of the Veil Nebula (NGC 6960) and the eastern section (NGC 6962-5) are about 3 degrees apart. They are both remnants of a supernova that occurred several thousand years ago. They have a low surface brightness and are hard to see through a telescope except under nice dark skies. A nebula filter such as an OIII filter can greatly enhance the view, and a large telescope can show a wealth of detail.



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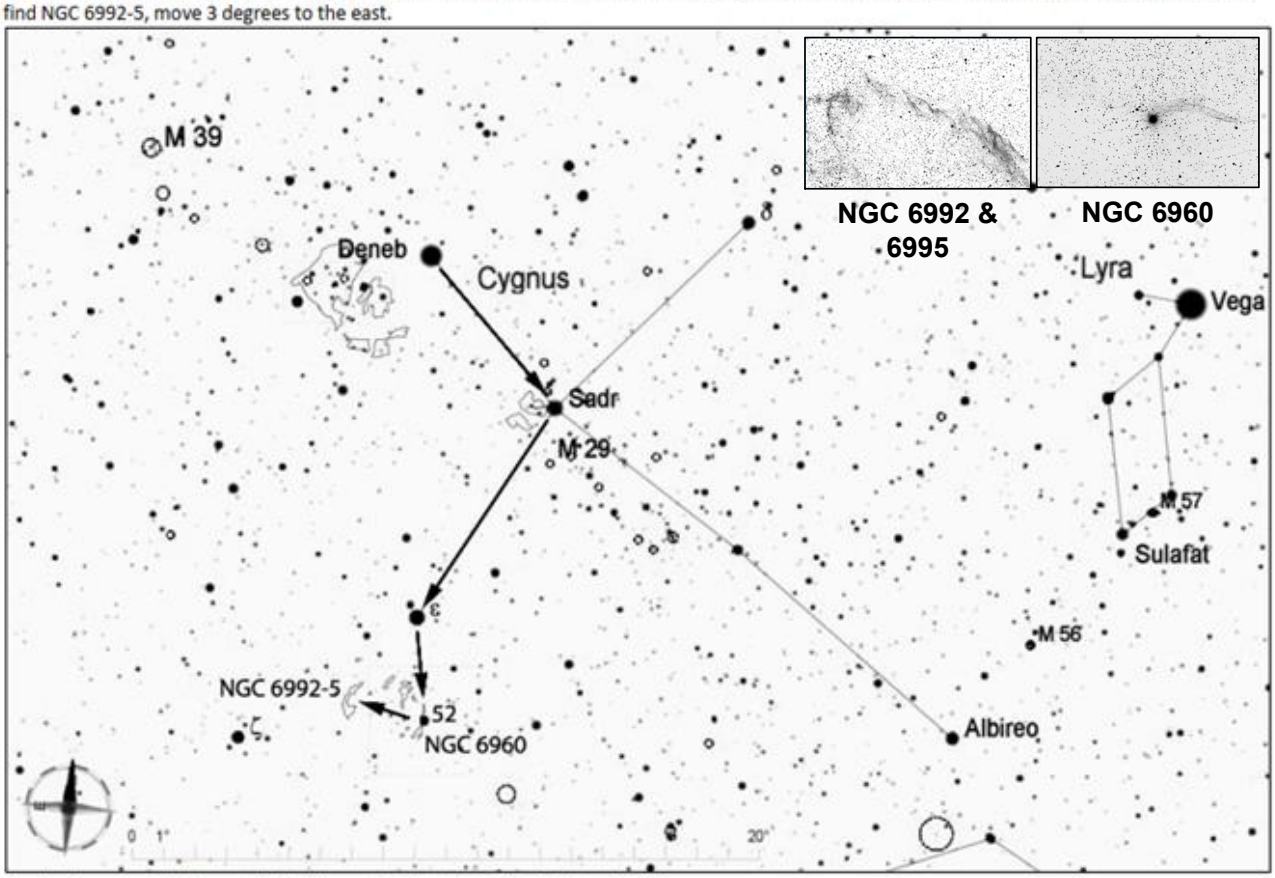
For this star hop, start from Deneb, the first-magnitude star that forms the tail of Cygnus, the swan (or if you visualize the brightest stars of Cygnus as a cross shape, Deneb is at the top of the cross).

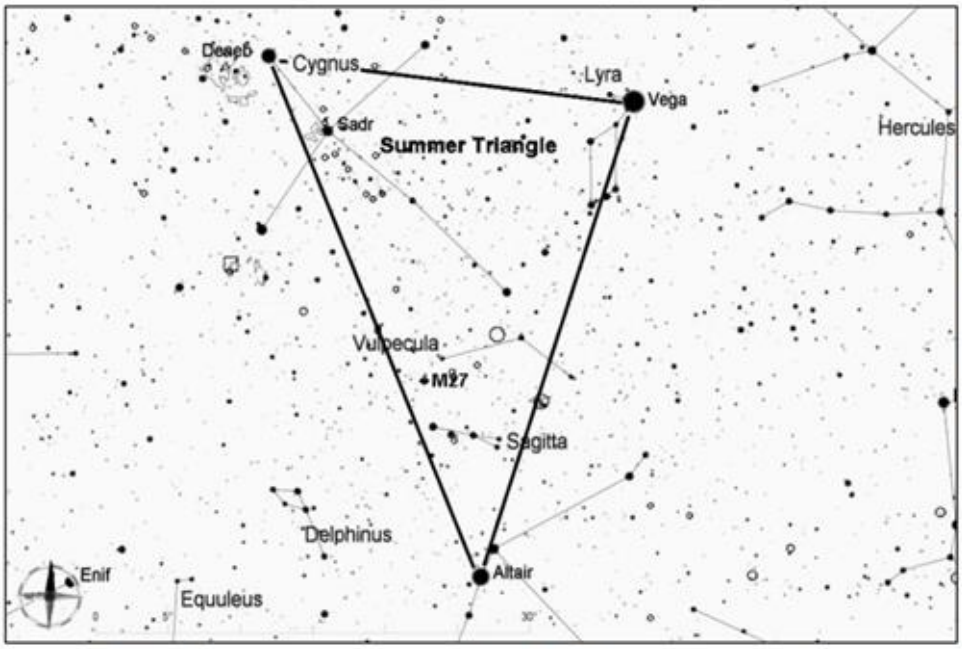
From Deneb, look to the southwest for Sadr, the magnitude 2 star at the center of the Cygnus cross shape and then southeast to Epsilon (ε) on the eastern arm of the cross. Then look 4 degrees to the south for 4th magnitude 52 Cygni, which almost touches the brightest streak of NGC 6960. To find NGC 6992-5, move 3 degrees to the east.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 7000 (Caldwell 20, North America Nebula) and Open Cluster NGC 6996 in Cygnus

This nebula gets its name from its curious resemblance to the shape of the continent. On a dark night, it can be seen with the naked eye as a hazy patch in the Milky Way, several times the diameter of the Moon. It consists of vast expanses of glowing hydrogen gas. The nebula is in a dense section of the Milky Way. A small open cluster that can be seen in roughly the "Great Lakes" region of the nebula is NGC 6996.



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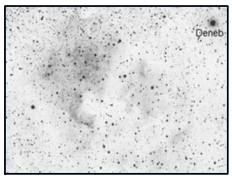
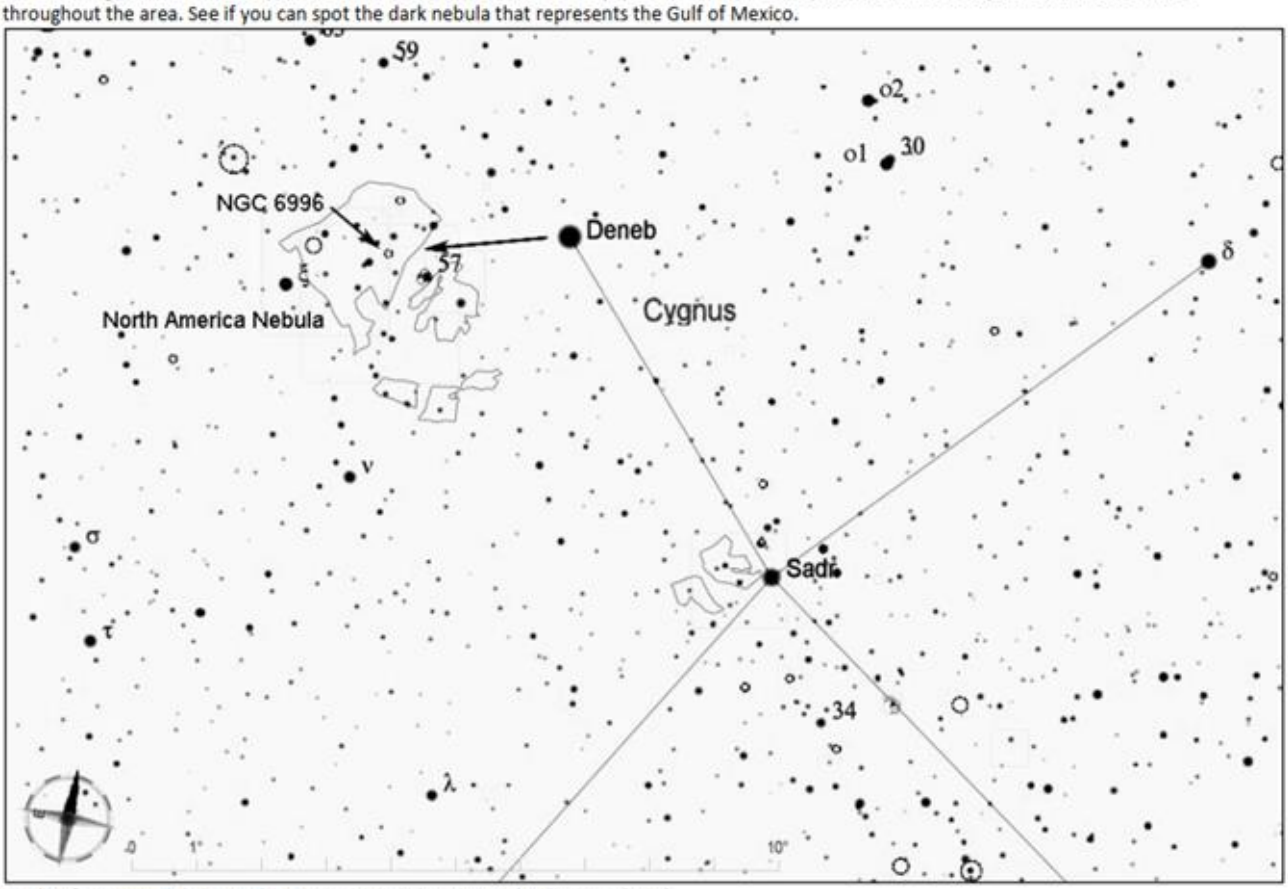


NGC 7000

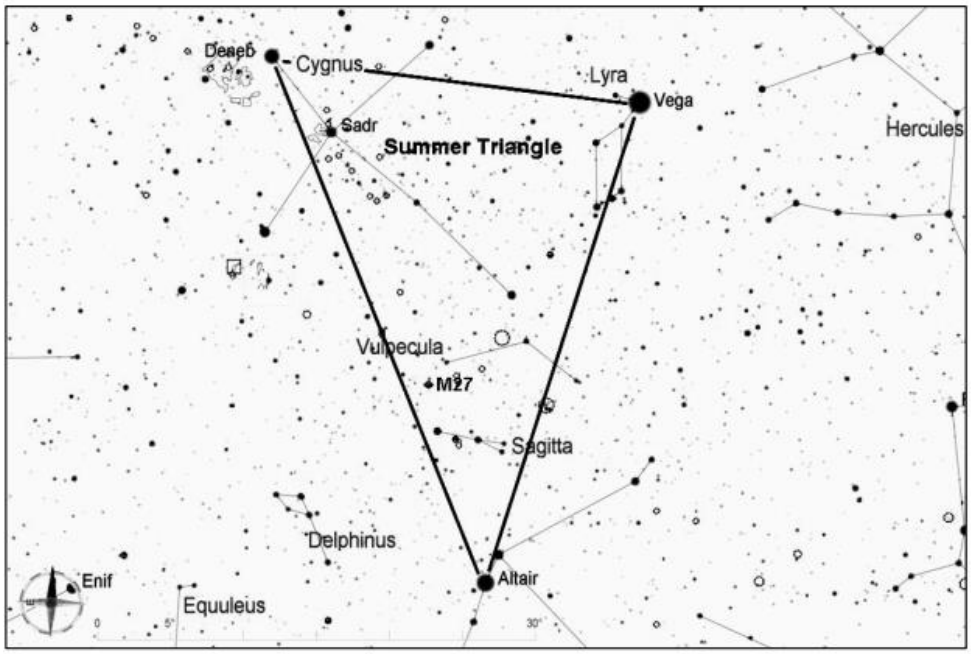
From Deneb, the North America Nebula is just about 3 degrees to the east. It may be visible to the naked eye, and is a nice sight through binoculars on a dark night. With a telescope, it is best viewed with a wide-field eyepiece. There are faint patches of nebulosity and star clouds visible throughout the area. See if you can spot the dark nebula that represents the Gulf of Mexico.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Omicron 1 Cygni, Triple Star in Cygnus

This is a very attractive trio because of their contrasting colors--orange, blue, and white. The three stars can be resolved in binoculars (if held steady or on a tripod) and through the smallest of telescopes. The stars are apparently not physically close together but simply in the same line of sight, but this does not detract from the beauty of these colorful stars in a Milky Way background.



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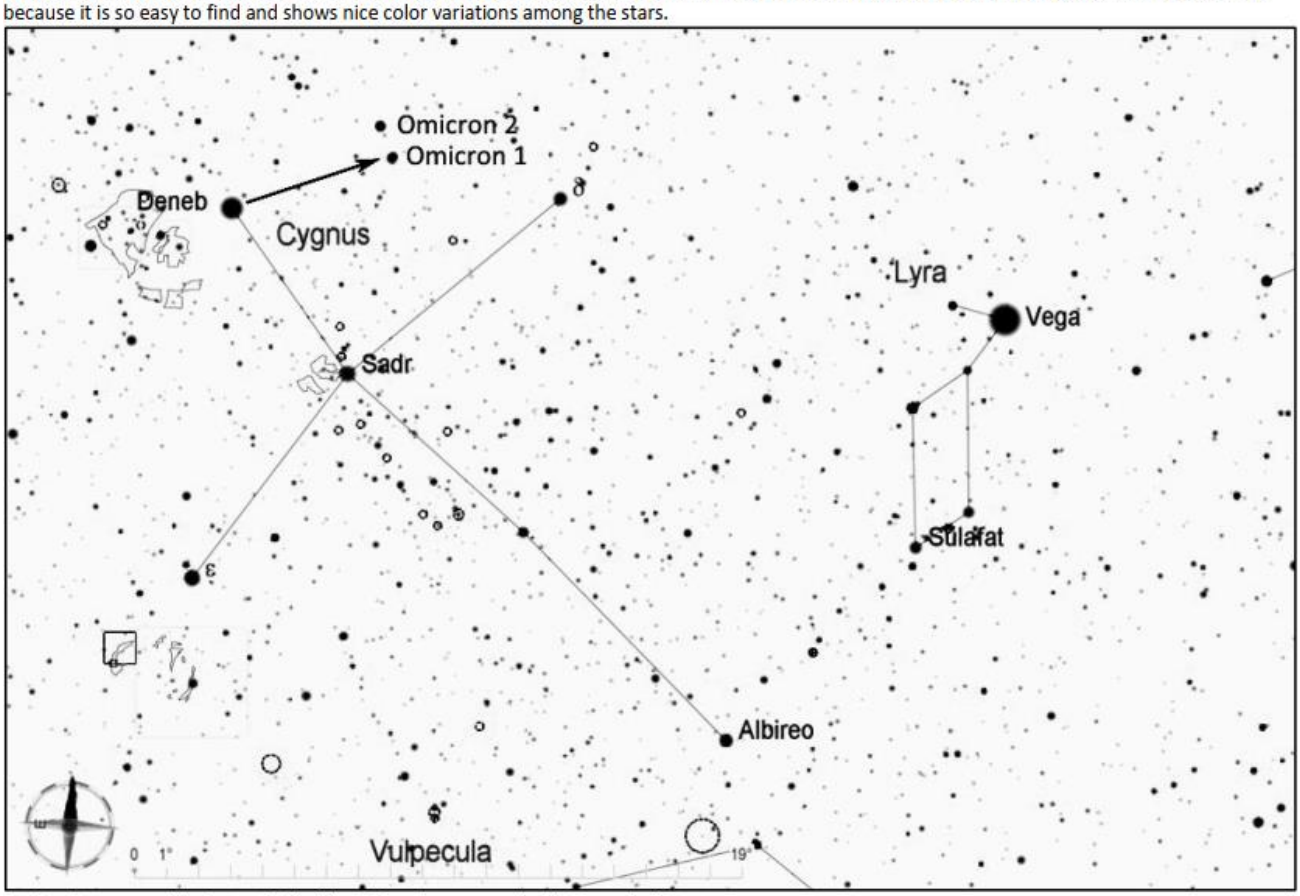
For this star hop, start from Deneb, the first-magnitude star that forms the tail of Cygnus, the swan (or if you visualize the brightest stars of Cygnus as a cross shape, Deneb is at the top of the cross).

Omicron 1 and Omicron 2 appear as a matching pair about 5 degrees to the northwest of Deneb. Omicron 1 is a good target for novice observers because it is so easy to find and shows nice color variations among the stars.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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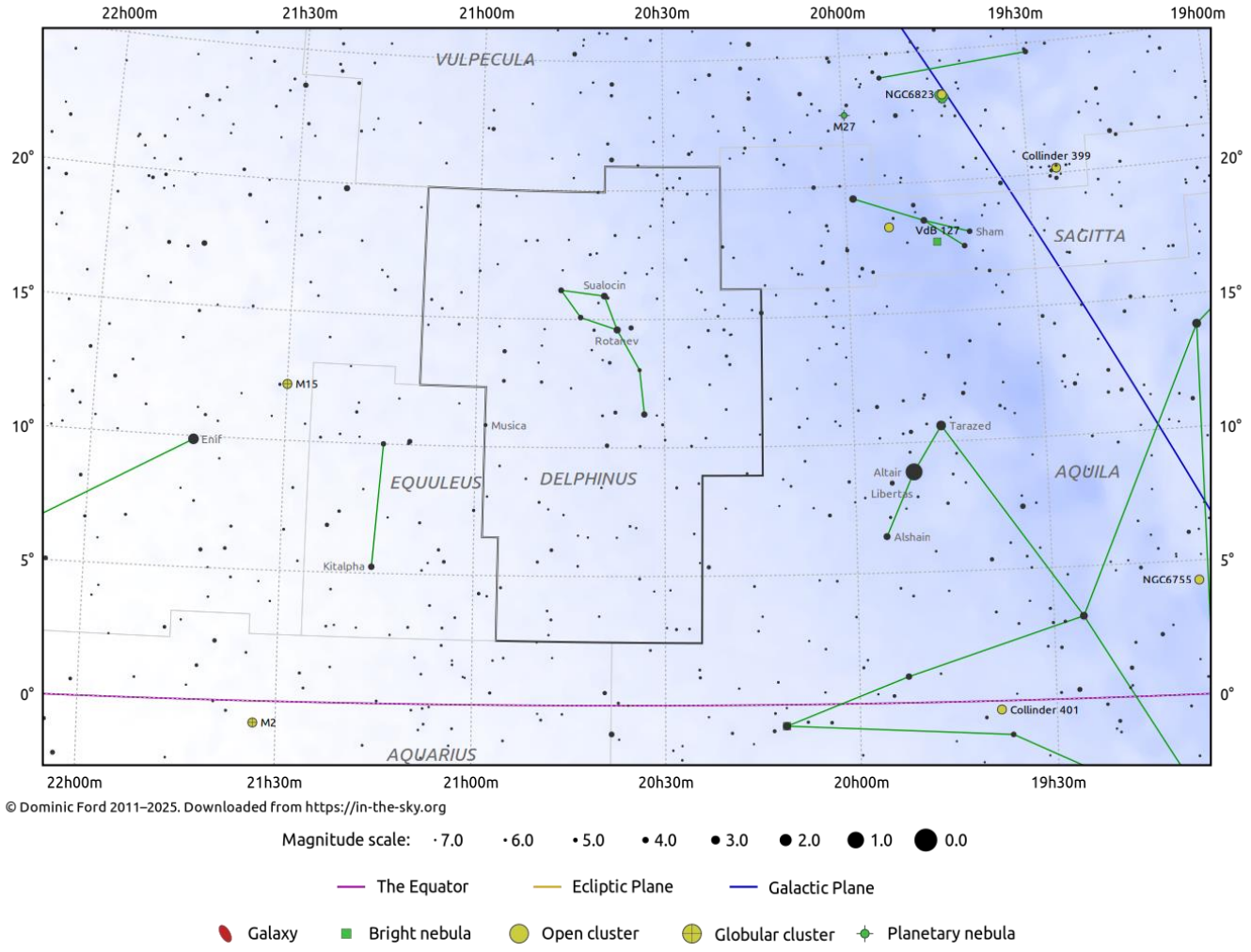
Delphinus (Del)

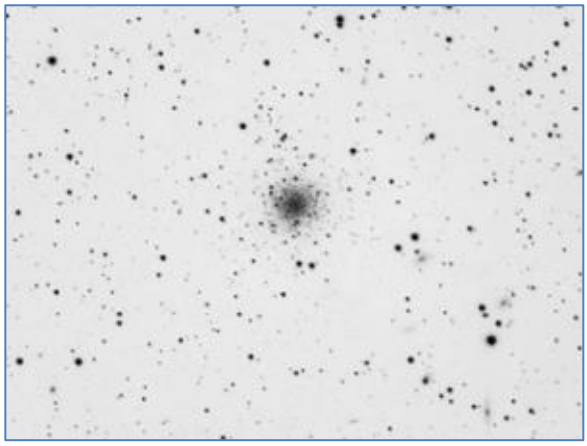
Evening Visibility: **July – November**
Online Information: **Delphinus**
Charts: **2** Featured Objects: **3**
More Online Information: NGC-6934, Gamma Delphini, NGC-7006

In-The-Sky.org Constellation Map

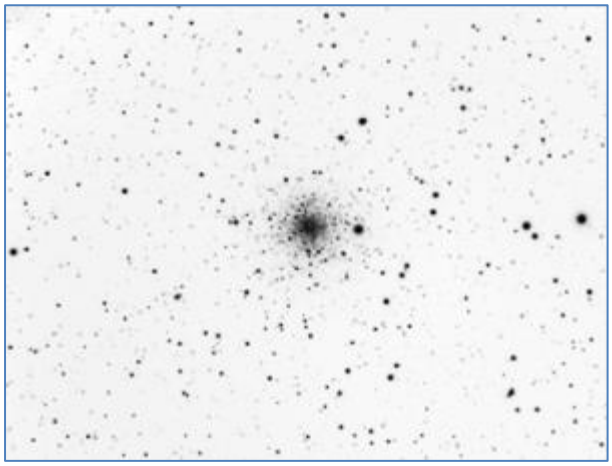


Object (Type)	Chart	Aliases	Stats
NGC-6934 (GC)	1, W1	C-47	| Mag=8.8 | SB=21.4 | Size=1.2' |
Gamma Delphini (DS)	2, W2, SD	SAO-106475, HIP-102531, 12 Del, STF-2727, ADS-14279, HR7947, HD197963	| Mag= 4.4, 5.1 | Sep=9" |
NGC-7006 (GC)	2, W2	C-42	| Mag=10.6 | SB=21.5 | Size=2.8' |

Image Gallery



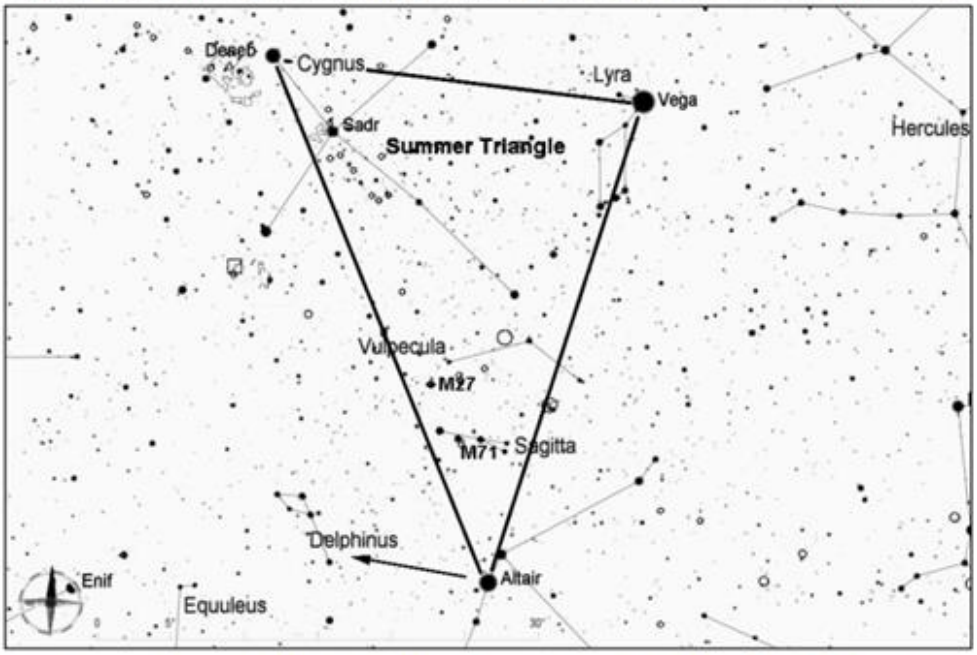
NGC 7006 (C 42)



NGC 6934 (C 47)

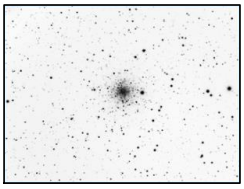
NGC 6934 (Caldwell 47), Globular Cluster in Delphinus

The distance to this globular cluster, 51,000 light years, is about half the diameter of our Milky Way galaxy, so it is not surprising that it looks fairly small and dim (about magnitude 9). Through medium-sized amateur telescopes, it has a brighter center surrounded by a dim glow, an appearance typical for unresolved globular clusters. In larger scopes, some individual stars in the periphery can be resolved.



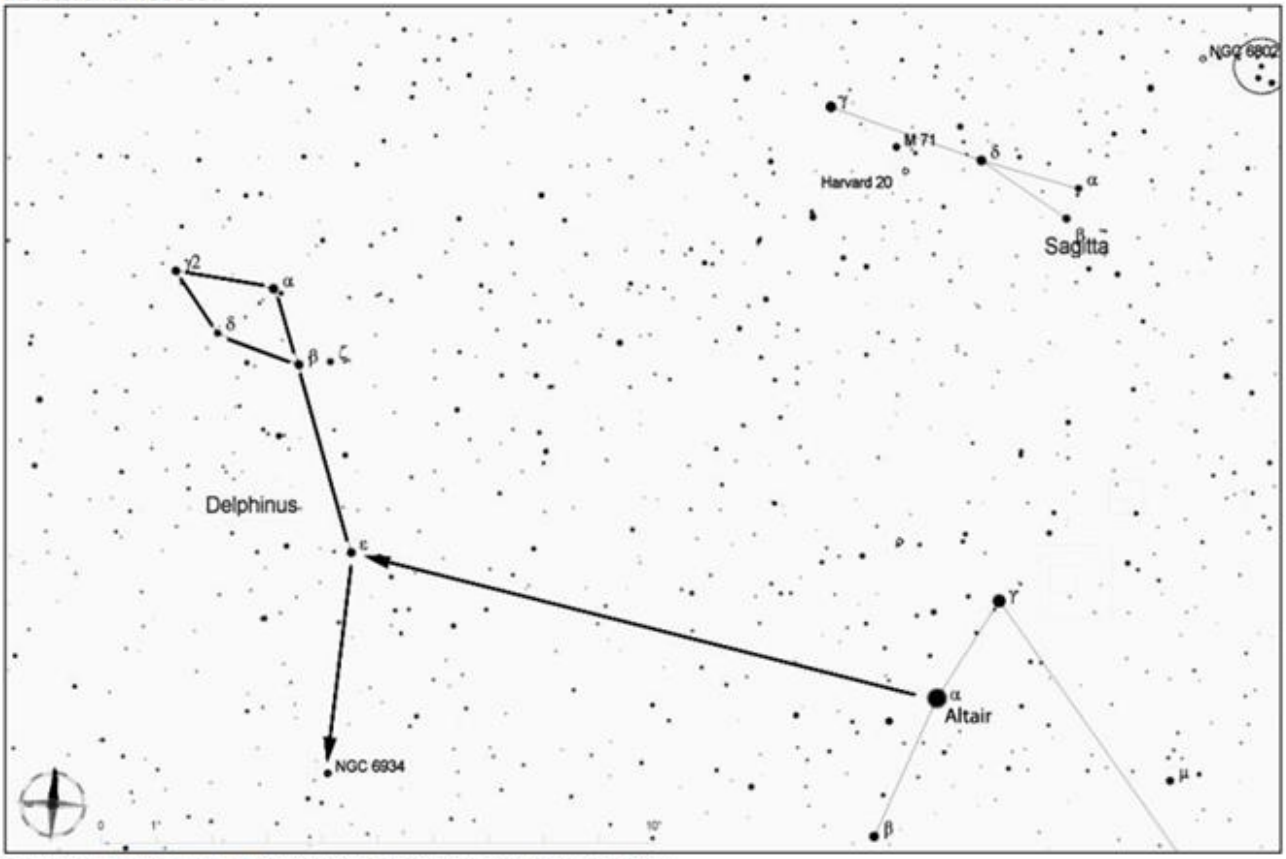
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

Find Altair at the south point of the Summer Triangle. Look about 10 degrees to the east to find the distinctive shape of Delphinus, which does resemble a dolphin jumping out of the water.



NGC 6934

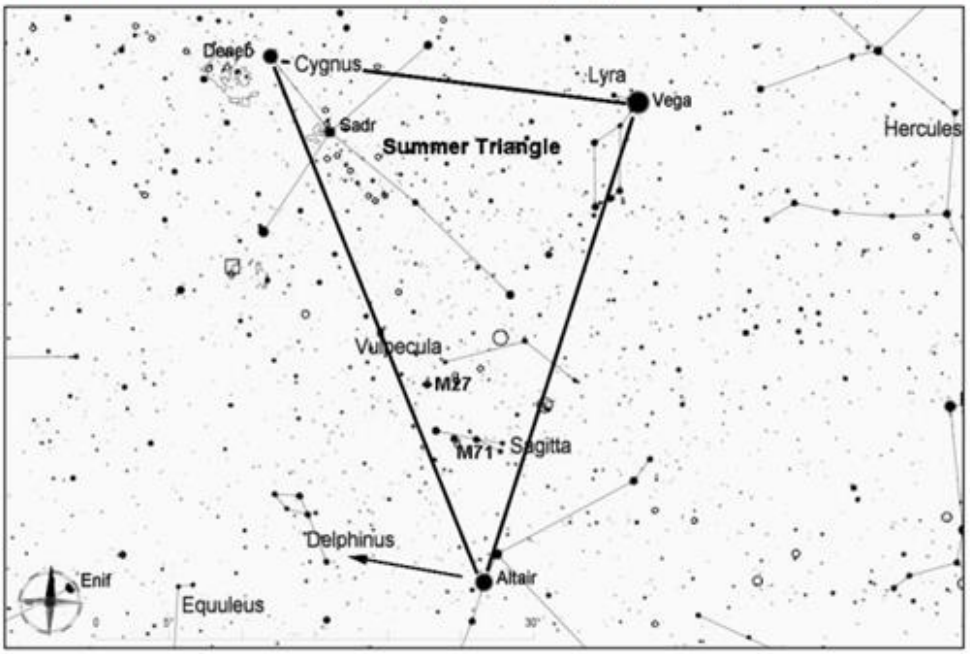
It is about 3 1/2 degrees from Beta (β) in the center of Delphinus to Epsilon (ε) in the tail. From Epsilon, look another 3 1/2 degrees south to reach the location of NGC 6934.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Gamma Delphini and NGC 7006 (Caldwell 42), Globular Cluster

Gamma Delphini is a fine double star for any telescope, with its components separated by 9". About 3.5 degrees to its east is NGC 7006, one of the most distant globular clusters in our galaxy, about 130,000 light years away. Not surprisingly, this globular is dim (magnitude 10.6), and its individual stars cannot be resolved without a very large telescope. It appears as a fuzzy ball with a brighter center.



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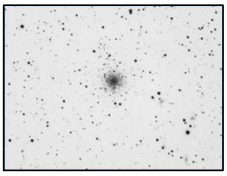
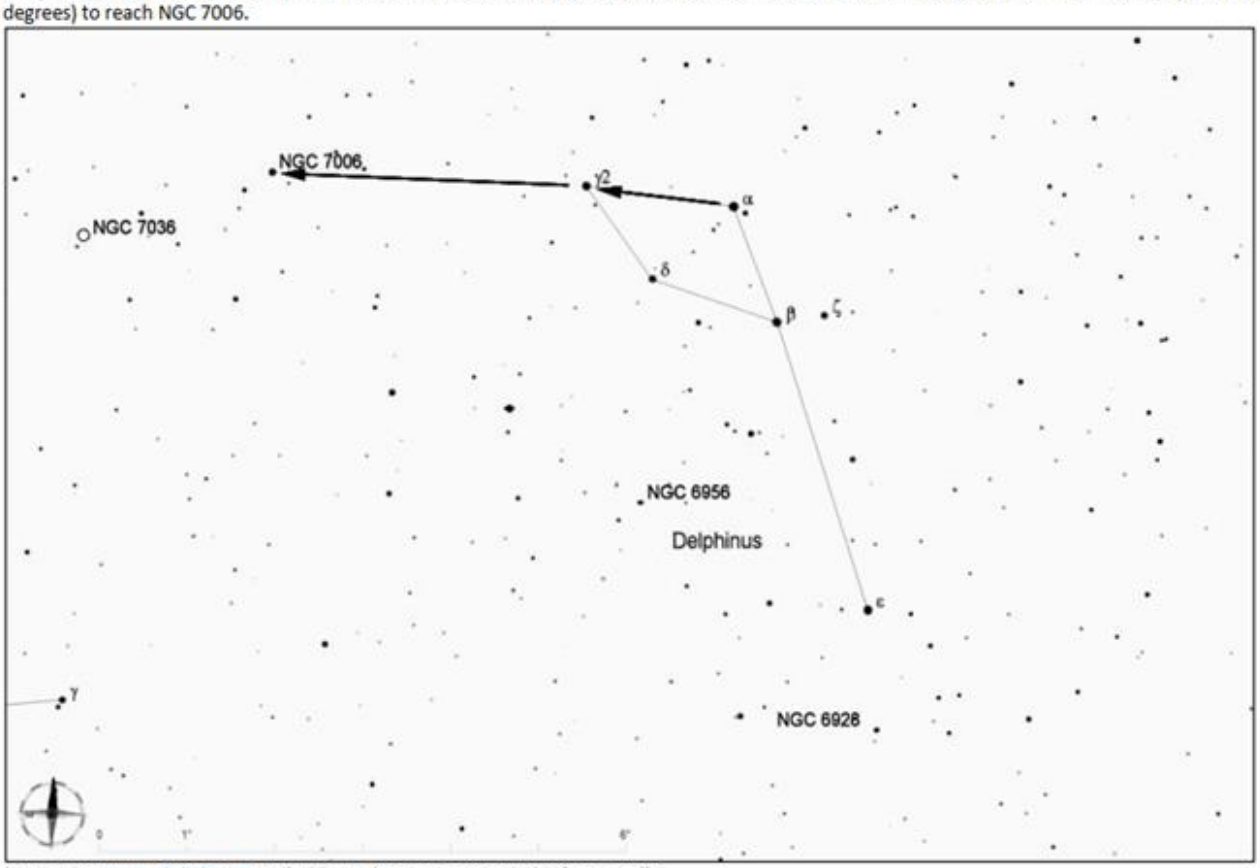


NGC 7006

Gamma Delphini (γ2) is the star that marks the nose of the dolphin. Use medium to high power for a good view of its two component stars (magnitudes 4.3 and 5.0). Then form a line between γ2 and alpha (α) Delphini, and extend this line to the east about twice their distance (about 3.5 degrees) to reach NGC 7006.

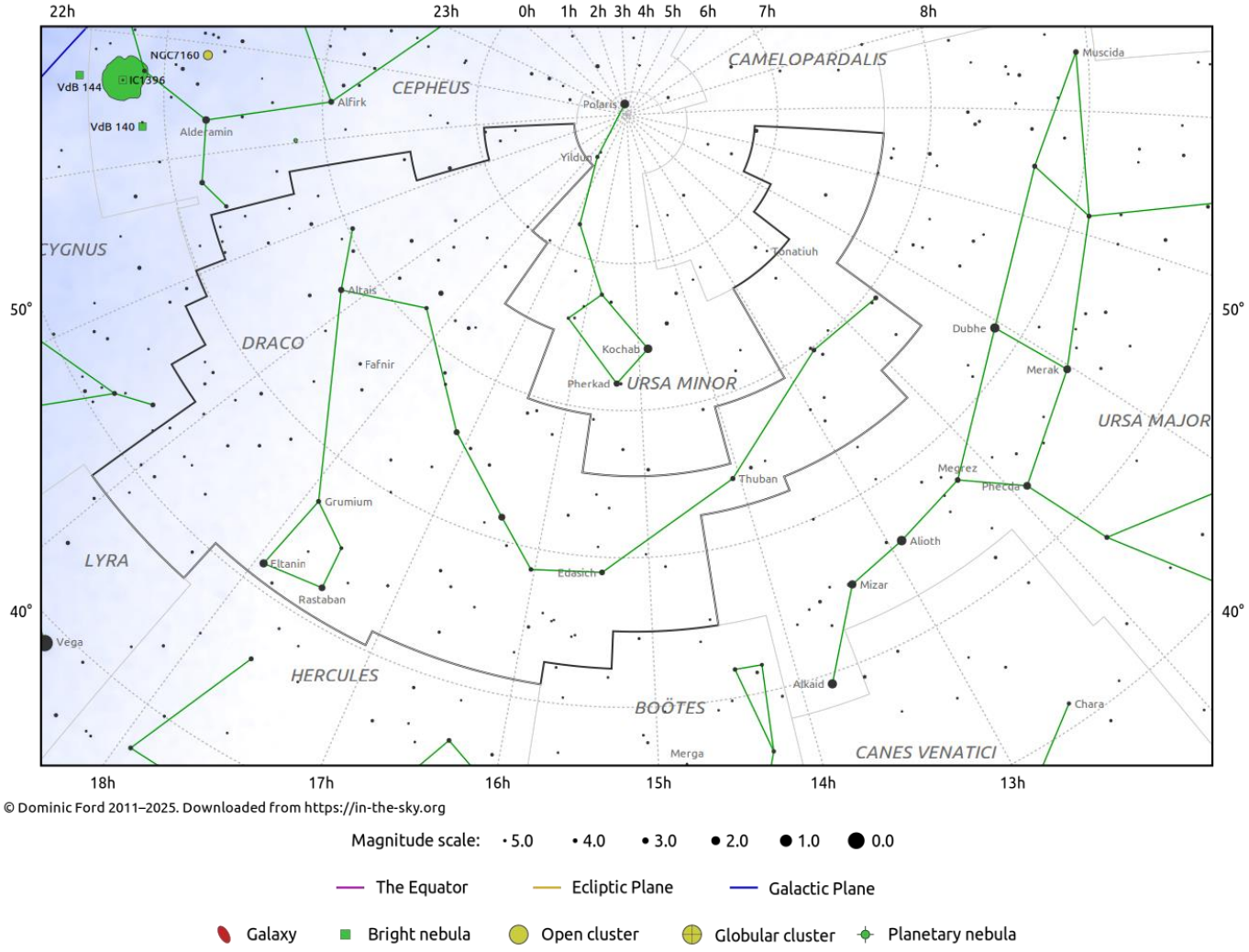


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Draco (Dra)

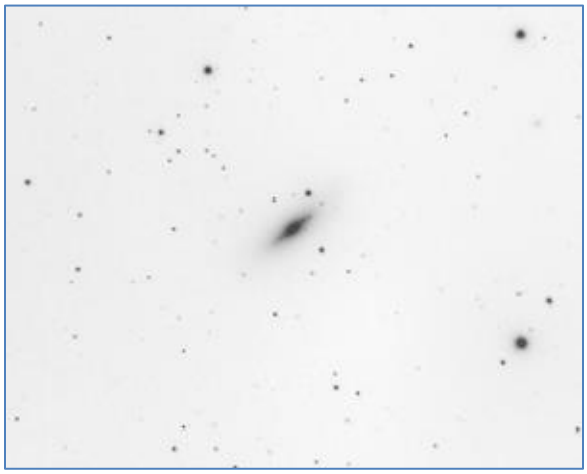
Evening Visibility: **April – October**
Online Information: **Draco**
Charts: **4** Featured Objects: **4**
More Online Information: M-102, NGC-4236, NGC-6503, NGC-6543

In-The-Sky.org Constellation Map

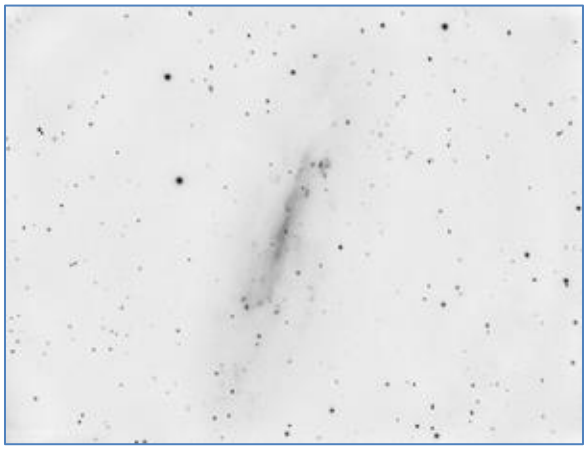


Object (Type)	Chart	Aliases	Stats
M-102 (G)	1, W1	NGC-5866, PGC-53933, UGC-9723	| Mag=9.9 | SB=22.7 | Size=6.5’ x 3.1’ |
NGC-4236 (G)	2, W2	C-3, PGC-39346, UGC-7306	| Mag=10.5 | SB=24.7 | Size= 21.9’ x 7.2’ |
NGC-6503 (G)	3, W3	PGC-60921, UGC-11012	| Mag=10.2 | SB=22.8 | Size=7.1’ x 2.4’ |
NGC-6543 (PN)	4, W4	Cat’s Eye Nebula, C-6	| Mag=9.8 | SB=21.4 | Size=20” |

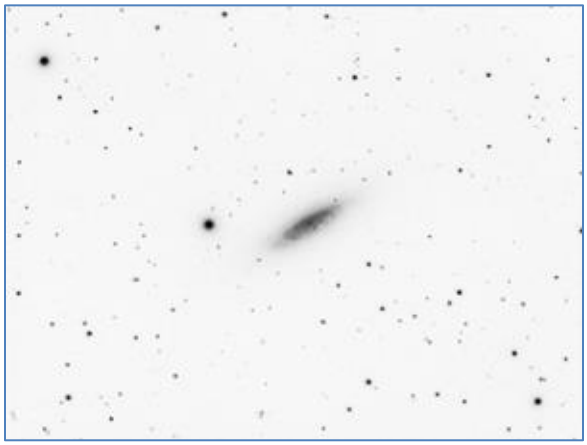
Image Gallery



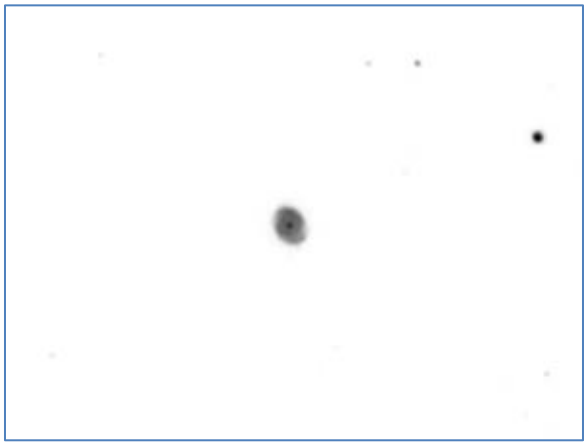
Messier 102



NGC 4236 (C 3)



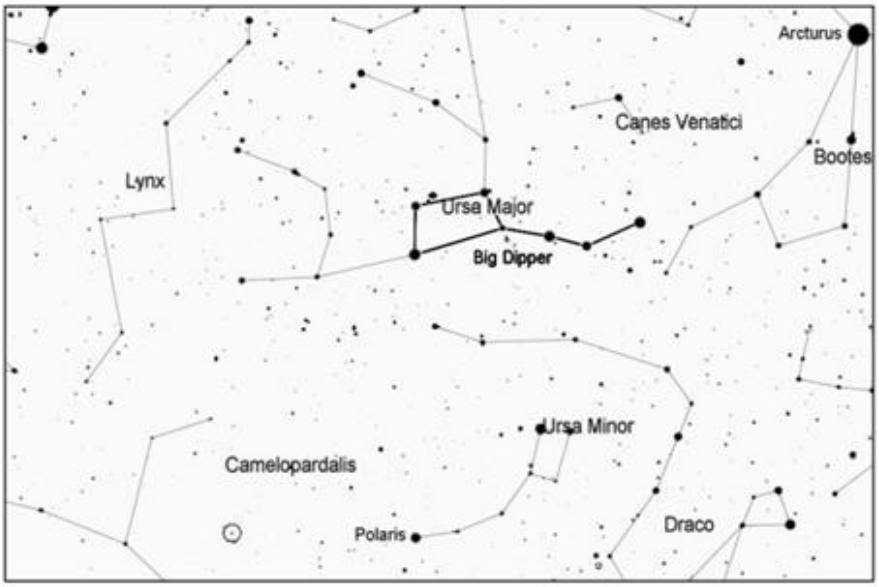
NGC 6503



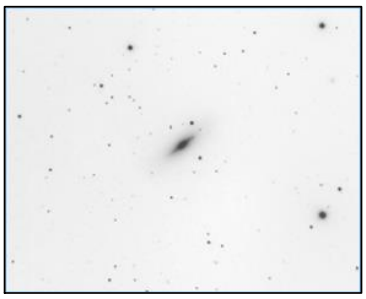
NGC 6543 (C 6) The Cat's Eye Nebula

Messier 102 (NGC 5866), Galaxy in Draco

NGC 5866 is sometimes called Messier 102, but historians have shown that the galaxy Messier listed as number 102 is actually a duplicate listing of Messier 101. However, to avoid a gap in the Messier catalog, some people refer NGC 5866 as M102. It is a nice lenticular (lens-shaped) galaxy. Because of its large central bulge and pointy arms, it is sometimes called the Spindle Galaxy. It is about 47 million light years away.

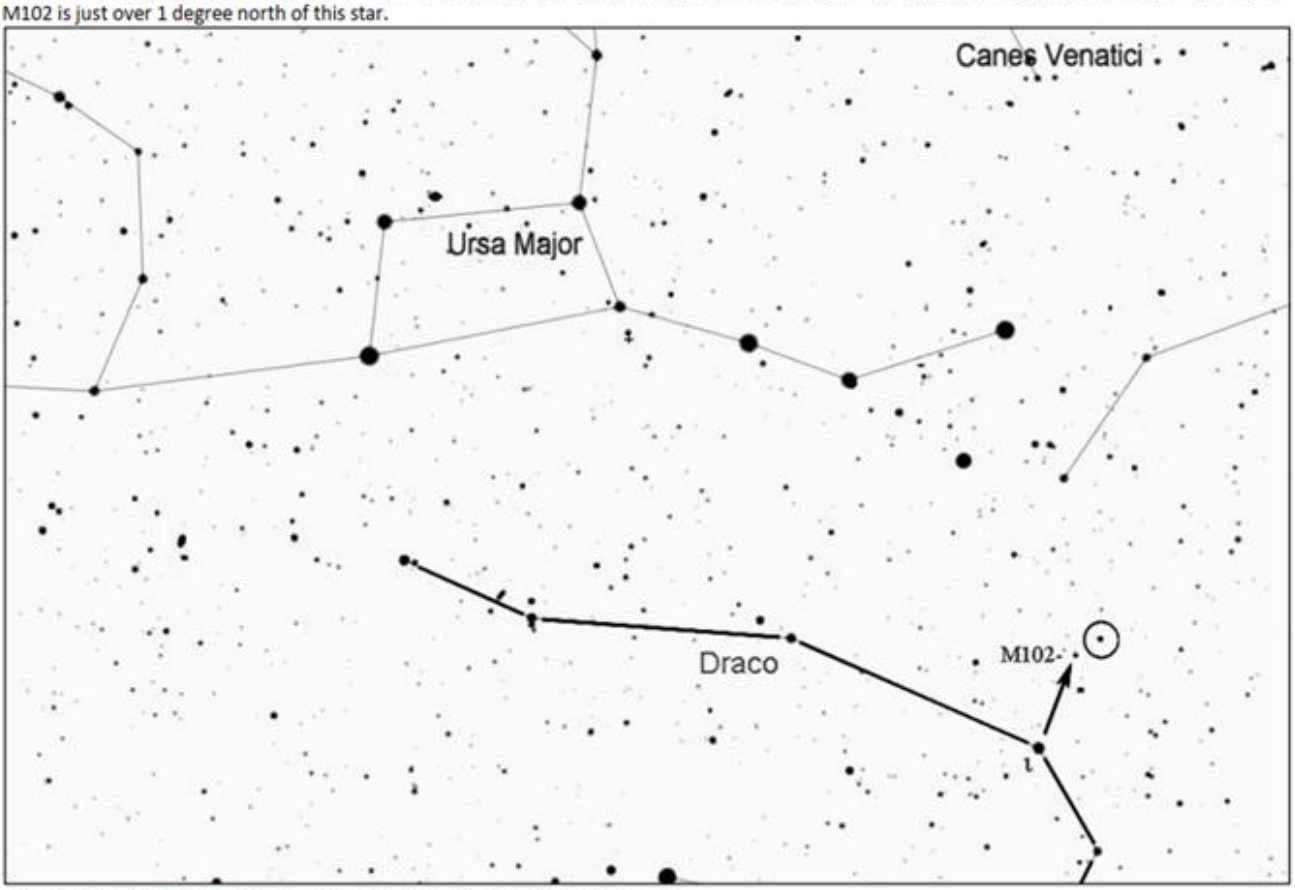


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



M 102

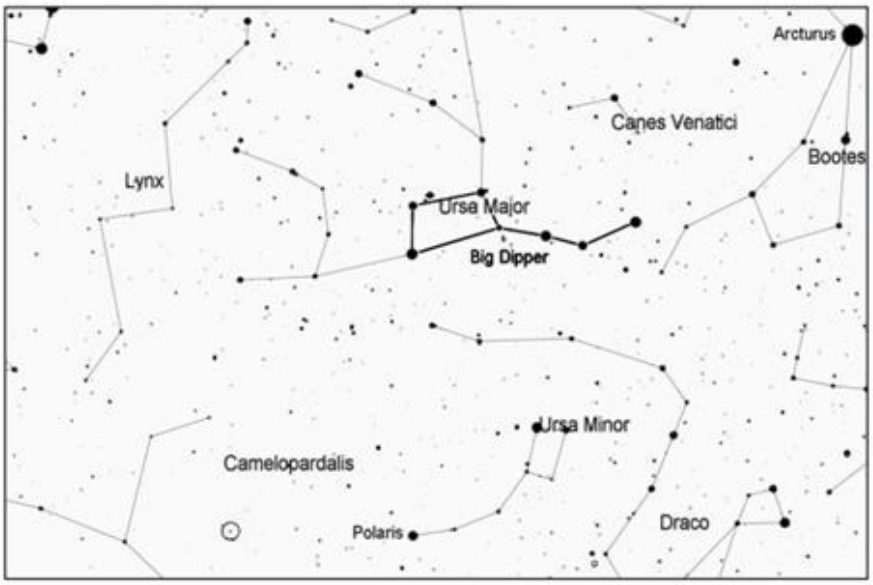
Note that north is to the bottom in this chart. Look north of the Big Dipper to find a string of stars that represents the tail of Draco, the dragon. Follow this string until you reach get to ι (iota) Draconis, a 3rd magnitude star that is north of the Big Dipper's handle. Once you reach ι, take a left turn and go 4 degrees to arrive at M102. This small galaxy can be tricky to locate, but note the 5th magnitude star that is circled in the chart below. M102 is just over 1 degree north of this star.



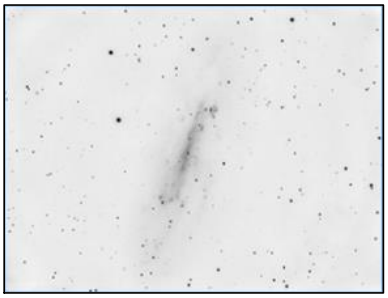
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 4236 (Caldwell 3), Galaxy in Draco

This is a large and very elongated spiral galaxy that is hard to observe because of its very low surface brightness. The best recommendation is to use a low-power eyepiece with a wide field of view, and this faint oval should appear slightly brighter than the sky background. This galaxy is part of a nearby group of galaxies that includes M81 and M82 in Ursa Major, and it is about 12 million light years away.

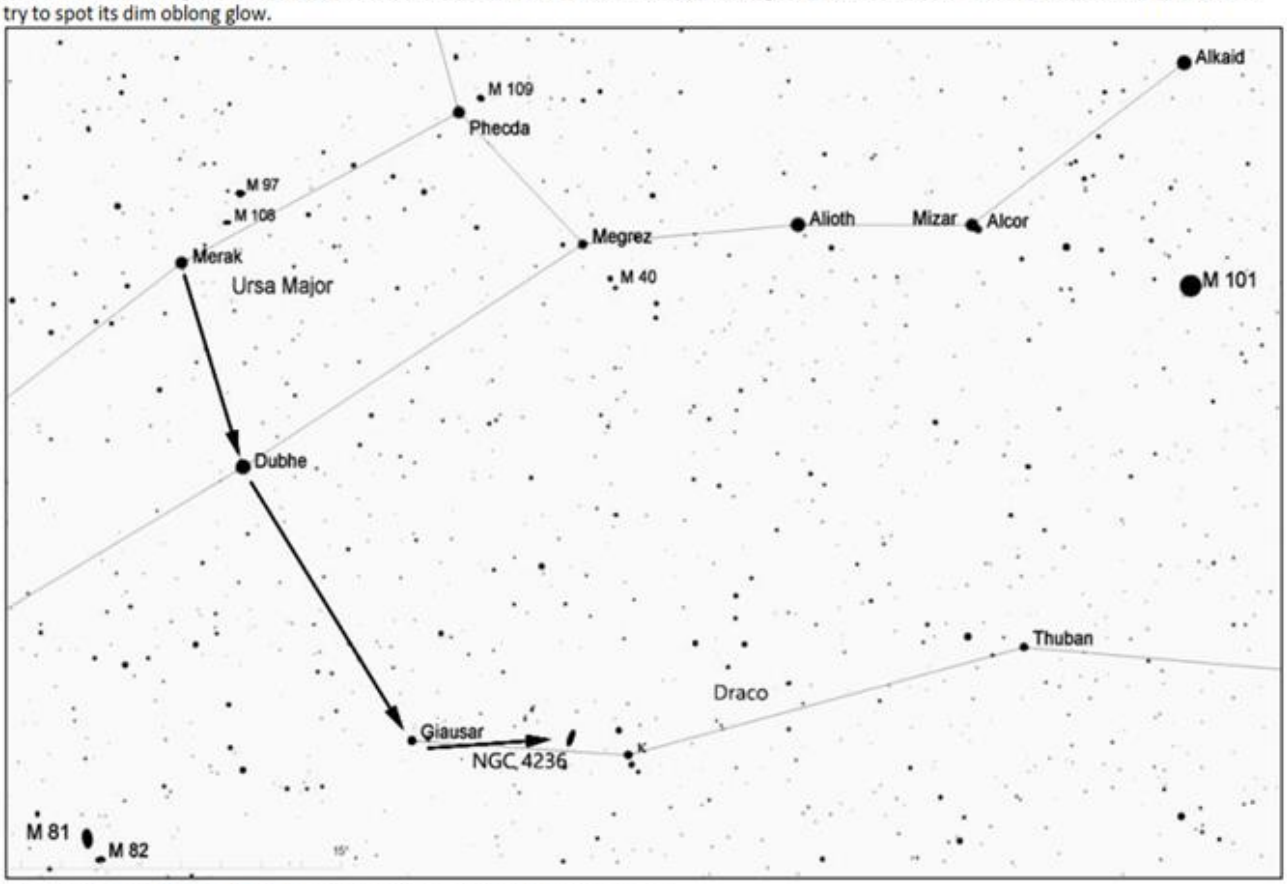


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



NGC 4236

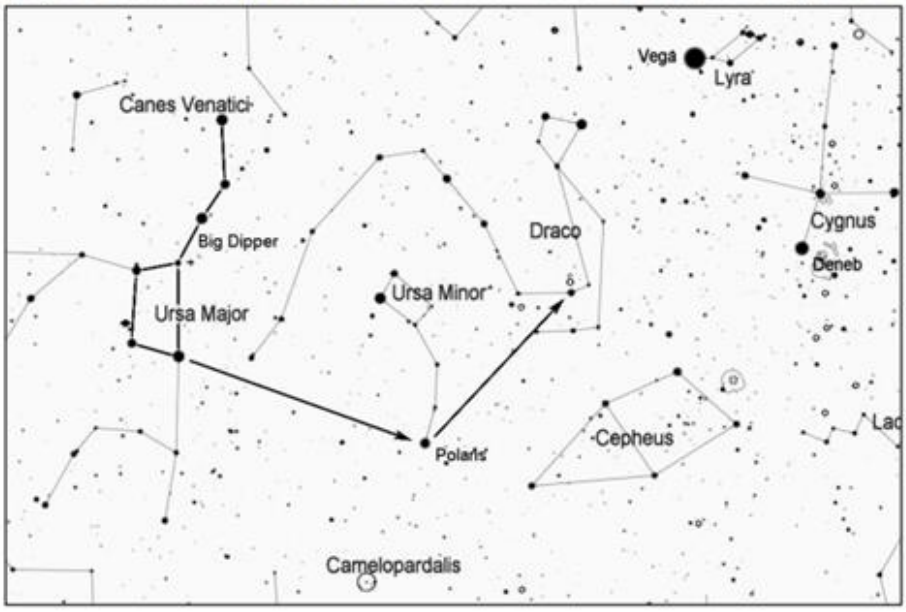
The stars Merak and Dubhe in the bowl of the Big Dipper are called the "pointers" because they point to the North Star, but they also point (more or less) to the closer 4th magnitude star Giausar at the tip of the tail of Draco, the dragon. As shown below, the next star in Draco's tail is Kappa (κ) Draconis, about 5 degrees away. About 3/4 of the distance from Giausar to Kappa is the galaxy NGC 4236. Be sure to use a wide-field eyepiece to try to spot its dim oblong glow.



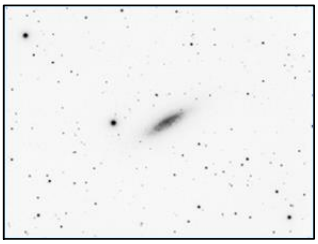
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6503, Galaxy in Draco

NGC 6503 is classified as a dwarf spiral galaxy because it is relatively small for a spiral, about 30,000 light years in diameter, less than 1/3 the size of our own Milky Way galaxy. At magnitude 10.2, NGC 6503 appears fairly bright for a galaxy, and at an estimated distance of about 17 million light years, it is one of the closer galaxies to Earth. It can be seen in even small telescopes. Visually, it has an obvious elongated shape.

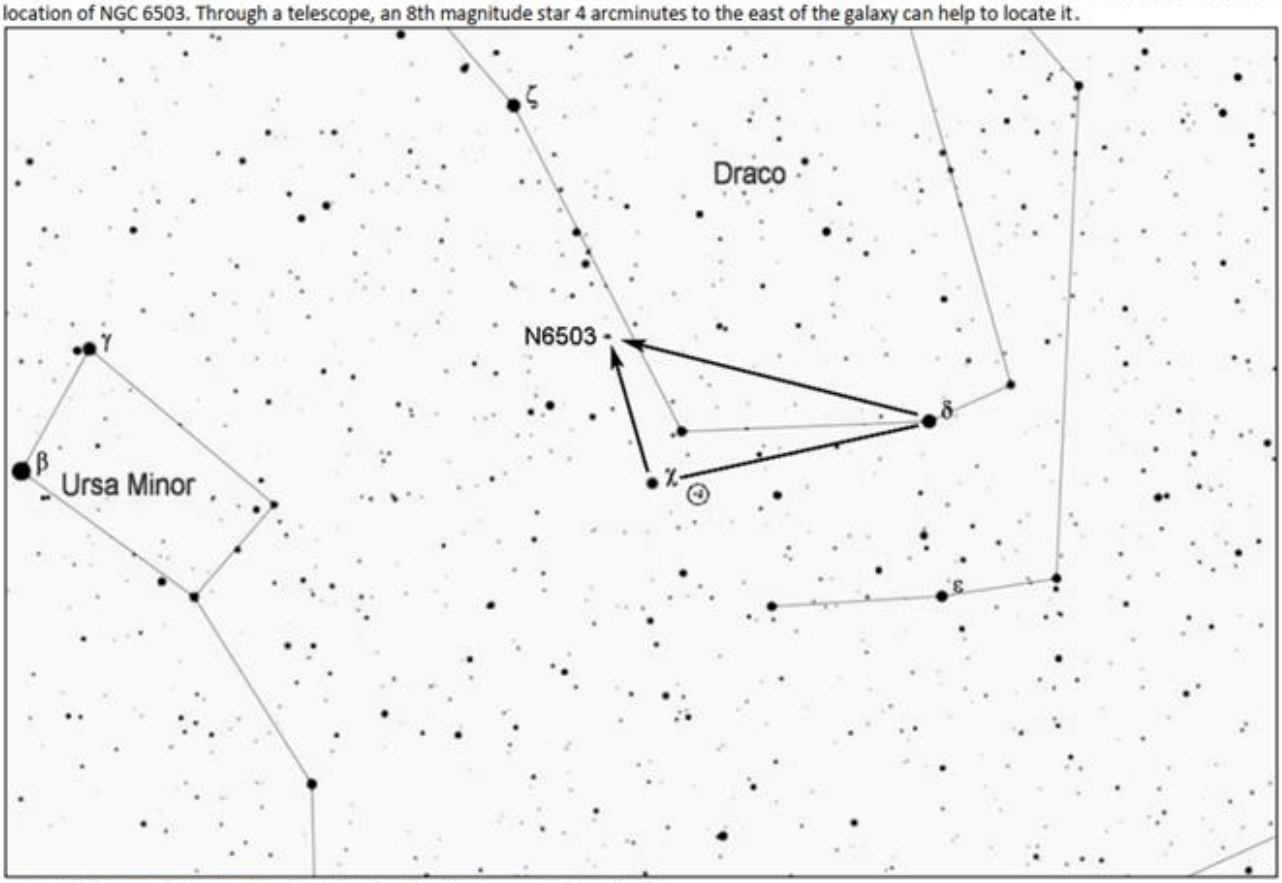


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here roughly as it is orinented in the evenings of late summer and fall. Use the two pointer stars in the bowl of the Big Dipper to find Polaris, the North Star. Then take a left turn to reach a group of stars that form a twist in the body of Draco, the dragon. The brightest star in this group is δ (delta) Draconis.



NGC 6503

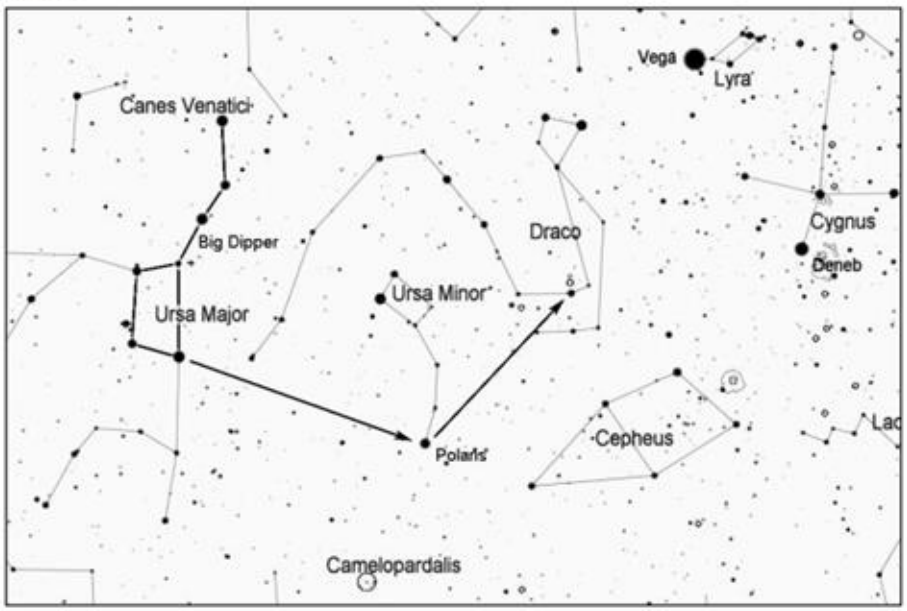
This is a tricky area of the sky to navigate, so look carefully at the chart below. Locate δ Draconis and χ Draconis, two 3rd magnitude stars about 6 degrees apart. Imagine an right triangle with these two stars as the longer side, as shown in the chart, and the third point of this triangle shows the location of NGC 6503. Through a telescope, an 8th magnitude star 4 arcminutes to the east of the galaxy can help to locate it.



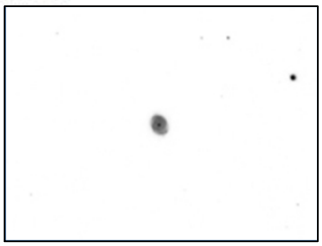
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6543 (Caldwell 6), the Cat's Eye Nebula, Planetary Nebula in Draco

This bright planetary nebula is not very large, but it can be recognized by its distinct blue-green color. If you look closely, it is not hard to see the central star from which this nebula has formed. Through a large telescope at high magnification, some of the internal structure of the nebula can be seen.

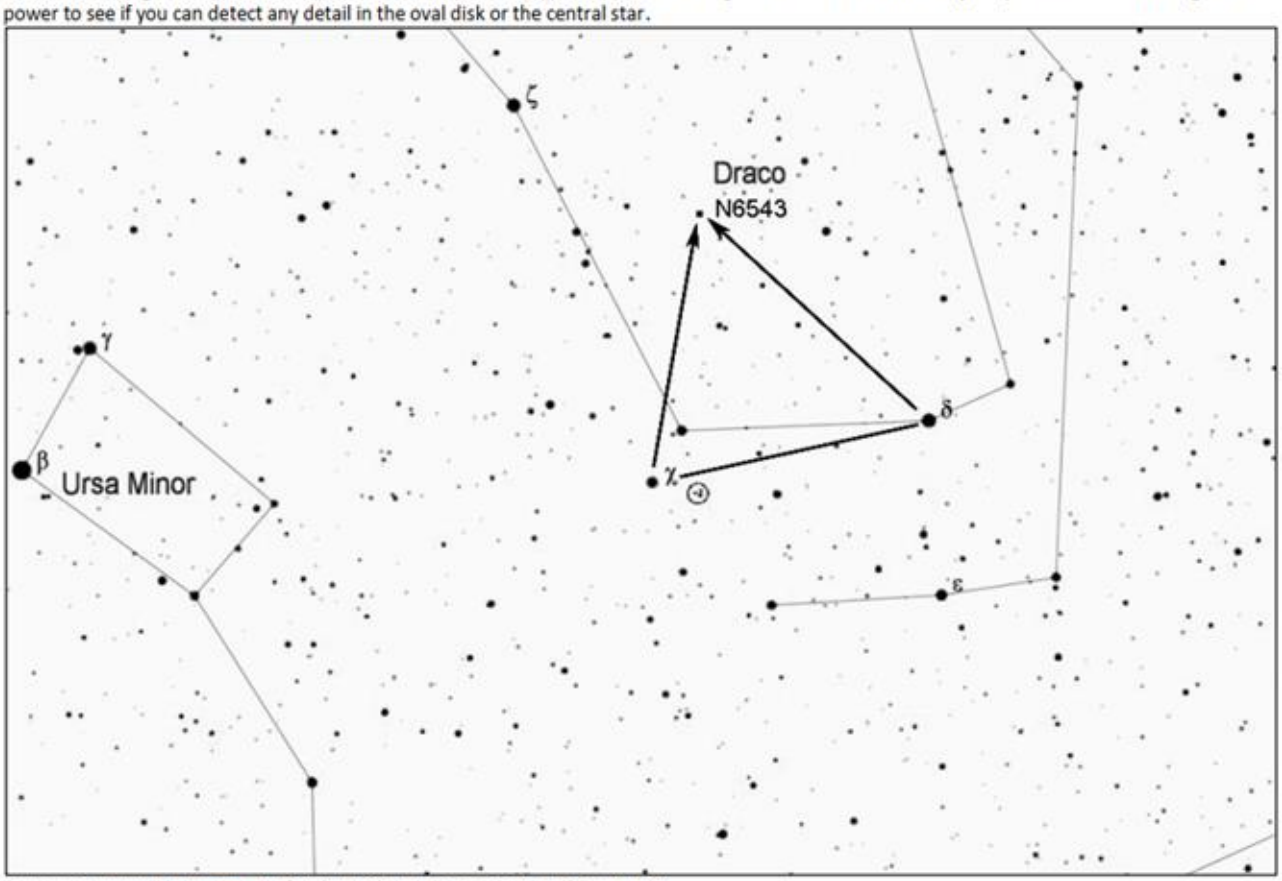


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here roughly as it is orinented in the evenings of late summer and fall. Use the two pointer stars in the bowl of the Big Dipper to find Polaris, the North Star. Then take a left turn to reach a group of stars that form a twist in the body of Draco, the dragon. The brightest star in this group is δ (delta) Draconis.



NGC 6543

This is a tricky area of the sky to navigate, so look carefully at the chart below. Locate δ Draconis and χ Draconis, two 3rd magnitude stars about 6 degrees apart. Imagine an equilaterial triangle with these two stars as the base, and the third point of this triangle shows the location of NGC 6543. There are no bright stars in this area, but with a low-power eyepiece the small blue-green nebula should be easy to spot. Then switch to higher power to see if you can detect any detail in the oval disk or the central star.

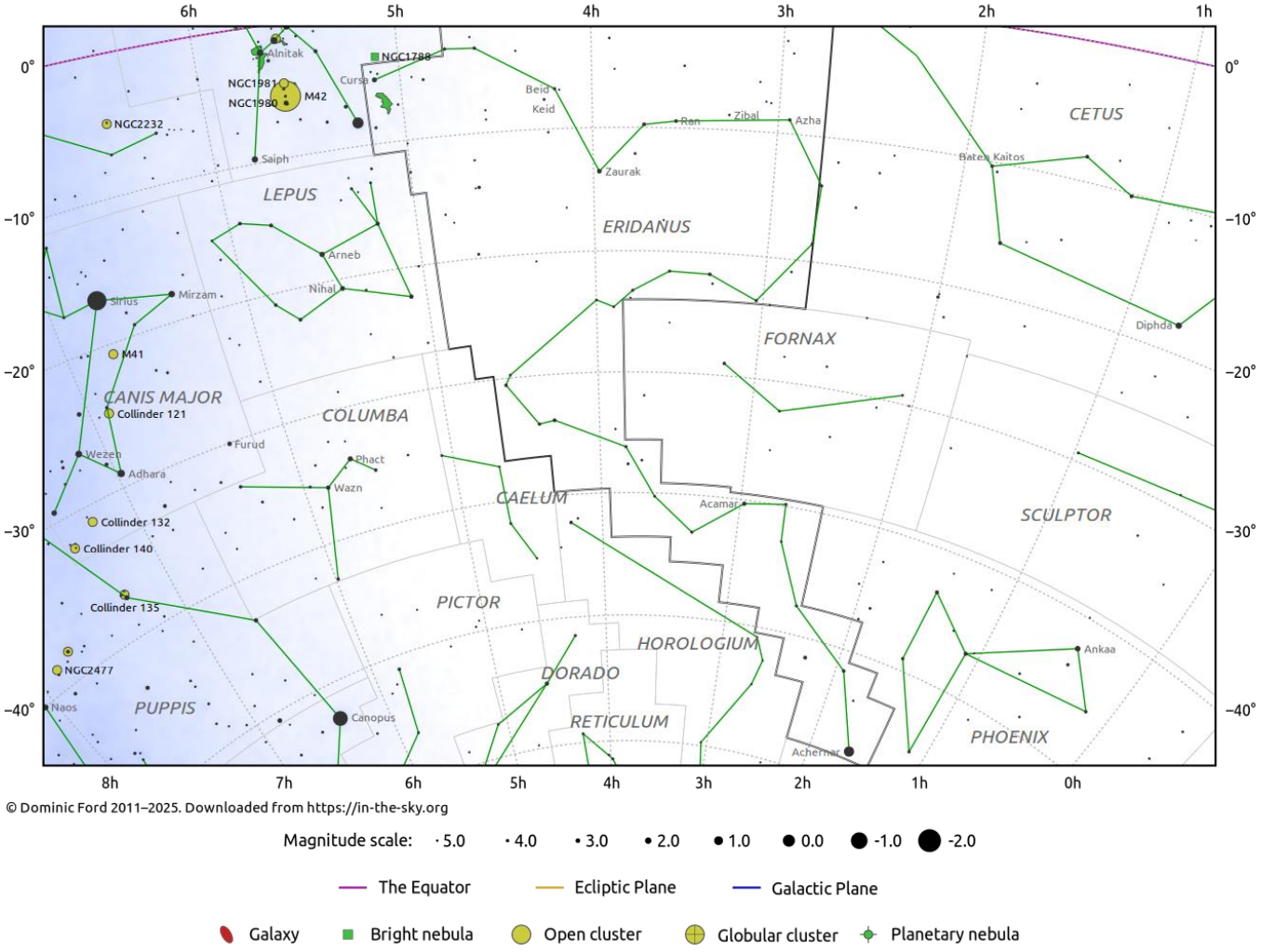


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Eridanus (Eri)

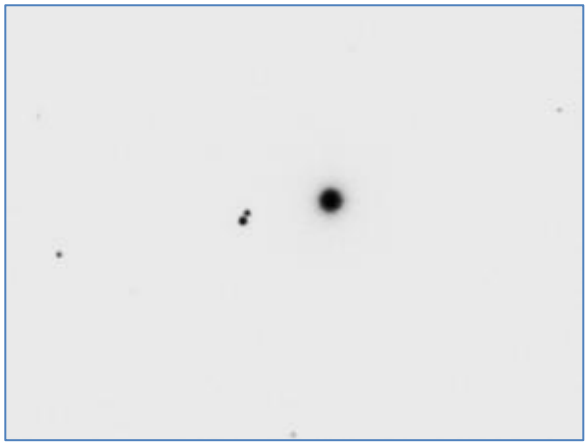
Evening Visibility: **November – February**
Online Information: **Eridanus**
Charts: **1** Featured Objects: **1**
More Online Information: Keid

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
Keid (MS)	1, W1, SD	SAO-131063, HIP-19849, STF518, Keid, BD-07 00780, 40 Eri, HR1325, HD26965	| Mag=4.4, 9.5, 11.2 | Sep=83”, 8” | Triple Star system

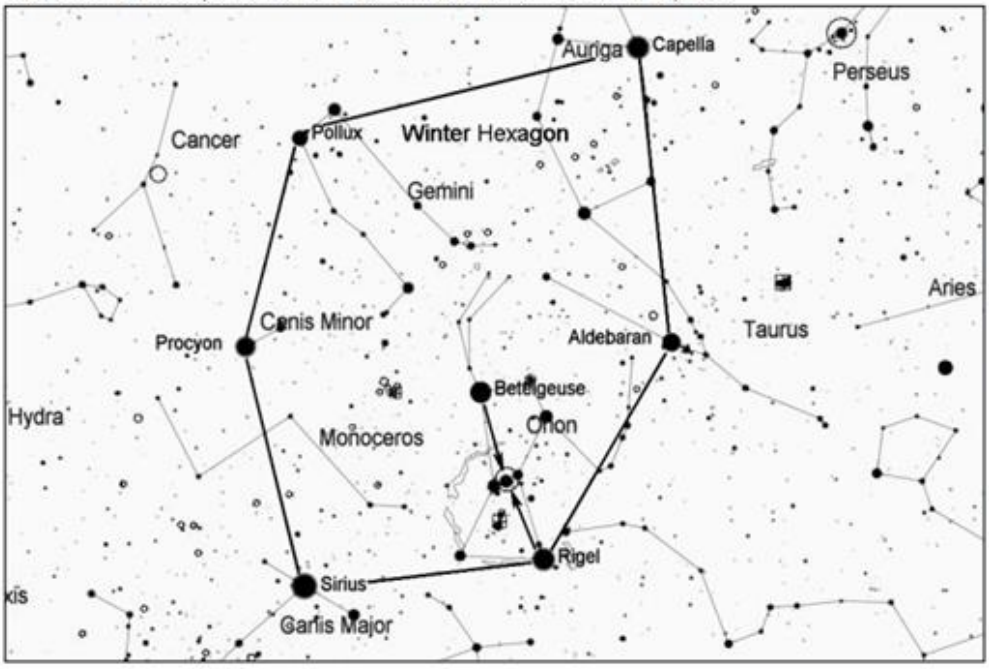
Image Gallery



Keid (Omicron 2 Eridani)

Keid (Omicron 2 Eridani), Triple Star

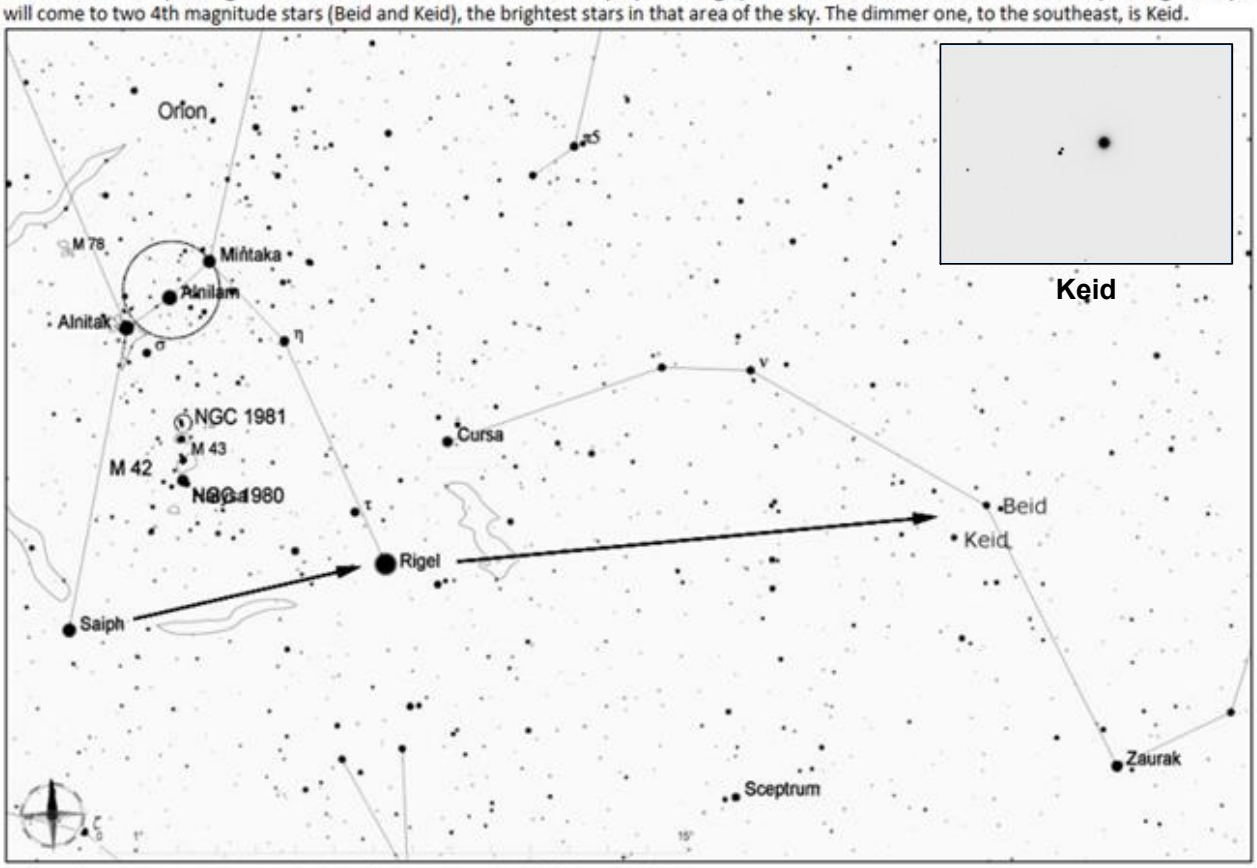
Many stars in the sky are much larger and brighter than our Sun, but not these. This trio is just 16 light years away. The brightest of the three is a yellow-orange star that is slightly smaller than the Sun and 40% as bright. The next brightest is a white dwarf that is just 50% larger than the Earth in diameter! The dimmest of the three is a red dwarf, and it is actually larger in diameter than the white dwarf. The red and white dwarfs are about 35 astronomical units apart, a bit farther than the distance from the Sun to Neptune.



If you don't know how to find the constellation Orion, first find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

Between Betelgeuse and Rigel is a row of three bright stars that form the belt of Orion.

Visualize an arrow pointing to the west across the two "feet" of Orion (Saiph and Rigel). Extend that arrow about twice as far beyond Rigel and you will come to two 4th magnitude stars (Beid and Keid), the brightest stars in that area of the sky. The dimmer one, to the southeast, is Keid.



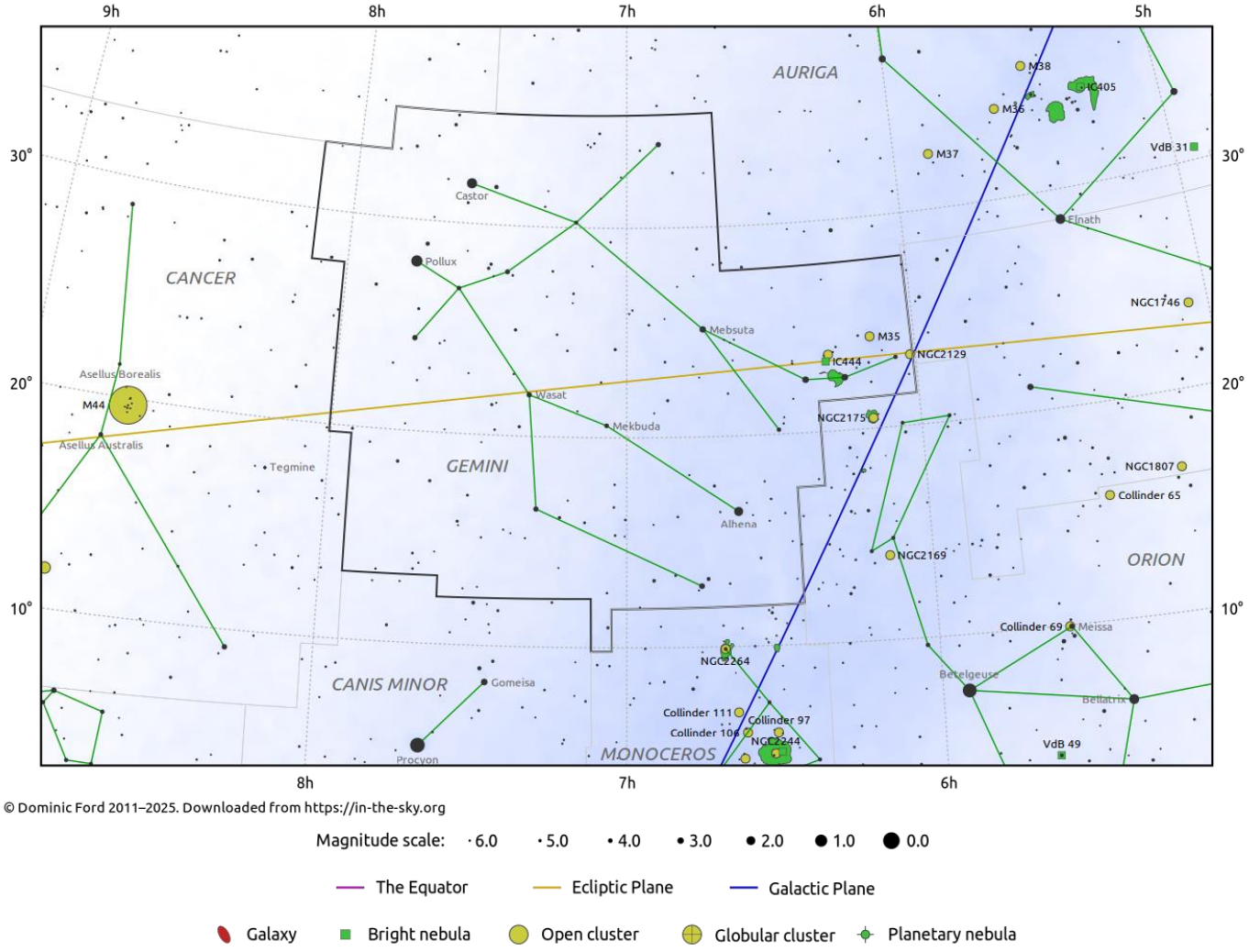
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Blank

Gemini (Gem)

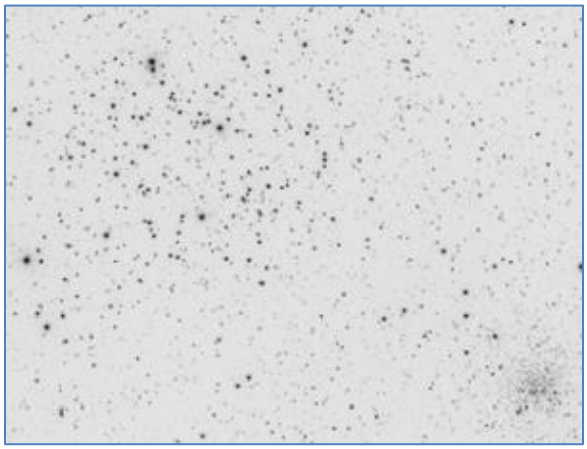
Evening Visibility: **December – April**
Online Information: **Gemini**
Charts: **2** Featured Objects: **3**
More Online Information: M-035, NGC-2158, NGC-2392

In-The-Sky.org Constellation Map

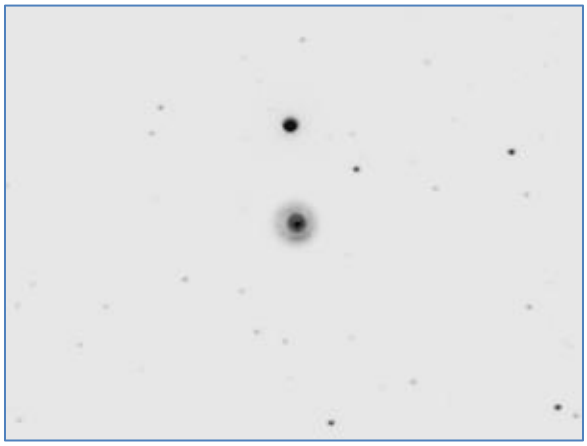


Object (Type)	Chart	Aliases	Stats
M-035 (OC)	1, W1	Shoe-Buckle Cluster, NGC-2168	| Mag=5.3 | SB=21.4 | Size=28' |
NGC-2158 (OC)	1, W1		| Mag=8.6 | SB=20.7 | Size=5' |
NGC-2392 (PN)	2, W2	Clown Face Nebula, C-39, Eskimo Nebula, Lion Nebula	| Mag=10.1 | SB=17.9 | Size=48" x 48" |

Image Gallery



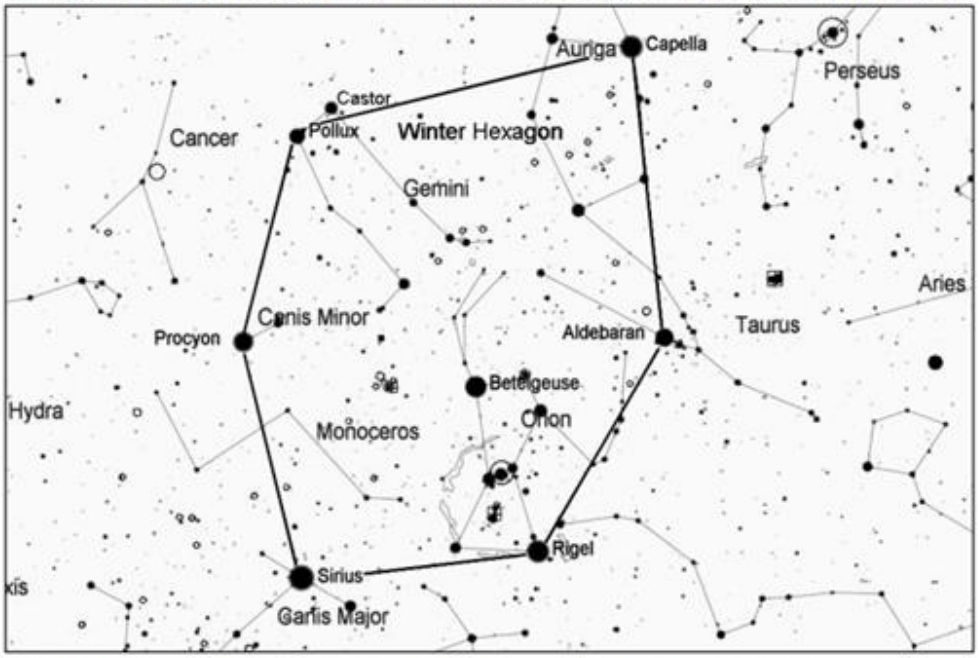
Messier 35 and NGC 2158



NGC 2392 (C 39) The Clown Face Nebula

Messier 35 and NGC 2158, Open Clusters in Gemini

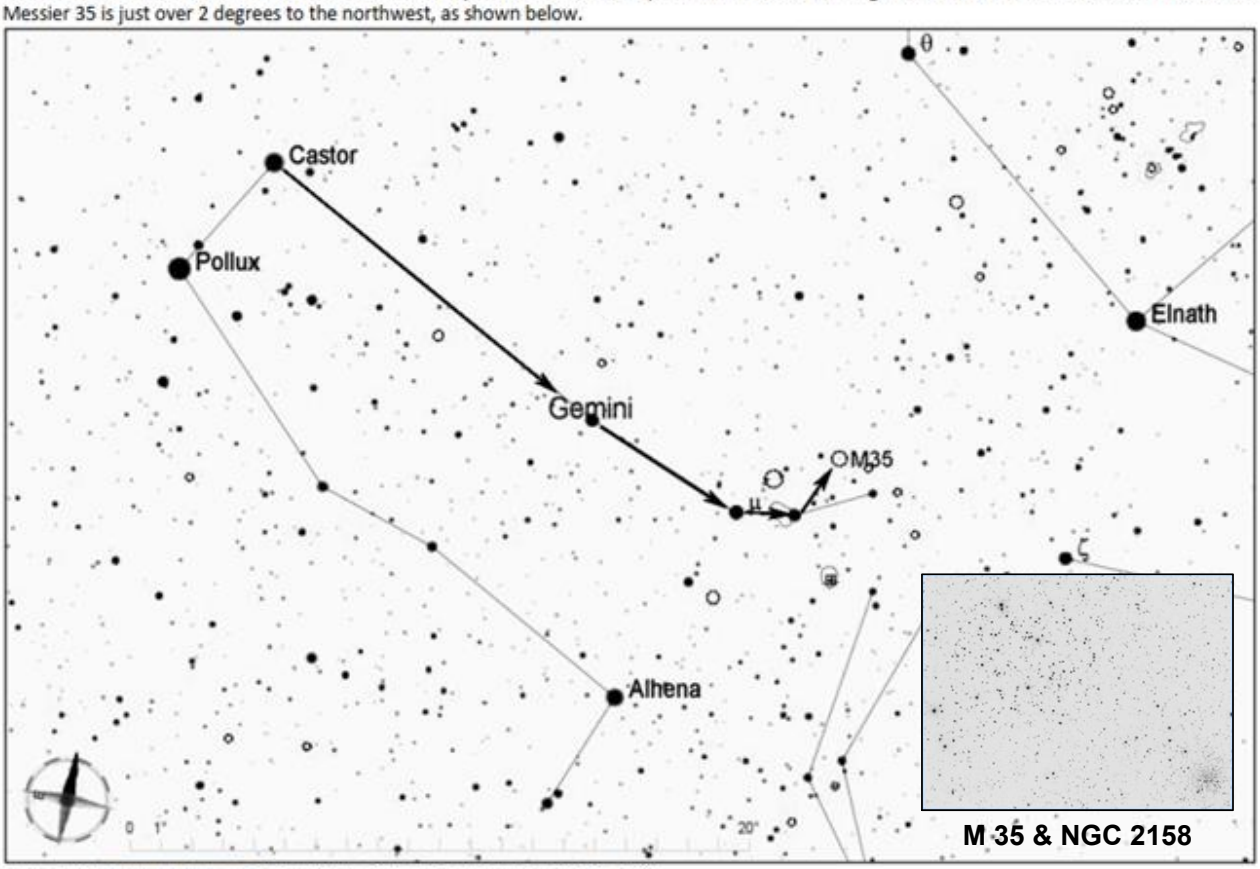
Messier 35 is a large and bright open cluster in Gemini, filling the field of a low-power eyepiece with stars. Just 1/4 degree to the west is a much dimmer and more distant open cluster, NGC 2158. Through a small telescope NGC 2158 appears as only a dim glow, but with a large scope at high power it can be resolved into a dense group of stars. The distances to these two clusters are about 2,800 and 17,000 light years, respectively.



Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Pollux in the constellation Gemini and its twin star, Castor, which just slightly dimmer.

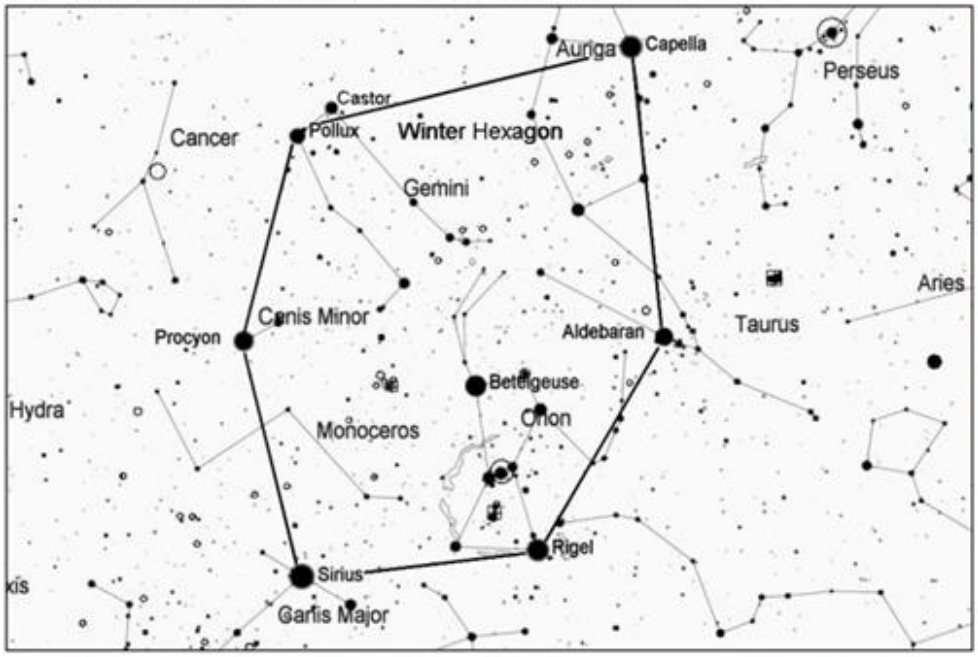
Ancient stargazers visualized Gemini, the twins, as a pair of boys standing side by side, with Pollux and Castor representing their heads. From Castor, follow a line of stars to the foot area of the boy on the west, where you will find two third-magnitude stars. From the second of these stars, Messier 35 is just over 2 degrees to the northwest, as shown below.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

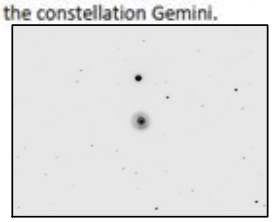
NGC 2392 (Caldwell 39), the Clown Face Nebula in Gemini

At magnitude 9.2, the Clown Face Nebula is a small but bright planetary nebula that resembles a human face surrounded by a round ruffy collar. With telescopes of medium or large aperture, the nebula has a distinct greenish color, and its central star of magnitude 10.5 is easy to see. The nebula is estimated to be nearly 1 light year in diameter and about 4,200 light years away.



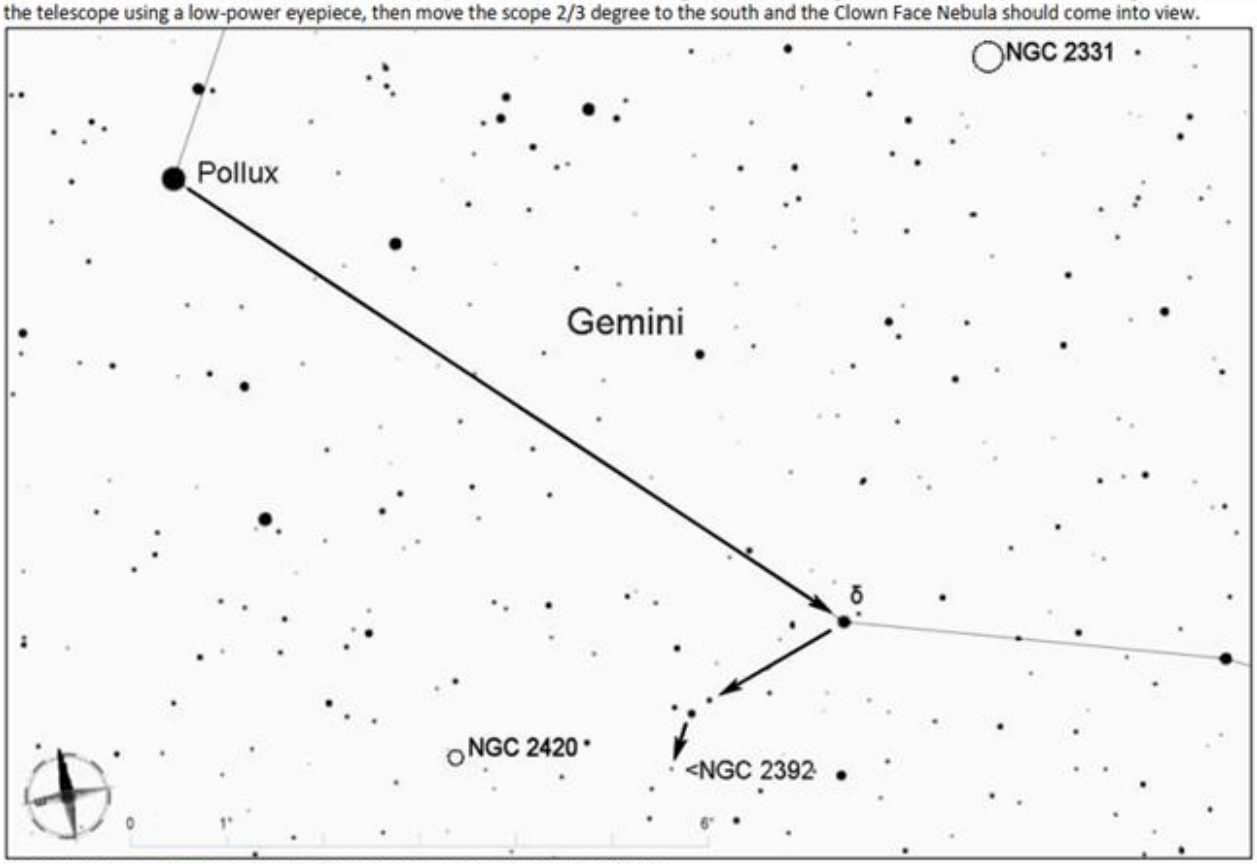
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky-- Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Pollux in the constellation Gemini.



NGC 2392

From Pollux, move about 8 degrees to the southwest to δ (delta) Geminorum, magnitude 3.5. Then look 2 degrees to the east-southeast of δ, as shown below, and with binoculars or a finderscope you should see a small triangle of stars (of magnitudes 5, 6, and 7). Get this triangle centered in the telescope using a low-power eyepiece, then move the scope 2/3 degree to the south and the Clown Face Nebula should come into view.

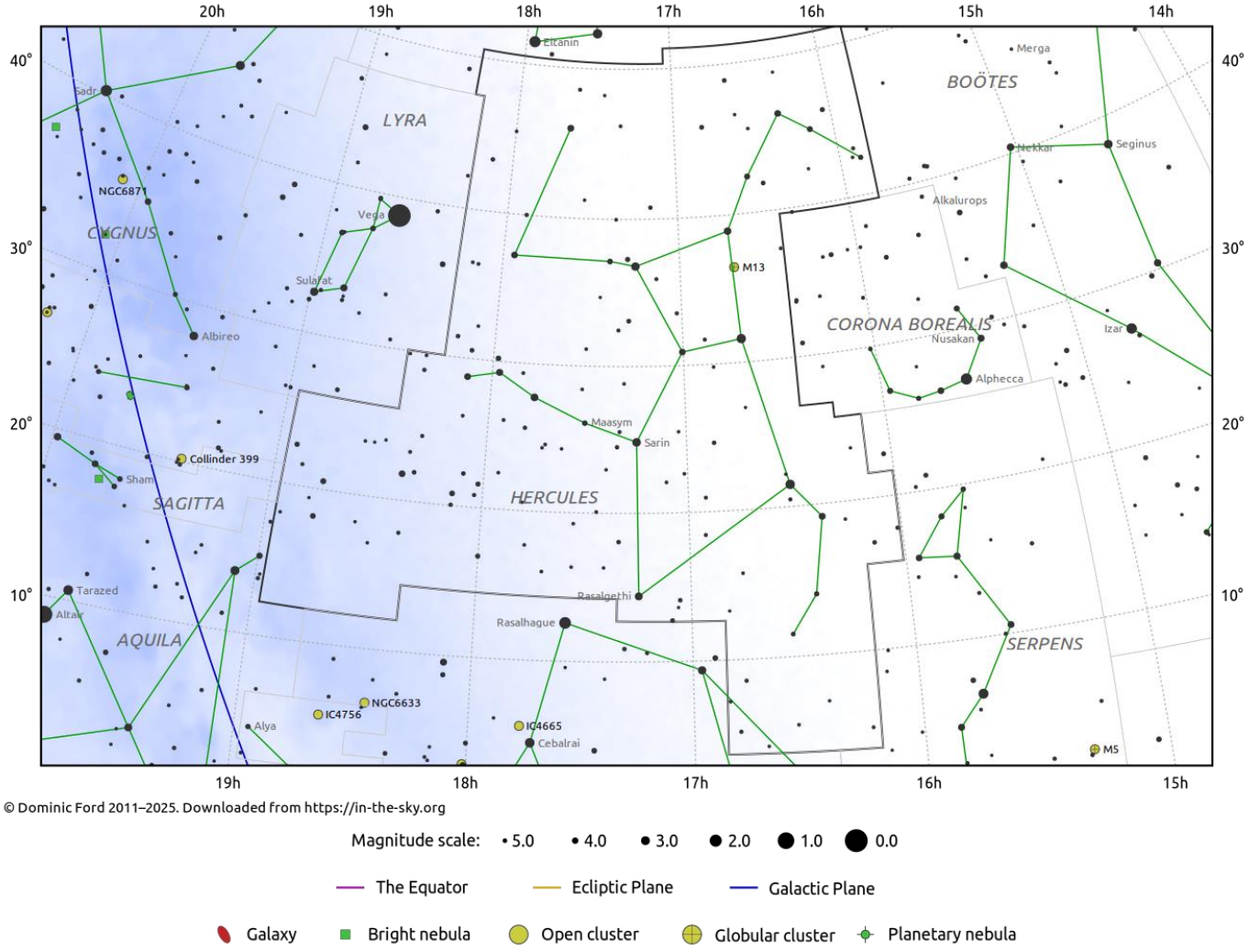


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Hercules (Her)

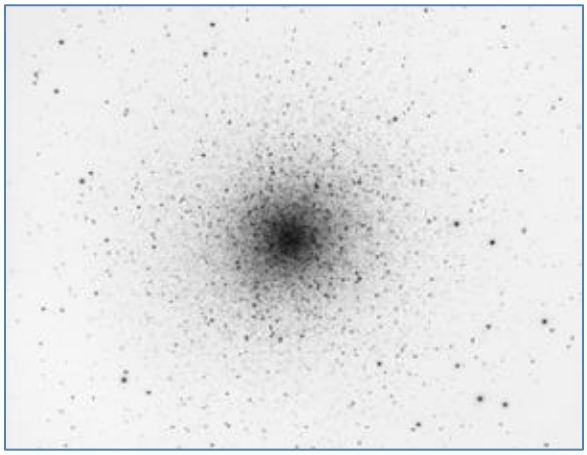
Evening Visibility: **May – October**
Online Information: **Hercules**
Charts: **2** Featured Objects: **2**
More Online Information: M-013, M-092

In-The-Sky.org Constellation Map

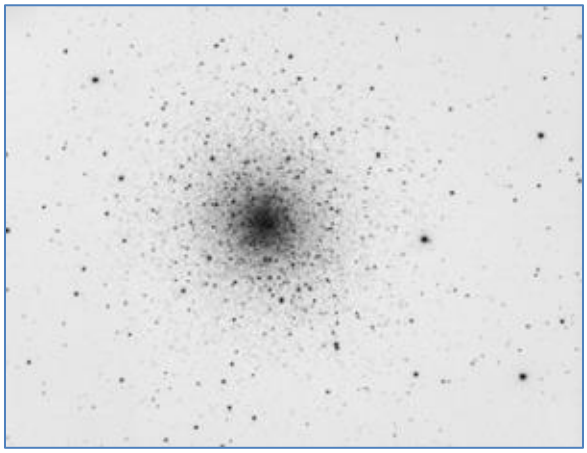


Object (Type)	Chart	Aliases	Stats
M-013 (GC)	1, W1	Great Hercules Cluster, NGC-6205	| Mag=5.8 | SB=21.7 | Size=20' |
M-092 (GC)	2, W2	NGC-6341	| Mag=6.4 | SB=21.4 | Size=14' |

Image Gallery



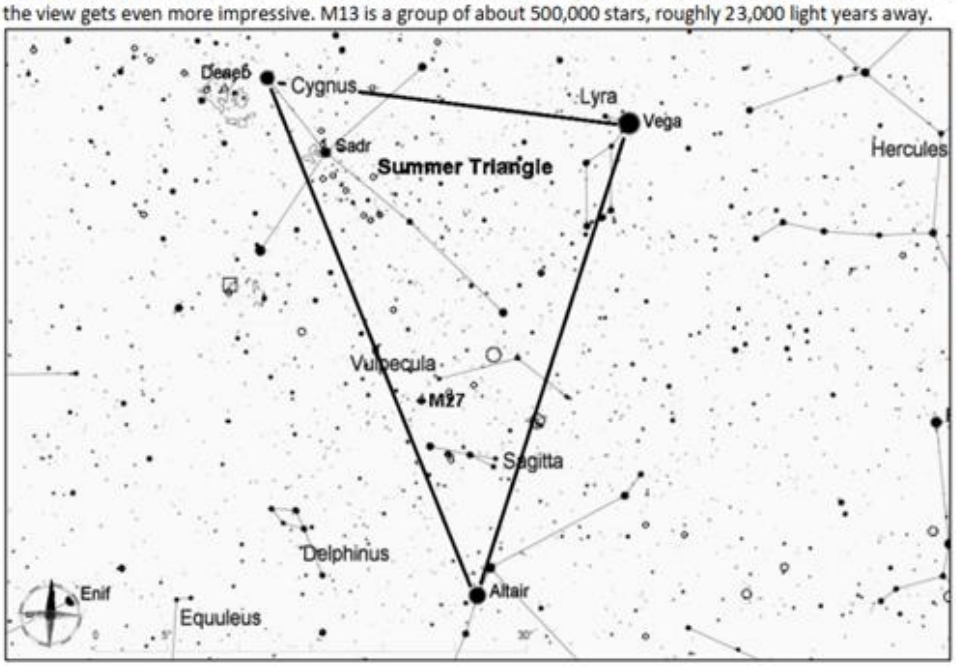
Messier 13, The Hercules Cluster



Messier 92

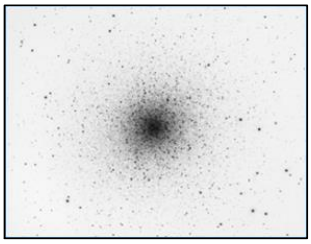
Messier 13, the Hercules Cluster

Messier 13 is one of the most spectacular deep-sky objects. It can be seen as a fuzzy ball through any binoculars or telescope, but to get a good view an aperture of 8 inches or more is needed, because that is large enough to resolve many of the cluster's individual stars. With larger scopes, the view gets even more impressive. M13 is a group of about 500,000 stars, roughly 23,000 light years away.



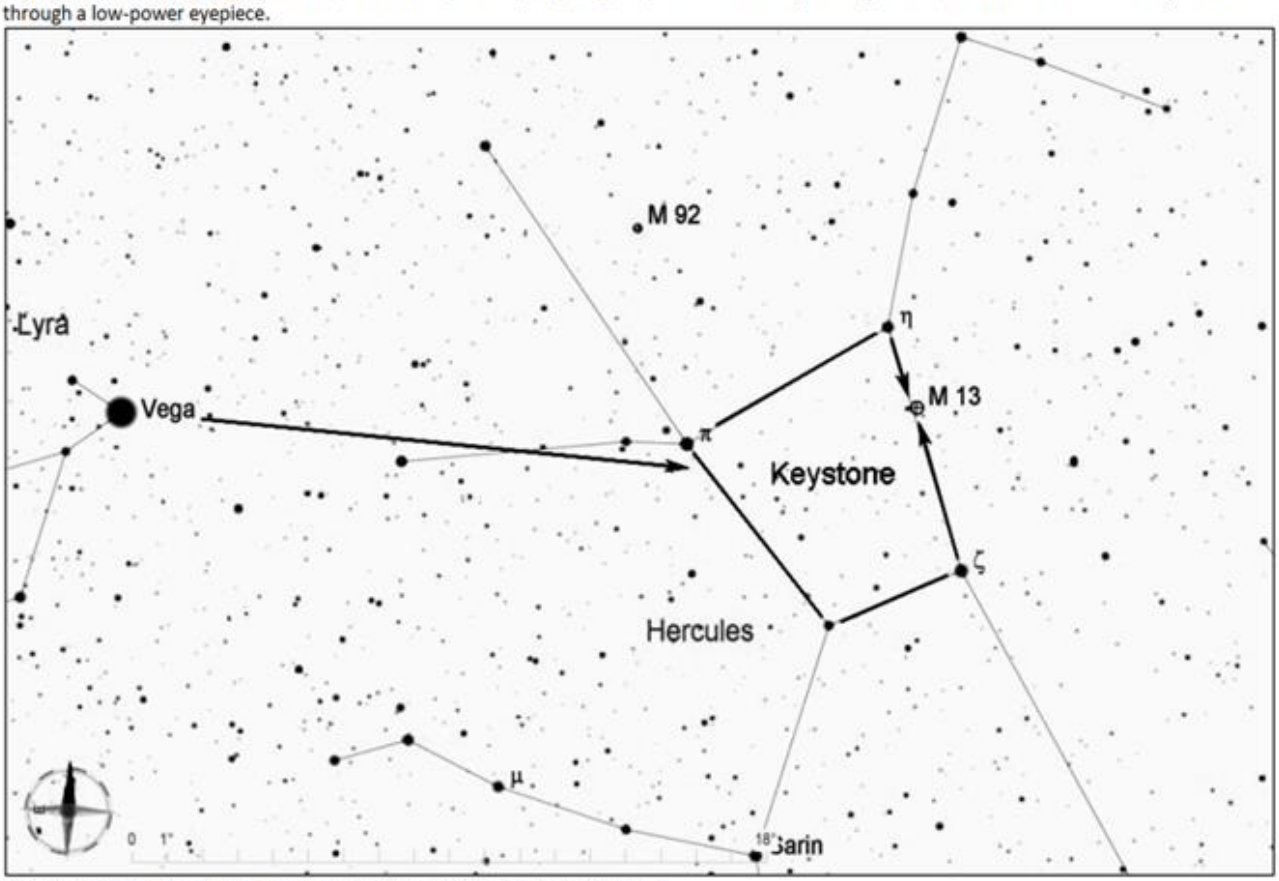
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from brilliant blue-white Vega (magnitude 0), the brightest of the three stars of the Summer Triangle.



M 13

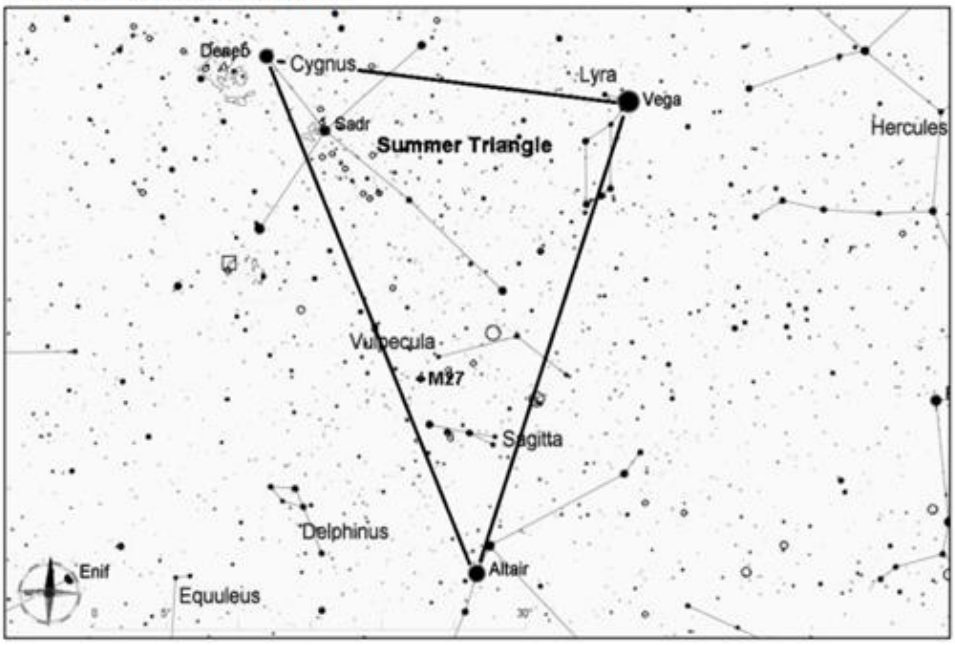
From Vega, look about 15 degrees west for the distinctive 4-sided figure in the center of Hercules known as the keystone. On the west side of the keystone (farthest from Vega), M13 is 1/3 of the way from η (Eta) to ζ (Zeta) Hercules. Point your scope there, and M13 should be clearly visible through a low-power eyepiece.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

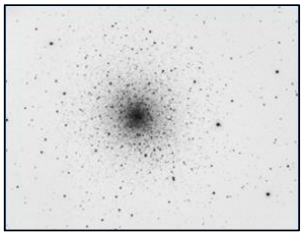
Messier 92, Globular Cluster in Hercules

Messier 92 is one of two beautiful globular clusters in Hercules, the other being the famous M13. Although M92 is not quite as large and bright as M13, it is still an excellent sight in a medium to large telescope, and it should not be overlooked. The cluster is about 27,000 light years away and contains several hundred thousand stars.



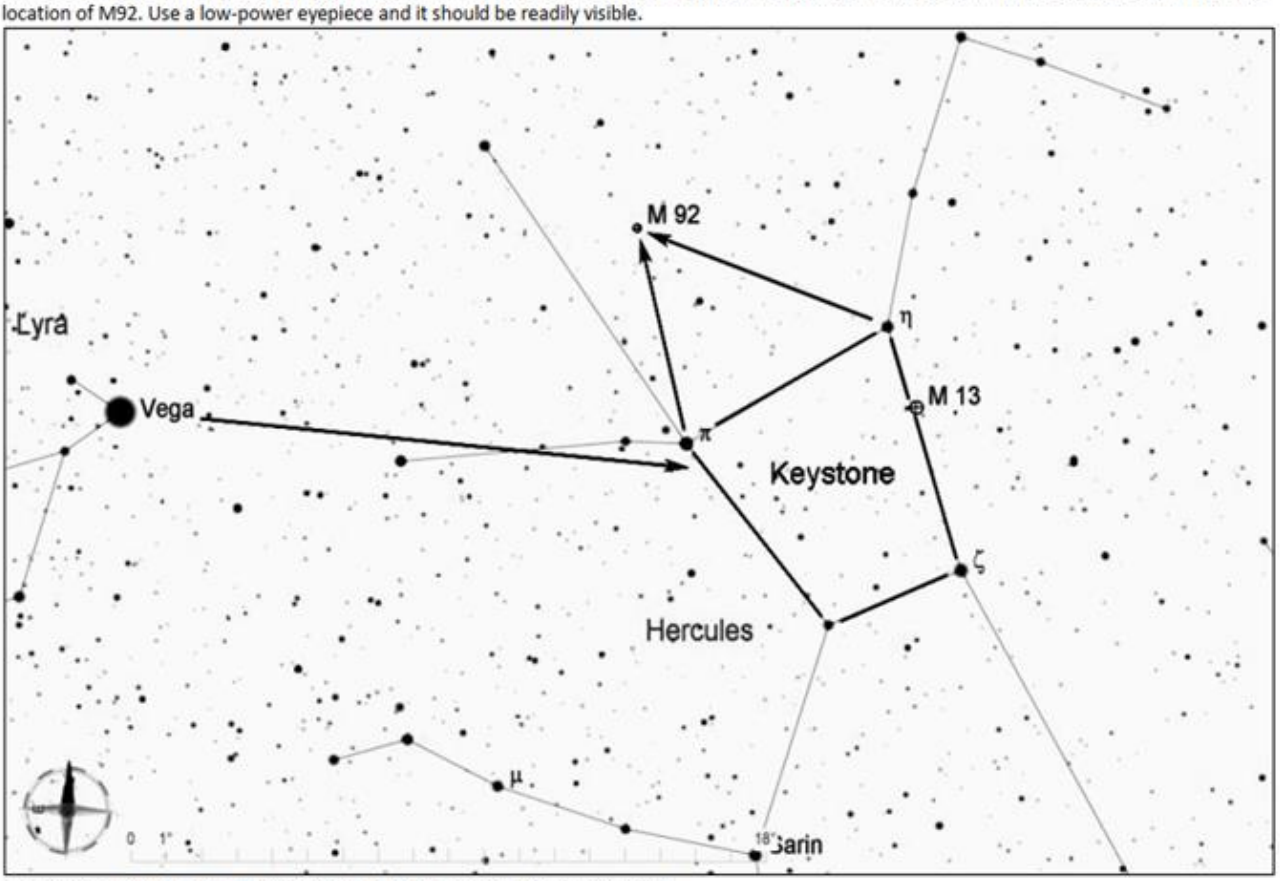
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from brilliant blue-white Vega (magnitude 0), the brightest of the three stars of the Summer Triangle.



M 92

From Vega, look about 15 degrees west for the distinctive 4-sided figure in the center of Hercules known as the keystone. On the north side of the keystone, imagine a triangle pointing to the north, with the tip of the triangle slightly shifted toward Vega (as shown in the chart below). This is the location of M92. Use a low-power eyepiece and it should be readily visible.

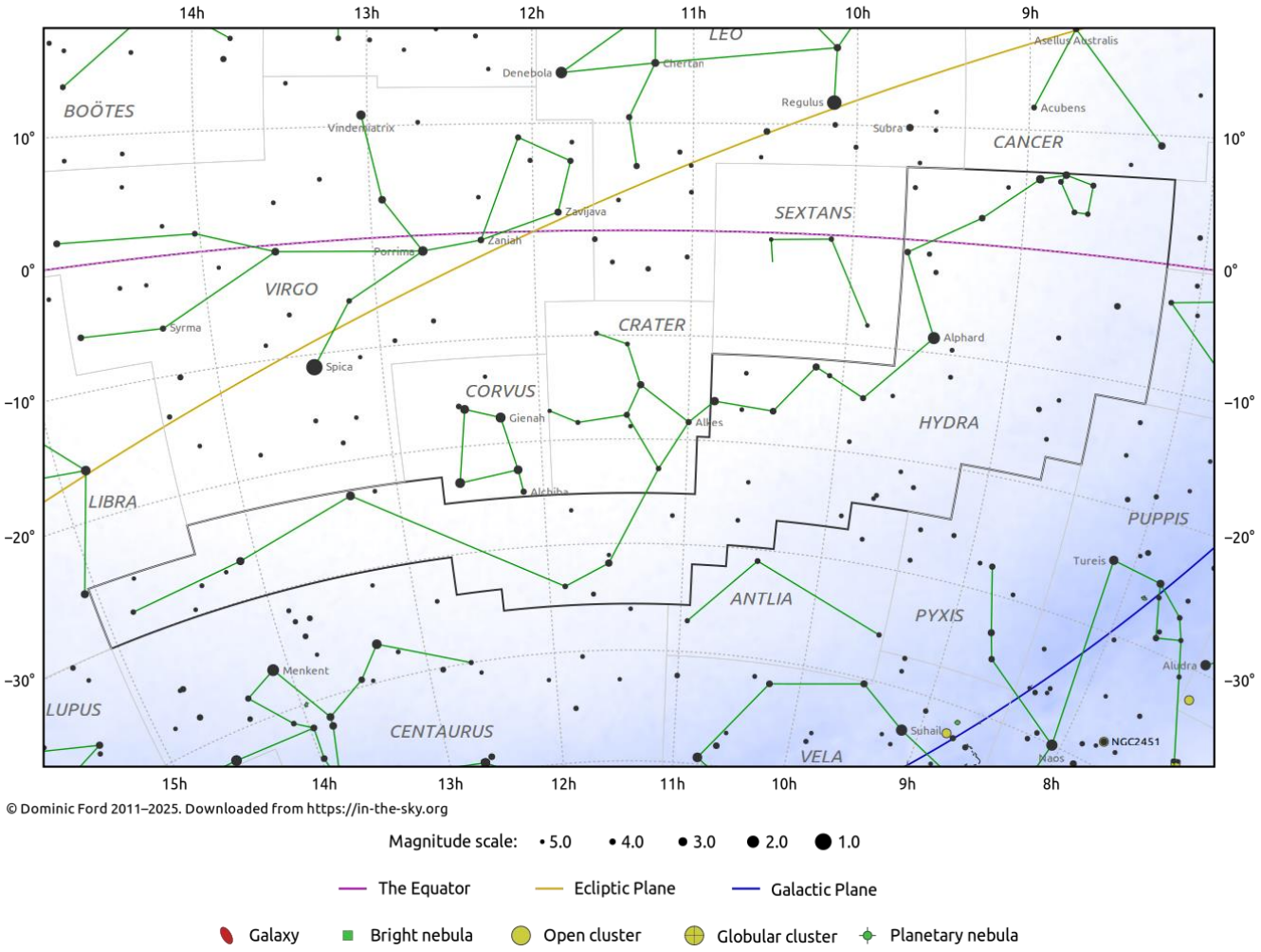


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Hydra (Hya)

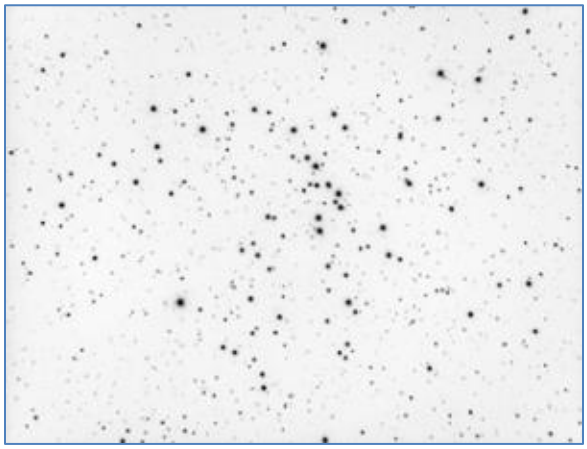
Evening Visibility: **May – July**
Online Information: **Hydra**
Charts: **5** Featured Objects: **5**
More Online Information: M-048, M-068, M-083, NGC-3242, U Hydrae

In-The-Sky.org Constellation Map

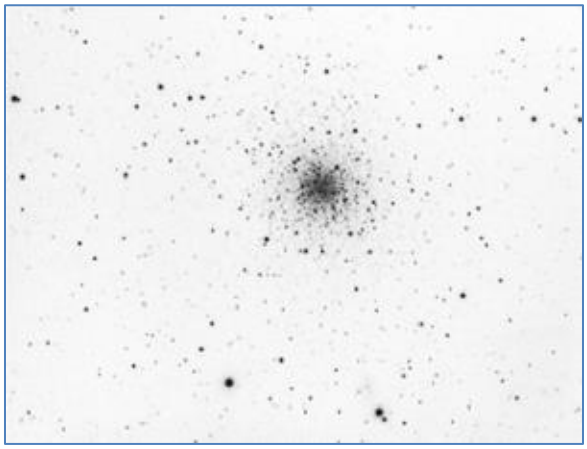


Object (Type)	Chart	Aliases	Stats
M-048 (OC)	1, W1	NGC-2548	| Mag=5.8 | SB=22.8 | Size=30' |
M-068 (GC)	2, W2	NGC-4590	| Mag=7.8 | SB=23.0 | Size=11' |
M-083 (G)	3, W3	Southern Pinwheel Galaxy, NGC-5236	| Mag=7.6 | SB=22.1 | Size=12.9' x 11.5' |
NGC-3242 (PN)	4, W4	CBS Eye, Ghost of Jupiter, C-59	| Mag=8.6 | SB=24.2 | Size=25" |
U Hydrae (CS)	5, W5	BD-12 03218, CD , CP , AG, HD92055, HR4163, HIP52009	| Mag=4.9 | B-V Color Index=+2.80 |

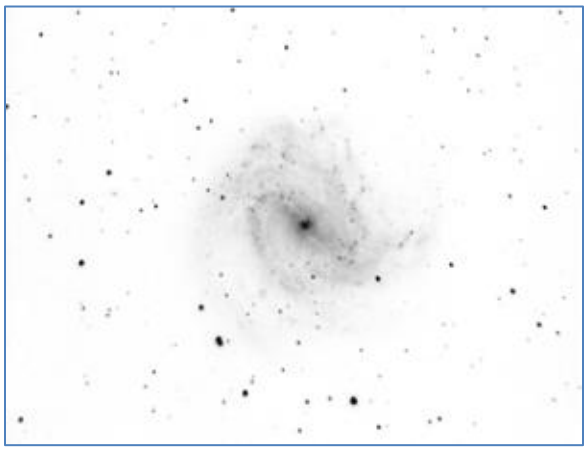
Image Gallery



Messier 48



Messier 68

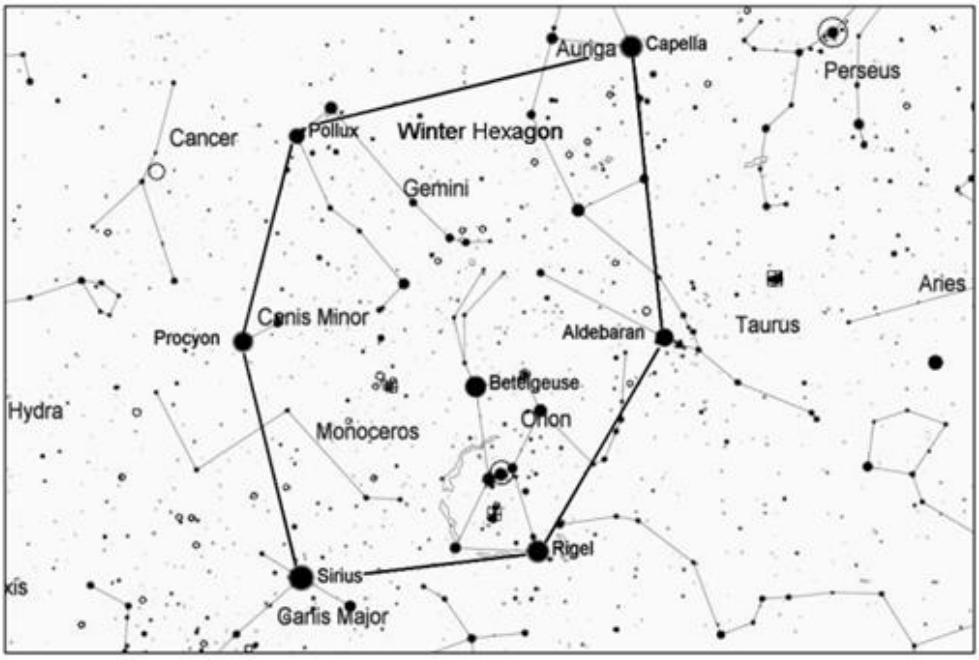


Messier 83, The Southern Pinwheel Galaxy

U Hydrae

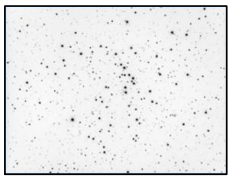
Messier 48, Open Cluster in Hydra

Messier 48 is a large sprawling cluster that covers an area of sky about the size of the full Moon. It includes about 80 stars. At magnitude 5.8, this is a good target for binoculars or any telescope at low power. M48 is about 24 light years across and about 2500 light years away.



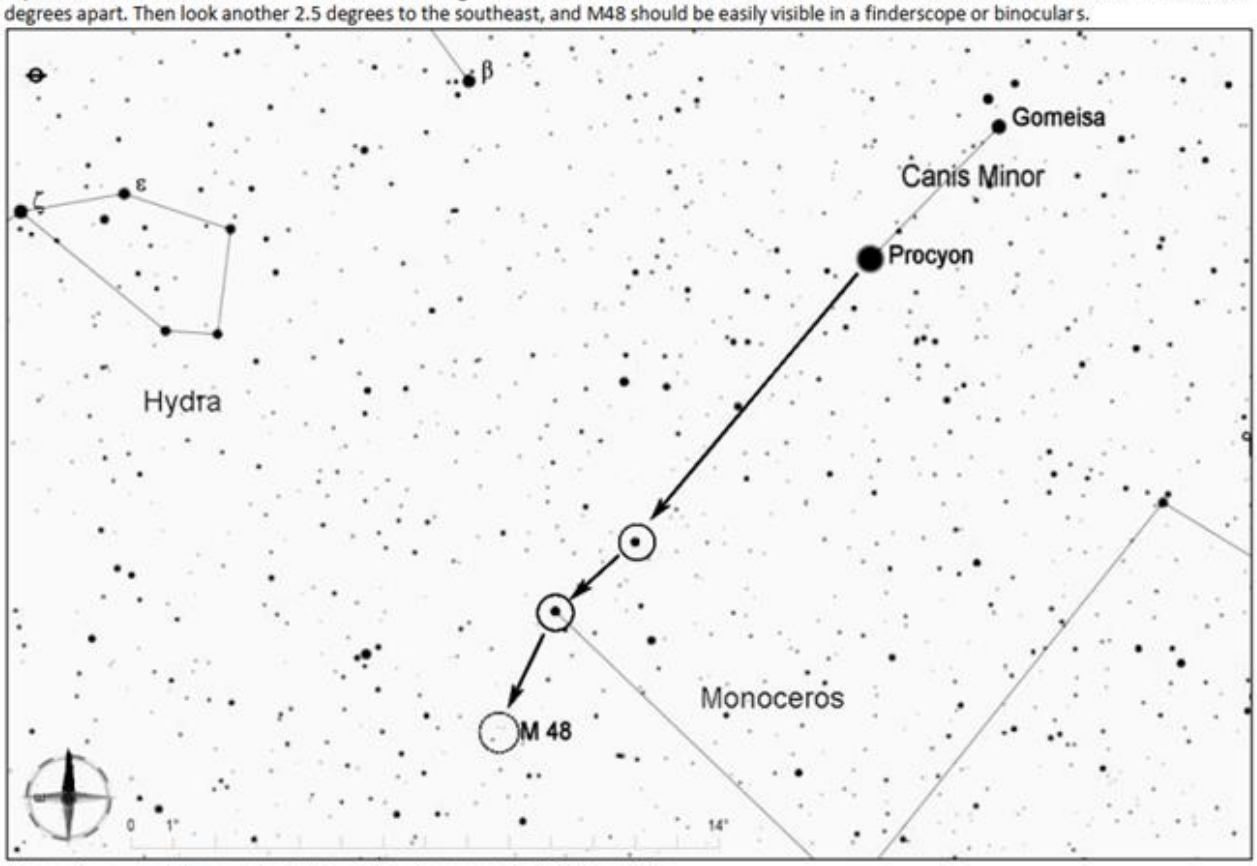
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Procyon in the constellation Canis Minor.



M 48

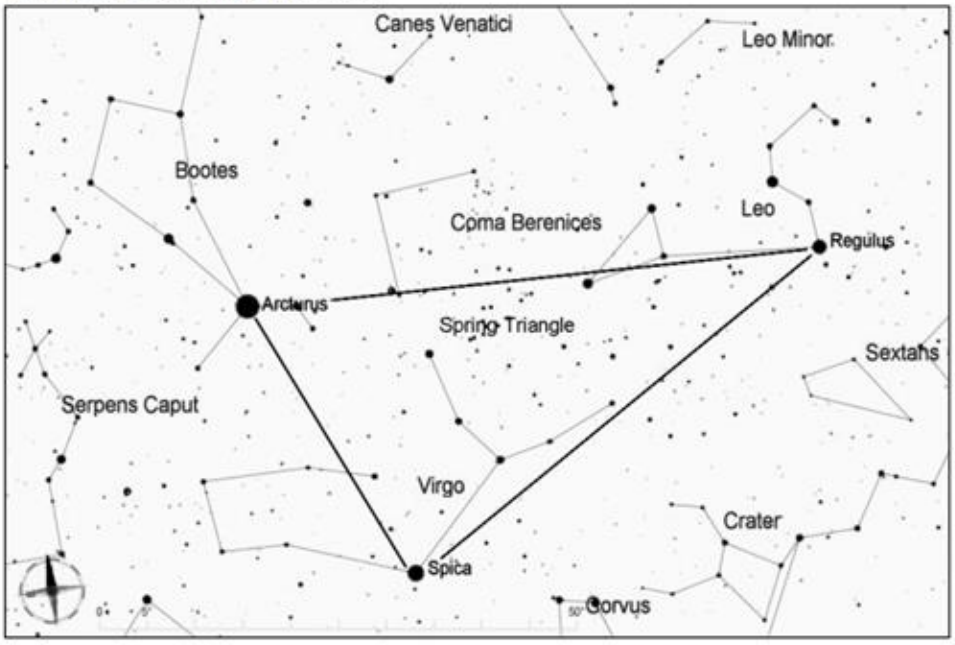
Procyon and 3rd magnitude Gomeisa are the only two bright stars in Canis Minor. Use them as a pointer, extending a line about twice their separation to the southeast. Look for the two 4th magnitude stars in Monoceros that are circled in the chart below. These two stars are about 2.5 degrees apart. Then look another 2.5 degrees to the southeast, and M48 should be easily visible in a finderscope or binoculars.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

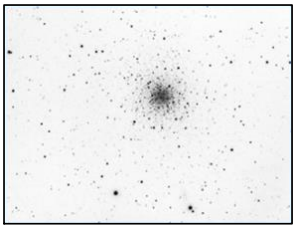
Messier 68, Globular Cluster in Hydra

Messier 68 is one of the few globular clusters that can be found in a region of the sky populated by many galaxies. In the spring, it passes low in the southern sky below the stars of Corvus the crow. A telescope of medium size can resolve some of its individual stars. M68 is about 100 light years in diameter and about 34,000 light years away.



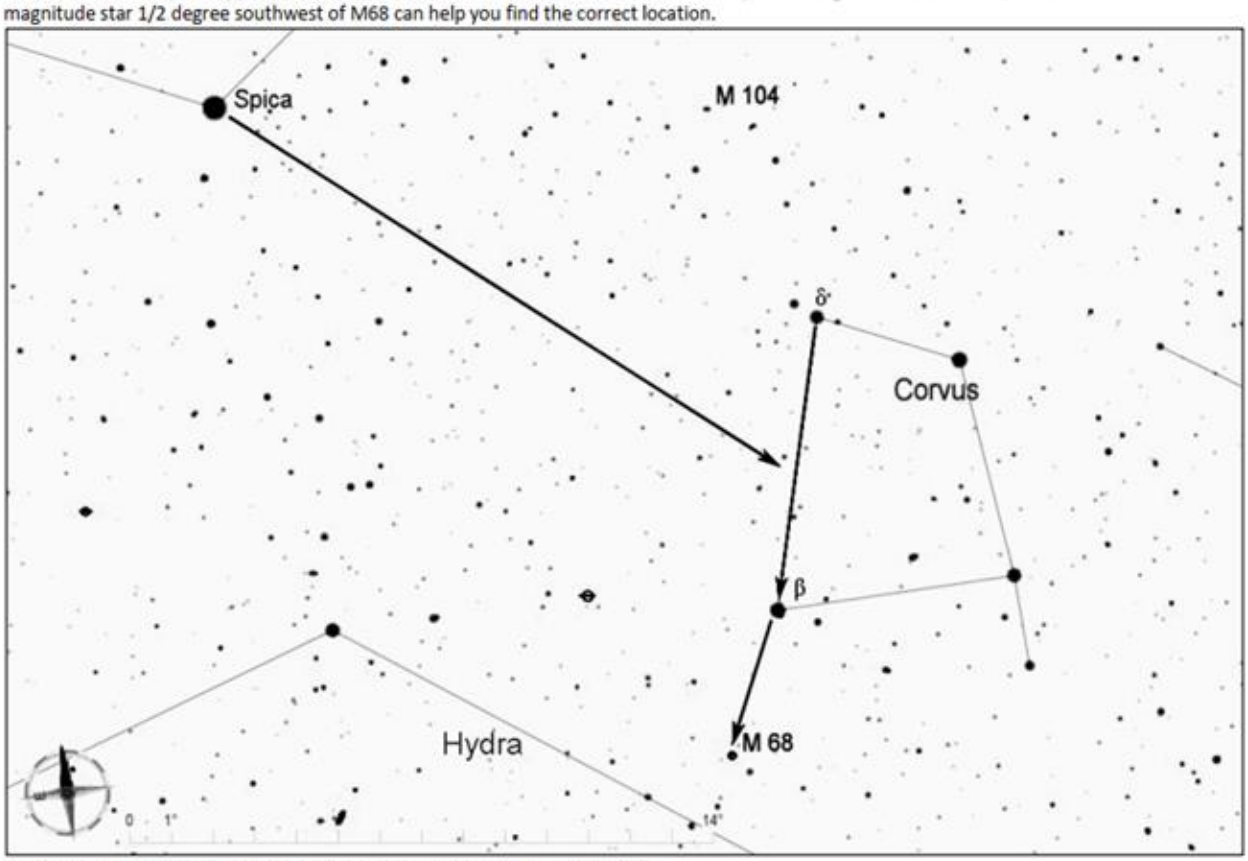
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Spica in the constellation Virgo.



M 68

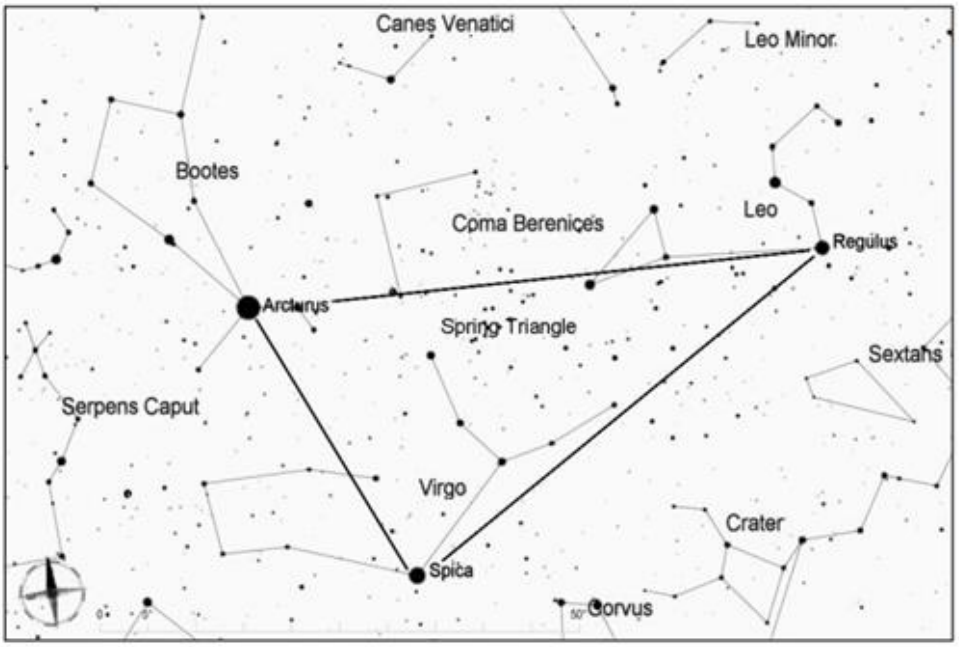
Look about 20 degrees to the southwest of Spica to find the distinctive four-sided shape of Corvus, the crow. Form a line with the two stars on the east side of Corvus (δ and β), and extend this line half as far to the south. This will take you to the general area of M68, as shown below. A 5th magnitude star 1/2 degree southwest of M68 can help you find the correct location.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

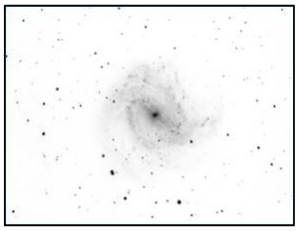
Messier 83, the Southern Pinwheel Galaxy

Messier 83 is a nice example of a barred spiral galaxy (with its arms flowing from a long central bar). It is one of the nearest spiral galaxies, about 16 million light years away. M83 is low in the southern sky for observers in the northern hemisphere, and having to view it through a thicker layer of the earth's atmosphere dims the galaxy's visual appearance. Still, on a dark night it can be an impressive sight, especially through a large scope.



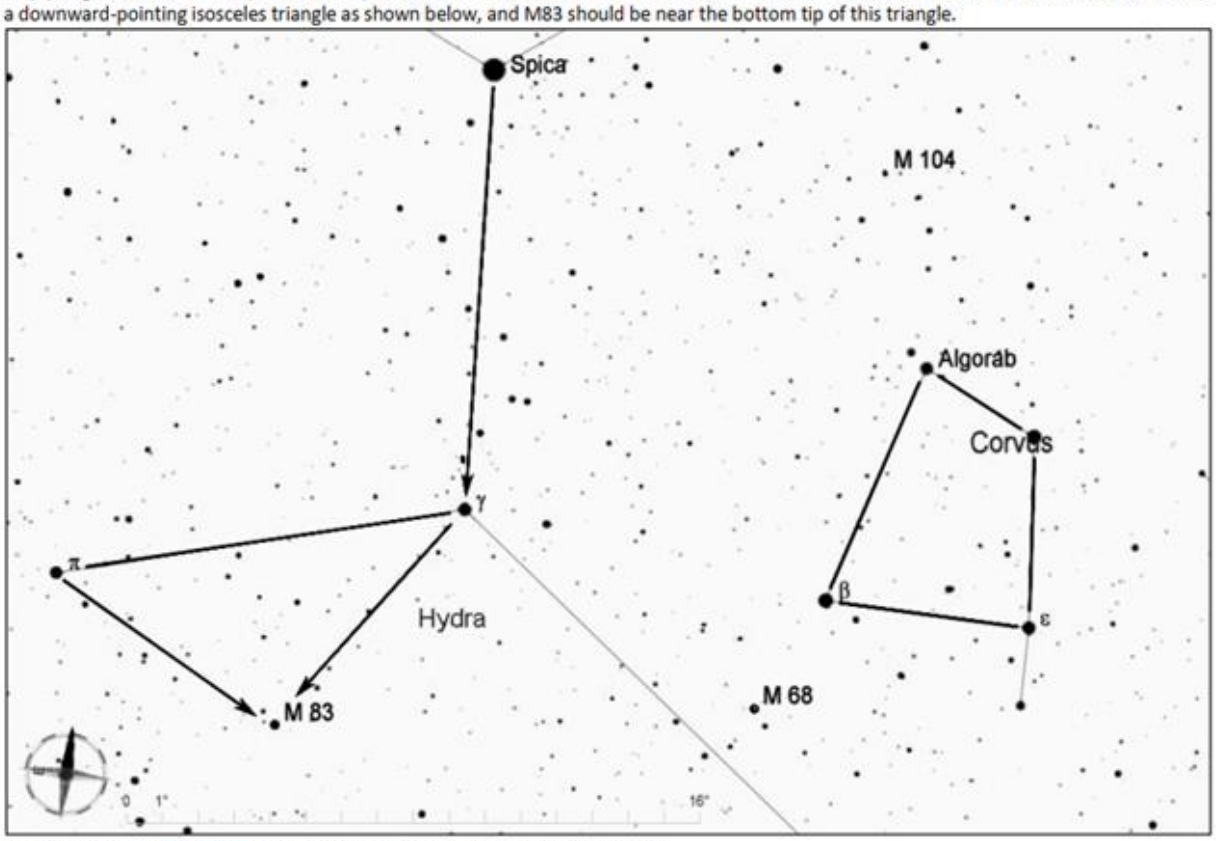
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Spica in the constellation Virgo.



M 83

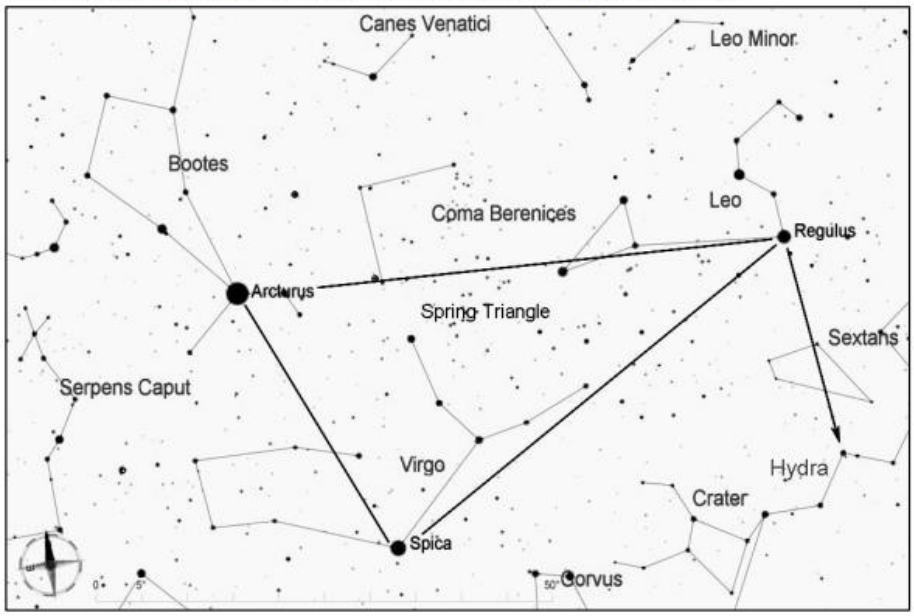
Look about 12 degrees to the south of Spica to find 3rd magnitude γ (Gamma) Hydrae, and then find 3rd magnitude π (Pi) Hydrae to its east. (To help you get oriented in this part of the sky, look for the distinctive four-sided shape of Corvus.) Once you have found γ and π Hydrae, visually form a downward-pointing isosceles triangle as shown below, and M83 should be near the bottom tip of this triangle.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 3242 (Caldwell 59), the Ghost of Jupiter in Hydra

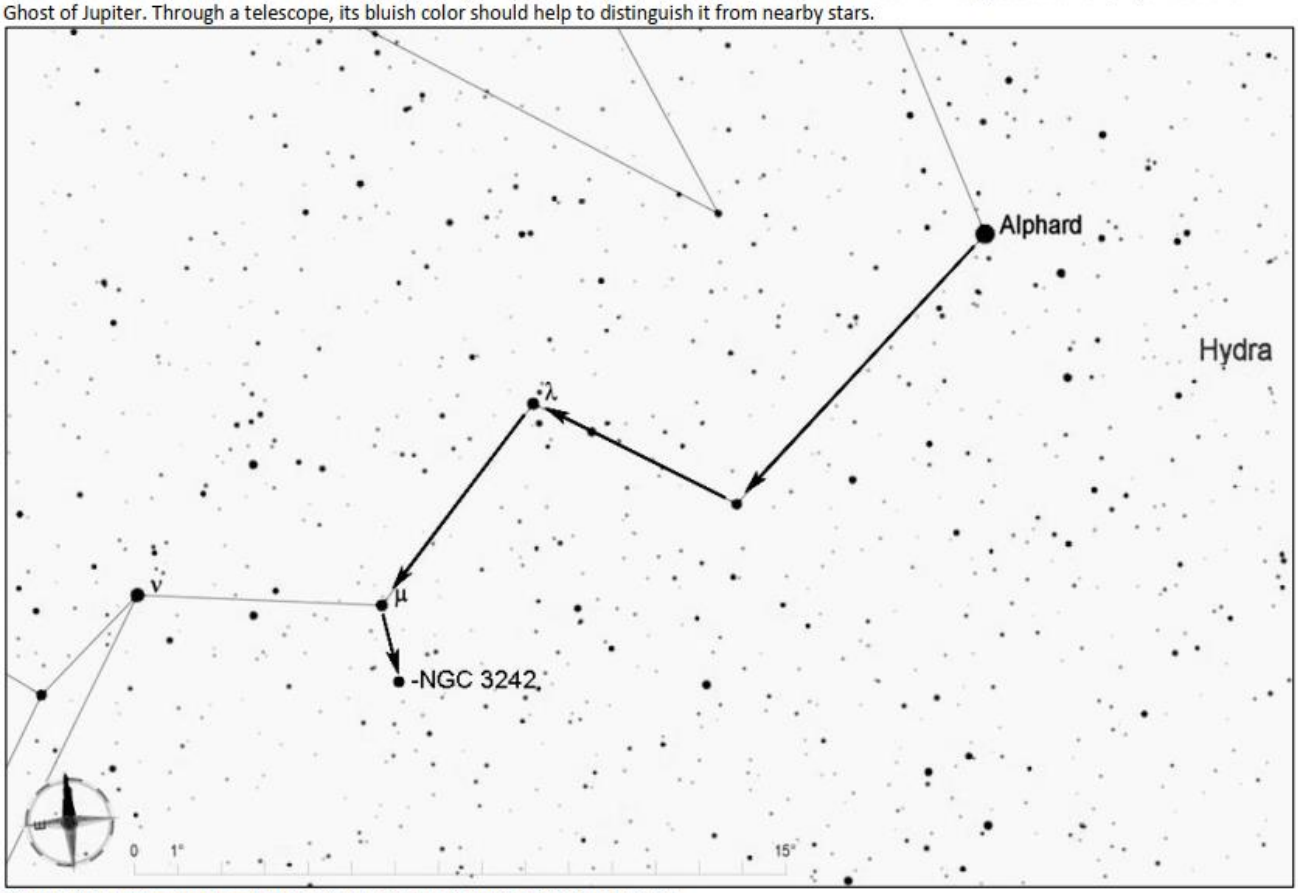
The Ghost of Jupiter is a planetary nebula, the remnant of an old star. It has a disk roughly the apparent size of Jupiter, but it is pale and bluish in color. At magnitude 7.3, it will be visible in any telescope. Use high magnification to see its oval shape. Larger scopes will show the star in its center and some detail in the surface of the disk. This nebula is about 3600 light years away.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo. Look about 30 degrees south of Regulus for the zig-zag constellation of Hydra.

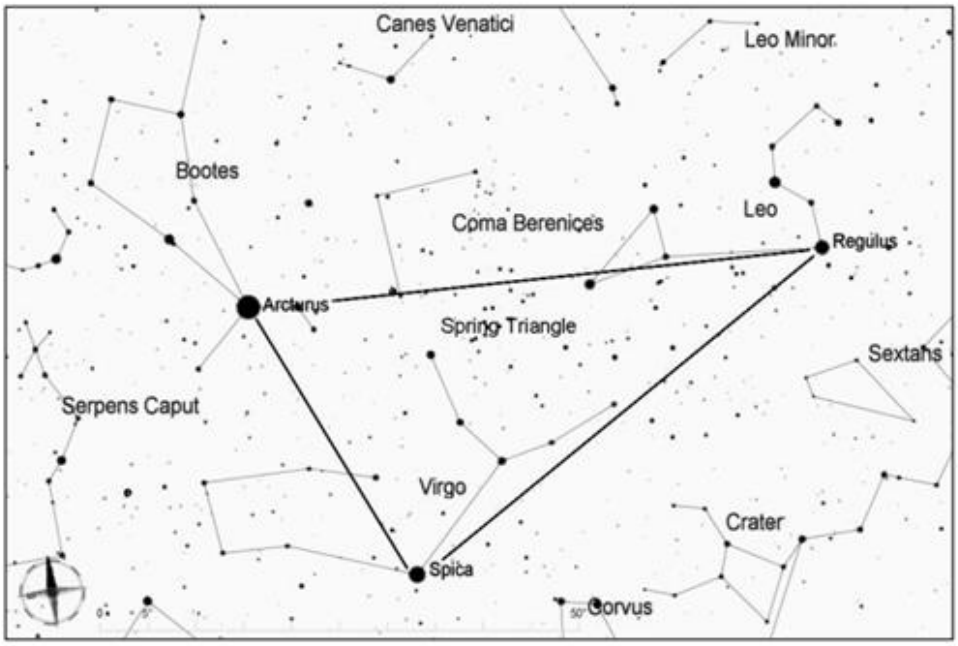
The brighest star in Hydra, the water snake, is 2nd magnitude Alphard, easily visible to the naked eye. From Alphard, look east and follow a zig-zag line of stars that form part of the slithering body of Hydra to reach μ (mu) Hydrae, magnitude 3.8. Less than 2 degress south of μ Hydrae is the Ghost of Jupiter. Through a telescope, its bluish color should help to distinguish it from nearby stars.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

U Hydrae, Carbon Star

U Hydrae is one of the reddest stars in the sky. It is classified as a carbon star because there is a large amount of carbon in the star's atmosphere, which absorbs light at the blue end of the spectrum but allows the red wavelengths to pass through. It is a large and bright star, about 400 times as luminous as our Sun and about 680 light years away. Its red color is easily seen in binoculars, and it is a memorable sight in any telescope.

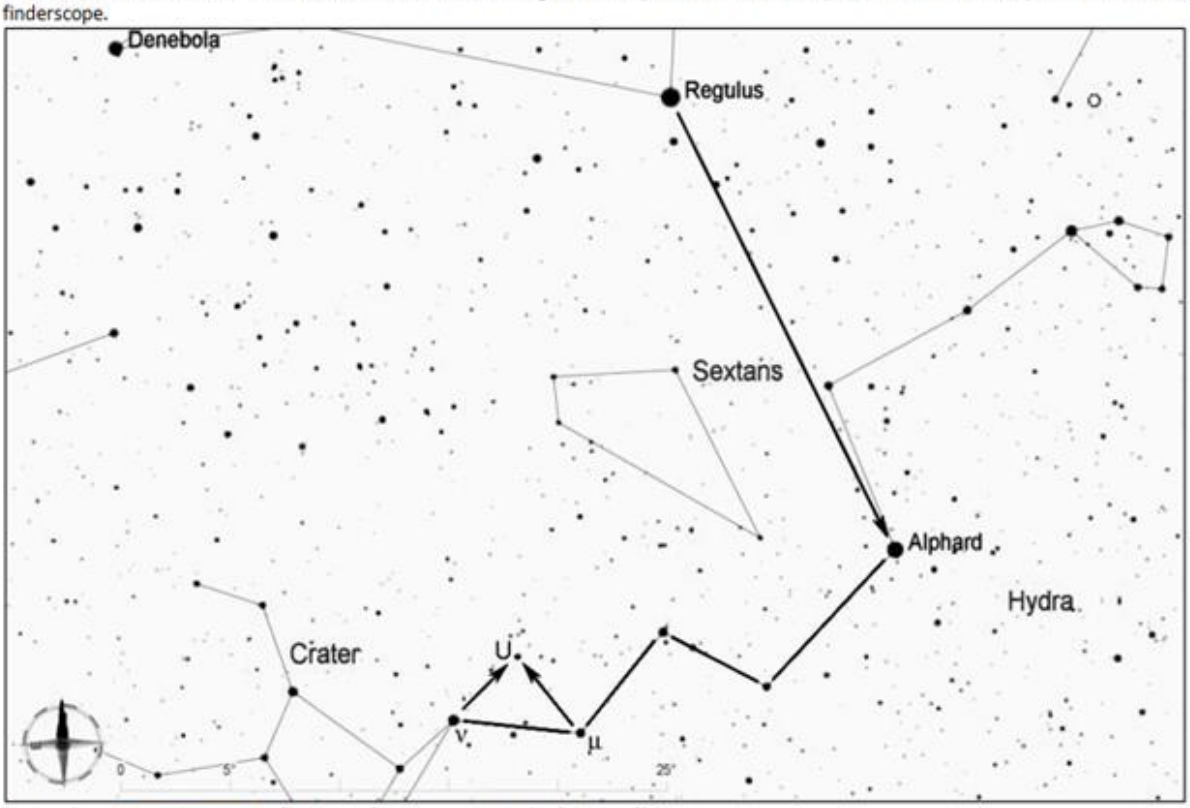


Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo.

U Hydrae

Look about 30 degrees to the southwest of Regulus to find 2nd magnitude Alphard, the brightest star in Hydra, the water snake. From Alphard, look east and follow a zig-zag line of stars that form part of the slithering body of Hydra. Using the chart below, find the 3rd and 4th magnitude stars ν (nu) and μ (mu) Hydrae. Use these two stars to visualize a triangle, and U Hydrae will be at the top corner. It can be easily seen in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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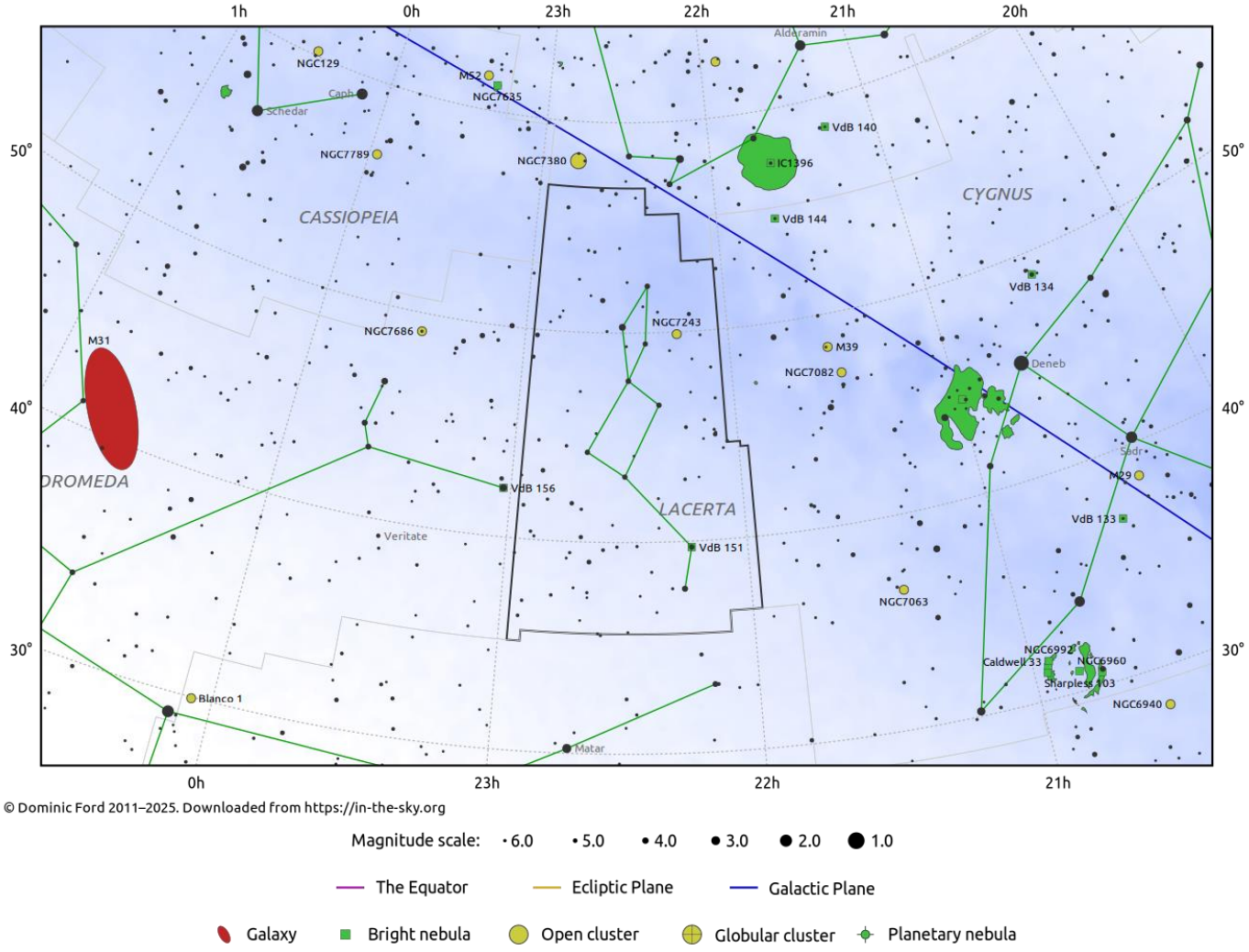
Lacerta (Lac)

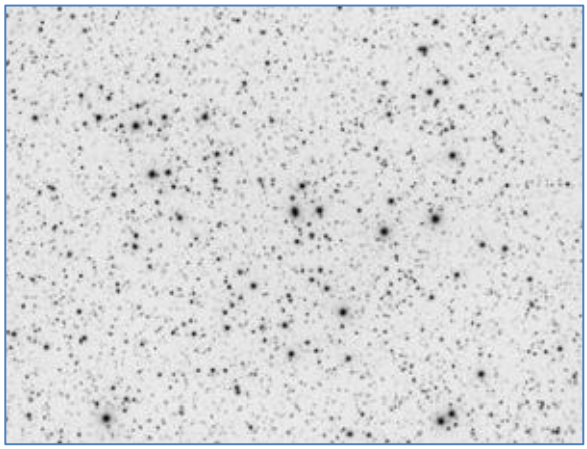
Evening Visibility: **June – December**
Online Information: **Lacerta**
Charts: **1** Featured Objects: **1**
More Online Information: NGC-7243

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
NGC-7243 (OC)	1, W1	C-16	| Mag=6.4 | SB=21.6 | Size=21' |

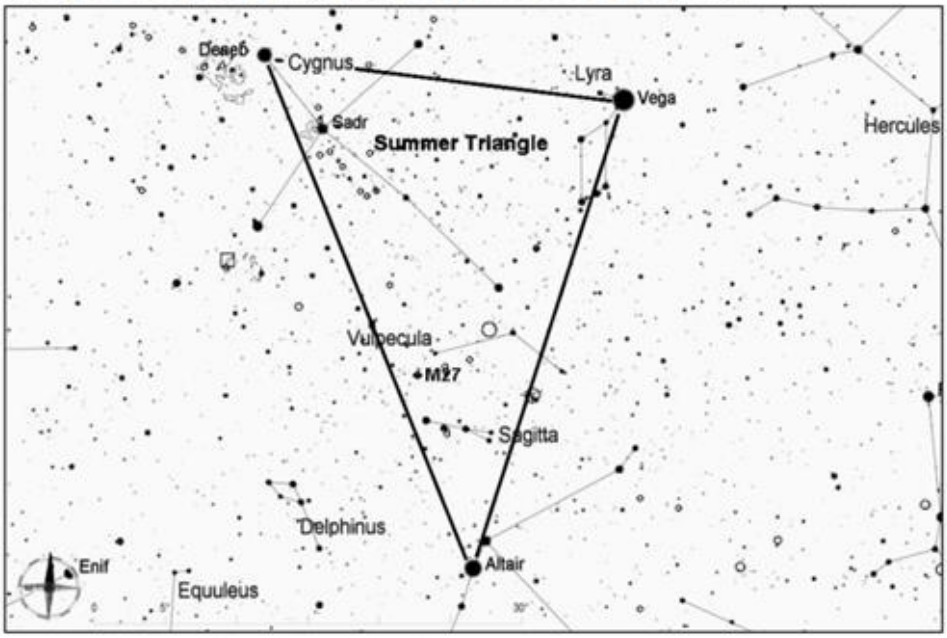
Image Gallery



NGC 7243 (C 16)

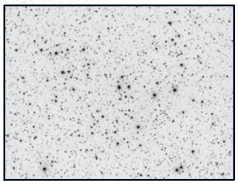
NGC 7243 (Caldwell 16), Open Cluster in Lacerta

NGC 7243, or Caldwell 16, is a large and coarse cluster with an irregular shape. The Milky Way passes through this area of sky in the faint constellation Lacerta, the lizard, so there are many dimmer stars in the background. In the center of the cluster is a double star, Struve 2890, two matching blue-white stars of 9th magnitude. The cluster is about 2600 light years away.



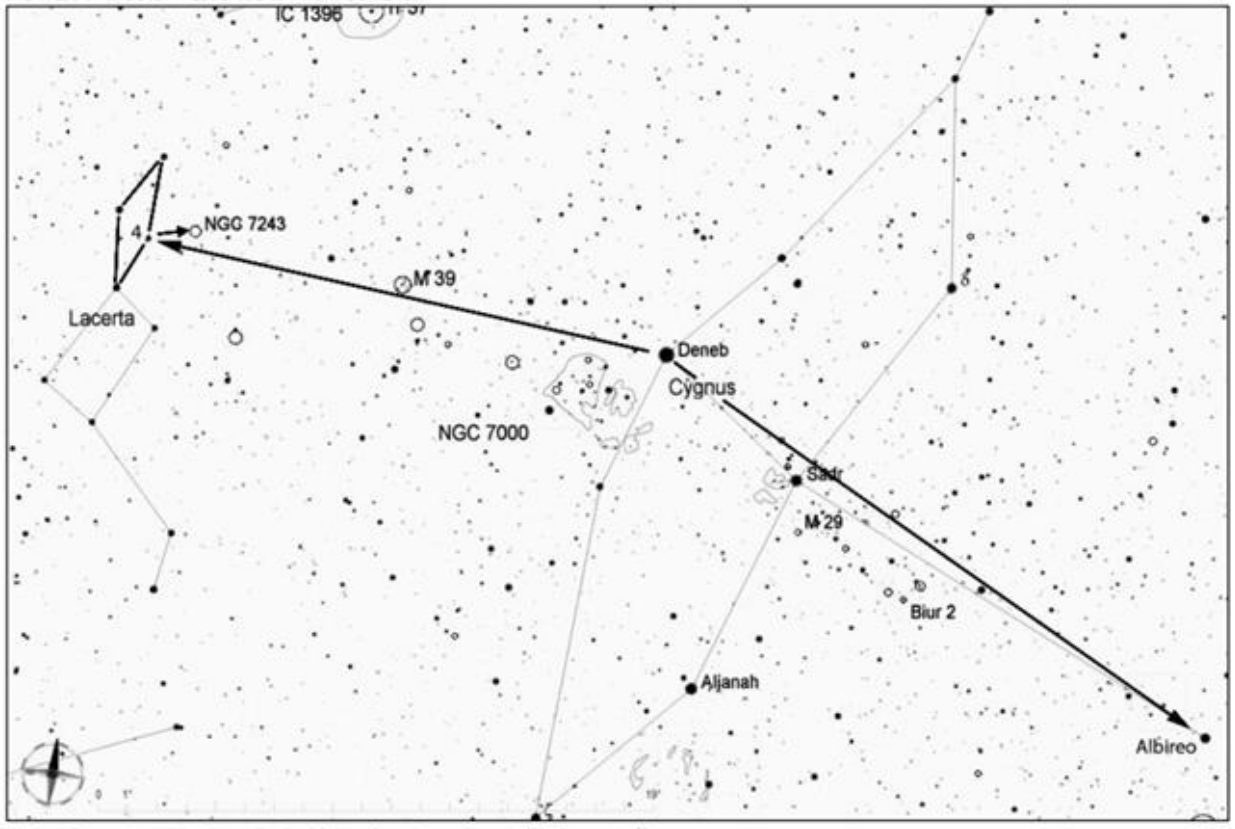
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Deneb, the first-magnitude star that forms the tail of Cygnus, the swan (or if you visualize the brightest stars of Cygnus as a cross shape, Deneb is at the top of the cross).



NGC 7243

Notice that the distance from Deneb at the top of the Cygnus cross to Albireo at the bottom is about the same as the distance (in roughly the opposite direction) to the four dim stars in a diamond shape that form the head of Lacerta, the lizard. All the stars of Lacerta are dim, but this diamond shape should be visible to the naked eye under moderately dark skies. Once you have found the head of Lacerta, look about 1 degree to the west of the star 4 Lacertae to find NGC 7243.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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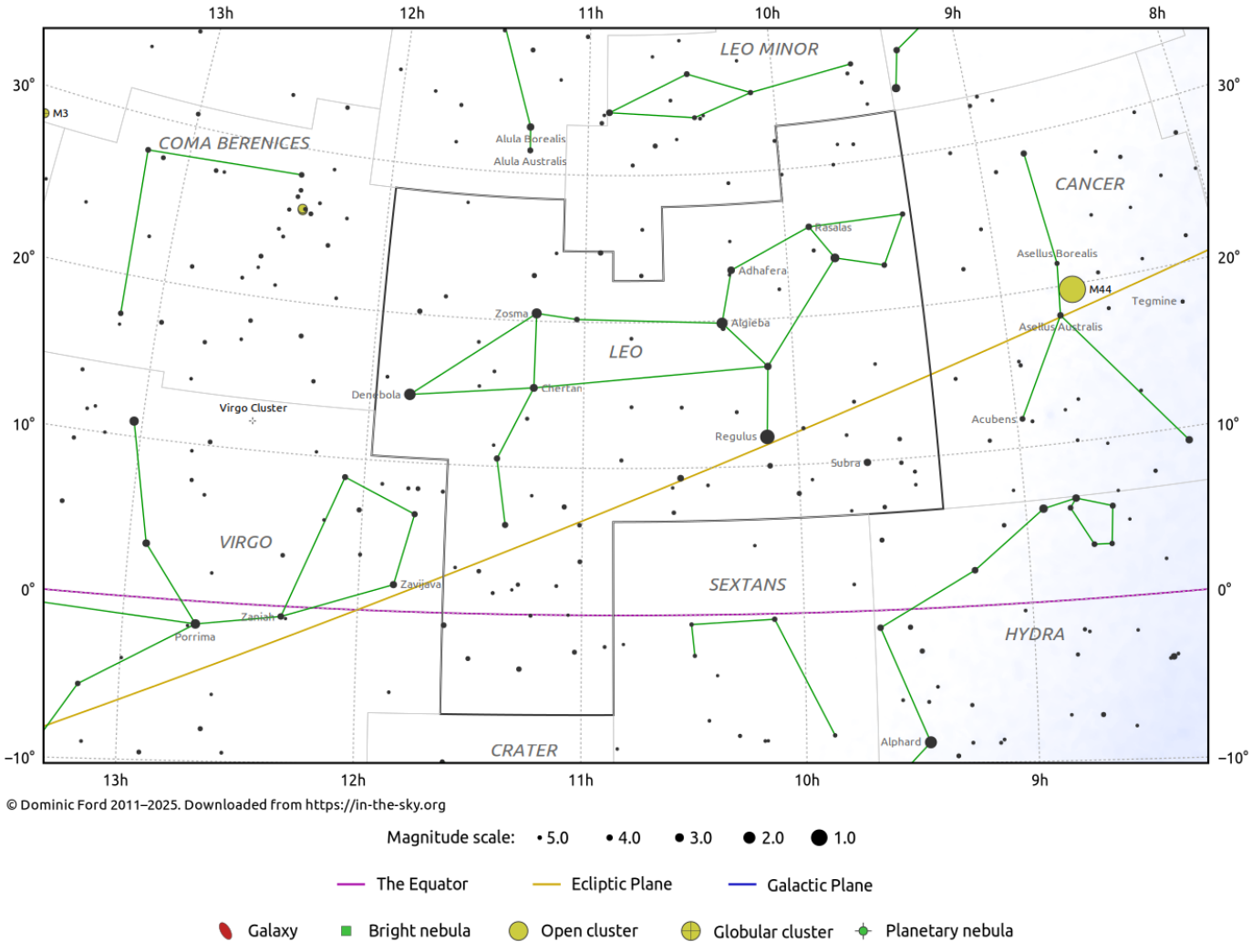
Leo (Leo)

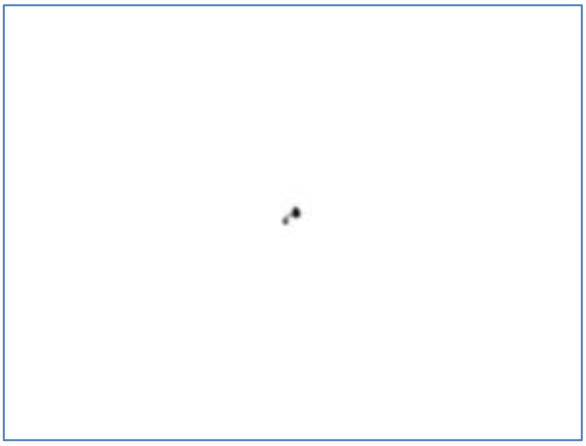
Evening Visibility: **February – June**
Online Information: **Leo**
Charts: **6** Featured Objects: **18**
More Online Information: Algieba, M-065, M-066, NGC-3628, M-095, M-096, M-105, NGC-3185, NGC-3187, NGC-3190, NGC-3193, NGC-3226, NGC-3227, NGC-3626, NGC-3599, NGC-3605, NGC-3607, NGC-3608,

In-The-Sky.org Constellation Map

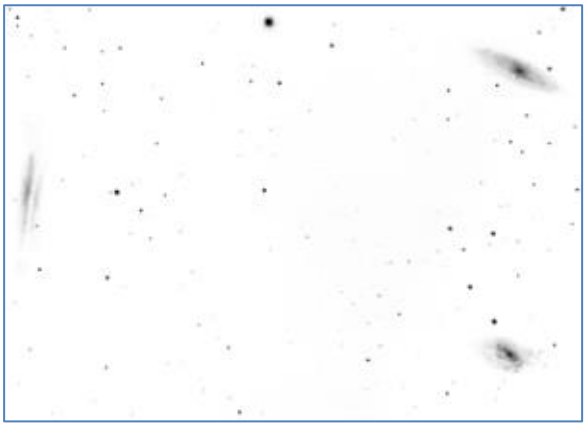


Object (Type)	Chart	Aliases	Stats
Algieba (DS)	1, W1, SD	SAO-081298, HIP-50583, γ Leo, 41 Leo, Gamma Leo, HD89484, HR4057, STF1424	| Mag=2.3, 3.6 | Sep=4.7" |
M-065 (G)	2, W2	NGC-3623, Leo Trio Galaxy Group	| Mag=9.3 | SB=22.0 | Size=8.7' x 2.5' |
M-066 (G)	2, W2	NGC-3627, Leo Trio Galaxy Group	| Mag=8.9 | SB=22.3 | Size=9.1' x 4.2' |
NGC-3628 (G)	2, W2	Hamburger Galaxy, Leo Trio Galaxy Group, Sarah's Galaxy	| Mag=9.5 | SB=24.0 | Size =14' x 3.6' |
M-095 (G)	3, W3	NGC-3351	| Mag=9.7 | SB=23.0 | Size=3.1' x 2.9' |
M-096 (G)	3, W3	NGC-3368	| Mag=9.2 | SB=22.7 | Size=7.6' x 5.2' |
M-105 (G)	3, W3	NGC-3379	| Mag=9.3 | SB=22.6 | Size=5.4' x 4.8' |
NGC-3185 (G)	4, W4	Gamma Leonis Group	| Mag=12.2 | SB=22.6 | Size=2.4' x 1.2' |
NGC-3187 (G)	4, W4	Gamma Leonis Group	| Mag=13.4 | SB=24.3 | Size=3.0' x 1.3' |
NGC-3190 (G)	4, W4	Gamma Leonis Group	| Mag=11.1 | SB=22.9 | Size=4.4' x 1.5' |
NGC-3193 (G)	4, W4	Gamma Leonis Group	| Mag=10.9 | SB=21.8 | Size=3.0' x 2.7' |
NGC-3226 (G)	5, W5	Interacting Galaxies	| Mag=12.3 | SB=22.3 | Size=3.2' x 2.8' |
NGC-3227 (G)	5, W5	Interacting Galaxies	| Mag=11.1 | SB=23.2 | Size=5.4' x 3.6' |
NGC-3626 (G)	6, W6	C-40, PGC34684	| Mag=10.9 | SB=22.0 | Size= 3.1' |
NGC-3599 (G)	6, W6		| Mag=10.2 | SB=22.8 | Size=2.8' |
NGC-3605 (G)	6, W6		| Mag=12.1 | SB=22.8 | Size=1.7' |
NGC-3607 (G)	6, W6		| Mag=10.8 | SB=21.5 | Size=4.9' x 2.5' |
NGC-3608 (G)	6, W6		| Mag=11.7 | SB=22.0 | Size=3.0' |

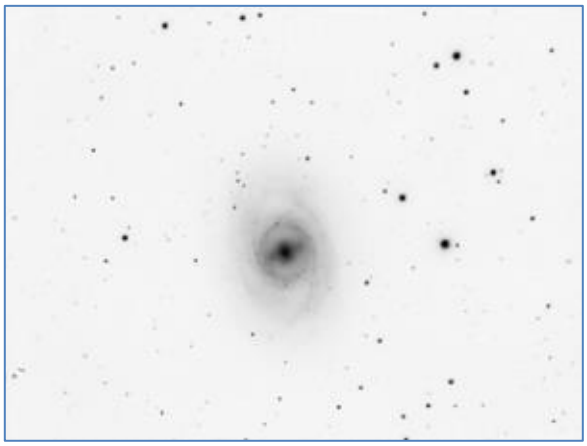
Image Gallery



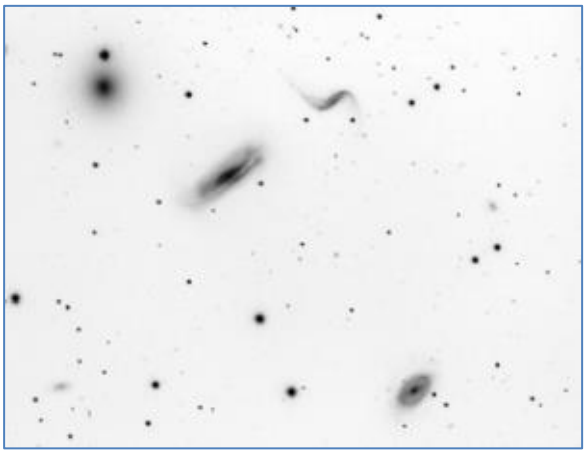
Algieba (Gamma Leonis)



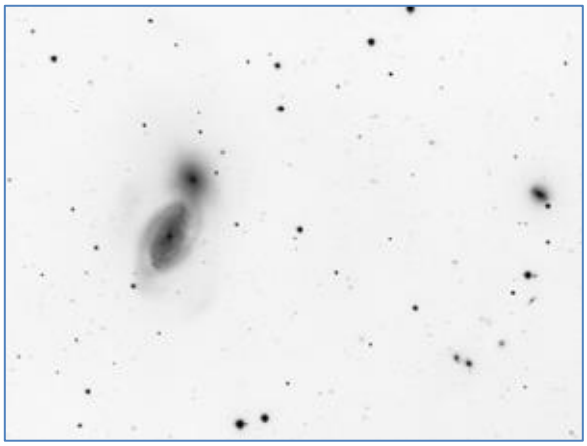
Messier 65, 66 and NGC 3628 (Leo Trio)
(No Online Photo)



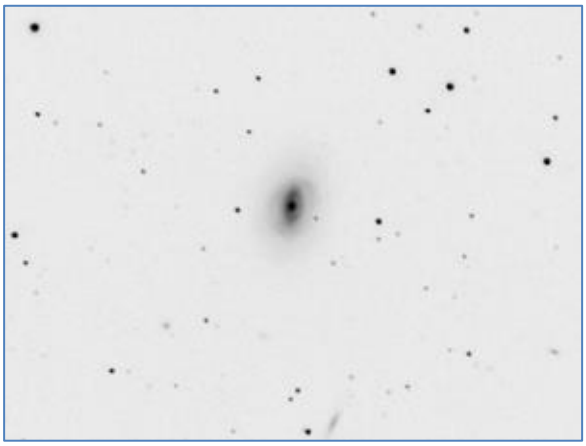
Messier 95



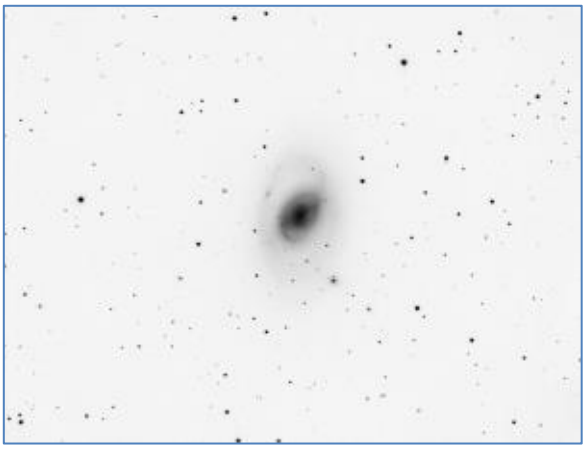
NGC 3185, 3187, 3190, 3193
Gamma Leonis Galaxy Group



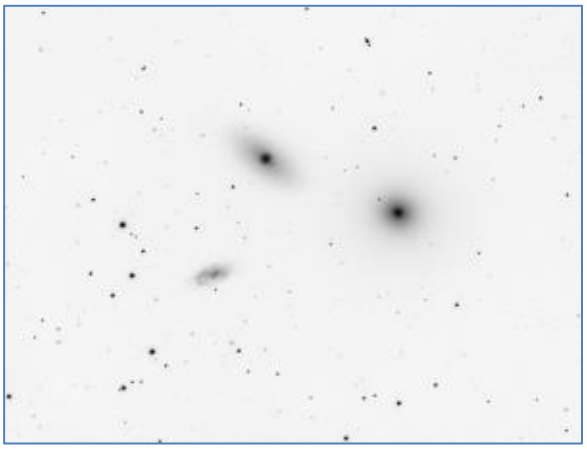
NGC 3226 and NGC 3227



NGC 3626 (C 40)



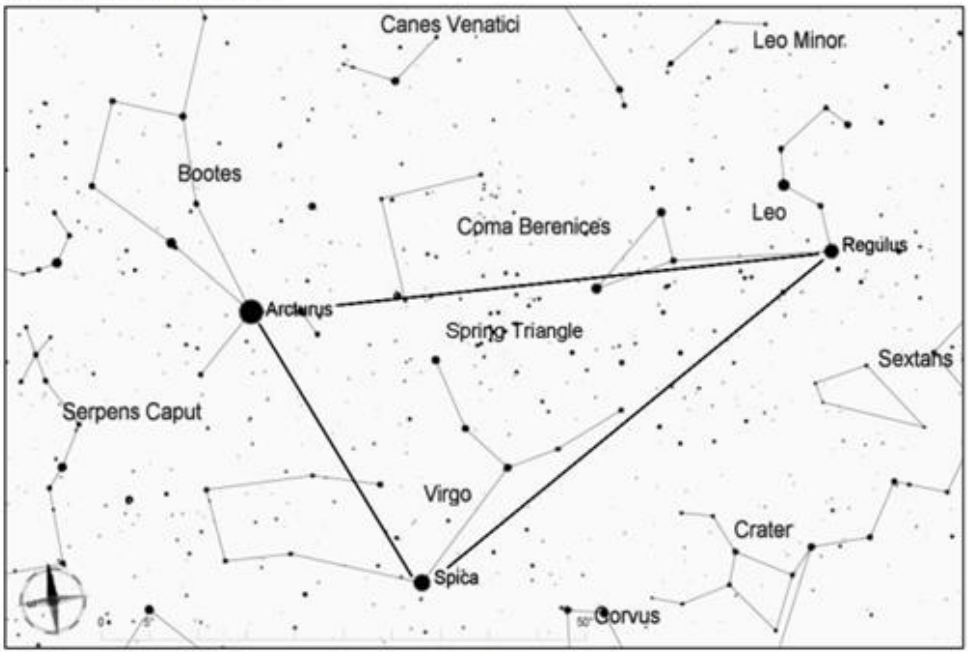
Messier 96



Messier 105

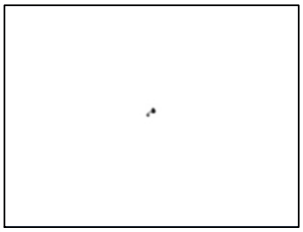
Algieba (Gamma Leonis), Double Star in Leo

Gamma Leonis, or Algieba, is a well known double star in the "sickle" portion of the constellation Leo. The brighter star appears orange or reddish, and the dimmer companion is yellow. The two stars are only 4.7 arcseconds apart, so fairly high magnification will help to separate the pair. They are about 130 light years away.



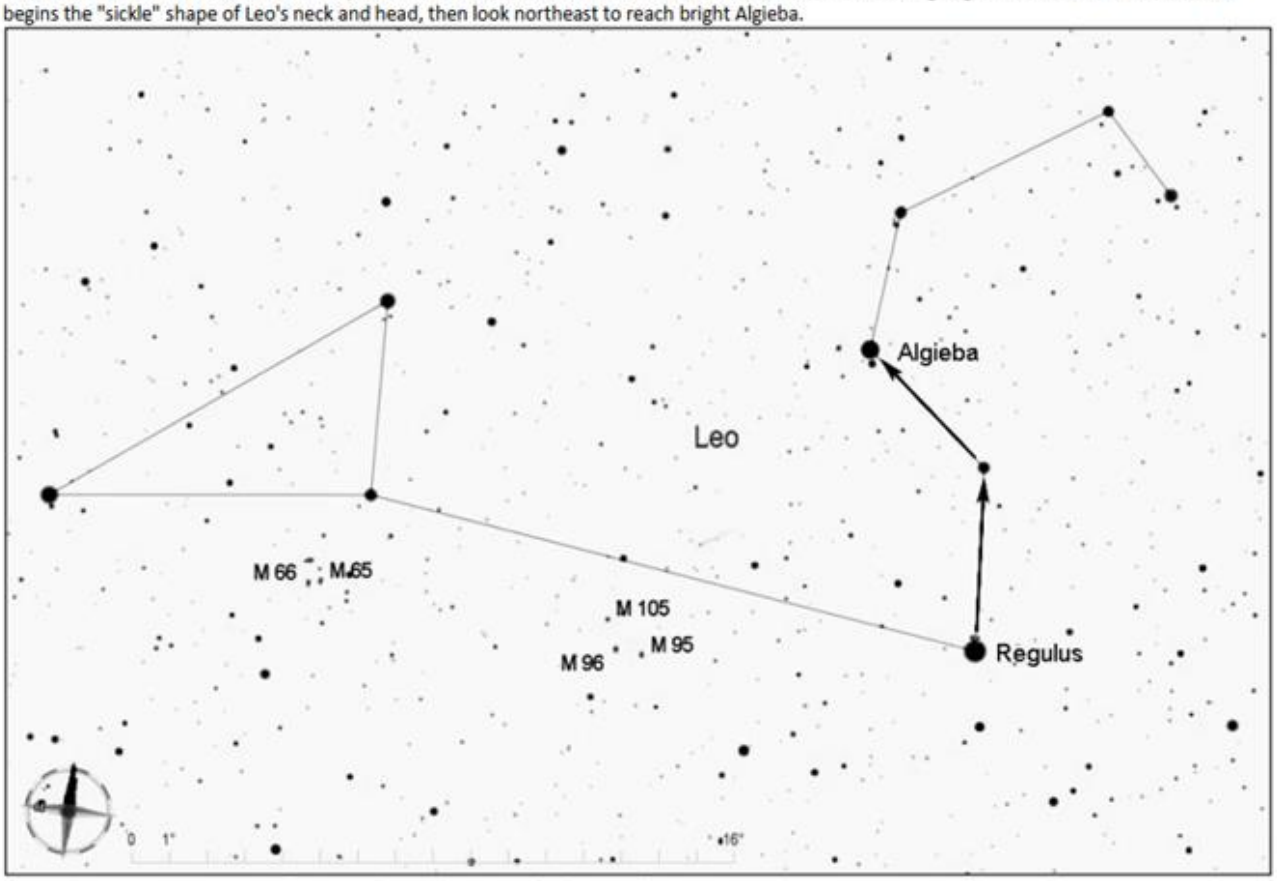
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



Algieba

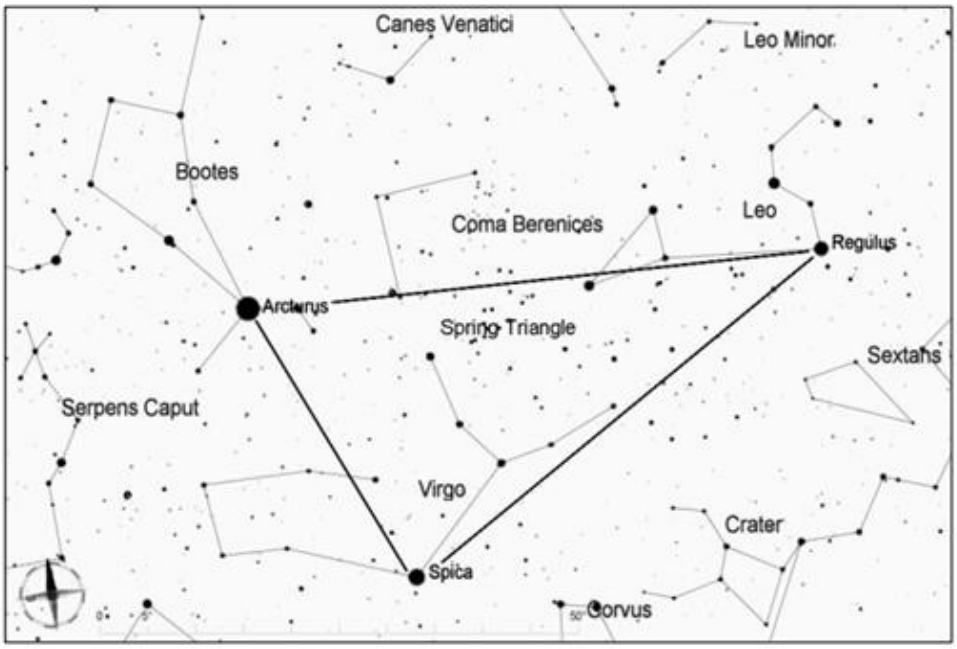
The constellation Leo looks like a lion in profile, with its head to the west and its tail to the east. After finding Regulus, look north for a star that begins the "sickle" shape of Leo's neck and head, then look northeast to reach bright Algieba.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

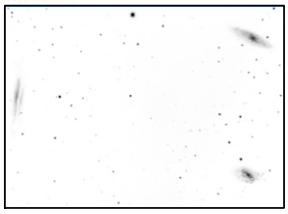
Messier 65, 66, and NGC 3628, the Leo Trio

These three galaxies will all fit in a 1-degree field of view of a low-power eyepiece, and they are bright enough to be seen with even small telescopes. Messier 65 and 66 appear oval with brighter centers. NGC 3628 is larger but dimmer and more challenging to see. It has a very elongated shape, and with large telescopes its dust lane can be spotted. This group of galaxies is about 35 to 40 million light years away.



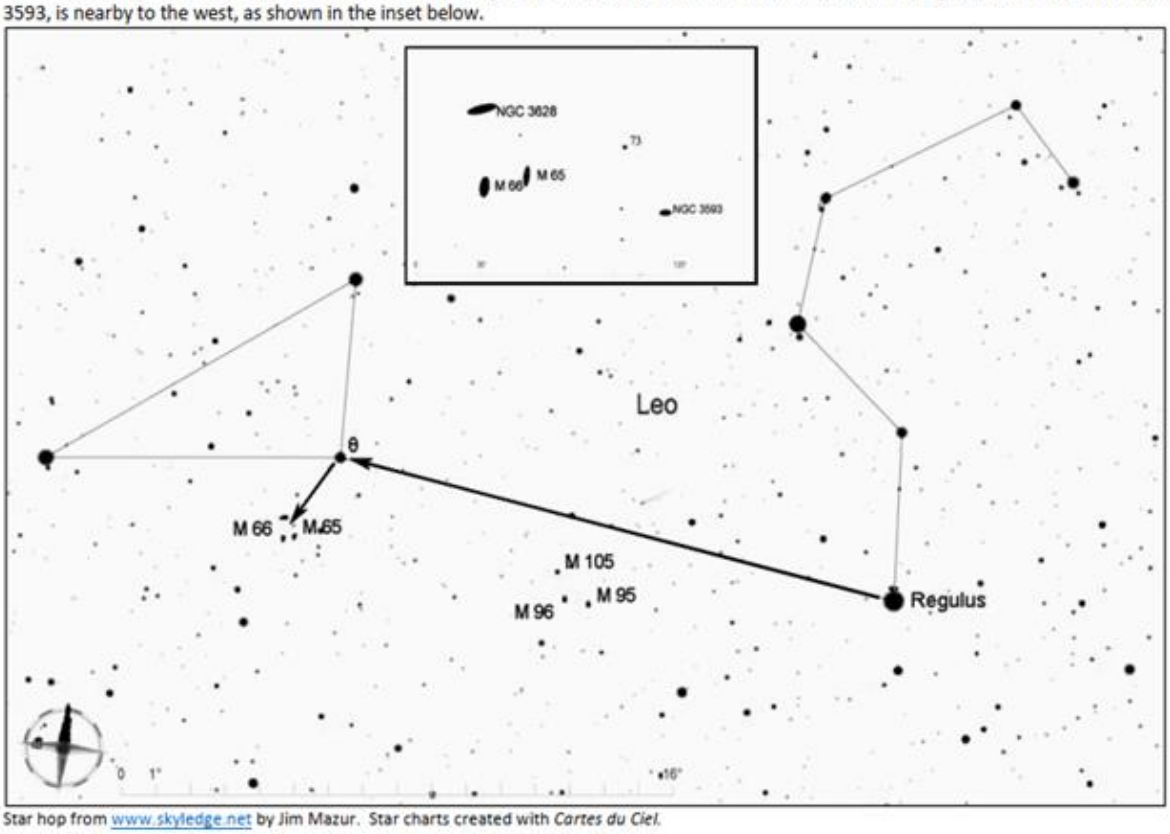
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



M 67, 66 & NGC 3628

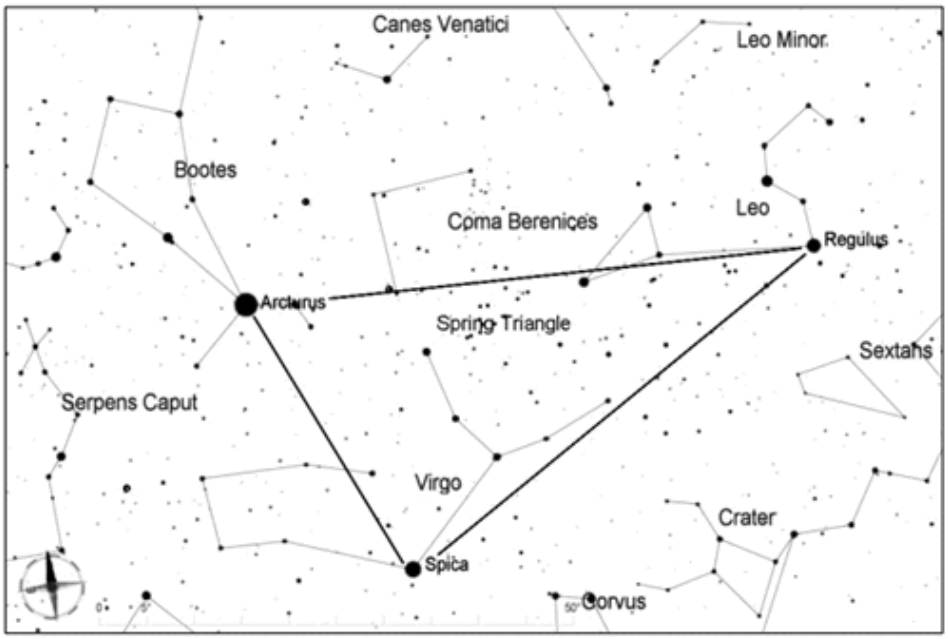
The constellation Leo looks like a lion in profile, with its head to the west and its tail to the east. After finding Regulus, look for θ Leonis, one the the three stars that form the back end of the lion. Then move your score about 2.5 degrees to the southeast to arrive at the region of Leo Trio. You can use low power to view them all at once, then switch to higher power to look for more details in the individual galaxies. Another spiral galaxy, NGC 3593, is nearby to the west, as shown in the inset below.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

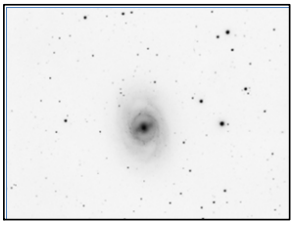
Messier 95, 96, and 105, Galaxies in Leo

Messier 95 is a barred spiral galaxy, Messier 96 is a spiral galaxy, and Messier 105 is an elliptical galaxy. This group of galaxies is about 30 million light years away. All three are about 9th magnitude, and their overall shapes can be seen with a small telescope. Much more detail is visible with larger telescopes, and two other galaxies (NGC 3371 and 3373) can be seen nearby.



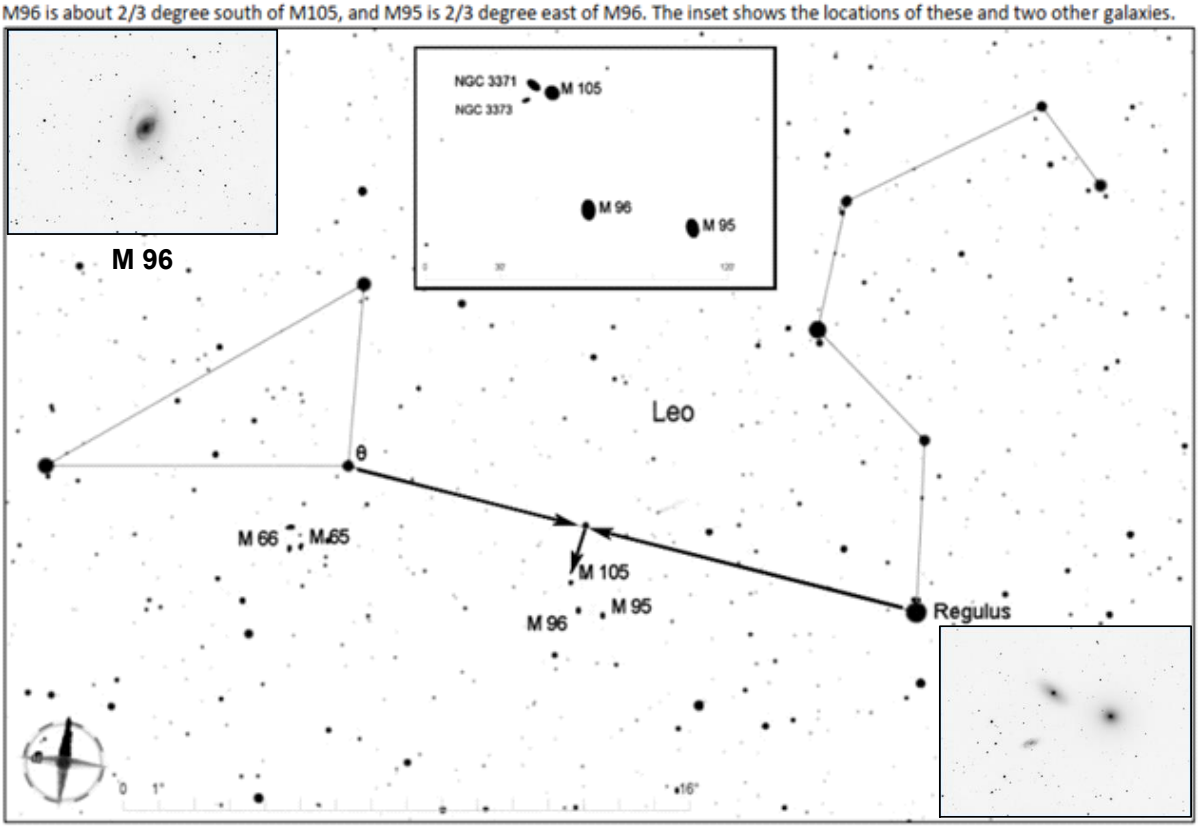
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



M 95

The constellation Leo looks like a lion in profile, with its head to the west and its tail to the east. After finding Regulus, look for θ Leonis, one the the three stars that form the back end of the lion. About 60% of the way from Regulus to θ is a 5th magnitude star that will be visible in binoculars or a finderscope, the brightest star in that area. From this star, point the telescope about 1.6 degrees to the south to reach M105. As shown below, M96 is about 2/3 degree south of M105, and M95 is 2/3 degree east of M96. The inset shows the locations of these and two other galaxies.

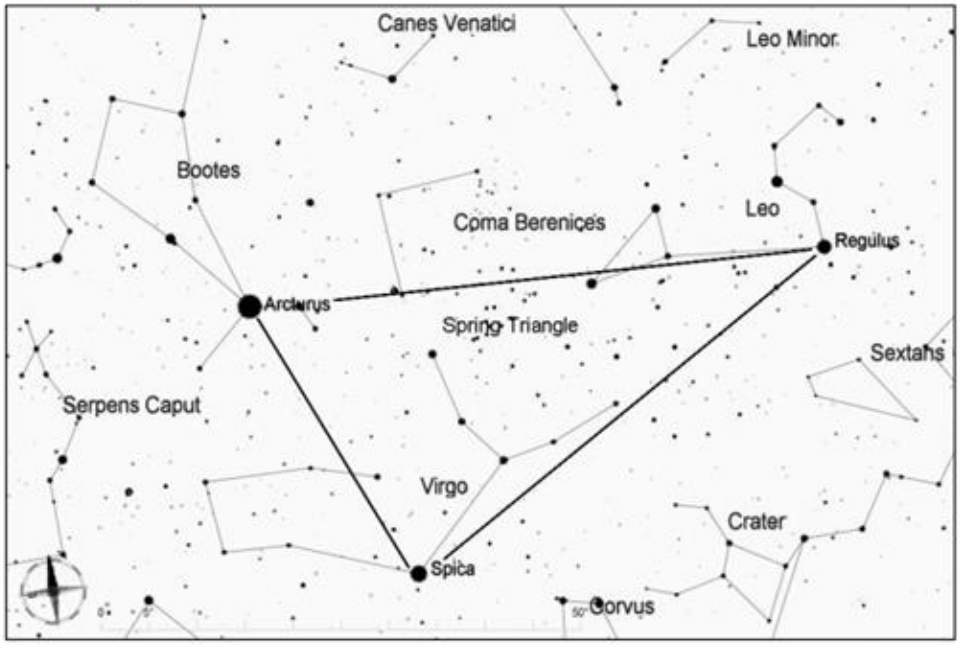


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

M 105 (Right)

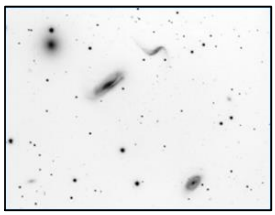
NGC 3185, 3187, 3190, and 3193, Galaxies in Leo

This tight group of four galaxies is about 80 million light years away. It is sometimes called the Gamma Leonis Galaxy Group because it is just 2 degrees north of second-magnitude Gamma Leonis (Algieba). These four can all fit within the field of view of a typical medium-power eyepiece. NGC 3193 is an elliptical galaxy, whereas the other three are spirals. NGC 3187 (magnitude 12.9) is the hardest to see because it is small and has a low surface brightness.



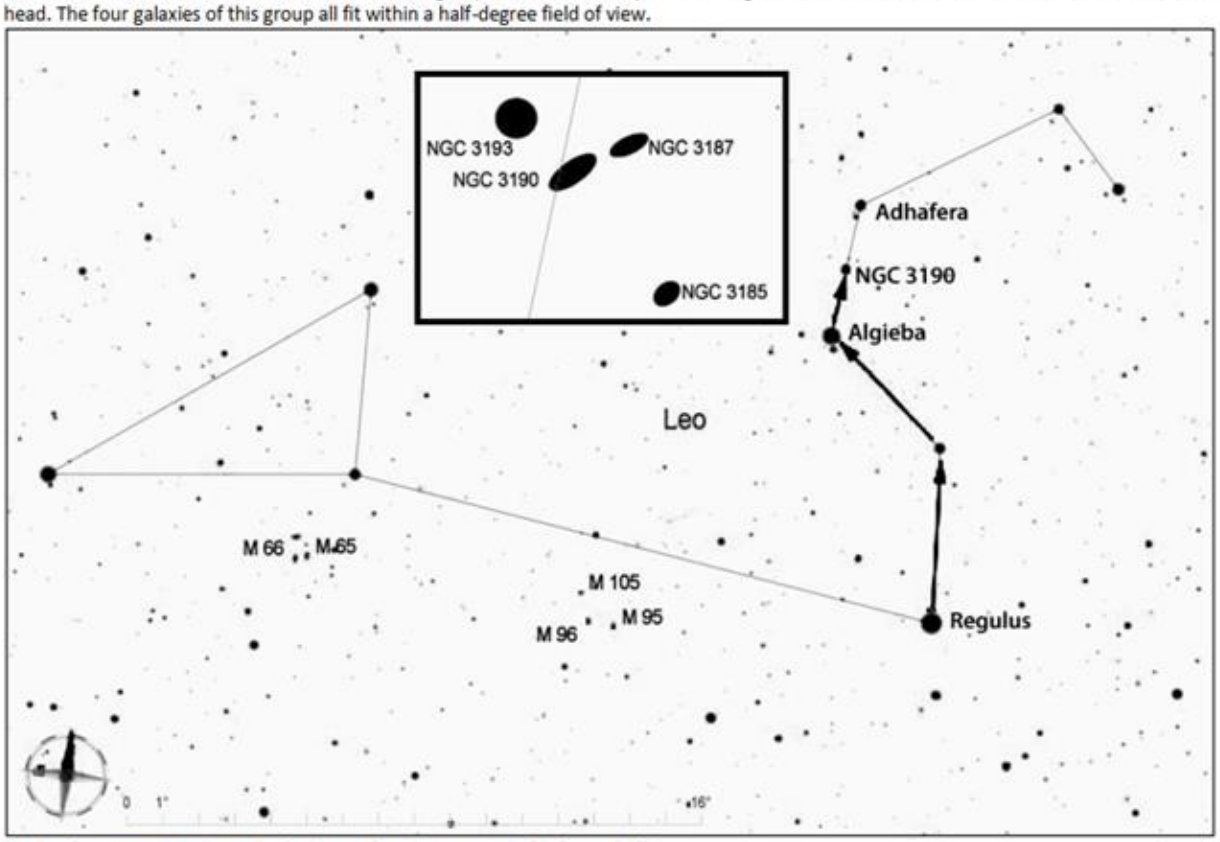
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



NGC 3185, 3187, 3190, 3193

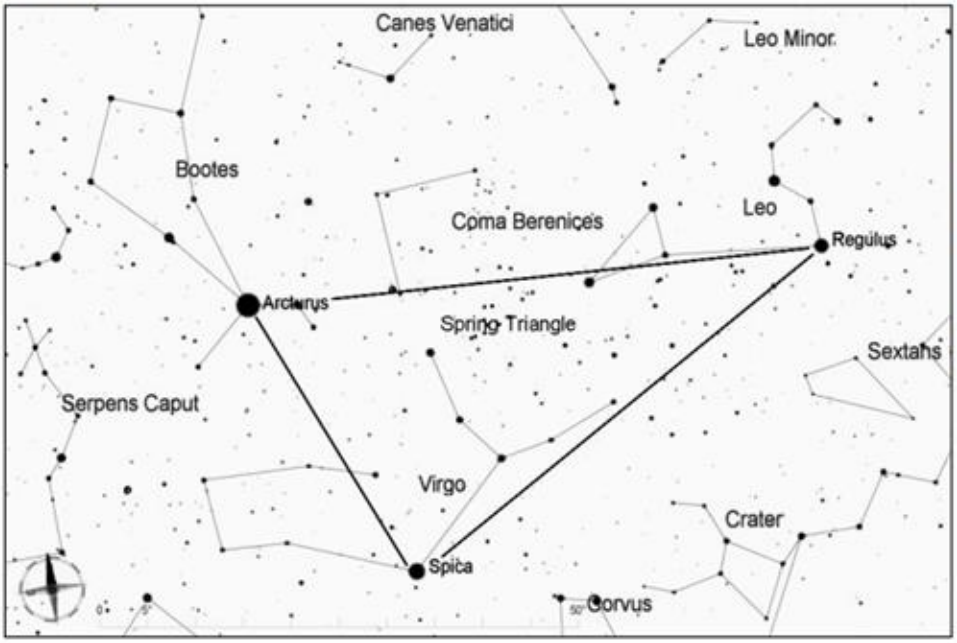
The constellation Leo looks like a lion in profile, with its head to the west and its tail to the east. After finding Regulus, follow the bright stars that form the neck and head of the lion. The NGC 3190 group is located halfway between Algieba and Adhafera, the two stars that form the back of head. The four galaxies of this group all fit within a half-degree field of view.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

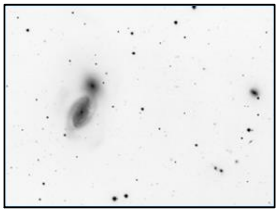
NGC 3226 and 3227, Interacting Galaxies in Leo

At about magnitude 11, this interacting pair of galaxies can be spotted with a medium-sized telescope, and they are easy to locate because of their proximity to the bright star Algieba. They are about 77 million light years away. NGC 4227, the southernmost of the two, is slightly larger and brighter. Less than 1/4 degree to the west is NGC 3222, a much smaller galaxy of magnitude 12.8 that is estimated to be about 270 million light years away.



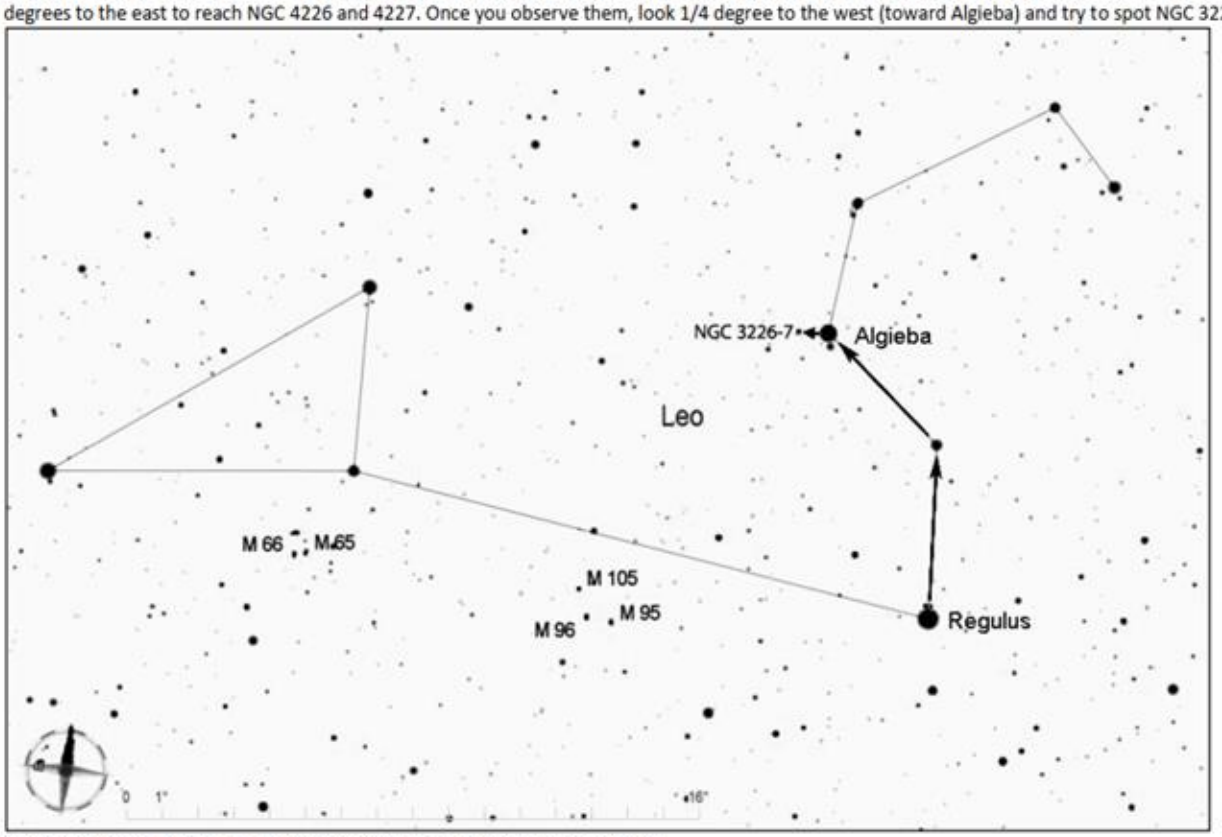
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



NGC 3226 & 3227

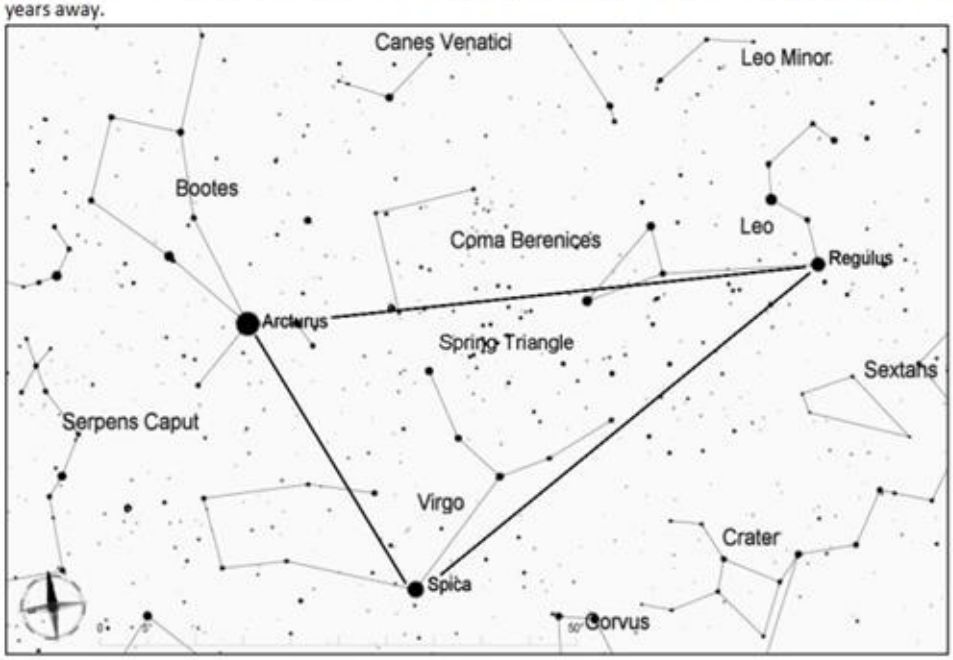
The constellation Leo looks like a lion in profile, with its head to the west and its tail to the east. After finding Regulus, look north for a star that begins the "sickle" shape of Leo's neck and head, then look northeast to reach bright Algieba, a nice double star. From Algeiba, move about 3/4 degrees to the east to reach NGC 4226 and 4227. Once you observe them, look 1/4 degree to the west (toward Algieba) and try to spot NGC 3222.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

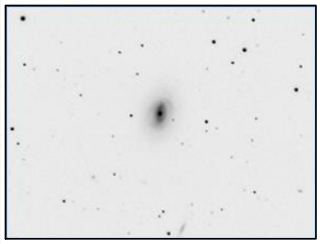
NGC 3626 (Caldwell 40), and NGC 3599, 3605, 3607, 3608, Galaxies in Leo

NGC 3626 (Caldwell 40) is a lenticular galaxy that is oblong in the north-south direction and has a small bright center. Just 1 degree to the west are four more galaxies that can fit within a 1/2-degree field of view of a typical medium-power eyepiece. NGC 3507 and 3508 are about magnitude 10 and not difficult to see. NGC 3605 and 3599 are much dimmer. All five of these galaxies are part of the same galaxy cluster, roughly 65 million light years away.



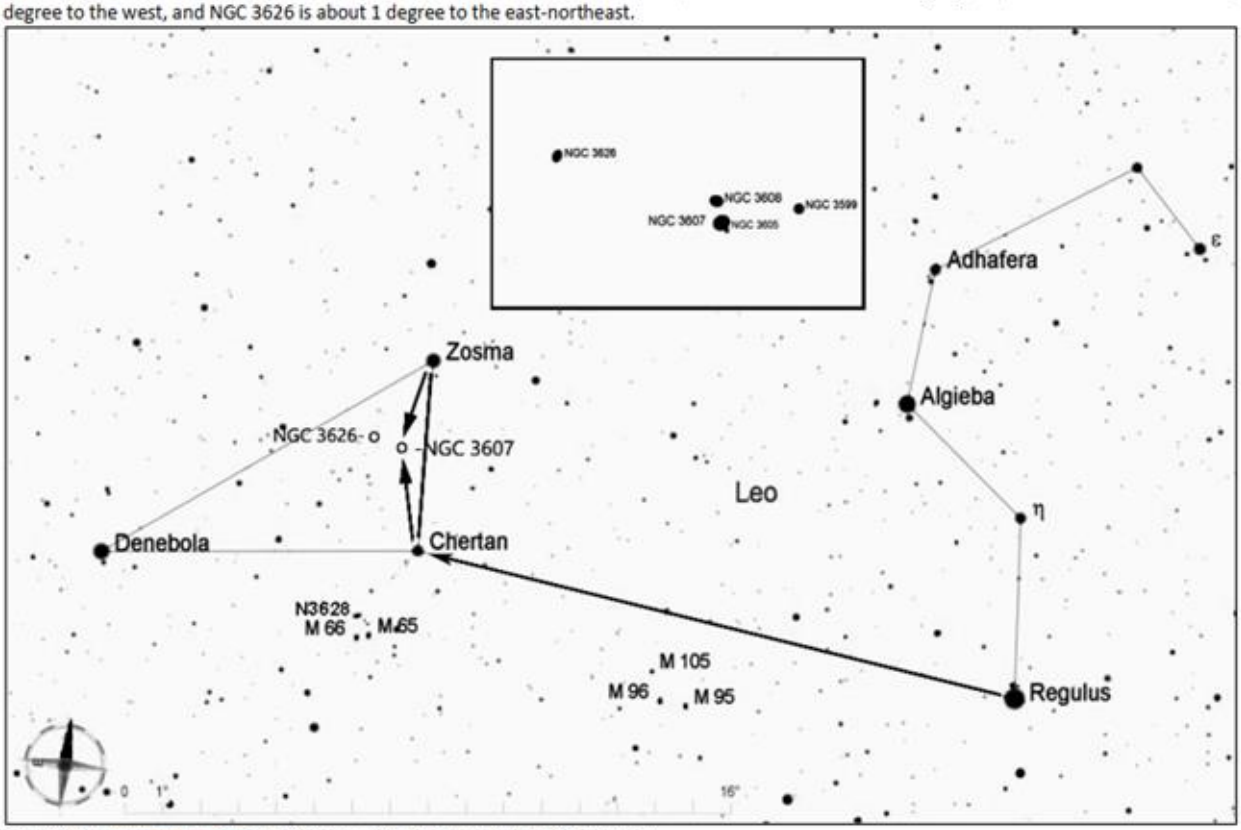
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo, the lion.



NGC 3626

The constellation Leo looks like a lion in profile, with its head to the west and its tail to the east. After finding Regulus, look for Chertan and Zosma, two of the three stars that form the back end of the lion. Point your scope about half way between these two stars and just slightly to the east, visualizing a very shallow triangle as shown below. This is where NGC 3605, 3607, and 3608 are located in a tight group. Dim NGC 3599 is about 1/3 degree to the west, and NGC 3626 is about 1 degree to the east-northeast.

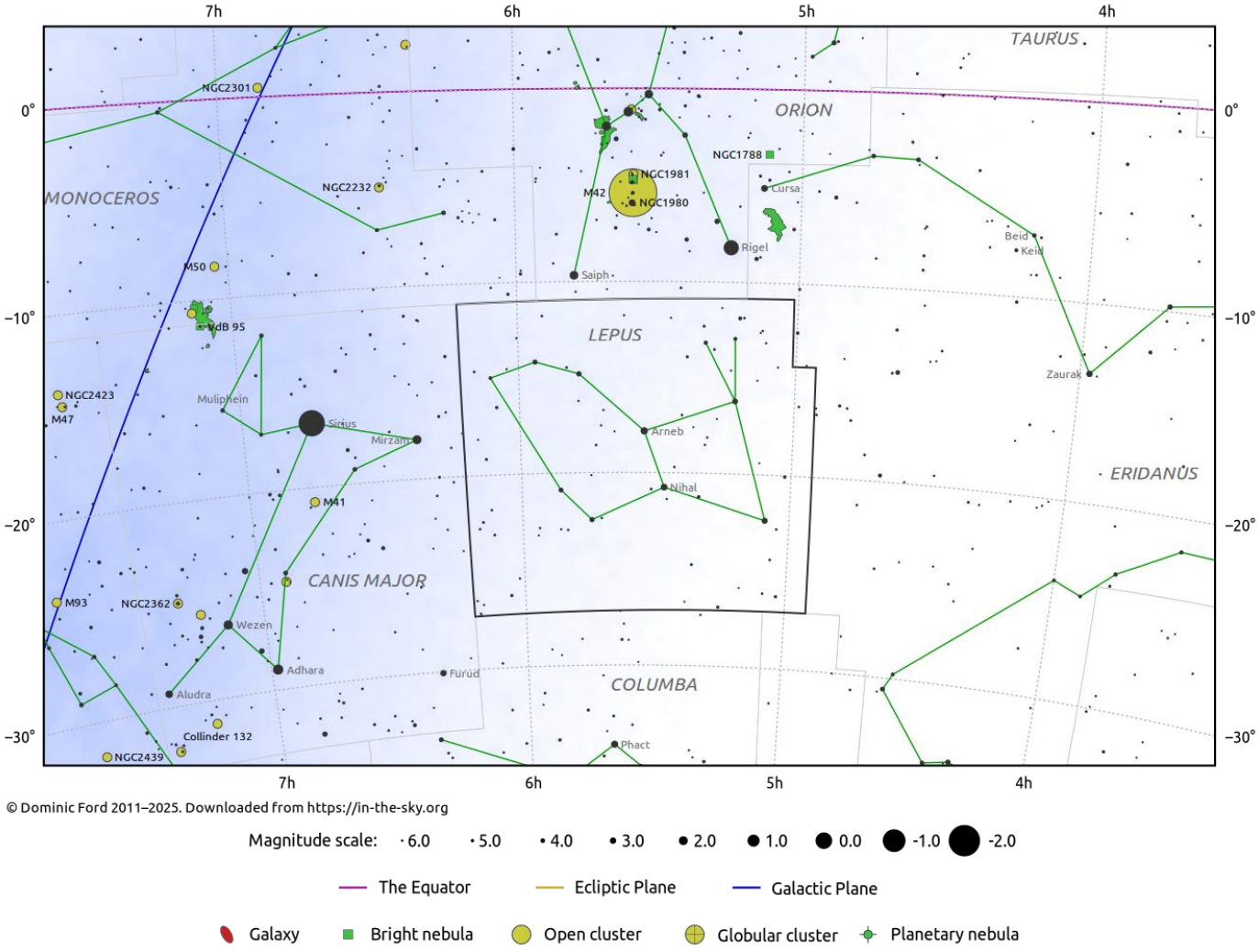


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Lepus (Lep)

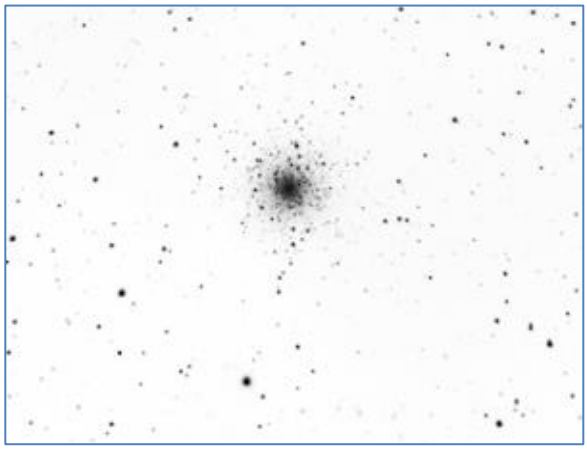
Evening Visibility: **December – March**
Online Information: **Lepus**
Charts: **1** Featured Objects: **1**
More Online Information: M-079

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
M-079 (GC)	1, W1	NGC-1904	| Mag=8.7 | SB=21.8 | Size=8.7' |

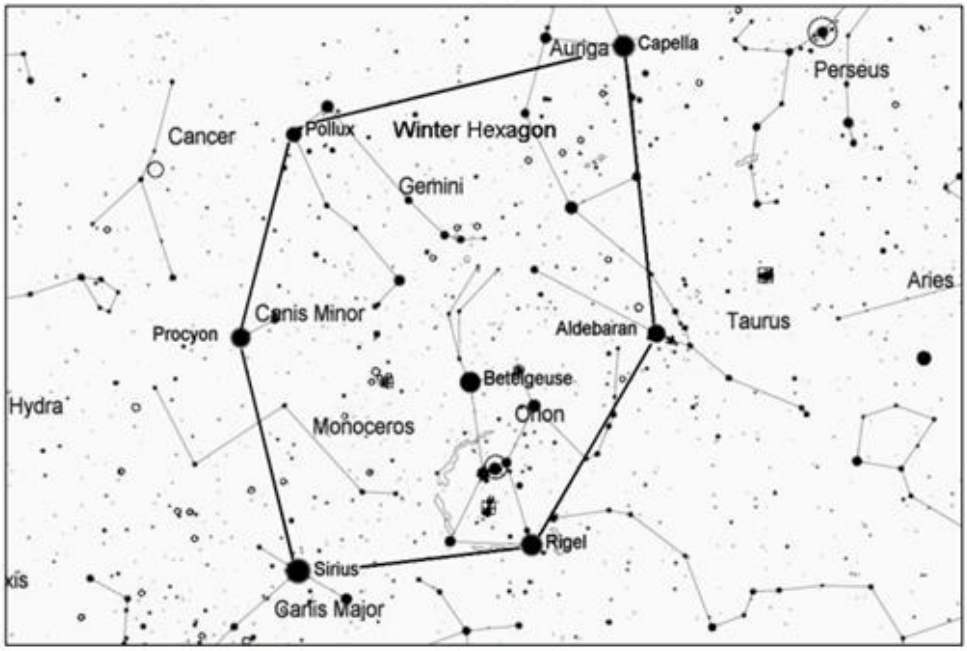
Image Gallery



Messier 79

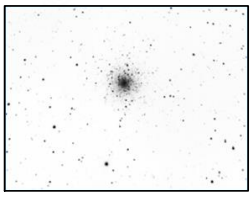
Messier 79, Globular Cluster in Lepus

Messier 79 is one of the few bright globular clusters visible during the winter in the northern hemisphere. It has a dense core where individual stars are difficult to resolve. Around the periphery, a few stars can be spotted with a small telescope, and larger scopes will show many more. The cluster is about 18 light years across and about 43,000 light years away, on the outskirts of our Milky Way galaxy.



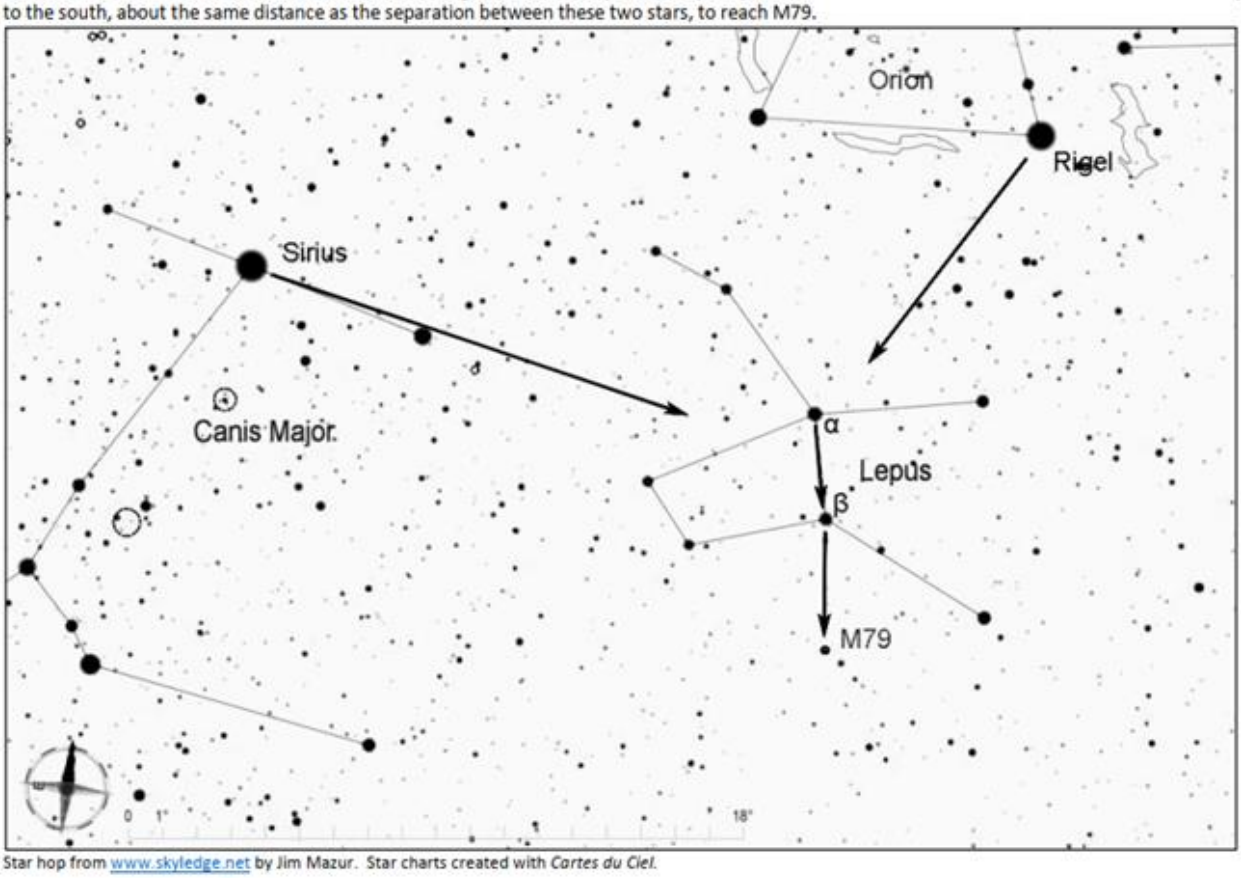
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius and Rigel.



M 79

Look west of Sirius and south of Rigel to find the constellation Lepus, the hare. On a clear winter night, the stars of Lepus are easy to see as long as the constellation is above the horizon. Use the two brightest stars of Lepus, α and β, to point to the location of M79. Extend a line between α and β to the south, about the same distance as the separation between these two stars, to reach M79.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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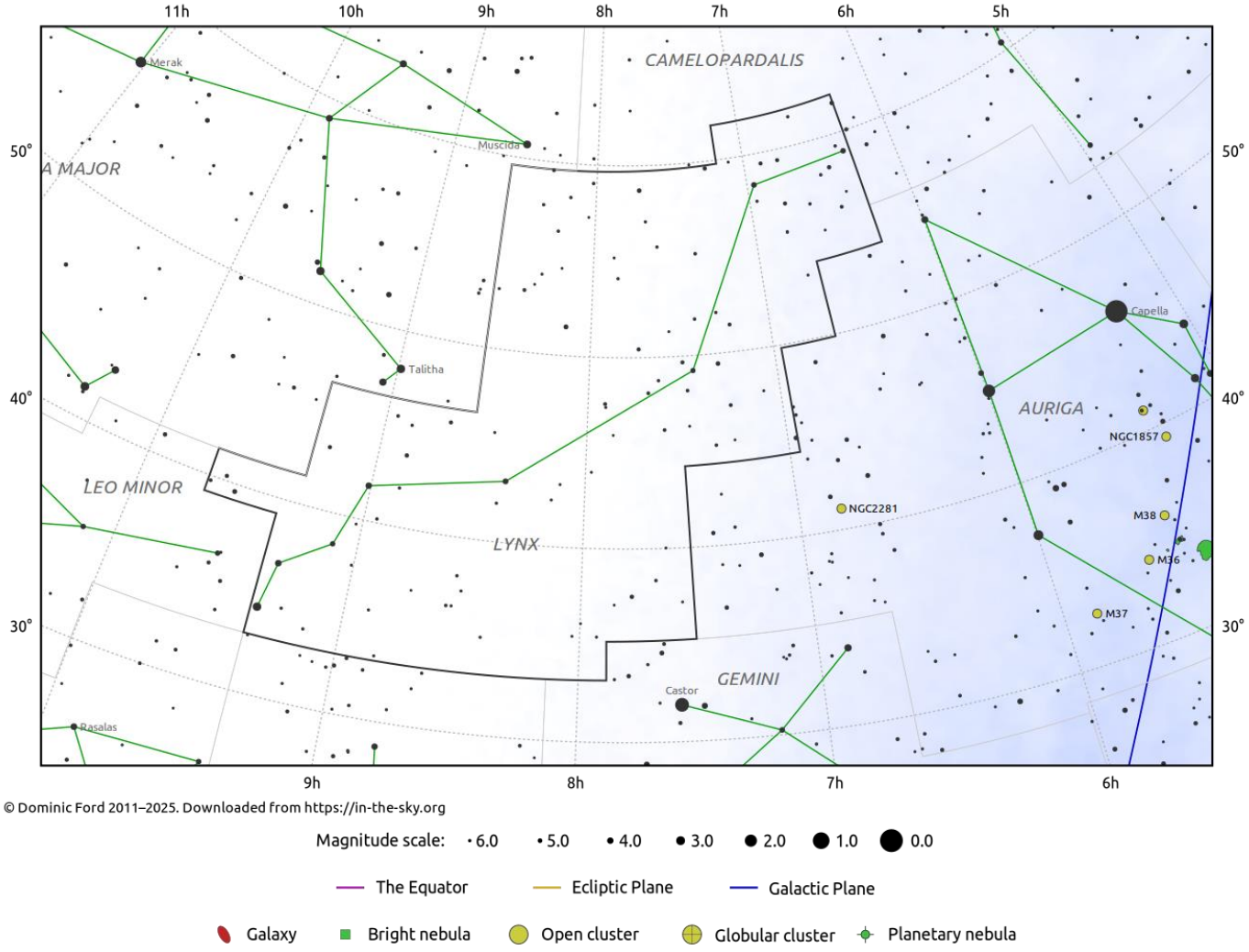
Lynx (Lyn)

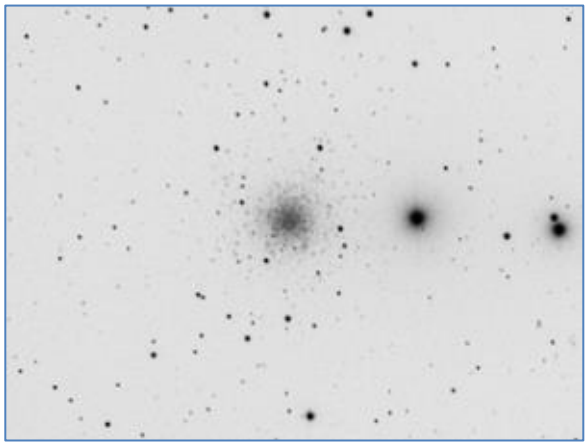
Evening Visibility: **December – April**
Online Information: **Lynx**
Charts: **1** Featured Objects: **1**
More Online Information: NGC-2419

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
NGC-2419 (GC)	1, W1	Intergalactic Wanderer, Tramp, C-25	| Mag=9.1 | SB=22.1 | Size=6' |

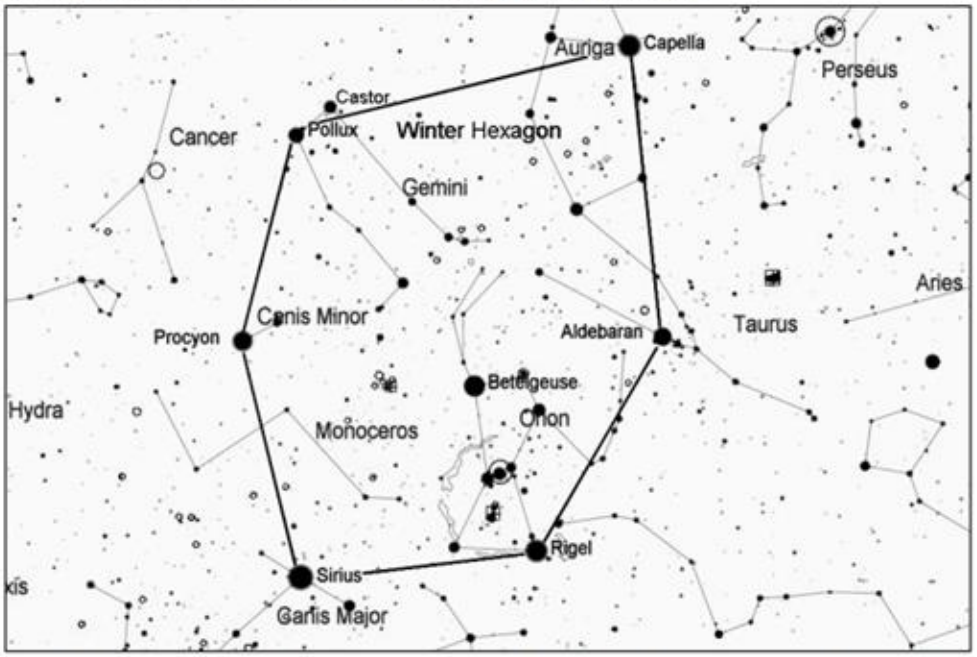
Image Gallery



NGC 2419 (C 25) Intergalactic Wanderer

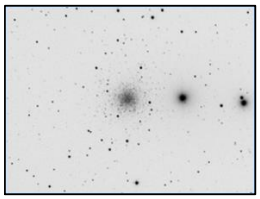
NGC 2419 (Caldwell 25), the Intergalactic Wanderer in Lynx

270,000 light years away, this is the most distant globular cluster that is still part of our Milky Way galaxy. Despite its nickname as the Intergalactic Wanderer, it is actually a part of our galaxy. At about magnitude 10, this cluster can be seen in amateur telescopes of modest size as a hazy ball, and with large scopes a few individual stars may be resolved around the periphery.



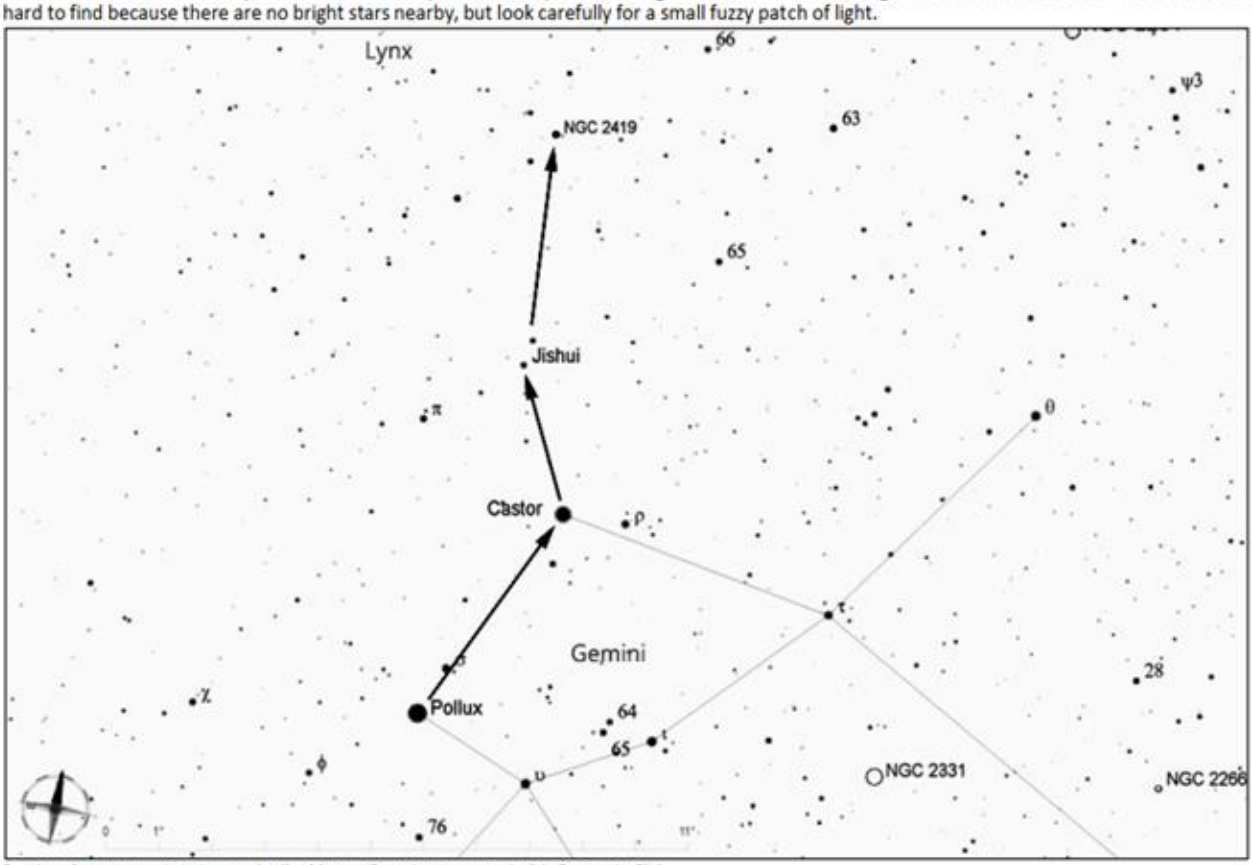
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Pollux in the constellation Gemini.



NGC 2419

From Pollux, move to Castor and then go north-northeast about 3 degrees to reach 5th magnitude Jishui and a 5.5 magnitude star just to its north, both of which should be easy to see in a finderscope. From this pair of stars, go due north another 4 degrees to reach NGC 2419. This cluster can be hard to find because there are no bright stars nearby, but look carefully for a small fuzzy patch of light.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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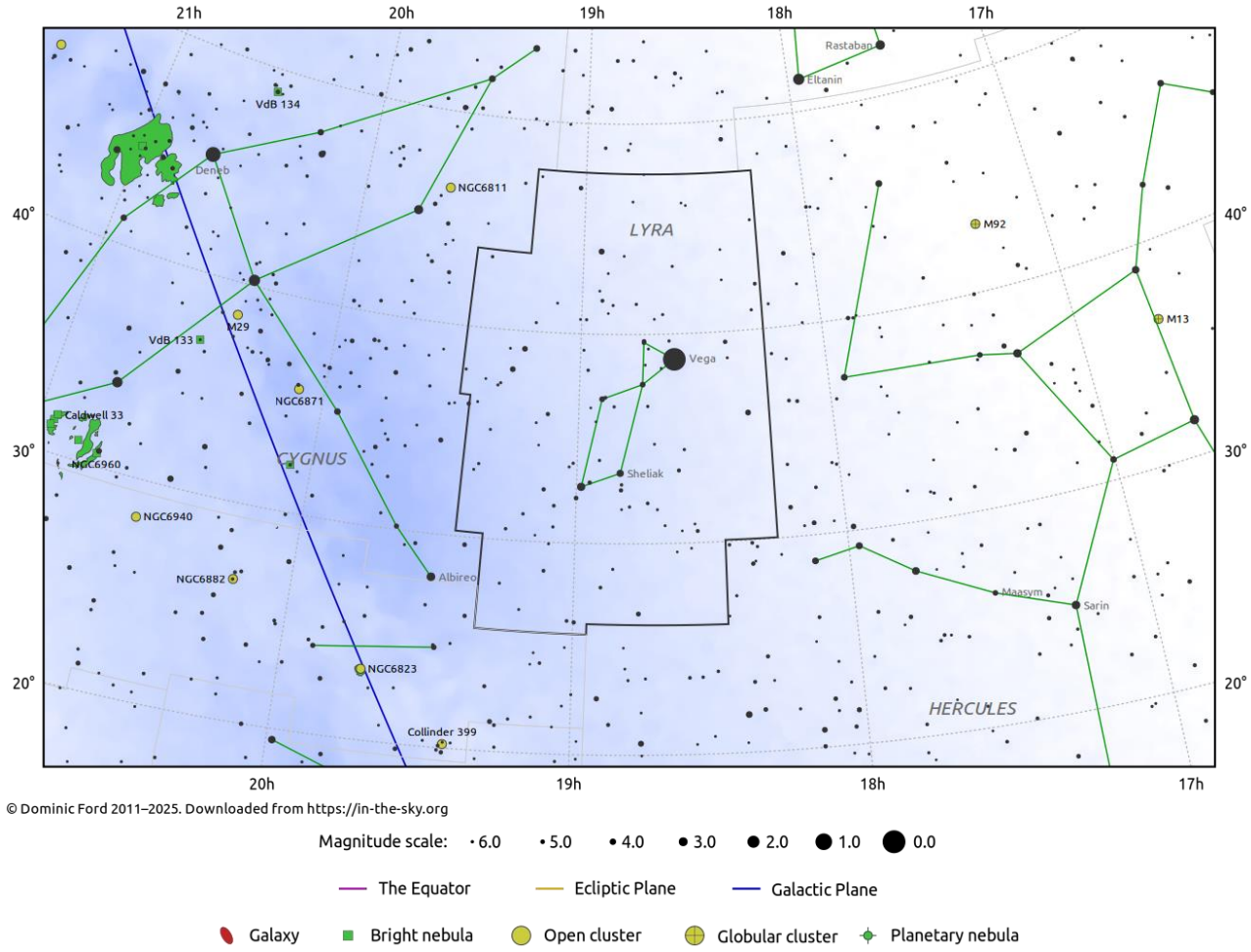
Lyra (Lyr)

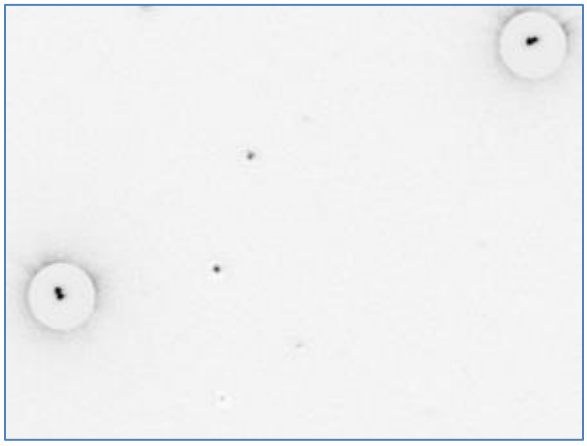
Evening Visibility: **June – November**
Online Information: **Lyra**
Charts: **3** Featured Objects: **4**
More Online Information: Epsilon Lyrae, T Lyrae, M-056, M-057

In-The-Sky.org Constellation Map

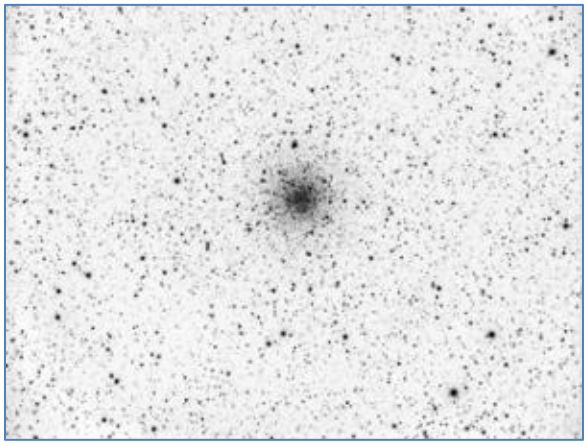


Object (Type)	Chart	Aliases	Stats
Epsilon Lyrae (MS)	1, W1, SD	SAO-067310, HIP-91919, Double Double , ε Lyr, 4 Lyr, HR-7051, HD-173582, STF-2382	| Mag=4.7, 6.2, 5.1, 5.5 | Sep=208”, 2.6”, 2.3” |
T Lyrae (CS)	1, W1	SAO-067087, HIP-90883	| Mag=7.8 |
M-056 (GC)	2, W2	NGC-6779	| Mag=8.3 | SB=22.4 | Size=8.8’ |
M-057 (PN)	3, W3	Ring Nebula, NGC-6720	| Mag=8.8 | SB=20.1 | Size=1.4’ x 1.1’ |

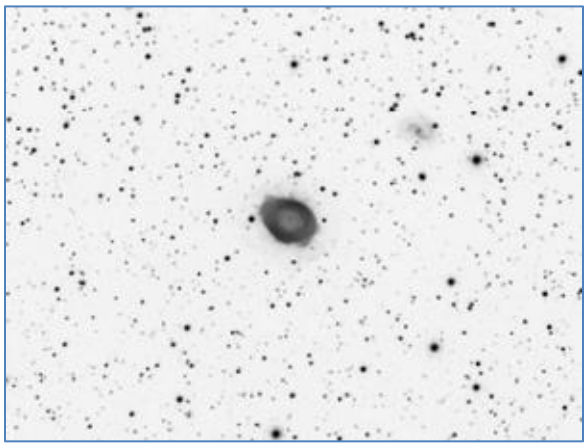
Image Gallery



Epsilon Lyrae, The Double Double



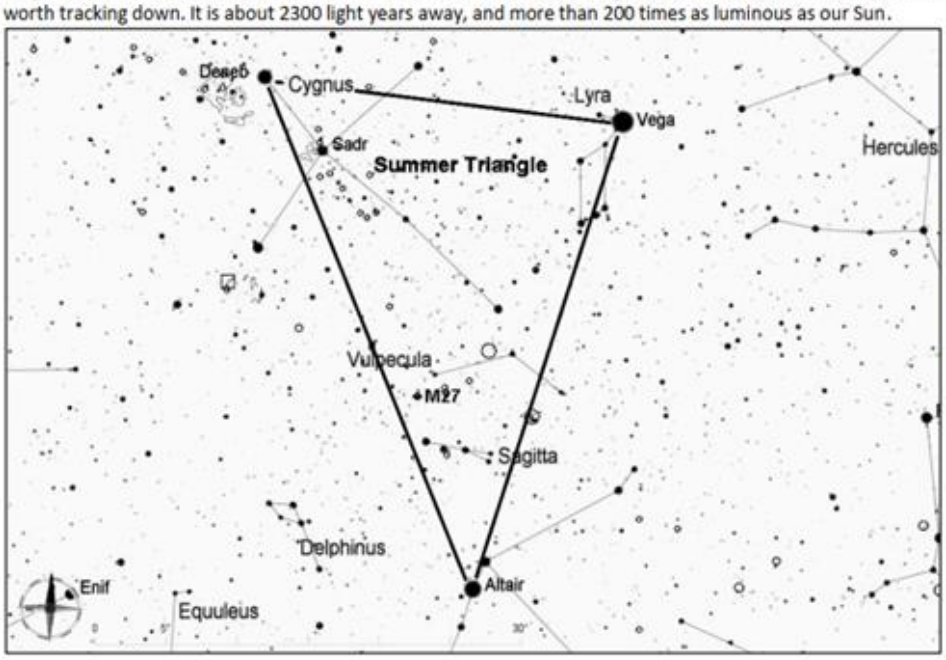
Messier 56



Messier 57, The Ring Nebula

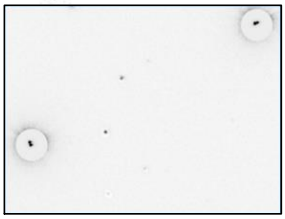
Epsilon Lyrae (Double Double) and T Lyrae (Carbon Star)

Epsilon Lyrae is the famous Double double star, consisting of two close pairs. The separation for each pair is only about 2 arcseconds, so fairly high magnification is needed to resolve them. This star system is about 162 light years from Earth. The carbon star T Lyrae is a very red star that is well worth tracking down. It is about 2300 light years away, and more than 200 times as luminous as our Sun.



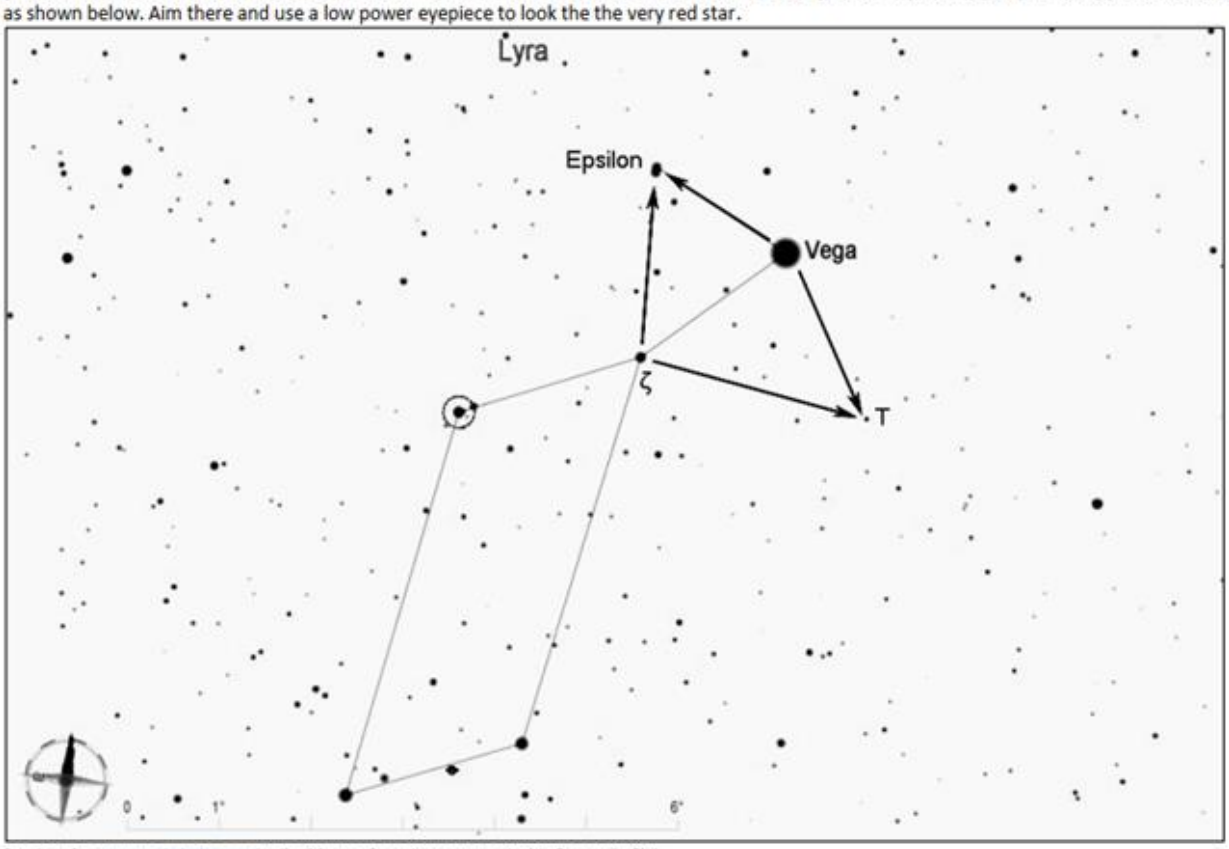
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from brilliant blue-white Vega (magnitude 0), the brightest of the three stars of the Summer Triangle.



Epsilon Lyrae

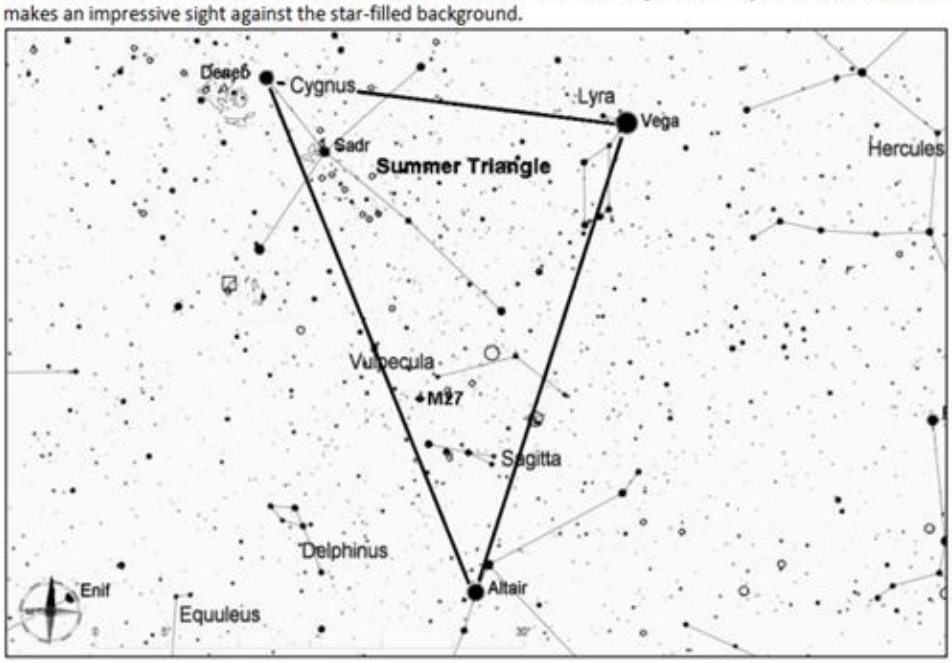
The constellation Lyra has a distinctive shape consisting of a small triangle (including Vega) connected to a parallelogram. Find the small triangle that includes Vega, Zeta (ζ) and Epsilon. Aim at Epsilon, and start with a low power eyepiece to find the two bright pairs. Then switch to high power (at least 100x) to resolve the two close pairs. To find the red star T Lyrae, visualize a similar triange with Vega and ζ going in the opposite direction, as shown below. Aim there and use a low power eyepiece to look the the very red star.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 56, Globular Cluster in Lyra

Messier 56 is a small but attractive globular cluster. It is bright enough to find pretty easily. Through a medium or large scope, its center is bright and its periphery is nicely resolved into individual stars. On summer evenings, M56 is high overhead where there is less haze and humidity, and it makes an impressive sight against the star-filled background.



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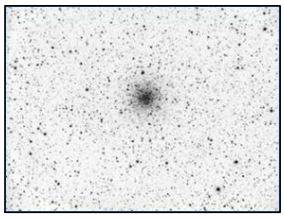
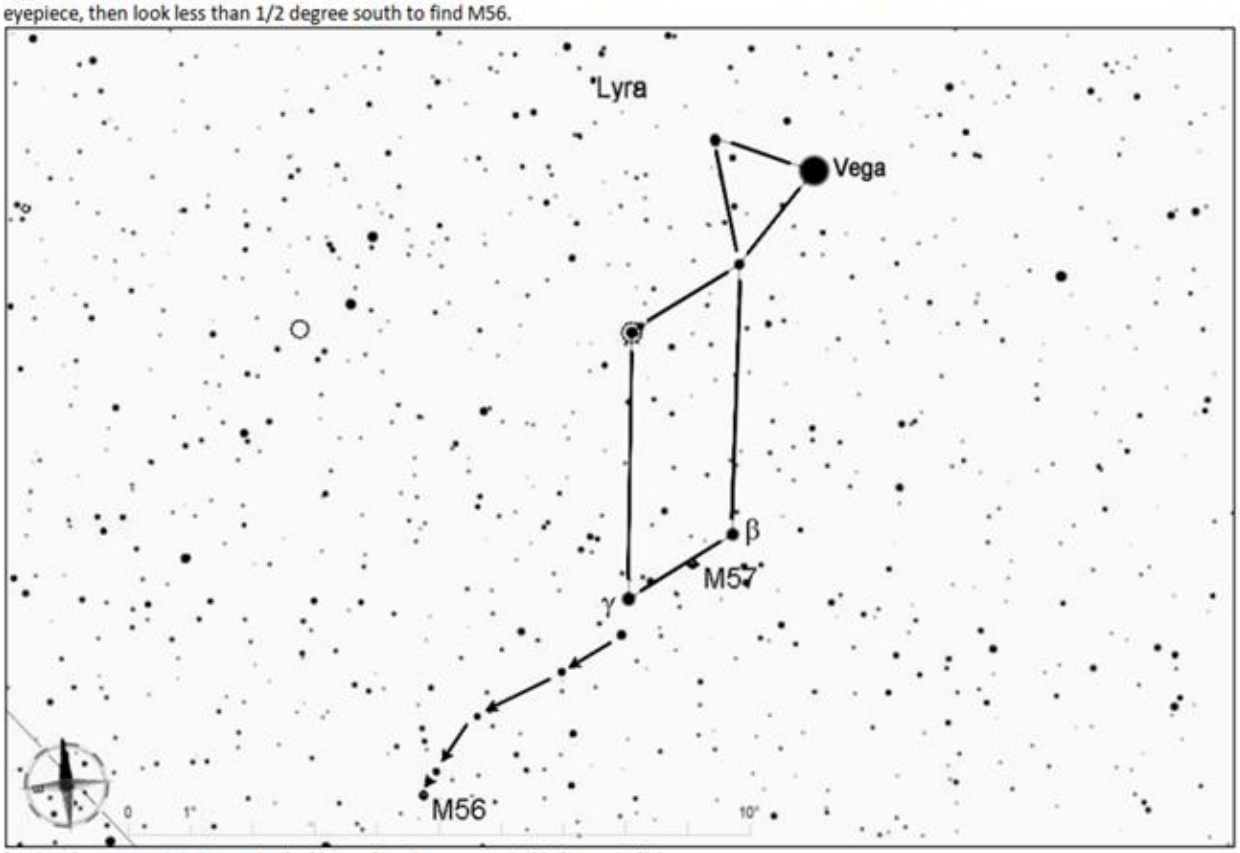


M 56

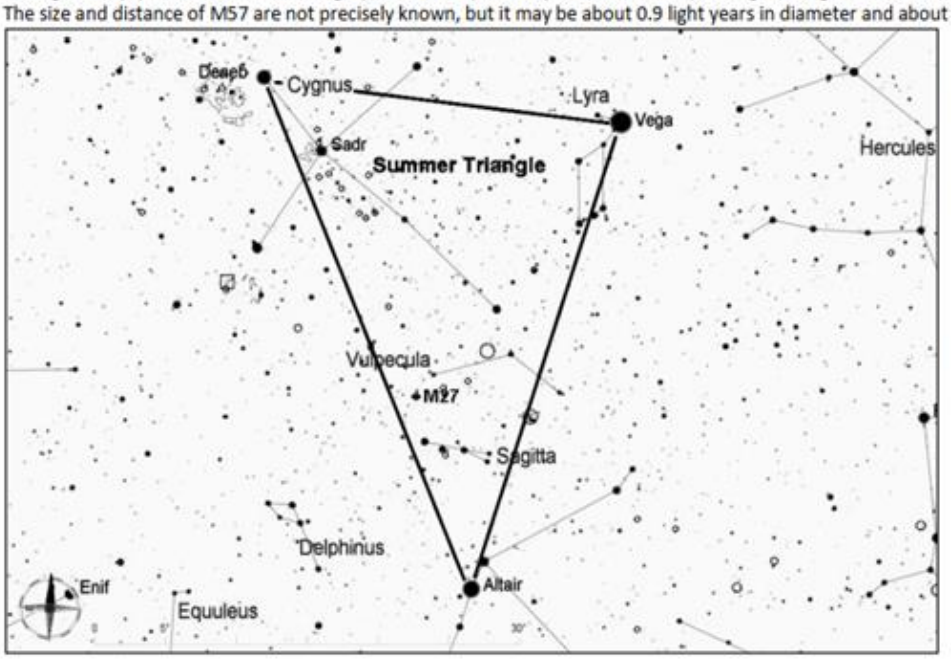
The constellation Lyra has a distinctive shape consisting of a small triangle (including Vega) connected to a parallelogram. Look for the southern-most star of the parallelogram, the one furthest from Vega, which is γ (Gamma) Lyrae. Just south of γ, there is a chain of 4 dim stars that will be visible through a finderscope or binoculars. Follow this chain to the southeast, as shown below. Get the last star in this chain centered in the eyepiece, then look less than 1/2 degree south to find M56.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

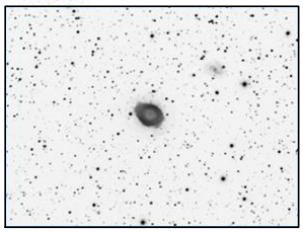
Messier 57, the Ring Nebula

The iconic smoke-ring shape of M57 can be seen with even small telescopes if you use high magnification. Photographs show a range of colors, but through the eyepiece the nebula looks gray. As with all planetary nebulae, this expanding ball of gas has been emitted from the star in its center. The size and distance of M57 are not precisely known, but it may be about 0.9 light years in diameter and about 2300 light years away.



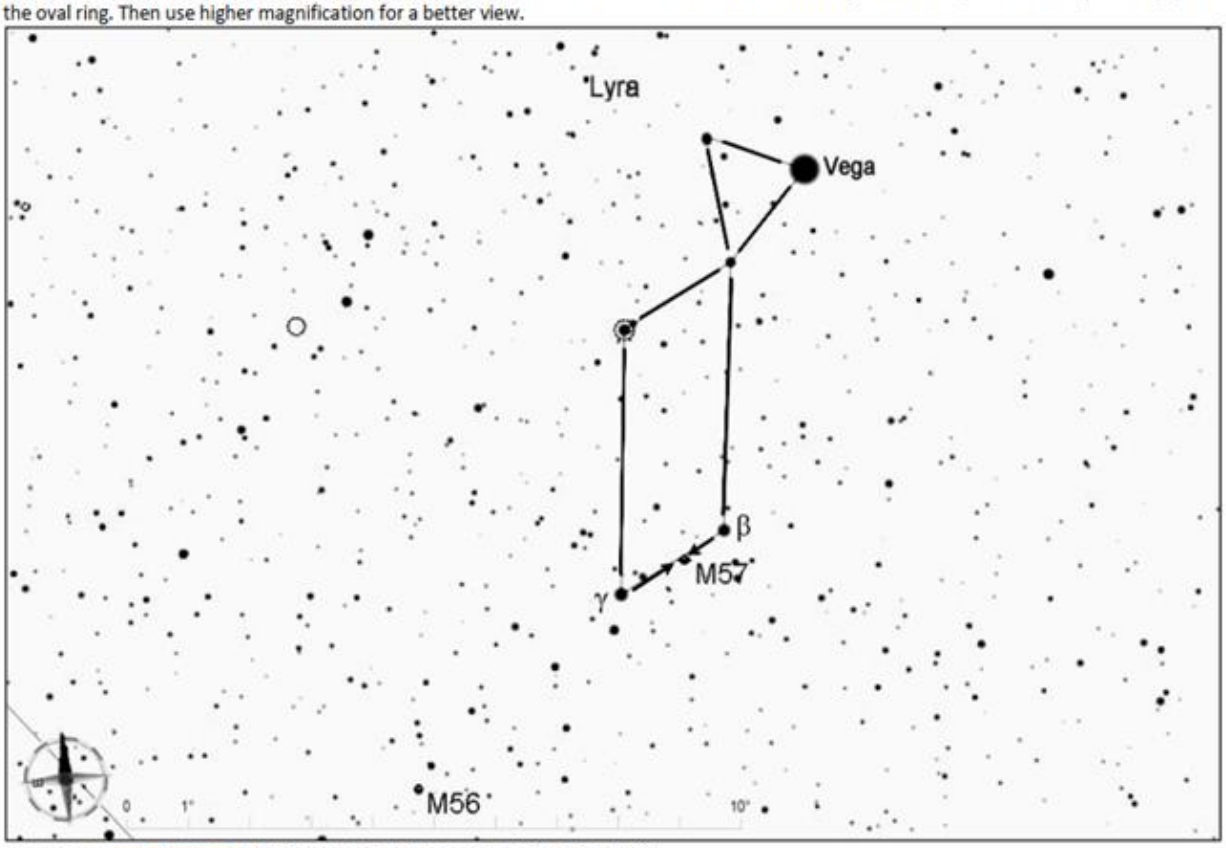
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from brilliant blue-white Vega (magnitude 0), the brightest of the three stars of the Summer Triangle.



M 57

The constellation Lyra has a distinctive shape consisting of a small triangle (including Vega) connected to a parallelogram. Look for the two southern stars of the parallelogram, those furthest from Vega. The Ring Nebula is about 2/3 of the way from γ (Gamma) to β (Beta) Lyrae. It may be too dim to see through a finderscope, but point your scope between those two stars and look through the telescope with a low-power eyepiece for the oval ring. Then use higher magnification for a better view.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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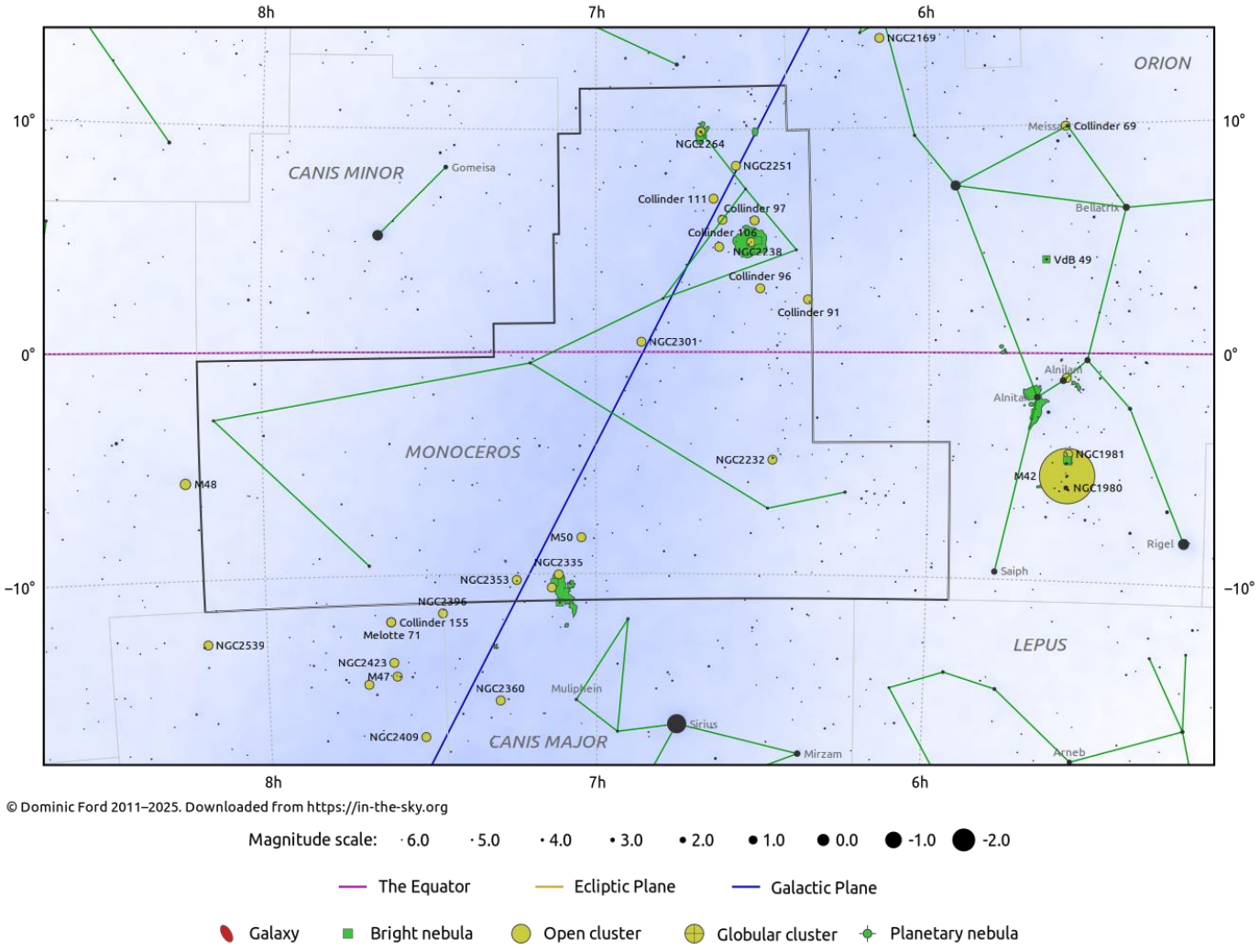
Monoceros (Mon)

Evening Visibility: **January – April**
Online Information: **Monoceros**
Charts: **5** Featured Objects: **10**
More Online Information: Beta Monocerotis, M-050, NGC-2237, NGC-2238, NGC-2239, NGC-2244, NGC-2261, NGC-2264, NGC-2506, NGC-2539

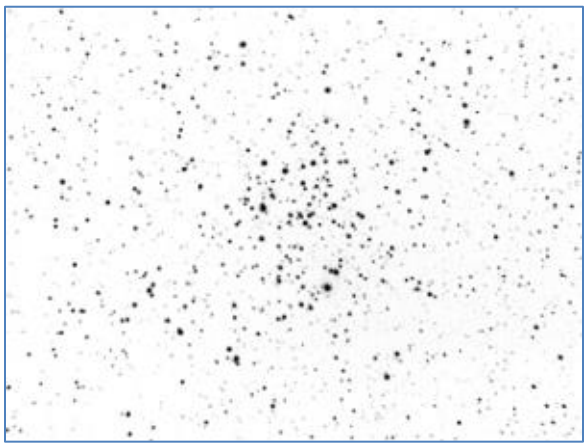
In-The-Sky.org Constellation Map



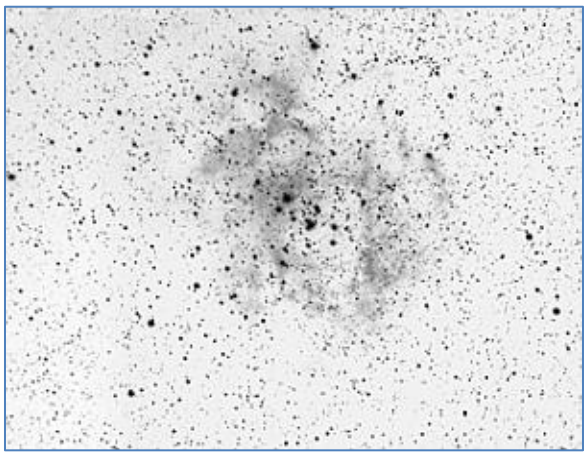
Object (Type)	Chart	Aliases	Stats
Beta Monoceros (MS)	1, W1, SD	SAO-133317, HIP-30867, 11 Mon, STF919 HR 2358, HD 45727	| Mag=4.6, 5.0, 5.3 | Sep=7”, 3” | Triple Star System
M-050 (OC)	2, W2	Heart-shaped Cluster, NGC-2323	| Mag=5.9 | SB=21.6 | Size=16.0’ |

Object (Type)	Chart	Aliases	Stats
NGC-2237 (EN, OC)	3, W3	Rosette Nebula, C-49	| Mag= 9.0 | SB=?? | Size=1.3° |
NGC-2238 (EN, OC)	3, W3	Rosette Nebula, C-49	Mag= 9.0 | SB=?? | Size=1.3° |
NGC-2239 (EN, OC)	3, W3	Rosette Nebula, C-49	Mag= 9.0 | SB=?? | Size=1.3° |
NGC-2244 (OC)	3, W3	Rosette Cluster, C-50	| Mag=4.8 | SB=20.3 | Size=24' |
NGC-2261 (EN, RN)	4, W4	Hubble's Variable Nebula, C-46	| Mag=9.0 | SB=xx | Size=2' |
NGC-2264 (OC, EN)	4, W4	Christmas Tree Cluster, Cone Nebula	| Mag=3.9 | SB=21.4 | Size=20' |
NGC-2506 (OC)	5, W5	C-54	| Mag=7.6 | SB=20.5 | Size=12' |
NGC-2539 (OC)	5, W5		| Mag=6.5 | SB=21.8 | Size=15' | (Located in Puppis)

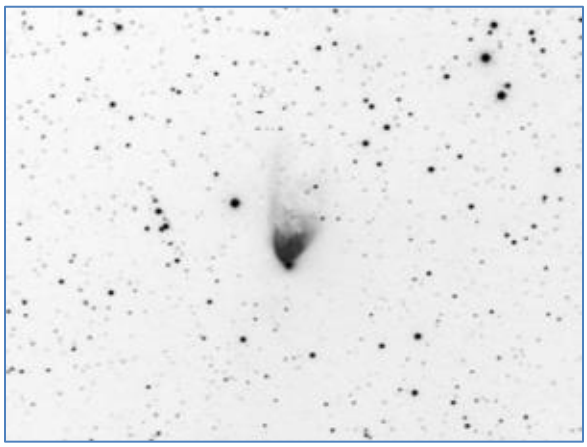
Image Gallery



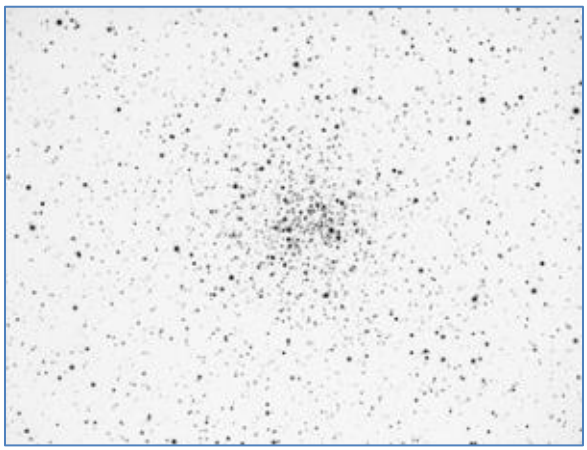
Messier 50



NGC 2237-9 (C 49, 50) Rosette Nebula and Cluster



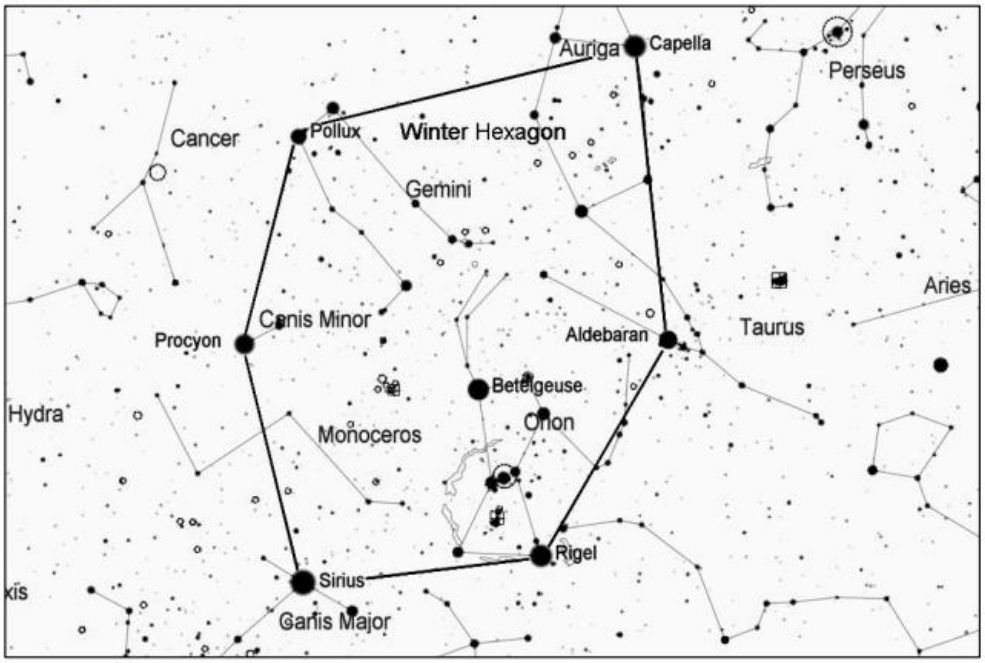
NGC 2261 (C 46) Hubble's Variable Nebula



NGC 2506 (C 54)

Beta (β) Monoceros, Triple Star

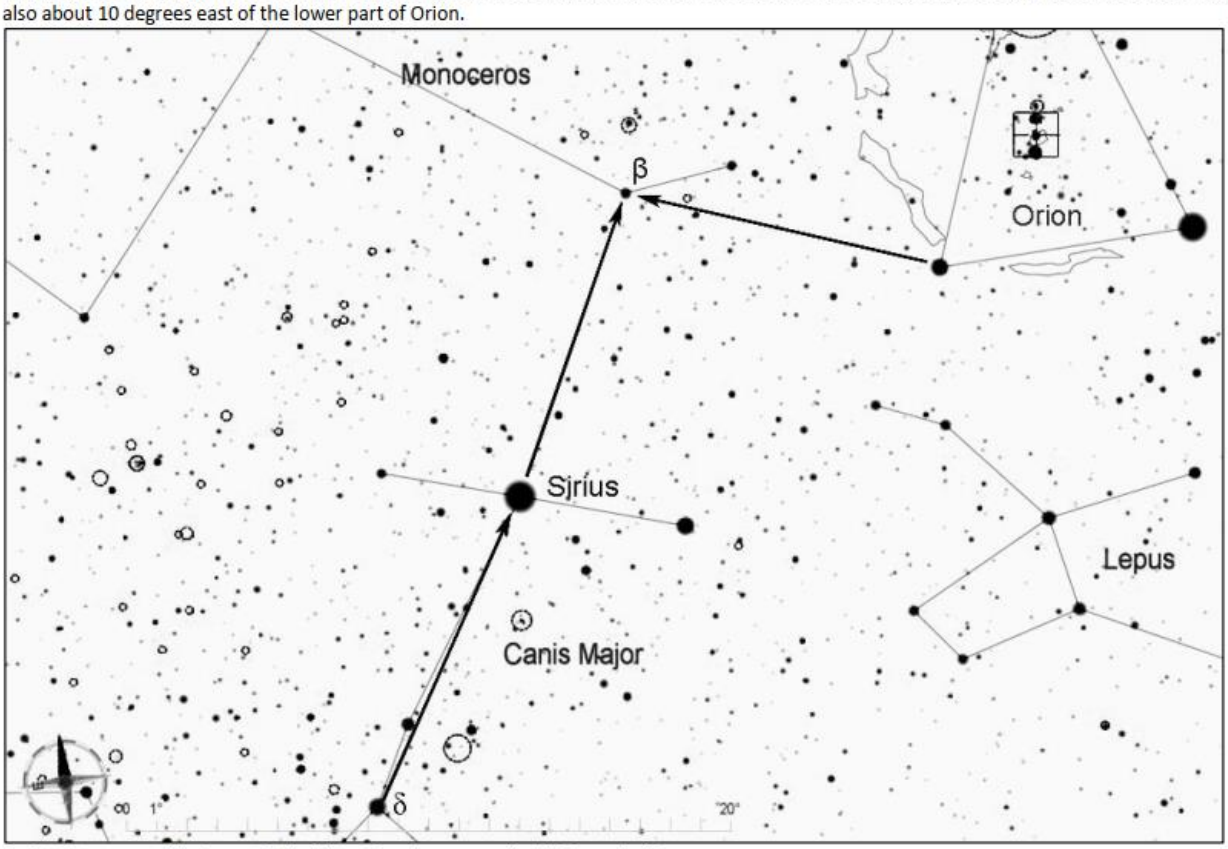
This is a nice trio of stars, approximately equal in brightness. The separation between the A and B components is 7.4 arcseconds, and the separation between the B and C components is only 2.8 arcseconds. This closer pair will require a magnification of at least 100x and possibly more to separate the two. All three are hot blue-white stars that are well over 1000 times more luminous than our Sun. The group is about 680 light years away.



Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.

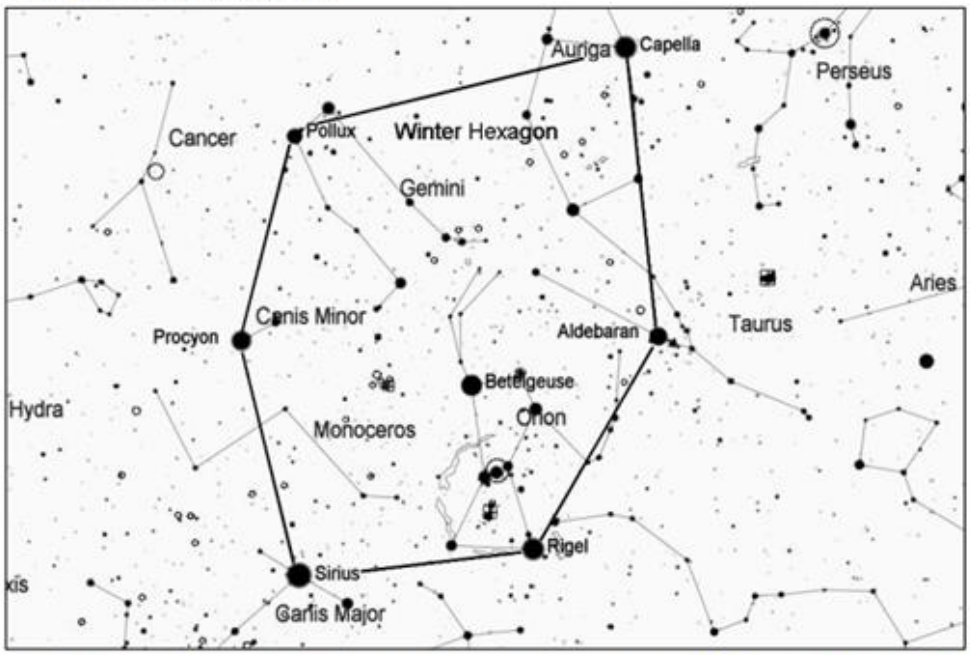
At a combined magnitude of about 3.8, β Monoceros should be easy to see even in a light-polluted sky. To locate it, use the stars that represent the backbone of Canis Major (δ and Sirius) as a pointer, and extend this line the same distance (about 10 degrees) to reach β Monoceros. Note that β is also about 10 degrees east of the lower part of Orion.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

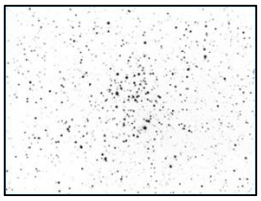
Messier 50, Open Cluster in Monoceros

Messier 50 is a nice open cluster for telescopes of all sizes, filling an area of sky about half the diameter of the Moon. It lies about 3100 light years away, and it is about 13 light years in diameter. Look carefully at the star colors. The cluster contains mainly white and blue-white stars, but a few red and yellow stars are visible as well.



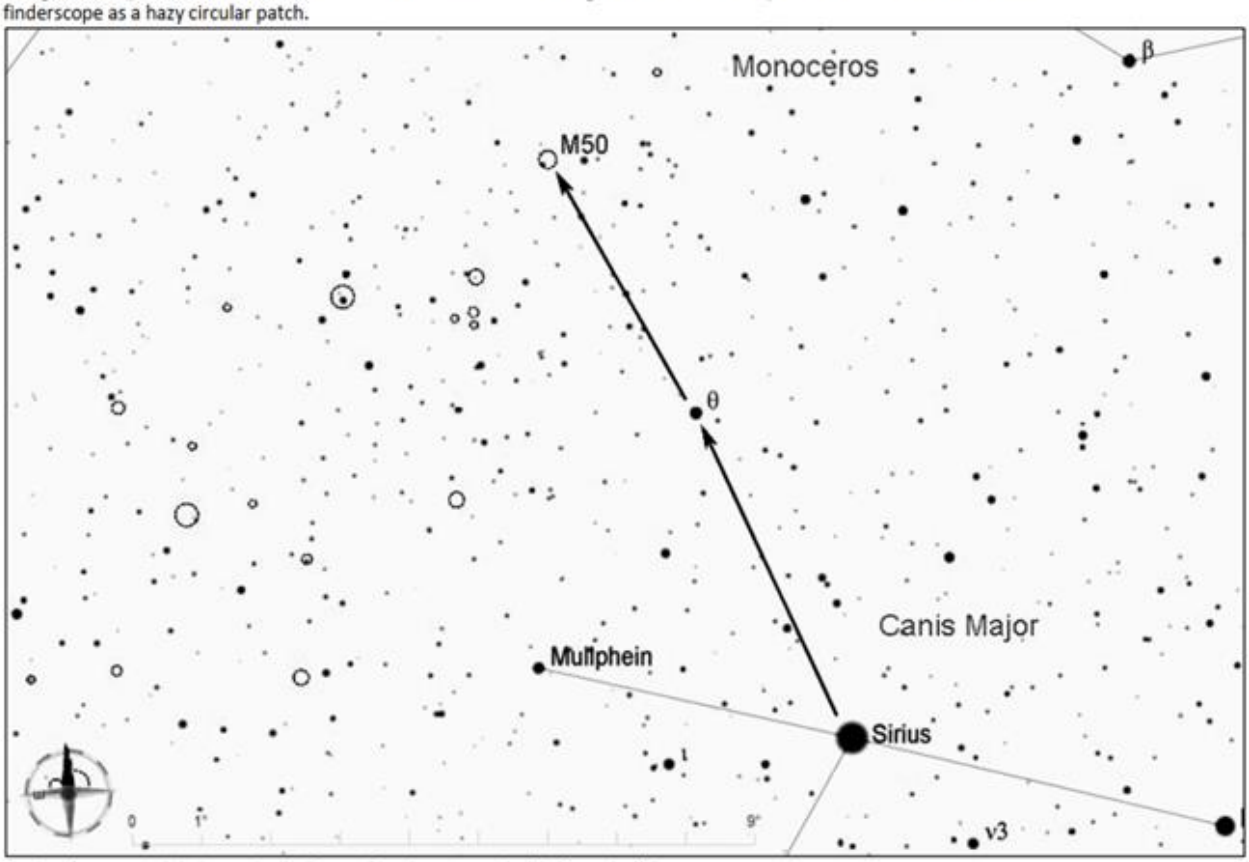
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



M 50

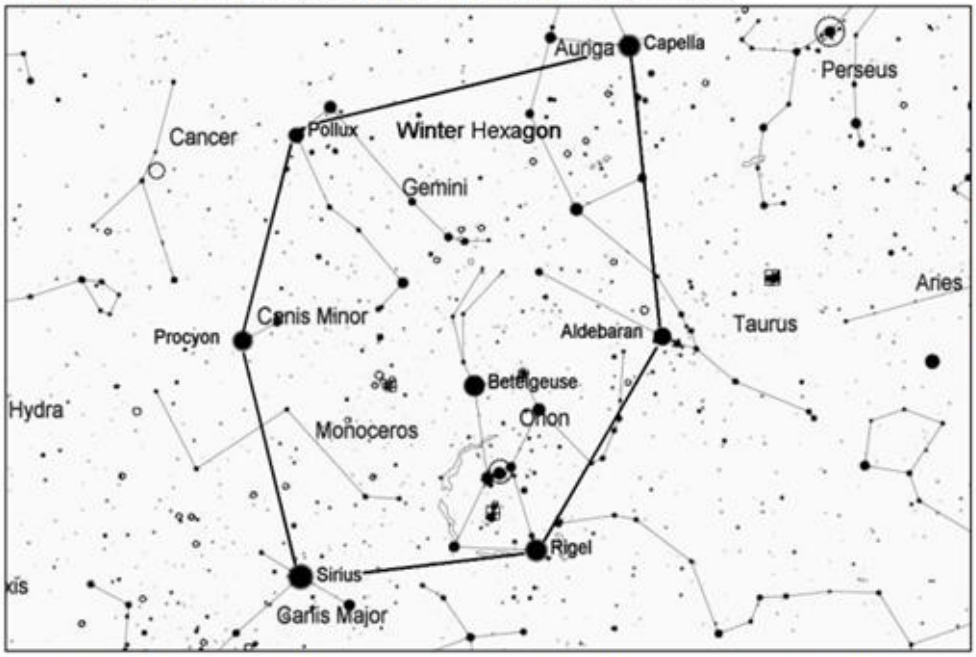
Look 5 degrees to the north of brilliant Sirius to find a much dimmer star, 4th magnitude θ Canis Majoris. From θ, follow this same line another 4 or 5 degrees and you will arrive at the location of M50. There are no bright stars in the vicinity, but M50 should be visible in binoculars or a finderscope as a hazy circular patch.



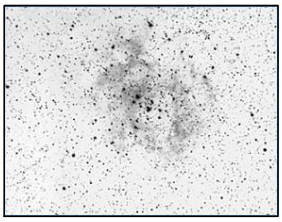
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 2237-9 & 2244 (Caldwell 49 & 50), Rosette Nebula and Cluster

The Rosette Nebula (Caldwell 49) is a very large but dim emission nebula that surrounds an open cluster of young, blue-white stars. The cluster is NGC 2244 (also known as Caldwell 50 or the Rosette Cluster), and at magnitude 4.8 it is bright enough to be seen with binoculars or even the naked eye. The Rosette Nebula, however, has a low surface brightness, and although it is about twice the apparent diameter of the full Moon, it can be difficult to see except from a dark location. The nebula is about 5500 light years away.

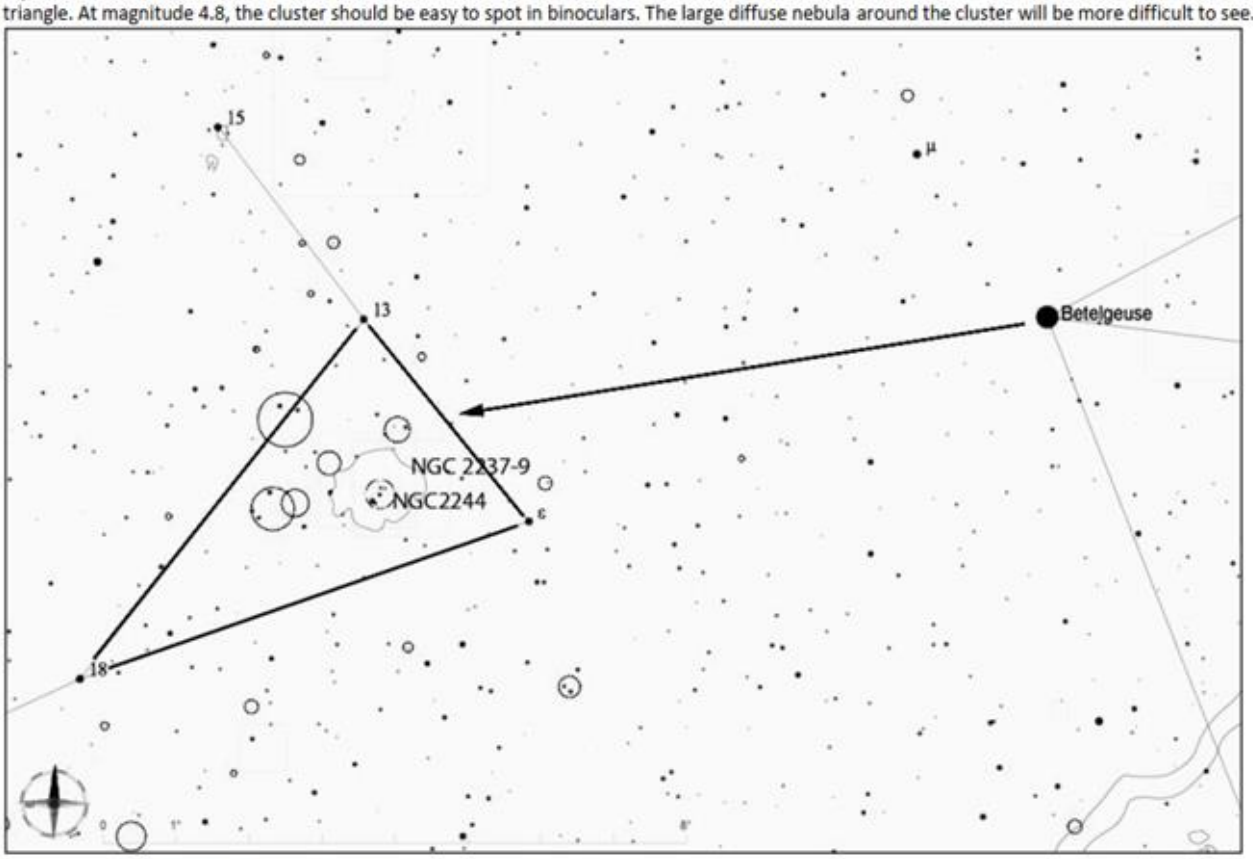


Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.



NGC 2237-9 & 2244

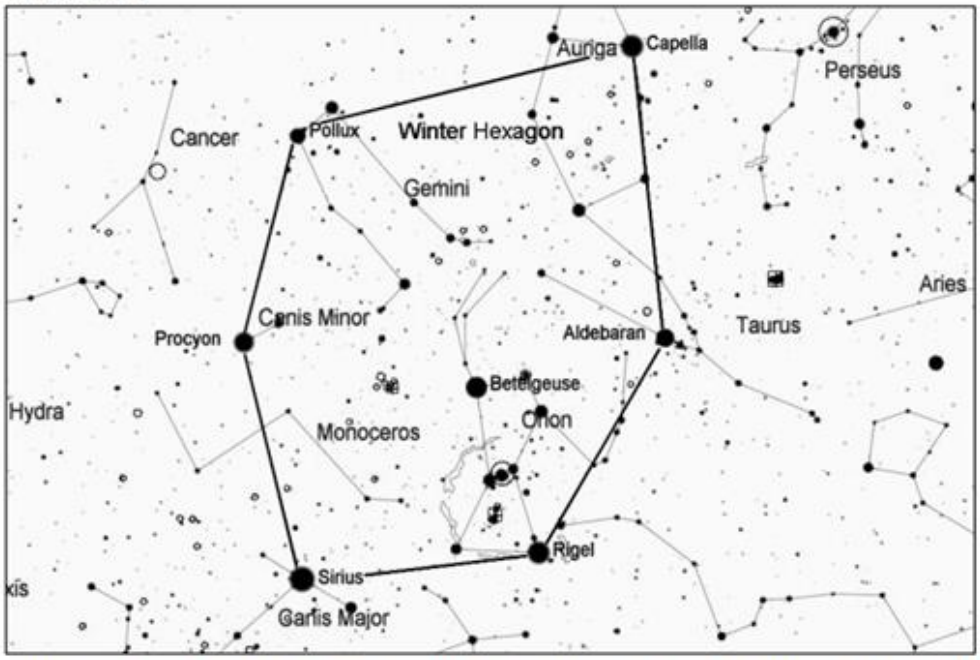
Start from bright red Betelgeuse, and look about 10 degrees to the east for a triangle of three dim (4th magnitude) stars, which are supposed to represent the head and neck area of Monoceros, the unicorn. As shown in the chart below, the Rosette Nebula and cluster are located within this triangle. At magnitude 4.8, the cluster should be easy to spot in binoculars. The large diffuse nebula around the cluster will be more difficult to see.



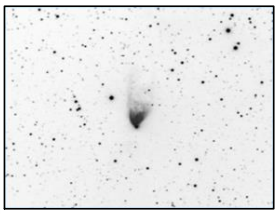
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 2261 (Caldwell 46, Hubble's Variable Nebula) and NGC 2264 (Christmas Tree Cluster)

These two targets are in a rich section of the Milky Way passing through Monoceros. NGC 2264 is a large open cluster that roughly takes the shape of a Christmas tree. The cluster is surrounded by faint nebulosity, including a section called the Cone Nebula. About a degree away is a comet-shaped nebula, Hubble's Variable Nebula. The nebula is illuminated by the variable star R Monocerotis, and its brightness and appearance change slowly over time.

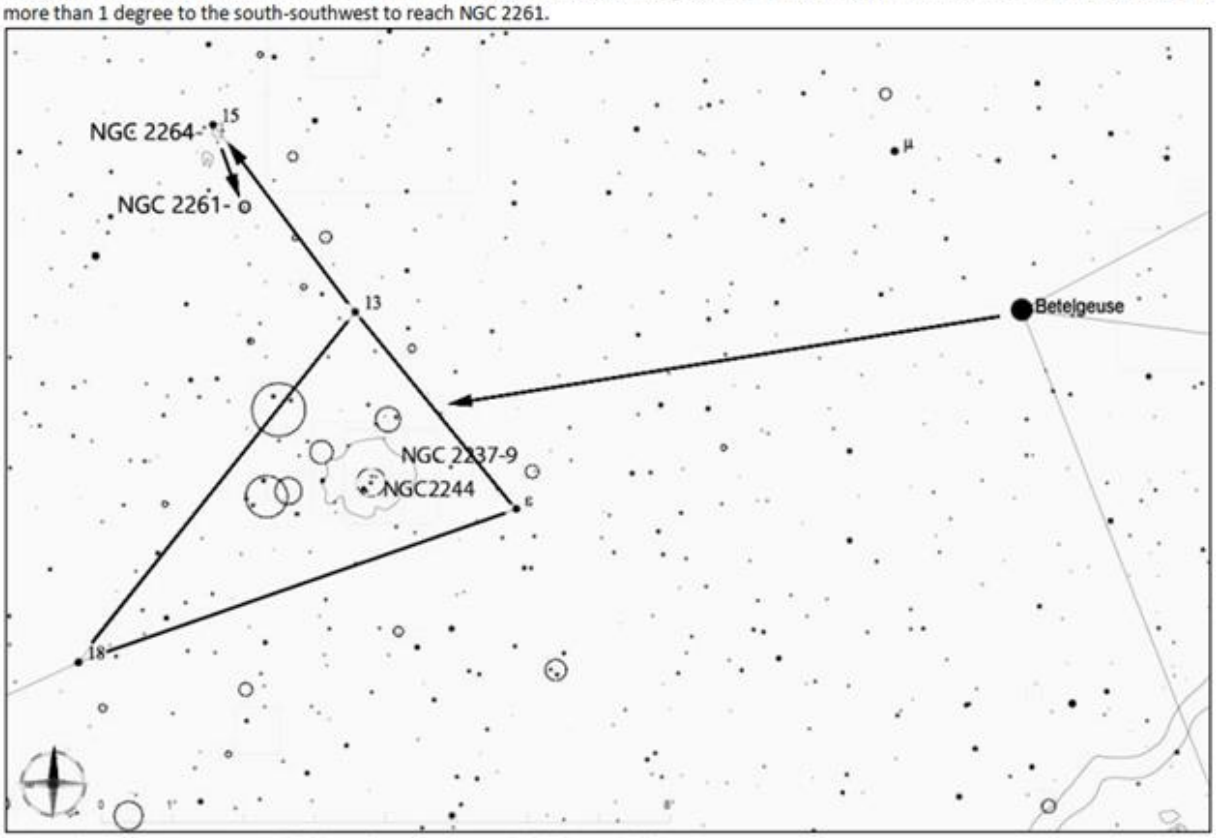


Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.



NGC 2261

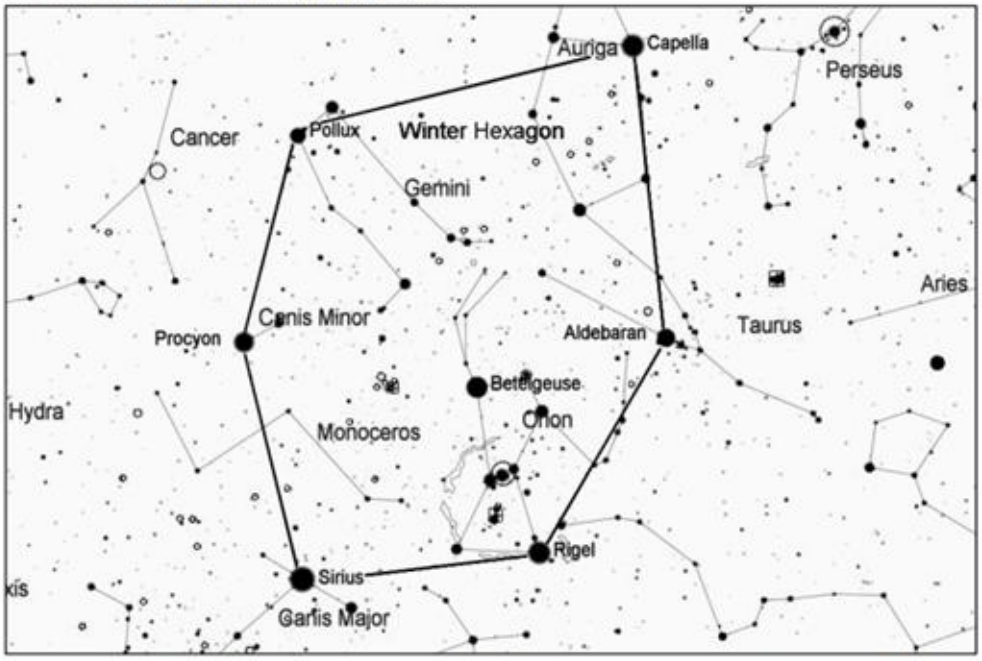
Start from bright red Betelgeuse, and look about 10 degrees to the east for a triangle of three dim (4th magnitude) stars, which are supposed to represent the head and neck area of Monoceros, the unicorn. As shown in the chart below, extend a line from the short edge of this triangle about an equal distance to the northeast, and you will reach 15 Monocerotis, the brightest star in the Christmas Tree Cluster. From there, move a little more than 1 degree to the south-southwest to reach NGC 2261.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

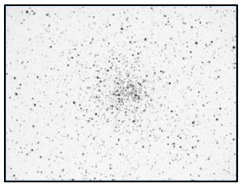
NGC 2506 (Caldwell 54) and NGC 2539, Open Clusters

NGC 2506 (Caldwell 54) is a nice dense open cluster of about 150 stars in the constellation Monoceros. It is a fairly distant group, about 12,000 light years away. Just about 3 degrees to the southeast, across the constellation border in Puppis is another open cluster, NGC 2539. This group contains about 100 stars and is about 4,400 light years away.



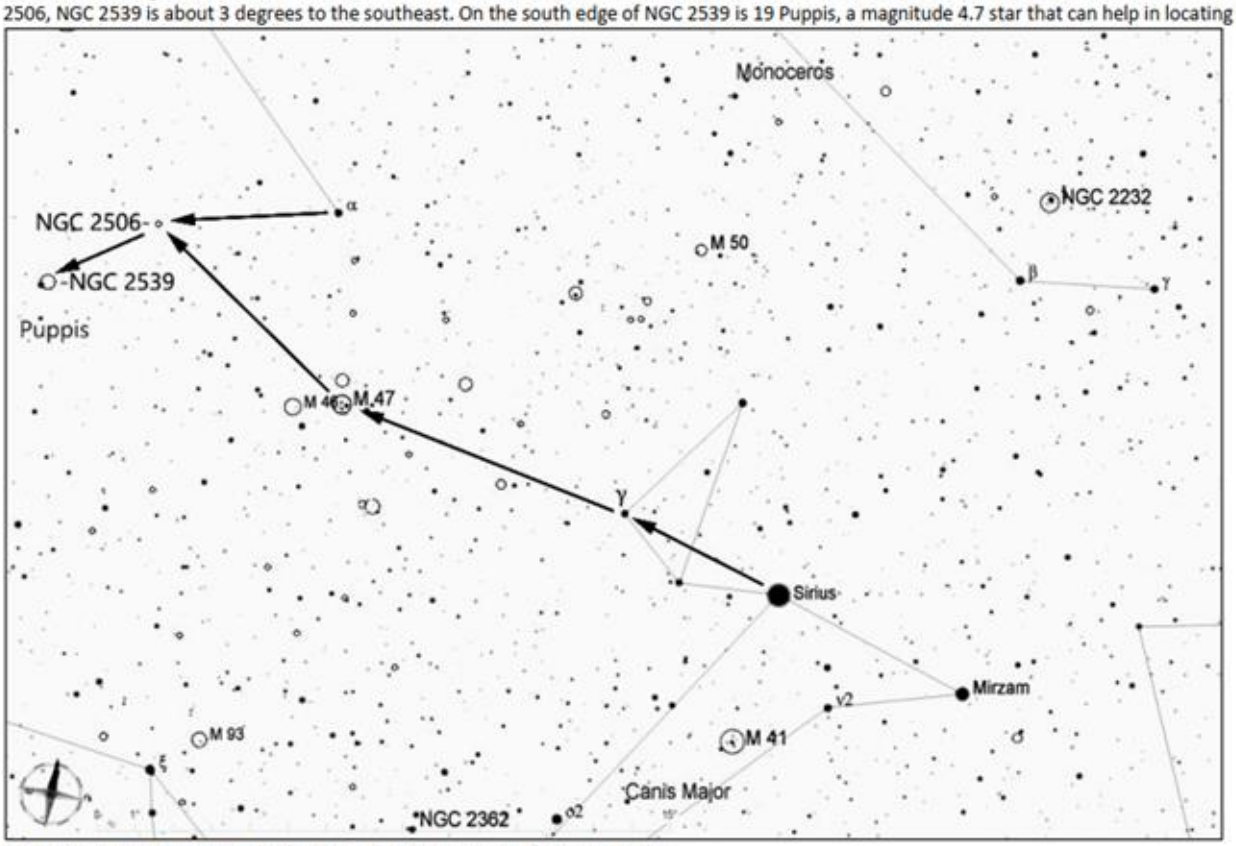
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



NGC 2506

Look 5 degrees to the northeast of brilliant Sirius to find a much dimmer star, 4th magnitude γ Canis Majoris, which represents the eye or head of the big dog. From γ, follow roughly this same line twice as far to the northeast and you will arrive at the bright cluster M47. After viewing M47, move about 7 degrees in the same direction to reach NGC 2506. (As shown below, NGC 2506 is also 4 degrees east of α Monocerotis.) From NGC 2506, NGC 2539 is about 3 degrees to the southeast. On the south edge of NGC 2539 is 19 Puppis, a magnitude 4.7 star that can help in locating it.



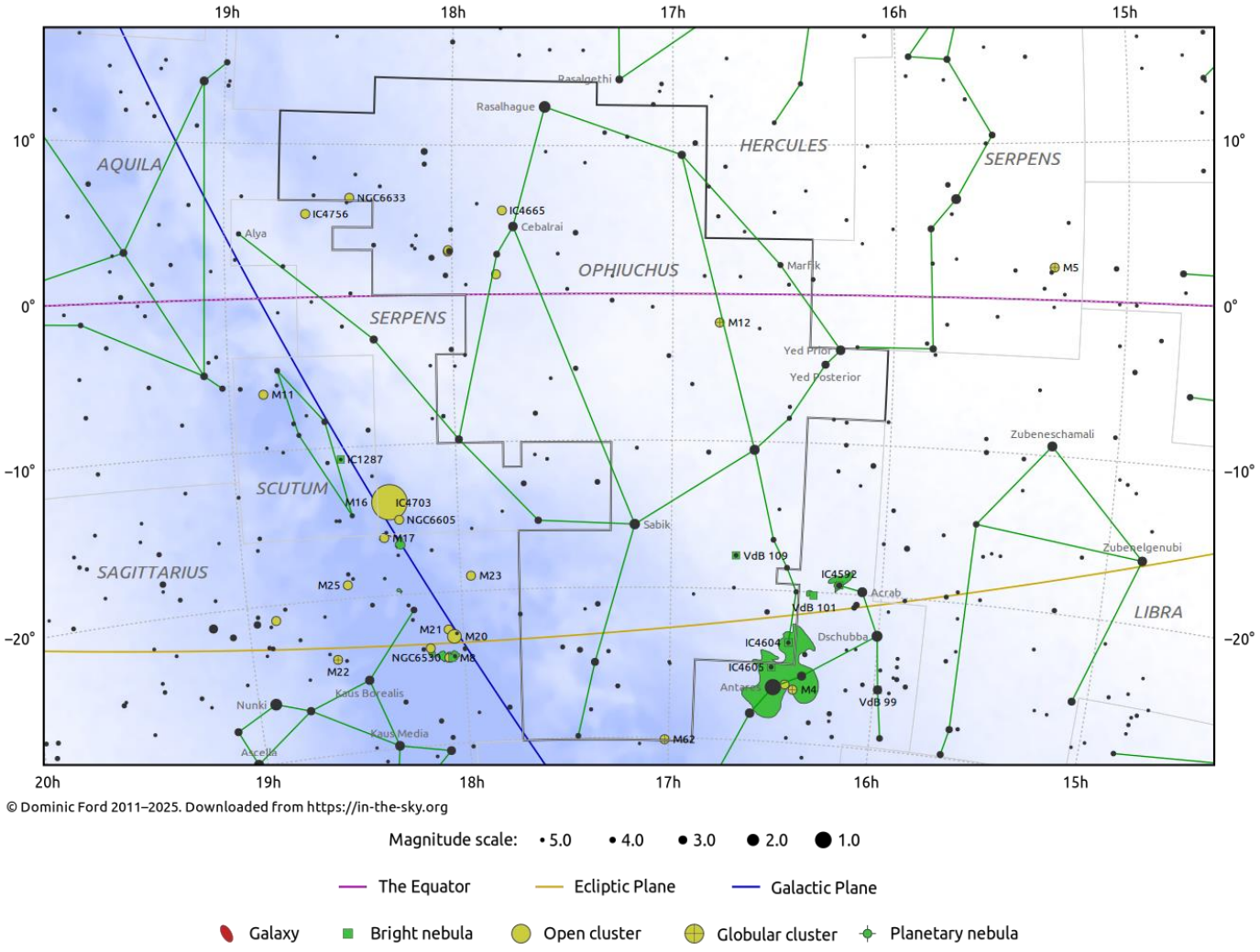
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Blank

Ophiuchus (Oph)

Evening Visibility: **June – September**
Online Information: **Ophiuchus**
Charts: **6** Featured Objects: **11**
More Online Information: IC-4665, M-009, M-107, M-010, M-012, M-014, M-019, M-062, NGC-6572, NGC-6633, IC-4756

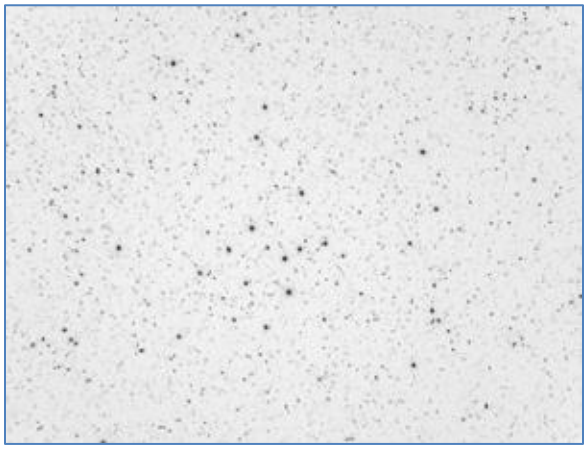
In-The-Sky.org Constellation Map



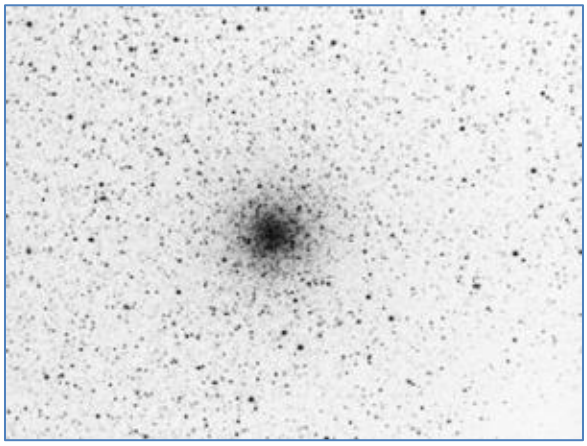
Object (Type)	Chart	Aliases	Stats
IC-4665 (OC)	1, W1	Collinder 349, Melotte 179	| Mag=4.2 | SB=20.9 | Size=40’ x 40’ |
M-009 (GC)	2, W2	NGC-6333	| Mag=7.7 | SB=22.5 | Size=9.3’ |
M-107 (GC)	2, W2	Crucifix Cluster, NGC-6171	| Mag=7.9 | SB=23.6 | Size=10’ |

Object (Type)	Chart	Aliases	Stats
M-010 (GC)	3, W3	NGC-6254	| Mag=6.6 | SB=22.0 | Size=20’ |
M-012 (GC)	3, W3	Gumball Globular, NGC-6218	| Mag=6.7 | SB=22.4 | Size=16’ |
M-014 (GC)	4, W4	NGC-6402	| Mag=7.6 | SB=23.5 | Size=11.0’ |
M-019 (GC)	5, W5	NGC-6273	| Mag=6.8 | SB=22.8 | Size=17.0’ |
M-062 (GC)	5, W5	Flickering Globular Cluster, NGC-6266	| Mag=6.5 | SB=22.4 | Size=15’ |
NGC-6572 (PN)	6, W6	Blue Racquetball, Emerald Nebula, Green Nebula, Turquoise Orb	| Mag=9.0 | SB=12.6 | Size=6” |
NGC-6633 (OC)	6, W6		| Mag=4.6 | SB=20.4 | Size=27’ |
IC-4756 (OC)	6, W6	Graff’s Cluster, Cr 386, Mel 210	| Mag=4.6 | SB=22.2 | Size=52’ | (In Serpens Constellation)

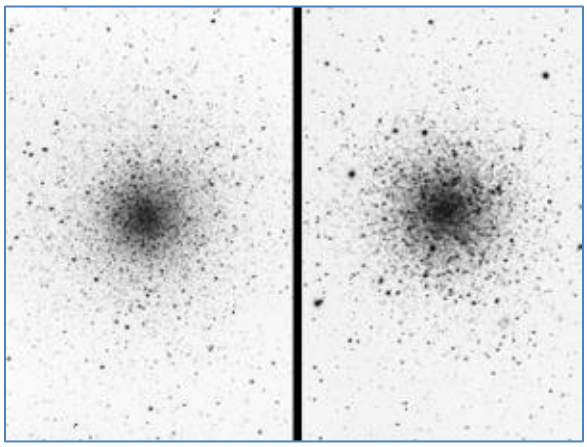
Image Gallery



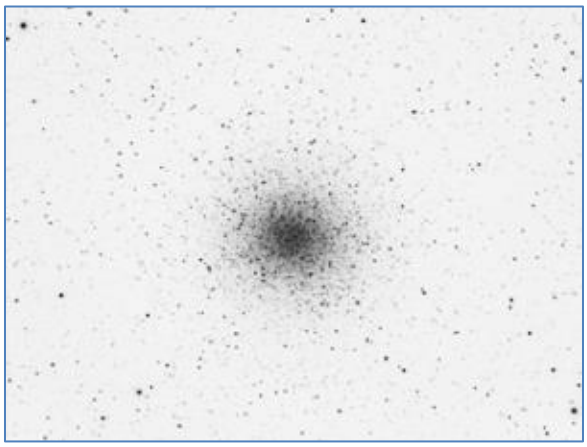
IC 4665



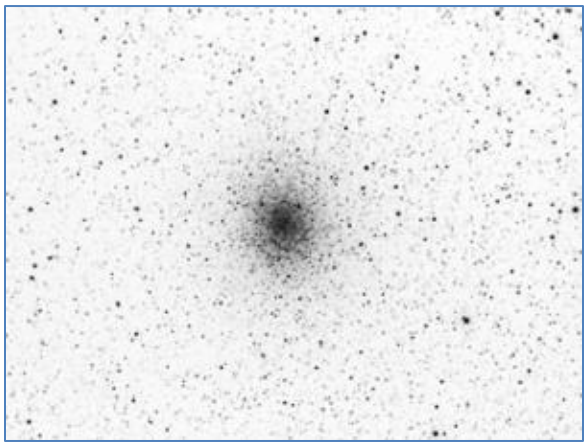
Messier 9



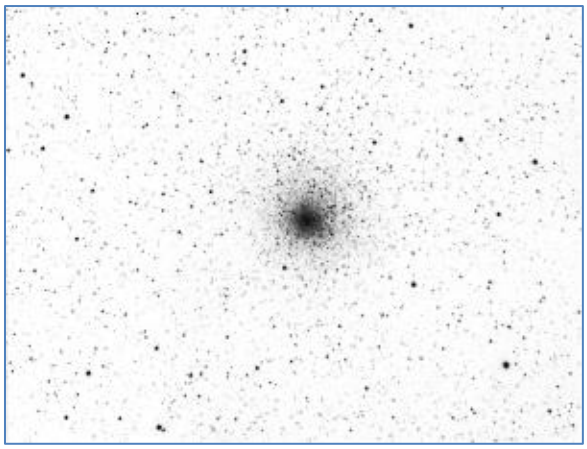
Messier 10 and 12



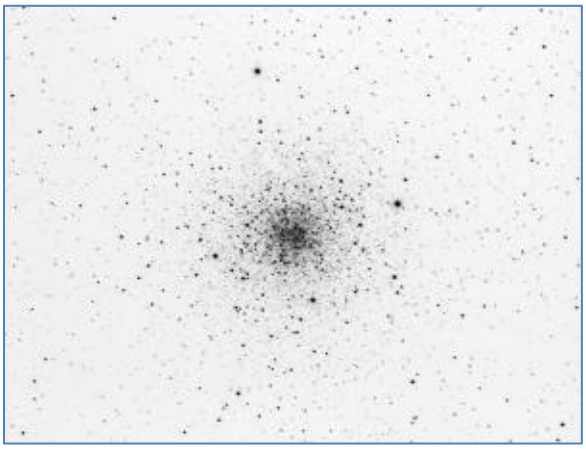
Messier 14



Messier 19



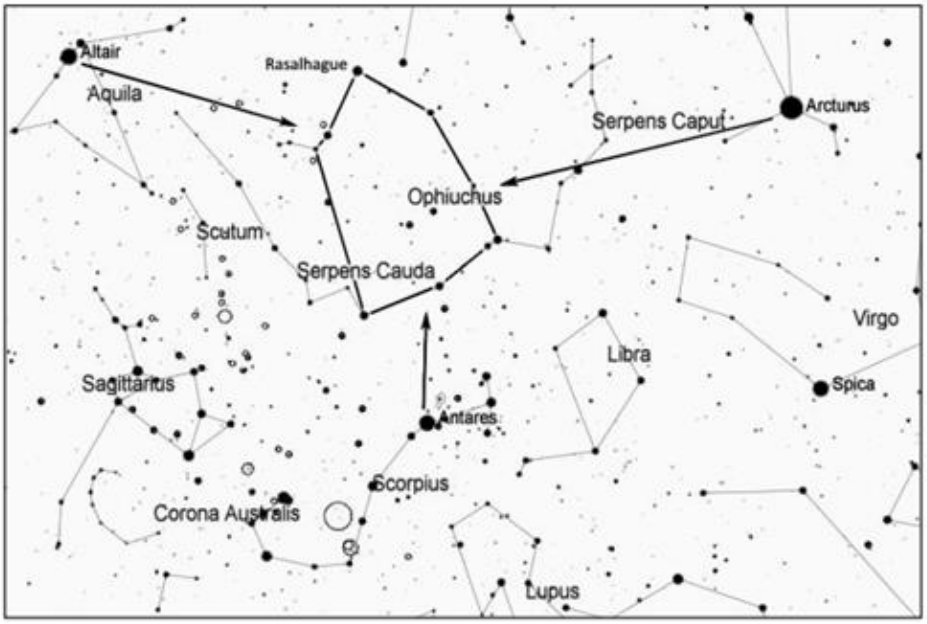
Messier 62



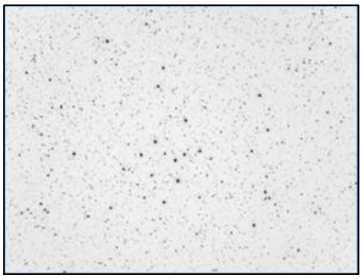
Messier 107

IC 4665, Open Cluster in Ophiuchus

IC 4665 is a large, coarse group of a few dozen stars covering more than 1 degree of sky. It is best viewed with binoculars or a rich field telescope with a large enough field of view to hold the whole cluster. The cluster is about 1100 light years away.

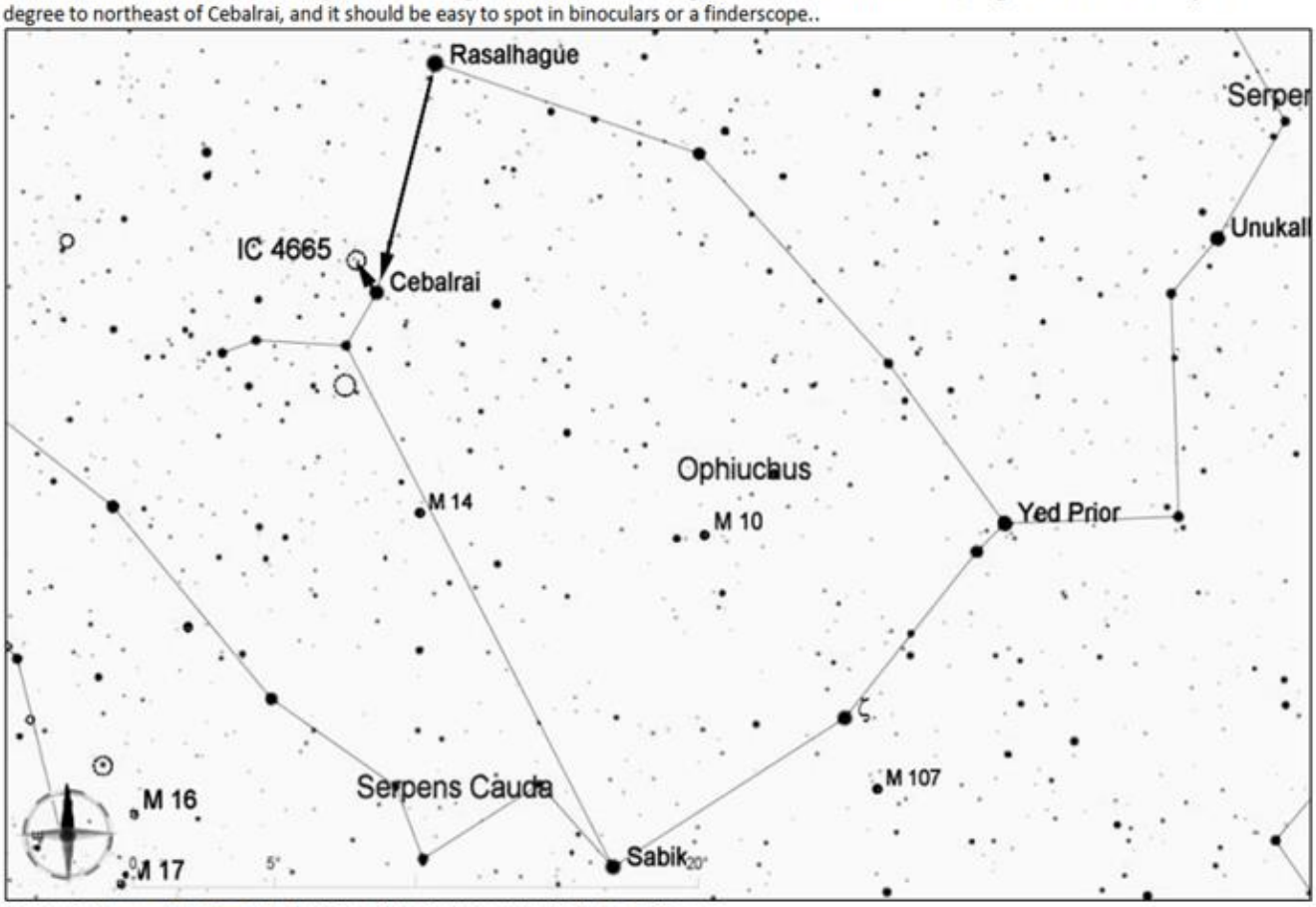


Start by finding the constellation Ophiuchus, the serpent bearer, a large oval shape that is west of Arcturus (part of the Spring Triangle), east of Altair (part of the Summer Triangle), and north of Antares. The oval is about 25 degrees from top to bottom, and its main stars are second and third magnitude, so they should be easy to see with the naked eye even with moderate light pollution.



IC 4665

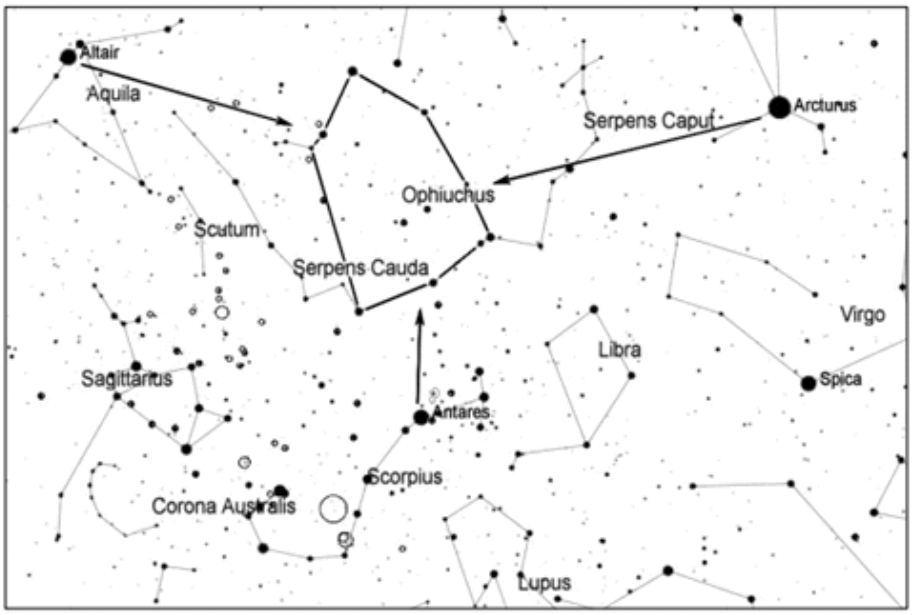
At the top of Ophiuchus, find the bright star Rasalhague, then look about 8 degrees to the south for Cebalrai, magnitude 2.8. IC 4665 is just 1 degree to northeast of Cebalrai, and it should be easy to spot in binoculars or a finderscope..



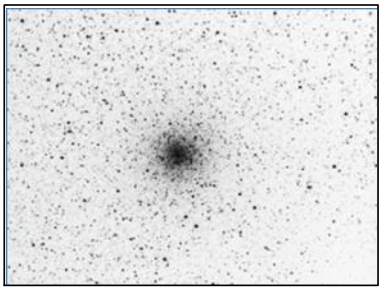
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 9 and 107, Globular Clusters in Ophiuchus

M9 and M107 are two globular clusters in the southern part of Ophiuchus. They are not as large or as bright as some other globular clusters in the summer sky, glowing at magnitudes 7.7 and 8.0, respectively. M9 is about 26,000 light years away, and M107 is about 21,000 light years away. Each cluster is within about 3 degrees of a second-magnitude star, which makes it easier to locate them.

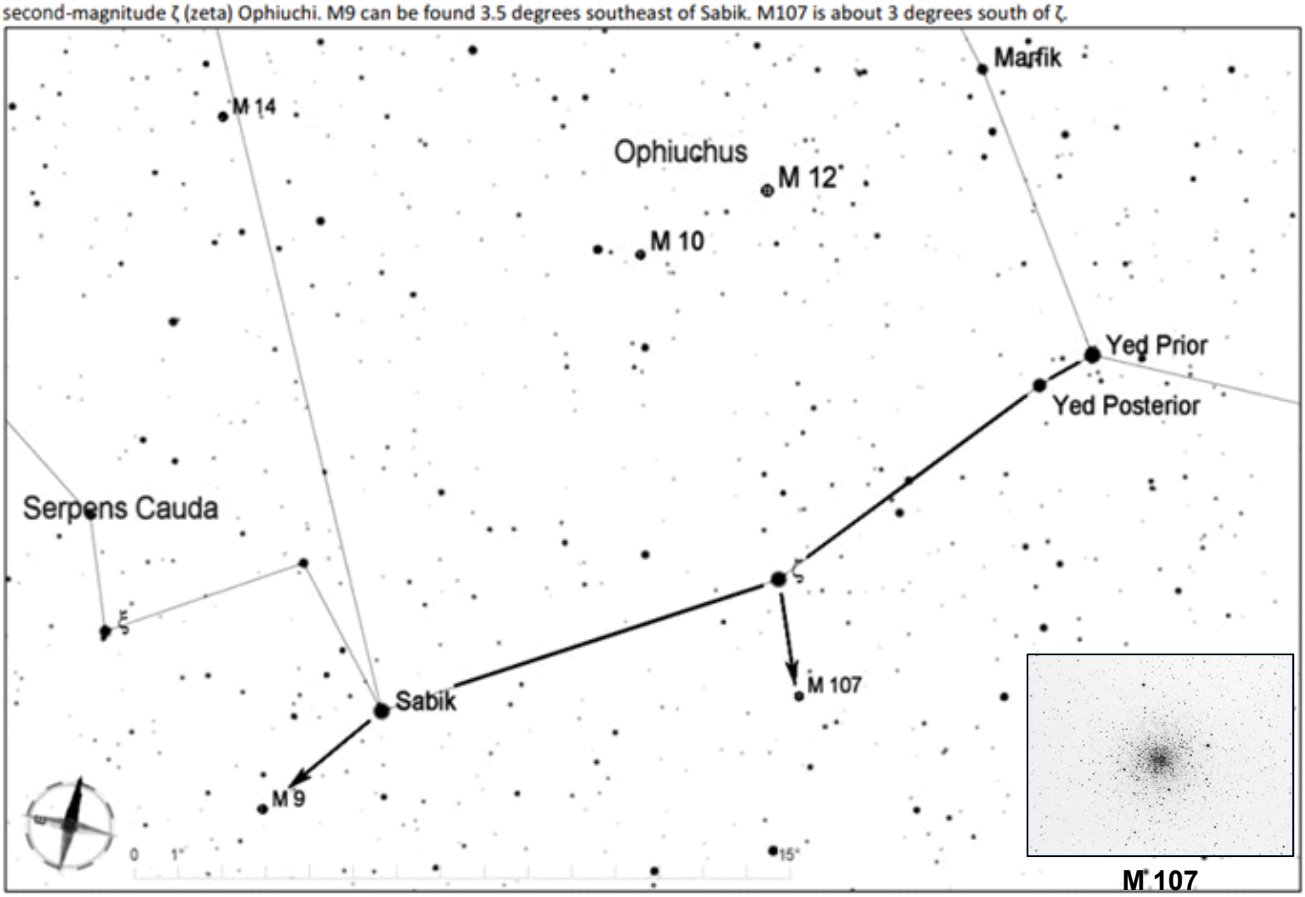


Start by finding the constellation Ophiuchus, the serpent bearer, a large oval shape that is west of Arcturus (part of the Spring Triangle), east of Altair (part of the Summer Triangle), and north of Antares. The oval is about 25 degrees from top to bottom, and its main stars are second and third magnitude, so they should be easy to see with the naked eye even with moderate light pollution.



M 9

Look for the line of four stars that form the south end of Ophiuchus, stretching from Sabik in the east to Yed Prior in the west. In between is second-magnitude ζ (zeta) Ophiuchi. M9 can be found 3.5 degrees southeast of Sabik. M107 is about 3 degrees south of ζ.

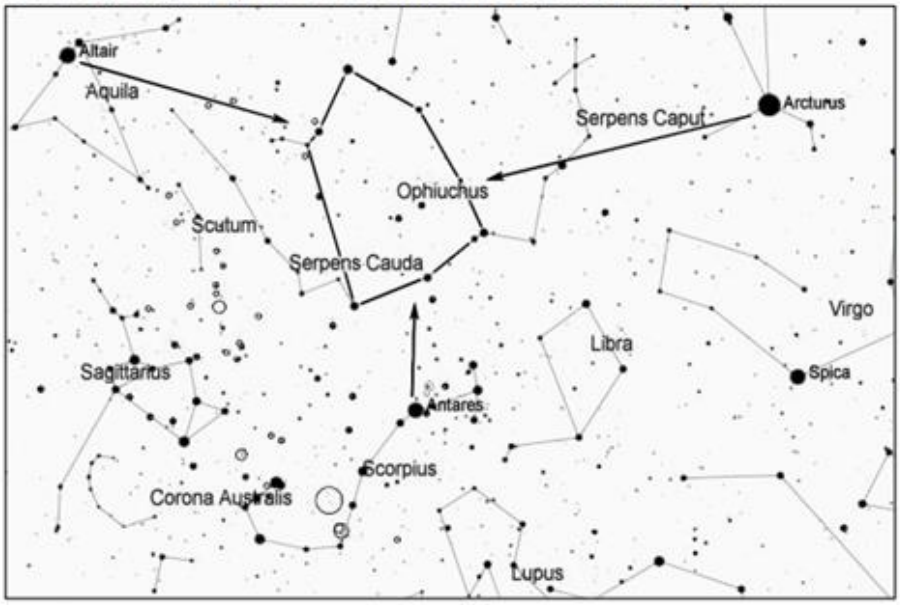


M 107

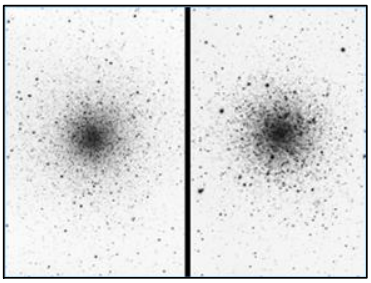
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 10 and 12, Globular Clusters in Ophiuchus

M10 and M12 are a pair of globular clusters about 3 degrees apart and similar in size and brightness. They are both about magnitude 6.6, making them good targets for telescopes of all sizes. Medium to large scopes will show hundreds of individual stars in both clusters. The stars of M12 are less densely packed, making them easier to resolve all the way to the center of the cluster.

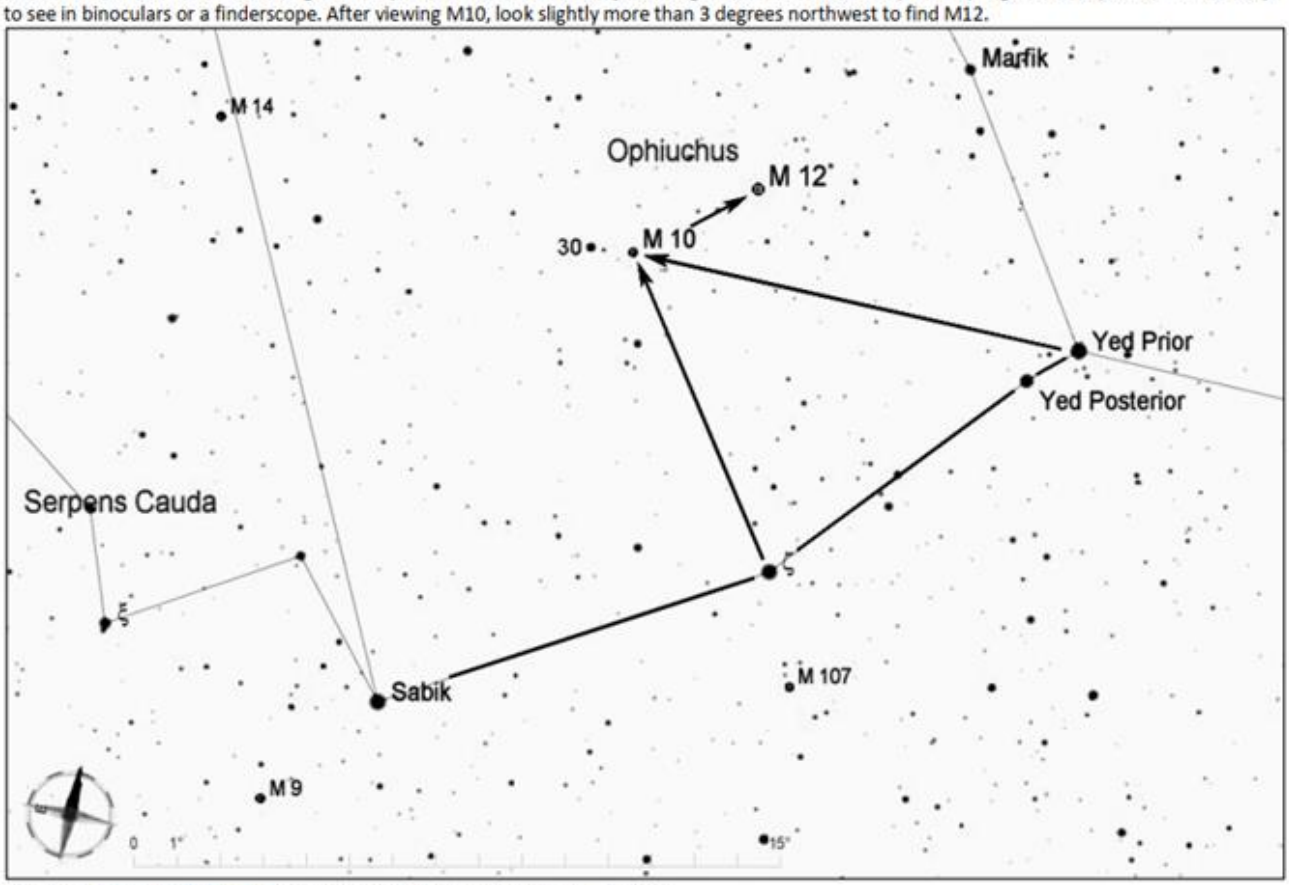


Start by finding the constellation Ophiuchus, the serpent bearer, a large oval shape that is west of Arcturus (part of the Spring Triangle), east of Altair (part of the Summer Triangle), and north of Antares. The oval is about 25 degrees from top to bottom, and its main stars are second and third magnitude, so they should be easy to see with the naked eye even with moderate light pollution.



M 10 & M 12

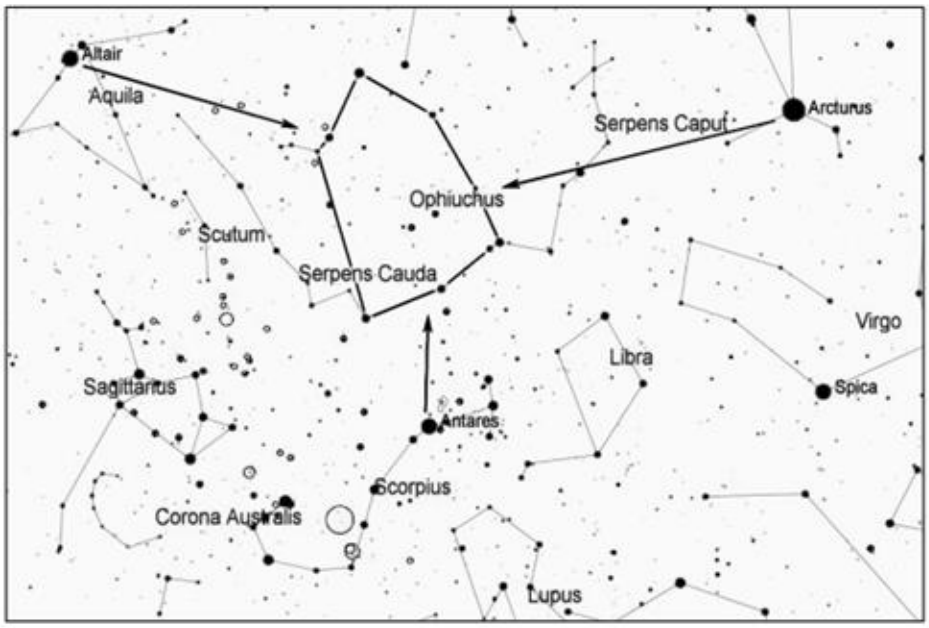
Look for the line of four stars that form the south end of Ophiuchus, stretching from Sabik in the east to Yed Prior in the west. In between is second-magnitude ζ (zeta) Ophiuchi. Use ζ and Yed Prior to form a triangle extending toward the center of Ophiuchus, as shown below, and M10 is at the northern corner of this triangle. To help find it, note that M10 is just 1 degree to the west of 30 Ophiuchi (magnitude 4.8), which will be easy to see in binoculars or a finderscope. After viewing M10, look slightly more than 3 degrees northwest to find M12.



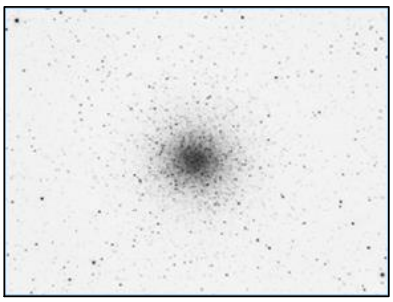
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 14, Globular Cluster in Ophiuchus

Messier 14 is one of several prominent globular clusters in the constellation Ophiuchus. It is about one magnitude dimmer and slightly smaller than both M10 and M12, two other globulars that can be found a few degrees to its west. It is also farther away than these two, and its stars are dimmer and a bit harder to resolve in a medium-sized telescope. High magnification helps to see the individual stars in its core.

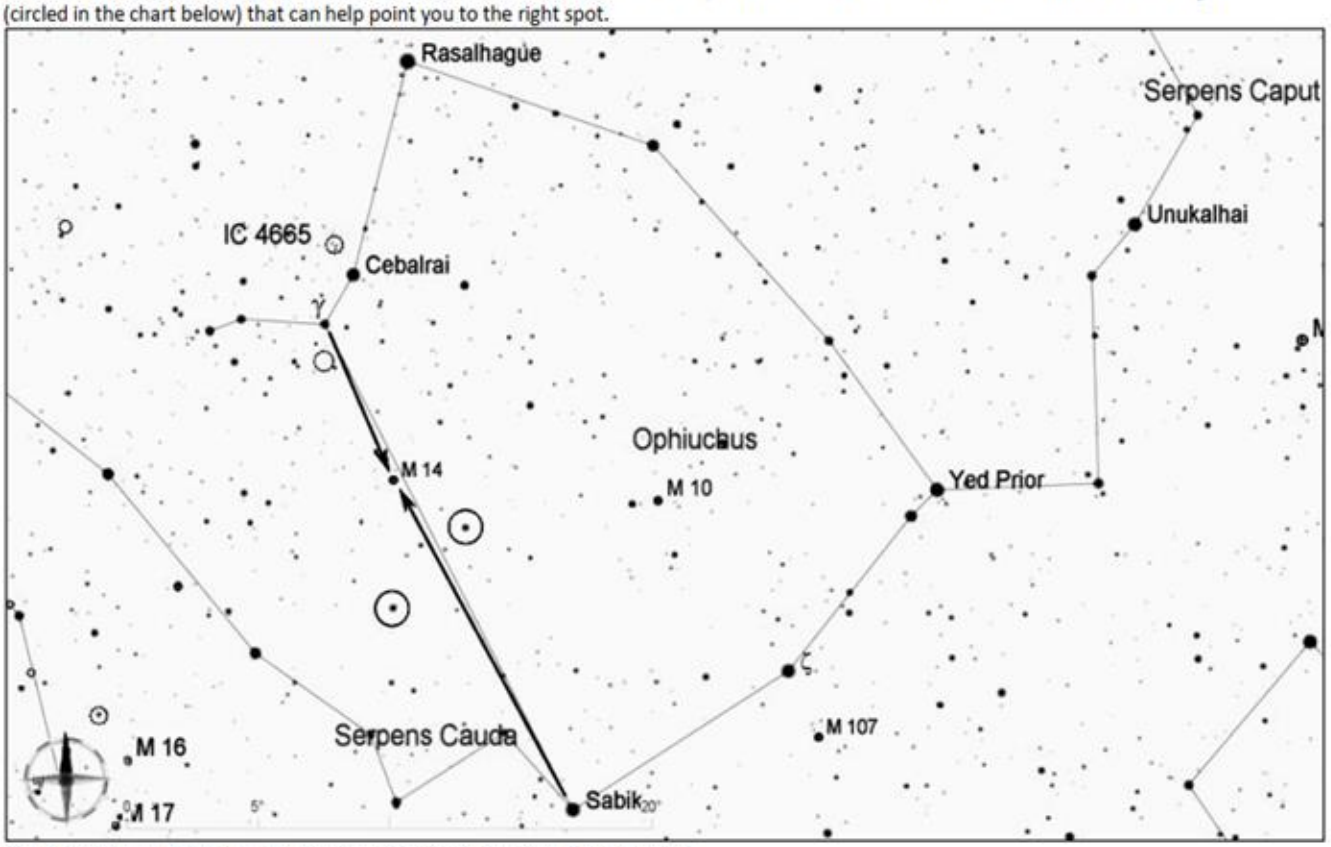


Start by finding the constellation Ophiuchus, the serpent bearer, a large oval shape that is west of Arcturus (part of the Spring Triangle), east of Altair (part of the Summer Triangle), and north of Antares. The oval is about 25 degrees from top to bottom, and its main stars are second and third magnitude, so they should be easy to see with the naked eye even with moderate light pollution.



M 14

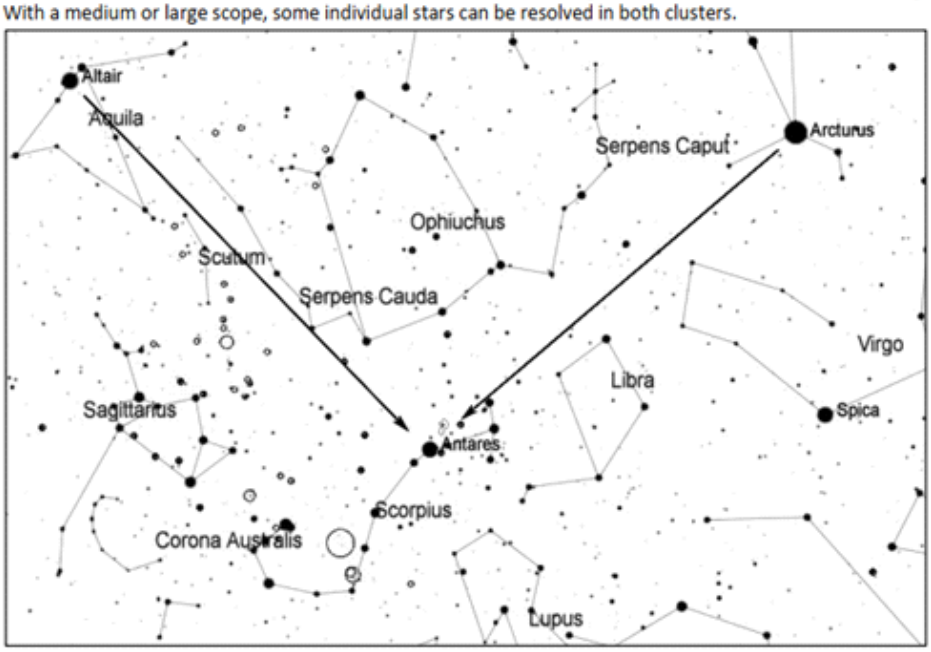
On the east side of Ophiuchus, look for γ (gamma) to the north and Sabik to the south. M14 is nearly on a line between these two stars, about 1/3 of the way from γ to Sabik. M14 can be hard to locate because there are no bright stars nearby. Below M14 are two stars of about magnitude 4.5 (circled in the chart below) that can help point you to the right spot.



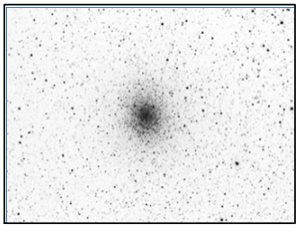
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 19 and 62, Globular Clusters in Ophiuchus

Both of these globular clusters are about magnitude 7.2, making them easy targets for any telescope. Most globular clusters are roughly round and symmetrical, but these two are exceptions. M19 is noticeably oblong in the north-south direction, and bright core of M62 appears to be off-center. With a medium or large scope, some individual stars can be resolved in both clusters.

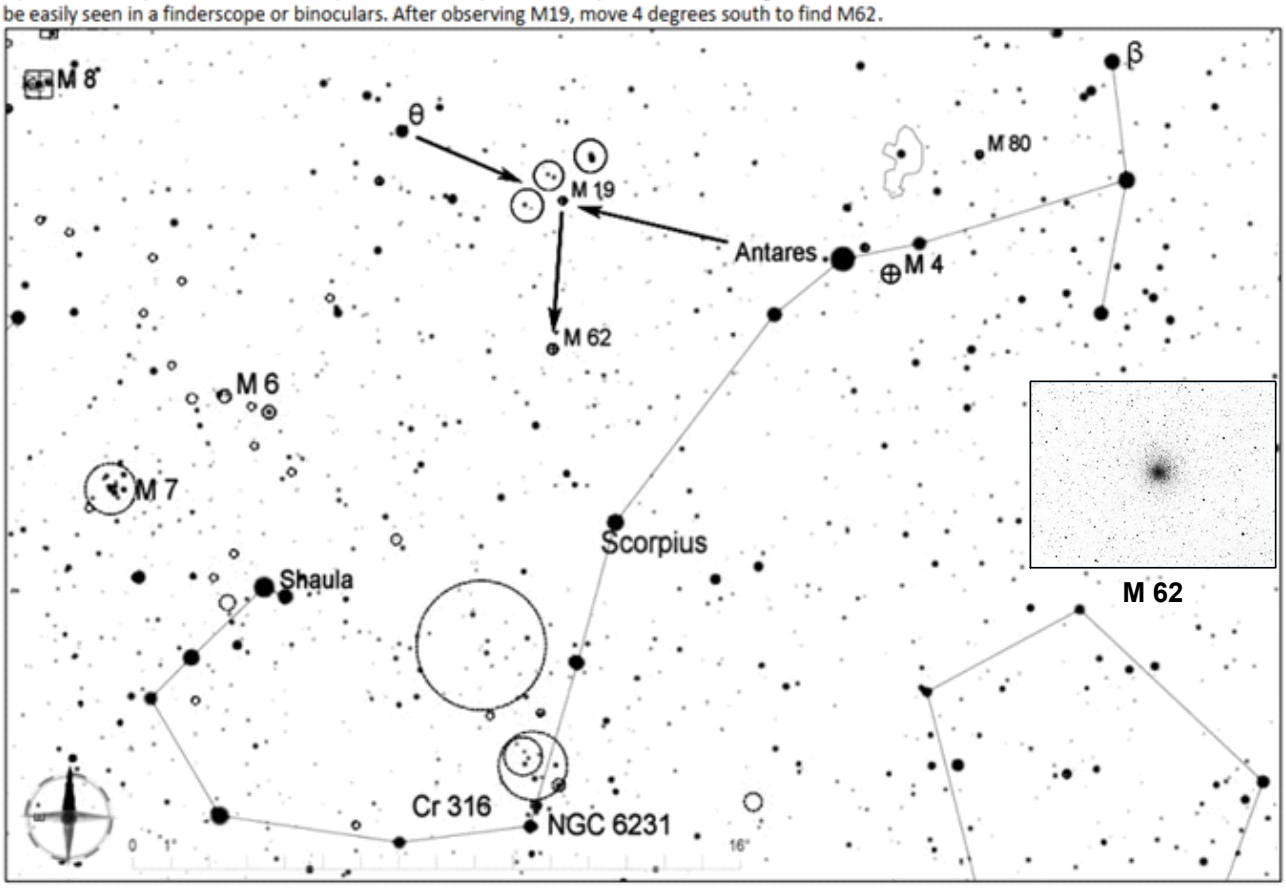


Start by finding first magnitude Antares, the brightest and reddest star low in the southern sky on summer evenings. To get oriented, note that Antares is about 60 degrees southwest of Altair (part of the Summer Triangle) and a similar distance southeast of Arcturus (part of the Spring Triangle). Antares represents the eye of Scorpius, and on a clear night you should be able to see the curving shape of the scorpion if you have a good view of the southern horizon.



M 19

From Antares, look about 12 degrees to the east for 3rd magnitude θ (theta) Ophiuchi. M19 is a little more than half way from Antares to θ Ophiuchi. To help locate M19, note its position with respect to three pairs of stars of magnitudes 6 and 7 that are circled in the chart below and can be easily seen in a finderscope or binoculars. After observing M19, move 4 degrees south to find M62.

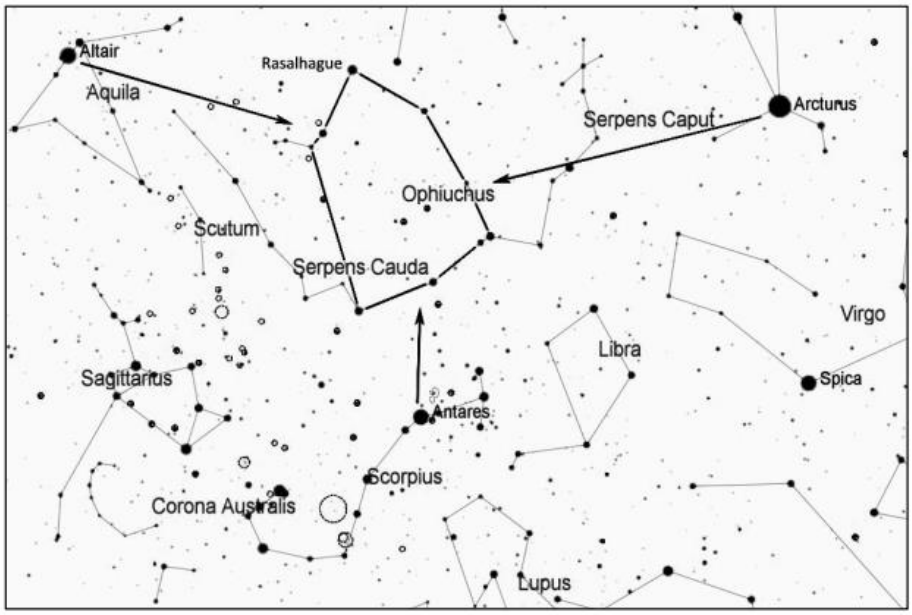


M 62

Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

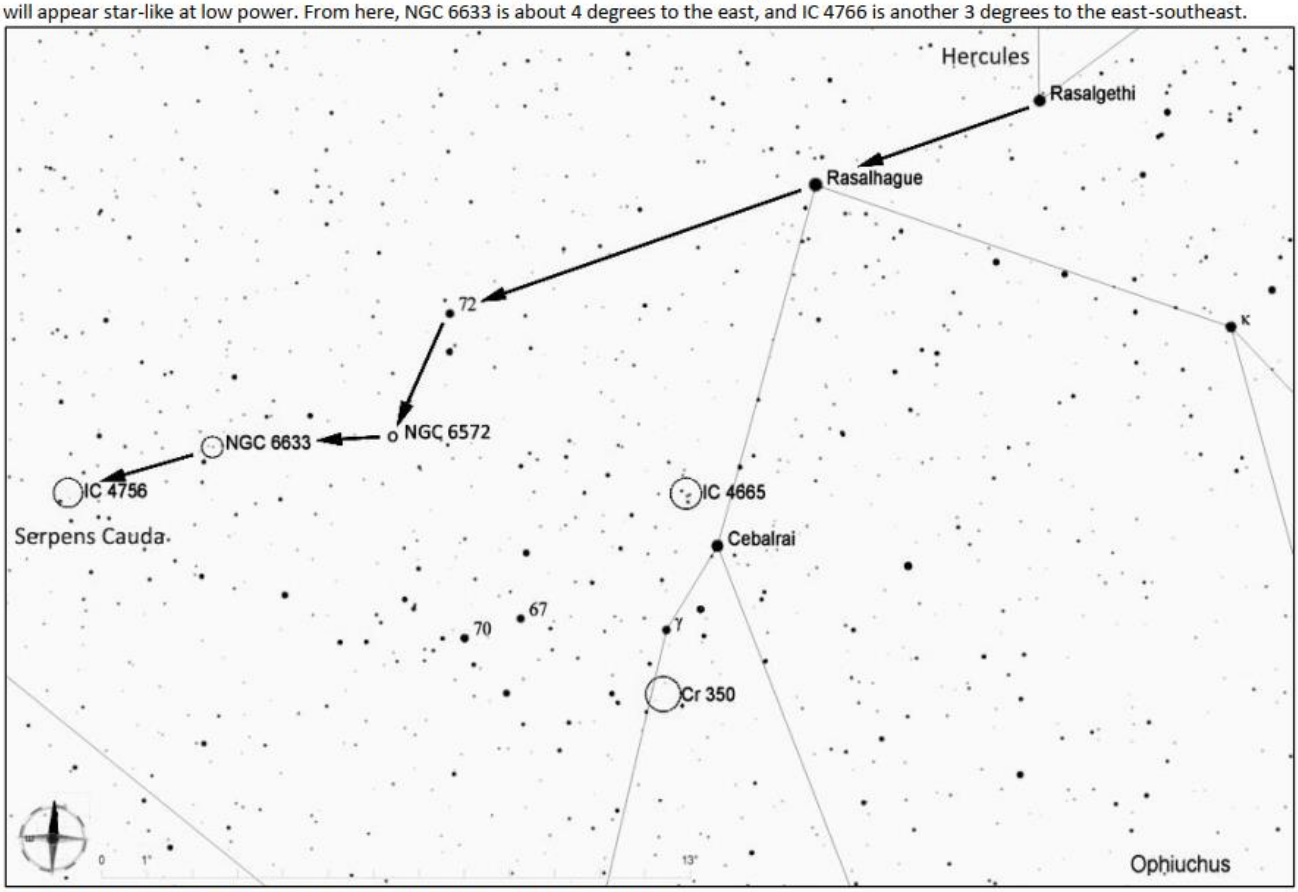
NGC 6572 (Planetary Nebula), NGC 6633, IC 4756 (Open Clusters)

This area in northern Ophiuchus and Serpens Cauda is rich in planetary nebulae and star clusters. NGC 6572 is a small but bright planetary nebula that is known for its intense blue-green color. Use high magnification for the best view. To its east are two bright open clusters, NGC 6633 and IC 4756, that are nice targets for binoculars or rich-field telescopes.



Start by finding the constellation Ophiuchus, the serpent bearer, a large oval shape that is west of Arcturus (part of the Spring Triangle), east of Altair (part of the Summer Triangle), and north of Antares. The oval is about 25 degrees from top to bottom, and its main stars are second and third magnitude, so they should be easy to see with the naked eye even with moderate light pollution.

At the top of Ophiuchus, imagine a line between the bright star Rasalhague and slightly dimmer Rasalgethi (in Hercules). Extend this line to the east about twice this distance to reach the star 72 Ophiuchi, magnitude 3.7. Then look 3 degrees to the south-southeast for blue-green NGC 6572, which will appear star-like at low power. From here, NGC 6633 is about 4 degrees to the east, and IC 4766 is another 3 degrees to the east-southeast.

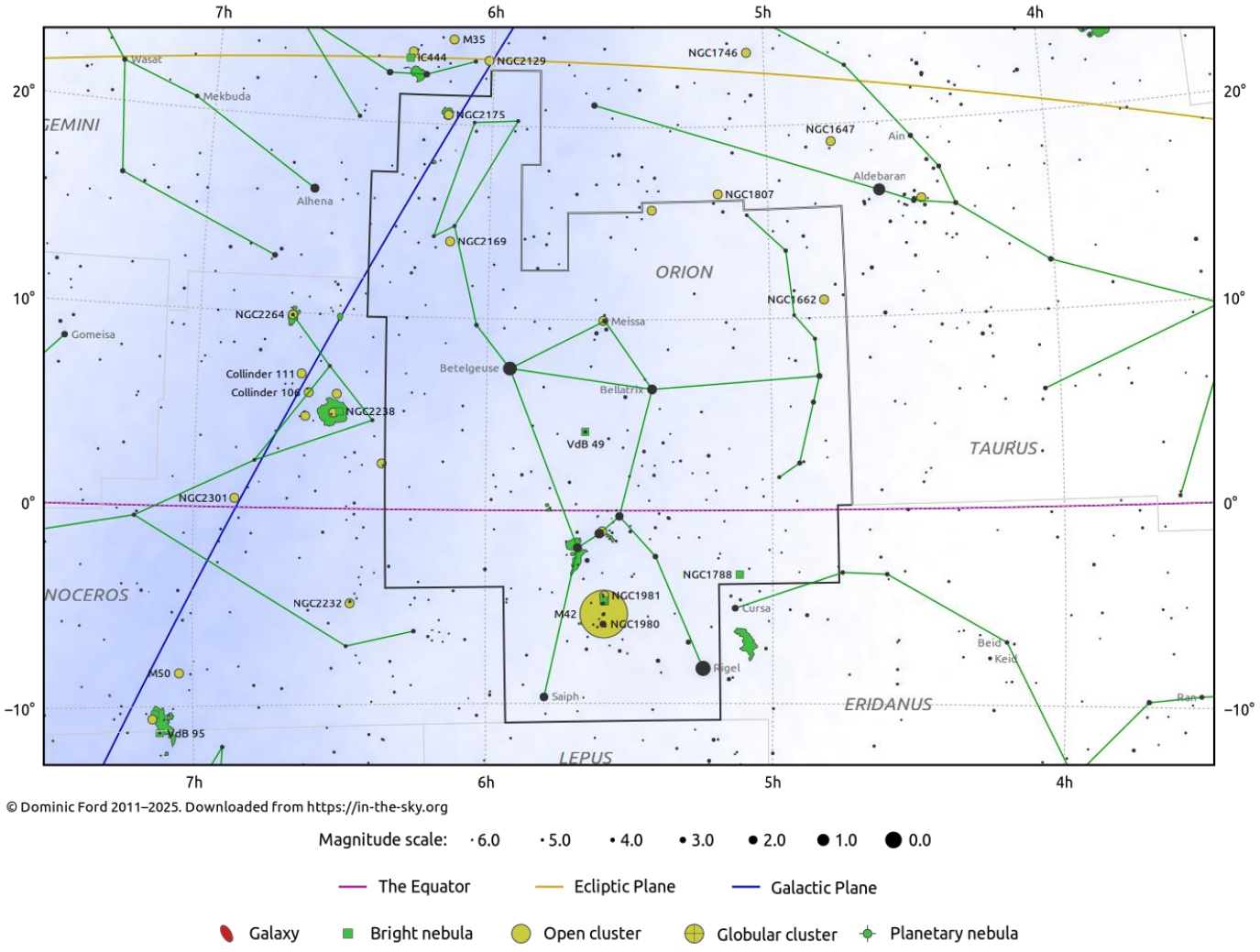


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Orion (Ori)

Evening Visibility: **November – March**
Online Information: **Orion**
Charts: **5** Featured Objects: **8**
More Online Information: M-042, M-043, M-078, NGC-1980, NGC-2169, NGC-2194, Sigma Orionis, Struve 761,

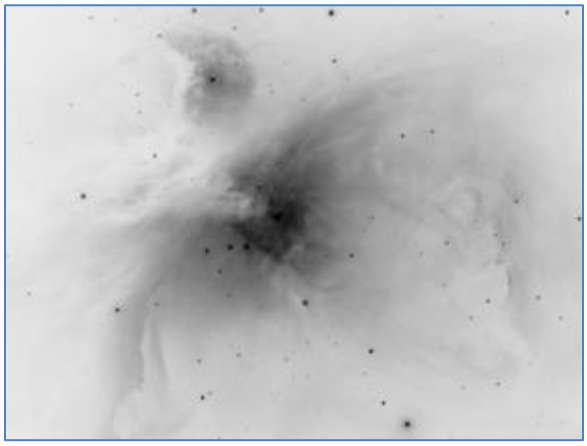
In-The-Sky.org Constellation Map



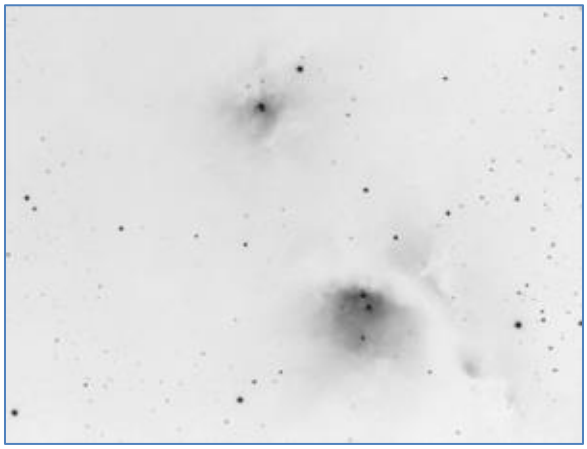
Object (Type)	Chart	Aliases	Stats
M-042 (EN, OC)	1, W1	Orion Nebula	| Mag=4.0 | SB=21.7 | Size=65’ x 60’ |
M-043 (EN, DN)	1, W1	De Mairan’s Nebula, NGC-1982	| Mag=9.0 | SB=24.1 | Size=20’ x 15’ |
M-078 (EN, RN)	2, W2	NGC-2068	| Mag=8.3 | SB=21.1 | Size=8’ x 6’ |

Object (Type)	Chart	Aliases	Stats
NGC-1980 (OC)	3, W3	The Lost Jewel of Orion, OCL 529	| Mag=2.5 | SB=xx | Size=14.0' x 14.0' |
NGC-2169 (OC)	4, W4	"37" Cluster, Cr 38, "LE" Cluster	| Mag= 5.9 | SB=18.8 | Size=7' |
NGC-2194 (OC)	4, W4		| Mag=8.5 | SB=22.1 | Size=9' |
Sigma Orionis (MS)	5, W5, SD	SAO-132406, HIP-26549, 48 Ori, HR1932, HD37468	| Mag=4.1, 5.3, 8.8, 6.6, 6.7 | Sep = 11.4", 0.2", 12.9", 30.1", 42.6" | Five Star System
Struve 761 (MS)	5, W5, SD	SAO-132399, STF761, ADS4240, HD294272	| Mag=7.9, 8.4, 11.9 | Sep=68.1", 72.1" 8.5", 32.7" | Triple System

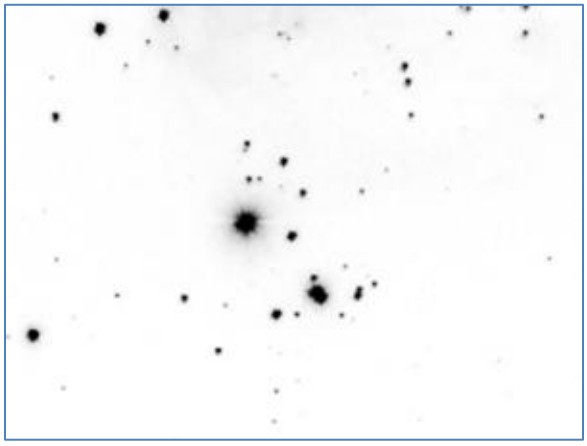
Image Gallery



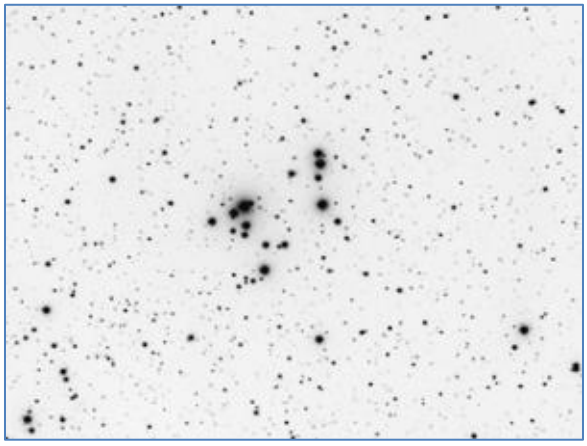
Messier 42 and 43, The Orion Nebula



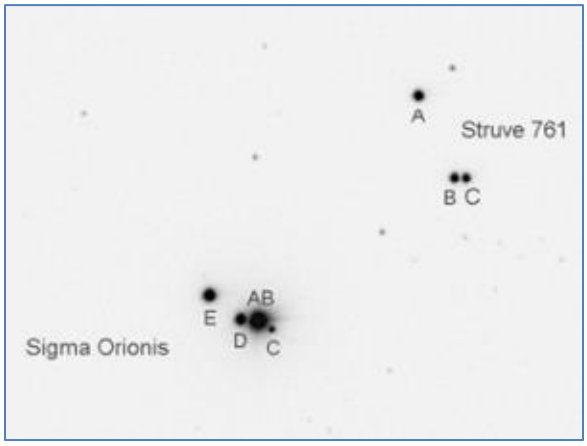
Messier 78



NGC 1980
(No Online Photo)



NGC 2169, The "37 Cluster"



Sigma Orionis and Struve 76

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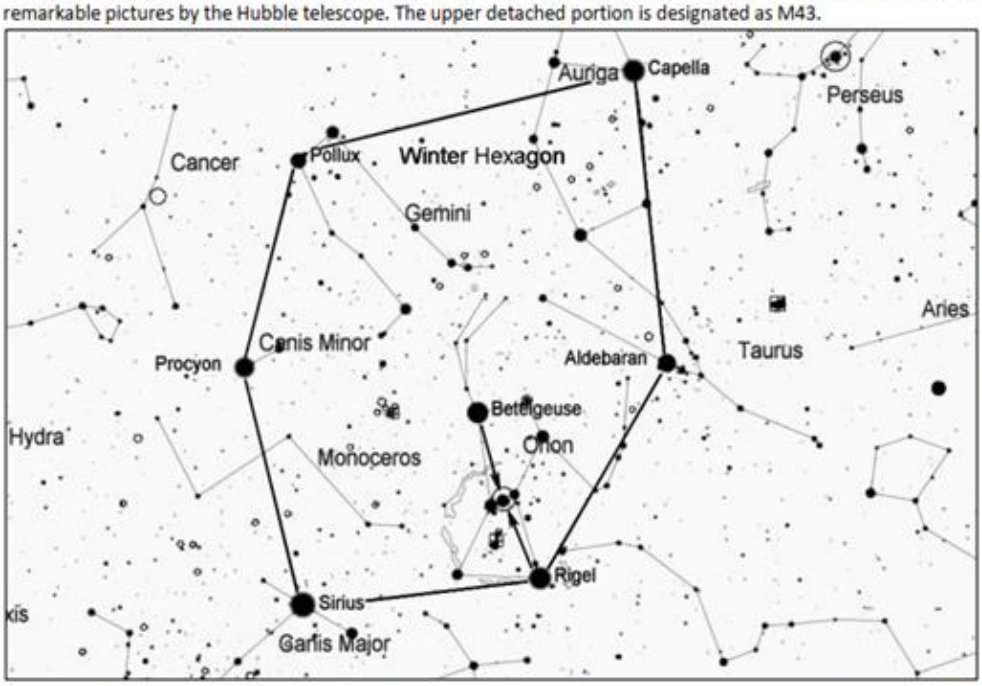
Messier 42 and 43, the Orion Nebula

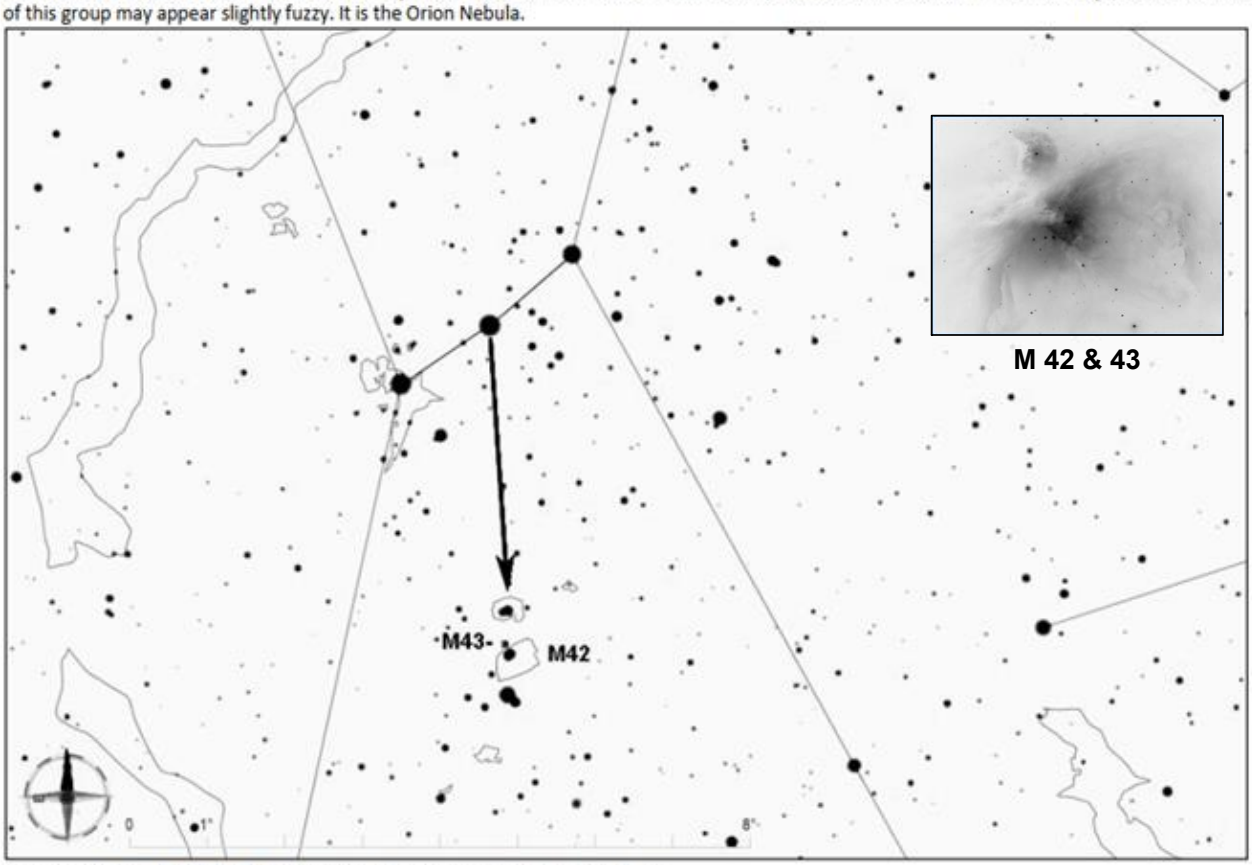
The Orion Nebula is one of the easiest nebulas to find, and it is visible to the naked eye as part of Orion's sword. It is a wonderful sight in binoculars or any telescope. The human eye has different color sensitivity to dim light than a camera. Most photographs show mostly reds and pinks, but through a large telescope the nebula is a lime green, with touches of pink. Many new stars are currently forming in this nebula, as seen in some remarkable pictures by the Hubble telescope. The upper detached portion is designated as M43.



If you don't know how to find the constellation Orion, first find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

Between Betelgeuse and Rigel is a row of three bright stars that form the belt of Orion.

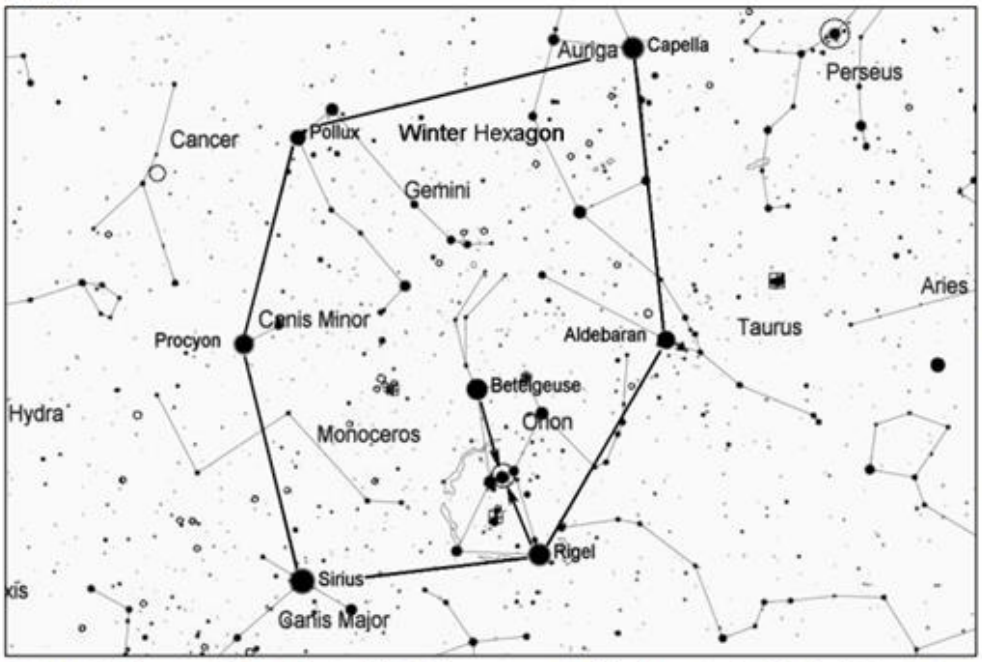
Look below the center star of Orion's belt and you should see a row of three dimmer stars, oriented north-south. To the naked eye, the central star of this group may appear slightly fuzzy. It is the Orion Nebula.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 78, Diffuse Nebula in Orion

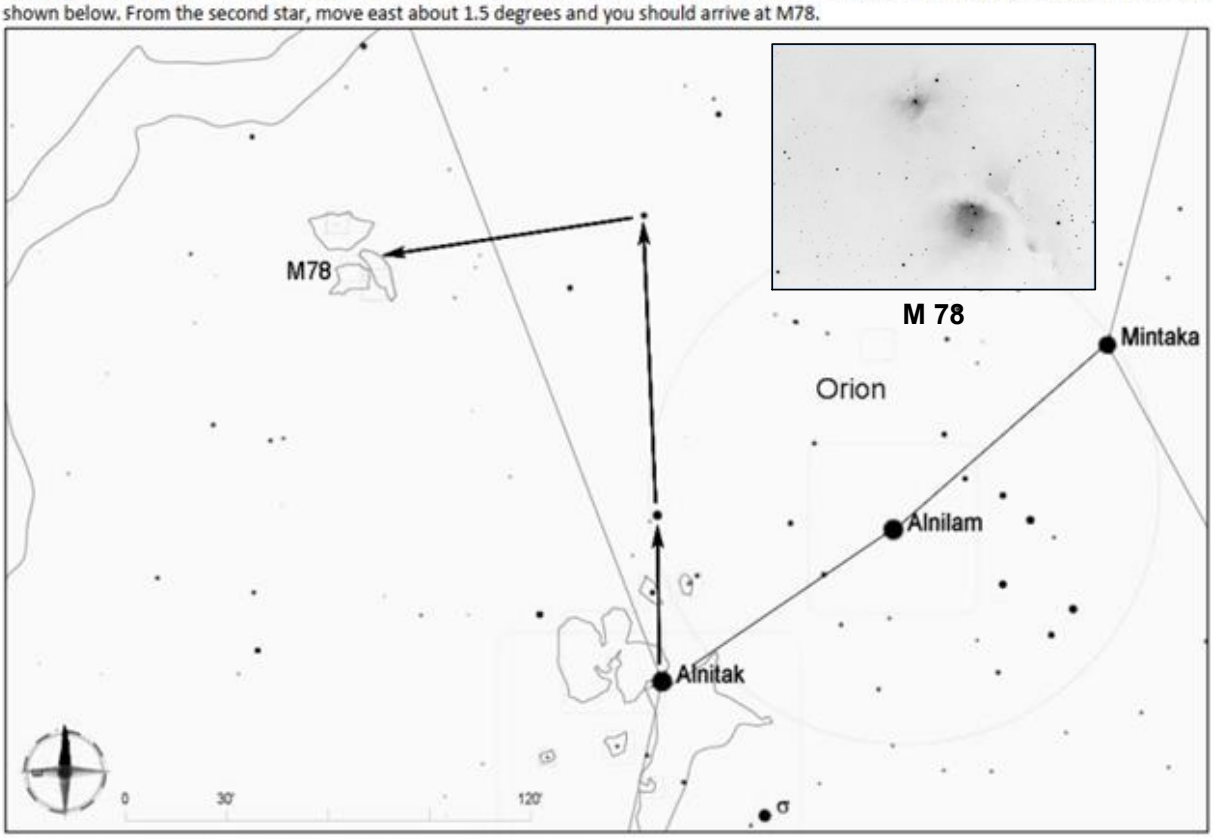
At magnitude 8.3, this is a relatively bright reflection nebula, glowing by reflecting the light of two 10th magnitude stars that can be seen inside the nebula. Some observers have described its appearance as resembling a comet with a fan-shaped tail. This nebula is estimated to be about 4 light years in diameter and about 1600 light years away. You might also be able to spot a smaller and dimmer nebula, NGC 2071, just a bit to the north of M78.



If you don't know how to find the constellation Orion, first find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

Between Betelgeuse and Rigel is a row of three bright stars that form the belt of Orion.

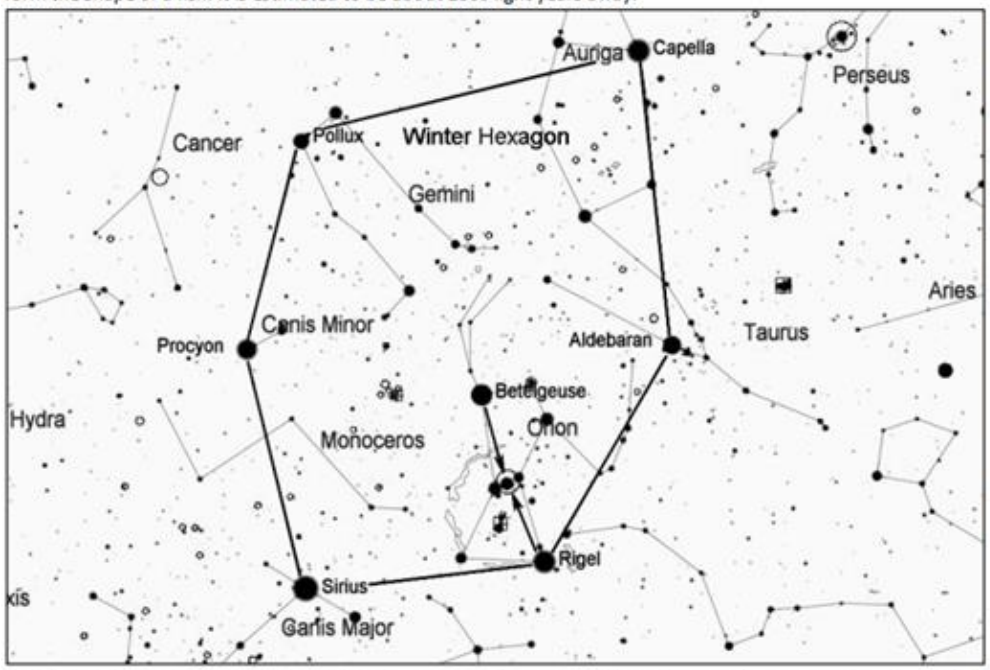
M78 is just 2.5 degrees to the northeast of Alnitak, the easternmost of the three stars in the belt of Orion. But you may have trouble pointing the telescope to that specific spot in the sky. If so, one route is to follow the line of two dim stars (magnitudes 5 and 6) directly north from Alnitak, as shown below. From the second star, move east about 1.5 degrees and you should arrive at M78.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 1980, Open Cluster and Nebula in Orion

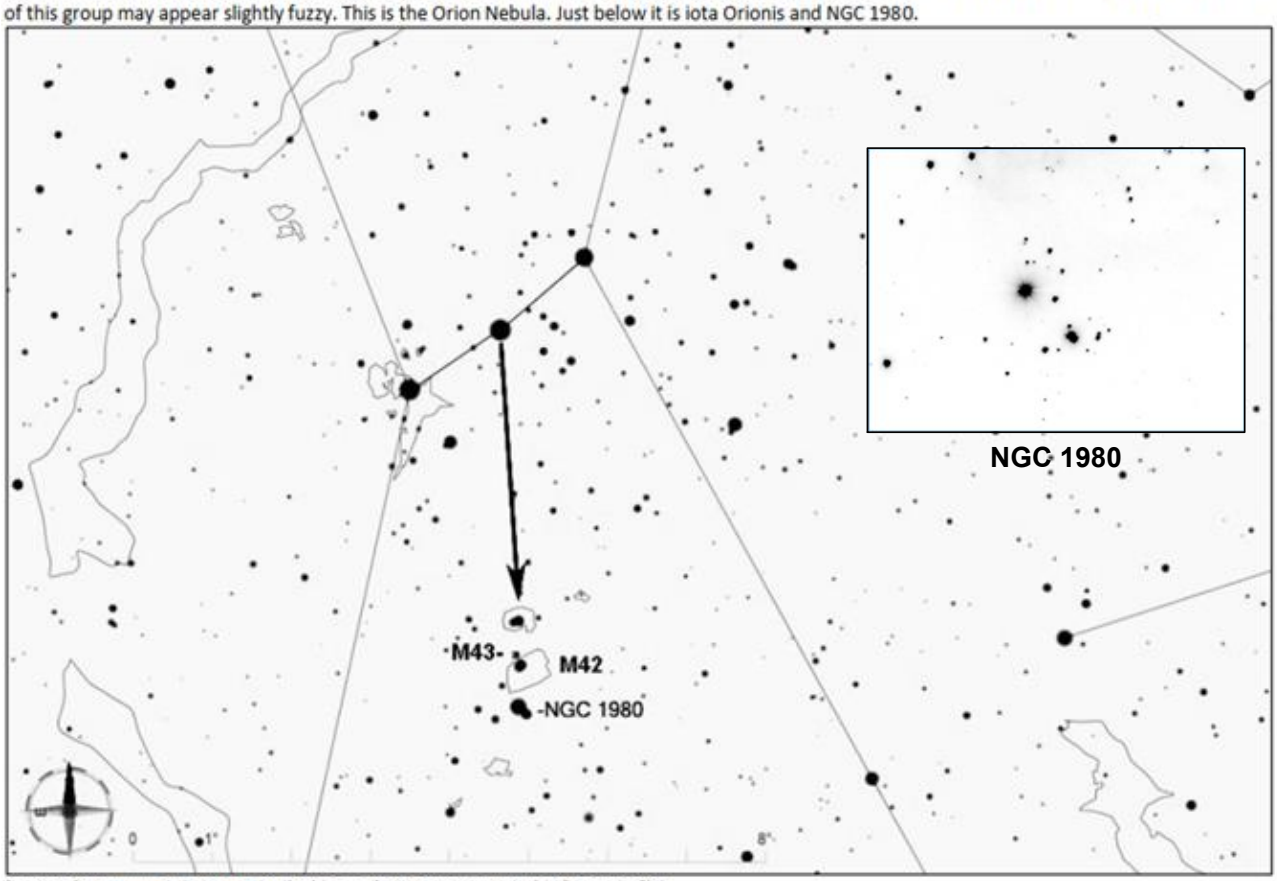
NGC 1980 is a loose open cluster just south of the famous Orion Nebula (M42) in Orion's sword. It is embedded in a faint nebulosity that is difficult to observe visually through a telescope. The cluster consists of triple star iota Orionis (magnitude 2.8) and few dozen stars, the brightest of which form the shape of a fish. It is estimated to be about 1800 light years away.



If you don't know how to find the constellation Orion, first find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

Between Betelgeuse and Rigel is a row of three bright stars that form the belt of Orion.

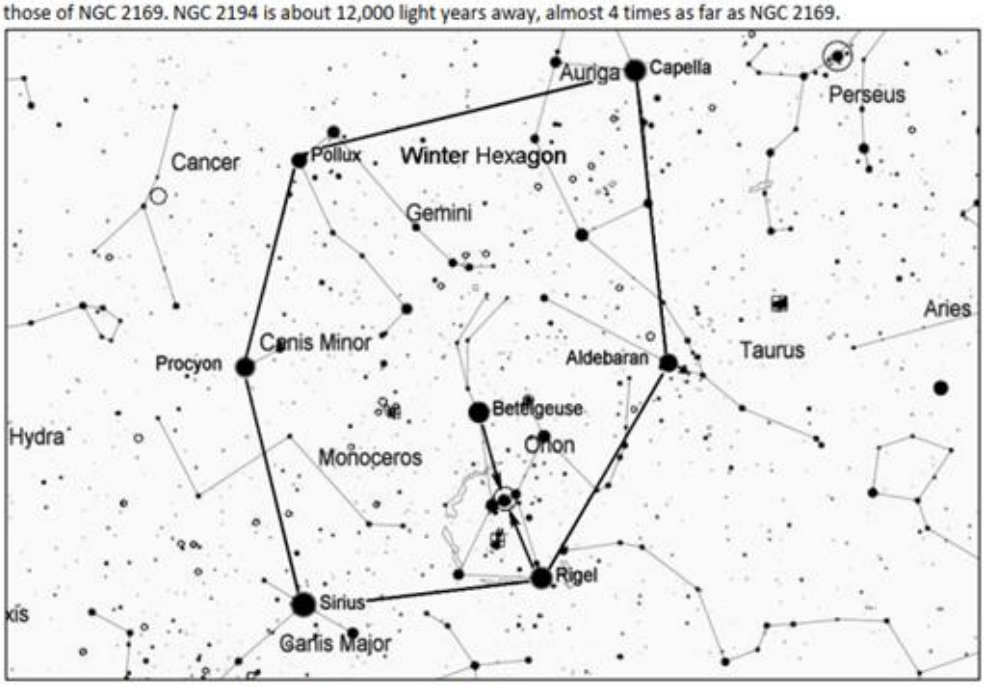
Look below the center star of Orion's belt and you should see a row of three dimmer stars, oriented north-south. To the naked eye, the central star of this group may appear slightly fuzzy. This is the Orion Nebula. Just below it is iota Orionis and NGC 1980.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

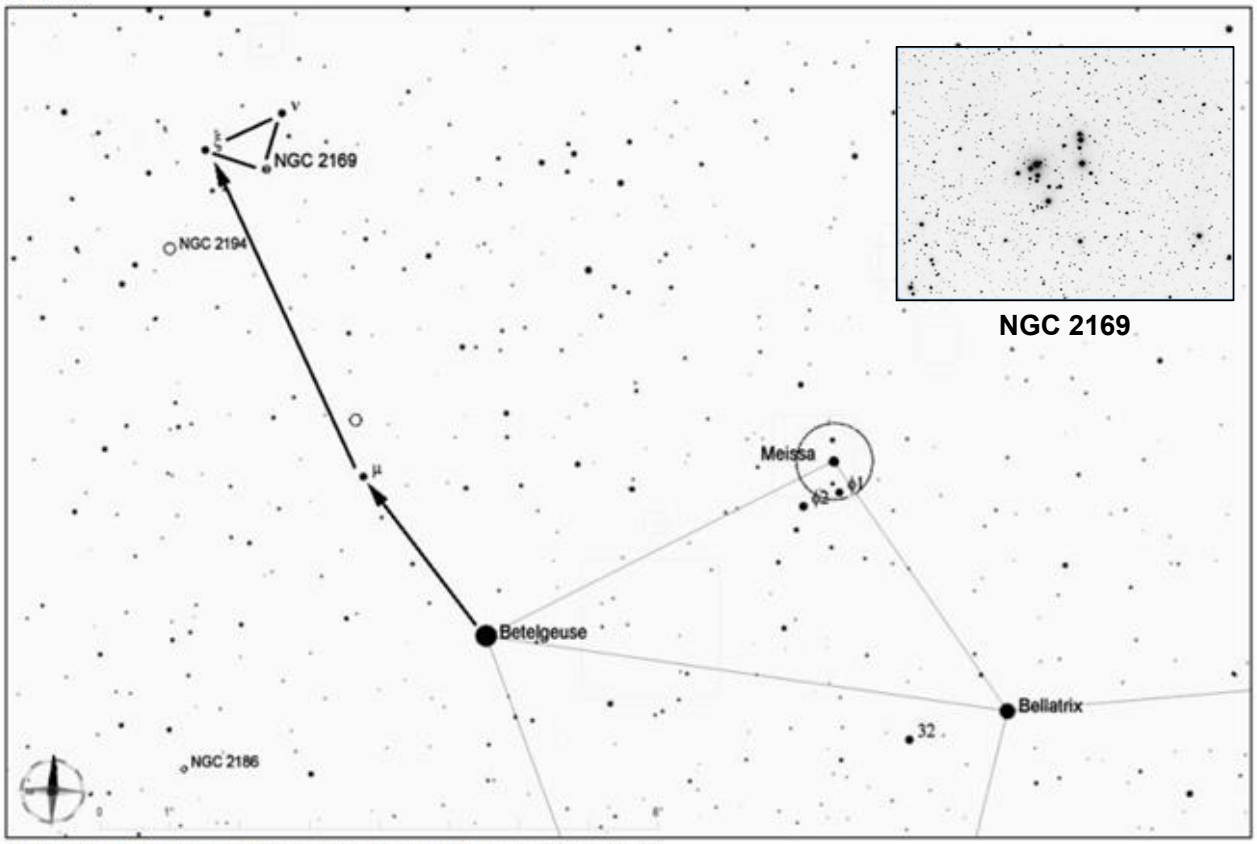
NGC 2169 ("37 Cluster") and 2194, Open Clusters in Orion

NGC 2169 is a compact open cluster of relatively bright stars that form the digits "37", hence its nickname. The cluster is about magnitude 6 and about 5 arcminutes across. NGC 2194 is about 9 arcminutes across but a much dimmer 8th magnitude, and its individual stars are also dimmer than those of NGC 2169. NGC 2194 is about 12,000 light years away, almost 4 times as far as NGC 2169.



If you don't know how to find the constellation Orion, first find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon, above the row of three bright stars that form the belt of Orion.

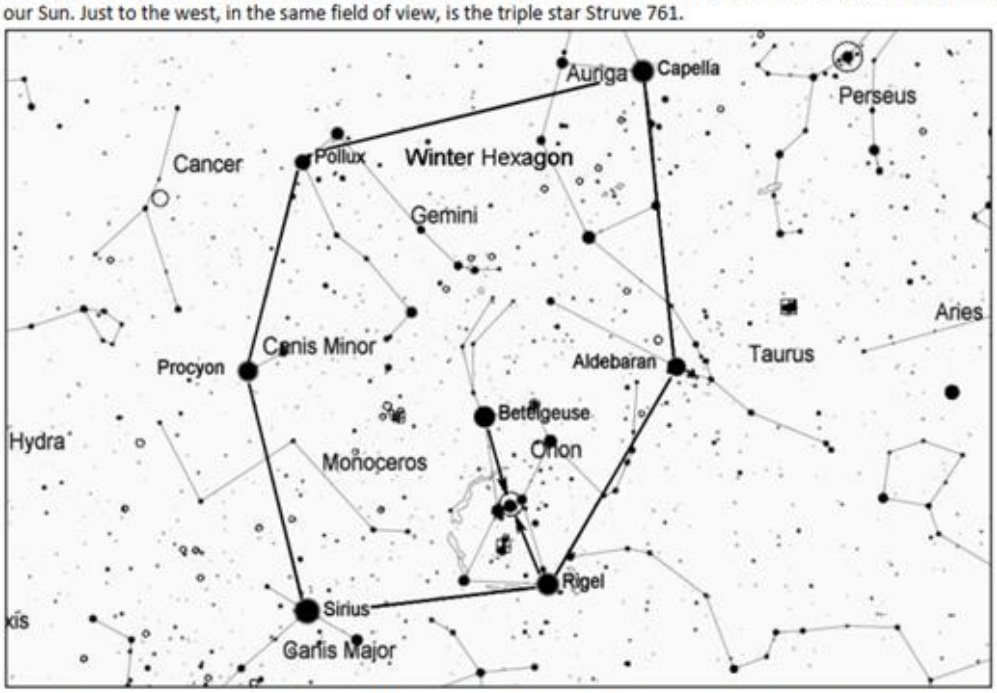
Look 8 degrees above Betelgeuse to find two 4th magnitude stars about a degree apart that represent the raised hand of Orion. These two stars form a small triangle with NGC 2169, which is below the two stars. From NGC 2169, the much dimmer NGC 2194 is less than 2 degrees to the southeast.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Sigma Orionis and Struve 761, multiple star systems

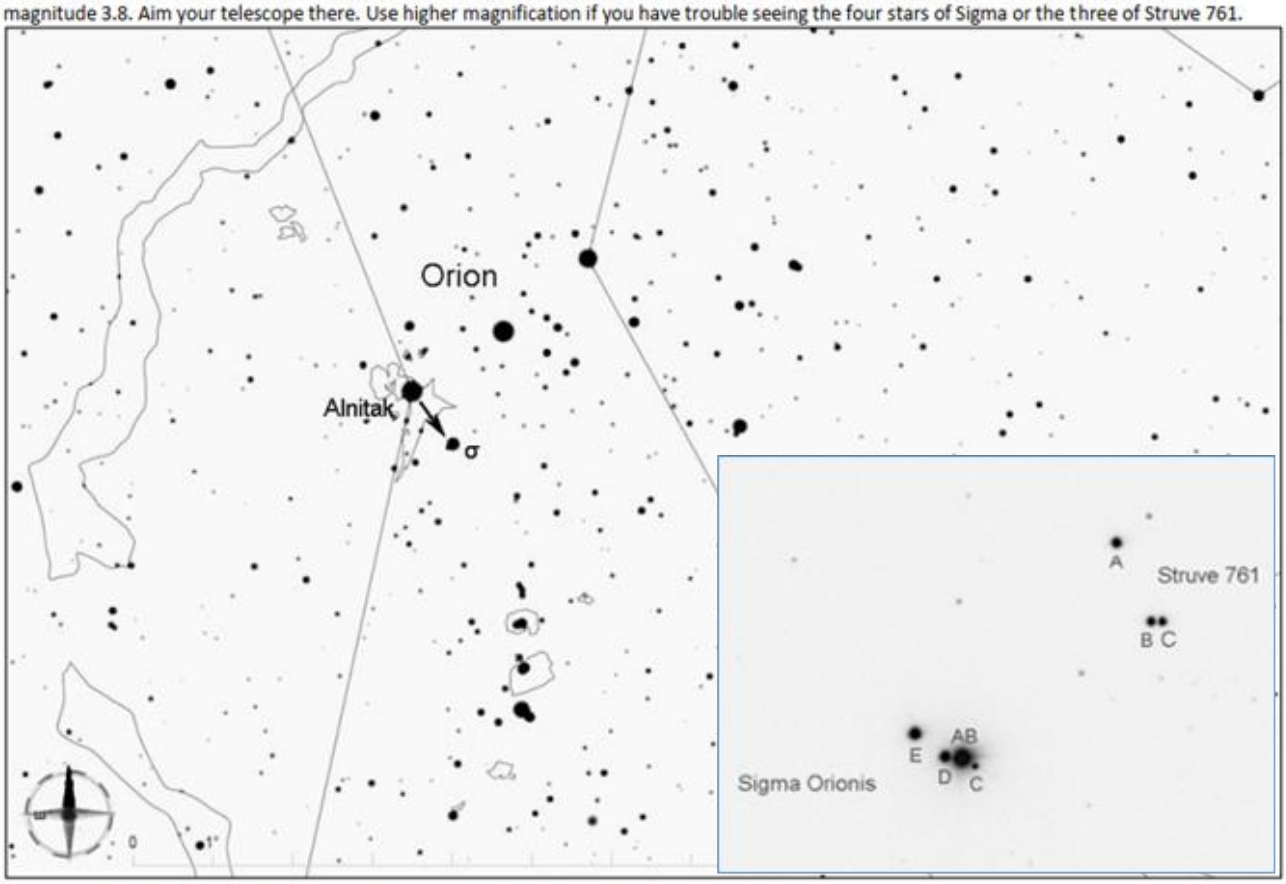
These are two excellent multiple stars for telescopic observation. Even binoculars will show some of the individual stars. Most telescopes will show the four bright stars that are the Sigma Orionis system. This group is about 1270 light years away, and all of these stars are larger and brighter than our Sun. Just to the west, in the same field of view, is the triple star Struve 761.



If you don't know how to find the constellation Orion, first find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

Between Betelgeuse and Rigel is a row of three bright stars that form the belt of Orion.

Look about 1 degree below Alnitak, the left (eastern) star of Orion's belt, and you should see Sigma Orionis (σ) with the naked eye, since it is magnitude 3.8. Aim your telescope there. Use higher magnification if you have trouble seeing the four stars of Sigma or the three of Struve 761.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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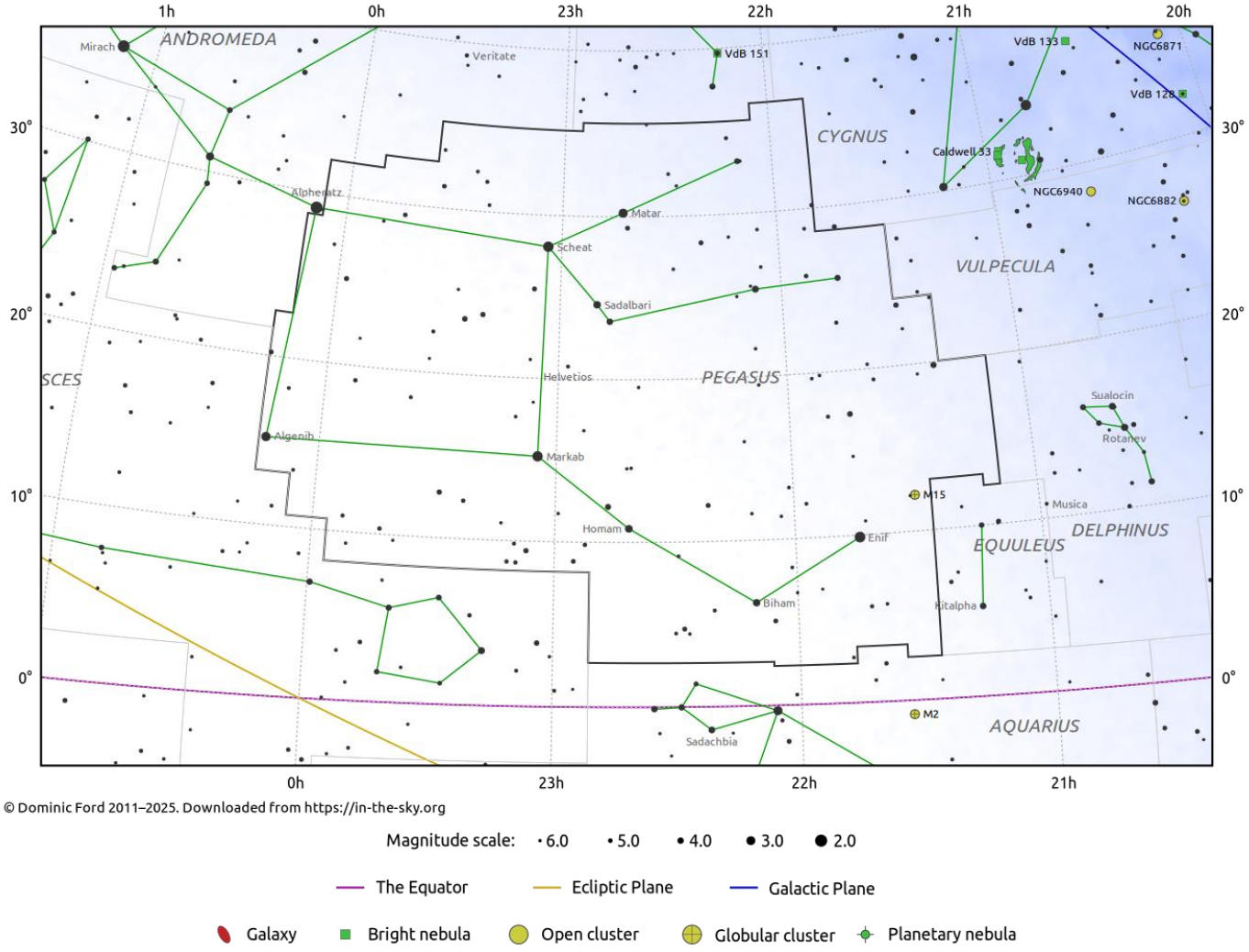
Pegasus (Peg)

Evening Visibility: **September – January**
Online Information: **Pegasus**
Charts: **4** Featured Objects: **5**
More Online Information: M-015, NGC-7331, NGC-7479, NGC-7814, NGC-14

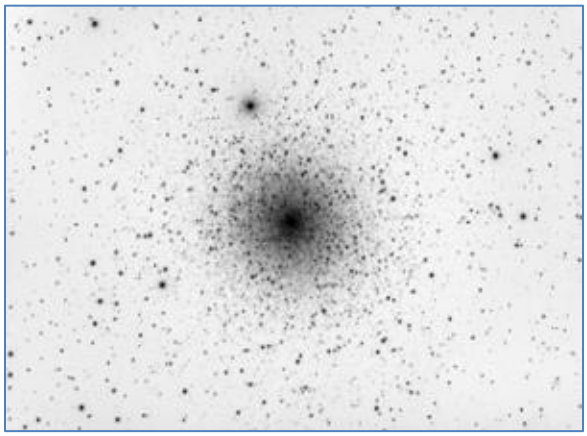
In-The-Sky.org Constellation Map



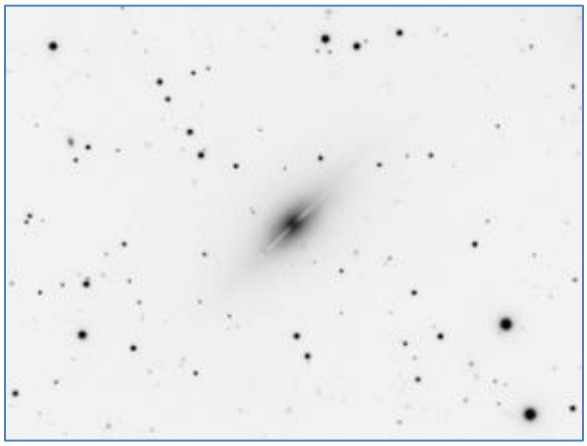
Object (Type)	Chart	Aliases	Stats
M-015 (GC)	1, W1	Great Pegasus Cluster, NGC-7078	| Mag=6.2 | SB=21.6 | Size=18.0' |
NGC-7331 (G)	2, W2	C-30	| Mag=10.4 | SB=23.3 | Size=10.5' x 3.7' |

Object (Type)	Chart	Aliases	Stats
NGC-7479 (G)	3, W3	Propeller Galaxy, Superman Galaxy, C-44	| Mag=11.6 | SB=22.7 | Size=4.1’ x 3.1’ |
NGC-7814 (G)	4, W4	Little Sombrero, C-43, UGC8	| Mag=11.6 | SB=23.1 | Size=5.5’ x 2.3’ |
NGC-14 (G)	4, W4		| Mag=12.7 | SB=23.0 | Size=2.0’ x 1.3’ |

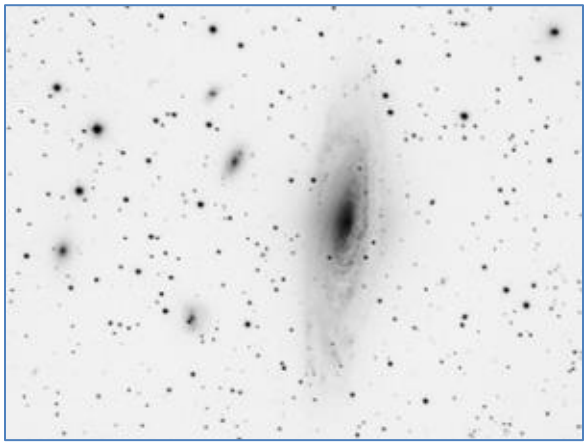
Image Gallery



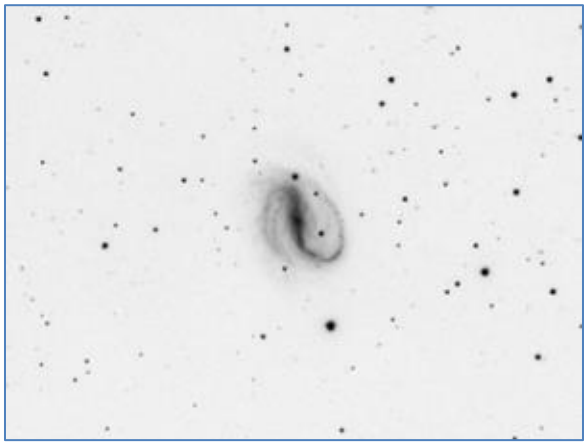
Messier 15



NGC 7814 (C 43), Little Sombrero Galaxy



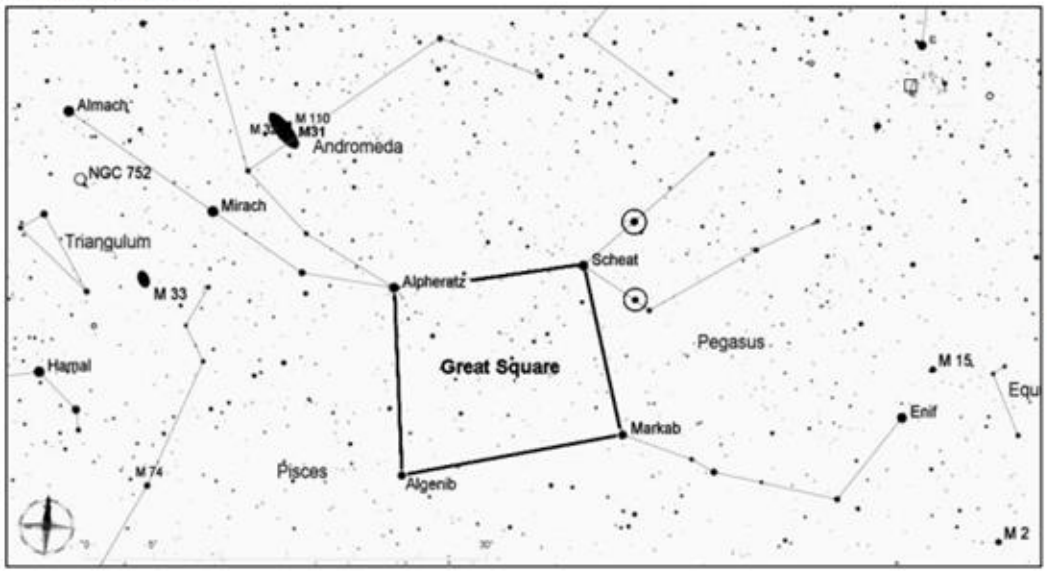
NGC 7331



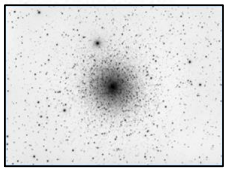
NGC 7479 (C 44), The Propeller Galaxy

Messier 15, Globular Cluster in Pegasus

Messier 15 is one of the brightest globular clusters at magnitude 6.1, and it has a very dense core. This can be seen through a telescope by comparing the relative brightness of its center to other large globulars like M13 or M22. The cluster is estimated to be about 33,000 light years away, and to contain over 100,000 stars. It is a nice sight through telescopes of small or medium aperture, and the view through a large Dobsonian scope is spectacular.

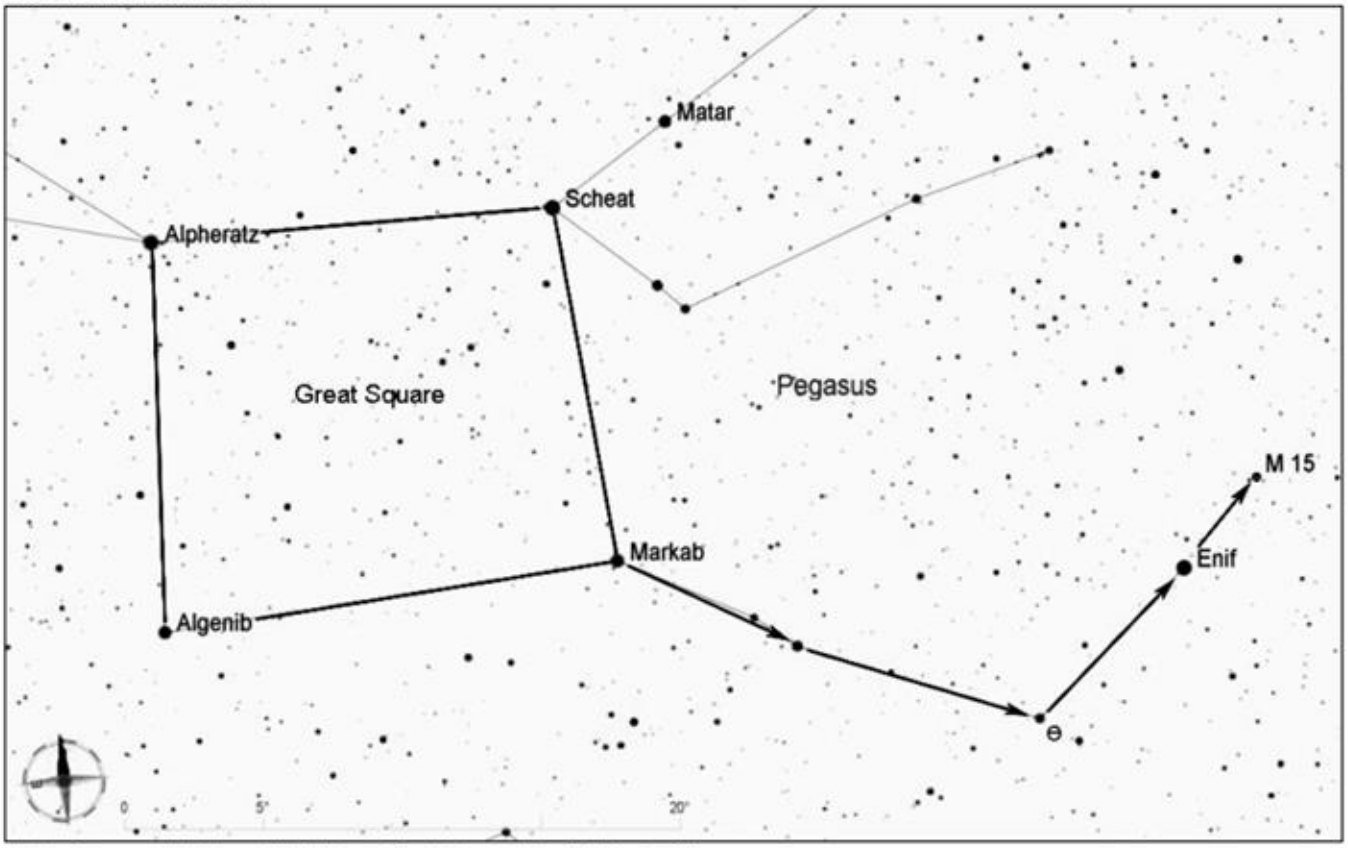


Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.



M 15

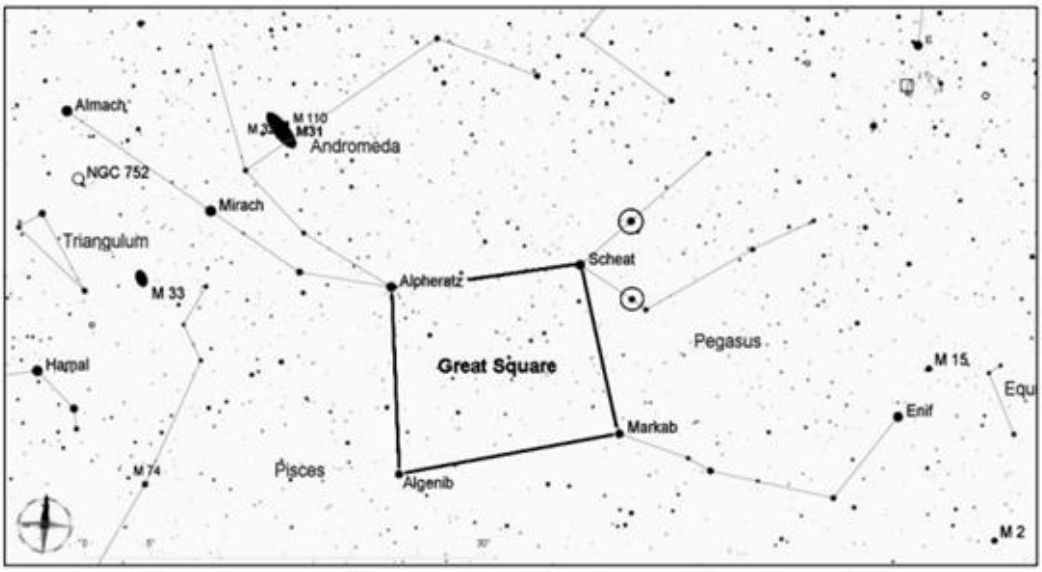
Starting from Markab at the southwest corner of the Great Square, follow the chain of stars to theta (θ) Pegasi, then take a left to Enif, the brightest star in that region of the sky. Extend the line from θ through Enif to a spot about 4 degrees to northwest, as shown in the chart below, and point your telescope there. With a low-power eyepiece, you should be able to spot M15 as a hazy ball. Then use higher magnification to get the best views of this cluster.



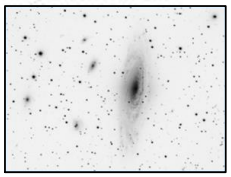
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 7331, Galaxy in Pegasus

NGC 7331, also known as Caldwell 30, is a large spiral galaxy about 47 million light years away, and about 130,000 light years in diameter. The galaxy has a bright central region that can be seen in small telescopes as an oblong glow. With larger telescopes, some of the galaxy's structure can be seen, and so can several smaller galaxies to its east.

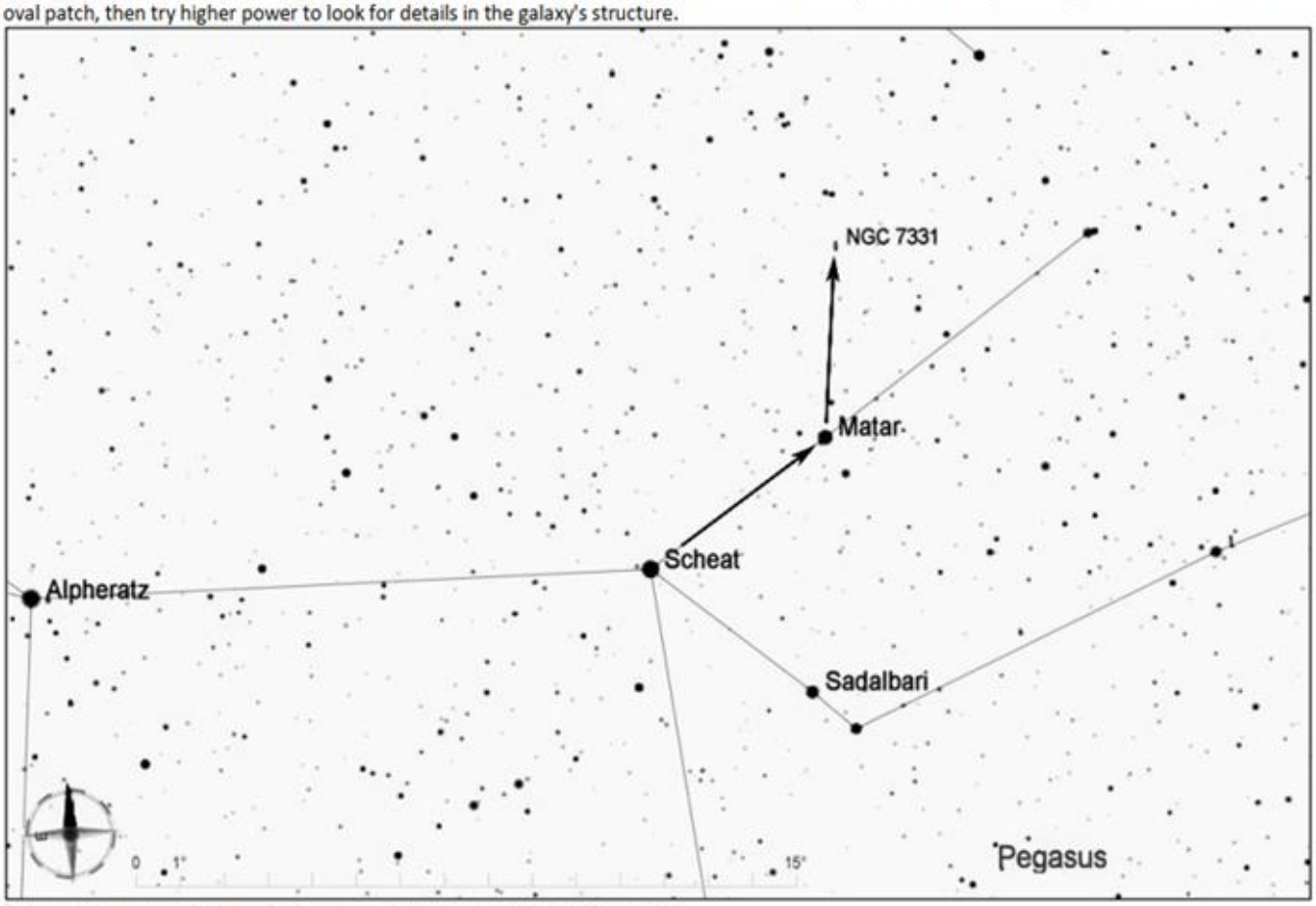


Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.



NGC 7331

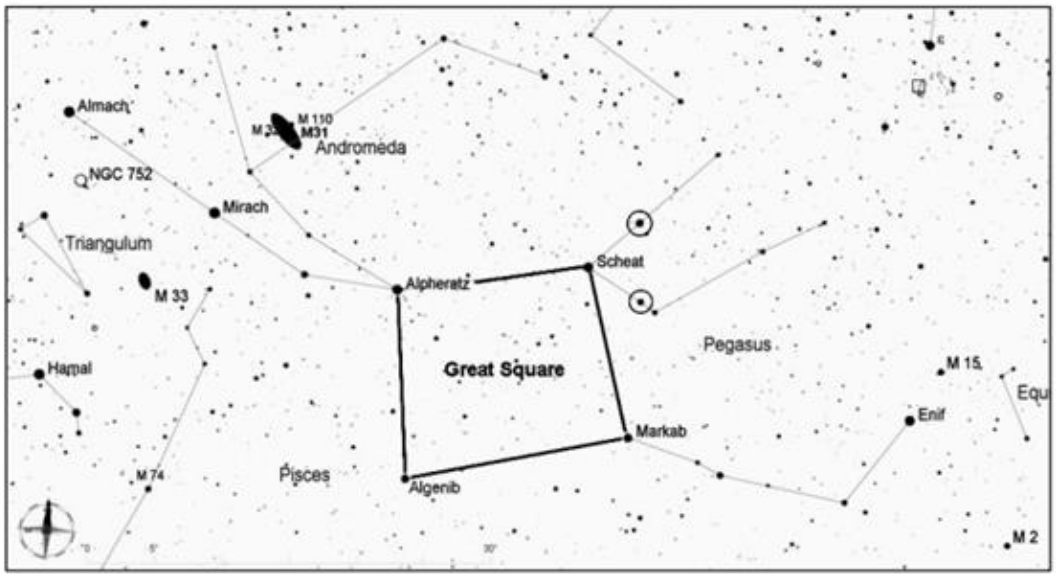
From Scheat at the northwest corner of the Great Square, look 5 degrees to the northwest to find Matar, magnitude 3. From Matar, move about 4.5 degrees north to reach NGC 7331. At magnitude 9.3, it should be visible in even small telescopes. Use a low-power eyepiece and look for a dim oval patch, then try higher power to look for details in the galaxy's structure.



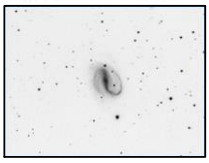
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 7479 (Caldwell 44), Propeller Galaxy in Pegasus

NGC 7479 is a good example of a barred spiral galaxy. It has a very long central bar and two tightly wound arms that give it a backward "S" shape. When viewed through a telescope, the bright nucleus is easy to see and so is the bar, but the spiral arms are much dimmer and require a scope of decent size and a dark night to see well. The galaxy is 105 million light years away.

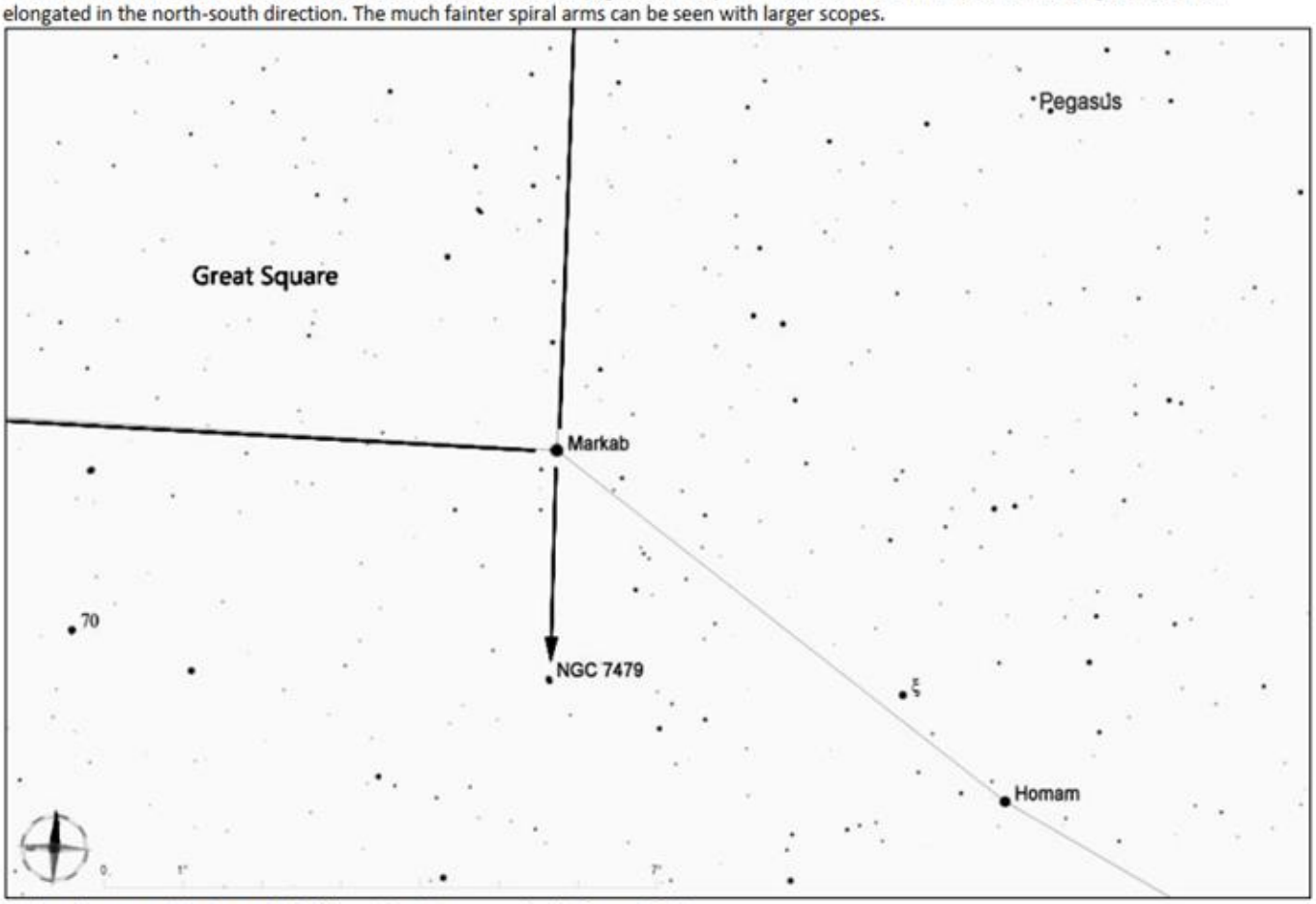


Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.



NGC 7479

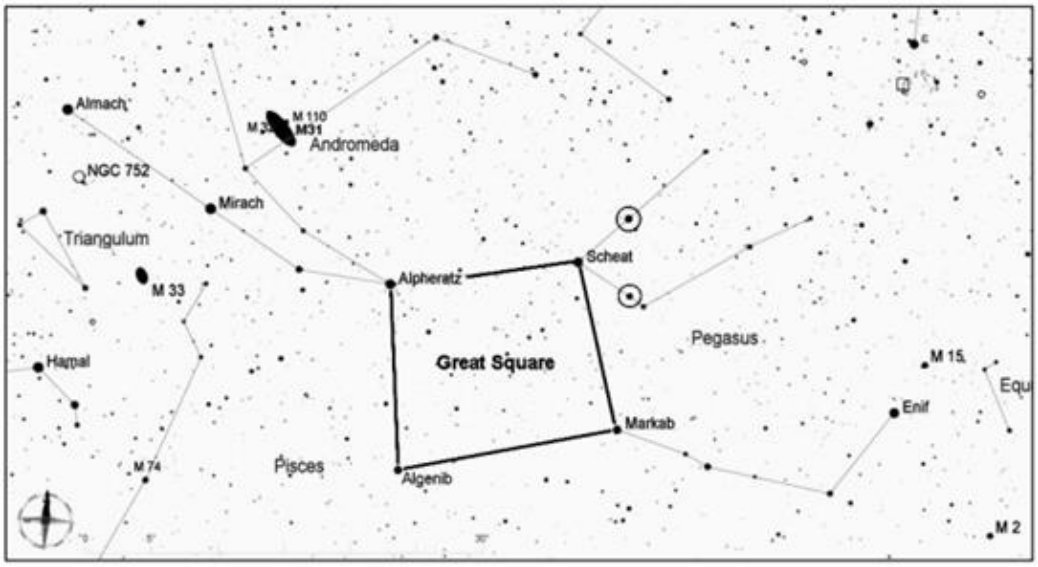
Find Markab at the southwest corner of the Great Square. Look 3 degrees directly south to reach NGC 4779. Look for the bright central bar elongated in the north-south direction. The much fainter spiral arms can be seen with larger scopes.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 7814 (Caldwell 43, Little Sombrero) and NGC 14, Galaxies in Pegasus

Through a telescope, this galaxy appears oblong with a bright center and faint arms. At magnitude 10.6, it can be seen in even small scopes. It is sometimes called the Little Sombrero because in photographs it looks similar to the Sombrero Galaxy, Messier 104. It is about 40 million light years away. NGC 14, a smaller and dimmer galaxy (magnitude 12.4), is about 1 degree to the east of NGC 7814.



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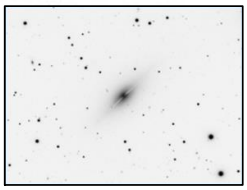
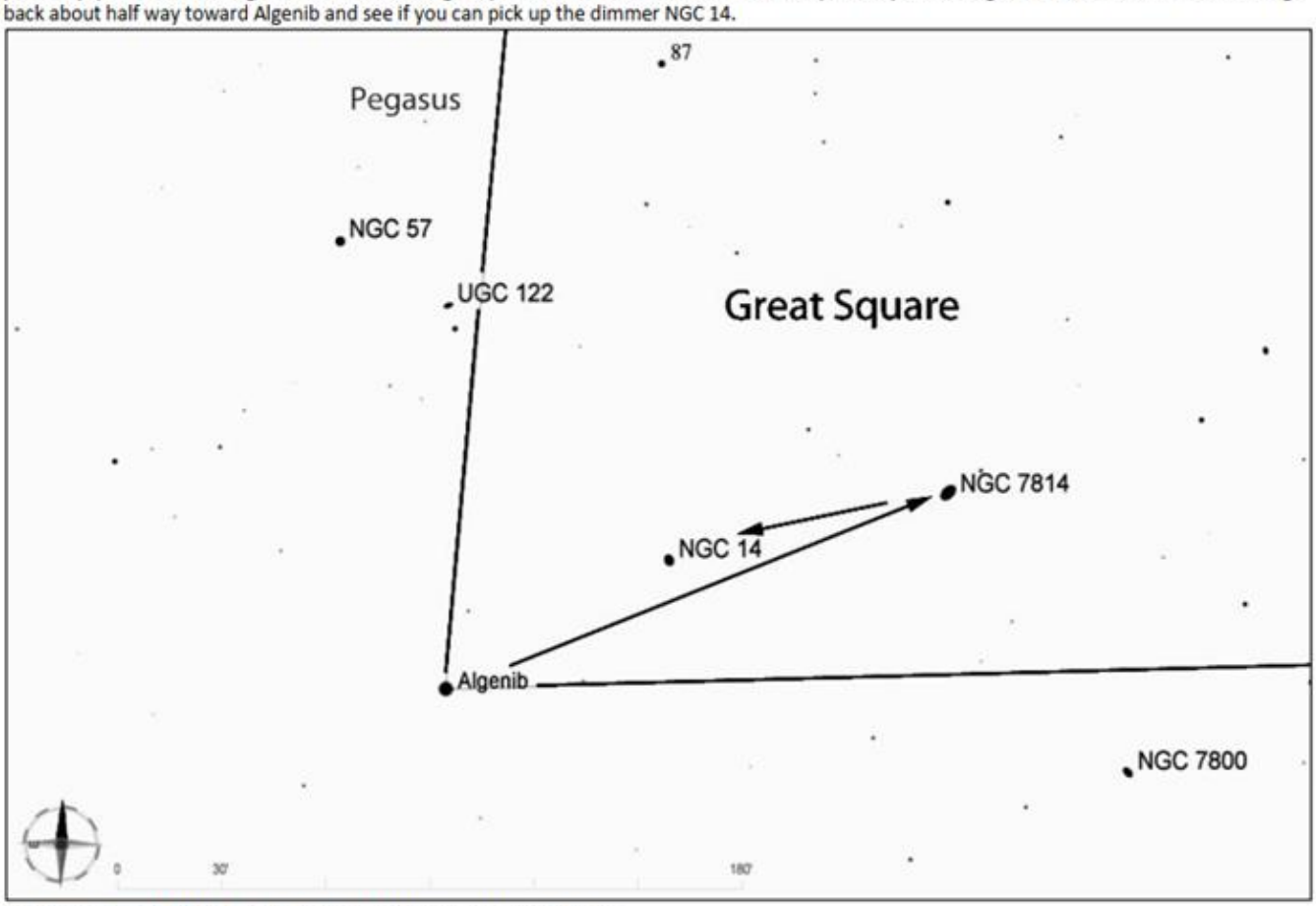


NGC 7814

Find the bright star Algenib at the southeast corner of the Great Square. NGC 7814 is about 2.5 degrees to the west-northwest. If you use a low power eyepiece with a 1 degree field of view, the galaxy will be about 2 and a half fields away. Once you take a good look at the Little Sombrero, go back about half way toward Algenib and see if you can pick up the dimmer NGC 14.

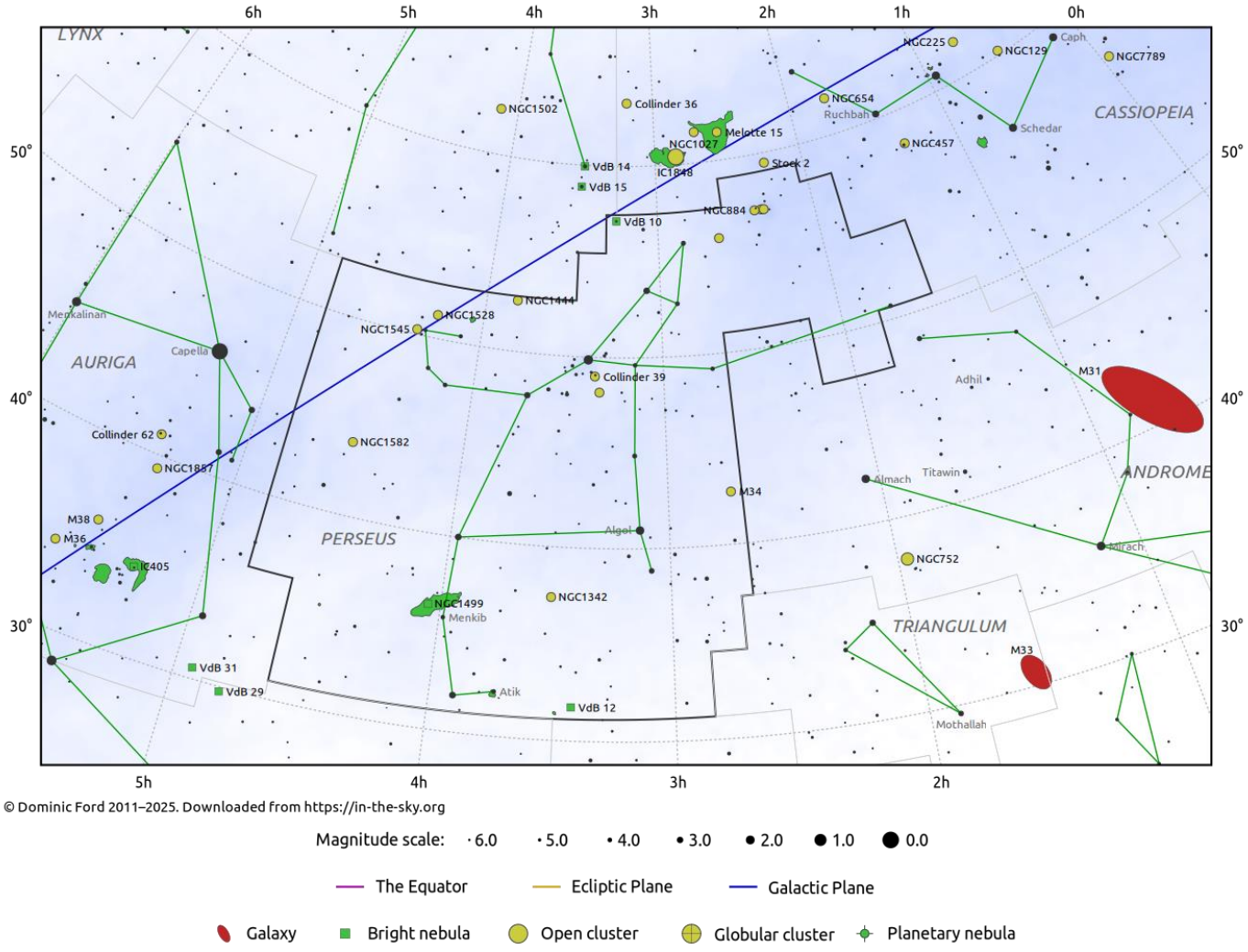


From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Perseus (Per)

Evening Visibility: **October – March**
Online Information: **Perseus**
Charts: **6** Featured Objects: **7**
More Online Information: NGC-869, NGC-884, Melotte 20, M-034, M-076, NGC-1499, Abell-426

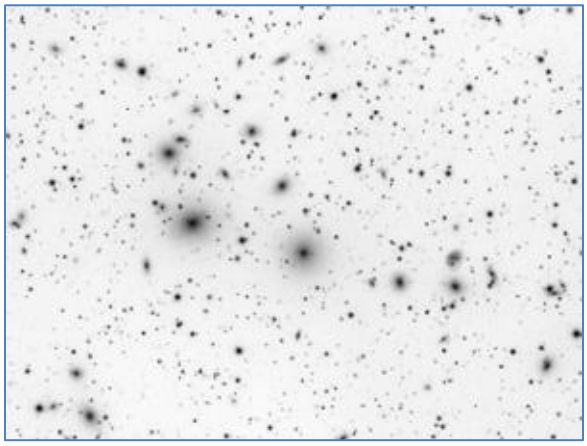
In-The-Sky.org Constellation Map



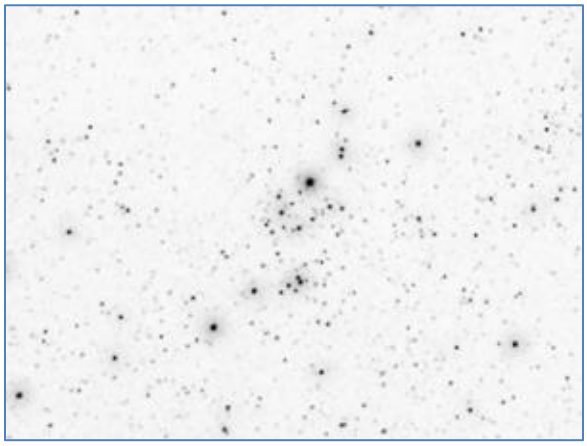
Object (Type)	Chart	Aliases	Stats
NGC-869 (OC)	1, W1	Perseus Double Cluster, C-14, h Persei	| Mag=3.7 | SB=20.0 | Size=30' |
NGC-884 (OC)	1, W1	Perseus Double Cluster, C-14, X Persei	| Mag=3.8 | SB=20.0 | Size=30' |

Object (Type)	Chart	Aliases	Stats
Melotte 20 (OC)	2, W2	Alpha Persei Cluster, The Alpha Persei Association, Collinder 39	| Mag=1.2 | SB=21.2 | Size=3° |
M-034 (OC)	3, W3	Spiral Cluster, NGC-1039	| Mag=5.5 | SB=22.3 | Size=35.0’ |
M-076 (PN)	4, W4	Little Dumbbell Nebula, Apple Core Nebula, NGC-650/651, The Barbell Nebula, The Cork Nebula	| Mag=10.1 | SB=24.0 | Size=4.8’ |
NGC-1499 (EN)	5, W5	California Nebula, Sh2-220, NGC-1499	| Mag=6.0 | SB=?? | Size=2.5° long |
Abell-426 (GX)	6, W6	Perseus I Galaxy Cluster	| Mag=11.9 | SB=N/A | Size=2.1° |

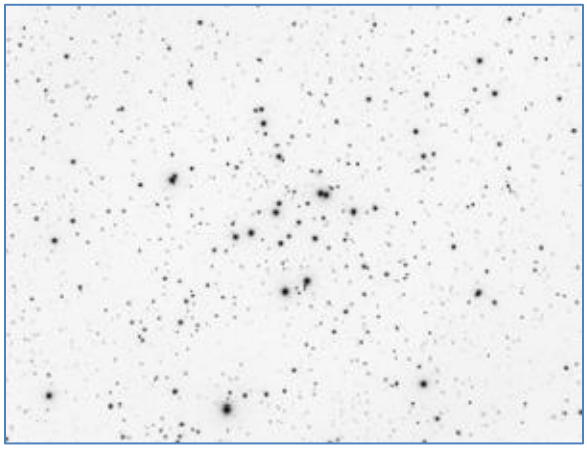
Image Gallery



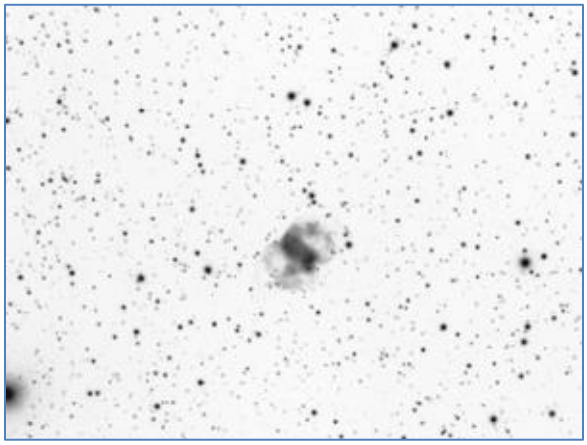
Perseus I Galaxy Cluster (Abell 426)



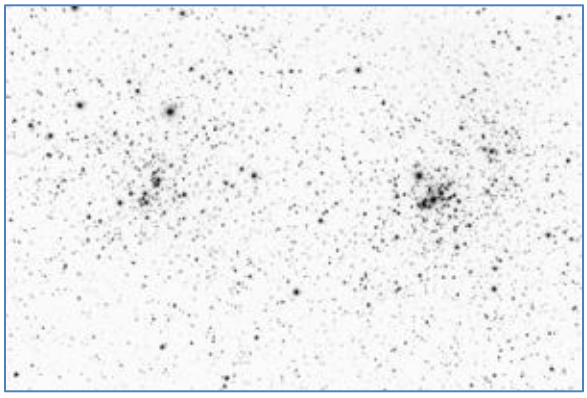
Alpha Persei Association



Messier 34



Messier 76, The Little Dumbbell Nebula

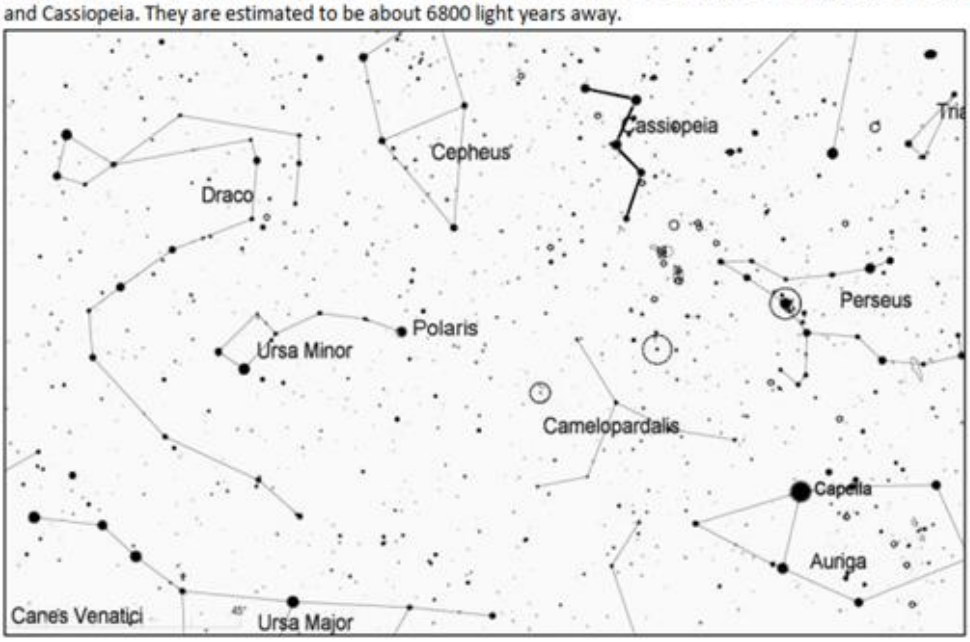


NGC 869 and 884 (Perseus Double Cluster)

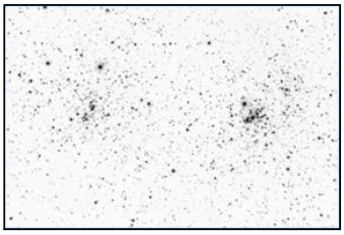
Blank

Perseus Double Cluster (NGC 869 and 884)

These two open clusters, side by side, are among the most impressive in the entire sky. Each contains several hundred blue-white stars, plus a few red giants that can be identified by their red-orange color. These clusters are visible to the naked eye as a hazy patch between the stars of Perseus and Cassiopeia. They are estimated to be about 6800 light years away.

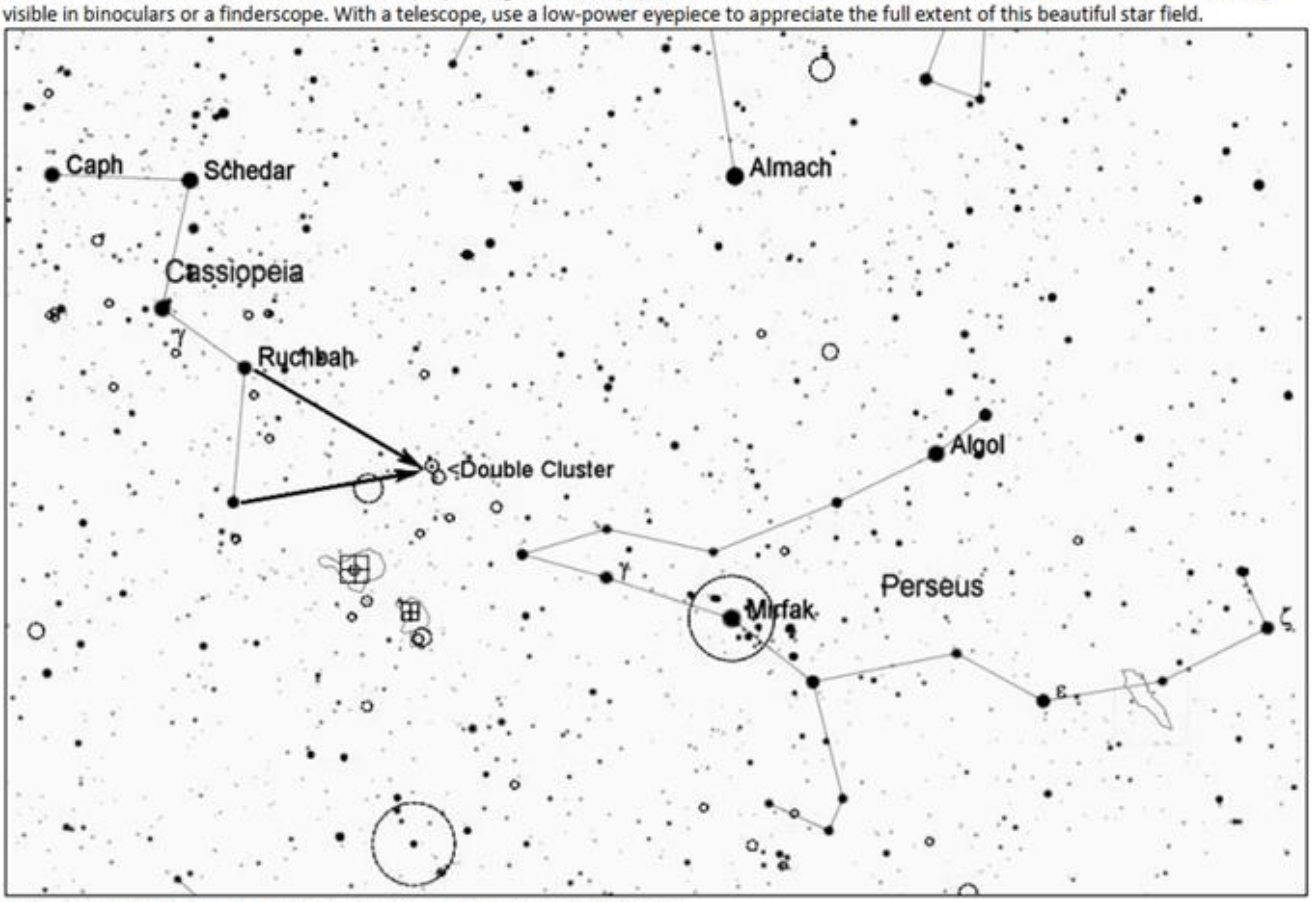


Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".



NGC 869 & 884

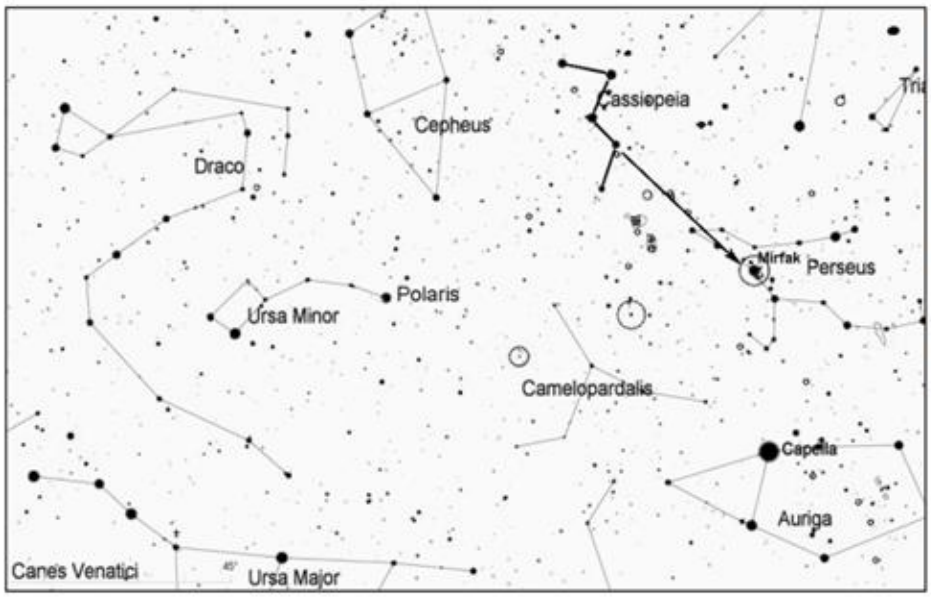
Once you have located Cassiopeia, use the first two stars of the W shape to make a slightly elongated triangle pointing in the direction of Perseus, as shown in the chart below. With the naked eye, you might see a hazy spot there, which is the Double Cluster. If not, the clusters will be readily visible in binoculars or a finderscope. With a telescope, use a low-power eyepiece to appreciate the full extent of this beautiful star field.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

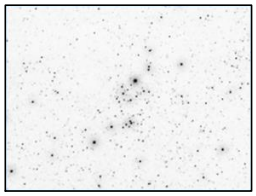
Melotte 20, the Alpha Persei Association

The bright star Mirfak is also known as Alpha Persei. The group of young, hot stars that surround it is called the Alpha Persei Association. This is one of the few star clusters that can be seen with the naked eye, and it is a wonderful sight through binoculars. The cluster extends about 3 degrees from end to end, making it too large to fit in the field of view of most telescopes. This group of stars is about 600 light years away.



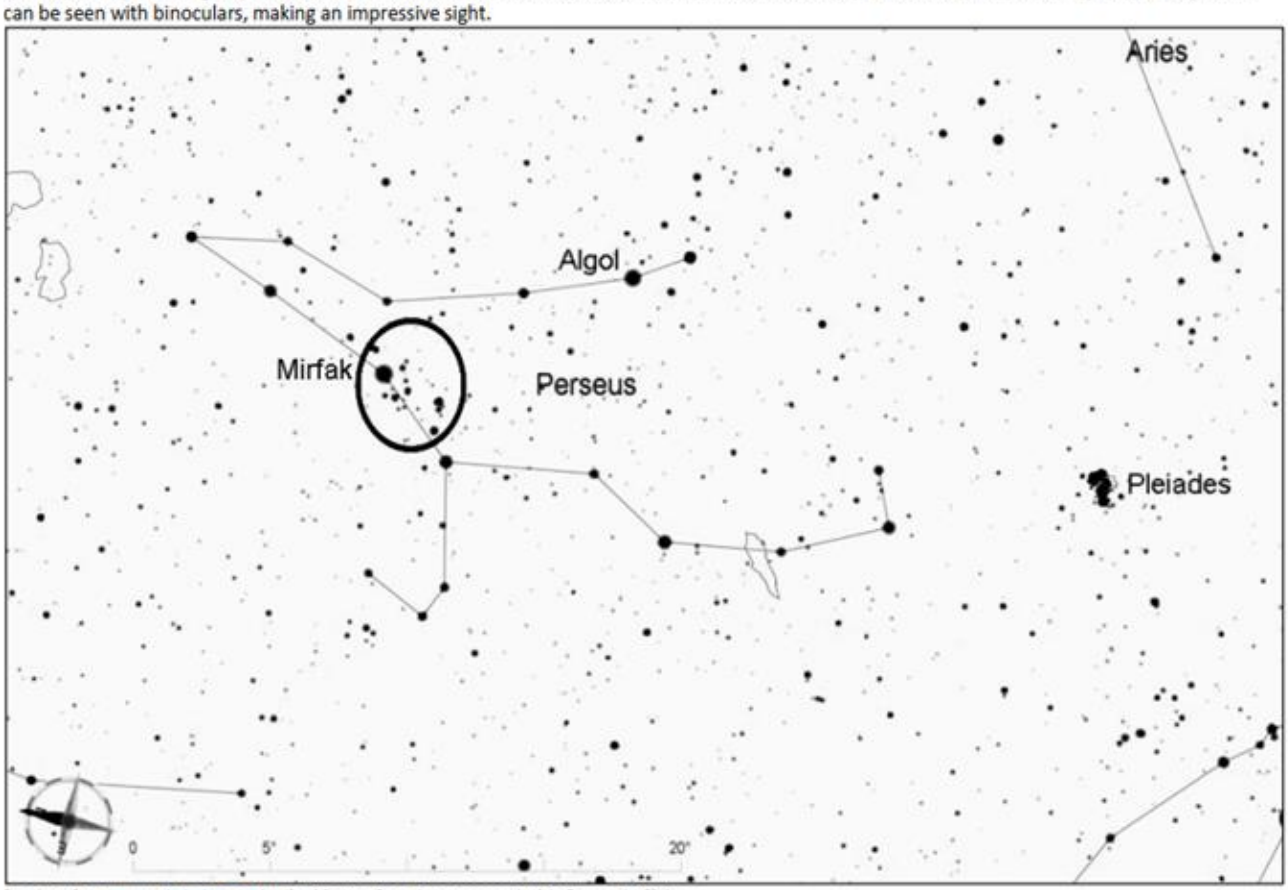
Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".

As shown here, use the stars of Cassiopeia to direct you to the nearby constellation Perseus, and its brightest star, Mirfak.



Melotte 20

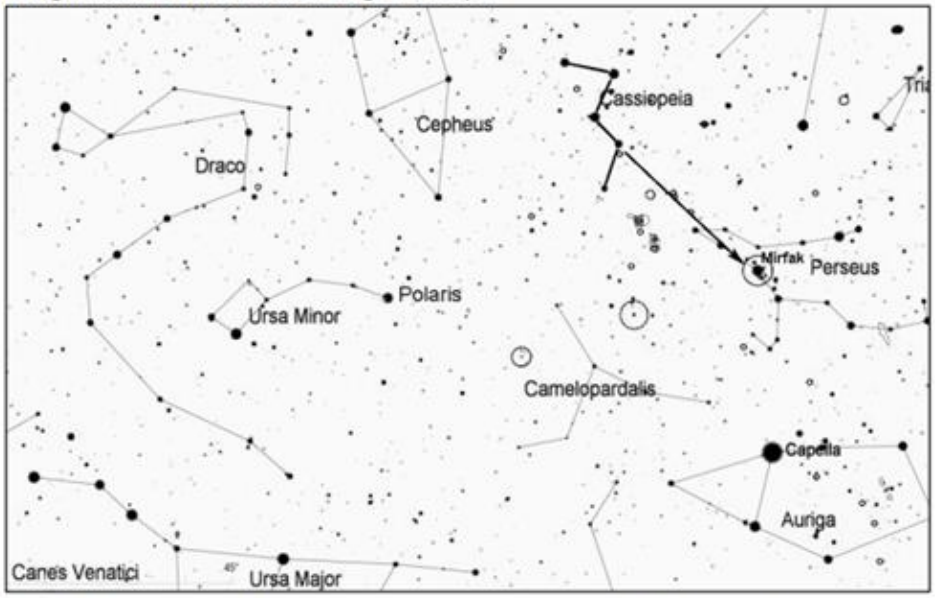
The stars of Perseus are fairly bright. The shape I see is some sort of animal with a curved tail. Whatever shape you see, note that Mirfak is surrounded by a loose group of stars, which is the Alpha Persei Association. Some of these stars can be seen with the naked eye, but many more can be seen with binoculars, making an impressive sight.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

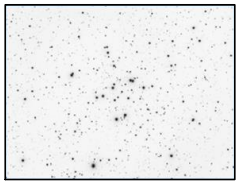
Messier 34, Open Cluster in Perseus

Messier 34 is a bright open cluster about 1/2 degree in diameter. It has about 10 or 15 bright stars and dozens of dimmer ones that can be seen through a typical amateur telescope. The size of this group is about 15 light years across, and it is about 1500 light years away. It is a nice view through binoculars, and even better through a telescope.



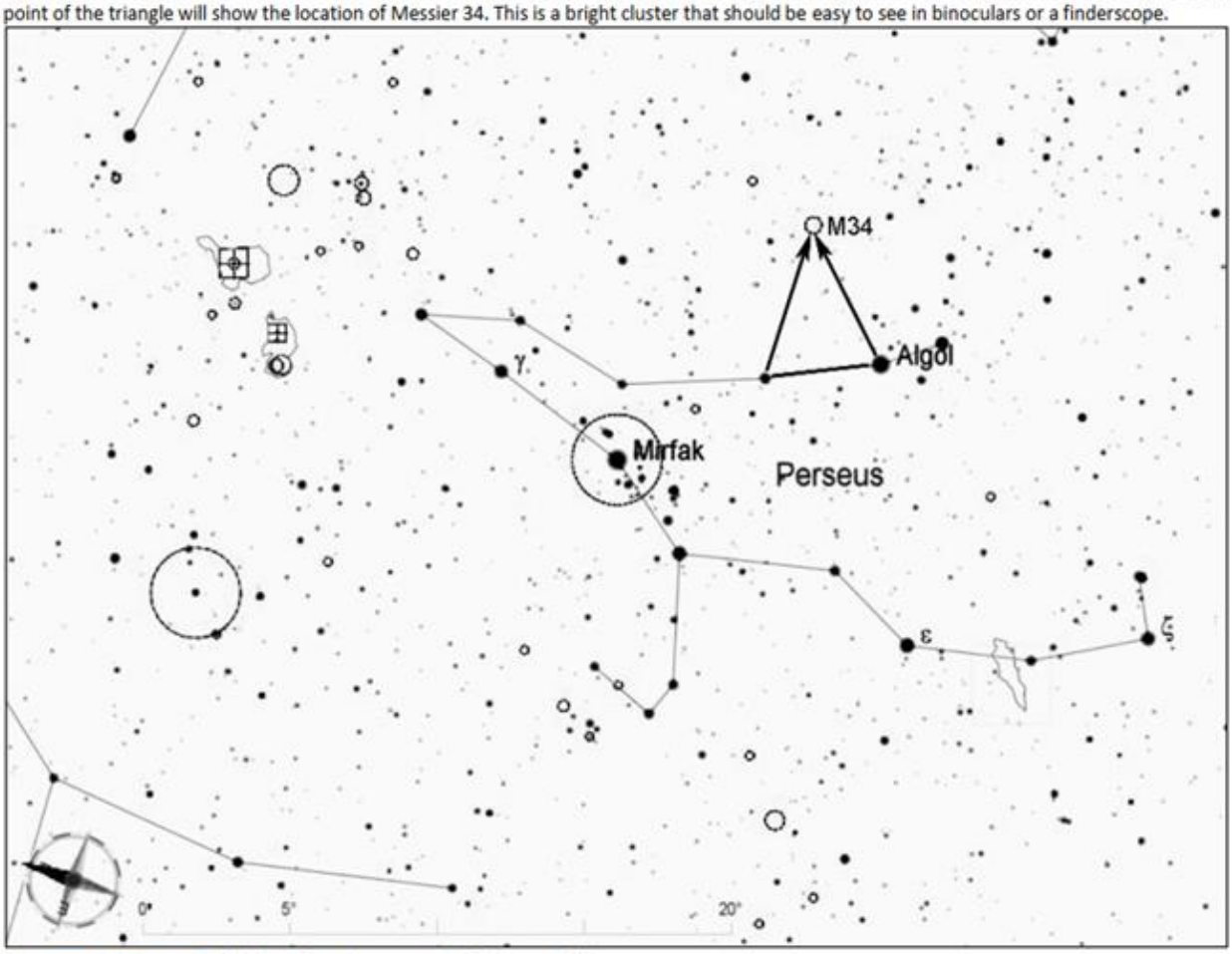
Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris where it is oriented like an "M".

As shown here, use the stars of Cassiopeia to direct you to the nearby constellation Perseus, and its brightest star, Mirfak.



M 34

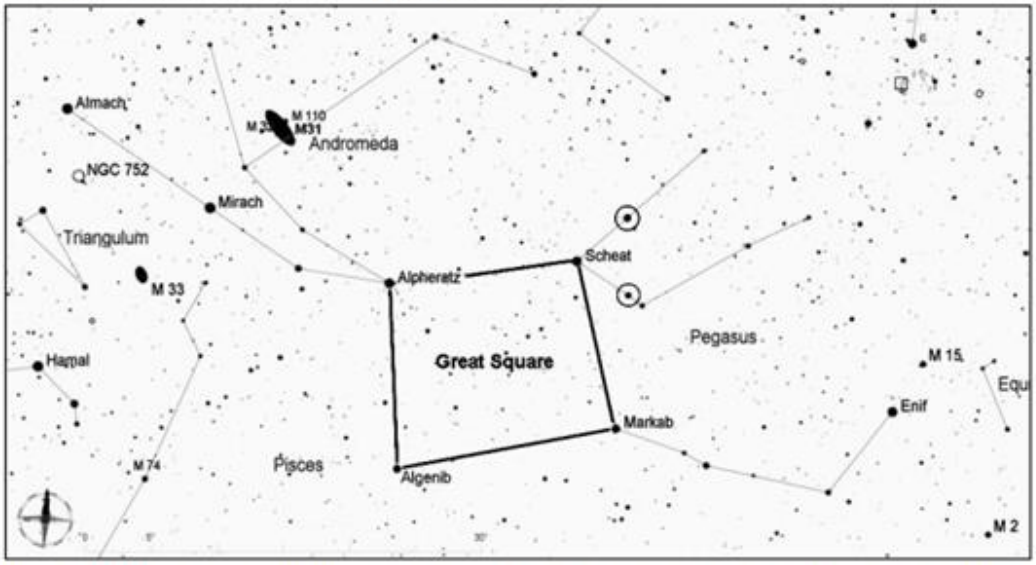
The stars of Perseus are fairly bright. The shape I see is some sort of animal with a curved tail. Whatever shape you see, look for the bright star Algol and the somewhat dimmer star to its north. As shown below, form a slightly elongated triangle with these two stars as the base, and the third point of the triangle will show the location of Messier 34. This is a bright cluster that should be easy to see in binoculars or a finderscope.



From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

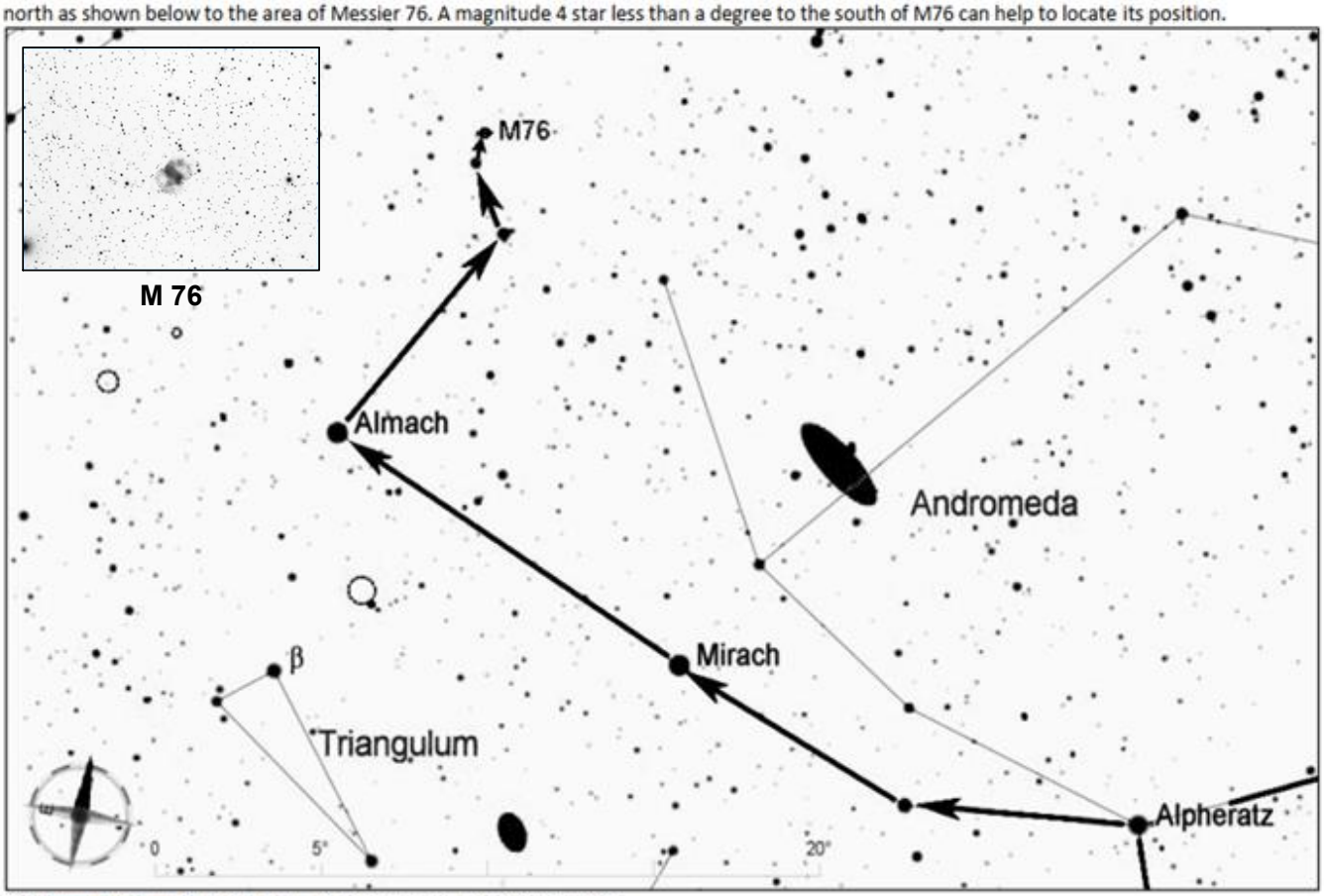
Messier 76, the Little Dumbbell Nebula

Messier 76 is called the Little Dumbbell Nebula because it has a shape that is similar to the larger and brighter Dumbbell Nebula (Messier 27). Through a telescope at medium to high power, it has a rectangular shape with a slightly narrower midsection. M76 may be about 1 or 2 light years in diameter and about 5600 light years away, but there is a lot of uncertainty about its size and distance. It is within the borders of the constellation Perseus, but a convenient star hop goes through nearby Andromeda.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

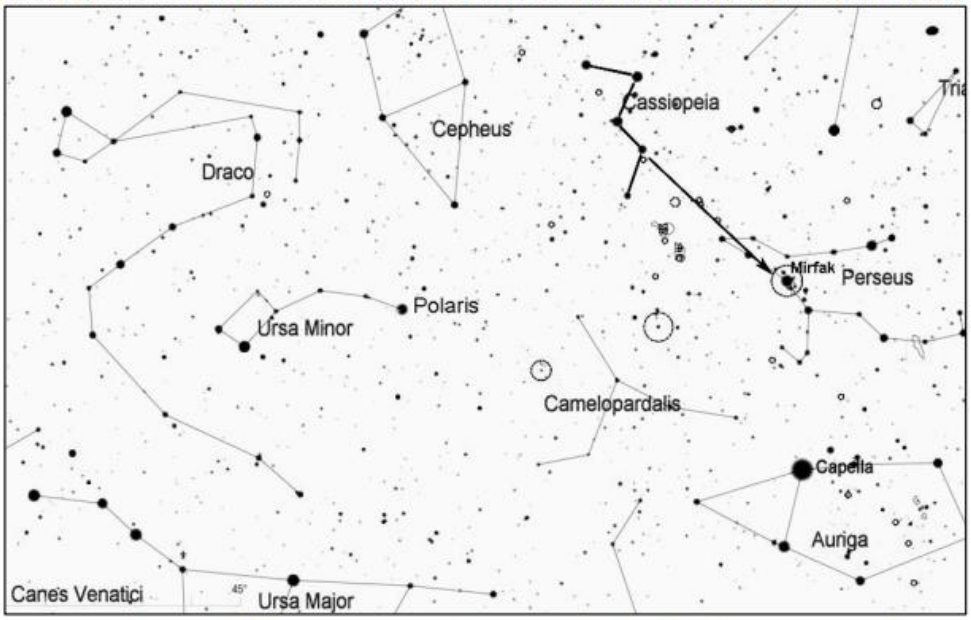
The constellation Andromeda stretches to the northeast from the Great Square, starting at the second-magnitude star Alpheratz. Using the naked eye, follow the stars of Andromeda east to Almach, another magnitude 2 star. Take a right turn at Almach to a slightly dimmer star, and then head north as shown below to the area of Messier 76. A magnitude 4 star less than a degree to the south of M76 can help to locate its position.



From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 1499, the California Nebula in Perseus

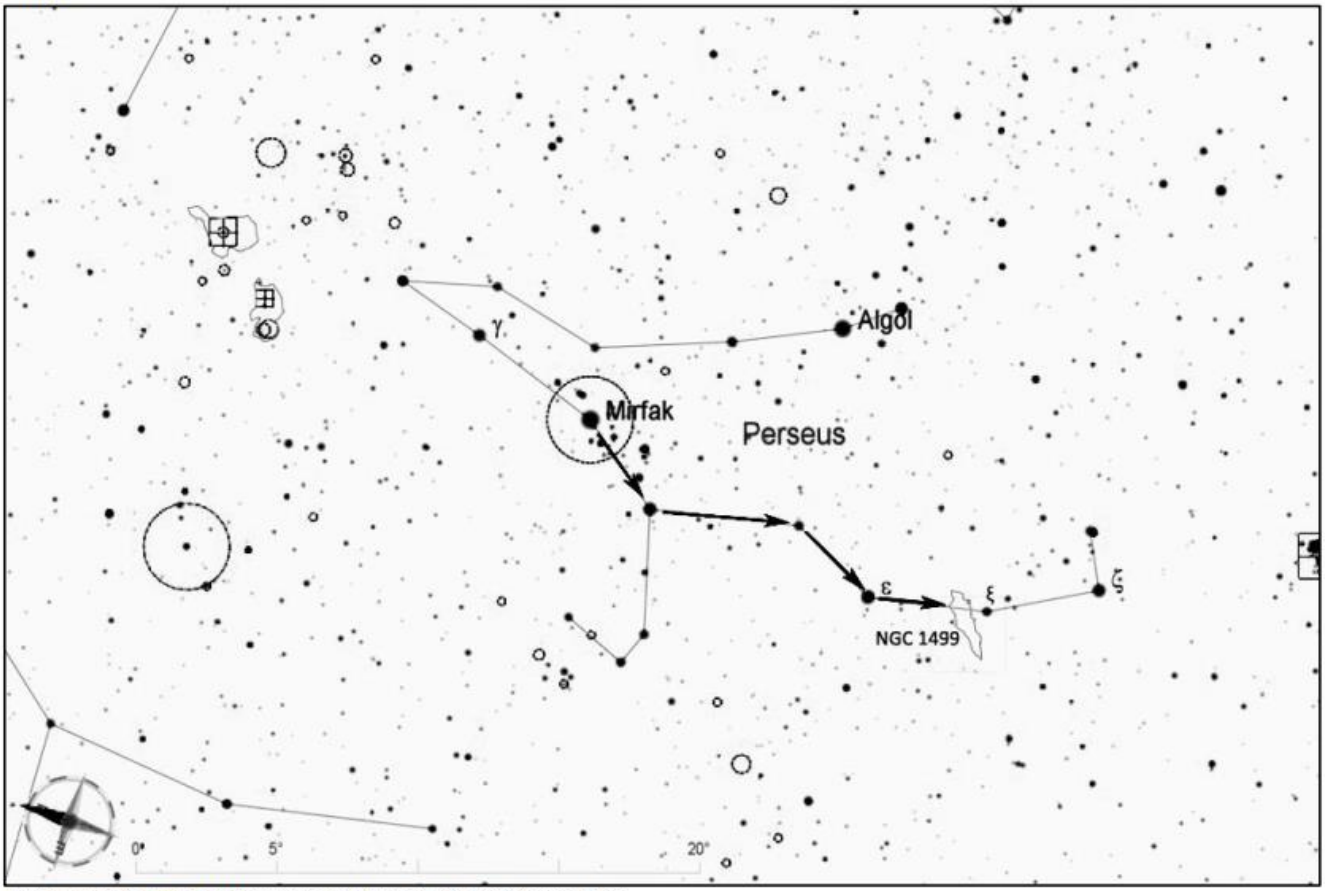
Photographs show that NGC 1499 stretches across more than 2 degrees of sky and has roughly the shape of California. Despite its size, this emission nebula is not easy to see through binoculars or a telescope because of its low surface brightness. Having a good dark night is essential, and using a nebula filter to enhance the contrast between the nebula and the sky background can really help.



Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".

As shown here, use the stars of Cassiopeia to direct you to the nearby constellation Perseus, and its brightest star, Mirfak.

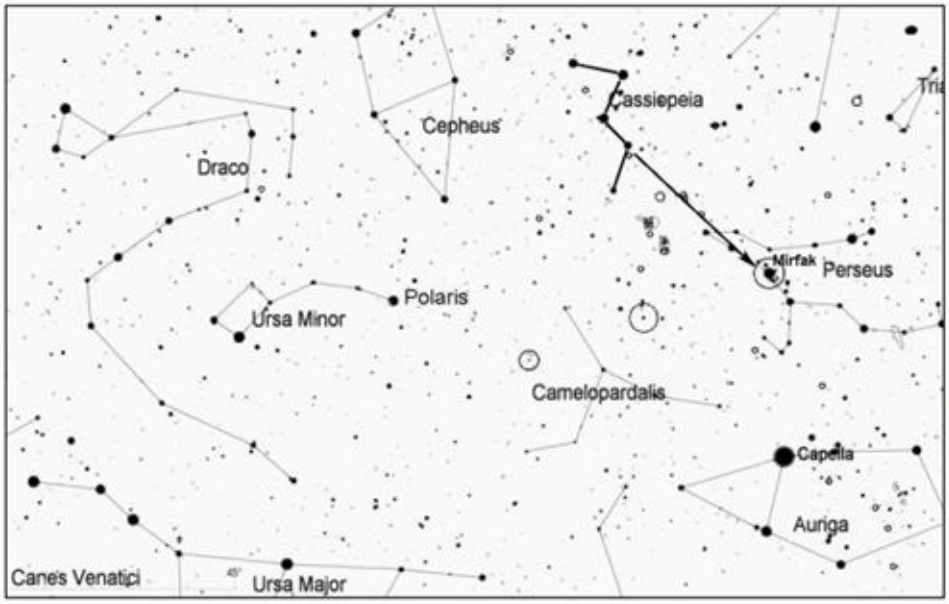
The stars of Perseus are fairly bright. The shape I see is some sort of animal with a curved tail. From the bright star Mirfak, follow a zig-zag line of four stars down the back leg of this animal shape. As shown below, NGC 1499 is between Epsilon (ε) and Xi (ξ) Persei, just about a degree north of ξ. This location is pretty easy to find, but the nebula is hard to see because it is so large and diffuse. Try on a clear moonless night from a dark location.



. From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Perseus I Galaxy Cluster (Abell 426)

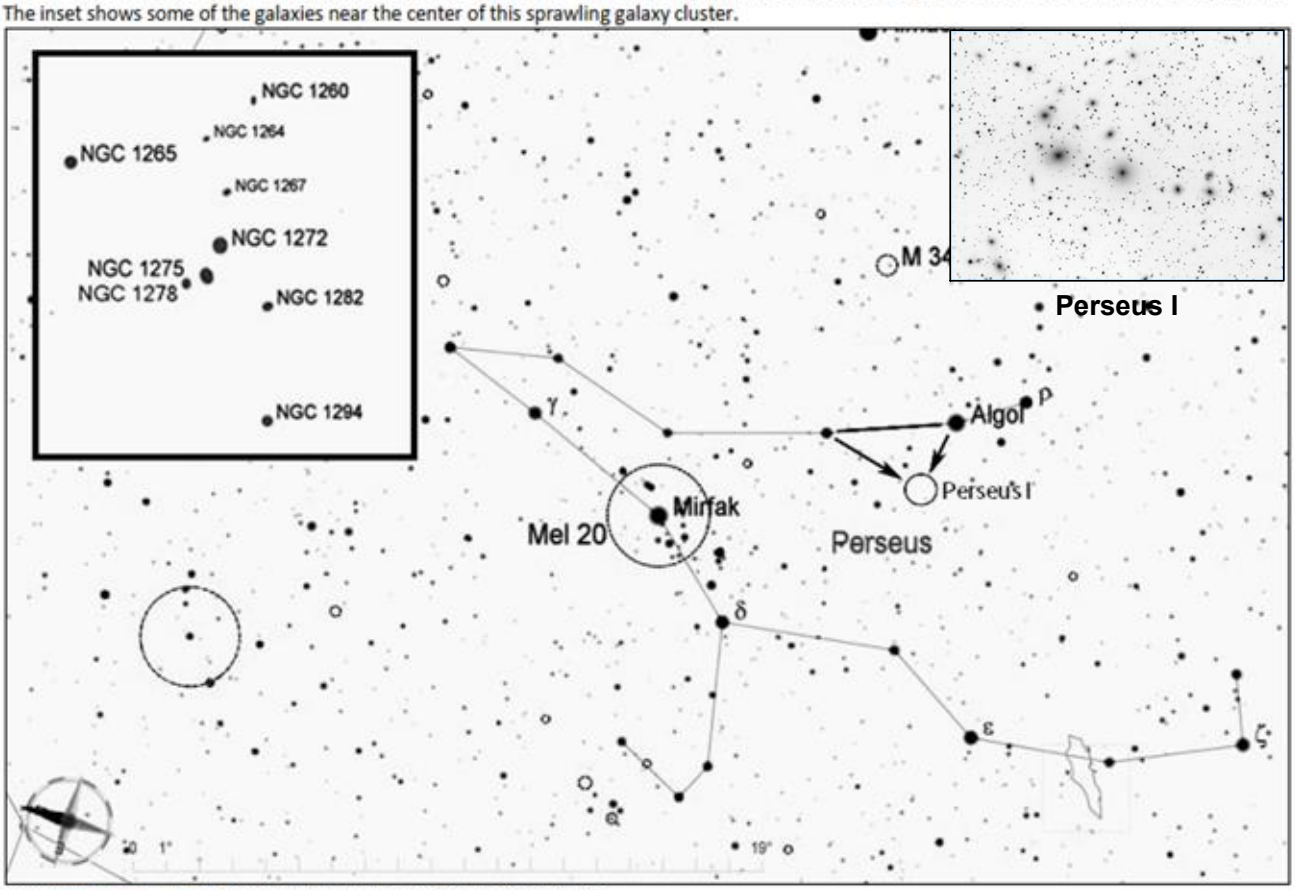
This is one of the most distant galaxy clusters that can be seen through amateur telescopes. It is about 240 million light years away. A bright galaxy near the center of the cluster is NGC 1275, also known as Perseus A, a strong source of radio emissions. At magnitude 11.9, it should be visible through a medium-sized telescope. Other relatively bright members include NGC 1272 and NGC 1278. See how many galaxies you can spot.



Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".

As shown here, use the stars of Cassiopeia to direct you to the nearby constellation Perseus, and its brightest star, Mirfak.

The stars of Perseus are fairly bright. The shape I see is some sort of animal with a curved tail. Whatever shape you see, look for the bright star Algol and the somewhat dimmer star to its north. As shown below, visualize a right triangle with these two stars, and the third point is near the center of the Perseus I cluster. Look with a low power eyepiece to try to spot a galaxy or two, then use higher power to search for dimmer galaxies. The inset shows some of the galaxies near the center of this sprawling galaxy cluster.

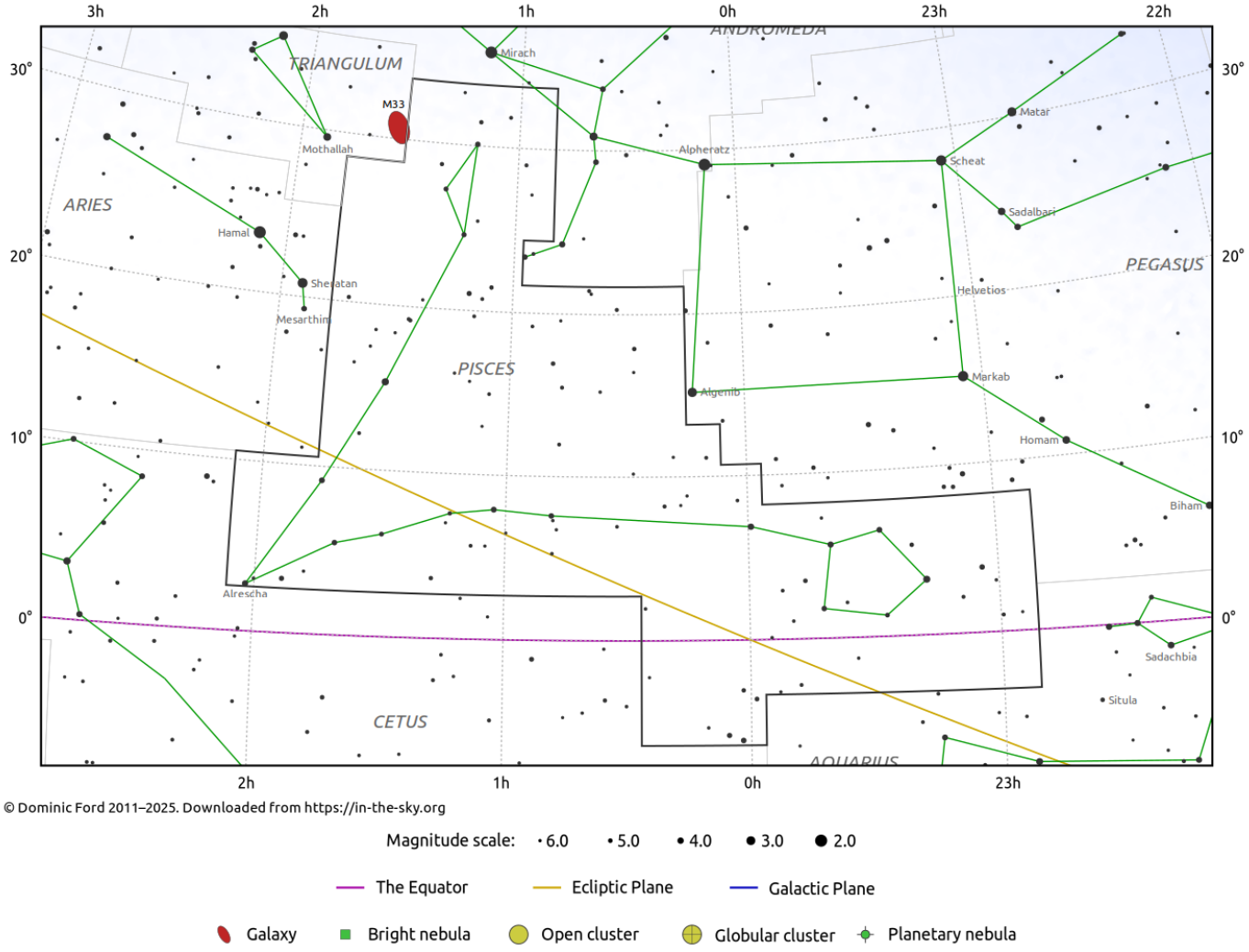


From www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Pisces (Psc)

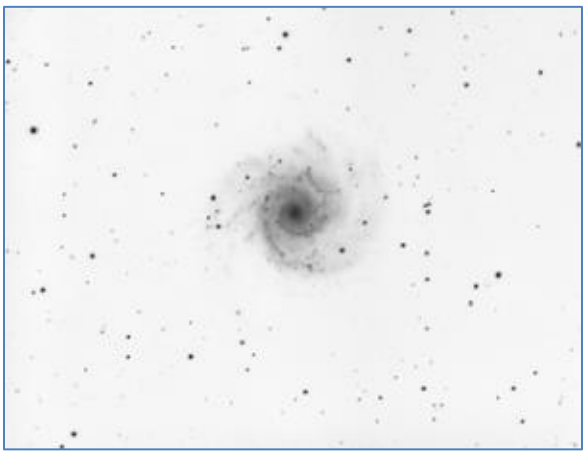
Evening Visibility: **October – February**
Online Information: **Pisces**
Charts: **1** Featured Objects: **1**
More Online Information: M-074

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
M-074 (G)	1, W1	Phantom Galaxy, NGC-628	| Mag=9.4 | SB=23.4 | Size=10.5’ x 9.5’ |

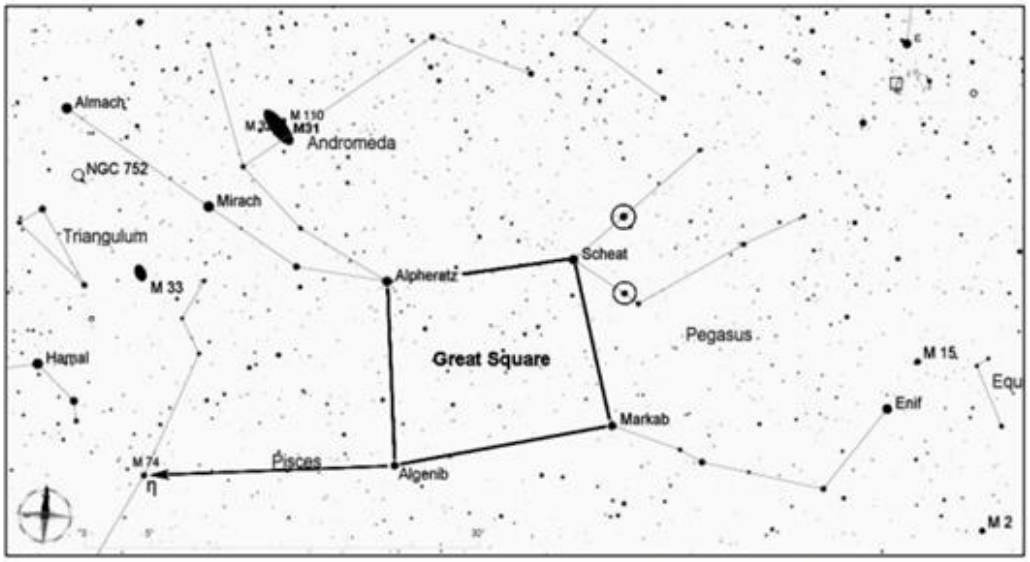
Image Gallery



Messier 74

Messier 74, Galaxy in Pisces

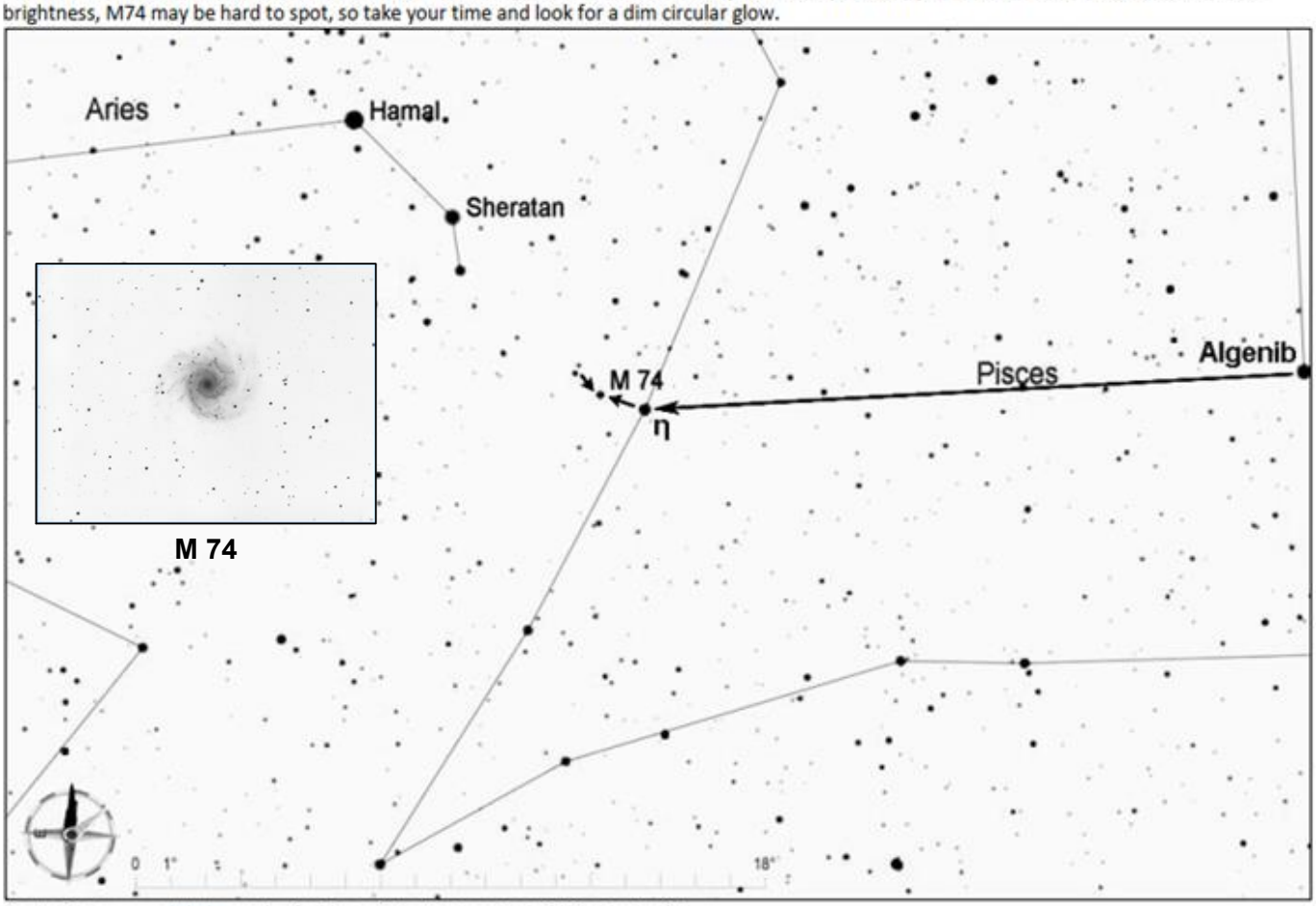
Messier 74 has the reputation of being the most difficult Messier object to find, because although it is fairly large, it has a very low surface brightness. Under dark skies, it can be seen in a small telescope, and large scopes will show a brighter center and some detail in its spiral arms. This galaxy is similar in size to our Milky Way Galaxy, and it is about 32 million light years away.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

Using the southern edge of the Great Square as a pointer, extend a line to the east about the size of the Square, and you will arrive at η Pisces, which at magnitude 3.6 is the brightest star in that area of sky.

From η Pisces, Messier 74 is just over a degree to the east-northeast. Note in the chart below that one degree further in the same direction is a pair of dim stars that will be visible in binoculars or a finderscope. M74 is about halfway between η and this pair of stars. Because of its low surface brightness, M74 may be hard to spot, so take your time and look for a dim circular glow.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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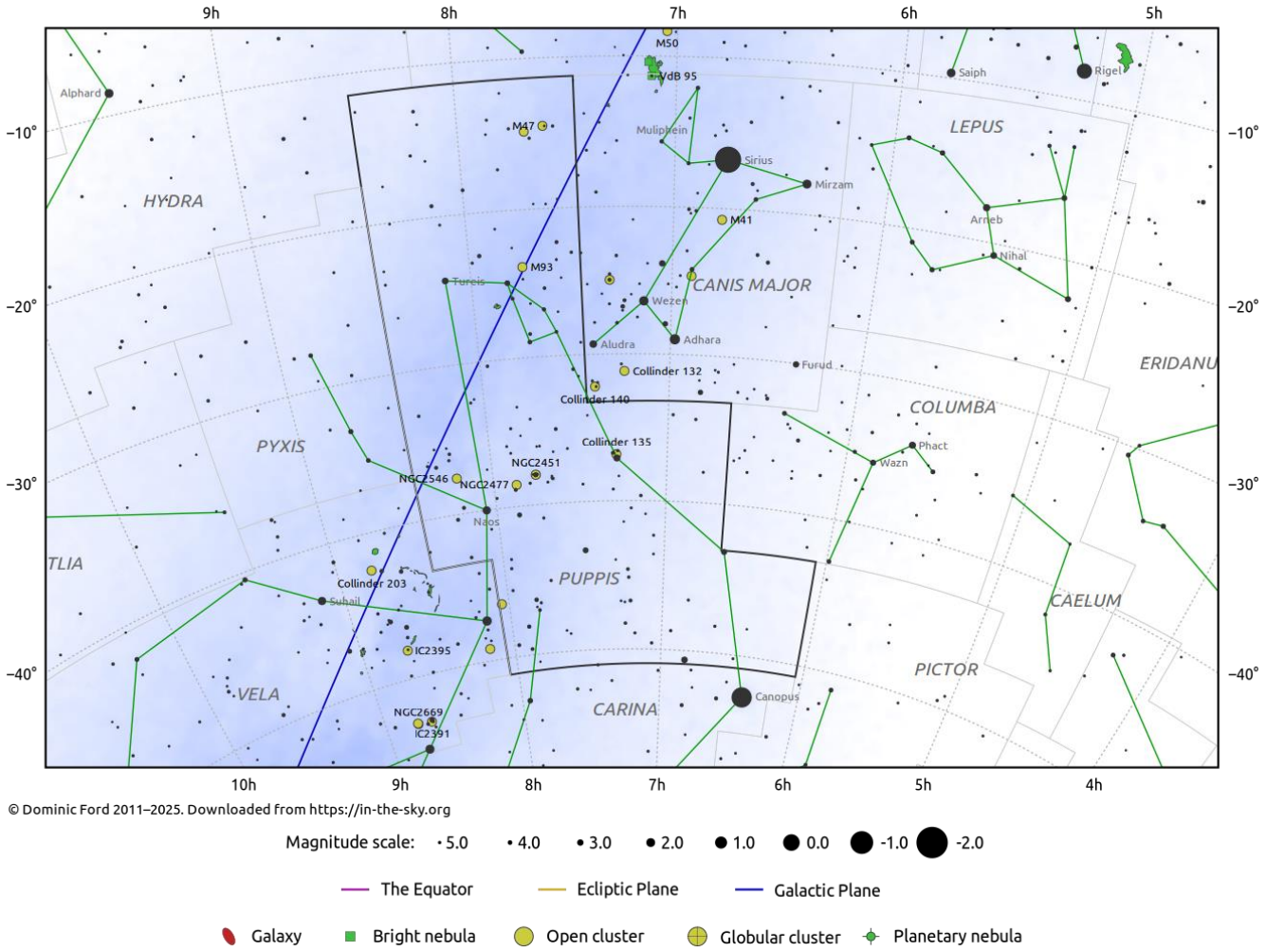
Puppis (Pup)

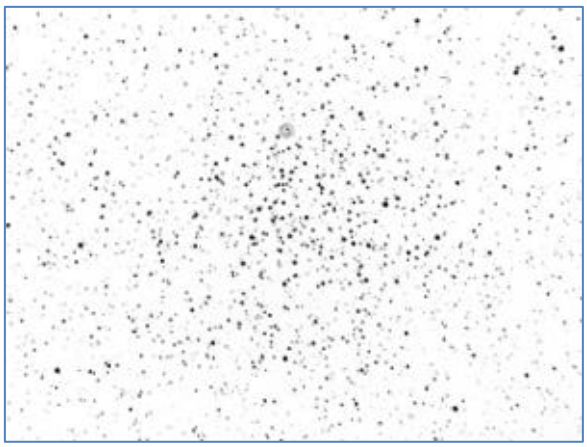
Evening Visibility: **February – April**
Online Information: **Puppis**
Charts: **3** Featured Objects: **5**
More Online Information: M-046, M-047, M-093, NGC-2477, NGC-2451

In-The-Sky.org Constellation Map

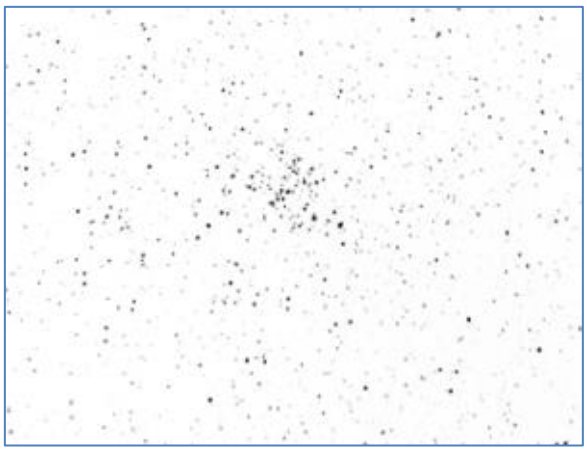


Object (Type)	Chart	Aliases	Stats
M-046 (OC)	1, W1	NGC-2437	| Mag=6.0 | SB=22.3 | Size=22.8’ |
M-047 (OC)	1, W1	NGC-2422	| Mag=4.4 | SB=20.5 | Size=30’ |
M-093 (OC)	2, W2	Critter Cluster, NGC-2447	| Mag=6.0 | SB=21.8 | Size=10’ |
NGC-2477 (OC)	3, W3	Termite Hole Cluster, C-71	| Mag=5.8 | SB=21.6 | Size=27’ |
NGC-2451 (OC)	3, W3		| Mag=3 | SB=19.7 | Size=45’ |

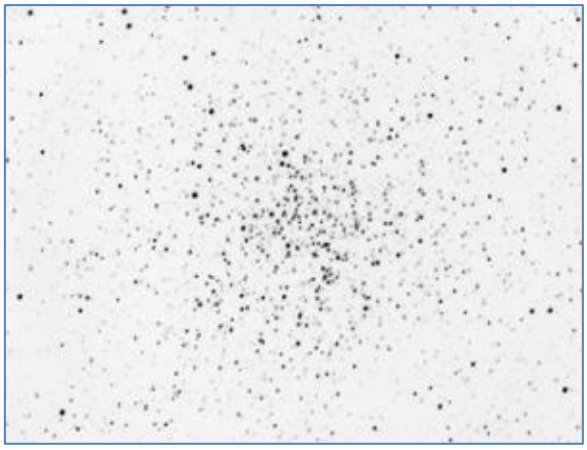
Image Gallery



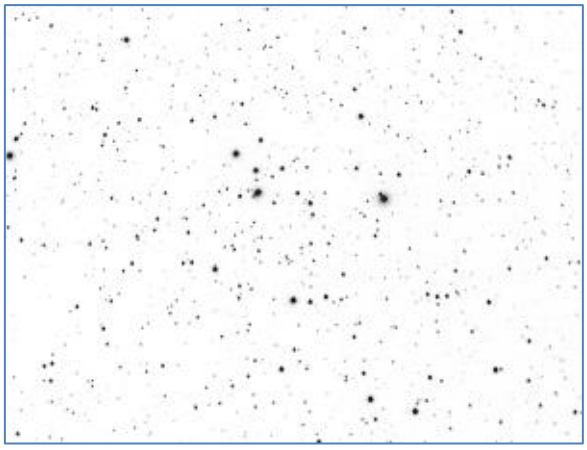
Messier 46 and NGC 2438



Messier 93



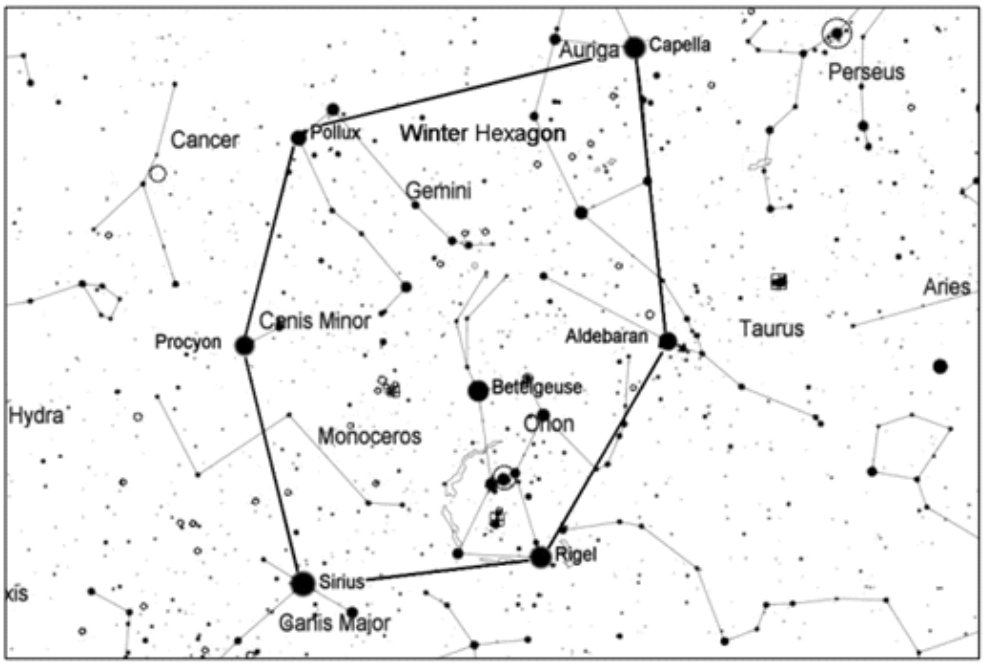
NGC 2477 (C 71)



Messier 47

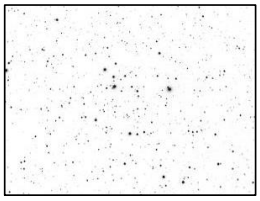
Messier 46 and 47, Open Clusters in Puppis

Messier 46 and 47 are two very different open cluster just over a degree apart. M46 contains more than 100 stars of fairly uniform brightness. Near the northern edge of M46 is a planetary nebula (NGC 2438) that can be seen well in medium to large telescopes. (The planetary nebula is actually closer than the cluster.) Messier 47 contains an interesting mixture of bright and dim stars. The distances to M46 and M47 are 5,300 and 1,600 light years, respectively.



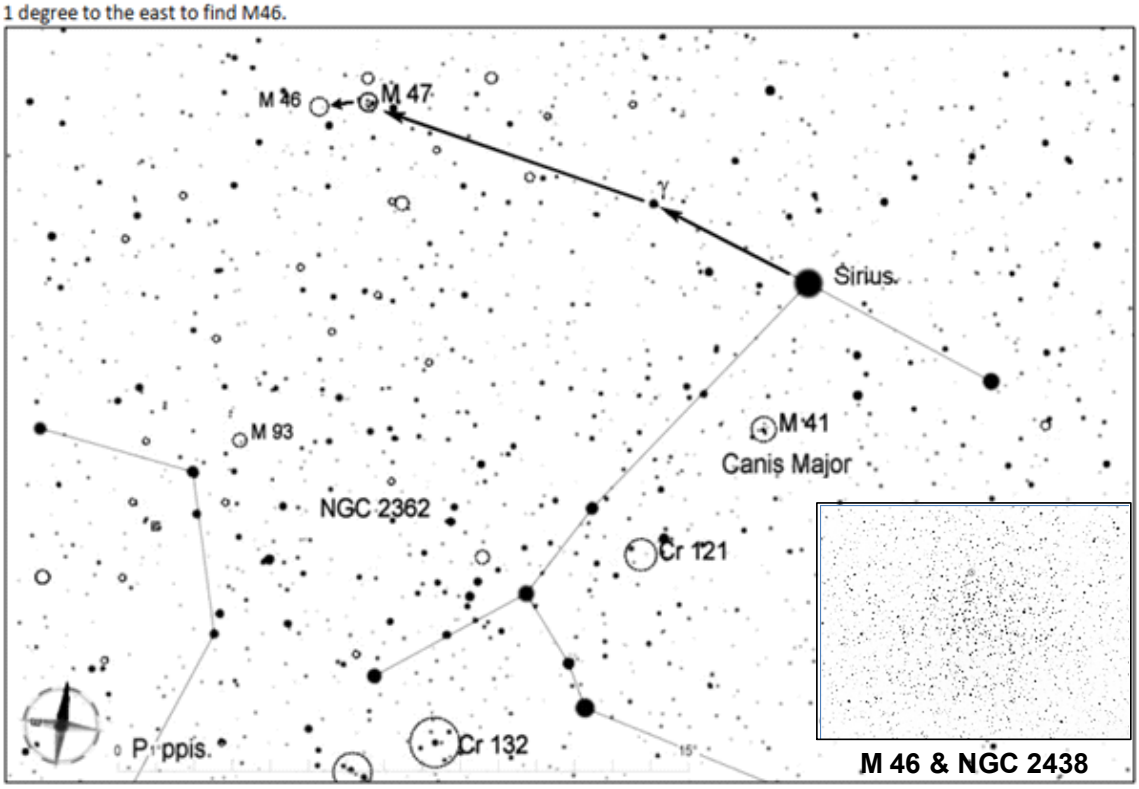
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



M 47

Look 5 degrees to the northeast of brilliant Sirius to find a much dimmer star, 4th magnitude γ Canis Majoris, which represents the eye or head of the big dog. From γ, follow roughly this same line twice as far to the northeast and you will arrive at the location of M47. There are no bright stars in the vicinity, but fortunately M47 is bright enough to be easily spotted in binoculars or a finderscope. After viewing M47, move slightly more than 1 degree to the east to find M46.

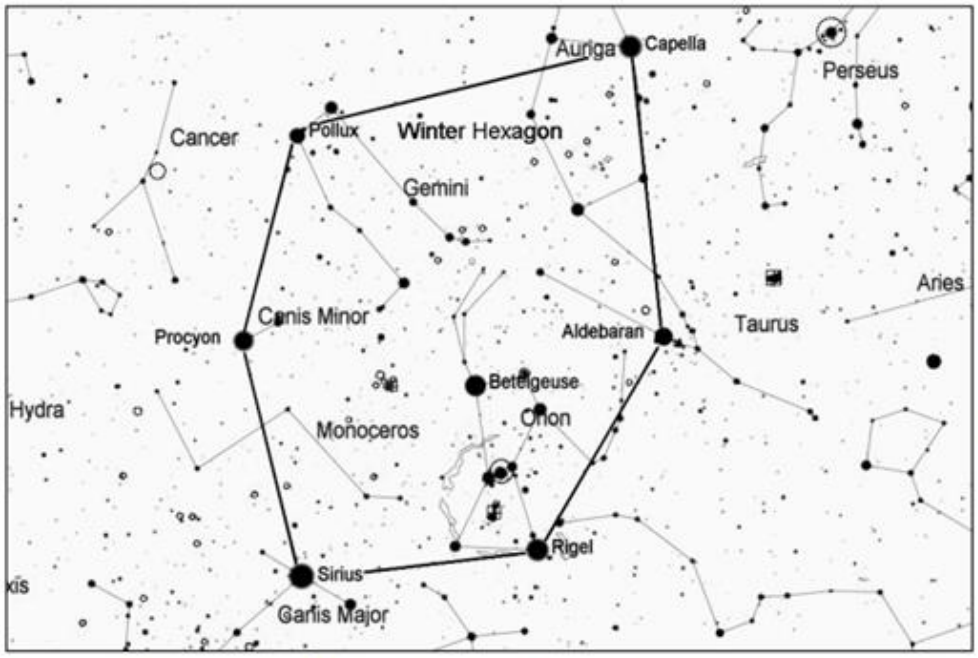


M 46 & NGC 2438

Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

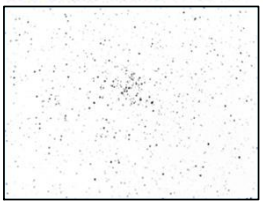
Messier 93, Open Cluster in Puppis

Messier 93 is a distinctive group of about 80 stars that stands out well against the Milky Way background when viewed through a telescope at low power. The densely packed center of the cluster has a wedge shape. The cluster is about 20 light years across and about 3400 light years away.



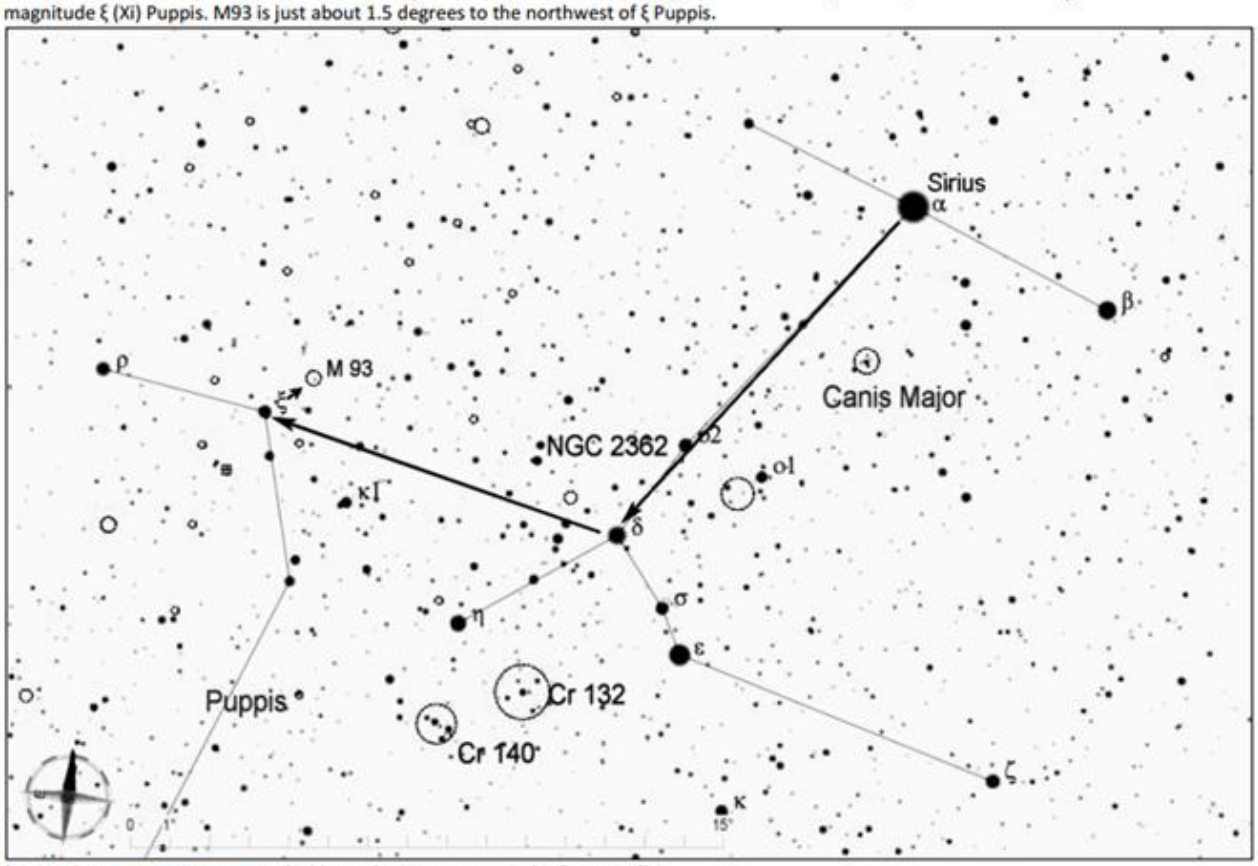
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



M 93

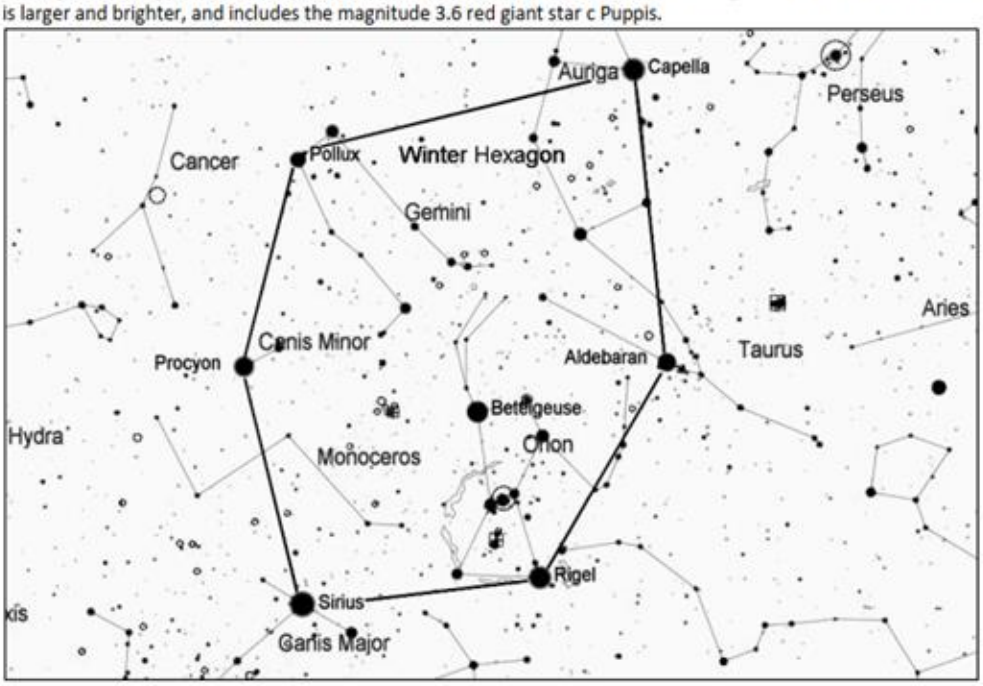
Sirius is known as the "dog star," and it forms the neck region of the constellation Canis Major, the big dog. From Sirius, look to the southeast to find δ (delta) Canis Majoris, one of the three bright stars that form the back leg and tail of the dog. From δ, look about 10 degrees east to find 3rd magnitude ξ (Xi) Puppis. M93 is just about 1.5 degrees to the northwest of ξ Puppis.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

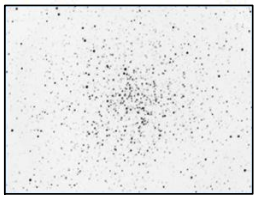
NGC 2477 (Caldwell 71) and NGC 2451, Open Clusters in Puppis

NGC 2477 (Caldwell 71) is a bright and rich cluster covering an area about half the diameter of the full Moon. In the mid-northern hemisphere, it never gets very high in the southern sky, so you need to seek it out when it is crossing the meridian (due south). NGC 2451 contains fewer stars but is larger and brighter, and includes the magnitude 3.6 red giant star c Puppis.



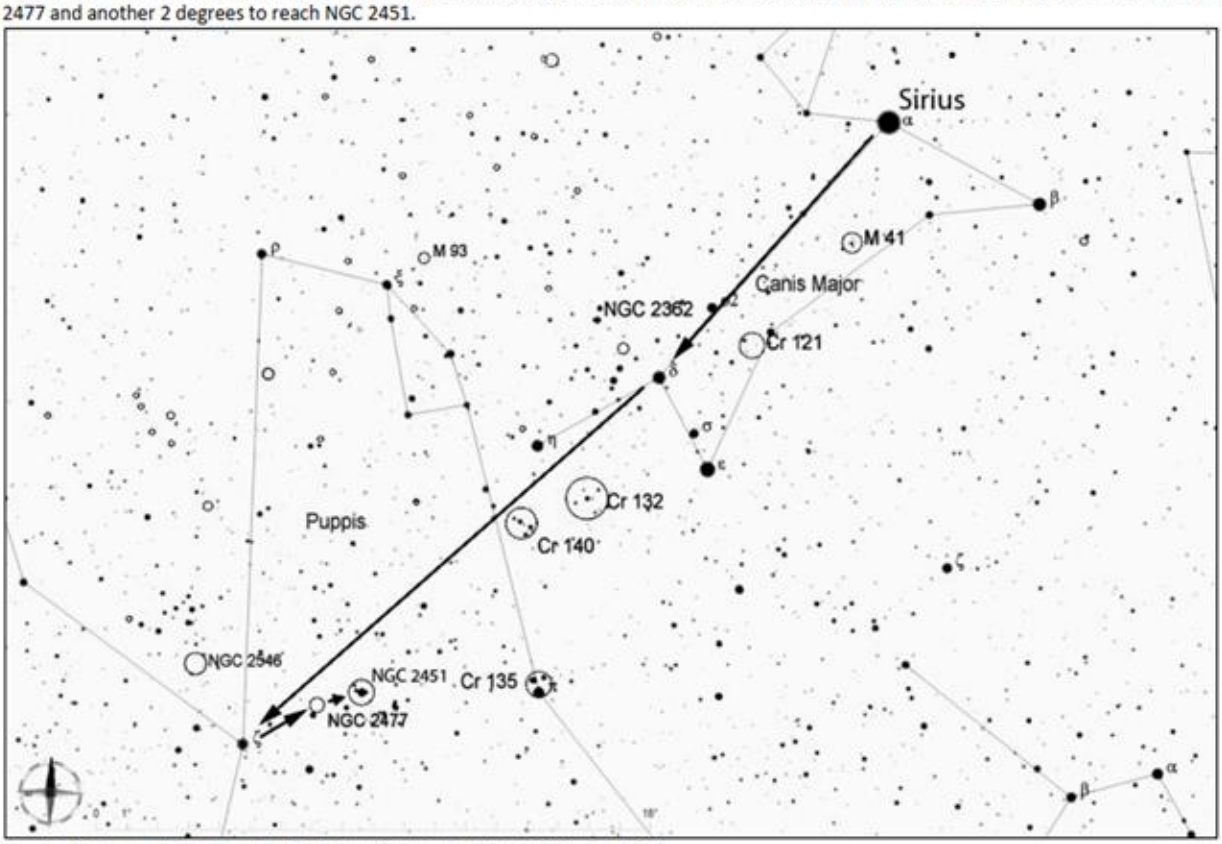
Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Sirius, the brightest star in the sky.



NGC 2477

Sirius is known as the "dog star," and it forms the neck region of the constellation Canis Major, the big dog. From Sirius, look to the southeast to find δ (delta) Canis Majoris, one of the three bright stars that form the back leg and tail of the dog. From δ, continue in this direction for another 18 degrees (almost 2 fists held at arm's length) to find 2nd magnitude ζ (Zeta) Puppis. Now backtrack to the northwest about 3 degrees to reach NGC 2477 and another 2 degrees to reach NGC 2451.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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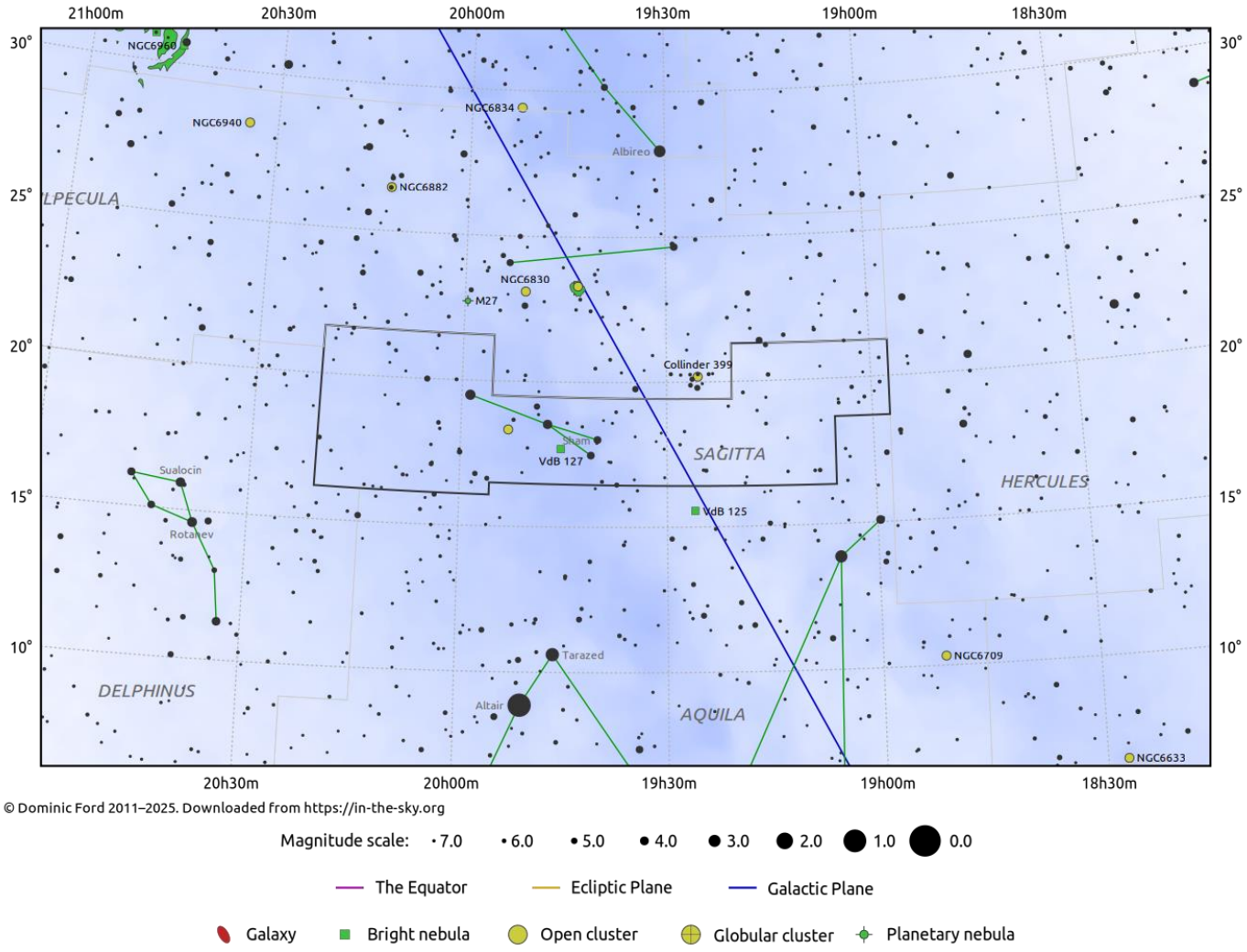
Sagitta (Sge)

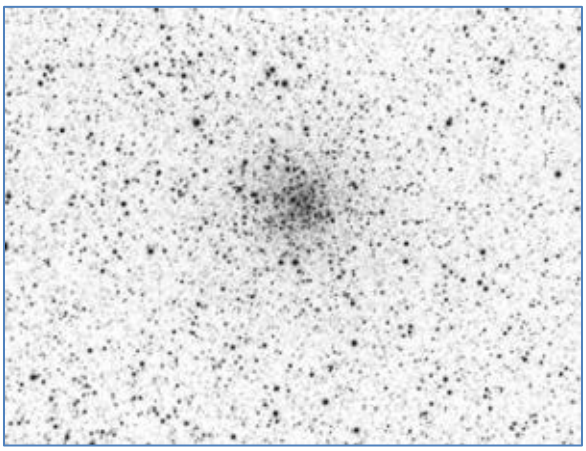
Evening Visibility: **July – September**
Online Information: **Sagitta**
Charts: **1** Featured Objects: **1**
More Online Information: M-071

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
M-71 (GC)	1, W1	Angelfish Cluster, NGC-6838	| Mag=8.2 | SB=21.4 | 7.2' |

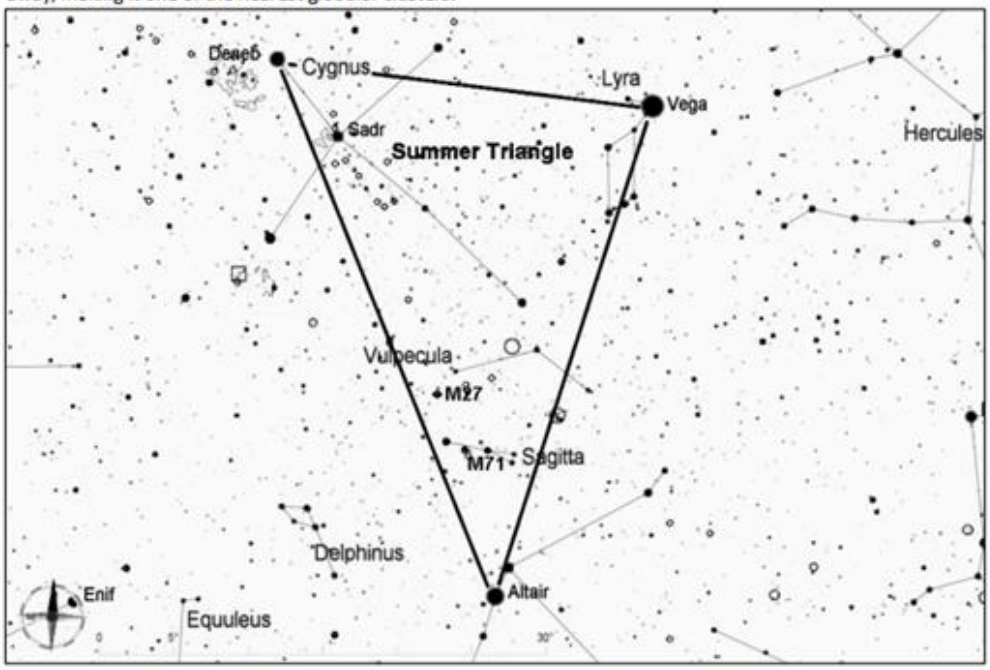
Image Gallery



Messier 71

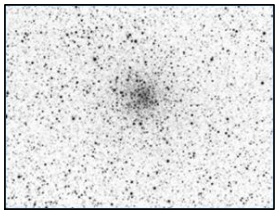
Messier 71, Globular Cluster in Sagitta

Messier 71 is an 8th magnitude globular cluster that is fairly loosely packed. With a telescope of medium to large aperture and magnification of 100x or more, it can be resolved into stars all the way to its center. This cluster is about 27 light years in diameter and about 13,000 light years away, making it one of the nearest globular clusters.



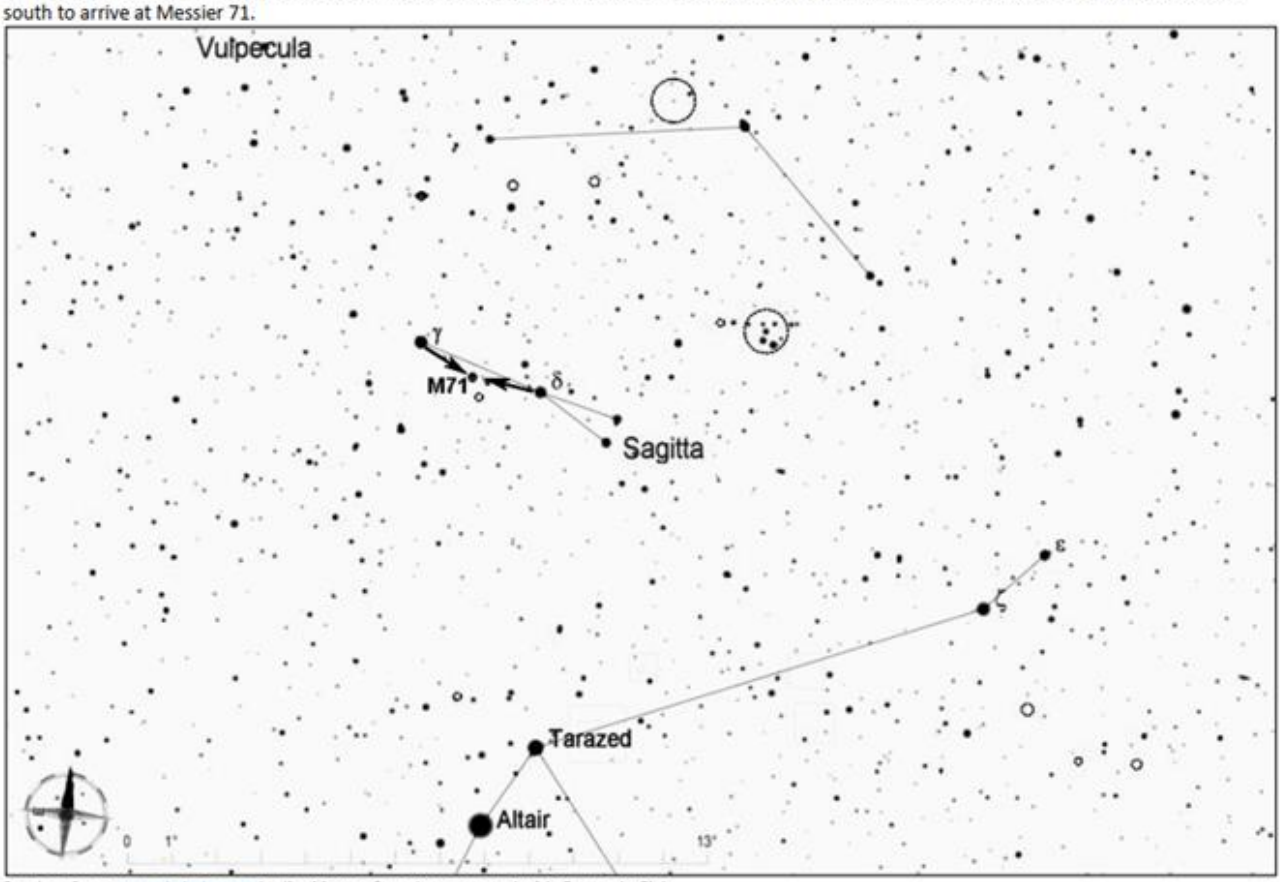
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

Look inside the Summer Triangle, to the north of Altair, to find the small constellation Sagitta, the arrow. Its four brightest stars do indeed form the shape of an arrow.



M 71

Point your telescope half way between the two stars that form the shaft of Sagitta, the arrow. Then give the telescope just a slight nudge to the south to arrive at Messier 71.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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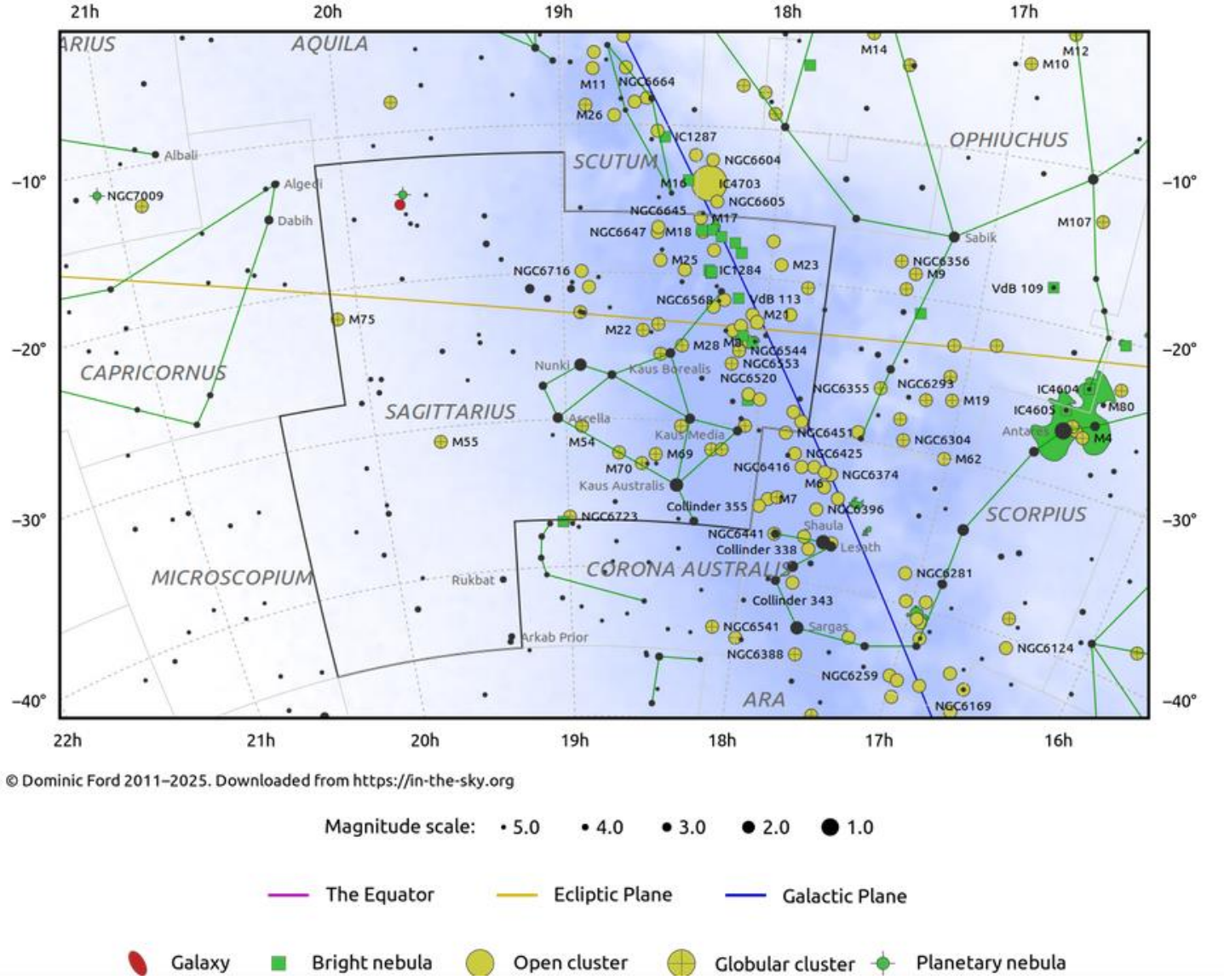
Sagittarius (Sgr)

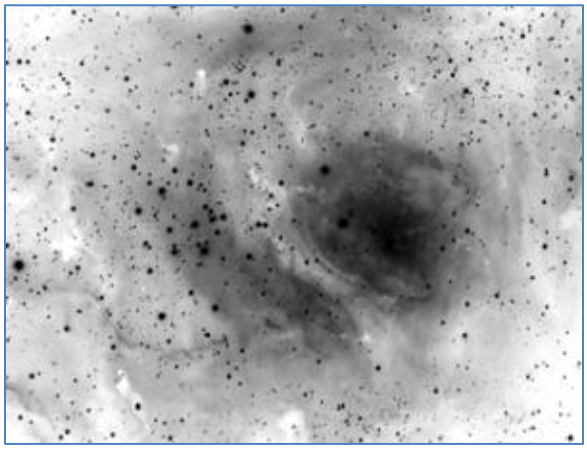
Evening Visibility: **July – September**
Online Information: **Sagittarius**
Charts: **10** Featured Objects: **19**
More Online Information: M-008, M-020, M-021, M-016, M-017, M-018, M-022, M-028, M-024, M-023, M-025, M-054, M-055, M-069, M-070, M-075, NGC-6522, NGC-6528, NGC-6822

In-The-Sky.org Constellation Map

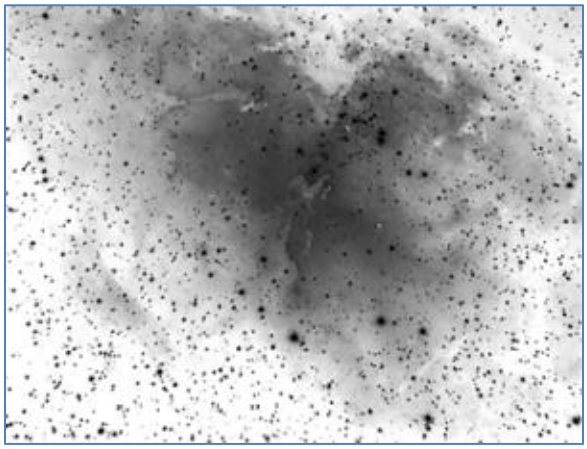


Object (Type)	Chart	Aliases	Stats
M-008 (EN, OC)	1, W1	Lagoon Nebula, Dragon Nebula, NGC-6523, Sh2-25, Gum 72	| Mag=4.6 | SB=23.4 | Size=90’ x 40’
M-020 (EN, DN)	1, W1	Trifid Nebula, The Clover, NGC-6514	| Mag=6.3 | SB=20.9 | Size=28’ |
M-021 (OC)	1, W1	Webb’s Cross, NGC-6531, Cr 363	| Mag=6.5 | SB=21.2 | Size=14.0’ |
M-016 (OC, EN)	2, W2	Eagle Nebula, Star Queen Nebula, The Ghost, NGC-6611, Cr 375, Gum 83	| Mag=6.4 | SB=22.8 | Size=70’ x 50’ | (In Serpens Constellation)
M-017 (EN)	2, W2	Swan Nebula, Omega Nebula, Horseshoe Nebula, Lobster Nebula, NGC-6618	| Mag=6.0 |SB=23.9 | Size=11’ |
M-018 (OC)	2, W2	Black Swan Cluster, NGC-6613	| Mag=7.5 | SB=21.4 | Size=9.8’ |
M-022 (GC)	3, W3	Great Sagittarius Cluster, Crackerjack Cluster, NGC-6656	| Mag=5.1 | SB=22.0 | Size=32’ |
M-028 (GC)	3, W3	NGC-6626	| Mag=6.8 | SB=22.4 | Size=11.2’ |
M-024 (OC)	4, W4	Small Sagittarius Star Cloud, NGC6603,Delle Caustiche, IC 4715	| Mag=2.5 | SB=21.7 | Size=2° x 1° |
M-023 (OC)	4, W4	NGC6494, Cr 356	| Mag=5.5 | SB=21.8 | Size=35’ |
M-025 (OC)	4, W4	IC-4725, IC 4725, Cr 382, Mel 204	| Mag=4.6 | SB=23.1 | Size=36’ |
M-054 (GC)	5, W5	NGC-6715, GCl 104	| Mag=7.6 | SB=21.9 | Size=12.0’ |
M-055 (GC)	6, W6	Specter Cluster, NGC-6809, GCl 113	| Mag=6.3 | SB=22.0 | Size=19.0’ |
M-069 (GC)	7, W7	NGC-6637, NGC 5534, GCl 96	| Mag=7.6 | SB=21.9 | Size=10.8’ |
M-070 (GC)	7, W7	NGC-6681, GCl 101	| Mag=7.9 | SB=22.1 | Size=8.0’ |
M-075 (GC)	8, W8	NGC-6864, GCl 116	| Mag=8.5 | SB=22.0 | Size=6.8’ |
NGC-6522 (GC)	9, W9	GCl 82	| Mag=8.3 | SB=21.0 | Size=9.4’ |
NGC-6528 (GC)	9, W9	GCl 84, ESO 456-48	| Mag=10.6 | SB=21.0 | Size=8.3’ |
NGC-6822 (G)	10, W10	Barnard’s Galaxy, C-57, IC-4895, PGC 63616	| Mag=9.3 | SB=22.7 | Size=15.5’ x 13.5’ |

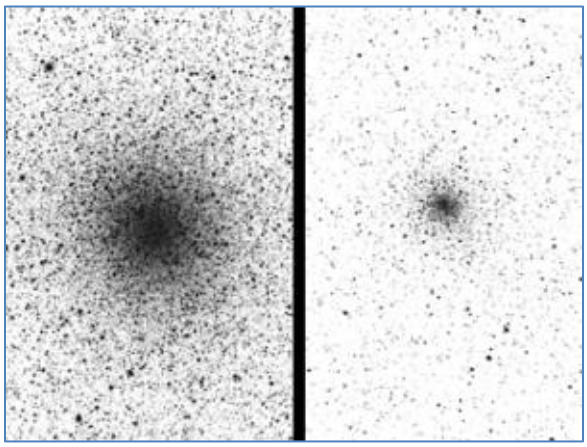
Image Gallery



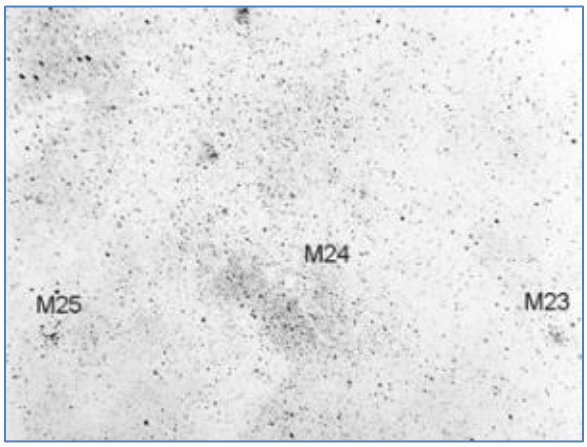
Messier 8, The Lagoon Nebula



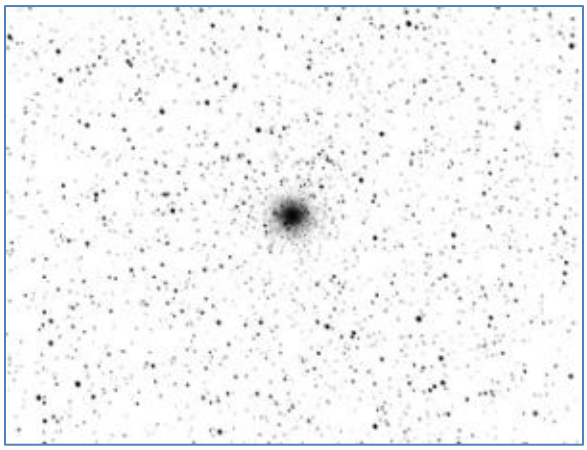
Messier 16, The Eagle Nebula



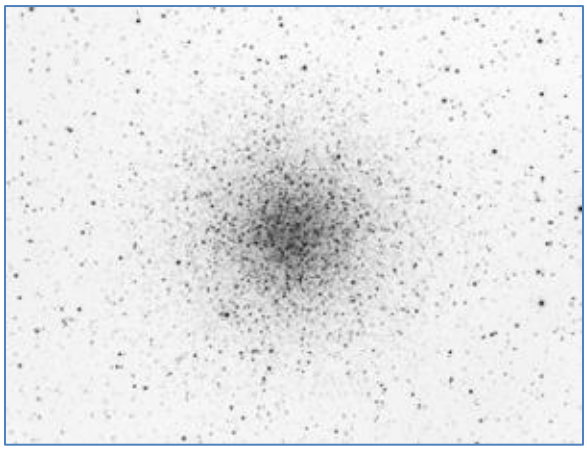
Messier 22 and 28



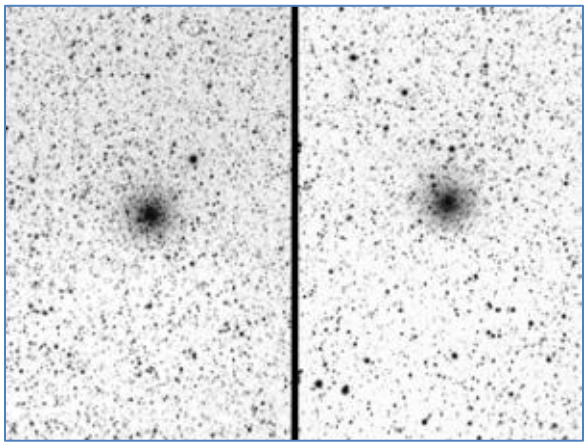
Messier 23, 24 and 25



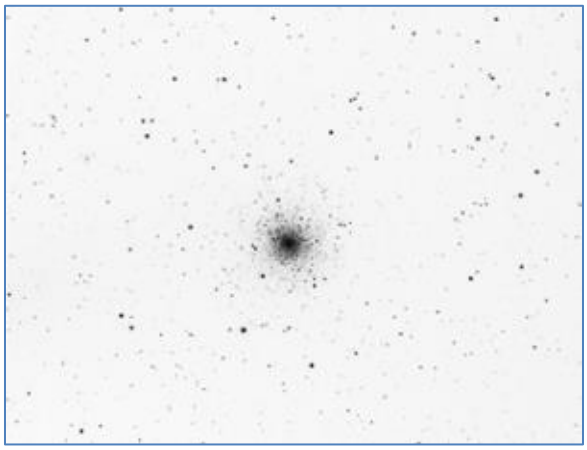
Messier 54



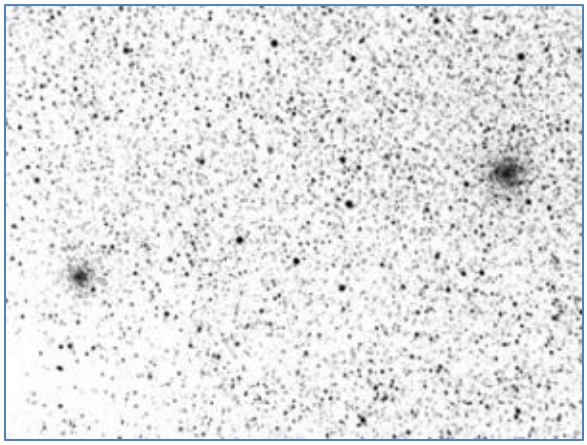
Messier 55



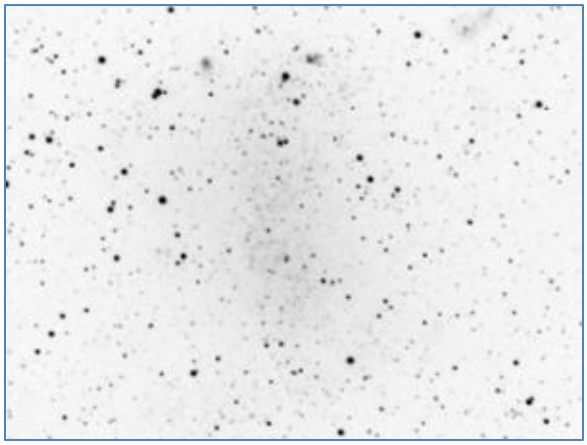
Messier 69 and 70



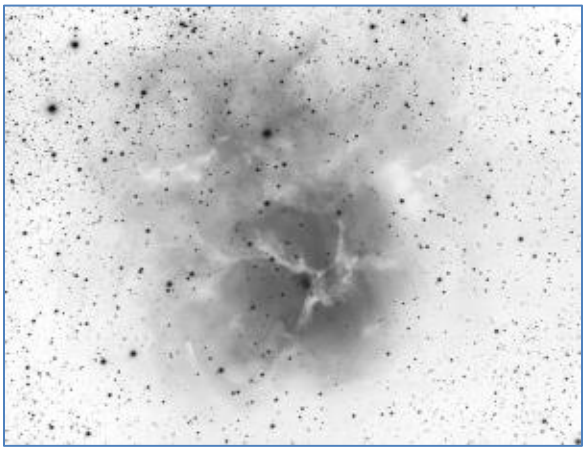
Messier 75



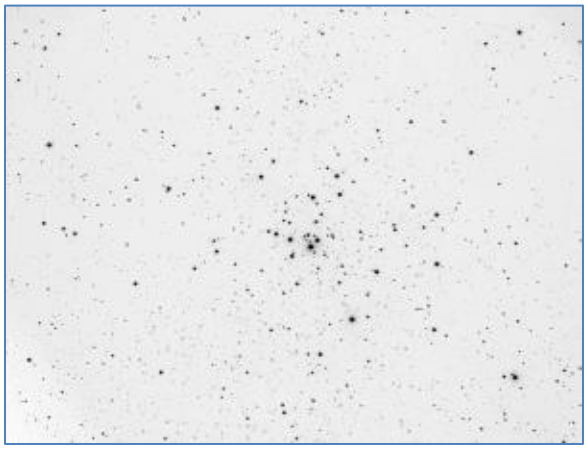
NGC 6522 and 6528



NGC 6822 (C 57), Barnard's Galaxy



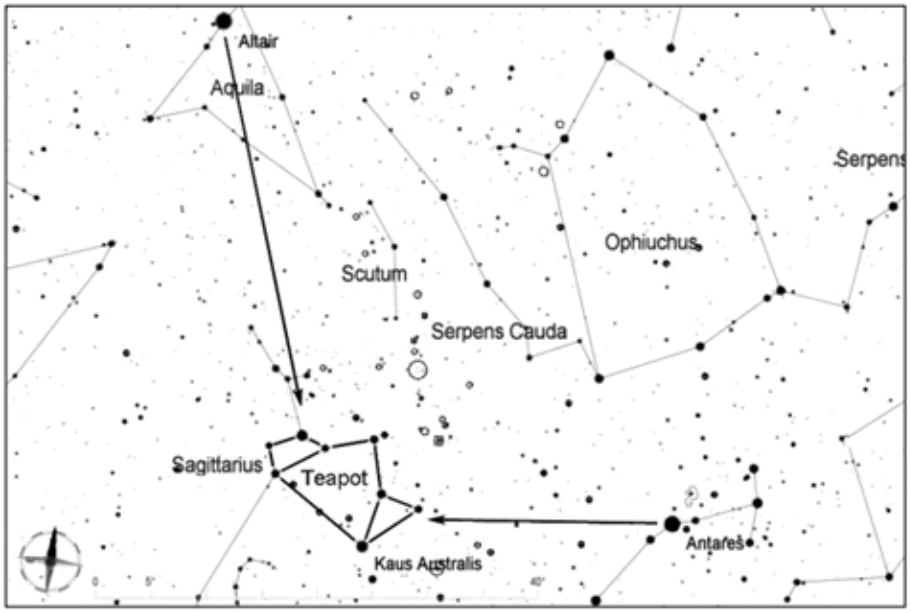
Messier 20, The Trifid Nebula



Messier 21, Webb's Cross

Messier 8 (Lagoon Nebula), Messier 20 (Trifid Nebula), and Messier 21

M8, the famous Lagoon Nebula, is one of the brightest nebulae in the sky, and one of the easiest to see with the naked eye. The nebula encompasses an open cluster, NGC 6530. To its north is M20, the Trifid Nebula. It consists of two hazy balls of light. With a medium or large telescope, you can see dust lanes in the larger and brighter section that divide it into three lobes. Just over 1/2 northeast of M20 is M21, an open cluster of several dozen stars that is ideal for telescopes of all sizes.



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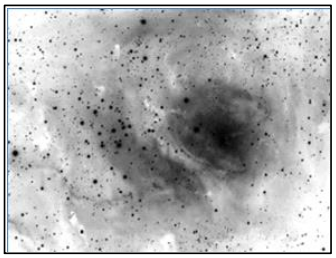
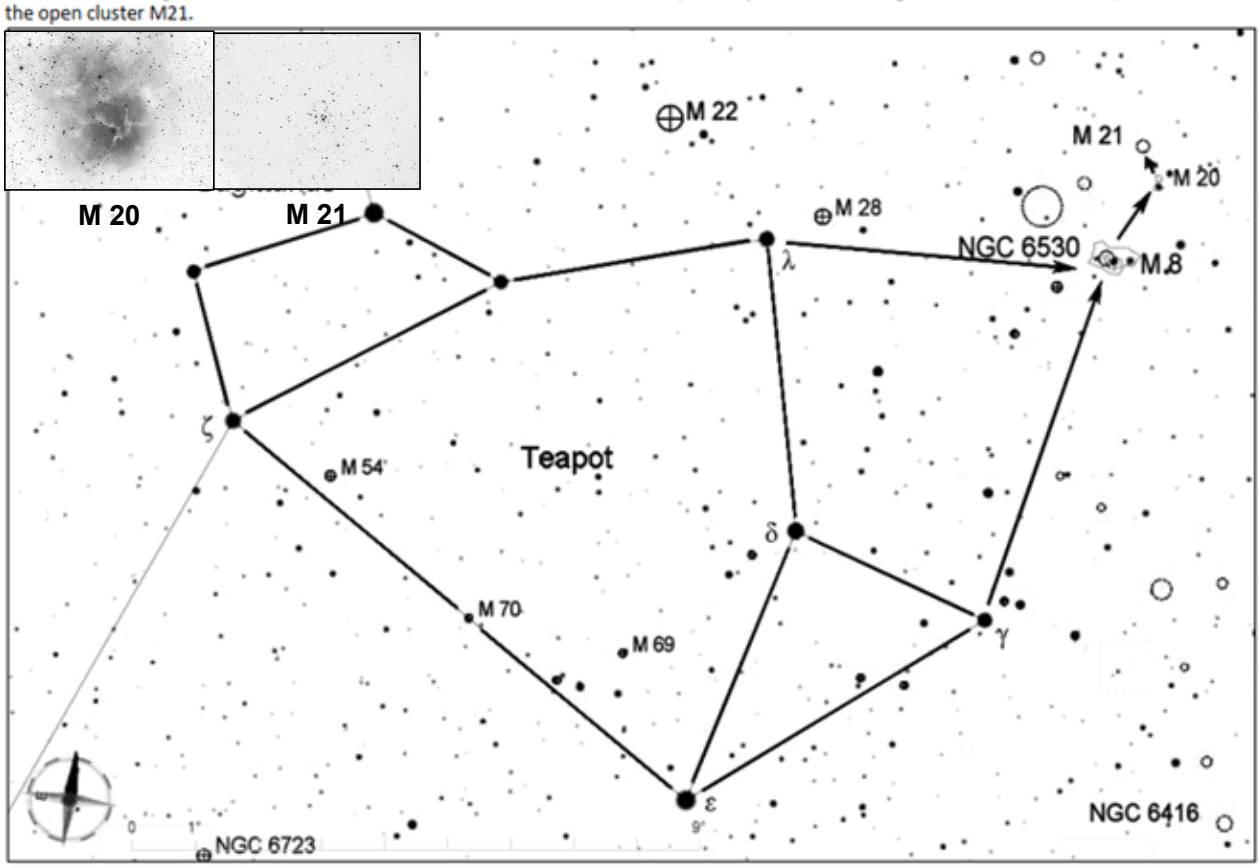


M 8

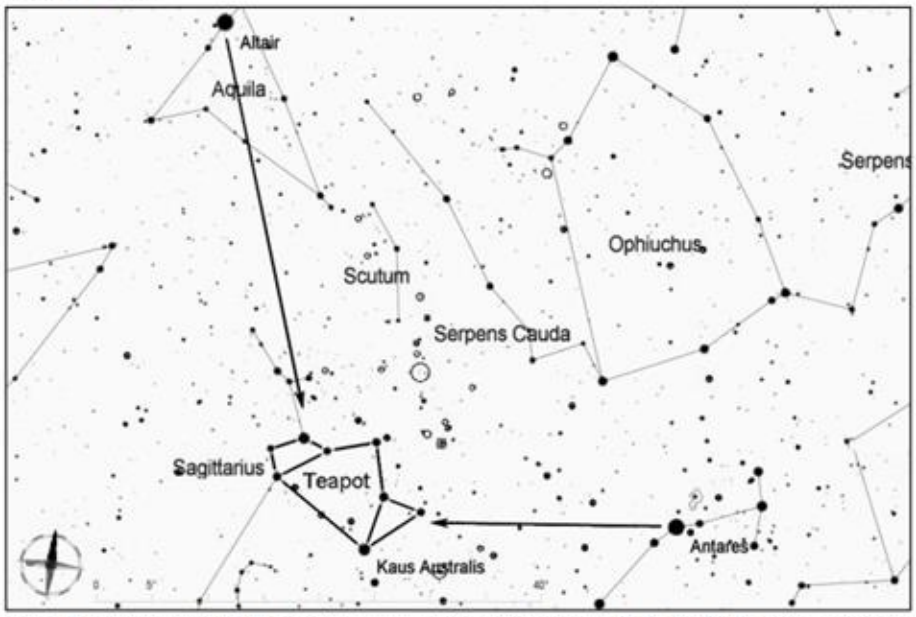
Use the stars that form the lid and spout of the Sagittarius teapot shape to guide you to a spot 6 degrees north of the spout's tip. There you will see M8, which is quite easy to see with the naked eye as a hazy glow if the night is clear and dark. After observing this beautiful mixture of nebula and stars, move 1.5 degrees north-northwest to reach the much fainter M20. Finally, move just about 1/2 degree to the northeast to spot the stars of the open cluster M21.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 16 (Eagle Nebula), Messier 17 (Swan Nebula), and Messier 18

Through most telescopes, M16, the Eagle Nebula, will appear as a cluster of bright stars encompassed by a faint nebula. The details in the nebula shown in photographs are hard to see except with a very large scope. In contrast, the distinctive swan (or check mark) shape of M17 is bright enough to be seen in a good pair of binoculars or through any telescope. M18 is a compact open cluster of a few dozen stars seen against the Milky Way background.



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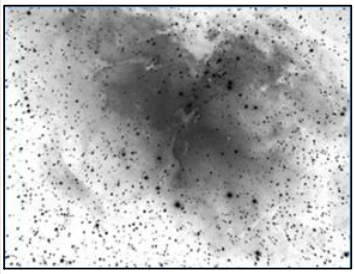
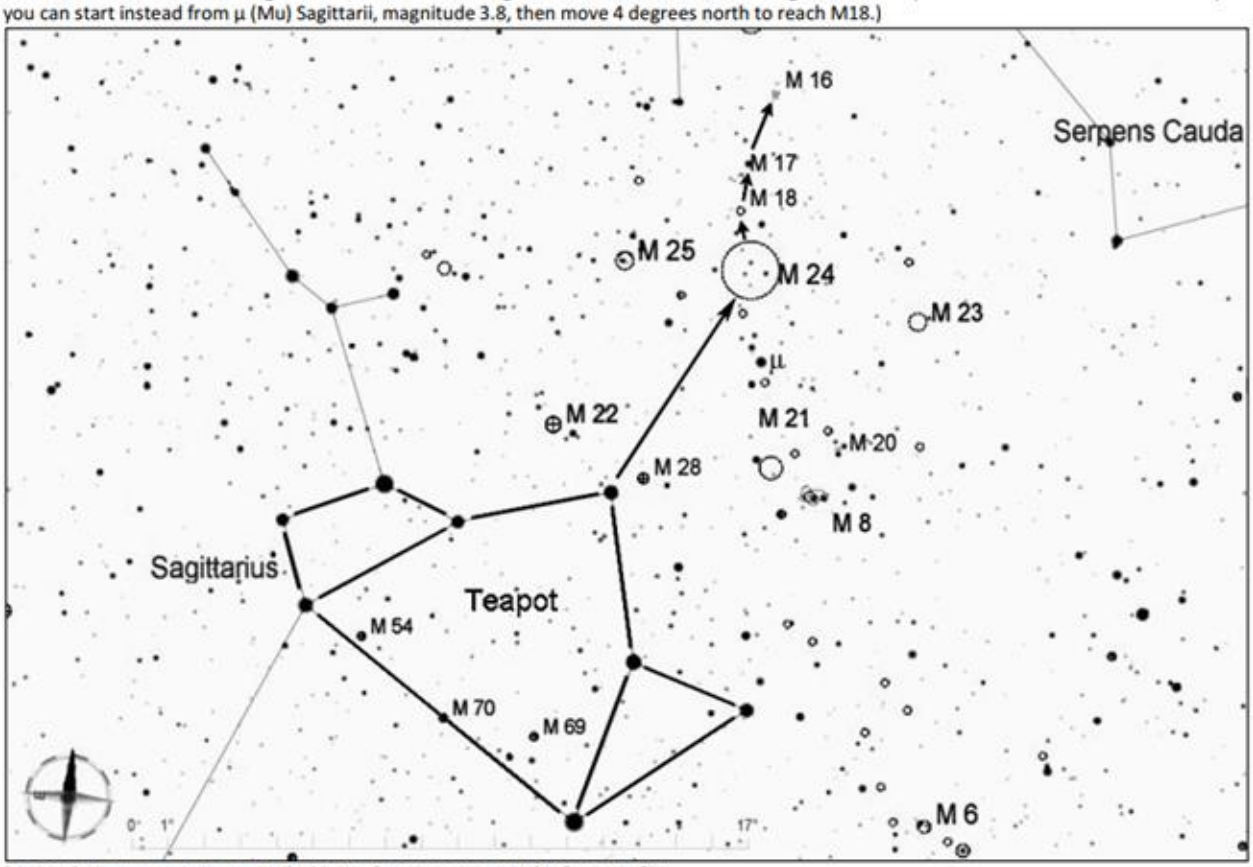


M 16

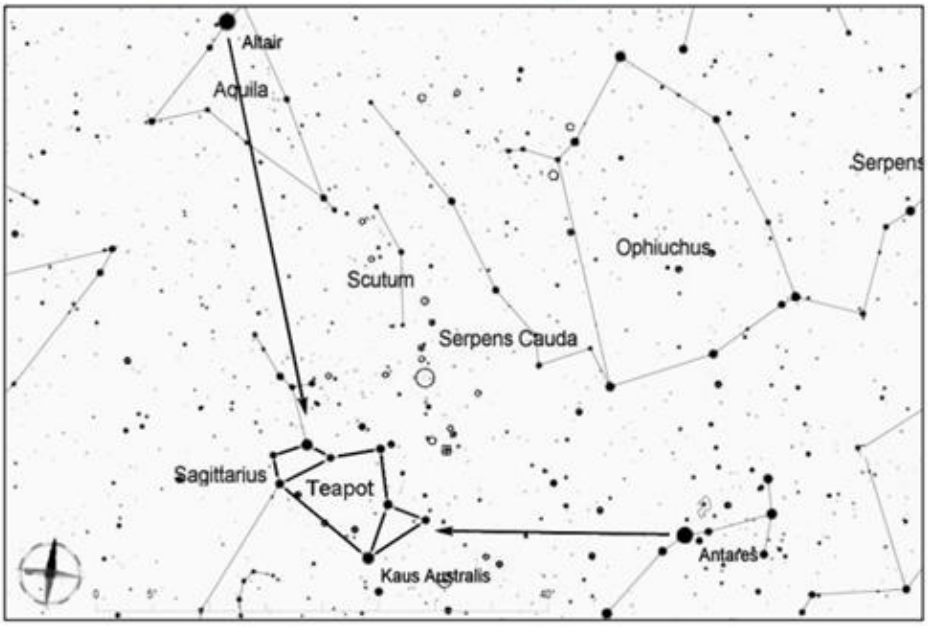
From the star at the top of the Sagittarius teapot asterism, look 7 degrees to the north-northwest with the naked eye, and you should see M24 as a large hazy patch several times the diameter of the Moon, a bright section of the Milky Way. M18, M17, and M16 are roughly in a line to the north. From M24, move about 1.5 degrees to M 18, another 1 degree to M17, then another 2.5 degrees to M16. (If M24 is not visible to the naked eye, you can start instead from μ (Mu) Sagittarii, magnitude 3.8, then move 4 degrees north to reach M18.)



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 22 and 28, Globular Clusters in Sagittarius

These two globular clusters are very different in size when viewed through a telescope. M22 is very large and bright, and through a large scope it is one of the most dramatic sights in the sky. M28 appears much smaller (partly because it is almost twice as far away), but it still can be spotted with a telescope of any size. Through a large scope its stars are well resolved.



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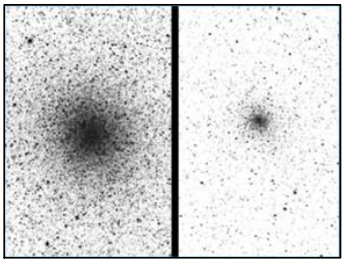
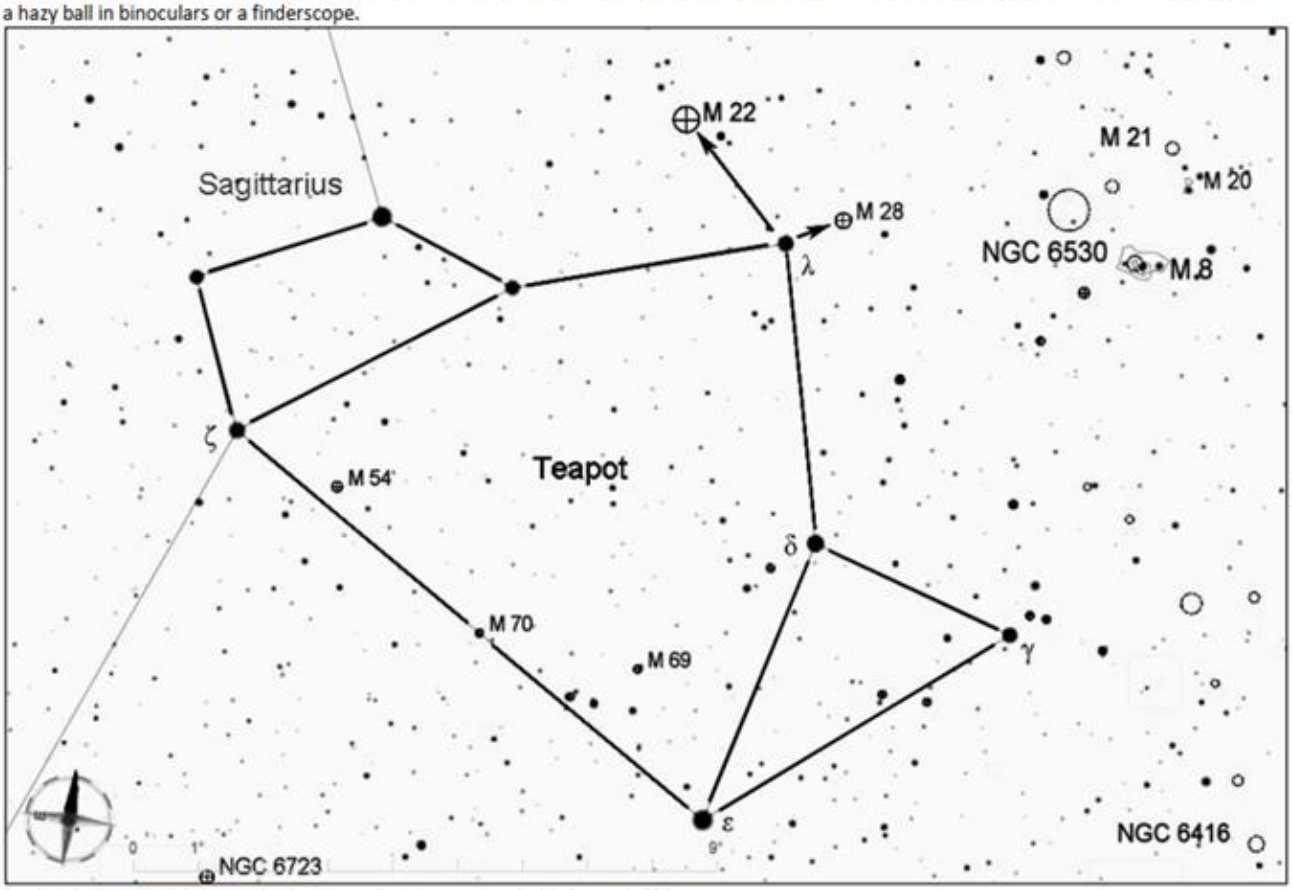


M 22 & M 28

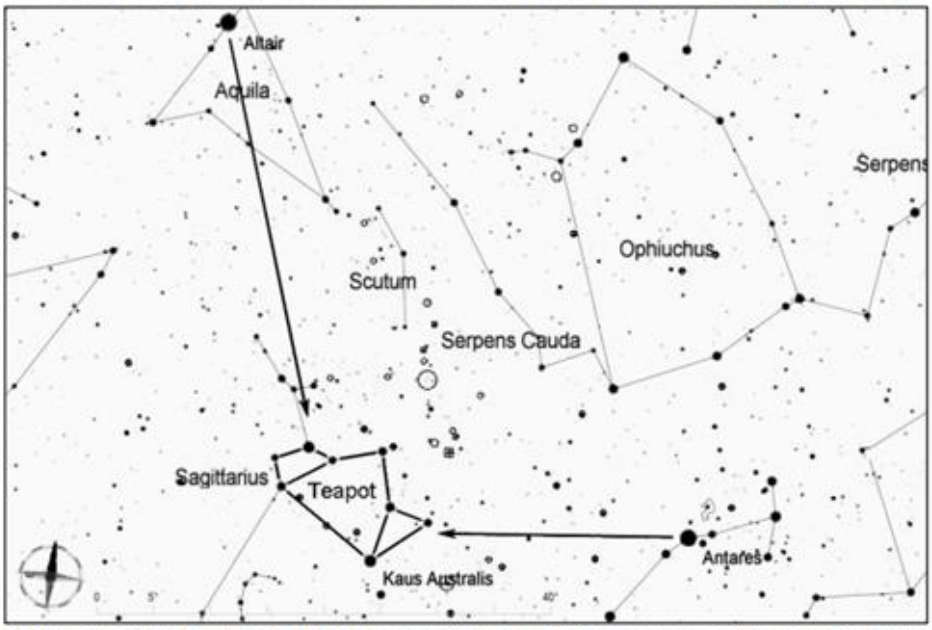
Look for λ (lambda) Sagittarii, the star that forms the top of the teapot's lid. From λ, M28 is less than 1 degree to the northwest, so both can fit in the same field of view with a low-power eyepiece. To find M22, look 2.5 degrees northeast of λ. M22 is large and bright enough to be seen easily as a hazy ball in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 24 Star Cloud and Messier 23 and 25, Open Clusters in Sagittarius

M24 is a very rich section of the Milky Way about 1.5 degrees across. It is visible to the naked eye, and it is a wonderful sight in binoculars or a telescope with a wide field of view. It is flanked by two bright open clusters, M23 to the west and M25 to the east. Both of these are nice sights in binoculars and telescopes at low power. These two open clusters are each about 2000 light years away.



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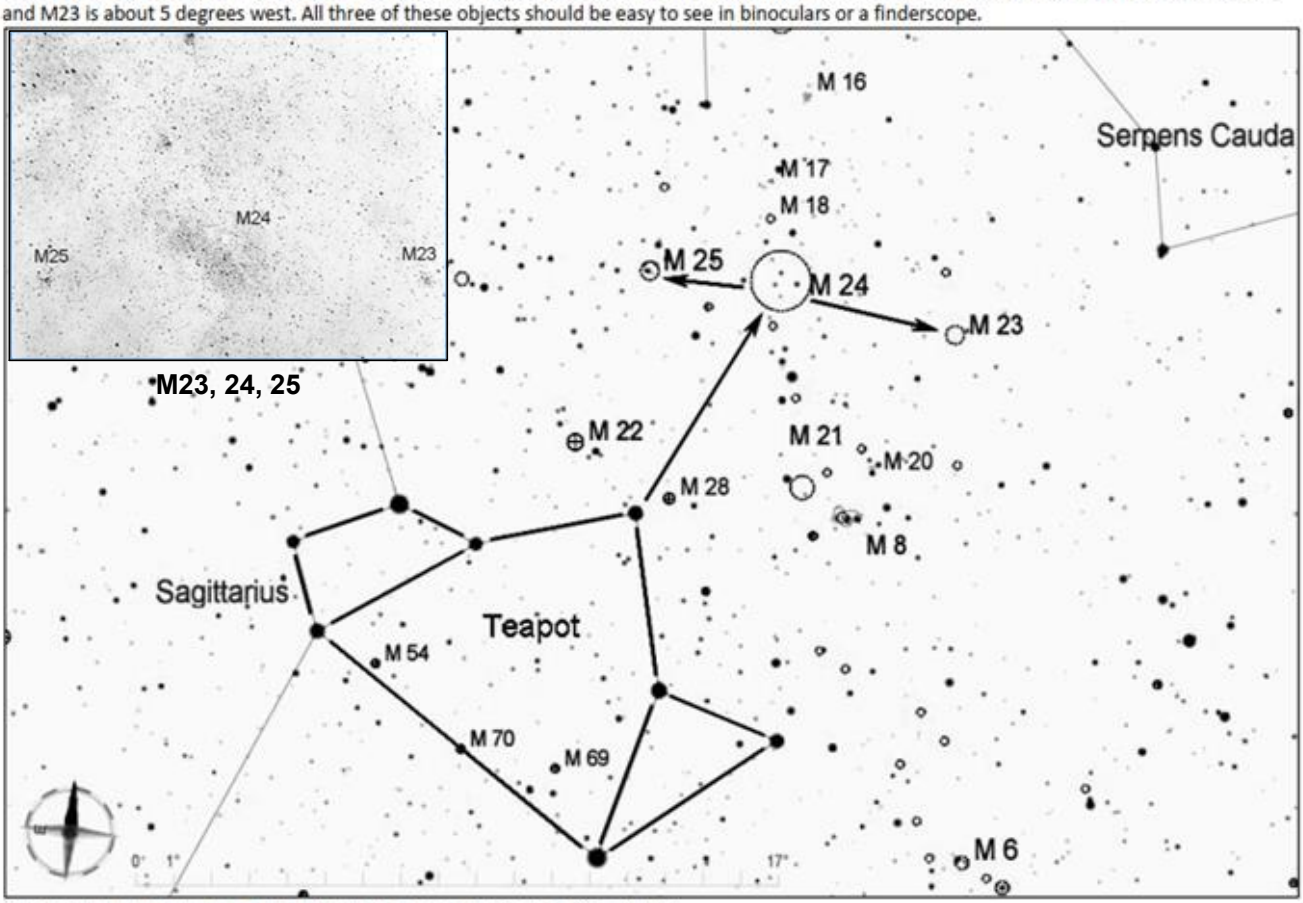
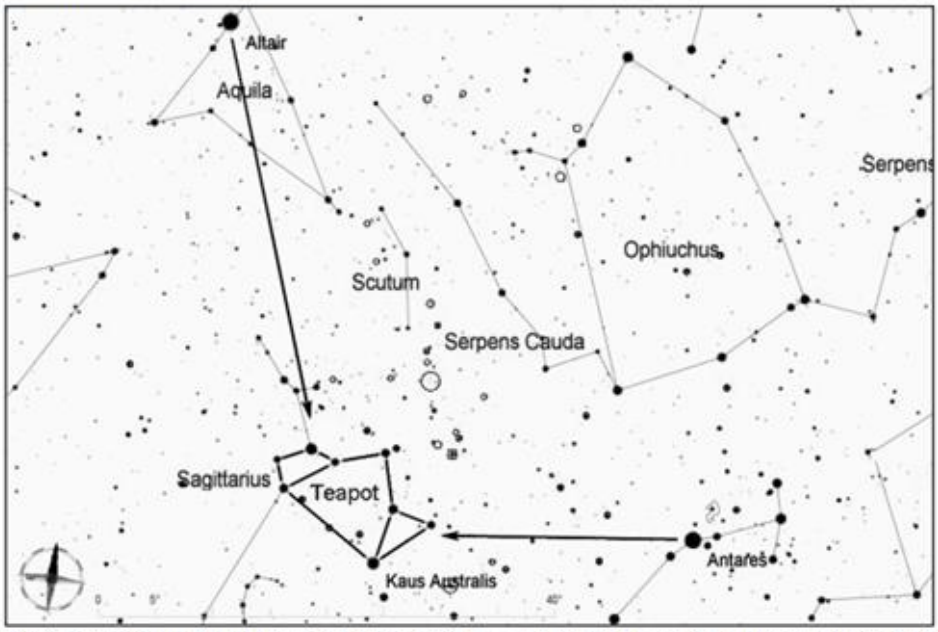
From the star at the top of the Sagittarius teapot asterism, look 7 degrees to the north-northwest with the naked eye, and you should see M24 as a large hazy patch several times the diameter of the Moon, a bright section of the Milky Way. From the center of M24, M25 is about 3 degrees east, and M23 is about 5 degrees west. All three of these objects should be easy to see in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 54, Globular Cluster in Sagittarius

Messier 54 is a unique object because it is one of just a few globular clusters that is easy to observe but not part of our own Milky Way galaxy. It resides beyond the far edge of our galaxy, near the center of a small satellite galaxy called the Sagittarius Dwarf Elliptical Galaxy. The dwarf galaxy is one of the closest companions to the Milky Way galaxy. M54 is about 87,000 light years away, so far that its individual stars are hard to resolve in even large amateur telescopes.



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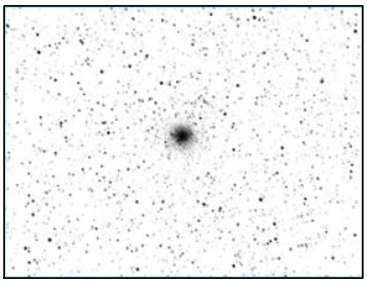
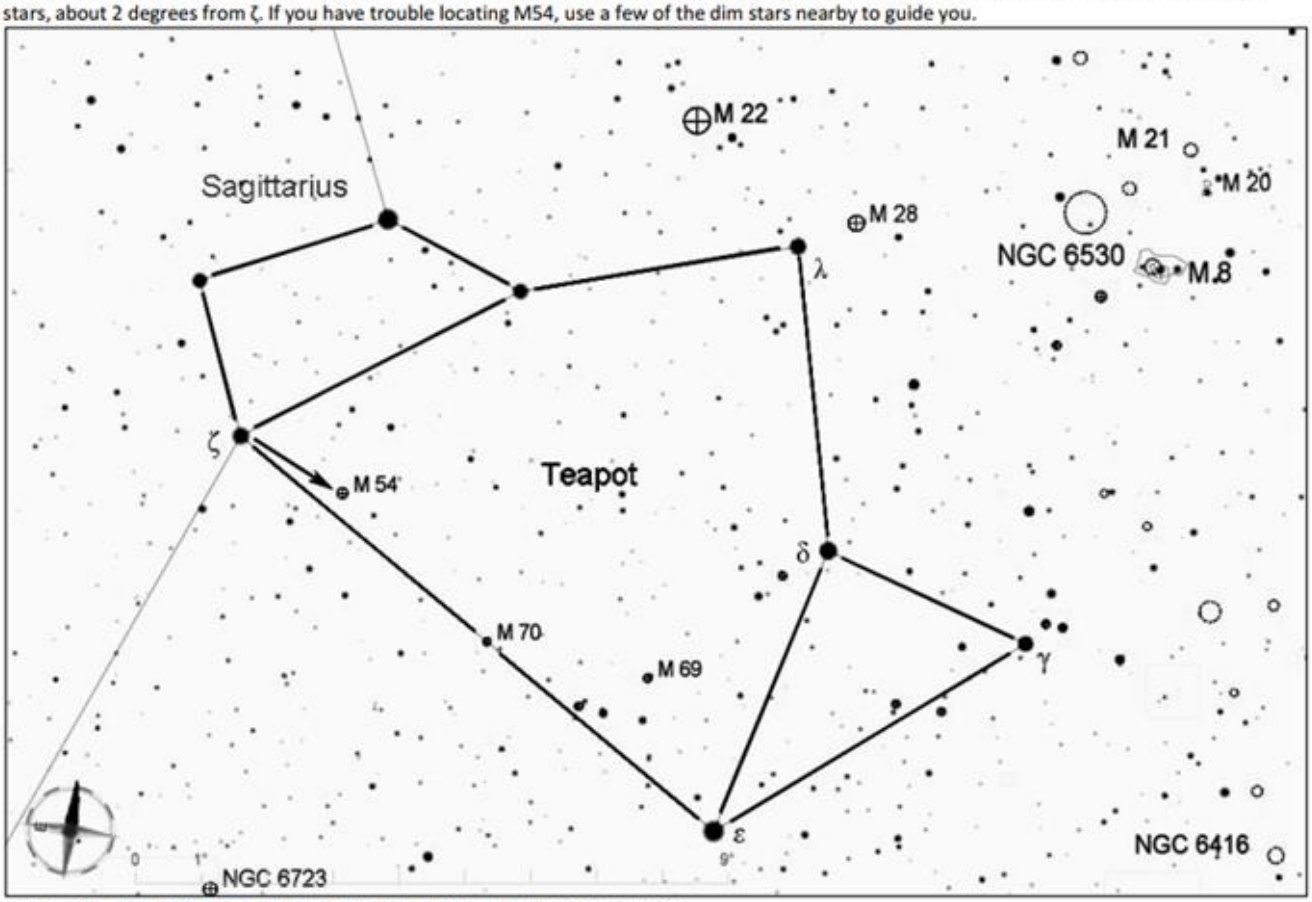


M 54

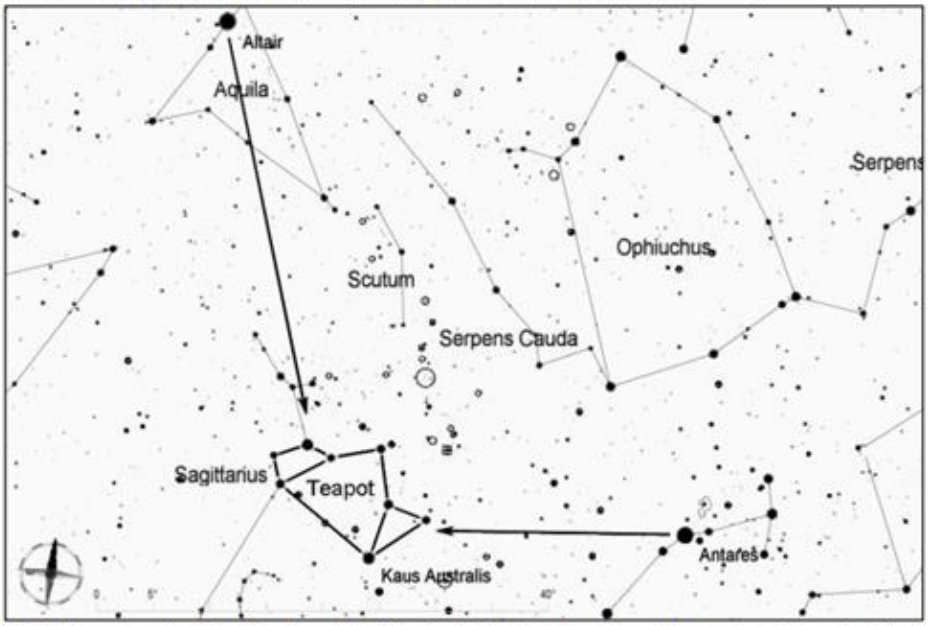
Find ζ (zeta) and ε (epsilon) Sagittarii, the two bright stars that form the base of the teapot asterism. M54 is just inside a line between these two stars, about 2 degrees from ζ. If you have trouble locating M54, use a few of the dim stars nearby to guide you.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 55, Globular Cluster in Sagittarius

Messier 55 is one of the closest globular clusters, about 17,300 light years away. It is large and bright (magnitude 6.3). It is loosely packed for a globular cluster, and individual stars can be resolved all the way to its center though a medium-sized telescope. Even a small telescope or good binoculars will show some granularity suggesting that it is composed of numerous stars.



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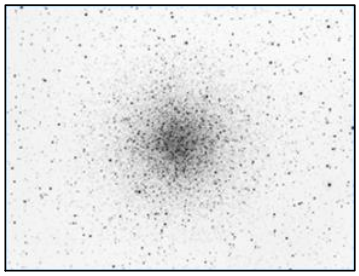
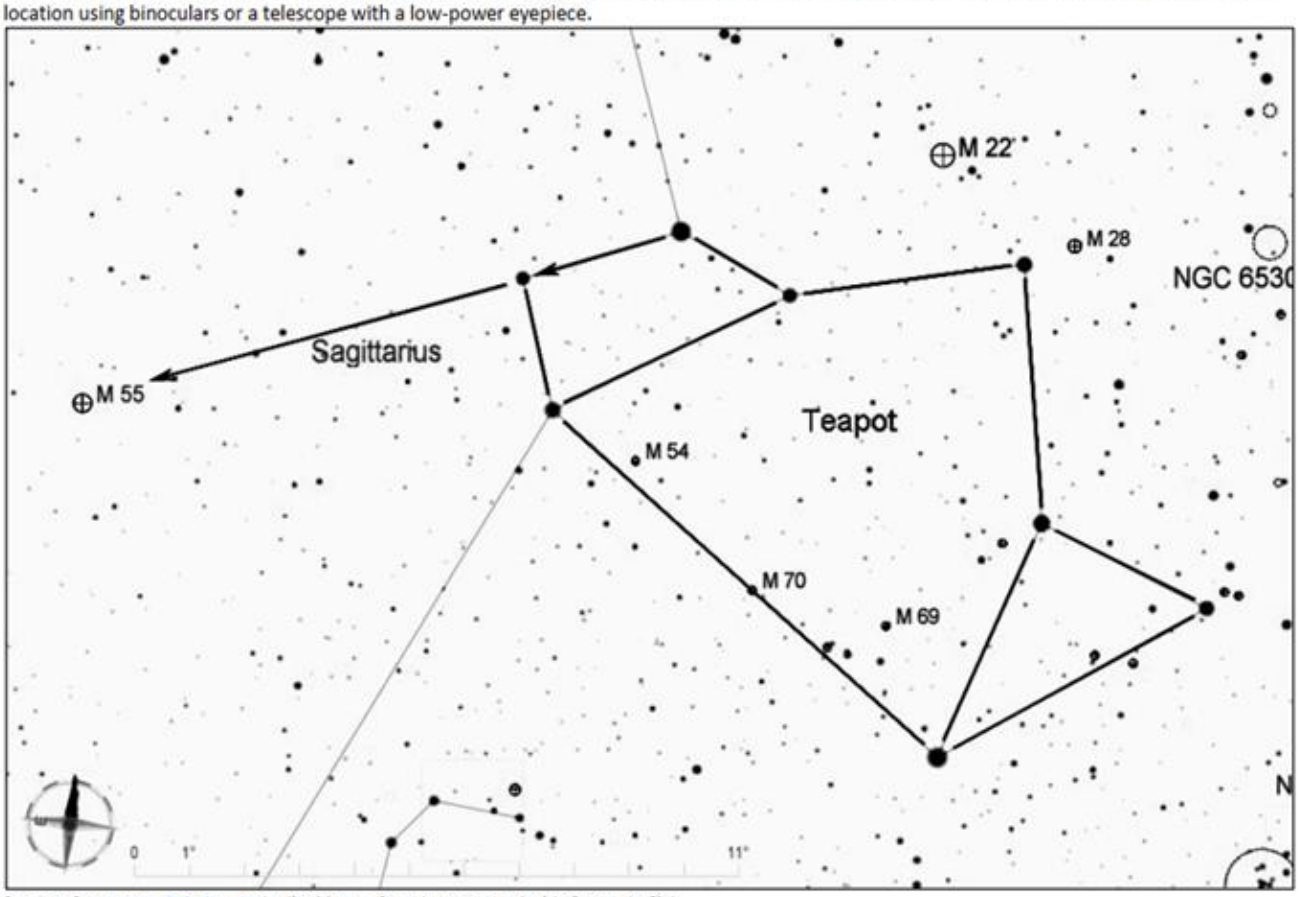


M 55

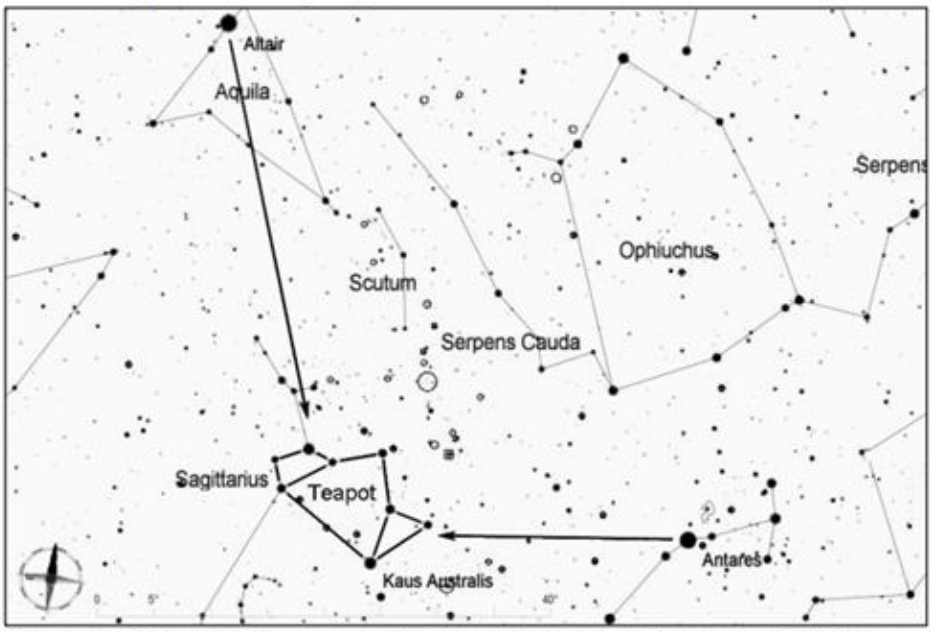
Find the two stars that form the "handle" of the Sagittarius teapot, and use them as a pointer, extending the line to the southeast about 2.5 times the distance between these two stars. There are no bright stars nearby, but if it is a dark moonless night, M55 should be fairly easy to spot in that location using binoculars or a telescope with a low-power eyepiece.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 69 and 70, Globular Clusters in Sagittarius

M69 and M70 are two small globular clusters near the bottom of the Sagittarius teapot shape. They are similar in size, brightness, and distance (about 29,000 light years away). Through a small telescope, each will appear as a small hazy ball with a brighter center, but no individual stars will be resolved. Large telescopes at high magnification can resolve some of their stars.



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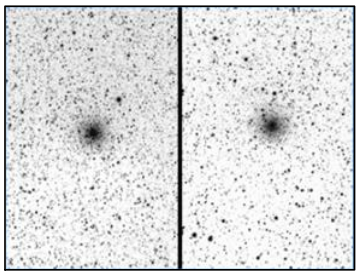
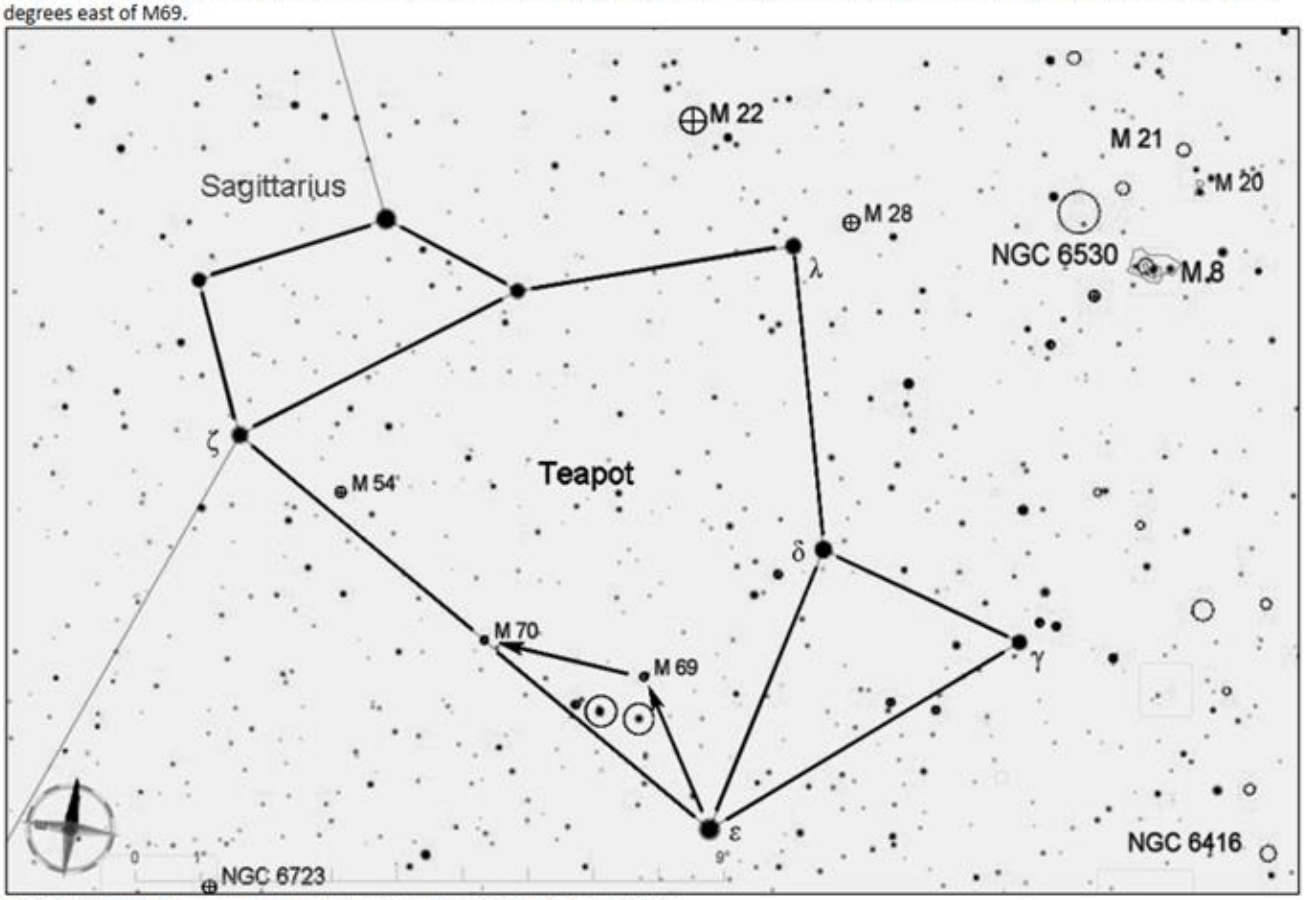


M 69 & M 70

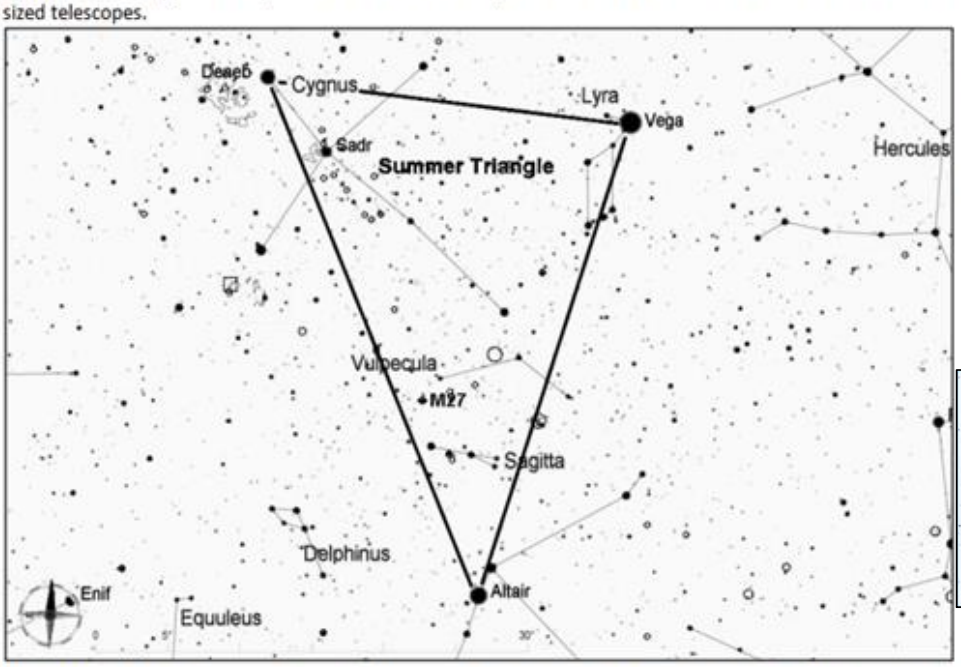
Find ε (epsilon) Sagittarii at the west corner of the base of the teapot asterism. From ε, M69 is 2.5 degrees to the northeast. Through binoculars or a finderscope, two stars below M69 (both about magnitude 5.3 and circled in the chart below) can help point you to the right location. M70 is 2.5 degrees east of M69.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

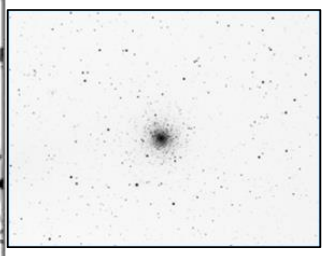
Messier 75, Globular Cluster in Sagittarius

Messier 75 is a globular cluster located in the northeast corner of Sagittarius, near the constellation Capricornus. Because of its distance (68,000 light years), M75 appears fairly small and dim. It is densely concentrated in its center. Some stars can be resolved around the edges with medium-sized telescopes.



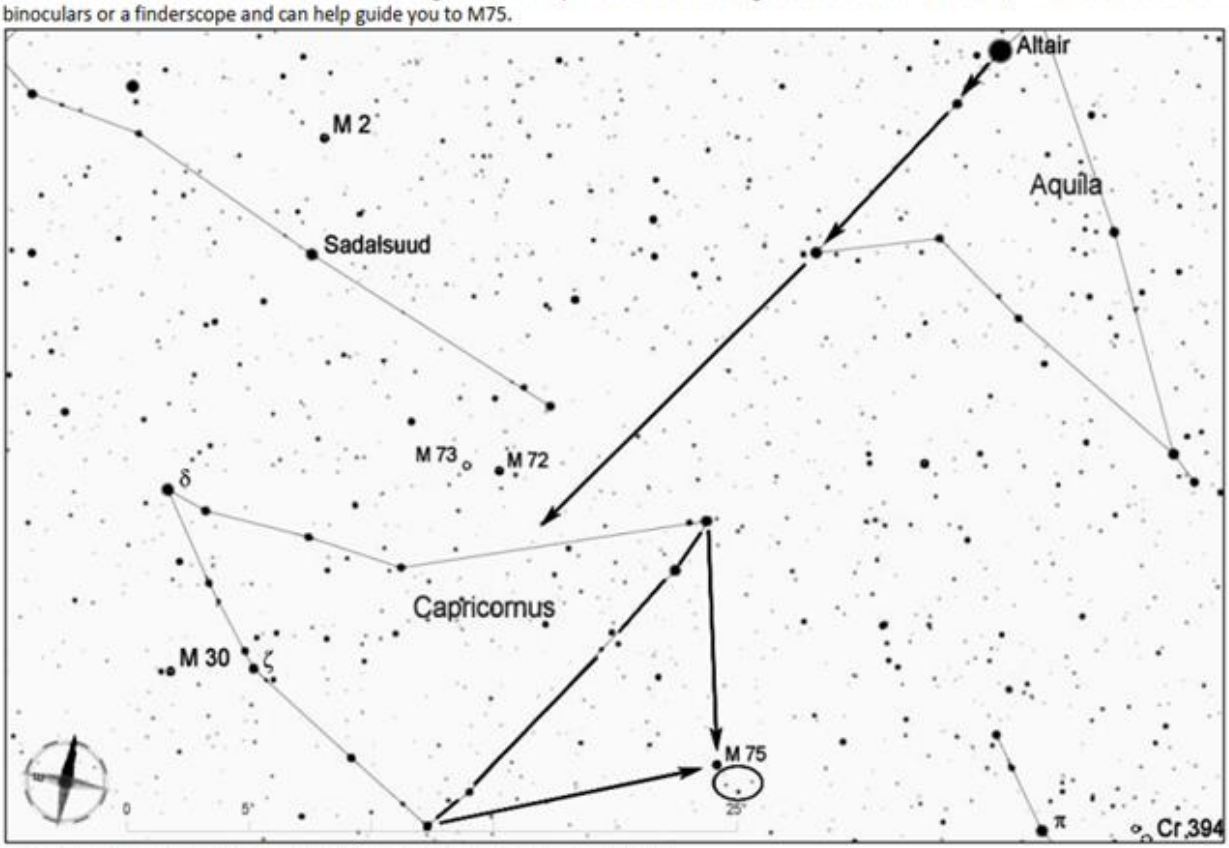
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Altair in the constellation Aquila, the eagle.



M 75

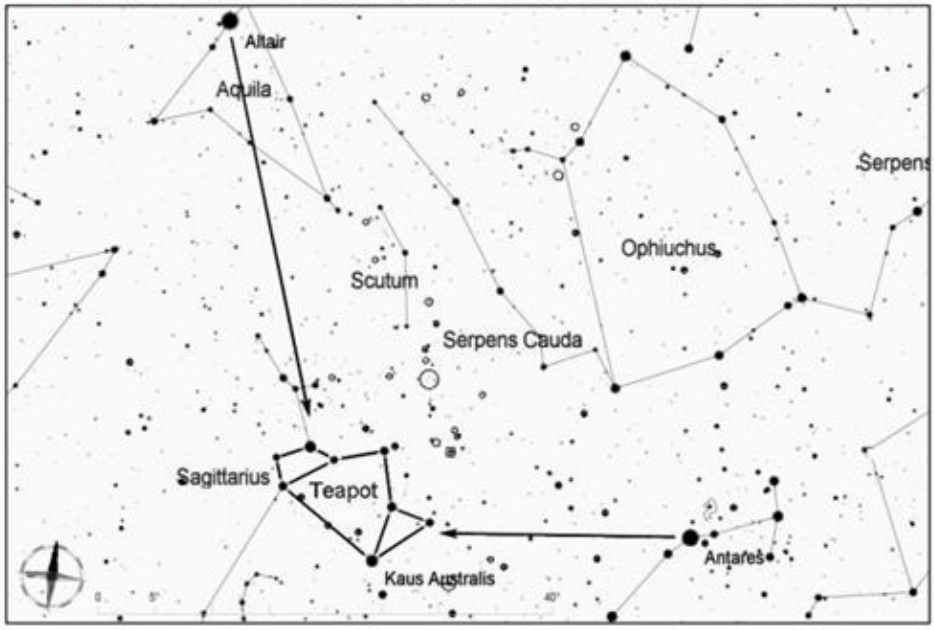
From Altair, follow the stars that form the upper edge of Aquila the eagle's east wing, and use these stars as a pointer to take you to the constellation Capricornus. To me, the stars of Capricornus form a large, open-mouthed smile. Once you locate Capricornus, look at the southwest edge of the smile shape, and visualize a large triangle pointing to the southwest, as shown in the chart below. M75 is at the point of this triangle. It can be diffucult to locate because there are no bright stars nearby. Note the small triangle of stars circled in the chart, which should be visible in binoculars or a finderscope and can help guide you to M75.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6522 and NGC 6528, Globular Clusters in Sagittarius

These two globular clusters are not very big or bright, but they are just 1/4 degree apart and can be seen in the same telescopic field of view. They make an interesting sight because of their proximity and their contrasting backgrounds. NGC 6522 (to the west) is seen against a very dense portion of the Milky Way, whereas NGC 6528 is on the edge of a dark nebula and there are fewer stars in the background.



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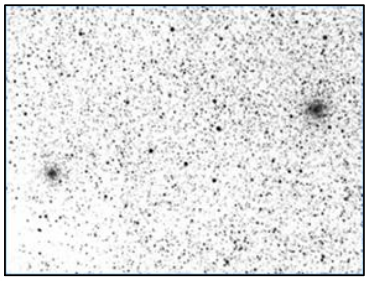
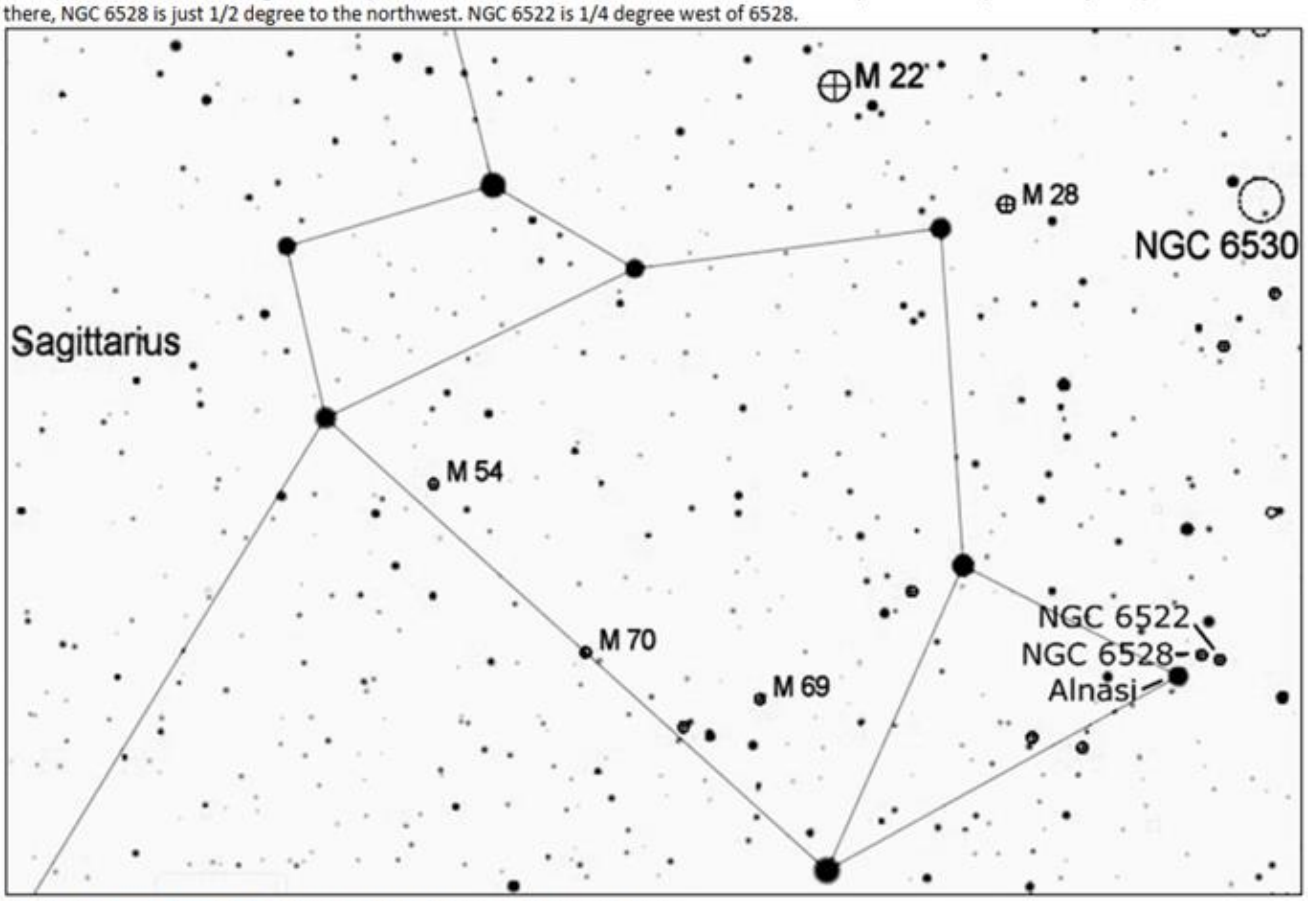


NGC 6522 & 6528

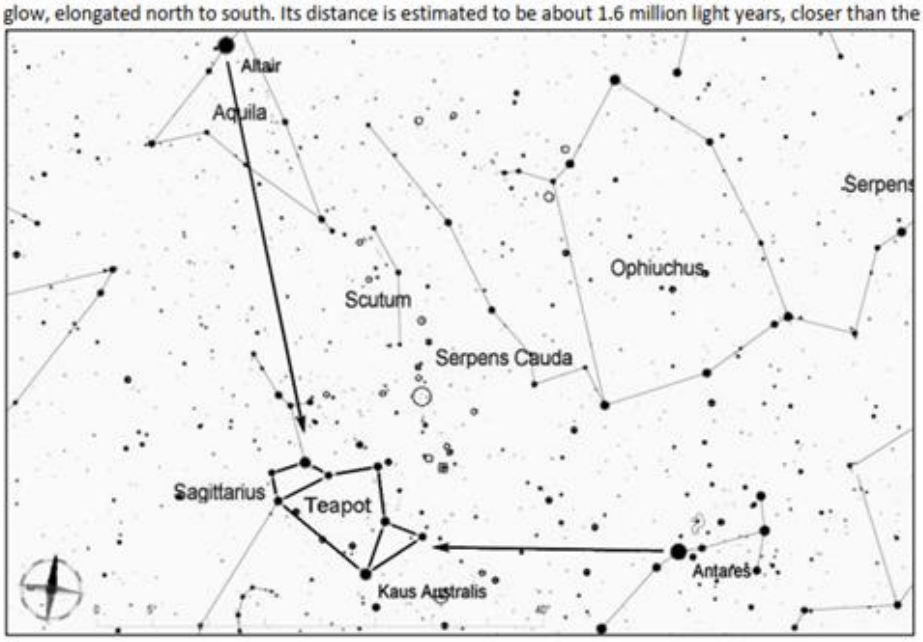
Once you have located the Sagittarius teapot, this is an easy star hop. Go to Alnasi, the star the represents the tip of the teapot's spout. From there, NGC 6528 is just 1/2 degree to the northwest. NGC 6522 is 1/4 degree west of 6528.



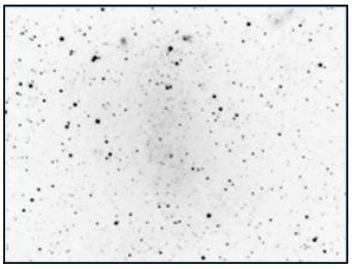
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6822 (Caldwell 57), Barnard's Galaxy in Sagittarius

Barnard's Galaxy is a small irregular galaxy that is a member of the local group of galaxies to which our Milky Way belongs. It has a low surface brightness that makes it a challenge to see, but under dark skies it can be spotted with binoculars or a telescope at low power. It appears as an oval glow, elongated north to south. Its distance is estimated to be about 1.6 million light years, closer than the Andromeda Galaxy.

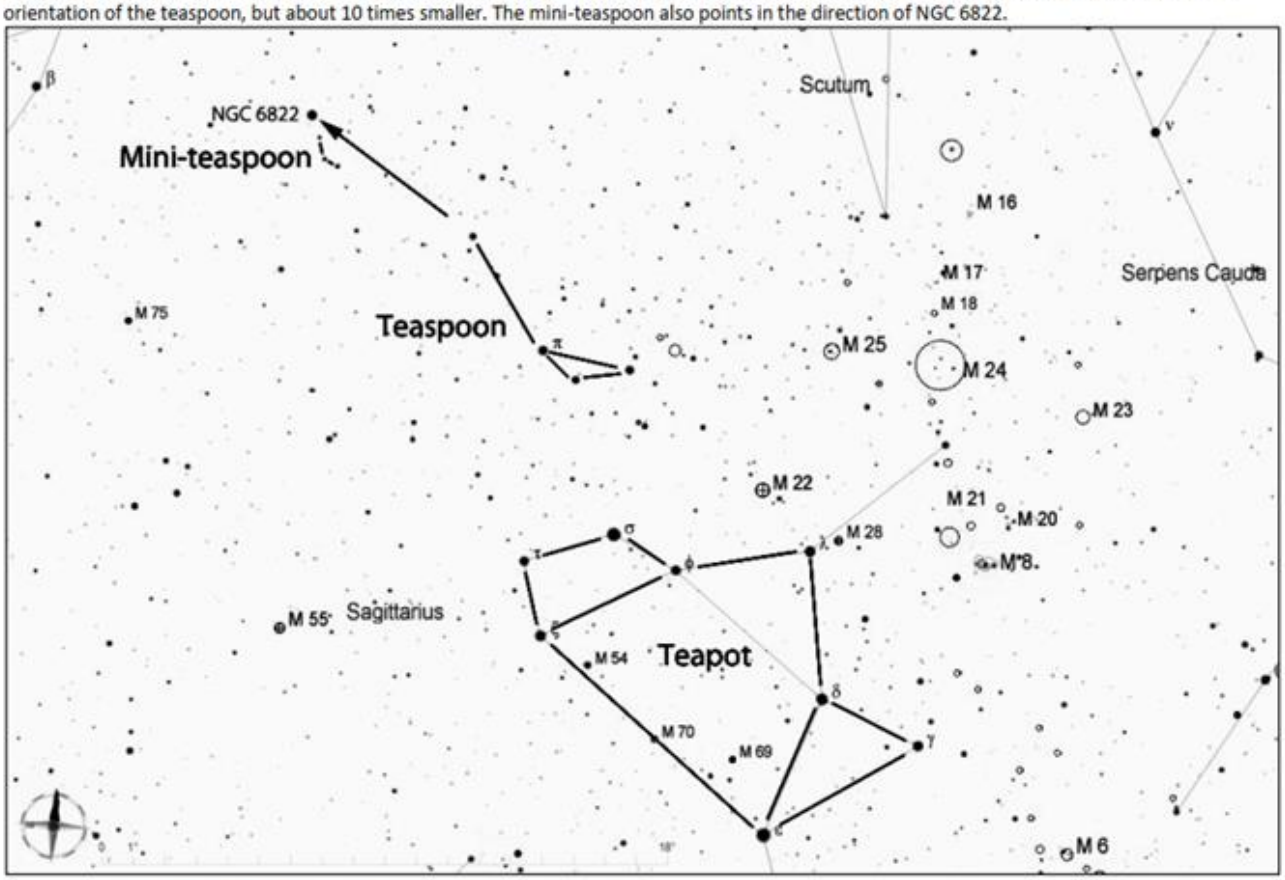


From mid-summer to early fall, the distinctive teapot shape of Sagittarius can be seen low in the southern sky during the evening. It is about 50 degrees south of Altair (part of the Summer Triangle) and about 30 degrees east of bright red Antares. It is well worth learning to recognize the teapot, for it can guide you to dozens of beautiful deep-sky objects.



NGC 6822

From the Sagittarius teapot, look about 10 degrees to the northeast to find the 4-star "teaspoon" asterism, which is not hard to spot if you know where to look for it. Continue to the northeast about the length of the teaspoon to reach NGC 6822. Looking though binoculars or a telescope with a wide-field view, you can spot three 5th magnitude stars that form what I call the "mini-teapot"--a triangular shape that mimics the shape and orientation of the teaspoon, but about 10 times smaller. The mini-teaspoon also points in the direction of NGC 6822.

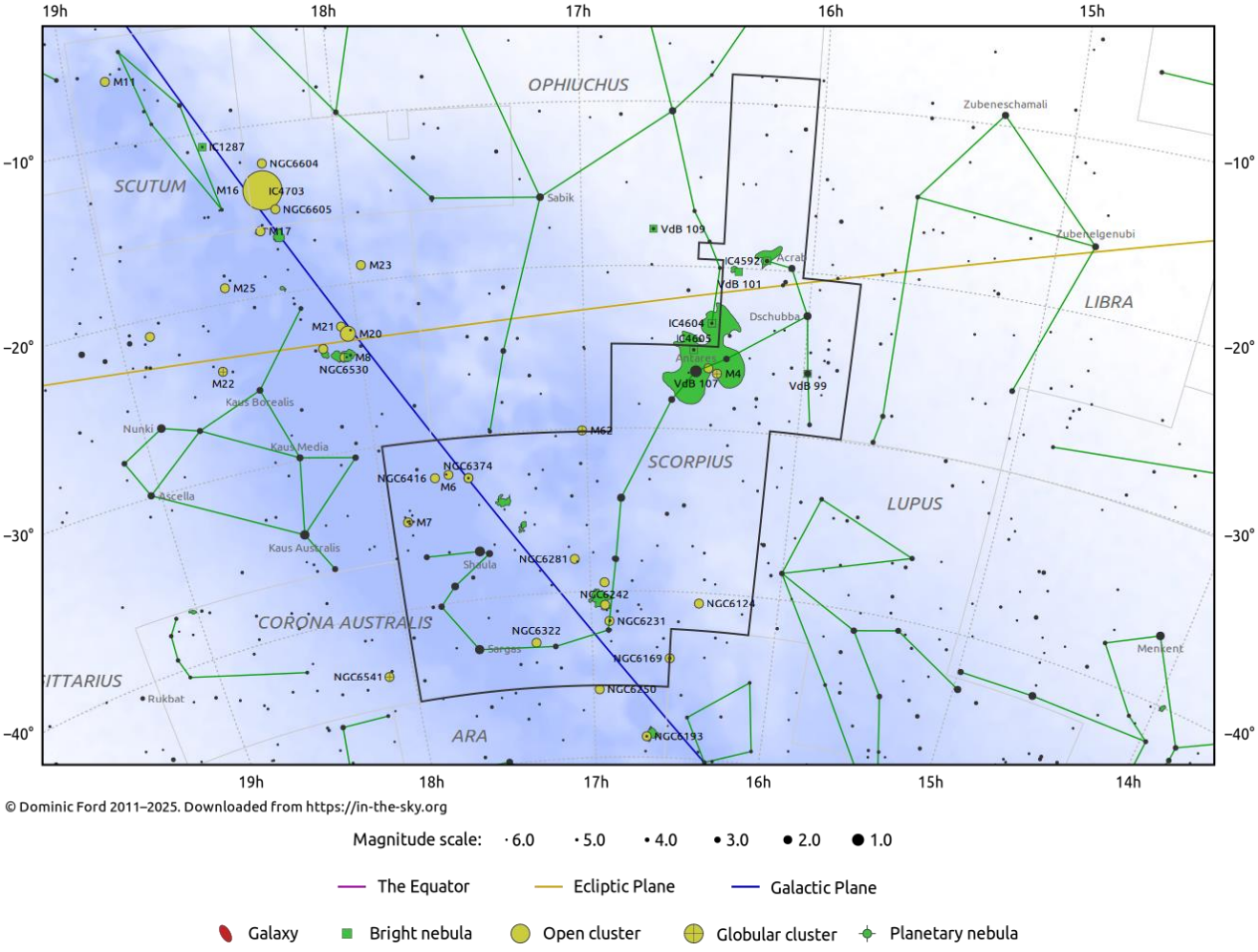


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Scorpius (Sco)

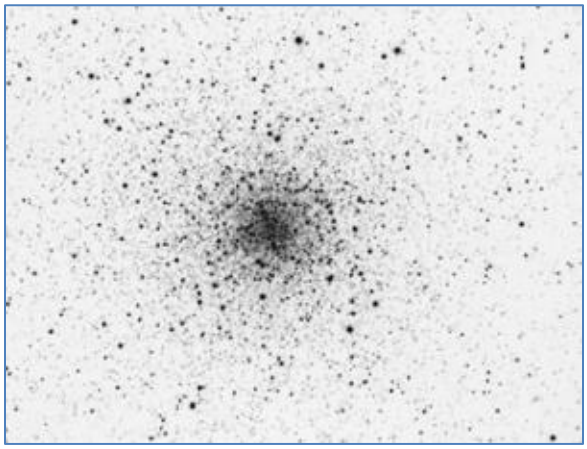
Evening Visibility: **June – Aug**
Online Information: **Scorpius**
Charts: **3** Featured Objects: **4**
More Online Information: M-004, M-006, M-007, M-080

In-The-Sky.org Constellation Map

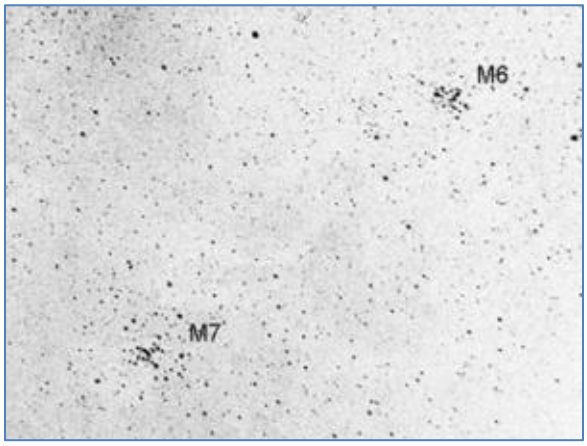


Object (Type)	Chart	Aliases	Stats
M-004 (GC)	1, W1	Cat's Eye, Spider Globular Cluster, NGC-6121	| Mag=5.6 | SB=23.2 | Size=26.0' |
M-006 (OC)	2, W2	The Butterfly Cluster, NGC-6405	| Mag=4.2 | SB=19.0 | Size=25' |
M-007 (OC)	2, W2	Ptolemy Cluster, Scorpion's Tail, NGC-6475	| Mag=3.3 | SB=21.6 | Size=80.0' |
M-080 (GC)	3, W3	NGC-6093, GCl 39	| Mag=7.3 | SB=21.9 | Size=10.0' |

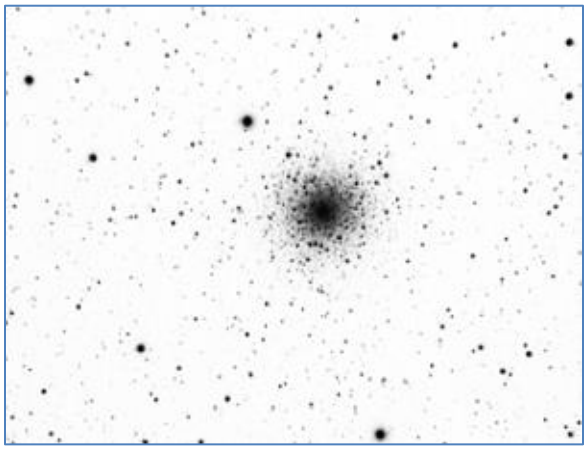
Image Gallery



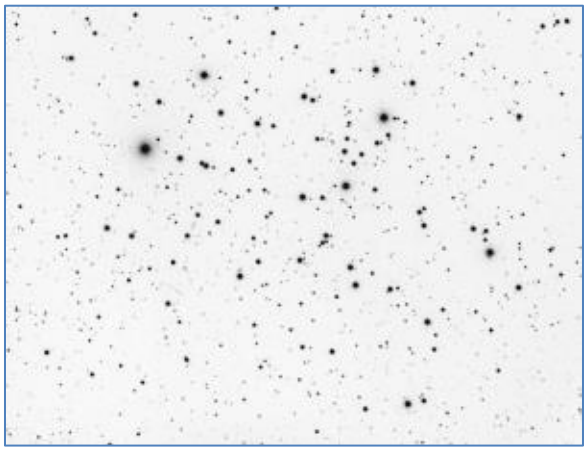
Messier 4



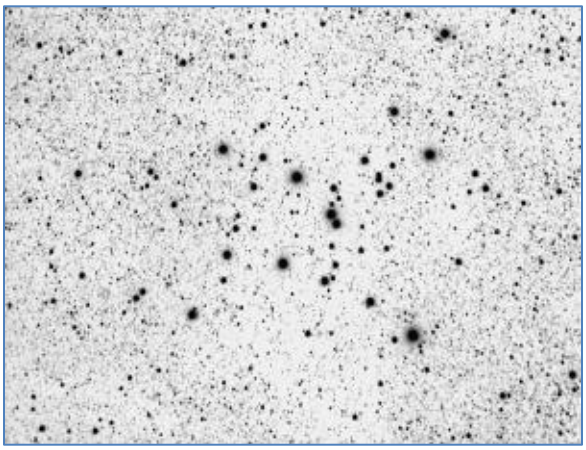
Messier 6 and 7



Messier 80



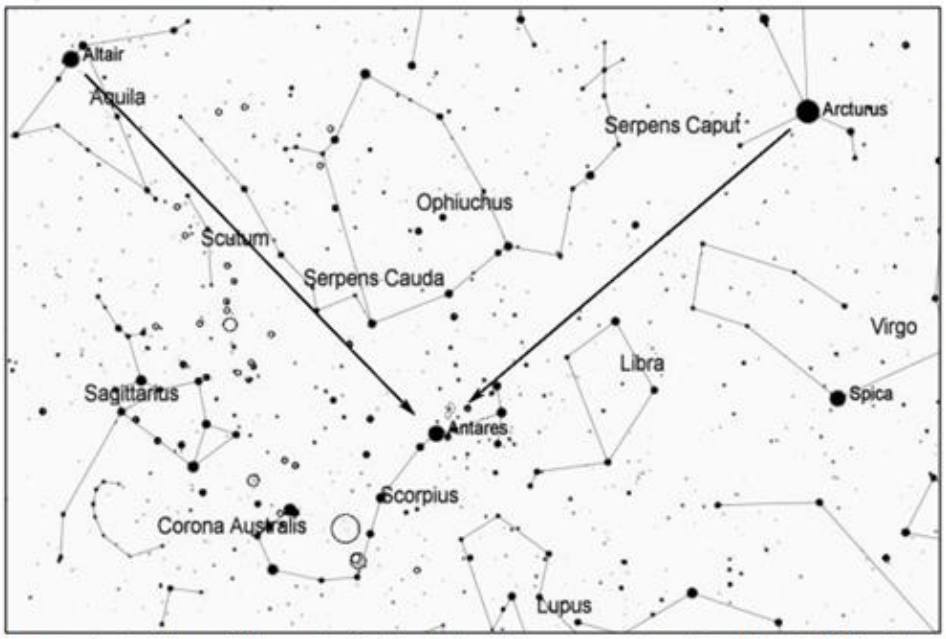
Messier 6, The Butterfly Cluster



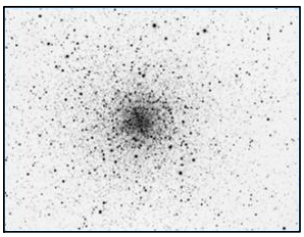
Messier 7, Ptolemy's Cluster

Messier 4, Globular Cluster in Scorpius

At a distance of about 6800 light years, M4 is one of the closest globular clusters. It is easy to spot with binoculars. Through a telescope, one distinct feature is the row of bright stars running from north to south through the center of the cluster. Compared to other bright globular clusters, it is fairly small and contains fewer stars. Messier 4 may contain something like 10,000 stars, whereas some of the larger globular cluster contain 500,000 or more stars.

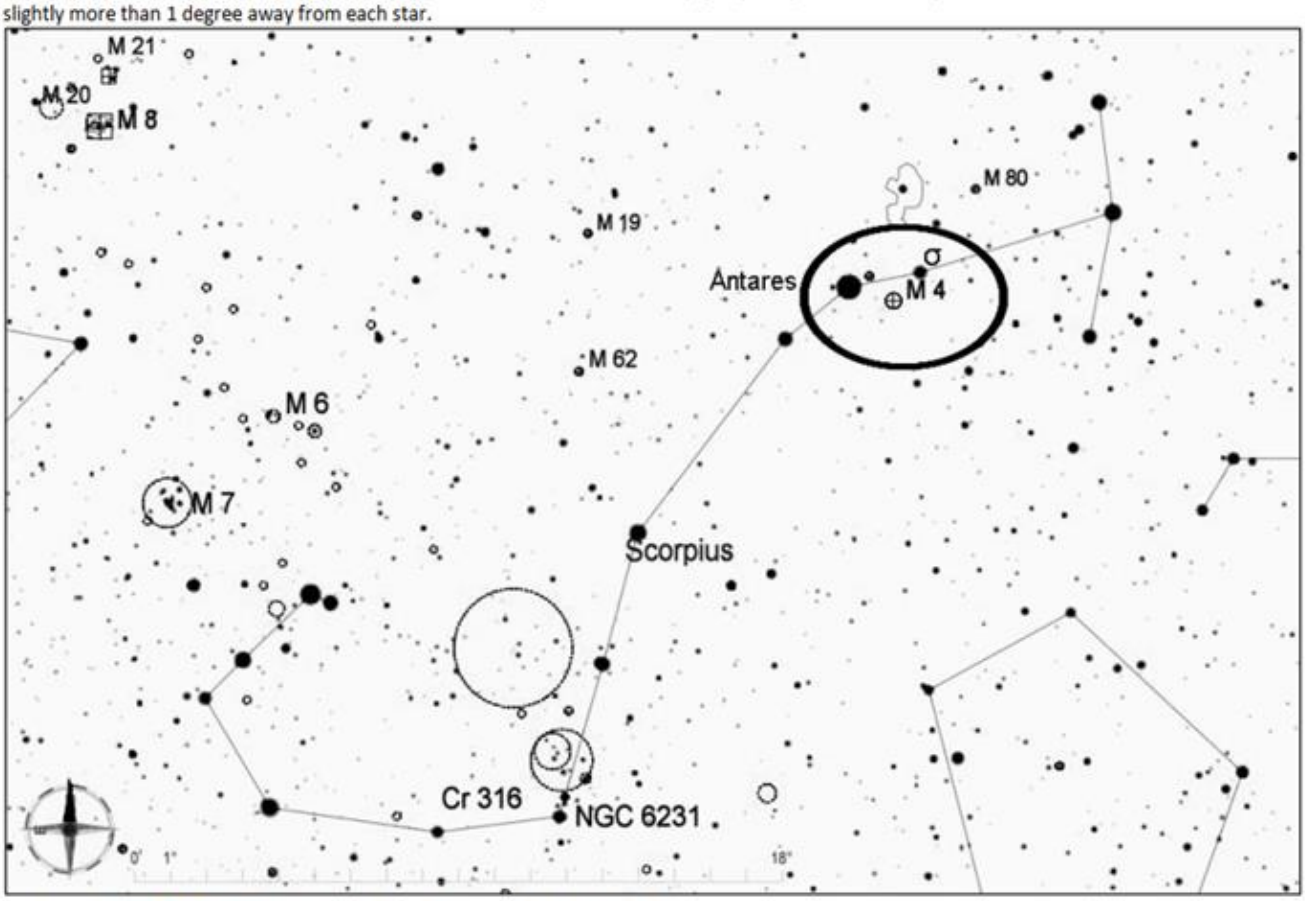


Start by finding first magnitude Antares, the brightest and reddest star low in the southern sky on summer evenings. To get oriented, note that Antares is about 60 degrees southwest of Altair (part of the Summer Triangle) and a similar distance southeast of Arcturus (part of the Spring Triangle). Antares represents the eye of Scorpius, and on a clear night you should be able to see the curving shape of the scorpion if you have a good view of the southern horizon.



M 4

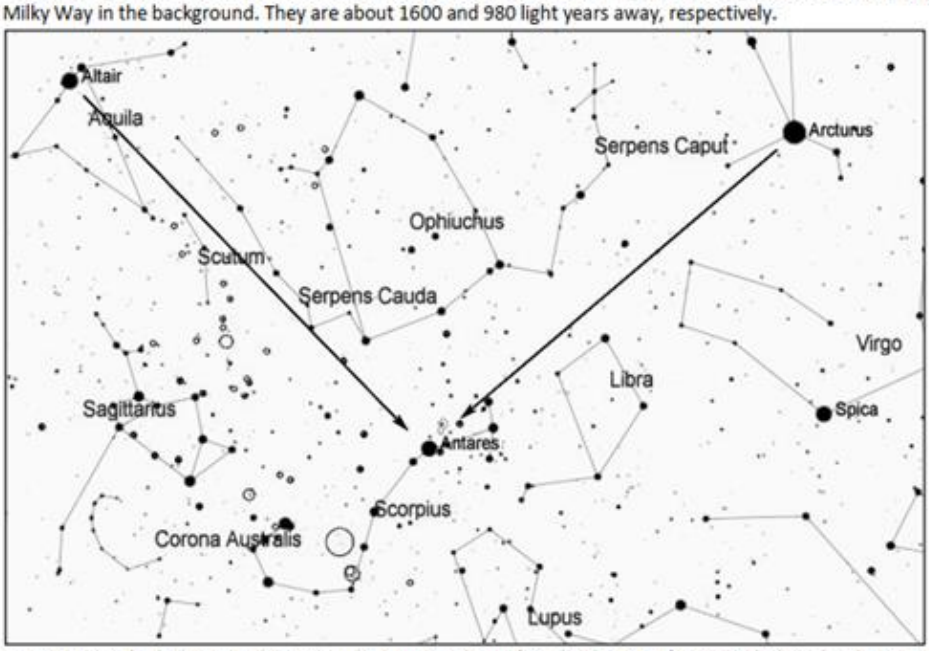
Once you locate Antares, M4 is easy to find. Look about 2 degrees west for σ (sigma) Scorpii. M4 is midway between and below Antares and σ, slightly more than 1 degree away from each star.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 6 (the Butterfly Cluster) and Messier 7 (Ptolemy's Cluster)

These two open clusters are among the most attractive in the sky, and they are wonderful sights through a telescope at low power. M6 really does have a recognizable butterfly shape, with a red star on the tip of one wing. M7 is a large cluster of many bright stars, with countless dim stars of the Milky Way in the background. They are about 1600 and 980 light years away, respectively.



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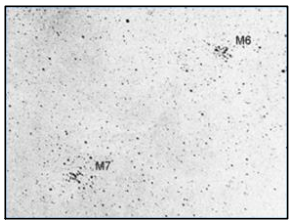
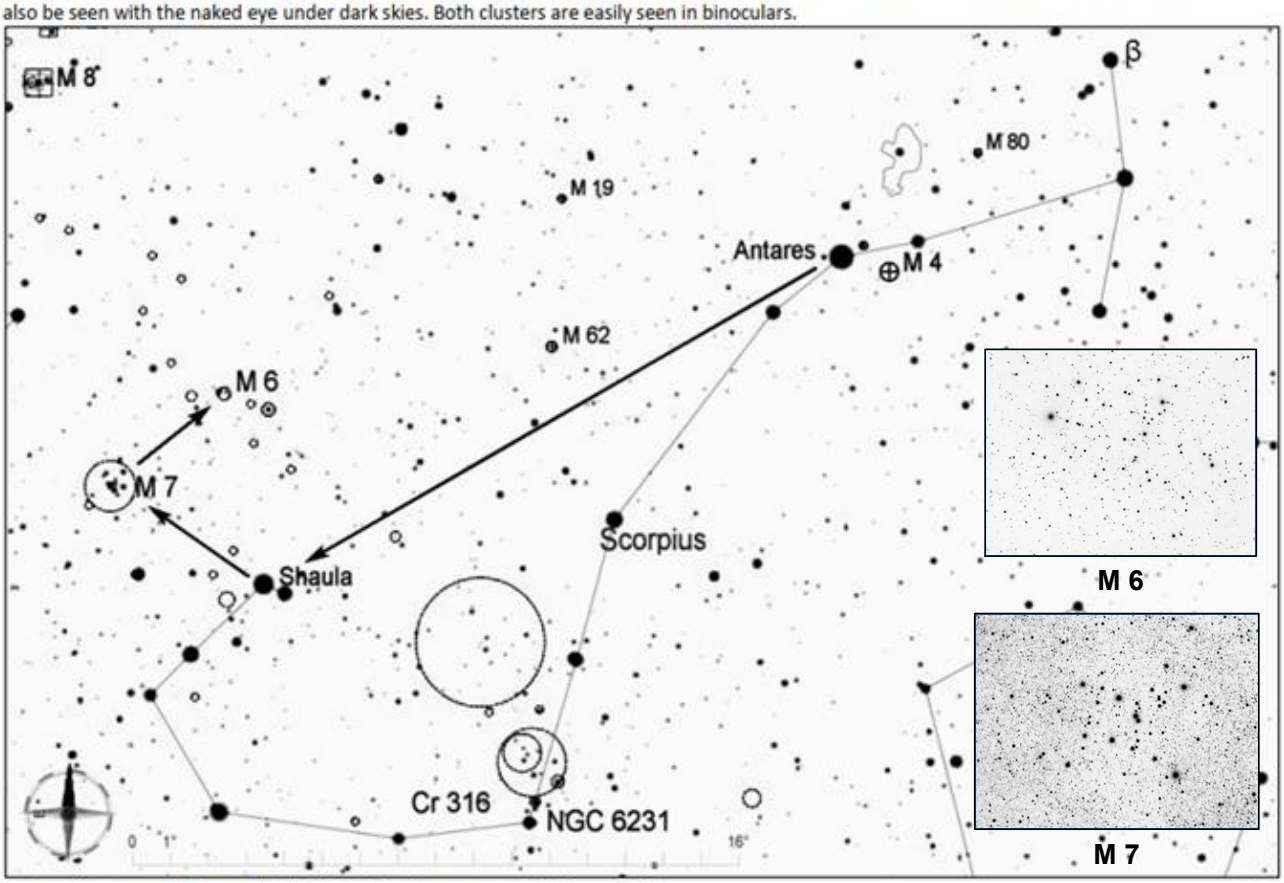


M 6 & M 7

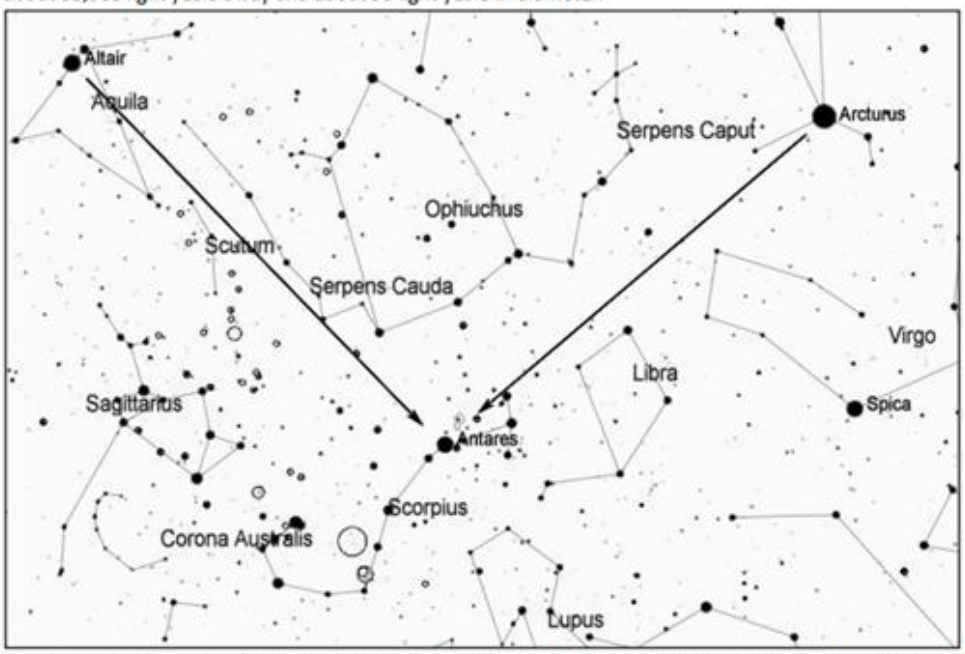
From Antares, look about 20 degrees to the east-southeast for a bright pair of stars (including Shaula, magnitude 1.6) that form the tip of the scorpion's tail. This distictive pair is easy to see as long as you have a good view of the southern sky. From Shaula, M7 is about 4 degrees to the northeast, and at magnitude 3.3 it is relatively easy to see with the naked eye. M6 is just 4 degrees northwest of M7, and at magnitude 4.2 it can also be seen with the naked eye under dark skies. Both clusters are easily seen in binoculars.



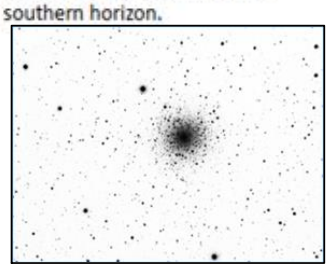
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 80, Globular Cluster in Scorpius

Messier 80 is a small but bright globular cluster that is easy to see in any telescope. Through small scopes it appears as a hazy ball with a much brighter center. With medium to large scopes, many of the stars around the periphery can be resolved, making an impressive sight. The cluster is about 33,000 light years away and about 95 light years in diameter.

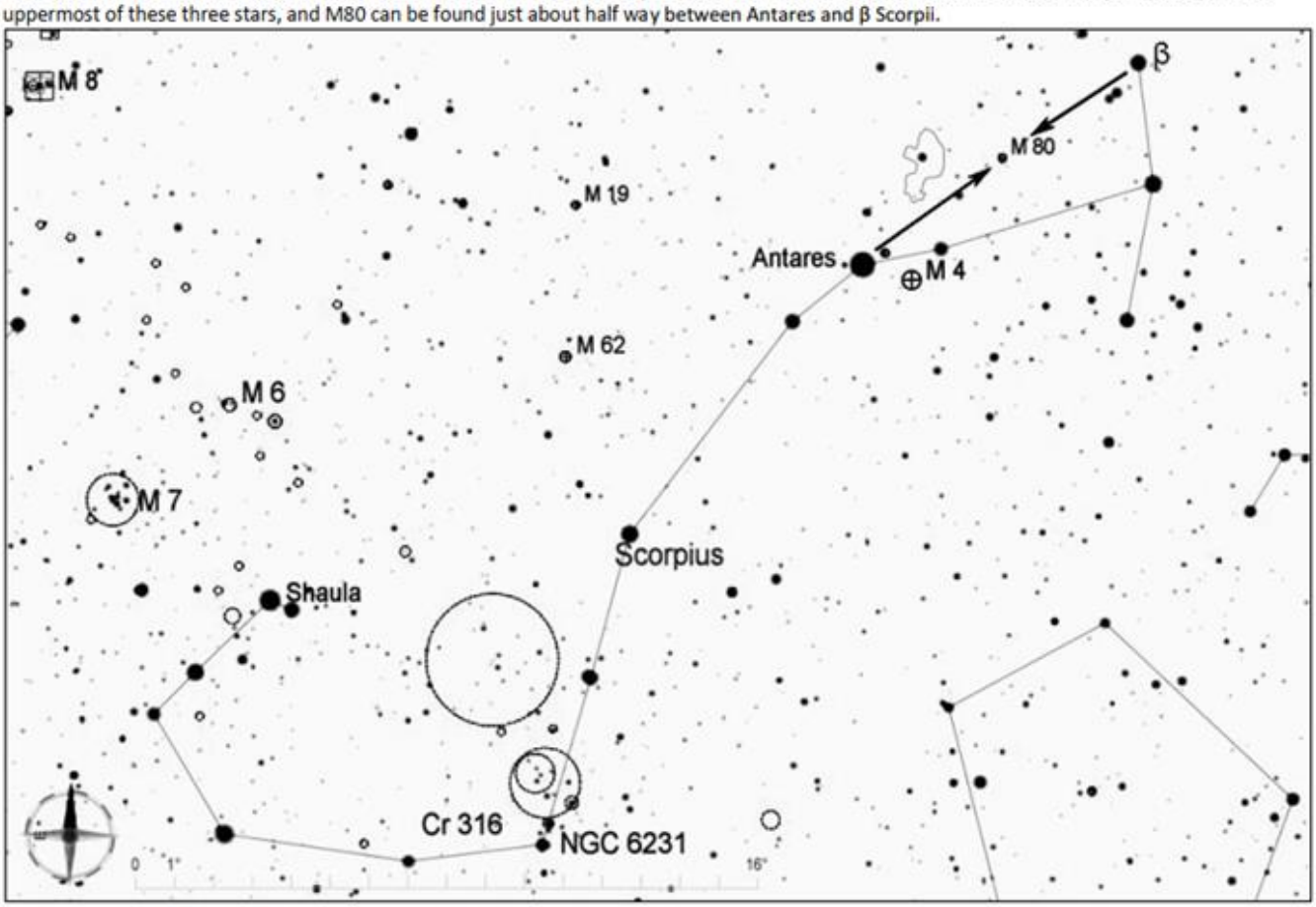


Start by finding first magnitude Antares, the brightest and reddest star low in the southern sky on summer evenings. To get oriented, note that Antares is about 60 degrees southwest of Altair (part of the Summer Triangle) and a similar distance southeast of Arcturus (part of the Spring Triangle). Antares represents the eye of Scorpius, and on a clear night you should be able to see the curving shape of the scorpion if you have a good view of the southern horizon.



M 80

Once you locate Antares, look to its west for the vertical line of three bright stars that represent the claws of the scorpion. β (beta) Scorpii is the uppermost of these three stars, and M80 can be found just about half way between Antares and β Scorpii.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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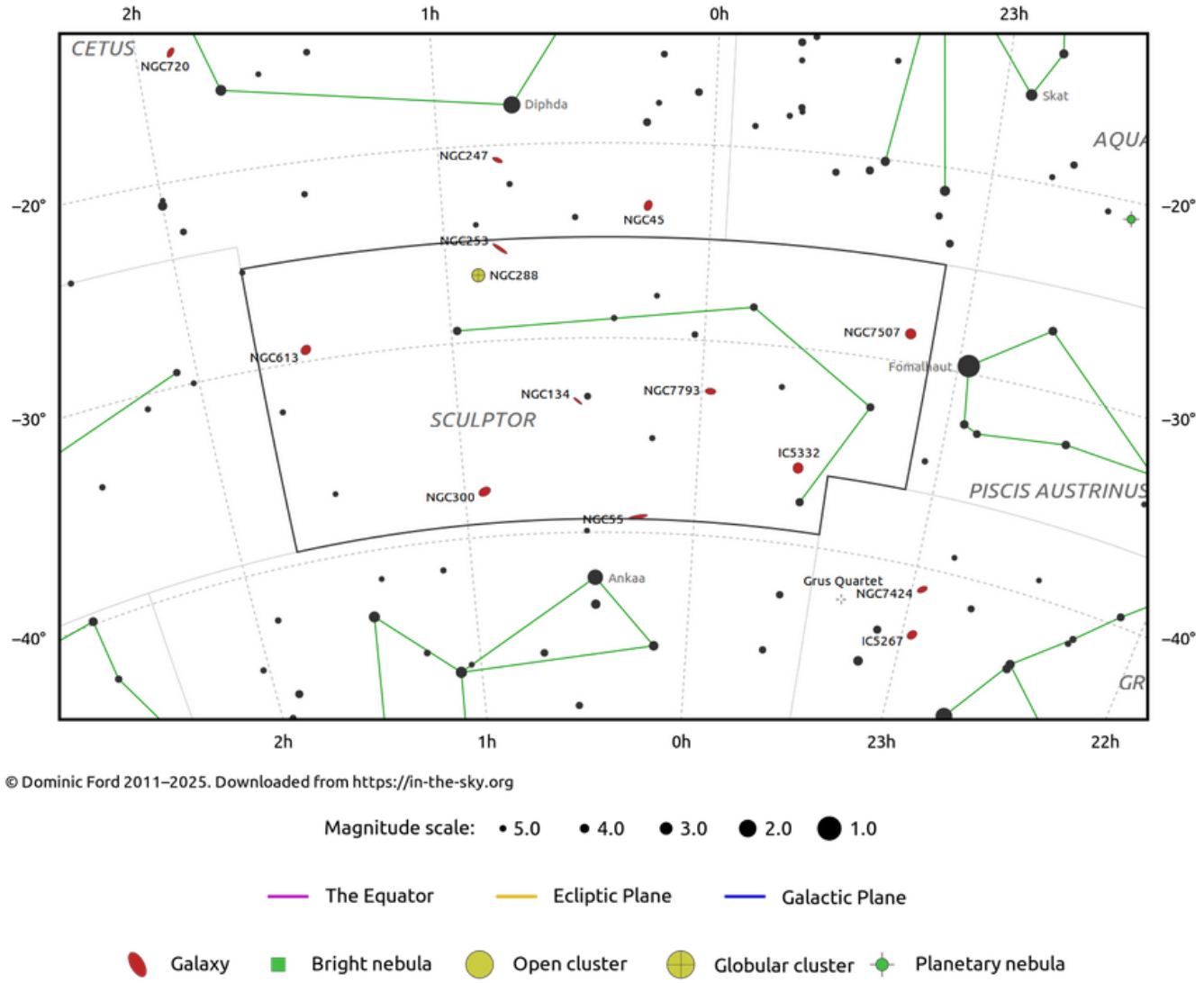
Sculptor (Scl)

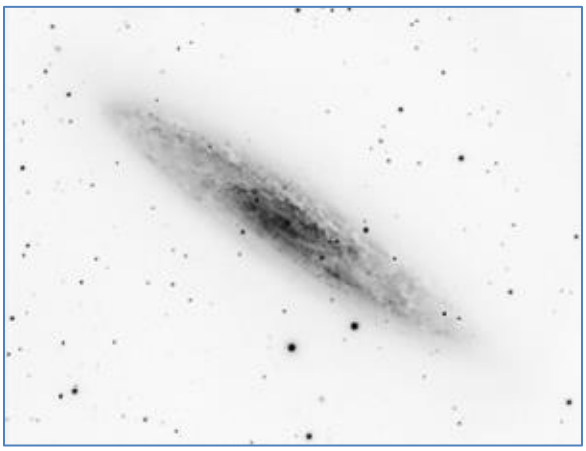
Evening Visibility: **October – December**
Online Information: **Sculptor**
Charts: **1** Featured Objects: **2**
More Online Information: NGC-253, NGC-288

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
NGC-253 (G)	1, W1	Silver Coin Galaxy, Silver Dollar Galaxy, Sculptor Galaxy, NGC-253, C-65	| Mag=8.0 | SB=22.7 | Size=27.5’ x 6.8’ |
NGC-288 (GC)	1, W1	Melotte 3	| Mag=9.4 | SB=22.4 | Size=13.8’ |

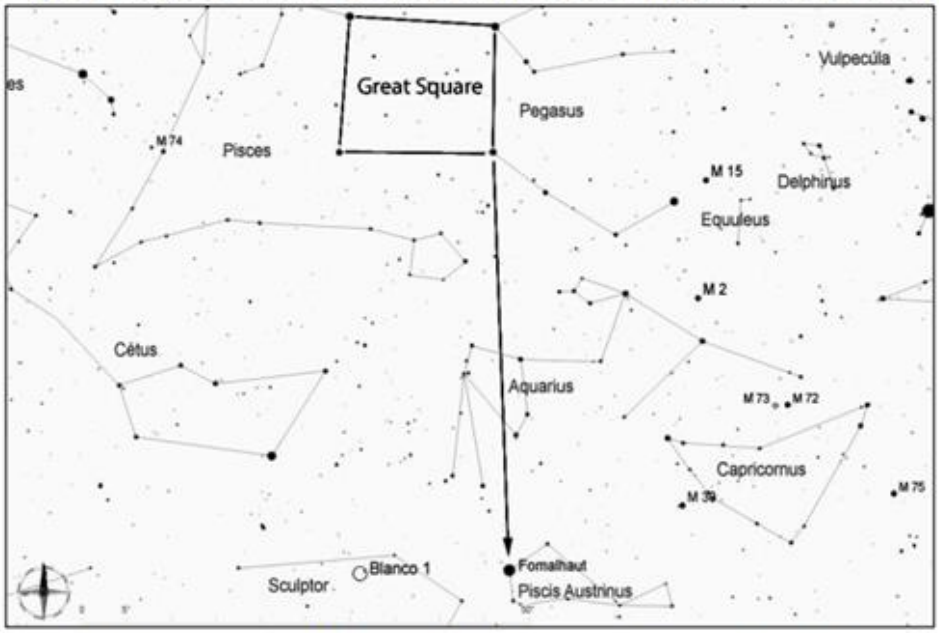
Image Gallery



NGC 253 (C 65) The Sculptor Galaxy

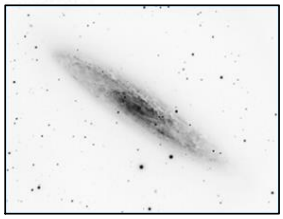
NGC 253 (Caldwell 65, the Silver Coin Galaxy) and NGC 288 in Sculptor

The Silver Coin Galaxy, also known as the Sculptor Galaxy, is one of the closest spiral galaxies, about 11 million light years away. It stretches across almost 1/2 degree of sky, and in large telescopes it reveals a wealth of mottling and detail. It is well worth a look with any telescope. Just to the southeast is a nice globular cluster, NGC 288, whose individual stars can be resolved with telescopes of medium or large aperture.



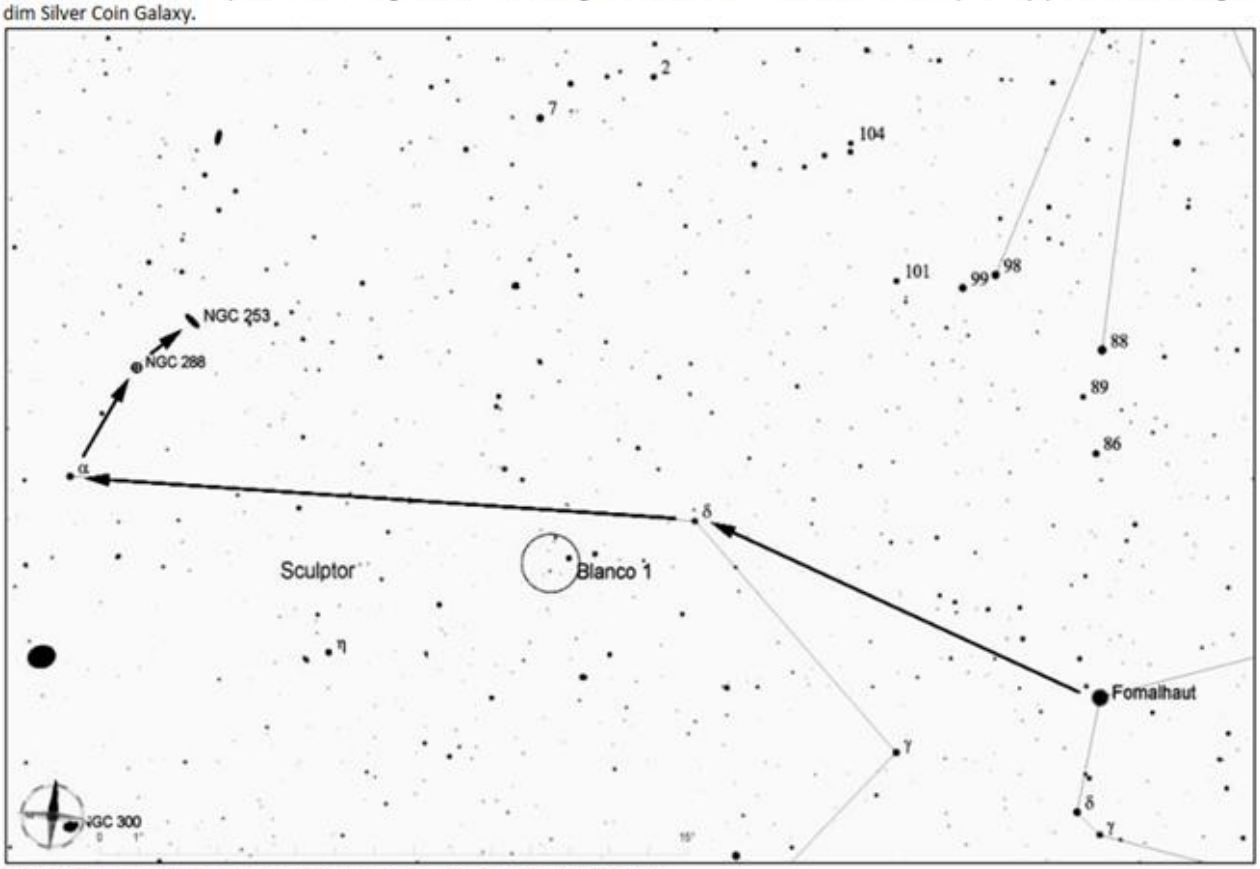
Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter.

Using the western edge of the Great Square as a pointer, extend a line to the south about 3 times the size of the Square, and you will arrive at bright Fomalhaut, the only first magnitude star in that region of the sky.



NGC 253

There are no bright stars near Fomalhaut, so we need to navigate with dim ones. Look to the east for two 4th magnitude stars about 15 degrees apart, δ and α Sculptoris. From α Sculptoris, move about 3 degrees to the northwest to arrive at the globular cluster NGC 288. It is bright enough to see in even a small telescope. From NGC 288 go about another 2 degrees to the northwest and start with a low-power eyepiece to find the long but dim Silver Coin Galaxy.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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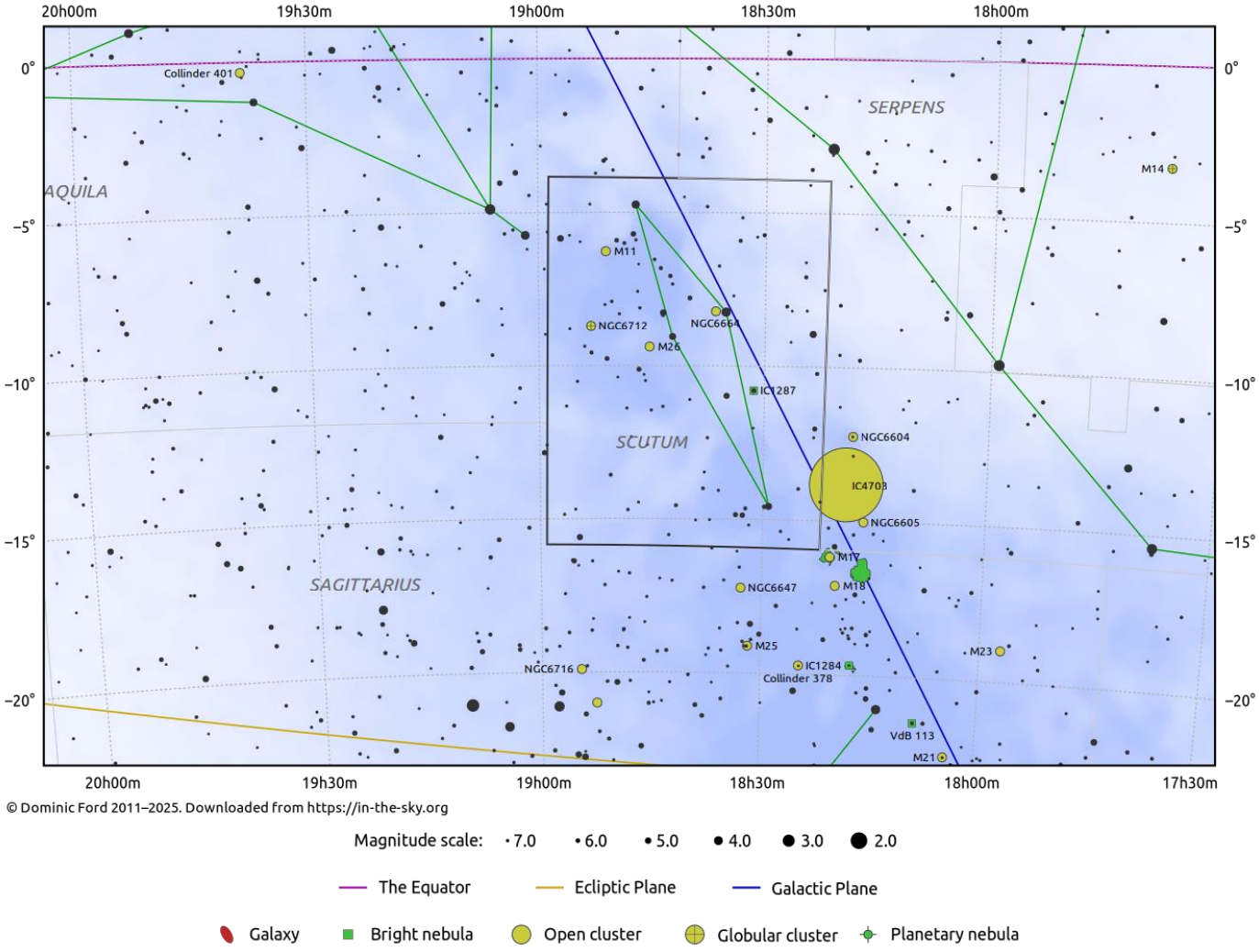
Scutum (Sct)

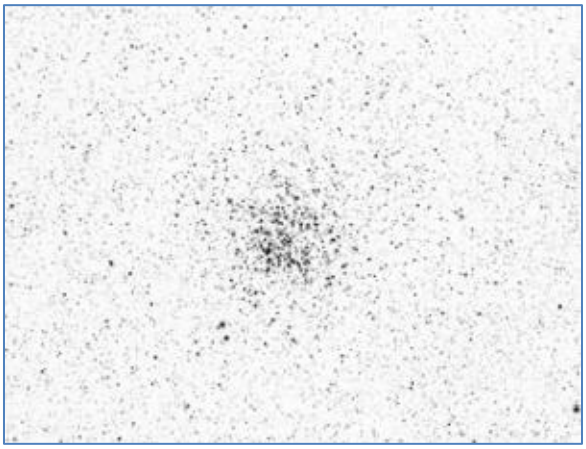
Evening Visibility: **June – October**
Online Information: **Scutum**
Charts: **1** Featured Objects: **2**
More Online Information: M-011, M-026

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
M-011 (OC)	1, W1	Wild Duck Cluster, Scutum Salt-and-Pepper Cluster, NGC-6705, Mel 213, Cr 391, OCl 76.0	| Mag=5.8 | SB=21.4 | Size=22.8' |
M-026 (OC)	1, W1	NGC-6694, Cr 389	| Mag=8.0 | SB=24.0 | Size=14' |

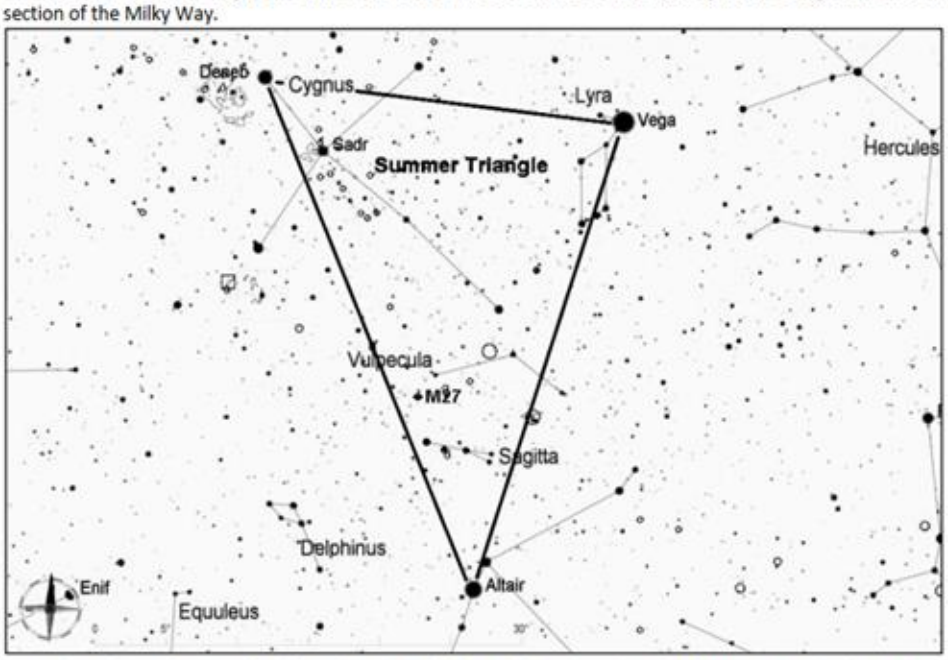
Image Gallery



Messier 11, The Wild Duck Cluster

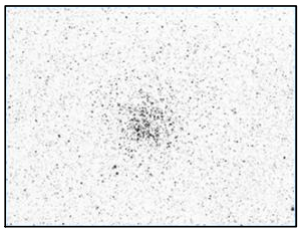
Messier 11 (Wild Duck Cluster) and Messier 26, Open Clusters in Scutum

Messier 11 is one of the richest and densest open clusters, with more than 1000 stars. Through binoculars or a small telescope at certain magnifications, it has a wedge shape that may look a bit like a flock of wild ducks in flight. M26 is similar in size but contains only about 100 stars, an attractive mixture of bright and dim ones. Both of these clusters are displayed against a background of countless dimmer stars in this rich section of the Milky Way.



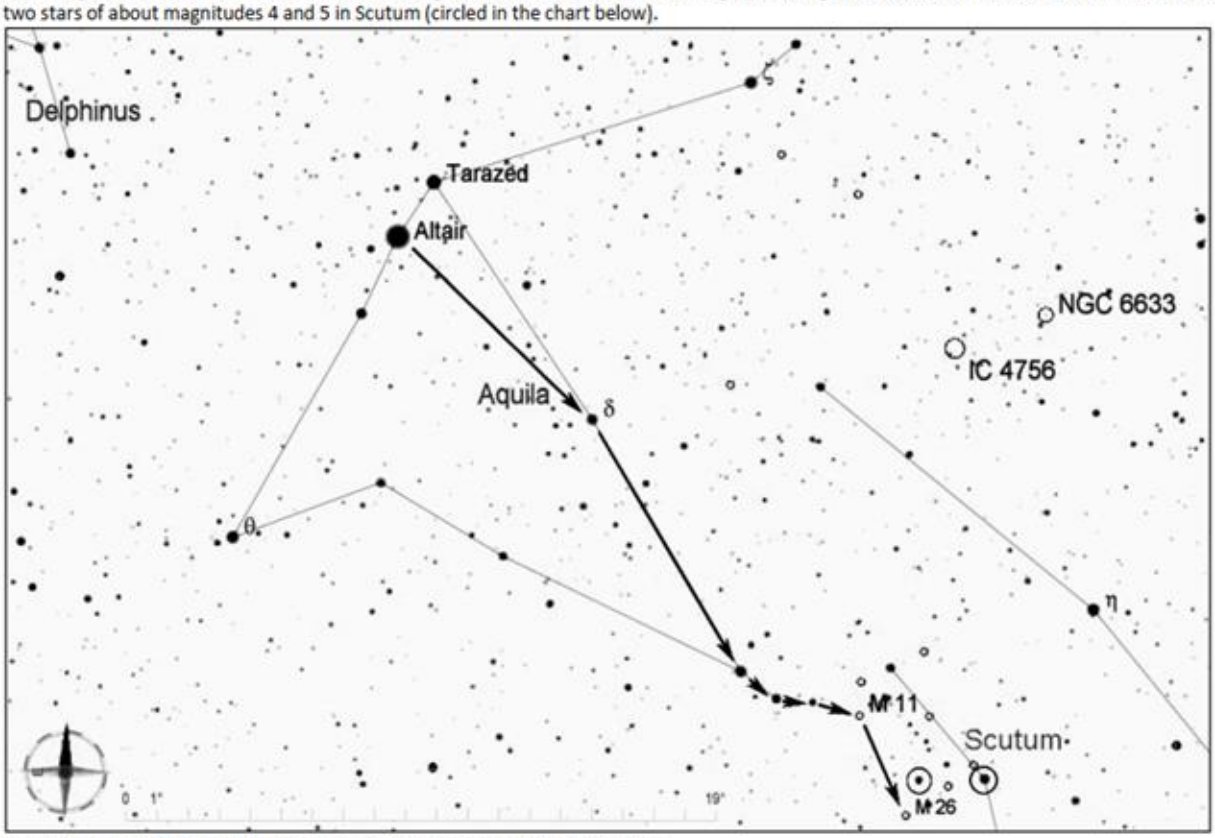
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

For this star hop, start from Altair in the constellation Aquila, the eagle.



M 11

From Altair, follow the stars that form the middle of the eagle's body and end with three stars that form a slightly hooked "tail". Extend the line of those three stars one more step to the southwest and you will arrive at M11, which is in the small and dim constellation Scutum, the shield. After observing M11, you can look for M26 about 3.5 degrees to the south-southwest. To get to the right location, note the position of M26 relative to two stars of about magnitudes 4 and 5 in Scutum (circled in the chart below).



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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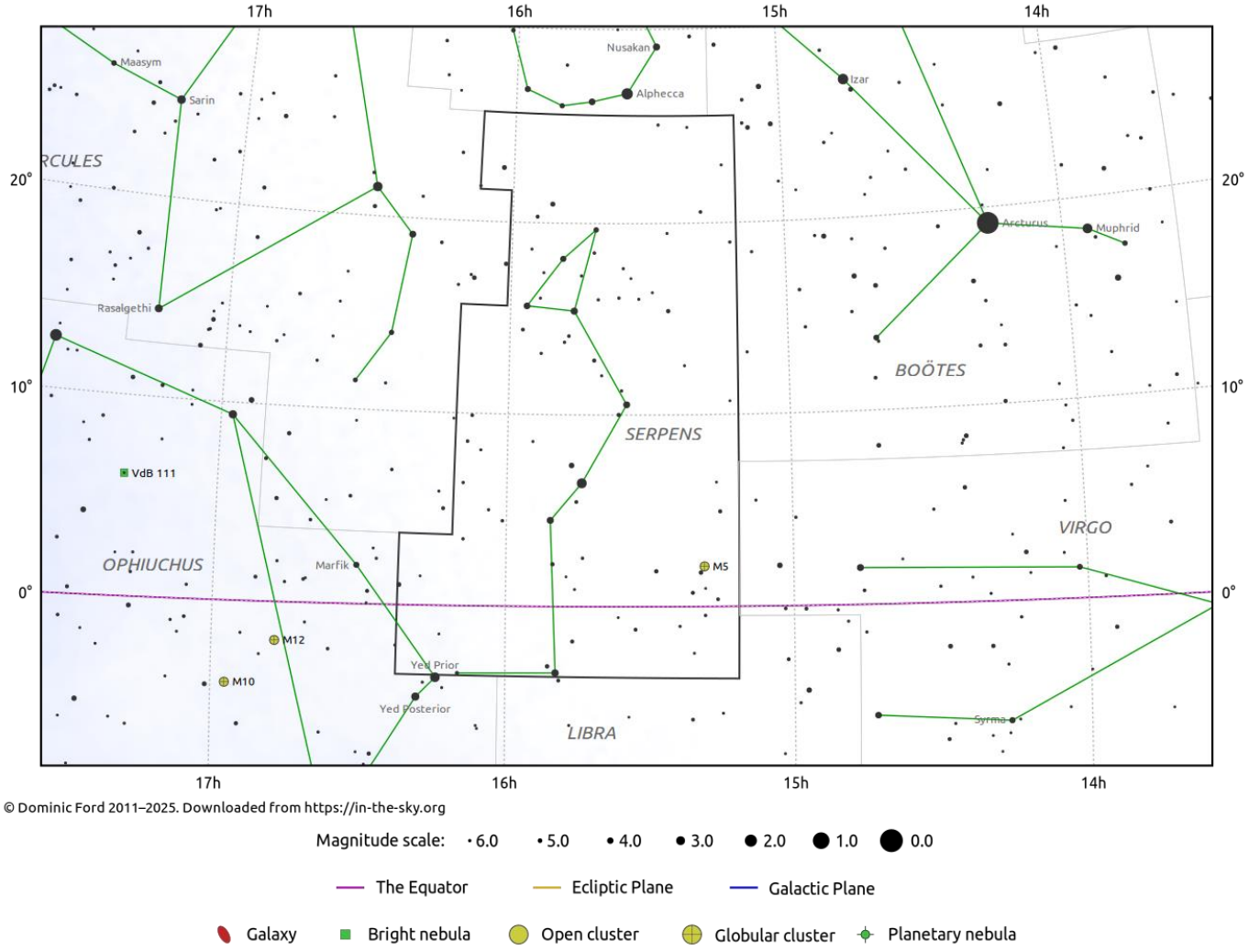
Serpens (Ser)

Evening Visibility: **June – September**
Online Information: **Serpens**
Charts: **3** Featured Objects: **7**
More Online Information: M-005, M-016, M-017, M-018, NGC-6572, NGC-6633, IC-4756

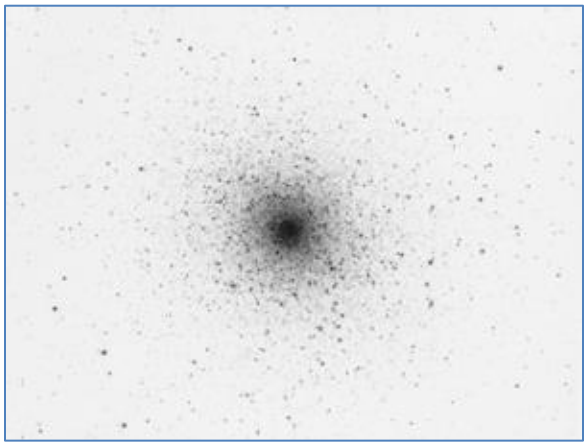
In-The-Sky.org Constellation Map



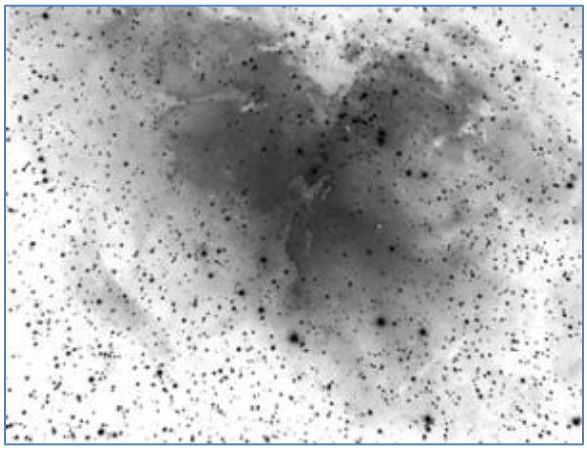
Object (Type)	Chart	Aliases	Stats
M-005 (GC)	1, W1	NGC-5904, GCl 34	| Mag=5.6 | SB=21.8 | Size=23.0' |
M-016 (EN)	2, W2	Eagle Nebula, Star Queen Nebula, The Ghost, NGC6611, Sh2-49, Gum 873, Cr 375	| Mag=6.4 | SB=22.8 | Size=70' x 50' |

Object (Type)	Chart	Aliases	Stats
M-017 (EN)	2, W2	Omega Nebula, Swan Nebula, Horseshoe Nebula, NGC6618,Checkmark Nebula	| Mag=6.0 | SB-23.9 | Size=11' | (In Constellation Sagittarius)
M-018 (OC)	2, W2	Black Swan, NGC6613, Cr 376, OCl 40	| Mag=7.5 | SB=21.4 | Size=9.8' | (In Constellation Sagittarius)
NGC-6572 (PN)	3, W3	Blue Racquetball, Emerald Nebula, Green Nebula, Turquoise Orb	| Mag= 9 | SB=12.6 | Size=6" | (In Constellation Ophiuchus)
NGC-6633 (OC)	3, W3	Cr 380, Mel 201	| Mag=4.6 | SB=20.4 | Size=27' | (In Constellation Ophiuchus)
IC-4756 (OC)	3, W3	Graff's Cluster, Cr 386, Mel 210	| Mag=4.6 | SB=22.2 | Size=12' |

Image Gallery



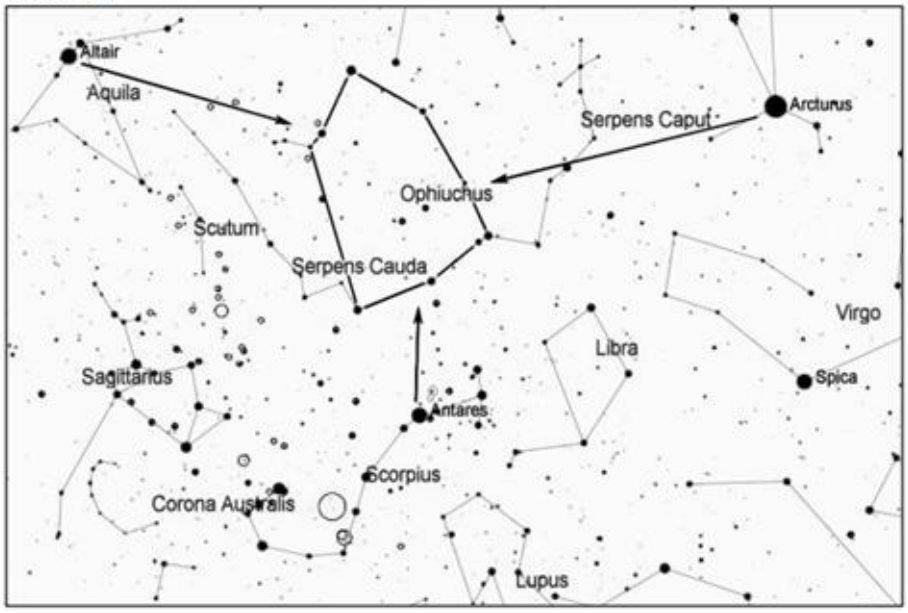
Messier 5



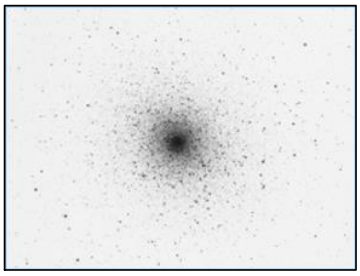
Messier 16, The Eagle Nebula

Messier 5, Globular Cluster in Serpens

Messier 5 is a superb object, one of the brightest globular clusters in the sky. The stars around the edges of this dense cluster can be resolved in even small telescopes, and its central core is very dense and bright. The view through telescopes with apertures of 10 inches or more is truly spectacular.

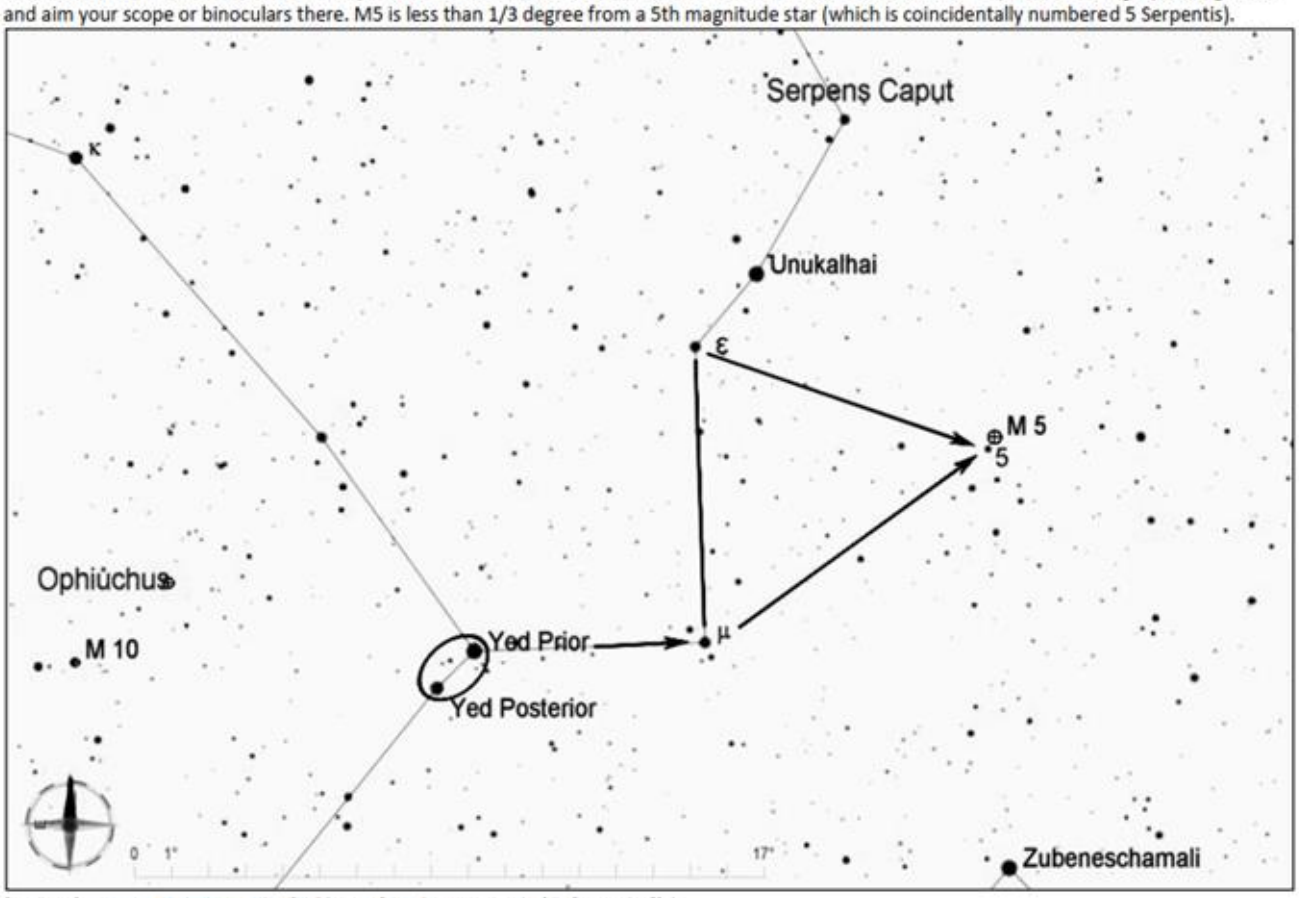


Start by finding the constellation Ophiuchus, the serpent bearer, a large oval shape that is west of Arcturus (part of the Spring Triangle), east of Altair (part of the Summer Triangle), and north of Antares. The oval is about 25 degrees from top to bottom, and its main stars are second and third magnitude, so they should be easy to see with the naked eye even with moderate light pollution.



M 5

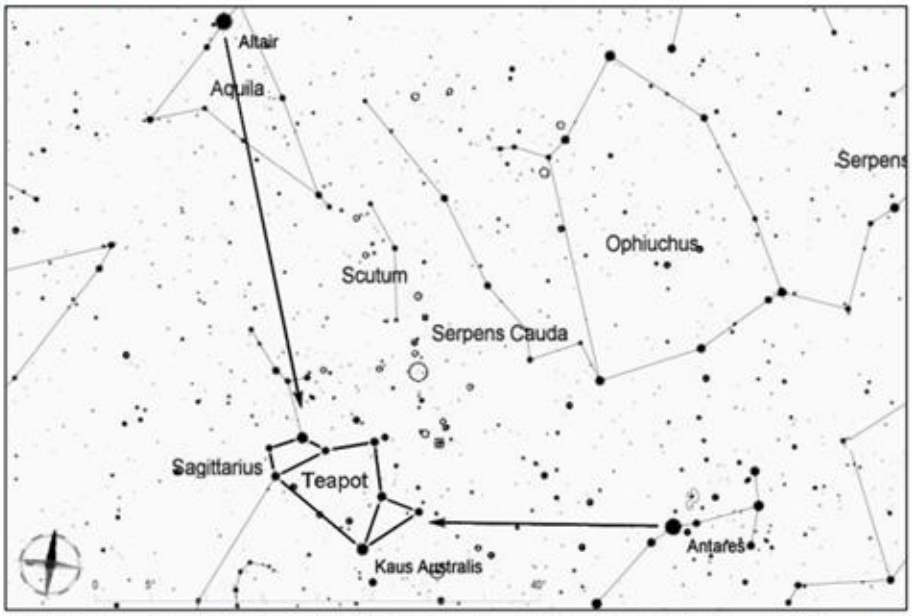
Find the pair of stars Yed Posterior and Yed Prior on the west side of Ophiuchus, circled in the chart below. From this pair, look about 7 degrees west for μ (mu) Serpentis, and then 7 degrees north for ε (epsilon) Serpentis. Use these two stars to visualize an equilateral triangle pointing west, and aim your scope or binoculars there. M5 is less than 1/3 degree from a 5th magnitude star (which is coincidentally numbered 5 Serpentis).



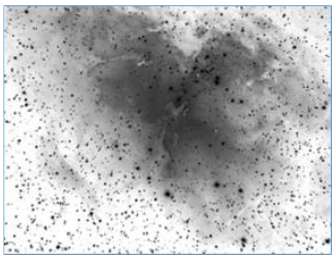
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 16 (Eagle Nebula), Messier 17 (Swan Nebula), and Messier 18

Through most telescopes, M16, the Eagle Nebula, will appear as a cluster of bright stars encompassed by a faint nebula. The details in the nebula shown in photographs are hard to see except with a very large scope. In contrast, the distinctive swan (or check mark) shape of M17 is bright enough to be seen in a good pair of binoculars or through any telescope. M18 is a compact open cluster of a few dozen stars seen against the Milky Way background.

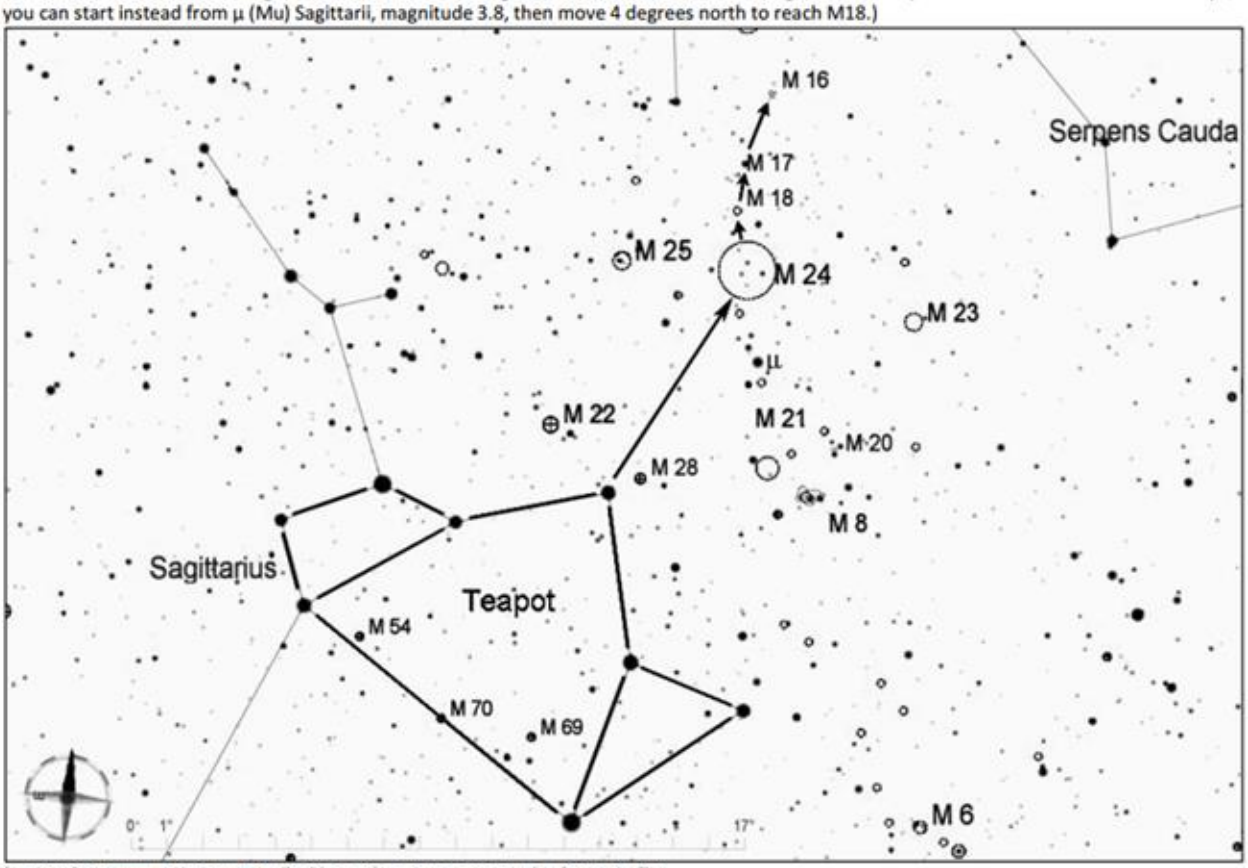


From mid-summer to early fall, the distinctive teapot shape of Sagittarius can be seen low in the southern sky during the evening. It is about 50 degrees south of Altair (part of the Summer Triangle) and about 30 degrees east of bright red Antares. It is well worth learning to recognize the teapot, for it can guide you to dozens of beautiful deep-sky objects.



M 16

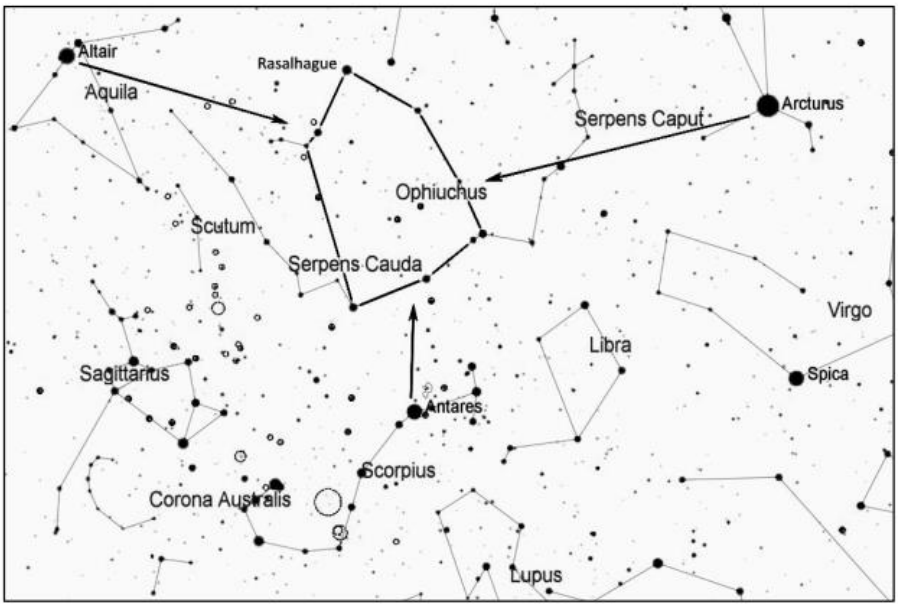
From the star at the top of the Sagittarius teapot asterism, look 7 degrees to the north-northwest with the naked eye, and you should see M24 as a large hazy patch several times the diameter of the Moon, a bright section of the Milky Way. M18, M17, and M16 are roughly in a line to the north. From M24, move about 1.5 degrees to M 18, another 1 degree to M17, then another 2.5 degrees to M16. (If M24 is not visible to the naked eye, you can start instead from μ (Mu) Sagittarii, magnitude 3.8, then move 4 degrees north to reach M18.)



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

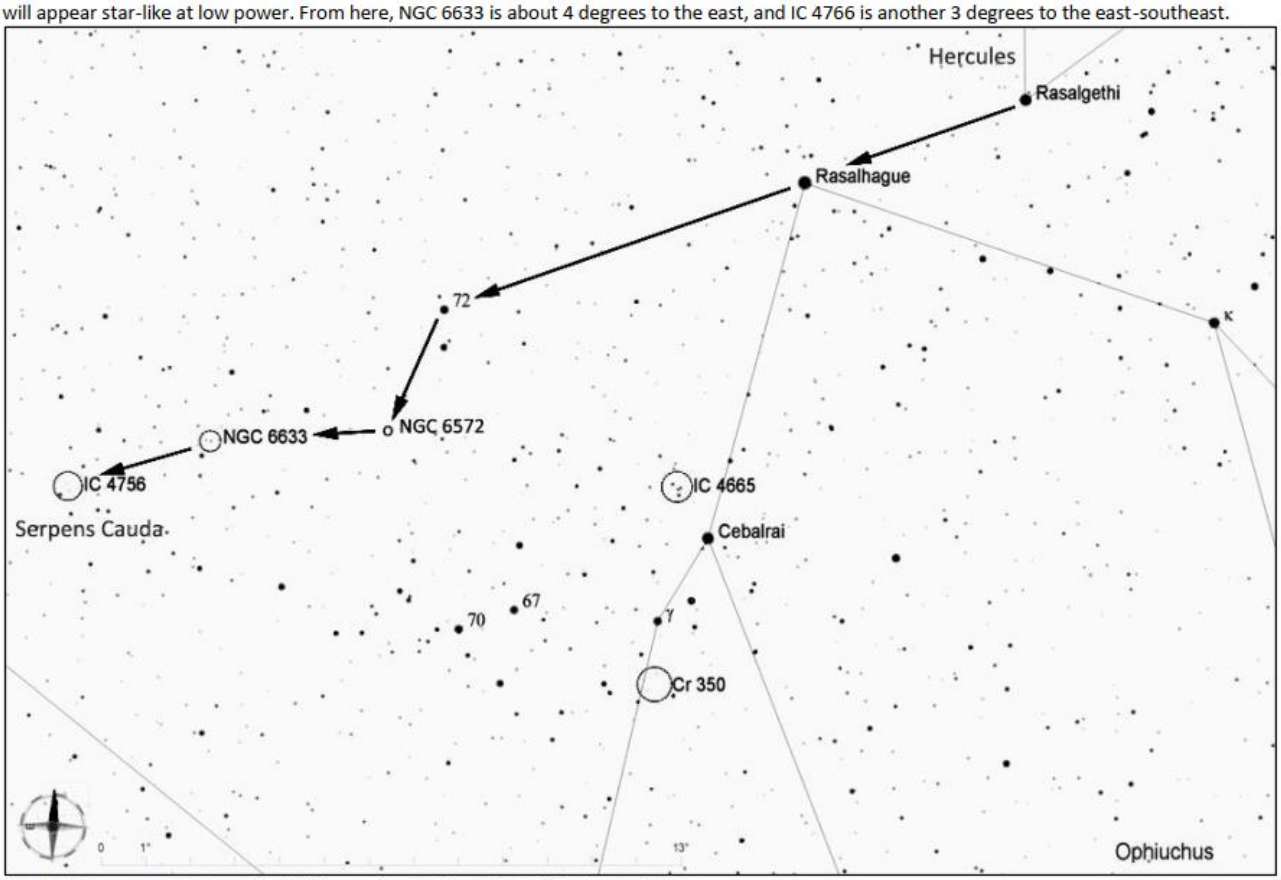
INGC 6572 (Planetary Nebula), NGC 6633, IC 4756 (Open Clusters)

This area in northern Ophiuchus and Serpens Cauda is rich in planetary nebulae and star clusters. NGC 6572 is a small but bright planetary nebula that is known for its intense blue-green color. Use high magnification for the best view. To its east are two bright open clusters, NGC 6633 and IC 4756, that are nice targets for binoculars or rich-field telescopes.



Start by finding the constellation Ophiuchus, the serpent bearer, a large oval shape that is west of Arcturus (part of the Spring Triangle), east of Altair (part of the Summer Triangle), and north of Antares. The oval is about 25 degrees from top to bottom, and its main stars are second and third magnitude, so they should be easy to see with the naked eye even with moderate light pollution.

At the top of Ophiuchus, imagine a line between the bright star Rasalhague and slightly dimmer Rasalgethi (in Hercules). Extend this line to the east about twice this distance to reach the star 72 Ophiuchi, magnitude 3.7. Then look 3 degrees to the south-southeast for blue-green NGC 6572, which will appear star-like at low power. From here, NGC 6633 is about 4 degrees to the east, and IC 4766 is another 3 degrees to the east-southeast.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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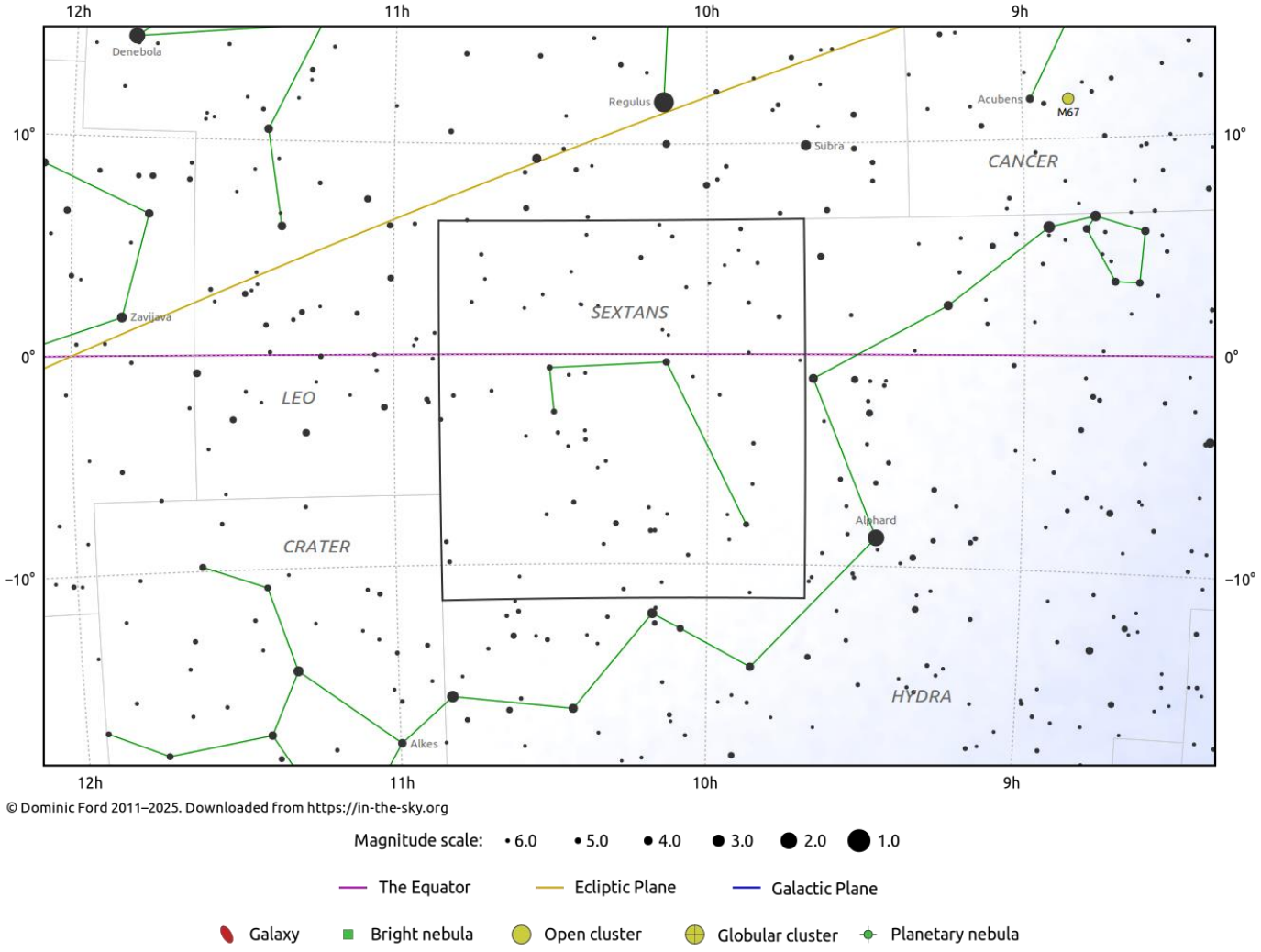
Sextans (Sex)

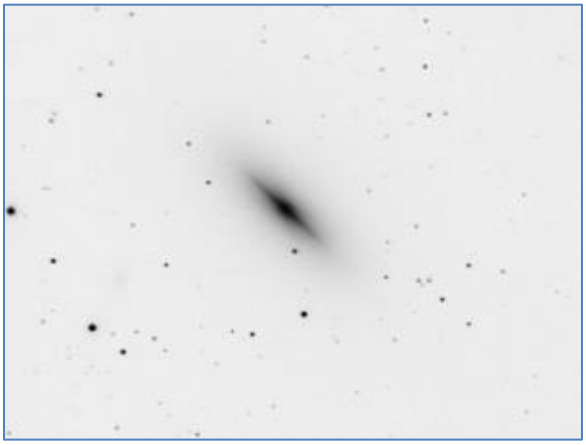
Evening Visibility: **March – June**
Online Information: **Sextans**
Charts: **1** Featured Objects: **1**
More Online Information: NGC-3115

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
NGC-3115 (G)	1, W1	The Southern Spindle Galaxy, Spindle Galaxy, C-53	| Mag=9.9 | SB=22.4 | Size=7.2' x 2.5' |

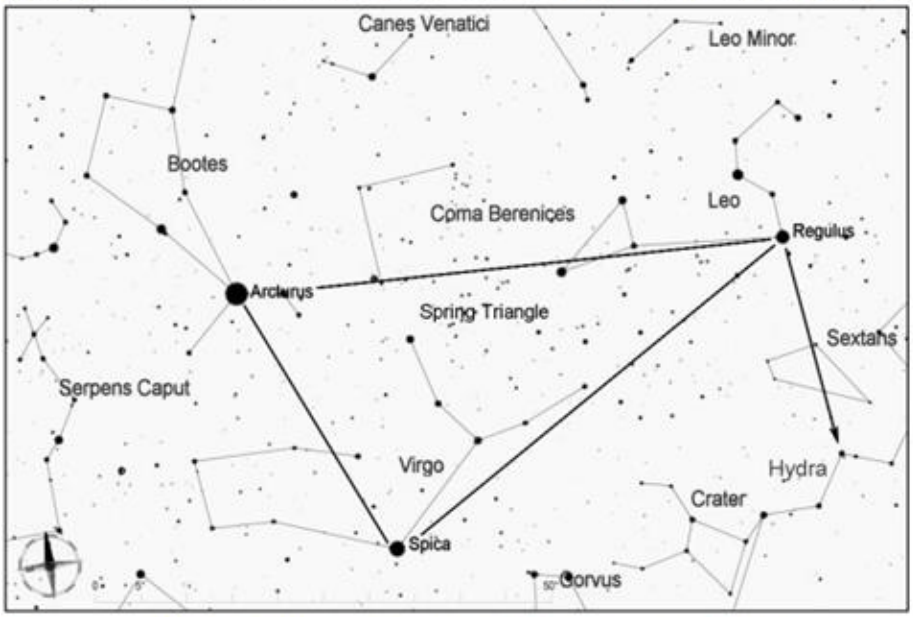
Image Gallery



NGC 3115 (C 53) Southern Spindle Galaxy

NGC 3115 (Caldwell 53), the Southern Spindle Galaxy in Sextans

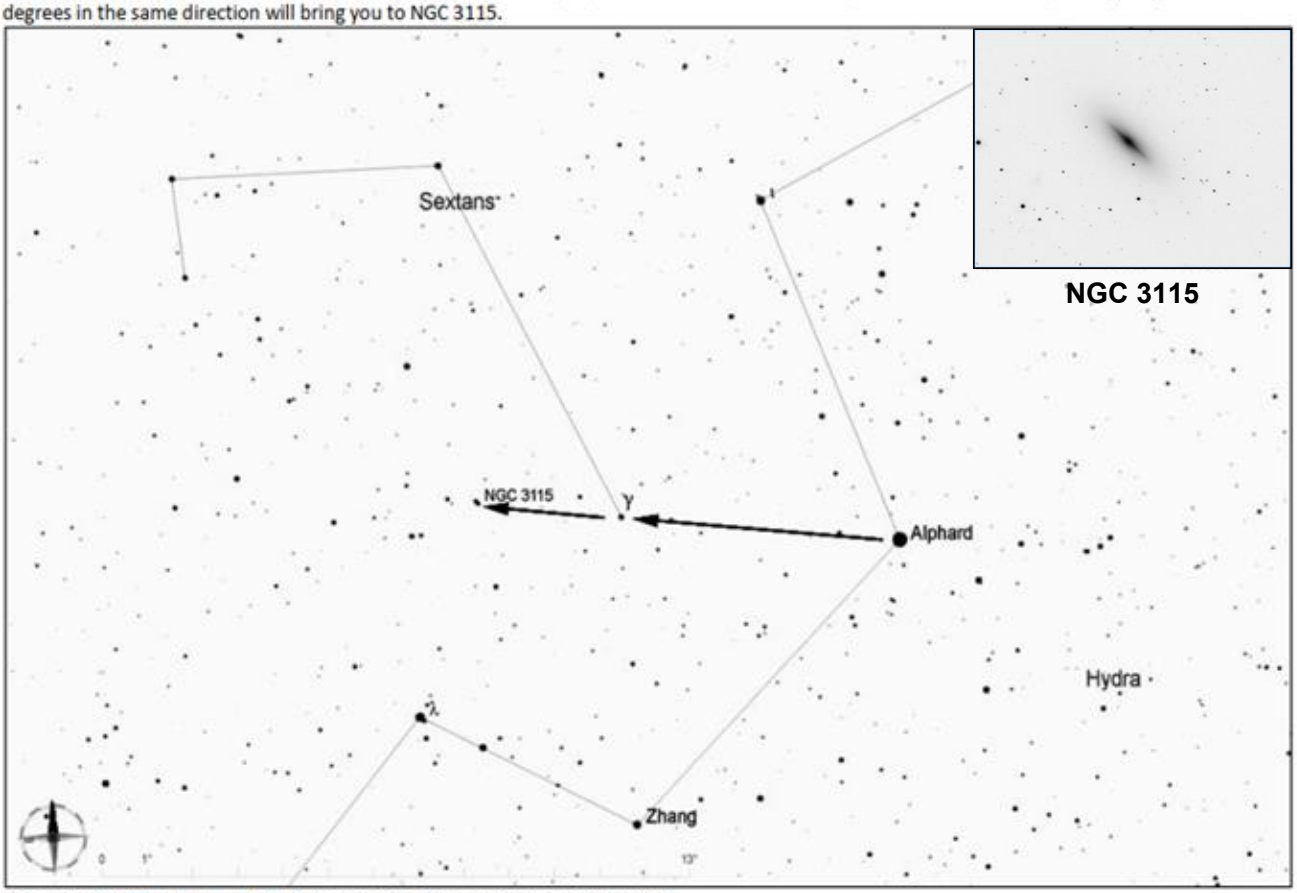
This galaxy is sometimes called the Spindle Galaxy, but I call it the Southern Spindle to distinguish it from the more famous Messier 102 (NGC 5866), which is also nicknamed the Spindle Galaxy. NGC 3115 is a lenticular (lens-shaped) galaxy seen edge-on. The bright central sections of this galaxy include a central bulge and very pointy arms, and these are surrounded by a fainter elliptical glow.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Regulus in the constellation Leo. Look about 30 degrees south of Regulus for the zig-zag constellation of Hydra.

The brighest star in Hydra, the water snake, is 2nd magnitude Alphard, easily visible to the naked eye. From Alphard, look 6 degrees east (and slightly north) for 5th magnitude gamma (γ) Sextans (which may require binoculars or a finderscope to see unless the sky is very dark). Another 3 degrees in the same direction will bring you to NGC 3115.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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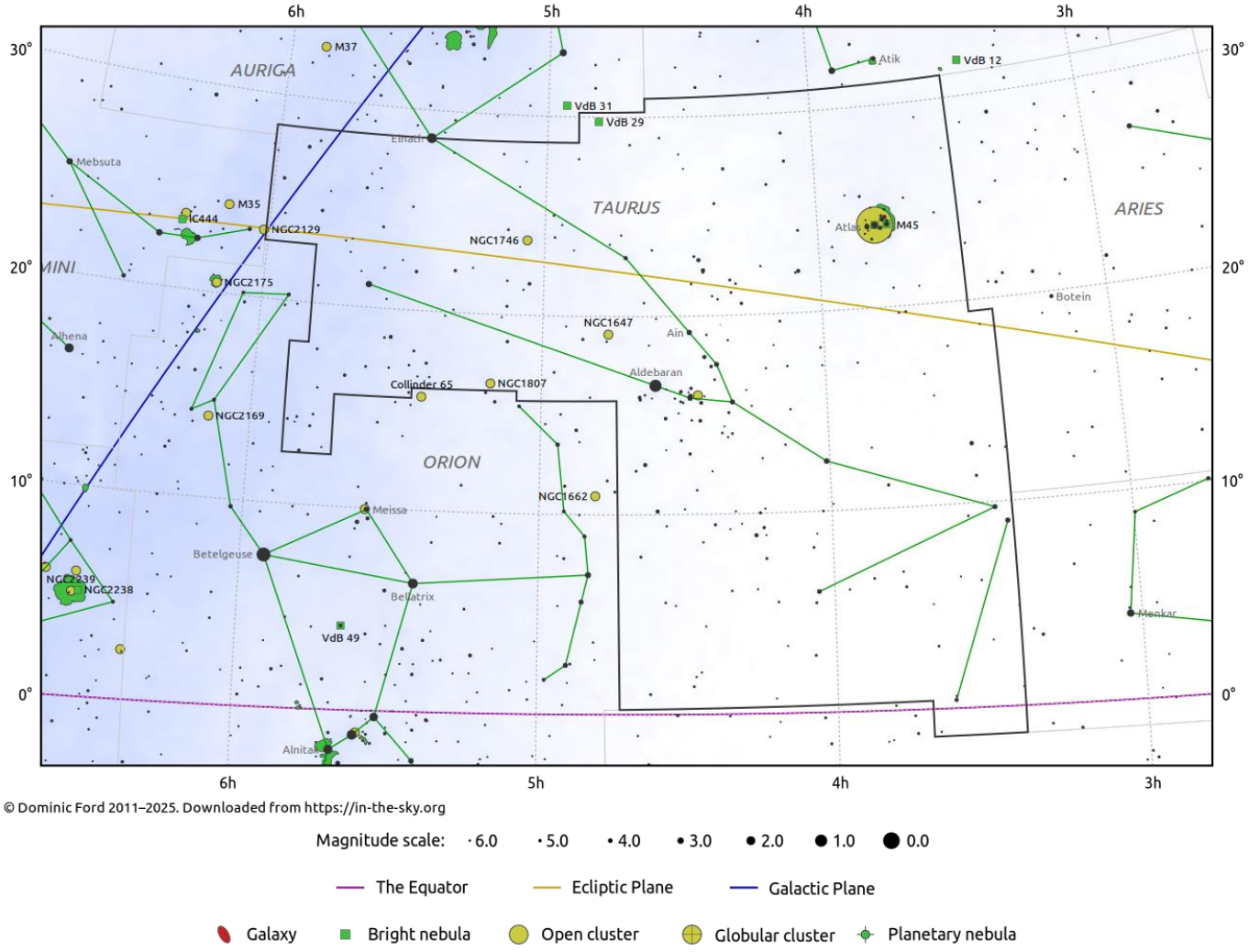
Taurus (Tau)

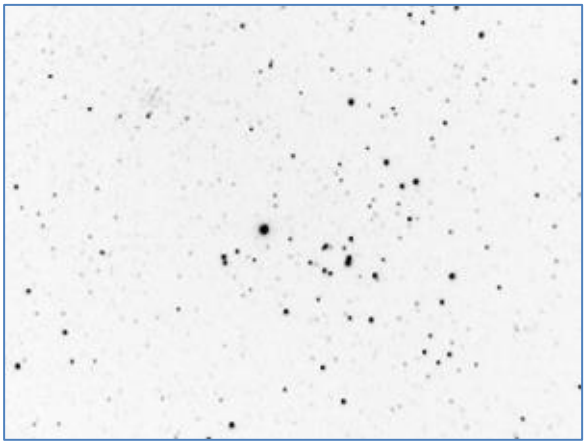
Evening Visibility: **November – March**
Online Information: **Taurus**
Charts: **4** Featured Objects: **4**
More Online Information: Melotte 25, M-001, M-045, NGC-1514

In-The-Sky.org Constellation Map

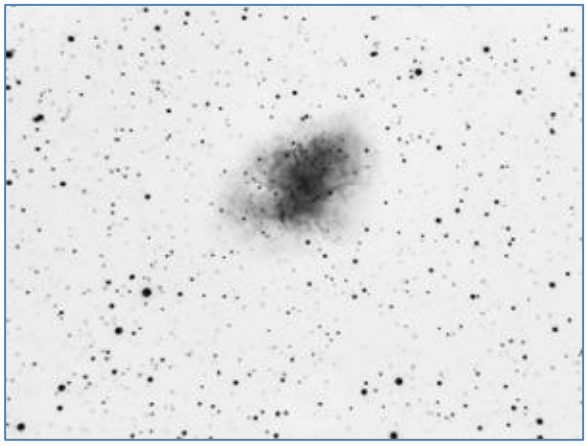


Object (Type)	Chart	Aliases	Stats
Melotte 25 (OC)	1, W1	The Hyades, C-41, Mel25, Collinder 50	| Mag=0.5 | SB=21.7 | Size=5° |
M-001 (SNR)	2, W2	Crab Nebula, Taurus A, NGC-1952	| Mag=8.4 | SB=20.5 | Size=7’ x 4.8’ |
M-045 (OC, RN)	3, W3	Pleiades, Seven Sisters, Cr42, Mel 22	| Mag=1.6 | SB=20.6 | Size=2° |
NGC-1514 (PN)	4, W4	Crystal Ball Nebula	| Mag=9.3 | SB=20.0 | Size=2.2’ |

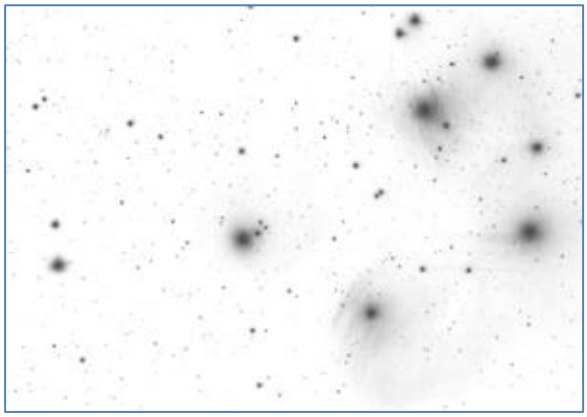
Image Gallery



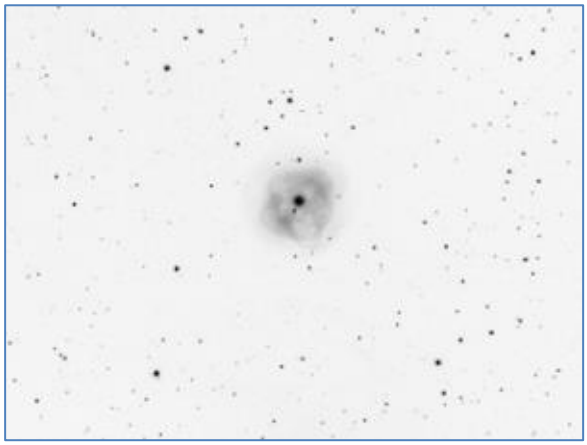
Melotte 25 (C 41) The Hyades
(No Online Photo)



Messier 1, The Crab Nebula



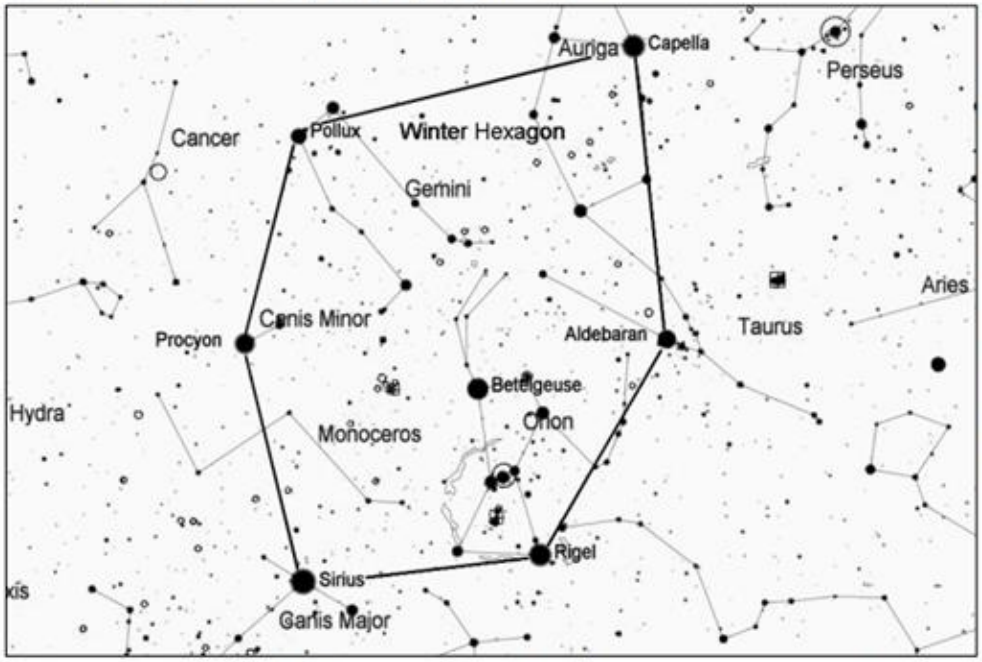
Messier 45, The Pleiades



NGC 1514

Melotte 25 (Caldwell 41), the Hyades

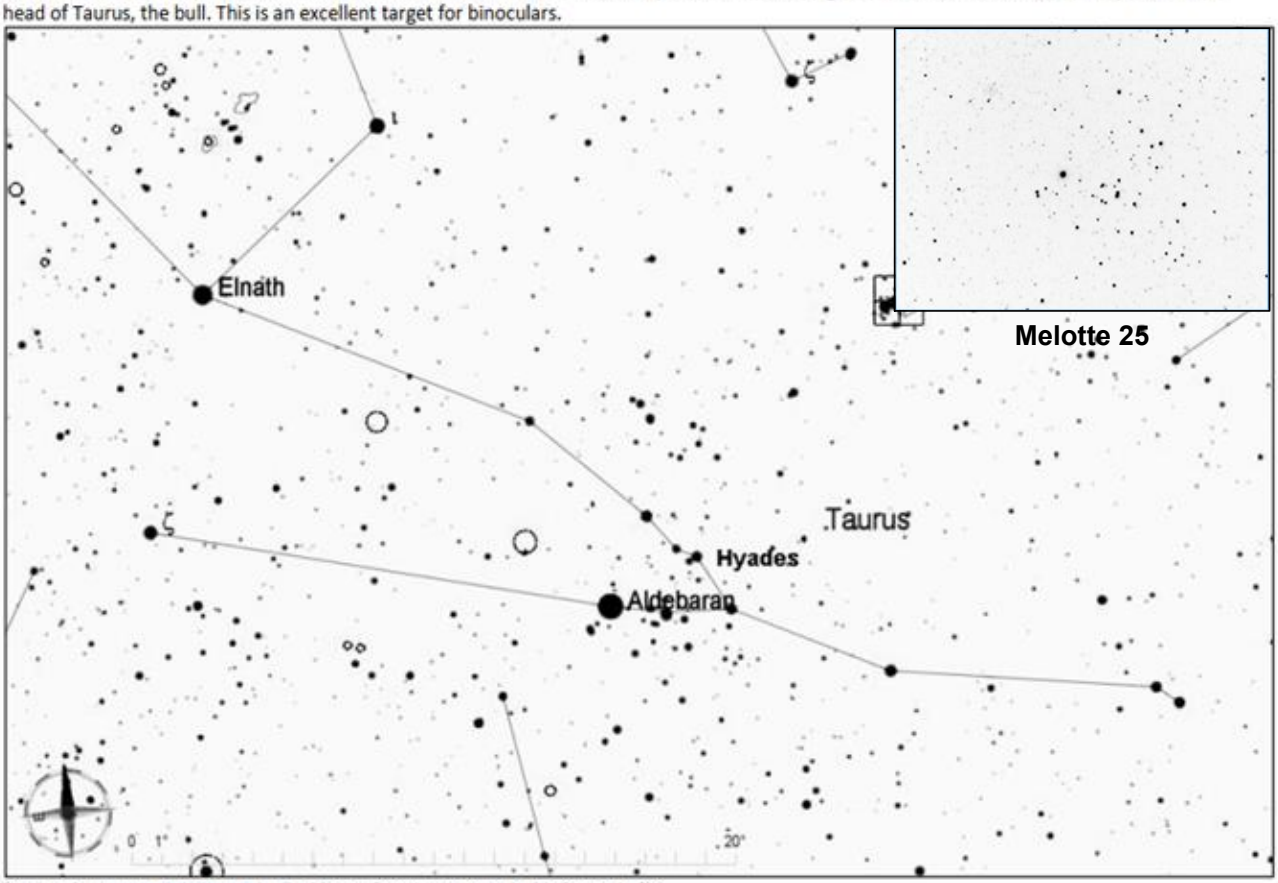
The Hyades group is the closest star cluster, 153 light years away. It is about 10 light years across, and it covers a full 5 degrees of sky. Many of its stars are plainly visible to the naked eye, and more can be seen with binoculars. The red first-magnitude star Aldebaran looks like it is part of the cluster, but actually it is in the foreground, 65 light years from Earth.



Find the Winter Hexagon, which is composed of six of the brightest stars in the sky--Sirius, Procyon, Pollux, Capella, Aldebaran, and Rigel. On mid-winter evenings, these stars form a large oval stretching from low in the south to nearly overhead. As spring begins, the Winter Hexagon sinks toward the west. The constellation Orion and its bright red star Betelgeuse are inside the Hexagon.

For this star hop, find Aldebaran, the reddish star that represents the eye of Taurus, the bull.

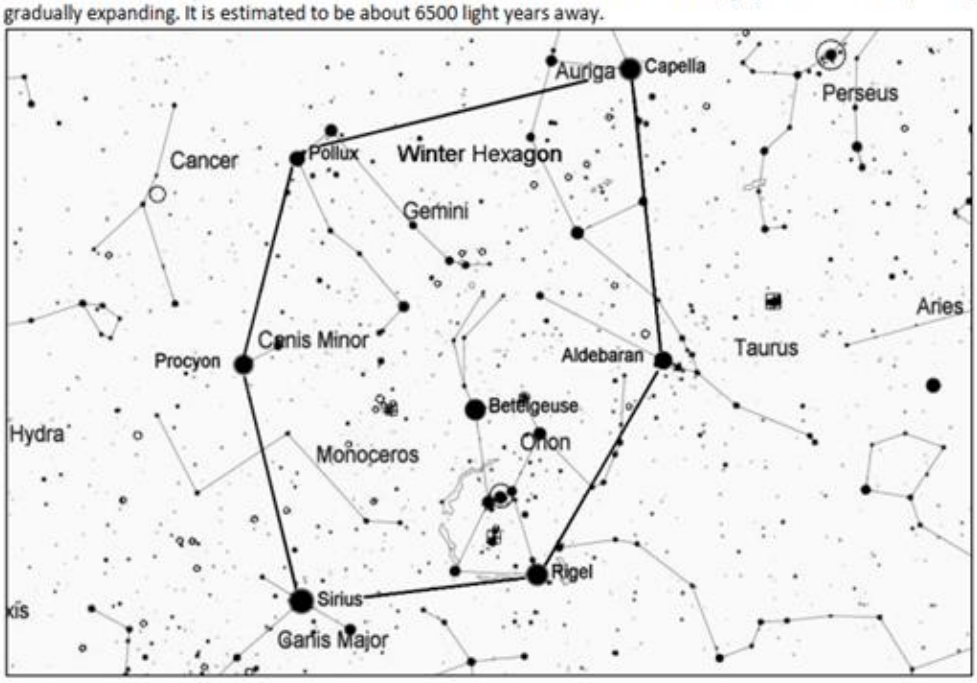
Look with the naked eye around Aldebaran to see some of the stars of the Hyades cluster. Its brightest stars form a V shape the represents the head of Taurus, the bull. This is an excellent target for binoculars.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 1, the Crab Nebula

Messier 1 is a supernova remnant--the aftermath of a supernova that appeared in the sky in the year 1054. Through a medium to large telescope, the nebula has an irregular outline accounts for its nickname, the Crab Nebula. Photographs taken several years apart show that the nebula is still gradually expanding. It is estimated to be about 6500 light years away.



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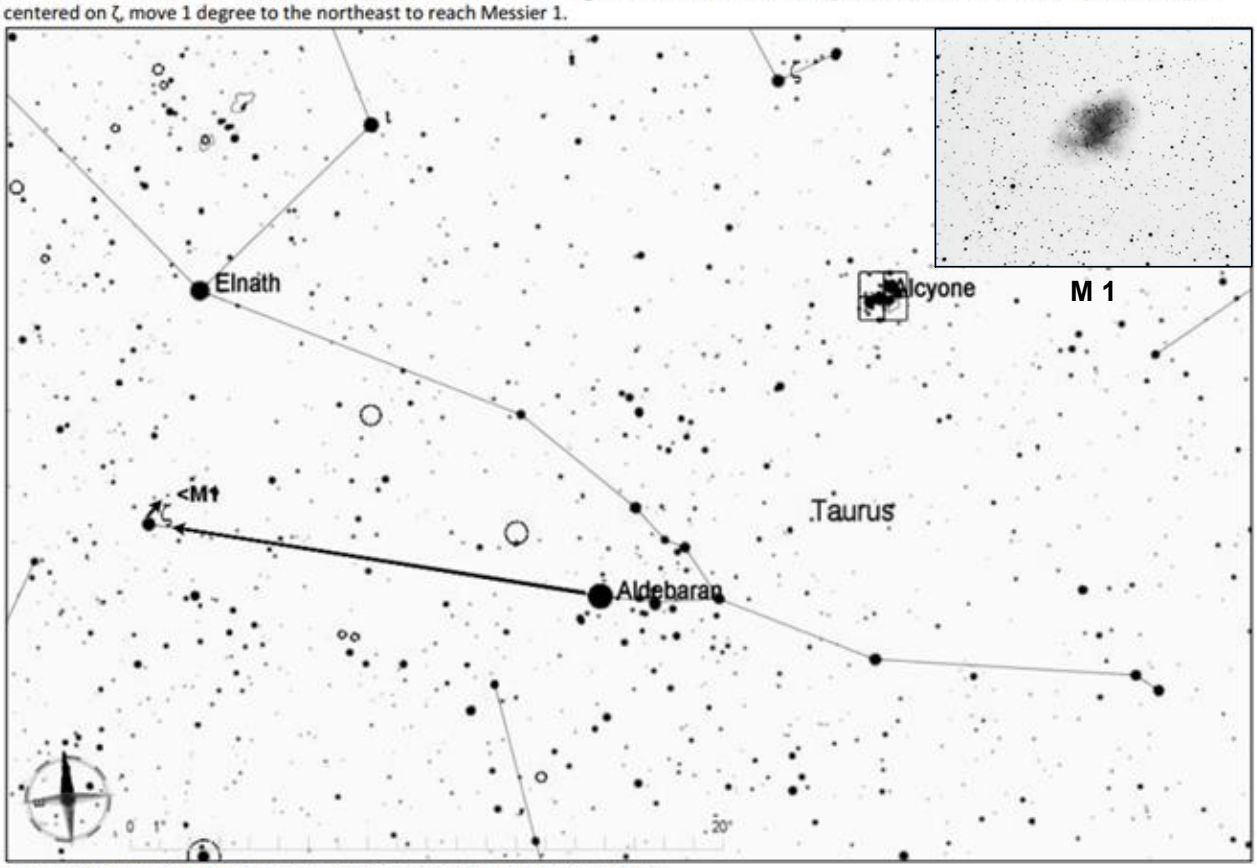
For this star hop, find Aldebaran, the reddish star that represents the eye of Taurus, the bull.

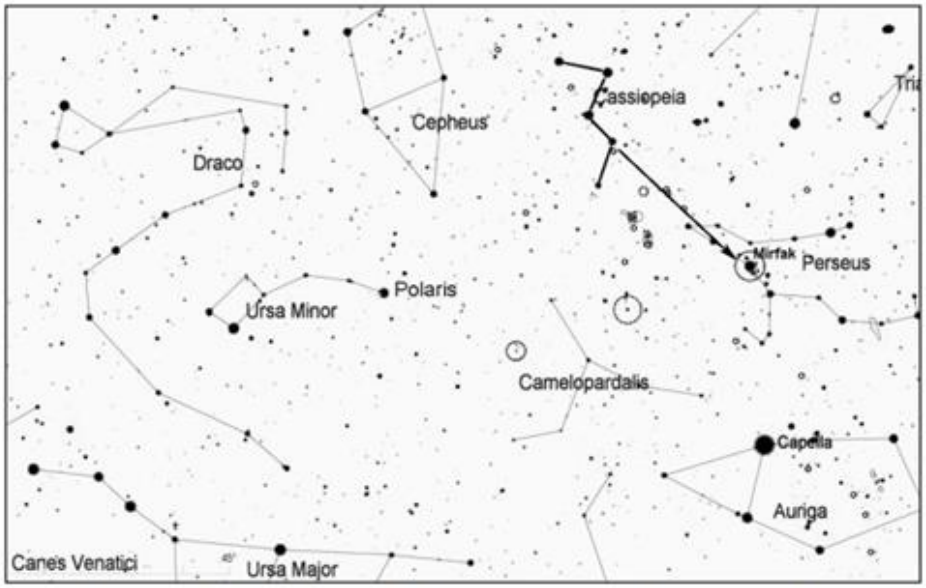
Aldebaran is part of a V-shaped group of stars that form the head of the bull (and are the brightest members of the Hyades star cluster). The two horns of the bull stretch to the east. Find ζ (zeta) Tauri, the third-magnitude star that marks the tip of the southern horn. With your telescope centered on ζ, move 1 degree to the northeast to reach Messier 1.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 45, the Pleiades

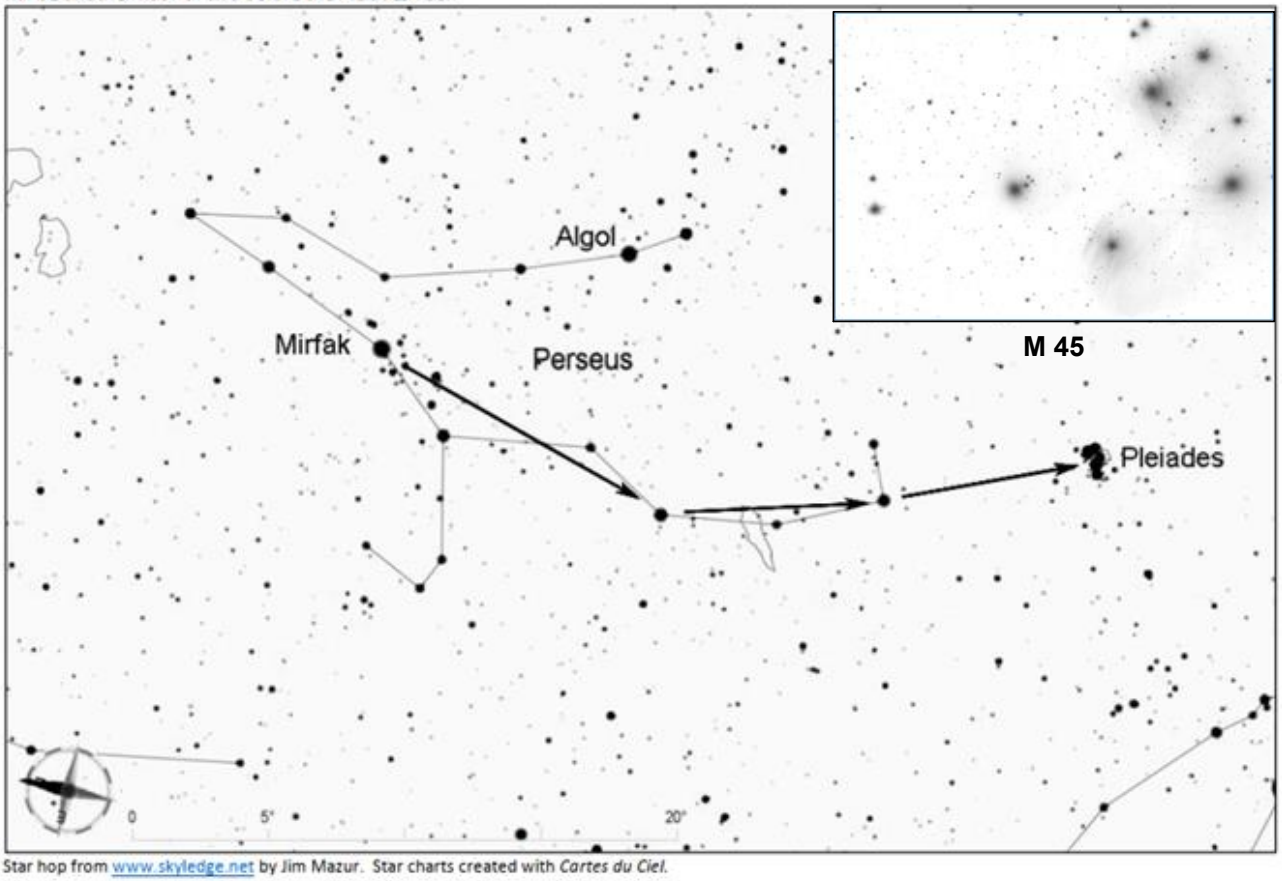
Also known as the Seven Sisters, the Pleiades are probably the best-known star cluster, easily visible to the naked eye. Through binoculars or a telescope, the brightest stars are dazzling, and many dimmer stars in the cluster are visible. This cluster is only about 430 light years away. The blue-white nebulosity that is so apparent in photographs is very hard to see looking through a telescope. Amateur astronomers don't need a star chart to find the Pleiades because it is so easy to see, but just in case you don't know where to look, here are the directions.



Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".

As shown here, use the stars of Cassiopeia to direct you to the nearby constellation Perseus, and its brightest star, Mirfak.

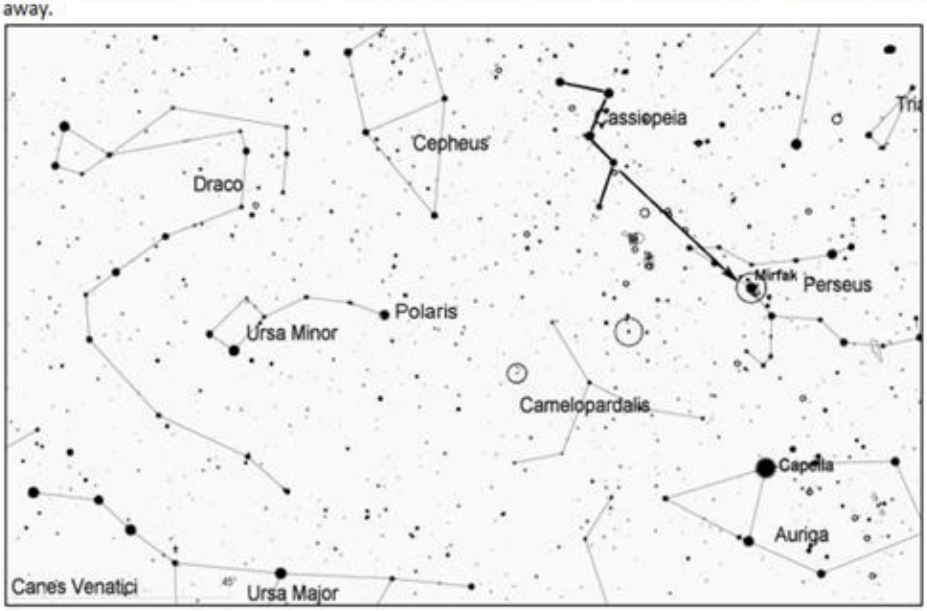
The stars of Perseus are fairly bright. The shape I see is some sort of animal with a curved tail. Follow the curving chain of stars that form the back leg of Perseus (whether you see the figure as man or beast), and they will point you to the Pleiades. If Perseus is low on the northeast horizon, it will be another hour or two before the Pleiades rise.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 1514, Planetary Nebula in Taurus

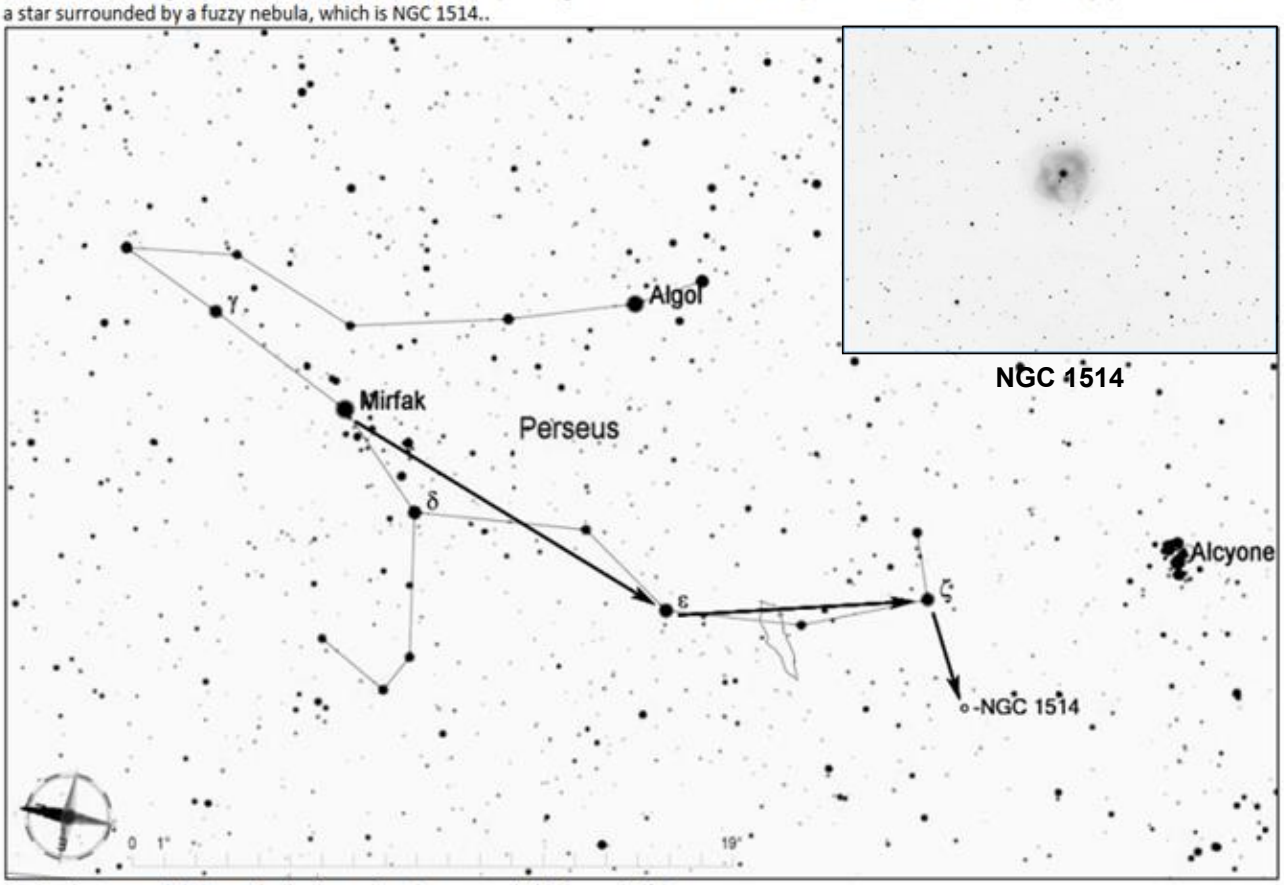
This is a pretty planetary nebula with a bright star (magnitude 9.4) in its center. The perfectly centered star convinced William Herschel that this object was not an unresolved star cluster but was some type of faint "atmosphere" surrounding the star. NGC 1514 is about 2 arc-minutes in diameter, fairly large for a planetary nebula. Through a telescope the nebula has a patchy appearance and diffuse edges. It is about 2400 light years away.



Find the constellation Cassiopeia, which has a distinctive "W" shape (although its orientation changes at different times of year as it circles the north celestial pole). On fall evenings, look for Cassiopeia in the northeast, where its tilt makes it look like a "3", and in the winter look high in the north above Polaris, where it is oriented like an "M".

As shown here, use the stars of Cassiopeia to direct you to the nearby constellation Perseus, and its brightest star, Mirfak.

The stars of Perseus are fairly bright. The shape I see is some sort of animal with a curved tail. Follow the curving chain of stars that form the back leg of Perseus (whether you see the figure as man or beast) until you reach the bright star that represents the rear foot, zeta (ζ) Perseii. From zeta, move about 3.5 degrees east-southeast, as shown below (crossing the constellation boundary into Taurus). Use a low-power eyepiece to search for a star surrounded by a fuzzy nebula, which is NGC 1514..

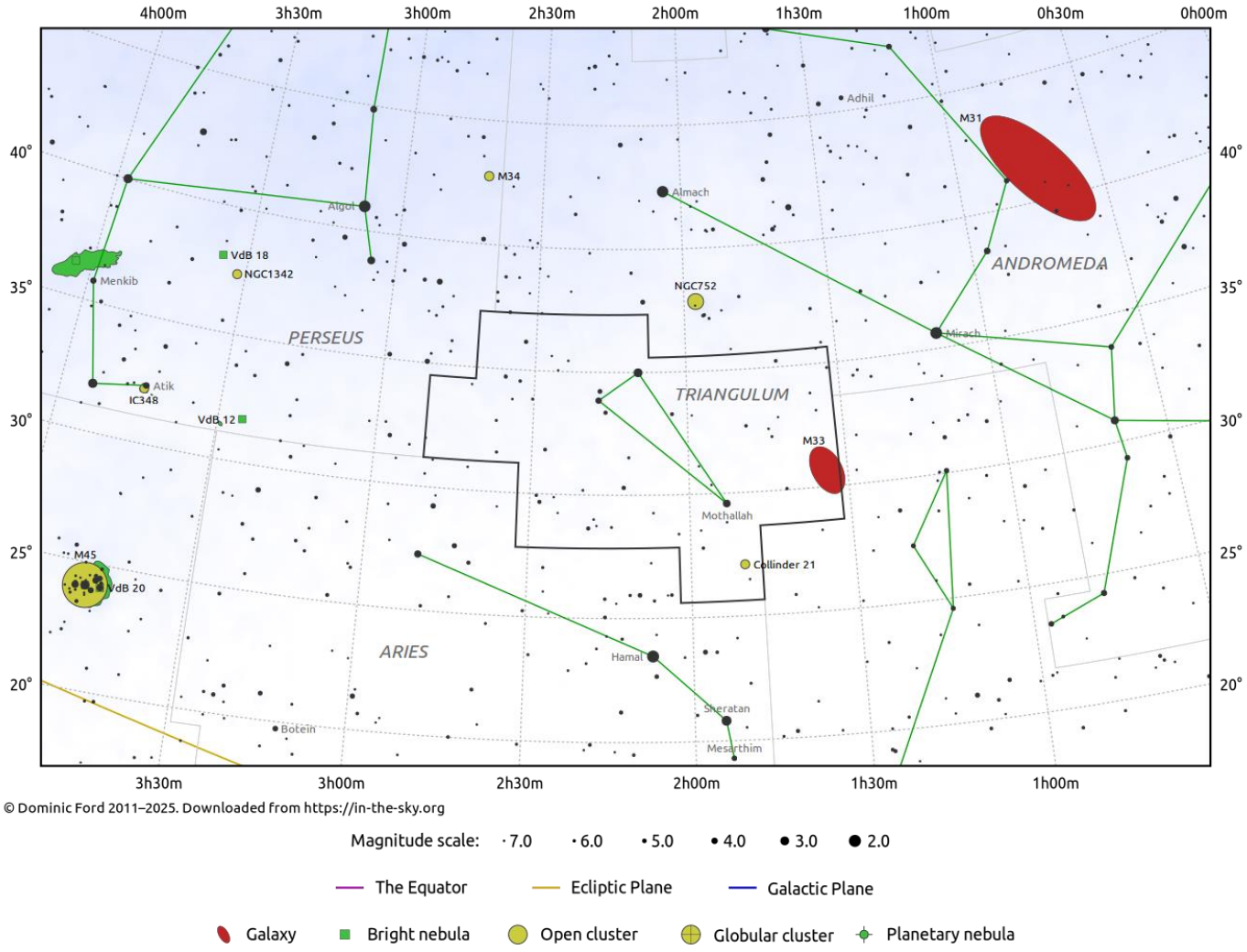


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Triangulum (Tri)

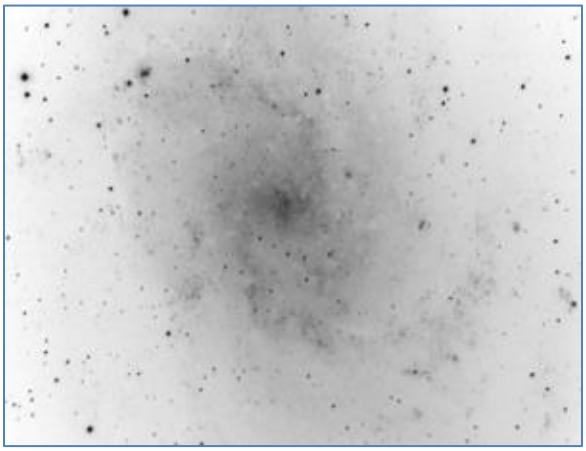
Evening Visibility: **September – February**
Online Information: **Triangulum**
Charts: **1** Featured Objects: **1**
More Online Information: M-033

In-The-Sky.org Constellation Map



Object (Type)	Chart	Aliases	Stats
M-033 (G)	1, W1	Triangulum Galaxy, Pinwheel Galaxy, NGC598, UGC1117	| Mag=5.7 | SB=23.5 | Size=70.8’ x 41.7’ |

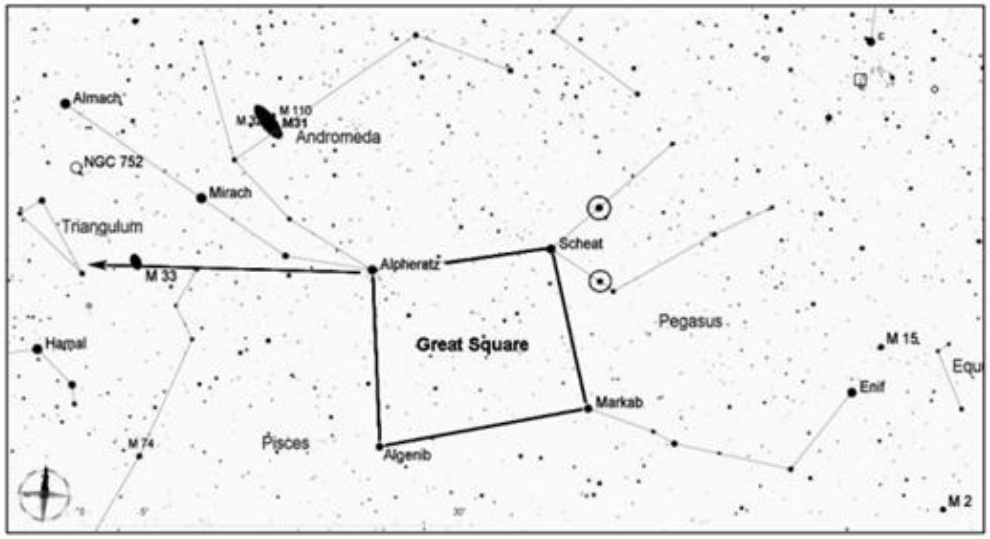
Image Gallery



Messier 33, The Triangulum Galaxy

Messier 33, the Triangulum Galaxy

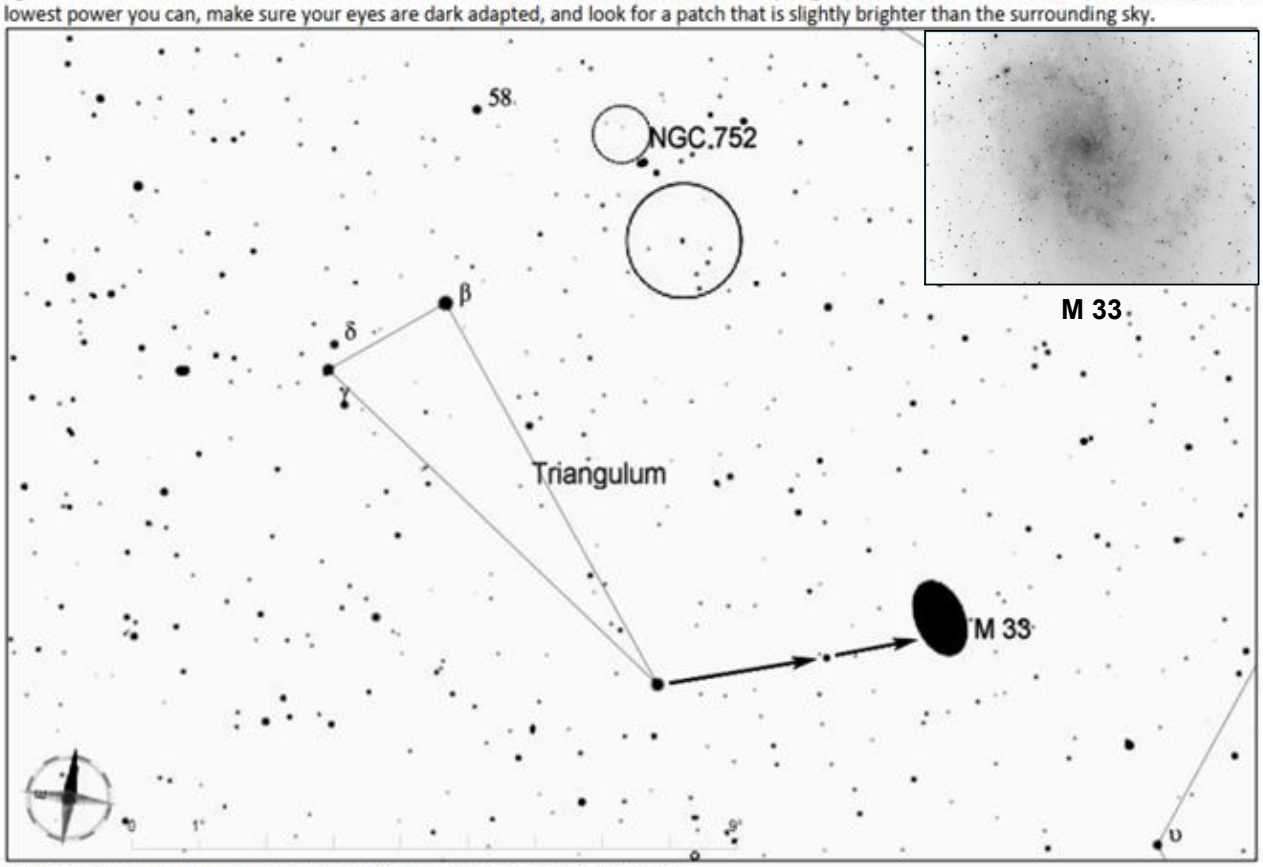
The Triangulum Galaxy is the second closest spiral galaxy (after the Andromeda Galaxy), and it is a member of our local galaxy group. It covers an area of sky larger than the full moon, but because its light is spread out over a large area, it can be difficult to see when you first look through a telescope or binoculars. Once you find it, however, patient observation can reveal a lot of detail, including several knots of glowing hydrogen gas. These features are best seen under a good dark sky.



Start by finding the Great Square of Pegasus, which rises in the eastern sky during the early fall evenings, is high overhead later in the fall, and sinks in the western sky during early winter. To be sure you know how the square is oriented in the sky, look for the two stars outside the northwest corner of the square (circled in the chart here) that form a small triangle with Scheat.

Using the northern edge of the Great Square as a pointer, extend a line to the east about twice the size of the Square, and you will arrive in the vicinity of the constellation Triangulum, whose 3 brightest stars form a long and narrow triangle.

From the narrow tip of the triangle, move to the east about 2.5 degrees, which is roughly the distance between the other two stars in the triangle. As shown in the chart below, you should arrive at a 6th magnitude star that will be visible in binoculars or a finderscope. Move the same distance again in the same direction, and you will reach the location of Messier 33. Look for a very large but faint oval. To see it with your telescope, use the lowest power you can, make sure your eyes are dark adapted, and look for a patch that is slightly brighter than the surrounding sky.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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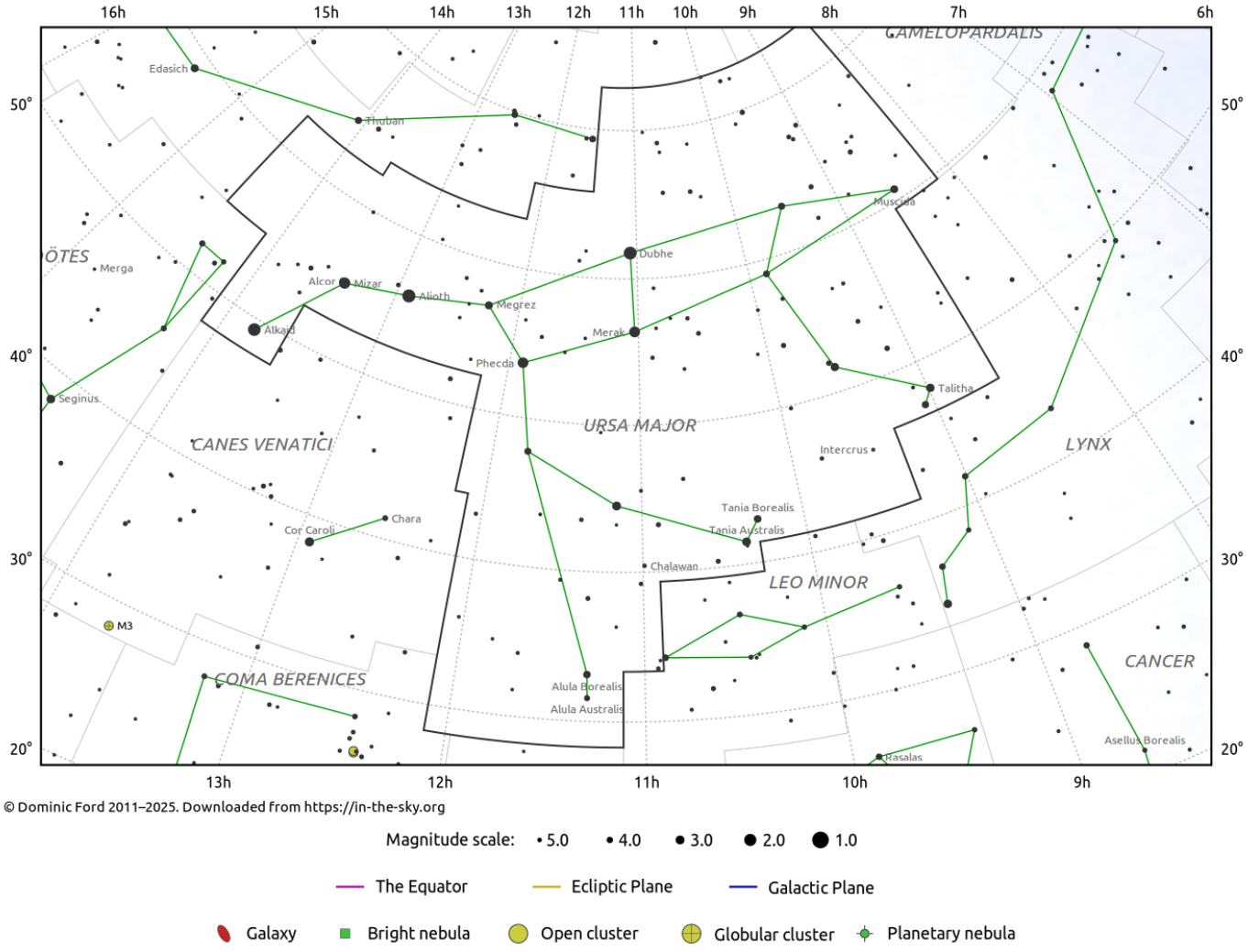
Ursa Major (UMa)

Evening Visibility: **February – October**
Online Information: **Ursa Major**
Charts: **6** Featured Objects: **8**
More Online Information: M-040, M-081, M-082, M-097, M-108, M-101, M-109, Mizar and Alcor

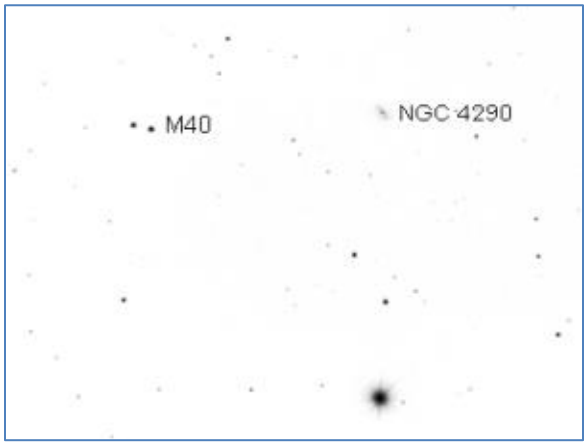
In-The-Sky.org Constellation Map



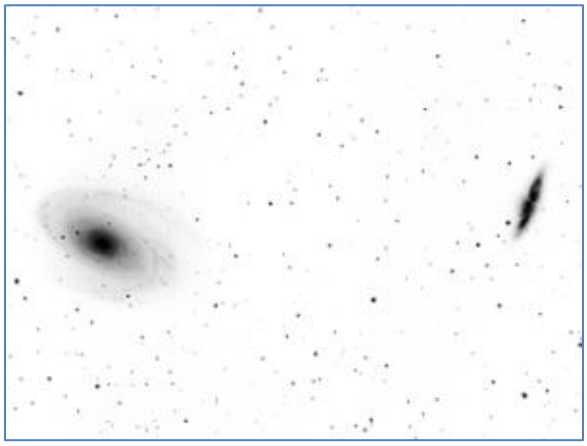
Object (Type)	Chart	Aliases	Stats
M-040 (DS)	1, W1	Winnecke 4	| Mag= 9.6, 10.1 | Sep=52" |
M-081 (G)	2, W2	Bode's Galaxy, NGC-3031, UGC 5318, PGC 28630	| Mag=6.9 | SB=22.6 | Size=26.9' x 14.1' |

Object (Type)	Chart	Aliases	Stats
M-082 (G)	2, W2	Cigar Galaxy, Ursa Major A, NGC-3034, UGC 5322, PGC 28655	| Mag=8.41 | SB=22.2 | Size=11.2’ x 4.3’ |
M-097 (PN)	3, W3	Owl Nebula, NGC-3587	| Mag=9.9 | SB=23.2 | Size=3.4’ x 3.3’ |
M-108 (G)	3, W3	Surfboard Galaxy, NGC3556, UGC6225, PGC 34030	| Mag=10.0 | SB=22.5 | Size=8.7’ x 2.2’ |
M-101 (G)	4, W4	Pinwheel Galaxy, NGC-5457, UGC8981, PGC 50063, Arp 26	| Mag=7.9 | SB=24.1 | Size=28.8’ x 26.9’ |
M-109 (G)	5, W5	Vacuum Cleaner Galaxy, NGC-3992, UGC6937, PGC 37617	| Mag=9.8 | SB=23.0 | Size=7.6’ x 4.7’ |
Mizar and Alcor (MS)	6, W6, SD	SAO-028737, HIP-65378, 79 UMa, Mizar and Alcor, STF-1744, HR-5055, ADS-8891	| Mag=2.3, 4.0, 4.0 | Sep=14”, 709” |

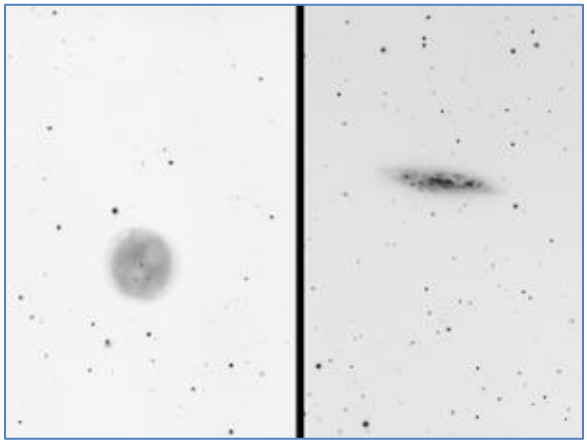
Image Gallery



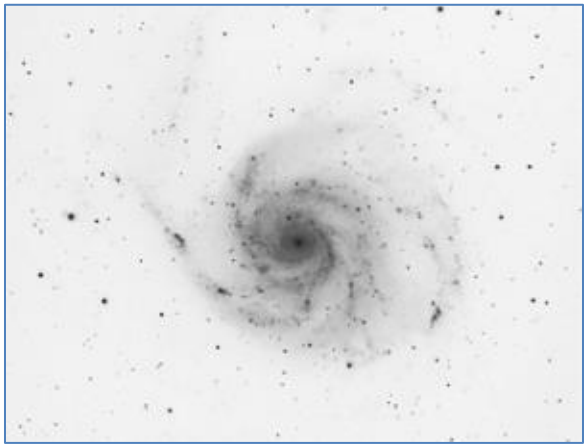
Messier 40



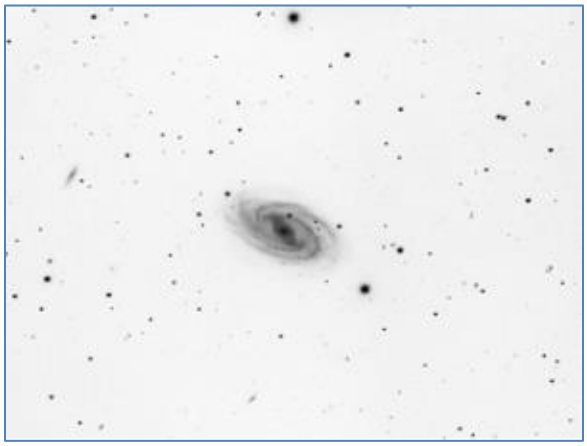
Messier 81 and 82



Messier 97 (The Owl Nebula) and Messier 108



Messier 101, The Pinwheel Galaxy



Messier 109

Mizar and Alcor

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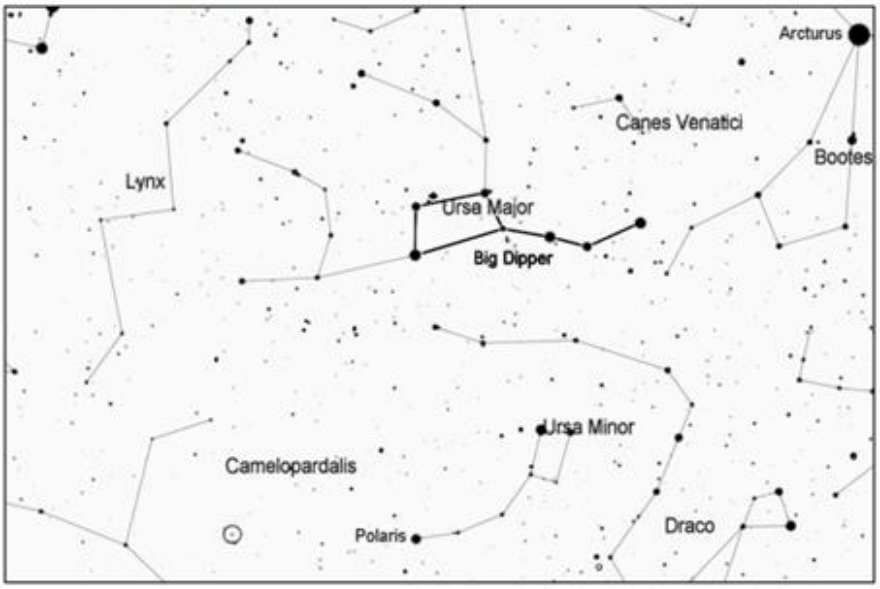
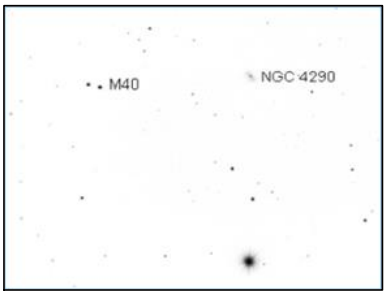
Messier 40, Double Star in Ursa Major

Messier 40 is probably the least interesting of the objects on Messier's list, just a pair of 10th magnitude stars about 50 arcseconds apart. They are probably not even a true double star, but rather a chance alignment of two stars at different distances from Earth. Few observers spend much time looking at Messier 40, but if you want to observe all the Messier objects (and many amateur astronomers do), you will have to hunt down this double star sooner or later.

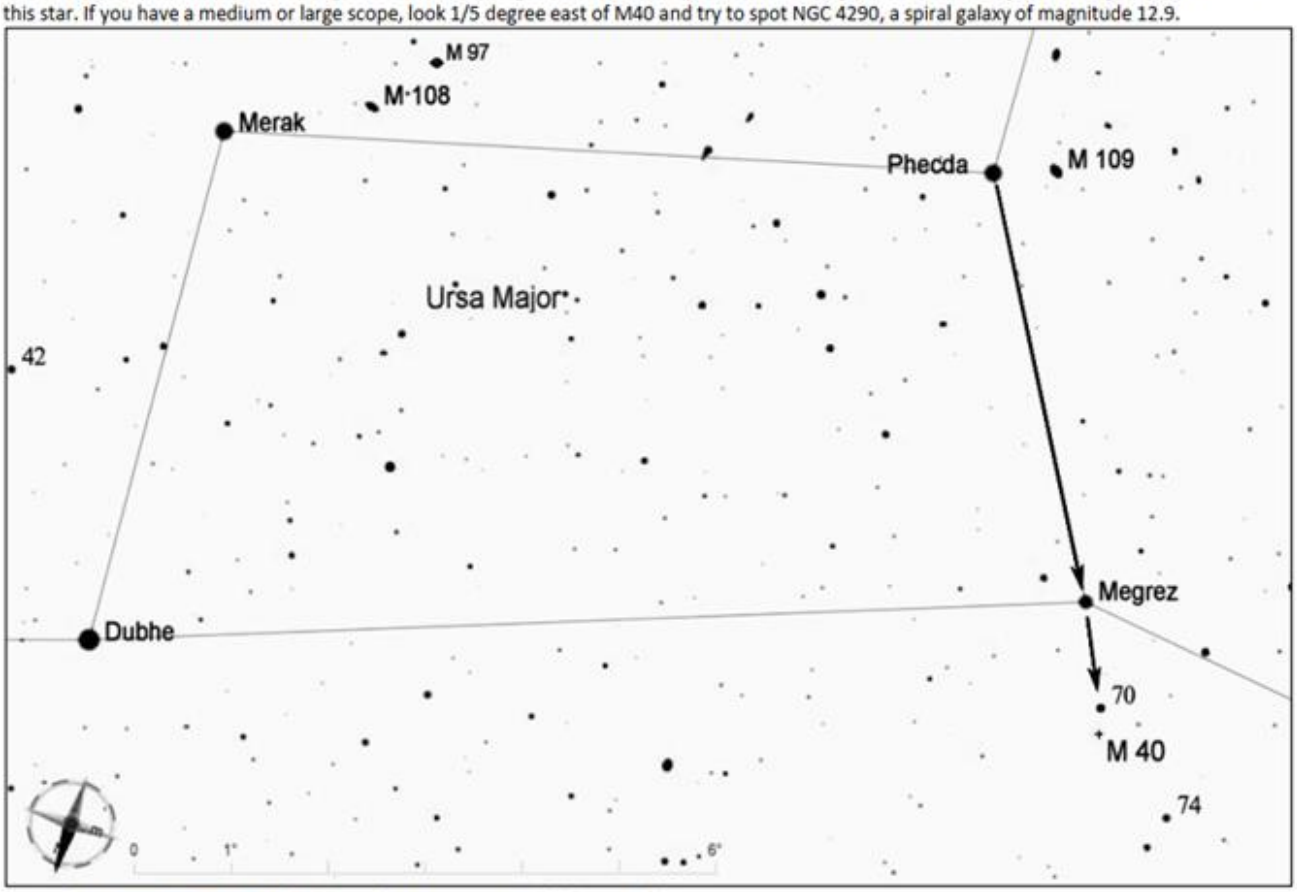


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



M 40

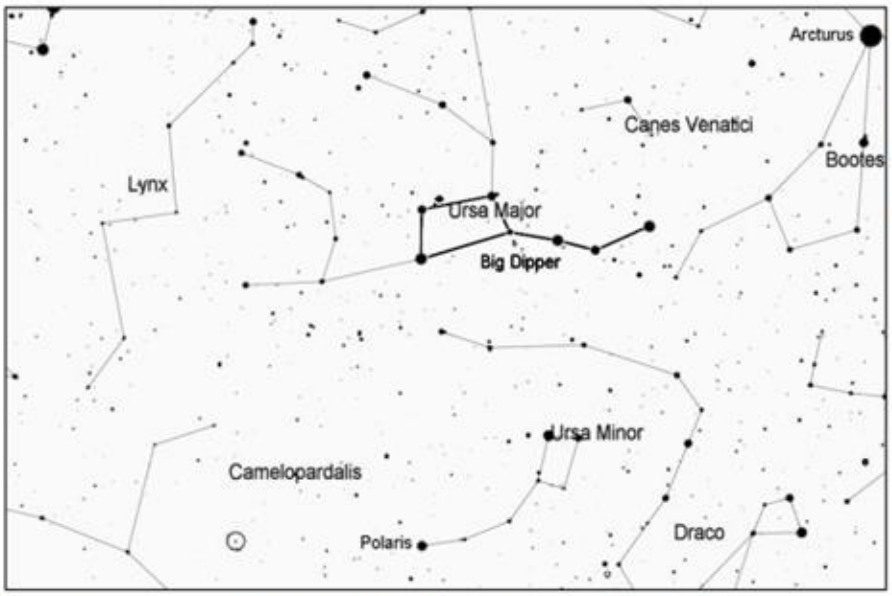
Note that north is to the bottom in this chart. Use Phecda and Megrez, the two stars on the inner edge of the Big Dipper's bowl to guide you in the correct direction, and look about 1 degree northeast of Megrez for 70 Ursa Majoris, a star of magnitude 5.5. M40 is just 1/4 degree northeast of this star. If you have a medium or large scope, look 1/5 degree east of M40 and try to spot NGC 4290, a spiral galaxy of magnitude 12.9.



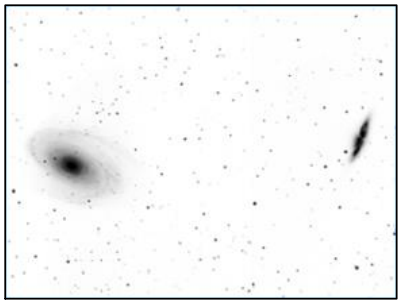
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 81 and 82, Galaxies in Ursa Major

Visible for much of the year, this is probably the most-frequently viewed pair of galaxies in the sky. Through a telescope, M81 is a fuzzy oval and M82 has a long rectangular shape that gives it the nickname the Cigar Galaxy. These galaxies are at the enormous distance of 12 million light years away, yet they are among the closest galaxies to us. Using high magnification can help show some of the intricate structure of M82.

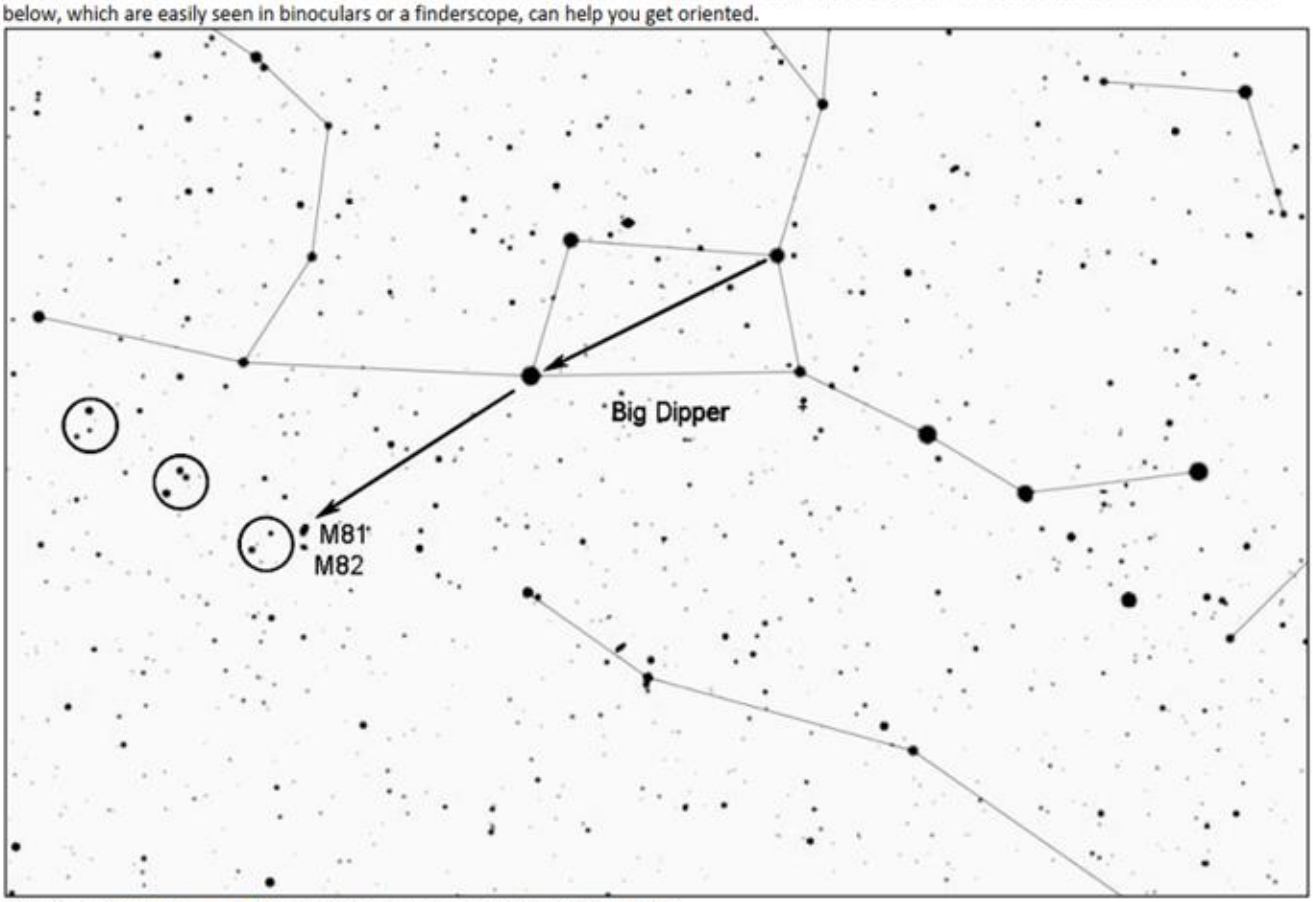


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



M 81 & M 82

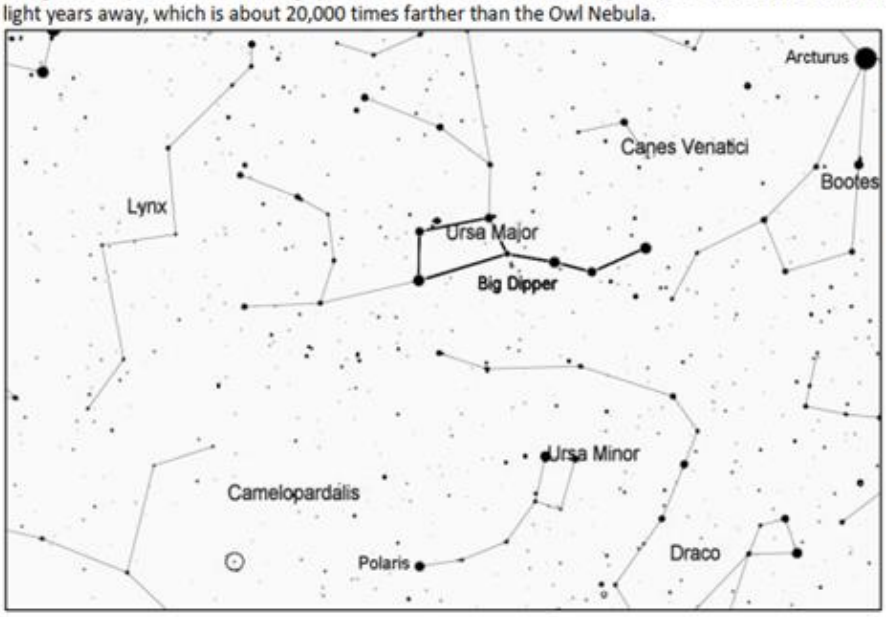
Visualize a diagonal line across the bowl of the Big Dipper, and extend this line a slighty longer distance outside the bowl, as shown below. This will bring you to the general vicinity of M81 and M82. It is easy to get lost in this part of the sky. If you do, the three star patterns circled in the chart below, which are easily seen in binoculars or a finderscope, can help you get oriented.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 97 (the Owl Nebula) and Messier 108

Messier 97, the Owl Nebula, is a fairly large planetary nebula, but its low surface brightness can make it difficult to spot at first. With a large telescope, the owl's two dark "eyes" can be seen, but they are not easy. Less than a degree away is the almost edge-on spiral galaxy M108. Its elongated shape is obvious through just about any telescope, and large scopes reveal some detail in its structure. The galaxy is about 32 million light years away, which is about 20,000 times farther than the Owl Nebula.



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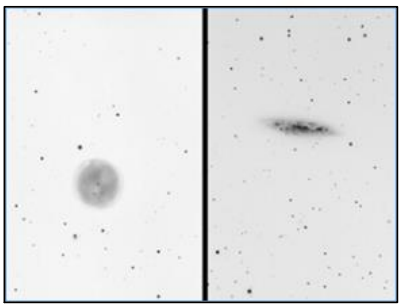
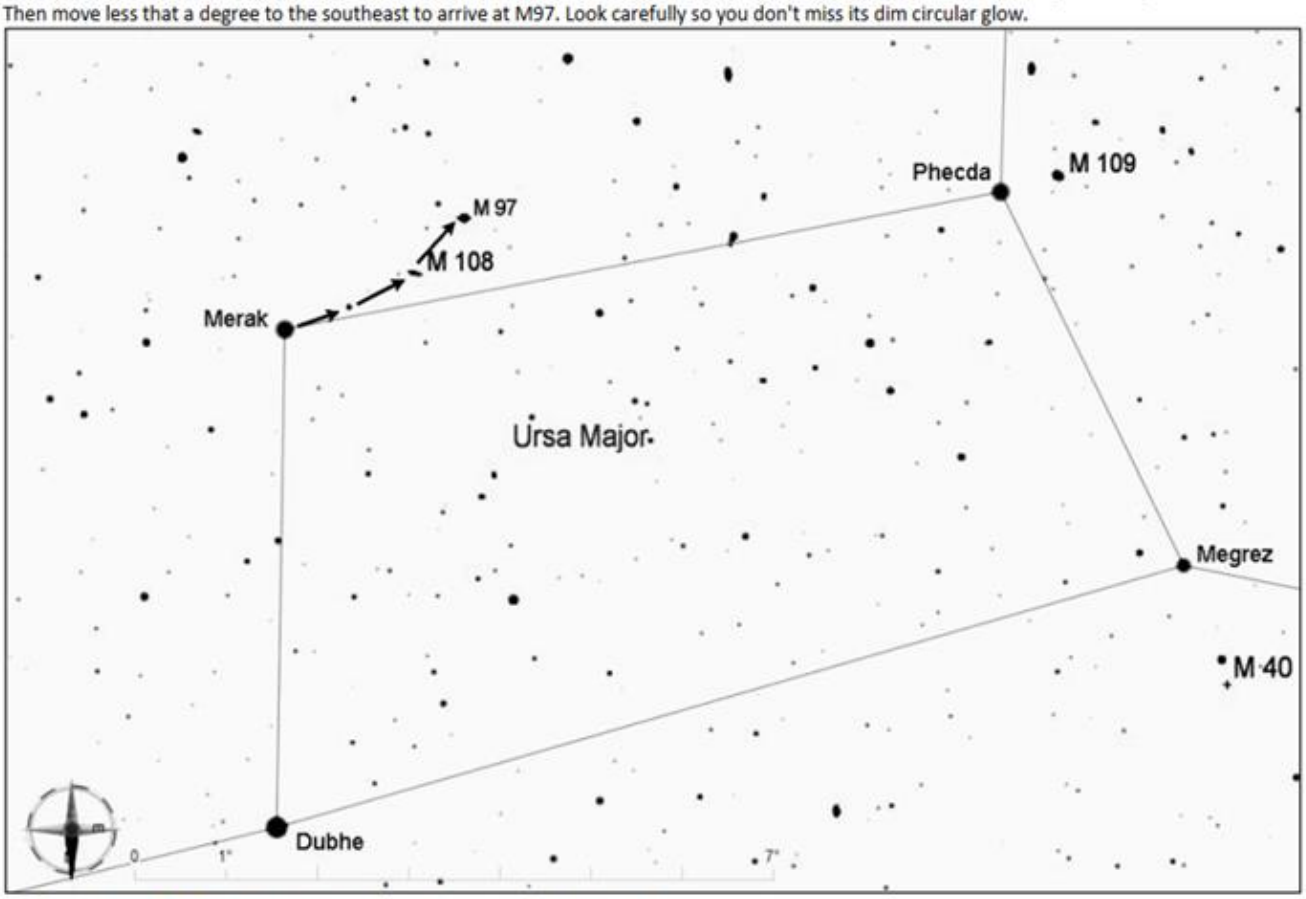


M 97 & M 108

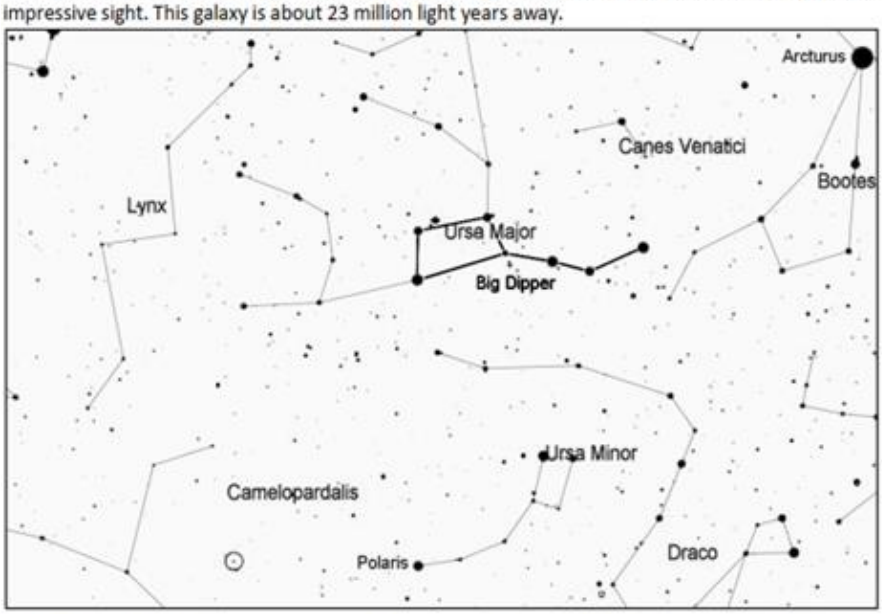
Note that north is to the bottom in this chart. Starting from Merak at the bottom of the Big Dipper's bowl, move 1.5 degrees to the southeast (just outside the of the bowl). A chain of a few dim stars can help guide the way. Through a telescope you should see the elongated shape of M108. Then move less that a degree to the southeast to arrive at M97. Look carefully so you don't miss its dim circular glow.



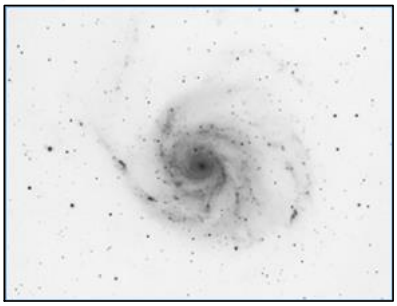
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 101, the Pinwheel Galaxy

Messier 101 is a large face-on spiral, filling an area of sky nearly as large as the full Moon. Through a medium-sized telescope, this galaxy appears as a faint circular glow with a bright center. With large scopes, the spiral arms and several bright knots within them can be seen, making this object an impressive sight. This galaxy is about 23 million light years away.

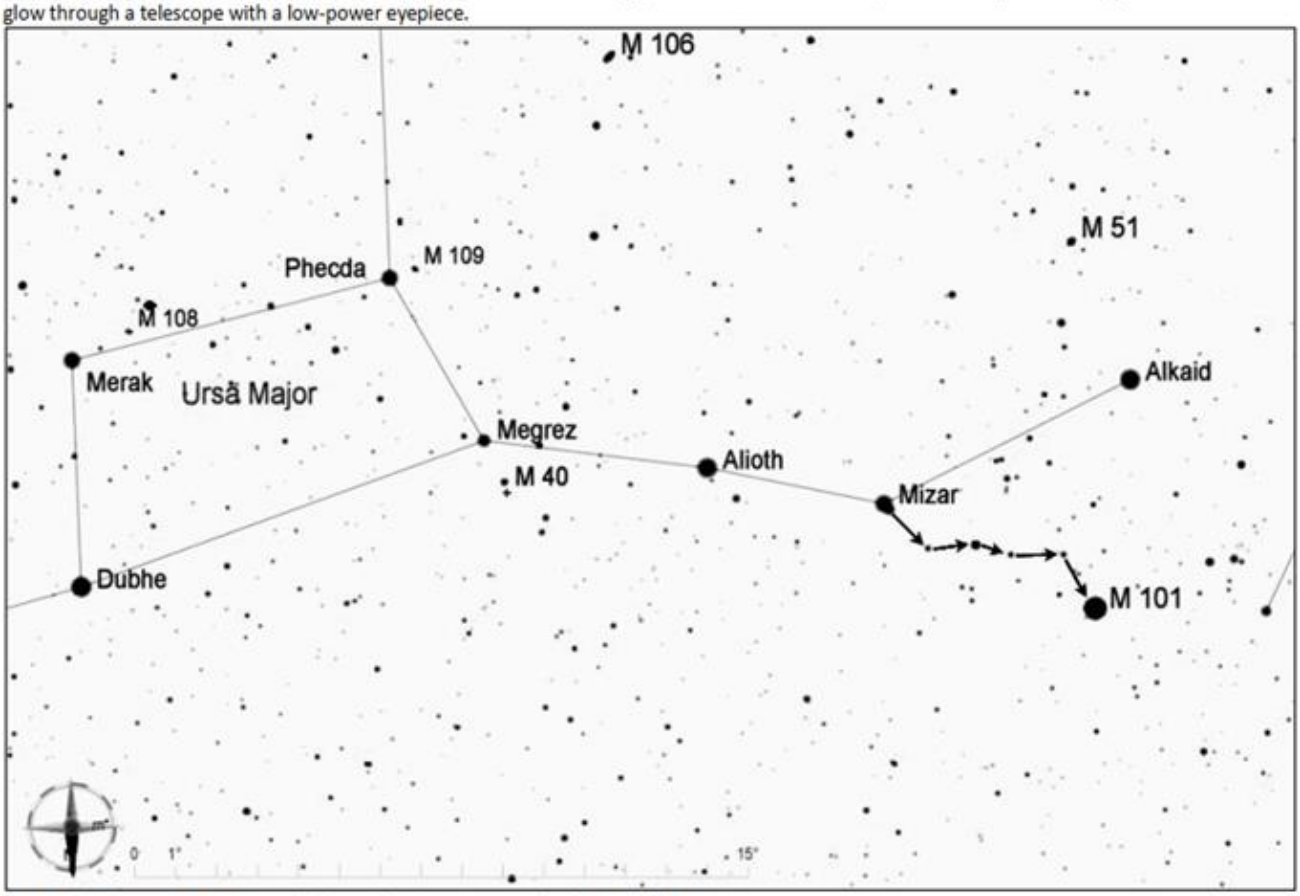


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



M101

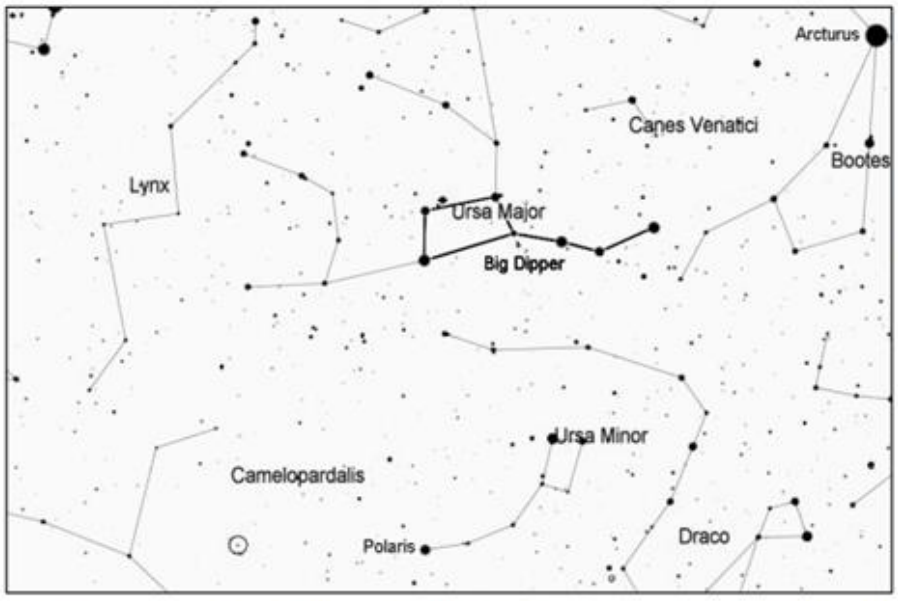
Note that north is to the bottom in this chart. Find Mizar, the middle star in the handle of the Big Dipper. Using binoculars or a finderscope, you should see a chain of 4 stars to the northeast of Mizar. As shown below, follow this chain to the east (away from the bowl of the Big Dipper), then take a slight right turn and one more step of a similar size. This will bring you to the location of M101, which will appear as a large but dim circular glow through a telescope with a low-power eyepiece.



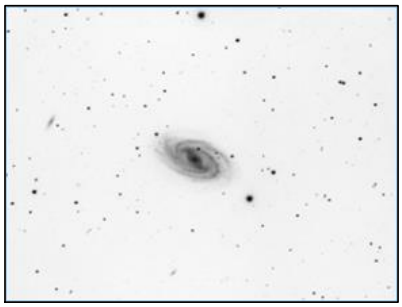
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 109, Galaxy in Ursa Major

Messier 109 is a barred spiral galaxy, and its bright central bar is what is most easily seen through a telescope. This is surrounded by the fainter light of its spiral arms. Although it is quite bright for a galaxy (about magnitude 9.7), M109 is a distant 82 million light years away.

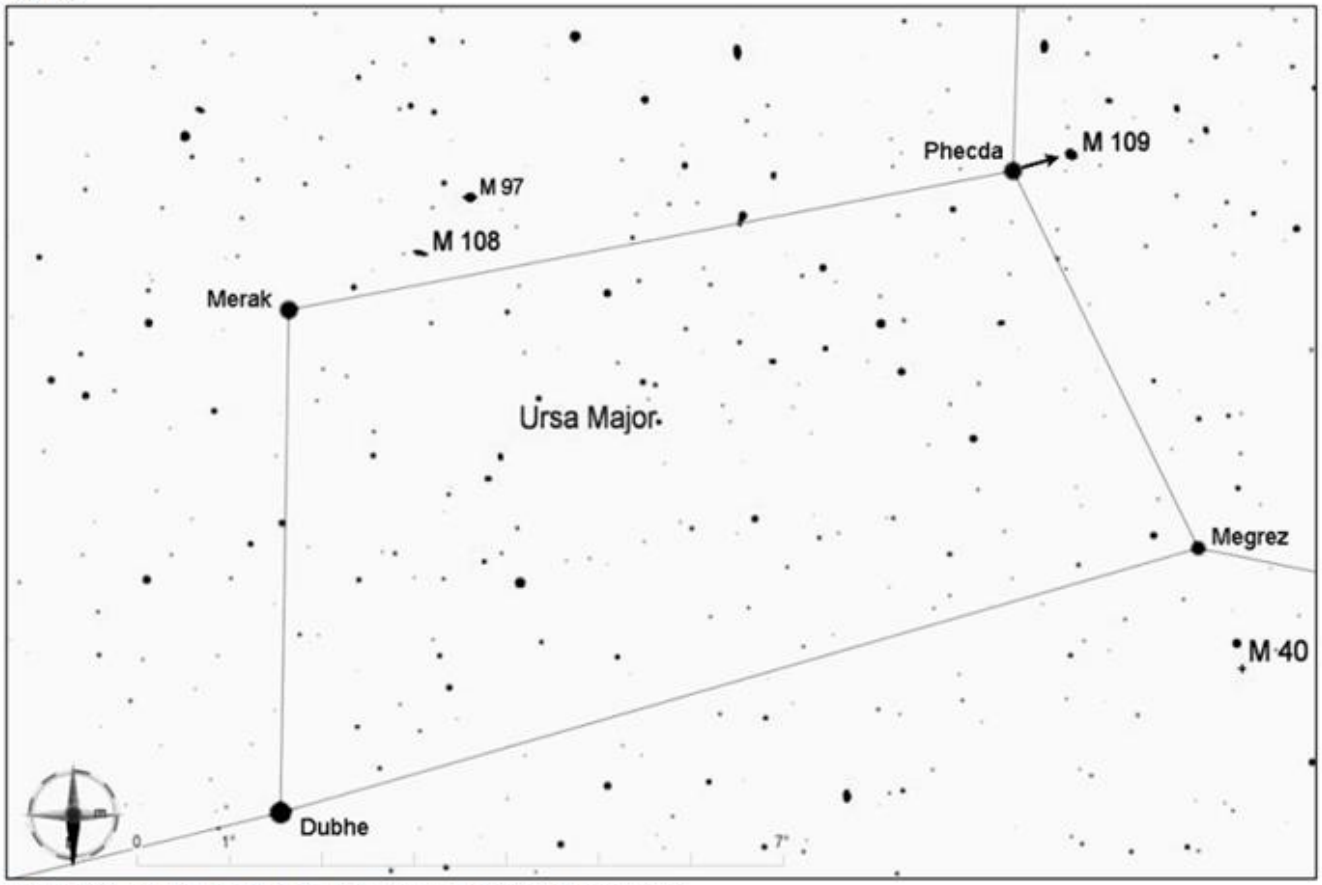


Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.



M 109

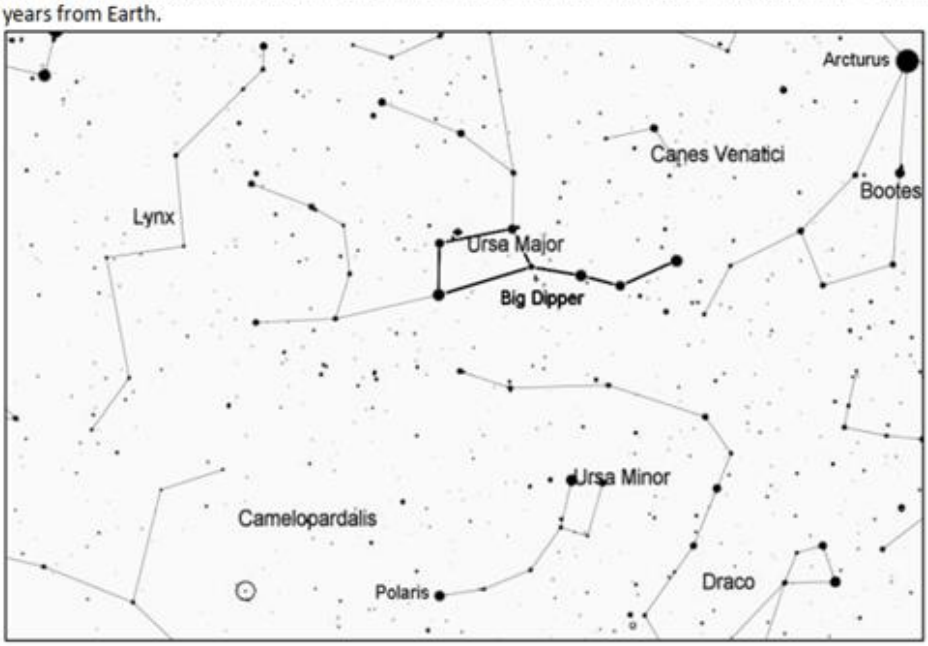
Note that north is to the bottom in this chart. Start by centering the bright star Phecda, at the bottom of the Big Dipper's bowl, in the telescope with a low-power eyepiece. Then move the scope just 2/3 degrees to the east-southeast (just outside the bowl). You should see the oblong shape of M109.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Mizar and Alcor, Double Star in Ursa Major

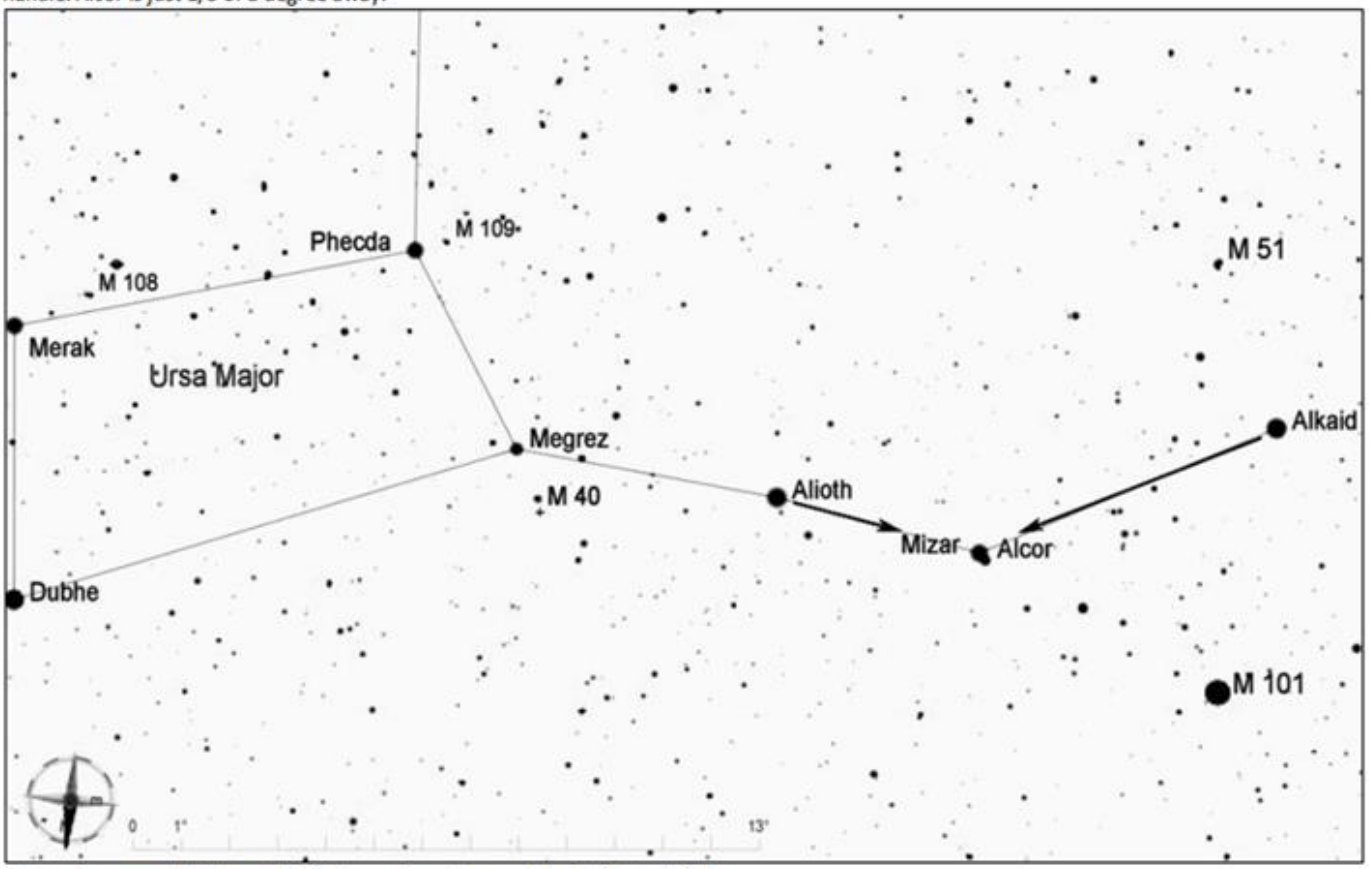
Mizar (magnitude 2.2) and Alcor (magnitude 4.0) may be the best-known double star in the sky, and the two stars can be seen with the naked eye. Through a telescope, Mizar is resolved as a close double star in itself; its two components are 14 arcseconds apart. These stars are about 86 light years from Earth.



Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here upside down, high in the sky above Polaris, which is where it can be found during the evenings in spring and summer. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.

Mizar & Alcor

Note that north is to the bottom in this chart. Mizar is the star at the bend in the handle of the Big Dipper, the second star from the end of the handle. Alcor is just 1/5 of a degree away.

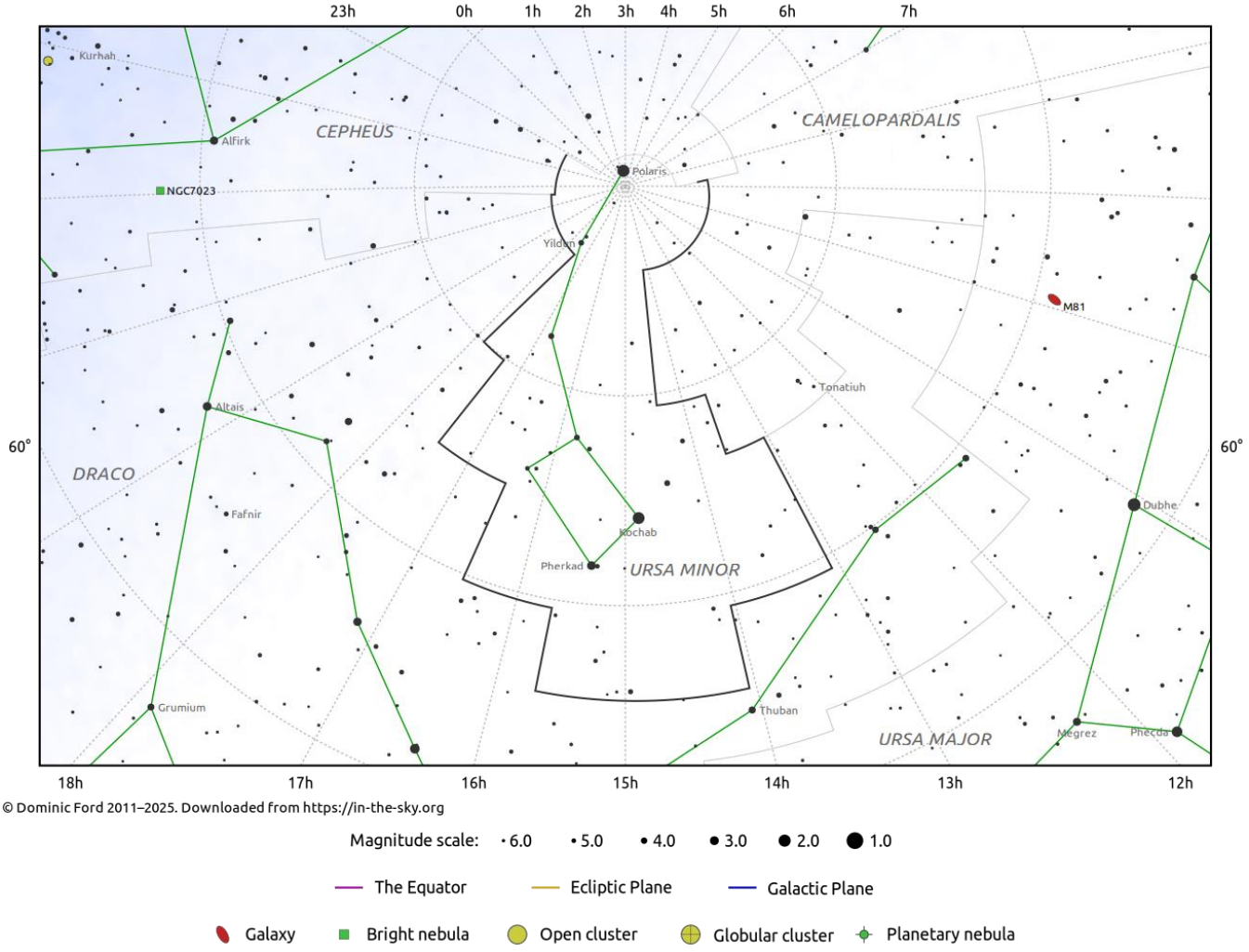


Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Ursa Minor (UMi)

Evening Visibility: **March – July**
Online Information: **Ursa Minor**
Charts: **1** Featured Objects: **2**
More Online Information: Polaris, Engagement Ring

In-The-Sky.org Constellation Map



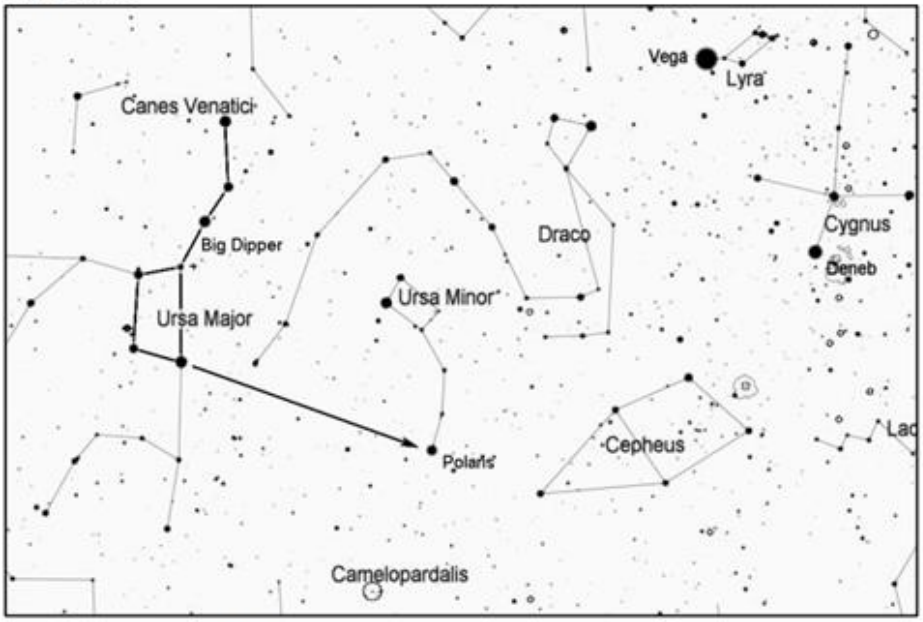
Object (Type)	Chart	Aliases	Stats
Polaris (DS)	1, W1, SD	SAO-000308, HIP-11767, 1 UMi, North Star, Loadstar, HIP 11767, STF 93 , SACDBL978, ADS1477	| Mag=2.0, 9.1 | Sep=18" |
Engagement Ring (AS)	1, W1		| Size = 45' |

Image Gallery

Polaris

Polaris (the North Star) and the Engagement Ring Asterism

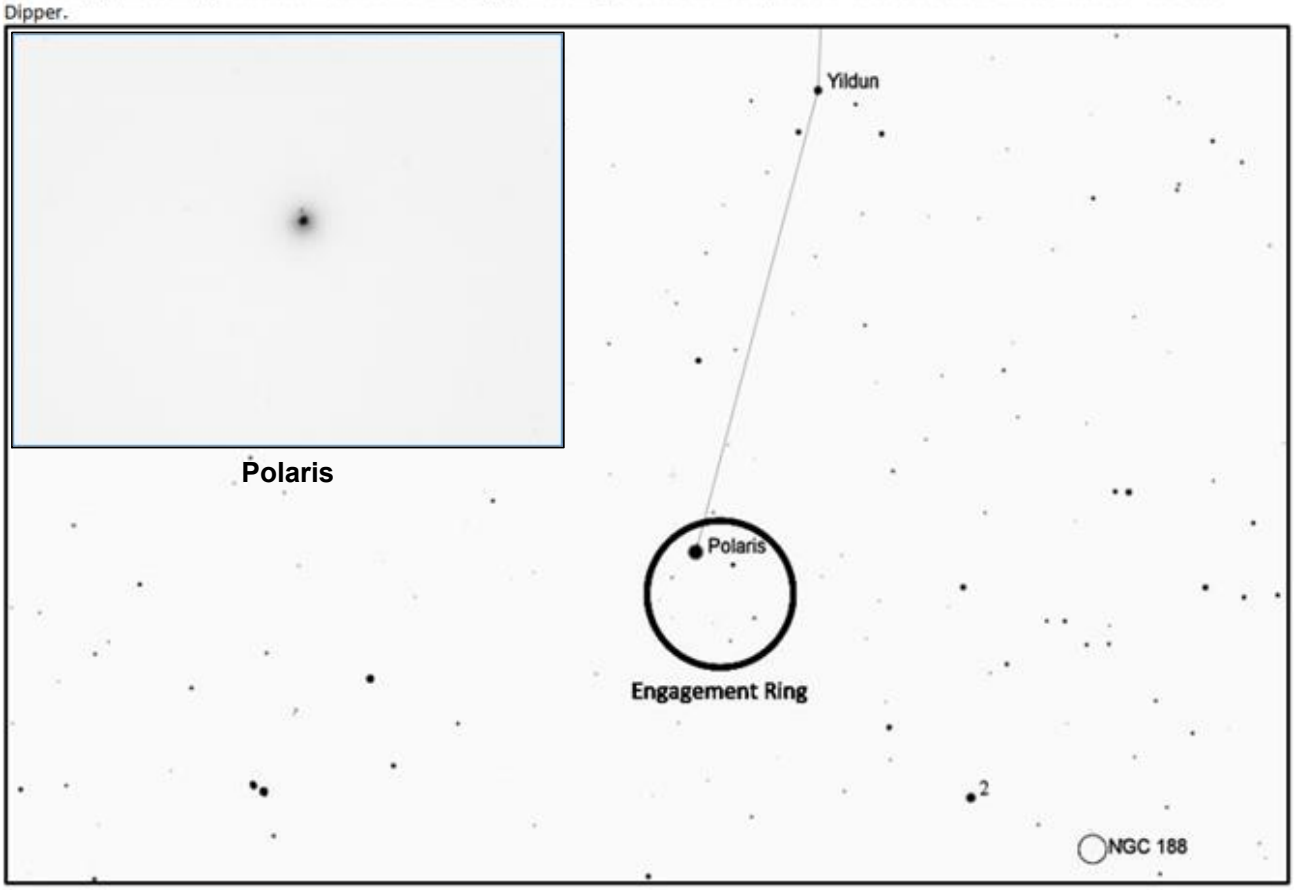
Contrary to a common misconception, Polaris is NOT the brightest star in the sky. At magnitude 2.0, it is the 48th brightest star. It also has a much dimmer companion, magnitude 9.1, that is 18 arcseconds away. This is almost a 700-fold difference in brightness. Polaris is part of an asterism known as the Engagement Ring. Polaris is seen as the diamond, and an irregular circle of much dimmer stars form a bent ring shape, about 3/4 degree across.



Start by finding the Big Dipper, one of the most recognizable star patterns in the sky. It is part of the constellation Ursa Major, the big bear. It is shown here on its side, as it appears on early evenings in the fall. For other seasons and times of night, rotate the chart as needed to match what you see in the northern sky.

Finding Polaris may be the best-known star hop of all: The two stars at the end of Big Dipper's bowl are called "the pointers" because they point to Polaris, about 30 degrees away.

Once you have centered on Polaris, it is good to use fairly high power to help see its dim companion. But use a low-power eyepiece to view the entire Engagement Ring. Note the orientation of the Engagement Ring relative to Yildun, the star nearest to Polaris in the handle of the Little Dipper.



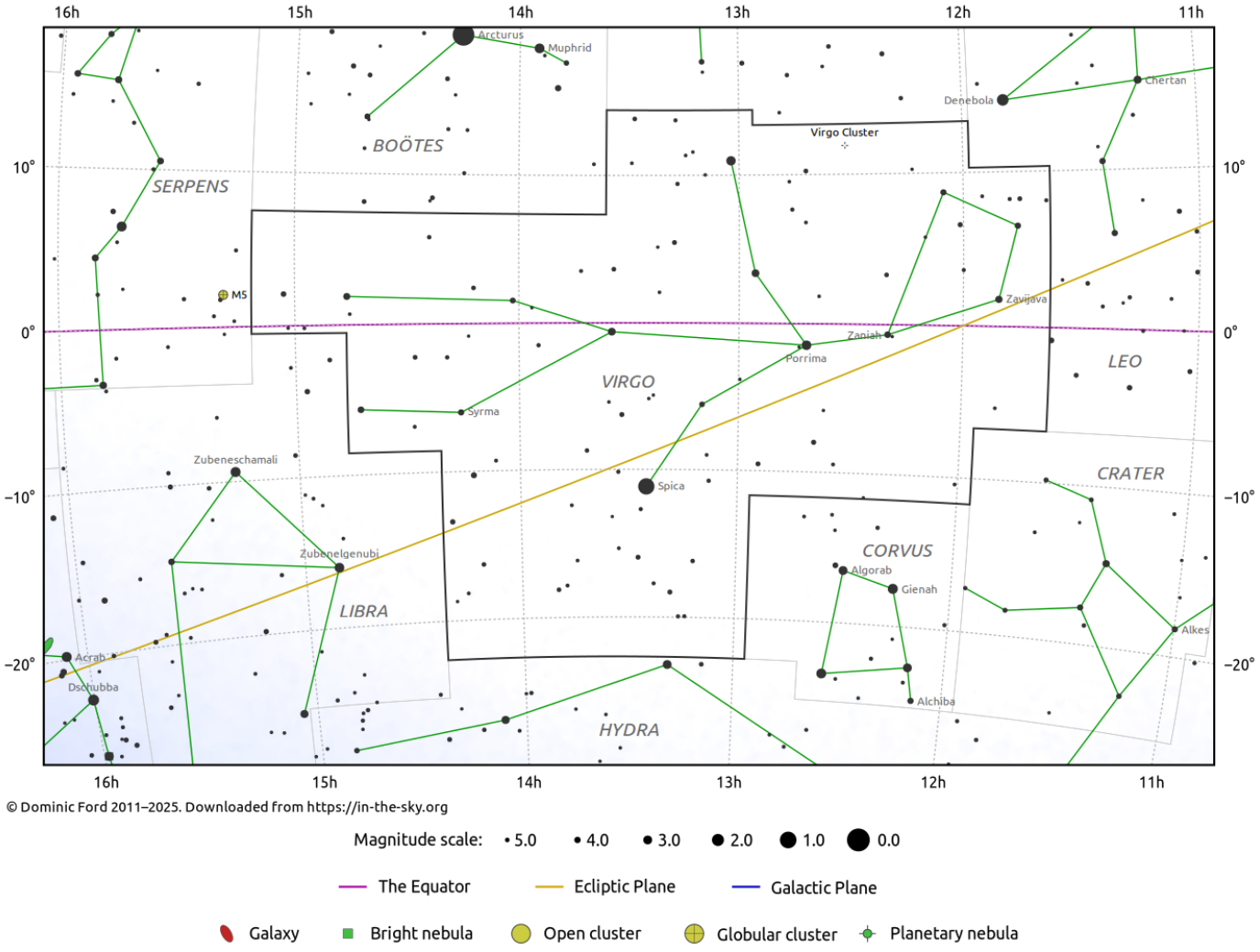
Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Blank

Virgo (Vir)

Evening Visibility: **March – July**
Online Information: **Virgo**
Charts: **7** Featured Objects: **13**
More Online Information: Porrima, M-049, M-058, M-059, M-060, M-089, M-090, M-061, M-104, Markarian's Chain, NGC-4435, NGC-4438, NGC-4567, NGC-4568

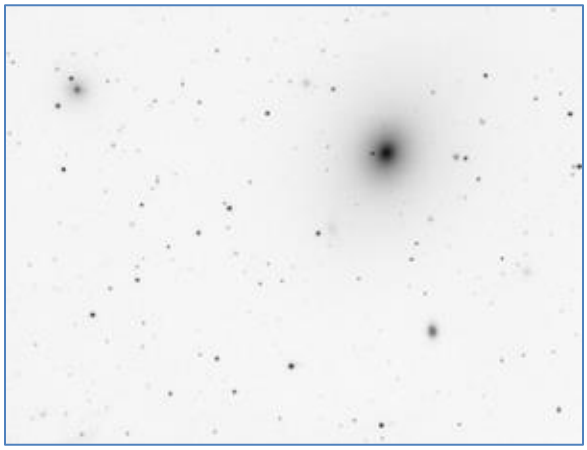
In-The-Sky.org Constellation Map



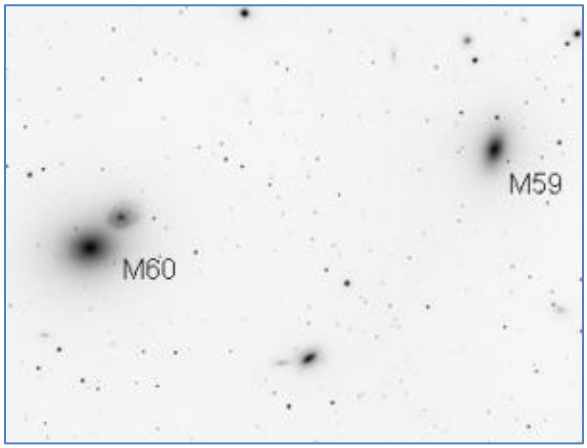
Object (Type)	Chart	Aliases	Stats
Porrima (DS)	1, W1, SD	SAO-138917, HIP-61941, γ Vir, 29 Vir, Gamma Virginis, HD110379, STF1670	| Mag=3.5, 3.5 | Sep=1.5" |
M-049 (G)	2, W2	NGC-4472, UGC7629	| Mag=8.4 | SB=22.7 | Size=10.2' x 8.3' |

Object (Type)	Chart	Aliases	Stats
M-058 (G)	3, W3	NGC-4579, UGC7796	| Mag=9.7 | SB=22.7 | Size=5.9’ x 4.7’ |
M-059 (G)	3, W3	NGC-4621, UGC7858	| Mag=9.6 | SB=22.6 | Size=5.4’ x 3.7’ |
M-060 (G)	3, W3	NGC-4649, UGC7898	| Mag=8.8 | SB=22.6 | Size=7.4’ x 6.0’ |
M-089 (G)	3, W3	NGC-4552, UGC7760	| Mag=9.8 | SB=23.0 | Size=5.1’ x 4.7’ |
M-090 (G)	3, W3	NGC-4569, UGC7786	| Mag=9.5 | SB=22.9 | Size=9.5’ x 4.4’ |
M-061 (G)	4, W4	Oriani’s Galaxy, Swelling Spiral, NGC-4303, UGC7420	| Mag=9.7 | SB=22.7 | Size=6.5’ x 5.8’ |
M-104 (G)	5, W5	Sombrero Galaxy, NGC-4594	| Mag=8.0 | SB=21.7 | Size=9’ x 4’ |
NGC-4435 (G)	6, W6	The Eyes, (Markarian’s Chain)	| Mag = 10.9 |SB=21.9 | Size=2.35’ x 1.43’ |
NGC-4438 (G)	6, W6	The Eyes, (Markarian’s Chain)	| Mag=10.1 | SB=23.6 | Size=8.5’ x 3.2’ |
NGC-4567 (G)	7, W7	Butterfly Galaxies, Siamese Twins	| Mag=11.3 | SB=22.3 | Size=3’ |
NGC-4568 (G)	7, W7	Butterfly Galaxies, Siamese Twins	| Mag=10.8 | SB=22.7 | Size=4.6’ |

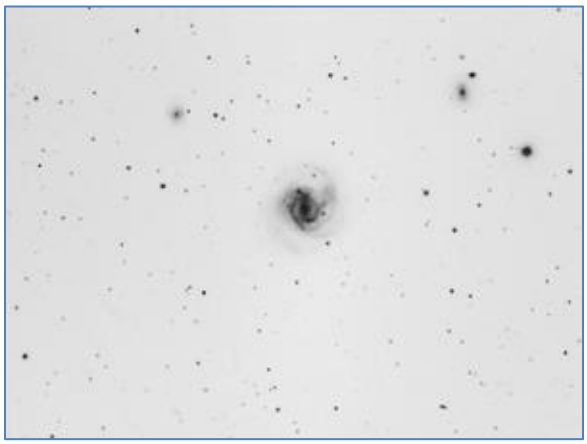
Image Gallery



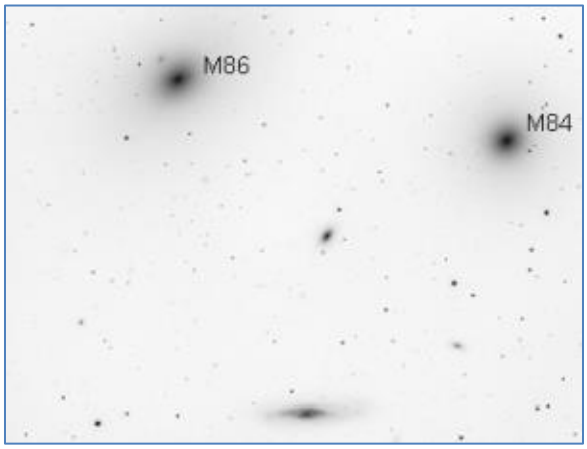
Messier 49



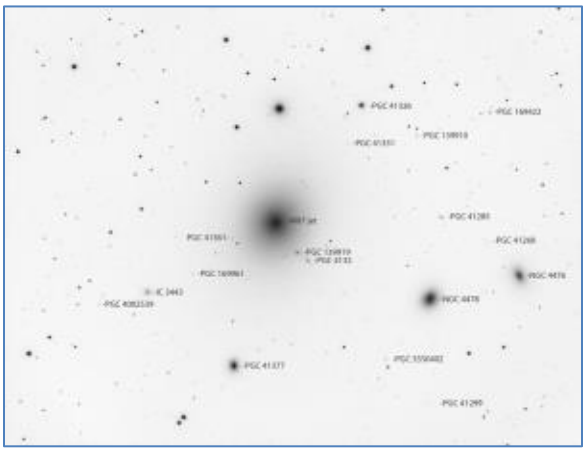
Messier 59 and 60



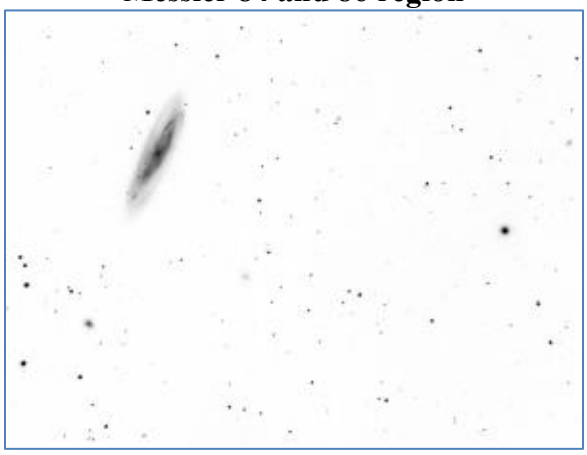
Messier 61, Oriani's Galaxy



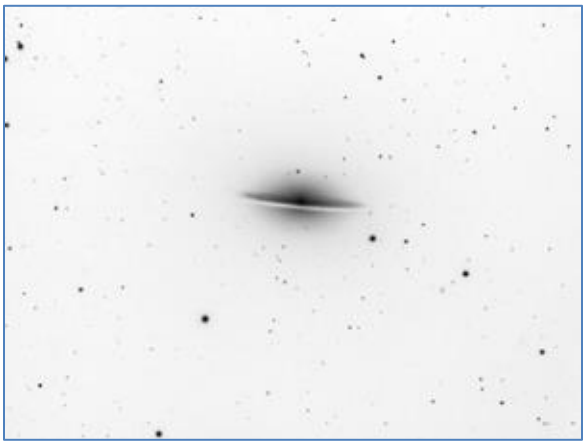
Messier 84 and 86 region



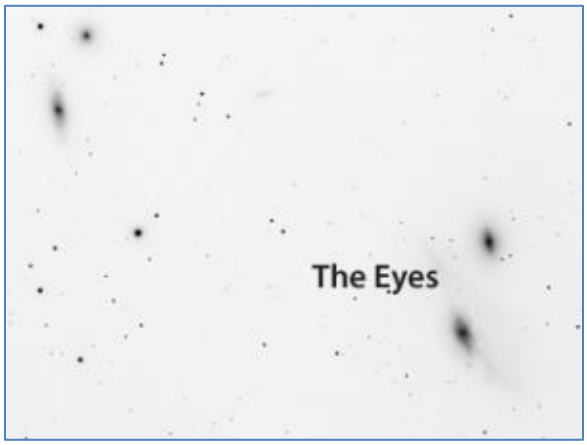
Messier 87 region



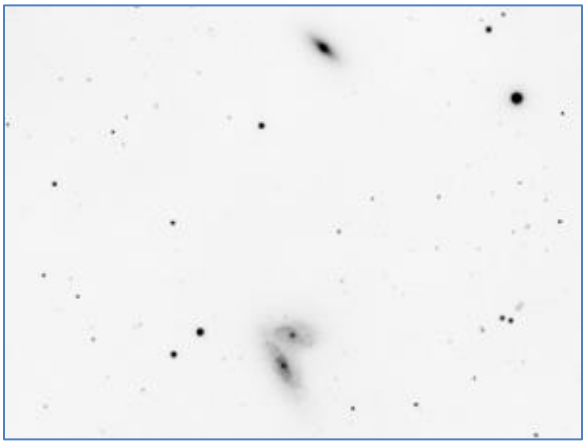
Messier 98



Messier 104, The Sombrero Galaxy



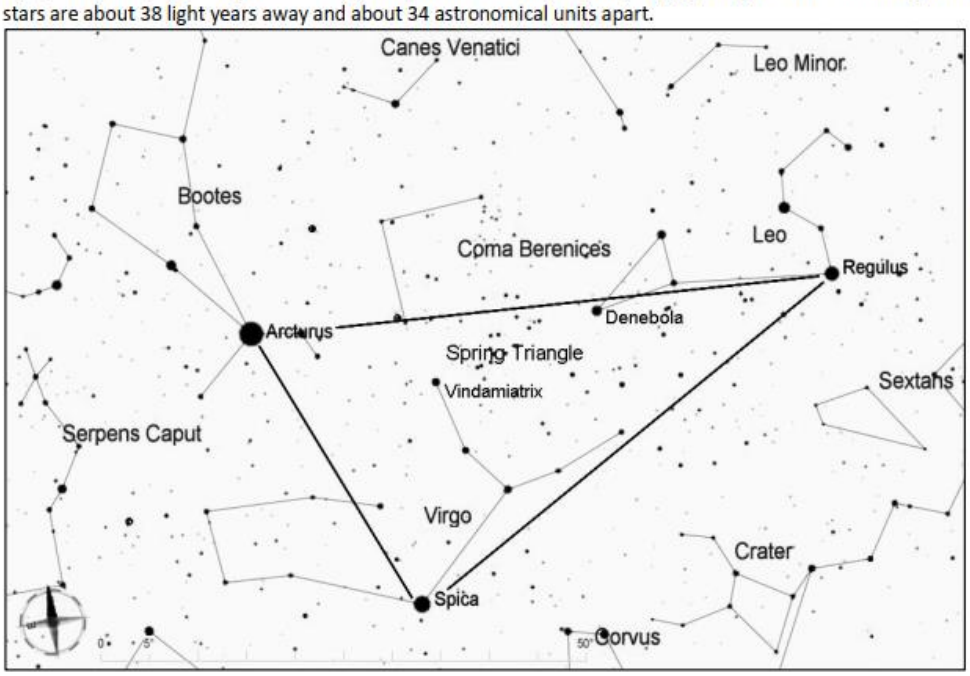
NGC 4435 and 4438, The Eyes



NGC 4567 and 4568, The Butterfly Galaxies

Porrima (γ Virginis), Double Star

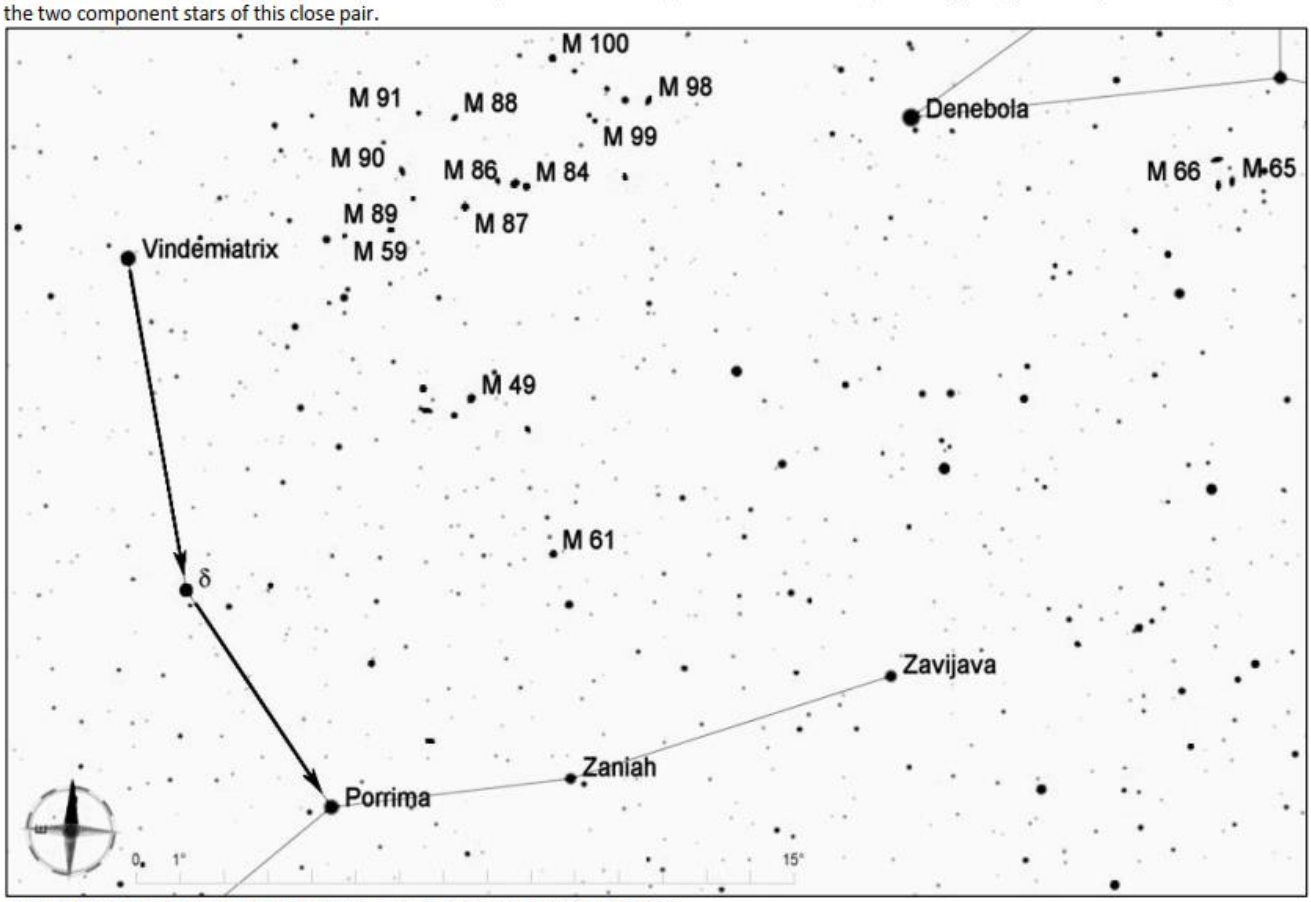
Porrima, or Gamma Virginis, is a bright naked-eye star at magnitude 2.7. Its two components are less than 3 arcseconds apart, so a telescope at high power is required to split them. The components are about equally bright, one yellow and one blue, making a beautiful color contrast. The two stars are about 38 light years away and about 34 astronomical units apart.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo.

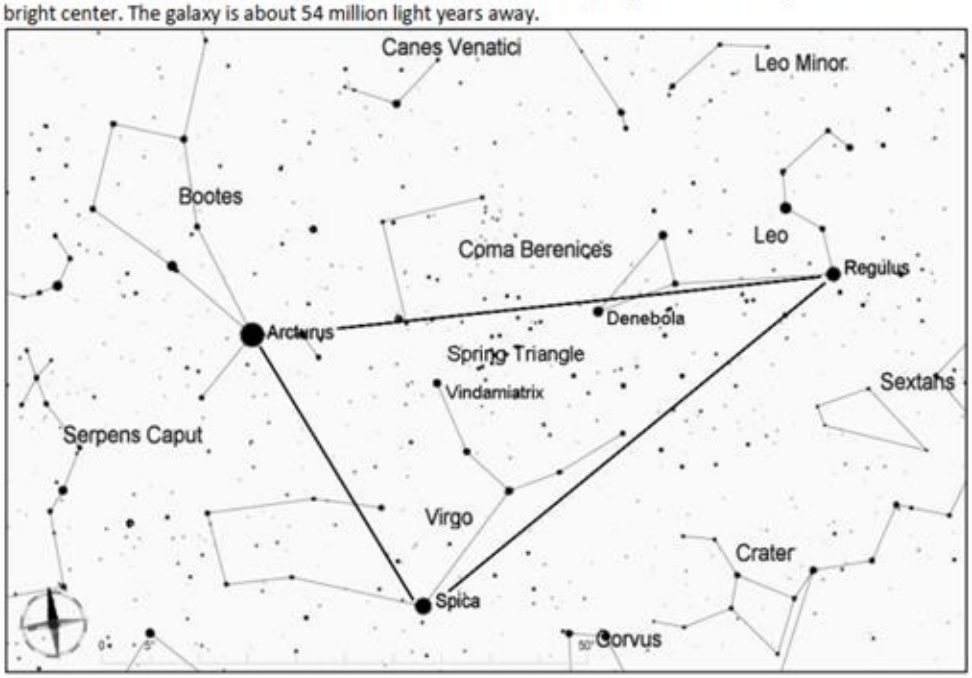
From Vindemiatrix, look south past δ Virginis to Porrima, which will be easily visible to the naked eye. Use high magnification, 100x or more, to see the two component stars of this close pair.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 49, Galaxy in Virgo

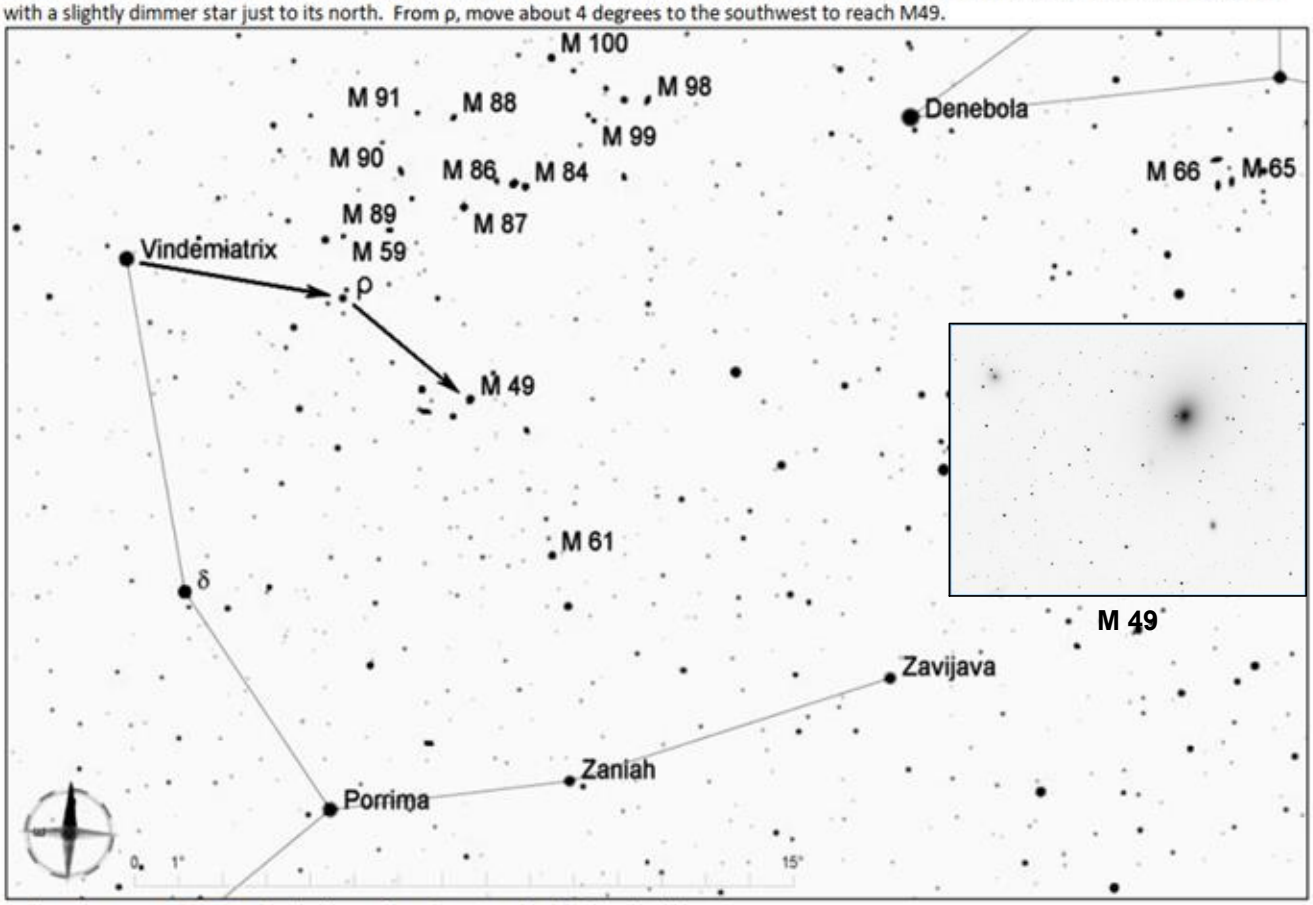
M49 is a large elliptical galaxy, one of the brightest in the Coma-Virgo galaxy cluster and one of the brightest in our sky at magnitude 8.4. It can be seen through any telescope as a round, featureless glow with a very bright center. A foreground star is visible within this halo, to the east of the bright center. The galaxy is about 54 million light years away.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

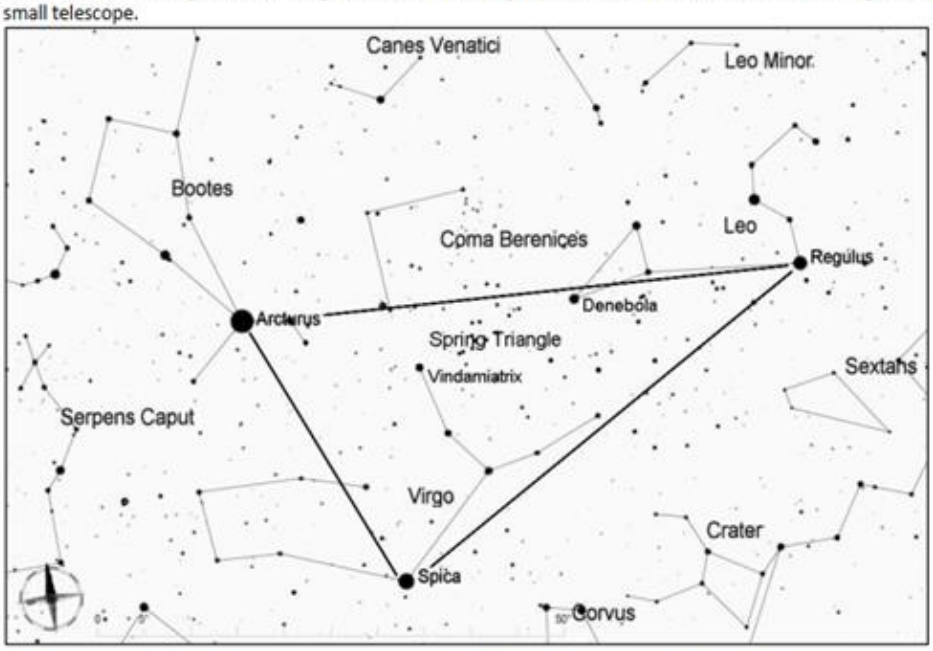
From Vindemiatrix, look 5 degrees west and slightly south to find ρ (rho) Virginis, a magnitude 4.8 star that is easy to identify because it is paired with a slightly dimmer star just to its north. From ρ, move about 4 degrees to the southwest to reach M49.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 58, 59, 60, 89, and 90, Galaxies in Virgo

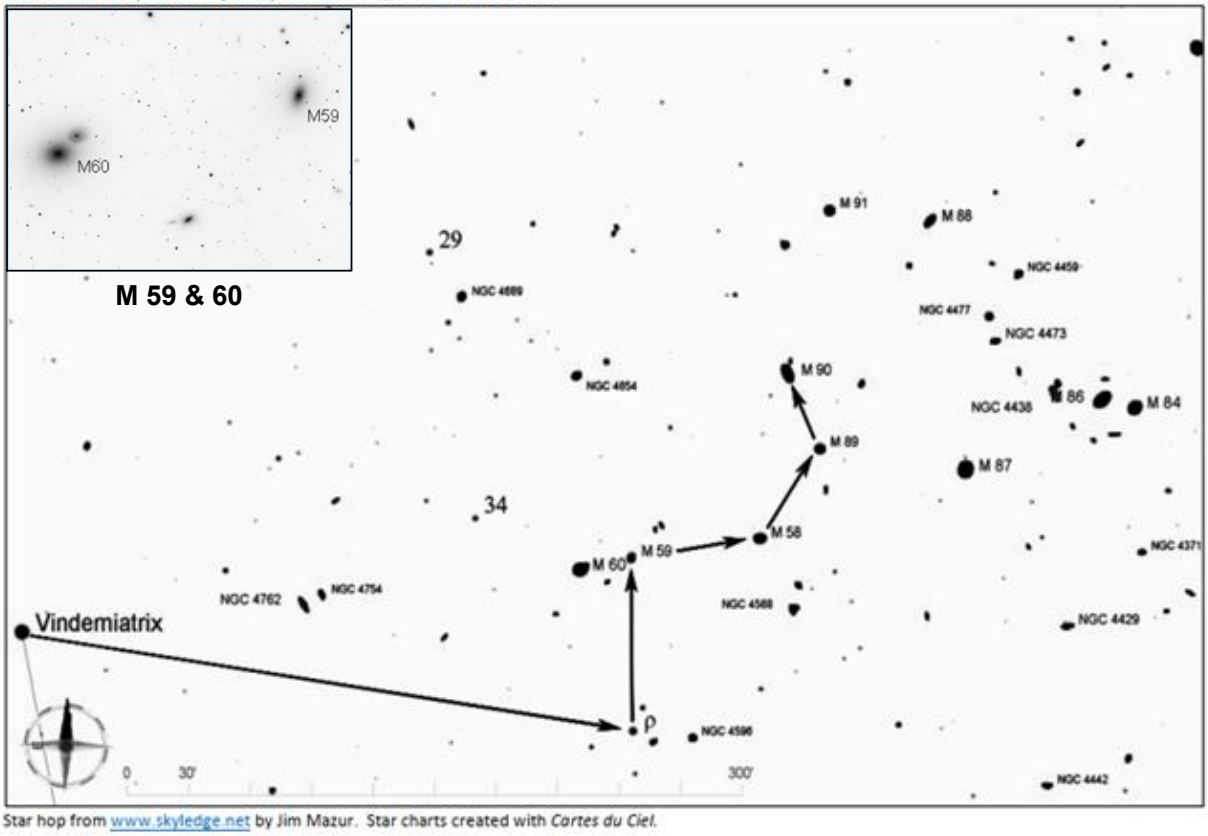
These are five of the many galaxies of the Coma-Virgo galaxy cluster, a prime hunting ground for galaxy observers every spring. Dozens of galaxies in this cluster are visible in medium to large amateur telescopes. This star hop includes elliptical galaxies M59, M60, and M89, and spiral galaxies M58 and M90. These galaxies are roughly 50 to 60 million light years away. All of them are around magnitude 10, and should be visible in even a small telescope.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

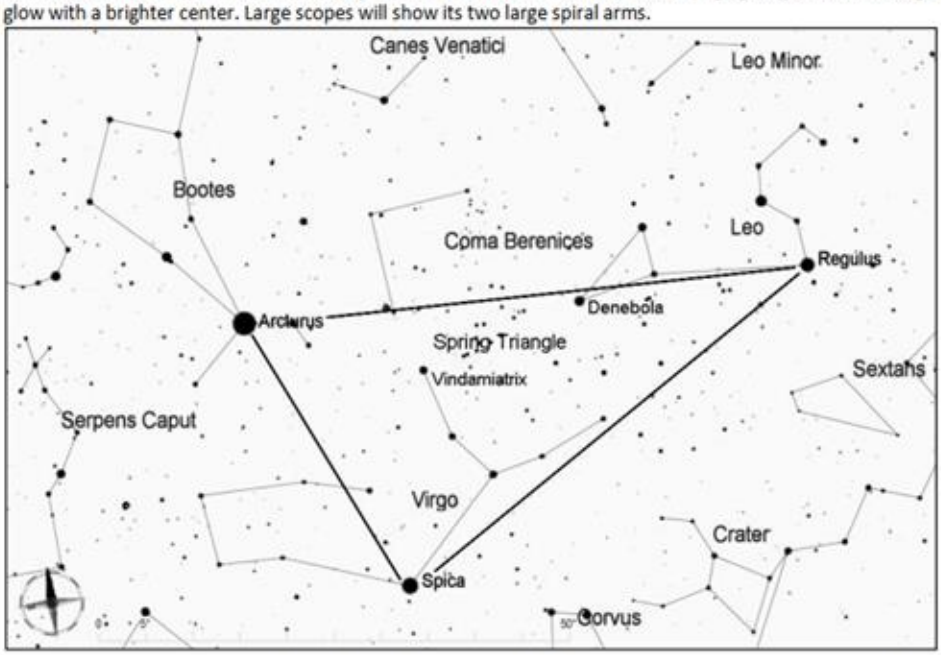
From Vindemiatrix, look 5 degrees west and slightly south to find ρ (rho) Virginis, a magnitude 4.8 star that is easy to identify because it is paired with a slightly dimmer star just to its north. Center ρ in the telescope with a low-power eyepiece, and then just move 1.4 degrees north to arrive at the oval shape of M59. Continuing with a low-power eyepiece and using the chart below, you can take hops of less than 1 degree to find M60 to the east of M59, and M58, M89, and M90 to the west and north.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

Messier 61, Oriani's Galaxy

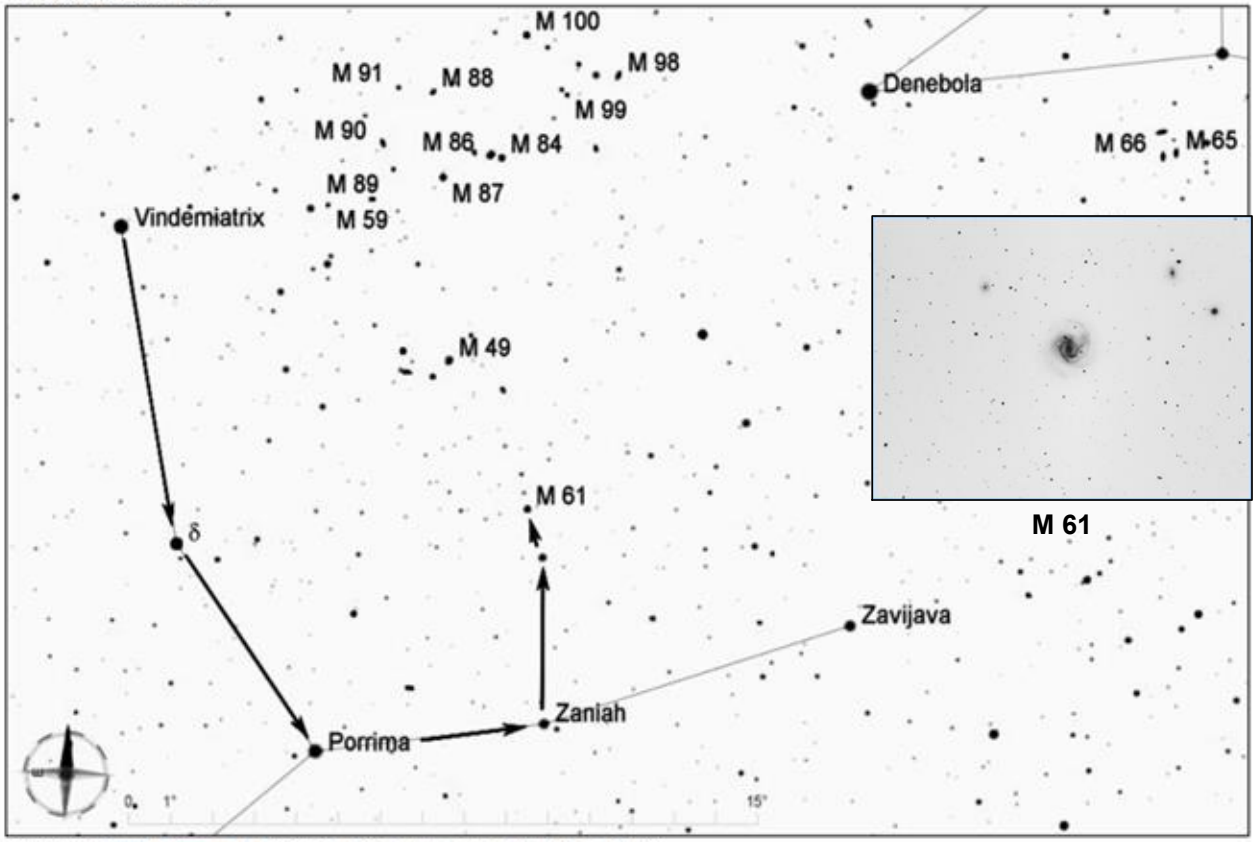
This beautiful face-on barred spiral galaxy was discovered in 1779 by Barnabas Oriani, a Catholic priest and accomplished astronomer, and it became the 61st entry in Messier's catalog. It is on the southern outskirts of the Virgo galaxy cluster. Through small scopes, it appears as a circular glow with a brighter center. Large scopes will show its two large spiral arms.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

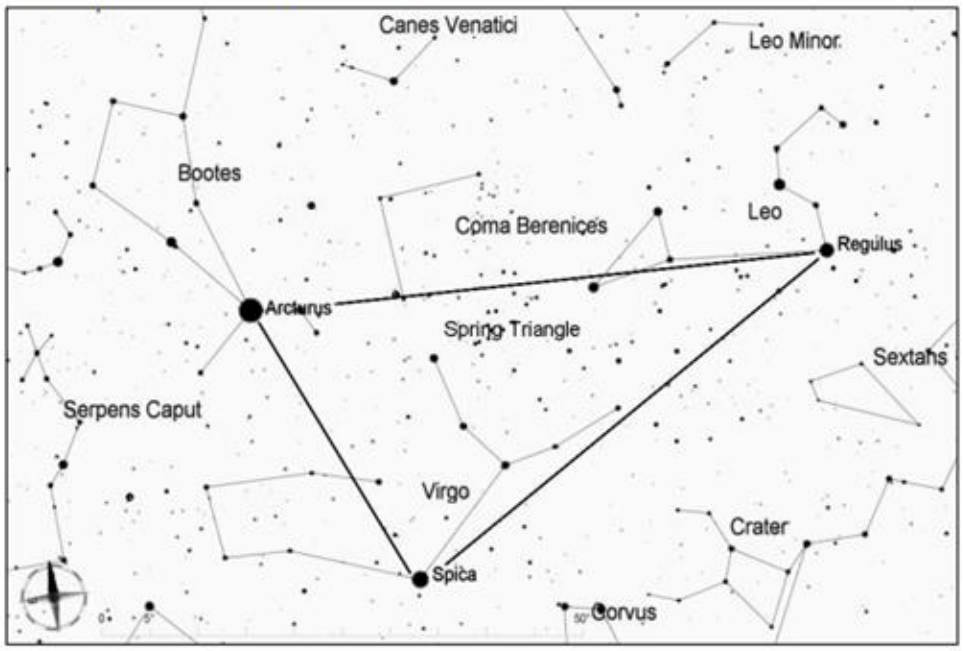
From Vindemiatrix, trace the curving arc of stars that form part of the constellation Virgo to reach Zaniah, as shown below. All of these stars should be easy to see with the naked eye under a clear sky. From Zaniah, move 4 degrees north to a 5th magnitude star that will be easily visible in binoculars or a finderscope. Center this star in your telescope with a low-power eyepiece, then move a little more than 1 degree to the north-northeast to reach M61.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

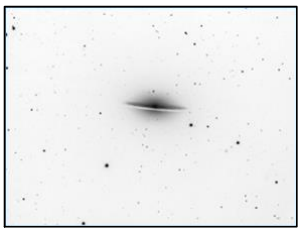
Messier 104, the Sombrero Galaxy

As it crosses through the southern sky each spring, the Sombrero Galaxy is a popular target for galaxy observers. It can be seen with telescopes large and small. Its bright nucleus and sharply pointed arms are fairly easy to see. The lower half of the galaxy, below the broad dust lane, is dimmer and requires a reasonably dark sky to see well.



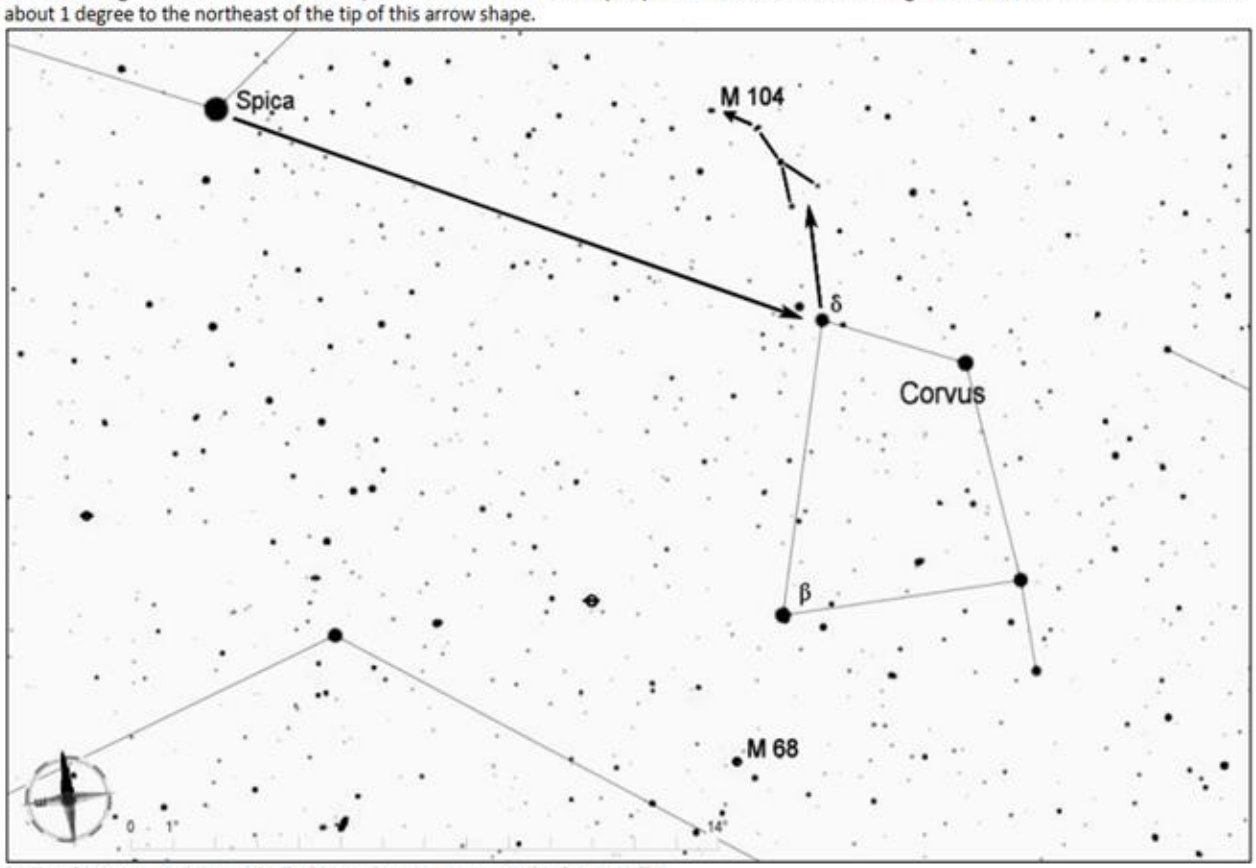
Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, begin at Spica in the constellation Virgo.



M 104

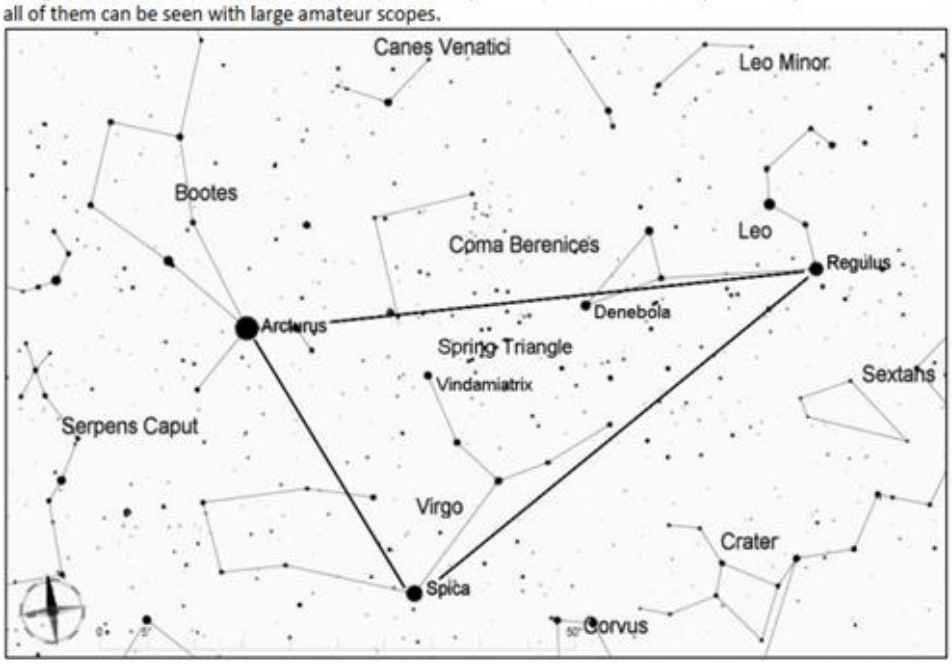
Look about 20 degrees to the southwest of Spica to find the distinctive four-sided shape of Corvus, the crow. Using binoculars or a finderscope, look a few degrees north of δ Corvus and you should see an arrow-shaped pattern of four 5th and 6th magnitude stars, as shown below. M104 is about 1 degree to the northeast of the tip of this arrow shape.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 4435 and 4438 (the Eyes) and Markarian's Chain

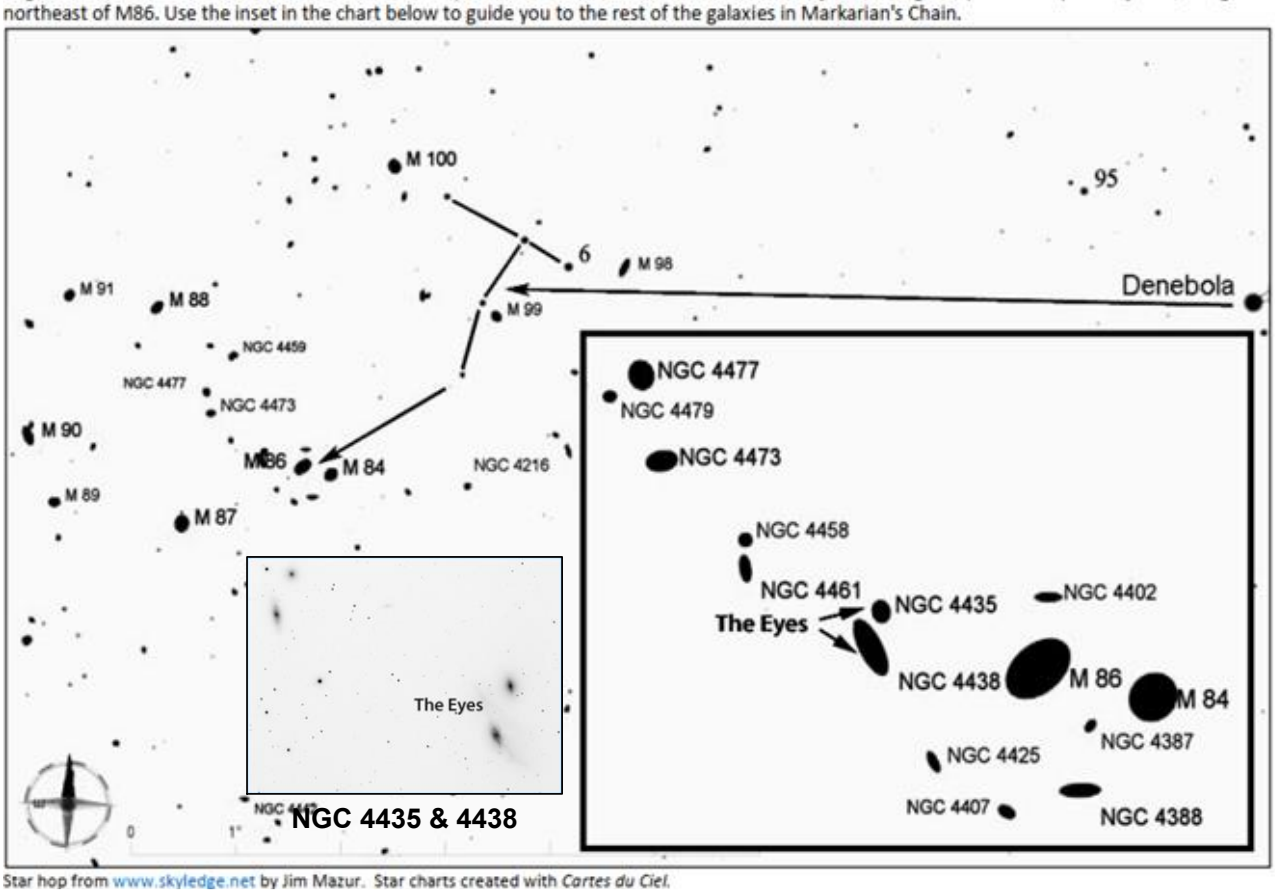
Markarian's Chain is a string of galaxies in the heart of the Coma-Virgo galaxy cluster, starting with the bright M84 and M86 to the west and stretching slightly more than 1 degree to NGC 4477. Just to the northeast of M86 is a pair of galaxies called "the Eyes" (NGC 4435 and 4438), and though a medium-sized telescope they do resemble a pair of eyes. Even small scopes can capture several of the galaxies in Markarian's chain, and all of them can be seen with large amateur scopes.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

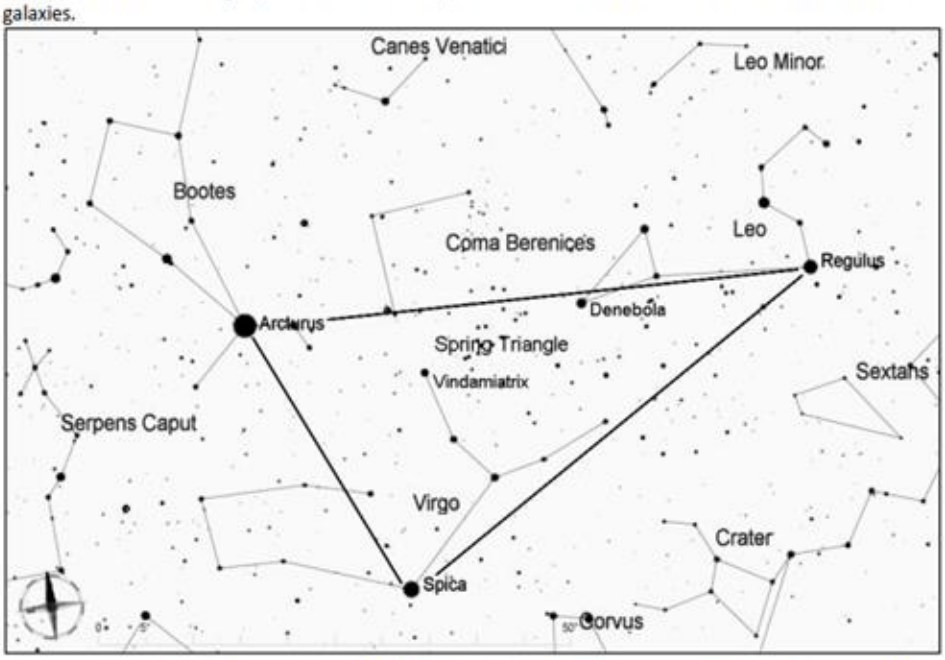
From Denebola, look 7 degrees east with a finderscope or binoculars to find a T-shaped asterism of five stars that includes 6 Virginis. Then move 2 degrees to southeast from the bottom of the T, and you will arrive at M84 and M86, which are just 1/4 degree apart. The Eyes are just 1/4 degree northeast of M86. Use the inset in the chart below to guide you to the rest of the galaxies in Markarian's Chain.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 4567 and 4568 (the Butterfly Galaxies) and Other Galaxies in Virgo

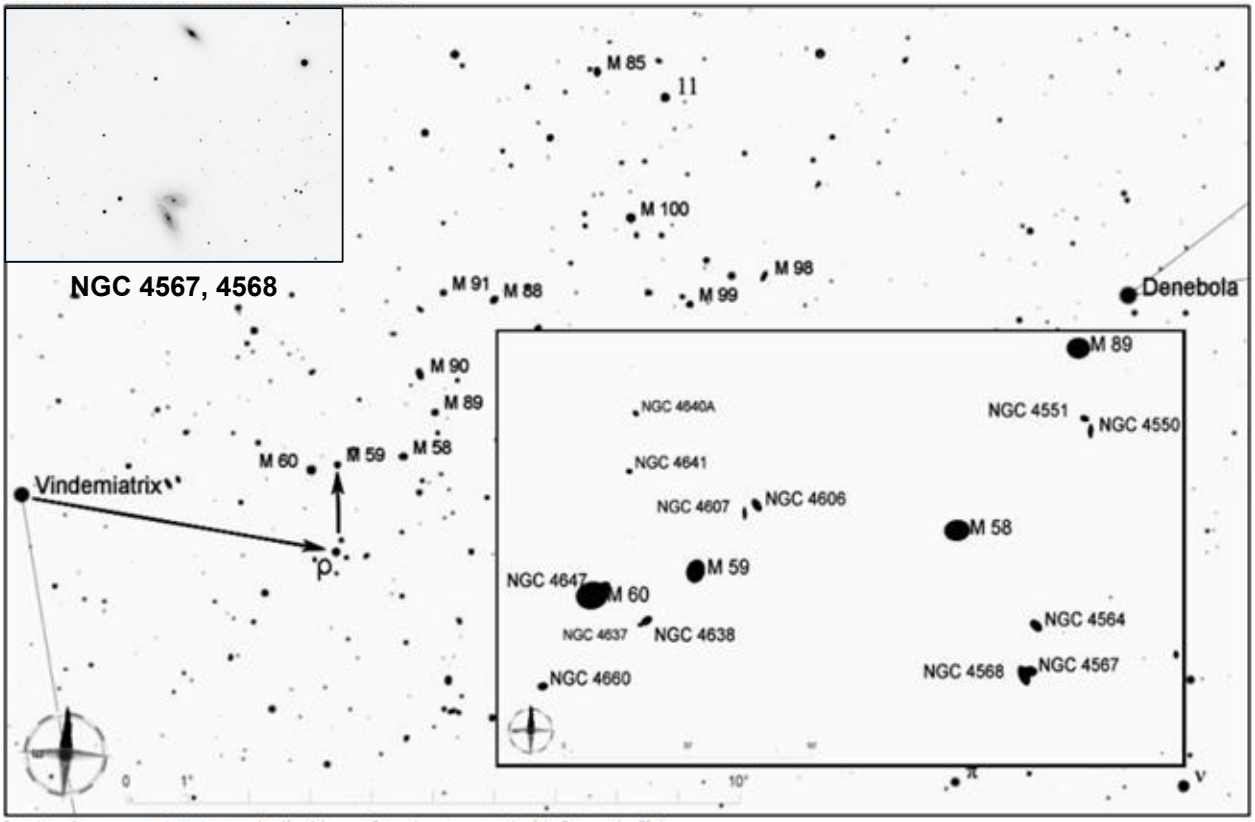
With a medium or large telescope, hundreds of galaxies can be glimpsed in the Virgo galaxy cluster, and some can be found in pairs. Just south of M58 is the interacting pair of 12th magnitude galaxies NGC 4567 and 4568, the Butterfly Galaxies. Another close pair, NGC 4550 and 4551, is northeast of M58. A third pair, NGC 4606 and 4607, is to the west of M58 and north of M59. The chart below can help find these and other nearby galaxies.



Start by finding the Spring Triangle, which consists of three widely-separated first magnitude stars--Arcturus, Spica, and Regulus. The Spring Triangle is high in the southeast sky in early spring, and in the southwest sky by mid-Summer. (To get oriented, you can use the handle of the Big Dipper and "follow the arc to Arcturus").

For this star hop, look in the middle of the Spring Triangle for Denebola, the star representing the back end of Leo, the lion, and Vindemiatrix, a magnitude 2.8 star in Virgo. The galaxies of the Virgo cluster are found in the area between these two stars.

From Vindemiatrix, look 5 degrees west and slightly south to find ρ (rho) Virginis, a magnitude 4.8 star that is easy to identify because it is paired with a slightly dimmer star just to its north. Center ρ in the telescope with a low-power eyepiece, and then just move 1.4 degrees north to arrive at the oval shape of M59. Continuing with a low-power eyepiece and using the inset in the chart below, you can take hops of less than 1 degree to M58 and then south to the NGC 4567 and 4568.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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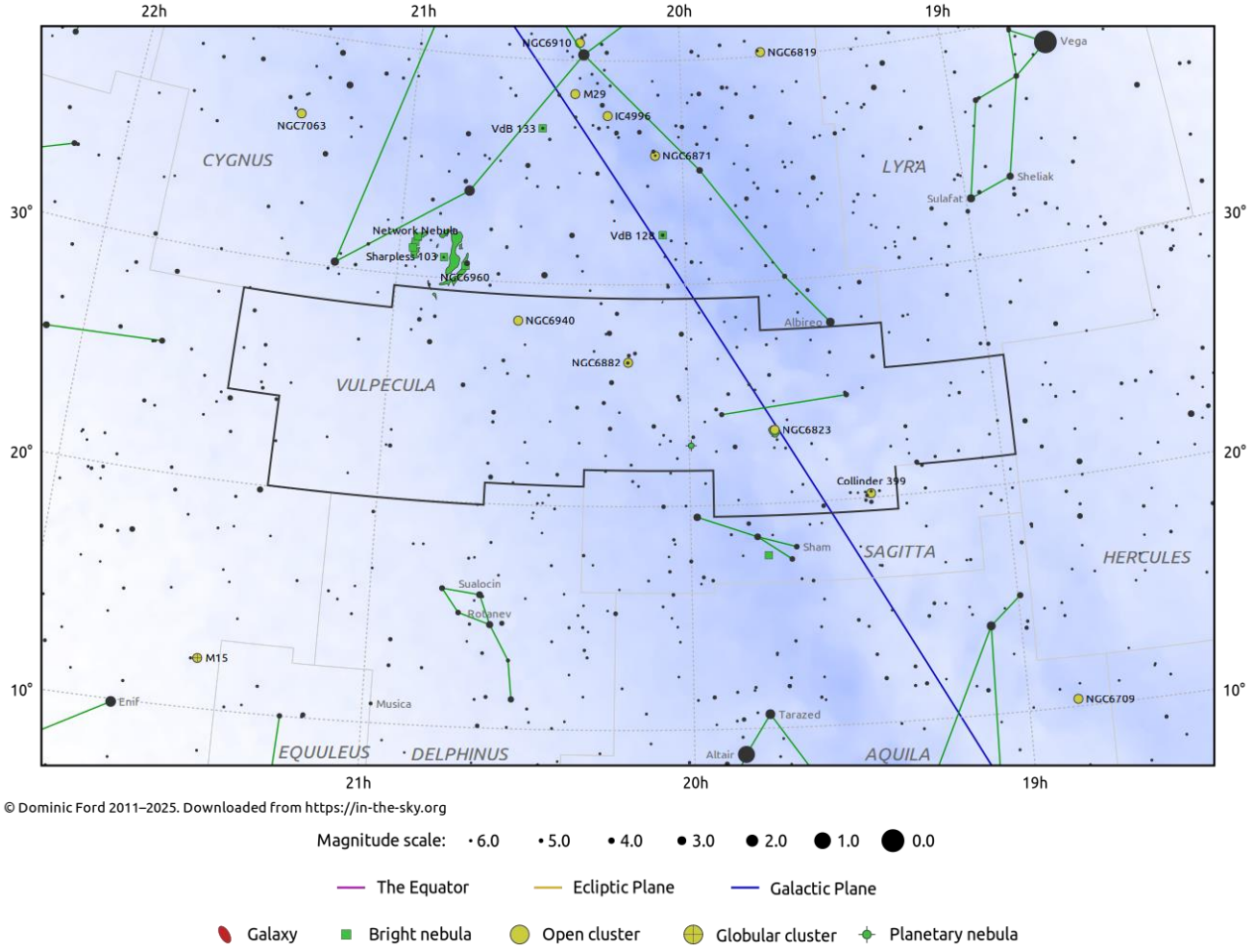
Vulpecula (Vul)

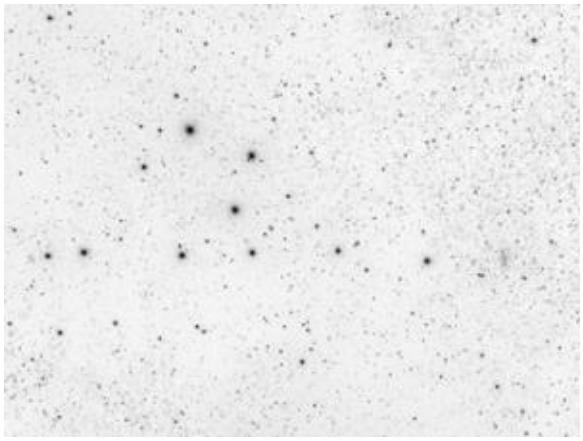
Evening Visibility: **July – November**
Online Information: **Vulpecula**
Charts: **3** Featured Objects: **4**
More Online Information: Collinder 399, M-027, NGC-6885, NGC-6882

In-The-Sky.org Constellation Map

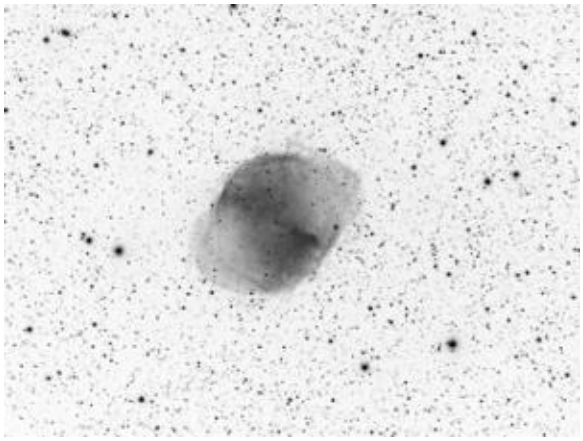


Object (Type)	Chart	Aliases	Stats
Collinder 399 (OC)	1, W1	The Coathanger Cluster, Brocchi's Cluster, Al Sufi's Cluster, Cr 399	| Mag=3.6 | SB=21.1 | Size=60' |
M-027 (PN)	2, W2	The Dumbbell Nebula, Apple Core, Diablo, NGC-6853	| Mag=7.4 | SB=22.0 | Size=8.0' x 5.6' |
NGC-6885 (OC)	3, W3	20 Vulpeculae Cluster	| Mag=6.0 | SB=18.9 | Size=7' x 18' |
NGC-6882 (OC)	3, W3	C-37	| Mag=3.6 | SB=21.1 | Size=60' |

Image Gallery



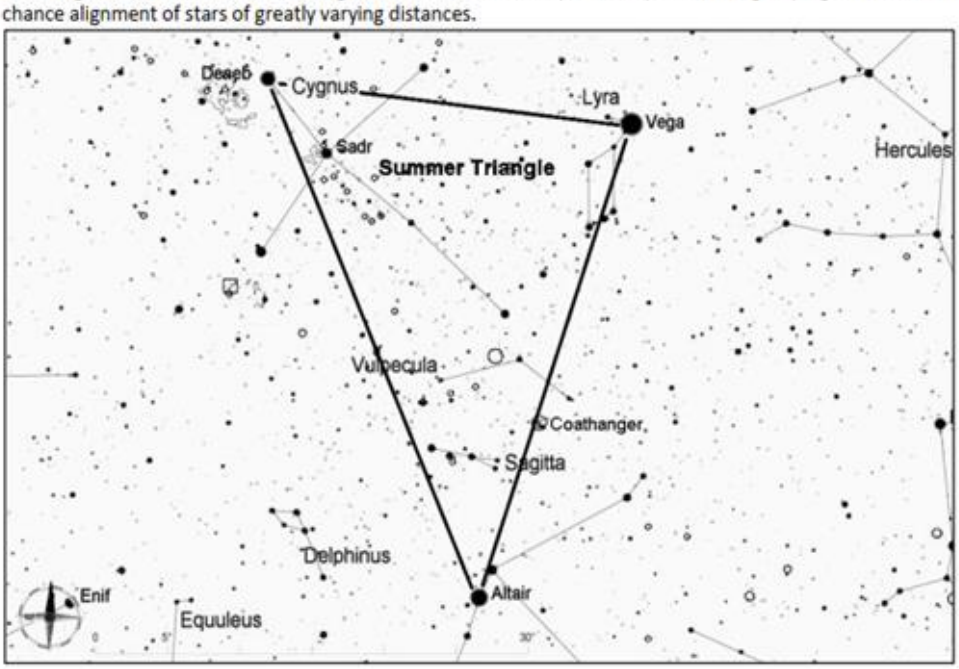
Collinder 399 (The Coathanger Cluster) and NGC 6802



Messier 27, The Dumbbell Nebula

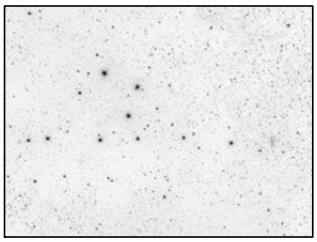
Collinder 399, the Coathanger Cluster

At magnitude 3.6, the Coathanger Cluster is not difficult to spot with the naked eye. It is also known as Brocchi's Cluster or Al Sufi's Cluster. Because of its large size, it is best viewed through binoculars or a telescope at low power. This grouping is not a true cluster but rather an asterism, or a chance alignment of stars of greatly varying distances.



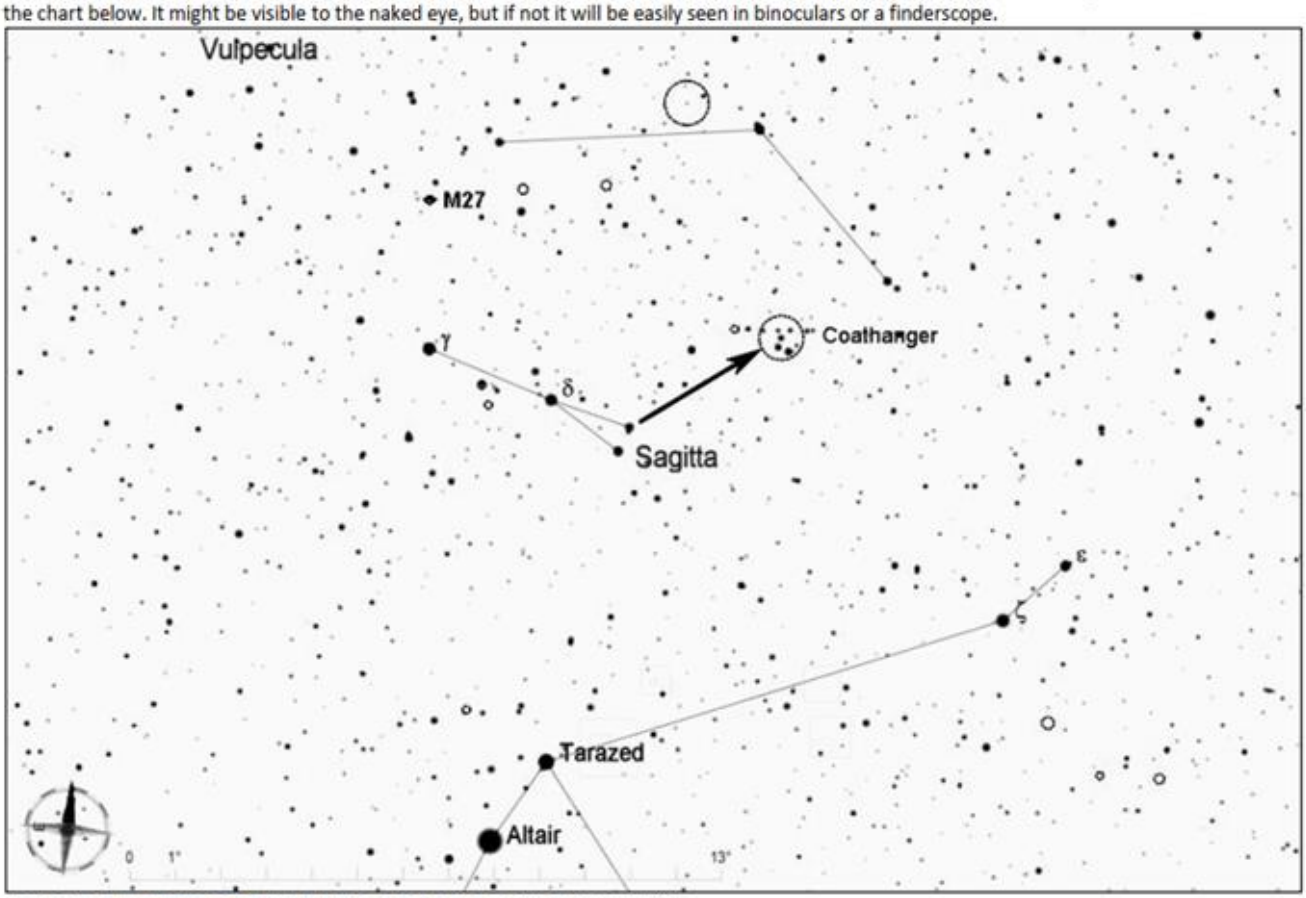
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

Look inside the Summer Triangle, to the north of Altair, to find the small constellation Sagitta, the arrow. Its four brightest stars do indeed form the shape of an arrow.



Collinder 399

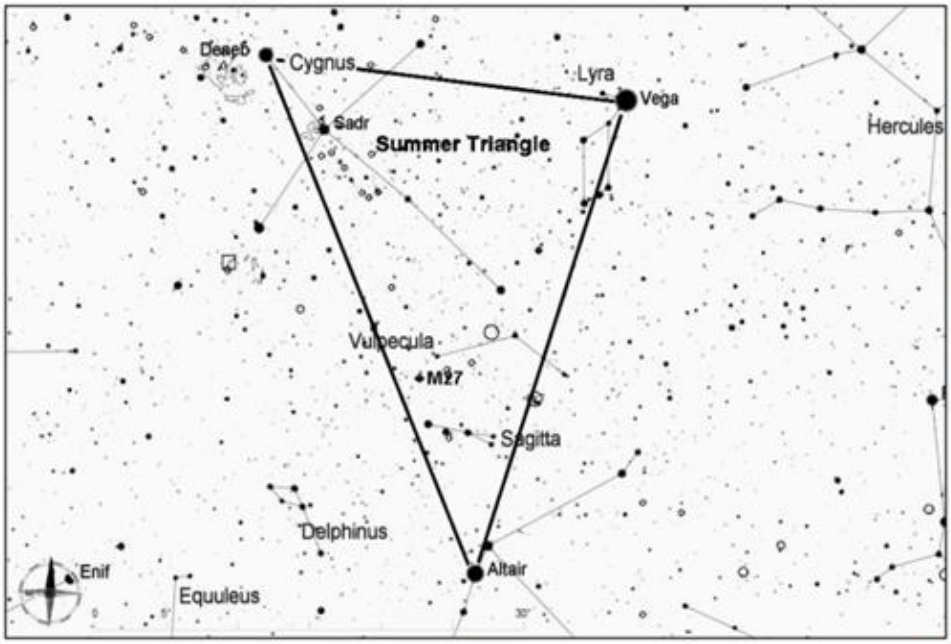
From the two stars that form the tail fins of the arrow, move your telescope 3 degrees to the northwest to find the Coathanger Cluster, as shown in the chart below. It might be visible to the naked eye, but if not it will be easily seen in binoculars or a finderscope.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

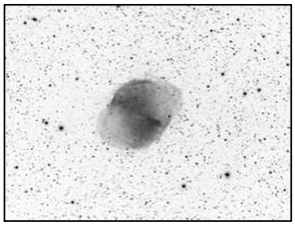
Messier 27, the Dumbbell Nebula

The Dumbbell Nebula is one of the largest and brightest examples of a planetary nebula. It is high overhead during the evenings throughout the summer and fall. It can be seen as a dim patch through binoculars, and a telescope will reveal its hourglass shape. This nebula is about 3 light years in diameter and about 1360 light years away.



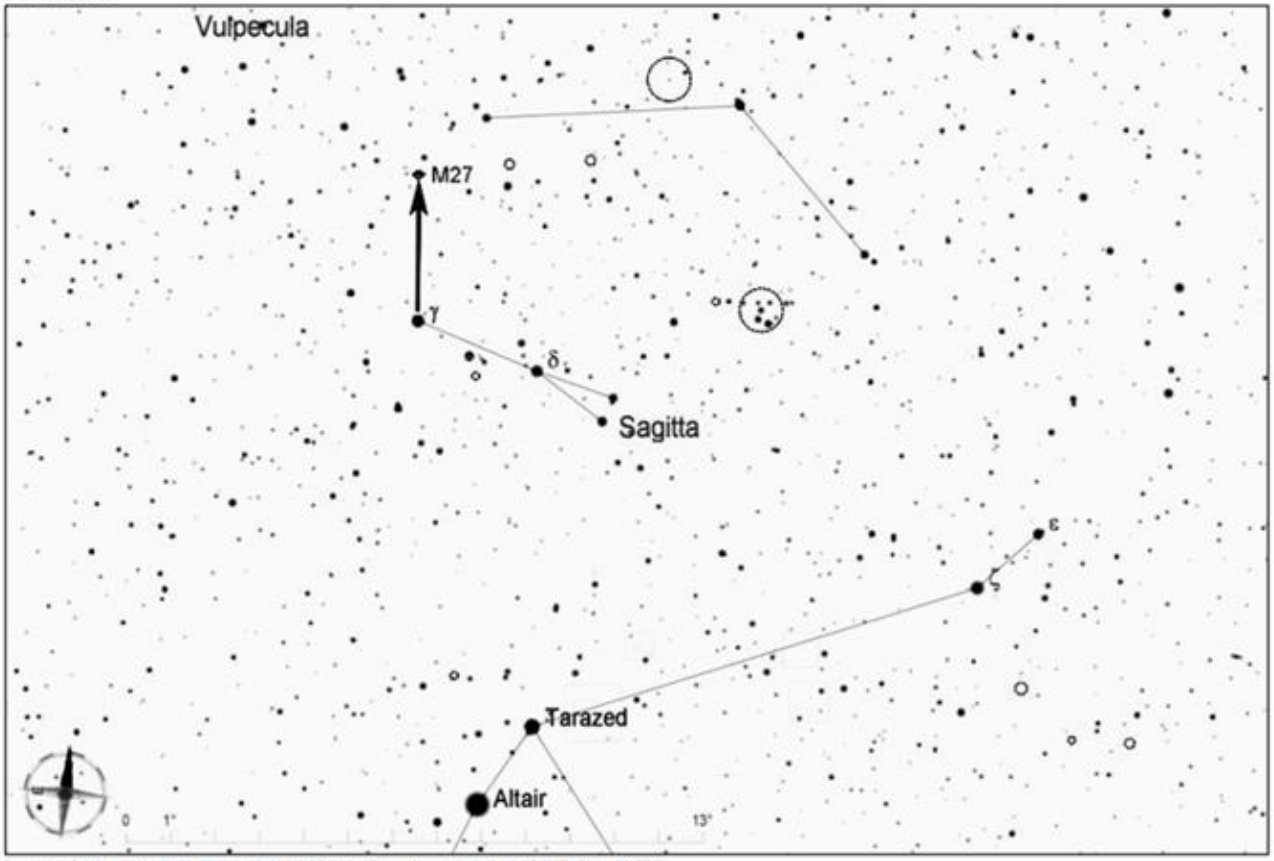
Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

Look inside the Summer Triangle, to the north of Altair, to find the small constellation Sagitta, the arrow. Its four brightest stars do indeed form the shape of an arrow.



M 27

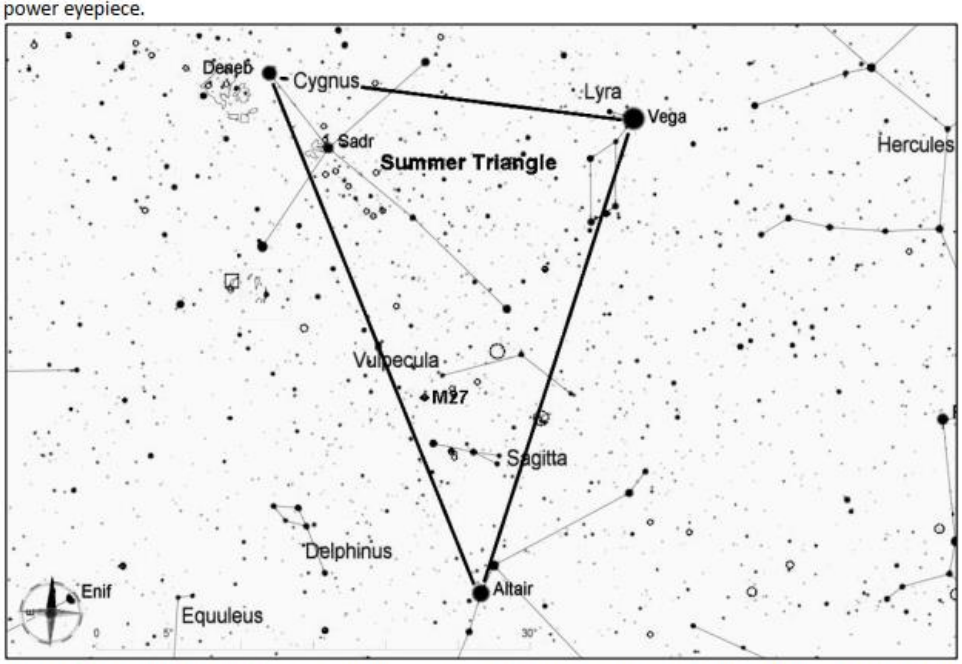
From Gamma Sagittae, the star that forms the tip of the arrow, move your telescope 3 degrees to the north to find Messier 27, as shown in the chart below.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

NGC 6885 (Caldwell 37) and NGC 6882, Open Clusters in Vulpecula

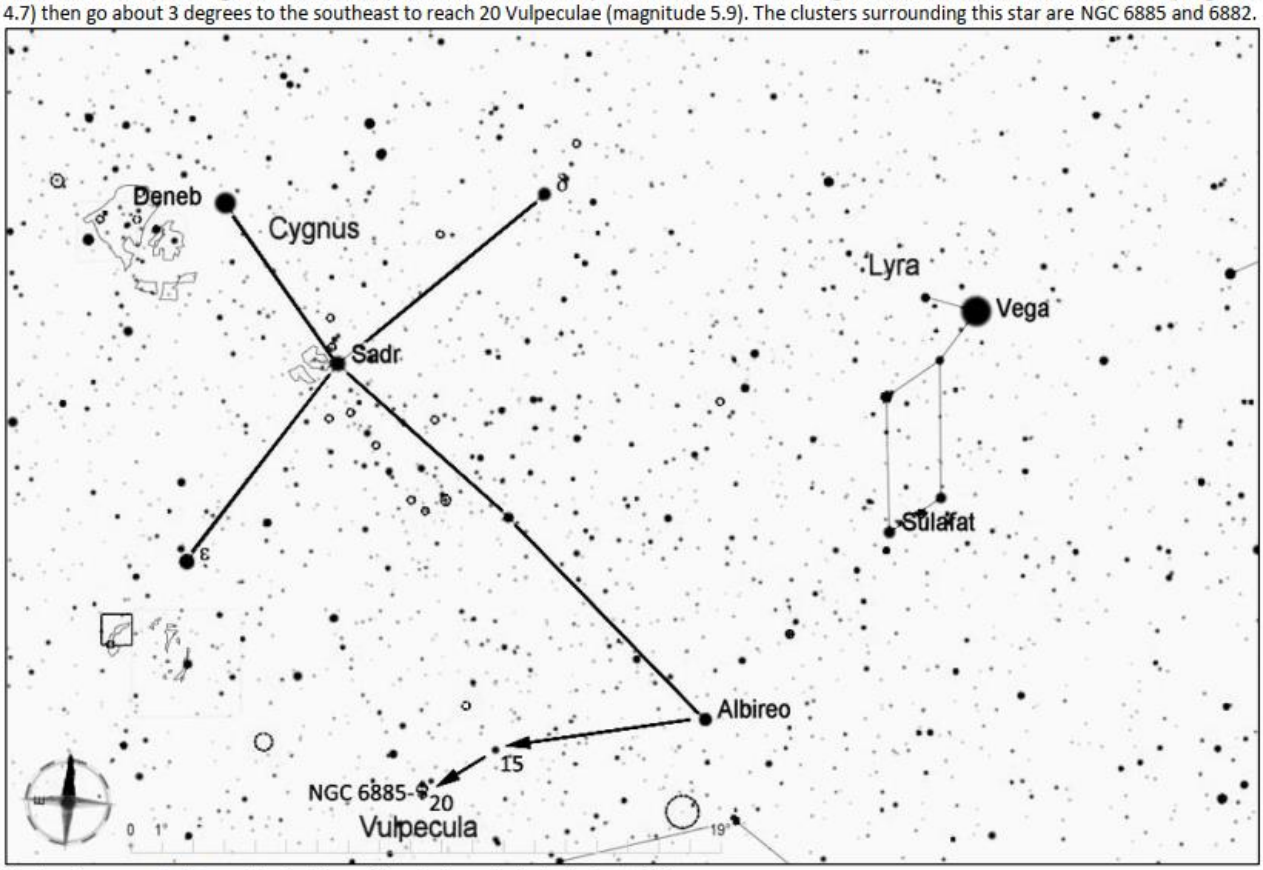
These two NGC numbers have been confused in the literature and on various star charts. They refer to two open clusters around 6th magnitude 20 Vulpeculae. One cluster is larger (about 20') and more scattered, and the other is a more condensed group of dimmer stars about 7' across, just to the northwest of 20 Vulpeculae. There is disagreement about which is NGC 6882 versus 6885, but either way they offer a nice view through a low-power eyepiece.



Start by finding the Summer Triangle, which consists of the three of the brightest stars in the sky--Vega, Deneb, and Altair. The Summer Triangle is high overhead throughout the summer, and it sinks lower in the west as fall progresses.

Look at Deneb, which marks the tail end of the constellation Cygnus, the Swan.

The brightest stars of Cygnus form a large cross shape, so it is also known as the Northern Cross. Albireo is the star at the base of the cross (or the head of the swan). At magnitude 3, it is easily seen with the naked eye. From Albireo, move 7 degrees to the east to find 15 Vulpeculae (magnitude 4.7) then go about 3 degrees to the southeast to reach 20 Vulpeculae (magnitude 5.9). The clusters surrounding this star are NGC 6885 and 6882.



Star hop from www.skyledge.net by Jim Mazur. Star charts created with *Cartes du Ciel*.

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Appendix

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Revision History

Here is listed changes/updates and corrections made to this book over time.

2025-05-05: Release of first version of this book.

2025-07-14 Release

- Messer 53 Links Repair and updates
- Addition of Stelle Doppie link for Double/Multiple Star Systems in constellations summary table
- Addition of Revision History Section
- | Multiple Star System Basics | - Addition of multiple star systems link to Wikipedia.
- | Carbon Stars | - Addition of Carbon Stars link to Wikipedia.
- | Online Resources| Addition of Stelle Doppie website

Log Book

We encourage you to create a personalized logbook to accompany *The Star Hopper's Guide to the Universe*. The following templates are designed for recording sketches, observations, and summaries of your stargazing experiences. Once you have printed the guide, you may choose to insert these pages throughout—either within each constellation section, at the beginning, or at the end of the guide—according to your preference. Decide which type of log you'd like to maintain (text, sketch, or both), print the desired number of log and summary pages, and add them to your printed copy. Page numbers have been intentionally omitted, allowing you to add them by hand as needed.

Astronomy Observation Log Summary

Page:

Target	Constellation	Page	Date	Comments

10

Target	Constellation	Page	Date	Comments

20

Target	Constellation	Page	Date	Comments

30

Target	Constellation	Page	Date	Comments

35

Astronomy Observation Log Summary

Page:

Target	Constellation	Page	Date	Comments

10

Target	Constellation	Page	Date	Comments

20

Target	Constellation	Page	Date	Comments

30

Target	Constellation	Page	Date	Comments

35

Astronomy Sketch Log

Page:

Site and Conditions
Date:
Site:
Observer:
Conditions:
Telescope:
Mount:

Session Notes

Target:	Time:
Eyepieces/Filters/etc:	
Observations:	
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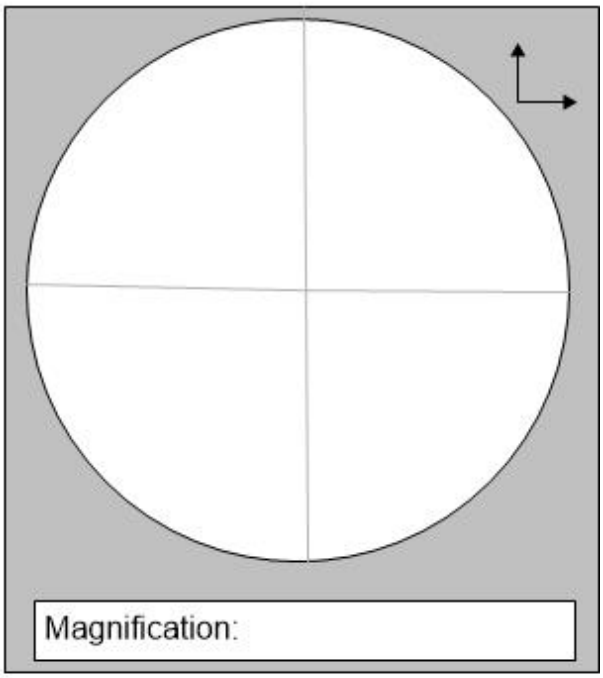

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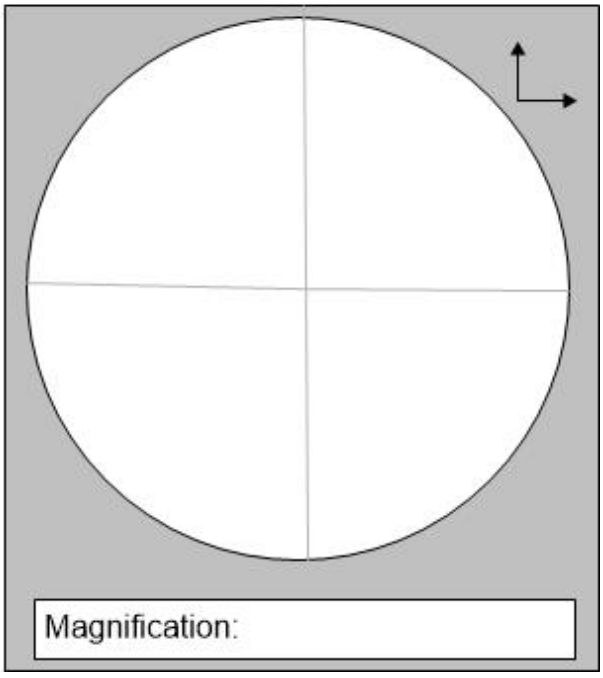

Astronomy Sketch Log

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Conditions:
Telescope:
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Session Notes

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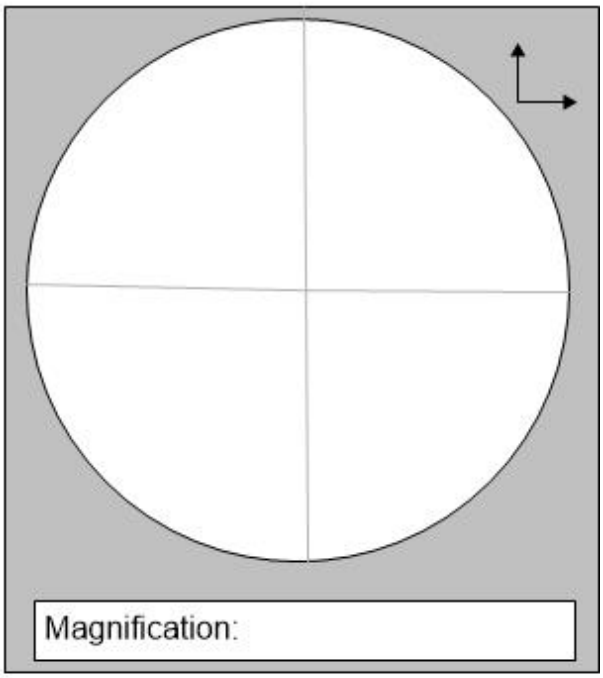
Eyepieces/Filters/etc:	
Observations:	
Comments:	



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Eyepieces/Filters/etc:	
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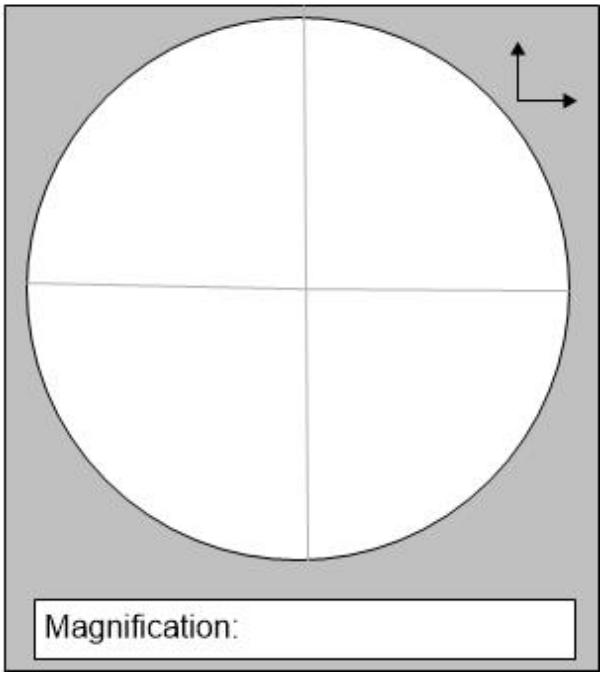
Comments:	



Astronomy Observation Log

Page:

Site and Conditions	Session Notes
Date:	
Site:	
Observer:	
Conditions:	
Telescope:	
Mount:	

Target:	Constellation:	Time:
Eyepieces/Filters/etc:		
Observations:		
Comments:		

Target:	Constellation:	Time:
Eyepieces/Filters/etc:		
Observations:		
Comments:		

Target:	Constellation:	Time:
Eyepieces/Filters/etc:		
Observations:		
Comments:		

Astronomy Observation Log

Page:

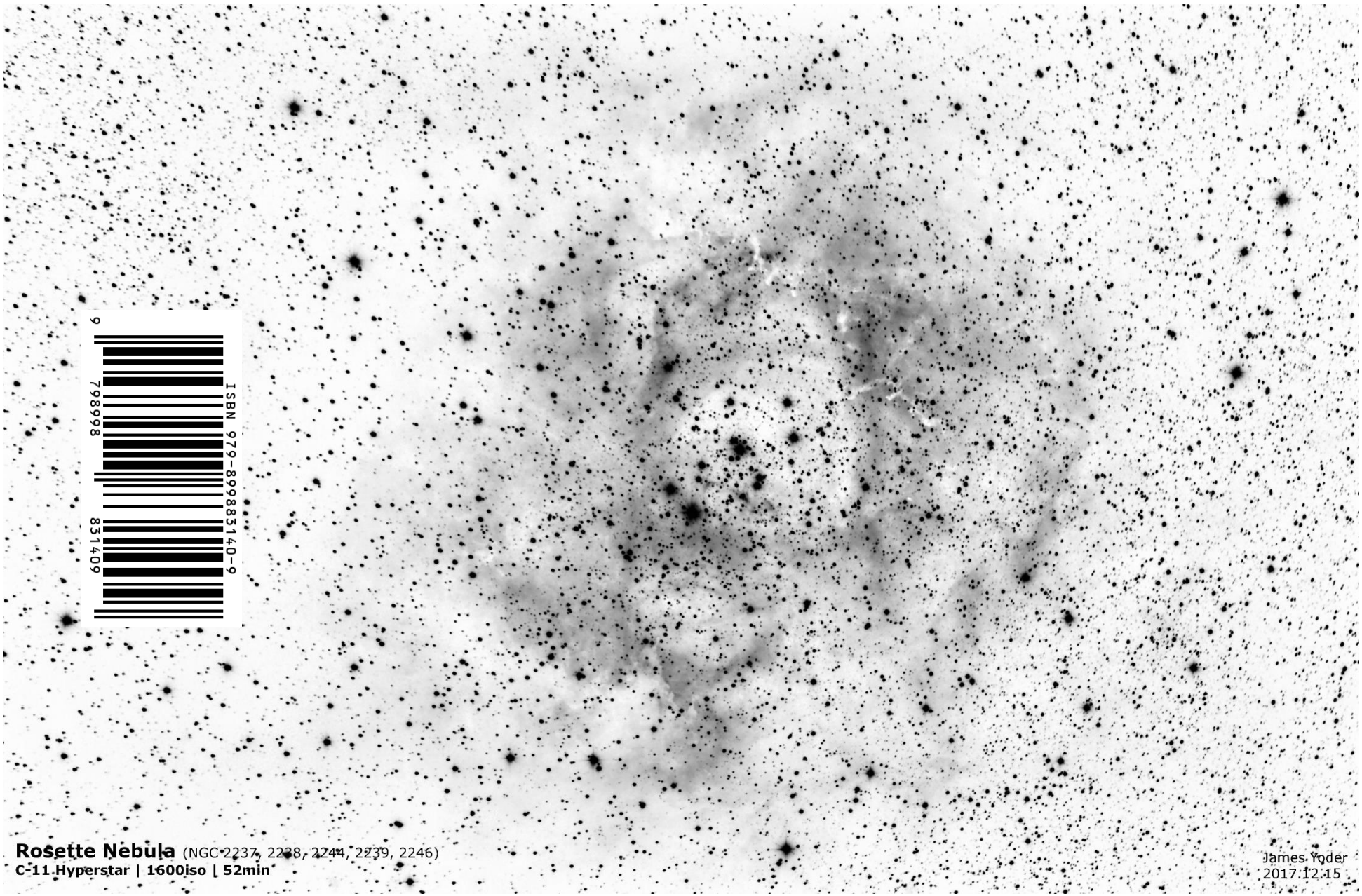
Site and Conditions	Session Notes
Date:	
Site:	
Observer:	
Conditions:	
Telescope:	
Mount:	

Target:	Constellation:	Time:
Eyepieces/Filters/etc:		
Observations:		
Comments:		

Target:	Constellation:	Time:
Eyepieces/Filters/etc:		
Observations:		
Comments:		

Target:	Constellation:	Time:
Eyepieces/Filters/etc:		
Observations:		
Comments:		

Blank



Rosette Nebula (NGC 2237, 2238, 2244, 2239, 2246)
C-11 Hyperstar | 1600iso | 52min

James Yoder
2017.12.15