

BINOCULAR OBJECTS

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Andromeda

M31 – The Great Galaxy in Andromeda

The most distant object that can be seen with the naked eye, it is superb in binoculars. This galaxy is our closest neighbor, 2.2 million light years away.

R Andromedae

This variable star has a range of 9 magnitudes.

NGC 752 and The Golf Club

Open cluster about 5 degrees from Gamma Andromedae. Because it is such a large object it is easier to see through binoculars than a telescope. There are about 75 stars in this cluster. Look 1 degree west of NGC 752 for a small pattern of 7 sixth and seventh magnitude stars in the shape of a golf club. NCC 752 reminds some as a golf ball next to the head of the club.

Aquarius

M2

A globular cluster that is 6.5 magnitude is easily found with binoculars. It is 37,000 light years away and approximately 150 light years in diameter. Although detail is not seen it is well worth finding. This cluster contains more than 100,000 ancient stars that may predate the Milky Way.

Aquila

R Aquilae

This variable star varies in magnitude from 6 to 11.5 of a period of 284 days.

NGC 6709

A pretty open cluster consists of about 40 closely knit stars against an already rich background of stars. This is approximately 3,100 light years from earth.

NGC 6738

This open cluster is very similar to NGC 6709. Once located, small binoculars may reveal a few of its brighter stars.

Auriga

M 36

Bright open cluster contains about 60 stars of 8th magnitude or fainter. Collectively they shine at 5th magnitude and lie 4,100 light years distant.

M37

An open star cluster about the size of the moon, it is one of the finest in the northern sky. It has at least one red giant near the center, giving the appearance of a "ruby in a field of diamonds." M37 lies about 4,600 light-years away. Binoculars will show this cluster as a misty spot. In a 6-inch telescope more than 100 stars can be seen.

M38

This small, open cluster of stars resembles an "X" when seen in wide field eyepieces. It contains about 100 stars and is about 4,200 light years away.

The Minnow

Another binocular highlight is an asterism sometimes called the Leaping minnow; a little group of 5th and 6th magnitude stars. Have you seen this cluster

Cancer

M44 - Praesepe or The Beehive Cluster

One of the sky's finest open clusters is easily seen from the city with binoculars. This cluster was named in 1996 as Utah's astronomical object. There are over 200 stars in Praesepe, spread over 1 ½ degrees, and are best seen in binoculars. Galileo was the first person to see the Beehive through a telescope. He saw more than 30 individual stars. It is about 525 light years away.

M 67

This 6th magnitude open cluster has 500 faint stars spread over ½ degree. Can be found with binoculars but easier with a small telescope. It is about 2,500 light years away.

R Cancri

A bright long-period variable; At its maximum it is magnitude 6.2. It varies down to 11.2 and back in a year.

Canes Venatici

M3

A rare gem in the northern sky, this globular cluster is some 35,000 light years away and 200 light years across. It contains perhaps 500,000 stars.

M 51 - The Whirlpool Galaxy

This famous galaxy appears as a round 8th magnitude glow with a bright nucleus. The distance to this galaxy is approximately 35,000,000 light years.

Canis Major

M41

A beautiful open cluster of about 80 stars surrounded by a rich field of background stars. This is perhaps the dimmest object visible without optical aid. Aristotle noted this object in 325 B.C. as one of the mysterious "cloudy spots" in the sky. This cluster is about 2,200 light years away.

NGC 2362

This open cluster is often overlooked but is a beautiful sight. At magnitude 4.1 it is easy to find, and is 4,600 light years away from earth.

The Boomerang

Look about 1 degree from Delta Canis Majoris for a half circle of 7 stars of 4th to 6th magnitude. It resembles a boomerang. The brightest star near the bend is Omega Canis Majoris.

Collinder 140

This bright, large open cluster is near the tip of the dog's tail. Some 30 stars of magnitude 5 to 9 are gathered here. The main ones form a narrow pattern reminiscent of the famous "Coat Hanger" asterism found in Vulpecula.

Capricorn

Alpha Capricorni

This wide double star has a separation of 6 arc minutes -- a naked eye test for a night's clarity and steadiness. The star is a double by coincidence, but each star is itself a true binary.

M30

This 7.5 magnitude globular cluster is 40,000 light years away and is bright, large and a little extended.

Cassiopeia

Owl Cluster - NGC 457

This is a very interesting object to see. In a small telescope some people see an Owl perched on a limb while others see E.T. This cluster is believed to be about 9,300 light years away and contains several thousands of stars.

M52

This open star cluster is large and rich, containing about 200 stars. It is magnitude 6.9 and lies 7,000 light years away.

M103 and NGC 663

A faint, 7.6 magnitude open cluster near Delta Cassiopeiae appears to look like a tiny puff of cotton. Continuing on find NGC 663, which is a larger and fuzzier open cluster. Other clusters are also binocular-visible in this constellation. Try finding NGC 129, NGC 7789, NGC 225, and NGC 547. How did you do in finding these?

Centaurus

Alpha Centauri

This star is only 4.3 light years away and is the Sun's nearest neighbor. One of the prettiest binary stars, its two components revolve around each other once every 80 years.

Omega Centauri - NGC 5139

Southern skies are needed, but it has been seen from the Rush Valley Site in Utah. This globular cluster is one of the finest examples in the entire sky with perhaps 1 million members. Only 17,000 light years away, it is one of the closest to us. It is oval in shape and with magnitude 3.7 is very easy to find.

Cepheus

Delta Cephei

One of the most famous of the variable stars, it is the prototype for the Cepheid variable. Its highest magnitude is 3.5 and it fades to 4.4. It completes a cycle every 5.4 days.

Mu Cephei

This star is so red that it is often called the Garnet Star. It varies in brightness between 3.6 and 5.1 irregularly over hundreds of days. This star is approximately 1,550 light years away.

Coma Berenices

The constellation itself has no bright stars and is hard to distinguish, but it is a remarkable area of sky and is beautiful in binoculars. One of the finest open star clusters for binoculars.

M53

This fine globular cluster is about 3 arc minutes in diameter and is located close to *Alpha Comae Berenices*. Similar to M13, this cluster is about 60,000 light years away and is about 8th magnitude.

Corona Borealis

Another fine binocular constellation comprised of a small semi-circle of faint stars, very distinct. It is interesting to see how many stars can be seen within the "Crown". 7 x 50 binoculars reveal at least 15 stars.

Cygnus

North American Nebula - NGC 7000

One of the sky's best examples of a bright nebula, this giant cloud is illuminated by brilliant Deneb, which is only 3 degrees to the west. Because of its size, the nebulae is difficult to see in a telescope: it is best seen with the naked eye at a dark site. This nebula is about 1,600 light years away.

M29

This 7th magnitude open cluster lies in an area of high dust absorption so it is sometimes overlooked. It is 7,200 light years away and contains a dozen 9th magnitude stars.

M39

This loosely bound open cluster of about 25 stars is seen at its best through binoculars, and loses its pizzazz in larger apertures. On a clear night at a dark site it may be seen with the naked eye, as Aristotle apparently did around 325 BC. This 4.6 magnitude cluster is only about 900 light years away.

Delphinus

A small constellation (only about 6 degree long) with a distinctive shape, easily seen through binoculars. It looks like a kite with a tail. Can you make out the different colors of the stars that make up this constellation?

Gemini

M35

This bright 5th magnitude open cluster is visible with the naked eye, is beautiful through binoculars and spectacular in a small telescope. It contains about 300 stars and is about 2,800 light years away.

Hercules

Hercules Cluster - M 13

The most dramatic globular cluster in the northern sky, it is faintly visible to the naked eye as a fuzzy spot. Easily seen through binoculars with a magnitude of 5.9, it lies 23,000 light years away. Its diameter is 160 light years and has more than a million stars.

M92

Another excellent globular cluster in Hercules, it is often mistaken for M 13 because they are so near to one another. This cluster is of 6.5 magnitude and is about 35,000 light years away.

Hydra

M48

A large open cluster best seen through binoculars or a wide-field telescope. It is moderately bright at 5.5 magnitude but is spread out. M48 can be seen with the naked eye at a dark site. This cluster contains about 80 stars and is 1,700 light years away.

M83

At 8th magnitude, it is one of the brighter galaxies visible in binoculars. There have been four supernovae here in the past 60 years. This galaxy is very close to us at 10 million light years.

Leo

M65 and M66

These two spiral galaxies near *Theta Leonis* are visible in binoculars but give a better view in a telescope. They are about 25,000,000 light years distant and are separated from one another by 180,000 light years.

M95 and M96

These spiral galaxies are said to be visible with binoculars, although they are both 9' magnitude. Maybe you will have success in finding these two galaxies that lie 29,000,000 light years away.

NGC 2903

If the sky is dark, a challenge is to find the galaxy NGC 2903. It should not be hard to find in 10 x 50 binoculars.

Lepus

M79

This 8th magnitude globular cluster can be difficult to find because it is large, rich and compressed, but with dark sky conditions it should not be hard to find. This is south of Orion in the sky. It is about 54,000 light years away.

Lyra

Epsilon Lyrae

This is a superb example of a "double-double" star. Slight optical aid will show two 5th magnitude stars. Both are themselves doubles, with separation under 3 arc seconds. A small telescope will split both of them. This whole system lies 180 light years from earth.

M56

This fine globular cluster is often overlooked because it is so close to M13. The magnitude of this cluster is 8.2, and is 46,000 light years from us.

Monoceros

M50

This beautiful open cluster is easy to find being 6th magnitude but is not as spectacular as others. Some of the 80 stars in this cluster are arranged in pretty arcs. This may be seen naked eye on the best of nights.

NGC 2244 and NGC 2237

Ten degrees east-southeast from Orion's giant Betelgeuse, a narrow rectangle formed by three nearly parallel pairs of stars should be visible. These stars belong to NCC 2244, a bright but sparse open cluster that stands out nicely in any binocular. The faint haze encircling NGC 2244 is the famous Rosette Nebula, NGC 2237. Binoculars are ideal for glimpsing the low-surface-brightness of the Rosette.

Ophiuchus

M9, M10, M12, M14, M19, and M62

These globular clusters provide a range of examples of different concentrations of stars. All are visible in binoculars but require a 6 or 8-inch telescope to really do them justice.

IC 4665

This is a big but often overlooked open cluster located near Beta Ophiuchi. On a dark night it is visible to the naked eye as a hazy splotch nearly 1 degree across.

Orion

The Great Nebula - M42

Plainly visible to the naked eye it can clearly be seen in binoculars in the city. M42 lies about 1,600 light years away and is over 30 light years in diameter.

M43

This is a small patch of nebulosity just north of the Orion Nebula. In fact, the M42 complex is the brightest part of a gas cloud covering the constellation of Orion at a distance of some 1,500 light years.

Pegasus

M15

One of the best of the northern sky's globular cluster is 31,000 light years away. Although visible in binoculars as a nebulous patch, in a telescope it is a real showpiece. It contains about 100,000 stars and is about 130 light years in

diameter and is about 6th magnitude. Many of these stars may predate the Milky Way.

Perseus

M34

This bright, 5th magnitude open cluster sits in the middle of a rich field of stars. It is an interesting view through binoculars or a telescope. It contains about 80 stars and lies about 1,500 light years away.

Double cluster - NGC 869 and 884

Two of the finest examples of open clusters in the sky, are magnificent through binoculars or the low power field in a small telescope. They are at a distance of about 7,400 light years away. Beside the double cluster there are 6 other clusters that are visible in binoculars. Have you spotted them yet?

Puppis

M93

This dim glow of 6th magnitude appears as a small ball of celestial cotton. Under dark sky and steadily held binoculars a few points of light within it should be revealed

Xi Puppis

A bright 3.5 magnitude star looks like a brilliant topaz amid countless fainter sapphires. It is a wide binocular double; the 5.3 magnitude companion is to the southwest.

M46 and M47

These two open clusters are only about 1 degree apart and in a part of the sky where there are not any bright stars which makes them difficult to find. M47 is magnitude 4.4 which indicates naked eye visible. Good hunting.

Collinder 135

This cluster contains brighter stars and contains the 2.7 magnitude ruddy star, Pi Puppis.

Sagittarius

Sagittarius contains more Messier objects than any other constellation. The best way to identify them is to take them one by one. The beginner will have to be careful not to confuse the various objects.

The principal stars of Sagittarius form the famous "Teapot" asterism. The brightest part of the Milky Way seems to emerge from the Teapot's spout like a puff of steam.

M22

The Great Sagittarius star cluster is a very large globular -- the best of the constellation's many globulars. At magnitude 5.1 it is an easy binocular object, but a telescope really brings out the cluster's beauty. Only 9,600 light years away, it is one of the closest globular clusters. It contains about 75,000 stars and is about 50 light years in diameter.

M23

Just one of the many clusters in Sagittarius. M23 presents over 100 stars in an area about the size of the Moon. It is a striking sight in binoculars or in a telescope at low magnification. M23 is about 2,000 light years away.

Lagoon Nebula - M8

On a dark night this is visible with the naked eye just north of the richest part of the Sagittarius Milky Way. This 6th magnitude nebula lies about 5,200 light years away.

Trifid Nebula - M20

Found only 1 ½ degrees northwest of the Lagoon Nebula. This is smaller and fainter than other nebulae and may be a bit of a challenge in binoculars, though is easy in a 6-inch telescope. Ideal conditions and sharp eyes might detect M21, which is located just ½ degree northeast of M20, although it is rather faint by binocular standards.

Omega Nebula - M17

Also called the Swan, the Horseshoe or the Checkmark, this nebula can be seen clearly in binoculars. The length of the nebula is about 12 light years and the diameter is 40 light years. It's about 5,700 light years away.

Scorpius

Antares

The Heart of the Scorpion, this red giant is about 600 million miles across and 9,000 times more luminous than the sun. It is thought to be about 520 light years away. Antares has a green companion star which is a radio source, but it is not visible with binoculars.

M4

Binoculars show this globular cluster as a fuzzy patch while a small telescope will start to show individual stars in a haze. This cluster is one of the nearest and largest of its kind. It lies about 7,000 light away and contains about 10,000 stars when looking to 19th magnitude.

M6 - Butterfly Cluster

This large open cluster of about 50 stars resembles a butterfly. It is about 2,000 light years away.

M7

This large, bright open cluster, lying south east of M6, needs to be seen through binoculars to be fully appreciated. M7 lies 800 light years away.

NGC 6231

This bright open cluster lies in a rich region of the Milky Way. It is best surveyed in binoculars or at very low power in a telescope. In this same area of the scorpion's tail are several other binocular-visible objects. Can you find NGC 6322, NGC 6242, NGC 6281, NGC 6393, or the clusters Harvard 12 or Harvard 18? Happy hunting!

M80

This small, bright globular cluster can be seen in binoculars but needs a 10-inch telescope to resolve stars.

Scutum

Wild Duck Cluster - M11

This magnificent cluster can be seen without optical aid as a bright patch of light. It contains more than 600 stars and is approximately 5,500 light years away. It is one of the finest open clusters in the sky, and should be viewed through a telescope to be fully appreciated.

Serpens

M5

One of the greatest shows of the summer sky, this very striking globular cluster is about 26,000 light years away and contains at least 500,000 stars.

Eagle Nebula - M16

This cluster of about 100 stars also has an emission nebula surrounding it. This is 6th magnitude but a telescope is needed to see it well. It is about 8,000 light years away.

Taurus

The Pleiades - M45

Also known as *The Seven Sisters*, it is the most famous star clusters in the sky. On a reasonably dark night you should be able to see at least six of the stars in the Pleiades with the naked eye. Containing more than 500 stars in all, the Pleiades is about 410 light years away and covers an area four times the size of a full moon. It is best seen with binoculars.

The Hyades

Like the Pleiades, this is also an open cluster, but it is so close to us (only about 150 light years away), even when viewed with the naked eye the stars seem to be spread out. Lots of color can be seen as the individual stars are studied. Can you pick the differences out? Try enhancing the colors by slightly defocusing your binoculars.

Aldebaran

This is an orange giant and is the brightest star in Taurus. Only 68 light years away, it marks the eye of the bull on some star charts.

Crab Nebula - M1

At magnitude 8 this can be very difficult to find. It is worth finding however since it is one of the most unusual objects in the sky. The distance is 6,300 light years.

Triangulum

The Pinwheel Galaxy - M33

This galaxy is one of the brightest and biggest members of the Local Group. The magnitude is 5.5 but its light is spread out over such a large area that it is difficult to see. Although it can be seen with the naked eye on very clear nights, you need a dark sky and binoculars to see a fuzzy glow. The Pinwheel Galaxy is 2.3 million light years away, slightly farther than the Great Galaxy in Andromeda even though it is only 570,000 light years away from M31.

NGC 604

A tiny, fuzzy patch on the Northeast side of M 33 may be found in larger binoculars by those with sharp eyes. One of many diffuse nebulae in M33, NGC 604 is about 30 times larger in diameter than M42, the Great Nebula in Orion.

Ursa Major

Dubhe

This bright, 1.8 magnitude star has been named as Utah's centennial star being 100 light years away.

Mizar and Alcor – “Horse and Rider”

This famous apparent double star in the middle of the dipper's handle is separated by 12 arc minutes and is possible to be seen as a pair with the naked eye. Mizar is itself a true binary star separated by 14 arc seconds.

M81 and M 82

This spiral galaxy pair can be easily seen with binoculars, even when viewing in a city, and is very dramatic when viewed under good conditions. M 82, at 8.4 magnitude, is a long, thin galaxy just a ½ degree from M 81, magnitude 6.8 and is a lot more difficult to see with binoculars. These two galaxies are about 7,000,000 light years away.

Ursa Minor

Polaris

Polaris viewed with binoculars or a low powered telescope shows a small circle of stars known as the "Engagement Ring of Polaris", Polaris being the diamond in the Ring.

Virgo

The Realm of the Galaxies

M49, M84, M86, and M87 are some of the objects that might be found in this area of the sky with binoculars. Scattered throughout Virgo and Coma Berenices are more than 13,000 galaxies known as the Virgo Cluster or Coma-Virgo Cluster, this mighty club of distant systems of stars are worth looking at with a small, wide-field telescope on a dark night.

Vulpecula

Dumbbell Nebula - M27

This is one of the finest planetary nebula, superbly seen in small telescopes. Being 7th magnitude, it can be found with binoculars, but appears only as a faint nebulous spot. It measures nearly 2 ½ light years in diameter and is about 980 light years from us. This is locally known as the Wiggins' Nebula.

Coat Hanger - Brocchi's cluster - C 399

A very loose cluster that looks like a wooden coat hanger made up of 6 stars forming the crossbar and four more forming an upside-down hook. These are 5th to 7th magnitude stars, and can be found about half-way between Vega and Altair (stars forming two corners of the Summer Triangle) in the dark area where the Milky Way splits. There are about 30 total stars in this cluster and it lies about 425 light years away.

This list is by no means comprehensive! It does not include many of the double and variable stars that are also visible with binoculars. Once you become adept at using binoculars, share your discoveries and enthusiasm with your neighbors and friends who may not realize what can be seen in the sky with their closet-bound, often neglected binoculars.