



OBJECT #282	NGC 4567/8
Constellation	Virgo
Right ascension	12h37m
Declination	11°15'
Magnitude	11.3/10.9
Size	3.1' by 2.2' and 4.3' by 2.0'
Type	Spiral galaxies
Other name	The Siamese Twins

For a wonderful example of interacting galaxies, turn your telescope toward the Siamese Twins. Under a dark sky, even a 6-inch telescope will reveal their overall “V” shape. To see any detail, however, you’ll need a 12-inch or larger instrument.

To tell these two galaxies apart, remember that NGC 4568 appears slightly brighter and a bit longer than its companion.



**Object #283** M90 Paul and Daniel Koblas/Adam Block/NOAO/AURA/NSF

OBJECT #283	M90 (NGC 4569)
Constellation	Virgo
Right ascension	12h37m
Declination	13°10'

(continued)	
Magnitude	9.5
Size	10.5' by 4.4'
Type	Spiral galaxy

M90 may be one of the least interesting spiral galaxies you'll ever observe. That's too bad, because we tend to expect more from Messier objects.

You will see an object that measures two times as long as wide. M90's spiral arms wind tightly around it, however, so unless your scope's mirror measures two feet across, be content to just check this bright galaxy off your list, and move on.

OBJECT #284	NGC 4589
Constellation	Draco
Right ascension	12h37m
Declination	74°12'
Magnitude	10.7
Size	3.0' by 2.7'
Type	Elliptical galaxy

Our next object lies 4.4° due north of magnitude 3.9 Kappa ( $\kappa$ ) Draconis. Through a 12-inch telescope, a bright central disk comes into view, surrounded by a much darker oval halo 2' by 1' across. Can you also see the spindle of the magnitude 14.0 spiral galaxy NGC 4572? It glows dimly only 7' west-northwest of NGC 4589.

OBJECT #285	M58 (NGC 4579)
Constellation	Virgo
Right ascension	12h38m
Declination	11°49'
Magnitude	9.6
Size	5.5' by 4.6'
Type	Barred spiral galaxy

Just about any size telescope will show M58's slightly oval structure. Through a 16-inch or larger scope, however, you should be able to pick out the brighter central bar. Around the bar, a fainter halo region represents the galaxy's tightly wound spiral arms.

OBJECT #286	Markarian's Chain
Constellations	Coma Berenices and Virgo
Right ascension	12h40m
Declination	13°
Magnitudes	various
Sizes	various
Type	Galaxy group

Nineteenth-century observers called the area bounded by the stars Arcturus, Spica, and Denebola the "realm of the nebulae." They weren't describing nebulae in the current sense, however. Their nebulae were galaxies, which looked nebulous through the small telescopes most observers used.

Across the heart of this region stretches Markarian's Chain, a group of galaxies bounded on the west by the large lenticular (lens-shaped) galaxies M84 and M86. From those two giants, the chain swings to the northeast. Where it ends depends on your perspective. Some observers end the chain at NGC 4477. Others swing from that galaxy to the northwest and include NGC 4459. The chain is named

for Armenian astronomer Benjamin Egishevich Markarian (1913–1985), who discovered an energetic class of galaxies in the 1960s.

The key to observing this region is having a good finder chart. Orient it so it matches your eyepiece's field of view. The finder chart will show a lot more area and objects, of course. What you want is to be able to move your scope left, right, up, and down and have those directions correspond to your chart.

OBJECT #287	M68 (NGC 4590)
Constellation	Hydra
Right ascension	12h40m
Declination	-26°45'
Magnitude	7.6
Size	12'
Type	Globular cluster

Our next target lies just outside the naked-eye limit. You'll spot M68 3.5° south-southeast of magnitude 2.7 Beta ( $\beta$ ) Corvi. Although you can see this cluster as a fuzzy glow through binoculars, you'll get a whole new perspective by pointing a small telescope at this object.

At low powers, look at the wide central region. It spans half of M68's diameter. Also, if your eyepiece gives a wide field of view, check out the star field M68 lies in. The individual stars around the cluster all seem to be about the same brightness, which adds to the easy visibility of the globular.

At a dark site, crank up the magnification to 200× and beyond through your 4-inch scope to resolve a dozen or so of M68's stars. Notice that the core doesn't appear round or evenly illuminated. If you use a 6-inch or larger scope, you can see "through" the cluster's brighter stars to a haze of fainter background points of light.



**Object #288** The Sombrero Galaxy (M104) Morris Wade/Adam Block/NOAO/AURA/NSF

OBJECT #288	M104 (NGC 4594)
Constellation	Virgo
Right ascension	12h40m
Declination	-11°37'
Magnitude	8.0
Size	7.1' by 4.4'
Type	Spiral galaxy
Other name	The Sombrero Galaxy

Deep within Virgo's heart lies a showpiece spiral galaxy guaranteed to delight amateur astronomers and the general public alike. The Sombrero Galaxy is undoubtedly one of the finest objects you can see through a small telescope.

M104 was the first galaxy to have a large redshift detected. Redshift refers to the direction of motion away from us caused by the universe's expansion. In 1912, American astronomer Vesto M. Slipher (1875–1969) discovered the Sombrero Galaxy was moving away from us at a speed of 2.2 million mph (3.6 million km/h).

The Sombrero Galaxy's lens shape and the dark dust lane that splits it are easy to spot. The galaxy's two sections have unequal brightnesses — the north outshines the south because M104 inclines 6° to our line of sight. The dust lane, therefore, appears to cross south of center.

Through a 4-inch telescope, you may detect the dust lane only near the Sombrero's center. The core is bright, and a large halo surrounds it, even extending above and below the sections of the spiral arms nearest the nucleus.

OBJECT #289	NGC 4605
Constellation	Ursa Major
Right ascension	12h40m
Declination	61°37'
Magnitude	10.9
Size	6.0' by 2.4'
Type	Spiral galaxy
Other names	The Faberge Egg Galaxy, the Frankenstein Galaxy

You won't need a big telescope to observe this galaxy. It's bright with a huge central region. The outer halo is quite faint and small, but, beyond that, details are lacking. One thing you can look for, however, is that NGC 4605's oval shape isn't perfect — it seems to bulge outward toward the south.

*Astronomy* magazine Contributing Editor Stephen James O'Meara gave this object its two common names. Because he saw slender waves of light and a star-studded face, O'Meara said it looked like a Faberge Egg with enameling.

He also called it the Frankenstein Galaxy because he observed it looks like it was badly pieced together with different body parts.

OBJECT #290	Struve 1669
Constellation	Corvus
Right ascension	12h41m
Declination	-13°01'
Magnitudes	6.0/6.1
Separation	5.4''
Type	Double star

Crank the power to 100× or more, and target this equally matched pair. The slightly brighter primary shines yellow. Its companion is white. You'll find this tight binary 4.5° northeast of Algorab (Delta [ $\delta$ ] Corvi).

This double star's name derives from German astronomer Friedrich Georg Wilhelm von Struve (1793–1864). He published a catalog of his binary star discoveries in 1827, and then measured 2,714 double stars and cataloged them in 1837.

OBJECT #291	Gamma ( $\gamma$ ) Virginis
Constellation	Virgo
Right ascension	12h42m
Declination	-1°27'
Magnitudes	3.5/3.5
Separation	0.5''
Type	Double star
Common names	Porrima; Arich

Gamma Virginis is one of the most famous double stars in the sky. Much research has been aimed at this binary, and astronomers have even written poems about it. When you observe it, make a note to revisit the stars every year or two. Currently, this is a close binary that requires a 12-inch or larger telescope. But the pair is widening, and by 2020 splitting it will be within reach of even small scopes.

According to Richard Hinckley Allen in *Star-Names and Their Meanings* (1899), this star's name is Latin, and it refers to Postvorta, one of two ancient goddesses of prophecy. Several sources refer to "Arich" as a traditional name for this star. Allen, however, doesn't mention this variant.

Admiral Smyth in *Cycle of Celestial Objects* devotes eight pages (which include four tables and three diagrams) to this double star. He described the pair as, "A 4, silvery white; B 4, pale yellow, but though marked by Piazzini of equal magnitude with A, it has certainly less brilliance; and the colours are not always of the same intensity, but whether owing to atmospherical or other causes, remains undecided."

OBJECT #292	M59 (NGC 4621)
Constellation	Virgo
Right ascension	12h42m
Declination	11°39'
Magnitude	9.6
Size	4.6' by 3.6'
Type	Elliptical galaxy

Although M59 does grace Charles Messier's famous list, don't get your hopes up as you point your telescope toward it. Note its oval glow and uniform illumination that only begins to fade close to the galaxy's edge. Got it? O.K., time to move on.



**Object #293** The Whale Galaxy (NGC 4631) John Vickery and Jim Matthes/Adam Block/NOAO/AURA/NSF

OBJECT #293	NGC 4631
Constellation	Canes Venatici
Right ascension	12h42m
Declination	32°32'
Magnitude	9.8
Size	17' × 3.5'
Type	Spiral galaxy
Common names	The Whale Galaxy, the Herring Galaxy, Caldwell 32

At first glance, the Whale Galaxy, with its bulging core and asymmetrical material distribution doesn't look like an edge-on spiral galaxy. Yet this object is one of the sky's brightest edge-on galaxies.

William Herschel discovered NGC 4631 March 20, 1787. Since then, observers have enjoyed views of this object through all sizes of telescopes. Through 4- to 6-inch scopes, you'll see an imperfect lens shape that's bigger and brighter on one side.

Larger scopes will reveal NGC 4631's companion — dwarf spheroidal galaxy NGC 4627, which sits 2.5' northwest. NGC 4627's gravity has distorted the Whale's once-classic spiral structure. In fact, the largest telescopes reveal a faint bridge of material connecting the two galaxies.

For the Whale Galaxy, the close passage of the smaller galaxy really has stirred things up. Its central region is a maelstrom of star formation. Huge clumps of stars, visible through 12-inch or larger telescopes, lie all along the spiral arms. If you're lucky enough to observe NGC 4631 through a scope with an aperture bigger than 16', look for dark areas made of dust and cold gas amidst the bright patches.

OBJECT #294	NGC 4609
Constellation	Crux
Right ascension	12h42m
Declination	-63°00'

(continued)	
Magnitude	6.9
Size	6'
Type	Open cluster
Other name	Caldwell 98

Because NGC 4609 sits only  $1.8^\circ$  east of Crux's brightest star, magnitude 0.8 Acrux (Alpha [ $\alpha$ ] Crucis), and because it lies 5' northwest of the only naked-eye star within the Coalsack, you'll have no trouble locating this object.

The star, magnitude 5.3 SAO 252002, also goes by the designation BZ Crucis because of its slight variable nature. Equidistant from BZ Crucis, but on the side opposite NGC 4609, is the magnitude 10.3 open cluster Hogg 15.

Through a 4-inch telescope at  $75\times$ , you'll see NGC 4609 break into about a dozen stars. Larger apertures reveal a second layer of about 20 fainter stars.

OBJECT #295	NGC 4636
Constellation	Virgo
Right ascension	12h43m
Declination	$2^\circ 41'$
Magnitude	9.4
Size	5.9' by 4.6'
Type	Elliptical galaxy

To find our next target, look  $3.3^\circ$  west-southwest of magnitude 3.4 Minelauva (Delta [ $\delta$ ] Virginis). Through an 8-inch telescope, this object has an oval shape with a northwest to southeast orientation. Its central region is small but bright, and the outer halo quickly fades to the blackness of the surrounding space.

OBJECT #296	M60 (NGC 4649)
Constellation	Virgo
Right ascension	12h44m
Declination	$11^\circ 33'$
Magnitude	8.8
Size	7.1' by 6.1'
Type	Elliptical galaxy

This bright, but under-observed galaxy lies  $1.4^\circ$  north-northeast of magnitude 4.9 Rho ( $\rho$ ) Virginis. Through medium-sized telescopes, M60 easily shows as a double galaxy. Its companion, NGC 4647, glows 3 magnitudes fainter, but it's still well within the light-grasp of a 6-inch scope.

M60 itself appears just slightly out-of-round, but otherwise featureless. M59 lies less than half a degree west of M60. A low-power telescope/eyepiece combination will show them both.

In *Cycle of Celestial Objects*, Smyth describes a contemporary's view of this type of object, and gives a reason for astronomers to observe them: "The hypothesis of Sir John Herschel, upon double nebulae, is new and attracting. They may be stellar systems each revolving round the other: each a universe, according to ancient notions. But as these revolutionary principles of those vast and distant firmamental clusters cannot for ages yet be established, the mind lingers in admiration, rather than comprehension of such mysterious collocations. Meantime our clear duty is, so industriously to collect facts, that much of what is now unintelligible, may become plain to our successors, and a portion of the grand mechanism now beyond our comprehension, revealed."





**Object #297** The Hockey Stick (NGC 4656-7) Doug Matthews/Adam Block/NOAO/AURA/NSF

OBJECT #297	NGC 4656-7
Constellation	Canes Venatici
Right ascension	12h44m
Declination	32°10'
Magnitude	10.4
Size	14' × 3'
Type	Irregular galaxy
Other names	The Hockey Stick, the Crowbar Galaxy, the Hook Galaxy

Our next deep-sky object is the fine Hockey Stick Galaxy. Not many bright stars lie nearby, so to find it you'll need to head 6.6° south-southwest of magnitude 2.8 Cor Caroli. That's the Alpha (α) star in Canes Venatici.

English astronomer Sir William Herschel discovered this galaxy in 1787. The core is the brightest part of the galaxy, followed by the blade, which lies to the northeast. NGC 4656's disk widens and gets fainter toward the southwest.

As you view this unusual galaxy, it's interesting to note that astronomers gave the stick and the bright knot in the blade separate NGC numbers. The long stick is NGC 4656, while the knot is NGC 4657.

Because you're already in the area, you owe it to yourself to take a look 0.5° northwest of the Hockey Stick Galaxy. There you'll find the magnitude 9.0 Whale Galaxy (NGC 4631). Gravitational interaction between these two objects is what tore the Hockey Stick Galaxy apart and gave it its unusual appearance.

OBJECT #298	Y Canum Venaticorum
Constellation	Canes Venatici
Right ascension	12h45m
Declination	45°26'
Magnitude	4.8

(continued)	
Period	158 days
Type	Variable star
Other name	La Superba

Our next target is one of the reddest stars in the sky. It's official astronomical designation is Y Canum Venaticorum, but observers usually call it La Superba. It received its common name from Italian astronomer Angelo Secchi. The star's color so impressed him that he christened it "the superb one," or La Superba.

Astronomers classify La Superba as a semi-regular variable star. That means most of the time the star's brightness varies between a peak of magnitude 4.8 and a low of magnitude 6.3. It takes 160 days to go from one peak to the next . . . usually.

La Superba has a surface temperature near the minimum for stars, about 2,800 K. (That's about 4,600° F.) Compare that to the temperature at our Sun's surface, which is 5,800 K (10,000° F).

La Superba also is a carbon star. Carbon compounds like soot accumulate in the star's upper atmosphere. The particles scatter light near the blue end of the spectrum. What's left for us to view is the red component of the star's light. As the particles build up, the star fades in brightness and also gets redder. Eventually, the carbon absorbs enough radiation to escape the star, and the cycle starts again.

To find La Superba, look a bit more than 7° north-northwest of magnitude 2.8 Cor Caroli (Alpha [α] Canum Venaticorum). A sky-distance of 7° equals the field of view of many binoculars. And although you can find La Superba through binoculars, its color appears best through small telescopes.

OBJECT #299	Beta (β) Muscae
Constellation	Musca
Right ascension	12h46m
Declination	-68°06'
Magnitudes	3.7/4.0
Separation	1.3"
Type	Double star

You'll need a superb 4-inch telescope to split this star. Use a magnification above 200×. Both components appear pale blue or blue-white.

OBJECT #300	NGC 4665
Constellation	Virgo
Right ascension	12h45m
Declination	3°03'
Magnitude	10.3
Size	3.5'
Type	Spiral galaxy

A famous astronomer long ago made a mistake designating this object. And it may not be the only one. German-born English astronomer Sir William Herschel assigned it two entries in his catalog. Those became NGC 4664 and NGC 4665. NGC 4624 may also refer to this galaxy.

You'd think a galaxy with that many numbers would look terrific. Unfortunately, this isn't the second coming of the Andromeda Galaxy. Through a 10-inch telescope, you'll see the bright, stretched-out central region oriented north-south. Not quite 2' southwest of NGC 4665's core lies the magnitude 10.7 star GSC 293:1166.

OBJECT #301	NGC 4697
Constellation	Virgo
Right ascension	12h49m

(continued)	
Declination	-5° 48'
Magnitude	9.2
Size	7.2' by 4.7'
Type	Elliptical galaxy
Other name	Caldwell 52

Our next object, NGC 4697, ranks as one of the sky's brightest galaxies. You'll find it 5.3° west of magnitude 4.4 Theta ( $\theta$ ) Virginis. A small telescope will reveal its hazy nature and oblong shape.

Step up to an 11-inch scope, and you'll see much more detail. Regions of this galaxy outside the core show a threefold variance in brightness, getting fainter as you move away from the core.

The bright central region's shape may remind you of a spiral galaxy. In fact, astronomers categorize NGC 4697 as a lenticular galaxy — one with characteristics of an elliptical but with a foothold on the first rung of a spiral galaxy's evolutionary ladder.

If you're using a 16-inch or larger telescope, you might notice an ultra-faint object 6' west-northwest of NGC 4697. That's PGC 170203. This spiral galaxy has a dismal magnitude of 15.1, so I'll forgive you if you don't spend much time observing it.

OBJECT #302	NGC 4699
Constellation	Virgo
Right ascension	12h49m
Declination	-8° 40'
Magnitude	9.6
Size	3.8' by 2.8'
Type	Spiral galaxy

You'll find our next target 1.6° west-northwest of magnitude 4.8 Psi ( $\psi$ ) Virginis. Any telescope will show this galaxy as an oval object 50% longer than it is wide, oriented north-northeast to south-southwest. Through 8-inch and larger scopes, you'll see the outer halo that marks where the tightly wound spiral arms reside. The central region appears wide and bright. The magnitude 10.7 star GSC 5535:1227 lies 5' to the east.

OBJECT #303	DY Crucis
Constellation	Crux
Right ascension	12h47m
Declination	-59° 42'
Magnitude range	8.4-9.8
Type	Variable star
Other name	Ruby Crucis

Our next target is one of the sky's reddest stars. It's also incredibly easy to find if you can observe south of about latitude 25° north. First find magnitude 1.3 Mimosa (Beta [ $\beta$ ] Crucis). Train your telescope on that brilliant star, crank the magnification past 100 $\times$ , and look just 2' to its west.

Ruby Crucis also goes by the designations GSC 8659:1394, TYC 8659-1394-1, and NSV 19481. The only tough part about this observation is to move Mimosa out of the field of view so you can see Ruby Crucis without all that glare. Oh, and the nearer you can view it to its minimum brightness, the redder it will appear.

OBJECT #304	Abell 3526
Constellation	Centaurus
Right ascension	12h49m
Declination	-41° 18'

(continued)

Size	180'
Type	Galaxy cluster
Other name	The Centaurus Cluster

Astronomers catalog our next object as the Centaurus Galaxy Cluster, but, actually, it's two galaxy clusters we see in the same direction. Most of the galaxies belong to the cluster Cen 30. Its brightest galaxy is NGC 4696 and it lies 160 million light-years away.

The other cluster, Cen 45, has NGC 4709 at its center. This much looser cluster lies at a distance of 220 million light-years.

You'll find this combination object  $7.6^\circ$  southwest of magnitude 2.8 Iota ( $\iota$ ) Centaurus. Through a 16-inch telescope, you'll spot roughly 20 galaxies in a  $2^\circ$  area. Magnitude 11.9 NGC 4696 appears oval, elongated east-west, and measures  $4.7'$  by  $3.3'$ . Magnitude 11.1 NGC 4709 lies  $15'$  to the east-southeast. It looks nearly circular,  $2.3'$  by  $2'$ , with a bright core.

OBJECT #305	32 Camelopardalis
Constellation	Camelopardalis
Right ascension	12h49m
Declination	$83^\circ 25'$
Magnitudes	5.3/5.8
Separation	$21.6''$
Type	Double star

This binary lies in the far northwestern section of Camelopardalis roughly  $7^\circ$  from Polaris (Alpha [ $\alpha$ ] Ursae Minoris). The slightly brighter primary is blue, and its companion glows white.

OBJECT #306	NGC 4710
Constellation	Coma Berenices
Right ascension	12h50m
Declination	$15^\circ 10'$
Magnitude	11.0
Size	$3.9'$ by $1.2'$
Type	Spiral galaxy

You'll find this object  $5.4^\circ$  west-southwest of magnitude 4.3 Alpha ( $\alpha$ ) Comae Berenices. Through a 12-inch telescope at low power, NGC 4710 is another of the sky's needles. This one orients north-northeast to south-southwest. Crank up the magnification past  $250\times$ , and you'll spot the bright central bulge with the edge-on spiral arms on either side. Finally, look  $19'$  southwest of NGC 4710 for the magnitude 13.8 spiral galaxy IC 3806.

OBJECT #307	NGC 4725
Constellation	Coma Berenices
Right ascension	12h50m
Declination	$25^\circ 30'$
Magnitude	9.4
Size	$11.0'$ by $8.3'$
Type	Spiral galaxy

You'll find this object  $5.9^\circ$  east-southeast of magnitude 4.3 Gamma ( $\gamma$ ) Comae Berenices. Through a 6-inch telescope, the galaxy appears as a bright oval region surrounding an intense core. The galaxy orients northeast to southwest.

Through a 14-inch scope, you'll spot the spiral arms. The one attached to the northeast side glows a bit brighter. You'll also spot two fainter galaxies in the same field of view. Magnitude 12.5 NGC 4712 lies  $0.2^\circ$  west. Magnitude 12.2 NGC 4747 lies  $0.4^\circ$  northeast.



**Object #308** M94 Adam Block/NOAO/AURA/NSF

OBJECT #308	M94 (NGC 4736)
Constellation	Canes Venatici
Right ascension	12h51m
Declination	$41^\circ 07'$
Magnitude	8.2
Size	13.0' by 11.0'
Type	Spiral galaxy

When does a face-on spiral galaxy not look like a spiral galaxy? When it's M94. This notable object — the brightest galaxy in Canes Venatici — has tightly wrapped spiral arms. Through small telescopes, most observers might classify it as an elliptical galaxy.

Pierre Méchain discovered M94 March 22, 1781. Messier observed M94, determined its position, and added it to his catalog just 2 days later. He called it a “nebula without star.” Look for it  $3^\circ$  north-northwest of magnitude 2.9 Cor Caroli (Alpha [ $\alpha$ ] Canum Venaticorum).

British astronomer and author Admiral William H. Smyth (1788–1865) gave a more detailed description, but it certainly doesn't describe a galaxy: “A comet-like nebula; a fine, pale-white object with evident symptoms of being a compressed cluster of small stars. It brightens toward the middle.”

Through an 8-inch scope, you'll see the tiny nucleus surrounded by a bright disk that measures only  $30''$  across. A much fainter oval halo surrounds the disk. Increase your telescope's aperture to  $16''$ , and you'll begin to see the tightly wound spiral arms close to the nucleus.

OBJECT #309	NGC 4731
Constellation	Virgo
Right ascension	12h51m
Declination	-6°24'
Magnitude	11.5
Size	6.6' by 4.2'
Type	Spiral galaxy

Our next target is not a bright galaxy — only magnitude 11.5 — but it has several features I think you'll find worth your observing time. NGC 4731 lies 3.3° east-northeast of magnitude 4.7 Chi ( $\chi$ ) Virginis.

This dim galaxy appears highly distorted into an “S” shape because it doesn't travel through space alone. You'll easily spot its brighter companion. Look only 0.8° to the northwest for magnitude 9.2 NGC 4697 (Object #301). Gravitational interaction with this elliptical galaxy has nearly destroyed NGC 4731's spiral arms.

Through a 10-inch telescope, observe NGC 4731's long, relatively bright central bar. If your observing site is dark enough, crank up the power past 200×, and look at the wide, irregular spiral arms that originate from each side of the bar.

The western arm appears somewhat brighter. Tiny bright patches within both arms signal the existence of hotspots of star formation. Through a 20-inch or larger telescope, use a nebular filter to increase the contrast of those regions and the galaxy's already formed stars.

At an estimated distance of 65 million light-years, NGC 4731 sits on the far side of the Virgo Cluster of galaxies.

OBJECT #310	NGC 4762
Constellation	Virgo
Right ascension	12h53m
Declination	11°14'
Magnitude	10.3
Size	9.1' by 2.2'
Type	Barred spiral galaxy

This object lies 2.3° west of magnitude 2.9 Vindematrix (Epsilon [ $\epsilon$ ] Virginis). More than four times as long as it is wide, NGC 4762 appears as a white line through medium-sized telescopes. If you want to show someone an edge-on galaxy, here's your chance.

You won't see a central bulge through any size scope. All you will notice is that the core appears ever-so-slightly brighter than the arms.

OBJECT #311	The Coalsack
Constellation	Crux
Right ascension	12h53m
Declination	-63°18'
Size	400' by 300'
Type	Dark nebula
Common names	Magellan's Spot, the Black Magellanic Cloud, and Caldwell 99

Although Crux the Southern Cross is the smallest of the 88 constellations, it's also the brightest when measured by bright stars per unit area. Any dark object, therefore — especially one as large as the Coalsack — will stand out.

The Coalsack has the greatest impact as a naked-eye object. When you use optics, the field of view shrinks, thus lessening the contrast with the surrounding bright Milky Way star field. Also, binoculars and telescopes reveal the Coalsack is not devoid of stars, and that takes away from its appeal.

The Coalsack falls mainly within the boundaries of Crux, but parts of it lie in Musca and Centaurus. And although we can't give a discovery date — Southern Hemisphere residents had seen it for thousands of years — Spanish explorer Vincente Yáñez Pinzón (c. 1460–after 1523) reported observing it in 1499.

OBJECT #312	NGC 4753
Constellation	Virgo
Right ascension	12h52m
Declination	-1°12'
Magnitude	9.9
Size	6' by 2.8'
Type	Spiral galaxy

Our next target lies 2.7° east of magnitude 3.5 Porrima (Gamma [γ] Virginis). Through even a 4-inch telescope, this galaxy appears football shaped with the long axis stretching east-west. It's twice as long as it is wide with a large, bright central region and a fainter, but noticeable halo.

OBJECT #313	NGC 4755
Constellation	Crux
Right ascension	12h54m
Declination	-60°20'
Magnitude	4.2
Size	10'
Type	Open cluster
Other names	The Jewel Box, the Kappa Crucis Cluster, Caldwell 94

Many amateur astronomers consider the Jewel Box Cluster the sky's finest open cluster. It's not the biggest or the brightest, or even the most populous. The reason NGC 4755 stops so many observers in their tracks is its colorful stars.

Almost all open clusters contain hot, recently formed stars. Most of them are blue but appear white through a telescope. The Jewel Box, however, contains more than half a dozen stars of various shades of blue, yellow, and orange.

French astronomer Nicolas Louis de Lacaille (1713–1762) discovered NGC 4755 during his trip to South Africa in 1751–1752. English astronomer Sir John Herschel's (1792–1871) eloquent description led to other astronomers coining the popular name "Jewel Box."

NGC 4755's alternate proper name, the Kappa Crucis Star Cluster, does not derive from a single star because no star in the cluster is bright enough to have garnered such attention. "Kappa," instead, refers to the entire cluster.

A 6-inch telescope and an eyepiece that yields 50× may be the best combination with which to view NGC 4755. Through this setup, you'll see nearly a dozen stars that exhibit color, twenty additional white stars, and a faint backdrop composed of some 200 cluster members.

OBJECT #314	Alpha (α) Canum Venaticorum
Constellation	Canes Venatici
Right ascension	12h56m
Declination	38°19'
Magnitudes	2.9/5.5
Separation	19''
Type	Double star
Other name	Cor Caroli

This stellar pair makes a nice sight through small telescopes in the Northern Hemisphere's spring under even moderate magnification. The brighter primary glows blue-white, and that provides a nice color-contrast to the yellow secondary. This double is a great target for star parties.

Prior to 1725, this star was known as the Lion's liver. In that year, however, British Astronomer Royal Edmond Halley (1656–1742) designated it Cor Caroli, in honor of Charles II (1630–1685). According to Richard Hinckley Allen, Halley did this at the suggestion of the court physician Sir Charles Scarborough, who said that the star had shone with special brilliancy on the eve of the king's return to London on May 29, 1660.

OBJECT #315	M64 (NGC 4826)
Constellation	Coma Berenices
Right ascension	12h57m
Declination	21°41'
Magnitude	8.5
Size	9.2' by 4.6'
Type	Spiral galaxy
Common names	The Blackeye Galaxy, the Sleeping Beauty Galaxy

English astronomer Edward Pigott (1753–1825) discovered M64 March 23, 1779. Messier independently found it a year later and added it to his catalog. William Herschel discovered this galaxy's dark dust feature, which he compared it to a black eye. The name caught on.

The dust lane is prominent, but only when viewed through a 10-inch or larger telescope. The lane sits north of the nucleus, separating the core from the northern spiral arm. The arms wrap tightly around the core, so you'll need a 16-inch scope to see any detail in them. If you view through a scope of this aperture, look for a halo formed by the arms' outermost regions.

OBJECT #316	NGC 4815
Constellation	Musca
Right ascension	12h58m
Declination	-64°57'
Magnitude	8.6
Size	3.0'
Type	Open cluster

Our next object sits at the southern edge of the Coalsack (Object #311). Specifically, you can find it 1.1° west-northwest of magnitude 5.7 Theta ( $\theta$ ) Muscae.

NGC 4815 is an open cluster, but even through a 12-inch telescope you'll only resolve the brightest 15 or so members. Two bright stars dominate the cluster. The easternmost is magnitude 9.6 GSC 8997:563. A bit more than 1' west-northwest lies magnitude 10.0 GSC 8997:72.

OBJECT #317	NGC 4856
Constellation	Virgo
Right ascension	12h59m
Declination	-15°03'
Magnitude	10.4
Size	4.3' by 1.2'
Type	Spiral galaxy

This object lies near Virgo's western border with Corvus. Through an 8-inch telescope at 200 $\times$ , you'll see a disk with a small, bright central region. The galaxy stretches three times as long as it is wide in a northeast to southwest orientation. For those of you using 14-inch or larger scopes, crank the power past 350 $\times$ , and look for a magnitude 13.1 star just barely east of the core.



With that aperture, you'll be able to catch some fainter galactic quarry nearby. First, target the magnitude 13.1 spiral galaxy NGC 4877. It measures 2.3' by 0.9' and lies 21' to the southeast of NGC 4856. Between the two galaxies lie two stars, magnitude 9.5 GSC 6112:285 and magnitude 9.2 SAO 157648. Then look 6' northeast of NGC 4856 for PGC 44645. This magnitude 14.9 spiral will really test your eyesight. It measures 1.6' by only 0.4' thick.

OBJECT #318	The Spring Triangle
Right ascension	13 h
Declination	9°30'
Type	Asterism

Our next objects is a naked-eye asterism called the Spring Triangle. This giant geometrical figure is visible in the spring all night long from any location in the Northern Hemisphere.

Three dazzling stars mark this asterism. The brightest is Arcturus (Alpha [ $\alpha$ ] Boötis), which shines at magnitude  $-0.04$  near the bottom of Boötes the Herdsman. Orange Arcturus is the fourth-brightest nighttime star overall and the brightest north of the celestial equator.

Next in brightness is Spica (Alpha Virginis), the luminary of Virgo the Maiden. Spica is the very definition of a 1st-magnitude star, but its brightness isn't constant. Its apparent magnitude varies between 0.92 and 1.04 over a period of just more than 4 days. Unlike Arcturus, Spica shines with a blue-white intensity that betrays its hot surface temperature of more than 20,000° Fahrenheit (11,400 K). Arcturus' orange surface is cooler, on the order of 7,300° F (4,300 K).

The third Spring Triangle star is Denebola (Beta [ $\beta$ ] Leonis), the star that marks the tail of Leo the Lion. And although Denebola, at magnitude 2.1, is the sky's 59th-brightest star, it's only 36% as bright as Spica, and it emits just 14% the light output of Arcturus.

OBJECT #319	NGC 4833
Constellation	Musca
Right ascension	13h00m
Declination	$-70^{\circ}53'$
Magnitude	7.8
Size	13.5'
Type	Globular cluster
Other name	Caldwell 105

You'll find our next treat  $0.7^{\circ}$  north-northwest of magnitude 3.6 Delta ( $\delta$ ) Muscae. NGC 4833 is easy to spot through binoculars or a finder scope. This is about as loosely concentrated a globular cluster as you can see. Because of this feature, you'll see about 30 of its outer stars randomly strewn across the field of view through an 8-inch telescope at 200 $\times$ . The central area appears more concentrated and oval, elongated east-west.

OBJECT #320	Abell 1656
Constellation	Coma Berenices
Right ascension	13h00m
Declination	$27^{\circ}59'$
Size	319'
Type	Galaxy cluster
Other name	The Coma Galaxy Cluster

Our next target is for those of you with large telescopes. It's the Coma Galaxy Cluster, also designated Abell 1656. You'll find this group  $2.7^{\circ}$  due west of magnitude 4.2 Beta ( $\beta$ ) Comae Berenices.

For those of you using go-to drives, “Abell 1656” may not be in your database. Instead, target either of this cluster’s brightest galaxies, magnitude 11.9 NGC 4874 or magnitude 11.5 NGC 4889.

Abell 1656 spans a whopping  $4^\circ$ . Within that neighborhood, hundreds of member galaxies lie in range of a large amateur telescope. The Coma Galaxy Cluster’s richest region, however, is the center, which measures  $0.5^\circ$  across and covers the same area as the Full Moon.

Even through a large scope, you won’t pull out much detail from individual members. The exceptions are magnitude 12.8 NGC 4911 and magnitude 12.5 NGC 4921. Both are spirals and respond well to magnification above  $300\times$ .

But, perhaps the main point of viewing the Coma Galaxy Cluster is just to see it. After all, this is a group of nearly 1,000 galaxies that lies more than 300 million light-years away.

OBJECT #321	NGC 4889
Constellation	Coma Berenices
Right ascension	13h00m
Declination	$27^\circ 59'$
Magnitude	11.5
Size	2.8' by 2'
Type	Elliptical galaxy
Other name	Caldwell 35

Look for our next target  $2.6^\circ$  west of magnitude 4.3 Beta ( $\beta$ ) Comae Berenices. A small telescope shows an oval glow 50% longer than it is wide, oriented northwest to southeast. Within the glow lies a slightly brighter central region. Don’t be distracted by the magnitude 7.2 star SAO 82595, which lies only  $9'$  to the northwest.

Larger telescopes really don’t reveal much more detail in NGC 4889. However, the larger your scope, the more faint smudges — each one a system of billions of stars — you’ll see in this incredible area of sky.

OBJECT #322	NGC 4945
Constellation	Centaurus
Right ascension	13h05m
Declination	$-49^\circ 28'$
Magnitude	8.8
Size	23.0' by 5.9'
Type	Barred spiral galaxy
Other name	Caldwell 83

This treat sits only  $0.3^\circ$  east of magnitude 4.8 Xi<sup>1</sup> ( $\xi^1$ ) Centauri. This is a huge, bright, nearly edge-on galaxy oriented northeast to southwest that looks great through any size telescope. The galaxy shows even illumination across its surface except at its ends. The northeastern one glows brighter. Through a 12-inch or larger scope at  $300\times$ , look for a dark indentation near the northeastern end. Our next object (NGC 4976) lies  $0.5^\circ$  east. A fainter galaxy, magnitude 12.5 NGC 4945A, sits  $0.3^\circ$  southeast of NGC 4945.

OBJECT #323	NGC 4976
Constellation	Centaurus
Right ascension	13h09m
Declination	$-49^\circ 30'$
Magnitude	10.1
Size	5.6' by 3'
Type	Elliptical galaxy

Our next target lies  $0.5^\circ$  east of NGC 4945 (Object #322). Through a 6-inch telescope, you'll see an evenly illuminated oval 50% longer than it is wide oriented north-northwest to south-southeast. A larger scope may differentiate the thin outer halo from the central region, but that's about it.



**Object #324** NGC 5005 Ray and Emily Magnani/Adam Block/NOAO/AURA/NSF

OBJECT #324	NGC 5005
Constellation	Canes Venatici
Right ascension	13h11m
Declination	37°03'
Magnitude	9.8
Size	5.8' by 2.8'
Type	Spiral galaxy
Other name	Caldwell 29

You'll find our next treat 3 east-southeast of magnitude 2.8 Cor Caroli (Alpha [ $\alpha$ ] Canum Venaticorum). Through an 8-inch telescope, you'll pick out the bright stellar core surrounded by a fainter oval disk. A 16-inch scope at 300 $\times$  still won't fully resolve the tightly wound spiral arms, but it will let you see the uneven brightness that marks the positions of immense dust lanes.

OBJECT #325	M53 (NGC 5024)
Constellation	Coma Berenices
Right ascension	13h13m
Declination	18°10'
Magnitude	7.7
Size	12.6'
Type	Globular cluster

This nice small telescope target is globular cluster M53 in Coma Berenices. To find it, look a little less than 1° northeast of Coma Berenices' brightest star. That's magnitude 4.3 Diadem (Alpha [ $\alpha$ ] Comae Berenices).

M53 sits 60,000 light-years from both the Sun and the Milky Way's center. It lies in our galaxy's halo region. Through a 4-inch scope under a dark sky, you'll see several dozen faint stars.

Many stars concentrate in the wide core of this cluster. Few field stars lie around M53, so you'll have no trouble defining where the cluster's stars end.

OBJECT #326	NGC 5033
Constellation	Canes Venatici
Right ascension	13h13m
Declination	36°36'
Magnitude	10.2
Size	10.5' by 5.1'
Type	Spiral galaxy

Our next target lies 1.7° east-northeast of magnitude 5.2 star 14 Canum Venaticorum. It appears twice as long as it is wide and elongated north-northwest to south-southeast. The broad bright central region overwhelms the faint spiral structure through anything less than a 14-inch telescope. Through large scopes at 350 $\times$  and above, you'll detect the faint spiral arms that wrap loosely around the inner glow. They show up best just to the east and west of the galaxy's center.



**Object #327** The Sunflower Galaxy (M63) Adam Block/Mount Lemmon SkyCenter/University of Arizona

OBJECT #327	M63 (NGC 5055)
Constellation	Canes Venatici
Right ascension	13h16m
Declination	42°02'
Magnitude	8.6
Size	13.5' by 8.3'
Type	Spiral galaxy
Other name	The Sunflower Galaxy

As spring begins to take hold in the Northern Hemisphere, the Sunflower Galaxy blooms near the Big Dipper. Target it, and images of summertime fields will dance through your head.

Pierre Méchain discovered this galaxy June 14, 1779. It marked the first of his deep-sky finds. He reported it to his friend Messier, who immediately included it in his catalog.

M63 lies 5.7° from the Whirlpool Galaxy (M51), and both of these objects belong to the M51 galaxy group. NGC 5195 (the Whirlpool Galaxy's companion) plus five galaxies fainter than magnitude 12.3 round out the collection.

M63 reveals a wealth of detail to a careful observer. Through small telescopes, the nucleus appears stellar, and a 3' long oval halo surrounds it. Through a 10-inch telescope, the halo shows clumpy structure formed by stellar associations and star-forming regions within M63's spiral arms.

Outside the central region, the arms fade with increasing distance from the nucleus. Through even large amateur telescopes, you'll only see hints of the many spiral arms that radiate outward. Astronomers refer to M63 and similar galaxies as "flocculent" spirals — those having only patchy, localized spiral structure.

OBJECT #328	NGC 5053
Constellation	Coma Berenices
Right ascension	13h16m
Declination	17°42'
Magnitude	9.9
Size	10.5'
Type	Globular cluster

In the same low-power telescopic field as M53 (Object #325), you'll find one of the Milky Way's least concentrated globular clusters, NGC 5053. Its brightest stars barely top magnitude 14, so, although you can spot the cluster through a small scope, you'll need an 8-inch telescope to resolve its stars as individual points. This unusual globular looks like an open cluster. It has only a few dozen widely spaced stars strewn across its width. Look closely and see if you can pick out its roughly triangular shape.

OBJECT #329	NGC 5068
Constellation	Virgo
Right ascension	13h19m
Declination	-21°02'
Magnitude	9.8
Size	7.3' by 6.4'
Type	Spiral galaxy

Our next target lies 2.1° due north of magnitude 3.0 Gamma ( $\gamma$ ) Hydrae. Through a 10-inch telescope it appears irregularly round. The southern half slightly outshines the northern section. Through telescopes with 18-inch apertures or more, this object resolves to a superb face-on spiral with many bright knots within the halo that surrounds the extended central region.

Two other galaxies worthy of your time lie nearby. Magnitude 11.4 NGC 5087 lies 0.5° northeast, while magnitude 10.5 NGC 5084 sits 0.8° to the south-southeast. Both are spirals.

OBJECT #330	NGC 5102
Constellation	Centaurus
Right ascension	13h22m
Declination	-36°38'
Magnitude	8.8
Size	9.8' by 4.0'
Type	Spiral galaxy
Other name	Iota's Ghost

This object sits only 0.3° east-northeast of magnitude 2.8 Iota ( $\iota$ ) Centauri. NGC 5102 appears relatively bright because it lies less than 11 million light-years away. Unfortunately, that distance also means the light from this galaxy spreads out quite a bit, so it doesn't show as many details as other similarly sized objects. Through an 8-inch telescope, look for a bright central region surrounded by a large oval halo twice as long as it is wide. Oh, and you'll get your best views if you move bright Iota Centauri out of the field of view.

OBJECT #331	Zeta ( $\zeta$ ) Ursae Majoris
Constellation	Ursa Major
Right ascension	13h24m
Declination	54°56'

(continued)

Magnitudes	2.4/4.0
Separation	12'/14.4''
Type	Double star
Other name	Mizar + Alcor

At the bend of the Big Dipper's handle, you'll find Mizar (Zeta [ $\zeta$ ] Ursae Majoris) and Alcor (80 Ursae Majoris). The two stars are separated by 12', an easy split for most observers just using their naked eyes.

Telescopically, Mizar itself splits into two components separated by 14''. Mizar's companion shines at magnitude 4.0. This was the first star astronomers telescopically identified as a double. Italian astronomer Giovanni Battista Riccioli (1598–1671) made this discovery at Bologna in 1650.

Originally, Zeta carried the name “Merak” (or, “Mirak”), which repeated the common name for Merak (Beta [ $\beta$ ] Ursae Majoris). Merak means “the loin.” Joseph Justus Scalinger (1540–1609) changed the name to Mizar.

OBJECT #332	NGC 5128
Constellation	Centaurus
Right ascension	13h26m
Declination	-43°01'
Magnitude	6.7
Size	31.0' by 23.0'
Type	Irregular galaxy
Other names	Centaurus A, the Hamburger Galaxy, Caldwell 77

Seeing Centaurus A high in the sky is one of the thrills of Southern Hemisphere observing. Observers call it the Hamburger Galaxy because two stellar regions (the bun) surround a dark dusty lane (the burger). Unfortunately, most northern viewers get only a taste of this object's details. For example, from Tucson, Arizona, NGC 5128 climbs to a maximum altitude of 15°. Viewing any object through that much of Earth's atmosphere presents a distorted view. For best results, head farther south.

Australian astronomer James Dunlop (1793–1848) discovered NGC 5128 and published the observation within a list of 629 objects titled “A catalogue of nebulae and clusters of stars in the southern hemisphere, observed at Parramatta in New South Wales,” which appeared in the *Philosophical Transactions of the Royal Society*, Volume 118, 1828.

NGC 5128's appearance arises from a galactic collision. The main body of Centaurus A — a giant elliptical galaxy — is absorbing a smaller spiral galaxy. The two objects collided more than 200 million years ago, causing huge bouts of star formation.

Through small telescopes, NGC 5128 appears round with a wide, dark lane cutting the galaxy in half. Use a 12-inch or larger scope, and you'll see a thin wedge of light shining through the lane's western end. That lane widens on both ends.



**Object #333** Omega Centauri (NGC 5139) Adam Block/NOAO/AURA/NSF

OBJECT #333	NGC 5139
Constellation	Centaurus
Right ascension	13h27m
Declination	-47°29'
Magnitude	3.5
Size	36.3'
Type	Globular cluster
Other names	Omega Centauri, Caldwell 80

Centaurus contains the nearest star system to our own, the spectacular double star Alpha ( $\alpha$ ) Centauri and notable galaxies like Centaurus A. For amateur astronomers, however, the biggest draw to this constellation is the sky's top globular cluster — Omega Centauri.

NGC 5139 does not have the common name “Omega” because of its shape, as in the case of the Omega Nebula (M17). Rather, it appeared as a “star” labeled with the Greek letter Omega ( $\omega$ ) on German cartographer Johann Bayer’s 1603 star atlas *Uranometria*. Bayer labeled stars with Greek letters to designate their brightnesses within constellations. Because Bayer interpreted a historical listing of NGC 5139 as a star, he assigned it Omega.

Omega Centauri is a wonder to behold through binoculars or telescopes of any size. The cluster appears slightly larger than the Full Moon, and, because it’s rotating relatively quickly, its shape is slightly out-of-round. Through an 8-inch telescope, you’ll see 1,000 stars, each a pinprick of light. At high power, the stars appear nearly uniformly distributed across the field of view. Through scopes with apertures larger than 16 inches, crank up the magnification, and look for individual red supergiants within this cluster.





**Object #334** The Whirlpool Galaxy (M51) Jon and Bryan Rolfe/Adam Block/NOAO/AURA/NSF

OBJECT #334	M51 (NGC 5194)
Constellation	Canes Venatici
Right ascension	13h30m
Declination	47°12'
Magnitude	8.4
Size	8.2' by 6.9'
Type	Spiral galaxy
Other names	The Whirlpool Galaxy, Lord Rosse's Nebula, the Question Mark

Even in a publication of the 1,000 best celestial wonders, the Whirlpool Galaxy stands out. It won't disappoint you when you view it through a small telescope; see it through a big scope, however, and it will knock your socks off. It lies  $3.6^\circ$  southwest of magnitude 1.9 Alkaid (Eta [ $\eta$ ] Ursae Majoris).

Messier discovered the object that would become his catalog's 51st entry while observing a comet October 13, 1773. Méchain discovered the Whirlpool's smaller companion, NGC 5195, March 21, 1781. This object's spiral structure first revealed itself through William Parsons' (The Third Earl of Rosse) 6-foot reflector at Parsonstown, Ireland, in 1845.

NGC 5195 lies some distance behind the plane of M51's disk. Although photographs appear to show a connecting arm between the two galaxies, this is an illusion. Computer models indicate NGC 5195 passed close to the Whirlpool's disk some 70 million years ago and then plunged through its plane.

You'll see M51's spiral arms through 8-inch or larger telescopes. Through a 12-inch scope, they appear patchy with much greater detail. Look for the thin, dark dust lanes that follow the arms' inner edges. Also, try to spot the apparent connecting arm between M51 and NGC 5195. Although M51 is larger, NGC 5195's core appears brighter.

OBJECT #335	NGC 5189
Constellation	Musca
Right ascension	13h34m

(continued)

Declination	-65° 59'
Magnitude	9.9
Size	153"
Type	Planetary nebula
Other name	The Spiral Planetary Nebula

Our next target lies 2.7° east-southeast of magnitude 5.7 Theta ( $\theta$ ) Muscae. NGC 5189 is a planetary nebula that shows five sets of “ansae.” This Latin term for “handles” describes small nodules emanating out from the central star. In fact, so many observers’ initial impressions are of a spiral galaxy that this object earned the moniker the “Spiral Planetary Nebula.”

Many observers have noted the resemblance of NGC 5189 to a barred spiral galaxy. A thin, bright bar traverses the planetary and surrounds its 13th-magnitude central star. Through a 12-inch telescope at 300 $\times$ , you’ll see a nebulous arm wrapping to the north from the west end of the bar and curling around the magnitude 11.0 star GSC 9003:1874. To spot the southern arm, you’ll need at least a 20-inch scope.



**Object #336** The Southern Pinwheel Galaxy (M83) Allan Cook/Adam Block/NOAO/AURA/NSF

OBJECT #336	M83 (NGC 5236)
Constellation	Hydra
Right ascension	13h37m
Declination	-29° 52'
Magnitude	7.5
Size	15.5' by 13.0'
Type	Spiral galaxy
Other name	The Southern Whirlpool Galaxy

Dubbing a galaxy the “Southern Whirlpool” puts a lot of pressure on it to perform visually. For M83, that’s no problem. Some observers rate this galaxy the finest barred spiral visible to northern observers.

Lacaille discovered M83 February 23, 1752. It was the third galaxy discovered. Only the Andromeda Galaxy (M31) and its companion M32 preceded it. Messier added it to his catalog March 18, 1781. You can find it  $7.2^\circ$  west-southwest of magnitude 3.3 Pi ( $\pi$ ) Hydrae.

M83 is one of the brightest members of a collection of some 14 galaxies called the M83 group. The other notable object in this group is Centaurus A.

The Southern Whirlpool Galaxy appears nearly face-on, so you’ll see its spiral structure through telescopes with apertures as small as 6 inches. The core is small and round, and the bar extends to the northeast and southwest. Both spiral arms are easy to see, but the one that wraps southward from the bar’s northeastern end shows up better. Through 12-inch and larger scopes, you’ll see large clumps of stars and star-forming regions along the arms.

OBJECT #337	NGC 5247
Constellation	Virgo
Right ascension	13h38m
Declination	$-17^\circ 53'$
Magnitude	9.9
Size	5.4' by 4.9'
Type	Spiral galaxy

Look for our next object  $6.9^\circ$  northeast of magnitude 3.0 Gamma ( $\gamma$ ) Hydrae. Although images of this galaxy show wonderfully arcing spiral arms curving around the nucleus, they’re too faint to see through most amateur telescopes. Through smaller scopes at magnifications above  $200\times$ , you’ll see a bright central region surrounded by a slightly oval haze that orients northeast to southwest.

OBJECT #338	The Kite
Constellation	Boötes
Right ascension	14h40m
Declination	$29^\circ 15'$
Type	Asterism

Our next object is a northern-sky springtime asterism many amateur astronomers call the Kite. Now, while many people see a kite in this part of the sky, I see an ice cream cone. (You can form either pattern from the same stars.) The cone is made of six stars in the constellation Boötes the Herdsman. Let’s start with the easiest to find — Arcturus (Alpha [ $\alpha$ ] Boötis) — the night sky’s fourth-brightest star.

Finding Arcturus is easy. First find the Big Dipper. Then follow the curve of the Dipper’s handle until you encounter a bright orange star. That’s Arcturus, and it’s the bottom of the ice cream cone.

The thin sugar-cone tips slightly to the north-northeast, so from Arcturus, head up to Epsilon ( $\epsilon$ ) and Delta ( $\delta$ ) Boötis to make the cone’s left side, and Rho ( $\rho$ ) and Gamma ( $\gamma$ ) Boötis for the right. Beta ( $\beta$ ) Boötis marks the top of the scoop of ice cream.

This used to be a two-scoop cone. Boötes, however, lies near its highest point in the sky during the hottest days of summer. So, sometime long ago, the second scoop melted, slipped off, and now lies just to the east of the cone — as the constellation Corona Borealis.



**Object #339** NGC 5248 Dale Niksch/Adam Block/NOAO/AURA/NSF

OBJECT #339	NGC 5248
Constellation	Boötes
Right ascension	13h38m
Declination	8° 53'

(continued)

Magnitude	10.3
Size	6.2' by 4.6'
Type	Spiral galaxy
Other name	Caldwell 45

Deep in Boötes' southwestern corner lies that constellation's brightest galaxy, NGC 5248. It lies in a relatively barren region of sky  $8.9^\circ$  east-southeast of magnitude 2.9 Vindemiatrix (Epsilon [ $\epsilon$ ] Virginis).

Even through a small telescope, you'll notice the bright core. Through a 10-inch or larger scope at magnifications above  $200\times$ , you can pick out the short spiral arms. Each contains a much brighter region of star formation that appears as a curved line.

Through a 14-inch instrument, look for two 15th-magnitude satellite galaxies of NGC 5248. UGC 8575 sits  $0.5^\circ$  west of the main object, and UGC 8629 lies  $0.5^\circ$  to the southeast.

OBJECT #340	MyCn 18
Constellation	Musca
Right ascension	13h40m
Declination	$-67^\circ 23'$
Magnitude	12.9
Size	25"
Type	Planetary nebula
Other name	The Hourglass Nebula

Admittedly, our next object is a faint one. You'll need at least a 16-inch telescope and a magnification above  $400\times$  to see much detail in it, but this object is worth the hunt if you're in the Southern Hemisphere. Look for the Hourglass Nebula (sometimes called the Engraved Hourglass Nebula)  $2.4^\circ$  east of magnitude 4.8 Eta ( $\eta$ ) Muscae. Oh, and while you can look for it by name, don't expect to see an hourglass. That moniker only came about after the Hubble Space Telescope imaged MyCn 18.

Visually, this object appears as two ultra-faint smoke rings just beginning to merge. The merger point appears brightest, but it's also tiny.

The designation "MyCn" comes from Margaret W. Mayall (1902–1996) and Annie Jump Cannon (1863–1941), of whose list of 39 emission-line objects the Hourglass Nebula is number 18. They discovered MyCn 18 in 1940.

OBJECT #341	NGC 5253
Constellation	Centaurus
Right ascension	13h40m
Declination	$-31^\circ 39'$
Magnitude	10.2
Size	5.1' by 1.3'
Type	Irregular galaxy

You'll find our next target  $7.3^\circ$  northwest of magnitude 2.1 Menkent (Theta [ $\theta$ ] Centauri). Alternatively, you can locate it by first finding M83. From that bright object, move  $1.9^\circ$  south-southeast. This peculiar dwarf galaxy lies nearby (11 million light-years), but you won't see many details.

Astronomers believe NGC 5253 may have been a dwarf elliptical galaxy until an ancient encounter with M83. Through an 8-inch telescope, a bright central region dominates the view. A 12-inch scope reveals several tiny, bright knots with the brightest at the northeastern end.



**Object #342** M3 Bill Uminski and Cyndi Kristopeit/Adam Block/NOAO/AURA/NSF

OBJECT #342	M3 (NGC 5272)
Constellation	Canes Venatici
Right ascension	13h42m
Declination	28°23'
Magnitude	6.2
Size	16.2'
Type	Globular cluster

This terrific small telescope target is a springtime globular cluster. To find M3, start at the brilliant star Arcturus (Alpha [α] Boötis). Draw a line 25° long up to the northwest until you hit Cor Caroli (Alpha Canum Venaticorum).

M3 lies near the midpoint of this line. No other bright deep-sky object lies nearby, so you'll have no trouble zeroing in on M3. And, here's a test for you sharp-eyed observers: Try to spot M3 without optical aid from a dark site. At magnitude 6.2, it's a tough naked-eye catch, but many observers have seen it, so it's not impossible.

M3 looks great even through a 4-inch telescope. The cluster has a wide, bright center that accounts for about half of this object's width. Surrounding the center are dozens of stars whose density gradually decreases with their distance from M3's core.

Start with a magnification around 100× and increase the power if the steadiness of the air warrants it. M3 isn't small — its overall size is half that of the Full Moon — but it is dense. Through ever-larger scopes, you'll resolve more and more stars in this amazing cluster.

I like Admiral William H. Smyth's description of M3 from his 1844 observing classic, *Cycle of Celestial Objects*. He writes, "A brilliant and beautiful globular congregation of not less than 1,000 small stars, between the southern Hound and the knee of Boötes; it blazes splendidly towards the centre, and has outliers in all directions, except the *sf* [south following], where it is so compressed that, with its stragglers, it has something of the figure of the luminous oceanic creature called *Medusa pellucens*."

OBJECT #343	NGC 5286
Constellation	Centaurus
Right ascension	13h46m
Declination	-51°22'
Magnitude	7.2
Size	9.1'
Type	Globular cluster
Other name	Caldwell 84

Our next target lies 2.3° north-northeast of magnitude 2.3 Epsilon ( $\epsilon$ ) Centauri. In addition to the globular cluster, you'll also immediately see the brilliant foreground star SAO 241157, also known as M Centauri, which lies 4' from the cluster's center. Despite the pairing, the star has nothing to do with the cluster, which lies 200 times as far away.

NGC 5286 contains many stars, but its brightest shine at magnitude 13.5, so you'll have trouble resolving it through telescopes with apertures less than about 14 inches. The central region appears concentrated, but the outer stars are difficult to see because of the brightness of M Centauri.

OBJECT #344	NGC 5281
Constellation	Centaurus
Right ascension	13h47m
Declination	-62°54'
Magnitude	5.9
Size	5'
Type	Open cluster
Other name	The Little Scorpion Cluster

This bright cluster lies 3.3° southwest of magnitude 0.6 Hadar (Beta [ $\beta$ ] Centauri). A 4-inch telescope at 100 $\times$  reveals three dozen stars in a tiny area. The cluster's brightest member is magnitude 6.6 SAO 252442, which lies just north of center. This star forms the top of a slightly curving line of a half dozen points that arcs gently toward the southwest.

*Astronomy* magazine Contributing Editor Stephen James O'Meara christened this cluster the Little Scorpion because he saw that animal patterned in its stars, complete with claws and a raised tail.

OBJECT #345	NGC 5308
Constellation	Ursa Major
Right ascension	13h47m
Declination	60°58'
Magnitude	11.4
Size	3.7' by 0.7'
Type	Spiral galaxy

For our next target, look 3.9° south-southwest of magnitude 3.7 Thuban (Alpha [ $\alpha$ ] Draconis). At magnifications under about 200 $\times$ , this galaxy looks like a luminous splinter. Cranking the power up thickens its appearance and reveals a slightly fatter nucleus. Through a 12-inch telescope, observers have reported a dark lane. Using a 30-inch Newtonian reflector, I saw a slightly more luminous "line" extending a bit from the nucleus in both directions along NGC 5308's long axis.

OBJECT #346	NGC 5322
Constellation	Ursa Major
Right ascension	13h49m
Declination	60°11'

(continued)	
Magnitude	10.1
Size	6' by 4.1'
Type	Elliptical galaxy

The next object lies  $4.5^\circ$  south-southwest of magnitude 3.7 Thuban (Alpha [ $\alpha$ ] Draconis). Through an 8-inch telescope, you'll see an east-west oriented oval half again as long as it is wide. The central region is bright and wide, and a thin halo you'll need high magnification to see surrounds it.

OBJECT #347	NGC 5350
Constellation	Canes Venatici
Right ascension	13h53m
Declination	$40^\circ 22'$
Magnitude	11.3
Size	3.1' by 2.5'
Type	Barred spiral galaxy

Toward the eastern edge of Canes Venatici lies the NGC 5353 galaxy group, also known as Hickson 68. NGC 5350 is its largest member. Find it  $7.8^\circ$  west-northwest of Seginus (Gamma [ $\gamma$ ] Boötis).

Through a 12-inch telescope at  $300\times$ , you'll note that NGC 5350 has a subtle bar that traverses the center from east to west.

An interacting pair of galaxies, magnitude 11.1 NGC 5353 and magnitude 11.5 NGC 5354, lie  $4'$  south-southwest of NGC 5350. NGC 5353 measures  $2.2'$  by  $1.1'$ , while NGC 5354 spans  $1.4'$ . These three galaxies join with magnitude 13.0 NGC 5355 and magnitude 13.7 NGC 5358 to form this compact galaxy group. The magnitude 6.5 star HIP 67778 lies  $3'$  west-southwest of NGC 5350.

OBJECT #348	NGC 5316
Constellation	Centaurus
Right ascension	13h54m
Declination	$-61^\circ 52'$
Magnitude	6.0
Size	$13'$
Type	Open cluster

Our next target lies  $1.9^\circ$  southwest of magnitude 0.6 Hadar (Beta [ $\beta$ ] Centauri). Now, at 6th magnitude, this cluster should be visible to observers at a dark site. That's a bit problematic because of the rich Milky Way star field it lies in.

Through a 4-inch telescope at  $150\times$ , you'll see three dozen 9th- and 10th-magnitude stars. A 10-inch scope at the same magnification brings into view a second tier of fainter stars, raising the total number past 50.

OBJECT #349	NGC 5315
Constellation	Circinus
Right ascension	13h54m
Declination	$-66^\circ 31'$
Magnitude	9.8
Size	$5''$
Type	Planetary nebula

To find this tiny but bright nebula, look  $5.2^\circ$  west-southwest of magnitude 3.2 Alpha ( $\alpha$ ) Circini. Through a 12-inch scope it has a faint bluish color and begins to show a disk at magnifications above  $200\times$ . A nebula filter such as an OIII will really help. The central star isn't all that tough to see. It glows at magnitude 14.2.



OBJECT #350	NGC 5367
Constellation	Centaurus
Right ascension	13h58m
Declination	-39°59'
Size	2.5' by 2.5'
Type	Reflection nebula

Our next object lies 2° northwest of magnitude 4.4 Chi ( $\chi$ ) Centauri. Through a 10-inch telescope, an evenly illuminated haze 3' across surrounds an associated star that shines at magnitude 9.8. To the northeast lies a detached region 2' across. Don't use a nebula filter on this object because the nebula is reflected starlight, which comprises all wavelengths.



**Object #351** M101 Adam Block/Mount Lemmon SkyCenter/University of Arizona

OBJECT #351	M101 (NGC 5457)
Constellation	Ursa Major
Right ascension	14h03m
Declination	54°21'
Magnitude	7.9
Size	26.0' by 26.0'
Type	Spiral galaxy

Only one thing prevents spiral galaxy M101 from making every observer's top ten list — its surface brightness. Covering slightly more area than the Full Moon, M101's light spreads out so much that only large amateur telescopes (those 12 inches and larger in aperture) do it justice.

M101 still represents one of the sky's "grand design" spiral galaxies — one with prominent and clearly defined spiral arms. Usually, the arms mostly or completely surround such galaxies. Only about 10% of all spiral galaxies fall into the grand design category.

From a dark site through a large telescope, look for M101's multiple spiral arms. The core is concentrated but broad, not starlike. Many star-forming regions and stellar associations lie along the spiral arms. In fact, at least five (NGC 5447, NGC 5455, NGC 5461, NGC 5462, and NGC 5471) are bright enough to have their own NGC numbers. Of these, NGC 5447 is the most prominent. Find it 6' southwest of M101's core. Several other objects within M101 once carried similar designations, but astronomers no longer recognize them. Use a nebula filter to tell the difference between star-forming regions and associations. The filter will dim the stars within the associations, but not the nebular gas of the star-forming regions.

To get a rough idea of the position of M101, make an equilateral triangle with the end two stars of the Big Dipper's handle. Alternatively, it lies  $1.5^\circ$  east-northeast of the magnitude 5.7 star 86 Ursae Majoris.

M101 is one of the most beautiful face-on spirals in the sky. From a dark site, a 12-inch telescope will show its multiple spiral arms surrounding a non-stellar core.

Through a 16-inch or larger telescope, use a nebula filter to cut down the brightness of stars within M101. This technique will help you see the glowing hydrogen clouds better.

Of M101, Smyth, writing in *Cycle of Celestial Objects* (1844), said, "It is one of those globular nebulae that seem to be caused by a vast agglomeration of stars, rather than by a mass of diffused luminous matter; and though the idea of too dense a crowd may intrude, yet the paleness tells of its inconceivable distance, and probable discreteness."

OBJECT #352	IC 972
Constellation	Virgo
Right ascension	14h04m
Declination	$-17^\circ 15'$
Magnitude	13.9
Size	43'
Type	Planetary nebula
Other name	Abell 37

At nearly 14th magnitude, you might be inclined to pass IC 972 by for less difficult targets. That's fine if you're viewing through a 4-inch scope, but if you have a 10-inch or larger instrument, have a look at the faint outer layers of a once Sun-like star. Because of its small size, IC 972 has a reasonable surface brightness. Better known as Abell 37, this object appears uniformly illuminated with a sharp edge.

OBJECT #353	NGC 5466
Constellation	Boötes
Right ascension	14h06m
Declination	$28^\circ 32'$
Magnitude	9.0
Size	11.0'
Type	Globular cluster

This object sits roughly  $5^\circ$  due east of the magnificent globular M3. NGC 5466 shines 3 magnitudes fainter than M3, but it's definitely worth a look. This object is one of the least-dense globulars you can observe.

Through a 12-inch telescope at  $150\times$ , you'll resolve two dozen stars, but be aware: they're faint. NGC 5466's individual stars glow at 14th magnitude. The star SAO 83172 lies in the same field of view as the globular. It appears bright compared to NGC 5466. The star sits 20' east-southeast of the cluster and shines at magnitude 6.9.

OBJECT #354	Circinus Galaxy
Constellation	Circinus
Right ascension	14h13m
Declination	-65°20'
Magnitude	10.1
Size	8.7' by 2.8'
Type	Spiral galaxy

Our next target, while not a telescopically fascinating object, is well worth a look. You'll find it 3.1° west of magnitude 4.2 Alpha ( $\alpha$ ) Circini. This Seyfert galaxy wasn't discovered until 1977 because it lies only 4° from the Milky Way's plane, which really dims the light of distant galaxies.

With a diameter of more than 300,000 light-years, the galaxy is enormous. Interestingly, it is also isolated. The Circinus Galaxy is not a member of the Local Group or any nearby galaxy group, nor does it have any known companions.

Through a 12-inch telescope at 100 $\times$ , it shows a medium-bright core surrounded by a faint halo. It appears nearly three times as long as it is wide. Also, please note that the listed brightnesses for this object vary by as much as 2 magnitudes.

OBJECT #355	Kappa ( $\kappa$ ) Boötis
Constellation	Boötes
Right ascension	14h16m
Declination	51°47'
Magnitudes	4.6/6.6
Separation	13.4"
Type	Double star

The components are blue-white and white, or blue and white, depending on whose eyes you believe. You'll find this nice pair 1.8° west of magnitude 4.0 Theta ( $\theta$ ) Boötis.

OBJECT #356	NGC 5523
Constellation	Boötes
Right ascension	14h15m
Declination	25°19'
Magnitude	12.1
Size	4.3' by 1.3'
Type	Spiral galaxy

Find this galaxy 1° east of the magnitude 4.8 star 12 Boötis. This disk-shaped object looks best through 12-inch and larger telescopes, although, even through scopes twice that large, you won't see much detail.

What you may notice is a slightly brighter, oval-shaped central region surrounded by a tiny bit of haze. Only 2' to the northwest, you'll find GSC 2010:1226, a magnitude 10.8 star.



**Object #357** NGC 5529 Bill and Sean Kelly/Adam Block/NOAO/AURA/NSF

OBJECT #357	NGC 5529
Constellation	Boötes
Right ascension	14h16m
Declination	36°13'
Magnitude	11.9
Size	5.7' by 0.7'
Type	Spiral galaxy

If you're like me and appreciate galaxies that look like lines drawn on the sky, don't miss NGC 5529. Look for it 3.9° west-southwest of magnitude 3.0 Seginus (Gamma [γ] Boötis).

Through an 8-inch telescope, you'll see a galaxy half a dozen times as long as it is wide. Only at the highest magnifications (and on the finest nights) will you detect the ever-so-slight central bulge.

Only 5' off NGC 5529's south-southeastern tip lies magnitude 10.9 GSC 2552:903. The galaxy's long dimension points the way to this star.

OBJECT #358	Iota (ι) Boötis
Constellation	Boötes
Right ascension	14h16m
Declination	51°22'
Magnitudes	4.9/7.5
Separation	38'
Type	Double star

Iota Boötis is an easy split through any telescope. The primary is yellow-white and the secondary glows white.

OBJECT #359	IC 4406
Constellation	Lupus
Right ascension	14h22m
Declination	-44°09'
Magnitude	10.2
Size	106''
Type	Planetary nebula
Other name	The Retina Nebula

As planetary nebulae go, the Retina Nebula is relatively bright although it measures more than 1.5' across. What makes it obscure for northern observers is its location. It lies at a declination of  $-44^\circ$ . My rule of thumb is that if you can see Omega Centauri (NGC 5139) from your observing site, you stand a good chance of picking up IC 4406, which lies  $3^\circ$  farther north.

IC 4406 sits a bit more than  $3^\circ$  southwest of magnitude 2.3 Eta ( $\eta$ ) Centauri. Through an 8-inch telescope equipped with an OIII filter, first study the overall appearance of this object to see the "inner eye" that makes it the Retina Nebula. The "top" and "bottom" of this planetary orient east to west and appear remarkably straight. The northern edge is brighter than the southern one. At high powers, you'll see that the central region has indentations, lending the whole object the appearance of another dumbbell-shaped nebula.