October

OBJECT #754	NGC 103
Constellation	Cassiopeia
Right ascension	0h25m
Declination	61°19′
Magnitude	9.8
Size	5′
Type	Open cluster

The easiest way to find our next target is to first locate magnitude 4.2 Kappa (κ) Cassiopeiae. Then move 1.5° southwest to the star 12 Cas. From there, drop south 0.5°.

Through an 8-inch telescope, you'll spot about three dozen stars in a tight pattern. A magnification around 50× will set this object in a nice star field. Triple the power, and look for arcs and hooks made by the cluster's stars. Some observers have detected the Greek letter Psi (Ψ) formed by stars in the center of NGC 103. Don't get it confused with the Psi Cassiopeiae Cluster (NGC 457), however.

OBJECT #755	NGC 104
Constellation	Tucana
Right ascension	0h24m
Declination	–72°05′
Magnitude	3.8
Size	50′
Type	Globular cluster
Other names	47 Tucanae, Caldwell 106

M.E. Bakich, *1,001 Celestial Wonders to See Before You Die*, Patrick Moore's Practical Astronomy Series,
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One of the sky's greatest celestial pairings occurs in the far Southern Hemisphere sky, where 47 Tucanae and the Small Magellanic Cloud align. Among globular clusters, only Omega Centauri (NGC 5139) outshines NGC 104, and only Omega appears larger.

French astronomer Abbe Nicholas Louis de Lacaille discovered the deep-sky nature of NGC 104 and cataloged it in 1751. Before then, this globular cluster carried the stellar designation bestowed on it by German astronomer Johann Elert Bode who extended John Flamsteed's catalog to the Southern Hemisphere. He continued to number all bright stars within constellations and called this object 47 Tucanae.

To the naked eye, NGC 104 appears as a fuzzy "star." A 3-inch telescope will begin to resolve this cluster's stars, but they really put on a show when you use an 8-inch or larger scope. Through such instruments, the cluster is a ball of stars you can resolve nearly to the core. The 2′-wide core spikes in brightness because of thousands of unresolved stars. Be sure to note the many streams of stars that emanate from a region 6′ in diameter.

Most observers consider 47 Tucanae the sky's most impressive globular cluster. The reason involves its stars' evolutionary stage. You can resolve a globular cluster well when your telescope lets you see the cluster's horizontal branch stars. In a globular cluster, where all stars formed at the same time, the number of stars of a given magnitude takes a sudden leap at a point astronomers refer to as the horizontal branch. That's the stage in a star's life right after its red-giant stage. Globular 47 Tucanae's horizontal-branch magnitude, around 13, makes it easy to resolve.

OBJECT #756	NGC 129
Constellation	Cassiopeia
Right ascension	0h30m
Declination	60°13′
Magnitude	6.5
Size	12′
Type	Open cluster

Here's an object sharp-eyed observers can detect with their naked eyes from a dark site. To find it, draw a line between magnitude 2.3 Caph (Beta [β] Cassiopeiae) and magnitude 2.2 Tsih (Gamma [γ] Cas). NGC 129 lies at the midpoint of this line.

Through an 8-inch telescope, you'll see a rich cluster in which you can resolve several dozen stars evenly spread over its diameter. Step up to a 12-inch scope, and 50 stars will pop into view.

OBJECT #757	NGC 133
Constellation	Cassiopeia
Right ascension	0h31m
Declination	63°22′
Magnitude	9.4
Size	3′
Type	Open cluster

NGC 133 forms a nice triangle with NGC 146 and King 14. This trio of open clusters lies near magnitude 4.2 Kappa (κ) Cassiopeiae. This star sits just above the constellation's "W" pattern. NGC 133 looks like a hook of four equally bright stars. King 14 is a fairly loose cluster. NGC 146 shines at magnitude 9.1 and measures 5′ across.

OBJECT #758	NGC 134
Constellation	Sculptor
Right ascension	0h30.4m
Declination	–33°15′

(continued)	
Magnitude	10.4
Size	8.5′ by 1.9′
Type	Barred spiral galaxy

You'll find this attractive galaxy 0.5° east-southeast of magnitude 4.9 Eta (η) Sculptoris. Through an 8-inch telescope, you'll see a small bright nucleus surrounded by an elliptical haze. If you move to larger telescopes, the haze resolves into tightly wound spiral arms marked here and there by dark regions.

Finally, look 9′ west of NGC 134 for the magnitude 13.0 spiral galaxy NGC 131. It has nearly the same orientation as its larger companion.

Object #759 NGC 147 Anthony Ayiomamitis

OBJECT #759	NGC 147
Constellation	Cassiopeia
Right ascension	0h33m
Declination	48°30′
Magnitude	9.5
Size	15.0′ by 9.4′
Type	Elliptical galaxy
Other name	Caldwell 17

Our next object is a satellite galaxy of the Andromeda Galaxy (M31), and so belongs to the Local Group of galaxies. To find it, move 1.9° west from magnitude 4.5 Omicron (o) Cassiopeiae.

Look carefully for this challenging object. NGC 147 is a dwarf elliptical galaxy without much apparent structure. When you do see it, you'll notice an oval halo a bit brighter than the background glow. Is the galaxy ever-so-slight brighter toward the center, or is that a foreground star? You decide.

Not quite 1° east of NGC 147, you'll find magnitude 9.2 NGC 185. It touts a higher surface brightness than its companion because it's slightly smaller, measuring 14′ by 12′. A 12-inch telescope reveals an oval halo with a bright core that spans two-thirds of the galaxy's diameter.

OBJECT #760	NGC 150
Constellation	Sculptor
Right ascension	0h34m
Declination	–27°48′
Magnitude	11.3
Size	3.4′ by 1.6′
Type	Barred spiral galaxy

Our next treat lies 5.5° west-northwest of magnitude 4.3 Alpha (α) Sculptoris. This galaxy has a bright concentrated core. Through a 10-inch telescope with an eyepiece yielding 150×, you'll see a ring of light surrounding the core, with a dark region between the core and the ring.

Through a 16-inch scope at 300× or more, you'll start to resolve NGC 150′s ring into two large, curving spiral arms. Only through the largest amateur scopes will you begin to see the short bar that emanates from the core.

Object #761 NGC 157 Erica and Dan Simpson/Adam Block/NOAO/AURA/NSF

OBJECT #761	NGC 157
Constellation	Cetus
Right ascension	0h35m
Declination	–8°24′
Magnitude	10.4
Size	4.0′ by 2.4′
Type	Spiral galaxy

I think you'll enjoy observing NGC 157. This galaxy lies 3.5° east of magnitude 3.5 Iota (ι) Ceti. Through small telescopes, it appears almost rectangular with an even brightness distribution and a faint outer halo. If you aim a 14-inch or larger scope at it, however, NGC 157 will reveal clumps of star formation within its spiral arms. The brightest of these lie to the northwest and south of the galaxy's center.

Object #762 NGC 188 Anthony Ayiomamitis

OBJECT #762	NGC 188
Constellation	Cepheus
Right ascension	0h44m
Declination	85°20′
Magnitude	8.1
Size	13′
Type	Open cluster
Other name	Caldwell 1

Our next treat is one of the sky's most northerly deep-sky targets and the first entry on Sir Patrick Caldwell Moore's list of 109 deep-sky objects. Because "M" was taken by Messier, Moore called his list the Caldwell catalog, and, thus, a "C" precedes each entry.

Open cluster NGC 188 (Caldwell 1) lies approximately 4° from Polaris (Alpha [α] Ursae Minoris). Through an 8-inch telescope at 100×, you'll see about 50 magnitude 13 and fainter stars. A 12-inch scope at a dark site will allow you to count twice that number of star. Because the stars all appear about the same brightness, our eyes form them into patterns. Curved lines, hooks, and letters are the ones I most often see. As you focus on the stars, dark lanes seem to run through the cluster, adding to the visual appeal.

OBJECT #763	NGC 189
Constellation	Cassiopeia
Right ascension	0h40m
Declination	61°05′
Magnitude	8.8
Size	5′
Type	Open cluster

NGC 189 lies a bit southwest of another nice open cluster NGC 225. Both are near Gamma (γ) Cassiopeiae, the middle star of the Queen's W pattern. Some observers have described NGC 189 as a figure U with a line thru it.

Object #764 NGC 205 Adam Block/NOAO/AURA/NSF

OBJECT #764	NGC 205
Constellation	Andromeda
Right ascension	0h40m
Declination	41°41′
Magnitude	8.1
Size	19.5′ by 12.5′
Type	Elliptical galaxy

Our next target is bright and easy to find. Just locate the Andromeda Galaxy, and look 0.6° northwest of its core. Elliptical galaxy NGC 205 shines about as brightly as M31's other easy-to-see companion, M32. NGC 205, however, is nearly three times larger. Even through large amateur telescopes, you won't see detail in this galaxy.

OBJECT #765	NGC 210
Constellation	Cetus
Right ascension	0h41m
Declination	–13°52′
Magnitude	10.9
Size	5′ by 3.3′
Type	Spiral galaxy

At first glance, you may initially think our next target is an elliptical galaxy, but that's only because NGC 210 has incredibly faint spiral arms. The extended central region appears oval with an even brightness across its surface. A magnitude 12.4 star lies slightly more than 1′ west-northwest of the nucleus. NGC 210 lies 4.2° north of magnitude 2.0 Diphda (Beta [β] Ceti).

Object #766 M32 Adam Block/NOAO/AURA/NSF

OBJECT #766	M32 (NGC 221)
Constellation	Andromeda
Right ascension	0h43m
Declination	40°52′
Magnitude	8.1
Size	11.0′ by 7.3′
Type	Elliptical galaxy

Because M32 lies 0.4° due south of the heart of the Andromeda Galaxy (M31), I'll forgive you if you choose not to spend too much time observing it. Any size telescope will show this featureless elliptical.

Object #767 The Andromeda Galaxy (M31) Adam Block/NOAO/AURA/NSF

OBJECT #767	M31 (NGC 224)
Constellation	Andromeda
Right ascension	0h43m
Declination	41°16′
Magnitude	3.4
Size	185′ by 75′
Type	Spiral galaxy
Other name	The Andromeda Galaxy

The sky's greatest galaxy gets its familiar name from the northern constellation where it resides, Andromeda the Princess. This star system is our nearest large spiral, and it sits at the far end of the Local Group of galaxies.

Observers have described M31 as something other than starlike as far back as 964. In that year, Persian astronomer Abdal-Rahman Al-Sufi called it a "little cloud" in his *Book of Fixed Stars*.

German astronomer Simon Marius (1573–1624) was the first to study it telescopically. He described it, "Like the flame of a candle seen through horn, and like a cloud consisting of three rays; whitish, irregular and faint; brighter toward the center."

Messier cataloged it August 3, 1764: "The beautiful nebula of the belt of Andromeda, shaped like a spindle; it resembles two cones or pyramids of light, opposed at their bases."

In 1888, British astronomer Isaac Roberts (1829–1904) became the first to photograph spiral structure in M31. American astronomer Vesto M. Slipher (1875–1969) first measured M31's radial velocity (the speed of a celestial object toward or away from us) in 1912. Slipher found its velocity far surpassed that of any other object, and his measurement helped prove M31 lay far from the Milky Way. In 1923, Edwin Hubble measured Cepheid variable stars in M31 and confirmed its extragalactic nature.

Observers approach the Andromeda Galaxy in one of two ways. Some use low-power optics for an overall view, which includes M31's nucleus, dust lanes, and two companion galaxies, M32 and NGC 205. If this is your approach, try 20×80 (or similar) binoculars from a dark site. Try to trace M31's full length, which equals 6 Full Moons side by side.

Other amateur astronomers eschew wide-field views of the Andromeda Galaxy in favor of greatly magnified looks at small regions through large telescopes. If this plan appeals to you, use a 10-inch or larger scope and crank up the magnification to 300× and more. Scan M31's spiral arms for bright clumps, which indicate star-forming regions.

OBJECT #768	NGC 225
Constellation	Cassiopeia
Right ascension	0h44m
Declination	61°46′
Magnitude	7.0
Size	15′
Type	Open cluster
Other name	The Sailboat Cluster

NGC 225 sits not quite 2° northwest of magnitude 2.5 Gamma (γ) Cassiopeiae, the star at the middle of the W asterism. The cluster contains two groups of stars, one a bit fainter than the other.

American amateur astronomer Rod Pommier gave this object its common name in an article in the May 2000 issue of *Astronomy* magazine. Pommier called NGC 225 the 'Sailboat Cluster' because it has a distinctive four-star arc that outlines the leading edge of what could be a sail, inflated, he said, by an imaginary wind. A mast of three to four stars in a line supports the sail, and the line connects to a boat outlined by eight stars arranged in an elongated ellipse. Alas, as Earth turns, the sailboat slowly drifts backward across the sky. Pommier suggested switching your drive off and watching NGC 225 sail across the eyepiece on a star-filled sea.

Object #769 NGC 246 Jeff Cremer/Adam Block/NOAO/AURA/NSF

OBJECT #769	NGC 246
Constellation	Cetus
Right ascension	0h47m
Declination	−11°53′
Magnitude	10.9
Size	225″
Type	Planetary nebula
Other name	Caldwell 56

The easiest way to find our next object is to locate two stars. Magnitude 4.8 Phi^1 (Φ^1) Ceti and magnitude 5.2 Phi^2 (Φ^2) Ceti form an equilateral triangle with NGC 246. They sit 1.5° north-northwest and north-northeast of the planetary nebula, respectively.

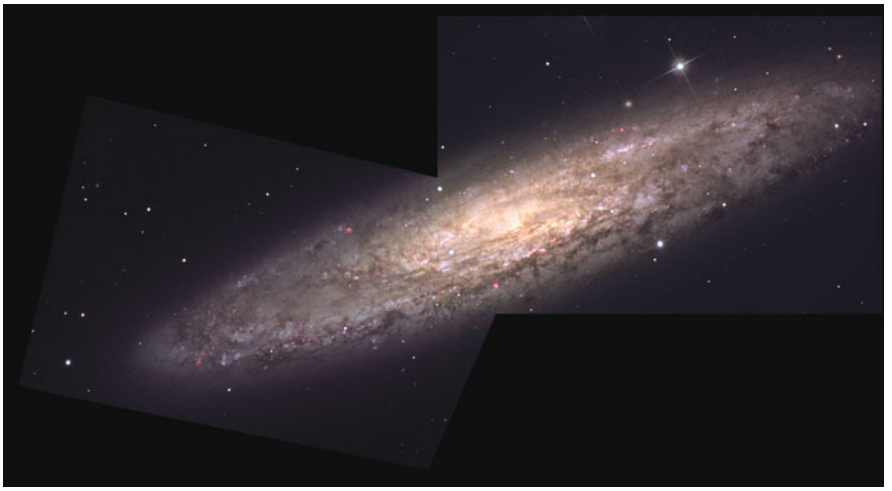
A 6-inch telescope under a dark sky reveals a large disk with several stars across its face, including an obvious central star. Through a 12-inch scope, a hollow center and a bright, thin rim on the northeast appear. A narrowband nebula filter, such as an OIII, dramatically improves the visibility of the patchy inner structure. Look 0.4° north-northeast for the magnitude 11.8 spiral galaxy NGC 255.

OBJECT #770	NGC 247
Constellation	Cetus
Right ascension	0h47m
Declination	−20°46′
Magnitude	9.2
Size	19.0′ by 5.5′
Type	Spiral galaxy
Other name	Caldwell 62

This is a big galaxy. It's so big, and its surface brightness is so low that, unless your sky is really dark, you'll have problems seeing it. You'll find it 2.9° south-southeast of Diphda (Beta [β] Ceti).

NGC 247 is one of the standout members of the Sculptor group of galaxies. The Sculptor group consists of a loose gathering of a couple dozen galaxies that lie between 50% farther away and twice as far as the most distant members of the Local Group. NGC 247 lies about 13 million light-years away.

Through a 10-inch telescope, NGC 247 has a concentrated, circular center with a tight, oval haze around it. The galaxy orients north-south. The magnitude 8.1 star GSC 5849:2326 sits at its tapered southern end. The northern edge of the galaxy is more rounded.



Object #771 The Silver Coin Galaxy (NGC 253) Doug Matthews/Adam Block/NOAO/AURA/NSF

OBJECT #771	NGC 253
Constellation	Sculptor
Right ascension	0h48m
Declination	–25°17′
Magnitude	7.6
Size	30′ by 6.9′
Type	Spiral galaxy
Other names	The Silver Coin Galaxy, the Sculptor Galaxy, Caldwell 65

The Silver Coin Galaxy makes every observer's top 10 list of galaxies. It's that good. This object's "fame quotient" is low, however, because from northern sites it lies low in the southern sky. That, and Messier didn't observe it.

British amateur astronomer Caroline Herschel (1750–1848), sister of Sir William Herschel, discovered NGC 253 September 23, 1783. Sir William added it to his catalog October 30.

The Silver Coin Galaxy — so named because of its appearance through small telescopes — is visible to sharp-eyed observers from a dark, southerly site. From the Northern Hemisphere, it's best to conduct this test of vision and sky quality in early October when NGC 253 lies due south, at its highest point.

NGC 253 belongs to the Sculptor Group of galaxies, the closest such system to our Local Group. This collection also includes NGC 55, NGC 247, and NGC 300.

Through an 8-inch or larger telescope, you'll detect the galaxy's mottled appearance. Although the core appears well-defined, it's only slightly brighter than NGC 253's outer regions. Dark dust lanes radiate from the center. Use a 12-inch scope to discern the spiral arms, one to the northeast and one to the southwest.

OBJECT #772	Eta (η) Cassiopeiae
Constellation	Cassiopeia
Right ascension	0h49m
Declination	57°49′
Magnitudes	3.4 and 7.5
Separation	12.9″
Type	Double star
Other name	Achird

This colorful binary lies 1.7° northeast of magnitude 2.2 Schedar (Alpha [α] Cassiopeiae). Low power works best to bring out the yellow color of the primary and the reddish hue of the secondary. Magnifications above 100× accentuate the brightness difference between the two, making them appear more white and yellow.

The common name "Achird" is a twentieth-century addition. Richard Hinckley Allen mentions the star as a nice double but says nothing about the name in *Star Names and Their Meaning*, which appeared in 1899.

OBJECT #773	65 Piscium
Constellation	Pisces
Right ascension	0h50m
Declination	27°43′
Magnitudes	6.3 and 6.3
Separation	4.6″
Type	Double star

Crank the power up past 100× to split this relatively close double. What you'll see is a pair of equally bright yellow stars. You'll find 65 Piscium 3.9° southeast of magnitude 3.3 Delta (δ) Andromedae.

Object #774 NGC 281 Anthony Ayiomamitis

OBJECT #774	NGC 281
Constellation	Cassiopeia
Right ascension	0h53m
Declination	56°37′
Size	35′ by 30′
Type	Emission nebula
Other name	The Pacman Nebula

Our next target is a fine emission nebula that lies 1.7° east of magnitude 2.2 Schedar (Alpha [α] Cassiopeiae) and only 1.3° south-southeast of magnitude 3.5 Eta (η) Cas. Astroimagers noticed the nebula's resemblance to the main character in the Namco video game Pac-Man, which Midway distributed throughout the U.S.

Through a 12-inch telescope equipped with a nebula filter, look for the dark lane that divides the brighter from the dimmer portion. The magnitude 7.4 star HD 5005 that forms the Pacman's eye shines through the brightest region of the nebula. This young, hot double star, along with open cluster IC 1590, provides most of the ultraviolet radiation that ionizes the nebula.

Object #775 NGC 288 Pat and Chris Lee/Adam Block/NOAO/AURA/NSF

OBJECT #775	NGC 288
Constellation	Sculptor
Right ascension	0h53m
Declination	−26°35′
Magnitude	8.1
Size	13.8′
Type	Globular cluster

This nice globular lies 3° north-northwest of magnitude 4.3 Alpha (α) Sculptoris. Through binoculars at a dark site, you'll easily spot NGC 288 and the Sculptor Galaxy (NGC 253) within the same field of view only 1.8° to the northwest.

NGC 288 has a broad central region characterized by a poor concentration of stars. But that just means you'll resolve many of them through an 8-inch or larger telescope. Magnifications above 200× will reveal more than 100 individual stars. As with other clusters whose stars are all about the same brightness, look for interesting patterns of stars.

OBJECT #776	Small Magellanic Cloud
Constellation	Tucana
Right ascension	0h54m
Declination	−72°50′
Magnitude	2.7
Size	320′ by 185′
Type	Irregular galaxy
Common names	SMC; Nubecula Minor

The sky's second-largest galaxy has the word "small" in its name only because of its counterpart, the Large Magellanic Cloud appears larger.

Historians often credit Portuguese explorer Ferdinand Magellan (1480–1521) with the discovery of these objects, but that is incorrect. The SMC and the LMC had been visible to Southern Hemisphere dwellers throughout history. What Magellan did was to make both "clouds" known to Europe; thus, they bear his name.

To the naked eye, the SMC appears 50% longer than it is wide, oriented on a northeast-southwest line. The central region and a 1°-wide area on the galaxy's northeastern end look brightest.

After you've observed the SMC with your naked eyes and then through binoculars, point your telescope at this wondrous object — and the bigger the scope, the better. The SMC contains no less than two dozen NGC objects brighter than magnitude 12.6.

Harvard College astronomer Henrietta Swan Leavitt (1868–1921) first noticed something was going on with Cepheid variable stars within this galaxy. She discovered the direct relationship between the brightness of Cepheids and the rate at which they cyclically brightened and dimmed. Astronomers now use such stars as standard candles to determine galactic distances.

OBJECT #777	NGC 300
Constellation	Sculptor
Right ascension	0h55m
Declination	−37°41′
Magnitude	8.1
Size	20.0′ by 13.0′
Type	Spiral galaxy
Other names	The Southern Pinwheel Galaxy, Caldwell 70

Perhaps the sky's most classic spiral galaxy inhabits a region in southeastern Sculptor. Along with the Silver Coin Galaxy (NGC 253), NGC 300 creates interest in a constellation whose brightest star glows at a feeble magnitude 4.3.

One glance at NGC 300 through an 8-inch telescope, and you'll know immediately why it's called the Southern Pinwheel Galaxy. The resemblance to the Pinwheel Galaxy (M33) is uncanny. NGC 300 has low surface brightness and a broadly concentrated central region that stretches nearly one-third this galaxy's length. The core, however, appears small, almost starlike.

Through 12-inch and larger scopes, examine NGC 300's two prominent spiral arms for dark lanes and bright spots signaling star-forming regions. Several foreground stars superimposed over the galaxy complete the picture.

OBJECT #778	NGC 346
Constellation	Tucana
Right ascension	0h59m
Declination	−72°11′
Magnitude	10.3
Size	5.2′
Type	Open cluster

This cluster lies within the borders of the Small Magellanic Cloud, just to the northeast of its center. This loose, wedge-shaped cluster ionizes a surrounding nebula, which you can spot even through small binoculars. To observers, the nebula resembles a barred spiral galaxy, but you'll need an 8-inch telescope to see it. The bar is about 4′ long and oriented roughly east-west. A thin, bright arm wraps around the south side from the eastern end of the bar, but the northern arm is more diffuse.

OBJECT #779	Sculptor Dwarf
Constellation	Sculptor
Right ascension	1h00m
Declination	−33°42′
Magnitude	8.8
Size	1.1° by 0.8°
Type	Dwarf spheroidal galaxy

You'll find our next target 2.3° south-southwest of magnitude 5.5 Sigma (σ) Sculptoris. Well, that's where to look for it, at least. Because the Sculptor Dwarf covers more area than 4 Full Moons its surface brightness is incredibly low. Eagle-eyed observers have spotted it through 6-inch telescopes, but your best bet is to head to an ultra-dark site, and insert your lowest-power eyepiece into at least a 12-inch scope. Then, ever-so-slowly scan the area. What you're looking for is a slight brightening of the background glow.

The Sculptor Dwarf was the first dwarf spheroidal galaxy discovered. In 1937, American astronomer Harlow Shapley found it on a photographic plate. The main difference between this type of galaxy and a dwarf elliptical is that a dwarf spheroidal galaxy has even lower surface brightness.

OBJECT #780	NGC 362
Constellation	Tucana
Right ascension	1h03m
Declination	−70°51′
Magnitude	6.5
Size	12.9′
Type	Globular cluster
Other name	Caldwell 104

You'll have to head south to spot our next treat. The bright globular cluster NGC 362 lies on the northern edge of the Small Magellanic Cloud. It's not part of that galaxy, however. Rather, it lies seven times closer to us.

Sharp-eyed observers will see it without optical aid as a faint, extended "star." Through an 8-inch telescope, NGC 362 explodes with detail. Well, except for the core. You'll need a larger scope and high magnification to resolve any of the stars near the cluster's center.

OBJECT #781	IC 1613
Constellation	Cetus
Right ascension	1h05m
Declination	2°07′
Magnitude	9.2
Size	18.8′ by 17.3′
Type	Irregular galaxy
Other name	Caldwell 51

Our next target is the huge Local Group galaxy IC 1613. You'll find it 0.8° north-northeast of the magnitude 6.1 double star 26 Ceti, right next to that constellation's border with Pisces.

Although some observers have detected it through an 8-inch (or even smaller) telescope, I suggest at least a 12-inch instrument to guarantee success. Look for a faint, round, uniform haze. And,

remember, its diameter is half as large as the Full Moon's. Large amateur telescopes — those above 20 inches in aperture — at high magnifications reveal an entirely different object. Instead of a softly glowing core, several dozen 17th-magnitude stars will make up the galaxy's central glow.

OBJECT #782	Psi^1 (Ψ^1) Piscium
Constellation	Pisces
Right ascension	1h06m
Declination	21°28′
Magnitudes	5.6/5.8
Separation	30″
Type	Double star

You can split this wide binary through any size telescope. Both stars appear pale blue or blue-white. Although similarly bright Psi^2 (Ψ^2) Piscium lies 0.9° to the southeast, you'll have no trouble distinguishing the binary Psi^1 (Ψ^1) from the equally bright Psi^2.

OBJECT #783	NGC 381
Constellation	Cassiopeia
Right ascension	1h08m
Declination	61°35′
Magnitude	9.3
Size	7′
Type	Open cluster

You'll find our next target 1.7° east-northeast of magnitude 2.5 Tsih (Gamma [γ] Cassiopeiae). At low power through a 4-inch telescope, note how well the cluster blends into the rich background. Crank the magnification to 150×, however, and you'll see an even distribution of some three dozen stars.

Object #784 Mirach's Ghost (NGC 404) Anthony Ayiomamitis

OBJECT #784	NGC 404
Constellation	Andromeda
Right ascension	1h09m
Declination	35°43′
Magnitude	10.3
Size	6.1′ by 6.1′
Type	Elliptical galaxy
Other names	Mirach's Ghost, the Lost Pearl Galaxy

Our next deep-sky object is a perfect target for a clear Halloween night: Mirach's Ghost, also known as NGC 404. Amateur astronomers call this magnitude 10.3 elliptical galaxy Mirach's Ghost because it lies only 6.8′ from 2nd-magnitude Mirach (Beta [β] Andromedae). As you might imagine, a 10th-magnitude galaxy next to that bright a star is pretty difficult to see.

Astronomy magazine Contributing Editor Stephen James O'Meara christened it the Lost Pearl Galaxy because some star atlases do not plot this object. The reason is that the printed image of Mirach overlaps it. He says, "Imagine a loose pearl rolling across the deck of a pirate ship, until it wedges firmly against the ship's brass."

This S0 galaxy — a type that has the disk shape of a spiral galaxy but no spiral arms — lies roughly 30 million light-years from Earth. Use high magnification to increase the contrast between the galaxy and the bright star. NGC 404 looks round and bright with an intense center. And don't fret too much about the glare from Mirach. There's no detail to be seen in the galaxy.

OBJECT #785	NGC 428
Constellation	Cetus
Right ascension	1h13m
Declination	0°59′
Magnitude	11.5
Size	4.6′ by 3.4′
Type	Spiral galaxy

You'll find our next object 1.6° south-southeast of magnitude 6.0 star 33 Ceti, right at the Pisces border. This spiral shows a broadly concentrated oval disk with a hazy glow around it. Through a 14-inch or larger telescope, challenge yourself to see NGC 428's magnitude 16.2 companion, UGC 772, which lies 13′ to the southeast.

OBJECT #786	Zeta (ζ) Piscium
Constellation	Pisces
Right ascension	1h14m
Declination	7°35′
Magnitudes	5.6/6.5
Separation	23″
Type	Double star

You'll have to look closely at this binary to see a color difference. Most observers report pale yellow or yellow-white as the primary star's color and white for the secondary. The separation is large enough, however, that you'll have no trouble splitting it.

OBJECT #787	Kappa (κ) Tucanae
Constellation	Tucana
Right ascension	1h16m
Declination	−68°53′

(continued)	
Magnitudes	5.1/7.3
Separation	5.4″
Type	Double star

This nice binary sits far below the horizon for most Northern Hemisphere observers. The primary appears yellow-white and the secondary yellow, although some observers see no color at all in the fainter star. You'll find this star 4.4° north-northeast of the Small Magellanic Cloud.

OBJECT #788	NGC 436
Constellation	Cassiopeia
Right ascension	1h16m
Declination	58°49′
Magnitude	8.8
Size	5′
Type	Open cluster

You can find this cluster 1.9° southwest of magnitude 2.7 Ruchbah (Delta [δ] Cassiopeiae). Actually, however, it's easier to find the bright Owl Cluster (NGC 457), and just move 0.7° northwest.

NGC 436 is a sparse cluster with two distinct stellar brightnesses. The brighter stars form a V shape whose point faces roughly eastward.

Object #789 The Owl Cluster (NGC 457) Anthony Ayiomamitis

OBJECT #789	NGC 457
Constellation	Cassiopeia
Right ascension	1h19m
Declination	58°20′
Magnitude	6.4

(continued)	
Size	13′
Type	Open cluster
Other names	The Owl Cluster, the ET Cluster, the Psi Cassiopeiae Cluster, Caldwell 13

One of the sky's two celestial owls (the other is the Owl Nebula [M97]) takes silent flight in Cassiopeia's rich star fields. Magnitude 5 Phi (Φ) Cassiopeiae lends its name to the cluster but doesn't travel with it through space.

Sir William Herschel discovered NGC 457 in 1787. Messier missed this cluster, although it outshines the two objects he included from this constellation — magnitude 6.9 M52 and magnitude 7.4 M103.

While observing this cluster in 1977, *Astronomy* magazine Editor David J. Eicher saw an owl figure made of the two brightest stars and the cluster's overall shape. He dubbed it the Owl Cluster, and it's carried that name ever since. Five years later, Universal Pictures released the movie *E.T.: The Extra-Terrestrial*. Some observers saw a resemblance between the alien character in the film and NGC 457, and they subsequently dubbed it the E.T. Cluster.

NGC 457 contains 25 stars brighter than 12th magnitude. Its most luminous star shines at magnitude 8.6. A 6-inch telescope at 50× shows nearly 75 cluster stars. Note the uniform background glow caused by distant, unresolved Milky Way stars.

OBJECT #790	NGC 488
Constellation	Pisces
Right ascension	1h22m
Declination	5°15′
Magnitude	10.3
Size	5.5′ by 4.0′
Type	Spiral galaxy

This relatively bright galaxy lies 2.3° west-southwest of magnitude 4.8 Mu (μ) Piscium. This bright spiral has a large core surrounded by bright halo that stretches north-south. Look for a line of four equally spaced 10th- and 11th-magnitude stars south of the galaxy.

Object #791 NGC 520 Jeff Newton/Adam Block/NOAO/AURA/NSF

OBJECT #791	NGC 520
Constellation	Pisces
Right ascension	1h25m
Declination	3°48′
Magnitude	11.4
Size	4.6′ by 1.9′
Type	Spiral galaxy

Here's an odd duck. Although it's cataloged as NGC 520, this object actually is a pair of interacting galaxies astronomers cataloged as a single object. Even a small scope will show its odd shape.

Through a 6-inch telescope at low power, you'll think you're looking at an edge-on spiral. Crank the magnification up to 150×, however, and the sharp northwest edge will pop into view. Through larger instruments, a dark lane that divides the two galaxies becomes visible.

OBJECT #792	NGC 524
Constellation	Pisces
Right ascension	1h25m
Declination	9°32′
Magnitude	10.4
Size	2.8′
Type	Spiral galaxy

You'll find our next target nestled in a group of galaxies that lies 3.4° northeast of magnitude 5.2 Zeta (ζ) Piscium. Within 1° of NGC 524, you'll also spot magnitude 12.6 NGC 489, magnitude 12.7 NGC 502, and magnitude 13.1 NGC 532, all spirals. Those objects, although fainter than our initial target, appear more like traditional spirals than NGC 524. That's because it's a face-on spiral with little details visible. Through any size telescope, you'll see a bright central region surrounded by a much fainter haze.

OBJECT #793	NGC 559
Constellation	Cassiopeia
Right ascension	1h30m
Declination	63°19′
Magnitude	9.5
Size	7′
Type	Open cluster
Other name	Caldwell 8

To find our next target, look 2.8° west of magnitude 3.4 Epsilon (ε) Cassiopeiae. Although its magnitude doesn't promise much, this cluster looks great through any size telescope. From a dark observing location, even a 4-inch scope will reveal three dozen stars. Most of them shine around magnitude 12 and pack into a roughly triangular core. A 12-inch instrument will double that number, bringing into view many fainter members that appear as "background" to those you've seen through smaller scopes.

Object #794 NGC 578 Adam Block/NOAO/AURA/NSF

OBJECT #794	NGC 578
Constellation	Cetus
Right ascension	1h30m
Declination	−22°40′
Magnitude	10.8
Size	4.8′ by 3′
Type	Spiral galaxy

You'll find our next target a bit more than 1° south-southeast of the magnitude 5.1 star 48 Ceti. Through a 12-inch telescope at 150× or higher, you'll see this galaxy's relatively wide core and hints (or stubs) of two of its spiral arms. Through a 30-inch scope at 450×, I detected four distinct spiral arms, which all contained bright star-forming knots.

Object #795 M103 Anthony Ayiomamitis

OBJECT #795	M103 (NGC 581)
Constellation	Cassiopeia
Right ascension	1h33m
Declination	60°42′
Magnitude	7.4
Size	6′
Type	Open cluster

Our next object is small telescope target M103. This magnitude 7.4 open cluster is really easy to find. It lies 1° east-northeast of magnitude 2.7 Delta (δ) Cassiopeiae.

M103 isn't a spectacular cluster, but you must seek it out because of its status as a Messier object. Its 40 bright stars stand out well from the rich fields of the Milky Way. Cluster members range from 8th through 13th magnitude and group tightly in a triangle 5′ on a side. Most observers report the best views when they use a magnification around 100×.

OBJECT #796	NGC 584
Constellation	Cetus
Right ascension	1h31m
Declination	−6°52′
Magnitude	10.5
Size	4.1′ by 2′
Type	Elliptical galaxy
Other name	The Little Spindle Galaxy

NGC 584 is a fat lens-shaped galaxy that doesn't show much detail. Through an 8-inch telescope, you'll see the broad, bright core take up three-quarters of the galaxy's length. A bright halo lies outside the core, but it quickly fades to the black of space.

Only 4′ east-southeast of NGC 584's core lies the magnitude 13.2 spiral galaxy NGC 586. Crank up the magnification past 200× to put some distance between the two objects before you observe the fainter galaxy.

Astronomy magazine Contributing Editor Stephen James O'Meara called this object the Little Spindle because of its resemblance to the Spindle Galaxy (Object #132).

OBJECT #797	NGC 596
Constellation	Cetus
Right ascension	1h33m
Declination	−7°02′
Magnitude	10.9
Size	3.2′ by 2′
Type	Elliptical galaxy

You'll find another relatively bright elliptical galaxy 2.5° east-northeast of magnitude 3.6 Theta (θ) Ceti. Through scopes 8′ in diameter and less, NGC 596 looks circular. It's only when you view this object through larger instruments that its slightly oval halo appears.

OBJECT #798	Triangulum
Right ascension (approx.)	1h34m
Declination (approx.)	30°39′
Size (approx.)	131.85 square degrees
Type	Constellation

If you're just starting out in the sky, an easy test is to locate the tiny constellation Triangulum the Triangle. And, when I say small, I'm not kidding. Triangulum ranks 78th in size out of the 88 constellations. It covers an area of 132 square degrees — only 0.3% of the sky.

Only 12 stars in this constellation shine more brightly than magnitude 5.5, but don't despair. Triangulum's small size actually makes it easier for you to locate.

To find this diminutive star pattern, look just above the horns of Aries the Ram for a small, thin, three-sided starry figure. Andromeda lies to Triangulum's upper right, and Perseus sits to its upper left.

Object #799 The Pinwheel Galaxy (M33) Adam Block/NOAO/AURA/NSF

OBJECT #799	M33 (NGC 598)
Constellation	Triangulum
Right ascension	1h34m
Declination	30°39′
Magnitude	5.7
Size	67′ by 41.5′
Type	Spiral galaxy
Other names	The Pinwheel Galaxy, the Triangulum Galaxy

Triangulum the Triangle would be easy to miss except that it contains one of the sky's standout galaxies. The Pinwheel Galaxy offers targets within its borders that the constellation lacks. Be prepared to spend lots of time observing this wonder.

Giovanni Hodierna probably observed the Pinwheel Galaxy before 1654. Messier independently discovered it August 25, 1764: "The nebula is a whitish light of almost even brightness. However, along two-thirds of its diameter it is a little brighter. Contains no star. Seen with difficulty in a 1-foot telescope."

Although you can glimpse M33 with your naked eyes from a dark site, this galaxy's surface brightness is low. Binoculars and small telescopes will help you gauge its overall shape, but you'll want to do a lot better than that. The best approach is to observe M33 through a 10-inch or larger telescope.

At 50×, look for an S shape emanating from a slightly brighter center. Luminous knots around M33's main body are vast star-forming regions. Through a 12-inch or (preferably) larger scope, find emission nebula NGC 604, which sits at the tip of M33's northern spiral arm. Crank up the magnification and look for two tiny lobes in contact. A nebula filter will improve your view of this nebula, but worsen the view of the rest of the galaxy.

OBJECT #800	NGC 602
Constellation	Hydrus
Right ascension	1h30m
Declination	−73°33′
Size	34′
Type	Emission nebula

Our next object sits just outside the eastern border of the Small Magellanic Cloud. NGC 602 combines an emission nebula with a cluster of stars. A 12-inch telescope, an eyepiece that gives a magnification of 200×, and a nebula filter will reveal an oval haze divided into two parts, the eastern side a bit brighter. The magnitude 12.2 star GSC 9142:30 shines at the nebula's southwestern edge.

Object #801 NGC 613 Fred Calvert/Adam Block/NOAO/AURA/NSF

OBJECT #801	NGC 613
Constellation	Sculptor
Right ascension	1h34m
Declination	−29°25′

(continued)	
Magnitude	10.1
Size	5.5′ by 4.1′
Type	Spiral galaxy

This nice spiral sits 0.6° northwest of magnitude 5.7 Tau (τ) Sculptoris. Through a small telescope, it appears as just an evenly illuminated oval glow. A 12-inch scope and 200× or more reveals a bright, extended central region from which short spiral arms emanate. Note the magnitude 9.6 star SAO 167149 only 2′ north-northeast of the galaxy's core.

OBJECT #802	M74 (NGC 628)
Constellation	Pisces
Right ascension	1h37m
Declination	15°47′
Magnitude	9.4
Size	11.0′ by 11.0′
Type	Spiral galaxy

Just move 1.3° east-northeast of magnitude 3.6 Eta (η) Piscium, and you'll find the gorgeous face-on spiral M74. At a distance of 24 million light-years, stellar associations and gas clouds in this galaxy stand out well, so it's one of the few that will benefit from a nebula filter. If you plan to observe this galaxy filtered, use at least a 12-inch telescope to assure good light throughput.

Through an 8-inch telescope, you can see the uneven spiral arms and the mottled halo that surrounds the bright core. The half dozen stars superimposed on the galaxy's glow make it a more impressive sight.

OBJECT #803	NGC 637
Constellation	Cassiopeia
Right ascension	1h43m
Declination	64°02′
Magnitude	8.2
Size	3′
Type	Open cluster

To find this open cluster, move 1.3° west-northwest of magnitude 3.4 Epsilon (ε) Cassiopeiae. A 4-inch telescope at 100× will reveal approximately 25 stars, and larger scopes don't show all that many more.

Object #804 The Little Dumbbell Nebula (M76) Adam Block/NOAO/AURA/NSF

OBJECT #804	M76 (NGC 650)
Constellation	Perseus
Right ascension	1h42m
Declination	51°34′
Magnitude	10.1
Size	65″
Type	Planetary nebula
Other names	The Little Dumbbell Nebula, the Barbell Nebula, the Cork Nebula

The Little Dumbbell Nebula in Perseus is number 76 on Messier's famous list. This planetary nebula sits in far western Perseus, near its border with Cassiopeia and Andromeda. You'll find it 1° north of the 4th-magnitude star Phi (Φ) Persei.

At magnitude 10.1 it's tied for the designation "Messier's faintest object" with galaxies M98 and M91. But don't let its magnitude fool you. M76 appears fairly bright because it isn't that large. Its elongated disk measures about 1′ across. And don't be afraid to crank up the magnification on this object — there's lots of detail to see.

An 8-inch telescope reveals the two lobes that gave the nebula its name, with the southwestern patch appearing a little brighter. A 16-inch scope brings out a faint strand extending west from the northeastern lobe. You might even catch a hint of the large, diffuse halo that surrounds the entire inner region.

OBJECT #805	NGC 654
Constellation	Cassiopeia
Right ascension	1h44m
Declination	61°53′
Magnitude	6.5
Size	5′
Type	Open cluster

NGC 654 is a moderately rich open cluster that contains 40 stars shining between 7th and 12th magnitude. You'll find it by drawing a line between magnitude 2.7 Ruchbah (Delta (δ) Cassiopeiae) and magnitude 3.4 Epsilon (ε) Cas. The cluster lies just to the east of the line's midpoint. Lots of open clusters populate this region of sky, so be careful with your identification.

OBJECT #806	NGC 659
Constellation	Cassiopeia
Right ascension	1h44m
Declination	60°40′
Magnitude	7.9
Size	6′
Type	Open cluster
Other name	The Yin-Yang Cluster

Our next nice open cluster lies 2.3° east-northeast of magnitude 2.7 Ruchbah (Delta (δ) Cassiopeiae) and only 10.5′ northeast of the magnitude 5.8 star 44 Cassiopeiae.

When you've finished observing NGC 659, look a bit less than 0.5° east, and have a look at the fainter open cluster IC 155.

Astronomy magazine Contributing Editor Stephen James O'Meara christened this collection of stars the Yin-Yang Cluster. He combines the stars in the core and a smaller, fainter group southwest of the core, with separate streams of stars. Separately, each of these, to O'Meara, looks like an apostrophe. Together, however, they appear as the Chinese symbol that combines Yin and Yang, the complementary opposite forces of life.

Object #807 NGC 663 Peter and Suzie Erickson/Adam Block/NOAO/AURA/NSF

OBJECT #807	NGC 663
Constellation	Cassiopeia
Right ascension	1h46m
Declination	61°15′
Magnitude	7.1
Size	16′
Type	Open cluster
Other names	Caldwell 10

Here's a gorgeous cluster you'll enjoy through any size telescope, and perhaps even with the naked eye. Several sharp-eyed observers (I'm one of them) have seen this object without optical aid from a true-dark site. Some have even proposed that the cluster's "official" magnitude is too faint. Check it out, and see what you think.

NGC 663 breaks into some 40 stars through a 6-inch scope at 75×. It does so, however, in a twin waterfall pattern. Each waterfall (you might see these features as chains of faint stars) terminates at a pair of much brighter stars. At this magnification, the space between them appears dark.

A 10-inch will fill in that region and show you more than 75 stars within the cluster. You'll find NGC 663 just 45′ north-northeast of the magnitude 5.8 star 44 Cassiopeiae. Be sure to go past NGC 659, which lies only one-quarter of NGC 663's distance from the star.

Object #808 NGC 672 Adam Block/NOAO/AURA/NSF

OBJECT #808	NGC 672
Constellation	Triangulum
Right ascension	1h48m
Declination	27°26′
Magnitude	10.9
Size	6.6′ by 2.6′
Type	Barred spiral galaxy

Look for this seemingly rectangular object 2.4° south-southwest of magnitude 3.4 Mothallah (Alpha [α] Trianguli). This barred spiral galaxy is interacting with its neighbor, the magnitude 11.4 spiral IC 1727 only 8′ to the southwest. NGC 672 appears elongated roughly east-west. The eastern half looks slightly brighter, as does the central region.

OBJECT #809	NGC 676
Constellation	Pisces
Right ascension	1h49m
Declination	5°54′
Magnitude	9.6
Size	4.6′ by 1.7′
Type	Spiral galaxy

NGC 676 is a lens-shaped spiral galaxy that doesn't reveal many details through any size telescope. Here's what every observer notices, however: the magnitude 9.4 star SAO 110143 placed squarely over NGC 676's center. The galaxy orients roughly north-south. Look for it not quite 2° east-northeast of magnitude 4.4 Nu (ν) Piscium.

OBJECT #810	Gamma (γ) Arietis
Constellation	Aries
Right ascension	1h54m
Declination	19°18′
Magnitudes	4.6/4.7
Separation	7.8″
Type	Double star
Other name	Mesarthim

I like to call this binary the "headlights" because the two components shine at nearly the same brightness, and both appear white. This is the double star I show first during autumn stargazes. Then I move on to the magnificent Albireo (Beta [β] Cygni).

Richard Hinckley Allen in *Star Names and Their Meanings* gives two possibilities for this star's common name. He said some of his contemporaries connected it with the Hebrew word Mesharetim, which means ministers. He thinks, however, that it's more likely an error made by celestial cartographer Johannes Bayer, who was unaware that the word Mesarthim referred to the lunar station to which this star and Sheratan (Beta [β] Arietis) belong.

OBJECT #811	NGC 720
Constellation	Cetus
Right ascension	1h53m
Declination	−13°44′
Magnitude	10.2
Size	4.7′ by 2.4′
Type	Elliptical galaxy

You'll find our next target 3° northeast of magnitude 3.5 Tau (τ) Ceti. It appears as a relatively bright oval of light with a broad central region. Through 10-inch and larger telescopes, you'll pick out the thin halo that quickly fades to black.

OBJECT #812	NGC 744
Constellation	Perseus
Right ascension	1h59m
Declination	55°28′

(continued)	
Magnitude	7.9
Size	5′
Type	Open cluster

NGC 744 is a bright open cluster. The star count is relatively poor, however. A 4-inch telescope will reveal two dozen stars. So will a 12-inch scope. The brightest nearby star is magnitude 7.9 SAO 22809, which sits 7′ to the north-northeast. Look for this cluster a bit more than 3° west-southwest of the Double Cluster (NGC 869 and NGC 884).

OBJECT #813	NGC 752
Constellation	Andromeda
Right ascension	1h58m
Declination	37°41′
Magnitude	5.7
Size	50′
Type	Open cluster
Other name	Caldwell 28

Although this object lies in Andromeda, the best way to locate it is to look 3.7° northwest of Beta (β) Trianguli. NGC 752 is large and bright, and easily visible to the naked eye from a dark site.

NGC 752 is huge, so view it at magnifications below 50×. Through 10×70 binoculars, you'll count about three dozen magnitude 10 stars. An 8-inch telescope drives the star count above 100. A crooked line of four magnitude 7 and 8 stars crosses the central part of the cluster running east to west. A pair of 6th-magnitude stars lies at NGC 752's southern end.

Another cluster abuts the southern end of NGC 752, but it's another story altogether. Rather than a cluster of stars, Abell 262 is a cluster of galaxies containing several dozen 13th-magnitude and fainter objects.

OBJECT #814	Lambda (λ) Arietis
Constellation	Aries
Right ascension	1h58m
Declination	23°36′
Magnitudes	4.9/7.7
Separation	37″
Type	Double star

Here's a great target for a small telescope, and, because this binary has such a wide separation, you won't even need high magnification to view it. If you observe this pair with others, have some fun and ask everyone to view Lambda and tell you what colors they see. You'll get "yellow and blue," "white and blue," "orange and green," and lots of other combinations. Observations like these are proof positive that the color receptors in human eyes are unique to each of us.

Object #815 NGC 772 Adam Block/NOAO/AURA/NSF

OBJECT #815	NGC 772
Constellation	Aries
Right ascension	1h59m
Declination	19°01′
Magnitude	10.3
Size	7.3′ by 4.6′
Type	Spiral galaxy
Other name	The Fiddlehead Galaxy

A little more than a degree east of magnitude 4.5 Gamma (γ) Arietis you'll find spiral galaxy NGC 772. Through a 10-inch scope, it exhibits a bright center surrounded by a haze. A bit more than 3′ south-southwest of NGC 772's core lies magnitude 13.0 NGC 770. This pair of galaxies interacts gravitationally. Images of NGC 772 show the result — a distorted spiral structure.

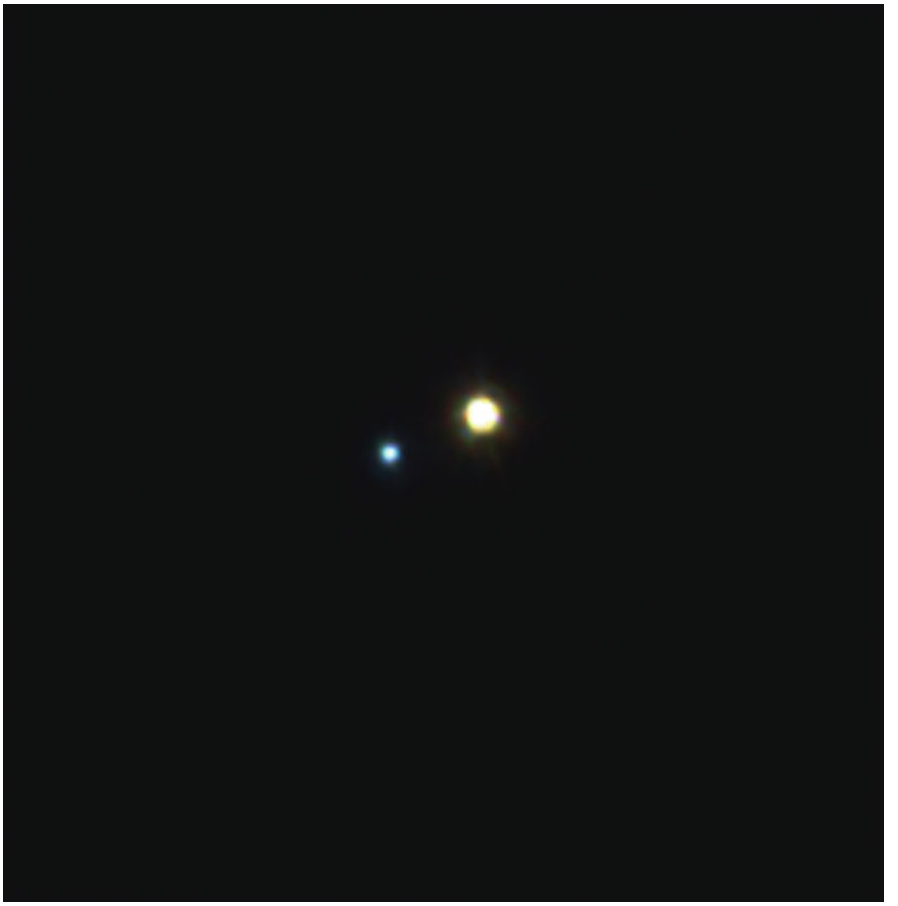
This galaxy's common name comes from *Astronomy* magazine Contributing Editor Stephen James O'Meara, who noted that its brightest arm looked to him like a fiddlehead unfolding.

OBJECT #816	Alpha (α) Piscium
Constellation	Pisces
Right ascension	2h02m
Declination	2°46′
Magnitudes	4.2/5.1
Separation	1.7″
Type	Double star
Other name	Al Rischa

Most observers report a pale yellow and pale blue for the colors of the primary and secondary, respectively. If you see the "yellow" component as white and the "blue" component as green, don't

worry. Human color receptors vary from one individual to the next. Do note that this is a close binary, so crank up the power past 150× to get a clean split.

This star's common name, Al Rischa, has an easy translation from Arabic — the cord. Its position marks the knot that ties the two ribbons of this constellation's fish together.



Object #817 Gamma Andromedae Adam Block/NOAO/AURA/NSF

OBJECT #817	Gamma (γ) Andromedae
Constellation	Andromeda
Right ascension	2h04m
Declination	42°20′
Magnitudes	2.2/5.0
Separation	9.8″
Type	Double star
Other name	Almach

As I compiled this list, I wasn't sure if I wanted to put Gamma (γ) Andromedae in the small-scope category or present it as a large-scope challenge object. I'll explain below.

Gamma And is the 3rd-brightest star in the constellation, shining at 2nd magnitude. But its visual output actually combines the light from a colorful pair of stars: yellowish Gamma^1 (γ^1) Andromedae

shines at magnitude 2.3, and bluish Gamma^2 (γ^2) glows at magnitude 3.6. About 10″ separate the two components, so any telescope will easily split this pair.

Why, then, did I consider describing it as a challenge object? The reason is that Gamma^2 is also a double, but one with a separation of only 0.4″. Gamma^2's components are just about the same brightness, at magnitudes 4.84 and 4.87. I split this star with a perfectly aligned and totally cooled-down 11-inch Schmidt-Cassegrain telescope in 2001. You won't split it with much less aperture.

In Star Names and Their Meanings, Richard Hinckley Allen explains that the common name Almach comes from "Al Anak al Ard," a small predatory animal found in Arabia. If you find yourself at a loss as to how to reconcile this meaning with the star marking the left foot of Andromeda the Princess, you're not alone. Allen can't either.

OBJECT #818	Iota (ι) Trianguli
Constellation	Triangulum
Right ascension	2h12m
Declination	30°18′
Magnitudes	5.3/6.9
Separation	3.9″
Type	Double star

To find this binary, look 4.2° east of magnitude 3.4 Alpha (α) Trianguli. At low power, you'll have trouble splitting Iota, so crank the magnification past 100×. Most observers see a yellow primary with a slightly fainter light-blue companion.

OBJECT #819	Stock 2
Constellation	Cassiopeia
Right ascension	2h15m
Declination	59°16′
Magnitude	4.4
Size	60′
Type	Open cluster

A bit more than 2° north-northwest of the Double Cluster (NGC 869 and NGC 884) lies the nearby cluster Stock 2. This object appeared on a list of open clusters compiled by astronomer Jürgen Stock. This object spans a full degree, so small telescopes do a good job displaying it, if you keep the magnification below 50×. Expect to see a loose collection of about 50 stars between 8th and 10th magnitudes.

OBJECT #820	NGC 821
Constellation	Aries
Right ascension	2h08m
Declination	11°00′
Magnitude	10.8
Size	2.4 by 1.7
Type	Elliptical galaxy

Although NGC 821 lies in Aries, it's easiest to find by starting at magnitude 4.4 Xi^1 (ξ^1) Ceti. From that star, move 2.4° north-northwest. The galaxy has an oval shape oriented roughly north-south. The evenly illuminated central region spans two-thirds of NGC 821's length. Outside is a thin halo visible through 12-inch and larger telescopes. You'll also spot the magnitude 9.2 star SAO 92805 on the galaxy's northwest edge.

Object #821 NGC 869 and NGC 884 Fred Calvert/Adam Block/NOAO/AURA/NSF

OBJECT #821	NGC 869 and NGC 884
Constellation	Perseus
Right ascension	2h19m, 2h22m
Declination	57°09′, 57°07′
Magnitude	5.3, 6.1
Size	29′, 29′
Type	Open cluster
Also known as	The Double Cluster, Caldwell 14

The Double Cluster in Perseus is a real treat through low-power optics. NGC 869 is the richer of the two clusters. It contains nearly three dozen 9th- and 10th-magnitude stars in an area 10′ across.

NGC 884 appears less concentrated but holds more bright stars, with the densest group on the southwestern edge. Through a 4-inch telescope at 50×, you'll see an abundance of color in these stellar jewels. Look for red, yellow, and blue gems scattered among the abundant white stars.

Each cluster holds a treasure at its core. NGC 869 contains a dark, Y-shaped rift. NGC 884's stars surround RS Persei, a deep-red semiregular variable star.

By the way, the Double Cluster looks particularly nice through binoculars that magnify 15 or more times.

To find this wonderful pair, draw a line from magnitude 2.7 Ruchbah (Delta [δ] Cassiopeiae) to magnitude 2.9 Gamma (γ) Persei. The Double Cluster lies at the midpoint of this line.

OBJECT #822	Omicron Ceti
Constellation	Cetus
Right ascension	2h19m
Declination	−2°59′

(continued)

Magnitude range	2.0-10.1
Period	331.96 days
Type	Variable star
Other name	Mira

The name Mira is Latin for "the Wonderful," and this luminary is the archetype for an important class of variable stars. Mira-type variables have long periods and large-amplitude variations in brightness. Mira itself takes 332 days to vary between 2nd and 10th magnitude, but it does so irregularly. In February 1997, Mira reached nearly 2nd magnitude, but at its next maximum at the beginning of 1998, the star disappointed observers by attaining only 4th magnitude. You can locate Mira slightly more than 7° southeast of magnitude 3.8 Al Rischa (Alpha [α] Piscium).