



September

OBJECT #708	8 Lacertae
Constellation	Lacerta
Right ascension	22h36m
Declination	39°38'
Magnitudes	5.7/6.5
Separation	22.4"
Type	Double star

This binary lies in a rather star-poor region of the sky. One way to find it is to move 5.4° southwest from magnitude 3.6 Omicron (*o*) Andromedae. Any size telescope will split this pair. Both components are white.

OBJECT #709	NGC 7314
Constellation	Piscis Austrinus
Right ascension	22h36m
Declination	$-26^\circ 03'$
Magnitude	10.9
Size	4.2' by 1.7'
Type	Spiral galaxy

This spiral is easy to spot through a 6-inch telescope because of its high surface brightness. It lies 1° due east of magnitude 6.4 Zeta (ζ) Piscis Austrini. NGC 7314 has a position angle of 3° , which means the object pretty much appears on a north-south line.

While you're observing this galaxy, try to spot the smaller and fainter spiral galaxy NGC 7313 roughly 4' to the southwest. Only one-sixth as long as NGC 7314, NGC 7313 glows at magnitude 14.2.



Object #710 Stephan's Quintet Adam Block/NOAO/AURA/NSF

OBJECT #710	Stephan's Quintet
Constellation	Pegasus
Right ascension	22h36m
Declination	33°58'
Magnitudes	14.8, 14.6, 14.0, 14.4, 13.6
Sizes	1.1' by 1.1', 0.9' by 0.9', 1.9' by 1.2', 1.7' by 1.3', 2.2' by 1.1'
Type	Galaxy group
Notes	NGCs 7317, 7318A & B, 7319, 7320

One of the mantras of amateur astronomy is “aperture rules.” This means you’ll see more detail as you observe through ever-larger telescopes. Few celestial objects demonstrate this better than Stephan’s Quintet.

French astronomer Edouard Stephan discovered this group in 1877. The five galaxies now carry the designations NGC 7317, NGC 7318A, NGC 7318B, NGC 7319, and NGC 7320.

Four of these galaxies — the exception is NGC 7320 — form a compact galaxy group, the first ever discovered. NGC 7320 belongs to the Pegasus Spur, a group of about three dozen galaxies, the brightest of which is magnitude 9.5 NGC 7331.

Although you can “see” Stephan’s Quintet through a 6-inch scope, 50× will show you only a faint, clumpy glow 3' across. A 12-inch telescope, on the other hand, lets you identify the individual members.

At the Quintet’s southwestern edge is NGC 7317, which lies next to a 13th-magnitude foreground star. The colliding pair NGC 7318A and NGC 7318B lies 2' to the east. You’ll need high magnification — above 200× — to “unmerge” them.

The brightest and largest member, NGC 7320, lies to the southeast and contains a 13th-magnitude foreground star in its halo. This galaxy shines at magnitude 12.5. NGC 7319, which sits at the group’s

northeastern edge, is the real test for visual observers and is the faintest galaxy in Stephan's Quintet. It glows softly at magnitude 15.3.

OBJECT #711	NGC 7329
Constellation	Tucana
Right ascension	22h40m
Declination	-66°29'
Magnitude	11.8
Size	3.2' by 1.9'
Type	Barred spiral galaxy

Our next target lies 2° southeast of magnitude 4.5 Delta (δ) Tucanae. Although it lies 150 million light-years away, a 12-inch telescope will show some detail. Crank the power up to 250 \times or beyond, and you'll easily spot the bar. Then note the central bulge, slightly fatter than the bar. Finally observe the irregular haze surrounding the central region that gives away the galaxy's spiral structure.



Object #712 The Deer Lick Group (NGC 7331) Adam Block/Mount Lemmon SkyCenter/University of Arizona

OBJECT #712	NGC 7331
Constellation	Pegasus
Right ascension	22h37m
Declination	34°25'
Magnitude	9.5
Size	10.5' by 3.7'
Type	Spiral galaxy
Other names	The Deer Lick Group, Caldwell 30

Deep-sky objects have some fanciful names. Usually, however, they fit the view. For example, the Blue Snowball (Object #733) is blue and round, the Omega Nebula (Object #538) looks like that Greek letter, and Gomez's Hamburger (IRAS 18059-3211) looks like a sandwich.

But what's with a deep-sky object called the "Deer Lick Group"? Well, in the 1980s, American amateur astronomer Tom Lorenzin bestowed the common name on this galaxy group to honor the Deer Lick Gap, which lies in the mountains of North Carolina. Apparently, Tom had a memorable view of these galaxies from there.

The Deer Lick Group's brightest member is NGC 7331. From a dark sky, you can spot this magnitude 9.5 spiral galaxy through binoculars, but a telescope brings out a lot more detail. Through a 10-inch scope with a low-power eyepiece, you'll see three galaxies to NGC 7331's east that form an equilateral triangle. These galaxies are not NGC 7331's companions but lie much farther away.

At 200 \times , the galaxy shows a bright nucleus surrounded by a nebulous glow 3 times as long as it is wide. Larger scopes show the western edge ends abruptly at a dust lane. On nights of good seeing, look for a spiral arm shining beyond this lane.

OBJECT #713	NGC 7332
Constellation	Pegasus
Right ascension	22h37m
Declination	23°48'
Magnitude	11.1
Size	3.7' by 1.0'
Type	Spiral galaxy

I'm certain you'll enjoy our next object, or should I say pair of objects? NGC 7332 and NGC 7339, just 5' to its east, form a gorgeous pair of lens-shaped galaxies just 2.1° west of magnitude 4.0 Lambda (λ) Pegasi.

Both objects appear more than three times as long as they are wide. Each has even illumination, but NGC 7332's core is a bit broader. NGC 7339 glows more faintly than its neighbor, at magnitude 12.2.

OBJECT #714	NGC 7361
Constellation	Piscis Austrinus
Right ascension	22h42m
Declination	-30°03'
Magnitude	12.2
Size	4.0' by 0.9'
Type	Spiral galaxy

Just look 3.3° west of magnitude 1.2 Fomalhaut (Alpha [α] Piscis Austrini) to find our next target. Through a 10-inch telescope, you'll see a celestial sliver oriented north-south appearing five times as long as it is wide. At 300 \times through a 12-inch scope, look for a truncation at the northern tip.



Object #715 NGC 7380 Kris Sandburg and Peter Jacobs/Adam Block/NOAO/AURA/NSF

OBJECT #715	NGC 7380
Constellation	Cepheus
Right ascension	22h47m
Declination	58° 06'
Magnitude	7.2
Size	20'
Type	Open cluster
Other name	The Wizard Nebula

Our next object lies 2.4° east of magnitude 4.1 Delta (δ) Cephei. Through an 8-inch telescope, two dozen stars 10th-magnitude and fainter pop into view.

Now insert a nebula filter and observe emission nebula Sharpless 2–142. It appears as an unevenly bright haze with an irregular border 0.5° long stretching from north to south. The northern part of the nebula glows more brightly than the southern part.

Amateur astronomers began calling this object the Wizard Nebula in the early 2000s when astroimagers began to circulate long-exposures of it on the Internet.

OBJECT #716	NGC 7418
Constellation	Grus
Right ascension	22h57m
Declination	$-37^\circ 02'$
Magnitude	11.0
Size	4.2' by 2.1'
Type	Barred spiral galaxy

You'll find this object 2.8° northwest of magnitude 5.6 Upsilon (υ) Gruis. Through a 16-inch telescope at $350\times$, the galaxy appears face-on and irregularly bright with ever-so-faint traces of spiral structure. Look for the magnitude 11.7 spiral NGC 7421 just 20' to the south.

OBJECT #717	Sharpless 2-155
Constellation	Cepheus
Right ascension	22h57m
Declination	62°37'
Magnitude	—
Size	50' by 30'
Type	Emission nebula
Other names	The Cave Nebula, Caldwell 9

Our next object lies 3.7° south-southeast of magnitude 3.5 Iota (*i*) Cephei. To be honest, this is a better target for astroimagers than for visual observers, but a large telescope (16 inches of aperture or more) equipped with a nebula filter will bring it in for you. Look for a deep, dark indentation in the nebulosity that gives Sh 2-155 its common name.

This nebula's moniker arises from the wide, dark region easily visible on images. The dark nebulosity appears like the mouth of a cave, thus the name.

OBJECT #718	IC 1459
Constellation	Grus
Right ascension	22h57m
Declination	-36°28'
Magnitude	10.0
Size	4.9' by 3.6'
Type	Elliptical galaxy

You'll find our next target a bit more than 3° northwest of magnitude 5.6 Upsilon (*υ*) Gruis. Through a 12-inch telescope at 150, the galaxy inclines northeast to southwest and appears evenly illuminated. Double the magnification to 300×, and you'll see the thin faint halo that surrounds the extended central region. You'll also notice IC 1459 isn't quite round.

OBJECT #719	NGC 7457
Constellation	Pegasus
Right ascension	23h01m
Declination	30°09'
Magnitude	11.2
Size	4.1' by 2.5'
Type	Spiral galaxy

Our next object lies 2.1° north-northwest of magnitude 2.4 Scheat (Beta [*β*] Pegasi). Through an 8-inch telescope, it appears nearly rectangular, twice as long as it is wide oriented northwest to southeast.

OBJECT #720	NGC 7462
Constellation	Grus
Right ascension	23h03m
Declination	-40°50'
Magnitude	11.3
Size	5.1' by 0.8'
Type	Spiral galaxy

Our next object lies 2.1° south-southwest of magnitude 5.6 Upsilon (*υ*) Gruis. Another galactic "needle," NGC 7462 measures six times as long as it is wide. A magnitude 10.4 star lies at this galaxy's southwest tip.

OBJECT #721	NGC 7479
Constellation	Pegasus
Right ascension	23h05m
Declination	12°19'
Magnitude	10.8
Size	4.0' by 3.1'
Type	Barred spiral galaxy
Other name	Caldwell 44

This showpiece galaxy (through a large scope) lies 2.9° south of magnitude 2.5 Markab (Alpha [α] Pegasi). A 10-inch telescope shows the odd spiral structure. At low power, you'll detect a bright core, the surrounding central bulge, and a bar elongated north-south. This galaxy's best feature is the single, tightly wound spiral arm curling to the west of the south end of the bar. The north end of the bar seems cut off. There's no trace of a spiral arm here.

OBJECT #722	IC 1470
Constellation	Cepheus
Right ascension	23h05m
Declination	60°15'
Size	1.2' by 0.8'
Type	Emission nebula

You'll find this nebula 5° east-northeast of magnitude 4.1 Delta (δ) Cephei. Through a 12-inch telescope at 200 \times , IC 1470 appears bright with a fainter extension to the southeast.

OBJECT #723	NGC 7492
Constellation	Aquarius
Right ascension	23h08m
Declination	-15°37'
Magnitude	11.4
Size	6.2'
Type	Globular cluster

Talk about low surface brightness! NGC 7492's diameter spans a quarter that of the Full Moon, but it shines more faintly than magnitude 11. In fact, even through a 12-inch telescope, you'll find it hard to believe you're observing a globular cluster.

For best results, head for a dark site, and crank the power past 200 \times . Even then, you only will spot 10 stars. NGC 7492 sits 3.3° east of magnitude 3.3 Skat (Delta [δ] Aquarii).

OBJECT #724	NGC 7510
Constellation	Cepheus
Right ascension	23h11m
Declination	60°34'
Magnitude	7.9
Size	4'
Type	Open cluster

You'll find this nice cluster 5° west-northwest of magnitude 4.9 Tau (τ) Cassiopeiae. A 4-inch telescope at 150 \times will reveal three dozen stars. Back off the magnification to 75 \times or lower, and you'll see a bar-shaped stellar region stretching northeast to southwest through the center of NGC 7510.



Object #725 NGC 7538 Fred Calvert/Adam Block/NOAO/AURA/NSF

OBJECT #725	NGC 7538
Constellation	Aquarius
Right ascension	23h14m
Declination	61°31'
Size	9' by 6'
Type	Emission nebula

Look for this nebula 5° northwest of magnitude 4.9 Tau (τ) Cassiopeiae. This object is part of a vast array of nebulosity known as the Cassiopeia complex. Through an 8-inch telescope, you'll see NGC 7538's outline, but it will be faint. A 12-inch scope will show a fat, nearly rectangular object half again as long as it is wide, oriented northeast to southwest.

OBJECT #726	NGC 7582
Constellation	Grus
Right ascension	23h18m
Declination	-42°22'
Magnitude	10.1
Size	6.9' by 2.6'
Type	Barred spiral galaxy

Look for this galaxy, and several others, 2.4° east-northeast of magnitude 4.3 Theta (θ) Gruis. This galaxy stretches twice as long as it is wide and orients northwest to southeast. Through any telescope less than 30 inches in aperture, it appears evenly illuminated across its face. Only that giant scope could bring out the ever-so-faint haze that gave away the presence of tightly wound spiral arms.

Another spiral, magnitude 10.6 NGC 7552, sits 0.5° to the west-southwest. A pair of galaxies, magnitude 11.3 NGC 7590 and magnitude 11.5 NGC 7599, both spirals, lie 12' to the east-northeast. Including NGC 7582, this foursome of galaxies is known as the Grus Quartet.

OBJECT #727	94 Aquarii
Constellation	Aquarius
Right ascension	23h19m
Declination	-13°28'
Magnitudes	5.3/7.3
Separation	12.7"
Type	Double star

Look for our next target 6.4° east-northeast of magnitude 3.3 Skat (Delta [δ] Aquarii). You'll find a pretty pair featuring a yellow primary shining 2 magnitudes brighter than its orange companion.



Object #728 NGC 7606 Adam Block/Mount Lemmon SkyCenter/University of Arizona

OBJECT #728	NGC 7606
Constellation	Aquarius
Right ascension	23h19m
Declination	-8°29'
Magnitude	10.8
Size	4.4' by 2.0'
Type	Barred spiral galaxy

Our next object lies slightly less than 1° southeast of magnitude 4.9 Chi (χ) Aquarii. NGC 7606 is an inclined spiral, but its arms lie tightly wound about the core, so you won't be observing them through normal-sized amateur telescopes. Look for a broadly concentrated core that occupies about half the overall length. The arms lie outside of that bright region, and then there's a rapid fade to the blackness of space.

OBJECT #729	NGC 7626
Constellation	Pegasus
Right ascension	23h21m
Declination	8°13'

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Magnitude	11.1
Size	2.4' by 1.9'
Type	Elliptical galaxy

Head 2.6° northwest of magnitude 4.3 Theta (θ) Piscium, just over the Pegasus border, to find this giant elliptical galaxy. It and its near twin, NGC 7619, which lies just 7' to the west, are the brightest members of the Pegasus I galaxy cluster. Despite being nearly 200 million light-years away, the two appear quite bright. An 8-inch telescope shows each galaxy as a bright core immersed in a featureless halo. Both galaxies have a slightly oval appearance.



Object #730 The Bubble Nebula (NGC 7635) Brad Ehrhorn/Adam Block/NOAO/AURA/NSF

OBJECT #730	NGC 7635
Constellation	Cassiopeia
Right ascension	23h21m
Declination	$61^\circ 12'$
Size	15' by 8'
Type	Emission nebula
Other names	The Bubble Nebula, Caldwell 11

The bright open cluster M52 in Cassiopeia serves as a guide to the Bubble Nebula. Observing it will give you a glimpse of how a star interacts with what's around it.

The remarkably spherical bubble marks the boundary between an intense wind of particles from a massive, hot star, BD+602522, and the nebula's interior. The central star is 40 times more massive than the Sun and emits a stellar wind moving at 4 million mph (7 million km/h). The bubble's surface actually marks the leading edge of this wind's gust front, which slows as it plows into the denser surrounding material.

The bubble's surface is not uniform because, as the shell expands outward, it encounters gaseous regions of different densities that impede the expansion by differing amounts. More material lies to the northeast than to the southwest, so the wind progresses less in that direction, offsetting the central star from the bubble's center.

Sir William Herschel discovered the Bubble Nebula in 1787. Of it, he wrote, “A star of 9th magnitude with very faint nebulosity of small extent about it.” The star measures a magnitude brighter than Herschel’s estimate, but his assessment of the nebula was correct — it’s faint.

An 8-inch telescope at a dark site barely shows NGC 7635 as a 3' by 1' arc surrounding the star. This wisp of light floats in a rich field of faint background stars. Through a 16-inch scope, you’ll see the whole bubble. Try to detect a fainter haze north of the bright arc and separated from it by a dark lane. A nebula filter will help you see this object better.

OBJECT #731	NGC 7640
Constellation	Andromeda
Right ascension	23h22m
Declination	40°51'
Magnitude	11.3
Size	10.0' by 2.2'
Type	Barred spiral galaxy

Near Andromeda’s border with Lacerta is where you’ll find our next object. It lies 4° east-southeast of magnitude 3.6 Omicron (*o*) Andromedae. An 8-inch telescope brings out the general lens shape, which is the stretched-out core and the first hint of spiral arms. Move up to a 12-inch scope, and you’ll see faint extensions to the north and south. Large star-forming regions near the core give NGC 7640’s surface an uneven texture.



Object #732 M52 Anthony Axiomamitis

OBJECT #732	M52 (NGC 7654)
Constellation	Cassiopeia
Right ascension	23h24m
Declination	61°35'
Magnitude	6.9
Size	12'
Type	Open cluster

Messier's 52nd entry is a fine open cluster observers with the sharpest eyes may just discern from the darkest locations. To find it, draw a line from magnitude 2.2 Alpha (α) Cassiopeiae to magnitude 2.3 Beta (β) Cas. That distance is 5° . Now extend the line another 6° , and you'll land on M52.

Through an 8-inch telescope you'll see at least 75 stars ranging from 9th to 12th magnitude. The cluster appears well defined against the starry background, particularly on its western edge. A prominent clump of six stars lies on the eastern edge.



Object #733 The Blue Snowball (NGC 7662) Adam Block/NOAO/AURA/NSF

OBJECT #733	NGC 7662
Constellation	Andromeda
Right ascension	23h26m
Declination	42°33'
Magnitude	8.3
Size	12''
Type	Planetary nebula
Other names	The Blue Snowball, Caldwell 22

If you have access to an 8-inch or larger telescope, look in the northern part of the constellation Andromeda for a planetary nebula called the Blue Snowball. You'll see immediately why astronomers gave it that name.

The Blue Snowball shines at magnitude 9. Luckily, its light isn't spread out over a large area. NGC 7662 — another designation for this object — measures only 2.2' across. This small size concentrates the planetary's light, allowing it to trigger your eyes' color receptors. If you're looking for (or wanting to show somebody) color in a deep-sky object, look no further than the Blue Snowball.

That being said, different observers have described it as pale blue, faint blue, light blue, Robin's-egg blue, slightly blue, whitish-blue, and, occasionally, various shades of light green. What's more, nobody's wrong. Each of us has our own sense of color perception, and it may differ a little or a lot from the observer next in line.

Through an 8-inch scope, the Blue Snowball appears as a small, evenly illuminated disk. You won't see the 13th-magnitude central star in anything less than a 16-inch scope, so search for other details, like the nebula's rich inner structure.

Look for a bright ring of gas surrounding NGC 7662's hollow center. A fainter gas shell — tough to see — encompasses the ring. The ring's brightest areas lie to the northeast and southwest. At magnifications above 300×, the brightness of the shell drops quickly near its edge.

OBJECT #734	NGC 7678
Constellation	Pegasus
Right ascension	23h29m
Declination	22°25'
Magnitude	11.3
Size	2.3' by 1.7'
Type	Spiral galaxy

Here's another nice deep-sky treat that disproves the notion that nothing lies within Pegasus' Great Square. NGC 7678 lies 1.2° southeast of magnitude 4.4 Upsilon (v) Pegasi. This face-on spiral has tightly wrapped arms that only begin to reveal themselves through 14-inch telescopes at high power. Note the nice isosceles triangle of 12th-magnitude stars that frames the galaxy.

OBJECT #735	NGC 7686
Constellation	Andromeda
Right ascension	23h30m
Declination	49°08'
Magnitude	5.6
Size	15'
Type	Open cluster

Our next object is one you'll be able to spot with your naked eyes from a dark site. Through a 4-inch scope, about 20 stars appear, ranging in magnitudes from 7.5 to 11. Look for this cluster 3° north-northwest of magnitude 3.8 Lambda (λ) Andromedae.

OBJECT #736	UGC 12613
Constellation	Pegasus
Right ascension	23h29m
Declination	14°45'
Magnitude	12.6
Size	4.6' by 2.8''
Type	Dwarf irregular galaxy
Other name	The Pegasus Dwarf

Our next target, the Pegasus Dwarf (UGC 12613), isn't bright, but it's one you should seek out. It lies just below the Great Square of Pegasus. The Pegasus Dwarf is one of the most distant members of our Local Group of galaxies. At a distance of 5.7 million light-years, it sits a bit more than twice as far from us as the Andromeda Galaxy (M31).

Through a 10-inch telescope, this dwarf irregular appears as a dim mist twice as long as it is wide. Don't expect to see many details. You'll find it 5.8° due east of Markab (Alpha [α] Pegasi).



Object #737 Cederblad 211 Adam Block/Mount Lemmon SkyCenter/University of Arizona

OBJECT #737	Cederblad 211
Constellation	Aquarius
Right ascension	23h44m
Declination	-15°17'
Size	2' by 1'
Type	Emission nebula

This ultra-faint patch of nebulosity surrounds the variable star R Aquarii. It's a challenge object even through a 24-inch telescope, so be warned.

You'll need an Oxygen-III filter and an eyepiece that will provide a magnification of 300× or more. Look for two tiny (10''-long) streaks that extend from R Aquarii to the west-southwest and the east-northeast. Observers have postulated that the nebula may be easier to see when R Aquarii is near its minimum brightness.

OBJECT #738	R Aquarii
Constellation	Aquarius
Right ascension	23h44m
Declination	-15°17'
Magnitude range	6-12
Period	386.96 days
Type	Variable star

This Mira-type variable star (for Mira, see Object #822) takes a bit more than a year to cycle through a 6-magnitude brightness range. When it's at maximum brightness, the star is usually barely visible without optical aid from a dark site. If you enjoy variable-star observing, R Aquarii is one to watch. Both its minimum and maximum brightnesses vary by more than a magnitude.

OBJECT #739	NGC 7741
Constellation	Pegasus
Right ascension	23h44m
Declination	26°05'
Magnitude	11.3
Size	4.0' by 2.7'
Type	Barred spiral galaxy

Our next object requires an 8-inch telescope to reveal its details. Through such an instrument at 100×, NGC 7741 appears as a mottled, round haze. Move up to a magnification of 250×, and you'll see the uniformly lit bar that extends from east to west across the glow. Apertures of 18 inches or more show hints of the faint surrounding spiral arms.

A nice double star consisting of magnitude 9.8 GSC 2254:1685 and magnitude 11.9 GSC 2254:1349 lies at the northern edge of the halo and points to the galaxy's core. Approximately 20'' separates the two stars.

You'll find NGC 7741 6.2° west-southwest from magnitude 2.0 Alpheratz (Alpha [α] Andromedae).

OBJECT #740	NGC 7762
Constellation	Cepheus
Right ascension	23h50m
Declination	68°02'
Magnitude	10.0
Size	15'
Type	Open cluster

You'll find our next target a bit more than 6° east-northeast of magnitude 3.5 Iota (ι) Cephei. Look carefully. NGC 7762 has a tendency to fade into the background when viewed with medium to high magnifications. Back off the power initially, and then increase it in steps to see several dozen 11th- and 12th-magnitude stars across this cluster's face.

OBJECT #741	NGC 7788
Constellation	Cassiopeia
Right ascension	23h57m

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Declination	61°24'
Magnitude	9.4
Size	4.0'
Type	Open cluster

Our next celestial target, NGC 7788, is the most northwestern of a line of three open clusters. The brightest, magnitude 8.5 NGC 7790 (Object #743), lies 17' to the southeast. Continue the line another 20' to the southeast, and you'll encounter magnitude 9.7 Berkeley 58. To find this group, start at magnitude 2.3 Caph (Beta [β] Cassiopeiae), and move 2.5° northwest.



Object #742 The Screaming Skull (NGC 7789) Anthony Ayiomamitis

OBJECT #742	NGC 7789
Constellation	Cassiopeia
Right ascension	23h57m
Declination	56°44'
Magnitude	6.7
Size	15'
Type	Open cluster
Other names	The Crab Cluster, Herschel's Spiral Cluster, the Screaming Skull

You'll find this terrific open cluster midway between magnitude 5.0 Sigma (σ) Cassiopeiae and magnitude 6.0 Rho (ρ) Cas. Even through a 4-inch telescope, you'll see 50 stars evenly spread across this rich cluster's face. An 8-inch telescope shows more than a hundred members and the number just keeps increasing with aperture.

Because so many equally bright stars occupy your view, your eyes will have a tendency to create patterns. Some observers see dark lanes between lines of stars. I see a stellar pattern that resembles a pinwheel, or a face-on spiral galaxy with four distinct arms. Some observers note the apparent counter-clockwise spiral pattern of the stellar “arms” of this cluster. Because British astronomer Caroline Herschel discovered this object in 1783, this feature led to the nickname Herschel’s Spiral Cluster.

NGC 7789 (long before it had an NGC number) was the last deep-sky object Admiral Smyth described in his 1844 epic *Cycle of Celestial Objects*. He said, “It is, indeed, a very glorious assemblage, both in extent and richness, having spangly rays of stars which give it a remote resemblance to a crab, the claws reaching the confines of the space in view, under an eyepiece magnifying 185 times. With this form in the mind’s eye, the imagined head will be in the *np* [north preceding, i.e. northwest], the tail in the *sf* [south following, i.e. southeast], and where the eyes would be, is the minute close double star of the 11th and 12th magnitudes, above estimated. There are several other pairs in the figure, especially towards the tail. The crab itself is but a mere condensed patch in a vast region of inexpressible splendour, spreading over many fields.”

Astronomy magazine Contributing Editor Stephen James O’Meara sees a skull with an open mouth. Most importantly, however, what do you see?

OBJECT #743	NGC 7790
Constellation	Cassiopeia
Right ascension	23h58m
Declination	61°13'
Magnitude	8.5
Size	17'
Type	Open cluster

Our next target lies 2.5° northwest of magnitude 2.3 Caph (Beta [β] Cassiopeiae). Although you can see this cluster through binoculars, you’ll need at least a 4-inch scope to resolve it well. You’ll easily spot several dozen stars in an area half as wide as the Full Moon. The background stars here are dense, but the cluster stands out nicely. Two other open clusters flank NGC 7790: Magnitude 9.4 NGC 7788 lies 17' to the northwest, and magnitude 9.7 Berkeley 58 sits 20' to the southeast.

OBJECT #744	NGC 7793
Constellation	Sculptor
Right ascension	23h58m
Declination	-32°36'
Magnitude	9.0
Size	9.3' by 6.3'
Type	Spiral galaxy
Other name	Bond’s Galaxy

Northern Hemisphere observers would be a lot more familiar with this galaxy if it didn’t lie in the southern constellation Sculptor. It’s bright, relatively large, and it has good surface brightness across its face-on view.

To find it, look 4.9° south-southeast of magnitude 4.6 Delta (δ) Sculptoris. NGC 7793 takes high magnification well, so crank the power past 250 \times . Only then do you have a chance to see the slightly darker markings in the many broad spiral arms.

American astronomer George Phillips Bond (1825–1865) discovered this galaxy in 1850 from Cambridge, Massachusetts. He found it while using a 4-inch *f*/8 refractor to search for comets.

OBJECT #745	Sigma (σ) Cassiopeiae
Constellation	Cassiopeia
Right ascension	23h59m

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Declination	55°45'
Magnitudes	5.0/7.1
Separation	3"
Type	Double star

Look for Sigma Cas 3.7° south of magnitude 2.3 Caph (Beta [β] Cassiopeiae). The two components lie fairly close together, so use a magnification near 150 \times to get a nice split. Many observers describe both stars as white, but bluish-white seem to be the next most chosen colors.



Object #746 NGC 7814 Adam Block/NOAO/AURA/NSF

OBJECT #746	NGC 7814
Constellation	Pegasus
Right ascension	0h03m
Declination	16°09'
Magnitude	10.6
Size	6.0' by 2.5'
Type	Spiral galaxy
Other name	Caldwell 43

Our next target lies 2.6° west-northwest of magnitude 2.8 Algenib (Gamma [γ] Pegasi), and it's a good one: NGC 7814. Small telescopes reveal this object's football shape, but with more tapered ends. The central region spans a third of NGC 7814's length. This galaxy does have a prominent dust lane captured by many astroimagers. You'll need a huge telescope to have a chance to see it, however. Through a 20-inch scope, crank the magnification past 400 \times , and look for two thin lines that emanate from points outside the core, and cross the galaxy's long axis.

OBJECT #747	NGC 7822
Constellation	Cepheus
Right ascension	0h03m
Declination	68°37'
Size	65' by 20'
Type	Emission nebula

Our next target, emission nebula NGC 7822, is a challenge object through a 12-inch telescope. You'll find it not quite 7.5° east of magnitude 3.5 Iota (*i*) Cephei. Its seemingly huge size only becomes apparent through imaging. What you'll see visually (and, I suggest a nebula filter) appears like a thin cloud half as wide and long as the above measurements. If you see NGC 7822, it's worth going after Cederblad 214, another faint nebula just 5' to the northeast.

OBJECT #748	NGC 7840
Constellation	Pisces
Right ascension	0h07m
Declination	8°23'
Magnitude	15.5
Size	0.4'
Type	Elliptical galaxy
Notes	The last NGC object

The last object in the NGC catalog isn't as easy to find as the first but it's worth the effort, I think, just to "bookend" the *New General Catalogue*. To locate it, first find the magnitude 13.4 spiral galaxy NGC 3. It lies 2.4° northeast of magnitude 4.0 Omega (ω) Piscium. NGC 7840 lies 5' north-northwest of NGC 3, and it's really faint and small. It glows dimly at magnitude 15.5 and measures a scant 0.4' across. You won't have much luck searching for this object through telescopes smaller than 16' in diameter.

OBJECT #749	NGC 1
Constellation	Pegasus
Right ascension	0h07m
Declination	27°43'
Magnitude	13.6
Size	1.7' by 1.2'
Type	Spiral galaxy

Those of you with 8-inch or larger telescopes who observe under a dark sky can search for spiral galaxy NGC 1. I like pointing this object out to fellow amateur astronomers because few have seen it. Although this object lies in Pegasus, it sits really close to that constellation's border with Andromeda.

Look for this magnitude 12.8 object 1.4° south of 2nd-magnitude Alpheratz (Alpha [α] Andromedae). Don't expect to see much detail through anything smaller than a 20-inch telescope, but, hey! At least you can say you've observed the first object in the *New General Catalogue*.

As you observe NGC 1, avert your gaze less than 2' south to spot another spiral galaxy, NGC 2. At magnitude 14.2, this object poses more of a challenge than NGC 1. NGC 2 measures 1' by 0.6'.

OBJECT #750	NGC 40
Constellation	Cepheus
Right ascension	0h13.0m
Declination	72°32'
Magnitude	12.4

(continued)

Size	37"
Type	Planetary nebula
Other names	The Bow-Tie Nebula, Caldwell 2

Our next celestial wonder sits unassumingly near the head of Cepheus the King. Despite its low overall magnitude, the Bow-Tie Nebula makes a fine target through all telescopes because its surface brightness is high. The Bow-Tie sits 5.5° south-southeast of the star marking the head of Cepheus the King, magnitude 3.2 Gamma (γ) Cephei.

As is the case with many of our celestial wonders, NGC 40 is a discovery of Sir William Herschel. He found it November 25, 1787.

An object's magnitude tells observers how bright the object appears. For objects that are not point-sources, like galaxies, integrated magnitude compares all the light from the object to the light of a single star. For NGC 40, then, magnitude 11 means its total light output equals that of a magnitude 11 star.

If you combine magnitude with surface brightness, you get a better description of how easily you'll see an astronomical object. Surface brightness is given in units of magnitude per square arcsecond. Let's compare NGC 40 with an equally bright galaxy that measures $6'$ across. Because the galaxy covers an area 100 times greater than NGC 40, its surface brightness is only 1% of NGC 40's. So, the Bow-Tie Nebula will be much easier to see.

A dear friend, Alaskan amateur astronomer Jeff Medkeff (1968–2008) developed a simple rule of thumb to help him determine how difficult a nebula or galaxy will be to see. He multiplied the magnitude by the surface brightness. This gave him a number (no units, just a number). The higher that number, the tougher the object will be to observe.

A 4-inch telescope at a dark site will reveal an oval disk about one-third longer than it is wide. The magnitude 11.6 central star appears bright compared to the nebula. Through a 10-inch scope, NGC 40's disk shows several bright knots toward the southeast and northwest. Increase the magnification to $200\times$ (if the seeing permits), and look for a dark cavity between the shell and the central star.

I rate this planetary as one of the most surprising in the sky. It never fails to delight when I show it to other observers.

OBJECT #751	NGC 45
Constellation	Cetus
Right ascension	0h14m
Declination	$-23^\circ 10'$
Magnitude	10.7
Size	$8.5'$ by $5.9'$
Type	Spiral galaxy

Observing NGC 45 isn't that straightforward because of two stars in the field of view. Right in front of the galaxy sits magnitude 9.9 SAO 166133. Then, not even $5'$ to the west-southwest, sits magnitude 6.5 GSC 6413:626.

Through an 8-inch telescope, you'll see the galaxy's condensed nucleus. Spotting the spiral arms takes at least 16 inches of aperture, and, even through that size scope, they're not all that bright.

You'll find NGC 45 about 8.5° southwest of magnitude 2.0 Diphda (Beta [β] Ceti).

OBJECT #752	NGC 55
Constellation	Sculptor
Right ascension	0h14.9m
Declination	$-39^\circ 11'$
Magnitude	8.1
Size	$30'$ by $6.3'$
Type	Barred spiral galaxy
Other names	Caldwell 72, the Southern Cigar Galaxy

You'll find this magnificent object 3.7° northwest of magnitude 2.4 Ankaa (Alpha [α] Phoenicis). Be prepared to spend some high-quality time observing it.

This galaxy's core lies distinctly offset to the west, giving the object a tapered, cigar-like appearance at low power and a two-part appearance at high magnifications. You'll see the faint dark lanes that divide the arms best if you use averted vision.

NGC 55 also is one of the sky's few galaxies that will benefit from a nebula filter. Because it's big and bright, an OIII filter will dim its stars, therefore increasing the contrast with star-forming regions of ionized hydrogen. Several of these are visible along the galaxy's arms through a 12-inch scope.

Finally, for those of you with large amateur telescopes, look for a magnitude 15.3 galaxy off NGC 55's eastern tip. That's PGC 599897. It measures approximately $2'$ by $1'$.



Object #753 IC 10 Adam Block/NOAO/AURA/NSF

OBJECT #753	IC 10
Constellation	Cassiopeia
Right ascension	0h20m
Declination	$59^\circ 18'$
Magnitude	11.3
Size	$7.3'$ by $6.4'$
Type	Irregular galaxy

Pan 1.4° east of magnitude 2.3 Caph (Beta [β] Cassiopeiae), and you'll find a member of the Local Group of galaxies. Even though it's close (2 million light-years), don't get your hopes up. IC 10's not all that bright, and it's pretty big as galaxies go. Even professional astronomers didn't recognize this diffuse object as a galaxy until 1935.

Through a 12-inch telescope, IC 10 appears amorphous. Larger scopes reveal many star-forming regions that lie in the galaxy's plane.