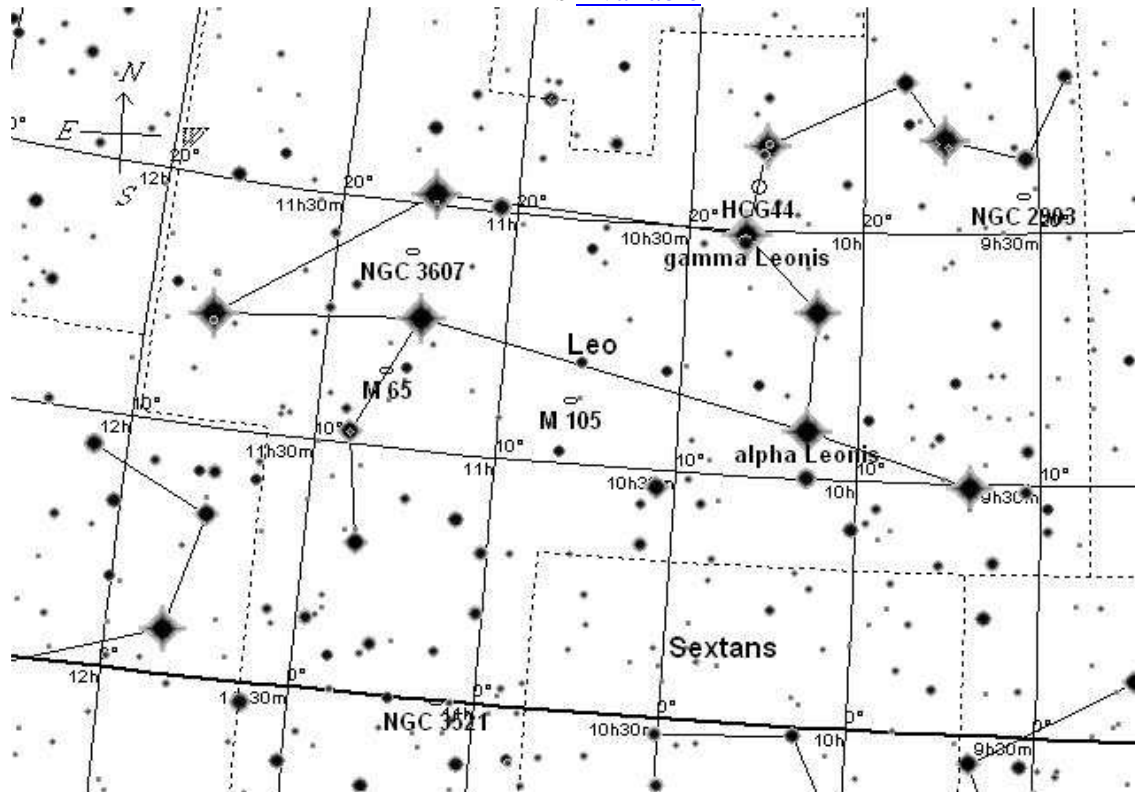


Small Wonders: Leo

A Monthly Guide to the Night Sky

by Tom Trusock

A PDF is [Available](#)



Wide field Chart

Target List	Name	Type	Size	Mag	RA	DEC
	alpha Leonis	Star	1.4	10h 08m 39.8s	+11° 56' 30"	
	gamma Leonis	Star	2.0	10h 20m 16.6s	+19° 48' 54"	
	UGC 5470	Galaxy	10.7'x8.3'	10.2	10h 08m 41.6s	+12° 16' 28"
	M 65	Galaxy	9.8'x2.9'	9.2	11h 19m 12.9s	+13° 03' 41"
	M 95	Galaxy	7.4'x5.0'	9.8	10h 44m 15.2s	+11° 40' 32"
	M 96	Galaxy	7.8'x5.2'	9.3	10h 47m 03.2s	+11° 47' 31"
	M 105	Galaxy	5.3'x4.8'	9.5	10h 48m 06.9s	+12° 33' 11"
	NGC 2903	Galaxy	12.6'x6.0'	8.8	09h 32m 28.3s	+21° 28' 37"
	NGC 3521	Galaxy	11.2'x5.4'	9.2	11h 06m 05.6s	-00° 03' 58"
	NGC 3607	Galaxy	4.6'x4.0'	9.9	11h 17m 12.0s	+18° 01' 22"
	NGC 3628	Galaxy	13.1'x3.1'	9.6	11h 20m 34.0s	+13° 33' 38"
Challenge Object	Name	Type	Size	Mag	RA	DEC
	HCG44	Galaxy Cluster	11.5	10h 18m 24.3s	+21° 46' 27"	

To many Leo's appearance means spring and what's more, signals the start of big game

season for serious deep sky aficionados. You won't find the typical amateur thinking about globulars, planetary nebulas or open clusters when Leo pops into sight - no, Leo's all about galaxies, and for many, it's an introduction to touring the depths of the Virgo-Coma supercluster.

Trivia: What's the brightest known planetary nebula in Leo?

In Greek astro-mythology, Leo symbolizes the Nemean lion that was the first of Hercules' 12 Great Labors. Hercules was sent to kill Leo but found that his weapons could not pierce the skin. Undaunted, he cornered the great beast in a nearby cave and strangled it to death with his bare hands. Using one of Leo's own claws to cut the impervious skin Hercules then fashioned a set of impenetrable armor.

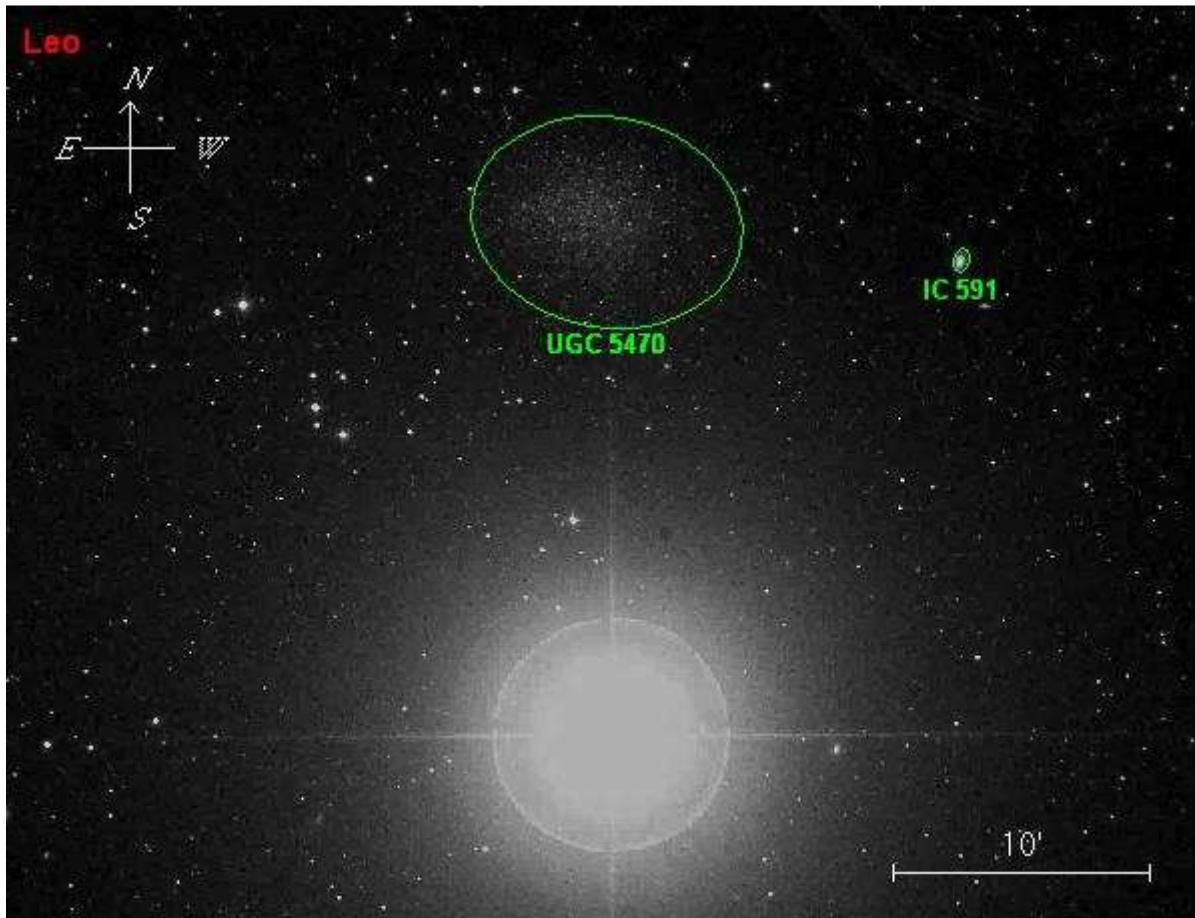
Leo is home to one of the most obvious asterisms in the night sky - the sickle or backwards question mark that makes up his head. Leo is a large zodiacal constellation which spans 947 square degrees and is located off the milky way. Leo and is rich in galaxies, galaxy clusters and quasars, and poor in those "local" deep sky objects like nebulae, planetaries, and star clusters. A quick search of the Abell and Hickson Galaxy Cluster (100 entries total) catalogs shows no less than 191 Abell's and 11 Hicksons (Hickson 57 - Copeland's Septet, 38, 44, 46, 47, 51, 52, 53, 54, 58, and 59) residing in Leo, and a quick search for quasars turns up no less than 199. The brightest quasar found in Leo is PG 1116+215 at mag 14.7. I'm not even going to speculate on the number of galaxies which lie in it's confines. Suffice it to say, if you are a galaxy aficionado, your season's arrived.

But don't look at the obscure catalogs and faint magnitudes and get the idea that Leo's a constellation for big scope owners - by no means! There are several bright galaxies, a couple of nice double stars, and even one (or more) of those obscure entries - a Hickson Cluster of Galaxies (HCG) - within the reach of the small scope owner. As usual, it's all about where and when you look.

Lets start off with the two of the more interesting stars in the constellation and their environs:

Alpha Leonis / Leo I Dwarf Elliptical Galaxy, Gamma Leonis

Located at the base of the sickle, Alpha (or Regulus) is the 21st brightest star in the night sky (mag 1.36), and lies about 77 light years from us. Regulus actually has two gravitationally bound companions making it a true triple star system. Telescopic observers will see it as a wide double, with it's companion (which is a double itself, thus yielding the third gravitationally bound member) being some 7 magnitudes fainter. The faint companion stars are in a thousand year orbit around the primary. To my eyes, Regulus is a nice blue white, with it's solitary companion (~mag 8) being a whitish yellow. If it weren't for the glare of the primary, this would be an easy split for nearly any telescope.

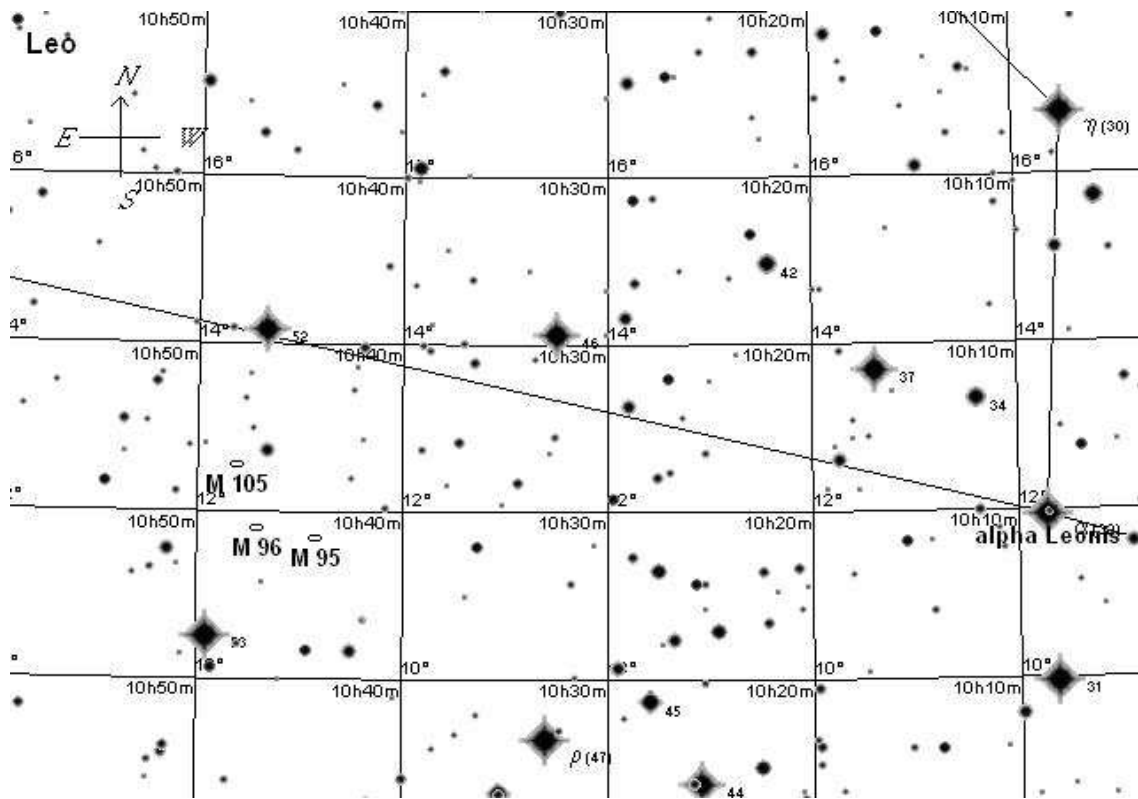


Leo I lies 20' North of Regulus

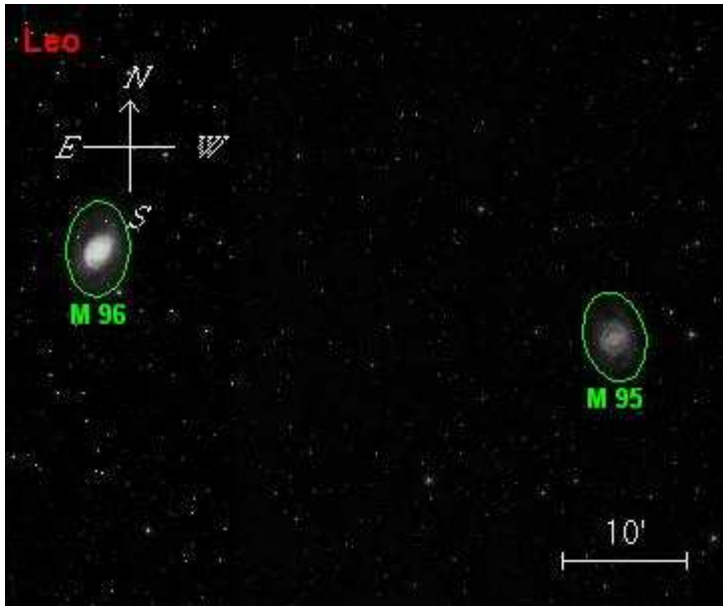
If you have a large telescope, look for the 10th magnitude **Leo I Dwarf Galaxy** (UGC 5470) lying a mere 1/3 degree to the north. This member of the local group would be a much easier catch for a moderate sized scope if it weren't for the glare of nearby Regulus. Walter Scott Houston relates that Leo I lay undiscovered until the 1950's when it was discovered photographically the 48" Schmidt camera on Mt. Palomar.

The third star up the sickle from Alpha is Gamma (or Algieba). With a visual magnitude of 2.0, it's outshone by it's nearby neighbor, but it's companion is several orders of magnitude brighter - mag 3.16, and most will find it a more visually interesting double. This one requires a little higher power - small scopes will usually show it as a peanut around 40-50x, and require powers around 75-100x to split. To my eyes, both stars appear a vibrant golden color. Gamma is the radiant of the November Leonids.

M95, M96, M105 / 3371 / 3373



M95 - Dean Rowe



Now lets move from double stars to some of the DSO showpieces in Leo - its galaxies. Leo is home to five messier galaxies, and a host of goodies that Messier missed. Our first stop will be the first "Leo Triplet": M105, M96 and M95.

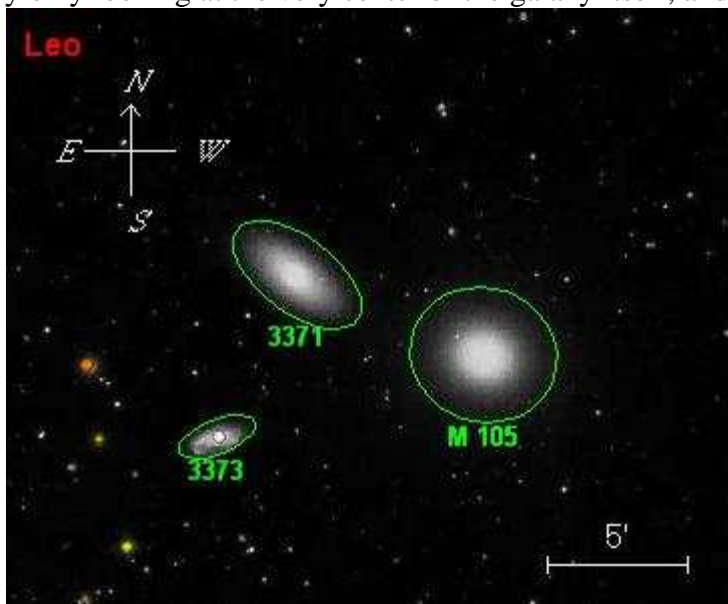
In a wide field scope, these three bright galaxies are all easily found in the same field of view - for example, they can all easily be seen in the same low power / wide field eyepiece in both my 4" f8.6 apo, and my 8" f5 reflector, but detailed inspection requires higher powers.

Like most denizens of the infinite depths, smaller scopes will show these galaxies only as a splash of light. In my 4" scope, under typical conditions, only the central core of M95 is visible. My 18" scope however, typically shows this to be an outstanding object and shows both the central bar and the nearly circular spiral arms coming off each end. On a good night it bears a marked resemblance to Darth Vader's Tie fighter, and is a stunning object. Astronomers have used the HST to locate Cepheids in its spiral arms and pin down a distance of around 38 million light years.

I've found M96 to have slightly more detail in small telescopes than it's neighbor. In my 4", I've noted a pronounced central brightening and a slight mottling of the surface at high powers, but again I'm really only looking at the very center of the galaxy itself, and not seeing the outlying arms which are visible in the photo(s) above. Visually, I find Messier 96 to be the brighter and more obvious of the two.

M95, M96 and M105 were discovered by Mechain in 1781 and are members of the M96 subgroup of the Leo I cloud.

Unlike the other two Messiers, M105 wasn't added to the Messier catalog until 1947. In his excellent book *The Messier Objects* O'Meara notes that



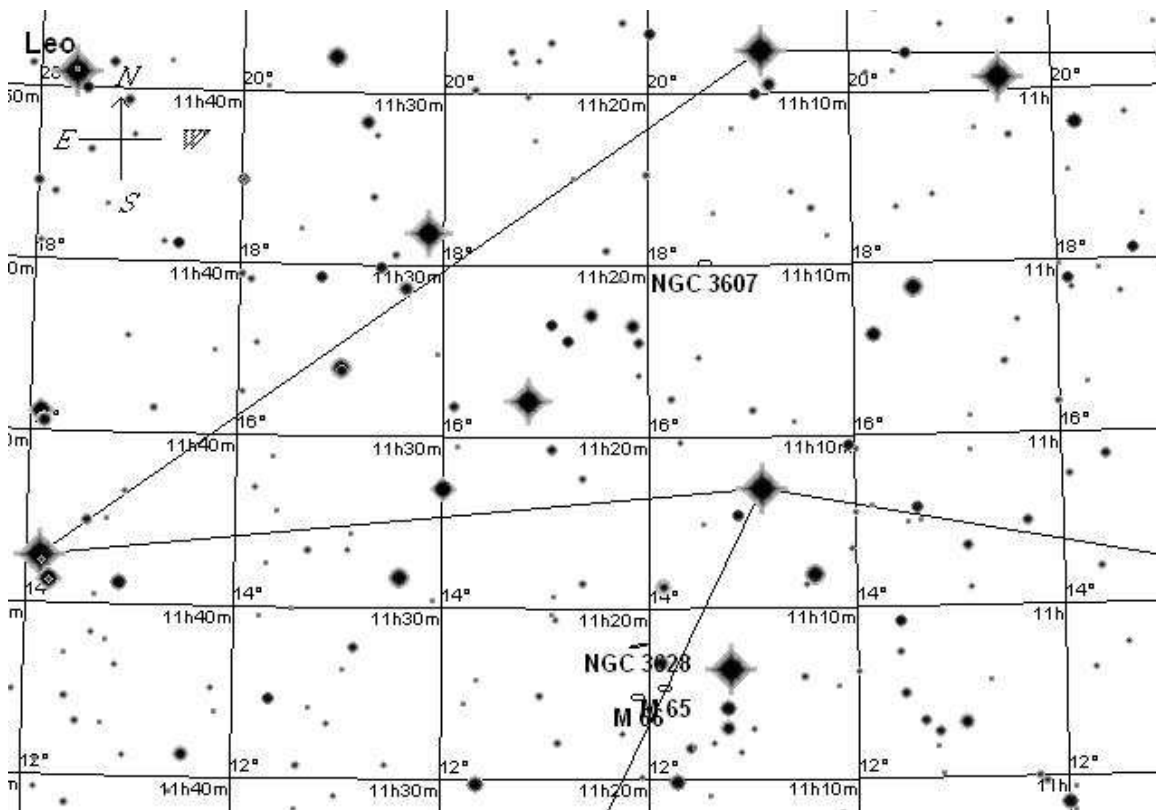
Helen Sawyer Hogg suggested adding it to the list because notes in Messiers copy of the catalog suggested he was aware of it. Sadly, there's no speculation as to why it wasn't added by Messier himself.

M105, an E1 elliptical galaxy, is accompanied by two spiral galaxies which are easily visible in moderate sized telescopes - NGC 3371 and NGC 3373. In 1997, the Hubble was pointed towards M105 (among other galaxies) to demonstrate the existence of massive black holes in most normal galaxies - M105's weighed in at 50 million solar masses - see the Hubble site link below for more information on this.

Visually, M105 appears similar at most apertures, with larger telescopes perhaps showing a slightly more pronounced brightening towards the center. What is the smallest apertures you can spot it's traveling companions, 3371 and 3373 with?

Now lets move a bit further back along the lion's body -

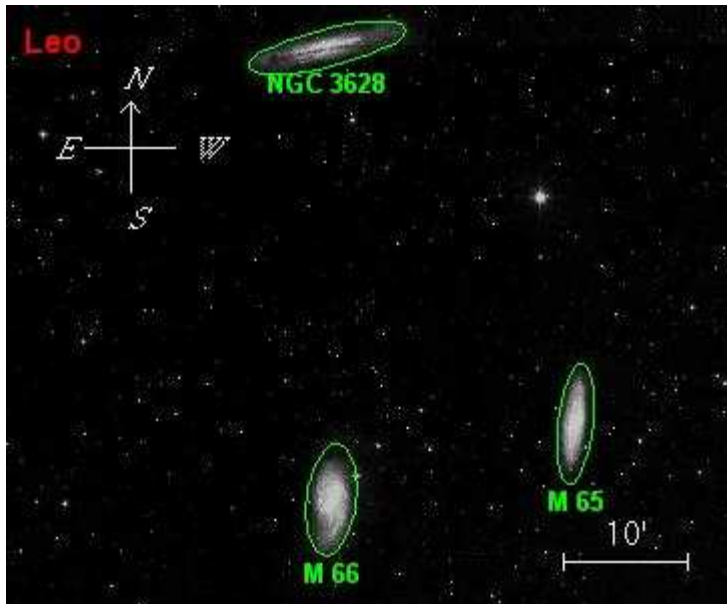
NGC 3628, M66, M65





NGC 3268, M65 and M66 - Rick Krejci

Our next Leo triplet consists of M66, M65 and NGC 3628, and again makes a wonderful grouping for a small telescope.



All three are typically visible most nights in my 4" telescope, but I find the appearance of 3628 to be very dependent on sky conditions. I've caught all three in a 70mm telescope, but never tried for the triplet in binoculars. Has anyone out there seen these three in 50mm or smaller bino's? From my experience with small telescopes, I'd suspect that M65 and M66 would be an easy catch but that NGC 3628 would be a bit more difficult. Although it's listed at a similar magnitude to the nearby messiers, it's much larger

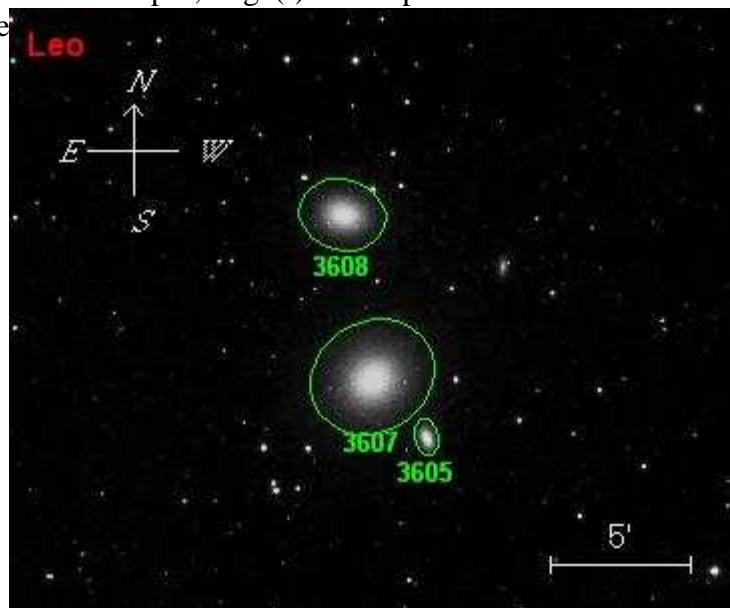
and therefore has a significantly lower surface brightness. Magnification has a rather curious effect on 3628 - a small amount can enhance it's visibility, but too much makes it disappear altogether. My notes from a session with the 4" apo state:

At 25x, 3628 appeared nearly as bright as M65 and M66, but as I added magnification it disappeared into the background. The best views were through the 13mm Nagler at 67x with all three galaxies in the same field. This grouping alone is a good way to waste an hour...

I do note that I've picked up 3628's dust lane with the 4", but have no record of seeing it with anything smaller.

While M65 is a splash of light in smaller scopes, large(r) telescope owners should look for a thin but prominent dark lane running down it's eastern side (towards M66), and a couple of stars superimposed on the foreground.

I find M66 to be the brightest of this trio. Observers should spend some time at moderate powers looking for dark patches or mottling inside the galaxy proper. Try varying the magnification and using a cloth to cover your head. The neighbors may think you a bit crazy, but I've found that if your site suffers from light trespass this little trick can significantly increase the naked eye limiting magnitude by improving my dark adaptation.



M65 and M66 were both discovered by Mechain in 1780, and all three, like the previous galaxies, are members of the Leo I Galaxy cloud (but are a different subgroup from the previous triplet).

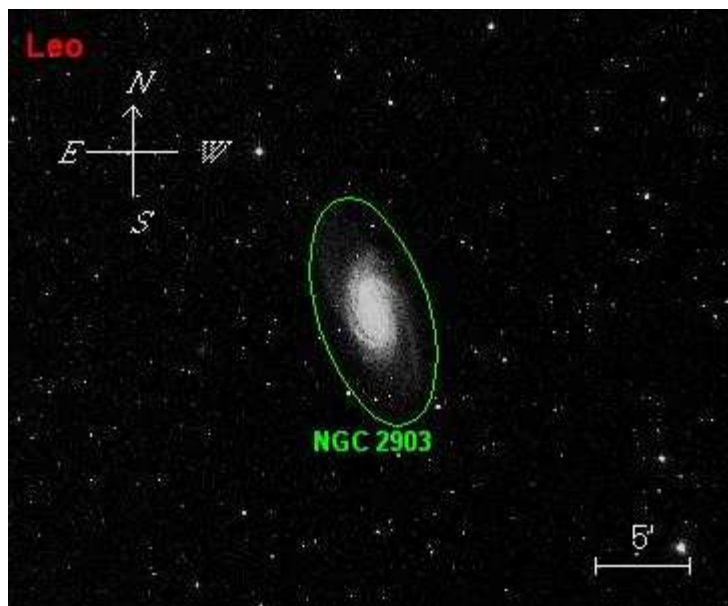
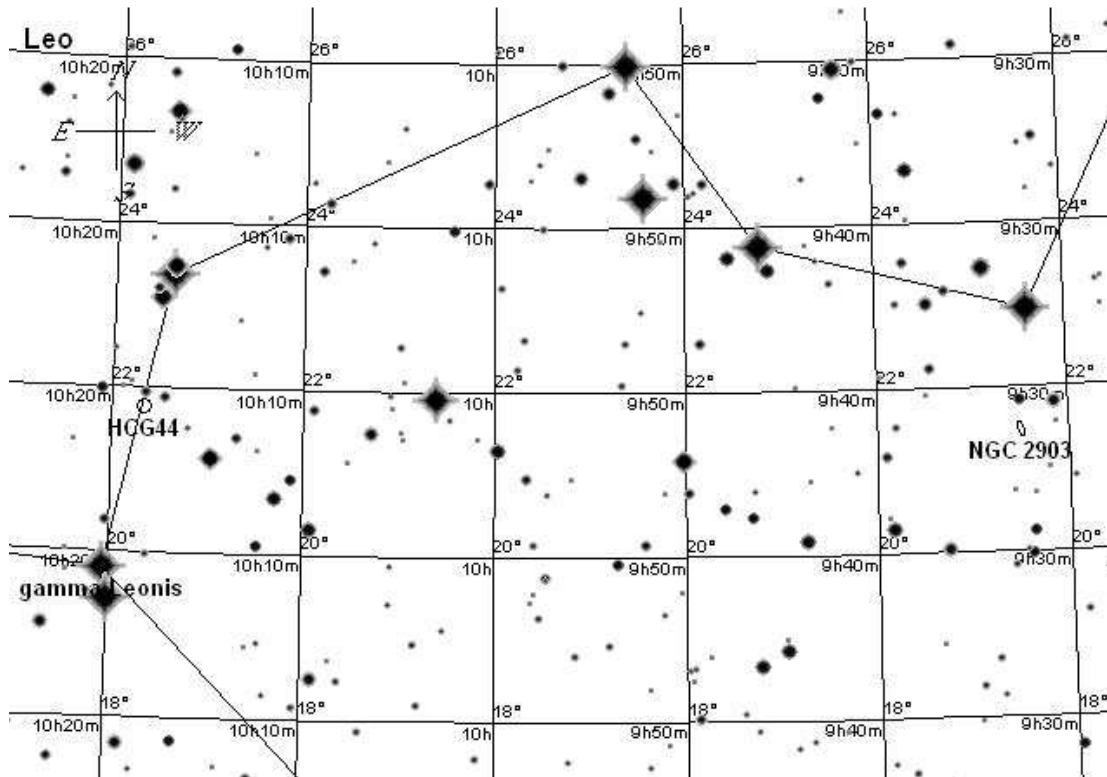
NGC 3607 / 3608 / 3605

Now point your scope about five degrees north into the body of the Lion to spot yet another galactic triplet: NGC 3608, 3607 and 3605. NGC 3607 is the brightest of this nice grouping of galaxies. What's the smallest scope you can make out all three members with? I'd suspect from dark skies you could catch them fairly easily in a 6", but I wonder has anyone seen them in a 4" or smaller?

Large scope owners should spend some time here and see how many other galaxies they

can catch. There are 14 galaxies here brighter than 15.4th magnitude (please note this is measured as a photographic magnitude in blue light rather than a visual magnitude so what you can see may actually be a little different). All of these galaxies are a member of the Leo II group. Leo II lies behind the Leo I group at about twice the distance (70 million light years).

NGC 2903



Now we follow the body of the Lion all the way around and move just off the western tip of the sickle to find NGC 2903. If you keep track of your NGC designations, this is something of a two for one since 2903 has two NGC numbers associated with it. One of the brightest non-messier galaxies, it has an HII (star forming) region located within it that's been assigned the NGC number 2905. However, I've never been able to ascertain exactly where it's located, and

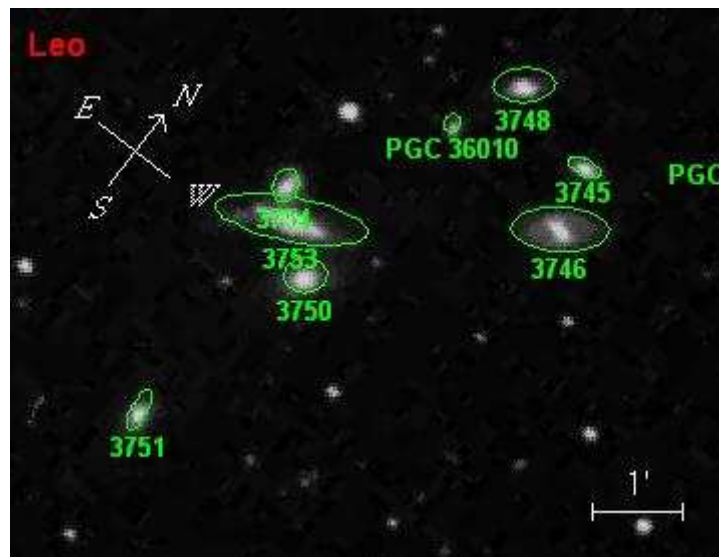
thus have never been able to confirm a sighting. If anyone can point me to an image which has 2905 labeled, I'd be very appreciative.

This is a wonderful galaxy for imagers, and for the visual observer can be seen in scopes of nearly any aperture. In the 4", it's quite large and bright, and contrary to most galaxies, takes magnification quite well. In large scopes, it's truly a spectacular sight.

Challenge Objects: Galaxy Clusters

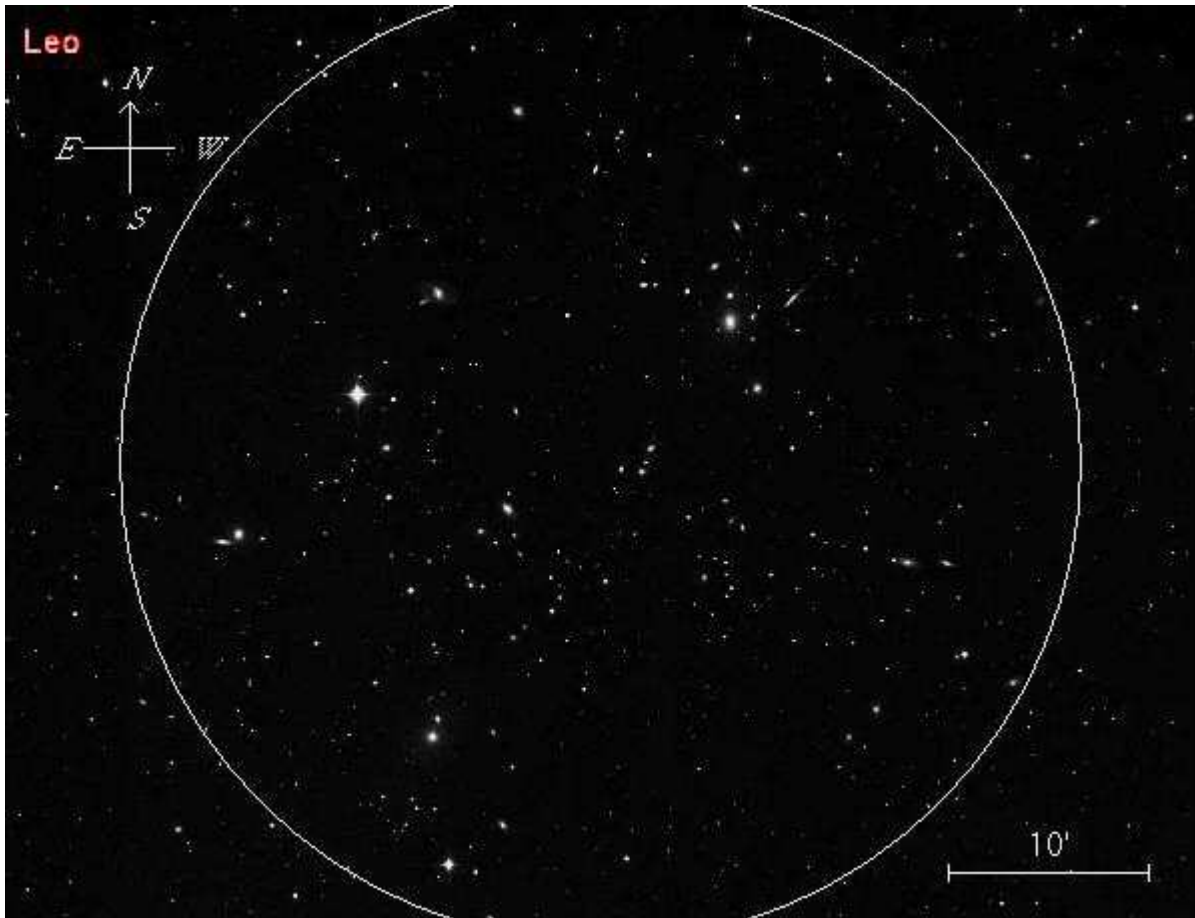
There are many different and visually interesting galaxy clusters in Leo, but not many are suitable to small telescope owners.

If you happen to have a larger scope, there's a rather nice spring counterpart to Stephan's Quintet - **Copeland's Septet (Hickson 57)**. Here you will find up to seven fairly faint NGC galaxies (all about mag 14) in a very tiny space (it should be noted that one is not technically part of the group, but simply in the optical line of sight). These are best seen in large scopes and high powers. Much like Stephan's, the impact is not from the visual scene, but rather an understanding of what, exactly one is looking at.



Copeland's Septet

Then, on the other end of the size scale lies **Abell 1367** - a massive cluster of tiny and faint galaxies which covers over a degree of the night sky.



Abell 1367 FOV through 20mm Nagler on 18" f4.5

Above is a simulated shot centered on **Abell 1367** with an 18" f4.5 telescope and a 20mm Nagler. How many galaxies do you see in this FOV? Look closely - there's over 60 - *and that's just within the FOV*. Scattered like grains of rice, I could easily identify over a dozen when I looked at this earlier this year in my 18", (13mm Nagler) with another 20 or so easily identified while scanning the nearby area. Not a one is a show stopper, but they run rampant through the field. I need to go back with detailed charts and spend some time in this area. I'd bet with some additional effort, I could identify far more.

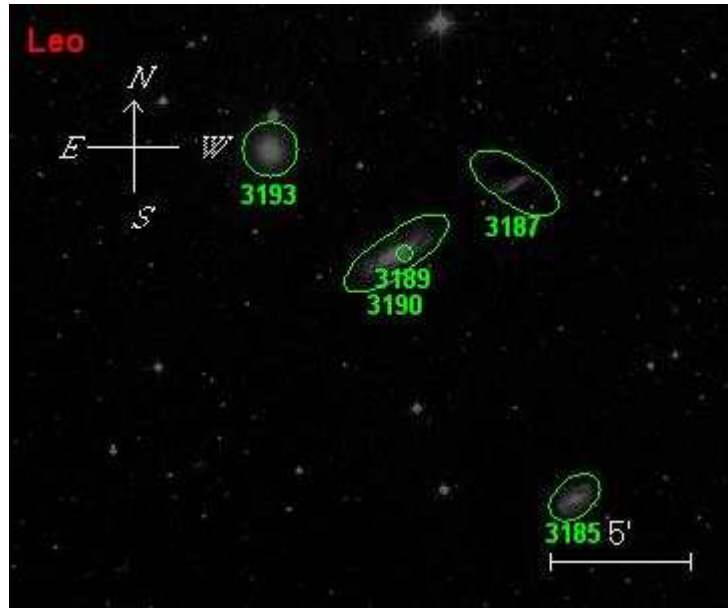
While it's not precisely centered on any one galaxy, NGC 3861 A is fairly close to the center and a good target for those using DSC's or goto. Use a moderately low power, wide field eyepiece. First looks may well give you the impression there's nothing there, but spend a few minutes, and soon you should be able to pick out tiny galaxies throughout the field of view.

Neither of these clusters is suitable for the small scope owner though.

The question arises: Is there a galaxy cluster that is? Certainly - you've been looking at parts of them all night. The two dominant ones this evening were the Leo I and Leo II clusters, but there is something that's a perhaps a bit more visually interesting for the

small scope owner, and that's our challenge object for this month.

Hickson 44



Located at the base of the Lion's neck 1/2 way between Gamma and Zeta leonis, Hickson 44 is a tight grouping of 4 fairly easily visible NGC's 3193, 3190, 3185 and 3187. 3190 and 3193 are fairly easy in small telescopes, then 3185 is next in line, and 3187 winds up being the most difficult. In an 18" scope, the group is easy and obvious, appearing much like the picture shown above - with the exception of the spiral arms on 3187, and for folks wishing to see those, I'll pass along the following tidbit: Arizona amateur Gary Myers indicated in private communication that the arms on 3187 are clearly visible in his 30" dob.

Leo contains far more objects than the few I've covered in this month's column - this is one constellation that could keep an avowed DSO fanatic busy for a long, long time.

Trivia Answer(?):

*According to SkyTools II, it's EGB 6 (PN G221.5+46.3) at mag 10.4, size 12' and a **surface brightness of 24.4**. However, all attempts to secure an image of this elusive object failed. In fact, the more digging I did into EGB 6, the more intrigued I became. If anyone can point me to a definitive explanation of what this object actually is I'd appreciate it. Photographs would also be appreciated.*

Additional Reading:

Massive Black Holes in Galaxies NGC 3377, NGC 3379 and NGC 4486b (3379 is M105)

<http://hubblesite.org/newscenter/newsdesk/archive/releases/1997/01/text/>

The Universe within 100 million Light Years - the Virgo Supercluster

<http://www.anzwers.org/free/universe/virgo.html>

Ray Cash - Observing Paul Hickson's Catalog of Compact Groups of Galaxies

<http://members.aol.com/anonglxy/hickson.htm>

*I'd love to hear of your experiences under the night sky - please feel free to e-mail me or send any observing reports to: tomt@cloudynights.com
Please indicate if I can cite your observations in future columns.*

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