Eugene Astronomical Society
www.eugeneastro.org

Io

April, 2022

PO Box 591 Lowell, OR 97452

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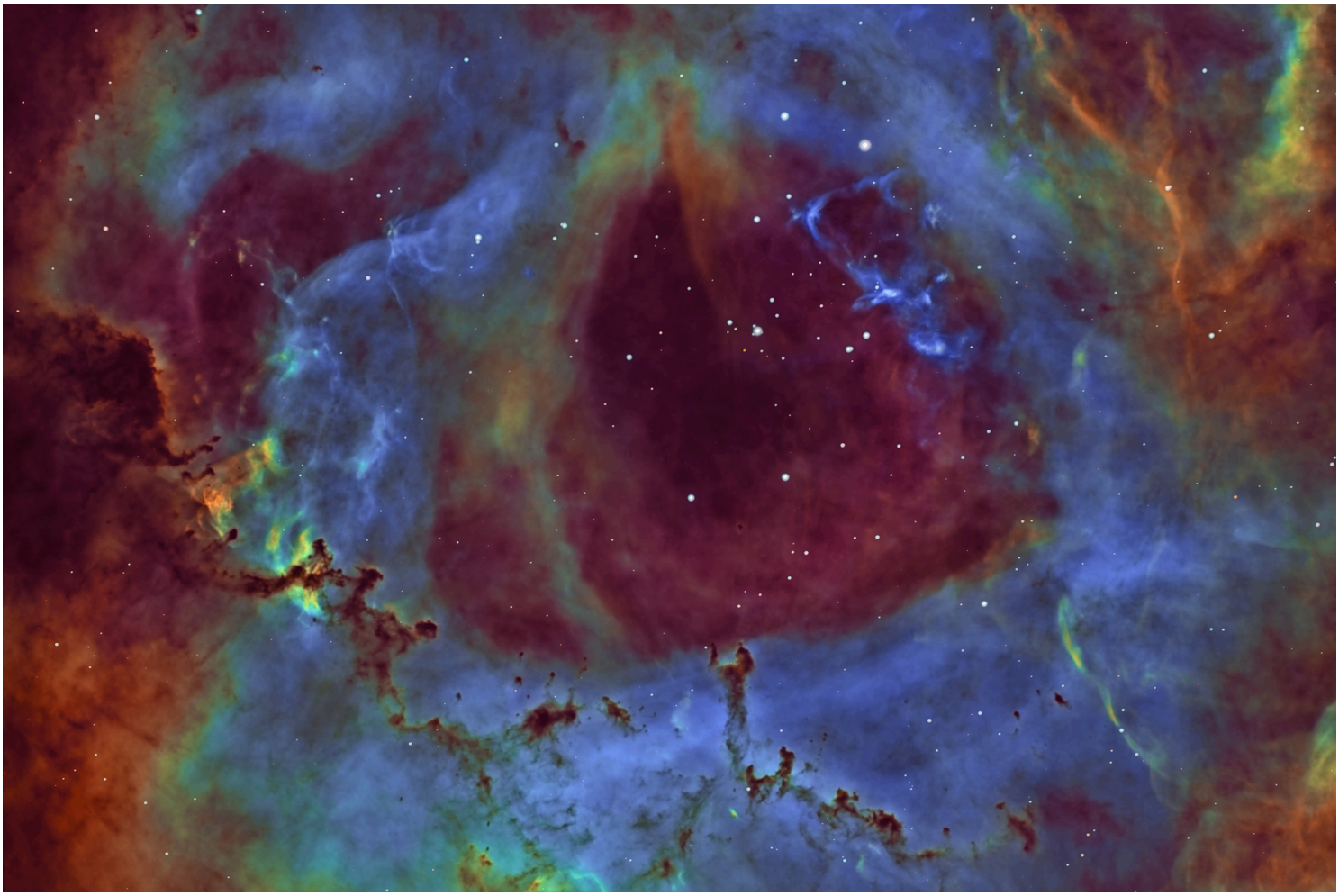

[1] NGC 2237, 2238, 2239, 2244, 2246, the Rosette Nebula in Monoceros Mark Wetzel

Eugene Astronomical Society
PO Box 591
Lowell, OR 97452

Annual Club Dues $25

EAS is a proud member of The Astronomical League.

April Meeting

Thursday - April 21, 2022 7PM

For our April meeting Jerry Oltion will give a talk on eyepieces and filters. He'll explain how they work, how to figure magnification and field of view, which ones are best for which kind of observing, etc.

If things go well epidemiologically in the next month, we stand a fair chance of meeting in person at the planetarium. We'll hold off on that decision until we know for sure, but we're hoping we can do it. If so, Jerry will bring examples of various eyepieces and filters and a telescope for demonstration outside after the meeting.

Jerry will also record a Zoom version of the talk for people who can't (or don't want to) make it to the live meeting.

This will be on Thursday, April 21 at 7:00. Mark your calendars!

President: Andrew Edelen 618-457-3331

Secretary: Randy Beiderwell 541-342-4686

Board: Andrew Edelen, Randy Beiderwell, Ken Martin, Jerry Oltion, Dan Beacham

Return to Star Parties

The EAS board of directors has decided that with the relaxing of masking regulations and the reduction in Covid case numbers, the club should start hosting star parties again. Consequently, we will resume our regular First Quarter Friday and Solar Sunday star parties starting in April.

Our first Solar Sunday could be as early as April 3rd, weather permitting. Solar Sundays are informal gatherings in Alton Baker Park on Sundays from Noon to 2:00. Anyone with a safe solar telescope is encouraged to set up near the scale model Sun in the park and invite passers-by to have a look at sunspots, solar prominences, etc. Safety is paramount at these gatherings; bring only certified safe solar viewing apparatus and make sure you know how to use it properly and maintain control of it at all times.

Our next First Quarter Friday will be on April 8th, with April 9th as our backup date if the weather doesn't cooperate on the 8th. First Quarter Fridays are held once a month on the Friday closest to the first quarter Moon. They start at 6:00 or dusk, whichever is later. On April 8th, with sunset at 7:48, the start time will be 8:00.

For First Quarter Fridays, anyone with a telescope is encouraged to bring it and show the public the view of the night sky. We set up on the concrete deck of the College Hill Reservoir at 24th and Lawrence in Eugene.

In accordance with state guidelines, masks will not be required and vaccination status will not be checked. Anyone uncomfortable with this is encouraged to not attend.

Last-minute go/no-go decisions due to weather will be made the day of the star party and announced on the email list.

Venus and Jupiter on April 30th

By Jerry Oltion

On the 30th of this month, Venus and Jupiter will be in conjunction. They will approach to within 1/4 degree of each other at their closest, which happens around 2:00 in the afternoon our time. That might seem discouraging — after all, it's happening in the middle of the day — but it's actually a really cool opportunity, because Venus is easy to spot by day, and with Jupiter so close by it's possible to tease it out of the skyglow, too. Unless you have a go-to telescope, this is one of the few opportunities you'll get to spot Jupiter by day.

We had a similar opportunity back in 2016, and we set up a telescope at the College Hill Reservoir to give people a chance to see it. It was a great little planet party, and Jupiter was quite easy to spot. We were even able to see its equatorial bands. The Moons weren't evident — the sky glowed brighter than they did — but it was still obviously Jupiter next to Venus.

This year we get a bonus: From 8:44 in the morning to just before noon, Ganymede will be casting its shadow on Jupiter, and that could very well be visible. It's certainly worth looking for, anyway.

The two planets won't be as close together as in this photograph from 2016. They were only 4 arc-minutes apart then, but this time they'll be 14. Still, that's comfortably within the field of view of a medium-high power eyepiece, so they ought to be pretty impressive even so.

Venus will be gibbous, just 2/3 illuminated, and 17 arc-seconds across. Jupiter will be fully lit (as always) and 35 arc-seconds across. Since Venus is closer to the Sun, it's much brighter even though it's smaller. It will shine at magnitude -4.1 while Jupiter is -2.1.

Both planets set at 4:15 p.m., and Jupiter may not be visible when low in the western sky, so catch them early.

And for those of you who like to get up early, Venus and Jupiter are 42 degrees west of the Sun, so they rise an hour and a half before sunrise. You can easily see both planets as a tight little double by naked eye until the Sun washes out the sky.

Interestingly enough, the Moon will be new at 1:28 p.m. If the alignment were just a little better, we could be having a total eclipse during the tightest part of the conjunction.

Venus-Jupiter conjunctions happen about once a year on average. We'll get another one next March 1st. They'll be 1/2 degree apart at their closest around 7:00 p.m., not as close as this month's conjunction, but still pretty close, and they'll be visible in the western sky after sunset. This is your year to see them together in broad daylight, though. Don't miss it!

Venus and Jupiter on April 30th (continued)

By Jerry Oltion

Pandemic willing, we'll probably have at least one or two telescopes set up at the College Hill Reservoir so people without their own scopes can see the conjunction. Keep an eye on the email list for last-minute details.

Photo caption: The conjunction of August 27, 2016. This month's conjunction won't be quite this close, but it'll still be pretty neat.

The Lion in the Spring

By Andy Edelen

Leo is the most-distinctive constellation of the early spring, the backward question-mark shape of the Sickle of Leo asterism being easily identifiable even in light-polluted skies. Leo is one of the "original 48" constellations as described by the astronomer/astrologer Ptolemy in the 2nd Century; in many of the ancient myths, Leo represented the Nemean Lion, killed by Hercules as one of his 12 Labors. (Interestingly, cultures from Greece, Rome, and the Middle East through India all saw Leo as a lion.) It's a considerably-large constellation, ranking 12th in area among the 88 constellations. Regulus, Leo's *lucida* (or brightest star) ranks as the 21st-brightest star in the sky.

Leo is prime territory for galaxy hunters, containing five Messier objects and several other galaxies bright enough to have been seen by Messier. We'll look at these here; the five Messier galaxies lie in two close groups and are easily viewed together. We'll also look at the cosmic Lion's brightest non-Messier galaxy, as well as one of its most interesting, but less-famous, galaxy quartets.

Before turning to galaxies, though, we'll stop at Leo's finest double star, Gamma (γ) Leonis, also known as *Algieba* ("the Forehead"). Algieba is composed of a red giant star (magnitude 2.28) and a yellowish subgiant (magnitude 3.51), separated by just over 4.6 arcseconds and lying about 130 light-years from us; a pair of binoculars should split the two components in good seeing conditions. The 4.6 arcsecond separation that we see amounts to about 170 astronomical units (the distance from the Earth to the Sun). The brighter ('A') star has been confirmed to have a Jupiter-like planet orbiting it; a second planet awaits confirmation.

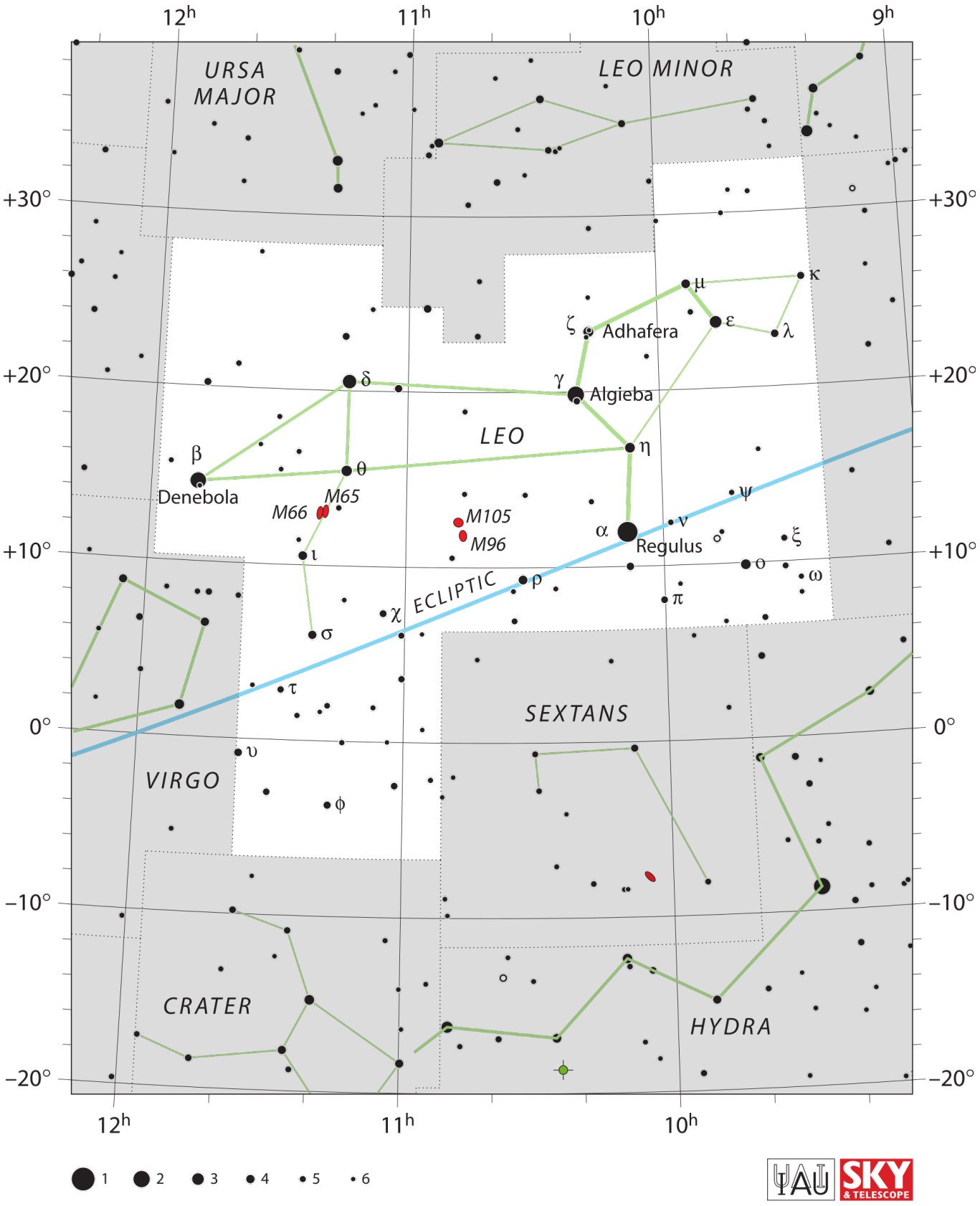

Image courtesy Sky & Telescope.

The Lion in the Spring (continued)

By Andy Edelen

North of Algieba (γ Leonis), just over halfway between it and Zeta (ζ) Leonis (*Adhafera*, "the Braid"), sits our first and most-difficult target, and the only one out of the grasp of binoculars. **Hickson Compact Group 44** consists of four galaxies—NGCs 3185, 3187, 3190, and 3193—bound together by gravity and located about 80 million light-years away.

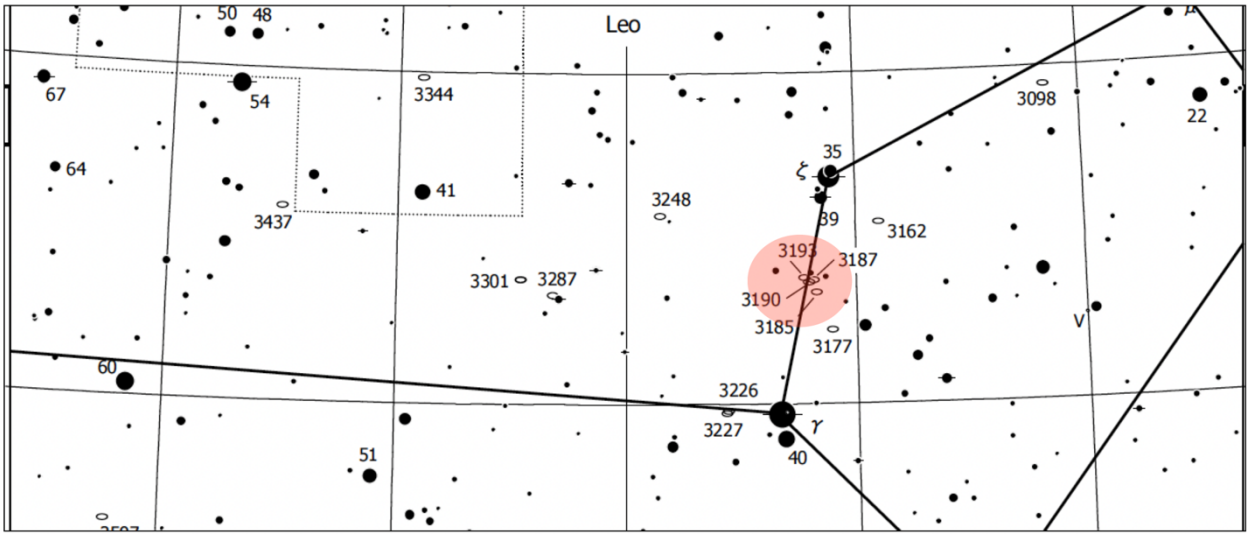

Image adapted from Taki's Mag 8.5 Star Atlas [http://www.geocities.jp/toshimi_taki/atlas_85/atlas_85.htm].

Of this quartet, **NGC 3190** is the brightest; it's a large edge-on spiral that's visible in a 6-inch telescope; the galaxy also is known as NGC 3189, although that's allegedly the SW side of the galaxy, which is brighter than the NE side. Next in brightness in the group is **NGC 3193**, a smallish elliptical galaxy just under six arcminutes NE of NGC 3190. NGC 3193 needs an 8-inch scope to show clearly.

The final of the four that can be detected in an 8-inch scope is **NGC 3185**, the western-most of the quartet. NGC 3185 is a barred spiral galaxy and the smallest of the four in the eyepiece; the bar isn't visible at all, just a fairly diffuse core and a tiny faint (14th-magnitude) star of the W edge.

Too dim for scopes under 12 inches is the final member of HCG 44, **NGC 3187**. NGC 3187 is a strangely-distorted spiral galaxy, stretched almost into a 'Z' shape by interaction with NGC 3190; the major axes of the two galaxies are co-linear, and the spiral arms of NGC 3187 are stretched out perpendicular to the galaxy's plane. The galaxy is visible only as a thin ghostly blur in a 12.5-inch scope under dark skies.

The Lion in the Spring (continued)

By Andy Edelen

Our remaining galaxies this month are visible in binoculars or small telescopes. Nine degrees due west of Hickson 44 is Leo's brightest galaxy, **NGC 2903**. It's hard to know how Charles Messier missed this bright, large spiral, which lies just over a degree south of Lambda (l) Leonis (**Alterf,** "the View of the Lion"). NGC 2903 is in some ways the first great galaxy of spring, aside from the M81/M82 pair in Ursa Major—it's relatively easy to find and impossible to miss once it's in the eyepiece.

NGC 2903 is quite obviously an inclined spiral in the eyepiece, with a large outer halo that's elongated 2:1. The core (the interior part of the galaxy) is bright and has a mottled texture, hinting at the clouds of stars and nebulosity that make up the galaxy's central region. A stellar nucleus is visible in scopes of the 6-inch class or larger. In large telescopes, a tiny knot can be seen on the core's northern edge; this is NGC 2905, a star-forming region within NGC 2903. Another such region may be visible on the core's southern edge, but this one is fainter and has no NGC designation.

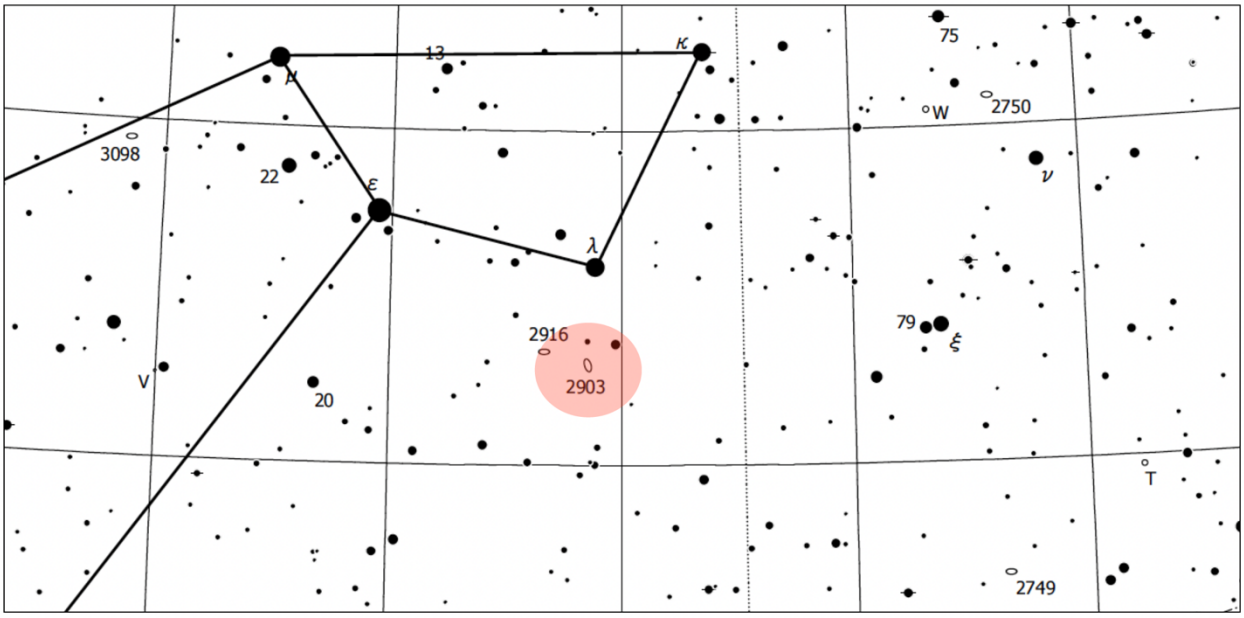

Image adapted from Taki's Mag 8.5 Star Atlas [http://www.geocities.jp/toshimi_taki/atlas_85/atlas_85.htm].

The Lion in the Spring (continued)

By Andy Edelen

NGC 2903 is a favorite of mine, and one of the first galaxies I seek out when the spring constellations start making an evening appearance.

Approximate appearance of NGC 2903 in a 10-inch telescope.
Adapted from an image by jdb_astro.

We'll head back east, to Leo's central region, for our next target (or, rather, trio of targets). About halfway between 5.45 magnitude 52 Leonis and 5.3 magnitude 53 Leonis is a "trio within a trio," anchored by the giant elliptical galaxy **Messier 105**. M105 was discovered by Messier associate Pierre Méchain in 1781 but added to Messier's catalogue only in 1947, when Helen Sawyer Hogg properly identified the galaxy based on Méchain's notes (which had conflicting positional data).

M105 is an easy target, with a stellar nucleus and a small, bright core that gradually fades away into darkness. There's no obvious halo (the core-halo distinction isn't always as obvious with elliptical galaxies as it is with spirals), The galaxy looks much the same in larger telescopes as it does in smaller ones. It's quite round and about 2′ in diameter in a 4-inch scope, expanding to 4′ x 3′ in a large scope; the slight ellipticity doesn't become apparent in scopes of less than 8-10 inches.

An 8-inch scope will reveal M105 to be part of a close-knit trio of galaxies, which also includes the barred spiral **NGCs 3384** (just over 7′ NW of M105) and **3389** (just less than 10′ E of M105). NGC 3384 is bright enough to be caught in a 4-6 inch scope, but NGC 3389 requires slightly more aperture. NGC 3384 is bright enough for large binoculars, and extended about 3′ x 1′; NGC 3389 is pretty faint even in an 8-inch scope, elongated about 2′ x 1′, and slightly mottled across its face.

The Lion in the Spring (continued)

By Andy Edelen

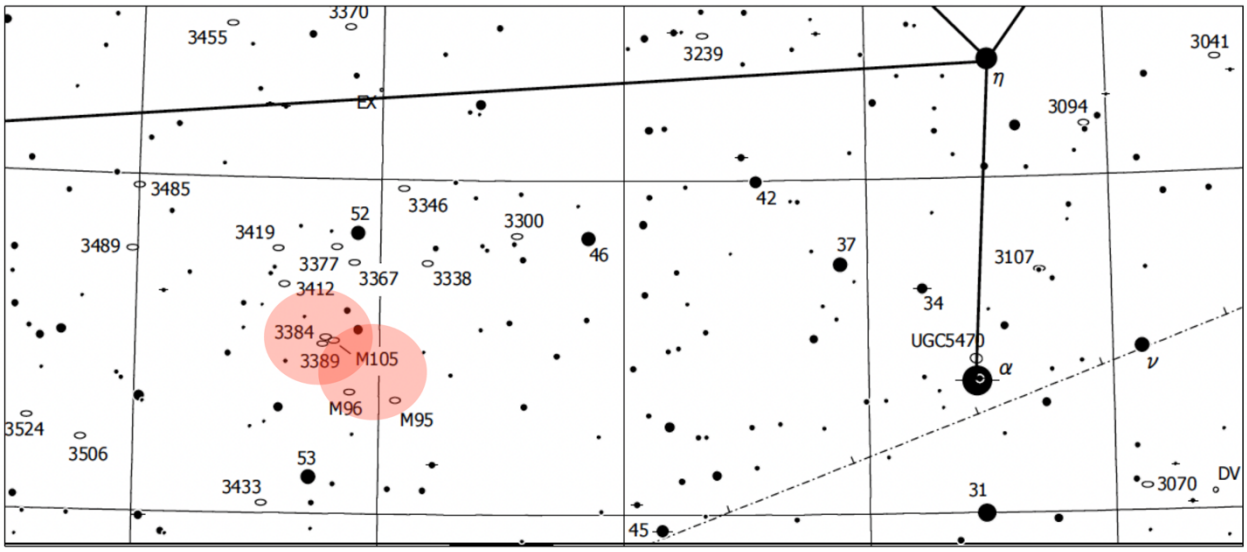

Image adapted from Taki's Mag 8.5 Star Atlas [http://www.geocities.jp/toshimi_taki/atlas_85/atlas_85.htm].

M105/NGC 3384/NGC 3389 is a "trio within a trio" because the "primary" trio consists of M105, M95, and M96. **M96** lies about a degree SSW of M105, or just over 1/3 of the way from 53 Leo to 52 Leo (and a bit W of that point). It's an impressive spiral—the brightest and largest of the Messier trio here—about 4′ x 3′ in a 4-inch scope. The size increases to about 5′ x 3.5′ in an 8-10 inch scope. A larger scope will show a larger, more diffuse nucleus than seen in most of this month's other galaxies.

The most photogenic of this Messier trio is **M95**, a nearly face-on barred spiral. M95 is shaped somewhat like a Greek letter theta (Θ), with a central bar that might be visible in a 16-inch scope. Smaller (8-inch) telescopes show a 3.5′ diameter halo with a bright central core and a tiny stellar nucleus. The halo shows irregular brightness and texture even in a 4-inch scope.

M105, M96, and M95 are all suitable targets for binoculars from a decently-dark site; they may all be seen in a very low-power eyepiece field of a md-sized telescope. The three of them (and their attendant galaxies, including NGCs 3384 and 3389) form a physical group—the M96 Group—that is itself a part of a larger galaxy "cloud" called the Leo I Cloud, which covers about 150 square degrees of sky, averages about 31 million light-years distance from us, and includes our next group as well.

The Lion in the Spring (continued)

By Andy Edelen

There is an actual "Leo Trio," one which is the best-known and most-photographed group in Leo. Located 7.5 degrees east of the M96 group, the Leo Trio (or Leo Triplet) consists of three spiral galaxies: M65, M66, and NGC 3628. This group is collectively considered Leo's showpiece object. The brightest of the three, M66, lies about halfway between Theta (θ) and Iota (ι) Leonis, below the triangle that makes up the Lion's hindquarters.

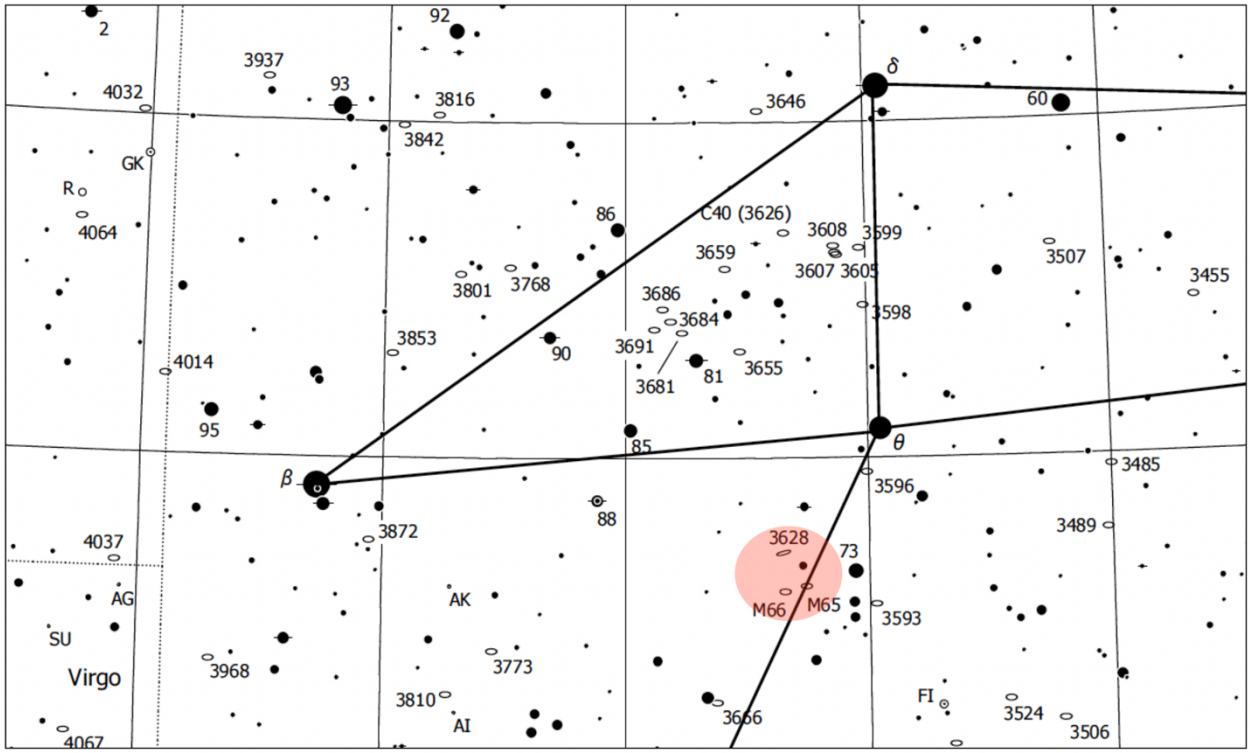

Image adapted from Taki's Mag 8.5 Star Atlas [http://www.geocities.jp/toshimi_taki/atlas_85/atlas_85.htm].

M66 is a large, somewhat-distorted spiral that's nearly face-on to us. Our largest galaxy this month, M66 extends 5′ x 2.5′ in an 8-inch scope, with a 2′ x 0.75′ core and a distinctly non-stellar nucleus. Hints of spiral arms may be seen in a 12-inch scope, particularly on the southern edge of the halo. Dark areas can be seen in the halo, hinting at both dark clouds in the galaxy and open spaces between the arms. An 8-inch scope will reveal mottled texture across the entire glow of the galaxy. A 14th-magnitude star SW of the galaxy's nucleus shouldn't be mistaken for a supernova—it's led to much disappointment among amateur astronomers looking for a big discovery.

The Lion in the Spring (continued)

By Andy Edelen

M65 lies 1/3-degree W of M66. It's only slightly less-bright, but slightly larger than M66, with a halo extending 7′ x 2′ (in an 8-inch scope) and a core region bigger than the total sizes of most of Leo's other galaxies. M65 is somewhat brighter on its northern end, due to a greater concentration of star-forming regions on that end. M65 is highly inclined—closer to edge-on than face-on—but not so much that the core/nucleus regions are blocked by the spiral arms and dust lane. (The dust lane visible in photographs requires a 16-inch or larger scope for a good view.)

The third member of the Leo Trio is the most elusive, as can be seen by the fact that Messier missed it altogether. Lying 3/4-degree N of M66, **NGC 3628** is sometimes referred to as the "Hamburger Galaxy," although the resemblance isn't that striking. A long spiral that's nearly edge-on, NGC 3628 extends 10′ x 2′ in an 8-inch scope, with a prominent 3′ x 1′ central core. A dark dust lane runs along the galaxy's length, and is visible in a 12" scope; the core is slightly larger and brighter N of the dust lane. The halo becomes diffuse and indistinct at the galaxy's "ends."

The Leo Trio fits into a low-power eyepiece field. Having all three in the field together allows an observer to compare them, and to note the differences in their inclination angles and shapes. As with our previous trio, the Leo Trio are gravitationally bound; this may account for the distortions seen in M66 and NGC 3628. They're also members of the Leo I Cloud, which is one of the largest structures we can see in the space between the Perseus-Pisces Supercluster and our own supercluster, in Virgo.

There are dozens of other bright galaxies in Leo—too many to describe here. These three groups, and the solitary NGC 2903, are just the tip of a very large iceberg.

Member astrophotography in this issue

[1] NGC 2237, 2238, 2239, 2244, 2246, the Rosette Nebula in Monoceros by Mark Wetzel

Gold Canyon, AZ
November 7 - 11, 2021

The Rosette Nebula was the third target of three imaged each night in Arizona. Hydrogen-a, Oxygen-III and Sulfur-II 7nm narrowband filter data were combined using the Hubble pallet by assigning S-II to the red, Ha to the green, and O-III to the blue channel (SHO). By doing three targets in a long night over several nights, I was able to collect many hours of subframes for each filter. I used an evaluation copy of Russ Croman's StarXTerminator tool in PixInsight to remove the stars so that the nebula could be processed separately from the star field. StarXTerminator worked exceedingly well on all three linear monochrome images. The stars image from the Ha and O-III integrated data were combined as an HOO image to create a RGB star field. Starless and stars images were processed separately in PixInsight. It turns out that the processing of starless images was much easier and faster than with conventional images. A luminance image was extracted from the combined SHO color image. The luminance was denoised, stretched and sharpened, while the RGB image was denoised, stretched and blurred. The luminance was combined with the starless RGB image, and the saturation and color balance were adjusted. The starless and stars images were combined using the PixelMath combine function with op_screen() to produce the final color image. The first image uses the classical Hubble pallet with the green removed. In the second image, some green was retained, and tonal mapping was applied in Photoshop to give more of a rainbow appearance.

The Rosette Nebula is a large, circular emission region in the constellation Monoceros. A small cluster of hot, young stars, NGC 2244, is in the center. The nebula spans over 1o of sky and it has a diameter of 130 light years. The nebula is estimated to contain around 10,000 solar masses. It is about 5,200 light years from Earth. Radiation from the open cluster in the center has pushed out the gas and dust. The pressure from this has initiated new star formation (SkySafari Pro 7).
Imaging details:

Celestron 9.25" Edge HD SCT
Celestron 0.7x Focal Reducer (FL = 1645mm, f/7)
Celestron off-axis guider with a ZWO ASI 174MM mini guide camera
Losmandy G11 mount with Gemini 2
ZWO ASI 2600MM Pro cooled monochrome camera (-10oC)
ZWO 36mm Hydrogen-a, Oxygen-III and Sulfur-II filters
RA: 97.8074o, DEC: 5.003o, Equatorial camera rotation: 340o
Software: Sequence Generator Pro, ASTAP plate solving, PHD2 guiding,
Losmandy Gemini ASCOM mount control and web client interface,
SharpCap Pro for polar alignment with the Polemaster camera,
PixInsight 1.8.8-11 with StarXTerminator,
Photoshop CC 2022

Hydrogen-a 10 min x 33 subframes (330 min), Gain 100, Offset 68, 1x1 binning
Oxygen-III 10 min x 33 subframes (330 min), Gain 100, Offset 68, 1x1 binning
Sulfur-II 10 min x 26 subframes (260 min), Gain 100, Offset 68, 1x1 binning

Do you have something for the newsletter?

If you have an article, photo, meeting notes, stories, etc. that you would like to share with the members, please contact me, I'd be happy to add them to the newsletter. If you have photos you would like to submit, I'm trying to include more information about the process and equipment used.

Astrophotographers: I want to offer these pages as a way to not only show off your terrific photos, but to provide us with information on how they are taken and processed. Seeing the amount of work that goes into these amazing images is always fascinating, and makes us appreciate them even more!

Bruce Sackett - bruce@busymind.net

Observing in April 2022

Apr 9, 11:48 AM	Apr 16, 11:55 PM	Apr 23, 4:56 AM	Apr 30, 1:28 PM
Mercury Set: 8:29 PM	Mercury Set: 9:19 PM	Mercury 9:56 PM	Mercury 10:10 PM
Venus Rise: 5:01 AM	Venus Rise: 4:54 AM	Venus Rise: 4:46 AM	Venus Rise: 4:37 AM
Mars Rise: 4:49 AM	Mars Rise: 4:34 AM	Mars Rise: 4:19 AM	Mars Rise: 4:04 AM
Jupiter Rise: 5:49 AM	Jupiter Rise: 5:25 AM	Jupiter Rise: 5:01 AM	Jupiter Rise: 4:37 AM
Saturn Rise: 4:39 AM	Saturn Rise: 4:13 AM	Saturn Rise: 3:47 AM	Saturn Rise 3:21 AM
Uranus Set: 9:49 PM	Uranus Set: 9:23 PM	Uranus Set: 8:58 PM	Uranus lost in Sun
Neptune Rise: 5:51 AM	Neptune Rise: 5:24 AM	Neptune Rise: 4:57 AM	Neptune Rise: 4:30 AM
Pluto Rise: 3:36 AM	Pluto Rise: 3:09 AM	Pluto Rise: 2:41 AM	Pluto Rise: 2:14 AM

All times Pacific Daylight Time (March 13 – Nov 5, 2022 = UT -7 hours) or Pacific Standard Time (November 6, 2022 – March 11, 2023 = UT -8 hours)

Date	Moon Rise	Moon Set	Twilight Begin	Sun Rise	Sun Set	Twilight End
4/1/2022	07:24	20:24	05:14	06:53	19:40	21:20
4/2/2022	07:44	21:31	05:11	06:52	19:41	21:21
4/3/2022	08:06	22:38	05:09	06:50	19:42	21:23
4/4/2022	08:31	23:45	05:07	06:48	19:43	21:25
4/5/2022	09:00	00:49	05:05	06:46	19:45	21:26
4/6/2022	09:35		05:03	06:44	19:46	21:28
4/7/2022	10:17	01:49	05:01	06:43	19:47	21:29
4/8/2022	11:07	02:43	04:59	06:41	19:48	21:31
4/9/2022	12:04	03:29	04:57	06:39	19:49	21:32
4/10/2022	13:08	04:08	04:54	06:37	19:51	21:34
4/11/2022	14:14	04:41	04:52	06:36	19:52	21:36
4/12/2022	15:23	05:08	04:50	06:34	19:53	21:37
4/13/2022	16:33	05:32	04:48	06:32	19:54	21:39
4/14/2022	17:44	05:54	04:46	06:31	19:55	21:41
4/15/2022	18:58	06:15	04:44	06:29	19:57	21:42
4/16/2022	20:14	06:38	04:42	06:27	19:58	21:44
4/17/2022	21:33	07:02	04:39	06:25	19:59	21:46
4/18/2022	22:53	07:31	04:37	06:24	20:00	21:48
4/19/2022	00:13	08:07	04:35	06:22	20:02	21:49
4/20/2022		08:52	04:33	06:21	20:03	21:51
4/21/2022	01:25	09:49	04:31	06:19	20:04	21:53
4/22/2022	02:27	10:57	04:29	06:17	20:05	21:55
4/23/2022	03:15	12:11	04:26	06:16	20:06	21:56
4/24/2022	03:53	13:27	04:24	06:14	20:08	21:58
4/25/2022	04:23	14:41	04:22	06:13	20:09	22:00
4/26/2022	04:47	15:53	04:20	06:11	20:10	22:02
4/27/2022	05:09	17:03	04:18	06:10	20:11	22:04
4/28/2022	05:29	18:10	04:16	06:08	20:12	22:05
4/29/2022	05:49	19:17	04:14	06:07	20:14	22:07
4/30/2022	06:09	20:24	04:12	06:05	20:15	22:09

All times are for Eugene, Oregon Latitude 44º 3' Longitude 123º 06'

Items of Interest This Month

First few days of the month: Venus, Mars, and Saturn cluster in the morning sky.

Last two weeks of the month: Best chance this year to see Mercury in the evening sky.

Last week of the month: Comet C/2021 O3 Panstarrs could put on a show.

Last few days of month: Mercury within 2° of Pleiades.

4/5 Mars less than 1/2° from Saturn in morning sky.

4/12 Neptune is closer to Jupter than Callisto (visible in morning sky before sunrise).

4/15-4/20 or so: Nice lineup of Jupiter, Venus, Mars, and Saturn in morning sky.

4/16 Algol at minimum for about two hours centered around 10:36 PM.

4/17 Mercury and Uranus 2° apart.

4/22 Peak of Lyrid meteor shower.

4/27 Venus nearly eclipses Neptune 12:14 PM. (Alas, Neptune will probably be too dim to see by day.)

4/30 Venus and Jupiter within 1/4° today. Great chance to see both planets by day. Catch them early; they set at 4:15 PM. (Ganymede shadow transit might be visible also: 8:44 AM – 11:59 AM)