



EUGENE ASTRONOMICAL SOCIETY

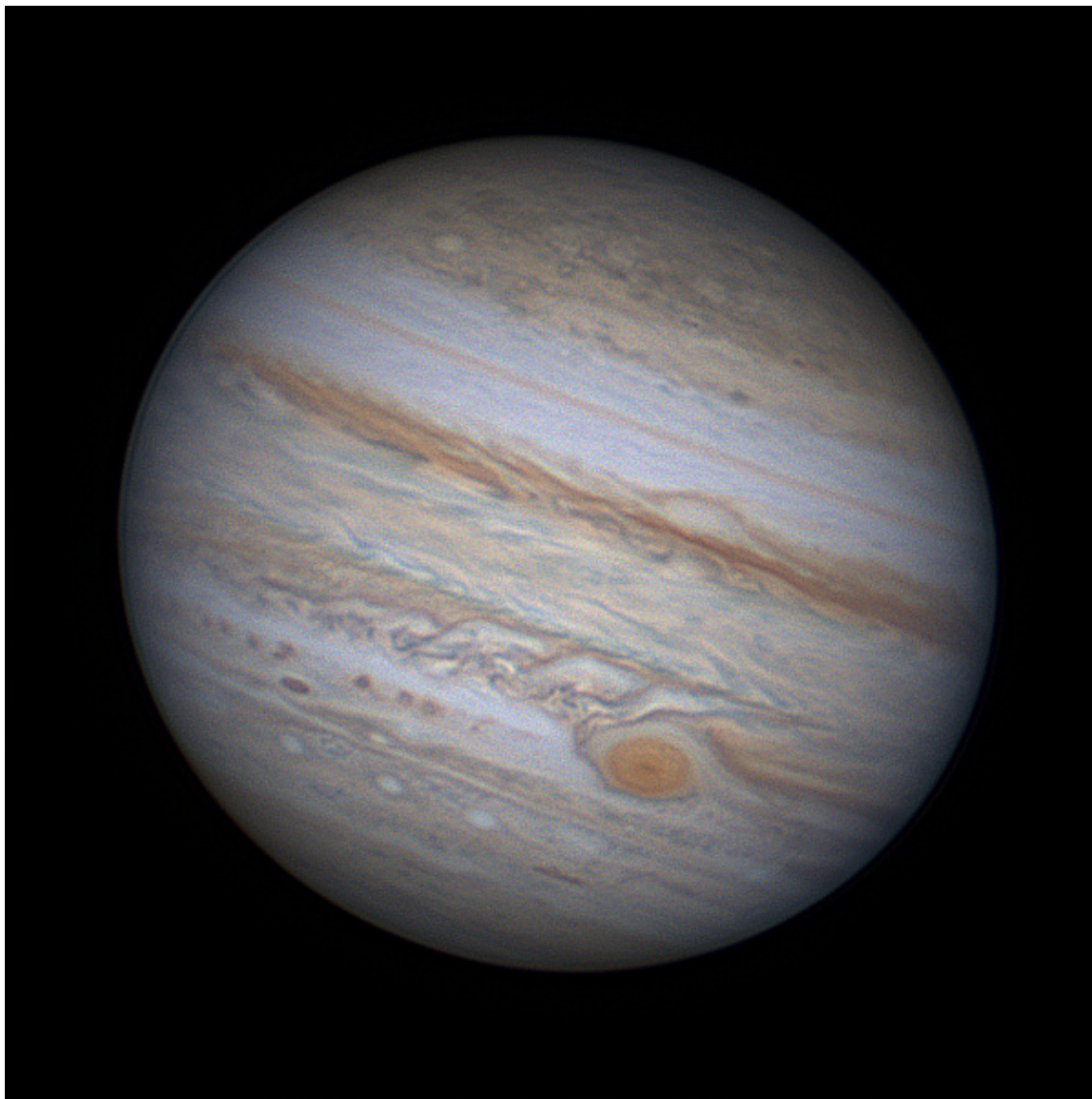
Io

October, 2022



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[1] Jupiter

Jeff Phillips

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October Meeting - Thursday, October 20, 7pm

The Nearest Stars - Bernie Bopp

The night sky is deceptive. Most of the stars we see with the naked eye are celestial giants or supergiants like Betelgeuse, Antares, or Rigel – spectacularly bright, but very distant from the Sun and far from typical. If we seek typical stars, we should investigate not the stars that are brightest, but the stars that are nearest to the Sun.

If we examine stars within 20 light-years of the Sun we find 131 objects, only 22 of which can be seen with the naked eye under ideal conditions. 80 of the 131 are red dwarf stars, many of them “flare stars.” There are also 6 white dwarfs, 20 brown dwarfs, and 2 sub-brown dwarfs, sometimes called rogue planets.

In this presentation I'll describe some of these nearby stars and explain the difference between white dwarfs, brown dwarfs, and those intriguingly named “rogue planets.” And what's a “flare star” anyway?? A more detailed discussion of the Alpha Centauri triple-star system will include information on exoplanet discovery and the exquisite radial velocity accuracy possible with modern instrumentation.

This will be at the planetarium

September Meeting

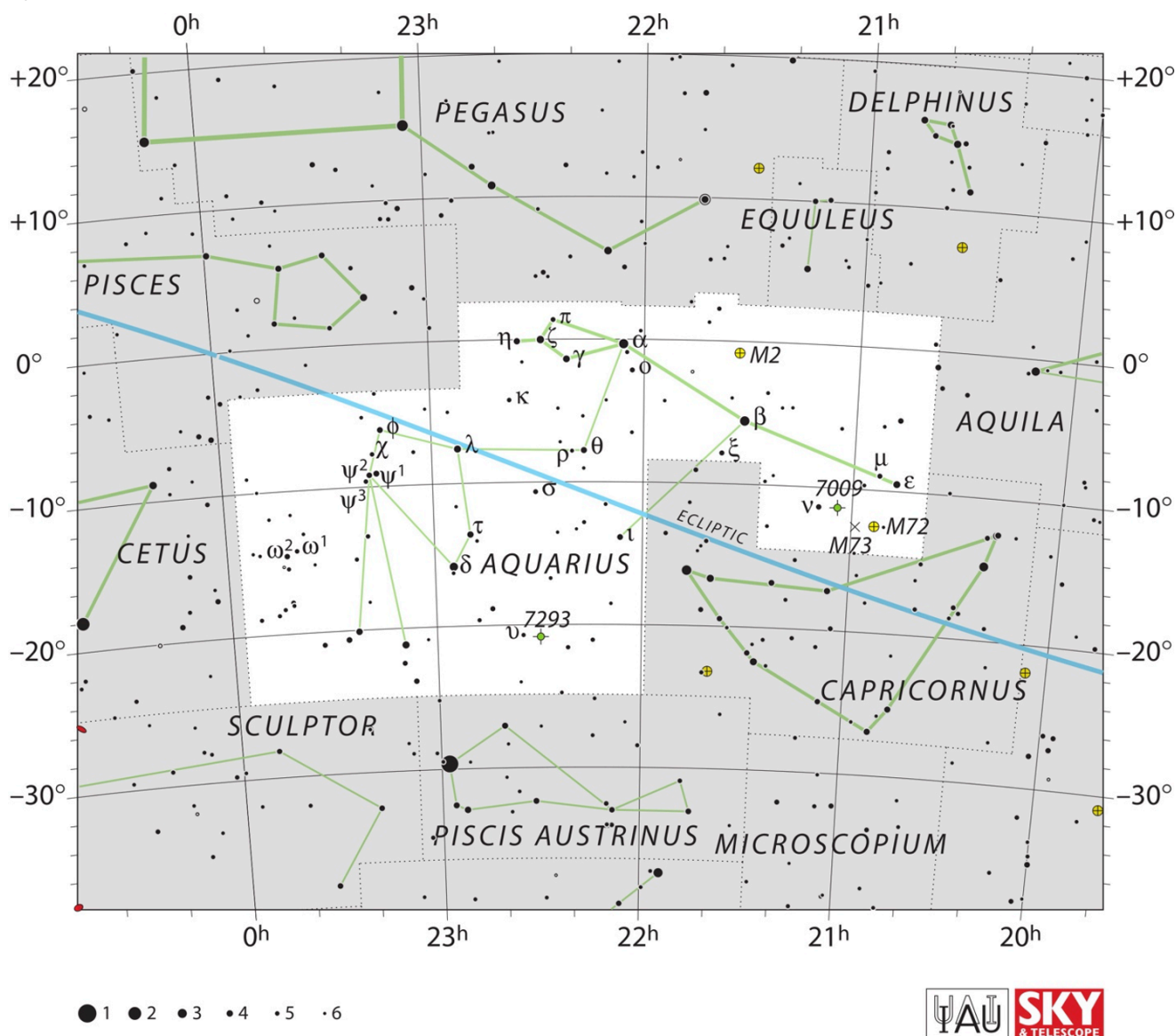
Life as we know it depends on everything that happened in the evolution of our Milky Way galaxy. There may be over 200 billion galaxies in the observable Universe. There are many beautiful galaxies in the night sky that amateur astronomers can observe or photograph. This talk was a brief primer on the physics of galaxies and the history of galaxy discoveries. Every galaxy has a story to tell or a mystery to be solved. A gallery of some galaxy images taken in Oregon and New Mexico was shown along with some fun facts about them.

<https://youtu.be/m8Q4tSJoGU4>

Constellation of the Month: Aquarius

By Andrew Edelen

Appearing faintly to the naked eye on October evenings is the sprawling constellation of Aquarius, the Water-Bearer. An important constellation culturally due to its presence as a member of the Zodiac (and currently housing the planet Neptune), Aquarius is nonetheless one of the more-difficult constellations to trace out against a less-than-pristine sky. In many ways, it's easier to define the constellation's stick-figure pattern by what it isn't than by what it is; all-too often, amateur astronomers simply define it as "the space between Aquila and Cetus, Pegasus and Pisces Austrinus, and Capricornus and Pisces." But a constellation this large—tenth out of the 88 recognized constellations in area—is bound to have a number of interesting objects within its borders, and Aquarius has a surprising variety of compelling deep-sky targets to choose from.



Aquarius, as seen in modern star charts. Courtesy IAU and Sky & Telescope.

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In the classic Greek mythology, Aquarius represented Ganymede (now, of course, also one of the moons of Jupiter), the cup-bearer of the Gods; he sat on the right side of Zeus, whose eagle (Aquila) carried Ganymede from the mortal realm to serve in Olympus. It was Ganymede who—on Zeus' command—poured out the waters of the Great Flood, of which only Deucalion and his wife Pyrrha survived to repopulate the Earth. In ancient Egypt, spring and the annual flooding of the Nile were the result of Aquarius dipping his cup into the Nile, and this took place while the Sun was “in” Aquarius.

Elsewhere, the Chinese saw the faint streams of water pouring from the cup as an army of light infantry and the remainder of the constellation as their fortifications; Fomalhaut, to the south, was their commanding officer. The peoples of the northern California Sierra saw these stars, and many of those in Pegasus, as part of the Cottontail Man, who led predators away from his people.

The showpiece object in Aquarius is the bright, large globular cluster Messier 2 [M2], which lies about a third of the way from Beta Aquarii (Sadalsuud) to Epsilon Pegasi (Enif), the star that marks Pegasus' nose. M2 can be seen with any optical aid under decent conditions; in smaller optics, it appears as the typical “fuzzy star” that so many of the bright globulars resemble. It's one of the more underappreciated Messier objects, often ignored in favor of M15 to the north or the still-visible riches of Sagittarius to the west. Yet M2 ranks 17th among all Milky Way globular clusters in magnitude, including the 29 Messier globulars, and can be seen with the naked eye under exceptional conditions. Be sure to look for M2 while searching for the other objects here—it's well worth the observing time.

All but two of our challenge objects this month can be found on the S&T map of the constellation at the top of this article. The first of these is a target for the naked eye, difficult from a light-polluted city, but easy from rural skies: the “Water Jar,” a ‘Y’-shaped asterism comprising the stars Pi, Zeta, Gamma, and Eta Aquarii. On our constellation map above, these stars make up four-fifths of the stick-figure's head (the other star being Alpha Aquarii), while the region east of the ‘Y’ comprises the water jar as we see it on modern star maps. (You can see two streams of water splashing out of it on the S&T map; for purposes of this article, I'll refer to the ‘Y’ pattern as the actual Water Jar.)

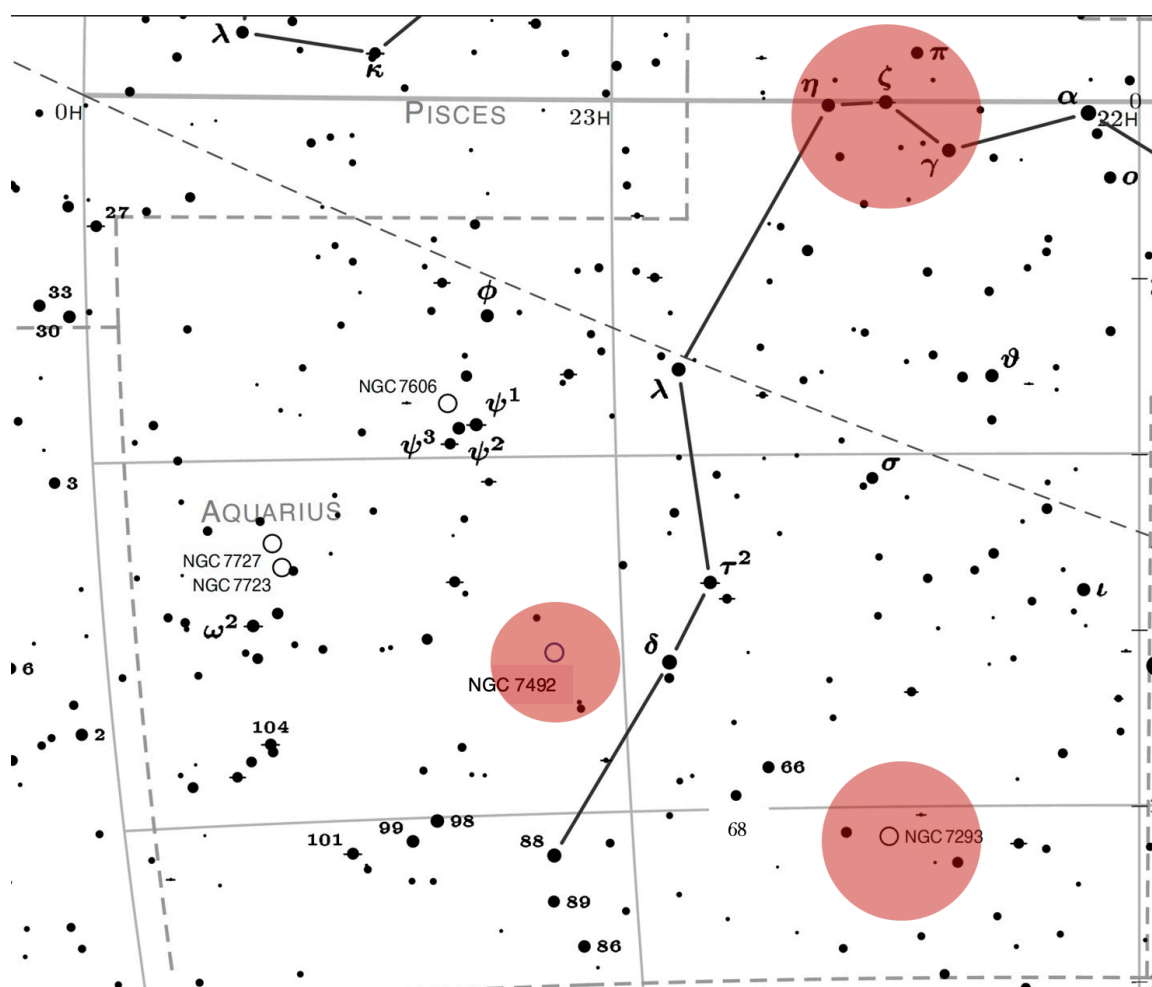
The stars in the Water Jar proper range from 3.7-magnitude Zeta Aqr down to 4.8-magnitude Pi Aqr. (Ironically, Zeta, the brightest of the four, has no proper name, while Pi is also known as Seat [SEE-aht].) Zeta Aquarii is also our target for 8-inch telescopes, as it's a pretty-tight double star of 2.4” separation, with yellowish-white components of magnitudes 3.65 and 4.34. But for naked-eye observing, try simply to discern the four stars of the Water Jar.

Constellation of the Month: Aquarius

By Andrew Edelen

For binoculars this month, we turn southward, to one of the most-photographed planetary nebulae in the sky. NGC 7293, the Helix Nebula, can be as challenging for small telescopes as it is for binoculars; its whopping 14' x 12' diameter is nearly half the size of the Full Moon, and its low surface brightness over that area can make it a challenge to spot in a narrow field of view. This makes binoculars ideal for this object under a dark sky, where its dim disk will stand out in greater contrast against the background sky. With a telescope, of course, you can use an O-III or NPB/UHC filter to increase this contrast (planetary nebulae are usually benefitted best by an O-III); a filter, however, will drastically dim the nebula's central star and the other stars embedded in the nebula's glow. You probably won't see the nebula's darker center in binoculars, but seeing the nebula is reward enough.

There are a couple of useful methods to find NGC 7293. It's about halfway between Fomalhaut ([Alpha Piscis Austrini], the brightest star in the autumn sky, down in Pisces Austrinus) and Deneb Algeidi [Delta Capricorni], the star at the northeast corner of Capricornus' "bikini bottom" pattern. It's also just west of fifth-magnitude Upsilon Aquarii: starting at Delta Aqr, hop down to the pair 66 and 68 Aqr, then down to Upsilon; the nebula is about a third of the way from Upsilon to 47 Aqr.



Constellation of the Month: Aquarius

By Andrew Edelen

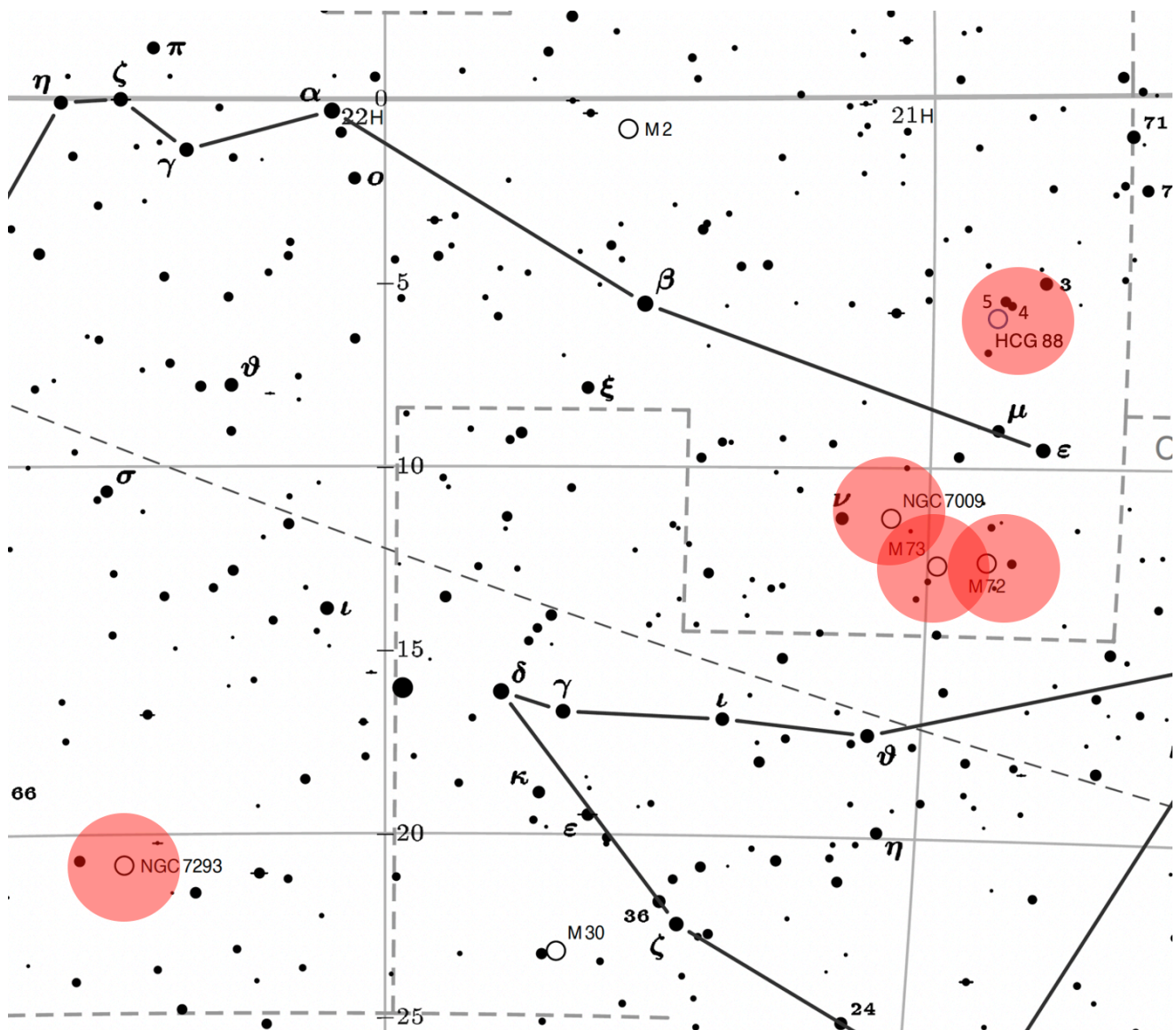
2-inch telescopes have a more unusual target this month. Messier 73 [M73] is one of the “forgotten” Messier objects, a small, Y-shaped asterism lying about 40% of the way from Epsilon Aqr to Theta Capricorni, the star in the middle of the north edge of Capricornus’ triangular form. M73 consists of four stars, ranging from 10.5 to 12th magnitude; the stem of the ‘Y’ points west, and the star in the middle is the faintest of the four; it will require high power and dark skies to draw out this particular star. Debate still rages over whether M73 is a real multiple star or merely a chance alignment of similarly-bright stars; there’s no denying, however, that the quartet is free of any nebulosity, as Messier claimed was present.

Aquarius’ second Messier globular lies less than two medium-power eyepiece fields west of M73, and is our target for 4-inch telescopes. M72 is a much smaller and fainter specimen than M2, and is the faintest globular in Messier’s catalogue. It’s still pretty bright overall, and can just be discerned in binoculars from a dark sky if one knows exactly where to look. M72’s brightest stars are of 15th magnitude, putting them well beyond the reach of anything smaller than a 10-inch scope on a great night, but the challenge here is merely to catch the granular glow of the cluster.

Three degrees east of M72 (and a bit north) is this month’s object for 6-inch telescopes: NGC 7009, the Saturn Nebula. NGC 7009 can just be spotted in binoculars; it’s tiny, but bright enough to reveal its presence with careful searching. The Saturn Nebula has an obvious turquoise tint to observers whose vision is less color-deficient than mine (i.e. everyone), and this helps it stand out from the starfield—but what really makes the nebula interesting, and what earns it its nickname, are two projections (ansae), one each extending from the east and west sides of the nebula; these give the nebula a distinctly Saturnian shape. These ansae can just be seen in a 6-inch telescope under fine conditions, while smaller scopes (or scopes under less-pristine skies) will see the nebula as football-shaped. The end of each ansa has a curious bright condensation on it which might be visible even if the rest of the extension isn’t.

There is a third globular cluster in Aquarius, and it’s a different sort from the two Messier globulars we’ve discussed. NGC 7492 is a largish, very dim, diffuse object requiring a 10-inch scope and dark, transparent skies to detect. (It’s on the first of our two close-up charts.) Located far over in the constellation’s eastern side, about 3.5° east of Delta Aqr, NGC 7492 looks more like a faint open cluster than a globular in photographs; in the eyepiece of a 12.5-inch scope, it’s little more than a feeble, uniformly-bright glow, with no member stars discernable. NGC 7492 is one of only a few members of Harlow Shapley and Helen Sawyer Hogg’s Concentration Class XII (on a scale of I-XII, with XII being the least concentrated) for categorizing globular clusters, and this diffuseness shows in the eyepiece.

By Andrew Edelen



Western Aquarius. Chart adapted from <https://www.cloudynights.com/articles/cat/articles/observing-skills/free-mag-7-star-charts-r1021>

Galaxies are my favorite type of object, and particularly galaxy groups or clusters: multiple galaxies seen together in the same eyepiece field. There's no better way to appreciate the vastness of the universe than to observe these enormous islands in the cosmic ocean as they interact (often with slow-motion violence) with each other. Aquarius, being in the autumn sky, is teeming with galaxies, but few of them are great individual targets. That's why our large-scope challenge this month is Hickson 88, a difficult quartet of galaxies north of M72.

Constellation of the Month: Aquarius

By Andrew Edelen

Back in 1982, Canadian astronomer Paul Hickson put together a list of 100 “compact groups” of galaxies; these compact groups had to have at least four gravitationally-bound members, had to span only a certain angular size in the sky, and had to be isolated from any other galaxies or clusters in space to qualify for his catalogue. (Hickson’s original paper can be found at <https://articles.adsabs.harvard.edu/pdf/1982ApJ...255..382H>) These groups range from moderately difficult (Stephan’s Quintet in Pegasus [HCG 92] and HCG 44 in Leo’s “neck”) to extremely difficult (HCG 50 in Ursa Major, near the Owl Nebula). HCG 88 lies somewhere between—three of its galaxies are difficult but clearly visible in a 12.5” scope, but the fourth takes excellent skies and even larger apertures.

Hickson 88 lies southeast of 4 and 5 Aqr, about 18’ from 4 Aqr; the two stars will lie within the same field of view of a medium-power eyepiece as the galaxies. (You’ll need to put the stars out of the field to observe the galaxies, as the starlight will overwhelm the galaxies’ weak light. And remember, for scale, that the Full Moon spans about 30’ diameter.) Three of the galaxies—NGCs 6978, 6977, and 6975—lie in a northeast-to-southwest line just under 4.5’ long. The fourth (PGC 65612 or MCG-1-53-14) lies just over 3.5’ WSW of NGC 6975, and is exceedingly faint, even compared to the other three. All four are quite small, with the biggest (NGC 6978) no more than about 1.0’ x 0.5’ as seen in a 20” scope.

(I should point out here that NGC 6975 is also catalogued as NGC 6976; the fourth galaxy, PGC 65612 / MCG-1-53-14, is sometimes incorrectly referred to as NGC 6975. Whew!)

Aquarius may be difficult to discern with the naked eye, but the constellation hosts a number of intriguing targets, both galactic and extragalactic. It’s well placed for observing on an October evening—get out there and see what you can find!

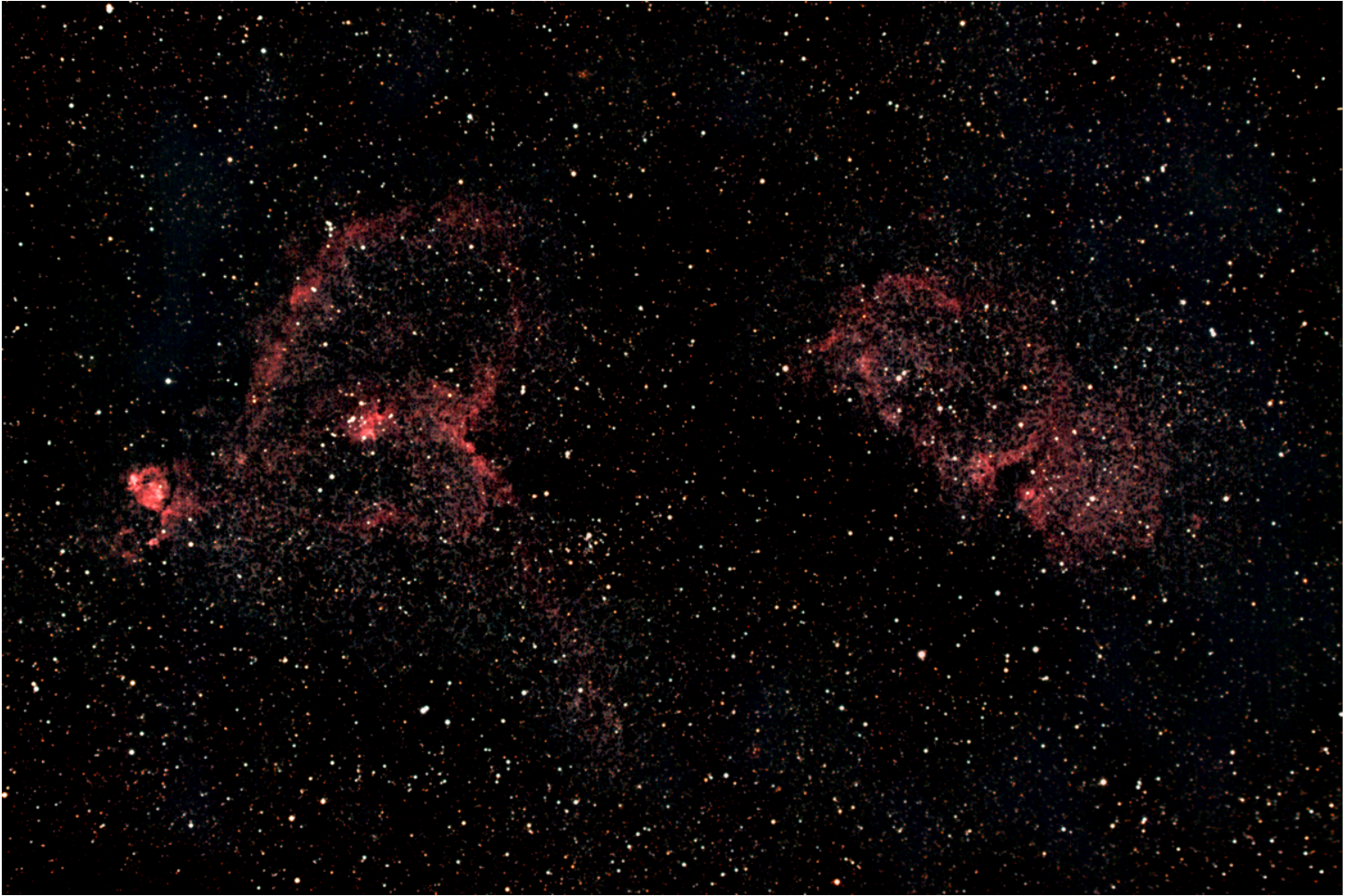
Eugene Astronomical Society

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Annual Club Dues \$25

EAS is a proud member of The Astronomical League.



[2] The Heart and Soul Nebula

Karmin Peterson

Member astrophotography in this issue

[1] Jupiter by Jeff Phillips

This was taken with a C14, Explore Scientific 2x Extender, ZWO ADC, ZWO ASI224mc color camera, and Celestron L (uv/ir cut) filter. Three 180 second AVI's at 10 mS exposure. 25% stacked with AS3!, sharpened with Registax, combined with Winjupos, and tuned slightly with AstralImage and Paintshop Pro. Too much info? Bottom line, best 25% of 45,000 frames. And years of practice.

[2] The Heart and Soul Nebula by Karmin Peterson

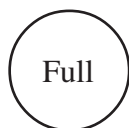
I've been testing out this new little travel set up. The lens/telescope is the Ultra wide TPO 180mm (FL) F4.5 (40mm aperture) triplet apo chromatic with a built in field flattener/reducer attached to my Canon EOS 50D camera on an iOptron Skyguider pro mount tracking only (not guiding) with a carbon fiber lightweight camera tripod. Pretty lightweight set up except for the counter weight.

This image is of the Heart and Soul nebulae in Cassiopeia, which easily fits in the field of view of this lens camera configuration. (According to Sky Safari this lens/camera combo has about a $7^\circ \times 3.75^\circ$ field of view!) I did 2 sessions on 9-16-22 and 10-23-22 stacking 90) 2 min frames for 3 hrs. of integrated images. Stacked in DSS, processed in Photoshop.

Since it is so wide field the aligning process works pretty well for 2 min exposures. The hard part was framing by hand to match the original set, which was slightly different on the second night. So I ended up cropping a bit more with the combination of the 2 nights. This mount doesn't have any motorized slewing so you just have to position and take a 2 min exposure and then adjust the position to get it closer to the framing you want since you can't actually see the object through the camera to know where you're pointing. After 11 exposures and position adjustments, I decided that was good enough.

I think the lens does a great job for how small it is.

Observing in October 2022



Oct 2, 5:14 PM	Oct 9, 1:55 PM	Oct 17, 10:15 AM	Oct 25, 3:49 AM
Mercury Rise: 5:54 AM	Mercury Rise: 5:45 AM	Mercury Rise: 6:11 AM	Mercury Rise: 6:49 AM
Venus Rise: 6:43 AM	Venus Rise: 7:01 AM	Venus lost in Sun	Venus lost in Sun
Mars Rise: 10:07 PM	Mars Rise: 9:46 PM	Mars Rise: 9:20 PM	Mars Rise: 8:51 PM
Jupiter Set: 6:43 AM	Jupiter Set: 6:10 AM	Jupiter Set: 5:34 AM	Jupiter Rise: 4:58 AM
Saturn Set: 2:52 AM	Saturn Set: 2:24 AM	Saturn 1:52 AM	Saturn Set: 1:20 AM
Uranus Rise: 8:17 PM	Uranus Rise: 7:49 PM	Uranus Rise: 7:17 PM	Uranus Rise: 6:44 PM
Neptune Set: 5:55 AM	Neptune Set: 5:26 AM	Neptune Set: 4:54 AM	Neptune Set: 4:22 AM
Pluto Set: 00:45 AM	Pluto Set: 00:17 AM	Pluto Set: 11:46 PM	Pluto Set: 11:15 PM

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

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

Items of Interest This Month

- 10/2 Red Spot transits 10:41 PM.
- 10/7 Red Spot transits 9:49 PM.
- 10/8 Mercury at greatest western elongation (visible in morning sky).
- 10/8 Europa shadow transit 6:25 – 8:57 PM.
- 10/11 Moon occults Uranus.
- 10/14 Red Spot transits 10:34 PM.
- 10/15 Europa shadow transit 9:01 – 11:32 PM. Ganymede eclipse ends 9:54 PM.
- 10/16 Io shadow transit 7:09 – 9:23 PM.
- 10/17 Jupiter's moons in two tight pairs.
- 10/19 Europa & Ganymede very close.
- 10/20 Moon occults Eta Leonis. Possible 2-step disappearance (binary star).
- 10/21 Orion meteor shower peaks in AM.
- 10/22 Venus in superior conjunction (behind the Sun). Europa shadow transit 11:37 PM – 2:08 AM.
- 10/23 Io shadow transit 9:05 – 11:19 PM.
- 10/24 Europa & Io very close.
- 10/27 Algal at minimum 9:53 PM. Europa & Io pass one another 10:00 PM.
- 10/28 First Quarter Friday star party.**
- 10/30 Io shadow transit 11:01 PM – 1:15 AM.
- 10/31 Red Spot transits 9:37 PM. Io eclipse ends 10:27, Europa eclipse ends 11:25.