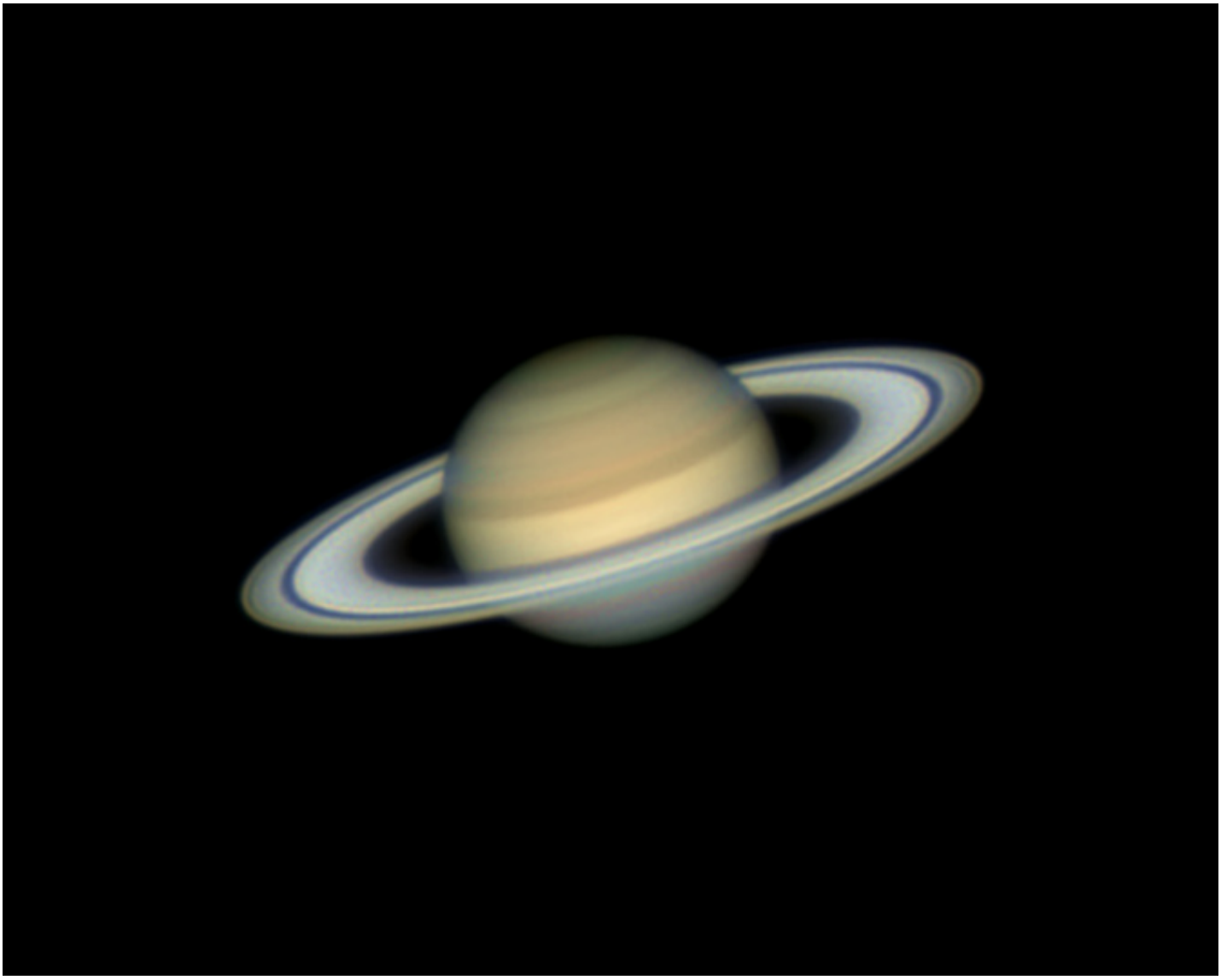
EUGENE ASTRONOMICAL SOCIETY

Io

September, 2022

PO Box 591 Lowell, OR 97452

www.eugeneastro.org



[1] Saturn at opposition Jeff Phillips

September Meeting - Thursday, September 15, 7pm

Galaxies: Some Science and History, Imaging Techniques and Some Photos

By Mark Wetzel

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 will give 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 will be shown along with some fun facts about them.

This will be a Zoom meeting

August Meeting

Jerry Oltion gave a talk about comets: their history, discovery, theories and exploration. This was an in-person meeting for some of us, but Jerry was also ready for those who couldn't be there with a YouTube video of the presentation:

https://youtu.be/HeHufsnttlk

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

Eugene Astronomical Society
PO Box 591
Lowell, OR 97452

Annual Club Dues $25

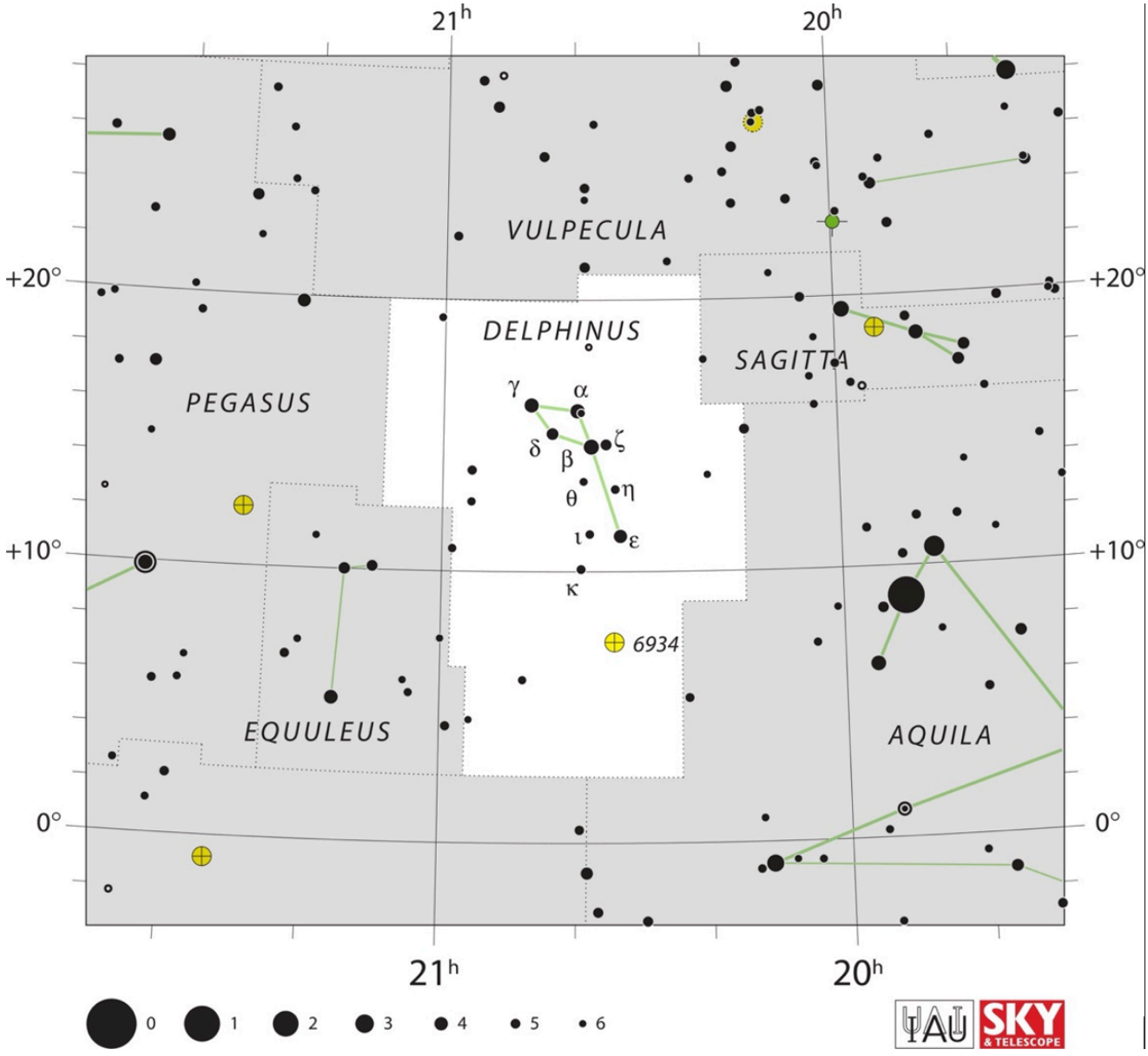
EAS is a proud member of The Astronomical League.

Constellation of the Month: Delphinus

By Andrew Edelen

For this month's constellation, we move only slightly eastward from last month's constellation, Aquila the Eagle. It's impossible not to notice Delphinus, the Dolphin, even from light-polluted skies; the constellation's compactness, and the somewhat uniform brightness of its primary stars, make the diamond-with-a-tail pattern of Delphinus stand out from the other small constellations around it, even with brilliant Altair so close by.

Delphinus lies just on the eastern edge of the Milky Way, so it's somewhat less rich in star density and famous galactic objects. It's one of the original 48 constellations of Ptolemy, and ranks only 69th out of 88 in area. But the constellation's borders nonetheless contain a variety of impressive sights for those wishing to follow the road less traveled.



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

Constellation of the Month: Delphinus

By Andrew Edelen

Delphinus also augurs the rise of the Celestial Ocean, the water-themed constellations of autumn: Capricornus (the Sea-Goat), Pisces and Pisces Austrinus (the Northern and Southern Fish), Aquarius (the Water-Bearer), Eridanus (the River)… even the Pegasus/Perseus/Andromeda/Cassiopeia/Cepheus group all represent the sky-as-ocean metaphor, as they are entangled in the tale of Andromeda's sacrifice to Cetus (the Sea Monster).

The Dolphin's own tale, to the Greeks, was one of heroism; he was placed in the sky for rescuing the poet Arion, a favorite of Apollo. Arion had taken passage aboard a ship bound for his homeland, but was set upon by the sailors, who had designs on Arion's wealth. Asking to play one final song before being flung into the sea, Arion sang a prayer to Apollo, who sent a dolphin to rescue the poet before he drowned. As a reward for returning Arion safely home, Apollo placed the dolphin into the sky where he could be forever seen and honored.

An alternative myth among the Greeks was that the dolphin had brokered a marriage between the god Poseidon and Amphitrite, the daughter of the Titans Oceanus and Tethys. Poseidon pursued Amphitrite in futility (as he was viewed by many of the Olympians as coarse and unattractive) until he sent his dolphin to follow her in her escape attempts; charmed by the dolphin and its words of praise on Poseidon's behalf, Amphitrite agreed to become Poseidon's consort. As a reward, Posiedon placed his faithful dolphin in the sky, above all of the sea's other creatures.

The diamond-shaped pattern that serves as the Dolphin's head (at least as far as the stick-figure version goes) is an easy signpost for the naked eye. This diamond was once commonly-known as Job's Coffin, although the origin of this name is unknown. To the Marshall Islanders this rhombus of stars represented a simple wooden bowl; to the Chinese, it was Hou-Koua, "the good gourd" (the constellation's remaining stars make up "the bad gourd," Pai-Koua). The Cochiti Pueblo people of New Mexico viewed the stars of Delphinus as a slingshot, while the Dakota and Lakota Sioux saw the constellation as a kite; to the Northern Sierra people of the Sacramento Valley, Delphinus was instead the paw-print of a cottontail rabbit. To the Plains Pawnee, Delphinus was the bow given by God to mankind in order to provide game.

Alpha and Beta Delphini, the constellation's two brightest stars, are named Saulocin and Rotanev; these identifiers obviously break from the tradition of using Arabic names for stars. But where did they come from? As it happens, these names spelled backwards are "Nicolaus Venator," which are the Latinised name of Niccolo Cacciatore, the assistant to Giuseppe Piazzi, the one-time director of Palermo Observatory in Sicily (Cacciatore eventually became director of the observatory himself). It's thought that Cacciatore himself wrote the names on one of the observatory's star atlases, and it took nearly a century before anyone discovered the joke.

Constellation of the Month: Delphinus

By Andrew Edelen

For a naked-eye challenge, try sighting 5.07-magnitude Kappa Delphini, which lies southeast from the Dolphin's tail star, Epsilon Delphini. A fifth-magnitude star should be fairly-easily visible from rural skies, but may be out of reach for observers in urban or suburban environments. Observing Kappa successfully without optical aid is a good test of both visual acuity and sky darkness. Telescope users will note Kappa as a pretty triple star, with two orange components and a more-distant, redder one.

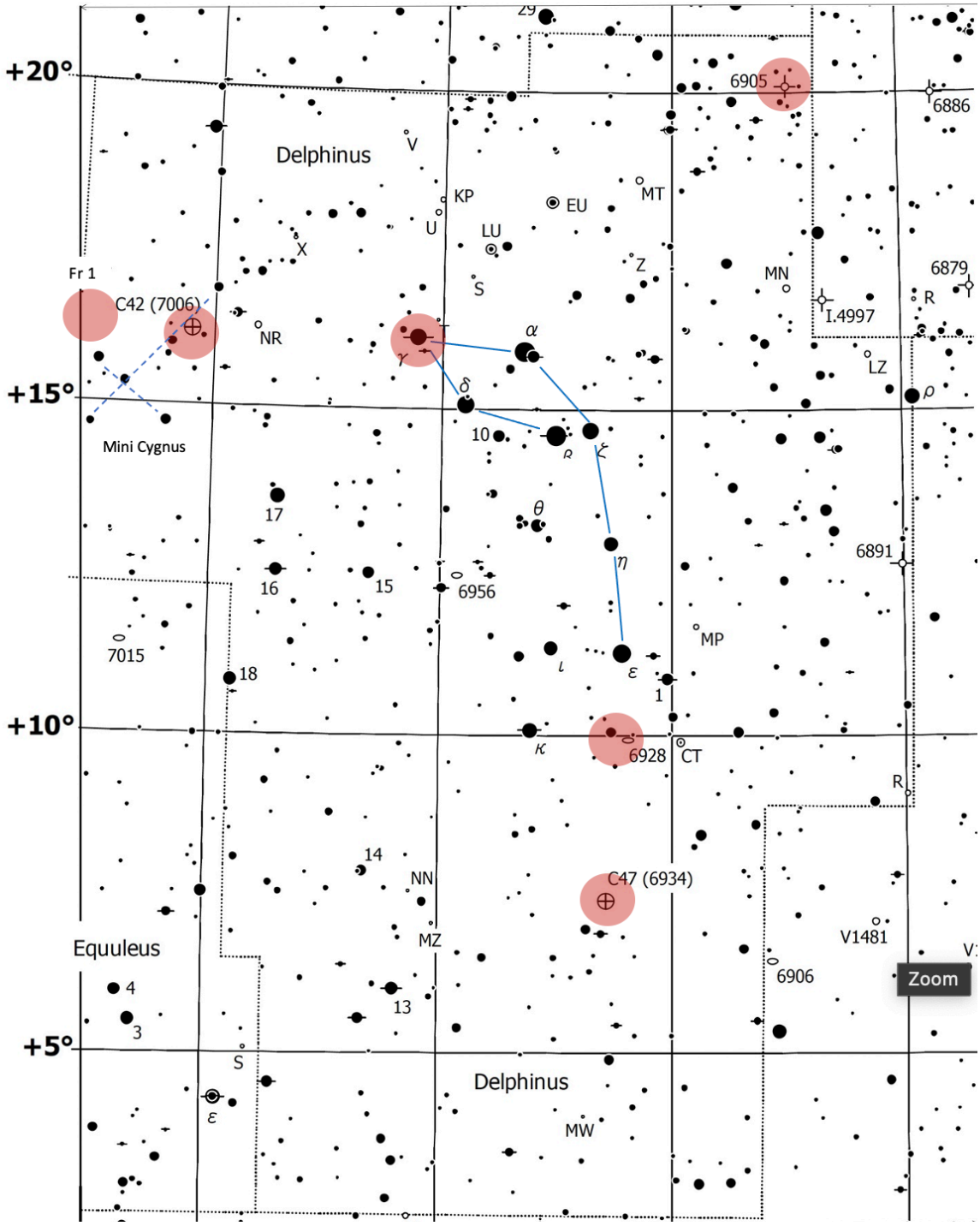


Chart of targets in this month's column. Adapted from Toshimi Taki's Mag 8.5 Star Atlas (http://takitoshimi.starfree.jp/atlas_85/atlas_85.htm)

Constellation of the Month: Delphinus

By Andrew Edelen

Our binocular target for this month isn't truly a physical object, but an asterism: a chance alignment of unrelated stars in a pattern that catches the eye and seems like it could be an actual open star cluster. Thousands of such asterisms have been noted by amateur astronomers (one, Rinnan's Run, is named after EAS' own Dan Rinnan; it's found in the spring constellation Sextans). Delphinus contains a notable asterism (aside from Job's Coffin, mentioned above), located on the far left of our full constellation chart above, where I've labeled it "Fr 1," its unofficial catalogue number, after Sky & Telescope writer Sue French, who first attached a name to it. She referred to it as "The Toadstool," for its familiar outline, and the name has stuck.

The Toadstool spans 15' (arcminutes) of sky, or about half the diameter of the Full Moon. There aren't many available observing reports about it, but it should certainly be visible in a pair of binoculars---someone has to be the first, right? For users of 8-inch or larger telescopes, there's an added bonus: a small spiral galaxy, NGC 7025, tucked in next to the eastern side of the Toadstool's stem.

The Toadstool asterism (French 1), with NGC 7025 at the center of the photo. Image courtesy POSS-II/STScII/CalTech/Palomar Observatory/Sky&Telescope)

Constellation of the Month: Delphinus

By Andrew Edelen

Delphinus contains several impressive double stars—all constellations do, really, when it comes down to it—but few in the autumn sky are as striking as Gamma Delphini, which marks the tip of the Dolphin's nose. Consisting of a 4.27-magnitude orange subgiant and a 5.14-magnitude yellow-white Sun-like star, separated by 9", Gamma is a beautiful target for scopes as small as 2 inches and as large as 20 inches or more. It's one of the very best doubles in the fall sky, along with two other members of the "Gamma squad"—Gamma Andromedae and Gamma Arietis.

Delphinus also has two notable globular clusters, both of which we'll discuss this month. NGC 6934 is, at magnitude 8.8, one of the brightest globulars in the sky's northern hemisphere not to have been included in the Messier Catalog. This one is visible from a rural sky even in binoculars, but it'll take a 4-inch telescope to really get a visual sense that this is a globular. (It will probably require a 6-inch scope to really begin resolving stars in NGC 6934, as the cluster's brightest star is magnitude 13.8.) I find NGC 6934 by extending the line from Zeta Del to Epsilon Del about that same distance; it's 3° 27′ from Zeta to Epsilon, and just over that—3° 54′—from Epsilon to NGC 6934. It's a bright, rewarding target that's worth the hunt.

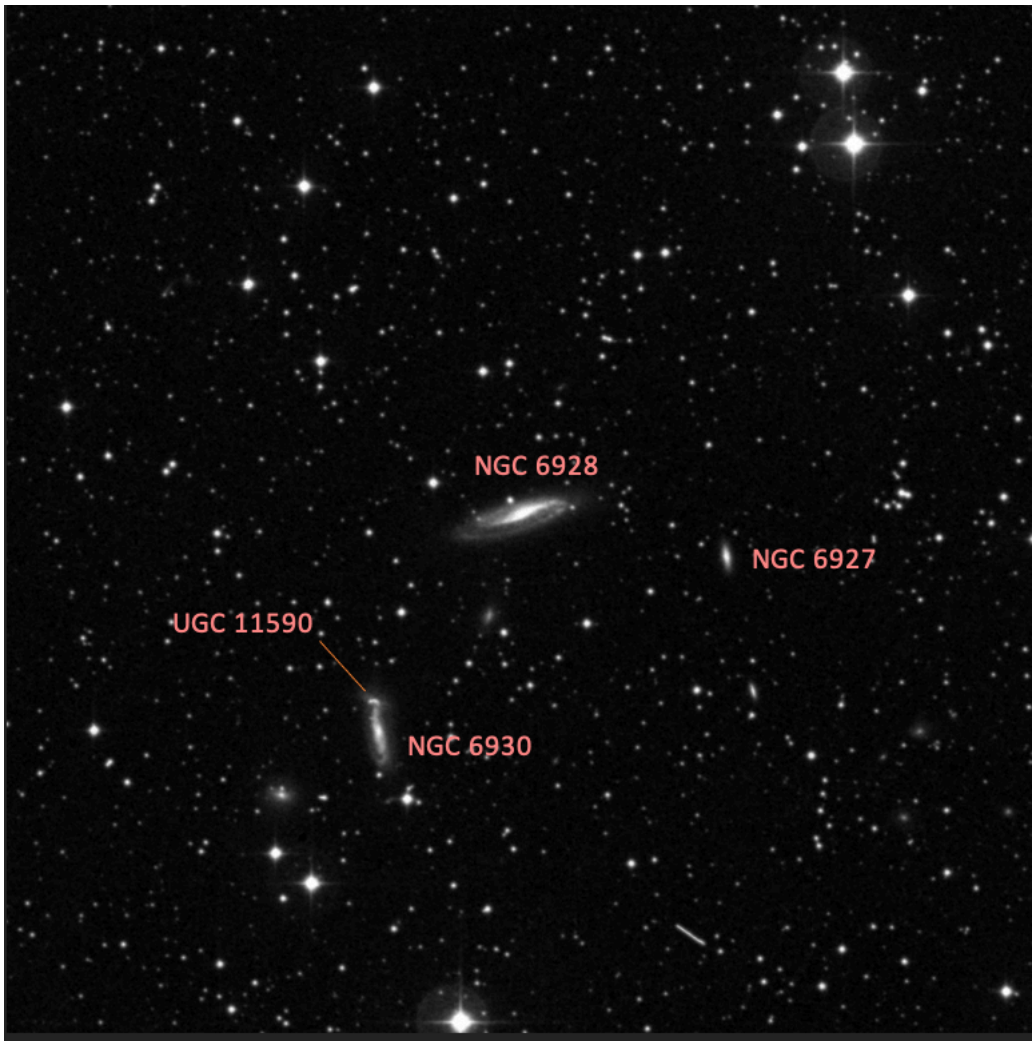
Delphinus' other globular cluster, NGC 7006, is a little bit more difficult than NGC 6934, but is in some ways even more intriguing. NGC 7006 shines at a mere 10.6 magnitude—two magnitudes fainter than NGC 6934—but lies more than 2.5 times farther away, at 135,000 light years (a distance larger than the Milky Way's diameter!). At one time, NGC 7006 was considered the second-most distant globular in the Milky Way after the Intergalactic Wanderer, NGC 2419 in Lynx. NGC 7006 is still a good target for a 6- or 8-inch telescope, despite the distance, although it'll take a much larger scope to reveal the cluster's stars. To find the cluster, draw a line from Alpha Delphini through Gamma Delphini and extend it twice that distance; the cluster is actually a little bit south of that line. If you have a finderscope, NGC 7006 lies in the north end of an asterism I call "Mini Cygnus," which does indeed look like a smaller version of the constellation Cygnus. The cluster will look like a small, fairly-uniform glow in smaller telescopes.

Our next object is harder to find but equally fascinating. NGC 6905 is a pretty planetary nebula in the constellation's northwest corner; nicknamed "The Blue Flash" for its noteworthy color in the eyepiece, NGC 6905 can be seen in scopes of 4 inches, but really needs an 8-inch for a good view. Its dying central star—the one whose outer atmosphere was expelled as the star collapsed, that outer atmosphere becoming the nebula—can be glimpsed under good conditions. (When looking at a planetary nebula, check to see if you can spot the central star.) As this particular nebula has a high surface brightness, you can use high magnification on it once you find it. And finding it can be tricky; if anyone wants advice on tracking the nebula down, send a post to the e-mail list and I'll try to explain how I find it.

Constellation of the Month: Delphinus

By Andrew Edelen

Being perched on the eastern shore of the summer Milky Way, Delphinus is poised to leap into the autumn ocean, which is filled with the island universes we know as galaxies. The galaxies of Delphinus are not showpiece objects like those found in Pegasus, Andromeda, or Cetus, but there are several smaller ones and a few groups that are subtly rewarding for those wishing to look beyond our own galactic environs. One such group is composed of NGCs 6927, 6928, and 6930; this trio lies just under 1.5˚ south of Epsilon Delphini. NGCs 6928 and 6930 can be seen in a 10-inch telescope, although they aren't easy; NGC 6928 has a brighter core region, while NGC 6930 is slightly smaller and has a more-subtle core to it. NGC 6927 requires at least a 12-inch telescope; it's a very faint little streak with a tiny core and a very difficult nucleus that both require averted vision (looking slightly away from the object, rather than directly at it) to see. These three galaxies are oriented roughly at right angles to each other: NGC 6928 runs mostly east-west, while the other two are elongated north-south. Users of large telescopes may also spot UGC 11590 (aka LEDA 200365) among the trio—it's a tiny, separate galaxy "attached" to the north end of NGC 6930, and takes both major optics and sharp eyes to spot.



The NGC 6928 "trio"; field is 15 arcminutes square. Image courtesy POSS-II/STScII/ CalTech/Palomar Observatory.

Constellation of the Month: Delphinus

By Andrew Edelen

Despite its small size and location just on the edge of the rich summer Milky Way, Delphinus nonetheless offers several impressive deep-sky objects of a variety of types. So when you've finished looking at the summer's Messier riches and are casting around for something new, take a look at some of the objects dredged up in the Dolphin's wake.

[2] SH2-129 The Flying Bat and Squid Nebulae in Cepheus Mark Wetzel

Member astrophotography in this issue

[1] Saturn at Opposition by Jeff Phillips

This Saturn image was made with a C14 telescope, a ZWO-224 color camera, a 2x barlow, an UV/IR cut filter, and a ZWO ADC. The ADC (Atmospheric Dispersion Corrector) compensates for the prismatic effect of Earth's atmosphere smearing the colors when the planets are low in the sky. Saturn rises to 30.5 degrees above the horizon from my place and I'm shooting through a gap in the trees. I shot four 6 minute AVI's but had to toss one because I forgot to tune the ADC before shooting. The final image is a combination of 18 minutes of video at 50 frames per second (20 mSec exposures).

Software used includes Firecapture, Autostakkert, Registax, Astra-Image, and Paintshop Pro.

[2] SH2-129 The Flying Bat and Squid Nebulae in Cepheus by Mark Wetzel

Linslaw Point, Walton OR, June 26, July 1, 22 and 24, 2022

This project was my first attempt to capture many hours of narrowband data using the SV102T refractor with a 0.74x focal reducer, providing a 2.55-degree field width. Subframes were captured over four clear nights using Hydrogen-alpha and Oxygen-III narrowband filters. Most of the subframes were used since they were of high quality. Guiding performance was very good with the total error ranging between 0.4 and 0.6 arcsec.

Post processing with PixInsight was quite a challenge to create an HOO false color image that highlighted the squid. I spent many hours in PixInsight using various process tools and scripts with a trial and error approach. I do not think that I can reconstruct the steps. StarXTerminator was used to remove the stars using the new opscreen option. However, SXT failed to remove the brightest stars with halos in the OIII image. The OIII halos from the ZWO filter were so bad that I broke down and ordered Chroma filters (expensive, ouch!). The Ha and OIII starless images were stretched using the GeneralizedHyperbolicStretch script. This was an experiment to brighten the very dim squid in OIII relative to the bright flying bat in Ha. The StarHaloReducer script was used to improve the large halos, but it left large rings behind. Photoshop was used to remove the halos and their artifacts using the Healing Brush and Spot Healing Brush tools. The Lasso selection tool was used to outline the squid. Dodge and burn tools were used to brighten the squid and darken the rest of the image. As this was a first attempt, the result is not uniform with some brighter areas remaining outside the squid's body. Back in PixInsight, the HOO false color image was created with the Multichannel Synthesis script with 100% Ha in the Red, 80% OIII in the Green and 100% OIII in the blue channel. The luminance was extracted from the color image. The HOO starless image was then further processed, and the luminance was combined with the HOO RGB color image to produce a sharpened LRGB nebula. One issue when combining stretched monochrome images to create a RGB color image was that the red channel was very saturated. The stars were processed separately, and the color was calibrated with the PhotometricCalibration process tool. The stars were combined with the starless image using PixelMath's opscreen combine method. When the stars and starless images were combined, the final LRGB image had a reduction in detail in the red areas. I also used the NoiseXTerminator tool from Russ Croman, which worked well. The stretched OIII channel was noisy as it was very dim with a low signal-to-noise ratio. The final result at least shows the squid clearly.

Member astrophotography in this issue

[2] SH2-129 The Flying Bat and Squid Nebulae in Cepheus by Mark Wetzel (continued)

Sharpless 2-129 is a bright nebula in the constellation Cepheus. The flying bat is a bright hydrogen emission region. The squid is a very faint oxygen emission region in the center. The squid's bipolar shape and emission are consistent with it being a planetary nebula, but its actual distance and origin are unknown. The shape may represent a spectacular outflow of material driven by a triple system of hot, massive stars, cataloged as HR8119, seen near the center of the nebula. If so, this giant nebula would physically be nearly 50 light-years across. SH2-129, the flying bat, is 2,300 light years from Earth (NASA).

The Squid nebula was discovered by the French amateur astrophotographer Nicolas Outters in 2011 (Nebula Photos). Since then, this object has become popular with astrophotographers. However, it takes many hours of imaging time to capture any detail in the squid. For this project, 10 hours of OIII data were used. Many imagers take 20 to 50 hours of 10 to 20 minute subframes!

Imaging details:
Stellarvue SVX102T refractor with 0.74x focal reducer (FL = 528mm, f/5.2)
ZWO large 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-alpha and Oxygen-III filters
Equatorial camera rotation: 90o

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 1.8.9 with StarXTerminator (AI version 10) and NoiseXTerminator,
Photoshop CC 2022.

Hydrogen-alpha 10 min x 60 subframes (600 min), Gain 100, Offset 68, 1x1 binning
Oxygen-III 10 min x 29 subframes (290 min), Gain 100, Offset 68, 1x1 binning

Observing in September 2022

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

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

Items of Interest This Month

Early in month: Mars near Aldebaran.
9/1 Jupiter's Red Spot transits 10:08 PM.
9/2 First Quarter Friday star party.
9/3 Red Spot transits 11:46 PM.
9/4 Callisto passes over Jupiter's north pole 10:30 PM
9/7 Io shadow transit 8:36 – 10:50 PM.
9/8 Red Spot transits 10:54 PM.
9/10 Red Spot transits 00:32 AM on 11th.
9/13 Europa shadow transit 9:21 – 11:55 PM. Red Spot transits 10:01 PM.
9/14 Io shadow transit 10:31 PM – 12:45 AM.
9/15 Red spot transits 11:39 PM.
9/16 Neptune at opposition.
9/20 Red Spot transits 10:46 PM. Europa shadow transit 11:57 PM – 2:30 AM 9/21.
9/23 Io shadow transit 6:54 – 9:09 PM. May be difficult due to Io eclipsing its own shadow. (Happens near opposition.)
9/22 Autumn equinox 6:03 PM.
9/26 Jupiter at opposition.
9/27 Ganymede shadow transit 9:08 – midnight. Red Spot transits 11:31 PM.
9/29 Callisto passes under Jupiter's south pole 8:00 PM. Red Spot transit 1:09 AM 9/30.
9/30 Io shadow transit 8:50 – 11:04.