The Denver
OBSERVER
FEBRUARY 2018

The Great Orion Nebula, M42. This high-dynamic-range composite image was created by Ron Pearson, who has recently begun experimenting with Aurora HDR software—he considers this image "preliminary." Ron will share what he has learned with interested DASers—see story in "DAS News," page 5.
Image Credit: Ron Pearson

FEBRUARY SKIES

by Zachary Singer

The Solar System

February brings a quiet month for planetary observing. One small highlight is the **Moon's limb gliding within about ¼° of the bright star Regulus (Alpha [α] Leonis) around 10:30 PM on Feb. 28th.** Essentially, we're narrowly missing a lunar occultation that's visible north of us, in Canada and Alaska. It will be a pretty view regardless, and you can still use Regulus as a "benchmark" to gauge the Moon's progress in its orbit—it will be noticeably farther from the star an hour or two earlier, and similarly, an hour or two later. Try observing in intervals over that time to "see" the Moon's motion compared to the star.

Mercury is lost in sunlight this month, and will reemerge as an evening object in March.

Venus also hides in the solar glare through most of February, but will become visible, low on the horizon after sunset, towards the end of the month.

Mars remains an object for the wee hours of the morning, rising between 2:00-2:30 AM all month. Though still too small to be an interesting target (you can't see detail on its surface yet), the span of Mars's disk is nonetheless slowly growing—to 6½° by the end of February. Look for the planet next to its doppelgänger, the red supergiant star Antares (Alpha [α] Scorpii) between the 7th and 16th of the month.

Jupiter rises ever earlier—by *midnight* at the end of the month, making it an increasingly attractive target. As Earth catches up to Jupiter in our respective orbits, the latter will

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Sky Calendar

*	Full Moon (none this month—next is Mar. 1st)
7	Last-Quarter Moon
15	New Moon
23	First-Quarter Moon

In the Observer

The Observer is available in color PDF format from the DAS website: http://www.denverastro.org/das/denver-observer/

Society Directory

DAS Executive Board

President:
Ron Hranac
president@denverastro.org

Vice President:
Lindsey Shaw
vpresident@denverastro.org

Secretary:
Ed Ladner
secretary@denverastro.org

Treasurer:
Michael Nowak
treasurer@denverastro.org

Executive Board Members:
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Sorin
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Committees

Van Nattan-Hansen Scholarship Fund:
Megan Daniels (Chair)
VNH@denverastro.org

EGK Dark Site Committee:
Darrell Dodge, Interim Chair
darksite@denverastro.org

IDA Representative:
Dr. Robert Stencel
coloida@hotmail.com

Volunteers or Appointed Representatives

ALCor:
Darrell Dodge 303 932-1309

Newsletter Editor:
Zachary Singer 303 718-4188
editor@denverastro.org

Newsletter Proofreaders:
Darrell Dodge, Ron Hranac

Website:
Darrell Dodge
webmaster@denverastro.org

IT Coordinator:
Ken Sturrock
itdept@denverastro.org

External Outreach Coordinator:
Julie (July) Candia
external@denverastro.org

Public Night Coordinator:
Hugh Davidson 303 679-0629

Librarian:
Eileen Barela

Telescope Loan Program:
Ed Scholes
scopeloan@denverastro.org

DAS Information Line:
(303) 871-5172

DAS Correspondence:
Denver Astronomical Society
P.O. Box 102738
Denver, Colorado 80250
president@denverastro.org

New-Member Ambassador:
Digby Kirby
odigby@gmail.com
(970) 301-2287

Membership Coordinator:
Dena McClung
membership@denverastro.org

http://www.denverastro.org

PRESIDENT'S MESSAGE *by Ron Hranac*

How Bright Is That Object?

You've likely heard or seen the word **magnitude** used to describe the brightness of objects in the sky. Indeed, astronomers commonly describe the brightness of stars, planets, comets, galaxies, and other celestial objects using two scales of numbers, one called *apparent* magnitude, and the other *absolute* magnitude.

Apparent magnitude is how bright a celestial object *appears* to us, as we see it from Earth. This is a useful measure for observing, so we can judge how big a telescope we would need for viewing a dim object, or which objects will be bright enough to see with the equipment we already have.

At the same time, apparent magnitudes have their limitations: All objects look brighter when they're closer to us, and dimmer when they're farther away. (Think of an approaching car on the highway at night.) A dim star that's *close* to us, and a bright star that's far away can appear to have the same brightness from our point of view. So, while apparent magnitude can show us if either star could be seen with our equipment, for example, it *doesn't* tell us how bright those objects really are, out in space—they may *look* the same, but there's a good chance we're actually comparing apples and oranges, as far as brightness goes.

Knowing the true brightness of astronomical objects is essential for astronomers—it's a fundamental clue to understanding the structure of the universe. To get around the problem of "apparent" brightness (or magnitude), astronomers developed the idea of an "absolute," or "true" one. It's a standardized value, so that apples can be compared to apples—formally, it's the brightness (magnitude) that a given object would have, if it were 10 parsecs (32.6 light-years) from us. That is, if we could put all the glowing objects we observe at this same distance, we could directly compare the brightness (or magnitude!) of one object with another, apples-to-apples, and learn a great deal about them. Commonly, astronomical catalogs report both the apparent magnitude of an object (so we can observe them more easily) and its **absolute magnitude** (so we can better *understand* the object).

The concept of magnitude itself is believed to have originated with Hipparchus (190~120

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DAS SCHEDULE

February 2018

2	DAS Annual Meeting—**E-Board Elections** DU's Olin Hall, Rm. 105—Starts at 7:30 PM
9	E-Board Meeting—At DU's Historic Chamberlin Observatory, 7:30 PM. All members welcome.
10	DAS Member In-Reach—At DU's Chamberlin Observatory, 7:00 PM
17	Dark Sky Weekend—EGK Dark Site & Brooks Observatory
24	Open House—DU's Historic Chamberlin Observatory—Starts at 6:00 PM
	(March 2018)
3	Spring Banquet--Details to follow.
9	E-Board Meeting—At DU's Historic Chamberlin Observatory, 7:30 PM. All members welcome.

During Open House, volunteer members of the DAS bring their telescopes to the Chamberlin Observatory's front (south) lawn, so the public can enjoy views of the stars and planets, try out different telescope designs, and get advice from DAS members. The Observatory is open, too (costs listed below), and its historic 20-inch telescope is open for observing with no reservations necessary.

Open House costs (non-members): If the skies are clear, $2/person ($5/family), $1/person in inclement weather. DU students with ID, and DAS members free.

Public Nights feature a presentation on astronomical subjects and a small-group observing session on the historic 20-inch telescope (weather permitting), at Chamberlin Observatory on Tuesday and Thursday evenings (except holidays), beginning at the following times:

March 10 - September 30 at 8:30 PM

October 1 - March 9 at 7:30 PM

Public Night costs (non-members): $4/adult, $3/child and students with ID. DAS members and DU students with ID: free.

Members of the public (non-DAS/DU, as above), please make reservations via our website (*www.denverastro.org*) or call (303) 871-5172.

President's Message

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BC), although some references cite Ptolemy (100~170 AD). In any case, the early magnitude scale had just six values, ranging from magnitude 1, for the brightest celestial objects to magnitude 6, for the dimmest celestial objects that could be seen naked-eye. At first glance, it seems somewhat counter-intuitive to use smaller numbers for brighter objects and larger numbers for dimmer objects. Here's an analogy that might help: Think of stars in a contest for brightness; the brightest ones get a "1st-place" ribbon as a group, the next-brightest stars share "2nd place," and so on. Magnitude works the same way. Over time, the magnitude scale was refined, and extended beyond the original, naked-eye magnitude range. It now includes negative numbers for very bright objects, and numbers larger than 6 for dimmer objects than can be observed naked-eye.

But what *is* magnitude? It's a logarithmic way to express or measure celestial object brightness, making it much easier to describe vast differences in brightness. A one-magnitude difference in brightness is equal to the fifth root of 100, or more simply, about 2.5 times brighter. (If you slept through math class, the fifth root of a number is simply the number you would multiply by itself five times to equal the original number. For example, the fifth root of 32 is 2, because 2x2x2x2x2=32.) The importance of the "5th-root of 100" is that every 5 magnitudes' worth of difference between two objects works out to 100 times the brightness—so a 10-magnitude difference between, say, two stars, means one is 10,000 times brighter than the other (because each of the 5-magnitude differences is good for 100x, and 100x100 equals 10,000). Considering that galaxies are many *billions* of times brighter (in the *absolute* sense) than our own Sun, magnitude is a much more convenient scale for comparing brightnesses!

For most people with good eyesight and under ideal dark-sky conditions, objects of magnitude 6 are about the dimmest that can be seen naked-eye (some people claim to be able to see things as dim as magnitude 7).

Let's put all of this in perspective. The following table lists a few popular celestial objects and their brightest apparent visual magnitudes (for a list of the brightest naked-eye stars, see https://en.wikipedia.org/wiki/List_of_brightest_stars). Keep in mind that diffuse objects such as galaxies, nebulas, comets, and so forth typically look dimmer than their apparent visual magnitudes would suggest, because their light is spread over a much wider area than, say, a star.

Celestial Object	*Apparent Visual Magnitude*
Sun	-26.7
Moon (full)	-12.7 (mean value)
International Space Station	-5.9
Venus	-4.8
Jupiter	-2.9
Mars	-2.9
Mercury	-2.5
Sirius	-1.5
Canopus	-0.7
Saturn	-0.5
Arcturus	-0.0
Vega	+0.0
Polaris	varies from +1.9 to +2.1
Mizar	+2.3
Andromeda Galaxy	+3.4
Uranus	+5.3
Neptune	+7.8

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ABOUT THE DENVER ASTRONOMICAL SOCIETY

Membership in the Denver Astronomical Society is open to anyone wishing to join. The DAS provides trained volunteers who host educational and public outreach events at the University of Denver's Historic Chamberlin Observatory, which the DAS helped place on the National Register of Historic Places. First light at Chamberlin in 1894 was a public night of viewing, a tradition the DAS has helped maintain since its founding in 1952.

The DAS's mission is to provide its members a forum for increasing and sharing their knowledge of astronomy, to promote astronomical education to the public, and to preserve DU's Historic Chamberlin Observatory and its telescope in cooperation with the University of Denver. The DAS is a long-time member in good standing of the Astronomical League and the International Dark Sky Association.

The DAS is a 501 (c)(3) tax-exempt corporation and has established three tax-deductible funds: the Van Nattan-Hansen Scholarship Fund, the DAS General Fund, and the Edmund G. Kline Dark Site Fund.

*****JOIN US!** More information about DAS activities and membership benefits is available on the DAS website at www.denverastro.org.

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ASTRO UPDATE

Selected Summaries of Space News

by Don Lynn

Martian Ice

Ground-penetrating radar and other evidence determined years ago that there are large deposits of water ice underlying the surface in the middle latitudes of Mars, between 55-58° latitude, both north and south. Near the poles, the ice is exposed, but closer to the equator, ice only persists if covered with a layer of dirt. The radar measurements were not precise enough to determine how deeply the ice is buried. Astronomers believe that the ice originated as snowfall long ago. New observations from Mars Reconnaissance Orbiter found eight places where eroded slopes have uncovered the ice layer. It appears layered, potentially revealing the history of snowfall over thousands of years or more.

Climate should change on Mars over thousands or millions of years due to changes in the planet's tilt or orbit. A mission to examine one of these erosion exposures might be able to read the climate history. Some of the exposures show ice over 100 yards thick, and some are within 1-2 yards of the surface. This would make them accessible sources of water for future missions.

Solar System Formation

A generally accepted theory has been that the Sun and its planets formed after a nearby supernova exploded almost 5 billion years ago. This would explain why primitive meteorites have been found with daughter products of radioactive aluminum-26, a product of supernovas. However, more recent work has shown that meteorites don't have enough iron-60, another product of supernovas. A new paper explains this by theorizing that a Wolf-Rayet (W-R) star produced the heavy elements that formed our planets and meteoroids, not a supernova. W-R stars have stellar winds that throw huge amounts of heavy elements off into space, including aluminum-26, but not much iron-60. The new paper posits that the solar system formed within the bubble blown by W-R stellar wind. Other astronomers have disagreed on the location within such a bubble, but there is some agreement that a W-R star was involved.

More on Tabby's Star

Tabetha Boyajian and colleagues wrote a paper a couple of years ago describing how the star KIC 8462852, now unofficially known as Tabby's Star, exhibited irregular dimming, unlike any other known star. It incited theories galore to explain the dimmings, including that it might be a megastructure built by aliens passing in front of the star (or comets, planets, rings, starspots, etc.). Astronomers watched it closely for 21 months, and the results were just announced: Four episodes of dimming were caught, and the amount of dimming was different at different wavelengths of light, eliminating the possibility of solid objects as the cause. Other observed properties ruled out all other theories except dust clouds passing in front of the star—sorry, no megastructures.

More on Neutron Stars Merging

As reported here in December, the observations of the merging neutron stars by LIGO (in gravitational waves) and in all wavelengths of light by about 70 telescopes left one major mystery: why were the gamma rays observed far weaker than expected? The first guess was that gamma rays are strongly observed only if their jets (focused radiation beams) are aimed at us, and this time they weren't. A new study has challenged this explanation and suggested that a jet has to punch through surrounding material before gamma rays can be strongly observed, and this event failed to punch through. This theory is based on radio observations that continued for more than 100 days after the event. Those radio observations did not show peaks at the right theoretical time for the "bad aim" theory, but did support a shell of surrounding material. Other astronomers are trying to reconcile the "bad aim" with the later radio observations. Perhaps we are going to have to observe more neutron star mergings before we understand this.

Yet More on Neutron Stars

Another question left from the neutron star merging observations is whether the resulting object was a larger neutron star or a black hole. A new study of the X-ray and radio observations of this event concludes that it was probably a black hole. Those observations best matched light expected to be produced by the shock where expelled gas hits interstellar matter, not from a debris disk or jet. Theory says that a resulting black hole would better match the shock source than a resulting neutron star.

Inclined Planet

A planet (dubbed GJ436b) has been found to orbit its star over the star's poles, rather than in the plane of the star's equator (as would normally be expected). It was already known that the planet is in a very eccentric orbit, closely approaching its star, then receding far from it. During the close approaches, the planet gets so hot that material evaporates off it, streaming a tail like a comet. A new study shows that a massive planet (as yet undiscovered) in the system could have perturbed GJ436b into its unusual orbit. Astronomers will try to detect such a second planet.

John Young

Astronaut John Young died in early January at age 87. He accomplished a number of firsts: First manned flight of the Gemini spacecraft, first flight of the Space Shuttle, first to fly into space six times, first to land in the lunar highlands. He was also the only astronaut to fly *three* types of spacecraft (Gemini, Apollo, and Shuttle). Young was the second person to return to the Moon (orbited in Apollo 10 and landed in Apollo 16). Now only five of the 12 people who have stood on the Moon remain alive.

Asteroid Radar Imaging

The Arecibo radio telescope and radar have been returned to operation after damage from hurricane Maria, and one of the first observations was radaring asteroid Phaethon (the parent body of Geminid meteors) during its close pass. Data suggest Phaeton is roughly spherical, has large depressions (probably impact craters), and is about 20% larger in diameter than previous estimates.

DAS NEWS

Volunteer Opportunities

Friday, Feb. 9th, 7:00-9:00 PM: Star Party for girls camp in Highlands Ranch off south US 85.

Wednesday, Feb. 28th, 8:00-9:30 PM: Star Party at Renaissance Stapleton.

Wednesday, March 21st, 2018, start 7:00 PM: Star Party, Cub Scout Pack 268, Homestead Elementary, Centennial, CO.

Saturday, March 24th, 2018, start 7:00 PM: Star Party, private birthday, Highlands Ranch, CO.

To volunteer, please contact July Candia:
external@denverastro.org
—and thanks!

Astro-Imaging Software

The DAS's Ron Pearson has begun experimenting with the latest version of Aurora HDR software—his early results imaging M42, the Great Orion Nebula, grace this month's cover. (For this sample, he kept things simple, and worked without dark frames—as you can see, his preliminary output is quite good already.)

Ron has more technical information and insights about using the software than can be shared here now, but if you're interested in joining the experiment and trading experiences with him (and hopefully soon, all of us), he can be reached at: ursamajor_1@mac.com.

DAS Elections

Our annual E-Board election was held at the **February 2nd** General (Annual) Membership meeting, and the results are in—here's our new roster:

President: Ron Hranac
Vice-President: Lindsey Shaw
Secretary: Ed Ladner
Treasurer: Mike Nowak
Trustees: July Candia, Jack Eastman, Joe Gafford, Dena McClung, Ed Scholes, Sorin, Chris Ubing, and Dan Wray

The new board will be installed in March, at the DAS Spring Banquet.

Thanks to outgoing E-Board members Brent Blake and Zach Gilbert, and the incoming ones for their work for the DAS!

February Member In-Reach

On **Saturday, February 10th, at 7:00 PM,** Ed Scholes will present "Secrets and Tweaks for Go-To German Equatorial Mounts," a solid overview of how to resolve problems in aligning your go-to telescope system, and getting it to actually point to and track the targets it's supposed to. While focused specifically on equatorial mounts, users of go-to alt-azimuth systems will find many of their concerns addressed as well.

Questions about DAS Membership & Renewals

At this time of year, DAS fields many queries about memberships and renewals—the best place to send your questions is to our Membership Coordinator, Dena McClung at: membership@denverastro.org.

**If you haven't renewed yet, *you really should soon*—don't forget our new option for Family/Dual Membership! You'll find a handy renewal page at: https://www.denverastro.org/dasrenew.html.

February Skies

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appear both brighter and larger. If you don't mind the crazy observing hour, then "Surf's up!" at Jupiter.

Saturn is now an early-morning object, rising at 4:50 AM on February 1st, and around 3:15 AM at the end of the month. In practice, that will leave the planet a bit low for good observations as the month begins—but near month's end, Saturn will attain a 20° altitude about 45 minutes before sunrise, which isn't too bad. Predawn observing will improve even more in March.

Uranus still sits high enough for a sharp observation—that is, to see its tiny disk *as* a disk. By the end of March, though, Uranus will slip into the sunset. (Uranus will have a *very* close conjunction with Venus on March 28th.) Look for Uranus about 3° east of Omicron (o) Piscium at the beginning of February, and about 2° eastward of the star at month's end.

As February begins, **Neptune** lies quite low in the west after sunset, and sets with the Sun at the end of the month. Superior conjunction is March 4th; the planet will then transition to a pre-dawn object.

Stars and Deep Sky

This month, we'll hit three targets in and around the constellation of Gemini, the Twins. Two are suitable for beginners, though they can be challenging targets, and the last one is for experienced observers. If you're not familiar with Gemini, see "Getting Your Bearings," on page 4 of the February 2016 *Observer*, at http://www.denverastro.org/newsletters/february2016_denverobserver.pdf. **There are also some easy targets for beginners (Castor and M35) in Gemini, in that issue's "Monthly Skies"**—observing them is a good way to become familiar with this area. Castor, as you'll see, is also a useful test for seeing conditions—if your telescope is properly collimated, and you can't split Castor, it's not a good night.

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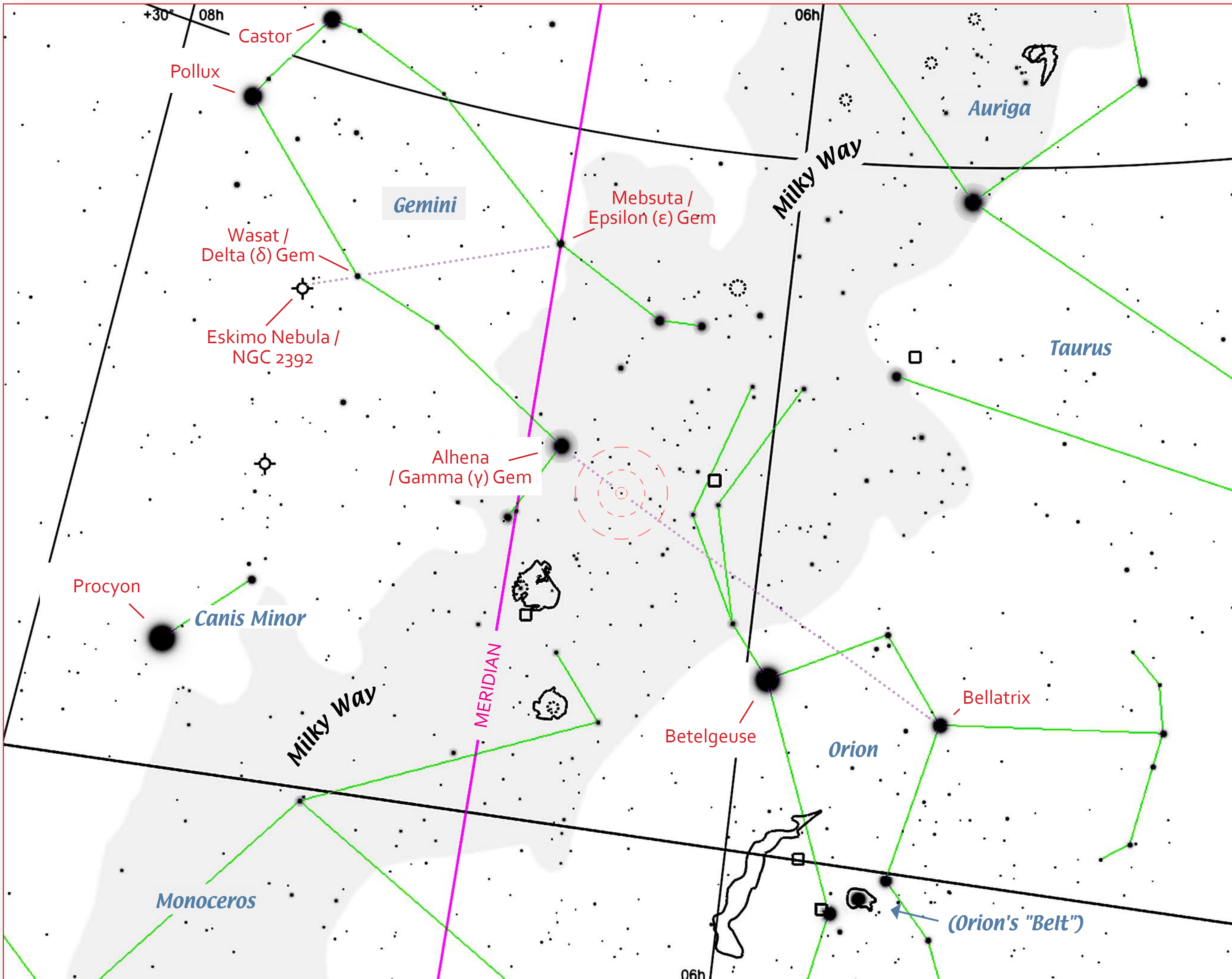

The Denver sky at 9:00 PM in mid-February. The dashed Telrad circles show their correct position when centering BL Orionis, one of this month's targets. Note dotted lines showing alignment of BL Ori between Alhena and Bellatrix, as described in text. (A second dotted line in Gemini, from Mebsuta through Wasat, shows the pathway to the Eskimo Nebula, NGC 2392.)

Object positions, constellation and meridian lines charted in SkySafari, and then enhanced.

February Skies

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Our first stop, then, is the binary star **Wasat, also known as Delta (δ) Geminorum, or "Delta Gem"** for short. This magnitude +3.5 star is **located at 07h 21m, +21° 57'**. Some stars are notable for their physical characteristics, some for being rare, others for their beauty—in Wasat's case, it's beautiful and challenging to observe. (It's also a landmark for finding our next target, so it's a fine star to have up your sleeve.)

In a telescope, Wasat is a striking binary star, with a pale cream-white primary; almost lost in the primary's glare sits a dim, purplish companion. In my eyepiece, it's a reddish version of "royal" purple—the system's color combination would remind veteran observers of Achird, (Eta [η] Cas), in Cassiopeia.

Though it's not hard to find, Wasat can be quite tough to split in a telescope. The problem isn't the angular separation; at 5.5", Wasat's stars are actually farther apart than nearby, and relatively easy, Castor's (Alpha [α] Geminorum). The snag is the disparity in the pair's apparent magnitudes—the primary glows at +3.5, but the companion is just +8.2—a 4.7-magnitude difference. (In plainer language, the bright star is roughly *75 times* more brilliant than its companion.)

Even with good seeing, Wasat is difficult in a 'scope at 200x, and a little easier at 300x. The pair seems much closer together than its actual separation, because the brighter star's glare, or blur circle, spreads across the gap—it reminds me very much of splitting Rigel, but I think this one may be tougher. On the same night as my last good Wasat observation, Castor was an *easy* split at 120x, and good for "WOW!" at 300x. (Recently, the seeing on many nights has

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February Skies

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been bad enough to make resolving Castor difficult or impossible—under skies like that, don't bother with Wasat.)

Wasat is a class-F sub-giant star, about 1000 K hotter than our Sun; it's just beginning the next part of its evolution, as the process of fusing hydrogen in its core starts to falter. Its companion, though, will have a vastly longer life—it's a much cooler class-K star, dimmer than our Sun and consuming its hydrogen fuel at a far slower rate. The companion circles at over three times Pluto's distance from our home star, and takes about 1,200 years to complete an orbit.

One last note—while I think of this star as a "treat" for a night of especially good seeing, even the most casual scan of the 'net shows that this star is easy, even with an 8-inch or smaller 'scope, under more stable skies than we have in Denver. Reports suggest 200x works well, and that the pair can be separated, at least sometimes, with as little as 100x. If you're traveling to a distant star-party, be sure to put Wasat on your observing list.

Finding Wasat is pretty simple—look for it about halfway between the bright stars Pollux (the "head" of one of the Gemini Twins) and Alhena (the same twin's "foot"); it's a touch closer to Pollux (see chart). Under good conditions, Wasat is dimly visible in suburban Denver—on a clear night in the country, though, it should be a sitting duck.

Our next target lies close to Wasat, less than a Telrad-field away. It's the **Eskimo Nebula, NGC 2392 (also known as Caldwell 39), at 07h 30m, +20° 52'**. This planetary nebula takes its popular name from the way its outer shell resembles a parka around an Eskimo's face. In reality, the nebula is a complex system of expanding gas, formed over time as its dying central star ejects material into space. Like many planetaries, it has high surface brightness, and displays a distinct blue-green tint. It's visible even in smaller telescopes, perhaps initially as a blurry or "blinking" star, either of which give away the object's true nature. Under higher magnification, mottling or uneven surface brightness in the nebula might be revealed.

In a larger 'scopes, of about 10 or 12 inches, detail becomes visible. With decent seeing, the outer shell is clearly differentiated from the inner structure, and the bright inner disk may show texture. In these larger instruments, the Eskimo is easily visible even in suburban Denver—it's immediately obvious at 60x as a pronounced non-stellar bluish disk, and 200x works well for showing structure. (A UHC filter helps a lot, but isn't absolutely necessary—try observing this object with and without the filter.)

It's easy to get your 'scope in the Eskimo's neighborhood—*you're already in it,* if you centered on our previous target, Wasat. From that starting point, imagine a line from Mebsuta, aka Epsilon (ϵ) Geminorum, and extending past Wasat—slide your Telrad's center along this line, in the direction *away* from Mebsuta, until the trailing outer edge of the Telrad roughly ¼-⅓°—*just a smidge*—from Wasat. (You can use the innermost circle of the Telrad to judge the size of the gap—it's ½°.) If this is done *carefully*, the Eskimo should then be near the center of both your finderscope *and a low-power telescope field*. You won't see it in a 6x30 finder, but in a 9x50, you *might* recognize it masquerading as a dim blue star—it appears as a close matching "twin" to an adjacent magnitude 8.3 star. Depending on conditions, you may find it easier to navigate just with the Telrad, and go straight to the telescope eyepiece.

Hubble Space Telescope photo of the Eskimo Nebula, NGC 2392.
Image Credit: NASA, Andrew Fruchter and the ERO Team (Sylvia Baggett [STScI], Richard Hook [ST-ECF], Zoltan Levay [STScI]).

On my most recent observing run with the 6-inch, I failed to recognize the Eskimo even though I was right on it. The first problem is a common one, and well-documented for planetaries—it looked quite star-like at low power. (Observing conditions were difficult, which didn't help.)

The second problem was serious lack of "map discipline"—that is, not thinking clearly and not following the charts. This can come from fatigue and/or allowing yourself to become deeply chilled (which prevents you from thinking clearly!). In this case, it was pretty cold and the wind had come up, dropping temps further—it was quite a fight out there after a while, and the wind chill finally won. (If you're not looking forward to a similar winter slugfest, let me suggest that the Eskimo will still be well up in mid-April, when it should be much warmer.)

Our last target is best for experienced observers. It's a carbon star, **BL Orionis ("BL Ori" for short), at 6h 26m, +14° 43'**. (If you're using a go-to system or a finicky star catalog, BL Ori is also listed as **HR 2308**, **SAO 95659**, and **HIP 30564**.)

I've left this target for experienced folks, because as far as carbon stars go, BL Ori is relatively subtle, with delicate hues best appreciated by someone who's seen other examples. Carbon stars can display rich coloration when carbon formed in the star's lower layers gets distributed

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into the outer envelope, scattering shorter wavelengths of light and bestowing a deep red or orange hue. If you've never seen a carbon star before, I suggest you skip BL Ori for now, in favor of the strikingly red star, R Leporis—its nickname, "Hind's Crimson Star," describes it well! (You'll find R Lep covered in the "Monthly Skies" of the January 2016 *Observer*; the issue is online, at http://www.denverastro.org/newsletters/january2016_denverobserver.pdf. R Lep can be tough to find, so you'll need to be skilled, stubborn, or equipped with a go-to 'scope. If you're none of those, try asking another DASer for a look—it's quite something.)

As for BL Ori, you'll see a star that looks much like a red supergiant, except for subtleties in hue—you're not coming here for "wow," you're coming to see a quiet variation on a theme. In my 6-inch Newtonian, I saw a "purplish-orange" star, and my observing companion saw it as "brownish orange." We both found the color understated, but still noticeably different than most orange stars. In the 6-inch, the view was best around 100x—60x gave a brighter image, but the color was even more subdued ("cream-orange").

Conditions were less than perfect that night, with hazy skies and bad wind. The nearby section of Milky Way was dim at best, and it shouldn't have been—the "soupiness" of the sky itself likely reduced BL Ori's color intensity.

BL Ori lies near Alhena, the bright star marking Gemini's "foot," so BL's not too hard to find. Center Alhena in your Telrad, and slide the Telrad towards Bellatrix (aka Gamma [γ] Orionis) until the distance from Alhena to the outer (4°) Telrad circle is just less than the distance from that edge to the Telrad's center. (*The final position is illustrated on our chart*.)

You might see BL Ori as a creamy-orange star in your finderscope (it showed in my 6x30), and you might not—all carbon stars are variable, and BL may become too dim to see in smaller finders, and even a 9x50. If the finderscope doesn't show it, careful Telrad work should get you close enough to see it in a low-power telescope field. Try slowly spiraling from your best-guess position if you don't have it in the main 'scope.

—See you next month.

The Denver Astronomical Society
P.O. Box 102738
Denver, Colorado 80250