

OBSERVER



A ROARING NEW YEAR TO ALL

NGC2359 - THOR'S HELMET

Just to the northeast of Sirius in Canis Major, Thor's Helmet features an aqua (ionized oxygen) "Art Deco" bubble created by a massive, active (pre-supernova) Wolf-Rayet star embedded in a large cloud of molecular hydrogen. Spumes of stellar material interact with the cloud to form the "horns" of the helmet, which reveal shock-waves as red, ionized hydrogen gas. Darrell Dodge made this image over the nights of November 20th and 23rd at the DAS EGK Dark Site when the nebula was near the Meridian, using a modified Canon 450D DSLR and an AT81N f/4 8-inch imaging Newtonian. Fourteen 360-second images from the two nights were pre-processed and combined with Nebulosity 2.5 and processed with CS5.

Image © Darrell Dodge

Calendar

- 9..... Full moon
- 16..... Last quarter moon
- 23..... New moon
- 30..... First quarter moon

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JANUARY SKIES

by Dennis Cochran

Cetus wags his tail in the early evening at the southern meridian. All of the classical winter constellations are in the eastern sky now, with the Pleiades just above the ecliptic leading the charge. Below the ecliptic Aldebaran stands out in front of the V-shaped Hyades star cluster, too spread out in the sky to have become a Messier object but existing instead as the constellation Taurus the Bull, a powerful figure in Mesopotamian and early Greek cultures. There is an M-object there, however, in the eastern extension of the Bull's lower horn just above the zeta star of Taurus: Mr, Messier's list starter, the Crab Nebula. This exploded star actually looks like an explosion frozen in time that has nevertheless changed slightly in the decades that humans have photographed it. The bright star at the extension of the Bull's upper horn is actually β (beta) Auriga. Here is another star which seems to share

two constellations, just like the northeast corner star of the Pegasus Great Square belongs to Andromeda.

From the area of the sky southeast of Aldebaran, a line of south-falling stars outlines Orion's shield held aloft west of his shoulder star Bellatrix. Down in his sword's scabbard M43 is the small blob above the larger M42, the famous Orion Nebula stellar nursery. If you're an imager, the region of the Hunter is full of nebular phenomena including Barnard's Loop, a huge quarter-circle east of the three belt stars. The top of its arc ends above the belt stars, and below that a smidgen, two-thirds of the way down the line from Betelgeuse towards the southeastern belt star is the nebula M78, which *Peterson's Field Guide to the Stars and Planets*, 2nd Ed. describes as a "wispy cloud."

While we're in the vicinity, the Horsehead Nebula is just under the southeastern star of the belt. It is smaller,

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PRESIDENT'S CORNER

by Ron Pearson

I wish a Happy New Year to you all. I hope everyone had a safe and prosperous December. The sun has crossed that stand-still solstice point and is heading north again in our sky. 2012 is going to offer us a couple of great astronomical opportunities—the last transit of Venus across the sun that we'll see in our lifetimes, and an annular eclipse of the sun not too far south of Colorado. It will be a partial eclipse in our Denver sky. I sure hope by now that you've sent in your membership renewal. Late in 2011 we passed the 350 member level!

Of immediate note on our DAS calendar is our annual nominations and election of officers and e-board members. We could all enjoy our telescopes



and struggle with learning the sky on our own but most of us join DAS because it's more fun to share these things in a social group where we can exchange information, listen to "experts" that the group brings in

or just exchange eyepieces to try out another person's. But organizing and carrying out meetings and events for ourselves and outreach to the public requires some of us to put in more of their personal time to make sure the doors at Chamberlin get opened to cutting the grass at our Ed Kline Dark Sky site, or making sure the warming hut hasn't been overrun by four-footed alien astro-mice. If you take a moment to look around at all the DAS offers from our website to our public or school outreach events these all need people that share a bit of their time to

bring astronomy to our membership and others. It doesn't add to their "bucket list" of deep-sky objects but sometimes a thanks or acknowledgement that someone learned something new or saw something "awesome" goes a long way to make up for an object find or astrophoto delayed. It's not just officer or e-board positions, it takes many volunteers to run down the details or see that loose ends are tied up for all the events and offerings of DAS. I hope all of you will consider what you can offer to help with in our little society that makes astronomy all the more fun or interesting for someone. Being involved is the best way to grow in any endeavor and assuming that someone else will do it is the best way to kill the fun or a society. So, thanks to all of you who have contributed to the DAS for the past years and thanks to all of you who will help the rest of us in this new year.

"Keep Looking Up" in 2012!



DAS SCHEDULE

JANUARY

- 6 DAS General Membership meeting at D.U.'s Olin Hall (Begins at 7:30 P.M.), Nominations of Officers
- 13 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 20-22 EGK Dark Sky weekend
- 28 Open House at Chamberlin Observatory (Begins at 5:30 P.M.)

FEBRUARY

- 3 DAS Annual Membership meeting at D.U.'s Olin Hall: Annual Election of Officers (Begins at 7:30 P.M.), Nominations of Officers
- 10 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 17-19 EGK Dark Sky weekend
- 25 Open House at Chamberlin Observatory (Begins at 5:30 P.M.)

Public nights are held at Chamberlin Observatory every Tuesday and Thursday evenings beginning at the following times:

March 15 - April 14 at 8:00 P.M.

April 15 - August 31 at 8:30 P.M.

September 1 - September 30 at 8:00 P.M.

October 1 - March 10 at 7:00 P.M.

Costs to non-members are: \$3.00 adults, \$2.00 children.

Please make reservations via our website (www.denverastro.org) or call (303) 871-5172.

Society Directory

- President:**
Ron Pearson (303) 670-1299
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Chuck Habenicht David Shouldice
Ron Hranac Dan Wray
Ron Mickle, Past President
President Emeritus, Larry Brooks

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Naomi Pequette (Chair)
- Finance Committee**
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The Executive Board conducts the business of the DAS at 7:30 p.m. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.

www.denverastro.org

JANUARY SKIES (CONTINUED FROM PAGE 1)

fainter and harder to see than you might think from the many images you've seen. East of Orion's left foot is the beta star of the dim constellation Monoceros the Unicorn, and just west of that star is a string of nebulae—NGC 2170 and 2183-85. Maybe you can find them or even image them; Peterson's Field Guide to the Stars and Planets doesn't discuss them. If you can't find β (beta) Mono, it's in the region exactly between Betelgeuse and Sirius, which emerges above the horizon later in the night.

Rigel, Orion's right-foot star, seventh brightest in the sky, is a double with a faint companion. West of Rigel is the very faint Witch's Head Nebula. Northwest of Rigel we jump over to the long, winding constellation Eridanus the River, starting at its beta star and wandering downstream west under Taurus and the tail of Cetus before curving south like a wave, then to the east again before snaking back southwest to end on the early-evening meridian low in the sky. Back at β (beta) Eri we

venture west downriver to encounter Eri Omicron, a widely separated pair of stars on the same level as Rigel. Omicron is actually a triple system only 16 light-years from ours. Following the river, γ (gamma) Eri is southwest of Omicron, and east of it is the planetary nebula NGC 1535; look for two concentric rings, the outer being fainter. An Omicron-to-Gamma distance southwest of Gamma Eri is a group of NGC galaxies, and a bit farther west of these another two that include the brighter galaxy NGC 1300, a barred spiral. It is just north of a fainter Eridanus star marked Tau4 in Peterson's Field Guide to the Stars and Planets, Chart 34. This chart shows the beta and omicron stars of Eridanus, with a bit more on Chart 35 and most of the remaining loops of this twisting constellation on Chart 34 and 46. There is a cluster of galaxies just west of the "g" star on Chart 34 (Eridanus is so long that they ran out of Greek letters for the stars) if you can find it, 15 degrees east-southeast of β (beta) Fornax.

And remember, if you can't find any of these faint, far-away southern objects, there's always unmistakable Jupiter to look at in the south half of the sky. After midnight Saturn rises earlier as the month progresses. Mars, being overtaken by the speeding earth, rises at 10 p.m., and despite the fact that opposition is approaching in March, isn't too big—about a quarter of the size of Jupiter. The War God always seems to be hanging out with Venus in the paintings of the Renaissance. The result of this dalliance is Cupid, who gets his cuddliness from her and his toy bow-and-arrows from his dad. The goddess of beauty, peace and love herself rises higher into the evening sky displaying a waning gibbous phase as she overtakes the earth. Then, there are the solar system leftovers called the Quarantids, a meteor swarm, coming along on January 3, radiating out of northern Boötes. Which reminds us: wear booties on these cold, long and often clear winter nights.

NASA'S SPACE PLACE

DAWN TAKES A CLOSER LOOK

A Space Place Partner Article
by Dr. Marc Rayman

Dawn is the first space mission with an itinerary that includes orbiting two separate solar system destinations. It is also the only spacecraft ever to orbit an object in the main asteroid belt between Mars and Jupiter. The spacecraft accomplishes this feat using ion propulsion, a technology first proven in space on the highly successful Deep Space 1 mission, part of NASA's New Millennium program.

Launched in September 2007, Dawn arrived at protoplanet Vesta in July 2011. It will orbit and study Vesta until July 2012, when it will leave orbit for dwarf planet Ceres, also in the asteroid belt.

Dawn can maneuver to the orbit best suited for conducting each of its scientific observations. After months mapping this alien world from higher altitudes, Dawn spiraled closer to Vesta to attain a low altitude orbit, the better to study Vesta's composition and map its complicated gravity field.

Changing and refining Dawn's orbit of this

massive, irregular, heterogeneous body is one of the most complicated parts of the mission. In addition, to meet all the scientific objectives, the orientation of this orbit needs to change.

These differing orientations are a crucial element of the strategy for gathering the most scientifically valuable data on Vesta. It generally requires a great deal of maneuvering to change the plane of a spacecraft's orbit. The ion propulsion system allows the probe to fly from one orbit to another without the penalty of carrying a massive supply of propellant. Indeed, one of the reasons that traveling from Earth to Vesta (and later Ceres) requires ion propulsion is the challenge of tilting the orbit around the sun.

Although the ion propulsion system accomplishes the majority of the orbit change, Dawn's navigators are enlisting Vesta itself. Some of the ion thrusting was designed in part to put the spacecraft in certain locations from which Vesta

would twist its orbit toward the target angle for the low-altitude orbit. As Dawn rotates and the world underneath it revolves, the spacecraft feels a changing pull. There is always a tug downward, but because of Vesta's heterogeneous interior structure, sometimes there is also a slight force to one side or another. With their knowledge of the gravity field, the mission team plotted a course that took advantage of these variations to get a free ride.

The flight plan is a complex affair of carefully timed thrusting and coasting. Very far from home, the spacecraft is making excellent progress in its expedition at a fascinating world that, until a few months ago, had never seen a probe from Earth.

Keep up with Dawn's progress by following the Chief Engineer's (yours truly's) journal at <http://dawn.jpl.nasa.gov/mission/journal.asp>. And check out the illustrated story in verse of "Professor Starr's Dream Trip: Or, how a little technology goes a long

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ABOUT THE DAS

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 is a long-time member in good standing of the **Astronomical League** and the **International Dark Sky Association**. The DAS' 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 Historic Chamberlin Observatory and its telescope in cooperation with the University of Denver.

The DAS is 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. To contribute, please see the bottom of the membership form for details (found on the DAS website: thedas.org).

More information about the DAS, its activities and the special tax-deductible funds is available on the DAS website at www.denverastro.org.

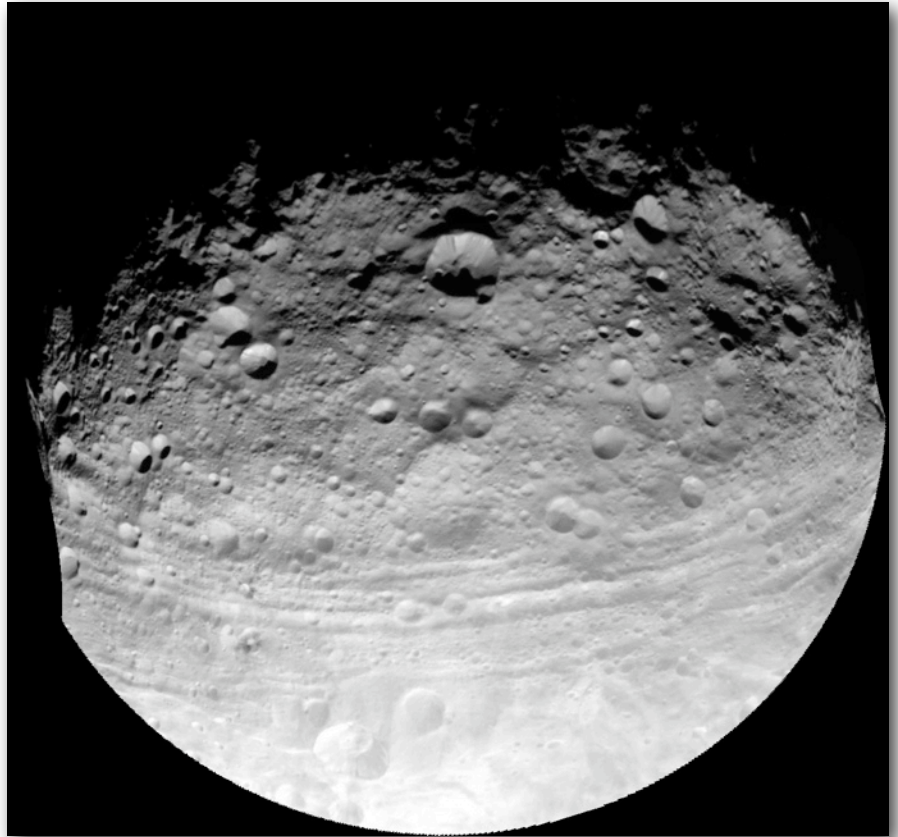


way," at <http://spaceplace.nasa.gov/story-prof-starr>.

This article was provided courtesy of the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

FEBRUARY SPEAKER—DR. TOSHIYA UETA, "OBSERVATIONS OF COSMIC DUST"

Dr. Ueta is an assistant professor in the DU Dept. of Physics and Astronomy. His research interests involve the interstellar and circumstellar distribution of cosmic dust and include stellar evolution, stellar mass loss, astropaleontology, astromineralogy, radiative transfer, infrared observations of dusty media, and interactions between stellar winds and the interstellar medium. He is an active user of infrared telescopes such as Spitzer (US), AKARI (Japan) and Herschel (Europe).



This full view of the giant asteroid Vesta was taken by NASA's Dawn spacecraft, as part of a rotation characterization sequence on July 24, 2011, at a distance of 5,200 kilometers (3,200 miles).

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



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