

OBSERVER

A CELESTIAL CORNUCOPIA



“Undeniably beautiful.” . . . “Unquestionably, the prettiest cluster in the sky.” Such are the remarks elicited by viewers of the Seven Sisters, M45, or the Pleiades. One of the nearest clusters to Earth (~400+ ly), the daughters of Atlas number close to a thousand, and include binaries, brown dwarfs and the exceptional hot blue, B-type stars that draw the eyes on autumn and bitter winter nights. *Image copyright 2010 Darrell*

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NOVEMBER SKIES *by Dennis Cochran*

Last November Jupiter was in Capricorn, the constellation we talked about last month. Now it’s farther east on the ecliptic, as you know. Keep looking at, or for, the Southern Equatorial Belt (SEQ), which may be back or may be starting a protracted return process or may still be inscrutable. The four Galilean Moons will be doing their dance, of course, and one can see changes of position just during the Open House, especially if a moon is nearing the limb of the giant planet. If one keeps track of the whole come-back process of the SEQ, which may be more complicated than a simple fade-in, it may be a once-in-a-lifetime occurrence.

Daylight Savings Time ends on Sunday morning the 7th. There is a rumor that DST will completely replace regular old Standard Time

soon. Adjustments to the months that more accurately reflect our culture will be made: November will be renamed “Xmas-Shopping-Season-Propert,” while October will be named “Halloween-Shopping-Season,” and September will be named “Start-O’Xmas-Shopping-Season” and August will be called “Back-to-School-Shopping-Season.” July is a candidate for “Surfing-Shopping-Season,” while June will be simply “Summer-Shopping-Season.” They’re still working on the first five months.

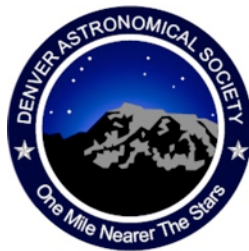
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PRESIDENT'S CORNER

Wow! Only two months left on my calendar for 2010. I'm going to have to go buy another one for 2011 soon. If you're just sitting back and watching the sky go by you've missed a lot of DAS activity, with more to come this month and in December before we roll into a new year. I sure hope you've been out observing during the great fall weather we had or participated in at least one of our outreach events for Astronomy Days. According to the Denver Museum of Nature & Science (DMNS) we had over 1000 people take part in our solar observing or talks. The sun and weather cooperated for two full days of sunspots and prominences, especially a giant one that stretched across 1/3 of the sun which dropped a couple of flares—big thanks to the many DAS members that helped out with scopes, gave "How To" talks or greeted people at our tables in Space Odyssey. At Chamberlin Observatory on Saturday night, we had over 500 paid guests look through the 20-inch Clark scope and many other scopes out on the lawn for a beautiful evening of Jupiter and lunar observing. The EPOXI mission teacher's workshop caught an asteroid or two in Darrell's 11-inch, even if Comet Hartley 2 was lost in the light pollution. This was one of the biggest outreach events for the DAS in years and was followed by a big Chamberlin Open House night in September. We had about 300 view through the historic 20-inch Clark. In between all this, Dr. Stencel, Aaron Reid, Amateur Telescope Society consultant Chris Ray, and

Jack Eastman took out the 20-inch Clark's objective lens for a long-overdue cleaning.

In October, the DAS also made a significant purchase of an Exploradome Observatory (<http://exploradome.us/>), which we will put up at the Edmund G. Kline Dark Site in the near future. The observatory is a 10 ft. x 10 foot metal building with an 8-foot dome. We decided on this type of building because of the possible need to move it in the future if our lease arrangement for the dark site land is not continued. A DAS observatory at the dark site has been on the plan since the day we got our site and it will now see fruition with the donation of a Celestron 14-inch SCT with a Losmandy G-11 mount. It's a special thing for many DAS members, as the E-Board agreed to name it the "Brooks Observatory" for our President Emeritus and friend, Larry Brooks, who did so much for the DAS. We are waiting on the telescope, which is being refurbished by Celestron International, who gave a generous donation of their time and materials. The observatory purchase was made from the DAS General Fund, not from the Dark Site Fund, and it is intended for use by all DAS members and for DAS Outreach activities. We did not have a special fund-raising for the observatory but the proceeds from this year's Annual DAS



Auction will go to defray the cost of the observatory in the General Fund.

The Exploradome Observatory purchase was made with the help of Craig Betzina, who has an "observatory farm" in Strasburg, not far from our Dark Site. As previous Observer articles have described, Craig also hosts a DAS telescope in one of the domes on his property. We have recently 'changed-out' the telescope from a

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ASTRONOMY DAY HELPER

Neil Pearson gets his scope ready for visitors at Colorado Astronomy Day.

Photo copyright 2010 Steve Solon



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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

NOVEMBER SKIES (CONTINUED)

Meanwhile, this month the Leonid Meteor Shower peaks on the 17th. Unfortunately the moon will be waxing towards full, which occurs four days later.

It's time to look at the Andromeda Galaxy if you haven't already. Find the Great Square of Pegasus and then its northeast corner. A two-curve "spray" emanates from Alpha Peg. My eyes see it that way, but *S&T's* map does not. Go out two stars on the spray and then up northwest a short way to find the galaxy. Under dark skies one can see it with the naked eye. When people at Open House ask me what the farthest thing one can see is, I say Andromeda. One can see farther in a telescope, but that answer will do for naked eye viewing. Besides the galaxy, what else is in Andromeda? Well, the two satellite galaxies, M32 and M110 (NGCs 201 and 205, respectively). A hard-to-find large M-object nearby is M33, a face-on galaxy in Triangulum. Look once again at the Andromeda spray and the bright Alpha star, number two in the lower curve, and note the distance and direction out to M31. Now go the same distance in the opposite direction from alpha for M33's position. I couldn't find it during a Messier Marathon from a darkish site in the California desert. It has a faint surface brightness and can elude you.

After failing to spot M33, go back to the lower curve of the Andromeda spray and follow it to its last star, Gamma. Now you're pointing at Perseus, in fact at Algol. This is the beta star of Perseus, and note that half-way to Algol from Gamma Andromeda is the star cluster M34, large enough to be seen with the naked eye under good conditions. To the northwest, just off the pointed top of Perseus is the Double Cluster. Just east of this pair is a smaller cluster, NGC 957. Southwest a bit from the Double Cluster is M76, a planetary that has been called the "hardest-to-see M-object." Now from Perseus's tip, drop down the non-*Algol* side of the constellation (which also could be described as a curving spray) clear to the end, passing the not-easily-seen California Nebula, NGC 1499, near the end, and keep on going to get to the Pleiades, M45 (see cover image by Darrell Dodge,) although one can just look in the eastern sky to see this well-known cluster that many people mistakenly call the Little Dipper.

No "Bad Things" this month, but we do have meetings: the Open House at Cham-



BLOWING IN THE WIND

Just a celestial stone's throw from Messier 52 glows the expanding oblong sphere known as the Bubble Nebula (NGC 7635) in Cassiopeia. Violent stellar winds expelled from a massive young central star have created and shaped the bubble, while the stellar child's energies cause the surrounding H II region to glow in familiar reds.

Image copyright 2010 Joe Gafford

berlin on Saturday the 13th (featuring Jupiter), and the Show-and-Tell General Meeting on Friday the 19th at Olin Hall. Thanksgiving is on Thursday the 25th, and therefore no Public Night will be held.

A S T R O N O M Y D A Y

All photos by Steve Solon

OUR WONDERFUL MEMBERS PULLED OUT ALL STOPS FOR ASTRONOMY DAY!

All photos counter-clockwise from the top left: Dan Wray shows off the sun to guests at Colorado Astronomy Day, Darrell Dodge mans a table ready to answer any and all questions, and Chuck Carlson at the Museum of Nature & Science (DMNS). On the following page, Norm Rosling gives a presentation, Cliff Simpson and Astronomy Day guests, the Barellas at the DMNS, Dan Wray next to the WFPC-2, astronaut Bruce McCandless at an eyepiece and Tim Pimental giving his presentation at the DMNS.



NOVEMBER SHOW N' TELL

At November's General Meeting on the 19th, the program and speaker are you! This is our annual member "Show n' Tell." If you've been working on a telescope or some accessory, special project, astrophotography or just have learned something new or

an interesting way to do observing which others might find useful, bring it along or put together a few minutes for a 'slide show' of your project. Share your project or experience with fellow DAS'ers at the next meeting.

PRESIDENT'S CORNER CONTINUED FROM PAGE 2

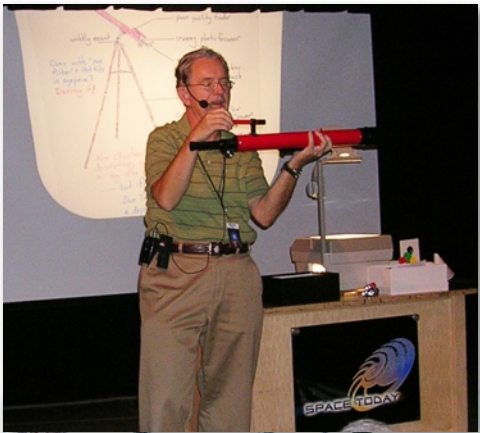
Meade LX-200 10-inch SCT to a Meade 127mm APO refractor. It and the observatory are there for you, DAS members, to use. Just give Craig a call to make arrangements. When our observatory is complete there will be two DAS observatories for members to use for observing or imaging. It will be up to you to

keep them collecting ancient photons from across the universe and not gathering Earth-bound dust.

As Thanksgiving comes this month we in the DAS can be thankful for the work of the many members who make all these activities possible and fun, for donations from generous

members, people who support what we do, and the many companies and entities that supply us with 'toys' to enjoy our hobby and endeavor in a profession where we all share our love of space and the night sky. —Ron Pearson.

R E C A P I N P H O T O S



JPL'S DR. DON YEOMANS
Image credit: NASA/JPL-Caltech



NASA'S SPACE PLACE

CLOSE ENCOUNTERS WITH JUPITER

A Space Place Partner Article

by Dr. Tony

Jupiter and Earth just had a close encounter—and it was a good one. In late September 2010, the two worlds were 31 million km (about 19 million miles) closer than at any time in the past 11 years. Soaring high in the midnight sky, Jupiter shone six times brighter than Sirius and looked absolutely dynamite through a backyard telescope.

Planetary scientist Scott Bolton of the Southwest Research Institute isn't satisfied. "I'd like to get even closer," he says.

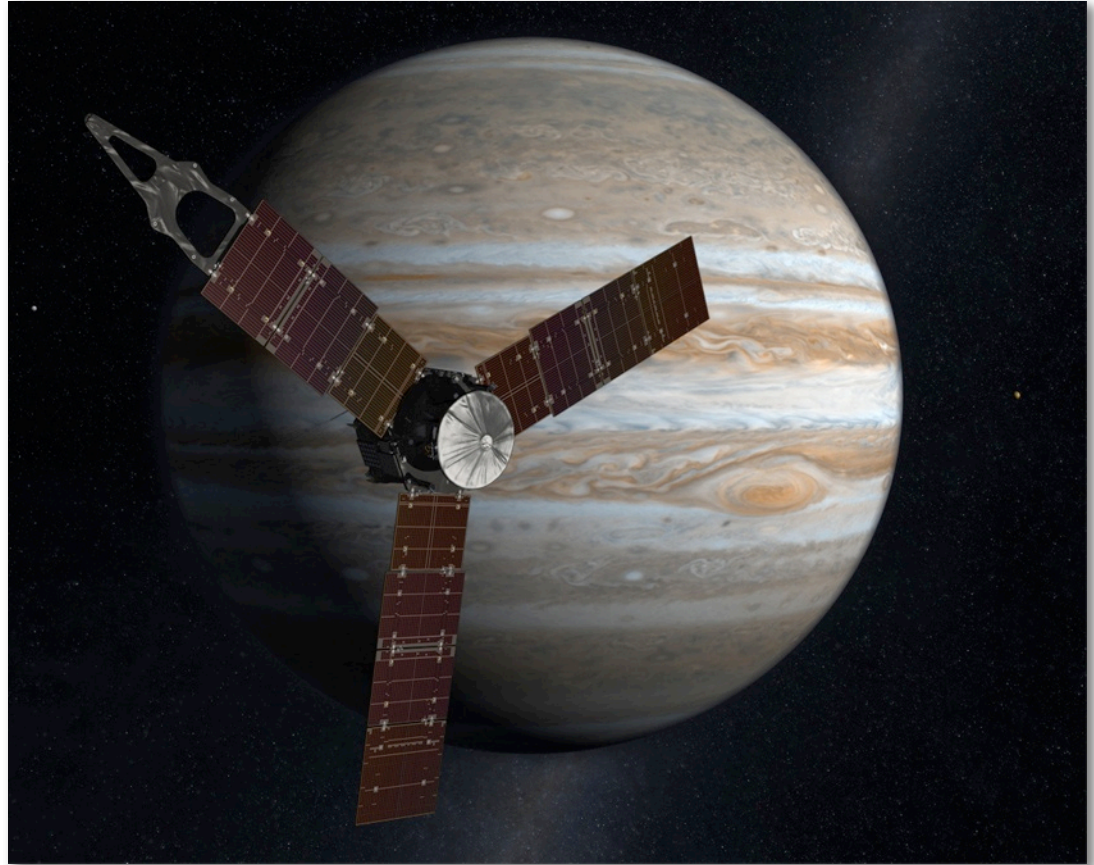
Bolton will get his wish in July 2016. That's when a NASA spacecraft named "Juno" arrives at Jupiter for a truly close-up look at the giant planet. Swooping as low as 5,000 km (about 3,000 miles) above the cloud tops, Juno will spend a full year orbiting nearer to Jupiter than any previous spacecraft.

The goal of the mission is to learn what lies inside the planet.

Astronomers have been studying Jupiter since the invention of the telescope 400 years ago, but in all that time the planet's vast interior has remained hidden from view. Even the Galileo probe, which dived into the clouds in 1995, penetrated no more than about 0.1% of Jupiter's radius.

"Our knowledge of Jupiter is truly skin deep," says Bolton, Juno's principal investigator. "There are many basic things we just don't know—like how far down does the Great Red Spot go? And does Jupiter have a heavy core?"

Juno will improve the situation without actually diving into the clouds. Bolton explains how. "Juno will spend a full year in close polar orbit around Jupiter, flying over all latitudes and longitudes. We will thus be able to fully map Jupiter's gravitational field and figure out how the interior is structured."



JUNO MISSION

The Juno mission, arriving at Jupiter in July 2016, will help to solve the mystery of what's inside the giant planet's core. Courtesy NASA/JPL

But that's not all. Researchers have good reason to believe that much of Jupiter's interior is filled with liquid metallic hydrogen, an exotic metal that could form only in the high-pressure, hydrogen-rich core of a giant planet. Jupiter's powerful magnetic field almost certainly springs from dynamo action inside this vast realm of electrically conducting metal.

"Juno's magnetometers will precisely map Jupiter's magnetic field," says Bolton. "This map will tell us a great deal about planet's inner magnetic dynamo—what it's made of and how it works."

Finally, Juno will probe Jupiter's atmosphere using a set of microwave radiometers. "Our sensors can measure the temperature 50 times deeper than ever before," says Bolton. Researchers will use that information to figure

out how much water is underneath Jupiter's clouds. "Microwave measurements of Jupiter's water content are particularly exciting because they will help discriminate among competing theories of the planet's origin."

Now that's a close encounter. Stay tuned for Juno.

Find out more about the Juno mission at http://www.nasa.gov/mission_pages/juno. Play the new Solar System Explorer super game, which includes the Juno Recall mini-game at <http://spaceplace.nasa.gov/en/kids/solar-system>. It's not just for kids!

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

NEW ASTRONOMER'S DEN

November, 2010

Galaxies and Clusters Prebude Winter Skies To Come

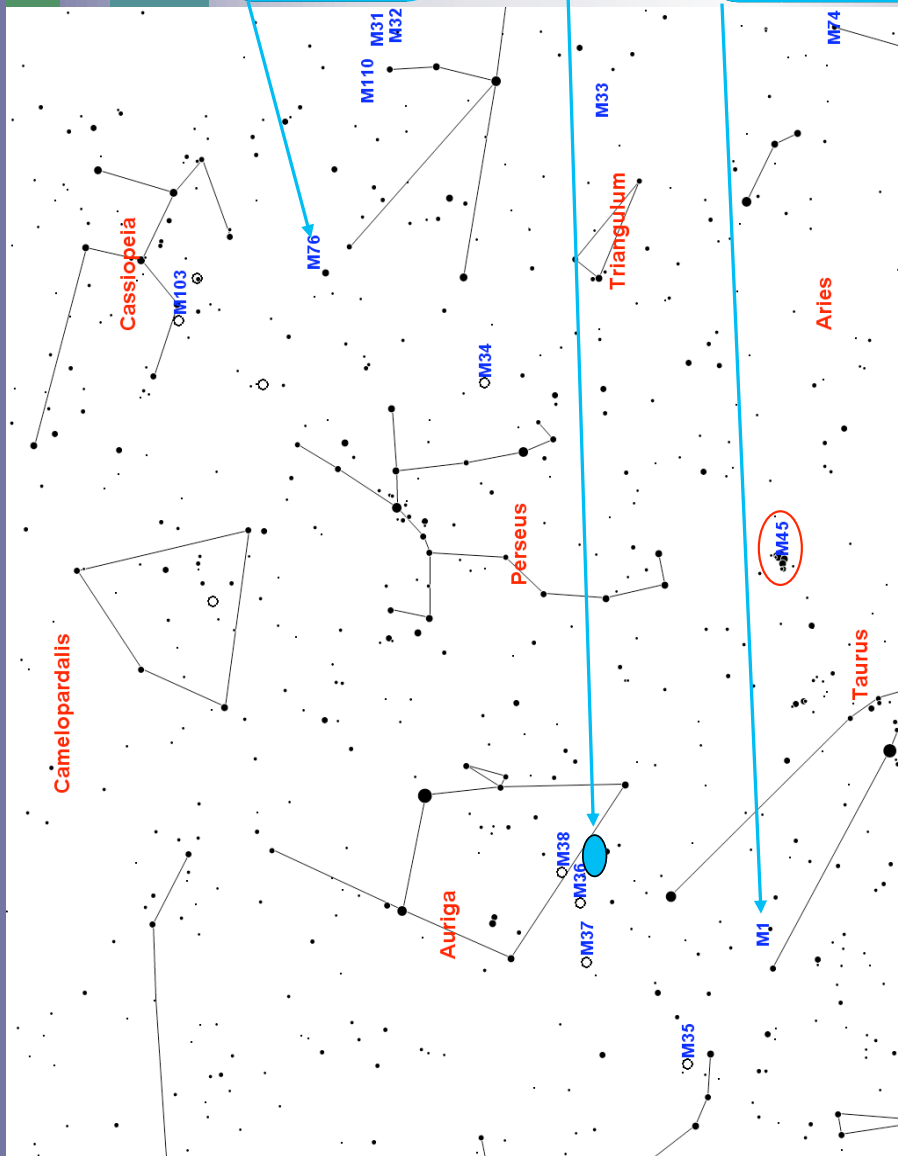


Much like its larger sibling, M27 in Vulpecula, M76, the Little Dumbbell Nebula resembles the weightlifter's tool of choice. A dying star at its heart, M76 sheds and energizes its outer layers, to leave a white dwarf.

Southern Auriga is rife with red emission nebulae: the Flaming Star and IC 410 (the Near-dertal, pictured) just for examples. A dark sky and a nebula filter combine to reveal detail in these vast systems.



Recorded by Chinese and Arab astronomers long ago, the remnant of SN 1054 never ceases to amaze observers, even with modest instruments. The glowing heart of this giant harbors a radio pulsar, spinning 30 times each second.



Northeast sky — 9 p.m.

Cassiopeia the Queen, Perseus the Hero and Auriga the Charioteer all reside in one of the northern sky's richest den of star clusters and nebulae. Bordered by the galactic duo of the Andromeda/Pinwheel spirals (Ms 31 & 33) to the west, the Little Dumbbell planetary nebula starts the parade, which progresses eastward through clusters M34, 38, 36, 37, ending in M35 in Gemini late in the evening. The showcase stellar assemblage of M45, the Pleiades (also known as the **Seven Sisters** and **Subaru**, circled) lies just to the south. As the night deepens, scout the tip of Taurus the Bull's eastern horn for exploded stellar remnant M1, the Crab Nebula.



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DAS SCHEDULE

NOVEMBER

- 6-8 EGK Dark Sky weekend
- 7 Daylight Saving Time ends
- 13 Open House at Chamberlin (Begins at 5:30 P.M.)
- 19 DAS General Membership Meeting and "Show 'n Tell" at Olin Hall at DU (Begins at 7:30 P.M.)

DECEMBER

- 3-5 EGK Dark Sky weekend
- 11 Open House at Chamberlin (Begins at 5:30 P.M.)
- 17 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 19 DAS Holiday Potluck at the Columbine Unitarian Universalist Church (Begins at 5:00 P.M. and takes the place of the General Membership Meeting)
- 20-21 Total Lunar Eclipse (Look for event details in December *Observer*)

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

March 9 - April 14 at 8:00 p.m.

April 15 - September 1 at 8:30 p.m.

September 2 - March 8 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.



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