The Denver OBSERVER

DECEMBER 2010

STELLAR ORNAMENTS

Though it is certainly not the easiest of nebulae to see, none can dispute the beauty and recognizability of Barnard 33, the "Horsehead Nebula." Cold clouds of interstellar gas and dust sculpt the equine head, which stands out in sharp contrast to the radiant-red emission nebula (IC 434) behind it. Together with the "Flame Nebula" and brilliant blue Alnitak, this region forms the upper hilt of the "Sword of Orion."

Image © 2010 Darrell Dodge

Calendar

5.....New moon

13.....First quarter moon

21..... Full moon (Total Lunar Eclipse)

27.....Last quarter moon

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DECEMBER SKIES

by Dennis Cochran

Last week at Open House I managed to find the Andromeda Galaxy, M31, through the glare of the city; a completely clear sky certainly helped. But of course what we could see in my 8" scope was only the nucleus, and I tried to convey to the visitors that the whole galaxy was ten times as big, spilling beyond the field of view. M31, the largest member of the Local Group, will be at the zenith during prime time this month, paradoxically harder to view in most scopes. This little smudge, I told our visitors, might be better named the Great Blob since it consists of billions of stars. And it's essentially the farthest thing one can see with the naked eye at 2.2 million light-years distance, an answer to the inevitable question, "What's the farthest thing you can see?" Andromeda is the easy answer, especially since you can follow up that answer with an easy-to-make observation. When I used to take my 16" Dob out to the desert it was possible to see the dust lanes and outer disk as well. Now I have to tell people that they are there, but out of sight because of light pollution. So M31 provides several astronomical lessons in one object: What does a galaxy look like, what is it made of, what's the farthest thing one can see and why can't one see the rest of it? Many of our visitors may not have heard the term "light pollution" before.

Jupiter has blazed its way toward the meridian by mid-evening and is so bright that we now play "Can you see it yet?" games in the twilight with the giant planet. The last time I saw it the Southern Equatorial Belt was still gone, but not forgotten. The moons of Jupiter are a marvel to most visitors, second only to the rings of Saturn as a visible wonder,

Continued on Page 3

PRESIDENT'S CORNER *by Ron Pearson*

As I write this in mid-November, I'm reminded how the sudden change in weather from warm fall to the winter chill of freezing and below certainly hit us observers hard at the November Open House and Tesoro events of the weekend of November 14th. We still had over 100 at Chamberlin despite the cold and clouds that moved in by surprise.

Participants in our public outreach program have been kept busy these past couple months with several requests by local schools and others for DAS astronomy programs and telescopes. Hopefully by December we'll have adapted and are out enjoying the rising winter constellations and the upcoming total lunar eclipse on Dec. 21-22.

Two important aspects of December, between holiday shopping and being with our families, are the renewal of your DAS membership and the Annual DAS Holiday Potluck party. As I hope everyone is aware by now, we switched to an annual membership renewal, so please fit this into your busy holiday schedules and then join us for the good food and tall tales of observing or telescope lies at the Holiday party. If for some reason you can't renew or decide not to renew your membership with us, I ask you to please drop Darrell Dodge or me a note or email. If there is something you think we need to improve about the DAS to earn your renewal, let us know what that is. We always need feedback and ideas about the DAS and what we do.

I'll take this opportunity to mention that the annual election of DAS officers and Board members is coming up in February. If you'd like to participate in the decision-making, take a more active role in the DAS or have ideas or perspectives you think can help the DAS accomplish its mission of sharing astronomy, think about running for a position. You don't need to be a 'high-tech astronomer' to participate or take a leading role. New blood and new ideas are welcome and needed in any organization. Have many peaceful, prosperous nights of clear and steady skies in the New Year!

WELCOME DAS NEW MEMBERS

Vern Bass
Catherine Boerder
Scott Emeson
Bob Fowler
Stephen Ipsen
Bruno Nardi
Doug Reagan
Arnold Wool

DAS Holiday Potluck

Saturday, December 18th
6-9 P.M.
Columbine Unitarian Universalist Church
6724 South Webster Street,
Littleton, Colorado

The DAS will provide liquid refreshments, ham, turkey and eating utensils; all you need to bring are a favorite side dish and a good story or two to tell your friends.

DAS SCHEDULE

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.)
18 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 (See Page 5 and look for event details on the DAS website).

JANUARY

Dec. 31-Jan. 1 EGK Dark Sky weekend
8 Open House at Chamberlin (Begins at 5:30 P.M.) "How to Use Your Telescope" talk at 7:00 P.M.
14 General Membership meeting at D.U.'s Olin Hall (Begins at 7:30 P.M.) Officer and E-board nominations.
21 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)

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.

Society Directory

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Joe Gafford David Shouldice
Frank Mancini Steve Solon
Keith Pool Dan Wray
Ron Mickle, Past President
President Emeritus, Larry Brooks

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Van Nattan-Hansen Scholarship Fund:
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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

DECEMBER SKIES *(CONTINUED FROM PAGE 1)*

especially if you can catch one of the moons appearing around or disappearing behind the bulk of the planet so that they can be appreciated as moons rather than star-like objects. By the way, Saturn's rising time is sneaking back from dawn towards midnight as the month progresses, but is still visible around 2-3 A.M. at year's end.

Sue French in the December *S&T* suggests we look for IC 1396 at the bottom of Cepheus; see her article on page 63 of *S&T* for more observables in this seldom-seen region. Cepheus the King, father of Andromeda in the six-constellation Perseus/Pegasus/Andromeda story, is a largish house-shaped constellation, or maybe a crude square with a dunce cap on it, located between the zenith and Polaris. The dunce cap points roughly in the Polaris direction. Emission nebula IC 1396 hangs below the house from the μ (mu) star of Cepheus, called Herschel's Garnet Star. The large oval of IC 1396 includes the Elephant's Trunk, a dark cloud protruding into the oval from the right side. At the lower left corner of the house is δ (delta) Cephei, the prototype of the Cepheid variables. This is a class of stars that turned out to be important distance indicators because their pulsation periods vary with their absolute luminosity, as discovered by Henrietta Leavitt in 1911. Their absolute luminosities could be determined if their distances were known. Once distances to the nearby Cepheids had been measured by the trigonometric parallax method, farther Cepheids could then, in turn, have their distances determined by measuring their apparent luminosities and period of variation. Edwin Hubble proved that M31's stars were far outside our galaxy by finding Cepheids in M31's outer regions, thus answering the question, "Are spiral nebulae features of our galaxy or are they separate galaxies?" The universe got a lot bigger after that. Cepheid variables are thus a 'standard candle' of a variable sort.

In early October I was able to return to Lowell Observatory on Mars Hill in Flagstaff, Arizona. The first evening it was raining, so there was no observing with the 24-inch Clark refractor. Earlier in the day we did manage to look through a small solar scope at a spotless Sun. The observatory is partner in a 4.2-meter telescope in the making. Flagstaff has a charming farmers market in a residential block just off of Route 66, close to the road going up to Mars Hill. There one can buy carrots, whose nutrients sharpen the eyesight, a boon for astronomers. Percival Lowell ate lots of carrots and was able to see the canals of Mars, something that modern spacecraft cannot see.

December Meetings: Saturday the 11th is Open House at Chamberlin Observatory, with a talk on How to Buy a Telescope at 7 P.M. The following Saturday, the 18th, we have our annual Holiday Potluck (see Page 2).

IT'S TIME TO RENEW FOR 2011

The renewal date for all DAS members is January 1, 2011.

If you are a DAS member, you've probably received your 2011 membership renewal packet in the mail by now. DAS membership is the best bargain that you'll get this year! For only $36 ($12 if you're a student under 23 years old) you receive:

- monthly newsletter,
- membership in the Astronomical League (and copies of the AL quarterly, *The Reflector*),
- discounts on *Sky & Telescope* and/or *Astronomy* magazines,
- the chance to use a fabulous dark sky site anytime you want (access to the Edmund G. Kline Dark Site),
- access to Historic Chamberlin Observatory and its library,
- access to an annual auction to trade-sell-acquire astronomical equipment,
- over 300 potential friends who share your passion for astronomy and associated pursuits,
- social opportunities at the Holiday Party, Spring Banquet, and July Picnic and
- opportunities to share your passion for astronomy and space science with others at Public Nights, Open Houses, Colorado Astronomy Day, and special public outreach events.

And now, with the new system started last year, it's easier than ever to renew. The renewal notice you received includes a renewal and donation form and a pre-addressed return envelope to Brad Gilman, your hardworking DAS Treasurer. All you need to do is check a few boxes on a form, write a check or two, drop them in the envelope and mail.

If you joined the DAS before January 1st of 2010 and you paid for one year when you last renewed, your cost to renew for 2011 will be $36.00 (regular members) or $12.00 (for students.)

If you're a NEW MEMBER and you joined after January 31, 2010 and you paid the full $36 fee when you joined, your renewal fee will be prorated $3.00 per month to discount the number of months you weren't a member during 2010. This will already be done for you on the renewal form. For example, if you joined October 1st, your renewal fee would be $36 minus $27 ($3 x 9 nonmember months) = $9.00.

When you register, you'll have an opportunity to donate to the DAS Dark Site, the DAS Van Nattan-Hanson Scholarship and/or DAS Public Outreach activities. And you'll also be able to update your contact information and say whether or not you want to be listed in the DAS Roster for 2011. If you do want to be listed in the roster, it's important to register on time. The deadline for inclusion in the printed roster is February 28th, 2011. Members who don't renew by the end of March will be removed from the membership rolls. Members may rejoin later in the year, but will not receive prorating for the months prior to the month in which they rejoined.

The most important thing you can do for the DAS right now is to drag out that renewal form, fill it out and send it in with your renewal fee. The DAS would be nothing without you!

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-exampt 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.*

OKIE-TEX AND BACK AGAIN

by Jack Eastman

It happened again—after the wonderful experience of last year, another Okie-Tex Star party in the Oklahoma Panhandle.

Due to the operation of disassembling, cleaning and alignment of the 20-inch Clark lens at Chamberlin the previous week, I left for the party Sunday morning, rather than Saturday, and arrived late afternoon—yes, in time for dinner. Loaded up the old van (Moby, the great white whale) with the usual (and maybe unusual) stuff, same as last year, but with one other telescope, the Explore Scientific 6-inch Maksutov-Newtonian, the result of a door-prize winning at RTMC earlier this year. I chose the same route as last year, south to Pueblo, east to Lamar, south again to Boise City, OK, and finally west to the camp. This time I was aware of the time change (they're on Central) and I did make it in time for a scrumptious dinner (Editor's. note: scrumptious dinners are a big thing with Jack.) The trip was uneventful; there were stiff headwinds all the way from Lamar to the Oklahoma line, and then some.

As last year, the meals were first class; many kudos to the Cimarron Heritage Center's volunteers for the terrific eats! Glad I wasn't on the bike! After dinner I set up the 'scopes, but left the 6-inch Clark in the box, as it was far too windy to be able to use it. I took advantage of that to carefully align the polar axis for better tracking later on. The weather looked very promising for clear skies, and so it was. There was a slight, very high cloud cover, producing a visible aura around Jupiter (which persisted throughout the week), but otherwise skies were very good. Dave Cotterell, from Ontario, Canada was here again and he measured the sky with a Sky Quality Meter (SQM) at 21.9 magnitude/square arcsecond—quite good. My little Explore comet hunter showed stunning views of the Milky Way through Sagittarius, Ophiuchus, up through Cygnus and on to the north. M33 and the Helix Nebula were easy to spot and M31 and companions were spectacular in the 6-inch with the 20mm, 100-degree eyepiece. This telescope, being a comet hunter, ought to be used for, well, comet hunting. I did locate Comet Hartley near Cassiopeia, but it was difficult. It was fainter and harder to see than the Helix in Aquarius.

The session went on well after midnight, and the only downside was the persistent wind. Other than that, the weather was good—warm, sunny days (but windy) and acceptable nights—maybe the lowest temperatures were in the mid-40s. As last year, there were no planned formal activities until Wednesday, when the afternoon talks and door-prize drawings were scheduled, so we could just walk around admiring some of the equipment and meet lots of great people; a very pleasant and relaxing atmosphere. Our DAS friend, John Anderson from Denver, had his solar telescope, with both white light and hydrogen-alpha filters set up during the day, along with his heliostat and spectroscope, a great demonstration of how astronomers know what's in the stars.

Neil Barnett, left, and DAS member Jack Eastman, right, with their telescopes at this year's Okie-Tex. These were the largest and smallest reflectors at the star party. Neil's scope is the second and last of the 36-inch "Yard Scopes" made. Jack's is from a 40 mm cut-out plug from a Celestron C-8. Neil's scope has 523X the light gathering power of Jack's.

Photo by Joe Gafford

After lunch on Tuesday I pulled out the bicycle and headed off, first to Kenton right around the corner (0.9 mile), then headed west. After about four miles I crossed into New Mexico and rode another three or so miles. The trip back was mostly downhill with a tailwind and I arrived back at the camp just as the dinner bell went off. Tuesday night was again quite dark (21.9 again from Dave's SQM) but again, windy. Although the temperature was in the high 50s, the wind made it seem much colder. I had the Clark set up and Jupiter was OK, but not great, as the seeing was marginal. Again, the comet hunter proved its worth. I couldn't revisit NGC 6144 (see Denver Observer, May 2010) as it had already set. This year's party was later than 2009, so Scorpio and friends were setting in the twilight. Wednesday night there were a few clouds early on but they went away. The sky seemed quite bright (Dave measured 21.4, the 0.5 magnitude difference from the previous night being significant) and there was still an aura around Jupiter —high clouds, but a mystery as to why the sky was bright, as there were no lights for about 40 miles. Scattered starlight? Even in spite of this, views with the comet hunter were truly spectacular. And so it was for the rest of the party. Wednesday after breakfast I attempted another bike ride, this time north to the Colorado line. It was downhill, with a tailwind for four or so miles to the Cimarron River. I gave up. It would be all uphill and into the wind going back and I'd probably miss lunch. This'll be a trip for next year.

There were about 410 or so folks in attendance, and telescopes from my little 0.04m (40 mm) Newtonian to a number of big Dobsonian 'scopes, the largest this year being Neil Barnett's (from Brighton, CO) .914m (36-inch) Yardscope II. Thursday night, with the sky again being relatively clear and dark, Neil and I explored M-42, the Orion Nebula, in great detail, using my 20mm 100-deg. Eyepiece—truly spectacular! Many years ago while at Mt. Lemmon, AZ, we were observing everything we could with their 61-inch telescope. I had always kicked myself for leaving early (I had to get back to Denver) before Orion came up. No more! I think the 61-inch would have been way too big, with a small field of view, after the experience with Neil's 36-inch. As last year, a number of classes showed up for a night or two under the dark skies. This time there wasn't any pickling and, as last year, we can hope they were impressed enough to dive deeper into astronomy and science in general.

Wednesday after lunch was the (unscheduled) swap meet, part one. I picked up a wind speed gauge, after which the wind seemed to stop. I did put it to use later, recording a gust at 22mph, but later on the winds did slow down.

After the swap meet the afternoon talks began. Richard Bell started things off with his talk, "Orion Always Comes Up Sideways," a star hopping tour of the winter constellations, pointing out interesting objects along the way. Then Warren Keller talked about Digital Imaging/Processing, a rather technical in depth discussion of the art of digital imaging. After dinner (and I might say, again, the meals were truly enjoyable - again many more kudos to the Cimarron Heritage

Center's volunteers for the great food), Neta Apple, from the Kansas City Astronomical Society, gave a talk on active galactic nuclei entitled, "Monsters in the Middle." Neta is one of 16 NASA High Energy Astrophysics Educator Ambassadors selected by the Sonoma State University NASA E/PO group. Thursday featured Mike Lockwood's "Building an Optical Shop," a discussion of his new house and large optical shop. He has a 50-inch mirror blank and the wherewithal to grind, polish and test optics of this caliber. His second talk was a potpourri of a number of subjects, and then it was Neta Apple again with "How Rare is Earth," a discussion of extra solar planets and speculations on what they might be like. After dinner Robert Reeve talked about making astrophotography simpler, suggesting how one might go about this with simpler equipment and procedures. Then it was door-prize time and finally out to the telescopes.

Friday afternoon talks involved Girl Scouts in Space by Fred Gassert, and Max Corneau talking about his Sky Shed Pod Observatory. Connie Walker, a Senior Science Education Specialist and Associate Scientist with the National Optical Astronomy Observatory (NOAO) gave a talk on the "Globe at Night," an international effort to measure the amount of light pollution using star counts and the Sky Quality Meter. Her second presentation detailed the future of the Dark Skies Awareness Project, the work of the International Dark Sky Association.

Saturday after lunch brought the swap meet, part II—nothing of great interest, although I did get a 20mm, 1.25-inch widefield eyepiece which worked OK on the comet hunter and well in the refractor. Then the talks started, beginning with "Flat Panel for Flat Fields", which, unfortunately I missed, but then Henry Throop talked about "How Did Life Form on Earth—Hints from Orion," an outstanding discussion of star, planet and chemical-element formation in the Orion Nebula. Sounded much like our own John Bally's great presentations on this subject—no mystery, as John was Henry's PhD advisor. I met Henry, probably 10 or so years ago at a dinner party at John Bally's Breckenridge home and observatory. Henry's second talk was "We're Half-Way There—New Horizon's Mission to Pluto"—self-explanatory—we're half-way there in time. Henry is working on the New Horizons Mission with the Southwest Research Institute in Boulder, but is based in Washington DC. I recall David Grinspoon's talk to the DAS several years ago regarding life on other planets, explaining the terms "habitable zone" where conditions are right for our kind of life. David said he was given an op-

Continued on Page 6

TOTAL LUNAR ECLIPSE DECEMBER 21, 2010

The last lunar eclipse of 2010 is especially well placed for observers throughout North America. The eclipse occurs at the Moon's descending node in eastern Taurus, four days before perigee.

The Moon's orbital trajectory takes it through the northern half of Earth's umbral shadow. Although the eclipse is not central, the total phase still lasts 72 minutes. The Moon's path through Earth's shadows as well as a map illustrating worldwide visibility of the event are shown in Figure 4. The timings* of the major eclipse phases are listed below.

Penumbral Eclipse Begins:	**05:29:17 UT**
Partial Eclipse Begins:	**06:32:37 UT**
Total Eclipse Begins:	**07:40:47 UT**
Greatest Eclipse:	**08:16:57 UT**
Total Eclipse Ends:	**08:53:08 UT**
Partial Eclipse Ends:	**10:01:20 UT**
Penumbral Eclipse Ends:	**11:04:31 UT**

Chart and table information courtesy of NASA. For more information, visit NASA's eclipse pages at: *http://eclipse.gsfc.nasa.gov/eclipse.html.*

***subtract 6 hours from UT to get local MST**

Total Lunar Eclipse of 2010 Dec 21

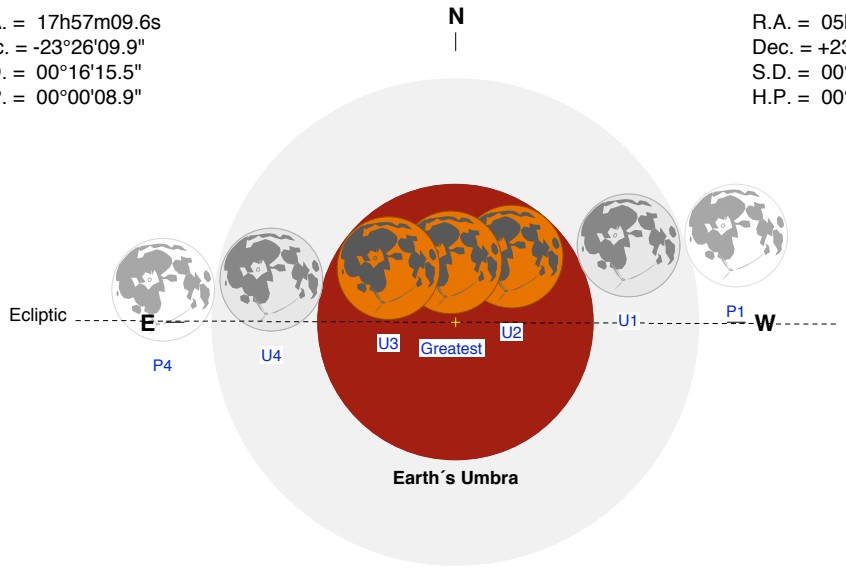
Ecliptic Conjunction = 08:14:33.1 TD (= 08:13:26.0 UT)
Greatest Eclipse = 08:18:03.7 TD (= 08:16:56.6 UT)

Penumbral Magnitude = 2.2807 P. Radius = 1.2538° Gamma = 0.3214
Umbral Magnitude = 1.2561 U. Radius = 0.7118° Axis = 0.3119°

Saros Series = 125 Member = 48 of 72

Sun at Greatest Eclipse (Geocentric Coordinates)
R.A. = 17h57m09.6s
Dec. = -23°26'09.9"
S.D. = 00°16'15.5"
H.P. = 00°00'08.9"

Moon at Greatest Eclipse (Geocentric Coordinates)
R.A. = 05h57m17.3s
Dec. = +23°44'47.8"
S.D. = 00°15'52.1"
H.P. = 00°58'14.3"



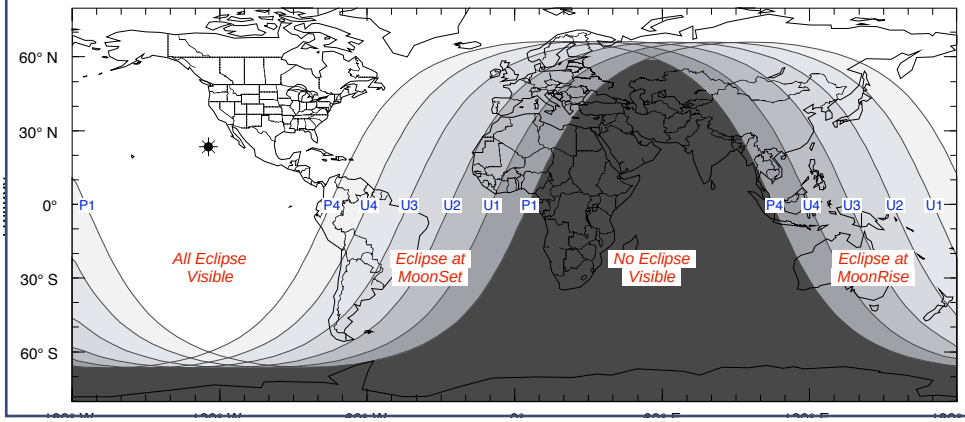
Eclipse Durations
Penumbral = 05h35m14s
Umbral = 03h28m43s
Total = 01h12m21s

ΔT = 67 s
Rule = CdT (Danjon)
Eph. = VSOP87/ELP2000-85

0 15 30 45 60
Arc-Minutes

F. Espenak, NASA's GSFC
eclipse.gsfc.nasa.gov/eclipse.html

Eclipse Contacts
P1 = 05:29:17 UT
U1 = 06:32:37 UT
U2 = 07:40:47 UT
U3 = 08:53:08 UT
U4 = 10:01:20 UT
P4 = 11:04:31 UT



NASA'S SPACE PLACE

BLUE RINGS AROUND RED GALAXIES

A Space Place Partner Article
by Trudy E. Bell and Dr. Tony Phillips

Beautiful flat rings around the planet Saturn are one thing—but flat rings around entire galaxies?

That is the astonishing discovery that two astronomers, Samir Salim of Indiana University at Bloomington and R. Michael Rich of UCLA described in the May 10, 2010, issue of *The Astrophysical Journal Letters.*

"For most of the twentieth century, astronomers observing at visible wavelengths saw that galaxies looked either 'red and dead' or 'blue and new,'" explained Salim. Reddish galaxies were featureless, shaped mostly like balls or lentils; bluish ones were magnificent spirals or irregular galaxies.

Elliptical galaxies looked red, astronomers reasoned, because they had mostly old red giant stars near the end of their life cycles, and little gas from which new stars could form. Spiral and irregular galaxies looked blue, however, because they were rich in gas and dust that were active nurseries birthing hot, massive, bluish stars.

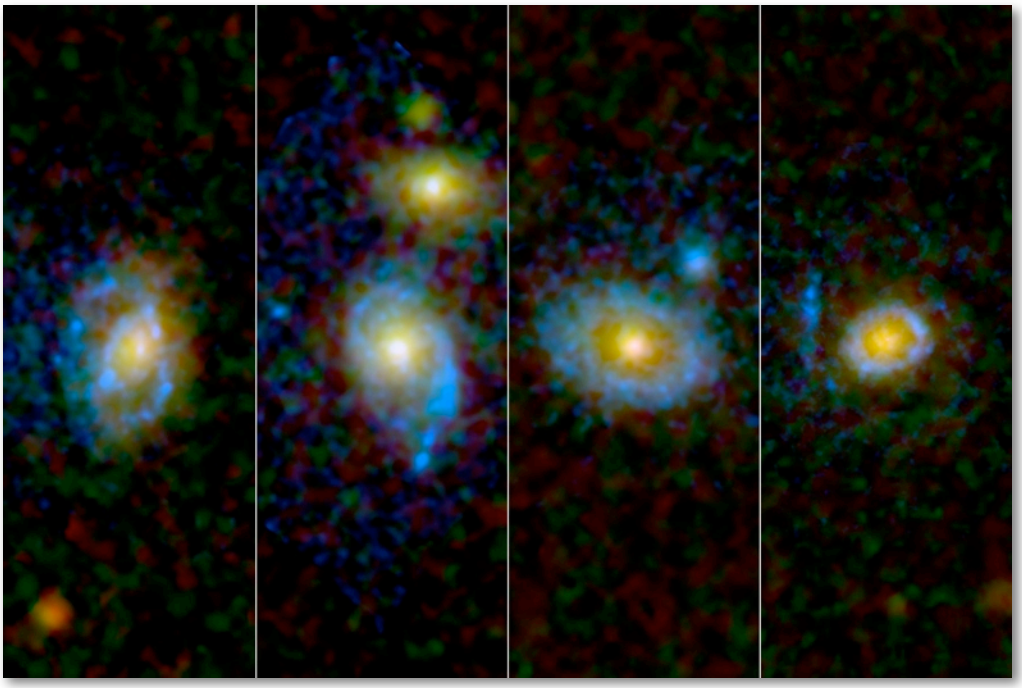
At least, that's how galaxies appear in visible light.

As early as the 1970s, though, the first space-borne telescopes sensitive to ultraviolet radiation (UV) revealed something mysterious: a few red elliptical galaxies emitted "a surprising ultraviolet excess," said Rich. The observations suggested that some old red galaxies might not be as "dead" as previously supposed.

To investigate, Salim and Rich used NASA's Galaxy Evolution Explorer satellite to identify 30 red elliptical galaxies that also emitted the strongest UV. Then they captured a long, detailed picture of each galaxy using the Hubble Space Telescope.

"Hubble revealed the answer," says Salim. The UV radiation was emitted by enormous, flat bluish rings that completely surrounded each reddish galaxy, reminiscent of the rings of Saturn. In some cases, the bluish rings even showed a faint spiral structure!

Because the bluish UV rings looked like star-forming spiral arms and lay mostly beyond the red stars at the centers of the elliptical galaxies "we concluded that the bluish rings must be made of hot young stars," Salim continued. "But if new stars are still being formed, that means the red-and-dead galaxies must have acquired some new gas to make them."



BLUE RINGS

The Galaxy Evolution Explorer UV space telescope helped to identify red elliptical galaxies that also emitted the strongest UV. These are detailed, long-exposure Hubble Space Telescope images of four of these galaxies that capture the UV-emitting rings and arcs indicative of new star formation.

Courtesy NASA/JPL

How does a galaxy "acquire some gas?" Salim speculates that it was an act of theft. Sometimes galaxies have close encounters. If a gas-rich irregular galaxy passed close to a gas-poor elliptical galaxy, the gravity of the elliptical galaxy could steal some gas.

Further studies by Galaxy Evolution Explorer, Hubble and other telescopes are expected to reveal more about the process. One thing is certain, says Rich: "The evolution of galaxies is even more surprising and beautiful than we imagined."

The press release is available at *http://www.galex.caltech.edu/newsroom/glx2010-03f.html.* The full published article is "Star Formation Signatures in Optically Quiescent Early-Type Galaxies" by Samir Salim and R. Michael Rich, *The Astrophysical Journal Letters* 714: L290–L294, 2010 May 10.

Point the kids to the Photon Pile-up Game at *http://spaceplace.nasa.gov/en/kids/galex/photon,* where they can have fun learning about the particle nature of light.

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

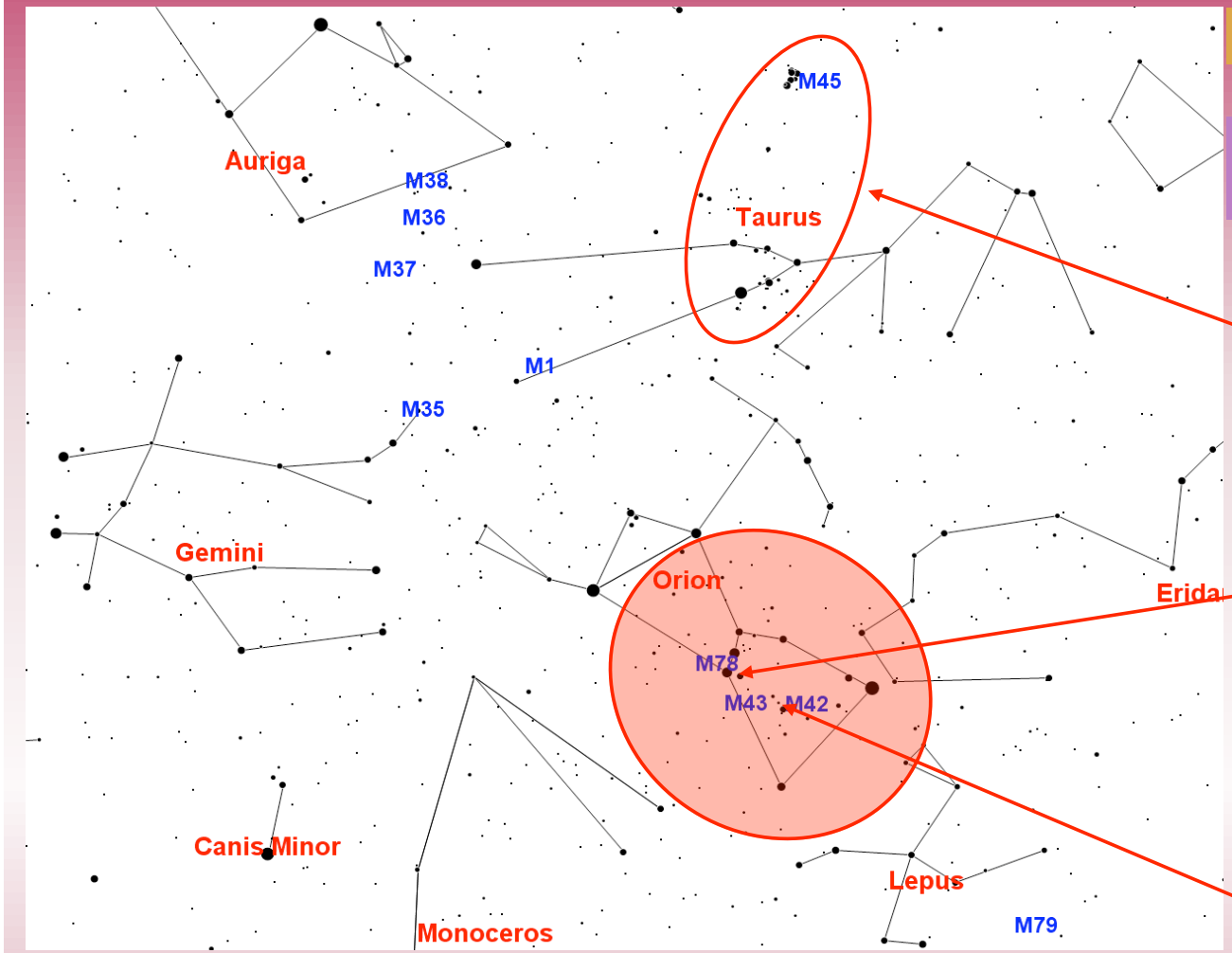
OKIE-TEX AND BACK AGAIN *(CONTINUED FROM PAGE 5)*

portunity for a nifty job with NASA, but turned it down when he found out it would be in DC. He said Washington was clearly outside his habitable zone!

After these great talks came one more prize drawing. The rule for the drawing is you have to be present to win, so lots of names of folks who had already left were called. All the drawn tickets go back in the barrel for the grand prize, which was a 76mm apo refractor and alt-az mount. It was an interesting coincidence that one of the names called was Jim Kuhns, who used to be my neighbor across the street and down one. He wasn't there, so the next name called was Jerry Hedricks, who used to be my neighbor directly across the street next door to Jim; clearly different, Jim and Jerry, but an interesting coincidence.

Now it was the final night under the stars. It clouded up later in the evening, probably a good thing as there was no guilt about hitting the sack a bit early, especially as we had to be up and out of camp the next morning. Sometime before dawn I was awakened by John Anderson—"It's raining lightly!" Out of the sack, put the refractor in the case, tarps over other stuff and back to sleep. Turns out it was only a short lived light drizzle, but it got me a head start on packing up. Sunday it was back to Denver.

A truly enjoyable event and with truly good skies, in spite of thin high clouds. As I said before, I'll do this one again!



Eastern sky — 9 p.m.

For northern hemisphere dwellers, the arrival of the winter skies heralds the presence of the greatest concentration of bright stars, indicated by the larger black dots. Fledgling sky watchers can take advantage of the easy-to-recognize constellations to hone their star-hopping skills, while seasoned observers will drown, once again, in the plethora of nebulae and clusters. Most notably, the Orion "Bubble", in the red oval, contains some of the brightest and most intricate stellar and nebular formations anywhere in the sky; entire evenings are spent in this region alone. The pristine air of the season permits finely-detailed observing, while imagers in dark locations capture full canvasses of the rich winter dome.

NEW ASTRONOMER'S DEN

December, 2010

The Hunter, the Hunted, and A Whole Lotta Bull

Very few are unaware of the Seven Sisters in the winter sky—a hazy stellar thumbprint among the darkness. The Hyades cluster (LL), as the head of Taurus the Bull, is the nearest cluster to our solar system, and a beauty it is.

One of the showpiece regions in Orion is the Horsehead-Flame Nebula. Comprised of red, irradiated hydrogen gas and cold, blue reflective dust clouds, this area deserves very close scrutiny with a nebula filter.

Just a finger's-width south of the Horsehead lies the northern hemisphere's brightest nebulae, M42 and 43. Topped by the blue reflection 'Running Man' nebula, this area is the most observed target at any winter public star party. Telescopes of all sizes will do this beautiful region justice.

denverastro.org

star chart courtesy *TheSky6* astronomy software suite.

THE PINWHEEL GALAXY

A beautiful spiral galaxy, M33 Galaxy in Triangulum is about three million light-years away.

Image © Alan Erickson

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