Houston Astronomical Society

December, 2011

GuideStar

December, 2011

Volume 29, #12

At the December 2 Meeting

The Amazing Death of Stars

Dr. Reggie Dufour, Rice University

Stars like the sun and others more massive end their lives with more of a bang than a whimper and are responsible for a number of remarkable events and "leftovers" in the universe. Dr. Dufour will discuss how stars form, evolve, and end their lives. More importantly, aside from the beautiful nebulae they leave behind, such processes enrich the interstellar medium with heavy elements that are the seeds of new stars and planetary systems. Indeed, each of us are made up of elements formed in early generations of stars in the Milky Way Galaxy and are truly "children of the stars!"

Dr. Reggie Dufour has been a professor in the Department of Physics and Astronomy at Rice University since 1976. He has presented at HAS meetings many times and at the Texas Star Party. Always engaging, Dr. Dufour's lectures are interesting, informative, and entertaining.

The Houston Astronomical Society is a member of the Astronomical League.

Highlights:

HAS Web Page:

http://www.AstronomyHouston.org

See the *GuideStar's* Monthly Calendar of Events to confirm dates and times of all events for the month, and check the Web Page for any last minute changes.

Schedule of meeting activities:

All meetings are at the University of Houston Science and Research building. See the inside back page for directions to the location.

Novice meeting: ..... 7:00 p.m.

Justin McCollum — Autumnal Constellations

General meeting: ..... 8:00 p.m

See last page for directions and more information.

The Houston Astronomical Society

The Houston Astronomical Society is a non-profit corporation organized under section 501 (C) 3 of the Internal Revenue Code. The Society was formed for education and scientific purposes. All contributions and gifts are deductible for federal income tax purposes. General membership meetings are open to the public and attendance is encouraged.

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Welcoming ..... Katy Keene .....
..... katykeene@comcast.net

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Texas Star Party ... Steve Goldberg. H:713-721-5077

Advisors

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Dr. Lawrence Pinsky, U. of H.
Dr. Lawrence Armendarez, U. of St. Thomas

Dues and Membership Information

Annual Dues:Regular $36
Associate $6
Sustaining $50
Student $12
Honorary ..... N/C

All members have the right to participate in Society functions and to use the Observatory Site. Regular and Student Members receive a subscription to *The Reflector*. *The GuideStar,* the monthly publication of the Houston Astronomical Society is available on the web site. Associate Members, immediate family members of a Regular Member, have all membership rights, but do not receive publications. Sustaining members have the same rights as regular members with the additional dues treated as a donation to the Society. *Sky & Telescope* and *Astronomy* magazines are available to members at a discount.

Membership Application: Send funds to address shown on last page of *GuideStar*. Attention - Treasurer, along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of H.A.S.

Table of Contents

Other Meetings...

Johnson Space Center Astronomical Society meets in the the Lunar and Planetary Institute on the 2nd Friday of each month. Web site: www.jscas.net

Fort Bend Astronomy Club meets the third Friday of the month at 8:00 p.m. at the First Colony conference Center. Novice meeting begins at 7:00, regular meeting begins at 8:00. Web site: http://www.fbac.org

North Houston Astronomy Club meets at 7:30 p.m. on the 4th Friday of each month in the Teaching Theatre of the Student Center at Kingwood College.Call 281-312-1650 or E-mailbill.leach@nhmccd.edu. Web site: www.astronomyclub.org

Brazosport Astronomy Club meets the third Tuesday of each month at the Brazosport planetarium at 7:45 p.m. The Brazosport planetarium is located at 400 College Boulevard, Clute, TX, 77531. For more information call 979-265-3376

December/January

Calendar

Date	Time	Event
December		
2	3:52 a.m.	Moon at first quarter
	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m.	HAS General Meeting, U of H
10	8:37 p.m.	Full Moon
14		Geminids peak
18	6:48 p.m.	Moon at last quarter
21	11:30 p.m.	Winter Solstice
23	9:00 p.m.	Mercury at greatest elongation west
	1:00 p.m.	C/2009 P1 Garradd reaches perihelion
		Ursids peak
24	12:07 p.m.	New Moon
		Prime Night, Columbus Site
25		Christmas
January, 2012		
1	12:15 a.m.	Moon at First Quarter
6	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m.	HAS General Meeting, U of H
9	1:30 a.m.	Full Moon
16	3:08 a.m.	Moon at last quarter
21		Prime Night, Columbus Site
23	1:39 a.m.	New Moon
30	10:10 p.m.	Moon at First Quarter

Send calendar events to Doug McCormick - skygazer10@sbcglobal.net

GuideStar deadline for the January issue is December 15

Check the web site:
www.astronomyhouston.org

The Houston Astronomical Society Web page has information on the society, its resources, and meeting information.

Want your astronomy work and name on the Internet for the whole world to see?

Have some neat equipment? Pictures in film, CCD, hand drawings or video format are all welcome on the page.

Follow the *GuideStar* on Twitter at:

GuideStar_HAS

Join Facebook and look for:

Houston Astronomical Society

Starline is back

Call 832-go4-HAS0 (**832-464-4270**) for the latest information on the meeting and other information about activities within the HAS.

HAS Board Meeting

The HAS Board meetings will be announced as they are scheduled. All members are invited to attend these meetings, but only board members can vote on issues brought before the board.

Observations... of the editor

by Bill Pellerin, GuideStar Editor

Life is What Happens When You're Making Other Plans

I was scheduled to make a presentation at the Novice meeting in December, but I won't be doing that. My dermatologist didn't like a spot I had on my nose, and I'm in the process of getting it repaired. So, I've re-scheduled for January. I hope to make the December meeting, but we'll see.

Please come to my presentation in January; I'll give you a new perspective on nebulae and their place in the universe.

New Officers and Committee Leaders

We start the new year with a new set of officers and committee leaders. Before we leave 2011, we say thanks to the members who served us in leadership positions this year.

I have the opportunity to serve the HAS as vice-president in 2012 and I plan to take an active role in pursuing the goals of the Society.

The HAS could use your help. Help keep the Houston Astronomical Society the great organization that it is.

Astronomical gifts

You can tell that we're entering the gift-giving season. Our mailboxes are filled with catalogs, and stores are advertising that they'll be open earlier than their competition.

Not being a fan of fighting crowds and shopping trips, I do much of my shopping on-line… all times of the year.

Here are a few things that are relatively inexpensive but would make good gifts for you.

Lunawheel Moon Phase Calculator—$15 from www.classicalastronomy.com. This gadget calculates the moon phase for any date 2000 years in the past or 2000 years in the future. Figure out if any day is good for observing.

Orion Planisphere Watch — $49.95 from www.telescope.com. (Orion Telescope). More a novelty than anything, and set for skies that are north of here. Interesting, though.

Casio PAS400B-5 Wristwatch — $29.41 from www.amazon.com. (on 11/21/11) I've had one of these for years. In addition to telling you the mundane things like the time and date, it also tells you the moon phase, and sunrise and sunset times. (It doesn't tell you moonrise and moonset times, though.) It's marketed as a fishing watch, and there are other similar models in the Casio line.

The 2012 officers, board members, and committee chairs are:

Officers

President ..... Gordon Houston
Vice Pres ..... Bill Pellerin
Secretary ..... Doug McCormick
Treasurer ..... Warren Murdoch

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Greg Barolak
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Mark Holdsworth
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Observatory ..... Bob Rogers
Program ..... Brian Cudnik
Publicity ..... Mike Rao
Telescope ..... John Haynes
Welcoming ..... Katie Keene

Past President

Ken Miller

Until next time...

clear skies and new moons!

..Bill

Just Looking

A *GuideStar* Interview by Clayton L. Jeter

Chris Westall & Lennie Brown

I first met Chris Westall two years ago at the dedication of the Blinn College Schaefer Observatory" and star party in Schulenburg, Texas. I had recently restored the college's '70s-era Celestron C-14 Schmidt-Cassegrain telescope. While operating the refurbished SCT that evening under the dome, I was introduced to Chris.

Some months later, I discovered that Chris had formed a new astronomy club in the La Grange area (halfway between Houston and Austin). He invited me to a star party at Lennie Brown's Bed and Breakfast near La Grange and I have since joined their group, the "Colorado Valley Dark-Sky Explorers". These two folks are the heartbeat of the astronomy community in their area.

This is a very informal group that loves the night skies. They have several observing sites and always seem to have a star party pending. Let's see how a new local club came to be and what makes it tick… thanks to Chris and Lennie. Here they are…

The Chris Westall bio…

Having grown up in the suburbs of Houston, there was never any real reason to be looking up at night other than to see the occasional moon phase. Even though I lived less than 2 miles from NASA and was interested in space exploration, I was never exposed to the wonders of stargazing.

It wasn't until I met some avid campers in college that I started to really venture out away from the lights and begin to realize there was something up there that I had been missing. But it was a week-long trip to Big Bend that really blew my mind and after that, I was on a mission to figure out exactly what it was that I was looking at. After a couple years of casually studying the night sky with my eyes only, I finally got a telescope and haven't looked back since.

In the intervening years my stargazing got put on the shelf a bit with the birth of children and other reasons, but when I met Lennie Brown a couple years ago and mentioned in conversation that I was a stargazer, she had the idea to offer star parties to her guests and I became the celestial tour guide. This turn of events seriously rekindled my stargazing fire.

From there, it went from the occasional small group star party at her B & B to community star parties that were attracting 50+ people… and thus the CVDExplorers was born in the summer of 2010. And although we're only about a dozen strong, we are a very tight-knit group that have developed some very strong bonds; which has made our frequent get-togethers—to do the thing that we love—that much more meaningful.

But I would be remiss if I failed to mention Mr. Jeter's role in all of this. From telescope expert to stargazing mentor to court jester (there's a reason his last name is one letter shy of that dubious title), Sir Clayton— as he has affectionately become known within the group—has been invaluable to us not only as

(Continued on page 6)

(Continued from page 5)

a technical resource but also with his infectious personality that usually keeps the group in stitches… *or wishing they were getting stitches*. ;-)

The Lennie Brown Bio…

Lennie, a fifth generation Texan, educator, community development professional and entrepreneur has served to facilitate community-based, economic development for over thirty years. She currently continues to develop and operates historic country lodging and event facility on her family's ranch near La Grange called TEXANA Trails Lodge (www.texanatrailslodge.com). As a certified teacher in both the elementary and secondary public and parochial education system, "Ms. Lennie" currently serves as a member of SWIFT/AmeriCorps Tutoring & Enrichment Program. She also continues to maintain her private consulting practice (TEXANA Community & Business Development Consultants) in fundraising and multi-sector partnership financing, tourism development and event production in La Grange.

Ms. Brown holds a Bachelor of Architecture from the University of Texas in Austin and has obtained five Teaching Certificates from the State Education Agency of Texas. She is currently pursuing a Masters of Science in Organizational Leadership at Argosy University aspiring to teach at the university level in tourism-related programs.

Her passion for the natural and cultural preservation of rural and urban Texas underlies her faith-driven drive to serve community. In the past two years she has teamed with co-founder, Chris Westall of La Grange, in an organizational endeavor for Colorado Valley Dark-Sky Explorers (CVDExplorers) to preserve the remaining dark skies of south central Texas through educational and public advocacy initiatives along with progressive marketing of the ecological tourism opportunities. Lennie is affirmed in her belief that astronomical interest serve to renew spirit, healing and nurturing for herself, family, guests, friends and community.

The Chris Westall and Lennie Brown interview…

Clayton: How did you first become interested in astronomy?

Lennie: Once upon a time, a long long time ago, one could see the stars in what is now called "The Galleria Area" where I grew up in Houston. It was on my daddy's lap, bundled with my brother, where he introduced us to the awe of celestial creation. Everywhere we traveled, the night sky provided us with a navigational bearing point and seasonal calendar. Without telescopes or star charts it was a way of life. When The Museum of Natural Science obtained a Planetarium and nearby NASA landed a man on the Moon, it set in motion a higher interest in natural order that I willingly abide.

Clayton: Do you think that by becoming involved in astronomy, it has somehow changed a direction in your life?

Chris: Without question. Being an avid stargazer and coming from an urban area to now living under dark rural skies, has given me a much greater appreciation of the "value" of the night sky; and this has been a major inspiration to me to, not only take every opportunity to explore it but also, impress upon others the importance of its legacy and need for safeguarding. I am definitely not the "activist-type" by any stretch, but my reverence for the stars has propelled me into a public role that I typically wouldn't gravitate toward. So this is a path I never anticipated being on, but very glad I am.

Clayton: What was the first glimmer-thought of starting a new astronomy club in central Texas? Did you and Chris plan this as a team?

Lennie: Inspired by a family man, Chris Westall, with knowledge (astronomy), tools (telescopes, binoculars, laser lights, PowerPoint presentations, books, etc.), an accomplished communicator/educator and a great sense of adventure and humor, along with an opportunity to enrich my Bed and Breakfast Event Facility with educational entertainment consistent with my business mission, it was an opportunity ready to happen.

Yes, as a strategic planning team with a passion for enjoying the night sky, Chris and I are cultivating an astronomy club in partnership with related groups, institutions and individuals that provide a meaningful experience for everyone we have been associated with. It's become an "extended family" for me. Sharing the night sky bonds God's people in a kindly way.

Clayton: You seem to be very proactive in trying to save our night skies from our ever encroaching light pollution. How and why the passion in this pursuit?

Chris: Having lived most of my life in Houston and Austin, I immediately realized how lucky I was to be living right under some pretty dark skies in and around La Grange. But also realizing that these skies will

(Continued on page 7)

(Continued from page 6)

eventually go the way of the buffalo if people/communities don't change some habits. So right now there exists a window of opportunity for this region to try to control its own destiny, but until now no one was sounding the call. It was a natural fit for our group.

Clayton: Tell us a bit about your Bed and Breakfast and how it tied in to the new astronomy club?

Lennie: TEXANA Trails and Lodge www.texanatrailslodge.com Si habla Espanol.

In 1834 when Texas was Mexico….an American Canadian family signed on as colonist, moved and built a substantial "hacienda" on a scenic hilltop over looking the Colorado River valley near present-day La Grange, located between Houston, Austin and San Antonio. This site was a proposed site for the permanent capitol of the Republic of Texas, fortunately losing out to Waterloo/Austin (otherwise Texana would be seriously struggling for a piece of dark sky!). My Dancy Brown family, also colonist, planters and officials of The Republic of Texas, enjoyed a relationship with the Brookfield Evans family acquiring the historic property as an investment and family retreat in 1893.

Six generations later, the twenty-five acre ranch site with the 1835 Stone House and adjacent 1850 Stone Stable/ Guest House (its grounds surrounded by an ancient stone defense wall) provide extraordinary lodging and event facilities for individuals and group stays. The 1835 Stone House is a large, classic, well-appointed, four bedrooms, two bath, semiformal residential setting with a fully-equipped kitchen, laundry, butler's pantry and porches that accommodates 8 to 10 lodging guests. Additionally, the two bedroom, two bath, kitchen/dining/study/great room, patio and porch is "rustico-rancho" furnished. The 1850 Stone Stable accommodates 2-5 lodging guest for a total of 10-15 lodging guests. Event venues utilizing the wonderful mix of indoor and outdoor spaces are suited for eclectic-styled, event social settings for 20 to 150 guests. Our support services include food service, period Vaquero-dressed Wait Staff, Educational Entertainment including Lecture Studies, Cultural Heritage and Eco Tours, Live Music, Spa and Spiritual Retreats and last not least…. *Night Sky and Site Tours.*

We produce several of our own annual public events including our STAR PARTIES held the *July 4th weekend (Natural Sky Fireworks!),* Outdoor Fandango's, Worship and Study Retreats and Period Themed Balls.

Clayton: Are any of your family or neighbors interested in your hobby? Do they observe too?

Chris: My kids (8 and 5) have shown some interest that may grow as they get older. As for the rest of my family, no one has really developed anything more than a passing curiosity in stargazing. As for my neighbors/community, there seems to be a pretty strong interest as the numbers for our events will attest, but unfortunately has not translated into many new members; despite no membership dues and, more importantly, having the most essential ingredient right under (or shall I say over) our noses. It's been a bit perplexing as we'd certainly like to continue to grow as a group and do more things.

Clayton: I know that both of you are visual observers…What's your attraction to the night skies? Got a favorite object?

Chris: There are very few things that get me as jazzed as seeing a distant object "live" in my telescope (or at least what it looked like as much as several million years ago). Stargazing has had such a huge impact on my overall perspective on the human condition, which for me is as much a fascinating as it is essential component of the experience. And one I wish more people would take the time to embrace.

As for favorite objects, when I first started stargazing I was in Big Bend in late Spring and this hugely bright object came up from the horizon and I had no idea what it was at the time, so it felt like I was discovering something no one had seen before. It turned out to be Omega Centauri, so OC will always have a special place in my heart for that exhilarating experience. My newest favorite object is the Eskimo Nebula, which I recently saw for the first time and thought was very cool, especially being able to see the white dwarf at the center.

Lennie: My attraction is the natural beauty, mysteries and cultural significance of the cosmic universe we see in our dark sky and the peace it gives me when I connect with it. It inspires me to celebrate this blessing by sharing it in communion with others. My favorite objects are the Pleiades and the vast and fascinating variety of planetary nebulas.

Clayton: How would you like to see your own astronomy grow? What's new for you and

(Continued on page 8)

(Continued from page 7)

the CVDExplorers?

Chris: Personally, most of my observing since the group started has been in an outreach capacity which I like very much, but has also prevented me from doing more intensive observing and being able to check off some of the objects on my personal observing lists. But those DSOs aren't going anywhere, so I'll get to them eventually. As for the CVDExplorers, we have launched the Fayette County Dark-Sky Initiative to educate our community about responsible outdoor lighting and are part of a tourism committee to promote our region as a dark-sky destination. I also write a monthly column on all things astronomy for our local paper.

One thing I would love to organize in the future is a mini-TSP at one or our darkest locations in the region. I'm thinking a 2-3 night event that, although not quite as dark as West Texas, would be much closer and more convenient for a lot of people. We are within an hour+ drive of 3 metropolitan and 2 micropolitan areas that are home to about 10 million people, so I think the idea has some potential.

Lennie: Besides the ecotourism and dark-sky advocacy work (which suits my CVDExplorer nickname "LBJuxtapostion"), I continue to enjoy and develop children's astronomy programming as a way of "learning-by-teaching" the basic location of celestial objects. I've become "Ms. Lennie – the Social Science Enrichment Teacher" in the local education settings. Now that I have a quality pair of binoculars (and lusting for a tabletop mirrored viewer for it), the CVDExplorers' 8-inch Dobsonian Meade loaner scope, a 1960's vintage Sears Japanese-made refractor and a newer CVDE 6-inch Meade equatorial reflector loaner scope clustering in my already eclectically-furnished B & B, *I'm posed and ready for an astronomical benefactor to adopt me!*

Clayton: I'd like to know a little about your telescope(s).

Chris: Well, I'm a dob guy all the way and after cutting my teeth for a decade with an 8" Meade, I'm now up to a 12" Orion push-to dob. Nothing fancy, but it gets the job done. I also regularly bring out my 20x80 binocs on a parallelogram mount that together with my scope, cover most of the bases. Since we started this group, we have had at least a half-dozen telescopes donated to us that we make available as loaners but also get to use, so we have a little bit of everything in the 2-8" reflector/refractor categories as well.

Clayton: It seems in recent years that the younger people are not that interested in amateur astronomy, or any of the sciences. Are you attaining any young club members? How can we turn this around?

Lennie: "How?" you ask….education, education, education made engaging, simple but intriguingly accessible to casual learners, interlaced with opportunities to do it themselves and with their friends and family. The schools are doing a better job today accessing students to this field of study from the classroom but the young people want it in their hand at night. The new phone apps are holding great interest, the Hubble photographs are wowing just about everyone at any age. For the young people who camp, hunt and enjoy time outside at night… they are interested and love it when someone among them shares information about what they are seeing.

Our group frequently sees elementary through middle school people at our public star parties and enjoy giving presentations/demonstrations/dark-sky tours to groups at their location or one of ours, including… sleepovers! The good news: They are catching the fever for it… it becomes a hobby among many others that young people have so many choices in. They are not lost forever… they come back to it like many do later in life.

Clayton: Do you have any helpful advice to pass on to observers just starting out in astronomy?

Chris: Yes- call you! Seriously though, this is not a hobby that is *necessarily* easy or cheap and I think that works against it (in our modern society) in terms of attracting and sustaining enthusiasts. But I would tell someone starting out to just take their time to learn the night sky before getting a telescope, but that it's going to take a little desire and effort to get over that hump. In the alternative, if they don't want to mess with that learning curve (and many don't) and have a little extra cash, then plunk down for a go-to and let technology do the work for you. Hey, if it gets you looking up I guess it really doesn't matter how you got there. Just don't do it alone, find like-minded people and share your new passion.

Clayton: Is there an email address that you have that a Houston Astronomical Society member could contact you for an additional question or two?

Chris: I can be reached at cvdexplor-

(Continued on page 11)

The Re-thinking an Alien World:

The Strange Case of 55 Cancri e

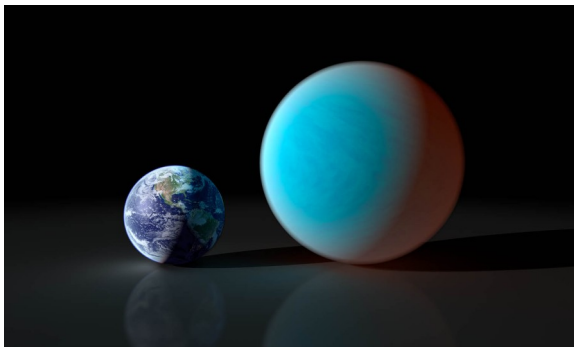
NASA Space Place

Forty light years from Earth, a rocky world named "55 Cancri e" circles perilously close to a stellar inferno. Completing one orbit in only 18 hours, the alien planet is 26 times closer to its parent star than Mercury is to the Sun. If Earth were in the same position, the soil beneath our feet would heat up to about 3200 F. Researchers have long thought that 55 Cancri e must be a wasteland of parched rock.

Now they're thinking again. New observations by NASA's Spitzer Space Telescope suggest that 55 Cancri e may be wetter and weirder than anyone imagined.

Spitzer recently measured the extraordinarily small amount of light 55 Cancri e blocks when it crosses in front of its star. These transits occur every 18 hours, giving researchers repeated opportunities to gather the data they need to estimate the width, volume and density of the planet.

According to the new observations, 55 Cancri e has a mass 7.8 times and a radius just over twice that of Earth. Those properties place 55 Cancri e in the "super-Earth" class of exoplanets, a few dozen of which have been found. Only a handful of known super-Earths, however, cross the face of their stars as viewed from our vantage point in the cosmos, so 55 Cancri e is better understood than most.



Artist's rendering compares the size Earth with the rocky "super-Earth" 55 Cancri e. Its year is only about 18 hours long!

When 55 Cancri e was discovered in 2004, initial estimates of its size and mass were consistent with a dense planet of solid rock. Spitzer data suggest otherwise: About a fifth of the planet's mass must be made of light elements and compounds—including water. Given the intense heat and high pressure these materials likely experience, researchers think the compounds likely exist in a "supercritical" fluid state.

A supercritical fluid is a high-pressure, high-temperature state of matter best described as a liquid-like gas, and a marvelous solvent. Water becomes supercritical in some steam turbines—and it tends to dissolve the tips of the turbine blades. Supercritical carbon dioxide is used to remove caffeine from coffee beans, and sometimes to dry-clean clothes. Liquid-fueled rocket propellant is also supercritical when it emerges from the tail of a spaceship.

On 55 Cancri e, this stuff may be literally oozing—or is it steaming? —out of the rocks.

With supercritical solvents rising from the planet's surface, a star of terrifying proportions filling much of the daytime sky, and whole years rushing past in a matter of hours, 55 Cancri e teaches a valuable lesson: Just because a planet is similar in size to Earth does not mean the planet is like Earth.

It's something to *re*-think about.

Get a kid thinking about extrasolar planets by pointing him or her to "Lucy's Planet Hunt," a story in rhyme about a girl who wanted nothing more than to look for Earth-like planets when she grew up. Go to http://spaceplace.nasa.gov/story-lucy.

*The original research reported in this story has been accepted for publication in **Astronomy and Astrophysics**. The lead author is Brice-Olivier Demory, a post-doctoral associate in Professor Sara Seager's group at MIT.*

Supernovae Popping Off Like Firecrackers in Carina

By Phil Plait, http://blogs.discovermagazine.com/badastronomy/

The Carina nebula is a sprawling, monstrous complex of gas located a mere 7500 light years from Earth. Hundreds of light years across, it's massive enough to create thousands of stars like the Sun. Tens of thousands.

And churn out stars it does. Embedded in the nebula are several clusters of newborn stars, and many of these stars are so massive they're nearly at the limit of how big a star can be without tearing itself apart. Stars that big explode as supernovae, and a new mosaic by the orbiting Chandra X-ray Observatory indicate they've been popping off in the nebula for quite some time.

This image is pretty amazing: it's a mosaic of 22 separate images by Chandra, covering 1.4 square degrees (seven times the area of the full Moon on the sky), and represents an exposure time of 1.2 million seconds! Since it shows X-rays coming from astronomical objects, it's false color: red is from lower energy X-rays, green is medium energy, and blue from the highest energy photons.

The diffuse glow is from two sources: the stellar winds from those massive stars slamming into surrounding ambient gas at high speed, and from the shock waves generated when supernovae explode. Both are extremely high-energy events, and produce copious amounts of X-rays. That long, horizontal arc is probably the edge of a bubble, a shell of gas piled up from the winds of stars and supernovae like snow piled up in front of a snowplow.

That's evidence right there that Carina has been cranking out supernovae over the past few million years. Interestingly, it's what's missing that provides more proof. Look near the top of the image; see that loose cluster of stars right near the top edge? That's Trumpler 15, a collection of thousands of stars packed into a volume of space only a few light years across (compare that to the Sun's neighborhood, where the nearest star is over 4 light years away).

About 900 of the stars in Trumpler 15 are massive enough to produce X-rays and be seen by Chandra, and the highest mass of these stars should be cranking out lots of the highest-energy X-rays. However, this high-energy emission isn't seen. Those stars should be there, but aren't. The conclusion is clear: those stars are gone. The most massive stars only live a few million years before going boom, and the cluster is roughly 8 million years old — plenty of time for those stars to have gone supernova. In other words, Trumpler 15 is has been seeing some action lately.

There are other clusters in the nebula as well, and you can see them in the picture (an annotated version is available as well); Trumpler 14 is below and to the right of Trumpler 15; Trumpler 16 is below 15 and just above the curving arc of shocked gas (Eta Carinae, a supermassive star just waiting to explode, can be seen just above that). All told, there are over 14,000 stars detected in this

(Continued on page 11)

(Continued from page 10)

image, and that just includes the ones putting out X-rays. Many, many more can be seen in visible light pictures such as the one here .

Not only that, but this Chandra survey has shown that the number of massive stars in the nebula is probably twice what we previously thought, and has also revealed six new possible neutron stars — the leftover cores of exploded massive stars. So the big conclusion to draw is that Carina has been churning out massive stars for quite some time, and for the past few million years the most massive of these have been exploding one after the other.

That may sound dangerous — stars exploding like flash bulbs in a nearby gas complex, aiiiee!! — but remember, the nebula is actually pretty far away. A supernova has to be less than 100 light years away to hurt us, and more like 25 light years away to really hurt us, so the nebula's distance of 7500 light years means we're safe from death by supernova.

But it does mean we get an excellent view of this star-explodey factory. There's still much to learn about how stars are born, how they live out their lives, and how they die. Chandra's X-ray vision is providing us with a big piece of that knowledge.

Image credits: NASA/CXC; Digitized Sky Survey/CXC

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(Continued from page 8)

ers@verizon.net or on our CVDE Facebook page.

Lennie: info@texanatrailslodge.com

Clayton: Thanks Chris and Lennie for taking the time to share your interest and thoughts within our HAS newsletter, the *GuideStar*. We wish you luck with all of your astronomy interests. Please come visit our society when in the Houston area, we'd love to see you.

Clear skies always!

Chris: Thanks Clayton. I appreciate the interest (you haven't run out of people to interview, have you?). ;-)

Lennie: Vaya con Dios, amigo! Mi casa es su casa. Mi estrellas es su estrellas.

Clayton L. Jeter is an avid SCT visual observer and a long time member of the Houston Astronomical Society. Contact him at: stonebloke@gmail.com

Shallow Sky Object of the Month

Double Cluster—NGC 884 / 869

Object: The Double Cluster

Class: Open Cluster (s)

Constallation: Perseus

Magnitude: 5.3

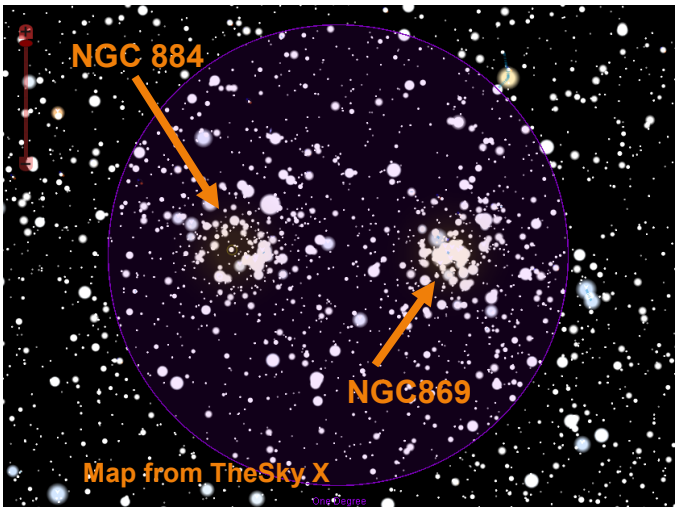
R.A.: **2** h 20 m 50 s

Dec: 57 deg 11 min 32 sec

Size/Spectral:

Distance: 7600 (NGC 884) and 6800 (NGC 869) ly

Optics needed: Binoculars / naked eye / wide field telescope



Why this object is interesting:

These two clusters are a magnificent site in binoculars or a wide-field telescope. The picture to the right is from TheSky X software, and the light blue circle is one degree on the sky. So, you need optics that will provide a visual field of at least one degree to get both clusters in the field.

A small refractor on a dark night would be a good instrument to use on this pair of clusters. It turns out that the new moon this December is on the 24th, Christmas eve. If you're with your friends and family on that night, this would be a great object to show them in your telescope. On that night the Double Cluster will be about 62 degrees above the horizon, and it will transit at 8:35 p.m.

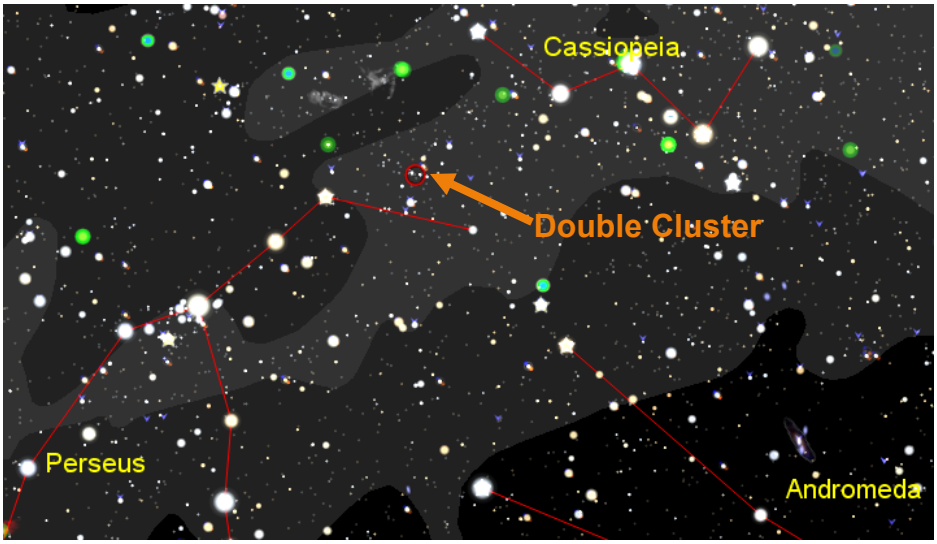
These cluster look like two swarms of bright white to blue/white stars against a black sky. On a clear, dark night, they're beautiful.

Here's what you can say about open clusters —

Stars form from clouds of material, mostly hydrogen, that exist in space and which collapse into stars as the result of gravity. When the cloud gets hot enough, the stars ignite, turning hydrogen to helium. Since these stars formed from the same cloud, they're about the same age.

Because astronomers understand the life cycle of stars, they can estimate the age of the cluster by identifying stars that are leaving the main sequence (beginning to run out of fuel). The astronomers know how long it takes a star of *that* size to reach this stage of life, so they know how old *that* star is. Since all the stars in the cluster are about the same age, they now have a good estimate of the age of the cluster.

Having done the analysis they know that NGC 884 (on the left in the image above) is about 3.2 million years old, and NGC 869 (on the right) is about 5.6 million years old.



Houston Astronomical Society

P.O. Box 20332

Houston, TX 77225-0332

General Membership Meeting

The Houston Astronomical Society holds its regular monthly General Membership Meeting on the first Friday of each month, unless rescheduled due to a holiday or a conflict with other events at the University of Houston.

Board of Directors Meeting

The Board of Directors Meeting is held on dates scheduled by the board at 7:00 p.m. at the Houston Chronicle office, downtown. Information provided to *GuideStar* will be published. The meetings are open to all members of the Society in good standing. Attendance is encouraged.

***GuideStar* Information**

The H.A.S. *GuideStar* is published monthly by the Houston Astronomical Society. All opinions expressed herein are those of the contributor and not necessarily of Houston Astronomical Society. The monthly Meeting Notice is included herein. *GuideStar* is available on the HAS web site to all members of H.A.S., and to persons interested in the organization's activities. Contributions to *GuideStar* by members are encouraged. Electronic submission is helpful. Submit the article in text, MS-Word format via email BillPellerin@sbcglobal.net. Copy must be received by the 15th of the month for inclusion in the issue to be available near the end of the same month. Or, bring copy to the General Membership Meeting and give it to the Editor, or phone to make special arrangements.

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The Houston Astronomical Society welcomes you to our organization. The HAS is a group of dedicated amateur astronomers, most of whom are observers, but some are armchair astronomers.

The benefits of membership are:

- Access to our 18 acre observing site west of Houston -- a great place to observe the universe!
- A telescope loaner program -- borrow a HAS telescope and try observing for yourself!
- A monthly novice meeting, site orientation meeting, and general meeting with speakers of interest.
- Opportunities to participate in programs that promote astronomy to the general public (such as Star Parties at schools)
- A yearly all-clubs meeting for Houston area organizations
- Meet other amateurs and share experiences, learn techniques, and swap stories

You're invited to attend our next meeting.

You'll have a great time.

Houston Astronomical Society

Meeting on Friday, December 2

7:00 Novice Meeting

8:00 General Meeting, room 117 Science & Research 1 Bldg

University of Houston

Directions to meeting:

From I-45 going south (from downtown)

- exit at Cullen Boulevard
- turn right on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

From I-45 going north (from NASA/Galveston)

- exit at Cullen Boulevard
- turn left on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

Parking:

There is Free Parking, **BUT DO NOT PARK IN ANY RESERVED PARKING SPACES AT ANY TIME.**
U of H parking enforcement will ticket your vehicle.

UPDATE (2011) — Due to construction in the stadium parking lot, use entrances 15D and 15F. You can park in this area, but NOT in a RESERVED space.