STAR FIELDS

Newsletter of the
Amateur Telescope Makers of Boston
Including the Bond Astronomical Club
Established in 1934
In the Interest of Telescope Making & Using

Vol. 23, No. 6 June 2011

This Month's Meeting…

Thursday, June 9th, 2011 at 8:00 PM
Phillips Auditorium
Harvard-Smithsonian Center for Astrophysics
Parking at the CfA is allowed for the duration of the meeting.

The Origin of Everything: How Things Got to Be the Way They Are Right Now

Look all around you. We live on a beautiful blue planet teeming with life, and with a complex industrial civilization all around us. But based on what we have learned from modern science, all of this started some 13.7 billion years ago from a tiny region of space, in an expanding fireball of utter simplicity known as the Big Bang. How did we get from Point A (the Big Bang) to Point B (a complex civilization on a complex planet)? Sky & Telescope editor Robert Naeye presents a whirlwind and colorfully illustrated trip through this amazing scientific story. He will trace the critical transitions that led to our current existence, from the origin of the first stars and galaxies through the formation of the solar system to the origin and evolution of life on Earth, to the emergence of intelligent beings capable of understanding where they came from.

Our speaker, Bob Naeye, owns five telescopes and more eyepieces than he can count. His favorite deep-sky activity is perusing the ghostly tendrils of the Veil Nebula using an OIII filter. Bob is editor in chief of Sky & Telescope magazine and SkyandTelescope.com. He is a proud member of the American Astronomical Society, the Astronomical Society of the Pacific, the Amateur Telescope Makers of Boston, and the Astronomical Society of Harrisburg, which is based near his hometown of Hershey, Pennsylvania.

Besides his S&T experience, Bob worked as a researcher/reporter at Discover magazine, senior editor at Astronomy magazine, editor in chief of Mercury magazine (the membership magazine of the Astronomical Society of the Pacific), and as senior science writer in the Astrophysics Science Division at NASA's Goddard Space Flight Center.

He has been honored by the Astronomical Association of Northern California with its Professional Astronomer of the Year Award, and also by the American Astronomical Society's High Energy Astrophysics Division with its David N. Schramm Award for Science Journalism. Bob has also authored two books and contributed to two others.

President's Message . . .

Last week my wife and I were driving around in a rental car in another state, using my car-GPS system that I brought along. As many of you know, this technology is great (at least most of the time) in helping to reach destinations in unfamiliar territory.

There is a downside, though, for someone used to using a map. The GPS gives a zoomed-in version of the world, but isn't so great for the big picture. So, if you want to find out how far some other place is in relation to your motel, for example, an old fashioned map is better. It gives an overview of the world in a single picture.

Back about ten years ago, I got a telescope as a gift. It was my first telescope since a simple one I made as a teenager- and things had changed a lot. It had a motorized Go-To drive to point the scope- a welcome feature since I was back into astronomy after a long absence, and had forgotten all about where objects were in the sky

Using the new technology, I was quickly able to find lots of things to look at, but didn't actually know how to locate them in the sky. I was missing the big picture, just like driving a car with a GPS only and without a map. So, a year or two later, when I bought a somewhat bigger telescope, it was without the Go-To feature. It became more satisfying to learn where objects actually are in the sky, and then be able to find them using a paper star chart.

Don't get me wrong, I think the Go-To technology is great, and a big help for amateurs, not to mention professionals. It can be essential in finding very dim objects. And, if you live in very light polluted skies, which hide many of the stars needed to locate an object using a star chart, it can be the difference between being able to observe or not.

If you are relatively new to astronomy -like me- say the last 10-15 years or so, you may have purchased a Go-To scope as your first and only instrument. and you've probably been able to see a lot more objects much more quickly than if you used a star chart. But, there is a lot of satisfaction to be found by turning off your Go-To computer and moving the telescope around by hand. Our long-time members, who had telescopes long before the Go-To revolution, have had to learn the sky and use a sky chart- our "map" for driving around the sky- since there was no easy alternative dozens of years ago. The Observing Committee is

encouraging this kind of skill in the new observing awards they announced a few months ago. To help you down this path, all new members should know they are welcome to take for themselves a set of star charts from the cabinet on the second floor of the clubhouse. So, if you haven't tried it, please give it a try!

Keep looking up,

~ Bernie Kosicki, President ~

May Meeting Minutes . . .

Lecture: "An Astronomer Reads Thoreau"

Photo by Al Takeda

Tom Calderwood takes the podium

The May meeting (834th) of the Amateur Telescope Makers of Boston featured ATMoB member Tom Calderwood. Tom has been contributing "An Astronomer Reads Thoreau" articles to the newsletter for some time. This was a meeting for which you pretty much had to be there. Tom provided background history, quotes, and discussion of the observations and science in Thoreau's Journal. I will provide some general notes, but not the detail provided in previous lecture minutes.

Henry David Thoreau is best known for his observations on botany, biology, economics and politics, but his curiosity knew no bounds. He left behind a journal of his thoughts and experiences, some two million words in length. A reading of the journal reveals a remarkable number of references to astronomy, revealing his interest in the field, even if he was not a regular observer. There are entries regarding astronomical science, night sky objects, atmospheric phenomena, optical effects, and poetry (rather like Astronomy Picture of the Day): *"The boy's sled gets put away in the barn or shed, and there it lies dormant all summer, like a woodchuck in winter. It goes into its burrow just before woodchucks come out, so that you may say a woodchuck never sees a sled, nor a sled a woodchuck, unless it were a prematurely risen woodchuck or a belated and unseasonable sled... The sun now passes from the constellation of the sled into that of the woodchuck."* Journal, 25 March 1860.

Henry David Thoreau, who pronounced his name Thór-oh, is one of Concord's most famous sons. He was a writer, naturalist, and Social Philosopher. Thoreau was born in 1817, graduated Harvard in 1837, lived at Walden in 1846-8, published "A Week" in 1849, published "Walden" in 1854, and died in 1862. His best known writings are: Walden, Cape Cod, Walking, Civil Disobedience and The Maine Woods. His work, The Journal, encompassing 1837 to 1861 contains about two million words. His book, Walden, has been in print for over 150 years. Thoreau was a tremendous reader and was college educated, including courses in optics and astronomy and his reading list included several other books on astronomy related subjects. He was a tremendous observer of everything. The Journal was intended to be read by other people. Some parts were "cut and pasted" (literally) into his other works. He had over 600 references to science and astronomy observations in his Journal (Walden has none and Maine Woods only one) and included good drawings. He owned and used an 8X collapsible spyglass. Tuberculosis was a lifelong problem for Thoreau. His family business was making pencils and later plumbago ink.

Observations both written and graphic in The Journal, as noted by Tom, include ideas such as: planet rotation and orbits, gravity, solar light and shadows, northern lights, a comet, sun dogs, an annular eclipse, moon halo, a sun pillar, crepuscular rays, a snow bow, a daytime star (which very well may have been Venus according to Tom's calculations), averted vision, staying warm while observing, losing a pencil while observing, the difficulty of tracking a small moving object through a telescope, the difficulty some people have actually looking through a telescope, unexplained light flashes (later explained), full moon, cloud formations, sun rises and sun sets, directions of winds, river heights, Venus, Moon and star observations, meteors, and many weather observations.

Tom, on a more scientific note, indicated that Thoreau was trained and worked as a land surveyor. In that regard, he had a surveyor's compass which he had to calibrate from time to time to determine the difference between true north and magnetic north. Tom attempted to duplicate the procedure using a sighting tool, a plum bob with the end suspended with a weight in water to dampen the line movement, and Polaris. While it was difficult, he was able to make the observation. His calculation resulted in a magnetic declination at the clubhouse of 14.99 degrees and the actual declination is 14.95 degrees. While this is extremely close, Tom is hoping to improve his observation.

Thoreau recorded science research needs at the time, including the need for "good observers" for star cataloguing. He was glad to hear that "the naked eye still retains some importance in the estimation of astronomers. Thoreau knew Bond and visited Alvan Clark. Clark "approved" of his spyglass but noted it was stopped down and the diaphragm would only be increased with some difficulty but that the "form" was good because blurred objects were the same on each side of focus. He also noted that the Harvard telescope had been closed to the public because the dust the visitors raised was causing problems with the optics.

Thoreau also knew a Mr. Perez Blood, who had a "homemade" telescope and an adjustable astronomer's chair, books on astronomy and globes. He visited Mr. Blood on occasion to view Saturn's rings, the mountains on the Moon including their shadows in the craters and the sunlight on the spurs of the

mountains. He borrowed books from Harvard for Mr. Blood. There is a mention of Blood going to college, but Tom could not find any record of this at any New England colleges. When trying to determine what the telescope may have been like, Tom took into account factors such as cost (bought for $95.10 and sold at auction for $50), magnification (85X) making guesses leads to about an 80mm objective f/14 telescope (Dolland. Clark?). It would be amazing if this telescope were to be found.

Thoreau also expressed humor in his observations. To a fisherman who asked if a comet in the NW posed any danger from that side, he suggested that he was dangerous only to himself. He noted that dogs must be shut up by day so as to be more vigilant by night, and one might say that about a moon and star gazers as well. He noted that the stars are a consolation to man, and continued on philosophically on fate and destiny and that while they may not be linked, it is encouraging to consider them friends. He also joked with an Irishman who had commented that if he could lift a leg and block the far bank of a stream, he could jump it by responding that he can blot out a star with his toe but could not jump that distance. And finally…

"The stars are God's dreams, thoughts remembered in the silence of his night." 25 March 1842

Links:
The Writings of Henry D. Thoreau:
http://www.library.ucsb.edu/thoreau/index.html

The Wiki entry on Thoreau:
http://en.wikipedia.org/wiki/Henry_David_Thoreau

Google Books content on or by Thoreau:
http://www.google.com/search?tbo=p&tbm=bks&q=inauthor:%22Henry+David+Thoreau%22

May ATMoB Business Meeting:

Bruce Tinkler provided the Secretary's Report.

Bernie Kosicki provided the Treasurer's report.

Tom McDonagh provided the Membership Report. This month he presented several slides. Tom announced that there were 291 members as of April 30th which compares favorably to the 329 at the same time last year. The club is in good shape. The demographics are changing. We should try to bring in more younger people. We can promote the opportunities for observing, lecture, clubhouse, talent pool, etc. Tom also reminded members that the club is a 501(c)3 charitable organization and asked members to consider making tax deductible contribution. Tom is available to answer all membership questions and may be contacted by email or by phone. He encouraged us to welcome our new and returning members. He also mentioned the value of members volunteering for star parties and encouraged members to participate in these enjoyable opportunities. He received a letter of thanks for the success of the Acton Star Party and student drawings and thanks from the Belmont Chenery Middle School. Our efforts for school star parties are always appreciated and are a real service to the community. They have even led to new members joining.

The Nominating Committee provided the slate of club officer nominees and reminded the club members about the procedure for providing a nomination from the floor. The 2011-2012 slate of nominees is:

President: Bernie Kosicki
Vice President: Mike Hill
Treasurer: Nanette Benoit
Secretary: Sid Johnson
Membership Secretary: Tom McDonagh
Member at Large: Neil Fleming
Member at Large: Chuck Evans

Bruce Berger provided the Observing Committee Report. Bruce presented the first club award certificates to Glenn Chaple and Michael Brown, both earning the Messier Marathon Observing

Award, Master Observer level. Details for the awards can be found at http://observing.atmob.org.

Photo by Al Takeda

Glenn Chaple receives one of the first Observing Committee awards

Club Events & Announcements were presented by Bernie:

Feb 18-Jul 29	"Understanding the Universe - An Introduction To Astronomy" - Clubhouse
May 13	Veritas Christian Academy - Wayland
May 14	National Astronomy Day - Clay Center Observatory Dexter, Brookline
May 21	May Clubhouse Work Party - Clubhouse
May 23	Harvard Elementary School Star Harvard
June 22	Board Meeting - Britton Clubhouse, Westford
July 27	Assabet River National Wildlife Refuge Star Party

Steve Clougherty provided the Clubhouse Report. John did a great job reporting the clubhouse and work party in the newsletter. Plans to be finalized for the new observatory building and will get the permit from Groton soon. The new gas grill has been purchased and instructions have been sent to the usual email lists. There will be outdoor work including cutting, trimming and chipping. Need to cut the grass and week wack. 20" telescope work is continuing including reinforcing the mount and truss tubes. The heating is in place. Preserving the coatings.

Other announcements:
Paul Valleli attended the May meeting for Stellafane. The snow is gone and the Porter Turret Telescope is open. Email and web registration for the convention is now open at http://stellafane.org/convention/2011/index.html. Paul announced that the Saturday Evening Keynote Speakers would be the Meteorite Men, however they have had to cancel and the replacement has not yet been announced. Hope to see you there!

Several members will be camping onsite for early camping beginning July 28th.

Mario Motta thanked the members who helped him remove and reinstall his primary mirror. The original United Lens coatings were not up to standard and did not hold up. Tony Pirera of Spectrum Thin Films (http://www.spectrumthinfilms.com) recoated the mirror with silver and other overcoats. Reflectance is flat at 99% across the spectrum. Mario was able to see the septet (Copeland?) with no averted gaze. Blue, which is difficult for imagers, is at 95% and higher for other colors.

Kelly Beatty presented to the Energy Committee to a good crowd in relation to the Massachusetts Light Pollution Bill. The "full spectrum" of light pollution will be presented next month.

Tom McDonagh mentioned that he traveled to Belize and saw the Southern Cross.

Ken Launie mentioned the exhibits at the Harvard University Science Center (http://www.fas.harvard.edu/~scdiroff/#intro) which is open during business hours. There is a special exhibit from the reserve collection including items from Thoreau (open for a few weeks). There is also a Cold War Astronomy exhibit which includes items and commentary from several ATMoB members (open for the summer). There is no charge for either exhibit. The location is on Oxford Street (the building with the dorm).

Bruce Tinkler encouraged club members to volunteer for Astronomy Day at the Clay Center in Brookline. Bruce also announced the newsletter deadline for Ross Barros-Smith.

There was a general announcement reminding members of the 4 planets in the morning sky.

John Sheff announced that there was a good turn out for the Urban Astronomy in Cambridge, part of the science festival. There were 3-4 ATMoB members and several other volunteers. John expressed his thanks to those who helped out.

Bernie Kosicki announced that any member wishing to make a 10-15 minute presentation for a July club meeting should call him or email him to be considered for the list of presenters.

Refreshments were provided by Chuck and June Evans.

Meeting adjourned 9:21pm.

~ Bruce Tinkler, Secretary ~

Clubhouse Report . . .

Here in New England the long stretches of rain only produced prolific grass growth and not the floods of the Mississippi River's rampage. However on Saturday May 21st we paid the price in human effort required to finish the first grass cutting of the season; nineteen members provided that effort, and more, by donating their time to the May 2011 clubhouse work session.

For over 6 hours John B. drove his tractor mower; Mike H. pushed power mower #1 from early morning; Joshua A. worked the new weed cutter; Joe G. pushed power mower #2; after the wheel was remounted by Joe G., wheelbarrow #1 was used by Todd F. and wheelbarrow #2 was used by Al T. after they raked the entire heavy grass cutting. Joe G. assisted Joshua A. in completing edging all observing pads. The goal of denying TICKS any launching sites above the cut grass was met.

Once the 12 foot platform was clear of tall grass, Ed K., Paul C., Joe G. and John R. re-measured the outside diameter of the home dome on it's temporary pedestal after the hard winter and found no change from previous measurements. It has remained stable. All drawings were verified. The team discussed details with the professional engineer on site.

As the activity allowed, Anna H. transplanted the new plants into the growing garden in front of the front porch. Further work was accomplished putting archives on the office computer.

Dave P. and Steve C., assisted by other members, measured in detail the changes being incorporated into the new base and rocker box for the 20" Shapley Newtonian alt-azimuth mount. The new table saw was assembled outside the machine shop on the concrete pad and the new design materialized from a 4X8 foot sheet of birch plywood. To be continued at the next work session.

While John S. checked the electrical in the barn and metal shed, Steve B. answered the club's request that a member find a home for the old table saw, and John B. returned to work the afternoon re- assembling the milling machine covers. Bruce B. and Mike H. retired to the library where they continued the disassembling of the new C-14 optical tube for cleaning by Phil R. Repair as necessary is proceeding. Later Dave P. and John R. purchased and delivered with Dave's truck, the 12ft length lumber for the coming dome project (stay tuned).

Lunch was cooked on the new grill after it was found needing to be cleaned. If you choose to use the grill, please clean it immediately after use. A *new* procedure using baking soda and water with a pad type brush dissolves the acidic burnt residue from the porcelain cooking surfaces. This liquid needs be removed or it will overflow the grease cup. The internal flavor bars have a porcelain exterior that need similar attention. If directions are followed then the new grill may last much longer than our old chromed wire cooking surface devices. But it will take effort. So please help. Porcelain will be damaged by wire brush scrubbing. Now, the lunch consisted of beef burgers, beef dogs, turkey kielbasa, salad with dressing, and baked bbq chicken. New thin buns were introduced. Cookies were enjoyed afterwards. Thanks to Eric J. at the grill, Sai V. at the salad bar, Art S. as major domo, a cast of dozens, and Nina C. for an excellent cleanup campaign.

The next work party is scheduled on June 18th starting at 10am. Let's hope for clear weather when, with higher solar activity, we may again be treated to Prominences in H-alpha. Until then thank you to the following members who made this session possible: Sai Vallabha, Al Takada, Art Swedlow, John Small, John Reed, Dave Prowten, Ed Knight, Eric Johansson, Anna Hillier, Mike Hill, Joe Gildea, Todd Frase, Nina Craven, Steve Clougherty, Paul Cicchetti, John Blomquist, Bruce Berger, Steve Beckwith and Joshua Ashenberg. A hike up the hill was enjoyed by 3 members Saturday. Join them next month!

Photo by Al Takeda

Art and Eric prepare a delicious 0lunch at the very grill that was the subject of *so* much debate on the email lists through April

~ Clubhouse Committee Chairs ~
~ John Reed, Steve Clougherty and Dave Prowten ~

Clubhouse Saturday Schedule

June 11	Evans & Lumenello
June 18	Takeda & Prowten
June 25	Leacu & Rounseville
July 2	Paquin & Small
July 9	Budreau & Burrier
July 16	Maher & Meurer **Work Party #7**
July 23	Swedlow & Vallabha
July 30	**CLOSED for Stellafane**

Thoreau on Astronomy . . .

...There is a certain glory that attends on water by night. By it the heavens are related to the earth, undistinguishable from a sky beneath you. And I forgot to say that after I reached the road by Potter's bars, or further, by Potter's brook, I saw the moon suddenly reflected full from a pool. A puddle from which you may see the moon reflected, and the earth dissolved under your feet. The magical moon with attendant stars suddenly looking up will mild lustre from a window in the dark earth.

Journal, 13 June 1851
~ Submitted by Tom Calderwood ~

Membership Report . . .

Membership count as of May 22, 2011 is at 297 individuals
Same time last year: 329

The membership renewal period begins in June and ends September 1st. Please feel free to send along your payment now.

Contact me if you require a renewal form
By phone (617-966-5221) or via email
(membership@atmob.org).

The renewal process can be completed on-line using Paypal. No Paypal account is required. Follow the link below to renew now.
http://www.atmob.org/members/person.php?frid=renewals

Renewal checks may also be mailed:
ATMoB
c/o Tom McDonagh
48 Mohawk Drive
Acton, MA 01720

Don't delay, renew today!

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the fullest extent allowed by law. Consider making a tax-deductible contribution to the club during your estate and tax planning this year. Many companies make matching contributions at an employee's request. This is a simple way to make your donation go twice as far.

Please take the time to seek out and welcome our new and returning club members:

Michael Maglothin	Nick Pappas
Chet Myslinski	Matthew Levin
Christopher Sousa	William Kimeria

~ Tom McDonagh, Membership Secretary ~

Sky Object of the Month…

This month, we travel southward to the constellation Scorpius and the showpiece double star beta (β) Scorpii. Also known as Graffias or Akrab (take your pick – I'll go with Graffias), beta Scorpii is an eye-pleasing pair of magnitude 2.6 and 4.5 stars separated by 13.6 arc-seconds. The magnitudes and separation are quite similar to those of the better-know Mizar; indeed, Graffias rivals Mizar in visual splendor.

Graffias is an ideal target for any backyard astronomer, regardless of his/her experience or size telescope. Its brightness and prominent location (it's the uppermost of a vertical row of bright stars just west (to the right) of Antares) makes Graffias an easy-to-find target. An ample separation allows Graffias to be split with the smallest of telescopes and a magnification as low as 25X.

What makes beta Scorpii particularly intriguing are its colors. A number of observers describe the pair as blue-white, which is in keeping with their B-type spectra. But look closely. I've always seen the companion as decidedly bluish, even turquoise. What's your opinion?

There appears to be disagreement as to whether Graffias is a true binary pair or an optically aligned duo. The two have shown little movement relative to one another since the earliest measures in 1779, but they share a common proper motion. If Graffias is a binary system, the orbital period must be in excess of one thousand years. This must-see double star lies about 600 light years away.

Your comments on this column are welcome. E-mail me at gchaple@hotmail.com

~ Glenn Chaple ~

Supernovae Popping off Like Fireworks in Carina…

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:

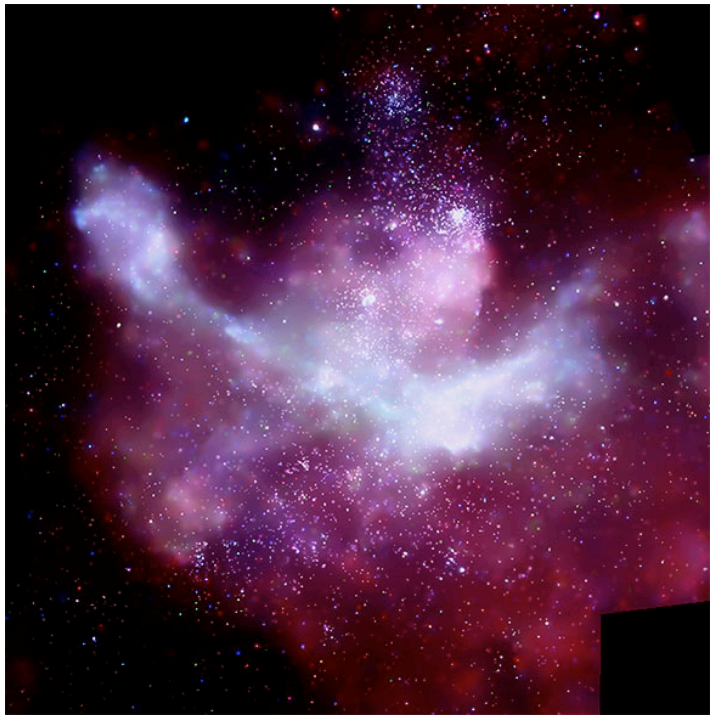

Image credit NASA/CXC

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 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 inset here.

Image credit: Digitized Sky Survey/CXC

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.

Editor's note: This article was originally written as a blog entry. For print readers, the linked URLs are listed below:

*http://chandra.si.edu/photo/2011/carina
**http://chandra.si.edu/photo/2011/carina/carina_xray_crop_label.jpg
†http://blogs.discovermagazine.com/badastronomy/2010/10/04/the-crab-is-still-crabby/
††http://www.youtube.com/watch?v=pGqHP26rn5U

~ Phil Plait~
Bad Astronomy
(http://blogs.discovermagazine.com/badastronomy)
This content distributed by the AAVSO Writer's Bureau

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Hey, readers!

Did you finish a telescope project?
Take an unbelievable astrophoto?
Share something great with the email lists?
Survive some sort of astro-adventure?
Did anything explode?

The newsletter wants to hear about it.

The newsletter depends on content submitted by members just like you. If you've read this far, it's probably something that you value every month. So why not take some time to put a few words and pictures together for your fellow members who feel the same way?

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July *Star Fields* DEADLINE
Noon, Sunday, June 19th
Email articles to the newsletter editor at newsletter@atmob.org

POSTMASTER NOTE: First Class Postage

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How to Find Us...
Web Page www.atmob.org

MEETINGS: Held the second Thursday of each month (September to July) at 8:00PM in the Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge MA. For INCLEMENT WEATHER CANCELLATION listen to WBZ (1030 AM)

CLUBHOUSE: Latitude 42° 36.5' N Longitude 71° 29.8' W

The Tom Britton Clubhouse is open every Saturday from 7 p.m. to late evening. It is the white farmhouse on the grounds of MIT's Haystack Observatory in Westford, MA. Take Rt. 3 North from Rt. 128 or Rt. 495 to Exit 33 and proceed West on Rt. 40 for five miles. Turn right at the MIT Lincoln Lab, Haystack Observatory at the Groton town line. Proceed to the farmhouse on left side of the road. Clubhouse attendance varies with the weather. It is wise to call in advance: (978) 692-8708.
