



## **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. 22, No. 9    October 2010**

### **This Month's Meeting...**

**Thursday, October 14<sup>th</sup>, 2010 at 8:00 PM  
Phillips Auditorium**

**Harvard-Smithsonian Center for Astrophysics**  
Parking at the CfA is allowed for the duration of  
the meeting.

### **Astronomy in a Small Nation**

Amateur astronomer Julio Vannini will discuss the dawn, downfall, and rebirth of astronomy in his small Central American nation of Nicaragua. The nation enjoyed a flowering of interest in astronomy up until 1972, when a devastating earthquake and a subsequent civil war reduced astronomical activity to near zero. But in recent years, astronomy has enjoyed a renaissance. Julio will discuss the challenges, achievements, and dreams of Nicaraguan amateurs as they work to rebuild public enthusiasm for astronomy.

Julio Vannini is an amateur astronomer from Nicaragua, Central America. He's an active member of the Nicaraguan Amateur Astronomers Society. For two consecutive years he's been designated as national coordinator for Nicaragua at the Astronomy Education and Public Outreach Section for the Latin America Astronomy League and as national contact for Astronomers Without Borders. His main interest resides in variable stars and the Moon.

Please join us for a pre-meeting dinner discussion at [Changsho](#), 1712 Mass Ave, Cambridge, MA at 6:00pm before the meeting.

### **President's Message...**

In last month's Star Trails, there was a letter to the club from Allan Cook about his trip to the Bell Labs Horn antenna in Holmdel NJ. Inspired by his letter, I made my own visit to this instrument during a recent trip to visit my daughter's family in New Jersey. So, together with my son-in-law and two grandchildren, we all made the pilgrimage to this site.

We saw an aging instrument that was bigger than I had envisioned from pictures, and which showed the effects of weather and time. But more than that, being in this place led me to think about all that had happened here 50 years ago. At that time, the model of rapid expansion of the universe from a point was consistent with Hubble's 1929 observation of general expansion. But there were other models of universe formation also, including the steady state model, whose champion, astronomer Fred Hoyle, was the one credited with inventing the term "Big Bang" during a 1949 radio interview.

In the early 1960's, Penzias and Wilson of Bell Labs noticed a faint noise from their newly constructed microwave horn antenna, which was meant to be part of a passive satellite communications project. Several years later, after failing to find and eliminate their unwanted noise, their analysis of this accidental discovery showed that the noise was in fact real-it was the leftover microwave radiation from the cooling Big Bang. This was the first really definitive piece of evidence for the theory, and earned them the Nobel Prize some dozen years later. Their measurement and analysis has been called one of the two most significant and important astrophysical experiments of the entire twentieth century (the other being Hubble's discovery of the redshift vs. distance relationship).

A few very dedicated amateurs fifty years ago probably knew and understood the difference between the Big Bang and Steady State models, but the general public certainly did not. This contrasts greatly with the situation at present, where improved communications and better science education in schools have made "Big Bang" almost a household term. As a volunteer fourth grade astronomy teacher, when I ask the kids if they ever heard of the term, hands shoot up into the air. What a difference 50 years makes.

Speaking of school children, we are entering the start of the school Star Party season. Consider coming to one of our star parties that will soon be announced if you haven't attended one before- they are important and fun. The energy and enthusiasm level is high, and the children truly appreciate learning about and looking at celestial objects through members' telescopes. Star parties are a major element of the club's outreach program and one of main ways that the public knows who we are.

Keep looking up.

~ **Bernie Kosicki, President** ~

### **June Meeting Minutes . . .**

The September meeting (826<sup>th</sup>) of the Amateur Telescope Makers of Boston featured Dr. Anna Frebel of the Harvard-Smithsonian Center for Astrophysics. Dr. Frebel joined the Optical and Infrared Astronomy Division of the CfA in January 2009 as a Clay Fellow; she is also affiliated with the CfA's Institute of Theory and Computation. She was awarded the 2010 Annie Jump Cannon prize of the American Astronomical Society for "outstanding research and promise for future research," an honor awarded annually to a woman postdoctoral astronomer. She is the

2010 Lise Meitner Lecturer. She also won the 2009 Ludwig-Biermann Young Astronomer Award. Her research centers on the detection and characterization of the most metal-poor stars to gain an understanding of early generations of stars and the subsequent chemical evolution of the Milky Way and dwarf galaxies. Before coming to the CfA, Dr Frebel obtained her PhD in 2006 at the Australian National University, and was a McDonald Research Fellow at the University of Texas at Austin. For her thesis, she was awarded the Charlene Heisler Prize of the Astronomical Society of Australia for the best Australian astronomy PhD thesis of 2006. In 2009, the German astronomical society awarded her the Ludwig-Biermann young astronomer award.



*Photo by Al Takeda*

**Stellar archaeology: Fossils of the earliest times – Going back in time through chemistry:**

Why are we interested in metal-poor stars and what is their role in the early Universe? The first stars (Pop III) were composed only of Hydrogen and Helium. These stars began the creation of other heavier elements. When they came to the end of their lives, the elements they created became available for the second generation of stars which were also metal poor. Subsequent stars had more heavy elements available. Dr Frebel is interested in mostly the second (Pop II) and third generation of stars. These stars were created about 1 billion years after the Big Bang and they are very rare in the universe today and are generally to be found in the halo of the galaxy. Younger stars (Pop I) are comparatively metal rich.

For Pop II stars to still be around, they need to be low mass, long lifetime stars (10 billion+ years). Pop III stars cannot still exist because stars consisting only of H and He cannot form small dense stars, they were big stars which died relatively fast. Pop II stars can provide clues the nature of the first stars, the origin and evolution of the elements, processes and chemical yields of the first/early supernovae, early star and early galaxy formation processes, hierarchical merging of galaxies, and the formation of the galactic halo, and the lower limit to the age of the universe. Metal-poor stars are a great tool for near-field cosmology because they are the local equivalent to the high red shift Universe having been created from the first stars. We can go back in time using chemistry, not just red-shift.

Dr. Frebel identifies these stars through spectroscopic analysis, identifying heavy element concentrations. The challenge is that very metal poor stars have 1/250,000<sup>th</sup> the abundance of Iron as our sun. Current distribution functions of Milky Way Halo star metallicity indicate a very fast drop off of stars with an Fe/H ratio (compared to the sun) of -2.5 or more suggesting that they are very rare (on the order of about 100).

Two of the most iron-deficient stars (hyper iron-poor) know are HE 0107-5240 (red giant 5200k) at -5.2 and HE 1327-2326 (subgiant 6180K) at -5.4. Both have 0.6-0.8 solar masses. Another extremely iron poor star is G64-12 at -3.2. How much iron are we talking about? HE 1327-2326 has about 100 times less iron than Earth, 10 times less than Mercury, and only 100 times more than the Moon. In order to get enough photons for accurate measurements, we are looking at many hours of exposure time on very large telescopes (from 5 to over 20 hours, stacking images of 10-55 minutes depending on equipment and star magnitude). In answer to a question, the effect of gravitational settling of elements may actually be stronger than convection zone mixing. Also, note that we want stars which do not rumble since we are looking at the surface of the star for our data. “A picture is worth 1,000 words, a spectrograph is worth 1,000 pictures.”

**Nuclear astrophysics: How old are the oldest stars? Detecting radioactive elements and stellar age measurements:**

Dr. Frebel discussed the processes creating the elements in the first and metal poor stars including a history of the theory. R-process (rapid neutron-capture process) stars have a hard time creating elements because the beta-decay time is shorter than the neutron capture time. S-process stars, on the other hand, have a longer beta-decay time which makes element creation easier. However, the R-process is responsible for the production of the heaviest elements with the mostly likely production site being pre-enrichment supernovae. This can only be proven through the chemical fingerprint in the oldest/low metallicity stars (others have been contaminated from subsequent generations of stars) by looking at Thorium, Uranium and stable R-process elements like Europium and Osmium. Example stars include HE 1002-0755 and HE 1523-0901, both Fe/H about -3 and relatively bright at -14.1 and 11.1 V magnitude. Ages can also be derived from this process from a comparison of the observed ratio of a radioactive element (such as Thorium or Uranium) and a stable R-process element (such as Europium, Osmium, Iridium) and a theoretically derived initial production ratio which provides our baseline. This process has been shown to be universal. Stars can be compared for their abundances of these elements and scaled to determine their age with high accuracy. Only three stars have measured uranium lines. From current data, the age of HE 1523-0901 appears to be about 13 billion years old. Dr. Frebel will shortly be using the Hubble Space Telescope to gather data on HE 1523-0901 to produce the most complete chemical abundance pattern of a star after the Sun and study the very beginning of chemical evolution. Dr. Frebel showed samples of the elements that result from this process and indicated that they are available online.

**Near-field cosmology: Formation of the galactic halo:  
Chemical history of dwarf galaxies & hierarchical galaxy  
growth:**

Computer simulations how galaxies assemble show that very few larger halos and many smaller halos merged to form the galactic halo (hierarchical growth). Many of the small halos survive this process and are still around today. Dwarf galaxies are useful tools to study star formation and chemical evolution in small systems, early galaxy formation and the build up of the Milky Way. With stellar archaeology, we can examine the chemical history in search of the oldest population. If surviving dwarfs are analogs of early Milky Way building blocks then we should find chemical evidence of it (metallicities and abundances of metal poor stars in dwarf galaxies should agree with those found in the halo).

**Outlook: Where the sky will take us? New surveys and  
telescopes to hunt more metal-poor stars:**

Using the Clay, Keck, and Magellan telescopes, Dr Frebel has made long exposure observations (5-20+ hour) of stars in dwarf galaxies. She has identified stars with Fe/H ratios of between -3.0 and -3.8 (with visual magnitudes of 16.8 to 19.2) and distances of up to 154kpc. With larger telescopes we may be able to see deeper into the halo. 1,000kpc might be possible which could allow us to study stars in the Andromeda galaxy at 778kpc! This will allow us to see further back in evolution within (and possibly outside of) our local galaxy. The first stars ignited about 13.5 billion years ago. They seeded the old dwarf galaxies with the first heavy elements about 12 billion years ago. Chemical evolution proceeds from there, however small stars from that time frame can survive that long (12-13 million years). We can use them to study the chemical fingerprint of the early universe.



Haldun Menali spoke briefly about his ship-board experience observing the 2010 solar eclipse near Tahiti. He presented maps and pictures as well as his eclipse images. Haldun mentioned that the entire land mass of the Tahitian island group is similar to that of Rhode Island. He said it was a great experience and that everyone should make an effort to view a solar eclipse. The difficulties he had in this case were related to being on a ship (motion) and some clouds while the eclipse was occurring. His web site is <http://www.astroalcove.org> Haldun has volunteered to present more details at an upcoming meeting.



*Photos Courtesy Haldun Menali*

Bob Naeye spoke about the Sky and Telescope Pacific Eclipse Trip, July 9<sup>th</sup>-14th. Before that, however, he mentioned the

astronomy books which he brought for members to select and take home. The “Cloud Image” book, the sole book not to be selected by any member in the last two groups of books Bob has brought us, was awarded to Bernie Volz. He also presented a copy of the Sky and Telescope Magazine boxed DVD set to the club. The eclipse trip visited Tahiti, Easter Island and Moorea. His presentation of the trip included many pictures of the beauty and culture of the islands. Particularly impressive were the Moai, the stone statues of Easter Island. The trip started with a challenging flight, arriving at 2am.

Some interesting facts about the island: it is one of the most remote inhabited places on earth. It has a population of 5,500 but the population of wild horses exceeds that of people. It has an area of 63 square miles and was annexed by Chile in 1888. The island is windswept and has heavy surf. The Moai statues are nothing like the pictures and images in movies when seen in person. They are 20-25 feet tall and have been restored by archeologists. The groups in their final positions face away from the ocean. It was also interesting seeing ongoing process of their creation recorded in stages by seeing them in various levels of completion in the quarry and in while being moved. The civilization collapsed very quickly.

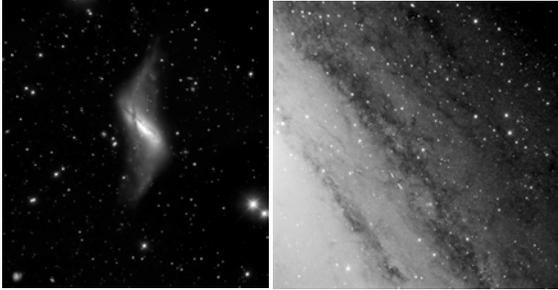
For the eclipse observations, several busses brought the visitors out to see the eclipse, also partly plagued by clouds. Several well known individuals were in the group observing the eclipse including author Dava Sobel (“Longitude”). The Sky and Telescope eclipse image below was taken by Dennis di Cicco and processed by Sean Walker. The trip concluded with a visit to Moorea, described by Frommer’s as the most beautiful island in the world. Bob showed several pictures including Cook’s Bay and Opunohu Bay.



*Photo by Bob Naeye*

Mario Motta presented two images, NGC 660 a polar ring galaxy (a host galaxy that captured gas from a passing galaxy making a polar ring) and M31 Andromeda Galaxy with star V1 at minimum (M31\_V1 9/5/10 mag 19.4). This is Hubble’s original Cepheid variable in Andromeda imaged 80 years later (<http://www.aavso.org/aavso-alert-notice-422>). Interestingly, Mario commented that he was able to capture his image from the comfort of his home 32” observatory in 90 minutes, closely

matching the image Hubble took using the 100 inch telescope Hooker Telescope at Mount Wilson, CA with over 8 hours of hand guiding. Hubble used images of this and other stars taken in 1922-23 (and announced on January 1, 1925) to calculate the distance and come to the conclusion that they were too far away to be part of the Milky Way Galaxy, changing forever our view supported by many including Harlow Shapley, that the universe consisted only of the Milky Way Galaxy.



*Photos by Mario Motta*

Steve Beckwith brought the business meeting to order at 9:16pm.

Bruce Tinkler provided the Secretary Report and summarized the July meeting's minutes.

Nanette Benoit provided the Treasurer Report including the current club finances. She also indicated that the Annual Report has been prepared and is waiting for the President's signature. She also reported that an audit of the club's books has been requested and is in process.

The Membership Report was given by Tom McDonagh. He provided an historical perspective on membership and indicated that membership typically dips at this time of year because of procrastination on membership renewals however we are on course for typical membership levels and we do have a number of newer members and younger members.

The Observing Report was given by Bruce Berger. He discussed the improved ability of the club in the area of astrophotography including the C14's electronic focuser with digital readout. He also noted that we have very good people resources in teaching astrophotography.

The Clubhouse Report was given by Steve Clougherty. He directed us to the newsletter for the details of the last clubhouse work party and announced the upcoming work party for September 25<sup>th</sup>. He encouraged members to come up to the clubhouse to see the machine shop and observatories.

Club Announcements were given by Bernie Kosicki.

- Fridays, Sept 3-Oct 22: New perspectives on the Solar System. Clubhouse
- Sept 19 starting at Noon - Annual Picnic- Clubhouse
- Sept 25 Clubhouse work party- Clubhouse
- Astronomy nights in Arlington Sept 25
- AstroAssembly 2010 (Skyscrapers, Inc.) on Oct 1 & 2, Seagrave Memorial Observatory, Auburn

Bernie also announced there was an upcoming BBC photo shoot which needed an astronomer to assist with a telescope and imaging Jupiter on October 9<sup>th</sup> in Winchester. Anyone interested in this can get the details and contact information from him. Bruce Tinkler also announced that Ross Barros-Smith wanted experiences and pictures from this year's Stellafane gathering for an internet extra of the newsletter with a deadline of September 16<sup>th</sup>. Bruce also announced on Ross' behalf that the newsletter deadline is noon, September 26<sup>th</sup>.

The meeting concluded with the presentations given by Haldun, Bob, and Mario as reported above. Refreshments were provided by Nanette Benoit. The meeting was brought to a close at 10:09pm.

~ *Bruce Tinkler, Secretary* ~

## Clubhouse Report . . .

Preparation for the September 2010 Club Picnic took place on September 12th (by E. Myers and A. Takeda) and by 13 members on September 18th to provide a clean clubhouse and well groomed observing grounds. After the successful picnic, sixteen members donated their time to build on these earlier efforts by tackling ongoing projects during the September 25th full moon work party. A review of accomplishments follows with credit where due. One aspect of our team effort is the extensive cooperation where a need for help is cheerfully answered.

- Clam Shell Observatory stair railing adjustment continued by D. Prowten; and 8" Dall-Kirkham star tests and drive accuracy checks continued throughout the night by J. Maher. The 20" Shapley compound Newtonian was also tested with a large set of eyepieces to define needed adjustments.
- Schupmann optical tweaking, star testing and drive accuracy checks showed great strides thru the efforts of G. Sussman and E. Johansson assisted by P. Rounseville. These tests were performed on the temporary mount on the 12 foot deck awaiting the home dome.
- The old home dome support ring was cleaned, scraped clean of glue debris, polished and assembled on the temporary level platform built last month by D. Prowten. This was accomplished by B. Berger and T. Frase assisted by other members as needed.
- Far barn East doors were provided a new locking mechanism, to keep rain and snow out, by J. Reed and D. Prowten.
- Clubhouse North wall was scraped over 2/3 of the width; this section now awaits clapboard nailing or replacement to allow staining to commence. This big effort was tackled by A. Takeda, H. Drake, and E. Myers.

- The Bridgeport Milling machine work continued; previously electrified by J. Small, leveled and aligned by D. Prowten and J. Blomquist, the illuminated position indicator readout system is now usable with new bulbs due to efforts of J. Blomquist.
- Electrical conduit installation in the metal shed continued by S. Simunovic.
- Old machine shop window repair continued by E. Johansson and J. Reed.
- The annual composting system rotation was completed by S. Clougherty and S. Vallabha.
- Organization of club archive material continued thru the effort of E. Boynton, assisted by A. Hillier and J. Reed.
- Prep of the clubhouse West wall was delayed by a malfunction of the 32foot ladder. The ladder was restrung with a new heavy duty hoisting rope by J. Reed, A. Takeda, E. Myers and S. Vallabha.

A well deserved lunch expertly prepared by the team led by A. Swedlow, cooked on the barbie by E. Johansson and served with Sai V.'s famous salad, was devoured by a ravenous crew. This team, assisted by E. Myers and J. Maher, returned the house to mouse proof conditions. Star testing the telescopes continued until 2:30am.

The next work party/session is scheduled for Saturday October 23rd when finishing exterior staining and winterizing the grounds will take priority. Thank you for all your help!

*~ Clubhouse Committee Directors ~*  
*~ John Reed, Steve Clougherty and Dave Prowten ~*

### Clubhouse Saturday Schedule

October 9	Maerz	Maher
October 16	Meurer	Mock
October 23	Toomey + Wolf <b>Work Party #11</b>	
October 30	Myers	Nugent
November 6	Panaswich	Siegrist
November 13	Leacu	Rounseville
November 20	Hopkinson + Small <b>Work Party #12</b>	
November 27	Swedlow	Vallabha

### Thoreau on Astronomy . . .

Mr. Sanborn tells me that he looked off from Wachusett last night, and that he saw the shadow of the mountain gradually extend itself eastward not only over the earth, but finally into the sky in the horizon. Thought it extended as much as two diameters of the moon into the sky, in a small cone. This was like the spectre of the Brocken.

Journal, 19 October 1857

*~ Submitted by Tom Calderwood ~*

### Membership Report . . .

Membership count as of 9/28/2010: 220  
 Same time last year: 237

You may have noticed the membership count has dropped drastically between the September and October membership report. At the time this report being generated, 136 members had failed to renew their memberships. Membership renewal payments are now long overdue.

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

I will be available at October 14th club meeting in Cambridge if you wish to renew at that time. Drop me a line if you intend to do so. Special thanks to all of those that have renewed already. Don't delay, renew today!

If you wish to receive a new ATMoB nametag, please contact me via email with your name as you wish it to appear and the pickup location. I can drop off completed nametags at the clubhouse or the monthly Cambridge meeting.

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the extent allowed by law. Consider making a tax-deductible contribution to the club when renewing your membership.

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

Todd Frase  
 Alana Parks  
 Tony Costanzo  
 Ruben Salinas  
 Anna Starkova  
 Justin Wolf  
 Robert Simcoe  
 William Hinkle

*~ Tom McDonagh – Membership Secretary ~*

## A Picnic Thank You to All . . .

The day of the 2010 ATMoB picnic, Sunday, September 19<sup>th</sup>, was cool and overcast. Although the skies would not permit solar or night sky observing, they did encourage relaxing, eating, and lots of interesting discussions.

Creating an event such as the club picnic is a team effort and ATMoB members have great team spirit. A week before the event Eileen Myers cleaned and Al Takeda made repairs and adjustments all around the clubhouse. John Reed and Eileen bought food and supplies. The Saturday crew of Al, Art Swedlow, Bruce Berger, David Prowten and Sai Vallabha set up the large picnic canopy. John Reed weed whacked and John Blomquist mowed the lawn. The Sunday set-up team of Al, Art, David, Julie Kaufmann and Sai set up the food tent, and the tables and chairs. Balloons arrived with Eileen, and Sai provided touches of nature with flowers and autumn leaves.

The main event gourmet hamburgers/hot dogs/kielbasa Chefs were Eric Johansson and Julie Kaufmann, and the huge salad was prepared by Chef Sai Vallabha. Thank you to everyone who brought all the rest of the yummy food.



Julie Kaufman and Eric Johansson preparing picnic meals.

*Photo by Al Takeda*

Bruce Tinkler set up a selection from his collection of astronomy books for beginners and intermediates. Members enjoyed looking through Bruce's very portable Edmund Scientific Astroscan telescope, with its wide field of view and bright images. Some learned why a planisphere is useful and how to use one. Bruce generously brought several back issues of astronomy and science magazines for folks to take with them.

Mike Hill set up and demonstrated mirror making techniques. One very interested new member was eager to learn what it was all about. Mirror making activity continues to increase at the clubhouse.

Eileen Myers and Julie Kaufmann led the activities for kids, included assembling Galileo-style refracting telescopes and putting together a Moon Finder. Kids of all ages played with Spirograph and Spirotot, creating mathematical curves and colorful patterns. Do you remember playing with these geometric drawing toys from the 1960's?

Bruce T. led the first ATMoB geocache expedition up the Haystack access road to search for hidden cache containers using a GPS device.

Ed Los led the leisurely walk "up the hill" accompanied by several members.

John Maher and Bruce Berger opened the observatories. Bruce, by the way, exerted the most physical effort just to arrive at the picnic, biking from his home in Chelmsford. Bruce was very happy when his wife arrived later to take him and his bike back home.

The cleanup crew of Al, David, Eileen, Eric, John R., Julie, Sai, Tom McDonagh, and others helped make that activity go very quickly.

Almost the entire ATMoB Executive Board was in attendance: President Bernie Kosicki and his wife Pat, VP Mike Hill, Secretary Bruce Tinkler, Newsletter Editor Ross Barros-Smith, Membership Secretary Tom McDonagh, and Member-At-Large Chuck Evans.

Sai Vallabha posted picnic photos very quickly on the club's website. Al Takeda emailed his photos too.

Everyone's help made the day so pleasant and everyone had a good time. What a wonderful group of people! Congratulations to all for making the event a success. Thank you all very much!

~ *Eileen Myers* ~

## A Tribute to the Star Hustler . . .

*[Editor's Note: Anna had originally submitted this piece for the September newsletter, however due to an email glitch, it was not received in time to go to print.]*

On August 27th, I arose at 5:15 AM and was welcomed by Orion in the southern sky (my favorite constellation).

The first rays of sunlight pierced the darkness. It is approaching its' autumnal rising and immediately thought of Jack Horkheimer sitting on the belt of Orion. The sword hanging down. I never had the privilege of meeting him in person. When I was attending The Astronomical League meeting in Frederick, MD. where he was going to attend. But, because of health reasons he was not there. However, he will always be in the sky.

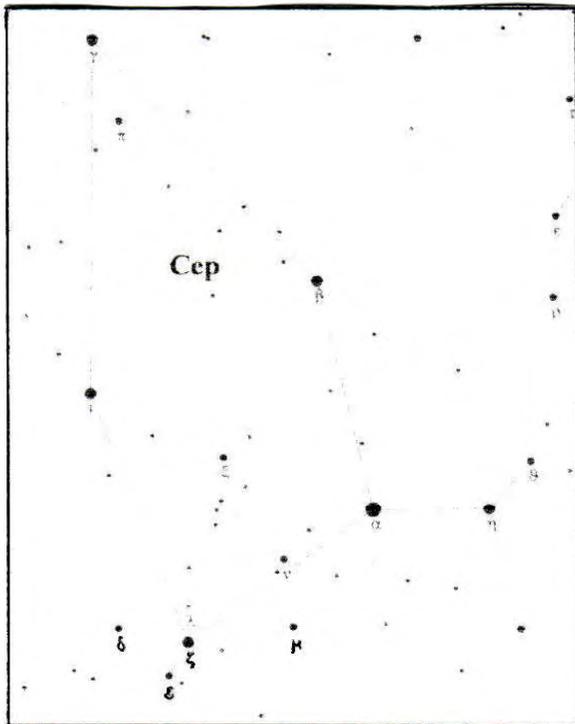
~ *Anna Hillier* ~

## Sky Objects of the Month . . .

October 2010 - Delta ( $\delta$ ) and Mu ( $\mu$ ) Cephei

In the southern part of Cepheus is a pair of naked eye variable stars worthy of note. The first, delta ( $\delta$ ), is the prototypical Cepheid variable. It ranges between magnitudes 3.5 and 4.4 in a

precise 5.37 day period. The rise from minimum to maximum brightness takes about 1½ days; the fade back to minimum involves an additional four.



Finder chart for delta (δ) and mu (μ) Cephei  
From *Touring the Universe with Binoculars (TUBA) Star Atlas*  
Dean Williams and Phil Harrington

Its short period and one-magnitude amplitude make delta Cephei an ideal variable star for the novice. Even better, delta Cep is part of a triangle formed by zeta (ζ) and epsilon (ε). Their respective magnitudes of 3.6 and 4.2 closely match delta's maximum and minimum brightness, making them convenient markers for magnitude estimates. A week of nightly observations (weather permitting) will allow you to follow delta Cep through a complete cycle.

A telescope isn't needed to follow delta's variations, but it will reveal a 7<sup>th</sup> magnitude companion 41 arc-seconds away. Pale yellow and blue, they make a nice low-power sight.

About 6 degrees east of delta Cep is mu (μ) Cephei. Its ruddy hue was first noticed by William Herschel, and the star is now known as Herschel's "Garnet Star." The name is misleading, because mu Cep appears more of a Betelgeuse-like yellow-orange when viewed with binoculars or telescope. Just as the ruddy hue of Betelgeuse seems more striking when compared to the pure-white star Rigel, so is mu Cep's color more evident when compared with alpha (α) Cephei. Like Betelgeuse, mu Cep is a red supergiant undergoing the death throes of a massive, aging star. Betelgeuse may be celebrated as one of the larger stars in our galactic neighborhood, but it pales in comparison to mu Cep. Approximately two to three times the diameter of Betelgeuse, mu Cep would engulf the entire solar system out to beyond Saturn's orbit were it put in place of our sun!

Unlike delta, mu Cep has an irregular cycle. Varying between magnitudes 3.4 and 5.1, mu Cep undergoes a complex set of superimposed cycles between 700 and 4500 days. Right now, it shines at about magnitude 4.0 – easily seen with the unaided eye. Unlike the nightly observations required to follow delta Cephei, a monthly sighting of mu Cephei will suffice.

Your comments on this column are welcome. E-mail me at [gchapple@hotmail.com](mailto:gchapple@hotmail.com)

~ Glenn Chaple ~

## For Sale . . .

**Calendars** - Starting with the October meeting and until they are sold out, I will once again have the Astronomy Deep Space Mysteries 2011 Calendars available for sale. They list for \$12.95 (see <http://www.kalmbachstore.com/68162.html>) but the club sells them for \$8 (this includes a small profit to the club – so you not only get a great buy, but you help support the club as well).

It is greatly appreciated if you have exact change available. Or, you can write a check (made payable to the ATMob). Sorry, but I will only sell them at the monthly meetings, first come, first served. Please see Bernie Volz.

**Small Scopes** - (1) Celestron 60-mm spotter scope, zoom, adjustable viewing angle (right angle to straight through), 1/4-20 thread, tough plastic case. \$100. (2) Takahashi FS-60C 60-mm f/5.9 CaF12 doublet refractor. OTA and tube ring. OTA has two stickers on it (which might be hard to remove) and some minor enamel paint-chip dings. Tube ring has a Vixen-style finder "shoe" epoxied to it. \$400. Please call Joshua Roth at 781-643-3897 or email [jrothastro@yahoo.com](mailto:jrothastro@yahoo.com)

## The Contents of Paul's Garage

Sony CLIE Palm Computer \$20, Can run planetarium programs.

Steel beams and garage door tracks for a 10X10 ft roll off observatory, surface rust but can be sandblasted or stripped. Just call to pick up in Burlington. FREE!

Exploradome black polyethylene roller ring. 9 ft. diameter by 7-inch thick. Use as dome rotation base. \$50

Lunt 60mm Solar H-alpha Scope model B600. O.8 Angstrom Bandwidth. View prominences and surface detail. Split Ring or Dovetail interface. Like new condition with aluminum case. \$750 or BRO. Contact Paul Valleli at 781-272-8946 or email [valleli@rcn.com](mailto:valleli@rcn.com)

\*\*\*\*\*

## November Star Fields DEADLINE

Noon, Sunday, October 24<sup>th</sup>

Email articles to the newsletter editor at  
[newsletter@atmob.org](mailto:newsletter@atmob.org)

Articles from members are always welcome.

\*\*\*\*\*

**POSTMASTER NOTE: First Class Postage**

Amateur Telescope Makers of Boston, Inc.  
c/o Tom McDonagh, Membership Secretary  
48 Mohawk Drive  
Acton, MA 01720  
**FIRST CLASS**

**EXECUTIVE BOARD 2010-2011**

PRESIDENT: Bernie Kosicki (978) 263-2812  
[president@atmob.org](mailto:president@atmob.org)

VICE PRES: Mike Hill  
SECRETARY: Bruce Tinkler (781) 862-8040  
MEMBERSHIP: Tom McDonagh (617) 966-5221

TREASURER: Nanette Benoit (978) 290-2802  
MEMBERS AT LARGE: Chuck Evans (978) 649-7157  
Neil Fleming

PAST PRESIDENTS:  
2008-10 Steve Beckwith (978) 779-5227  
2006-08 Virginia Renehan (978) 283-0862  
2005-06 Bernie Volz (603) 968-3062

**COMMITTEES**

CLUBHOUSE : John Reed (781) 861-8031  
Steve Clougherty (781) 784-3024  
David Prowten (978) 369-1596

NEWSLETTER: Ross Barros-Smith (978) 263-6599

OBSERVING: Stephen Beckwith (978) 779-5227  
John Maher (978) 568-1253  
Mike Mattei

**OBSERVING AND PUBLIC OUTREACH**

STAR PARTY COORDINATOR:  
Virginia Renehan [starparty@atmob.org](mailto:starparty@atmob.org)

**How to Find Us...**

**Web Page [www.atmob.org](http://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.