



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. 7 July 2011

This Month's Meeting...

Thursday, July 14th, 2011 at 8:00 PM
Phillips Auditorium
Harvard-Smithsonian Center for Astrophysics
Parking at the CfA is allowed for the duration of
the meeting.

Members Meeting Night

Several members will give short presentations on their astronomy related activities at our July meeting. Do you have something of interest that you have done and would you like to share with other members? Please email Bernie Kosicki to reserve a presentation slot.

President's Message . . .

A recent newspaper article described how a Brown University junior, Westwood resident Tomas Weinreich, made a real scientific advance in our understanding of the amount of water on the Moon- and this when he was a freshman. For a long time, the conventional scientific notion was that the moon was pretty dry- not much water. In the past few years there was some new evidence that there is probably more water in the surface layer of the Moon than previously thought, but no evidence that there are any sub-surface stores.

As a freshman Tom had a summer job at Brown to help to analyze small grains of moon dust. He was asked by the project leader to pick out some small round brown-orange particles for further study. But he noticed something else he thought was interesting- some small crystals with black spots. So he took the initiative on his own to separate these from the dust also.

The brown-orange particles were created during volcanic events, and contained a small amount of water, as the principal investigator of the program guessed. But the crystals with black

specks- the ones that Tom separated on his own-contained the mineral olivine with trapped water inside. Surprisingly, these were found to contain 20 to 100 times the water of the original orange particles that were the primary target of the study! This discovery implied for the first time that there were significant reservoirs of water below the surface of the moon, equal to the concentrations of some sub-surface reservoirs on Earth.

This story shows that there are unexpected discoveries that can reward someone who notices something unusual and takes a risk in following up his hunch. But a second important story is that the observant and risk-taking person was so young and untrained. Freshman Tom Weinreich's motivation and awareness is the real story.

How did this happen? We speculate that Tom may have showed early interest in science in school, and also in STEM-type activities, like, for example, astronomy. For many years our club has invested a significant amount of energy in star parties for schools in the greater Boston area to stimulate interest in science in young students. And our star party volunteers' work is noticed and appreciated. Just this month the club was presented with a special award for 10 years of Star Parties in Acton from the Acton-based Parents Involvement Project. This STEM based volunteer organization knows how activities like ATMOB's Star Parties can excite the imagination of young people. Thank-you to all our members who have contributed to all our star parties over the years!

In addition to star parties, a number of our members volunteer a lot of time to STEM-oriented and outreach programs at Harvard, MIT, and Dexter Academy, to name a few.

So our club and its members are really trying to make a difference in stimulating science interest in youth-it is one of our main activities. Do you have any ideas on the subject of youth-oriented programs in the club? Please drop me a line.

Keep looking up,

~ Bernie Kosicki, President ~

June Meeting Minutes . . .

Lecture: "An Astronomer Reads Thoreau"

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

The June meeting (835th) of the Amateur Telescope Makers of Boston featured ATMOB member Robert Naeye who presented a colorfully illustrated whirlwind trip through the history of the Universe. He traced 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.

Bob Naeye is Editor in Chief of *Sky & Telescope* and its website, skyandtelescope.com. He is a proud member of the American Astronomical Society, the Astronomical Society of the Pacific, the Astronomical Society of Harrisburg - which is based near his hometown of Hershey, Pennsylvania - and the Amateur Telescope Makers of Boston. A graduate of Oberlin College (Ohio), Bob has worked as a researcher/reporter at *Discover Magazine*, as senior editor at *Astronomy*, editor in chief of *Mercury* (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. He 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 began by expressing appreciation to Bernie Kosicki, Mike Hill and ATMoB for the invitation to speak, and Mark Garlick, Robert Gendler, and R. Jay GaBany for the generous use of their images. He also said that this is the most ambitious talk he has ever attempted, covering the 13.7 billion years going from the big bang to a modern global society. This fast paced talk combines his interest in science and history and is based on observational and experimental evidence. Note that this is "accepted" science now, but subject to change. (He also admitted watching the Bruins rather than rehearsing, as a true life-long hockey fan would!)

The Big Bang: 13.7 billion years ago. A key misconception is that the modern Big Bang Theory does say how the Universe originated; however it only says that it went through a hot, compressed phase.

Inflation: A high density of vacuum energy caused a "primordial seed" to double in size at least 85 times in 10^{-35} second (to the size of a golf ball). Space expanded faster than the speed of light. At the end of inflation, the vacuum energy that drove inflation transformed itself (condensed) into particles and radiation. Inflation never completely stops; there are multiple universes (Andrei Linde). Our universe is one of an enormous number of universes. Vacuum energy is constantly changing in space and time due to quantum effects, so some regions will always be inflating. New universes emerge in inflationary space when regions slow to a normal expansion rate each universe may have its own physical laws most of which would not permit life.

First 3 minutes: Nucleosynthesis occurs. Protons and neutrons combine to produce 75% hydrogen, 25% helium, and trace amounts of lithium, beryllium, and even boron. Measurements find these ratios in interstellar space.

380,000 years after the Big Bang: Recombination The Universe has cooled to about 3000 Kelvin (5000°F). Electrons combine with protons (atomic nuclei) to form atoms. The Universe becomes transparent to light. That light is now seen as

the cosmic microwave background. Before that, the electrons "blocked" light from moving.

The Cosmic Microwave Background (CMB): A "picture" of the Universe at age 380,000 years. Quantum fluctuations during inflation were the seeds of cosmic structure. WMAP - sees statistical patterns seem to match predictions based on inflation.

The Cosmic Dark Ages: From 380,000 years after the Big Bang to about 200-400 million years after the Big Bang. The CMB redshifted out of the visible range. There were no sources of light to illuminate the Universe

Cosmic Renaissance: The First Stars Form (200-400 million years after the Big Bang). Most were probably binary or multi-star systems formed out of clouds of pure hydrogen and helium. The stars were massive 100 to 1,000 solar masses, were short lived, extremely luminous, and blew up catastrophically. They were the first to synthesize and distribute heavier elements into the Universe. Massive early stars produced supernovae and GRBs

The First Galaxies: ~500 million years after the Big Bang (Hubble deep field). An open question is which came first, galaxies or their central supermassive black holes?

Evolution of cosmic structure was described in part by Dr. Margaret Geller, of the Harvard CfA, with the stick man figure. Data from 2dF Galaxy Redshift Survey. Computer simulation frames: Millennium Run. Galaxies grow and evolve by hierarchical mergers (collide and merge), large galaxies cannibalize smaller galaxies. We see more collisions in high red shift, early universe (things were closer together). The Milky Way is cannibalizing the Sagittarius dwarf galaxy.

The Birth of Stars and Planets: Nebulae, clouds of gas in galaxies, collapse and begin rotating, forming disks, within those disks, pebbles become asteroids and comets become planets. So far, we've found 556 extrasolar planets (more being found all the time - 6 more since the lecture). M67 - The stars are similar in age and characteristics of our sun - could have come from there. The Orion Nebula is a current day birthplace of stars and planets.

Life Cycle of Stars: Supernovae are essential to producing and dispersing heavier elements necessary for the formation of planets and life. These explosions may also be responsible for triggering gas clouds to collapse to form solar systems like our own.

Birth of Our Solar System: 4.6 billion years ago - nuclear fusion begins in the Sun - gravity in the Sun's center increases the temperature and pressure until hydrogen nuclei don't bounce off each other but stick together and fuse.

Formation of Earth: Early Earth formation was violent and hot. A giant impact with another planet-sized body formed the Moon about 50 million years after Earth. During the period of the early Earth (Hadean Eon), radioactive decay continues releasing energy (heat). Earth is highly volcanic. The atmosphere consists of nitrogen, carbon dioxide, and water vapor (not much oxygen). There was possibly a Late Heavy Bombardment about 3.9 billion

years ago. The archaean Eon starts 3.8 billion years ago. The continents had yet to form lots of water on the surface, atmosphere consisted of nitrogen, carbon dioxide, methane, and water vapor.

A Momentous Event: The Origin of Life (Though life may have started earlier but been wiped out by the late heavy bombardment period!) First chemical evidence: 3.8 billion years ago. First fossil evidence: 3.5 billion years ago. The first organisms might have been thermophiles. If so, they may actually be survivors of the late heavy bombardment period or may even have lived in the hot environment of the period. Panspermia: Did life originate on Mars? This is not universally accepted or refuted. We do know that planetary exchange through meteorites is possible. Terrestrial life remained primitive for billions of years (bacteria, algae, stromatolites). First photosynthetic organisms and the rise of oxygen in the atmosphere: 2.4 billion years ago – oxidation of iron shows the percent of oxygen. First eukaryotic cells: ~2.0 billion years ago (probably via symbiosis) makes evolution of more complex life possible. Prokaryotes: small, lack nucleus or nuclear envelope, scattered chromosomes, asexual. Eukaryotes: larger, nucleus or envelope that encloses chromosomes, reproduce sexually. The first multicellular organisms: ~1.0 billion years ago. Sponges were probably among the first metazoans.

Disruption and Continuing Evolution: Snowball Earth - 660 to 635 million years ago – volcanos could have punched through and releasing enough CO₂ to melt ice. When the ice melted, the Earth experienced the Cambrian Explosion: 580 to 530 million years ago (Stephen Jay Gould “Wonderful Life” book). There becomes amazing creativity in life including plants and animals. Life gets interesting and the modern world starts to form. Cambrian: the first plants and animals. The first vertebrates: 525 million years ago. Algae moves onto land ~450 million years ago (followed by lichens and fungi). Animals move onto land: ~375 million years ago. First vascular plants and forests: ~400 million years ago. First insects: also around 400 million years ago.

Reshuffling the Evolutionary Deck: Several mass extinctions have occurred; a large percentage of species on Earth disappear. Not all of these events resulted from impacts. Some could have been from environmental changes like the movement of continents causing ocean and thermal currents to change. Pangea breaking up may have been a contributor. The first mammal-like reptiles (synapsids): 324 million years ago. Breakup of the supercontinent Pangaea: starting 250 million years ago. The age of the dinosaurs (Mesozoic): 230 million to 65 million years ago. The first true mammals: 220 million years ago. Mammals coexisted with the dinosaurs. Mammals remained very small throughout the Mesozoic as the dinosaurs dominated all the ecological niches for large animals. First flowering plant (Archaeofructus): 125 million years ago. The Cretaceous mass extinction: 65 million years ago – 125 mile wide crater caused by asteroid 6 miles across. Ash layer dates the same time. The effect was devastating to other plants and animals as well as the dinosaurs. Additional contributions from volcanism in India. The Cenozoic: 65 million years ago to today

Modern Earth the Rise of Mammals and Humans: Earth recovered quickly from the mass extinction. Biodiversity thrives at the same or higher level than prior to the mass extinction. This

paved the way for mammals which took over many of the niches for large land animals. Birds are the likely only survivor of the dinosaur branch. First primates (lemurs): 55 million years ago. First ape (Proconsul): 22 million years ago. An early bipedal hominid (our family): Australopithecus afarensis, 4 million years ago, brain size 35% modern humans (Lucy: 3.3 feet tall, 80 pounds). An early stone toolmaker (Homo habilis): 2.3 to 1.4 million years ago. Brain capacity slightly less than half that of modern humans, brain continues to evolve. Homo erectus: arises in East Africa 1.8 million years ago and spreads over all of Africa and much of Eurasia. This was the hot spot of evolution which then spread out with the social and intellectual capability to travel large distances and survive in a variety of environmental conditions. Brain size: 750 to 1225 cc. A European lineage of Homo erectus evolves into Homo Neanderthalensis about 200,000 years ago. Neanderthals were expert hunters but they lived a tough life! Survived the ice age. We need to show them respect for their ability to bring down very large animals. This was done in social cooperation from very close range. Many were seriously injured doing this but those injuries healed which indicates the group cared for the injured individual.. Anatomically modern humans evolve in East Africa: ~195,000 years ago. Neanderthals vs. modern humans: Brain capacity: 1450 vs. 1350 cc.

The Human Diaspora: 100,000 to 1,000 years ago. Homo Sapiens replace archaic human species all over the world. Tools get better and better. Humans adapted to the ice age in Europe move to other areas, adapting as they move until the last area of expansion, the pacific islands are populated about 1,000 years ago. While there is some human and neanderthal interbreeding, humans overtake them winning out for resources, possibly by their social, intelligence, and language capability. The Pleistocene Epoch – People lived for tens of thousands of years in small communities, widely separated family groups of hunter-gatherers. People managed to survive in a wide variety of climates and ecosystems: a characteristic unique to humans. Total population probably never exceeded 1 million. Density: 1 person per square mile. Life was not necessarily bad! Evidence shows relatively long, healthy lives. They were good at finding food resources and there was less spread of infectious diseases. Humans become increasingly more social and creative. Human art fully robust by 40,000 years ago. Lascaux Cave, France (17,300 years ago). Peak of the last Ice Age (20,000 years ago). A warming trend was rudely interrupted by a sudden cold spell: the Younger Dryas (12,800 to 11,500 years ago). A short quick drop in temperature for 1,000 years.

The Birth of Agriculture: Within 1,000 years of warming again, we have the birth of agriculture. Farming started in multiple locations in the fertile crescent and spread very fast ~10,000 years ago. Agriculture and animal domestication begins independently in many parts of the world by 5000 BCE. Conclusion: Agricultural revolution was inevitable as soon as Earth warmed up after the Younger Dryas. Agriculture profoundly changed human social organization: people settled into large groups, economic specialization, paved the way for towns, cities, and civilization, however it also brought wars and infectious diseases. The first writing: 4,100 years ago. Large Cities: Uruk (in Sumer), 2900 BCE (~60,000 residents).

The Expansion of Civilization: Great agrarian empires of antiquity (political organization): Persian, Roman, and Han (pictured at their height). Of course the down side was the 5 horseman of the apocalypse: disease, climate change, migration, state collapse, and famine. Eastern and Western Civilization experience rise and collapse, stalls for 1000 years. Recent explorations include: Zheng He: 7 major voyages 1405-33 (Ming Dynasty) 200+ ships and 10,000+ crewmen. Columbus's first expedition: 3 small ships, 87 crewmen. The Europeans stumble upon the Americas and exploit their vast resources after 1492 leading to a sophisticated multi-continent economy. Why didn't the Chinese reach the Americas first? The world came to them!

Industrial Revolution: Major event – the shift from muscle power (human and animal) to mechanical. The scientific revolution begins in Europe in the 1600s. The Trans-Atlantic Economy circa 1750. James Watt (and others) improve the steam engine @ 1775 Unleashes the latent power in fossil fuels. The breakthrough that paves the way for the Industrial Revolution which transforms in the human condition – life expectancy increases with the efficient production of food and improvements in storage capability. Captain James Cook on the Australian Aborigines – “They may appear to some to be the most wretched people on Earth, but in reality they are far more happier than we Europeans.” Global Gross Domestic Product (i.e., economic output) increases. Average human height and literacy rates soar in developed nations. The world's human population explodes. Energy capture (kilocalories per person per day, log scale) increases. The rise in human social development. Population density – Reaching 7 billion people. GDP (wealth) per capita increases and is very high in certain nations. We have an amazing world around us. Our accomplishments in building, music, and literature are incredible. We provide social help for those in need. Our scientific accomplishments are overwhelming. On the down side, we have wars, diseases, pollutants (we have made a measureable impact on our planet), we are causing mass extinction of other species as humans take over territory and the environment. We have the ability to destroy ourselves with nuclear weapons.

Conclusion: 13.7 billion years of cosmic, biological, and social evolution culminates in the defining moment of not only human history, but the history of the Universe... Boston Red Sox win the 2004 World Series!

Questions:

Note: the lunar eclipse that night was paralleled by the Bruins winning the championship this month on another lunar eclipse night!

Correlation of intelligence and brain size is better viewed as brain size vs. body size. Humans are an anomaly when viewed this way and others who rate high on that scale include dolphins and chimps. Neanderthals may have been at a disadvantage due to brain structure. They had less surface area and only reached a certain level of sophistication. Part of the limitation may have been a limited vocalization capability which limited language development. They also spent more time than humans just trying to survive.

Could there have been more than one snowball Earth cycle? Yes, going much further back there may have been three. This is not universally accepted. Questions remain about the albedo problem vs. the ability of volcanism to overcome the ice ages.

Particles – matter vs. antimatter. After inflation, after the forces split and before nucleosynthesis there was a slight excess of matter possibly due to slight asymmetries. We're not sure why yet.

The heat detected by WMAP was generated in the time before 380,000 years. We will never be able to see beyond it.

The first evidence for dark matter was proposed by Fritz Zwicky in the 1930s. He used the virial theorem to deduce there was not enough mass based on the luminosity of a Coma cluster of galaxies to hold them together. This was followed by Vera Rubin confirming the same thing by the speed of spiral/angular rotation of galaxies.

Dark matter particle detectors are beginning to produce results (though not yet robust). We are seeing hints of progress and 10 years might solve this issue.

Cosmologists, climate change scientists, and long-range weather predictors are all fringe members of society (according to Fred!). By the way, the climate did change in the past due to a variety of factors but we can show with simple science that is easy to measure that we are having an effect on our planet. Could magnetic field reversals have had a climate effect or contributed to extinction? This happened 780k years ago and it appears to have happened fairly quickly. It would have been disruptive but not extinction level. The field gets weaker then reorganizes, during this time, the atmosphere provides a level of protection.

We shall not cease from exploration, and the end of all our exploration will be to arrive where we started, and know the place for the first time. T. S. Eliot

After Bob's presentation ended, Mario presented some images of the supernova in M51 and discussed his measurements of it.



June ATMoB Business Meeting:

June ATMoB Business Meeting: (8:03pm)

The annual business meeting was held before the speaker. The meeting was run by Mike Hill since Bernie Kosicki was unable to attend.

Tom McDonagh provided the Membership Report.

Bruce Tinkler provided the Secretary's Report.

Nanette Benoit provided the Treasurer's report. She indicated that, as expected, at the end of May, expenses exceeded income by a small amount.

Steve Clougherty provided the Clubhouse Report. The May 21st work party focused on mowing the grass and weed wacking. Once the grass was taken care of, measurements were taken of the home dome pedestal which was determined to be stable. Work progressed on the rocker box for the 20" Shapley Newtonian. The electrical was checked in the barn and shed. Work was also done in the library on the new C-14 donation which has active cooling, mirror flop stopper, micro focuser, motorized crayford focuser with digital readout. While no one got any ticks while working, caution including wearing long pants and treating the lower legs with repellent is a good idea. Bruce Berger indicated that his dog gets lots of ticks there.

Bruce Berger provided the Observing Committee Report. He reiterated the work on the C-14 including prudent use of club funds to acquire needed items at NEAF. In addition to the 2 observing awards given last month, at least four members are pursuing other awards (double stars). Reminder, for more information on the observing award program, go to <http://observing.atmob.org>. Bruce also indicated that he had recorded an occultation at the clubhouse and posted the video on YouTube (<http://www.youtube.com/user/bab01824?blend=1&ob=5>). We were the only ones to get it! We have also had a donation of a Meade Starfinder on an equatorial mount. It will be available for use at the clubhouse or for loan and should be very popular.

Club Elections: Last month the nominating committee provided a slate of officer nominees. No nominations were made from the floor. The vote was unanimous, with none opposed. The officers for 2011-2012 are:

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

Vote for July Meeting: A vote was held to see if the membership wants to have a July meeting. The vote was also unanimous with none opposed.

Club Events:

Feb 18-Jul 29	"Understanding the Universe - An Introduction To Astronomy" Clubhouse
June 22	Board Meeting - Britton Clubhouse, Westford
July 27	Assabet River National Wildlife Refuge Star Party, Sudbury
Aug 19	Hutchinson Field Star Party, Milton

Other announcements:

Mario Motta let us know that Kelly Beatty will be testifying before the Energy Committee on June 22. Everyone on the committee is for the bill and this should just be a formality. They are pushing hard for it. Mario is hopeful.

Refreshments were provided by Virginia Renehan.

Meeting adjourned 9:51pm.

~ *Bruce Tinkler, Secretary* ~

Clubhouse Report . . .

Starting early at 8:00am, the work session on June 18 was adjusted to beat the forecasted pm rain. The rain never came, but 90 degree temperatures with higher humidity forced some change of plans. After replacing the tractor drive belt, John B. returned to finish the heavy mowing started earlier. Push power mowers were operated by Dave S., Joshua A., Harry D. and Gennady S., raking the heavy cuttings and barrowing to the compost pile was accomplished by Barbara B., Al T., John M., and Gennady S.. Trimming started earlier in the week by John R. was completed by Joshua A. Later tree trimming continued in front of the house by Joshua A., John M. and John R. The cuttings await the return of Brian M. and his chipper. The porch garden was trimmed by Eileen M. and weeded by Barbara B.

Meanwhile in the Knight roll-off roof observatory, Dave P. and Steve C. continued to dismantle the 20" Shapley dob mount, modifying the base to accept the newly created cabinet grade rocker box Dave created based on measurements taken at the May session. After milling and installing new roller bearings on the rocker box and attaching the formica bearing rings, things came together in the Knight observatory. After modifications needed for smooth operation, the mount now allows smooth movement in both Azimuth and Elevation using the optical tube handle provided. Next session, Dave will tackle the stiffening of the secondary and tertiary mirror mounts. Based on recommendations by Gerry S. when he star tested the 20", Sergio S. machined a master eyepiece holder extender along with two secondary fillers should they be needed after the stiffening work readjusts the focal point. The current focal point will be tested the next night the sky is cloud free. Dave and Steve were assisted by Sai V., Sergio S., Al T., and John M.

Upstairs on the library table, Mike M. assembled the pieces of the newly donated C-14 optical tube disassembled by Bruce B. and Mike H. for cleaning by Phil R. The OTA was then mounted in place of the current C-14 with a new dove tail assembly in the Knight Observatory with the assistance of Barbara B. and Gennady S. Optical testing will follow.

The team was fed and watered by the capable Chuck Wagon team of Eric J. and Art S. on the grill, Sai V. and Eileen M. in the kitchen, with safeguarding leftovers and cleanup covered by Nina C. and Eileen M. Grub consisted of Kielbasa, Beef dogs, Turkey kielbasa, chik-n-que bbq chicken, super salad by Sai ., rolls and condiments, soda and cookies for dessert. John B. brought donuts for early arrivers. Coffee kept several members going beyond normal endurance.

A big thank you to our 23 members who skipped the Bruins Victory Parade and donated their day to this work party: J. Ashenberg, B. Berger, J. Blomquist, B. Bosworth, P. Cicchetti, S. Clougherty, N. Craven, H. Drake, E. Johansson, R. Koolish, B. Kosicki, J. Maher, M. Mattei, E. Myers, D. Prowten, J. Reed, P. Rounseville, D. Siegrist, S. Simonvic, G. Solodar, A. Swedlow,

A. Takeda and S. Vallabha. Maher and Rounseville took over duty and opened the clamshell and Knight observatories. Skies did not cooperate as during the day denying solar observing. Greg Chase stopped by at dusk to visit; he was the clubhouse caretaker through the late '80s and early '90s. Sci-Fi movies were viewed as clouds prevented observing. The popcorn was delicious.

Come up or over and join us at the next Work Session on Saturday July 16, 2011 at 10am. Dave will be able to use some help working on the 20" Shapley reflector. The grass will again need be lowered. The tree trimming will need to be finished. And the house painting/staining stopped short by snow a few months ago will be tackled. We all appreciate any help you can give.

~ *Clubhouse Committee Chairs* ~

~ *John Reed, Steve Clougherty and Dave Prowten* ~

Clubhouse Saturday Schedule

July 9	Budreau & Burrier
July 16	Maher & Meurer Work Party #7
July 23	Swedlow & Vallabha
July 30	CLOSED for Stellafane

Thoreau on Astronomy . . .

The other evening, returning down the river, I think I detected the convexity of the earth within a short distance. I saw the western landscape and horizon, reflected in the water fifty rods behind me, all lit up with the reflected sky, though it was a narrow picture. A stroke of my oar and the dark intervening water was interposed like a dark, opaque wall. Moving my head a few inches up or down produced the same effect; ie: by raising my head three inches I could partially oversee the plane of the water at that point, which was otherwise concealed by the slightest convexity.

Journal, 11 August 1856

~ *Submitted by Tom Calderwood* ~

Observing Committee Report...

May and June's most popular topic seems to have been the supernova in M51. Our own John Buonomo and Mario Motta had their pictures of SN 2011dh published online in Sky & Telescope. John captured both his images from his roadside observatory in North Billerica using modest equipment. I want to impress on our readers that although it's great to have a 5-1/2 square feet of aperture under a pristine dark sky, most of us do not, but some very useful and pretty images can be had on a more austere budget. John Buonomo captured these before and after images using a Celestron C8 Schmidt-Cassegrain telescope and an inexpensive USB camera.

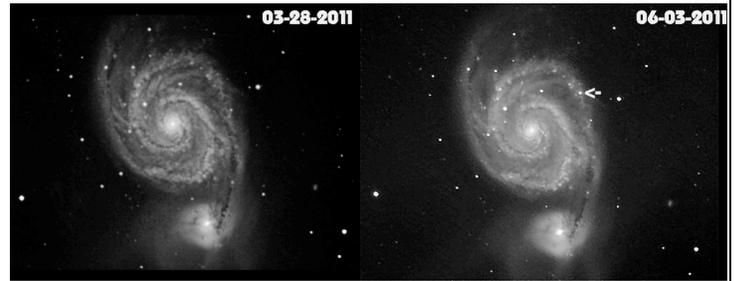


Image: John Buonomo, N. Billerica, MA: Celestron C8 F6.3 1200MM Meade DSI pro II March image 60x60sec unguided June Image 128x60sec unguided Captured & Aligned with Nebulosity, Processed in Photoshop

Did you know that ATMob has a "lending library" of telescopes, including a couple of 8" SCTs, available for checkout to any member in good standing? If you have no telescope, want to try something different, are having "aperture fever" or need a small and light scope to take on a summer vacation, contact me or one of the clubhouse committee members to check out what's available.

ATMoB and the Observing Committee would like to thank Dr. Frank Colombo for his generous donation of a beautiful 10" Meade Starfinder newtonian telescope on a motorized equatorial mount. The scope is in fine condition and is ready for use by ATMob members.

~ *Bruce Berger, Observing Committee* ~

Research on Chester Sheldon Cook...

Anna Hillier writes to say that her material on Chester Sheldon Cook, presented at 215th Meeting of the American Astronomical Society earlier this year, is now online at: <http://adsabs.harvard.edu/abs/2010AAS...21531601S>

The abstract: "How did the public telescope on the mall become dedicated to Chester Sheldon Cook? He was a multifaceted individual with qualities to be a musician and optician. His musical abilities went hand in hand with his optical work at Harvard College Observatory. His interactions with Donald Menzel and James G. Baker are explored in this oral presentation."

Anna notes, "It does not contain the information that the we obtained after January 2010. He is buried in Dover, Massachusetts at The Highland Cemetery." Anna invites anyone interested in more information to send her an email.

~ *Anna Hillier and Ross Barros-Smith* ~

Club picnic...

Saturday, September 10 is this year's date for the Annual Club Picnic at the Tom Britton Clubhouse in Westford. Starting at 3:00 P.M. enjoy the day with other ATMob members, sharing your astronomy stories and experiences. Bring any astrophotography

you would like to show. Please bring a tasty dish to share - salad, main dish, dessert, soup, appetizer, fancy bread, anything goes! A serving utensil would be helpful. We will provide the hamburgers, potato chips, ketchup, mustard, coffee, paper goods and plastic cutlery. The food is always varied and delicious. There will be solar viewing during the day and night sky observing after sunset (all weather permitting). The picnic is on rain or shine. Bring lawn chairs or blankets to sit on. Depending on the weather, bring your favorite suntan lotion and mosquito repellent. Observing will continue until Midnight if the sky is clear, so bring your telescope and your observing clothing and gear. The club's scopes will be open too.

Club members, their families and friends are invited. Do bring the kids and grandchildren. There will be a tour of the clubhouse facilities and a demonstration of mirror grinding. There will be opportunities for kids to take part in astronomy activities. We also plan to walk "up the hill", stopping along the way to talk about the MIT Haystack Observatory facility.

Directions to the clubhouse can be found on the last page of Star Fields and at the club website.

Questions - Email Eileen Myers at starleen@charter.net
Don't miss the fun!

Clear skies,
Co-Hosts/Co-Chefs: Al Takeda, Art Swedlow, Eileen Myers,
Eric Johannson, John Reed, and Sai Vallabha

Sky Object of the Month...

Quick question. How many times (to the nearest thousand) have you viewed the great globular cluster M13 with your telescope? Next question. How many times (nearest thousandth) have you visited Hercules' other great globular cluster M92? I doubt it would be an exaggeration to say that I've seen M92 once for every hundred times I've viewed M13.

The reason for M92's relative anonymity can be summed up in three words - location, location, location! M13 is conveniently placed on the western edge of the "Keystone" of Hercules. M92, on the other hand, is positioned in a part of Hercules devoid of such landmarks. One way to find M92 is to trace line from delta (δ) to pi (π) Herculis and extend it further by about half that length.

M92 may not be as impressive as M13, but it's a marvelous sight, nonetheless. Were we to grade the two clusters on their visual impact, M13 would receive an "A+", while M92 would garner an "A". M82 shines at magnitude 6.5 - about a half magnitude fainter than M13. Its 14 arc-minute diameter is about half that of M13. Because the two lie at about the same distance from Earth (about 25,000 light years), M13 is intrinsically the larger.

Binocular users will have no trouble viewing M92. I captured it with a pair of 10X50 binoculars during a Messier Marathon last April. A 4-inch telescope at 120X will begin to resolve the cluster's outer portion, while an 8 to 10-inch or larger Dob at 150-200X will capture M92's true splendor. While comparing

M92 with M13, I noticed that the latter had a brighter, more condensed core. I also discovered that M92 deserves far more attention than I've given it in the past.

M92 was discovered by Johan Bode (of Bode's Law fame) in 1777. Next clear night, take a few moments to discover (or rediscover) this dazzling globular.

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

~ *Glenn Chaple* ~

Star Fields Updates...

New Club Secretary

With the new incoming slate of officers, our club secretary, Bruce Tinkler, will be stepping away from the keyboard, presumably to crack his knuckles and enjoy a lot of newfound free time. His duties will be taken on by Sydney Johnson. Bruce has seated himself at the front of the Phillips Auditorium at every monthly meeting, diligently taking notes on our speakers and proceedings, for the last year. Writing his detailed accounts of our activities every month has required many late nights in front of a glowing screen - even through sickness!

If you encounter Bruce or Sydney at a meeting or on the observing field, please take a moment to thank them. The club secretary position has sometimes been called "the hardest job in the club," but it also deserves to be one of the most appreciated.

Call for Stellafane Material

For those of you attending Stellafane this year, please consider taking some time to contribute a few words or pictures from your trip to Springfield. Observing reports, short remarks, and full articles are all welcome. We hope to give a great account of what ATMOb members were up to on top of the hill!

Newsletter Help Requested

A few members may be aware that I will be in the United Kingdom from the beginning of August through the end of the year. While abroad, I still plan on maintaining Star Fields and will hopefully even have *much* more time to invest in making it a better newsletter. Despite this, someone else's assistance in handling the physical replication and mailing of the printed copies will be required. If you're interested in helping out, even for part of that time, please drop me an email at newsletter@atmob.org.

~ *Ross Barros-Smith, Newsletter Editor* ~

September *Star Fields* DEADLINE

Noon, Sunday, August 21

Email articles to the newsletter editor at
newsletter@atmob.org

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How to Find Us...

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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.
