



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. 33, No. 6 June 2021

This Month's Meeting . . .

Thursday, June 10th, 2021 at 8:00 PM
[Zoom On-line Meeting](#)

All ATMoB meetings scheduled for the Harvard-Smithsonian Center for Astrophysics in Cambridge, MA have been **canceled indefinitely** due to concerns over the [coronavirus](#) outbreak.

We are holding virtual on-line meetings using the Zoom application. Please refer to the [ATMoB website](#) for future meetings. Members should check their email on the ATMOB-ANNOUNCE list for additional information. Please [select this Zoom link to attend the 942th Meeting of the Amateur Telescope Makers of Boston.](#)

Annual Meeting . . .

Thursday, June 10th is the Annual Meeting for the members of the Amateur Telescope Makers of Boston.

ARTICLE VI, Section 2 of the Bylaws; "Annual Meeting - The first regular meeting of the members in June of each year shall be the annual meeting for the election of officers and the hearing of the annual reports."

The 2021 Nominating Committee, Glenn Chaple, Bruce Berger, and Keira Mooney and assisted by Laura Sailor and Julie Kaufmann, have completed a slate of candidates for the upcoming Executive Board election. The slate includes:

- Richard Nugent - President
- Corey Mooney - Vice President
- Ava Couch - Secretary
- Chris Elledge - Membership Secretary
- Eileen Myers - Treasurer
- Alan Sliski - Member-at-Large
- Kai Cal - Member-at-Large
- Mark Helton - Member-at-Large

Sky and Ocean Joined: A Brief History of the U.S. Naval Observatory



The main building of the U.S. Naval Observatory in Washington, D.C.,
U.S. Navy photo by Geoff Chester

This month's speaker is Geoff Chester of the U.S. Naval Observatory. Geoff's presentation will be "Sky and Ocean Joined: A brief history of the U.S. Naval Observatory." Geoff writes: The U.S. Naval Observatory (USNO) performs an essential scientific role for the United States, the Navy, and the Department of Defense. Its mission includes determining the positions and motions of the Earth, Sun, Moon, planets, stars, and other celestial objects; providing astronomical data; determining precise time; measuring the Earth's rotation; and maintaining the Master Clock for the United States.

The U.S. Naval Observatory is one of the oldest scientific agencies in the country. It was established in 1830 as the Depot of Charts and Instruments. Its primary mission was to care for the U.S. Navy's chronometers, charts, and other navigational equipment.

In 1844, as its mission evolved and expanded, the Depot was reestablished as the U.S. Naval Observatory and was located on a hill north of where the Lincoln Memorial now stands in Washington's Foggy Bottom district. For nearly 50 years the Observatory remained at the Foggy Bottom location.

During these years significant scientific studies were carried out, such as speed of light measurements, the phenomena of solar eclipses, and transit of Venus expeditions. Publication of its annual *American Ephemeris and Nautical Almanac* started in 1855 and continues to the present day. In 1877, using the recently completed 26-inch Alvan Clark "Great Equatorial" refractor, astronomer Asaph Hall discovered Phobos and Deimos, the two satellites of Mars.

The Observatory moved to its present location in upper Georgetown in 1893. USNO is headquartered in Washington, D.C., and operates a dark-sky observing station near Flagstaff, Arizona (NOFS). It also has a small detachment activity, the Alternate Master Clock facility (AMC), located at Schriever Air Force Base in Colorado Springs.

Geoff and I go way back...to our youthful days as members of the Aldrich Astronomical Society. Today, Geoff is the Public Affairs Officer and Historian for the United States Naval Observatory in Washington, DC, a position he has held since 1997. Prior to joining the Observatory staff, he spent 19 years working in the Albert Einstein Planetarium at the Smithsonian Institution's National Air & Space Museum as staff astronomer, photographer, and visual production coordinator. He has always had a keen interest in astronomy and has been actively observing the sky for more than 50 years. He is a member of the Association of Lunar and Planetary Observers, the International Dark Sky Association, and the Northern Virginia Astronomy Club.

By a curious quirk of history, his great-grandfather, Rear Admiral Colby M. Chester, was the Superintendent of the U.S. Naval Observatory from 1902 to 1906. He was the fourth Superintendent to live in "Quarters A", the house that is now the official Residence of the Vice President of the United States. Geoff assures us that this had nothing to do with his getting the job, since Admiral Chester died some 20 years before Geoff was a thought.

Please join me on June 10th. I'll open the meeting at 7:45 p.m. and hope to see you all there!

~ Rich Nugent – President ~

President's Message . . .

At last month's meeting, I mentioned a couple of benefits that come with your ATMob membership. I spoke about the telescopes and equipment available to members. To review, we have a suite of telescopes and imaging rigs on the observing field. At the south end of the field is the club's 17-inch Dobsonian telescope. It rolls out of its enclosure, and within 5 minutes it's ready for observing. We opened it up at last month's work party and I'm happy to report the scope is in great shape and is waiting to be used. To the north is the clamshell observatory with its 10-inch Meade Schmidt-Cassegrain telescope (SCT). Considered a "hybrid" platform, this telescope is used for both visual observing and imaging. The only caveat is that members must use their own imaging camera with this telescope. On the west side of the observing field, you'll find the newly installed Mittelman-ATMob and the William Toomey observatories. Each enclosure is home to complete astro-imaging systems. While we are still "kicking the tires" on the Mittelman-ATMob Observatory (MAO), the William Toomey observatory is ready for your projects. Finally, to the north of these structures, is the Ed Knight roll-off Observatory. This contains our 25-inch Dobsonian and Meade 16-inch computerized, Schmidt-Cassegrain telescope. Members are encouraged to visit the site to be trained on opening/closing of the observatories and the use of the telescopes. Work party Saturdays usually work best but let the Clubhouse Committee directors know, in advance, of your interest to make sure someone will be available to conduct the training. While the Dobsonians are simple to use, the imaging rigs are - at least, to me - very complicated. But these scopes are

there for the members to use and enjoy! So, if you want to observe through a large aperture Dob or collect data for imaging, we have just what you need.

As we emerge from the pandemic, I am hoping that the Friday night classes will resume. Members are free to attend and, afterwards, can join observers outside. Perhaps seminars might be held. How to use setting circles, how to collimate your telescope, how to clean your optics are potential topics. What about member star parties? Have you been keeping up with the 19+ objects lists? How about the mini-Messier marathons? How about a small-scope star party where no scope bigger than 4" would be used? Double stars? The Moon? I could go on and on!

If you're interested in making a telescope mirror, we have the newly renovated grinding and polishing areas. We have necessary supplies to get you started and a Foucault tester and an interferometer for evaluating mirrors. My hope is that Saturday afternoons will be busy, once again, with folks pushing glass (or using the grinding and polishing machines) and turning out quality mirrors. It would be wonderful if lots of folks learned how to grind, polish, and figure the glass to be able to pass along their knowledge to others.

So, what do you do with the finished optic? Read on! If you're building a telescope, you'll likely need to fabricate some of its parts. Our machine shop might be able to help. We have a lathe, a milling machine, a heavy-duty drill press, and the tools to go with them. These machines are inherently dangerous, so no one can work in the shop alone and training is absolutely mandatory! But there's good news...Some of our members are very skilled machinists and are willing to teach others.

If your project requires small parts that don't need to be as robust, then the club's 3-D printer may be the way to go. To use the printer, you first must use a computer design program (like the free, web-based program, OnShape) and then a program to interface your design with the printer (like another free, web-based program, Cura). Once you've done this, your only limitation is the size of the printer's print volume. Perhaps Saturday afternoon classes could be held to teach members how to get from idea to finished product!

Post-pandemic, I would love to see more members volunteering in several areas. We hold monthly work parties to clean and maintain the building and telescopes. These are held on Saturdays near the full moon and are a lot of fun! As a great enticement, the food at lunchtime is fabulous! To take it a step further, consider becoming a Clubhouse Committee "A" member. These folks - myself included - are trained on the opening and closing procedures for the Saturday night observing sessions and are assigned 2-3 duty nights throughout the year. You don't have to stay all night, either. Members on duty just let the observers know when they are locking up the Clubhouse.

If you want to observe under darker skies, consider organizing weekend trips. Veteran club members will remember trips to Baxter State Park in Maine and observing at Miles Standish State Park in Massachusetts. Attending local conventions is fun and some offer dark(er) sky observing. Stellafane, the Astronomer's

Conjunction, the Summer Star Party, Arunah Hill, and AstroAssembly should not be missed! Once we get past the pandemic, NEAF will return to being an in-person experience. This weekend-long vendor event is a great way to see the newest astro equipment and to meet lots of people interested in amateur astronomy. One recommendation...if you go to NEAF you might want to leave your credit cards at home!

If you think you might be interested in interacting with the public, then volunteer to help with outreach. Although we haven't had requests for some time – think pandemic – I'm sure the requests will begin pouring in for the coming school year. If you have kids in your school system, ask their teachers if they are interested in holding an evening event? The school organizes the star party, and we support the event by providing telescopes and knowledge. If you have time, visit the classrooms during the day. The students love visitors...so do their teachers!

How about getting involved with the Library Telescope Program? Modification parties are a lot of fun and you'll quickly learn your way around a reflecting telescope! Libraries request the scopes and – despite the tamper-resistant modifications made to the scopes – we visit occasionally to collimate and otherwise tweak the telescopes.

Astronomy Day – there are now two each year – offer a great way to share our hobby with the public. Most recently, the club has provided telescopes for afternoon and evening observing at New England Sci-Tech in Natick, MA. I'm hopeful that October's Astronomy Day (on the 9th) will be held as an in-person event...stay tuned.

There are so many ways to become more active in the club! You know the saying – “It takes a Village!” More members getting involved will lead to a better ATMob experience for everyone. And, by becoming more active in the club, you'll learn new things and make new friends. Watch the newsletter and emails for info on the observing sessions, work parties, and other club activities and please join in. In the meantime, stay safe and be well!

~ Rich Nugent – President ~

Membership Report . . .

I am pleased to welcome our newest member: Chris Slack

As of May 26th, 2021 we have 344 memberships covering 441 members. This is broken down as follows:

- 143 Regular Members
- 134 Senior Members
- 5 Student Members
- 57 Family Memberships covering 154 Members
- 3 Guest Members
- 2 Honorary Members

Renewals for all members began on June 1st except for members who joined after January 1st this year. Please visit the website at <https://www.atmob.org/renew> to begin your renewal. You may need to login and revisit the link to proceed. If you want a printed newsletter mailed to you each month, then you

need to select one of the membership levels that include “with Mailed Newsletter” in the type.

You can also download the membership application from the website at <https://www.atmob.org/signup> by clicking on the “Download an application” link.

Please contact me if you need any help with renewing or logging into the website.

~ Chris Elledge – Membership Secretary ~

Meeting Recordings . . .

The recording of ATMob meeting #941 is available on YouTube: <https://youtu.be/dFnAcQRDAho>

I would like to thank David Levy for giving his talk and allowing us to record it. Please read the description of the video on YouTube for details on how to hear the background music for the slideshow during the talk.

This link is to the publicly available cut of the meeting recording. To view the original version of the meetings, please see the Announce Forum on the ATMob Website <https://www.atmob.org/forums>

~ Chris Elledge - Membership Secretary ~

May Meeting Minutes . . .



David Levy on Zoom *

ATMob 941st Meeting Minutes May 13, 2021

Rich Nugent presented the President's welcome, including remembrance of Bill Toomey (1947-2021). The CfA remains closed, but the Westford grounds will be open with the same restrictions as before: only the bathroom is open in the Clubhouse, and double-masking will be required there.

- Alva Couch presented the Secretary's report, including the minutes from the 940th meeting and a summary of the wonderful talk by Rachel Freed: “Astronomy: From Passion to Profession”. Alva also reported on the special board meeting on April 22, 2021 at which the board voted unanimously to support a proposal by Chris Elledge to outsource printing and mailing of the newsletter for a yearly charge of \$14, to be enacted for the next membership cycle.

- Eileen Myers presented the Treasurer's report, and reported a small inflow from donations and minimal expenses.
- Chris Elledge presented the Membership report and welcomed new member Morgan McLeod.
- Glenn Chaple presented the Observer's report. Mercury will be at its greatest eastern elongation on May 17. This month there are conjunctions of Mercury and Venus, and Saturn and Jupiter take turns being paired with the waning crescent moon. The May observer's challenge is M3.
- Steve Clougherty presented the Clubhouse report. The first work party of the year was on Saturday, May 1 with 14 volunteers. Half of the time was spent on outdoor work, and the other half in cleaning the observatories and the first floor of the Clubhouse. Al Takeda and others got weed whackers going and cleaned up the yard. Maria Batista cleaned our refrigerator! We also reorganized the barn for the summer. The next work party is planned for May 22, 2021.
- Alan Sliski presented the Mittelman ATMob Observatory report. The Observatory has made its way to the Clubhouse on a flatbed truck. Many thanks to MIT buildings and grounds crew who showed up with a forklift and crane and positioned the observatory in its final location. With the enclosure in place, Aaron Sliski anchored the observatory to the timbers. The Planewave CDK 17 telescope was transported to the site in the back of Alan's Volvo and was reinstalled on its mount. The next step includes finishing power and Ethernet connections, and completing the configuration of the automation and scheduling program. The operations team will need additional volunteers to help with telescope scheduling, including managing proposals, reviewing imaging output, and distributing information.
- Rich Nugent presented the Outreach report. Rich was asked to provide a telescope and an enthusiast to guide viewing sessions at the Tower Hill Botanical Gardens. Kelly Beatty was approached by the Belmont library about organizing a stargazing session in coordination with them. There is a plan to donate a telescope to the Chelsea public library.
- Old business:
Amazon Smile remains a great way to donate to ATMob!
- New business:
Bruce Berger, Glenn Chaple, and Kiera Mooney were elected to the Nominating Committee. Their recommendations for a slate will be announced in the June 10 meeting and the election will be held online.

Maria Batista formed a website committee to make the website more welcoming.

Member night is on July 8, featuring presentations from our members.

Our presentation for the evening was by David Levy whose talk was "A Nightwatchman's Journey: The Road Not Taken".

David Levy has discovered 22 comets either independently or with Gene and Carolyn Shoemaker, including Comet Shoemaker-Levy 9. While considered one of the most prolific comet-discoverers alive, David began his quest 19 years before he discovered his first new comet. The secrets to his success include persistence, opening the observatory every clear night, as well as a fascination with the beauty and poetry of the night sky. He shared many recollections of past wonders, including comets, sky poetry, and even Shakespeare, culminating with a discussion of Comet Shoemaker-Levy 9 and its eventual collision with Jupiter. Throughout the presentation, David insisted that he is not a technical astronomer, but rather, someone whose fascination with the beauty of the night sky has led to discovering many memorable wonders.

~ *Alva Couch* – *Secretary* ~

Clubhouse Report . . .



(L-R) Maria Batista and Chris Elledge mowing. May 22, 2021 *

May 2021 Clubhouse Report

We held our monthly work party on Saturday, May 22 and there were a total of 13 members in attendance. The sky was overcast but it never rained, therefore allowing several members to use the mowers and weed whackers to complete mowing and trimming the entire property.

Other volunteers finished cleaning the second floor of the Clubhouse and the upper barn loft. We now have the Clubhouse in very good shape with an eye toward expanded activities in the near future.

Special thanks to Eileen Myers who made a delicious lunch for all volunteers! Eileen also cleaned our bathroom, completing the cleaning and organizing effort for the first floor of the Clubhouse!

During the afternoon, with much of the cleaning and mowing completed, we tackled a few ATM related projects. Phil Rounseville took the lead and cleaned the 25-inch Dobsonian

mirror. He also carefully cleaned the corrector plate of the Meade 16-inch SCT.

Dave Prowten assisted John Reed troubleshooting the electrical problem in the Ed Knight roll off observatory. Dave discovered that both GFI power sources to the two telescopes were tripped. This problem was corrected in short order and we now have full power restored.

Bruce Berger worked on some power systems in the Mittelman ATMoB Observatory enclosure.

Al Takeda continued to work on the Mittelman ATMoB Observatory control desk in the electronics room. Al also assisted with the fabrication of Maria Batista's heated cover for her new truss tube Dob. John Harrington vacuumed the second floor of the Clubhouse during the work session.

John Harrington was checked out on the club's 17-inch Dob housed in the Greg Chase hutch.

We would like to thank the following members for their help during the work session: Maria Batista, Bruce Berger, Paul Cicchetti, Steve Clougherty, Chris Elledge, Eric Johansson, Eileen Myers, Rich Nugent, Dave Prowten, John Reed, Phil Rounseville, Steve Scampini, Chris Stokes, and Al Takeda.

We have tentatively scheduled our next work session for Saturday, June 19, with a rain back up date of Saturday, June 26.

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

Newsletter Announcement . . .

ATMoB will resume mailing printed newsletters beginning with the June newsletter; however, we will only do so for memberships that renew this year while paying a required \$14 additional fee for mailed newsletters. We will be using a service to handle the printing and mailing, and this fee will cover the expense to the club. When renewing online starting on June 1st, select the appropriate membership listing "with Mailed Newsletter" on the end to be charged the fee and receive the newsletter by mail.

Any member who paid the \$5 donation for postage in 2020 may request a refund from ATMoB since we were unable to handle the printing and mailing for that period of time. If you want to request a refund, please contact our Treasurer, Eileen Myers.

As always, any member with a financial hardship may request a waiver of dues. Contact the Membership Secretary for further information.

~ *Chris Elledge – Membership Secretary* ~

Observer's Challenge** . . .

June, 2021

NGC 5746 - Edge-on Barred Spiral Galaxy in Virgo

Mag: 10.3

Size: 7.4' X 1.4'



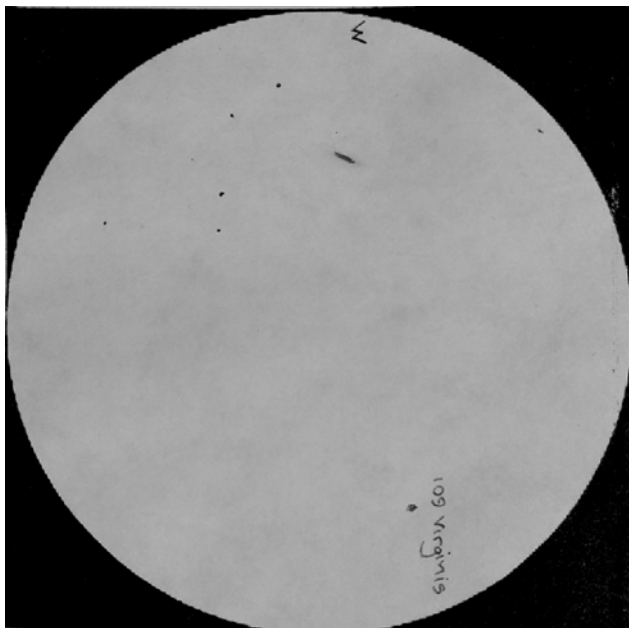
32-inch f/6.5 telescope with ZWO ASI6200 camera, Total time = 3 hours
- 1 hour each Red, Blue, Green. Processed CCD stack, Pixinsight, and touch up
with Photoshop. North is up. Image by Mario Motta, MD

Telescope aperture is a major factor in determining how difficult each monthly Observer's Challenge is. Under dark-sky conditions, our June Challenge - the 10th magnitude edge-on barred spiral NGC 5746 in Virgo - would be an ultimate test for a common 2.4-inch (60mm) refractor and a piece of cake in a 10-inch (254mm) reflector.

When considering the difficulty of any Observer's Challenge, you also need to factor in the ease with which it's located - particularly if you find your way by star-hopping. In this case, NGC 5746 is quite accommodating. It's just 20 arc-minutes (1/3 degree) west and slightly north of the 4th magnitude star 109 Virginis.

NGC 5746 is a classic example of an edge-on spiral or barred spiral galaxy. It's comparable in visual splendor to the better-known Messier 104 (the Sombrero Galaxy), NGC 4565 (the Needle Galaxy), and NGC 891 (the Silver Sliver Galaxy). In Stoyan and Schurig's *Interstellarum Deep Sky Atlas*, NGC 5746 is labeled as the "Mini Sombrero Galaxy." All of these edge-ons are bisected by a distinctive dust lane, which appears particularly stunning in deep sky images.

When I viewed NGC 5746 with a 10-inch f/5 reflector at 139X under magnitude 5 suburban skies, it appeared as an elongated 2- to 3-arc-minute-long streak oriented roughly north-northwest to east-southeast. There was no sign of the galaxy's dust lane. Knowing exactly where to look and resorting to averted vision, I was able to glimpse NGC 5746 with a 4.5-inch f/8 reflector.



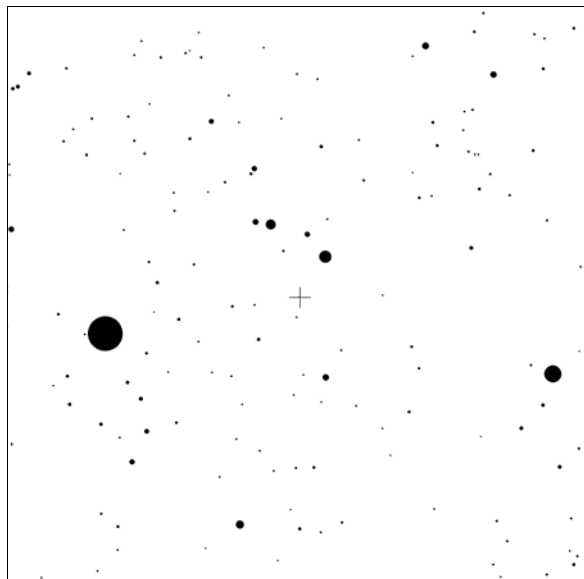
(Above) NGC 5746, as seen with 10-inch f/5 reflector at 139X under mag. 5 skies. 0.6° field, South is up. (Below) For comparison - portion of above sketch showing same area as in Mario Motta's image. Drawings by Glenn Chaple.



NGC 5746 was discovered by William Herschel February 24, 1786. Some 95 million light years away, this huge galaxy spans 160,000 light years.



jwinman.com



AAVSO Variable Star Plotter (VSP) Stars to magnitude 14.5. One degree field, North is up

**The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone who is interested. If you'd like to contribute notes, drawings, or photographs, we'll be happy to include them in our monthly summary. Submit your observing notes, sketches, and/or images to Roger Ivester (rogerivester@me.com). To find out more about the Observer's Challenge or access past reports, log on to <https://rogerivester.com/category/observers-challenge-reports-complete/>.

~ Submitted by Glenn Chaple ~

NGC 4565: 0.8-Meter vs. 8.0-Meter . . .

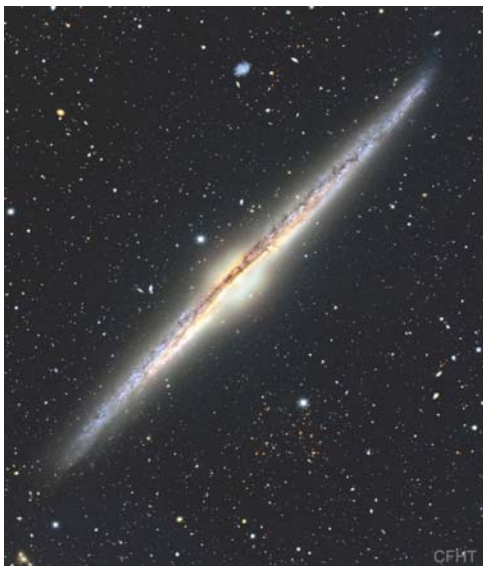
The [Astronomy Picture of the Day \(APOD\)](#) image on [May 17, 2021](#) is [NGC 4565](#), an incredible image taken with the [Canada-France-Hawaii Telescope \(CFHT\)](#) on Mauna Kea, Hawaii (an 8.0-meter mirror, one of the largest scopes in the world). See the APOD image below, and also my image.

Mine is not at the same level of fine detail of course (I am "only 0.8-meter" in size or 32-inches) but, it does compare nicely. I am pleased. It's great when you can compare your image with a major "professional" telescope, for sure!

For a comparison, I've posted both together. I'm especially happy that the color is almost a match, as I'm a stickler to "get the color right", and based on the professional image, I think I achieved this. Much of this is not only "just good" optics, but good processing. Despite imaging since the 1980's I am still learning, and have adopted some recent techniques in PixInsight which helped get the color exactly correct, and squeeze out good detail.



NGC 4565: Image by Mario Motta.



NGC 4565: Image by CFHT.

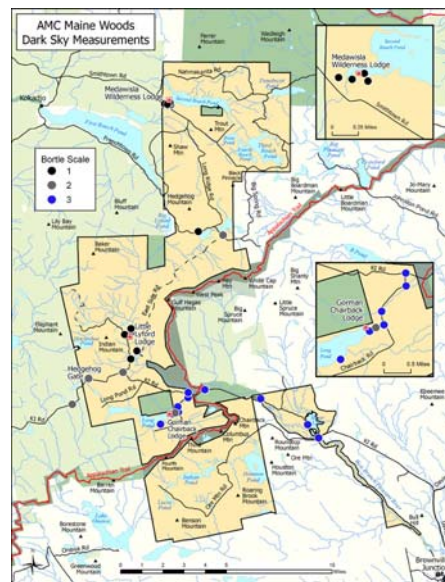
Speaking of the CFHT (Canada-France-Hawaii Telescope), I visited the facility some years ago. Its mirror was cast in the [Richard F. Caris Mirror Lab](#) at the University of Arizona by [Roger Angel](#) who perfected the technique of casting and polishing these behemoth mirrors. One of his mirror makers, Peter Wangness, left the lab to set up his own private mirror making commercial business. He says I was his first customer, when he cast my 32-inch (0.8-meter) scope as a favor and at cost as a test back in 2004. He pre-made the rough curve before I ground and polished it.

To minimize cost and engineering, he simply took the plans of the 8-meter mirror and shrunk it down to 0.8-meter...so my 32-inch is in effect a "1/10th" model of the CFH telescope. Something I have always been very happy about.

For all reading this, you can now compare directly an image from the 8-meter CFHT, and its 1/10 scaled model, which is my scope.

~ Submitted by Mario Motta ~

AMC Maine Woods International Dark Sky Park . . .



AMC Maine Woods International Dark Sky Park. Dots applied indicate the Bortle Scale associated with that location. Click on the map for an enlarged view.

Last week, the International Dark Sky Association certified the creation of the [AMC Maine Woods International Dark Sky Park](#), the first IDSP in New England. I have been working for several years with the [Appalachian Mountain Club](#) to create this, and to protect the last dark sky area in the eastern 2/3 of the US. Comprising over 75,000 acres, the park includes beautiful lodging facilities including Medawisla Lodge, Gorman Chairback Lodge, and Little Lyford Cabins of the Appalachian Mountain Club. Telescopes and observing gear are available, and guests can enjoy true Bortle Class 1 skies. Located a few hours drive from Boston, it is a great astronomy and outdoors destination, with great hiking, paddling, fishing, mountain and road biking. Everyone is urged to visit and take advantage of this unique and special area.

Doug Arion - Executive Director, [Mountains of Stars](#)

~ Submitted by Douglas N. Arion ~

Editor: * Photos by Al Takeda unless otherwise noted.

July Star Fields DEADLINE
Sunday, June 20th

Email articles to Al Takeda at
newsletter@atmob.org

Articles from members are always welcome.

Amateur Telescope Makers of Boston, Inc.
c/o Chris Elledge, Membership Secretary
99 College Ave
Arlington, MA 02474
FIRST CLASS

EXECUTIVE BOARD 2020-2021

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| MEMBERS AT LARGE: | Maria Batista | (617) 347-3730 |
| | Alan Sliski | |

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| 2015 - 18 | Glenn Chaple | (978) 369-1596 |

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| OBSERVING: | Bruce Berger | (978) 387-4189 |
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| | | |
|------------|-----------|----------------------------------------------------------------|
| NEWSLETTER | Al Takeda | newsletter@atmob.org |
|------------|-----------|----------------------------------------------------------------|

PUBLIC OUTREACH

| | | |
|------------------|-----------------|--------------------------------------------------------------|
| COMMITTEE CHAIR: | Rich Nugent | starparty@atmob.org |
| STAR PARTIES: | Bernie Kosicki | |
| | Laura Sailor | |
| | John Harrington | |

How to Find Us...

Web Page www.atmob.org

MEETINGS: Zoom On-Line Meetings until further notice. Meetings held the second Thursday of each month (September to July) at 8:00 PM. For meeting details go to www.atmob.org and check your email on the ATMOB-ANNOUNCE list.

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

The Tom Britton Clubhouse is CLOSED. 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.

Heads Up For the Month . . .

To calculate Eastern Daylight Time (EDT) from Universal Time (UT) subtract 4 from UT.

Jun 2 Last Quarter Moon (Moonrise at midnight)

Jun 10 New Moon

Jun 10 Partial Solar Eclipse at Sunrise, 05:06 EDT (09:06 UT)

Jun 12 Venus 2 degrees South of Moon at sunset

Jun 17 First Quarter Moon (Moonset at midnight)

Jun 20 Summer Solstice

Jun 24 Full Moon

July 1 Last Quarter Moon (Moonrise at midnight)

July 4 Mercury at Greatest Western (Morning) Elongation (22 degrees)

July 9 New Moon