

## Members Sky Watch, Concord NH, 15 June 2012

After the June NHAS business meeting, a members-only sky watch was held at the Discovery Center, mainly as a telescope clinic to help our members sort out their own telescopes. Here is a report on this event:

The outdoor part went very well! **Michelle Thomas** got help with her ETX-125, **Steve Rand** got instructions on aligning his Orion XT10 Intelliscope and **Ted Blank** got help with his new (old) Meade ETX-80 with the early Autostar controller. By the end of the night all three scopes were executing accurate GO-TOs and tracking. Thanks to the old hands (and to a visitor, Bruce Berger from ATMOB) for helping out those who came seeking wisdom and knowledge.

✧ Ted Blank

## Lincoln Ackerman School Sky Watch, Hampton Falls NH, 16 June 2012

The event took place as scheduled. About 30 people attended. I was the only NHAS member there. I set up in the ball field behind the school, and the teachers were able to turn off all but two of the sodium floodlights on the school building, so it was for the most part dark. They think they can get all of the floodlights turned off next time. Unfortunately the skies were mostly cloudy and I had to switch back and forth between the objects visible in the sucker holes. Everyone got to

see Saturn and Mars, and some people got to see the other objects I tried to show: M13, M3, Mizar, Albireo, Cor Caroli, Gamma Leonis. The clouds moved in for good at 10:30 PM.

✧ Paul Winalski

## Sandown Public Library Sky Watch, Sandown NH, 18 June 2012

The event took place under clear skies. We set up along the access road behind the Library, overlooking the cemetery. There was a decent horizon view and only one bright streetlight. Well over fifty people were there, so it's good that we also had a good turnout by NHAS members: **Ted Blank, Herb Bubert, Rich DeMidio, Gardner Gerry, JJ Traversy, Bob Veilleux, and Paul Winalski.**

I spent the early part of the evening showing Saturn (four moons visible), then switched to Albireo, 61 Cygni, M13, M81 and M82, M57, M27, M3, and T Lyrae. There was also a pass of the ISS and several bright satellites, including an Iridium flare and an even brighter flare by an unidentified satellite.

✧ Paul Winalski

## Griffin Free Public Library Sky Watch, Auburn NH, 19 June 2012

Presentation and sky watch went well. The skies cleared as the sun set and this allowed us to show Saturn, M13 and other summer objects to about 40-45 people. A big success, and the Friends of the

Griffin Free Library donated to NHAS!

Members present were **Herb Bubert, Rich DeMidio, Gardner Gerry, Bob Veilleux, Paul Winalski.**

✧ Paul Winalski

## Dunbar Free Library Sky Watch, Grantham NH, 20 June 2012

We had clear, but hazy, skies and about fifty people show up for a very successful sky watch. I, **Gardner Gerry**, and **John Bishop** were there from NHAS. The Grantham Recreation Area site is excellent—a large, open field with excellent horizon views, easy drive-up access for setting up scopes, a town with very little light pollution, and no nearby artificial lighting. I showed Saturn, Mars, M81 and M82, M57, Albireo, Mizar, and Polaris. We had an ISS pass and an Iridium flare as well.

The Friends of the Dunbar Free Library donated \$200 to NHAS.

✧ Paul Winalski

## Harvey-Mitchell Memorial Library Sky Watch, Epping NH, 21 June 2012

We only had the librarian and a couple of other people show up, and a few passers-by. The library parking lot unfortunately was lit by a couple of floodlights. **Ted Blank** and I mainly concentrated on Saturn. I also showed Mars, Epsilon Lyrae, and M57. We did get an ISS pass and an Iridium flare, along with another very bright satellite flare (apparently not Iridium) and some other bright satellites. This

was also first light for their library telescope.

✳ Paul Winalski

### **Astro 201: Stellar Evolution, 22 June 2012**

The workshop took place at YFOS, as scheduled. About ten NHAS members attended (in the YFOS warming hut, this constitutes a crowd). Based on the replies that I got, the attendees enjoyed the presentation almost as much as I did in giving it.

✳ Paul Winalski

### **Sky Watch for Daniel Webster Council Boy Scouts, Newington NH, 29 June 2012**

The event took place as scheduled under clear but somewhat hazy skies. About 150 scouts and leaders stopped by to view the Moon, Saturn, Mars, and other objects. There was a very healthy turnout of NHAS members and scopes (**Pat Adams, John Bishop, Herb Bubert, Don and Melinde Byrne**), so lines were pretty short.

I showed at various times: the Moon, Saturn, Mars, M3, M13, M57, Albireo, 61 Cygni, M27, and T Lyrae.

✳ Paul Winalski

### **First Night Outreach**

I was recently contacted by a woman who had visited the NHAS “corner” on First Night in Portsmouth back in January. She wanted some help with her telescope. After some email communication we got together in early July. She has a Meade Polaris 114mm reflector on the EQ mount, a bit dusty with one spreader leg detached. I reattached the spreader and was pleased to see that the mount was a sturdy one and that the rings could be loosened in order to allow the OTA to rotate for good eyepiece position. The only major adjustment required was to set the latitude from 32 to 42 degrees. Both of the slow motion controls worked well, the scope was in

almost perfect collimation and the finder scope was almost right on target. I could not stay until it got dark but we practiced finding distant objects in the finder scope and then seeing them in the eyepiece, and I left her with instructions for finding Saturn. Her only EP was a 25mm so I left an extra 12mm with her for a little more magnification. She plans to join NHAS.

✳ Ted Blank

### **Email from Robert Naeye**

I finally got the speaker’s gift (NHAS-engraved laser pointer) mailed to Robert Naeye. He responded to me with an e-mail I’m sharing with you all:

*“Thanks so much for sending the laser pen, which arrived today. I had no idea I would be receiving such an excellent gift. I thank you and all the NHAS members. I really enjoyed speaking to your group, and hope to do so again sometime in the future. I realize the skies were cloudy around Boston, but my S&T colleague Sean Walker took some decent images from Manchester, through holes in the clouds. I hope you and other NHAS members were able to see the transit!!!*

*Clear skies,  
Bob”*

✳ Ken Charles

### **Sky Watch for Frost Free Library, Marlborough NH, 8 July 2012**

The sky watch for Frost Free Library in Marlborough took place as scheduled. About twenty people participated. NHAS members attending were **Herb Bubert, Gardner Gerry, Steve Rand, and Paul Winalski**.

The weather predictions turned out to be wrong, and we would have been better off holding the event on its original date of Saturday 7 July. Although thunderstorms had been forecast for that night, it turned out to be clear in Marlborough. But on Sunday night we had mostly overcast skies with a few sucker holes here and there. I managed to

show Mars, Polaris, and Albireo. I know others succeeded in finding Saturn (which wowed everyone) and the Ring Nebula in Lyra.

The observing location is ideal—no artificial lighting nearby. If only we’d had clear skies.... The librarian was very pleased with both the indoor presentation and the observing, and they are planning to have us back in the fall. We can expect those who attended to spread the word, and we should have a bigger crowd next time.

✳ Paul Winalski

### **Presentation for Manchester West Side Library, Manchester NH, 11 July 2012**

I presented our standard show to about 25 kids and a few parents. Well received and the kids asked good questions.

The Library would like us back in the fall for a sky watch. We may be able to use the football field across the street.

✳ Gardner Gerry

### **Sky Watch for Wadleigh Memorial Library, Milford NH, 11 July 2012**

We had a very successful sky watch. Lots of NHAS folks there to help out. On arrival I was immediately busy setting up my scope and then doing the public observing.

NHAS members present were: **Patrick Adams, John Bishop, Ted Blank, Gardner Gerry, Ramaswamy, Gerry Smith, Pete Smith, Mike Townsend, Bob Veilleaux, and Paul Winalski**,

Gardner reported showing Saturn, Alberio, M57 and M13 with his C9.25.

✳ Paul Winalski

### **What If Inches Were Bigger?**

Telescopes come in lots of apertures and f-numbers but there seems to be an attraction to certain apertures and f-numbers. Several manufactures

make solid-tube Newtonians in 6 and 8 inch apertures. 4.5- and 10-inch models are common, too, but while there have been 5- and 7-inch Newtonians made commercially, they are far more rare. No one makes a 1-inch Newtonian or a 30-inch solid-tube Newtonian.

In refractors, the 4-inch f/10 to f/15 achromat is another “standard” telescope, though these days it’s mostly labeled as a 100-mm! I see 70-mm, 80mm and 90-mm refractors for sale, but few odd sizes in between those, like 73-mm.

Considering the 100-mm to 4-inch change, I noticed that both numbers are round numbers. I found myself wondering whether these sizes were chosen because the numbers were satisfyingly round or whether there was some real physical or anatomical reason why those sizes were used.

Restated, I was wondering whether, if our measurement system were different -- if “inches” were a little bit bigger or smaller—would a “four-inchette” f/12 still be the standard achromatic refractor? Or would the standard still be the same real size and have a different measurement value, like “8.23 inchettes”? Are telescopes like shoes, which have a size set by real-world constraints, or are they like measuring cups, which have a size set by convention?

I now think there’s something real behind the standard sizes—or rather, several real things. I think that if we had no measurement standards, Newtonian solid-tube telescopes would still be sold with about four choices in the range of (in current measurements) four inches to ten inches. There are a number of constraints that make certain sizes “sweet spots” for telescopes.

One such constraint is our atmosphere. In theory, the wider the aperture, the better the resolution. But the Earth’s atmosphere is wiggly enough that most nights in most places don’t allow resolution finer than one arc-second. Physics tells us that a four-inch aperture can resolve one-arc

second. So up to four inches of aperture, you get more resolution if you make the aperture larger. Above four inches you only get a brighter image—you don’t get more resolution. So the payoff for a slightly larger aperture is smaller above four inches than below it. So you’d expect a design at just that size to be popular.

The minimum payoff is a constraint as well. A one-inch achromat doesn’t do much for you astronomically unless packaged in pairs as binoculars. If you don’t get significant magnification and light-gathering, why get a telescope in the first place? The judgement of the market seems to be that 60mm is the minimum aperture to justify “being a telescope” at all while 25mm seems to be the minimum for binoculars.

Another big constraint is transport. Not just transport as in “does it fit in the car” but also “can I put it on the mount and take it off again later, alone in the dark”.

Let’s look at the constraints from human anatomy first. I’ll start with how many hands you have: two. For tripod- or pier-mounted telescopes, at one time during setup you will lift your telescope onto the mounting head, hold it there with one hand and tighten the fastener with the other. If the telescope falls, it will get damaged; it’s a high-stakes operation! People therefore want the telescopes they mount to be “wieldy” in one hand.

As humans, we have a number of things we manipulate with one hand, like tennis rackets, swords, fly swatters, fans and squirt guns. Many of them are about a meter long; few are longer. Another set of tools is manipulated with two hands, like hockey sticks, lacrosse sticks, quarterstaffs, brooms, golf clubs and baseball bats. They seem to mostly be between one and two meters.

So it looks like “wieldy” for one hand has a definite upper-size limit, and that limit is around a meter, while “wieldy” for two hands is a bit less than two meters.

Now, if you are designing an achromat, there’s a rule of thumb that says that chromatic error is not a problem for a telescope of aperture A in inches if the design’s f-number is three times A. Thus a one-inch can be f/3 and a two-inch can be f/6 but a three-inch should be f/9, and so on. You can solve this in reverse: if you’ve decided to design an achromat which will be B inches long, the maximum aperture it can have and still not show too much chromatic error is the square root of (B divided by three). A 300-inch long telescope could have a 10-inch lens (and would be f/30).

So now we can figure out the natural sizes for achromatic refractors that aren’t permanently mounted!

If the requirement is to be “wieldy in one hand” you’ve got “about a meter” as the length, then the rule says the largest aperture you can have is about 3.6 inches. That explains the 90-mm telescope being a standard size.

Note that the resolution payoff to being a bit larger is high until you get to four inches, at which point it drops. So the obvious tradeoff is a 4-inch with not quite enough length to fit the rule: a four-inch f/10 or f/8.

Achromatic refractors can have smaller f-ratios and thus can be shorter, so we see five-inch APOs for sale but all kinds of refractors clearly have the “one-hand wieldy” issue and the dominating constraint is thus length. Even the longer ones aren’t heavy enough that weight is a constraint, but that’s a issue for other designs.

Let’s look at solid-tube Newtonians now. They only have to be “two-hand wieldy”, as if they’re in a Dob mount, you never lift them above the waist, let alone the shoulder. So they can be quite heavy. But around twelve inches, the mirror weight begins to be a burden and larger apertures quickly become impractical to make because no-one could lift the tube to put it in the base! The slope of that curve is steep because the weight of the

mirror goes up as the cube of the aperture.

Another factor limits solid-tube Newtonians: they have to fit in your car. Apparently, most cars can fit a tube of about fifty inches long and so the common apertures wind up mounted in a tube of that length. This explains why a typical lineup at a vendor includes a 6-inch f/8, an 8-inch f/6 and an 10-inch f/5!

The truss-tube design lets Newtonians get bigger but the weight constraint is still there, kicking in strongly above sixteen inches. Most of us can't lift the mirror box with a mirror larger than that. You can buy truss-tube Newtonians in larger sizes but they come with wheelbarrow handles and require ramps; above around twenty inches they are "boutique" items, build to order, rather than commercially made, so the concept of "standard" doesn't really apply.

Rather than going on to consider other designs, let's return to the issue of which sizes picked. I've established, I think, that there's a range of apertures which is "natural" for achromats (two-plus to four inches), for apochromats (three to six inches), for solid-tube Newtonians (four to twelve inches) and for truss-tube Newtonians (ten to sixteen inches).

The issue of how a "natural" range of sizes is broken up into a few models for sale is interesting as well, but I'll leave that for another essay!

✧ John Bishop

## NHAS June 2012 Business Meeting

The June business meeting was held at the McAuliffe-Shepard Discovery Center on 15 June 2012. Both our President and Vice President were absent, so **Gardner Gerry**, chairman of the NHAS Board of Directors, presided over the meeting.

### Membership

**Paul Winalski** will present Astro 201: Stellar Evolution at YFOS next week. There will also be a YFOS orientation session for new

members. Contact **Bill Steele** if you plan to attend.

### Public Observing

Paul Winalski reported that we have a very heavy sky watch schedule this summer. The statewide library children's summer reading program is "Dream Big", and many libraries have requested sky watches to go along with that theme.

### Market Square Day

**Ted Blank** reported that we had perfect weather (unlike the past couple of years) and consequently incredible crowds. Telescopes were set up for observing both in white light and H $\alpha$ . Over 1000 people stopped by. We set up a scale model of the solar system up and down the street. There was a scavenger hunt involving visiting all of the planets on the model. **Tom Cocchiario** donated a Galileo replica scope as the prize for a drawing of people who completed the scavenger hunt. The new club tent looks really good.

### Miscellaneous Business

**Joe Derek** sent a cost estimate for repairs at YFOS to the Board of Directors.

**John Rose** pointed out that Stellafane is two months away—the officers need to contact our Stellafane Coordinator.

We need guest speakers for all of 2012. Contact John Bishop if you have a prospective speaker.

### Scope of the Month

Gardner Gerry presented a "Case of the Month". This is a ScopeGaurd case he had custom made for his 9¼ inch Schmidt-Cassegrain. These superb cases are available for all sizes of scopes.

### Gadget of the Month

**Ken Charles** presented an app for smart phones for Sky Safari that will control your scope via SkyFi (WiFi setup for telescopes).

Bruce Burgher from ATMob talked about the Arcturus Labs Magnify gadget that an iPhone can slide into, and that clips onto a 1¼" eyepiece for taking phone photos. The

company is soliciting kick-starter funding; Bruce invested \$60.

### Book of the Month

A book on the Transit of Venus—the history of transits and information on the 2012 transit (which was upcoming at the time).

### Educational Outreach Committee

**Rich Schueller** reported that there was an EOC meeting last Thursday, which unfortunately he couldn't attend. **Matt Amar** is looking for a primary person for the July Rey Center event.

The Library Telescope Program has placed scopes for all library requests submitted through the end of last year.

The EOC is working on planning for the 2012 New England Fall Astronomy Forum (NEFAF).

### Venus Transit

Members described their 2012 Venus transit experiences, including in some cases the extraordinary lengths they went to in order to get somewhere where the skies were clear.

### Evening Presentation

In lieu of an outside speaker, NHAS members shared their experiences of the June transit of Venus. Some of our members traveled great distances to be free of the clouds over New Hampshire.

Afterwards, we held a members-only sky watch outside the Discovery Center. Several new/novice members got expert advice in sorting out their scopes.

## The Bottom Line

<b>Starting Balance:</b>	<b>\$11087.19</b>
<b>Deposits/Credits:</b>	
Membership:	30.00
Donations:	25.00
Bank interest:	0.89
Total :	55.89
<b>Accounts/Paid:</b>	
Rackspace Cloud:	21.90
United Site Services (porta potty)	56.38
Orion Telescopes (Astronomy Bowl prizes)	166.92
Caravan Canopy (NHAS tent)	707.34

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Lunt Solar (scope repair)	520.11
Rainbow Symphony (solar glasses)	
	285.70
Total:	1758.35
<b>Net Account Balance:</b>	<b>\$9384.73</b>
<b>Petty cash drawer:</b>	\$100.00
<b>Cash Balance:</b>	<b>\$9484.73</b>

**EOC Share:** 5205.57

**Membership:** 137

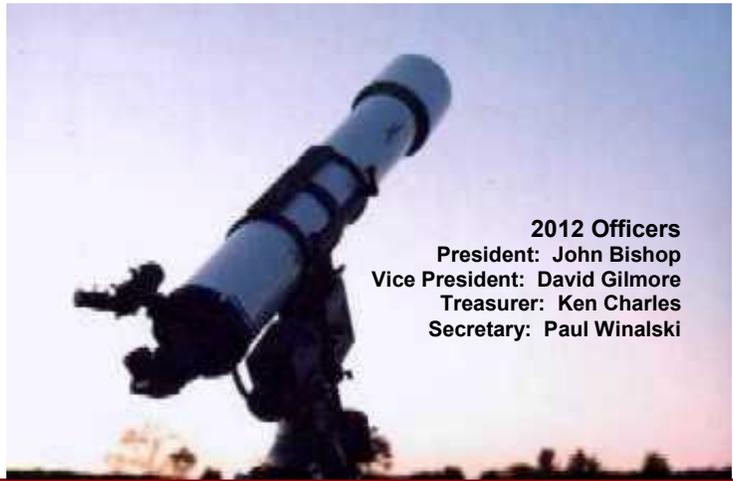
**New Members:**

John Eddy, Bedford NH

**Donations:**

John Eddy 25.00

\* Ken Charles  
NHAS Treasurer 2012



**2012 Officers**  
**President: John Bishop**  
**Vice President: David Gilmore**  
**Treasurer: Ken Charles**  
**Secretary: Paul Winalski**

**DEADLINE August 2012 Issue: 5 PM August 13**

E-mail articles to the Editor.

**CHANGE OF ADDRESS** – Notify the Treasurer of changes to postal or e-mail address.

**How to Join N.H.A.S.**

**Write to us:**

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 Manchester, NH 03108-5823  
 Attn: Treasurer

**Send E-mail to:**

[info@nhastro.com](mailto:info@nhastro.com)

**Use our web site:**

<http://www.nhastro.com/>

**This month's contributors:**

Ted Blank, Ken Charles, Gardner Gerry, John Bishop

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## NHAS Upcoming Events

Event	Date	Time	Location
Solar Observing for FOES&S Center	July 14	10:00 AM	Henry Law Park, Dover NH
Rey Center Sky Watch	July 14	9:00 PM	Curious George Cottage, Waterville Valley NH
Coffee House Night	July 20	5:00 PM	YFOS
YFOS Orientation	July 20	6:30 PM	YFOS
Astro 101: Planetary Observing	July 20	7:30 PM	YFOS
Philbrick-James Library Sky Watch	July 23	7:30 PM	4 Church Street, Deerfield NH
Gafney Library Sky Watch	July 24	8:00 PM	138 Meadow Street, Sanbornville NH
Tracy Memorial Library Sky Watch	July 25	7:30 PM	304 Main Street, New London NH
Weare Public Library Sky Watch	July 27	7:30 PM	10 Paige Lane, Weare NH
Goffstown Public Library Sky Watch	July 27	8:30 PM	180 North Mast Road, Goffstown NH
Sidewalk Astronomy	July 28	6:00 PM	Market Square, Portsmouth NH
Seabrook Library Sky Watch	July 30	7:30 PM	25 Liberty Lane, Seabrook NH