

The NHAS Observer

and
VLBA Tour



Newsletter of the New Hampshire Astronomical Society

Vol. 2006 No. 1

"All the news that fits in print"

January 2006

2006 Election Results

President's Message

Hey, it's a new year! Some stuff has changed, and some hasn't, with most things in the latter category (see elections below). I want to pass on a big thanks to our outgoing treasurer and board chairperson, **Barbara O'Connell** and **Linda Lopez**, respectively. So, what's new for this year? Well, there have been several updates to the web site, including a contact page (finally!) and increasing activity on the forums. We are going to be transitioning away from the three Yahoo Groups we've been using and direct those conversations over to the NHAS forums. Look for those groups to be shut down sometime early this year. Second, I am continuing to work with Richard Tessier from the Great Northern Moose Lodge in the inky dark skies of Dummer, New Hampshire to put together some type of observing event for the summer. It's looking like they won't be ready for a large group this June, but maybe we can organize a smaller "in-club" event to further check out the location. Next, I am putting together our evening programs for the year and already have January and March booked (2 down, 10 to go). So at this month's meeting **Edward Los** will be giving a presentation on the digitization of Harvard College Observatory's glass plate collection – the largest such collection in existence. And finally, don't forget the proxy vote included in last month's newsletter! Please bring them to the January meeting at St. Anselm, pass them along to someone who is going, or mail it to the address shown on the last page. See you at the meeting!

* Matthew Marulla
NHAS President 2006

Highlights for this Month

The 2006 election of officers occurred at the December 2005 meeting. The radio telescope group had a field trip which can be read about on [Page 2](#). The photo committee group update can be found on [Page 2](#). **John Bishop** has contributed a technical article that you may read on [Page 3](#). **LeW Gramer** provides another great report on meteor observations from Florida on [Page 3](#). We also got a bit of sad news this past month regarding some historical information related to St. Anselm's. Thanks to **Jeff Schnick** for providing us with the history and the news, which can read on [Page 4](#). Finally, the December 2005 business meeting minutes can be found on [Page 5](#)

* Rich DeMidio
NHAS Secretary 2006

2006 NHAS Election Results

Elections were held at the December 2005 meeting. Your 2006 officers are

<i>President</i>	<i>Matthew Marulla</i>
<i>Vice President</i>	<i>John Bishop</i>
<i>Secretary</i>	<i>Rich DeMidio</i>
<i>Treasurer</i>	<i>Chase McNiss</i>
<i>Board Member</i>	<i>Nils Wygant</i>

As you know, **Barbara O'Connell** decided not to run for reelection this year. Everyone expressed their thanks and appreciation to Barbara for her outstanding service to the club. Barbara not only acted as Treasurer, but also handled the popular merchandise and ran the booth at Astronomy days and other public events. Her contribution was tremendous. On the bright side, Chase will have an easier job since he will benefit from Barbara's work. Best of all, hopefully Barbara will have more

time to actually observe and enjoy some of the events she helped to organize. ☺



Barbara O'Connell, photo by Chase McNiss

Newsletters for 2006

Now that I have had a year under my belt, I have learned a lot and would like to implement a few changes in 2006. First and foremost, the NSL is our publication so I always want to give members the spotlight with articles, observation reports, and other interesting news. This means that any contribution no matter how small or insignificant is worthy of publication. I always need to be planning ahead so if the article is not used in the next publication, it simply means I had other things planned or held off to give an article the attention it deserves. Some things I will do passively like browsing the astrophotography pages or blogs. The major goal I have for this year is to have the NSL published on the Web the Monday of our business-meeting week. This gives the membership time to review the content and to see the agenda for the business meeting. This is your newsletter and my job is to represent the dynamics that exist within our organization.

* Rich DeMidio
NHAS Secretary 2006

VLBA Tour

*Editor's Note: The Radio Astronomy group has gotten into full swing with a recent tour of a site just in our background. Unless specified, all photos are courtesy of Dave Weaver who uploaded many pictures to <http://www.nhastro.com/member/forum/viewtopic.php?t=85> I have also included the thank you note that Bob wrote at the end of the article. The Radio Astronomy committee went on a tour of the **Very Long Baseline Array** antenna in Hancock NH on December 31st, 2005.*



Photo by Dave Weaver

Ten of us had a wonderful and informative tour of the entire facility. In attendance were **Joe Frazier, Tim Frazier, Marion Hochuli, Larry Lopez, Steve Lundahl, Mike Miller, Alan Shirey, Phil Shute, Bob Sletten, and Dave Weaver.**



Tour Guide – Doug Whiton

Doug is a technician that keeps the systems operational, gave us an overview of the data collection area, the hydrogen maser time base, the dish drive control room, the dish superstructure, the feed/receiver and down-converter room and then the tour

culminated in a walk on the dish surface itself. We all joined in asking lots of questions at all points during the tour. Doug and his assistant Mark tried to field all of them. After we climbed off the dish



They moved the unit in both azimuth and elevation so we could witness the action.



It is overwhelming in size yet majestic as it moves. We have photos (and video) of all aspects of the tour but they don't supplant the experience of being there. Hopefully we can put images on the club web site and in the upcoming newsletter. This tour was a great success and we hope to have other Rad-Astro activities coming soon.



** Bob Sletten*

Hello Doug, Thank you for a wonderful tour of your very impressive facility. We had a great time. It exceeded all of our expectations. You guys should be proud of that system. It is a great thing. Sorry if we asked to many questions. We could not control ourselves. We were excited. You did very well fielding all of them. I'll send you a copy (link) to our

club newsletter that has the trip write-up. You will see that we were impressed. Again, THANK YOU VERY MUCH for having us. Bob Sletten NHAS

Astro Photons

Editor's Note: The migration to the NHAS Web Site for astrophotography has been completed. Moving forward, I will browse the site and publish photos uploaded to the area. The NHAS Photo Committee will be meeting January 28th at the Nashua Public Library. The meeting will start at 3:00 pm On the agenda will be informal discussions regarding DSLR and video astrophotography. Anyone having images they want to share are encouraged to bring them. The meeting is open to all NHAS members and their guests. Hope to see you there,

** Chase McNiss*

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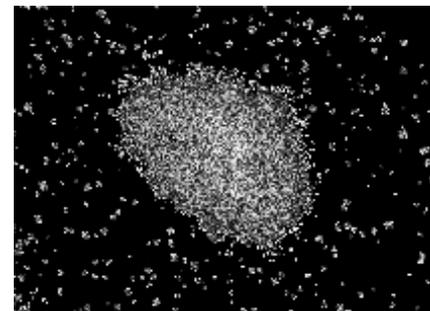


Photo by John Buonomo

So how did you spend your Christmas? For **Matthew Marulla** and **Mike Townsend**, they spent the morning imaging an occultation of Spica. Matt will be showing the video at this week's club meeting so we will have to wait for the details. Nonetheless, here is an image of Matt and Mike as they prepared.



*"How Matt & Mike Spent Christmas"
photo by Matthew Marulla*

Deep Sky Object of the Month

Editor's Note: This month's report is again on a meteor shower from Florida January 3rd and 4th.

We got to enjoy a few more Winter meteors in the Everglades last night, despite a barrage of low-lying clouds. I got out to Pa-hay-okee Lookout at around 11pm, and set up to just ever-so-slightly fog-hazy skies... A big ball of scud (low stratocumulus) rolled through before long, though, delaying the start of my session. I finally got the session going at 04:30UT (11:30 EST), and fellow observer Mike Smith arrived around 11:45 local. Unfortunately, it wasn't long before the low-level cloud decks began passing overhead again, cutting off first one area of the sky, then another. And for about an hour in the middle of my session, we had to take a break completely and watch the end of the Orange Bowl (American college) football game! For as always, Mike arrived amply supplied with inverter-powered "comfort gear", including a small TV, and a microwave for coffee. :) We finally managed to restart the observations near 1am local (05:50 UT). And by wobbling our heads around like bobble-heads, we managed to keep a steady 90%-clear field of view for another 40 minutes, until the deck raised up and thickened over our heads around 2:30 local (06:33 UT). The high QUA rates (and the brightest shower meteors) had obviously passed us by, before the radiant rose over South Florida USA. Still, this was my first SUCCESSFUL Quadrantid observing session since the last time I lived in Florida full-time - when I was 15 years old, in January 1983! So I am pretty happy with the results, in spite of low counts and a short session. :) A full report just to NAMN/IMO will follow momentarily. Did others fair any better for clouds - or in catching high Quad rates?

IMO METEOR SUMMARY

Observer's Name: Lewis J.

Gramer IMO Observer Code: GRALE

EVENING Date (UT): 03-Jan-

2006 IMO Showers Active that Date:

MORNING Date (UT): 04-Jan-2006
COM,DCA,QUA
Session Start Time (UT): 4:30
Session End Time (UT): 6:33
Observing Site Location: Pay-ha-okee Lookout, Everglades, FL, USA
Site Latitude: +25:22.5
Longitude: -80:45.0 Elevation: 1m

SHOWERS OBSERVED:

Shower Name	Quadrantids	Delta
Cancrids	Coma Berenicids	Sporadics
3-letter Code	QUA	DCA
COM	Spor	

SUMMARY OF ALL METEOR

DATA BY PERIOD:

#	Start	End	CFV	Teff	LM	F
	QUA	DCA	COM	Spor	TOTAL	
1	4:30	6:33	125+05	1.03	6.92	1.075
6	4	1	9	20		

TOTALS		1.03	6.92	1.075	
6	4	1	9	20	
Average Magnitudes					3.25
3.25	4.50	3.28	3.33		

GENERAL COMMENTS ABOUT SESSION:

I recorded no Constellations or DCVs tonight, to reduce dead time. Near-ground fog and low-level Sc clouds were intermittent all night, causing a late start, very variable LMs, a long break in the middle, and ultimately ending the session prematurely at 06:33 UT. The peak of QUA activity (and the bright ones) were clearly over before the radiant rose: still, some 'tail' activity was noted. Highlight of the night was my FIRST successful Quadrantid session since the age of 15 - the last time I lived in Florida... :)

Mike Smith also recorded with me using the IMO method tonight. Pa-hay-okee Lookout really is a lovely place to observe from, and especially in the dark hours. But I *must* remember to bring my mosquito coils out there with me every single night, cold front or not! Temps tonight dropped, from about 70oF to 60oF, and damp was only a slight problem near the end of the session.

* Clear skies all!
Lew Gramer

Diffraction-Limited

In a conversation with a fellow telescope nut, the subject of "diffraction-limited field" came up, with he saying that the bigger that field was, the better the telescope was. Now, it sounds reasonable that a telescope with a bigger diffraction-limited field of view would be better than one with a lesser field of view, but I wasn't sure, so I went home and pushed some numbers around. And guess what? It's not true! It's not so because the "diffraction-limited" part of the phrase changes as you change the telescope. The phrase refers to the area around the center of the focal plane within which optical errors such as coma and astigmatism produce blurs which are smaller than the inevitable blur caused by the diffraction of light. This means that the cometic blur (for example) fits completely "inside" the diffraction blur and we thus don't see it. As far as we can tell, there is no coma. Now, the size of the diffraction blur is related to the aperture A and the focal length F: it is proportional to (F/A). The larger the aperture, the smaller the diffraction blur, and thus the smaller a cometic or astigmatic blur it can hide. The cometic blur size is proportional to (A*A*d)/(F*F*F) where "d" is the distance from the optical axis. The astigmatic blur size is proportional to (A*d*d)/(F*F*F). Rather than give the details of the formula, let's use a known telescope to create a "figure of merit", a measurement of "good-enough" to allow further comparisons between other telescopes (i.e., there's an unknown constant, and we're going to pick an approximation of it which is good enough for comparison purposes). Consider a 4-inch f/10. For purposes of this discussion, whether it's a refractor or a reflector doesn't matter. A is 4 inches, F is 40 inches. "d" is at most 1 inch for a 2-inch eyepiece with a 2-inch field stop; it is at most .625 inch for a 1.25-inch eyepiece, and smaller yet when using an eyepiece with a smaller field-stop. Let us stipulate that we like the view in this little telescope when we use a 2-inch eyepiece using the full two inches (actually 47 mm) of the focuser tube, but we see some coma; let us stipulate that when we use a 15mm Plossl eyepiece, we see no coma. 15mm implies 68x, Plossl

implies 50 degrees AFOV, which implies a .74 degree true field of view, which implies a .49-inch field stop -- call it half an inch in diameter, which is a quarter of an inch in radius. We'll use that as the "d" value for the radius of the diffraction-limited field of view. The diffraction blur for this telescope will be $K \cdot F/A$ or $10 \cdot K$; the cometic blur will be $C \cdot A \cdot A \cdot .25/F \cdot F \cdot F$ or $.25 \cdot C/4000$ and the astigmatic blur $G \cdot A \cdot .0625/F \cdot F \cdot F$ or $.0625 \cdot G/16000$. As you may note, the astigmatic blur is very likely to be so much smaller than the others that we won't go far wrong if we ignore it for the rest of this article. Now imagine doubling the aperture of the telescope. The diffraction blur halves (because of the "A" term on the bottom) while the coma grows to four times its old value (because of the "A*A" term on the top of the fraction). We stipulated that the old telescope had a diffraction-limited field of view of radius .25 inches and that the coma blur just filled the diffraction blur. This new telescope must therefore have a diffraction-limited field of view which is one eighth the size: one-half because the diffraction blur is smaller, and one quarter because the cometic blur at any radius from the center of the field of view is four times bigger than in the old telescope. In other words: The bigger the aperture at the same focal length, the smaller the diffraction-limited field of view. It shrinks as $1/(A \cdot A \cdot A)$! What if we double the focal length instead, giving a 4-inch f/20? Then the diffraction blur doubles, and the cometic blur shrinks by a factor of 8, so our diffraction-limited field of view grows by a factor of 16! This should explain why long-focal length telescopes have such good views. The longer the focal length, the bigger the diffraction-limited field of view. It grows as $(F \cdot F \cdot F \cdot F)!$ The difference between the two factors explains one good reason that telescopes tend to have smaller focal ratios as they get bigger -- it's not just that they would be unwieldy if they were long, it's also because the views aren't as bad -- or rather, the penalty for a "fast" focal ratio goes down with absolute size. Put together, we get $(F \cdot F \cdot F \cdot F)/(A \cdot A \cdot A)$. For example, if you double the aperture and double the focal length, the diffraction-limited

field of view doubles. That's maybe more goodness than you need, and is probably a longer telescope than you want. So if you only wanted to keep the same size of diffraction-limited field of view as you'd had in the old telescope? The new telescope has double the aperture, but you only need to make the focal length the fourth root of two cubed longer -- about 1.68 times the old focal length. To keep the same size of diffraction-limited field in a telescope of aperture M times bigger, the focal length should be $\sqrt{\sqrt{M \cdot M \cdot M}}$. Another way to express it is as $\sqrt{M} \cdot \sqrt{\sqrt{M}}$. This grows much more slowly than M. Let's consider a giant scope: a 40-inch f/5. It's got 10 times the aperture and 5 times the focal length. The diffraction blur is 5/10ths of the 4-inch f/10, so it's half the size. Throughout the field of view stars are sharper and detail better. The diffraction-limited field of view, however, is $(5 \cdot 5 \cdot 5 \cdot 5)/(10 \cdot 10 \cdot 10)$ or 5/8 the size of the original telescopes -- it's actually smaller, despite the fact that the views are better. That's because the blur is smaller and can't hide coma and astigmatism as well as the bigger blur did. That's true even though the cometic blur is smaller (and the astigmatic blur very much smaller) than in the 4-inch. Another way to think of this is that as a telescope gets bigger, it's like using the same size of telescope but shrinking the wavelength of the light used: there's no geometric change in coma or astigmatism if you keep the same proportions. But the shorter wavelength shrinks the diffraction blur. There is one important difference: as the telescope gets bigger, the eyepieces don't. That's because our eyes don't get bigger. This means that the relative size of our eyes (and thus the part of the focal plane we look at) gets smaller and smaller as the telescope gets bigger. This means the view improves, as we are (in a geometric sense) using parts closer to the optical axis. What does this mean? Well, other things being equal "aperture wins" -- but it also means that big aperture doesn't have to imply long focal length. More importantly, it means "diffraction-limited field of view" isn't a good measure of the goodness of a telescope except as it

relates to the goodness of figure of the primary mirror or lens. The size of the diffraction-limited field of view is an intrinsic feature of the measurements of the telescope, and thus not a quality guide

* John Bishop



Photo by Chase McNiss

Editor's Note: John is our club's vice president and author on several technical papers submitted to the club newsletter. All members are encouraged to write and submit papers for technical exchange.

St. Anslem's Connection

Some 15 or 16 years ago, after we once again had trouble getting into the Manchester Central High School building for our monthly NHAS meeting, I went to the Registrar at Saint Anselm College to see if we could use a classroom there for our meetings. The Registrar was an imposing man, the monk who, as president of the College, had seen Saint Anselm College through the turbulent times of the Viet Nam era. In his usual gruff manner, he informed me that I was in luck, he just happened to be an astronomy enthusiast. Father Placidus Riley was the Registrar who gave NHAS permission to hold its meetings on the Saint Anselm College campus. After a long illness, Fr. Placidus passed away at the age of 84 on Wednesday, December 21, 2005. He was buried in Saint Leander's Cemetery on the Saint Anselm's College campus.

* Jeff Schnick

The Bottom Line

Starting Balance: \$3,249.43
December Deposits: \$633.51
 (interest and memberships)
December A/P: \$217.64
 (insurance, plowing)
Net Balance: \$3,872.08
Cash Balance: \$3,872.08
Membership: 89

New members:

Rebekah Kibbee (binos, reflector)
 Marcus Simoes (Meade)

Donations: None

Comments: A reminder that Astronomy Magazine subscriptions are now up to \$34.00 a year. Please make checks out to Kalmach Publishing to reflect the new rate.

* Chase McNiss

Looking Back at Last Month

Opening **Matthew Marulla** provided a verbal copy of the agenda which included officer elections for 2006 and an intro to the evening program which as a demonstration of the new CMP planetarium program. Only a few of these systems exist in the country and CMP is proud to have one. Matt also informed the group that he was recovering from some computer HW failures and loss of some data. This meant that he had no cool pictures to show us ☺



Photo by Chase McNiss

Matt also had another important task for our meeting in delivering to **Ed Ting** the gift certificate from Anacortes that NHAS members contributed to.

Scope of the Month None.

Public Observing. **Ed Ting** in his last presentation talked about equipment in his possession that needs to be handed over. As part of the position, the person gets access to some cool toys ☺ Some of these items include some nice TeleVue eyepieces and a compilation of directions, notes, contact information, email addresses, and correspondence from all the events he worked on. This

work is also known as Ed's "black book". As of this writing, a new person has not yet been appointed.

Book of the Month, None

Committees. Photo Club Chase

McNiss reported that the committee would hold meetings again in January from the holiday break. Stay tuned to the email list for upcoming meetings. NHAS website. **Web: Matthew**

Marulla reported that he will update the contact information on the website now that elections have been completed. 34 people have currently registered on the website. **ATMs:**

Larry Lopez was on vacation so no report was provided. **YFOS.** **Larry Lopez** No report provided.

Membership: Bob Sletten (acting) no new report. **Radio Astronomy: Bob Sletten** reported that a trip is being planned to a local radio observatory site.



Photo by Chase McNiss

Other Topics. Matthew Marulla

focused on the election and first asked if there were additional nominations followed by the vote.

Evening Program: I had to leave early so was unable to attend the evening program consisting of a demo of the new CMP planetarium system. I was told it was quite spectacular. Perhaps we can ask **Dave McDonald** nicely to provide another demo at a future date ☺

Follow Up Items:

In the November 2005 meetings, Matt showed us some pictures from the Spitzer space telescope that some scientists reported the possible capture of the first light from the earliest stars in the universe. Recently, I read a Sky and Telescope article (February 2006) in which many scientists are skeptical and the findings are under tight scrutiny.

* Rich DeMidio

In the next Issue

Hopefully the weather will cooperate with field reports from NHAS field sessions mainly the annual "Freeze your Buns" off. It is also not too early to start thinking about and getting the Messier Marathon fever. Several folks have written articles in the past for preparation and observing.

* Rich DeMidio

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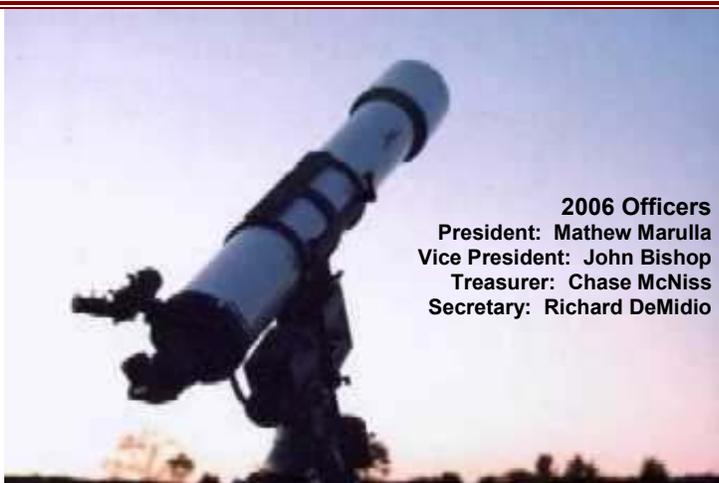
NHAS
P.O. Box 5823
Manchester, NH 03108-5823
Attn: Treasurer

Send E-mail to:

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2006 Officers

President: Mathew Marulla
Vice President: John Bishop
Treasurer: Chase McNiss
Secretary: Richard DeMidio

This month's contributors:

Mathew Marulla, Barbara O'Connell, Chase McNiss, Bob Sletten, Lew Gramer, John Bishop, Jeff Schnick, John Buonomo, Rich DeMidio

New Hampshire Astronomical Society
P.O. Box 5823
Manchester, NH 03108-5823



Digitizing a glass plate collection

NHAS Upcoming Events

Event	Date	Time	Location
Jan Business Meeting	Jan 20	7:30 pm	St Anslem's
Coffee House	Jan 27	Dusk	YFOS
Photo Comm Meeting	Jan 28	3 pm	Nashua Public Library
CMP Skywatch	Feb 3	7:00 pm	Planetarium Concord, NH
Feb Business Meeting	Feb 17	7:30 pm	Planetarium Concord, NH
March Messier Marathon	Mar ??	??	We are looking at potential dates