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THE NHAS OBSERVER

Newsletter of the New Hampshire Astronomical Society

Volume 2002 No. 6 **"All the news that fits in print"** **June 2002**

NHAS Astrophoto Show

Chase McNiss will present the NHAS Astrophotography Slide Show. This show is a presentation that was originally put together in memory of **Lou Kachavos**, a club member and astrophotographer who passed away a few years ago. The slide show is not a presentation on techniques, but a showcase of interesting and beautiful images donated by club members taken over the years.

President's Message

It seems that summer is here even though we haven't had the summer solstice yet. Summer is the time for Star Parties. Before you travel to another state for a Star Party, please consider that we have a mini one every month called the NHAS Coffee House.

The dates this summer are June 14th, July 12th, August 9th (although some of us will be attending Stellafane that weekend). The NHAS Coffee House events are held at YFOS. If you have never been there, please get in touch with an officer for more information (like directions and rules).

Looking back at the month of May, we find that Astronomy Day has come and gone. What a great Astronomy Day it was! The weather was great and the turnout was respectable. We enriched the community by sharing our knowledge, time and attention with them.

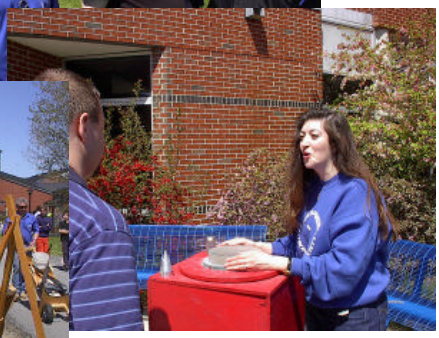
If you weren't able to attend the event but are interested in purchasing a T-shirt, we do have extras available. Once we've tallied the extras, we will post the information via e-mail. You can purchase one at a future NHAS Business Meeting (please note that payment is due upon ordering).

I just want to take one last opportunity to thank the people who volunteered for one of the largest NHAS events. You all did a great job and deserve a pat on the back!

Astronomy Quote: "Though the day still lingers, the rose-scattering fire of the evening star already scintillates through the azure sky." – Willem Kloos, Dutch poet and essayist

★ Barbara O'Connell
NHAS President 2002

Astronomy Day 2002



Thanks to everyone who helped make Astronomy Day at the Christa McAuliffe Planetarium such an incredible event. We had approximately 400 paying visitors, and many others who came to see NHAS offerings.

Ed Ting estimated 250 attendees for the Skywatch, and I bet that was a conservative estimate. I just wanted to thank everyone for helping out. We really appreciate it, and we'll try to have another successful event next year. We want to continue trying new things to bring the most people here to give them exposure to Astronomy. Thanks so much.

Tanja Diederich
Education Director
Christa McAuliffe Planetarium

More photos are available on the NHAS web site. These photos are courtesy of David Karam.

Public Observing Highlights

A public skywatch at Weare Middle School was clouded out on Weds. May 8th. Due to the enthusiasm of the participants, the event was rescheduled for Weds. May 22nd. About 100 people attended.

★ Ed Ting

Feature Story

Astrophotography and Exposure Times……Page 2

Web Uploads

The 2002 Astronomy Day web page is now available. If you have pictures to contribute, I would be happy to post them on the NHAS web site. http://www.nhastro.com/aday/2002/aday2002.html

★ Barbara O'Connell

AstroPhotons

The Astrophotography Committee met on Saturday May 11th at the Nashua Public Library. **Richard Fleming** presented a talk on selecting CCD cameras, imaging, and issues related to getting the right pixel size. **Matt BenDaniel** demonstrated image manipulation software.

The next Astrophoto Committee meeting is Saturday June 8th at 3 p.m. at the Nashua Public Library.

★ Mike Kertyzak

ATM True Grit

The True Gritters met on June 2 at **Don Ware's** home in Hollis, NH.

Astrophotography and Exposure Times

One of the most frustrating aspect of astrophotography is to spend a night taking pictures of deep sky objects and then find out your pictures did not record the objects. I have been there, done that.

Trial and error is a tough way to learn but there are some books on the subject to help. The best is Barry Gordon's *Astrophotography and the Fx System*. This book is extremely helpful in computing exposure times. However, his book lacks references of films to use and the type of film also plays a role. With a bit of research and luck one can get those great pictures that you are proud to show all your friends.

Recording something on film is a combination of four items:

- Brightness of subject
- F-ratio (or for stars aperture)
- Film speed (and type)
- Exposure time

Number one can not be changed but the other three can. It is these three that you will use to compute an exposure time. F-ratio is how fast a system can record the object in question. As most astronomers know, it is the focal length divided by the objective lens/mirror diameter. Some systems are very fast but suffer from coma (curved images that get worse the farther you are from the center of the field), or vignetting (uneven field illumination – bright centers with dark corners). For telescopes the best compromise is to get something between f/5 and f/7. Anything lower usually has lots of coma or vignetting. Anything higher usually is too slow for the film buff.

Film speed is another tough choice. Sure you can go out and buy a roll of ISO 3200 film and expect to decrease your exposure time but there are problems with this thinking. The higher the speed of the film, the grainier the image becomes. Also, high-speed films usually lack sensitivity to the red end of the spectrum, which is where most nebulas emit light. So, you have to choose the right film and speed for a compromise again.

Kodak makes the best films on the market for the red sensitivity. Specifically, the Law Enforcement 400 film, Kodak Supra 400, and Kodak Royal Gold 400 have good to great red sensitivity. The Law Enforcement film is the best but it has to be specially ordered. The Supra is found in professional shops while the Royal Gold is found in most places where film is sold.

FUJI 800-speed film lacks red sensitivity but is great for galaxies. For those using slides, there is no really good slide film that records nebulosity well. However, I recommend sticking with Kodak because the FUJI usually gives a green cast to the images. Elitechrome 200 seems to work the best for red emission nebula but you will have to double the exposure times you would use on 400 print film. All these films have excellent grain structure and can be enlarged to produce excellent images. With this knowledge, we find that we are going to use ISO 400 or 800 speed films in most applications.

The last factor is the all important exposure time. This is merely a matter of taking the first three factors and calculating the exposure time. For an f/5 to f/6 system, using ISO 400 film, I have found that it takes about one hour to record red nebulosity, faint comets (brighter comets only require about half to one-fourth this time), and galaxies. This may seem like a long time but if you want the image, you have to pay the dues. If you double the film speed, the object will record twice as fast so the exposure time is cut in half.

Therefore, when photographing galaxies using ISO 800 film, it will only take 30 minutes. If you can get fast f-ratio systems (as when using long telephoto lenses), the exposure time will also decrease. For instance, if I were to use a 200 mm f/2.8 lens with Law Enforcement 400 film to photograph the North American Nebula, it would only take 15 minutes. An f/2.8 system is four times as fast at capturing light as an f/5 to f/6 system.

If you have problems figuring the ratio of your system to the f/5 to f/6, try looking at the F-stop on your camera lens. Each higher numbered stop effectively doubles the exposure time. The density of the image on the negative is important so anything less than half the exposure times I recommend is going to make for a poor image. Don't cut too many corners.

Recording astronomical objects on film is not easy and takes a lot of work but you want that work to payoff in the end. Hopefully, this will help the next time you go out for an "all-nighter" in pursuit of photons for your camera.

★ Tim Printy

The Humason-Hubble Connection

I'm not certain how many people in NHAS are interested in the history of American astronomers, but there is a very interesting story surrounding a companion and assistant to the famous astronomer Edwin Hubble. This person's name was Milton Humason.

Milton Humason was born on August 19, 1891, at Dodge Center, Minnesota. From 1908 to 1910, he was a mule packer who assisted in the construction of the telescopes on Mount Wilson. He had less than a high school education and no particular ambition. As it turned out, he became rather fond of one of the Mount Wilson astronomer's daughters

(Cont'd p. 3)

(Cont'd. from p. 2)

and managed to secure a job as a janitor after the telescope went into operation, presumably to be near his lady friend.

Apparently young Milton had special talents as a mechanic since it was soon apparent that when a mechanical malfunction of the telescope occurred, young Milton was the only person who could fix it.

It wasn't long before Milton Humason's attributes turned into an avid interest in astronomy proper and he began assisting the astronomers in their work. Some time later, his interest and talents brought him recognition for his ability to perform long and arduous work on photographs and other astronomical analysis efforts. He eventually became the constant companion and assistant of Edwin Hubble. In fact Hubble and Humason together published a number important scientific papers with Hubble lending his experience and name for Milton's benefit whenever possible.

The interesting part of this story is that Humason's work led to Hubble's discovery of the expansion of the universe, something for which the usually caustic and egotistic Hubble gave credit to Humason. Humason wrote a number of scientific papers, presumably with the help of Hubble and others, and he was universally accepted as a first rate astronomer and one of their peers even though he never finished high school.

This is a real success story about someone who fell in love with astronomy.

★ Michael Wheeler

The Bottom Line

Balance: $8,950
2002 members: 135
NHAS offers its thanks those who joined or renewed this month and for the following donation:
$25 from **Taylor Cole** in honor of **Joe Derek's** birthday

★ Jim Warenda

Looking Back at Last Month

Opening. Barbara O'Connell read a request for volunteers for Chico Observatory in Arizona and noted that several members were attending the NEAF convention in Suffern, N.Y.

Mike Townsend mentioned a good deal on a Celestron C11 scope he saw at Rivers Camera. A possible scope donation was brought up by **Jeff Schick**, a small 4.5-inch Dob reflector that someone wanted to donate. The officers took this as an item to discuss. **Book of the Month: Jim Warenda** presented *The Perfect Machine*, a long, detailed examination of how the 200-inch Hale Telescope was designed and built. **Larry Laforge** donated *Atlas of the Andromeda Galaxy*, a technical book on that galaxy by Paul Hodges. **Committees.** Membership: **Bob Sletten** presented two ideas: 1) a new member class that receive lots of interest, and 2) new member introduction in the newsletter with the option that new members could write something about themselves for circulation via the member e-mail list. Web: **Barbara** said the web site is running fine. ATMs: The next meeting was to be at **Don Ware's** home Sunday May 19. Club scope is with **Larry Lopez**. **Public Observing. Barbara** review the upcoming events including the back-to-back skywatches on June 7 & 8. The field trip to Insight Technologies was to be on May 22nd.

YFOS. Joel Harris said the site has been mowed and is in good condition. **Treasury. Jim Warenda** reported a balance of $8,885 with all bills paid. Membership was at 134 and he gave us updated membership lists. Jim noted with amazement that members have bought almost $1000 worth of Astronomy Day NHAS merchandise.

Astronomy Day. Barbara said the day was wonderful and the skywatch was very well attended. CMP even turned off the streetlights.

Evening Program. Mike Stebbins presented a program on the Scale of the Universe.

There was good audience participation later in the talk as people warmed up to Mike's presentation style. On two occasions, Mike made scale drawings on the board, which was a nice touch.

He showed by relationship that the distance between stars is much greater (relatively) that the distance between galaxies. This was a noteworthy comparison.

Photo by Bob Sletten

He also made the interesting point that the difference between "talking" astronomers and "doing" astronomers is Math.

DEADLINE July 2002 Issue: 5 PM June 29

E-mail your articles to the Editor. Phone if you have a late submission.

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Notify the Treasurer. Include your full name and new street address. If changing an e-mail address, specify whether you want to add, modify, or delete an e-mail address.

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NHAS Upcoming Events

NHAS Slide Show, CMP

Event	Date	Time	Location
CMP Skywatches	June 7&8	8:30 p.m.	Planetarium, Concord, NH
Astrophoto Committee	June 8	3:00 p.m.	Public Library, Nashua, NH
Coffee House	June 14	8:00 p.m.	YFOS
June meeting	June 21	7:30 p.m.	Planetarium, Concord, NH
CMP Skywatch	July 5	9:00 p.m.	Planetarium, Concord, NH
Goffstown Skywatch	July 10	9:00 p.m.	Goffstown Public Library, NH
Coffee House	July 12	8:00 p.m.	YFOS
July meeting	July 19	7:30 p.m.	St. Anselm's College, Goffstown, NH