

S.C.R.A.P.S.

Society's Chronological Astronomical Papers



Spring Galaxies by Bob Arr

The reverse question mark named Leo brings in the season of the galaxies. If you like to marvel at the island universes that rival our Milky Way, you'll find them from Leo and Coma Berenices all the way up to the Big Dipper. Whirlpool and Sunflower are famous face-ons, and Needle (NGC 4565), a stunning edge-on. All are easy finds. Another super edge-on is NGC 4631 (which many see as larger than Needle) plus it has two additional galaxies in the same field, NGCs 4627 and 4656.

If you like variety, check out the Beehive open cluster in Cancer, dazzling in binoculars, or very low power in a telescope. By all means, show Big Dipper's premier double double, Mizar/Alcor to a friend. While you're in that vicinity, examine the striking color of the star La Superba, 7° north of Cor Caroli. Don't overlook the giant globular cluster M3 between Cor Caroli and Arcturus.

Tennessee Heritage Boy Scout Camporee by Bob Arr

The Activities and Civic Service Committee of the Boy Scouts' Great Smoky Mountain Council invite all Boy Scouts, Varsity Scouts, and Explorers from its ten districts to take part in its council-wide 2003 Fall Camporee. This spectacular event will be held October 3 – 5, 2003 at the Forks of the River Wildlife Management Area in Knoxville. They will have many historic displays and conservation booths planned as program areas. Camping and programming will follow a Cherokee Nation Clan Theme and will be set up in seven clans representing the clans of the Cherokee Nation.

SMAS has been invited to participate as well, on Saturday, October 4, with daytime solar viewing plus regular nighttime viewing. Many of these boys are earning their Astronomy badges, and we have been asked to demonstrate finding directions by the stars and telling time by the sun (its shadow, that is), and learning some of the constellations. If you enjoy working with kids, please help support this effort. It will be highly publicized, and they expect about 2,000 kids to take part. We can use any (or all!) of the telescopes in the club, plus volunteers just to talk to the kids. We'll have more details at the next meeting.

Lunatic by Lee Erickson

For many, the Moon ruins the opportunity to see the heavens, but I want to encourage you to start watching the Moon and not dreading it. You can get more enjoyment by finding the lunar features in the Astronomy League Lunar Club List. The list is at: <http://www.astroleague.org/al/obsclubs/lunar/lunar2.html>. Janice and I have enjoyed looking for the features on this list and there is no better time to start than just after a new Moon. This month the new Moon is on April 1 (no fool'n). So a few days after, you can begin watching the changing features of the eastern lunar surface. The dates of other phases are: April 9 the first quarter, April 16 Full, and April 23 the last quarter. I got these dates from: <http://www.wunderground.com/US/TN/Maryville.html>. One of the first things to see is "New Moon in Old Moon's Arms", which is the darker side of the moon back lit only by light reflected off the Earth. You are to observe it within 72 hours of the new Moon. For more features, use the program Virtual Moon Atlas. You can find it at: http://www.astrosurf.com/avl/UK_download.html. I hope these links will help you enjoy looking at the Moon.

A Day In the Life of An Amateur Astronomer

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6:45 Alarm goes off awhile before the brain is capable of understanding it's time to get up. With clear skies last night the temptation at the eyepiece was just too great so I didn't get to bed until after 1 AM.

7:19 With a shower and fresh clothes I begin to wake up just as I enter the garage. While picking up the newspaper in the driveway, I make a quick look around to see if I left anything outside. Check the back bumper of my car to make sure I didn't leave any eyepieces on it.

7:45 Arrive at work, turn on the computer and check email. Although email correspondence is a big part of my daily work, 16 of the 21 new emails are from astronomy egroups. I'll have to ignore these non-work-related emails until break time.

9:00 Read job-related emails and respond and/or begin necessary research to respond.

9:15 Check Astromart by mistake when I accidentally clicked that link instead of the work-related link in my book-marks.

9:45 Click work-related link and read appropriate information.

10:00 Email observing buddy to see if he's available for lunch.

10:05 Pick up Orion catalog by mistake when reaching for job-related trade publication.

10:45 Quickly put down Orion catalog and begin scanning index of trade publication.

10:50 Leave office to meet observing buddy for lunch.

11:00 Arrive in parking lot of restaurant. I'm a little early so pull out my PDA to check weekly meetings schedule.

11:01 Turn on PDA and am greeted with extremely dim display. Peel off red Rubylith colored filter to reveal Planetarium application running.

11:10 Standing in restaurant parking lot trying to find Venus as its location is indicated by Planetarium.

11:20 Locate Venus just as two other cars arrive in parking lot. Neither car is my observing buddy's. Occupants walk slowly toward restaurant looking back at me then looking up at the sky in the direction I'm looking. I think about asking if they want to see Venus but, considering the looks they're giving me, decide to keep quiet and just get back in my car.

11:45 Awakened by on-time observing buddy rapping on car window.

Noon Go inside barbecue place for lunch.

2:00 Finish lunch and astronomy-related conversation.

2:10 Arrive in parking lot at work and step out of car to see if I can still spot Venus. Building occupants pay no attention to me scanning the sky – they know me.

2:30 Back at the ole desk and check email. 15 new emails. 12 are astro egroup posts. I'll get to them as soon as I finish with that stack of paperwork..

2:45 Start on that paperwork.

2:33 Find copy of last month's observing list in financial report. Scan list to note SEEN or NOT SEEN as best I can recall. Oh yea, NGC2158. Can't believe I was not previously aware of it in the field of view with M35. Let me take a quick look in Burnham's Celestial Handbook to see what's said there about it.

2:42 Find copy of Burnham's in office bookshelf between computer user manuals and personnel notebooks.

3:15 Check Dark Sky Clock. Hmmm clear skies tonight.

3:17 Email observing buddy.

3:20 Back to stack of paperwork on my desk.. Gotta update that spreadsheet

3:33 Accidentally click on Astromart link again.

3:50 Close browser and open spreadsheet.

3:51 Spreadsheet reminds me of the eyepiece calculator spreadsheet I found on the internet. Open eyepiece calculator spreadsheet. Man, that 16mm Nagler would give me a great field of view at higher magnification than my 18mm Ultima.

4:00 Open browser, surf to Astronomics to check price of 16mm Nagler.

4:10 Surf to Visa credit card account info to check balance.

4:12 The 18mm Ultima is a great eyepiece.

4:13 Update spreadsheet, compose email and attach spreadsheet. Send (and check) email.

4:14 Break-time! Better read these new egroup posts.

4:55 Where has time gone? Why all this work piling up? Oh well, I'll get it knocked down tomorrow.

5:00 Out of office and headed home. Check out the license plate of that car ahead... "M31OTA".

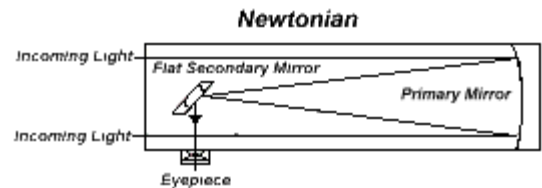
5:15 Arrive at home. Find new issue of Sky & Telescope in the mail. Yippee
No need to put up the scope and accessory case I left out in the living room – I'll be using it later.

A Day In the Life of An Amateur Astronomer (cont.)

5:45 Fire up computer and open Sky Map Pro. Print up some charts for those neat targets in S&T.
6:00 Wife calls me to dinner. "Just a minute. I want to check Astromart"
6:30 Set down to cold fish sticks and icy stare. Impish, knowing smile of familiarity from offspring who is eating his dessert.
7:00 Offer to clean off table in hopes of reclaiming human status.
7:15 Sit down on sofa with wifey and make small talk to finish defrosting the room.
7:30 Announce that I think I'll step outside for a breath of fresh air. Announcement receives cordial reply. Good sign.
7:45 Sun setting. Must decide how to gather up telescope gear and justify absence from the family for a few minutes.
8:00 Walk back inside and ask wifey, "Wanna take a look at Saturn?". Wife sucker for Saturn (and ONLY Saturn) so get positive response.
8:03 Scope stuff in driveway.
8:09 All set up and scope on Saturn. Call wifey out.
8:15 Wife goes back inside after looking at Saturn and making appropriate remarks about how beautiful the planet is. Rest of night mine.
12:45AM Bang tripod legs on wall while trying to sneak equipment back inside. Wakes wife. "What time is it?" I reply, "around 12, I just got up to go to the bathroom".
6:45 Alarm goes off...

Optical Performance By Michael Littleton

What makes the difference between telescopes—one that produces sharp planetary images or splits close double stars and one of a similar sized that does not? The ability to see fine planetary detail or split two close images is a measure of the telescope's *resolution*. The theoretical resolution of a telescope is only determined by the size of the objective mirror or lens. In practice, resolution is affected by a number of other factors. Some factors are inherent in the telescope design. For example, the spider and the secondary mirror in the Newtonian telescope design degrade resolution by blocking and diffracting some of the light from the object. Thus, a Newtonian will have somewhat poorer resolution than refractors with the same objective size.



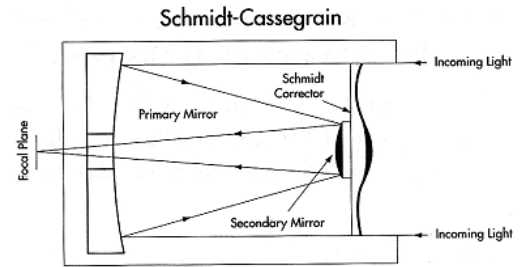
Other factors affecting resolution are not inherent in the telescope design but are dependent on the optical quality of the telescope. When white light passes through a glass prism, the different wavelengths or colors making up white light bend at different angles producing the "rainbow". Likewise, a simple convex lens cannot produce a sharp image because the light rays from an object are focused at different points depending on their color. This focus difference between colors is called *chromatic aberration*. Chromatic aberration produces the colored "ghost" images in inexpensive refractors around bright objects like Jupiter or the Moon. An *achromatic refractor* reduces chromatic aberration by adding a second lens of a different glass type that offsets some of the focal length differences among colors. Additional lenses are added in *apochromatic refractors* to virtually eliminate chromatic aberration. Unfortunately, apochromatic refractors have the highest cost per inch of aperture of any telescope design.

A telescope's primary mirror has no chromatic aberration. The simplest mirror surface to generate is a sphere, but a spherical primary mirror will focus parallel light rays at different points depending on the distance away from the mirror's optical axis. This property is called *spherical aberration*. A parabolic mirror is free of spherical aberration and is used in as the primary mirror in most Newtonian telescopes. In f/10 and greater focal ratio Newtonians, the effect of spherical aberration is small and the surface is left spherical. An alternate approach to correct for spherical aberration is to use a spherical primary mirror with a

Optical Performance (Cont.)

front corrector lens. Examples of this approach include the Schmidt-Cassegrain and Schmidt-Newtonian telescopes.

Coma is an aberration that distorts the image as the image moves away from the optical axis of the system. Coma is the dominant optical aberration in the Newtonian telescope. In the eyepiece, star images will appear round near the center of the field and have a V-shaped flare near the edge of the field. The effect of coma increases quickly as the focal ratio of a telescope decreases (i.e. fast focal ratios). Spherical primary mirrors (unlike parabolic mirrors) are free of coma. Telescopes with fast spherical primary mirrors and front corrector lenses are capable of coma and spherical aberration free images over wide fields of view (e.g. Schmidt cameras).



Astigmatism is when a mirror or lens is not symmetrical around its optical axis. A ruler with a half-cylindrical lens to magnify print has astigmatism—it magnifies print in only one direction. Likewise, a telescope suffering with astigmatism will have oval-shaped star images (i.e. airy disks). The effects of astigmatism are less pronounced at high focal ratios. Eyepieces with astigmatism may distort an image by having changing magnification depending on the distance from the field of view. Eyepieces free of this condition are called *orthoscopic*.

When trying to get the best performance from a telescope, the user cannot overlook the fact that the optical system includes both the telescope and the eyepieces. A poor eyepiece will produce a bad image from the best telescope. Select good quality eyepieces that fit the type of telescope and the objects most observed with the telescope. Eyepiece selection will be discussed in a later article.

Telescope Design Drawings are from Celestron International at www.celestron.com

FOR SALE

Takahashi FS 78 package: This model telescope is no doubt the best three inch scope you will ever find. Razor sharp, crisp color free images are the hallmark of Takahashi and this scope is a performer. Items for sale: FS-78 OTA and also included Tak mounting ring, 6 x 30 Tak finder and camera angle adjuster and CA-35 camera adapter. This system is ready to go for astrophotography or CCD. On a steady night will easily support 300X magnification with no degradation for great views of Jupiter and Saturn and the Lunar terminator. Excellent for solar observations and exceptional wide-field performance as well. All items new would run \$1581 + shipping. My price for a SMAS member is \$1185.00 and I will sell without the astrophotography accessories for \$1000. For more info please contact Mike Fleenor.email: mfleenor@tds.net or phone: 675-5488.

TAKE A BREAK FROM YARD WORK!

Share your astronomical experience with the rest of SMAS and everyone on the Internet by writing an article for SCRAPs. Contact Mike Littleton at (865) 671-1022 or email littleton@ix.netcom.com.

March Meeting by Angela Quick

The SMAS March meeting was held on Friday, March 14th at the Division Street Campus of Pellissippi State Community College. President Bob Arr began the meeting proper at 7:pm following an informal social gathering for refreshments in the student lounge. 14 members were present at the meeting, as were four guests: John Paul Sosville, Myles Williams, Paul Bush, and Karma Quick. Welcome!

Erik Iverson gave a treasurer's report. At this time, the club has assets of \$259.25 in checking, \$31.43 in petty cash, and \$320 in undeposited dues for a total of \$610.68. We expect to receive another \$440 in dues this month. Total assets for the year: \$1050.68. Expected club expenses for the year are \$120 for the SCRAPS newsletter, \$35 for hosting the SMAS web page, \$157 for Astronomical League dues, \$25 for room rental for the Christmas Party, \$44 for post office box rental, and \$327 for liability insurance for total expenses of \$708. Taking assets minus expenses, our expected ending assets on March 1, 2004 are \$377.68.

Erik also received a copy of our liability insurance policy, which is now in effect, and a rider offering additional protection from the effects of terrorist activities. Lee Erickson moved we decline the rider; Rob Feldhege seconded the motion, and the members present voted to decline the insurance rider.

Bob Arr updated us on the club's publicity activities. He has arranged TV publicity with Matt Hinken when SMAS presents the complete telescope for kids to Central High School. Ken Garland of the Knoxville News Sentinel will also provide coverage of the event. Bob has invited Ken Schwall of WBIR to attend one of our star parties. Ultimate goal: have a stargazer's weather forecast broadcast on all three local TV networks on the evenings of SMAS star parties, followed by an invitation to the public to join us.

Rob Feldhege demonstrated the Eyepiece Explorer web page – <http://www.stic.net/mattwier/>. You can use this web page to estimate how an object will look with different combinations of eyepieces, apertures and focal lengths.

Jan and Lee Erickson shared advice on observing the moon. The moon has the distinct advantage of being observable any time the sky is clear. You can use your eyes alone or binoculars or a telescope to observe the moon – each will show different features. To start observing the moon, walk outside at night and look up! The Astronomical League offers a certificate for successfully observing 100 lunar features. Features are often best visible when on or near the terminator – the changing shadows provide needed contrast. Even though the entire face of the moon is illuminated when the moon is full, the glare of the full moon obscures details at this time. Jan showed us a number of interesting features of the moon, including the man in the moon, the woman in the moon, the rabbit in the moon, and the cow jumping over the moon. She showed us the mare (mare means sea in Latin), and some famous craters and ray systems. She even showed us how to go to Hel (a crater on the moon's surface)! Lee and Jan recommend two tools to help you in observing the moon: the Virtual Atlas of the Moon, free software that you can download to your computer from the web page http://www.astrosurf.com/avl/UK_index.html, and the book Photographic Lunar Atlas by Hatfield.

Bob Arr gave a presentation on objects to find in his favorite constellation, Canis Major, the Big Dog. In addition to helping us locate Canis Major in the sky (it's at Orion the Hunter's heels, chasing Lepus, the Hare, with it's companion Canis Minor, the Little Dog), Bob told us about Sirius, the brightest star in our sky after the Sun; the Messier open clusters M41, M46, M47, and M93; open cluster NGC 2362; and the double star Tau Canis Majoris, also known as the Winter Albireo for the beautiful color contrast of its stars. A handout of sky chart and notes to take home accompanied the talk. Bob also introduced the concepts of mirror reversal, altitude and azimuth, and using a Telrad finder for estimating distances and star hopping.



April 2003

President:
Bob Arr

Vice President:
Rob Feldhege

Observe Chair:
Ron Dinkins

Secretary:
Angela Quick

Star Party Organizer: Tom Rimmell

Treasurer/ALCOR:
Erik Iverson

SCRAPS Editor:
Mike Littleton

SUN	MON	TUE	WED	THU	FRI	SAT
		1 New Moon	2	3	4 UTK	5 Starparty Astro- Imaging
6	7	8	9 1st Qt. Moon	10	11 SMAS Meet- ing	12
13	14	15	16 Full Moon	17	18 UTK	19 TAO
20	21	22 Lyrids Peak	23 Last Qt. Moon	24	25	26
27	28	29	30			

SCHEDULE OF EVENTS

SMAS Website:
<http://www.smokymtnastro.org/>

Webmaster:
Mike Fleenor

- 4/4/03 and 4/18/03 Public observing from the roof of the Physics Building at UTK
- 4/5/03 Starparty at Look Rock
- 4/5/03 Astro-imaging seminar at Tamke Allen Observatory 6 PM
- 4/11/03 SMAS Meeting at the Division Street Campus of PSCC
- 4/15/03 Mercury sets at 9:49 PM; Mars rises at 3:00 AM; Jupiter sets at 3:48 AM; Saturn sets at 12:49 AM
- 4/19/03 Public observing at Tamke Allen Observatory
- 4/22/03 The Lyrid Meteor Shower peaks. The shower is active from 4/16 to 4/25.