



The American Astronomer

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Leonid's Aftermath !

Meteor Report from Kansas

by Brenda Culbertson

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Anticipation grew to great heights as people from all backgrounds awaited a chance to view the multitude of zooming streaks across the night sky. But which night?

The meteor storm was predicted to occur on November 17, 1998, around mid-day. Reports stated that the predicted peak time had a plus or minus 12 hours. Those reports were passed along to prospective meteor storm watchers as plans were made for viewing.

I began watching this year's Leonids a few nights before the peak was predicted. I knew that this year would be good, since I had seen so many meteors before the predicted peak. Also, New Moon is a wonderful phase in the lunar cycle for viewing meteor showers/storms.

During the day Monday, the professors in the Department of Physics and Astronomy at Washburn University of Topeka, where I work, and I, were discussing the Leonid shower/storm. I decided that if skies were clear, I would go out very early Tuesday and take a look. The professors made like plans.

After a long day at work fielding questions about the Leonids and talking with the media, I set the alarm for 4:30 a.m. and went to bed. I was just too tired to stay up all night, or so I thought. Then sometime around 12:30 a.m. I woke up. There was no obvious reason for me doing that, but I turned and looked out my window, which faces south. Even with sleepy eyes, two panes of glass, and a not-quite-awake mind, I saw meteors. I believe a bright flash was what woke me!

I didn't think I could still move as fast as I had after seeing that shower of meteors from my window. I jumped out of bed, dressed, and woke my husband, Mike. I was ready to go outside within 15 minutes, and was awestruck when I walked out the door.

Meteors were all over the sky! The first bolide I saw was directly overhead. It was so bright that I closed my eyes out of reflex. It

left a train that was about 40 degrees long, five degrees wide, and lasted 20 to 30 seconds. Mike had never seen anything like that one. That is until the next one!

I went back in the house to put film in my camera. While I was inside, a brilliant flash came from the southwest. The flash was so bright that the inside of the house lighted up. I ran out yelling, "What was that?" Mike was standing and pointing where the train was still lingering. His second fireball!

We finally lost count of fireballs, but estimated a rate of about 200-250 meteors per hour. The intensity was greatest between 1 and 3 a.m. that morning. After two hours, we believed that the meteor storm was subsiding. This was a good time for a break.

We went back inside to get a bit more sleep, but found ourselves outside again by 4:30 a.m. Meteors were still flying, but not as many as earlier. Mike said that if he had not seen the previous two hours' worth of fireballs, he would have been more impressed with the later display. We gave up at sunrise for that day.

The next evening, Tuesday, an open house was scheduled in Crane Observatory on the Washburn University campus. Since we had press coverage, 250 to 300 people showed up. Of course, we could not see many meteors from downtown Topeka, but we did show people Jupiter and Saturn through the telescopes. We also told people where and how to watch the Leonids. About half the people at the observing session took off for darker skies. We were open until 9 p.m. when the numbers of people dwindled.

Later Tuesday night, clouds rolled in sometime during my nap. I had set the alarm again for 12:30 a.m. and awoke to a mostly cloudy, windy night with a clear pocket directly overhead. Through the clear pocket I could still see meteors flying, but weather conditions were just a bit too much for me. I went back in and got up a few hours later to a very cloudy day.

I am glad I went out on Monday night. Mike and I were definitely not disappointed. He is ready for the next shower, but does not expect to see anything like this Leonid storm for a long time.



This year's Leonid meteor shower peaked a little ahead of schedule. The highest rates apparently came about 15 hours earlier than predicted. European observers may have had the best of it as dazzling fireballs came every few seconds -- sometimes several at the same time. Meteor watchers in the US under clear skies were not disappointed on the night of November 16-17, but rates were markedly lower the following night. No damage to Earth-orbiting satellites has been reported. Leonid photo by AAAA member Brenda Culbertson.

Stephen M. LaFlamme Earns Lunar Certificate

A hearty congratulation goes to Stephen M. LaFlamme of Bridgewater, MA, for earning the Astronomical League's Lunar Club Certificate. Stephen observed 100 features on the moon, using his naked eye, 10x50 binoculars and a Celestron C-11 Schmitt-Cassegrain telescope.

Nice job, Stephen, we are proud of you.



AAAA

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A Member
Society of
The
Astronomical
League

Notes from the President

The Internet is a powerful force in our society, and the AAAA continues to grow because of it, partly because of our sponsorship of *Sky & Telescope's* weekly news bulletin "Skyline", and partly because of our web page. Our Vice President, Ed Flaspoepler, continues to do a wonderful job in making the AAAA web page a valuable resource for amateur astronomers. Because of Ed's efforts, we now get 80% of our members from the net. If you haven't been out on the AAAA web page lately, you owe yourself a visit. The Arp Peculiar Galaxy photo gallery continues to grow, and Ed has almost doubled the information in the Constellation Homepage. We even advertise now that the AAAA is the "Internet Astronomy Club".

Which leads me to my next topic. As a service to our members, we are now setting up a special section on the AAAA Home Page for AAAA member contributions. If you want to be seen and have your work published, then this is the place to be. We already have Leonid meteor shower photos from AAAA member Brenda Culbertson, an article on green light versus red light from member Doug Kniffen of Missouri, and of course, we publish the photos of Kansas City, Kansas, member Larry Robinson on supernovae and comets. So if you would like a forum to be seen or heard, or have a project that is near and dear to your heart, let us know about it and we will add it to the AAAA Home Page.

Finally, our Assistant Editor, Brenda Culbertson, of Kansas, continues to gain recognition in the amateur astronomy world because of her writing. The Astronomical Society of the Pacific has asked Brenda to write an article for its newsletter *Mercury*. We are truly fortunate to have Brenda on our staff, since we already enjoy her wit and wisdom each issue. Well done, Brenda. We are proud of you.

Please keep us informed of your activities, and please remember that no project is too small. Even a letter to the editor explaining what you are doing now is important.

Clear, dry skies, and bloodshot eyes.

John Wagoner - President - AAAA

Smithsonian Online Magazine Notices AAAA

The December 1998 issue of the *Smithsonian Magazine Online*, in a story about Arizona's Grand Canyon Star Party, designated your club as an "Informative Link" on the Internet, along with the Texas Star Party, the Stellafane Convention, and the Riverside Telescope Makers Conference. Go to the Smithsonian web page, <http://www.smithsonianmag.si.edu/smithsonian/issues98/dec98/star.html>, and read about the Grand Canyon Star Party. Then follow the link to the AAAA web page!

Magazine Subscriptions

Subscribe to *Astronomy* or *Sky & Telescope* magazine. Both magazines have regular monthly star charts, plus a calendar of what to view each month. A regular subscription to S&T is \$36.00 per year, but you can get it at the club discount through the AAAA for only \$27.00 per year. A regular subscription to *Astronomy* is also \$36 per year, but you can get it at the club discount for only \$24.00. You can subscribe to either magazine, or extend your current subscription, on the AAAA web page. Or send a check for the correct amount, made out to AAAA, to:

AAAA

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Letters, We Get Letters!

Double and Halley's

Dear John,

Sorry for not writing to you any earlier -- I was very, very happy to receive the certificate of my Doubles some time ago! Thank you very much for your speedy processing and forgive me for this slow acknowledgement.

My brother-in-law from Switzerland is here with us for a few weeks and I am showing off some beauties of the heavens -- I showed him some striking doubles, which was truly a new experience for him. Of course, we are enjoying Jupiter and Saturn almost every night!

This afternoon I received a beautiful copy of the Halley Watch Atlas! I am | happy and overwhelmed -- thank you very much for that great book; I know you have something to do with that somehow! Indeed, I will share it with my friends for many years to come.

Now I have to go back to observe some "urban" beauties! Thank you again for all your kind concerns.

Yours,

*Isaac M. Kikawada
Schoggi@aol.com*

From the AAAA Online Guestbook

Hi guys! Every time I come back to this Home Page, it gets better and better. I just wanted to say how great it is to be a member of the AAAA. I will be a member for my third straight year in Jan.-Feb. Although I haven't finished my Double star club, I will be starting on my Urban club and I'll try to finish my Double star club soon. The main reason I like the AAAA is because it makes Astronomy a hands-on, socializing kinda hobby. Well, I hope this finds you all with clear clean skies. :-)

Friend and Fellow Amateur Astronomer,

*P.J. Mitchell.
Oxford, AI*

*Saturday, December 12, 1998 at
01:22:45 (CST)*

Starry Nights Festival

Dear Ed:

Thank you for the invitation to Starry Nights Festival. The Yucca Valley area seems very nice, and I love Joshua Tree National Monument. Thanks to

you, the star party is tentatively on my calendar for next year. I hope it was a good star party and that you got plenty of eye-piece time.

Co-incidentally, in the same pile of mail your invitation was in, there was a letter (survey) from ALPO asking members comments and ideas about that organization.

Thanks for the invite. Please let me know if you head for any other gatherings in the S.W.

*Jerry Van Wyngarden
Ajo, AZ*

Geminids Update

Another WOW!!!!

The meteors were great from our house. Around 9:30 p.m. there was one that did the --->>>>---->>> brightness thing. In other words it pulsed before it vanished. It went from yellow to blue to yellow to blue and left a 25 to 30 degree trail. The trail did not linger long, however, but it was 0 or -1 magnitude.

Most of the meteors (appx 100 per hour) were the short, faint, slow moving ones common to the Geminids, but there were some good bright ones, too. A few fireballs were also associated.

Brenda Culbertson

A Christmas Note

A personal note:

This year has been a fantastic one for me. I have been blessed with so much. Mike and I were married last year between Christmas and New Year. We are still doing very well.

I have seen so many wonderful things between last Christmas and this one, such as the recent meteor storm, eclipses, occultations, and hundreds of objects in the night sky.

I truly believe that God gave us all we are, all we have, and all we will never obtain. He has hidden things for us to discover. He has helped us achieve goals we have set for ourselves. He is here with us continually.

I hope you all take time to go out and look up to see the, so far, unreachable gifts in the night sky. And thank God for all He has given us.

Bless you all.
Merry Christmas!

Brenda Culbertson

AAAA Offers Astronomical League Online Sales

In 1781, French astronomer Charles Messier listed 110 of the most beautiful objects available to amateur observers and their telescopes.

As a member of the Astronomical League, you are eligible to earn the Astronomical League's Messier Observing Award for observing all objects on Messier's list, get an official Certificate of Participation, and receive a beautiful Messier Club lapel pin.

In 1783, Sir William Herschel compiled a catalogue of 2,478 deep skyobjects using his 40-inch speculum telescope in England.

After observing the Messier objects, the visual observer will want to rise to the challenge of observing 400 of the brightest of the Herschel Objects.

The Astronomical League provides a series of observing manuals to help you explore both the Messier List and the Herschel Catalog. Astronomical League Sales is an outlet for these manuals, and for many other astronomically-related items, including clothing and other items that have the Astronomical League logo on them, and books published by the Astronomical League. AL Sales also stocks specialty publications that just are not available elsewhere.

The American Association of Amateur Astronomers is pleased to offer the convenience of Online Retail Sales of Astronomical League observing manuals, t-shirts, and other quality AL merchandise, through our online credit card service, CCNow. Through CCNow, your order will be processed and billed to your credit card of choice, and we will send notification to AL Sales to ship your order. Visit our web site at <http://www.corvus.com/al-sales.htm> to take advantage of this service.

Please note that this service is for the convenience of online credit card sales ONLY! Astronomical League Online Sales items can also be purchased by mail with payment made by check or money order through our regular mail outlet:

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Visit the web site of the American Association of Amateur Astronomers for details!

*Ed Flaspoepler
Vice-President, AAAA
<http://www.corvus.com>*

Sunflower Observatory

38 deg. 52min. 7.4 sec. / -94 deg. 45min. 21.5sec.

The Sunflower Observatory was built by AAAA member Larry Robinson, in the backyard of his home in Olathe, KS. The Sunflower Observatory was constructed for the purpose of studying supernova, asteroids and comets. It employs a Meade LX-200 10-inch f/6.3 Schmidt Cassegrain automated telescope focal reduced to f/4 by use of a Celestron focal reducer and field flattener. Attached to the telescope is a Santa Barbara Instruments Group ST7 Charge Coupled Device camera. Both the telescope and the camera are controlled from computers at the observing station inside the house. A video finder and motorized JMI focuser make it possible to conduct entire observing sessions in an uninterrupted session. Set up and shutdown take less than five minutes, making it possible to take advantage of any favorable observing window, however brief.

The observatory itself is a roll off building on a deck. The telescope is permanently mounted independent of the deck and building on a Le Sueur Astro Pier, which is attached to a concrete foundation four feet deep and two feet in diameter. This half ton ballast assures a stable vibration free platform for the telescope and is permanently polar aligned for ideal photographic results. All wiring is buried in four-inch conduit back to the indoor control room.

The control room is equipped with a Pentium 11 Packard Bell computer which is used as the primary telescope control instrument and secondary backup camera control instrument. The telescope is directed across the sky using a planetarium type program called The



AAAA member Larry Robinson's Sunflower Observatory, in the backyard of his home in Olathe, KS, was dedicated September 18, 1998

Sky, Version IV, developed and supported by Software Bisque. A second program, Guide 6, developed by Project Pluto is also available to control the telescope.

Imaging is usually controlled by a laptop computer using CCDOPS for Windows developed and supported by SBIG. These images are then compared to images from a CDROM collection of the Polamar Observatory and Southern Sky Digitized photographs of the all sky survey.

Images are reduced and data extracted using Computer-Aided Astronomy Version 3.2 for submission to the International Astronomical Union via email over the internet. Images can be further processed using CCDSoft by Software Bisque. Some of these are put on internet pages which can be reached from the main page at <http://members.tripod.com/-btboar/>

While imaging the observatory is logged on as "BTfriend" to the Undernet Chat room #sciastro. Interesting images are shared with other astronomers, and questions asked and answered among an international community of interested amateur astronomers. Anyone is welcome to log on any time for discussion and to just see what's happening. Information on how to get to #sciastro

can be found on their website. A link to it exists on my web page.

Images from the Sunflower Observatory are archived using a writeable CDROM. Since first light, there have been over 100 observing sessions and over 5,000 images taken. The archive is up to 600 Megabytes and is into its second CDROM.

Images from Sunflower Observatory may be used without written permission as long as source is cited. The owner of Sunflower Observatory takes no responsibility for the accuracy or appropriateness of such use. Special image requests may be made to lrobinson@ix.netcom.com and images will be provided back as email attachment or as web page postings for download as time and circumstances permit.



The Control Room at the Sunflower Observatory



M63, Spiral Galaxy in Virgo, taken at the Sunflower Observatory

Montana Starwatch '98



by Scott Sandness, President
Southwest Montana Astronomical
Society, Bozeman, Montana

"Oh Man Baby!" was the exclamation as Mike Murray, our club secretary, located a faint comet on a dark clear night at Montana Star Watch '98.

Held at the Ruby Reservoir near Virginia City, Montana, the Montana Star Watch has become one of the northwest's premier "medium size" star parties. Over 160 people participated this year, with clear dark skies on both nights, August 21-22. We were a little worried on Friday night as thunderstorms loomed overhead, but the last one glided out just before midnight, swiping the sky clean, to leave only crispy clear skies and incredible viewing. After the light show put on by the thunderboomers, a new light show cropped up in the north: the Aurora Borealis creeping over the Tobacco Root mountains. It started out as a greenish glow resembling a northern sunrise, but then it would jump to spikes of light streaking two-thirds of the way to the zenith. Some even noticed the colors change to tinges of red and blue. After the thunderstorms the skies were very clear. In fact, the very stable viewing and a Celestron-8 brought in Saturn as never before!

There were telescopes of all shapes and sizes. Several big Dob's were on hand, including two 20-inch instruments, a 17.5-inch home-built split ring and a 16-inch Orion. There were also some 12-inch scopes, 10-inch SCT's, 5-inch refractors, and mounds of telescopes of various sizes and shapes. Beginners and experts alike sighted hundreds of celestial objects, ranging from the very faint to the glare and splendor of Jupiter and its Red Spot. The glow of the Milky Way shimmered beautifully on the lake.

George Hripcsak and his guests from New York City made their way to Star Watch. About half an hour after sunset, when you could see just a dozen stars or so, they compared it to the Big Apple's midnight sky. They seemed very impressed with our Montana night sky.

Astronomers from clubs around the region attended the Star Watch, including members from Billings, Butte, Great Falls, Helena, Missoula, and Whitefish Montana, as well as Idaho Falls and Twin Falls Idaho, Tucson Arizona, and Spokane Washington. The Spokane club will be hosting the 1999 ALCON Conference of the Astronomical League.

The "travel the farthest" award went to Philipp Teutsch and his guest from Austria, who added a wonderful multicultural perspective to the observing.

All in all, Montana Starwatch '98 was a huge success. Great skies, tasty western BBQ, entertaining guest speakers, lots of door prizes, the traditional Sunday morning breakfast, and most of all, super nice people.

Lots of help from other astronomy clubs around the state is what has allowed the Montana Star Watch to grow into the popular event that it now is. Our thanks go to the astronomy clubs from Great Falls, Helena, and Billings for their great help! We're already looking at ways to make next year's event even bigger and better. The date is already set for August 13 and 14, 1999. So if you plan on visiting the Yellowstone area, come on out and experience our laid-back hospitality, and see what the stars look like in Big Sky country!

To get a brochure on the next Montana Starwatch, contact Mike Murray, Assistant Director, Taylor Planetarium, Museum of the Rockies, 600 W. Kagy Blvd., Bozeman, MT 59717, phone (406) 994-6891, e-mail: ammmm@montana.edu. <http://www.montana.edu/smasweb/swatch.html>

Astronomy on the Hi-Desert

The Second Annual Starry Nights Festival took place on October 16-18, 1998. The convention, with speakers, workshops, and demonstration booths, was held during the days at the Yucca Valley Community Center, while the observing sessions were held at night in the nearby Joshua Tree National Park. There was a pancake breakfast on the 18th, and a 5K run on the 17th.

I am happy to report that, thanks to a cheap ticket on America West Airlines from Dallas to Long Beach, which ran mostly on time, I was able to attend the Starry Nights Festival in Yucca Valley, and had a wonderful time. I attended interesting talks by speakers I had not encountered before, like Leo Connolly, Edwin Krupp and Gene Hanson, as well as my old friend David Levy.

I was able to enjoy the magnificence of the Yucca Valley skies. I think I had the best view of M31 I have ever seen through Tim Hunter's 8.5x44 Swift binoculars. Transparency and contrast were exceptional.

But most important of all, I was able to meet and visit with many people in the Western Region of the Astronomical League. People like Lance Shaw, Marishka Emry, Wayne and Arlene Johnson, Beverly and Jack Sales, Mark Angeli, Ashley MacDermott, and all the attendees whom I got to chat with were committed to amateur astronomy and the WRAL.

I was able to be a good will ambassador for the Astronomical League, distributing 200 copies of the Eclipse Issue of the REFLECTOR from May 1998, as well as copies of many of the AL's binocular observing clubs. All were eagerly received by participants.

WRAL Chairman Bob Gent afforded me the opportunity to make a short statement at the WRAL business meeting. I pointed out the benefits the AL offers to its member societies, which appears on page two of every copy of the REFLECTOR, and I exhorted everyone to take the enthusiasm evident at SNF, and the information we provided about the AL, back to their local clubs.

I had a great time at Starry Nights Festival. You can read my full report on the AAAA web page, URL www.corvus.com/snf-main.htm

Ed Flaspoepler
Vice-President, AAAA

W i n t e r W o n d e r s

by Brenda Culbertson
stargazr@mail.holton.k12.ks.us

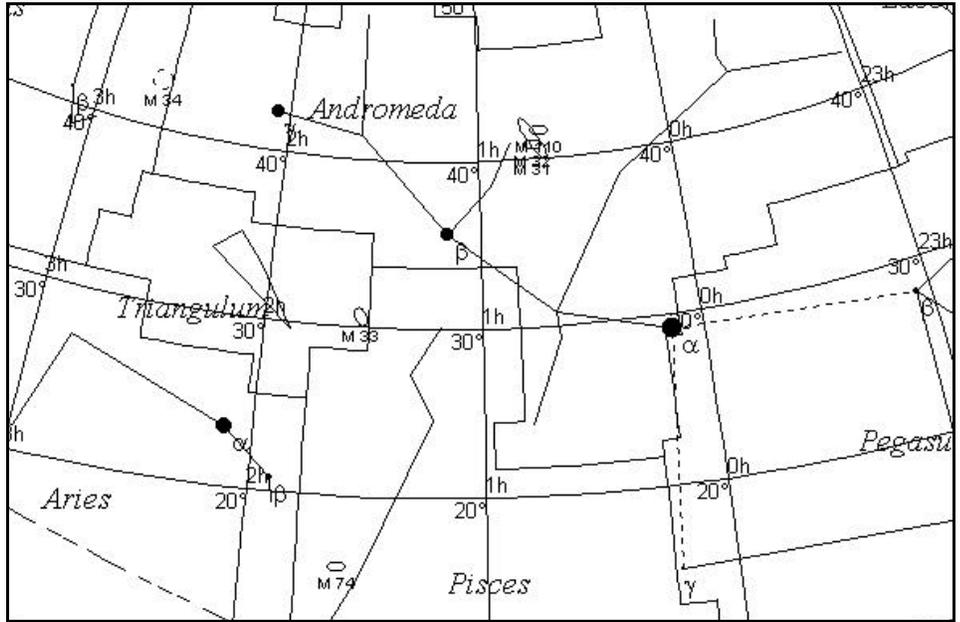
Winter brings thrills and chills for astronomers. Dark comes early each evening, giving us plenty of time to thrill at the beauty of the winter sky. But the winter chill make us wonder when the cold will be over, so we can observe in warmer weather. But do not fret, we have some wonderful ways to keep you warm this winter. (Say that one ten times quickly.) Check out the article "Keeping Warm While Observing" elsewhere in this issue.

If you are in a place where you can leave your equipment set up, you are ahead of the game. Trying to set up equipment in the dark after a long day at work can be just enough to counterbalance your desire to observe. These winter wonders just might make you wander over to your telescope tonight, especially if it is already set up.

While we wait for Orion to get into prime position, take a look in Andromeda. Then we will venture into Taurus to hunt a few things just before Orion takes center stage. If a few objects have been repeated from last year don't be upset. The beginners from last year should have progressed far enough to locate some of the more difficult objects as new beginners take their places.

EASY OBJECTS

Andromeda brings us an easily recognized object with which beginning observers like to practice. The Great Andromeda Galaxy (M31) is easily seen without a telescope or binoculars. All the observer needs to do is to go out in a dark site and look between the middle star in the leg of Andromeda and the bottom point in



Cassiopeia. A fuzzy patch can be seen there. The view through a low power pair of binoculars will give a brighter image of the famous spiral galaxy.

Triangulum may be small, but it has something that is big. The 60x40 minute Pinwheel Galaxy (M33) is 6.5 mag. Although you may think it is pretty bright, that brightness is spread out over a fairly large area. Use low power for the best view of this object. To locate it, first find the Andromeda Galaxy, then scan back to the middle star in Andromeda, and keep going about the same distance as Andromeda Galaxy is from the middle star. Use averted vision to find M33. Don't be too disappointed if you have to try a couple times.

One of the most famous clusters in the sky is viewable in winter. The Pleiades Star Cluster (M45) is very bright and can be seen very easily without aid. When it is up, observers see it. No directions are really needed to locate it.

Another object which needs no aid is the Orion Nebula. When Orion is high in the sky, look for the glowing patch just below the middle of his belt (the three stars in a straight line). A look with binoculars will show a larger, colorful area. Telescopes will show much more detail and give a very satisfying view.

MODERATELY DIFFICULT OBJECTS

Although The Great Andromeda Galaxy is very easily seen, its four companions require higher power than most binoculars offer. The companion galaxies are much smaller than M31 and are ellipticals. The companions are NGC221 (M32) - 9.5 mag; NGC205 - 11 mag; NGC185 - 12 mag; and NGC147 - 12 mag.

Would you like to see the star by which we set standards for one type of variable?

Look just north of Epsilon Tauri (the bright star in the northern part of the V) and about two degrees west. There should be a star that ranges from 9 to 13 mag. This will be T Tauri.

While looking at T Tauri, look for a variable nebula (NGC 1555) nearby. First you see it, then you don't.

If you are tired of observing the Orion Nebula (M42), look nearby for its smaller neighbor, M43. M43 has a central star of 8 mag and is difficult to distinguish as separate from M42. The object is not difficult to see, but the difficulty comes in determining which part is which.

DIFFICULT OBJECTS

GRB34 may not be difficult to see, but try to separate the double. This is a red dwarf binary system just 1/4 degree north of 26 Andromedae. These two are said to be the closest double stars to our solar system. One star is 8 mag and the other 11 mag.

If you like viewing doubles, try this double cluster. The NGC 1807 and NGC 1817 double cluster has stars that range from 8 to 14 mag. Each cluster's surface brightness is around 8 mag. and they are very close together. Look for them in Taurus.

Orion is so full of nebulosity, it is difficult to distinguish where one begins and another leaves off. But if you can find a central star in some of that nebulosity, you may have found one of the planetary nebulae. J20 has a 10 second diameter and appears to be 13 mag. The central star, however is about 14 mag and can be seen in large apertures.

To find the coordinates of any of the objects mentioned in this article, just consult your star charts. Make sure they catalog objects that reach the magnitude limit for

Dates to Remember

- | | |
|-----------------|--------------------------|
| December 13-15: | Geminid Meteor Shower |
| December 18: | New Moon |
| December 21: | Winter Solstice |
| December 25: | Christmas Day |
| January 1: | New Years Day |
| January 3-4: | Quadrantid Meteor Shower |
| January 17: | New Moon |
| February 16: | New Moon |
| March 17: | New Moon |
| March 20: | Vernal Equinox |
| March 31: | Passover Begins |

There are several occultations of various sorts, as well as eclipses and other astronomical events over the next few months. Check your calendar for dates. Also *Sky & Telescope's* News Bulletin will give specific information.

Keeping Warm While Observing

by Brenda Culbertson

stargazr@mail.holton.k12.ks.us

Winter is upon us and we know what that means. Heavy clothes, sniffly nose, and observing woes. (Hey, I just made that up!) I could say something about cold weather foes, like frozen toes, coffee flows, and, well, who knows? But that would be stretching it.

The bite of the season has bitten. We need to make sure we stay safe while viewing our favorite wintertime objects. Keeping warm is a trick that some have more trouble with than others.

Keeping warm in a remote area is difficult. The best way to be warm is to STAY warm, not GET warm. While setting up equipment you generate heat, and sweat. Once you are finished with the laborious activity, you should put dry sox on and make sure you are insulated enough to hold the heat in without being hot.

CLOTHING

Wearing the proper clothing is essential to keeping warm.

Layers of clothing will help retain your body heat. Start with a thin layer against your skin. Silk does a great job. This type of material covers your pores and acts like an extra layer of skin.

Next, put on a heavier layer of porous material, such as cotton or wool. This type of fabric will draw moisture away from your skin while confining heat. Porous material provides a honey comb structure which gives heat somewhere to go.

Next wear a medium weight layer to cap off the pores of the cotton or wool. We want to keep the heat in the honey comb, not let it go. This clothing should be something to keep you warm enough if you take your coat off.

Finally, make sure you wear the appropriate weight coat or full body suit. Don't forget your hat and gloves. Layers of sox for your feet are as necessary as proper boots.

Keep everything covered from your head to your toes.

WARMING UP

If you get cold and need to get warm again, there are several ways. Going in the house is always best, but if

you are in a remote area you should start your vehicle and warm up in it. Don't think you are a "wimp" if you have to get out of the cold. You are just smart for doing it.

VICTUALS

Make sure you take water with you if you are going to a remote site. Believe it or not, water will help keep you warm. A thermos of non-alcoholic warm drink is welcome after a short time in the cold. Decaffeinated drinks are better than the fully caffeinated ones since caffeine dehydrates the body.

Snacks are important to take along. Snacks high in carbohydrates are the best, but most observers tend to take along something sweet, too.

FLIGHT PLAN

Make sure you tell someone where you are going and when you plan to be back. Cold weather will sap the juice from your vehicle battery. Take a cell phone or two way radio with you if you can. They might just save you from a bitter disaster.

Using the buddy system is always good. If you are going to a remote site, have a friend go along with a second vehicle. Maybe the second vehicle could be loaded with victuals.

PREPAREDNESS

Take more than you think you will need. Blankets, a tent, lots of water and drinks, and snacks should fill up the area around your observing equipment. You can't use it if you don't take it.

PERSONAL REQUIREMENTS

Pay attention to what your body is telling you while you are out in the cold. If you are too tired, rest a while. If you are hungry, eat. Thirsty, drink. Too cold, give it up and get warm. There is no sense in risking frostbite or hypothermia. Those stars will be there longer than you will be here. There will always be another chance to see what you wanted.

OTHER

Although winter keeps many people in, you can still go out and observe. Just do it safely and don't push yourself too hard. Have fun.



M31 in Andromeda



M33 in Triangulum



The Pleiades, M45 in Taurus

which you are looking. I made the mistake of planning an observing session with objects on my list I could not find because they were fainter than objects on my charts.

If you do not have access to charts, and you want coordinates of a particular object, just e-mail me. I'll look it up for you. Make sure you give me a day to get back with you, though. I now have access to a wide variety of star charts and software to find almost anything out there.



STS-95 Godspeed John Glenn



**STS-95 Godspeed
John Glenn**

October 28&29, 1998

LEFT: Rollback of servicing structure. Closeup of Space Shuttle *Discovery*. Night press photo line. RIGHT: Three views of the launch of *Discovery* on Mission STS-95. UPPER RIGHT: Four views of Solid Rocket Booster separation more than two minutes after launch.

Holiday Card by Carter Roberts
Chabot Observatory, Oakland CA

Best Wishes for 1999

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