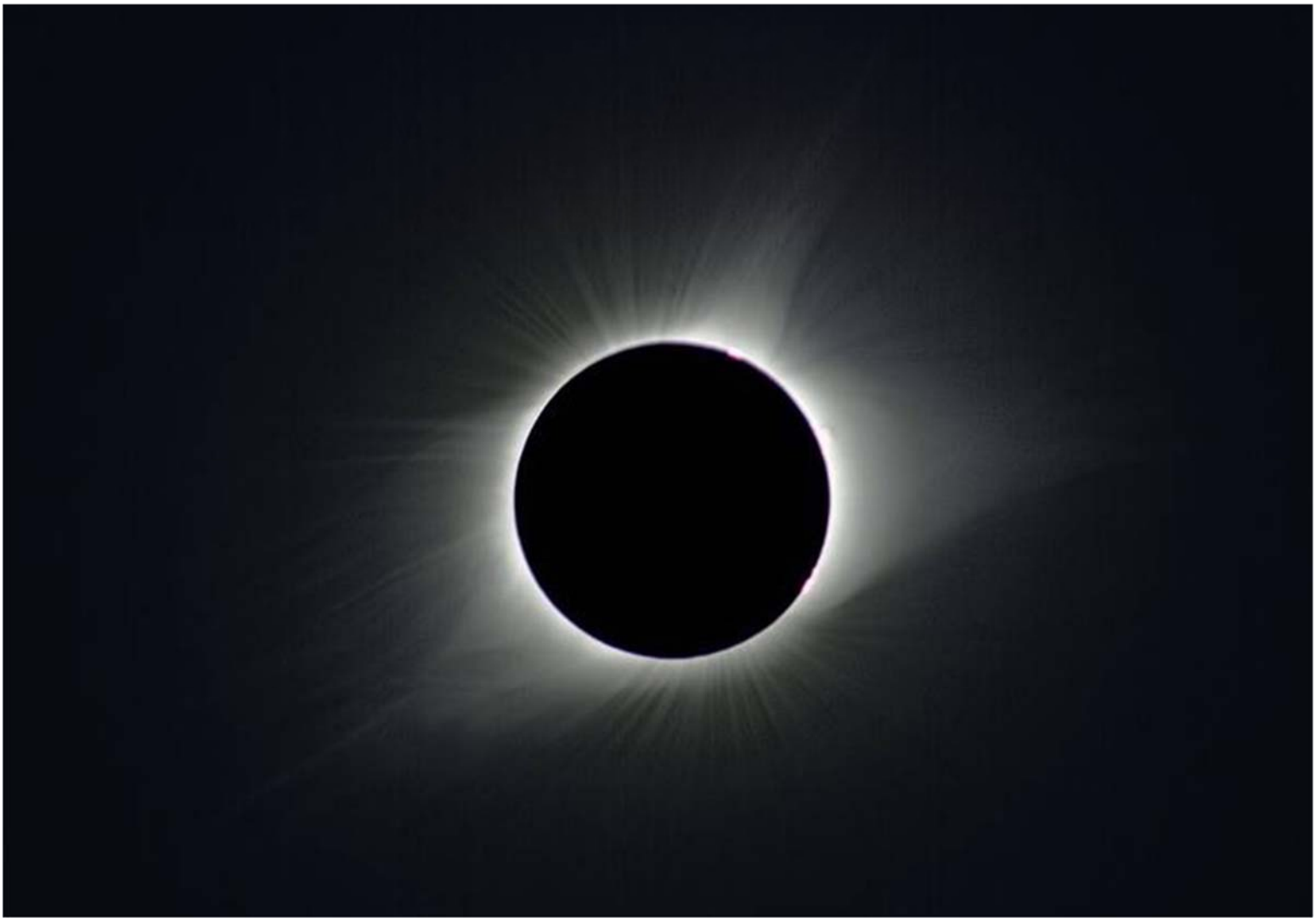
Northern Lights

North Central Region of the Astronomical League

Autumn 2017 - Series II , Volume 2, No. 2



This single-frame image was taken by Tim Stone, President of the TCAA. He viewed from Camp Ondessonk near Ozark, Illinois.

In this edition:

NCRAL Chair's Message

The Great Total Solar Eclipse of August 21, 2017, has come and gone… finally. By now some of us probably have had our fill of eclipse talk, press releases, Facebook posts, and images, and would like to move on to other topics. I certainly do. As a former planetarium director at my local university, I tend to get lots of press attention – even 16 years after leaving that position. Writing a 24-page eclipse guide garnered a bit more attention.

On the Sunday before the eclipse, a columnist in a local newspaper call me "the all-knowing Carl Wenning." I do think that's a bit of hyperbole, but many people did seek me out to speak with me about the eclipse starting months before it occurred. It's nice to get a bit of face time with the press and the public, but it can become trying after a while. I'm sure that at least some of the Region's members had the same experience.

In my last NCRAL Chair's Message I noted that one undesirable trend we see in amateur astronomy is the "graying" of our club memberships. Our recent experiences with the total eclipse have shown us one thing – the American public is still greatly interested in astronomy. Hundreds of thousands – perhaps millions – watched this cosmic event. This provides for hope in correcting the current situation.

I observed the total eclipse from Camp Ondessonk just south of Ozark, IL, along with members of the Twin City Amateur Astronomers, the Champaign-Urbana Astronomical Society (CUAS), and the University of Illinois Astronomy Club. Dave Leake of CUAS (and our 2017 NCRAL Award winner) had arranged for us to hold seven workshops, two plenary talks, and two nighttime and one daytime observing sessions. The camp was filled to capacity with over 800 people present on the day of the eclipse.

Because I knew that the roads going home would be busy following the eclipse, I decided to wait 4 hours after totality to begin my trek home. I drove for two hours up US 45, a relative back road. During this time, there were cars in front and behind of me as far as the eye could see. By the time I got to Effingham, IL, I could see that I-57 was bumper-to-bumper traffic going at a very slow rate. I decided to use my trusty GPS and travel through back roads to make it home. In the end, it took me 7 hours for what should have been a 4-hour trip. It was the "Armageddon" I had warned others about, but wasn't really prepared for. I was taken by surprise at the extreme nature of interest shown by the public. Stopping by McDonalds in Effingham, IL, on the way home all I could see were eclipse t-shirts and hear discussions about how wonderful the eclipse was. In the end, while frustrating, I was delighted to be part of perhaps the largest mass movement of people in this country's history!

Again, this all goes to show that interest in things astronomical is NOT on the wane. We as amateur astronomers can still capitalize on this interest to increase the number of amateur astronomers and build our clubs. There is no reason why we should be seeing the "graying" of amateur astronomy with this much interest out there. We just need to figure out ways of getting people to follow up on their interests and commit time, treasure, and talent to the hobby of amateur astronomy.

Carl Wenning
NCRAL Chair

Northern Lights Editor's Message

Fall is upon us and as the warm days of summer leave us, the cool and earlier Fall nights now accompany us with a different assortment of astronomical objects. Summer 2017 was an exciting season with the Great Solar Eclipse of August 21 being the most anticipated astronomical event of recent years. It was great to share the experience with fellow amateur astronomers from the Twin City Amateur Astronomers, the Champaign/Urbana Astronomical Society, other reginal clubs and the public in general at Camp Ondessonk in Ozark, Illinois.

We are pleased to see the reach of the ***Northern Lights*** growing, our appreciation for the many words of encouragements we have received since Carl Wenning restarted this publication a year and a half ago now. We also want to acknowledge and thank other societies and individuals that contributed with articles and other materials for this edition which includes some of your best images of the Eclipse, a profile on Brian Chopp of the Neville Public Museum Astronomical Society (Green Bay, WI) winner of the first prize in the Astronomical League/ Astronomics sketching contest, articles from Jamey Jenkins, Twin City Amateur Astronomers; Ellen Tsagaris, Popular Astronomy Club; and Dan Andrae, Door Peninsula Astronomical Society thank you for these insightful articles. Other contributors are Tim Stone, Twin City Amateur Astronomers; Susan Basten, Door Peninsula; Dave Falkner and Valts Treibergs, ALCON 2018; James Wehmer, Champaign/Urbana Astronomical Society; Paul Pouliot, Twin City Amateur Astronomers; Gabe Shaughnessy, Racine Astronomical Society and everyone else that contributed in other ways.

I encourage other clubs and societies to take advantage of this publication as a medium to disseminate information, club activities, special events, member recognitions and more. The North Central Region of the Astronomical League includes the following states: North Dakota, South Dakota, Minnesota, Iowa, Wisconsin, Illinois and the Upper Peninsula of Michigan with 46 registered organizations. Many of us travel frequently throughout the region and it would be great to have a regional calendar of activities or Star Parties at the very least. We can compile a list of events to be published here as well as in the NCRAL's Web site Events section if the organization can submit their list of events.

The winter edition of the ***Northern Lights*** , will be available around December 21st, 2017. To the clubs and societies, individuals members and affiliates, please send your submissions by December 10th. Also, I hope to receive more submissions for our Photo Gallery section from the many astroimagers in the region and not necessarily astroimages but pictures of a local event that you would like to share with the region.

Finally, as the fall season changes the colors of the land the year's end holidays return, our wishes for a safe and joyful holiday season.

Clear skies,

Jim Gibbs, Editor-in-Chief
(Twin City Amateur Astronomers)
jrgibbs@msn.com

NCRAL on Facebook

Did you know that NCRAL now has a Facebook page for sharing information about your Region's AL-affiliated clubs? This is a great way share observations, notes, images, and any other things you think the NCRAL membership or AL members-at-large living in our region would enjoy. Check us out at:

https://www.facebook.com/northcentralregionastronomicalleague/

Lastly, would you like to see your images on the NCRAL Facebook page banner? If so, send your image and a 2-3 sentence caption to the ***Northern Lights*** newsletter assistant editor at carlwenning@gmail.com.

Regional Officer & Leader Contact Information

NCRAL Chair: Carl Wenning (2-year term expires spring 2019)

Bio: Carl has been an amateur astronomer since being introduced to the sky by his grandfather during July 1957. Today he is a 38-year member of the Twin City Astronomers of Bloomington-Normal, IL. He is an AL Master observer who makes frequent use of his CPC 11" telescope. He is a former planetarium director and physics teacher educator who remains actively involved in astronomy education and public outreach events.

Contact: carlwenning@gmail.com

Vice Chair: John Attewell (2-year term expires spring 2019)

Bio: John is a statistical analyst by day and amateur astronomer by night. He is particularly interested in the history of astronomy especially how early astronomers used mathematics to explain their observations. John is a member of the Rochester Astronomy Club (Minnesota, not New York) and was the planning chairman for the 2017 NCRAL conference held at the Eagle Bluff campus near Lanesboro, MN.

Contact: john_attewell@hotmail.com

Secretary-Treasurer: Donald Klemt (2-year term expires spring 2018)

Bio: Don has been in the Racine Astronomical Society for the past 30 years. His interest in astronomy started when his dad took him to Dearborn Observatory (Northwestern University) when he was about 10. He has been active in public outreach for all 30 years in the RAS. His scopes include a 20", 11", 10", and a 90mm solar scope. He has served as Secretary-Treasurer of the NCRAL for the past 11 years. Don is retired from the Chicago Board of Trade where he was a member for almost 40 years.

Contact: donklemt@ameritech.net

Representative: Bill Davidson (completing vacant 3-year term that expires spring 2019)

Bio: In the days of the Apollo missions, Bill first observed the moon (and sunspots!) with a 50x, 60mm JC Penny's refractor telescope. Not discouraged, 40 years later, he built and observes with a 6.25-inch achromatic doublet objective, f/10, 1600 mm focal length refracting telescope. He recently retired as a college mathematics instructor, has been a member of the Rochester Astronomy Club for 20 years, and serves as editor of the club's newsletter *RochesterSkies.*

Contact: rochesterskies@outlook.com

NCRAL Webmaster: Jeff Setzer (appointed)

Bio: Jeff has been an amateur astronomer since 1984, and has been part of the Northern Cross Science Foundation since that time. He is a longtime member of their Board of Directors, has held several office positions, and is currently their President. He has completed several Astronomical League observing programs, made his own telescopes and optics, and is a self-described telescope nut. You will often find him at star parties with his 22" Starmaster and TeleVue 85 telescopes.

Contact: astrosetz@hotmail.com

***Northern Lights* Editor-in-Chief:** Jim Gibbs (appointed)

Bio: Jim has been observing the starry skies since he was 10 years old. His primary affiliation is with the Twin City Amateur Astronomers where he has been a member for 4 years. He is an avid amateur astronomer who enjoys observing and especially imaging around the TCAA dark sites and travelling around finding other dark sites. He is a software engineer and currently is concentrating in growing his small consulting business.

Contact: jrgibbs@msn.com

UPDATE: NCRAL 2018 Hosted by Door Peninsula Astronomical Society

The theme of the 2018 NCRAL convention will be ***Dark Skies for Bright Stars*** and a very fitting theme as our club, DPAS is located in Door County, Wisconsin, home of the first International Dark Sky Site in Wisconsin – and only the 13th in the United States. The site is at Newport State Park and visits to the park can be planned for anyone wishing to visit the area. The dates for NCRAL 2018 are May 4 and 5, 2018 with registration Friday afternoon and all meetings and speakers on Saturday.

The Lodge at Leathem Smith in Sturgeon Bay, Wisconsin, will be headquarters for the meeting. NCRAL attendees will receive special room rates and all of the events will take place there, including meetings and meals, which promise to be exceptional. The Lodge is near our Astronomy Campus which includes our observatory, Stargarden for members' telescopes, and the Stonecipher Astronomy Center which is used for programs and meetings. Speakers have been confirmed and the keynote speaker will be Kevin Poe, who will have an exciting presentation and calls himself "The Dark Ranger".

Registration for NCRAL 2018 will begin in January, and information soon will be added to our website that you may visit at www.doorastronomy.org. For more additional information, email DPAS president Gary Henkelmann at President@doorastronomy.org or me at Treasurer@doorastronomy.org.

Door County Wisconsin is a beautiful natural area surrounded by the waters of Lake Michigan and Green Bay. We are home to five state parks and numerous county and town parks located along the bluffs and rocky shorelines. Registrant packets will include information on visiting these areas along with wineries, breweries, art galleries, restaurants and the quaint villages throughout the county.

Come a few days early and stay a few days longer to take in all that Door County has to offer. And for those wishing to bring astronomy equipment, you couldn't find a better place for viewing ***Dark Skies for Bright Stars***.

Susan Basten
DPAS Publicity Committee

Future NCRAL Regional Meetings

Each year at our Region's annual meeting, the NCRAL leadership solicits hosts for upcoming meetings. The following affiliates have either agreed to or are considering hosting future meetings. We are still in need for hosts, but especially for 2020 and 2022.

2018 Door Peninsula Astronomical Society (May 4-5)
2019 Popular Astronomy Club (tentative)
2020 OPEN
2021 Neville Public Museum Astronomical Society (tentative)
2022 OPEN
2023 Twin City Amateur Astronomers

If your club has never hosted an NCRAL Region meeting, please consider doing so. While it is a considerable amount of work, it can be quite fun. It provides an opportunity to showcase your group's facilities and accomplishments, and to bring in interesting guest speakers. You can also use such an event to grow your club's membership.

Resources are available to help plan and execute the meeting, not the least of which is the Astronomical League's Planning Guide that be used for general guidelines. https://www.astroleague.org/al/socaids/convplan/conplidx.html Experienced Region members also can provide lots of guidance and assistance.

Please contact NCRAL Chair Carl Wenning at carlwenning@gmail.com should you have any questions or wish to toss your hat into the ring.

ALCON 2018 Coming July 11-14

by Dave Falkner and Valts Treibergs, Co-chair

Gleaned from ***GEMINI***, a publication of the Minnesota Astronomical Society.

The Minnesota Astronomical Society will be hosting the Astronomical League National Convention in 2018. The dates of ALCON 2018 are July 11-14. The convention will be held at the Hilton Minneapolis/St Paul Airport Mall of America near I-494 and 34th Avenue South. We will have field trips to Eagle Lake Observatory and other attractions in the Twin Cities, such as the Bell Museum, the Science Museum of Minnesota, and the Mall of America. We will host a "star-b-q" at Eagle Lake Observatory (ELO) in Baylor Regional Park.

The theme of our convention will be Outreach. This will be a wonderful opportunity to show the world how we do astronomy in the Upper Midwest. We will also be able to showcase our world-class facility at ELO. We may have a couple of talks at the observatory and nightly observing. Several planets will be visible, including Jupiter and Saturn. Mars will be within a couple of weeks of its very favorable opposition.

Along with several speakers from the five-state area, we will bring in a few nationally known speakers. We have already secured Bob Berman, author of the *Strange Universe* column in ***Astronomy*** magazine; and outreach advocate Dr. Pamela Gay, director of CosmoQuest, director of technology and citizen science at the Astronomical Society of the Pacific, and host of the podcast "Astronomy Cast." We hope to get one or two other national speakers.

AL-Affiliated Clubs Can Now Directly Update Their Information on the AL Website!

Did you know that the president, treasurer, or ALCor of your club may update information about your club yourself by requesting an account at URL https://members.astroleague.org/request_account and entering their email address and then pressing the "Request account information" button near the bottom of the page? An email with instructions and a link to create a new account will then be sent within a few minutes. Once logged in, there are instructions at https://members.astroleague.org/content/club-officer-tutorial on how to update your club's info.

NCRAL BYLAWS NOW AVAILABLE ONLINE

Did you know that NCRAL has a set of Bylaws? The Region's Bylaws explain who we are, what we are about, and even include a bit of history. For instance, did you know that NCRAL was established on August 30, 1947? Did you know that NCRAL is to be governed by an Executive Council consisting of the Region's three elected officials (Chair, Vice Chair, Secretary-Treasurer) in concert with the Representative to the AL Council? Did you know that there is an NCRAL Council that guides the Region in concert with the presidents and one representative of all the AL-affiliated astronomy clubs in a six-state region? If you'd like to know more about how NCRAL operates, be sure to check out the Bylaws at https://ncral.wordpress.com/bylaws/

NCRAL Advisory Group Questions

by Carl Wenning, NCRAL Chair

On July 25th, I posed a question to the NCRAL Advisory Group. As new Region Chair elected in April 2017, I had received a request to make a visit to a couple of the Region's affiliates. I had indicated a willingness and interest in doing so in the Summer 2017 issue of ***Northern Lights***. Others had followed up with a request. Because making such trips can be expensive, I felt that it would be helpful to have the Region's assistance in doing so. Right now, the Region is flush with money, and I was thinking that if members of the Executive Council (Chair, Vice Chair, Secretary-Treasurer, and Representative to the AL National Council) could be assisted in making such visits, they would benefit the membership by building a bit more cohesiveness and camaraderie among our members and our clubs. I therefore suggested that NCRAL presidents and their appointed seconds (there are none appointed following an earlier request), as well as one member-at-large, consider the following proposal:

Site Visits by Members of the NCRAL Executive Council: NCRAL shall provide limited financial support to members of the NCRAL Executive Council (Chair, Vice Chair, Secretary-Treasurer, and Representative to the AL National Council) for making visits to Regional star parties and affiliated association meetings for the purpose of giving invited talks about the Astronomical League and/Region. Executive Council members will be reimbursed for travel expenses (the cost of gas by driving only) by the Region, whereas on-the-road meals and accommodations will be paid for by the inviting star party or club. The Executive Council must pre-authorize all NCRAL expenditures.

I received the following responses which I am posting here anonymously:

I think funding... at least in part should be strongly considered... I would think that the cost of your meeting with non-AL members to provide the benefits of AL, especially in person would more than be offset by increased membership...

Clear Skies!

My response: *Including non-AL affiliated clubs would be a good idea, but there might be a different set of criteria for payments and amounts of cost allowed. Making visits to such groups to encourage membership in the AL is a good idea. I feel that using NCRAL funds to grow NCRAL and the national group would be something for the larger group to consider as these are NCRAL funds about which we are speaking.*

Sounds good to me. How much of our dues to the AL gets distributed to the regions? Seems proper to invest a little of that income to promote the organization.

My response: *Actually, no portion of club or member-at-large dues paid to the AL comes back to the Region. Dues go to pay the expenses of maintaining a national office and publishing the **Reflector** newsletter. The money in NCRAL coffers comes entirely from within the Region. When we hold regional meetings, the "profits" (if any) are split equally between NCRAL and the host club.*

Well, let's think about this. The cost of meals and accommodations could really get expensive depending on where he eats and where he stays. Carl is close so he could be here in a short drive. If someone came from upper Michigan it might require a two-night stay or more. And then if we give an honorarium we could be talking some serious money. If a member were to provide accommodations (lodging and breakfast) in their home this would help defray the cost as [we] are doing with [the speaker] for [our club's] banquet. Of course, we are not required to participate in this endeavor, this is voluntary. My feeling is with the money we pay for membership I feel NCRAL could kick in a little more.

My response: *Yes, there would have to be some cost-control measures such as a per-diem. The cost of gas should be that which is paid to refill the tank of the car used. Any honoraria would be at the discretion of the host club. It would be good for a committee to be formed to look in to this if the Advisory group deems it a reasonable idea. Right now, the sentiments generally appear to be in favor of this proposal with a few reasonable notes of caution thrown in.*

The problem I have are the words "some visits." We don't how many visits are involved and therefore we can't begin to estimate the costs. If we have an idea of how much this would totally cost and number of groups, we could get an estimate and how it would affect our balance. I would prefer pay-as-you-go per group and then you know where you stand.

My response: *As the proposal states, "The Executive Council must pre-authorize all NCRAL expenditures." The Executive Council would have complete control of expenditures from the Region's treasury from the very start if the proposal is approved in whatever its final form.*

I would say ok for a two-year trial to see impact on NCRAL budget.

My response: *If the proposal in whatever its final form is approved, it would not be unreasonable to include a trial period to make certain that it is working properly.*

I think it's a great idea. The NCRAL should definitely sponsor this as an outreach opportunity. Hopefully the responsibility won't fall entirely on you.

My response: *I have not consulted directly with other member of the Executive Council about whether they would participate in this activity or not. All I can say is that no Executive Council member would ever be obliged to go on such trips unless the bylaws of the Region were amended to make this a requirement of the position which I doubt will ever happen.*

I have discussed your proposal for travel costs with others in [our club]. I would say we can basically support your proposal. Traveling around the region is expensive and any help we can get from NCRAL will help you and the clubs to encourage getting together. The costs associated with hotels and restaurants for you or other out-of-town speakers is a significant cost. [Our club] is supporting a guest speaker…to come to our banquet in October. Two club members…are putting up [the speaker] at their house to save cost. I'm not sure we can count on that kind of "bed & breakfast" accommodations in the future. But suffice it to say that [our club] does not have much money and devotes much financial resources to support an enthusiastic public outreach. So, I don't think it likely we will be inviting out of town folks to attend events until perhaps next year. This is not to say we don't want you to come. We do. But we need to be judicious with our funds. Would there be any possibility to coordinate trips with other clubs/activities somehow? Thanks.

My response: *Reasonable questions and concerns all. Whatever can be worked out for accommodations and free meals for the invited speaker would be entirely at the discretion of both parties. Again, participation in this activity of inviting speakers from the Executive Council would be entirely discretionary. The only caveat is that the Executive Council should not be thought of as an NCRAL speakers' bureau. In my estimation, if a visit is to be financially supported by NCRAL in part, then the topic of discussion/presentation should be restricted so at least 50% of the time is spent talking about the benefits of belonging to the Astronomical League and by default the Region.*

Sorry to get back to you so late on this. This is a pretty good idea. We need to do something to make the regional organization more approachable from the "local" level. We don't seem to have that interaction right now and this may be one way to "walk among the membership" and make connections. If you are going to do this, I would suggest also having some kind of short presentation in-hand that explains the structure of the region and outline some of the problems (e.g. dwindling membership). It could also be a fact-finding tour to see if there are any solutions to this problem or if there are any other hidden problems that need addressing by the regional officers. You have my blessing, good luck!

My response: *Thanks for your support! Yes, I agree that it would be very helpful to have a "canned" presentation that all Executive Council members could use. The work of creating such a presentation could be given over to the committee that would set guidelines for the program's administration. Having a fact-finding tour is also an excellent idea. I would be good to have the visitor prepare a short article, say, for the* ***Northern Lights*** *newsletter if nothing more.*

If I haven't replied already, I agree with reimbursing auto gas expenses for NCRAL officers that attend star parties in our region. Very good idea.

My response: *I'm glad that you like the idea.*

The fact of the matter is that there are many excellent ideas provided by the Advisory Group members who contributed above. Now, I want to appoint an Ad Hoc Committee from among NCRAL members to review the above proposal, and to make "final recommendations" in light of the record here. I would ask that the Committee come up with guidelines for the program's administration if approved. Please let me know by emailing me directly at carlwenning@gmail.com if YOU are interested in serving on this committee. I don't anticipate that the work of the committee will require more than a few back-and-forth emails.

Before the spring meeting occurs, I will communicate both by email and by the ***Northern Lights*** newsletter the final proposal and guidelines. Then, when we hold the Executive Council meeting (the first of two meetings during NCRAL), I will ask the Advisory Council (consisting of club presidents and one appointed member from that group plus a few at-large members) to approve bringing the proposal and guidelines before the general membership (during the second meeting).

AstroBits – News Items from Around the Region

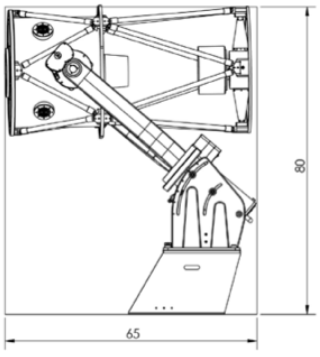
Editor's note: *AstroBits are gleaned from the newsletters and announcements of NCRAL astronomy clubs sent to the editors of* ***Northern Lights****. If you would like to have the spotlight regularly shown on your group, be certain to have your club's editor forward a copy of your newsletter to assistant editor Carl Wenning.*

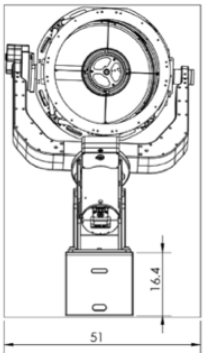
- The Champaign-Urbana Astronomical Society (CUAS) is holding an Astronaut Quilt Raffle to support the construction of their new roll-off-roof observatory. Check out this beautiful quilt which could well be yours! Tickets are available for a donation of $1 each, or six for just $5. Drawing for the winner will be held during the CUAS October 19th meeting, so get your tickets early. You may purchase raffle tickets online by going to http://cuas.org/astronaut-quilt-raffle/. Payment can be made with debit and credit cards or PayPal. In the "Add special instructions to the seller:" box, add the message "raffle tickets" as well as your contact information such as email and physical mailing address (should you be so lucky as to win). Tickets will not be distributed for online purchases, but the CUAS Secretary will keep track of names, contact information, and ticket numbers. Should you have any questions, you may contact CUAS Treasurer Erik Johnson at ejohnson@parkland.edu.

- Both Jamey Jenkins and Jim Gibbs, members of the Twin City Amateur Astronomers, did NCRAL proud with an article and two astronomical images published in the September 2017 issue of ***Reflector*** published by the Astronomical League. Jamey wrote a 3-page article titled, "Have a Successful Observing Session." It dealt with the 7 **p**'s of successful observing: **p**assion, **p**reparation, **p**rograms, **p**lanning, **p**erseverance, **p**atience, and **p**resentation. Congratulations are due to both Jamey and Jim for having images included in the same issue of ***Reflector***. Featured were one of Jamey's lunar images and one of Jim's narrow-band images of NGC 6995 – a nebula in Cygnus.

- NCRAL Chair Carl Wenning (2017-2019) was named 2017 recipient of the Astronomical Leagues' Mabel Sterns Newsletter Award for publication of ***The OBSERVER*** of the Twin City Amateur Astronomers (Bloomington-Normal, Illinois). As the AL website notes, "the newsletter editor performs the primary function of informing astronomy club members about what is happening in their club. Often the editor is forced to become quite creative in filling the allotted space for each issue when the call for articles doesn't quite fill up the publication. In acknowledgement of the important role of the newsletter editor, in 1988, the Astronomical League established the Mabel Sterns Newsletter Award to recognize these essential people. The Award is named in honor of the first newsletter editor of the League, Mabel Sterns, who served in that capacity from 1948-1952 (see photo). The first-place winner will receive the Sterns Newsletter Award plaque at each year's national convention, ALCon. The competition is open to all Astronomical League astronomy clubs. The award program is chaired by the vice president of the League. Judges for this program include former club newsletter and League *Reflector* editors. Top finishers for this award are recognized in the ***Reflector***." Carl has served as editor of 45 issues of ***The OBSERVER*** since January 2014 – most in the range of 16-24 pages. You can see his handiwork at the following URL: http://tcaa.us/Observer.aspx This is the second time that editors of ***The OBSERVER*** have been so recognized. Co-editors Jean Memken & Mike Rodgers received the inaugural Mabel Sterns Newsletter Award in 1998 – nineteen years ago. Carl has served as co-founder (along with Jim Gibbs) and editor-in-chief of NCRAL's ***Northern Lights*** newsletter, and now assistant editor under editor-in-chief Jim Gibbs.

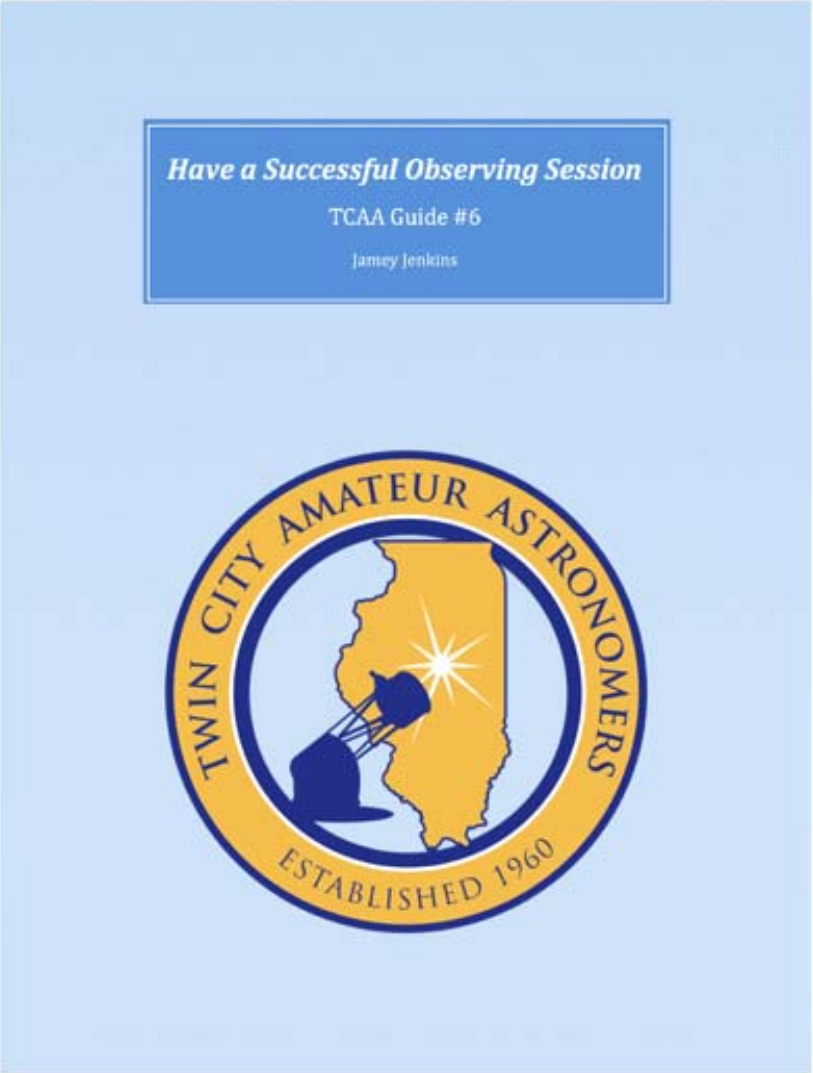
- The Twin City Amateur Astronomers have made significant progress in the construction of their new Waynesville Observatory located at a dark sky site just east of Waynesville, IL. This site is approximately 10 miles south-southeast of the Sugar Grove Nature Center where the club maintains two observatories – the Sugar Grove Observatory (12" visual telescope) and the Prairie Sky Observatory (20", 17", 16", and 10" imaging telescopes). The heart of the new Waynesville Observatory will be a 24" f/11 on a yoke mount. The new site will include a 13-foot-diameter clamshell dome and a 10' x 20' roll-off-roof structure. As separate observing room will provide comfort for observers year around. It is anticipated that the facility will be completed by mid-autumn, with equipment installation continuing in the ensuing months. The 24" AG Optical CDK telescope is being built by Dave Tandy and will be mated to a Paramount yoke mount and pier. The mirrors for the telescope are currently being worked on in California. The roll-off-roof will be in place on the 10' x 20' observatory by the end of September.





TCAA Guides to Amateur Astronomy Grows in Number

The number of TCAA Guides to amateur astronomy has just increased from five to six. TCAA member Jamey Jenkins recently contributed Guide #6 – HAVE A SUCCESSFUL OBSERVING SESSION. This Guide is a reproduction of his excellent article by the same name that appeared in the September 2017 issue of AL's ***Reflector*** magazine. This guide provides information about the seven **p**'s required for having a successful observing session: **p**assion, **p**reparation, **p**rograms, **p**lanning, **p**erseverance, **p**atience, and **p**resentation. Congratulations to Jamey for publication of his excellent article. To read Jamey's article reformulated as a TCAA Guide, retrieve it from the TCAA website at http://tcaa.us/TCAAGuides.aspx.



This guide joins five others that are geared to improve the experience of new amateur astronomers. The five prior TCAA Guides to Amateur Astronomy are as follows:

Guide #1 – INTRODUCTION TO AMATEUR ASTRONOMY

This guide addresses the basics that everyone needs to know in order to become an amateur astronomer. It deals with the use of eyes, binoculars, and telescopes to view the night sky. It should not be mistaken for a textbook in astronomy.

Guide #2 – MEMBERSHIP AND BENEFITS

Even long-time members do not know everything they need to know about membership in this club. Many benefits are overlooked and this publication does what it can to clearly illustrate the benefits of membership.

Guide #3 – ASTRONOMY AS A HOBBY

Why is it that we don't attract as many amateur astronomers as we would like? Our club has lots of great benefits, and it's more the just lack of knowledge of benefits. Part of the problem today stems from the fact that many people don't understand the meaning of a hobby and the benefits derived from it.

Guide #4 – THE ART OF SKY INTERPRETATION

Interpreting the sky requires more than just standing in front of a group of people and talking. If it were that easy, there would be many more speakers in our club! There is an art of sky interpretation, and this guide describes it. Even if one doesn't intend to give public talks, this guide provides a wealth of information about what can be seen in the sky with the unaided eye.

Guide #5 – COORDINATING OBSERVING SESSIONS

While coordinating observing sessions might appear to be an easy task to those who attend them, there is considerable background work associated with both public and members-only sessions. Consider hosting an observing session and use this guide to assist.

Guide #6 – HAVE A SUCCESSFUL OBSERVING SESSION

*This guide is a reproduction of an article by the same name that appeared in the September 2017 issue of AL's **Reflector** magazine. This guide provides information about the seven **p**'s required for having a successful observing session: **p**assion, **p**reparation, **p**rograms, **p**lanning **p**erseverance, **p**atience, and **p**resentation.*

Profiles in Amateur Astronomy: Brian Chopp

Editor's note: From time to time ***Northern Lights*** will feature a profile of an NCRAL-affiliated amateur astronomer to help our members get to know one another, and to set examples for others to emulate. This quarter we focus the membership's attention on Brian Chopp of the Neville Public Museum Astronomical Society (Green Bay, WI) who was recently won first prize in the Astronomical League/Astronomics sketching contest.

1) How long have you been an amateur astronomer, and who or what stimulated your interest?

I was interested in astronomy from a very young age. I think my interest was originally sparked from science fiction shows such as *Star Wars* and *Star Trek* as well as some of the cool things that NASA was doing at the time: the advent of the Space Shuttle and photos from the Voyager missions. I was born in 1974, so I was a bit after the Apollo missions.

My parents bought me a small telescope when I was in middle school. It was a "cheaper" department store type of telescope, maybe 3-4" lens with a wobbly wooden tripod but was probably about $80.00 at the time and was what we could afford. I had fun exploring the Moon, planets and brighter stars with it. But at the time, I really wasn't aware of what I could see with it. I didn't occur to me that I could see galaxies or star clusters with it.

Many years later when I was out of college and had a decent paying job, I purchased an 8" Meade Schmitt-Newtonian with a go-to mount. It was a little more complicated than I had imagined, and was having problems with it. That prompted me to seek out help from the local astronomy club, the Michiana Astronomical Society. I think that is when my interest really took off. I really learned a lot more about the hobby working with the club members. They were very happy to share their knowledge and it was nice to be part of a group that shared my interest in astronomy.

2) What sort of telescopes do you and have you owned?

My main telescope is a 15" Teeters Classic. It is a truss-tube Dobsonian, very well designed. I have had that telescope for about 3 years now and am very happy with it. My previous scope, which I still own, is a 10" Discovery Dobsonian. I don't believe that Discover is in business anymore, but it is also a nice telescope. I continue to use it when I just want to quickly set up in the backyard and also bring it to public outreach events.

3) How long have you been a member of various astronomy clubs?

I have been a member of the Neville Public Museum Astronomical Society in Green Bay, WI for about 11 years. It has been great to be a part of this club. There are so many talented members in many areas of astronomy, from astrophotography to observing, telescope building and mirror grinding, and outreach. Before that, I belonged to the Michiana Astronomical Society in South Bend, IN. I was a member there for about 5 years.

4) Have your earned any awards or honors in the field of amateur astronomy? Please describe.

Yes, I have completed about 15 Astronomical League observing clubs including the Messier, Binocular Messier, Double Star, Lunar, Lunar II, Globular Cluster, Deep Sky Binocular, Stellar Evolution, Outreach and Constellation Hunter. I recently completed the Herschel 400 club, after about five years of working on it. I also recently won first prize in the Astronomical League/Astronomics Sketching contest.

5) With which observing programs are you currently involved?

I am currently working on the Sketching Club program. This was a perfect club for me, and am glad that the members of the Haleakala Amateur Astronomers put it together. I have completed about half of the requirements. I have been having fun trying different techniques. There are a few others that I have started over the years but now that I have completed quite a few programs, and have observed a wide variety of objects, I think I am ready to venture off on my own for a while as well.

6) What is your greatest satisfaction in the realm of amateur astronomy?

One thing that I find satisfying is sharing my love for astronomy with others. Our club hosts a few public observing

nights each year. It is always nice to show someone the Moon or Jupiter or Saturn though my telescope, particularly kids. Often times it is the first time they have viewed through a telescope and it is fun to share that with them. It helps to keep that freshness of astronomy alive.

7) What are your fondest memories as an amateur astronomer?

I guess I can think of two that really stand out. The first was my first telescope. It was a "cheaper" department store type of telescope, a refractor with a wobbly wooden tripod, but it was what we could afford at the time. At first, I would mostly look at the Moon as well as point it at brighter stars in the sky. I was new to astronomy and didn't really know the sky very well. One night I decided to point it at a bright yellow star that was in the southeast. I got the telescope aligned and looked in the eyepiece and there was Saturn! I still remember the excitement. It was the first time I looked at Saturn through a telescope. Even with the small scope I could easily make out the rings. I rushed into the house to get my mom to show her. It was pretty cool.

The other memory was observing with my daughter one night a few years back. My family and I regularly attend the Northwoods Starfest, held near Eau Claire, WI and hosted by the Chippewa Valley Astronomical Society. It is a very nice event, and is well suited for bringing families. I had been bringing my daughter, Maddie, there since she was maybe two years old (she is 9 now) but for the first several years it would be her bed time before it got dark so she didn't get a chance to be a part of the observing fun. When she was five, she was finally able to stay up until after dark and observe with me. Maddie sat on my lap and I let her use my laser pointer, which I think was her favorite part of astronomy. She pointed at stars in the sky and I told her what their names were or what constellations they were in. She saw her first meteor streak across the sky and was so excited she screamed to the whole observing field that she saw it. Later on, we waved at the astronauts in the ISS as it passed over. It was just a fun night with my daughter.

8) What are your goals today as an amateur astronomer?

Now that I have completed quite a few observing clubs, I plan to kind of go my own direction for a while from an observing standpoint. I still plan to complete the sketching club but there are many other objects that I observed as part of other clubs that I would like to go back and sketch. I've only sketched a few of the Messier object so I would like to tackle more of those.

Much of what I've observed wasn't done with a lot of context as to what the objects were. I have been reading a nice series of books called *Annals of the Deep Sky* that provide a lot of scientific insight as to what we know about the nature of the objects. *Astronomy* and *Sky & Telescope* also provide this information. I would like to go back to some these objects and view with this information at hand. I think it would be interesting to view them again with a more fundamental understanding of them.

I plan to view the total solar eclipse this August. That has been on my to-do list for quite some time. I hope everyone has clear skies, where every you happen to be that day.

9) What are your thoughts about professional and amateur astronomy today?

I think it is an interesting time. NASA continues to do amazing things. I am a big fan of the various mission they have or have had within the solar system. The photos from Cassini, Messenger, New Horizons and now Juno of the planets have been spectacular. Juno's recent pictures of Jupiter's cloud bands have been stunning. And the photos that even amateurs can generate today of deep sky objects is outstanding. Really beautiful. It does seem like visual observing is waning a little but I am hopeful that it will continue to be an interest for some time.

Adventures of a Starlight Detective

By Jamey Jenkins, Twin Cities Amateur Astronomers

My first school science project was the construction of a simple spectroscope. Built as a foot-long box with an entrance slit of razor blades and dispersion provided by an Edmund Scientific replica grating, remarkable terrestrial spectra were visible. Over the years, as my astronomy interests developed, I was sensitive to the importance of spectroscopy—the study of spectrum analysis—yet I never considered investigating that mysterious realm of astrophysics. This type of work was seemingly beyond the abilities and talents of the average amateur astronomer.

Recently, an online acquaintance made me aware that an amateur observer can provide useful scientific data in several fields: astrometric, photometric, and spectroscopic. Through these areas amateurs are making dramatic progress assisting professionals with research projects. What if I could develop the technical skill to become a so-called citizen scientist? The possibility is intriguing to me. Anticipating future retirement, I've taken up the calling to develop that skill, and then conceivably pursue an astronomical passion – to observe with a purpose, contributing to the body of astronomical knowledge. This article will briefly describe my initial efforts exploring what I find to be a spellbinding activity.

Getting Started

It seems to me the best opportunity for the typical astronomy buff

wishing do science is in the field of stellar photometry, the measurement of light intensity as a function of wavelength. Asteroids and stars make numerous targets while organizations like the AAVSO provide the necessary data base, and mentor an inspired observer. Although a lifelong amateur astronomer, I see myself as a raw beginner in these areas of technical expertise. Having a firm foundation and proficiency for me is essential to any worthy project, so rather than diving directly into photometry, I have set about using a “hands-on” approach to educating myself on the fundamental properties of stars. Photometry will follow.

Low-resolution spectroscopy is the means I’ve selected to begin my astrophysical journey. This type of work is accomplished inexpensively, while providing a deep well of knowledge regarding stellar composition, evolution, temperature, and star color.

Recording spectra requires appropriate tools for the task. A converging beam slit-less spectrograph can be created with the addition of a screw-in transmission grating before a camera—a design reminiscent of my earlier science project. The camera + grating are inserted into the converging light beam of a telescope as if doing prime focus photography; only now a spectrum is formed some distance away on the CCD chip. This is the arrangement used with my existing equipment, a 102mm f/7 ED refractor and DMK41 monochrome camera (see Figure 1).

The Shelyak Instruments Star Analyser 100 is a popular grating for the beginning spectroscopist; it is the grating I utilize. The SA100 is a high efficiency 100 lines/mm transmission grating, blazed in the first order. First order blazing in this case means that the rulings of the grating are engineered so the bulk of star light is diffracted into the first of multiple spectra that the grating produces.

First Light

Trial and error is one way to see what works well, and what might not. The first piece of business with this type of spectrograph is to properly orientate the grating. The idea is to position the grating’s rulings parallel to the pixel array of the camera, eliminating the introduction of artifacts into the imaged spectrum. Because the grating attaches to the nosepiece of the camera like a standard 1-1/4” eyepiece filter, it is a matter of rotating the grating cell on its threads until aligned, and locking it in position. When aligned I use a small piece of scotch tape to hold the cell in place.

Facilitating the alignment requires locating a star, finding focus, checking alignment on the monitor screen, removing the camera, tweaking the rotation of the cell, re-taping, insert the camera, re-acquire the star, and so on. This for me is a tedious affair at best. Then I stumbled upon a tip on how to quickly align the SA100 grating to a CCD. Looking down the barrel of the camera nosepiece watch the reflection of the CCD on the backside of the grating (you will see two chips). Rotate the grating until both CCD chips superimpose, now the grating rulings are parallel to the pixels! Perfection in one fatal swoop and done in the light, not the dark.

Generally speaking a greater separation between diffraction grating and CCD produces a higher dispersion of the spectrum. However, the more a spectrum is spread the dimmer it becomes. The best arrangement for a novice is a separation which places the zero-order target image just inside the frame of the camera (left side), and the first-order spectrum totally visible near the center field of view. Depending on the physical size of the CCD the separation may be in the 40-55 mm range. Additional spacers if needed can be used to increase the separation of the grating and CCD. Again, trial and error is one means of finding optimal separation for a given telescope, grating, and camera.

Capture the Spectrum

Imaging a spectrum (called the spectrogram) is a bit like deep sky imaging except the target may be only a single star. Focus and exposure will be geared for recording the first-order spectrum, not the zero-order stars. Ideally, during exposure, the brightest part of the spectrum should be just below the saturation point of the pixels. Depending on the analyzing software, spectra may be captured as either a video, a single frame, or as a live monitor view. My technique has been to capture a 10-30 frame AVI video clip, from which to either extract individual frames, stack selected frames, or average frames in the analyzing program. Figure 2 shows a typical spectrogram as obtained with the 102mm f/7 refractor and SA100 grating.

In the converging beam slit-less spectrograph a spectrum is created as a series of overlapping images of the zero-order stars. The resolution of the spectrum is therefore dependent on the size of the airy disc formed by the telescope, as well as the quality of the seeing conditions. Short focus, low focal ratio instruments because of the small disc formed work best; many experienced observers say that an f/5 focal ratio is about ideal. The focal ratio can be native or obtained with a focal reducer. Poor seeing conditions will expand the airy disc of the target star resulting in a loss of resolution and smearing of fine spectrum detail.

Processing the Spectrum

After a spectrum is captured, the next step is to process it. Processing can include extracting or combining superior camera frames, applying various corrections, and through mild sharpening improving the visibility of spectral features. Calibration of the spectrum for wavelength is also necessary at this point.

Figure 3 is a graph illustrating spectral intensity verses wavelength of magnitude -1.46 Sirius, called a calibrated raw profile. This star is of a bright, spectral class A1V main sequence variety, a great first target because of its strong Hydrogen Balmer lines. Spectral calibration can be accomplished by locating the position of a feature and assigning its wavelength relative to the zero-order image; the easily identified Hydrogen lines are ideal for calibrating.

Several freeware programs are available for analyzing spectra, however I found it advantageous to spend a few dollars, and invest in the Rspec software developed by Tom Field. Rspec is powerful and an educational software, supported by an extensive how-to library, user group forum, and an online web site with a direct line to the developer. For my circumstances, Rspec is a perfect fit!

Spectral Analysis

Work in spectroscopy is accomplished in three stages: capture, processing, and lastly the detective work of identifying spectral lines. The latter phase I’ve definitely found a challenging, but edifying experience. If you enjoy solving riddles or working puzzles, this activity would be invigorating for you.

To the uninitiated, a spectral profile doesn’t look like much more than a lot of wiggly lines. But to a spectroscopist the dips, peaks, and widths represent locations and intensities of dark absorption and/or bright emission lines. Careful examination of even low-resolution spectra can give clues to a star’s spectral classification (OBAFGKM), chemical composition, temperature, and in some instances Doppler shifts. At the time of this writing I have barely scratched the surface of observational possibilities, continuing to focus my efforts on the identification of spectral lines, and developing an understanding of the differing stellar classes. Line identification is facilitated by the built-in reference features of Rspec, published spectroscopic atlases, on-line reference sources, and the annotated spectral profiles of professional and amateur spectroscopists.

A low-resolution spectrum as formed with my equipment requires careful and cautious examination of features. Noise in the spectrogram, such as created by the electronic camera, adds spurious wiggles among legitimate features confusing identification. Light pollution and atmospheric absorption do the same. The so-called signal-to-noise ratio of a spectrogram can be improved by limiting background illumination and using dark frames to control camera noise. With low-resolution spectrographs, several nearby spectral lines may blend to form a single line; sorting out these anomalies adds to the detective nature of this work.

Data presentation is a report of your findings. Figure 4 shows an intensity-normalized spectral profile of the class A3V, 2.1-magnitude star Denebola (Beta Leo). Normalization is a process applied to a raw profile to equalize the spectrum helping to make features readily visible but does not preserve the expected black body radiation curve. Cropped to 4000-7600 angstroms, we see absorption lines labeled (annotated) with wavelengths and element names. The features are quite typical of a class A star. Notice the deep dips of the Hydrogen lines—this element dominates with A stars, showing boldest in class A0. A few ionized metals (Fe and Mg) are faintly visible, while in the deep red to near infrared we find the Fraunhofer A and B atmospheric oxygen and the Telluric H2O contamination (Earth's water molecules) at 7186 angstroms.

Find Out More

If this activity seems interesting, let me give you fair warning! Spectroscopy can be a habit-forming endeavor that prompts the observer to keep searching deeper. When the spectro-bug bites it bites hard, but be assured you'll have a rewarding and fascinating experience.

There are a number of on-line sites with volumes of information regarding low and high-resolution spectroscopy. Material abounds on the subject, but if you are like me—a novice to this branch of astronomy—locate and read the article A Spectroscopy Primer for the Amateur Astronomer, by David Doctor as found in the March 2014 issue of the REFLECTOR magazine. This treatise is a wonderful place to start with David clearly explaining many of the fine points of astronomical spectroscopy. From there search out on-line and hard copy material, user group forums also offer guidance from experienced amateurs and connect you with like-minded observers—detectives to help answer the riddles found in the stars.

Jamey Jenkins has been an avid observer of the Sun for many years and a sometimes author. His most recent book is Observing the Sun: A Pocket Field Guide, published by Springer, 2013.

Figure 1. A simple converging beam slitless spectrograph can be created with the addition of a screw-in transmission grating before a camera.

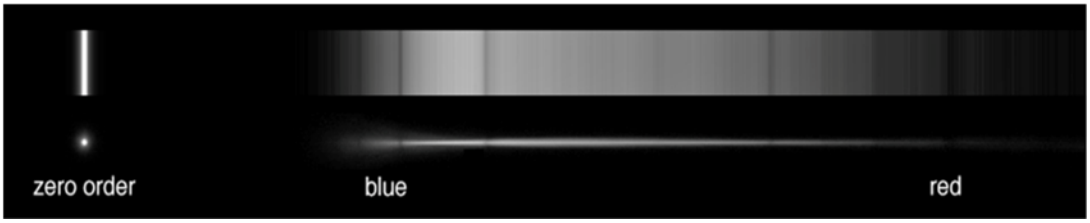


Figure 2. The lower image shows the appearance of a raw spectrum (Denebola) as recorded with the DMK41 camera. Zero-order is the target star with the 1st order spectrum formed to its right. Spectra do not have to be recorded in color; in fact, monochrome images have a better resolution. The blue wavelengths are on the left, the red to the right. A strip spectrum as above can be formed by drifting the spectrum at the telescope during exposure, or by digitally stretching the spectrum during processing.

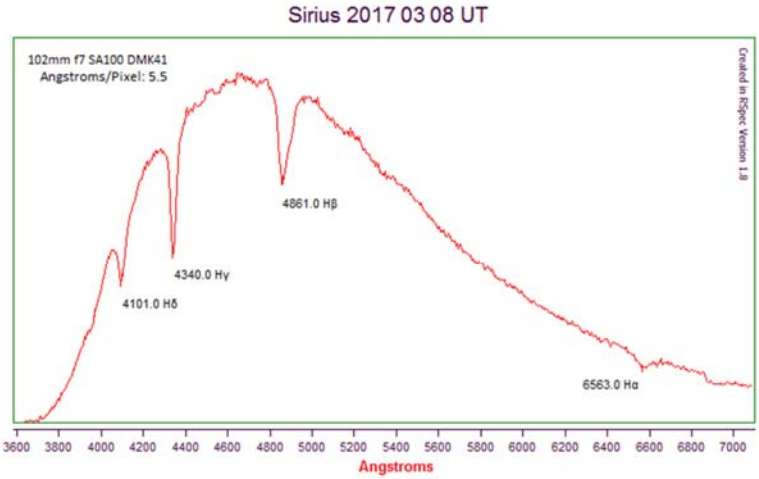


Figure 3. Left. Raw profile of Sirius. The hump of the graph is the result of the star color and the spectral sensitivity of the camera. The primary Hydrogen Balmer lines are labeled.

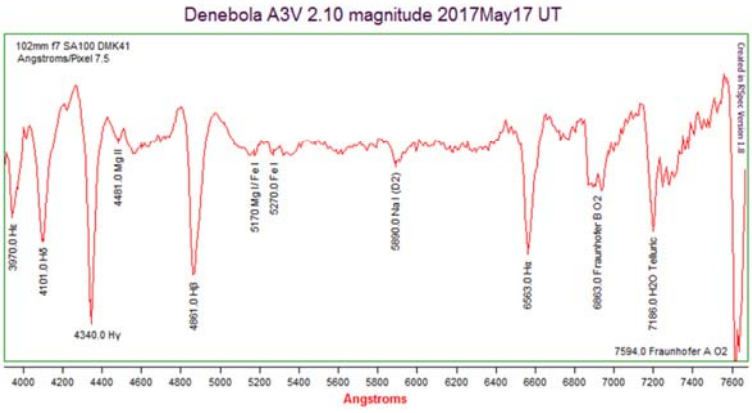


Figure 4. A raw profile of Denebola (Fig. 2 spectrum) has been processed through a technique called normalization, which removes the hump and equalizes the spectral intensities. A variety of absorption lines are identified.

Space Law: An Overview of How the Heavens are Legislated

by Ellen Tsagaris, Popular Astronomy Club

Space is indeed the final frontier; the only geographical area comparable on earth is Antarctica. In some way, space has been apportioned like Antarctica has, with various international governments claiming land and space, but not the whole. In fact, space is governed by an assortment of treaties and international conferences which basically state that no one entity can own the moon, individual celestial bodies, or the heavens and galaxies that surround them. What follows is a brief survey of those laws, but as complicated as these laws are, this article is not intended to be another hitchhiker's guide to the galaxy.

After Sputnik 1 was launched October 4, 1957, the United States and other countries began to realize the legal implications of space exploration. Before Sputnik's launch, Matthew J. Kleiman observes in "Space Law, 101", that "the legal status of space was unclear" (Kleiman, n.d.) Outer space was treated legally as airspace was treated; national sovereignty included the air space above a country's territory (Kleiman). As early s 1919, international law accepted this definition of air space. According to such a definition, Sputnik orbiting the earth would have trespassed on the air space of every country it flew over. The United States more or less looked the other way, certainly not "up." (Howell) President Eisenhower indulged the Soviets because he had hope of the US overtaking them in the space race. As a result, rules governing "outer space" began to change, especially those dealing with aircraft.

Today "space law" means international and national laws that rule and govern what we as humans do in outer space (Kleiman). The laws will further evolve with the growth of private entities seeking to pick up the space program where the space shuttle program left off.

The International Institute of Space Law, IISL:

Nearly fifty countries belong to this global organization that promotes peaceful use of space. IISL's mission is "the promotion of further development of space law and expansion of the rule of law in the exploration and use of outer space for peaceful purposes." (iislweb.org) In connection with the ECSL or European Centre for Space Law, IISL holds an annual symposium. Other events include the International Astronautical Congress.

Apparently, the answer to the question of "who owns the moon" is no one, and everyone. (Space.com) While the flag of The United States presumably remains firmly planted on the lunar landscape, the moon isn't exactly a candidate for statehood. In fact, the Moon Agreement of 1979 is a treaty signed by 16 nations. It sets standards for use and exploration of the moon. All nations apparently have the right to explore the moon and space in general. The United Nations has been active in implementing international space treaties, just as it has been active in implementing treaties among nations on Earth.

The most important standard of all that is common to all space treaties dictates that the moon and space in general should be explored for the benefit of all people of the earth. (U.N. Office for Outer Space Affairs). Since 1968, The United Nations has hosted four conferences dealing with the use of outer space. Most space treaties forbid the orbit of nuclear weapons and stress that all nations have the same equal rights to space exploration. In a way, space-faring treaties are similar to seafaring treaties and rules, including Hugo Grotius' *Law of the Sea* (1609). Piracy is forbidden in both sea and sky by all laws that deal with either.

Several other treaties were written during the sixties, seventies, eighties and nineties that dealt with the use and exploration of outer space. (Space.com) These include The Rescue Agreement (1968), The Liability Convention (1972), The Broadcasting Principles (1977), The Remote Sensing Principles (1986), The Nuclear Power Sourcing Principles (1992), and The Benefits Declaration (1996). These agreements all deal with rescuing astronauts and legal liability of space travel, use of satellites, use of television broadcasting signals in space, and more. Apparently, the idea of avoiding a real Star Wars scenario was in the minds of those who draft such treaties.

While modern space explorers continue to travel boldly where no one has gone before, new laws and regulations will accompany them. As private space tourism evolves, the law of space personal injury will also grow, and with it, a new legal specialty in space will skyrocket.

References

Grotius, Hugo. *The Law of the Sea* (1609). Brill-Nijhoff, 2015).

Howell, Elizabeth "Who Owns the Moon? Space Law and Other Space Treaties." Retrieved from www.space.com.

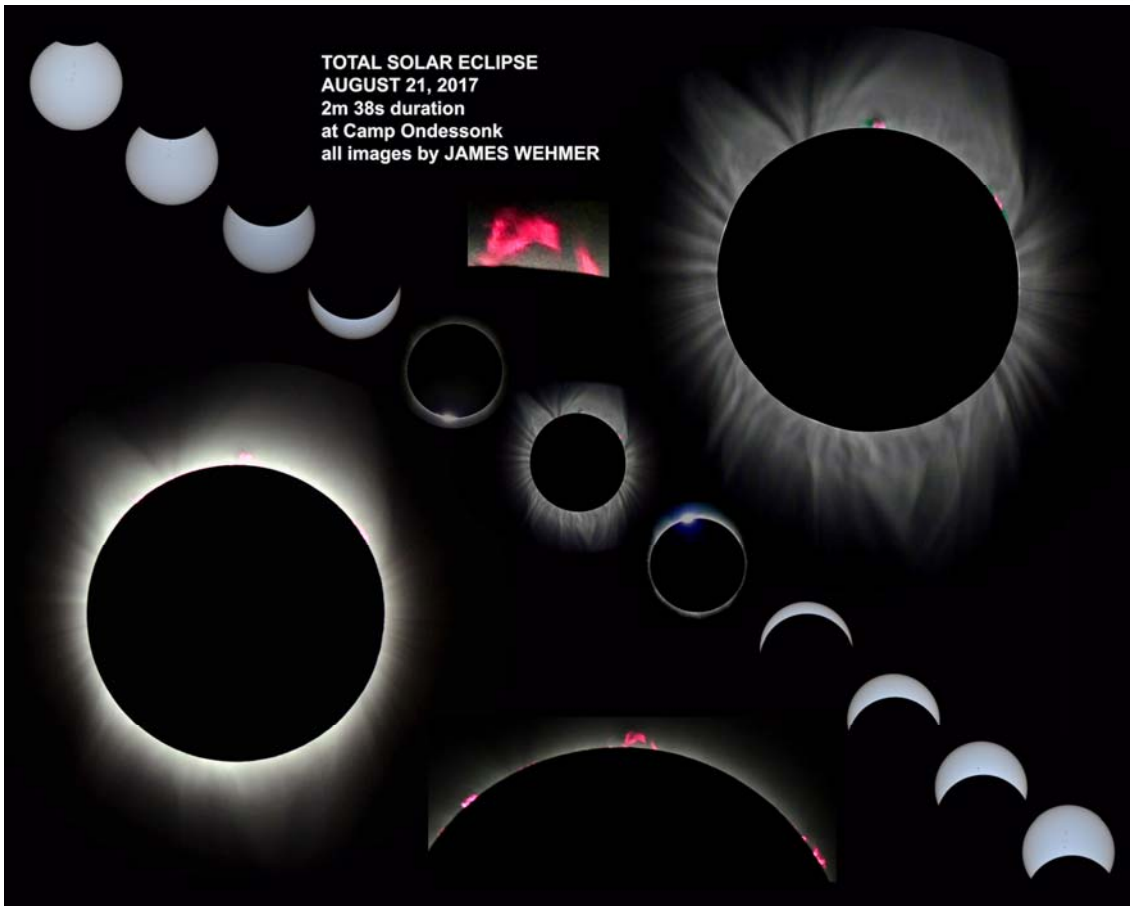
International Institute of Space Law. Retrieved from http://iislweb.org/?s=index&search_404=1

Kleiman, Matthew J. "Space Law 101: An Introduction to Space Law." Retrieved from https://www.americanbar.org/groups/young_lawyers/publications/the_101_201_practice_series/space_law_101_an_introduction_to_space_law.html

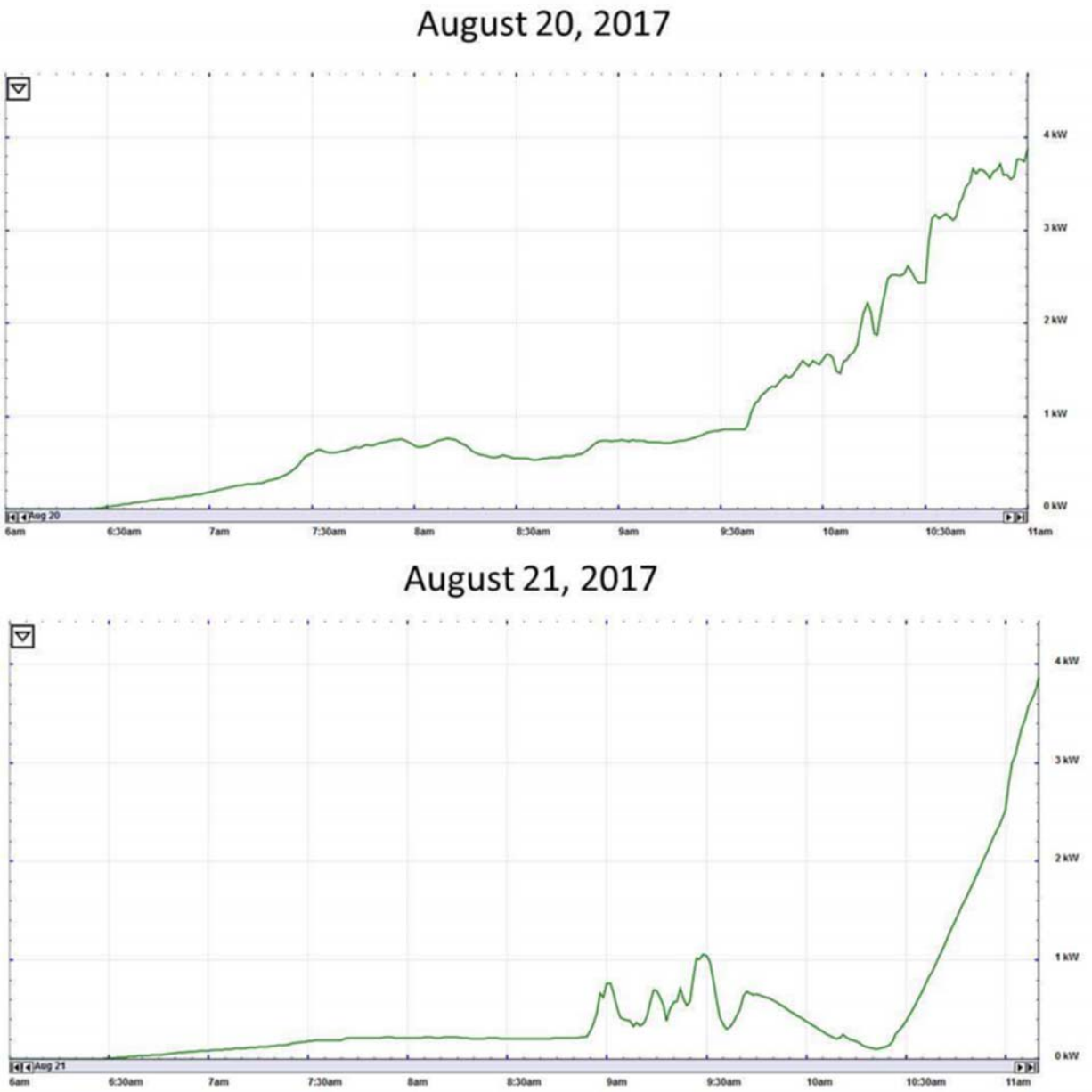
United Nations Office for Outer Space Affairs.
www.unoosa.org

Some Images from the August 21st Total Solar Eclipse

Champaign-Urbana Astronomical Society member James Wehmer took the above images during the August 21st total solar eclipse. He used a Nikon D3100 camera and Meade LXD75 6-inch f/5 Schmidt-Newtonian telescope without filters. All images of prominences were taken a 1/4000 sec. The diamond ring was shot at 1/1250 sec. Totality was shot at 1/250 sec. All images were taken from Camp Ondessonk near Ozark, Illinois. To the right are some additional pictures by Jim.



Solar Insolation Drop



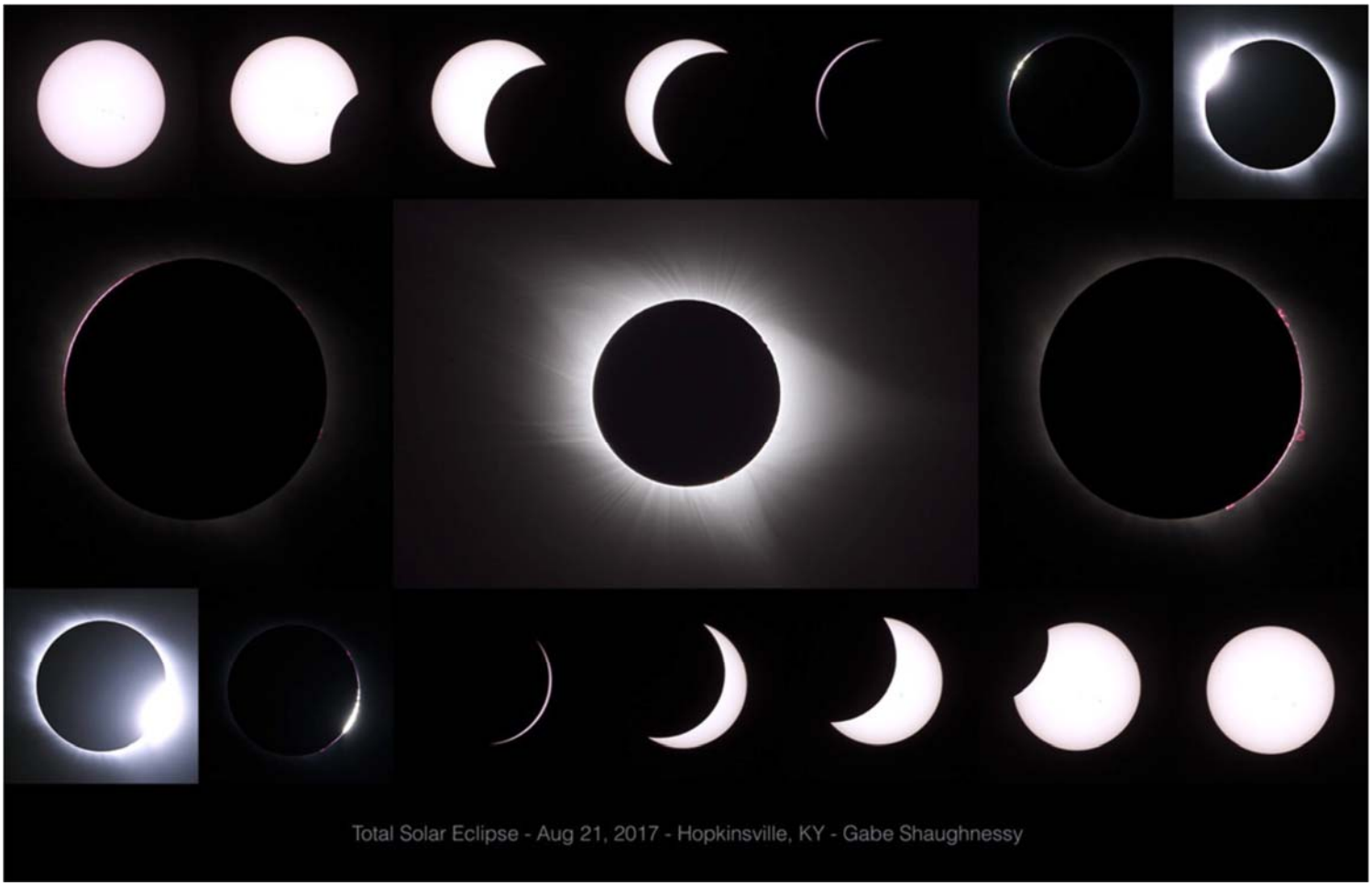
Paul Pouliot of the Twin City Amateur Astronomers provided two graphs of the power output of a household array of solar panels at his brother Tom's house in Seattle, WA. There are several factors that influence the power output such as a passing bank of fog and the orthogonality of the sun's rays with respect to the solar array, but the difference between two days of data are clearly evident. Note the dip in the second graph starting around 9:30 a.m. The power output does not attain the previous day's level until after 11:00 AM. The eclipse ran locally from 9:06 a.m. to 11:39 a.m.

Eclipse Animation

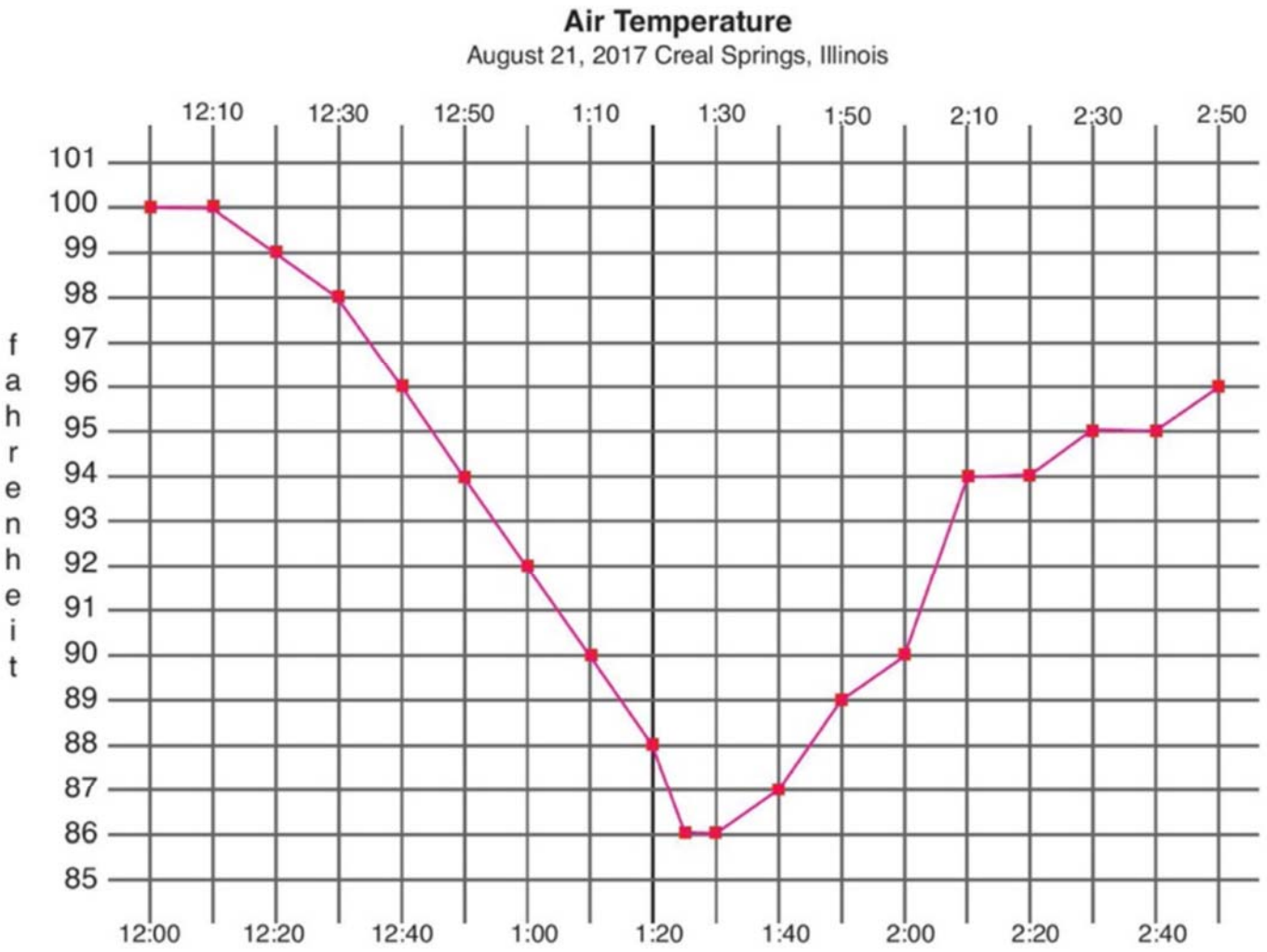
Jamey Jenkins of the Twin City Amateur Astronomers put together an eclipse animation from the images he obtained of the August 21st event at Creal Springs, IL. The animation video can be found here: https://goo.gl/FuPWCm

Images from Hopkinsville, KY

Gabe Shaughnessy, a member of the Racine Astronomical Society, submitted a few eclipse photos taken at Hopkinsville, KY, for your viewing pleasure. Included is a collage of the partial phases and totality as well as some larger images of totality. Equipment used consisted of the following: TMB92SS Scope, Nikon D61 camera, Mach1 GTO + T-pod 130 mount, Televue 2x Powermate Barlow, Baader Astrozap solar filter, and the use of *Solar Eclipse Maestro* for acquisition.



Eclipse Air Temperature Drop



Jamey Jenkins (TCAA) provided a graph of the air temperature recordings taken throughout the eclipse by his son-in-law Chris Morgan. He noted a drop of air temperature at their observing site of 14 degrees Fahrenheit overall. According to Jamey, "This made for a 'cool' experience. Also, the cicadas were quite loud at the onset of totality, but quieted down with the return of the Sun. Even our 2-year-old grandson Finn wanted to take a nap on his grandmother's lap…but changed his mind when he realized it was still daytime!

Thanks DPAS

by Dan Andrae, Door Peninsula Astronomical Society

I recently retired to Door County (Wisconsin) and found that there is an astronomy club there – the Door Peninsula Astronomical Society (DPAS). I joined it even though I am only an armchair astronomer. I have a hard time staying up late and don't have a telescope. The meetings are informative and it's a great group of people.

When they mentioned they were setting up a trip to the total eclipse August 21st near St. Louis, I was all for it. It would give me a chance to take a road trip with my wife and daughter to see a possibly once-in-a-lifetime event. We hadn't taken a family road trip in 20 years since a "4 corners" southwest trip in an RV. My wife Marji and I picked up our daughter who just graduated from grad school at UW Madison and we were off.

We stopped at a few sites along the way to St. Louis like Cahokia Indian Mounds in southern Illinois. We even stopped at a Cracker Barrel for standard huge "on the road" lunch. The DPAS group met the night before to talk about details and discuss the local network news that was the buzz. We also got plenty of gas and food for the upcoming eclipse/apocalypse. We heard that it was going to be crazy – the most photographed and witnessed predictable natural event in history.

We got up early on the 21st expecting the worst. I opened

the curtains to check the world and nothing. There was no major auto traffic; everything looked normal. We checked with another couple who left early for the viewing site and they said the only thing they noticed was a longer line at the McDonalds drive thru. We got our things together and headed out to the viewing site about an hour and a half southwest of St. Louis, allowing an extra hour or so because of traffic. But there were no traffic problems at all as we made our way to the site. As we got closer, we notice people selling solar glasses for $4/pair whereas we got ours for free from DPAS. They were also asking for $40 to park in an un-shaded asphalt parking lot when it was 96°F and humid. We got concerned about what we were in for.

The site DPAS President Gary Henkelmann had arranged was ideal – a grassy shaded hill that a resident allowed us to use. The owner even opened her house to the group for a bathroom. PDAS members were already there and had their scopes set up in anticipation. Then the moment approached when the moon started to eclipse the sun and there was a lot of "ooohing" and "ahhhhing". But when the moon totally eclipsed the sun it was magnificent – the light changed quite quickly to something never before seen by me – otherworldly yellow/gray. Bugs started making noise, and it was like a sundown all around the horizon from the hill we were on. We all were looking at the sun now without any equipment and looking at each other knowing that this was truly an amazing moment. I thought the corona (Latin for "crown") was the most amazing thing – the aura of plasma that surrounds the sun, millions of degrees Fahrenheit, hotter than the surface, and extending millions of kilometers into space. WOW – it was the fastest 2 ½ minutes of my life. Then came the diamond ring and the continuing movement of the moon across the sun.

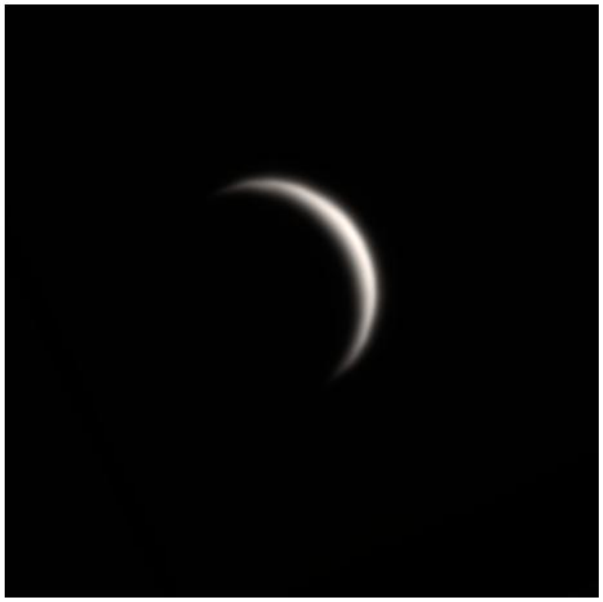
We all packed up for the trip back home, and then found traffic problems as we got closer to any major highway and St. Louis. It was definitely worth the 10-hour trip to the site. Thank you Gary Henkelmann and the DPAS folks for setting up the experience.

DPAS eclipse observing trip: *The author, Dan Andrae, is in the tan shirt 5th from right in the front row. To his right is his daughter Richelle (wearing a white head band), and to her right Marji who is wearing the pink shirt. DPAS President Gary Henkelmann is located behind the Andrae family in a blue shirt with his hands near his solar glasses.*

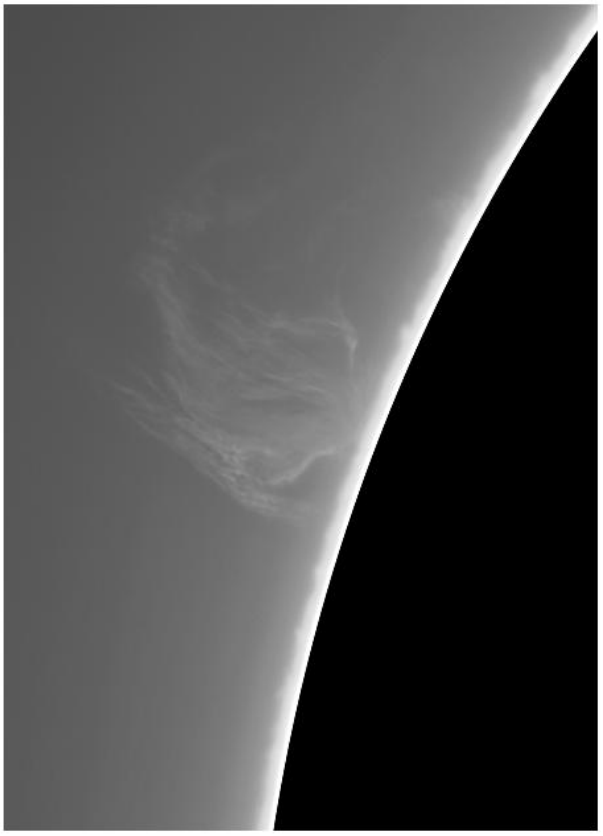
NCRAL Photo Gallery

NGC 5907 by Tim Stone, Twin City Amateur Astronomers. Image produced using both a PlaneWave CDK 20" and AG Optical 16" telescopes with an STX16803 camera at the Prairie Skies Observatory near McLean, Illinois.

NGC6888, the Crescent Nebula in Narrowband (HaSIIOIII) by Jim Gibbs, Twin City Amateur Astronomers. Taken at the Sugar Grove Nature Center near McLean, IL on July 7th.



Venus by Jamey Jenkins, Through the 12-inch f10 SCT at Sugar Grove Observatory on 9 March 2017 at 0001 UT. McLean, Illinois.



Ghostly prominence on the NE limb of the Sun, August 18 @ 1437UT. By Jamey Jenkins from the Twin City Amateur Astronomers.

Editors Note: If you have astroimages or Star Party related pictures you would like to see publish in this section email them to jrgibbs@msn.com by December 10th. Please include a brief description, your club affiliation and dates taken.

Observatory Equipment for Sale

The late founder of the Sangamon Astronomical Society, Don Jardine, owned and maintained an observatory on his property north of Berlin, Illinois. Now, a year after his passing, Don's wife Virginia has decided to sell the property on which both home and observatory occupy. The observatory is enclosed with a 10-foot diameter Ash dome with lower drop out dome slot. The observatory houses a MEADE LX 200 telescope. Adjacent is milling shop with a metal lathe. These items are for sale and must be transported from the property by the buyer. Delivery by the seller is not negotiable.

The Ash dome might be more than 40 years old but has been serviced by Ash as recently as 10 years ago. Rotation of the dome is motorized, but slot is manually controlled. The asking price for the dome is $10,000; however, this is a negotiable

The telescope is a Meade LX 200 14-inch f/10; it is about 15 years old. It has most of its accessories. The telescope is believed be functioning well, but has been used little in the past few years. The telescope has no tripod, but the mounting rests to a concrete pier inside the observatory. The asking price for the telescope is $2500, and is negotiable.

The metal lathe is a Smithy Granite model 1324. Accessories and tools that came with the lathe are included. The asking price is $1000 and is negotiable.

If interested in acquiring any of these items, contact Matthew Will at matthew.will@att.net to make arrangement for inspecting the dome, telescope, or lathe. He is accepting quotes on behalf of Don's wife Virginia and she will have the final say on the terms of the sale.