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## DECEMBER CLUB EVENTS

The year's last **members-only observing session** will take place at SGNC on Saturday, December 4<sup>th</sup> – the Saturday evening closest to new moon – if a clear sky prevails and it's not too cold and windy. With the change from daylight saving time back to standard time last month, sunset will occur quite early. (With the listserv for any last-minute announcement.) Sunset occurs at 4:29 p.m. on this date, with the end of astronomical twilight occurring at 6:07 p.m. Observing, in the main, will begin around 7 p.m. though some will likely arrive earlier to take advantage of the prevailing darkness.

The club will hold its traditional **Saturnalia/Holiday Party** on Saturday, December 18<sup>th</sup>. Our hosts will be Donna and Dave Osenga who have most graciously agreed to open their warm and wonderful home to us once again. Their address is 1109 N. Linden, Normal, and their home phone is 452-4336 if someone needs directions after getting lost. They are the 5<sup>th</sup> house on the west side of Linden, north of Lincoln Street. They have two garage doors and a basketball hoop on the driveway. Please use the driveway or the street in front of the house to park. Start time will be 7 p.m. TCAAers are asked to bring snacks to share and Donna and Dave will have some soft drinks, apple cider and coffee on hand. Members are invited to bring any "cool" astronomy videos or other items that they would like to share. Last year we had a good turn out and attendees had a great time. You'll not want to miss this event.

A **total lunar eclipse** will take place during the night of Monday/Tuesday, December 20/21, 2010. It will be visible in its entirety as seen from across the USA. The beginning of the total eclipse will be visible from northern Europe just before sunrise. The end of the total eclipse will be visible rising at sunset for Japan and northeastern Asia. This will be the first total lunar eclipse in nearly three years, the last being on February 20, 2008.

The barely discernable penumbral phase of this eclipse will begin at 11:27 p.m. (all times CST) on Monday evening; the readily discernable umbral phase will begin at 12:32 a.m. on Tuesday morning. Totality begins at 1:40 a.m. and mid eclipse occurs at 2:17 a.m. At mid eclipse, the moon will be located some 55 degrees above the west-southwestern horizon. Totality will end at 2:53 a.m. The umbral phase of the eclipse concludes at 4:02 a.m. and the penumbral phase ends at 5:06 a.m. Totality will last a total of 1 hour, 13 minutes. The umbral phase will last 3 hours and 29 minutes.

The TCAA leadership is making arrangements now for a public observing session at Fairview Park in Normal. The TENTATIVE public viewing session is planned to run from 12:30 a.m. to 2:00 a.m. – a mere 90 minutes in light of cold and possibly windy weather. If this event is approved by the Normal Parks & Recreation Department and the sky is clear, TCAAers with telescopes should arrive in time to set up south of the loop drive at the west side of the park and view the start of the umbral phase of the eclipse at 12:32 a.m. Those electing to stay throughout the entire event will be free to do so. Watch the TCAA listserv over the coming days for confirmation of this event.

## PASSINGS OF NOTE

June Barling, Brian Barling's mother, passed away on November 5<sup>th</sup>. Carl Wenning attended the funeral on November 9<sup>th</sup>. He extended condolences to Brian and his wife Teresa on behalf of the club. E. Marcus Bock, father of former TCAAer Garth Bock, passed away on November 6<sup>th</sup>. Garth was active in the club in the 1980s and was a close friend of President Jim Moncher.

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#### **Membership Dues**

Individual Adult/Family \$40  
Full-time Student/Senior \$25  
Electronic Newsletter \$25

To join the TCAA, send your name, contact info and dues payment to  
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## **MINUTES OF THE NOVEMBER 2ND BOARD MEETING**

The meeting of the TCAA Board was called to order by President Dave Osenga at 6:40 p.m. In attendance were Dave, Carl Wenning, William Carney, Paul Pouliot, Lee Green, Duane Yockey, Dan Miller and Bob Finnigan. Before the meeting was called to order, past TCAA president Bob Finnigan announced that he is donating a new CGE-Pro mount to the club! This will be mounted in the observatory to support the C-14 telescope that Bob recently donated. Thank you, Bob, for your generosity!

The minutes of the previous meeting were reviewed and approved unanimously. Lee Green had no issues to raise as Secretary. As webmaster, he noted that the web site continued to receive messages from people and that the club now had 26 "Likes" on Facebook. Treasurer Duane Yockey submitted the monthly financial report that reflected little new activity. He reported that he continues to forward information received from the Astronomical League through the listserv. Lee submitted his application for honorary membership in the Messier observing club.

William reported that repair on the recently donated C-14 were still ongoing. William then indicated that the Meade fork mount had tentatively been sold for \$250 and that once the transaction was complete, the money would be remitted to the club. The Meade tripod and optical tube remain in the possession of the club. Dan reported that he had made good progress preparing the C-14 mount and that it would be ready to support either the C-14 or the 12" Meade tube. Since the mount handset was not available and the RA drive seemed to be tracking well, it was agreed that the drive should be made minimally functional and set up with a simple on-off switch.

The Board approved payment for copies of the *History of the TCAA 1960 – 2010* that were given to William Carney and Bob Finnigan.

Our recent public outreach activities were reviewed. Our October POS had over 80 people attend and the SGNC Autumn Celebration had light crowds due to rainy weather, so only 100 people stopped by the observatory. Dan reported that he had 60 people at his Easter Seals event at Millikin. He announced that he would be hosting the Taylorville Middle School on November 10 and would appreciate if any members could assist. The 2011 POS calendar was discussed briefly. Lee and Carl agreed to jointly review the calendar and report back.

The SGNC is considering improvements in the building adjacent to the observatory and has asked the club if we were interested in having a partitioned storage area in the building. The Board was definitely interested and directed Carl to communicate our desires back to the SGNC Board. Discussions touched upon our desire for a secure, watertight partition. Dan suggested a (20'x8') short storage container could provide a solution that met our requirements and that the cost of such a structure would be around \$1500.

We next talked about the club's awards and how the G. Weldon Schuette plaque had one spot remaining. The idea of establishing a "Distinguish Service Citation" award was floated, although it was noted that this award for the only one to recognize observing skill. Carl agreed to review similar awards to consider possible language for a new award, but since there remains one spot, discussion was tabled until a subsequent meeting. Carl also agreed to write an article for *The OBSERVER* to call for award nominations.

We then spoke about ideas for updating the club's website. Carl noted that the club history had been updated and that the several history pages were out of date. Lee noted that having the history presented on several pages was helping our page ranking and promised to update these pages for review. It was agreed that making the link for joining the listserv more prominent was desirable. Bob suggested that having a forum or blog would be a good idea. Those would serve for posting tutorials and would provide a place for displaying members' astrophotos.

Carl reported that the Challenger Learning Center will be sponsoring a program about astronomy and space science next year and has contacted us about helping to suggest speakers. We discussed a few possible candidates.

Our 2011 annual meeting will likely be held on February 5. Carl has been in contact with ISU about scheduling Turner Hall, our traditional meeting location, and with the Catering club. We discussed several possible topics, including mythology of the constellations. One possible speaker was mentioned, but no firm decision was made. Dan noted that the latest version of Google Sky now provided overlays of a mythology from several cultures. Carl agreed to provide a sample program for the meeting to Dave.

Dan announced that he would be leading a trip to Cape Canaveral for his students to witness the liftoff of the last Space Shuttle. While plans are still being set, there may be space available for a few members to join him.

We discussed the possibility of giving a token of appreciation to Erin Estabrook for the outstanding job she has been doing as the editor of *The OBSERVER*.

Finally, we also agreed on the desirability of having a holiday party and noted the unexpectedly large turnout at last year's event that was held at Dave's home. We will consult with the powers that may be and announce plans in the near future.

Respectfully submitted,  
Lee Green, Secretary

## CALL FOR NOMINATIONS

Each year at the club's Annual Meeting, the membership elects a board of directors to serve for the next 12 months, and members are recognized for their service to the club. This year will be no different.

Nominations are needed for the Board. Five nominees are needed to "take the reins" of the club. As the TCAA is a legally incorporated body, the Board of Directors formally runs the business of the club under Illinois law. Its members elect the head of the Board, and this person becomes president of the club. The Board then appoints members to the positions of vice president, secretary, treasurer, historian, property manager, and so on. These appointees need not be members of the Board, but are expected to attend Board meetings every other month.

Nominations are needed for the G. Weldon Schuette Society of Outstanding Amateur Astronomers. This award recognizes a TCAA member who has demonstrated great skill in observing, dedication to the club's education and public outreach efforts, and commitment to providing service to the membership. While holding the AL's Messier Award is recommended, it is not required by the Standing Rule that established this award in 1987. If it is awarded this coming February, it will be the twelfth and last time this award is given. It will likely be replaced by a distinguished service citation next year. Lee Green was our award winner at the last Annual Meeting.

Nominations are needed for the John and Bertha Kieviet Founders Award. This award is conferred upon a TCAA member to recognize demonstrated leadership to the club. Those so recognized need not have been a president of the club. If leadership is interpreted in terms of service to the membership, this is as close as the TCAA comes to having a distinguished service citation. The award was not presented last February.

Nominations are needed for the Eugene and Donna Miller Family Award. This award acknowledges the strong efforts by a family to participate in the club as a unit. One or more parents are recognized for their efforts to instill within their children interest in and dedication to amateur astronomy. Paul Pouliot was our winner last February.

Nominations will be accepted for Lifelong Honorary Membership. This designation is reserved for those TCAA members who have provided exceptional meritorious services to the club in terms of contributions of time and resources. This signal honor has been conferred only five times in the 50-year history of the TCAA.

To see who has previously been recognized with such awards, be certain to check out the club's historical volume *History of the Twin City Amateur Astronomers 1960-2010* available in book form or online at [http://www.tcaa.us/Download/TCAA\\_History.pdf](http://www.tcaa.us/Download/TCAA_History.pdf).

Please e-mail your nomination(s) to President Dave Osenga at [DaveOsenga@msn.com](mailto:DaveOsenga@msn.com). If recommending candidates for the Schuette, Kieviet, or Miller awards, a short description explaining why you feel the nominee(s) deserve(s) the award(s) is required. The current Board of Directors and appointed officers will make decisions about the awards during the January 4<sup>th</sup> Board meeting, so be certain to get your nominations in by new year's day at the latest.

## UPDATES FROM THE HISTORIAN

With the club's history in focus lately, two members have contributed personal items to the club. Dan Miller contributed nine photographs dealing with the construction of the SGO; the photographs were taken on June 23, 2000, as the observatory was nearing completion. Bob Finnigan contributed four photographs dealing with a field trip to Cahokia around 1980. He also contributed a book that he used to log confirmed Messier club observations from 1977 to 1980. He also provided the club a painting by Weldon Schuette showing the horizon at Cahokia and used in an Astronomy Day display at Eastland Mall back in the mid to late 1970s.

In addition to those who have already received a copy of *History of the Twin City Amateur Astronomers 1960-2010*, Historian Carl Wenning reports that Duane Yockey and Sandy McNamara have also obtained copies. If you wish to obtain one of the remaining copies, send a check for \$54.50 to Carl Wenning, 21 Grandview Drive, Normal, IL 61761-4071. Make the check payable to Carl Wenning. This amount includes \$5 for shipping. Only two (2) copies of this heirloom edition remain for sale. Once the remaining copies are distributed, they will no longer be available.

Carl continues to update the historical CD for distribution – ostensibly at the February 2011 Annual Meeting. If you have any photographs or anything else that you'd like to contribute to the club's historical repository, please contact Carl as soon as conveniently possible.

Sharon MacDonald has been in contact with Bill Kemp, librarian and archivist of the McLean County Historical Society, on behalf of the TCAA. The Society is willing to take charge of the club's historical records if the club so desires. They will keep secure into perpetuity any original historical documents the club cares to deposit with them. This is something that the Board of Directors might want to consider at an upcoming Board meeting.

After serving as Historian of the TCAA for the past 10 years, and after having completed the club's 50<sup>th</sup> anniversary historical volume, Carl has decided to step down from this appointed office when his current term expires in February. This will provide others the opportunity to write articles for *The OBSERVER* in order to document the club's activities. Carl agrees to continue providing updated electronic versions of the *History of the Twin City Amateur Astronomers 1960-2010* as long as he is able to do so.

## NOVEMBER EDUCATION/PUBLIC OUTREACH

### NOVEMBER SKY GUIDE

<b>01</b>	Mercury is at greatest eastern elongation (21°), 10 A.M.	
	The Moon passes 8° south of Saturn, noon	
<b>02</b>	The Moon passes 6° south of Venus, 3 P.M.	
<b>04</b>	Venus is at greatest brilliancy, 4 A.M.	
<b>07</b>	The Moon passes 1.8° north of Mercury, 3 A.M.	
<b>11</b>	The Moon passes 5° north of Neptune, 9 A.M.	
<b>13</b>	The Moon passes 7° north of Jupiter, 8 P.M.	
<b>14</b>	The Moon passes 7° north of Uranus, midnight	
	Geminid meteor shower peaks	
<b>19</b>	Mercury is in inferior conjunction, 7 P.M.	
<b>21</b>	Total lunar eclipse, 2 A.M.	
	Solstice (northern winter/southern summer begins), 6 P.M.	
<b>22</b>	Asteroid Pallas is in conjunction with the Sun, 11 A.M.	
<b>26</b>	Pluto is in conjunction with the Sun, 7 P.M.	
<b>28</b>	The Moon passes 8° south of Saturn, 9 P.M.	
<b>31</b>	The Moon passes 7° south of Venus, 10 A.M.	

Carl Wenning provided three talks to an astronomy class at Roanoke Benson High School starting on the afternoon of November 10<sup>th</sup> (The Shape and Motion of Earth). He also gave talks on the 15<sup>th</sup> (Newton and Gravity) and 22<sup>nd</sup> (Life in the Universe). The class contained 11 students, and is a follow up from the school observing session conducted by Lee Green and Carl on October 29<sup>th</sup>.

On the evening of November 10<sup>th</sup>, Dan Miller hosted a session at Millikin University for a school group. Five classes of 6<sup>th</sup> graders from Taylorville visited for a tour of the observatory and participated in several science events. Dan led the event giving a quick overview of stellar evolution. Lee Green was on-hand to assist showing the 20" telescope at the Requarth Observatory. Other activities included looking through other telescopes at a variety of objects and experiencing the effects of a static electric generator.

On the evening of November 18<sup>th</sup>, Lee Green presented an informational program for the ISU Horticulture Club that held a meeting at SGNC. Also in attendance were Bob Finnigan and Carl Wenning. Starting around 8:20 p.m., Lee gave a 25-minute presentation about the TCAA, who we are, and what we observe – concluding with a bit of detailed information about the solar system in general and Jupiter in particular. The 35 attendees then viewed the moon, Jupiter, and a few deep space objects through the 11-inch and 14-inch telescopes set up by Carl and Lee respectively. Several attendees indicated a desire to have similar viewing sessions at the ISU Horticultural Center and at the McLean County Juvenile Detention Center next spring.

## NOVEMBER OBSERVERS' LOG

Carl Wenning began the month of November by completing a series of observing sessions to finish the observations required to finish the Astronomical League (AL) Deep Space Binocular observing program. On the evening of November 1<sup>st</sup>, he was able to view two additional open clusters in Auriga the Charioteer bringing his count to 56 of the 60 required. On the morning of November 3<sup>rd</sup>, he completed four additional observations of objects in Camelopardalis and Puppis to complete the observing program. Carl has now completed 10 AL observing programs and qualifies for the *Master Observer* award – an award earned by only 99 individuals since 2001 when the award was established.

TCAAer Bob Finnigan has returned to astrophotography with a vengeance. He started astrophotography in early 1973 with the acquisition of a C14 telescope. He used a variety of films to photograph comets – several images of which appeared in the *Pantagraph*. Recently Bob acquired an 11-in Celestron and two photographic refractors. With Lee Green's assistance, Bob has become an accomplished astrophotographer in short order. Working with Lee on the night of November 5<sup>th</sup>, Bob took image of M42 in Orion. The picture (seen elsewhere in this issue) consists of 20-8-8-8 minute LRGB exposures with 2-minute sub-frames using a Takahashi TOA-130 with the SBIG STL-11000 camera on a Celestron CGEM mount. Bob took these images just after midnight. Lee did all corrections, including stacking and modifications, using Maxim 5 and Photoshop CS5 respectively. Congratulations Bob and Lee on a job well done!

The MOOS for November took place on the 6<sup>th</sup> but was poorly attended, possibly due to a combination of high thin clouds and a misstatement in *The OBSERVER* that it was a week later – during the 1<sup>st</sup> quarter moon phase! (Sorry to all readers who were misled by the incorrect date. The writer evidently looked at the wrong calendar month or year for moon phases.) Despite these factors, William Carney and Mark Cabaj were present to do a bit of imaging. The sky was partly cloudy, but slowly cleared as the night progressed.

Carl Wenning attempted to observe the outburst of Comet Ikeya-Murakami (C/2010 V1) during the predawn hours of November 8<sup>th</sup> using his 15x70 binoculars from in town. He had read about the comet only about an hour and a half earlier. He was not able to observe the roughly 8<sup>th</sup> magnitude comet. Amateur astronomers in Japan had discovered the comet just a few days earlier while it was gliding by Saturn in the pre-dawn sky. The comet's coma (atmosphere) bears a striking resemblance to the coma of Comet Holmes, which famously exploded in 2007. By now, the comet has moved into the glare of the Sun.

That evening, Carl repaired to the SGNC where he spent 3.5 hours observing objects for the AL's Herschel 2 observing club. Using his CPC1100 assisted by his *iPad* and *SkyFi* wireless interface, he was able to observe and record 42 objects. Joining him later that evening were Tony Cellini who used his 12-inch to view a variety of Messier objects and double stars, and Lee Green and Bob Finnigan who spent time doing astronomical imaging until late into the night. Around 10:30 p.m., they photographed the Horsehead Nebula in the constellation Orion with amazing results. The image (shown elsewhere in this issue) is a composite of twenty 5.5-minute exposures combined in Maxim 5. The photograph was taken using a Takahashi TOA-130 with the SBIG STL-11000 camera on Lee Green's Celestron CGEM mount. They remained out until about 2:30 a.m.

(Continued on page 5)

## IMPROVEMENTS AT SGO

Bob Finnigan and Lee Green set up Bob's new CGE-Pro mount at SGO on November 4<sup>th</sup>. They reported missing a couple of electrical cables, so the mount was not made functional at that time. Several days later they were in possession of the required cables. On the evening of November 18<sup>th</sup>, Bob, Tony Cellini, and Carl Wenning met with a machinist to determine how best to affix the mount to the concrete column using the mono pier donated by Dan Miller. Later that evening Bob and Lee made the tripod mounted CGE-Pro operable for the first time, but ran into problems due to an inadequate power supply.

On Friday, November 26<sup>th</sup>, William Carney spent some of his free time conducting upkeep of SGO. Specifically, he spread woodchips around the foundation of SGO to prevent erosion of the rock and earth surrounding the building. Carl Wenning, who just happened to be at SGNC photographing the structure for a PowerPoint program about the TCAA, captured William filling buckets with wood chips.



William reported via listserv later that afternoon, "I spent a little time today placing more mulch and rock around the base of the observatory. It should be good now till spring. I did not get a chance to paint the dome but will try and do it in the spring. During the winter anyone using the dome needs to place it in the western position as it is now. This is to limit snow coming in from the North. Also use the clamps to keep it from rotating. Make sure all lights are off after you are done. Leaving them on burns the bulbs out and uses electricity. The nature center graciously covers the cost of electricity and we need to limit that use where we can."

Shortly thereafter Lee wrote, "Bob and I were out there Tuesday. We got the replacement cables and the AC power adapter installed and powered up the scope. We could not complete the alignment procedure due to the handset not accepting the Align button. I guess it was too cold. We brought the handset back and put it on Bob's CGEM and tried it there – it worked fine. Bob purchased a wireless router and the VNC software to provide the ability to remote control the computer. We got that configured and ready. We will be going there tomorrow morning (Saturday, November 27<sup>th</sup>) to try to a complete, end-to-end run through."

Following that work Lee reported, "I worked with Bob yesterday and together we were able to get everything working to a large extent. The trouble we had with the hand controllers continued, but we were finally able to get the CGEM controller to work. We figured out how to run through the alignment procedure with the tandem bar installed. That caused the OTAs to point East when the mount is in Home position. We mounted the cameras, balanced the assembly and ran a variety of test alignments. We successfully connected the computers to the wireless router. Bob bought a "green" space heater that made our work much more comfortable. Then, last night, we put the system to the test. We successfully controlled the telescope from a computer on the ground floor. While it took 2 hours to calibrate, polar align and focus, we were able to take some images. Attached are some early images from the data, and although we did limited processing, I think you'll agree that the results are promising...."

Clearly this was an understatement. The results are more than promising; they are terrific – as the accompanying photos will themselves attest! Congratulations to Bob and Lee for accomplishing so much in so little time. We look to more stunning results as soon as the mount in CGE Pro mount is permanently erected within SGO.



## NOVEMBER OBSERVERS' LOG (CONT.)

*(Continued from page 4)*

The next evening, Tony and Carl returned to SGNC to take advantage of the unseasonably warm autumn weather. Tony spent his time working with his 12-inch and started viewing double stars as part of the AL's Double Star observing club. Carl made an additional 24 Herschel 2 objects. Notably absent at this time was William Carney who has been attending to his mother who was recently hospitalized.

On the evening of November 27<sup>th</sup>, Carl observed for about an hour from his front yard due to the relatively cool evening temperature. Working with his iPad/SkyFi controller and SkySafari software with his CPC 1100 telescope, he was able to observe more than a dozen geosynchronous Earth-orbiting satellites such as GOES 15 and DIRECT TV. At one point he was able to observe four such satellites in a single field of view as they slowly moved by a known star. Amazing!

## ASTRO LAB II: INTRODUCTION TO THE NEBRASKA ASTRONOMY APPLET PROJECT

By John Werner

This is TCAA's second topic in the series we are calling ASTRO LAB. We live in a time where computer simulations are available for almost any topic you can imagine. It is no wonder that there are excellent online labs for use by those that want to be introduced to the wonders of astronomy! These NAAP labs consist of background materials and one or more simulators that you can use in conjunction with a student guide. I have used these labs extensively in class and they are well suited for junior high grade level (somewhat challenging) and above. Adults can assist the younger astronomer.

The currently available labs are: Solar System Models, Basic Coordinates and the Seasons, The Rotating Sky, Motions of the Sun, Planetary Orbit Simulator, Lunar Phase Simulator, Blackbody Curves and UVB Simulator, Hydrogen Energy Levels, H-R Diagrams, Eclipsing Binary Stars, Atmospheric Retention, Extra Solar Planets, Variable Star Photometry, Cosmic Distance Ladder, and Habitable Zones.

A very cool lab to begin your online experience is "Basic Coordinates and Seasons Lab". The simulations of the seasons are amazing! Get ready to learn about Terrestrial Coordinates, Celestial Equatorial Coordinates, and Seasons and the Ecliptic. Read the background material and attack the student guide questions. I guarantee you will have fun and learn at the same time – what a great combination! Check it out at <http://astro.unl.edu/naap/>.

## A WONDROUS OBSERVING AID

By Carl J. Wenning

I recently completed my Deep Sky Binocular observing program through the Astronomical League. The first 42 observations were completed using my iPad's *SkyVoyager* program as a guide. The last 18 observations were completed using an updated version of *SkyVoyager* called *SkySafari*. I couldn't be more pleased. Recently I saw President Dave Osenga thumbing Dan Miller's iPad at a Board of Director's meeting, and decided to write a few words in response to his interest. I'm sure that you all might be at least somewhat interested in the iPad in conjunction with *SkySafari* and the *SkyFi* wireless network once you come to know their utility.

To give some sense of the utility of this duo, consider their impact on my Herschel 2 observing program. This AL program focuses on 400 additional NGC catalog objects not previously addressed in the Herschel 400 observing program. During a 3.5-hour time span on November 8<sup>th</sup>, I found, observed, and recorded detailed observing notes for 42 NGC objects – galaxies, planetary nebulas, and open clusters. Many of these objects are "faint fuzzies", hard to find without a detailed finder chart.

The *SkySafari* not only drives my CPC1100 directly to the celestial object with the click of a few buttons, but provides a detailed star map of the vicinity that precisely fits a circular field of view of my 28mm eyepiece and is properly oriented to match the semi-inverted image, the type of field that occurs with a SCT optical tube assembly that employs a right-angle prism immediately before the eyepiece.

Not only am I able to more easily find objects, but hints from the star maps provide me with additional information such as object size, orientation, and appearance. Once objects are observed, they are checked off my observing list along with an automatically recorded statement of the time and date of observation. The convenient note pad portion of the software allows for (almost encourages) detailed note taking. What previously was a hand scrawled, nearly illegible, half dozen words, becomes a type written note of typically 2-3 lines. The cold does not affect my ability to take notes when using a hunt-and-peck approach with the iPad's virtual keyboard.

In addition to all these features, *SkySafari* now allows users to develop an observing list for use at the telescope. Prior to going out, I entered about 100 Herschel 2 objects into an observing list. Once one observation was completed, I was immediately able to proceed to the next without any sort of hesitation.

Suffice it to say, iPad working with *SkySafari* and *SkyFi* has revolutionized the way I conduct observing sessions. In addition to the GoTo telescope, it is one of the most impressive and powerful observational aids I have seen in more than a half century of sky watching. Still, I recently offered six suggestions to the programmers for improvement in *SkySafari* and Tim, the lead programmer, has responded favorably to all of them. When all these recommendations to update *SkySafari* are implemented, they will improve significantly an already superb program.

# SURFACE BRIGHTNESS IN BINOCULARS AND TELESCOPES

By Carl J. Wenning

From February through May 2009, I wrote a series of articles for *The OBSERVER* titled Optimizing Observations of Deep Space Objects. Last month I wrote about limiting magnitude, comparing my 11-inch and 18-inch telescopes. This month I contribute yet another technical article about surface brightness of extended space objects, comparing views through my 22x100mm Oberworks binoculars with my recently acquired 18-inch Obsession reflecting telescope.

Early this last summer, when I used my 22x100mm binoculars for the first time, I was quite impressed by the surface brightness of the Lagoon and Trifid nebulas in Sagittarius. With the lower power and wider field of view of these binoculars (2.8 degrees) compared to a typical telescope, I was able to see M8 and M20 in the same field of view. I marveled at how bright they appeared even though they were rather small when seen through the binoculars. Looking at these objects (separately) through my 18-inch telescope at medium power later in the summer, showed larger and more detailed objects, but objects that have much lower surface brightness as compared to the binocular view. "Why should this be?" one might question, especially given the much larger diameter of the telescope objective (457mm) compared to the binocular objective (100mm). After all, given the relative light gathering power equation in last month's article indicates that the telescope gathers more than 20 times more light than a single binocular objective.

$$\frac{LPG_T}{LGP_B} = \left( \frac{457mm}{100mm} \right)^2 = 20.9$$

The explanation of this surprising difference in surface brightness has to do with magnifying power. While increased magnifying power can increase the limiting *stellar* magnitude of a telescope significantly (see last month's article), increased magnification reduces the apparent surface brightness of extended objects. Remember, stars are essentially point sources that cannot be magnified; extended objects such as the Lagoon and Trifid nebulas can be magnified. This magnification increases the apparent size of the nebulas on the retina of the eye resulting in a dimmer image. For instance, a magnification of 10X will make an object cover 100 times the surface area on the back of the eye (10 times higher and 10 times wider). This magnification reduces the surface brightness as seen by the eye one hundred times. This is why over magnification of celestial objects – such as is commonly done with toy telescopes – can make objects next to impossible to observe.

So, the apparent brightness of a celestial object in a telescope or binoculars is proportional to the square of the objective diameter and inversely proportional to the magnification squared. In the simplest case (perfectly reflecting mirror or perfectly transmitting lens, no secondary obstruction, etc.), the apparent relative brightness,  $B_{relative}$ , of an object seen with optical aid as compared to the unaided eye (dilated to a typical 6mm diameter) is given by the following formula (aperture expressed in millimeters):

$$B_{relative} = \frac{B_{aided}}{B_{unaided}} = \left( \frac{aperture}{6mm} \right)^2 \left( \frac{1}{mag} \right)^2$$

So the surface brightness of objects seen in my 22x100mm binoculars is about 57% the brightness of the same object seen with my unaided eye. My 15x70mm binoculars provide a relative surface brightness of 60%, about the same as my larger set. Now, consider a 7x50mm set of binoculars. They provide a surface brightness of 142% the naked eye surface brightness. That is, the latter set of binoculars actually *increases* the surface brightness of objects whereas the former set actually decreases the apparent surface brightness of an observed object. The trade off comes with the increased magnification. With higher magnifications, one actually can see more surface detail even though the image is dimmer.

Consider now the apparent surface brightness of an extended space object in my 18-inch telescope using an eyepiece yielding a low magnification of 52X. The above calculation shows a comparative brightness of 377%. That is, in my Obsession telescope magnifying 52 times objects appear about 3.8 times as bright (2.15/0.57) as in my 22x100mm binoculars. I can also see an image 2.5 times larger. Unfortunately, the field of view in the telescope is much more restricted with a telescope than with a pair of binoculars. So clearly an 18-inch telescope used at low power is certainly more capable than a smaller set of binoculars. At higher telescope magnifying powers, this relative surface brightness advantage disappears.

When comparing two telescopes of the same aperture, this distinction can be found in the focal ratio of the system. Focal ratio is the ratio between the focal length of the objective and its diameter. My 18-inch telescope has an 81.5-inch focal length making it an f/4.5 telescope (81.5in/18in). An f/4.5 telescope has a "faster" objective because the relative image brightness is high in comparison to a "slower" f/8 or f/10 system. (Fast and slow refer to the length of time required to obtain an astronomical image. A short focal ratio system can obtain an image rather quickly; the same diameter objective in a long focal ratio system can obtain an image comparatively slowly.) This is so because longer focal ratio systems will naturally produce higher magnifications due to its increased focal length. (Recall that magnification = focal length of the objective / focal length of the eyepiece.)

Consider this following comparison between the 11-inch and 18-inch telescopes. Because the larger telescope gathers 2.68 times more light than the smaller telescope, the same surface brightness can be obtained with the larger telescope at a higher power, a factor of 1.64 times ( $\sqrt{2.68}$ ) higher. That is, the view of an extended celestial object at 155X in my Celestron has the same surface brightness in my Obsession at about 250X.

One must not forget that larger apertures gather more celestial light while at the same time they also collect more sky light. It's only when the difference between these two is at a maximum that a larger telescope will perform at its best. So, using a larger telescope in locations with a bright sky certainly has its limitations. Larger telescopes perform best under very dark sky conditions where the contrast between celestial objects and the background sky is at a maximum.

So, what does one get with bigger telescopes of short focal ratio in addition to increased limiting magnitude? Simply put, greater surface brightness of images if the telescope is at a given magnification. A larger telescope used at low power pays very considerable dividends when one is trying to find the "faint fuzzies" that make up so much of the observable universe for amateur astronomers – but especially under dark sky conditions. As a result of these considerations, my CPC 11-inch telescope will continue to receive lots of use whereas my Obsession 18-inch telescope will be used where it can benefit the observer most – primarily for viewing under especially dark sky conditions.

## WHERE ARE THEY NOW?

By Carl Wenning, Historian

Perhaps the most genteel people ever to belong to the club were Aubrey and Miriam (nee Grieg) Johnson. I had the great pleasure of meeting them when I first began participating in TCAA events during the autumn of 1978. At that time Aubrey was the club's librarian, and he and Miriam rarely missed a meeting. They were inseparable.

Being in their mid to late 80s at that time, they were not regular observers. They just had an interest in space, especially since the advent of space flight in the early 1960s. Aubrey's interest was also sparked by his views of Halley's Comet in 1910, and he was always happy to recite his views of the comet's tail that "stretched clear across the sky" and telling of stories of hucksters who took advantage of peoples' ignorance of things astronomical.

Few TCAAers ever got to know the Johnsons as well as my family and I did. My daughter Rebecca, particularly, was one of their favorites. We visited with Aubrey and Miriam several times in their home and learned lots more about them that fascinated us to no end. They were such gracious hosts. I'll never forget Miriam's menagerie of ceramic animal miniatures. She gave a pair of cats to Rebecca one evening.

Their personal stories were very interesting. Miriam was a concert-qualified pianist who shared her musical skills with children through her lessons. She was the granddaughter of Norwegian composer Edvard Grieg of *Peer Gynt* fame (though the Americanized version of her maiden name was Gregg). Aubrey was an electrical engineer with naval experience as a radioman during WWI; he spent his professional life working for power companies. Both lived and grew up in Chicago, and moved to Bloomington in the 1970s to be near their only child – a son, Aubrey Jr. – who had moved to Normal several years before.

Aubrey and Miriam were in the Biograph Theater in the Lincoln Park neighborhood of Chicago on the hot summer evening of July 22, 1934. Sitting near them in the movie house was Public Enemy #1, John Dillinger. Shortly after they departed the theater, they recalled hearing the gunfire of the FBI that ended Dillinger's life in a nearby alleyway.

Aubrey was the club's first and only "Comet Halley Two Timer." Having observed it as a youth, Aubrey was able to get out to visit with "a 76-year-old friend" during the 1986 apparition of the comet thanks to assistance from Jim Baker. Aubrey was presented by the TCAA with a suitable "Comet Halley Two Timer" plaque during early 1987.

Aubrey and Miriam loved each other dearly, having been married for some 65 years at around the time of their deaths. Miriam passed away from cancer at 88 years of age. We had Aubrey over to our house a time or two after that to commiserate with him, lift his spirits, and cheer him up. Though we were able to share a few laughs, Aubrey died of a broken heart less than a year later. He was 96 years old, and the most senior of any TCAA member ever.

Both are interred near the south end of the graveyard in Evergreen Memorial Cemetery in Bloomington – the same cemetery as United States Vice President Adlai E. Stevenson.



# THE EVOLUTION OF AMATEUR ASTRONOMY: THE TCAA THEN AND NOW—PART III

By Carl J. Wenning, Historian

Now that the historical volume *History of the Twin City Amateur Astronomers 1960-2010* has been published, I am reflecting on the last 50 years of change in amateur astronomy in general and the TCAA in particular. The changes in technology and society have been spectacular, and account for many of the events occurring within the club's official history.

**Personal Electronic Computers:** Perhaps more than anything else, the world of computing has changed very significantly since the founding of the TCAA. In 1960, there was no such thing as a personal computer. The computers that did exist at that time were located mainly in universities and research centers. Many such devices were hard wired for programming purposes, and operated with the use of electronic “tubes” serving as switches. The only computers available to the general public were mechanical adding machines. Analog computer such as the slide rule was available for the mathematically inclined. Rev. Lloyd Strouse's planetary “horizograph” and Weldon Schuette's rotary satellite passage predictor were also available to those ingenious enough to make and use them. By the early 1970s, it was not unusual to find “nixie tube” desktop calculators able to add, subtract, multiply, and divide (and even take a square root if one had an advanced unit). Handheld electronic calculators, a spin-off of the NASA moon program, also became available by the mid 1970s. A few years later, with the invention of more advanced computer chips, simple desktop computers (no graphics – just lines of code) became available that could hold a few hundred electronic commands. Mainframe computers used keypunched “cards” and “card readers” to program them. Not until the mid 1980s did the personal computer make its appearance. From this time onward, amateurs could access and utilize computers regularly. Within a few years, amateur astronomers were making their own calculations and visualizing the night sky with their own planetarium programs. In a few more years amateurs had access to desktop planetariums and computers that could interface with GoTo telescopes. Around the turn of the new millennium, other handheld devices such as cell phones and iPods and iPads and even wireless networks became available to amateur astronomers.

**The Internet:** When the TCAA was founded in 1960, no one even had the faintest view of what has become known as Internet. The Internet started to become publicly available in the early 1990s. A forerunner for some of us old enough to remember were electronic bulletin boards that provided TCAAs an opportunity to interact online and share electronic messages and files. One of our members, Garth Bock, set up a server in his home accessible via computer using a dialup modem connected to a telephone line. Internet as we know it today, became widely available a few years later through such sites as electronic bulletin boards and college campus servers. Archie – a means of transferring files between computers – became available in 1990. Gopher was released a year later. That same year CERN made the World Wide Web freely available through the development of Internet protocols. A few years later and many college campuses were networked using Ethernet connections. Mosaic, one of the earliest web browsers with a graphic user interface became available around 1995 from UIUC and the world began to see the commercialization of the web shortly thereafter. Use of the Internet then began to explode. Amateur astronomers soon began to access the vast array of astronomical resources that became quickly available. Social networking would later appear and have a very strong impact on the social aspects of the club starting in the mid 1990s as evidenced by the gradual drop off of attendance at the TCAA's monthly meeting. It is suspected – and quite likely – that this aspect of the computer revolution helped turn our club from a social organization based on regular face-to-face meetings into one that is today primarily observation and education/public outreach oriented.

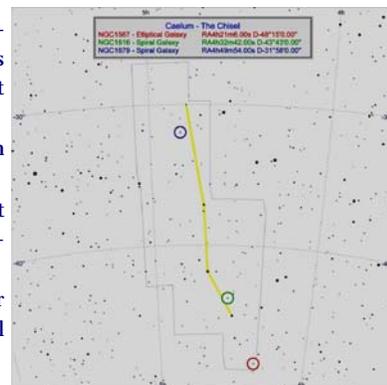
## CONSTELLATION OF THE MONTH: CAELUM—THE CHISEL

Caelum is a small, dim, southern constellation that was created by Lacaille to commemorate the creation of the Sculptors' Chisel. Caelum lies east of Eridanus and Horologium and west of Columba. Caelum is best seen during the winter months.

Caelum has no mythology associated with it. None of the main stars in Caelum are named.

Caelum is the 81st largest constellation covering 249 square degrees. It is the 83rd brightest (6th dimmest) constellation. Caelum reaches opposition on November 19.

Among the deep space objects in this small constellation are a number of galaxies. NGC1567 and its close companion ESO202-9 are both small galaxies. NGC1616 and NGC1679 are other small galaxies.



## WORKING WITH BOB

By Lee Green

I have had the pleasure of working with Bob Finnigan to take a variety of astronomy images. As many readers know, Bob is a past president of the TCAA and his schedule has recently allowed him to become active in the club once again.

Bob has generously donated his old 14" Celestron tube to the club. The Board approved the funds to refurbish the mirrors and the tube, and it was sent off two months ago. We hope that its return is imminent and after it comes back, it will be mounted at the SGO for our viewing pleasure and for further astrophotography work.

In the meantime, using his CGEM mount from his home in Normal, we have been experimenting with a variety of equipment combinations and configurations. One of the first targets was the Orion nebula, and on November 5, we exposed this LRGB exposure using 2 minute subframes with at total exposure time of 20-8-8-8 minutes. We also took flat field images and dark images for calibration and applied those for the resulting image shown here.

On November 8, we took a road trip to the Sugar Grove Nature Center to set up where we have darker skies. Using Lee's CGE mount, which was acting up and resulted in an imprecise polar alignment and after several false starts on M31 and M33, we were able to obtain a series of exposures of the Horsehead Nebula using all five color filters. You can imagine how pleased we were when we processed the resulting image that we share here.

We are looking forward to the next phase of the Moon so we can continue our quest for clear dark skies, warm weather and colorful nebulae.



## TCAA Treasurer's Report – November 2010

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OPERATING FUND BALANCE – October 31, 2010 - \$ 1,975.56

Income

Charles Mosier (Senior Dues) - \$ 26.00

Richard & Eve Chandler (Dues) - \$ 40.00

Expenses

LYB Inc. (Observer copies & postage) - \$ 37.31

Erin Estabrook (mailing labels) - \$ 28.00

Carl Wenning (TCAA History copies) - \$ 99.50

OPERATING FUND BALANCE – November 30, 2010 - \$ 1,876.75

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OBSERVATORY FUND BALANCE – October 31, 2010 - \$ 3,176.66

Income

Donation (Richard & Eve Chandler) - \$ 10.00

Expenses

None - \$ 0.00

OBSERVATORY FUND BALANCE – November 30, 2010 - \$ 3,186.66

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TOTAL TCAA FUNDS – November 30, 2010 - \$ 5,063.41

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Respectfully submitted, L. Duane Yockey, Treasurer

### **Sugar Grove Observatory**

#### **Listing of Official Keyholders (Paid \$10 deposit/\$5 renewal)**

Duane Yockey (renewed through 2009)

William Carney (renewed through 2010)

Carl Wenning (renewed through 2009)

Brian Barling (renewed through 2010)

David Osenga (renewed through 2010)

Josh Lindsey (renewed through 2010)

Dan Miller (renewed through 2009)

Lee Green (renewed through 2009)

## MISSING OUT ON TCAA ACTIVITIES & EVENTS?

If you are missing out on club activities or celestial events, be certain to join the TCAA listserv. Many activities are planned at the last minute, and announced only hours in advance through the club's listserv. Reminders about celestial events are also broadcast to the membership through the club's listserv. To join this free service by Yahoo, send a blank email to [TCAA-subscribe@yahogroups.com](mailto:TCAA-subscribe@yahogroups.com). Unsubscribing is just as easy. To unsubscribe, just send a blank email to [TCAA-unsubscribe@yahogroups.com](mailto:TCAA-unsubscribe@yahogroups.com).

To keep up to date on celestial events not described in *The OBSERVER* or addressed in the listserv, visit Carl Wenning's observing page at [www.phy.ilstu.edu/~wenning/observing\\_page.htm](http://www.phy.ilstu.edu/~wenning/observing_page.htm). It has been recently updated to include an extended sky calendar of events as well as additional space weather and satellite viewing links.

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### The OBSERVER

Newsletter of the TCAA, Inc.

Erin Estabrook, Editor  
314 Covey Court  
Normal, IL 61761

Are your dues due?



### The Dues Blues?

**If you see a check in the box above, it means your dues are due. To retain membership, please send your dues renewal to our esteemed Treasurer:**

**Duane Yockey  
508 Normal Avenue  
Normal, IL 61761**