TWIN CITY AMATEUR ASTRONOMERS, INC.

The OBSERVER

VOLUME 34, NUMBER 10 OCTOBER 2009

IN THIS ISSUE:

PRESIDENT'S MESSAGE: 4TH QUARTER IN THE IYA 1
TCAA EVENTS FOR OCTOBER 1
MINUTES OF SEPTEMBER 21ST BOARD MEETING 2
REDUCED RATE MAGAZINE SUBSCRIPTIONS 2
AL OBSERVING PROGRAM STANDINGS 3
LCROSS—CRASHING INTO A MOON NEAR YOU 3
SEPTEMBER OBSERVERS' LOG 4
UPCOMING ASTRONOMICAL MEETINGS 4
OCTOBER SKY GUIDE 4
REMAINING 2009 IYA SESSION @ BPL 5
REMAINING 2009 MEMBERS-ONLY OBSERVING SESSIONS 5
SEPTEMBER EDUCATION/PUBLIC OUT- 5
MINUTES OF SEPTEMBER 21ST NCREAL 2010 PLANNING COMMITTEE MEETING 6
2010 PUBLIC SKY VIEWING BROCHURE NOW AVAILABLE 6
OCTOBER IN THE IYA: WHAT IS THE FATE OF THE UNIVERSE? 7
VISIONS OF THE UNIVERSE: FOUR CENTURIES OF DISCOVERY 7
CONSTELLATION OF THE MONTH: PEGASUS—THE WINGED HORSE 8
POINTING A CAMERA TO THE SKY: ASTROPHOTOGRAPHY ON A BUDGET 8
THE LIFE AND TIMES OF GALILEO, PART 2 9
TREASURER'S REPORT 11

PRESIDENT'S MESSAGE: 4TH QUARTER IN THE IYA

It has been a busy time in the TCAA as we start wrapping up this International Year of Astronomy. This month on October 17, we hold our final Public Observing Session of the year and I am hoping for clear weather and giant crowds as we close the season. Our participation at the Autumn Celebration at the Sugar Grove Nature Center has always been a big event where we interact with hundreds of people. Please come out and join in on October 24 as we host and open-house at our observatory. Be sure to visit the Bloomington Public Library to see their new exhibit, described later in this newsletter, as they contribute to our celebration of the International Year of Astronomy

We are now less than 200 days from the start of the NCRAL 2010 regional conference that we will host next April. The program is shaping up to have a number of outstanding activities and excellent speakers. We will make formal announcements as we are able to confirm the speakers and finalize our agenda. The members of the planning committee have been very busy preparing the program and getting the many activities planned. We are attending several regional events to help get the word out to the clubs in our area. If you would like to get involved in helping out, please contact your favorite board member.

For those of us who are working on Astronomical League observing club awards, I recommend that you try to finish up on your programs soon so that they can be submitted for approval. It usually takes several weeks for these to turn around and we like to present these prestigious awards at our annual meeting in February.

TCAA EVENTS FOR OCTOBER

While not a TCAA event, several club members will be attending the DAAC Astronomy Jamboree at Friends Creek Regional Park (8 miles east of Maroa) on Saturday, October 3rd. Lee Green is looking forward to joining the club as they always host an impressive event with lots of people in attendance. TCAAers along with their telescopes are needed to assist. The keynote speaker this year will be David Leake, director of the Stearkel Planetarium at Parkland Community College in Champaign. For more information, visit the DAAC Astronomy Jamboree website at www.astrojam.com.

Several Board members and officers have agreed to attend the one-man *Galileo* play at IWU on October 9th. This program celebrates the 400th anniversary of Galileo's discoveries, explores the tensions between science and religion and one man's struggle for intellectual and spiritual salvation. Tim Hardy, a visiting professor at IWU in 1999, will perform the role of Galileo. He is currently a faculty member of the Royal Academy of Dramatic Art.

The club's Members-only Observing Session will be held at SGNC on Saturday, October 10th. John Werner will be coordinating this event. Sunset is at 7:10 p.m. and astronomical twilight comes to an end at 8:43 p.m. Observing will begin around 8:30 p.m.

On October 14th at 7 p.m. Lee Green will give the talk *Dark Skies and Light Conservation* as part of the *Visions of the Universe* series. This space-themed series runs from now through December 18th. The series includes 20 events including special speakers, movies, discussions, and more. Check out the complete schedule at www.BloomingtonLibrary.org.

The club's Public Sky Viewing Session will be held at SNGC on Saturday, October 17th. The program, *The Pleiades Star Cluster*, will begin at 7:00 p.m. John Werner and/or Dave Osenga will be giving the talk followed by a sky lecture and telescopic observing. Sunset on this date is 6:13 p.m.

This month's *Classroom for Kids* program will be presented at the Bloomington Public Library on Saturday, October 24th from 1:30 to 3:00 p.m. Lee Green will be coordinating this event. The theme for the month is "What is the fate of the universe?"

The SGNC's Autumn Fest kicks off at 10 a.m. on Saturday, October 24th, and runs until 5 p.m. that day. The club will hold an open house at SGO and will show telescopes and views of the sun and bright planets if the weather permits.

Carl, Lee, and Dan will present a talk and viewing session at Weldon Springs SRA on Monday, October 26th at 6:00 p.m. The program will be for Marty Morris' 4th grade class in Clinton.

Carl will present a 4-part series on Wednesday mornings throughout October. His program is offered through Illinois State University's Senior Professionals program. The events begin on October 7th and include and observing session at SGNC on October 28th.

The OBSERVER is a monthly publication of the Twin City Amateur Astronomers, Inc., a registered 501 (c)(3) non-profit educational organization of amateur astronomers interested in studying astronomy and sharing their hobby with the public.

TCAA OFFICERS

President Lee Green
309-454-7349
lee@starlightsoftware.com

Vice-president Dan Miller
309-473-3465
damiller@mail.millikin.edu

3rd Director Carl Wenning
309-454-4164
cjwennin@ilstu.edu

4th Director Dave Osenga
DaveOsenga@msn.com

5th Director Brian Barling
309-452-7507
res2213h@verizon.net

Secretary/Historian Carl Wenning
309-830-4085
cjwennin@ilstu.edu

Treasurer/ALCOR Duane Yockey
309-452-3936
duane@lybinc.com

Web Michael Rogers
309-825-6454
mprogers@mac.com

Property Manager
William Carney 309-829-7748
willcarney@aol.com

The Observer Editor
Erin Estabrook
314 Covey Court
Normal, IL 61761
309-454-6894
erin@lybinc.com

Submission deadline is the first of each month.

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

Duane Yockey
508 Normal Avenue
Normal, IL 61761

MINUTES OF SEPTEMBER 21ST BOARD MEETING

President Lee Green called TCAA Board members and officers to order at 6:37 p.m. Also present at the LYB meeting were Dave Osenga, Dan Miller, John Werner, Duane Yockey, and Carl Wenning. Brian Barling and William Carney were absent. The following announcement was made as a video projector was set up: Dan reported that the NSN Solar Observatory box had arrived. After this, the following matters of business were addressed:

- Minutes of the previous Board meeting were approved.
- Officers gave brief reports. Of particular note was a question by Lee about whether the TCAA should continue to get Abrams Planetarium *Sky Calendar*. The Board voted in the affirmative. Duane shared a poster that John Littlefield had donated to the club, and then provided a draft of the upcoming September's Treasurer's Report.
- The TCAA logo was formally approved, and a $175 payment to the graphic artist approved as well. Dave will pay the artist and express the club's sincere thanks.
- The February Annual Meeting was addressed. It was agreed to use Ewing Manor despite the $300 fee. Carl has made tentative reservations for February 6 and 20, from 5-10 p.m. He will survey the membership via listserv to determine which date is more acceptable. (The date was subsequently set as February 6.) Dave will check on the possibility of finding a musician to play the Manor's piano. Carl will check with Red Bird catering; John will check with Biaggi's; Lee will check with his wife about other options. Carl will check with Barry Beaman about being the keynote speaker with a $100 honorarium as well as travel expenses for himself and Carol his wife. William and Carl will also present their slide show dealing with the 50-year history of the TCAA. (Carl suggested to Lee after the meeting that the daughters and spouses of club founders John and Bertha Kieviet be invited as guests of honor with their meal costs being paid for by the club.)
- It was agreed to dispense with formal discussion of a new roll-off roof observatory at Board meetings. An ad hoc committee will be established that includes all interested members, not just directors and officers. The goal will be to have this group make recommendations at the annual meeting. John and Dan will co-chair this group and will organize it with a call through the club's listserv. The four other directors/officers present at the meeting agreed to serve on the committee as well.
- Carl proposed a series of minor amendments to the club's bylaws to clarify when directors and officers will be installed in office. The amendments were discussed and approved – a pre-requisite for bringing the proposal to the membership at the Annual Meeting. The proposed amendments will be published in *The OBSERVER* immediately prior to the February meeting.
- Lee noted the need for annually renewed membership cards with pertinent contact information. He will prepare and then have these available at the Annual Meeting and at club gatherings thereafter.
- Lee noted a need for an extension cord at SGNC for programs. Carl noted that he has a box of extra extension cords and will provide one to the club for keeping in the SGO.
- Lee noted a need for a new 2010 POS brochure now that the current season is pretty much over. Carl will see to its updating and will disseminate it later for Board approval. He was asked to have a few more evenings with the first quarter moon, and to see if he could work in the September 21, 2010, conjunction of Jupiter and Uranus. Dave asked that the Virgo cluster be included as a topic as well.
- Carl sought and obtained approval from the Board to ask Jack Keefe of the Pantagraph's *How Time Flies* column to point out pertinent TCAA events of 1960 in his 50-year-ago paragraph. (Jack subsequently said that he'd try but made not promise to include something about the TCAA, but won't start working on February columns until January.)
- The Calendar of Events was briefly touched upon. It was agreed that the TCAA would participate in the SGNC's Autumn Fest on October 24th and that William should leave the club's 10-inch telescope in place for display purposes. After that it will be removed along with the mounting stand atop the concrete column, and club members will be free to set up their telescopes therein for winter observing. The club will also host a public viewing session on the evening of the 24th if the Angela at SGNC approves. (She did not due to the fact that vendors will be moving materials out as late as 10 p.m.) Lee mentioned that he has the September 26th *Classroom for Kids* program covered with an NSN kit Planets and Moons; Carl reminded everyone of the NASA display that will open at Bloomington Public Library immediately thereafter; Lee will represent the TCAA at the DAAC Jamboree and get the word out about NCRAL 2010; several members agreed to attend the Galileo one-man play at IWU on October 9th. The next Board meeting was set for 6:30 p.m. on Tuesday, November 10th.
- The meeting was adjourned at 7:44 p.m.

Respectfully submitted,

Carl J. Wenning, Secretary

REDUCED RATE MAGAZINE SUBSCRIPTIONS

TCAAers – don't forget that you are eligible for reduced-rate subscriptions to both *Astronomy* and *Sky & Telescope* magazines. Our subscription coordinator, William Carney, recently reported that currently *Astronomy* magazine is $34.00 for one year or $60.00 for two years. Multiple-year subscriptions beyond that are not available. *Sky & Telescope* is $32.95 for one year; no multiple years are available. If you wish to subscribe at these reduced rate, write your check – made payable to "William Carney" – and send it to him. He will write checks to the magazines and fill out the forms. To subscribe, send your name and address along with magazine choice and preferences to: William Carney, PO Box 52, Bloomington, IL 61702. He will send the subscriptions out within a few days of receipt.

AL OBSERVING PROGRAM STANDINGS

Below is a listing of the status of observers pursuing AL observing programs reported as of September 30th. If you would like to have your information included in next month's listing, be certain to forward your observing totals to Carl Wenning by the end of the month.

AL Award	Brian Barling	William Carney	Lee Green	David Hahn	Dave Osenga	Carl J. Wenning	Duane Yockey
S. Skies Binocular 50						(50)	(50)
S. Sky Telescope 50						(52)	(50)
Telescope Messier Prov70/Hon110	(110)	(110)	108*	110*	70*	(110)	31
Binocular Messier 50		(100)	45			78*	22
Deep Sky Binocular 60		55					
Herschel 400 Club	249	(400)	400*			(400)	
Urban Club 100		(100)	99			(100)	
Comet Club Silver12/Gold30		31*				4	
Double Star Club 100	17		51			(100)	
Planetary Neb Club Bas60/Adv110		1				63*	
Globular Cluster Club 50			20			65*	
Lunar Club 100	(100)	(100)	93		88	100*	
Lunar II Club 100		34					
Asteroid Club Reg25/Gold100		(52)					
Earth Orbiting Satellite 28		5				3	
Outreach Basic10/ Stellar60/ Master160			(*, **)			31h-06* 26h-07 44h-08** 35.5h-09	

* Program or first award level now complete. ** Second award level now complete. Both * and ** will receive AL recognition (certificate and pin) at the next general membership meeting if available. Numbers in parentheses (#) indicate that the associated pin and/or certificate has been received.

LCROSS—CRASHING SOON INTO A MOON NEAR YOU

By Lee Green

The Lunar Crater Observation and Sensing Satellite (LCROSS) mission culminates on October 9 and we may get definitive results to answer the question of whether water can be found on the Moon.

The recently launched mission Lunar Reconnaissance Orbiter (LRO) will watch as its sister mission LCROSS impacts into a crater near the Moon's South Pole. The location of the targeted crater was selected because it position at the South Lunar pole is situated where sunlight never reaches the bottom of the crater. This maximizes the chances of finding water since and water exposed to sunlight would quickly evaporate in the lunar vacuum.

These missions were launched together on June 18, 2009 aboard an Atlas V rocket. LCROSS is scheduled to impact the Moon on October 9 using the Centaur delivery vehicle (about the size of a bus) and is expected to create a crater that is 20-25 meters across and 3-5 meters deep and throw a plume of lunar material 2-3km high. The "sheparding" spacecraft will fly through the plume measuring the contents of material thrown up by the impact and will then create a second impact the Moon, ending its mission. The LRO will act as observer and will relay the data back to Earth. The LRO will continue to orbit the Moon indefinitely and will use its 6 instruments to probe the Moon.

Amateur astronomers may be able to view the debris field for 30-100 seconds after impact, which is scheduled for 6:30am, CDT. It is estimated that telescopes 10" and larger will be needed to view the plume. From Earth, the plume is estimated to be about 5.5 arcseconds in extent with a visual magnitude between 6 and 9. As a point of reference, this is about the size that Mars currently appears in your telescope. So for best viewing, you will want to use the largest magnification you can muster (200-300x), and the event will still occur over a small fraction of the field of view. Further complicating our observations will be the rising twilight at that time which will make direct observation even more challenging. Visit **http://lcross.arc.nasa.gov/observation/amateur.htm** for additional information. This site has a link to an Excel spreadsheet that helps you determine the parameters for your telescope and it addresses the expected daunting challenges of imaging the event.

Visit **http://www.nasa.gov/mission_pages/LCROSS/main/index.html** for more information about the mission.

OCTOBER SKY GUIDE

02 The Moon passes 6° north of Uranus, 9 P.M.

05 Mars passes 6° south of Pollux, 5 P.M.

Mercury is at greatest western elongation (18°), 9 P.M.

08 Mercury passes 0.3° south of Saturn, 4 A.M.

11 The Moon passes 1.2° south of Mars, 8 P.M.

13 Venus passes 0.6° south of Saturn, 11 A.M.

16 The Moon passes 7° south, of Saturn, 8 A.M.

The Moon passes 7° south of Venus, 2 P.M.

21 Orionid meteor Shower peaks

The Moon passes 1.0° north of Antares, 10 A.M.

27 The Moon passes 3° north of Jupiter, 4 A.M.

The Moon passes 3° north of Neptune, 4 P.M.

30 The Moon passes 6° north of Uranus, 4 A.M.

31 Asteroid Ceres is in conjunction with the Sun, 10 A.M.

SEPTEMBER OBSERVERS' LOG

William Carney went out to SGNC on September 1st and observed another 10 objects on the AL's Lunar II observing program project. Carl Wenning stayed home on that evening and observed several satellites. Duane Yockey observed the sky with eyes and binoculars from the Boundary Waters area of northern Minnesota from September 1-10. On the night of the 2nd William again observed at SGNC taking in views of "moonless" Jupiter and sighted two more targets for his Lunar II observing project. By the 3rd William had increased his Lunar II observations to 24. He was also out on Labor Day and increased these observations to 28.

During morning twilight on September 3rd Carl and Teresa Wenning viewed the International Space Station (ISS) with STS-128 attached. It shone at magnitude –3.5 as it passed between the clouds. It's maximum altitude was 89° above the SW horizon at 4:57 a.m. Teresa suggested that they view it with binoculars. They did, and using 15X70 binoculars Carl was able to make out a discernable rectangular image moving perpendicular to its long axis. On Labor Day evening Carl was able to observe two successive passages of ISS/STS-128. The first crossing was at 7:52 p.m. from SSW to ENE and shone at magnitude -3. The second appearance was at 9:27 p.m. from WSW to WNW with the orbiters reaching the magnitude of Arcturus. William was able to make this same observation from Bloomington. He also observed a -6 magnitude Iridium flare satellite that same evening.

TCAAers again observed the ISS and STS-128 as they flew nearly overhead (an elevation of 89°) at 8:17 p.m. on September 8th. The orbiter and space station had just parted hours earlier, and the STS was leading the ISS by about 8 degrees (about 5 seconds). Carl estimated that the ISS shined at magnitude -3.5 and the STS was at about magnitude -1. He reported, "Wow!" and Lee Green reported, "Fabulous!" Dave Osenga observed the passage just north of town, and Hilary Goff Shirven reported viewing the dynamic duo from Hanna City. In Hil's words, "That was incredible. I'm new to all of this. I can't believe how quickly they moved!"

The next evening, September 9th, Carl and Teresa viewed the passage of STS-128 and ISS once again. The STS was in the lead of the ISS by around 20 degrees or so (about 1 minute, 12 seconds), and both were quite bright – with the STS much brighter than predicted. Carl reported, "The STS was trailing a large "C" of gases, about 1/2 degree across and extended below it and to the left. It was visible to the unaided eye even from town. I sent my daughter Teresa into the house to retrieve my 15X70 binoculars, and it was more obvious still. Neat!" William was out at SGO at the same time, and the "C" was easily visible there. He later pointed out that the plume was actually water being jettisoned before landing. That made for his 5th observation for the AL's satellite observing club. He also tried a little photography that night with his autoguider and mount and later got four more Lunar II objects. William observed again on the evening of the 11th and increased his Lunar II observing program by two more.

Despite a marginal sky (lots of water vapor leading to low transparency), at least fifteen members and guests were present at the members-only observing session on the evening of the 12th. In attendance were Nancy Fewkes and three friends, Randy Gleason and Jeannie, John Littlefield and Linda, Duane Yockey, Lee Green, Tony Cellini, Bobby Arn, and Carl Wenning. Kris Cummings and Jetty Ann Kircher left before the sky got dark because they found an injured bird they wanted to help. (Sadly, the bird didn't make it.) Several observers left around 9:30 p.m. due to the poor viewing conditions and others drifted away before midnight. Lee and Bobby stayed on site until after midnight.

Dave remained a bit after the observing session he hosted at Prairie View School on September 17th to view the -8 flare of the Iridium 15 satellite. As Dave remarked later, "It was traveling north to south through the square of Pegasus and got very bright once past the southern star Markab, it intensified quite a bit. The crowd gasped and clapped!!" The Wenning family also viewed this rather remarkable event from their front yard in Normal.

David Hahn has been working for the past year on the Messier observing program. He has now completed all 110 observations required to earn the Honorary Messier certificate. Congratulations to David. He will be receiving his observing certificate and pin at the club's annual meeting in February.

UPCOMING ASTRONOMICAL MEETINGS

For the record, here at the dates of regional astronomical meetings for amateurs that TCAAers might wish to attend. TCAAers in charge of outreach for the 2010 NCRAL meeting might want to get on the agenda of some of the meetings.

- ☆ Illinois Dark Sky Star Party: October 15-18, Jim Edgar Panther Creek State Park, see www.sas-sky.org
- ☆ NCRAL 2010: April 16-17, 2010, Bloomington, IL, see www.tcaa.us

REMAINING 2009 IYA SESSIONS @ BPL

The TCAA's saga into astronomy in recognition of the International Year of Astronomy continues with the *Classroom for Kids* program. Family astronomy workshops for those aged 10 years and above will take place from 1:30 to 3:00 p.m. on the 4th Saturday of each month at Bloomington Public Library throughout 2009. The November and December events have been integrated into a single December 5th event due to conflicts with the holidays. The topic for this date is The Lives of Stars and will feature an interesting light show demonstrating spectral of different types, Wien's Law, Stefan-Boltzman Law, and wave phenomena. These events are all intended to include hands-on, minds-on activities. Lee Green is the coordinator.

REMAINING 2009 MEMBERS-ONLY OBSERVING SESSIONS

The club's members-only observing sessions typically are slated one week earlier than the club's public sky viewing sessions. This ensures club members with a dark night, and a public sky viewing session with typically a crescent moon. Member-only observing sessions begin as soon as the sky grows dark enough for viewing, usually one hour after sunset.

Date	**Coordinator(s)**
November 14	Lee Green
December 19 (Saturnalia Party)	Carl Wenning

SEPTEMBER EDUCATION/PUBLIC OUTREACH

As part of the annual East White Oak Bible Church picnic, Dave Osenga hosted a stargazing session Saturday evening, September 12th, at Comlara Park. About 20 people attended and were given a tour of the sky that was visible above the haze of the evening. Several constellations, the Milky Way, several star clusters, Jupiter, Neptune, and the Andromeda Galaxy were observed through Dave's 8" reflector. They discussed the size and makeup of the Milky Way, the size and distances of several stars, the overall size and order of the universe, the speed of light, and the imagination it took to connect the stars into constellations. Several people were surprised by the rate at which the sky rotated during the time they were outside. He plans to do this again next year and, if the event does not fall on a MOOS night, perhaps other TCAAers can help out.

On the morning of the 15th, Carl Wenning gave a presentation to the C&I 257 Elementary Science Teaching Methods course at ISU. He gave a 90-minute demonstration dealing with how to teach the concepts of day and night, moon phases, eclipses, (using club materials) and reasons for the seasons. Nineteen students and one ISU faculty member were present in class.

Dave Osenga hosted a sky tour for the 5th and 6th graders of Prairieland Grade School in Normal on Thursday evening, September 17th. The viewing session took place just north of the school. As Dave noted, "We looked at Jupiter and the four Galilean moons through my 8" reflector, then did a constellation tour of those that are visible in spite of the city lights. The kids seemed to like Draco the Dragon and the green laser pointer the best! This is the 5th or 6th year we have done this for Mrs. Foster's classes."

Despite a mostly cloudy sky, 29 members of the general public joined 10 members of the TCAA for the September public viewing session on the 19th. TCAAers in attendance were Lee Green, William Carney, Dave Osenga, David Hahn, Carl Wenning, Kris Cummings, Jetty Ann Kircher, Duane Yockey, Mark Cabaj, and Tony Cellini. The session started at 7:30 p.m. with "contingency viewing" in the event the sky would entirely cloud over. Starting at 8 p.m. Dave O. delivered a 30-minute program titled *The Milky Way*. Following this, Lee give a laser-pointed-mediated sky lecture lasting nearly a half hour. The final half hour consisted of views through the telescopes of David H. and Carl. Viewing through the gaps in the clouds, attendees were able to observe M15, 30, 27, 57, 31, 32, 110, Mizar and Alcor, and *h* & Persei – the double cluster. The session drew to a close at 9:30 p.m.

The club's *Classroom for Kids* activity took place at BPL on the 25th. Lee Green gave a talk focusing on the use of telescopes to view the universe, and presented a scale model of the solar system using the community room's whiteboard. This was followed by about 15 minutes of active questioning by many of the 15 members of the general public in attendance. Carl Wenning followed up on this event by giving a 15-minute talk introducing the 10 panels of the NASA display *Visions of the Universe: Four Centuries of Discovery*.

MINUTES OF SEPTEMBER 21ST NCRAL 2010 PLANNING COMMITTEE MEETING

Chairman Carl Wenning called the NCRAL 2010 planning meeting order at 7:45 p.m. Also present at the LYB meeting were Dave Osenga, Dan Miller, John Werner, Duane Yockey, and Lee Green. Brian Barling and William Carney were absent. The following matters of business were addressed:

- Duane noted that there was nothing new to report in the affairs relating to hotels and catering. He did, however, note the need to refine the budget. This should be worked out by November 15th at the latest. He has not heard back from Normal Theater, but will check back with them about a "retro" astronomy-related movie.
- William was not present to talk about vendors and door prizes, but Carl contacted him after the meeting. William noted that because he now has a specific date, time, and location for the NCRAL 2010 meeting, he will soon move ahead to contact vendors about displays and door prizes.
- Dave noted that the new TCAA logo was nicely integrated with information about the dates of the NCRAL meeting. Nothing to report about A/V media other than the fact that it is now clear why laptops we will provide to our speakers must by PPTX compatible. Dave noted his willingness to put out signs in various locations as needed for the meeting.
- Dan had nothing to report about field trips, but Carl noted that he had spoken with Stacey Shrewsbury at the CLC to make certain that we can have our two Friday missions. Dan will call to confirm and also ask about a possible children's mission on Saturday.
- John shared lots of marketing ideas. He was given the go ahead to find out pricing for polo shirts with stitched TCAA logos. He provided the status of databases that he was working on for e-mail and snail mail (including clubs in Iowa, Indiana, and Missouri). He noted that there would be about 120 clubs on his listing. He's shooting for a mid December mailing and follow-ups in early January. He will post information to the *Reflector* magazine by October 15 with respect to the free 1/16 page ad we have been promised, and get information to *Astronomy* and *Sky & Telescope* for their websites. The NCRAL.org website already has a pointer to the NCRAL2010.org website. Carl will contact the leaders of the IDSSP to see if they will accept "stuffers" for their information packets.
- Carl noted information about the program, registration, and the PowerPoint presentation. Carl will update the program to include a 30-minute break after his talk to feature a 20-minute video tribute to Clyde Tombaugh that John has acquired. He indicated that Dr. Daniel Holland has tentatively agreed (and has been subsequently confirmed) to speak in lieu of another individual from South Carolina that we had previously considered. Carl further noted that Bobby Arn has agreed to be one of the 15-minute speakers (*DSLR Astrophotography*) in addition to Dan (*Itty Bitty Radio Telescope*) and John (*So, you really want to build an observatory?*). Carl noted, too, that he will soon start working on assembling the 100 or so expected information packets to be handed out at registration. He will also include icon for meals and paid programming on name tags. Time was then spent going through the informational PPT presentation with a number of improvements being suggested. Carl will make corrections and send them to the team for review.
- Lee noted that the NCRAL 2010 site has been getting hits, and that the draft video promotional has already been viewed some 100 times. He continues to improve the site, and asked for continuing input. The team then reviewed Lee's video and made a number of suggestions for improvement.
- Carl noted that as we are now approaching 200 days prior to the date of the NCRAL 2010 meeting, he would start to use a "countdown clock" to send information and reminders based on the established time line as well as the AL Meeting Planning Guide. This will help to ensure that everything is getting done in a timely fashion.
- John might make it to this weekend's Astrofest meeting in Kankakee. If he does, he'll be prepared to spread the word about NCRAL 2010. Bobby and Dan will speak at the IDSSP on Friday afternoon and will feature the club's promotional video as part of their talk; Duane and Carl will present on Saturday afternoon and will promote NCRAL 2010 using the promotional PPT.
- Lee noted that he is on the schedule of Rock Island's Popular Astronomy Club agenda for November 5th. Lee and Dan will share information about NCRAL 2010 at the DAAC Jamboree on October 3rd to the extent possible. (A day after the meeting, Carl was invited to speak to the membership of the Champaign Urbana Astronomy Club on November 12th.)
- The meeting drew to a close at 9:08 p.m. and the planning team will meet next on Tuesday, November 10th, following the TCAA Board of Directors meeting.

Carl J. Wenning, Chair of NCRAL 2010

2010 PUBLIC SKY VIEWING BROCHURE NOW AVAILABLE

The 2010 Public Sky Viewing Program brochure is now available online at www.tcaa.us. The following sky objects will be featured as shown below. Additional prominent sky objects such as planets, nebulae, star clusters, and galaxies will be viewed when visible.

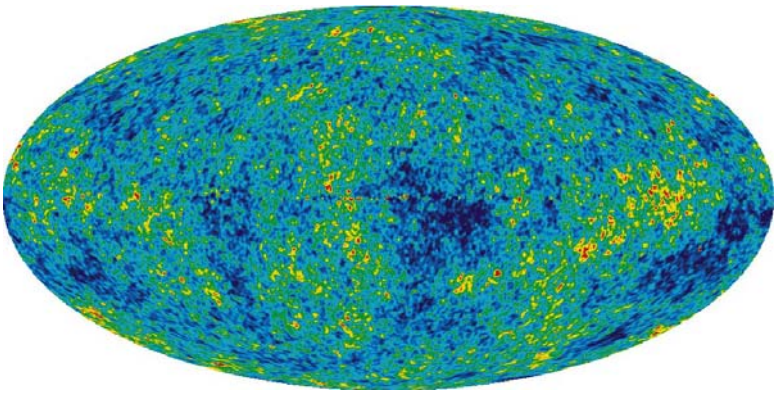
- March 20 – Crescent Moon and Mars
- April 24 – Gibbous Moon and Saturn
- May 22 – Variable Stars
- June 19 – Virgo Cluster of Galaxies
- July 17 – Globular Star Clusters
- August 14 – Planets and the Zodiac
- September 11 – Stars of Red, White, and Blue
- October 16 – Perseus Double Star Cluster

OCTOBER IN THE IYA: WHAT IS THE FATE OF THE UNIVERSE?

From IYA Discovery Guide

Where do we come from and where are we going? Humans have been asking these questions since before recorded history. Over the past 400 years, science has used observations and experiments to attempt to answer them. Cosmologists study the nature of the whole universe as they look for the answers to these big questions.

Most astronomers today accept the abundant evidence that the universe began about 14 billion years ago. But because we cannot see into the future, the fate of the universe has been somewhat more perplexing. In 1929, Edwin Hubble discovered that the universe is expanding. Then in 1990 NASA's COBE satellite showed that the universe was originally extremely hot and dense. So the universe started small and hot and is getting bigger and cooler. Based on what was known for most of the past century, scientists saw two different options for the fate of the universe, depending on how much mass it contained. Since mass creates gravity, the more mass there is, the more gravity will pull things together. Thus the two possible outcomes are:



1) Either there isn't enough mass to stop the expansion and the universe will just keep expanding forever, or

2) There is enough mass and gravity to pull the universe back together, and there will be some kind of "Big Crunch" in our future.

In both of these models, the rate of expansion was expected to slow over time.

Well, new discoveries sometimes mean that scientists have to change their models. That was the case in 1998, when two separate groups came to a shocking conclusion. Using observations with the Hubble Space Telescope and ground-based telescopes, the researchers found that not only is the universe *expanding*, it is also *accelerating!* It appears that there is some unknown force "pushing" the universe faster and faster apart. This acceleration has changed our understanding of the fate of the universe and created even more questions. NASA and the Department of Energy have jointly asked scientists to design a mission, to be launched in the next decade that will explore the nature of the so-called “Dark Energy” that is causing the universe to expand ever faster.

The fate of the universe is all very far in the future. But in the not so distant future, about four billion years from now, the Milky Way Galaxy will collide with the Andromeda Galaxy. Amazingly, stars in galaxies are so far apart that few, if any, of them will actually collide. But the dust and gas will slam together, and if humans still inhabit the Earth, our distant progeny should have quite a show as bright new stars are born in the night sky. You can see the Andromeda Galaxy now, while it is still over 2 million light years away.

VISIONS OF THE UNIVERSE: FOUR CENTURIES OF DISCOVERY

Bloomington Public Library is proud to be one of forty public libraries in the United States selected to host Visions of the Universe: Four Centuries of Discovery, a traveling exhibition to mark the International Year of Astronomy, a global celebration of astronomy highlighted by the 400th anniversary of the first use of an astronomical telescope by Galileo. The exhibit's colorful panels feature striking images of planets, stars, comets, nebulae, and galaxies taken by NASA's powerful astronomical observatories and spacecraft, as well as drawings and diagrams created by early astronomers such as Galileo, Christiaan Huygens, and Charles Messier, which show how the universe, stars, and planets were viewed and understood centuries ago.

This exhibit is presented by Space Telescope Science Institute, Boston, Md; smithonian Astrophysical Observatory, Cambridge, MA; and the American Library Association, Chicago; through funding from NASA.

This exhibit opened at the Bloomington Public Library on Saturday September 26 and will be displayed through December 11.

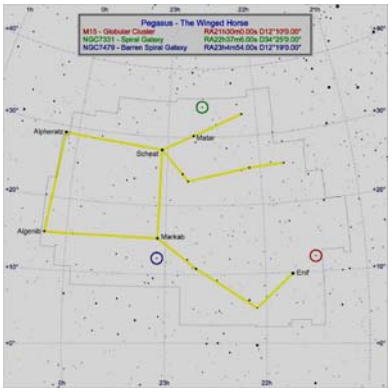
I was very impressed with the quantity and the quality of programming the Bloomington Public Library has prepared around this exhibit. In addition to two talks Lee and Carl have scheduled for October 14 and November 4, there are many other associated events. These events feature a film series as well as a variety of NASA ambassadors who will discuss topics of interest, including Oct 3 with Janet Moore on **What Can You See**, Oct 10 with James Joel Knapper on **Robotic Exploration of Space**, Oct 12 with Challenger Learning Center's Stacey Shrewsbury on **Toys in Space** and Oct 21 with Nancy Atkinson on **NASA Spinoffs** and **Rock or Meteor?**

On October 26, the library will feature the Starlab Portable Planetarium! Tickets for this free event must be obtained from the library after Oct 12, but the number are limited, so you'll need to plan ahead to attend this one.

Check out the all 22 of the activities at their website:

http://www.bloomingtonlibrary.org/see_&_do/programs/visions_of_the_universe_exhibit/programs/ .

CONSTELLATION OF THE MONTH: PEGASUS—THE WINGED HORSE



Pegasus is a large constellation that lies north of Pisces, west of Aries and shares a main star with Andromeda. Pegasus rises high in the early evening during the early autumn months. Pegasus is pictured as the forepart of the winged horse with his head to the south.

In mythology, Pegasus arose from the blood of Medusa spilled after her death at the hands of Perseus. Said to have a white coat and golden main, Pegasus' wings allowed him to fly. Pegasus was tamed by Minerva and given to the Muses. On their mountain Helicon, Pegasus started the Hippocrene fountain to flow with a kick from his hoof. Bellerophon was a youth who was asked to fight the Chimera, a fearsome monster that was part lion, part goat and part dragon. Bellerophon was given a golden bridal by Minerva and captured Pegasus at the well of Pirene and together defeated the Chimera. When Bellophon tried to ascend into heaven with Pegasus, Jupiter was offended and sent a gadfly to sting Pegasus who threw his rider. Pegasus continued into his celestial place while Bellophon died miserably.

Pegasus is the 7th largest constellation covering 1121 square degrees and is the 26th brightest. Pegasus reaches opposition on September 1. Four bright stars make up the asterism "The Great Square" which is easily recognizable,

The named stars in Pegasus include the stars of the Great Square, Markab, Scheat, Algenib and Alpheratz. Alpheratz is seen as the horse's navel and is actually part of the constellation Andromeda. Other named stars include Enif, the nose, Matar, the left knee.

Pegasus' location away from the Milky Way explains why its deep space objects are primarily galaxies. NGC7331 is an impressive spiral galaxy and NGC7479 is a barred spiral galaxy. M15 is a bright globular cluster located in the western part of the constellation.

POINTING A CAMERA TO THE SKY: ASTROPHOTOGRAPHY ON A BUDGET

By Bobby Arn

When we look through our telescopes at objects in space, we are seeing but a limited view of the many wonders our universe holds. Limited by the human eye, we have turned our focus to recording the night sky through the use of cameras and computers. By turning a camera to the sky, we are able to get a better picture (no pun intended) of the finer details, both for the purpose of scientific questioning and to simply be able to enjoy the aesthetic nature of the composition.

Once these images could only be achieved at the world's largest observatories, with state-of-the-art equipment. As the technology to make images improved (once from plates, to film, and now digital), amateur astronomers got involved and began probing the sky. Within the past decade there has been a boom in amateur astronomy technology. Now the hobby is filled with computerized mounts, auto-guiders, cooled cameras and much more. But with all of these new toys, getting started in astrophotography can be very difficult and intimidating, even for experienced amateur astronomers. However, the hidden secret that most people do not realize (even some astrophotographers) is that it does not HAVE to be difficult to start out - and you do not need anything more than a simple camera with the ability to manually control the exposure!!!

I am currently involved in a 2-year long research project, with Dan Miller serving as my advisor, to bring the world of astrophotography to the inexperienced. This includes other amateur astronomers and those with no prior experience in astronomy. For the former, it will be an extension of the skills and techniques used for visual observing and for the latter, I use astrophotography as a method to learn about astronomy - to learn all about the night sky. But the most important thing is the cost to get started. Yes, I agree that astrophotography, just like visual astronomy CAN be expensive. For the average person, going out and buying thousands of dollars of equipment to see if you like an activity is not practical, and sometimes not possible. However, starting out learning the skills (while obtaining great results) with equipment that you already have, just to see if you enjoy the process, is wonderful.

As part of the research project, I am in the process of writing a book, starting out with the user having nothing more than a simple camera (with manual control) and a still platform. This simple (< $300) setup has hundreds of possibilities for images - from shooting the Milky Way, to imaging constellations, night-scape (where parts of the Earth are in the shot), the moon, star trails, etc. As the reader learns more about camera operations at night, we start to digitally process these images, add basic tracking to the night sky (through the use of an Astrotrac, EQ-1, EQ-2, or EQ-3 system), and take multiple exposures for better results. With noth-

(Continued on page 10)

THE LIFE AND TIMES OF GALILEO, PART 2

By Carl J. Wenning

In recognition of the 400th anniversary of the telescope's use to view the heavens, I re-present here in multiple parts a review of short biographical sketch of Galileo that I wrote in 1996.

Galileo's first real contribution to astronomy came in the year 1604 with the appearance in the heavens of a "new" star. According to Aristotle, the heavens were perfect and unchanging, for if there was change, then things would have to move from a more perfect state to a less perfect state or visa versa. Since the heavens were absolutely perfect, there could be no change – or so Aristotle argued. Galileo used this appearance of the "new" star to show that Aristotle must be wrong. (Today we know such a star as a nova, meaning new star, but the star isn't new at old. Rather it's an old star that has exploded.) This observation, along with his previous work in physics, confirmed for Galileo that Aristotle's view of the heavens must be wrong.

Aristotle, a Greek philosopher of the fourth century B.C., taught that the Earth was unmoving and that the heavens turned daily overhead. To Aristotle the Earth was the center of creation and, therefore, all things had to orbit around the Earth. The Earth was necessarily at the center of creation because humans were fallen creatures and their very nature relegated them to a position at the center – the lowest point in creation.

Aristotle also believed that the heavens and earth were ruled by two completely different sets of physical laws. The very substance of the materials that made up earth and heavens were also different according to Aristotle. On Earth all "elemental" materials were subject to change, decay, and destruction, while in the heavens things were composed of "quintessential" materials that were by definition perfect, unchanging, and eternal. Even the motions of heavenly objects were uniform and planets moved in perfect circles. Indeed, every aspect of the heavens was perfect for how else could they be in heaven?

Astronomers of Galileo's day had accepted Aristotle's view of the cosmos without question. His views, and those scientists whose opinions conformed to these views, were regarded as possessing an almost divine quality. That is, if Aristotle said it was so, it must be so. One set of views that were adopted without question by the astronomers of those days were those of Hipparchus, a Greek astronomer of the second century B.C. His system of the cosmos placed Earth at the center of the cosmos and had the planets moving in orbits around the Earth.

In Hipparchus' view, the heavenly wonderers were in increasing distance from the earth: the Moon, Mercury, Venus, the Sun, Mars, Jupiter, and Saturn. The Moon circled the earth monthly. The Sun did so daily. The motions of the planets were sufficiently complex to require an additional complication.

As one watches the planets over the course of a year, each undergoes an unusual sort of motion. Inner planets such as Mercury and Venus are never seen very far from the sun. The outer planets, Mars, Jupiter, and Saturn, can appear from time to time opposite the sun in the sky. During most of the year these planets move slowly toward the east among the background of stars, but when nearly opposite the sun, they undergo a retrograde motion. For a few weeks the planets stop their eastward motion among the stars and go backward.

Hipparchus originally suggested that the planets went around the Earth, each carried on an invisible crystalline sphere. The planet was not actually part of the sphere; rather, it was rode on a smaller sphere whose center was carried in a circle around the Earth. As the smaller sphere turned within the larger sphere, its path described a circle. This circular motion, along with that of the larger sphere's motion, adequately explained to the ancients the observed looping motions of the planets.

This system was considerably more complicated than another system suggested by Aristarchus. Aristarchus believed that the whole of the observable motions of the sun, moon, stars, and planets could be explained by placing the sun at the middle and then allowing the planets to move in orbit around it. The earth would spin daily upon it axis, and circle annually around the sun. This suggestion was rejected, however, because it was hard to imagine the whole earth flying through space, especially when one doesn't feel the motion, things aren't being flung off into space, neither are they left behind when they are thrown up into the air. Winds don't blow continually from the east as might be expected for a world spinning in that direction. The arguments against a spinning earth were numerous and convincing to those persons unknowledgeable of the true laws of motion, laws which Galileo had just begun to understand.

The sun-centered world system was an idea whose time had not yet come and it was soon forgotten. It would, however, be revived centuries later by a Polish cleric known as Nicolas Copernicus and espoused and championed by Galileo.

Hipparchus' system of rotating and revolving spheres, though a cumbersome tool, did an adequate job of predicting the future positions of planets and was widely adopted. A Greek Alexandrian astronomer by the name of Ptolemy made a series of improvements in the second century A.D. Ptolemy refined Hipparchus' system. He dispensed with the crystalline spheres and replaced them with epicycles and deferents. A point known as the deferent would move around the earth. The planet would travel in a circle around the deferent. The combined motions of epicycle and deferent would adequately explain the motions of both inner and outer planets.

The deferents of the inner planets, Mercury and Venus, would lie continually between the Earth and Sun. Venus, moving the slower, would lie farther from the Earth and its epicycle would be the larger. Mercury, moving the faster, would lie nearer the Earth and its epicycle would be proportionately smaller. The moon, the fastest moving of all celestial bodies, would directly orbit the Earth as both common sense and observations indicated.

Outer planets were arranged from Earth as a function of speed among the background of stars. The planet with the slowest motion, Saturn, had the slowest moving deferent. It circled the Earth in just over a year. The planet with the fastest motion, Mars, had a deferent which

(Continued on page 10)

POINTING A CAMERA TO THE SKY: ASTROPHOTOGRAPHY ON A BUDGET (CONT.)

(Continued from page 8)

ing more than a simple mount, camera, and lens - the possibilities of targets are already astronomical!!! Through this work, it is my hope to bring new people into the exhilarating world of astronomy and astrophotography, without costing them a fortune.

The second part of my research is more scientific in nature and deals with the amount of noise within a long exposure. When a camera shutter opens and the sensor is exposed to the light entering the aperture (of a lens or telescope), there is more data recorded than captured. This unwanted signal is called noise. Noise within an image will cause it to look grainy and can even hide the detail. This unwanted signal is caused from the camera itself in the form of heat. As current passes through the body of the camera to control the shutter, the sensor not only records the object that is being imaged, but also the heat from the flow of electricity. Other factors in the amount of noise include the ISO setting (which is similar to gain), temperature of the outside air (which impacts the temperature of the sensor), and the length of the exposure (a 60-sec exposure records 60-sec of noise).

The good part is, we can correct for most of the noise in an image by subtracting a dark frame. A dark frame is an exposure taken with the same setting as the light frame (the exposure of the object in question), with the lens cup on the camera - so no external light strikes the sensor. We can then subtract the dark frame, which is a sampling of the noise, from the light frame to achieve a better image. The question that comes to mind is, how similar do the conditions of the dark frames have to be to the light frames (i.e.. if the light frame is taken at a temperature of 65 degrees F, is there a statistical difference if the dark frame is taken at 64 degrees? 60 degrees? what about a 100-second light frame with a 110-second dark?) Answering this question will allow an astrophotographer to build a dark frame library - a collection of dark frames with various temperatures, ISO speeds, and exposure lengths, to be applied when processing astrophotos. Having a dark library instantly doubles the amount of time a person can spend imaging an actual object at night - since the number of dark frame should equal the number of light frame for optimal results. To find this out, I am working with Dan Miller, with the support of John Werner, to come up with a function for the amount and distribution of noise while varying these conditions in order to find out how similar conditions need to be while building a dark library. While prior work on this subject has been done to verify the ability of a dark library to approximate noise in the field, a complete comparison has not been done to the effect of placing limits on what conditions are "close enough" with a CMOS sensor (standard sensor type found in consumer cameras).

If you care to check out full-color and cheap images of the night sky, feel free to check out http://barn.zenfolio.com. Most of my recent work has been taken with either a still tripod, camera and lens (less than $500 setup), or the Astrotrac mount, camera and lens (less than $1500 setup).

THE LIFE AND TIMES OF GALILEO, PART 2 (CONT.)

(Continued from page 9)

orbited the Earth in just under two years.

Each planet also moved on an epicycle with the line connecting the planet and the deferent always parallel to the Earth-Sun line. Such an alignment was necessary so that, when the planets appeared opposite the sun in the sky, their retrograde motions were at a maximum and the planets would lie nearest the earth. This would correspond to the time when they were the brightest. The sizes of the epicycles were directly related to the observed sizes of the retrograde loops of the planets. This arrangement for the outer planets adequately explained the observed motions of the outer planets.

Because Ptolemy was a skilled observer of the heavens, he knew that the planets moved somewhat irregularly in their orbits. He realized, too, that the seasons were of unequal length due to the irregular motions of the sun with respect to the background stars. The stars themselves moved at a rate slightly different from that of the sun so that they would circle the earth daily and appear to turn one additional time with respect to the sun annually.

To take these observations into account and to preserve the concept of perfect circular motion, Ptolemy offset the earth from the precise center of the system. The planets and sun each would be perfectly centered on a separate point called the eccentric. He made the deferents move at a uniform rate as seen from a perspective located at yet another set of points known as the equants. Such adjustments made the model marvelously complex and it yielded better - though not perfect - predictions as to the placements and motions of the sun, moon, and planets with respect to the background stars. These corrections to Hipparchus' world system were universally accepted. Today the modified system of Hipparchus is known as the Ptolemaic system.

This was the scheme of things when Galileo began to examine the world system as presented by Aristotle and Ptolemy. Though

TCAA Treasurer's Report – September 2009

OPERATING FUND BALANCE – August 31, 2009 -	$ 2,607.07
Income	
Bobby Arn (student dues) -	$ 26.00
John Littlefield (senior dues) -	$ 25.00
Tony Cellini (dues) -	$ 40.00
Nancy Fewkes (dues via Paypal) -	$ 41.00
Tim Henning (dues via Paypal) -	$ 41.00
George Weiland (dues via Paypal) -	$ 41.00
Expenses	
LYB Inc. (September Observer) -	$ 35.87
Paypal Fees -	$ 3.60
John Werner (NCRAL flyers) -	$ 47.58
Bianco Design Studio (TCAA logo) -	$ 175.00
OPERATING FUND BALANCE – September 30, 2009 -	$ 2,559.02

OBSERVATORY FUND BALANCE – August 31, 2009 -	$ 2,194.29
Income	
None -	$ 0.00
Expenses	
None -	$ 0.00
OBSERVATORY FUND BALANCE – September 30, 2009 -	$ 2,194.29

TOTAL TCAA FUNDS – September 30, 2009 -	$ 4,753.31

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 2009)
Carl Wenning (renewed through 2009)
Brian Barling (renewed through 2009)
Christopher Franklin (renewed through 2009)
David Osenga (renewed through 2009)
Josh Lindsey (renewed through 2009)
Dan Miller (renewed through 2009)
Lee Green (renewed through 2009)

UPCOMING EVENTS

- ☆ October 10, Members-only Observing Session, SGNC, dusk
- ☆ October 14, Visions of the Universe Series, *Dark Skies and Light Conservation*, BPL, 7 p.m.
- ☆ October 17, Public Sky Viewing Session, *Pleiades Star Cluster*, SGNC, 8:30-10:30 p.m.
- ☆ October 24, Autumn Fest, SGO open house, solar viewing, and informational display, SGNC, 10 a.m.-5 p.m.
- ☆ October 24, Classroom for Kids, *What is the fate of the universe?*, BPL, 1:30-3:00 p.m.
- ☆ October 26, observing session for Marty Morris' 4th graders, Weldon Springs SRA, 6:00-8:00 p.m.

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@yahoogroups.com. Unsubscribing is just as easy. To unsubscribe, just send a blank email to TCAA-unsubscribe@yahoogroups.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. It has been recently updated to include an extended sky calendar of events as well as additional space weather and satellite viewing links.

The OBSERVER
Newletter 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

Visit the Twin City Amateur Astronomers
on the web at
www.twincityamateurastronomers.org/