

Astronomy Club of Tulsa *Observer*



April 2009

Picture of the Month

Corvus

A sure sign that spring has arrived (other than the switch to daylight savings time...) is the sail shaped constellation of Corvus riding high in the southern sky toward midnight. Corvus (the crow or raven) has several stories behind the constellation.

Once the crow had beautiful silver or snowy white feathers and could speak to humans, but that all changed long ago. As Apollo's sacred bird, the crow (or raven) was told to watch over his pregnant love, Coronis. Coronis slowly lost interest in Apollo and was attracted to a mere mortal. The crow, who was secretly spying on her, reported her unfaithfulness to Apollo. In a rage of anger he unfairly turned the loyal raven's feathers black and took away its ability to speak. Coronis was then killed by Apollo's twin sister Artemis. The child of Coronis and Apollo was rescued and raised by the gods. He then became known as Asclepius, the "god" of medicine and healing (aka - Ophiuchus).

Another well known story is that when Apollo sent his raven to get some water in the "god's" cup (Crater), the raven waited for some figs to ripen and had a feast on them. He came back very late with a water snake (Hydra) and the water in the cup (Crater) he was sent for. The foolish raven blamed his tardiness on the water snake. Apollo was not tricked. He put the raven in the sky along with the water snake and the cup. 'Till this day, the snake keeps water from the eternally thirsty raven. (source - Wikipedia)

Credit: NASA, ESA, Z. Levay (STScI) and A. Fujii




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Important ACT Upcoming Dates:

- 100 Hours of Astronomy – Thu-Sun: April 2-5, 2009
- Public Star Parties: Fri. April 3 & 17, 2009 (page 14)
- ACT Meeting @ TCC - Fri. April 10, 2009, (7pm)
- Members Only Star Party: Fri. April 24, 2009
- ACT Board Meeting: TBD / eMail Notification



100 hours of Astronomy! Amateur and professional astronomers all over the world are celebrating astronomy the 1st week of April. Below are events planned by our Tulsa Astronomy Club. **Observing events dependent on clear skies.** Sunday event has indoor as well as outdoor events and will take place as scheduled.

Thursday April 2nd 7:45 to 10:00 PM
Sidewalk Astronomy at **Bass Pro in Broken Arrow and Jenks Riverwalk** area near the fountain.

Friday April 3rd -7:30 PM Observing Night at Observatory open to the public. Classes on Galaxies, telescope observing and good conversation.

Saturday April 4th 7:45 to 10:30 PM
Public Observing Night at Mohawk Park Polo Grounds east of the zoo.

Sunday April 5th 2:00 to 5:00 PM Hardesty Library 93rd and Memorial
Solar Observing and projects. Lecture on Black Holes distinguished "Extraterrestrials"
Sunday event has indoor as well as outdoor events and will take place as scheduled.

Editor's Note, 3/29/09

There have been many new article submissions in April's Newsletter. Keep up the awesome work, folks! A special note of thanks to new contributors Mike Henk, K.C. Lobrecht and Jerry Koenig – as well as regular input from Tony White, Ann Brunn, Peggy Walker, Rick Walker, Rod Gallagher, John Land, Chris Pagan and Tamara Green (our budding club photographer). Your help makes our ACT Newsletter a really great publication and a true pleasure to edit.

D.J. Karcher – Newsletter Editor

(More Information on Page 10)

President's Message by Tony White

Isn't Oklahoma weather fun? Here it is, the end of March, Messier Marathon weekend, and we get a record-breaking snowfall. Don't we have enough challenges in our hobby? Equipment problems, light pollution, uncooperative weather conditions... makes one just want to give up at times. However, the great article Mike Averill did on the Club in today's Tulsa World (Sunday's Scene section) kind of makes up for it. Thanks to Mike for a nice write-up, and also thanks to Rod for providing that wonderful Horsehead Nebula image for the feature image in the story. I've had several comments from non-Club members on it this morning, so I hope it will serve to attract some new interest.

And here we are coming in to April – 100 Hours weekend is upon us. I hope the weather cooperates (after this past weekend, especially!) and that we get a good turnout at all the planned events. I will not be at the Mohawk Park event personally, as I was previously committed for a Girl Scout event at Zink Ranch on Saturday night, but I know that it's in good hands. And I know that everyone is doing their best to help with these events, and for that – I thank all of you.

We do have our 14" RCX back from Cory Suddarth, who did a fantastic job cleaning the scope. To protect it from further issues like this, we will build a removable enclosure that should seal tight and keep the bugs out, as well as allow us to park the scope in a horizontal orientation to help prevent future issues. I believe the scheduled Work Day will fall on Easter Sunday, so I may call upon a few volunteers to help build and deploy the enclosure on a different day. We need to get the scope back into service ASAP before the peak public months, so this is a high priority. Keep your eye on the Yahoo group for more details. I'm also working on getting the necessary pieces from Zach Garrett to put our recently-donated 100mm binoscope into service. It will take a couple of months to get those, apparently, so be patient. I'm sure the result will be worth the wait!

We also need some more volunteers to do Astronomy 101 sessions. If you have a topic that you feel would benefit the membership – especially the newer and less-experienced members – please drop me an email. This month's session is scheduled to be Observing an Object, but we had no one step forward to do it. If you'd like to do it, please let me know.

Keep looking up!

Tony

April 2009

Tulsa, Oklahoma

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 Sunrise: 7:10am Sunset: 7:45pm Moonrise: 11:19am Moonset: 1:45am	2 100 HOURS SIDEWALK BASS PRO & RIVERWALK 7:30 – 10:00 Sunrise: 7:09am Sunset: 7:46pm Moonrise: 12:27pm Moonset: 2:41am First Qtr: 8:34am	3 100 HOURS RMCC PUBLIC Sunrise: 7:07am Sunset: 7:47pm Moonrise: 1:38pm Moonset: 3:29am	4 100 HOURS MOHAWK/ZOO Sunrise: 7:06am Sunset: 7:47pm Moonrise: 2:50pm Moonset: 4:08am
5 100 HOURS HARDESTY SOLAR 3-5PM Sunrise: 7:04am Sunset: 7:48pm Moonrise: 3:59pm Moonset: 4:42am	6 Sunrise: 7:03am Sunset: 7:49pm Moonrise: 5:06pm Moonset: 5:12am	7 Sunrise: 7:02am Sunset: 7:50pm Moonrise: 6:12pm Moonset: 5:41am	8 Sunrise: 7:00am Sunset: 7:51pm Moonrise: 7:17pm Moonset: 6:08am	9 Sunrise: 6:59am Sunset: 7:52pm Moonrise: 8:22pm Moonset: 6:36am Full Moon: 8:56am	10 ACT MEETING Sunrise: 6:57am Sunset: 7:52pm Moonrise: 9:26pm Moonset: 7:07am	11 Observatory Work Day (10-4) Sunrise: 6:56am Sunset: 7:53pm Moonrise: 10:30pm Moonset: 7:41am
12 Sunrise: 6:55am Sunset: 7:54pm Moonrise: 11:30pm Moonset: 8:20am	13 Sunrise: 6:53am Sunset: 7:55pm Moonrise: none Moonset: 9:04am	14 Sunrise: 6:52am Sunset: 7:56pm Moonrise: 12:26am Moonset: 9:54am	15 Sunrise: 6:51am Sunset: 7:57pm Moonrise: 1:16am Moonset: 10:47am	16 Sunrise: 6:49am Sunset: 7:57pm Moonrise: 2:00am Moonset: 11:44am	17 RMCC PUBLIC Sunrise: 6:48am Sunset: 7:58pm Moonrise: 2:38am Moonset: 12:43pm Last Qtr: 7:37am	18 Sunrise: 6:47am Sunset: 7:59pm Moonrise: 3:11am Moonset: 1:42pm
19 Sunrise: 6:45am Sunset: 8:00pm Moonrise: 3:40am Moonset: 2:42pm	20 Sunrise: 6:44am Sunset: 8:01pm Moonrise: 4:07am Moonset: 3:42pm	21 Sunrise: 6:43am Sunset: 8:02pm Moonrise: 4:33am Moonset: 4:43pm	22 Sunrise: 6:42am Sunset: 8:03pm Moonrise: 4:59am Moonset: 5:47pm	23 Sunrise: 6:40am Sunset: 8:03pm Moonrise: 5:27am Moonset: 6:53pm	24 MEMBERS Sunrise: 6:39am Sunset: 8:04pm Moonrise: 5:58am Moonset: 8:03pm New Moon: 9:23pm	25 Sunrise: 6:38am Sunset: 8:05pm Moonrise: 6:34am Moonset: 9:15pm
26 Sunrise: 6:37am Sunset: 8:06pm Moonrise: 7:17am Moonset: 10:27pm	27 Sunrise: 6:36am Sunset: 8:07pm Moonrise: 8:09am Moonset: 11:35pm	28 Sunrise: 6:34am Sunset: 8:08pm Moonrise: 9:10am Moonset: none	29 Sunrise: 6:33am Sunset: 8:09pm Moonrise: 10:18am Moonset: 12:35am	30 Sunrise: 6:32am Sunset: 8:09pm Moonrise: 11:30am Moonset: 1:27am		

TULSA-DOWNTOWNER

Published Every Friday by

WALTER C. COX
P. O. BOX 1897
Phone TE 5-7444

We ran onto two new dishes out at Alfred's this past week end. Pan shis-ka-bob and Kafta. We suggest you try either one, or both of these unusual meat dishes—they're tops!

Did you get a good look at MRKOS comet last week? We did, and reason was that Astronomy



Club of Tulsa's past president Jack Wells of Public Service Co. lives just across the street from us. Several nights last week Jack and a couple of other Astronomy Club's held "look-see" sessions in the Wells' back yard with many a neighbor gettin' their first real look at the skies through the big scopes. This pix shows Jack gettin' the comet centered on one of the 6" reflecting scopes.

Searching for more data on the

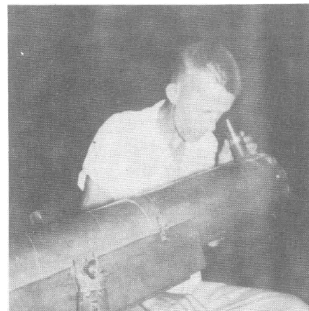


Mrkos Comet through one of the other huge scopes is Public Service

TULSA DOWNTOWNER

Co.'s Gene Gallaher who figured the "tail" was somewhere near a million miles long.

Still lookin' and more figurin', and Modern Bindery's Henry Monteith came up with the fact that



the length of the tail would be about 40 trips around the earth at the equator. Wells later told us the comet was close to 50 million miles from the earth and got the name "MRKOS" from the man who first saw it—in Czechoslovakia, Aug. 2nd this year.

From the Archives of
Jack Wells
(past President ACT)

Originally published in
Tulsa Downtowner
magazine August 23, 1957

ACT Word Search Puzzle by Peggy & Rick Walker

Male International Astronomers F-K Astronomy Club of Tulsa

L U A A S G V R E S I A K Z N A R F I K I M Z I R A W H K R S H O K F E N N W
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 K E D U N H H R D A B U L F A Z L H A R A W I L L I A M H U G G I N S R E E I

David Fabricius
 Axel Firsoff
 Savvas Koushiappas
 Alfred Fowler
 Julio Armero
 Hermann Goldschmidt
 Alexander Gurshtein
 Karl Harding
 Otto Heckmann
 Abraham bar Hiyya
 Hipparchus
 Cornelis van Houten
 Icko Iben
 David Jewitt
 Johannes Kepler
 Viktor Knorre

Johannes Fabricius
 J. Richard Fisher
 Charles Kowal
 William Fowler
 Joseph von Faunhofer
 Guatama Siddha
 Francois Gonnessiat
 Bengt Gustafsson
 Thomas Hariot
 Joseph Hellfrich
 John Herschel
 Kiyotsugu Hirayama
 Martin van den Hove
 Jr.
 Jiao Bingzhen
 Omar Khayyam
 Takao Kobayashi

Fearon Fallows
 Camille Flammarion
 Lubor Kresak
 Joseph von Faunhofer
 Johann Galle
 John Goodricke
 Guo Shoujing
 Guillermo Haro
 Maximilian Hell
 Einar Hertzsprung
 Shin Hirayama
 Fred Hoyle
 Kaoru Ikeya
 Franz Kaiser
 Al Khujandi
 Lubos Kohoutek

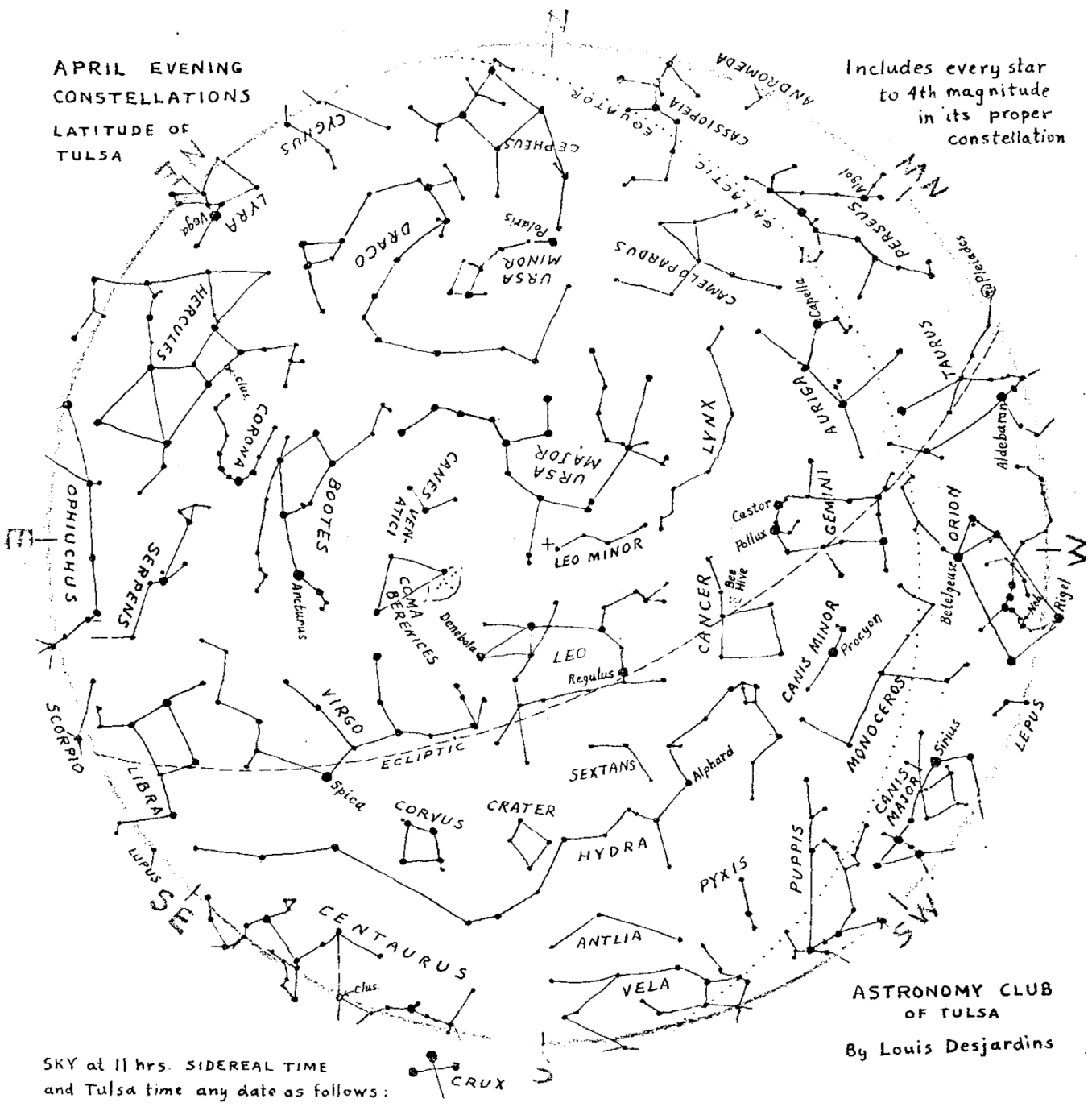
Herve Faye
 John Flamsteed
 Gerard Kuiper
 Dirk Frimout
 Carol Gauss
 Abu Gorgani
 Yusuke Hagihara
 Edward Harrison
 Karl Hencke
 Johannes Hevelius
 Gustave Hirn
 William Huggins
 Robert Innes
 Piet van de Kamp
 Khwarizmi
 Uri Kolesnik

Charles Fehrenbach
 Zdenek Kopal
 Yoshio Kushida
 Bryan Gaensler
 Riccardo Giacconi
 Paul Gotz
 Edmond Halley
 Stephen Hawking
 Thomas Henderson
 Antony Hewish
 Cuno Hoffmeister
 Hendrik van de Hulst
 Cyril Jackson
 Jacobus Kapteyn
 Kidinnu

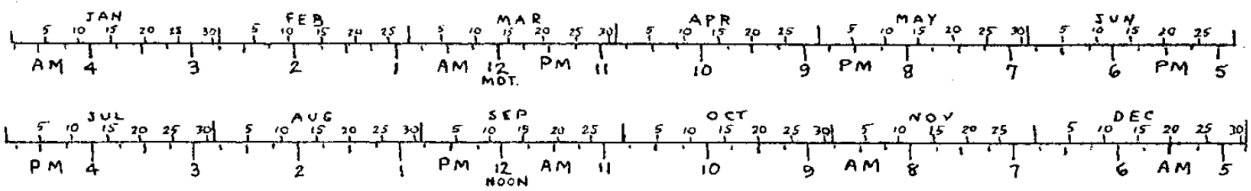
Farghani
 August Kopff
 Honore Flaugergues
 Gan De
 Michel Giacobini
 Andrew Graham
 Peter Hansen
 Will Hay
 Paul Henry
 John Hind
 Minoru Honda
 Christiaan Huygens
 Pierre Janssen
 Ghiyath al Kashi
 Hisashi Kimura

Erwin Freundlich
 Korado Korlevic
 Wilhelm Foerster
 Galileo Galilei
 David Gill
 Charles Green
 Abulfazl Harawi
 John Heard
 Prosper Henry
 Frederick Hinkle
 Heremiah Horrocks
 I' Sin
 James Jeans
 Muraoka Kenji
 Ernst Klinkerfues

(Answers next month in ACT May, 2009 Newsletter / Answers to March Puzzle on page 6)



SKY at 11 hrs. SIDEREAL TIME
and Tulsa time any date as follows:



First Quarter – 04/02/09 – 14:34 UT	April 12 th – Easter (<i>1st Sunday after Full Moon after Spring Equinox</i>)
Full Moon – 04/09/09 – 14:56 UT	April 12 th – Yuri Gagarin, first man to orbit Earth - 1961
Last Quarter – 04/17/09 – 13:36 UT	April 22 nd – Earth Day
New Moon – 04/25/09 – 03:23 UT	April 26 th – Mercury Greatest East Elongation (evening)

**INTERNATIONAL YEAR OF ASTRONOMY 2009
Hardesty Library Events**

Astronomy Club of Tulsa is holding a second meeting at the Hardesty Library in celebration of the International Year of Astronomy.

A.C.T.'s second feature presentation is:

Black Holes presented by Peggy Walker

**Sunday, April 5th from 2:00 – 3:00pm in the Conner's Cove Theater
(after presentation there will be solar observing opportunities outside)**

Peggy Walker will be bringing the most up to date information on black hole discovery for the past sixteen years provided by NASA and Jet Propulsion Laboratories.

Ms. Walker is currently the International Year of Astronomy Coordinator and is a two year member of the Astronomy Club of Tulsa. She is currently working on her Messier object observation as well as her Lunar certificate. One thing about her is that she has an interest in black holes and worm holes and the many theories associated with these objects. She's even dabbling in quantum mechanics and the ten dimensions!

The presentation will include:

- What exactly is a black hole?
- How many sizes?
- How they are formed
- How are they categorized
- How mass and spin are determined
- Black Hole anatomy
- Do Black Holes really suck everything in?
- Einstein's brilliant idea
- The Schwarzschild, Kerr, Reissner-Nordstrom Solutions
- How they are discovered, movement, matter, gases & oscillations
- Current information on our own Milky Way Black Hole
- Radio Telescopes
- The role of electromagnetic waves
- Worm Hole and White Hole possibilities

**HARDESTY LIBRARY 8316 E. 93rd Street
Off Memorial behind Jackie Cooper
918-250-7307**

Astronomy Antique collectibles

I have recently been trying to clean out my cabinets and closets. In order to keep from having to build on to the house it is necessary to clean out some of my existing collections. I have Sky and Telescope and Astronomy magazines dating back to about 1977. I also have two DC to AC inverters to run a telescope off of a car battery. If you are interested in giving them a home contact John Land at 357-1759.

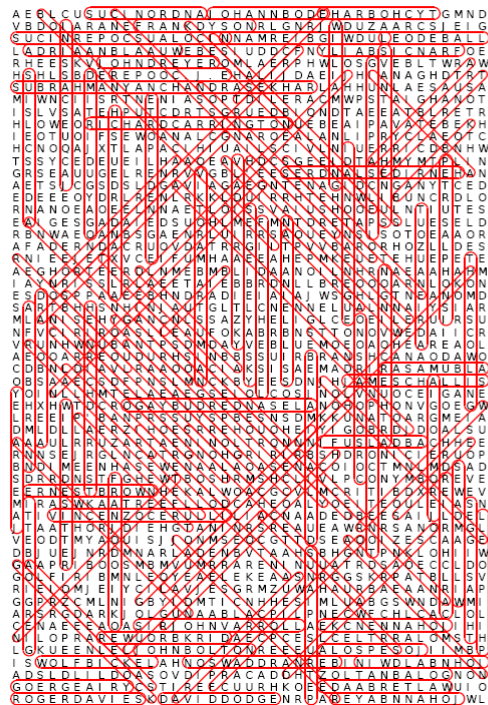
Giant coffee table sized Antonin Becvar COLOR Star Atlas Borealis 24" by 19" - This 1962 edition is in excellent condition. Yours for donation to the club.



Garrett Optical® stocks over 50 astronomy binoculars from six different manufacturers, and we're based right here in south Tulsa.

**Visit our website at
www.GarrettOptical.com
for more information!**

**Male International Astronomers A-E
Astronomy Club of Tulsa**



Answers for March 2009 Word Search

**Predicted MAXIMA of long period variables - April 2009
North of -55° Declination ~ Tulsa, OK Viewing Limit
(Predicted Maxima > 8.0 - Easy Binocular Range)**

Designation	Name	Code	Range	Est Max Date
0509+53	R Aur		<7.7-13.3>	Apr 24
*0632-01	SY Mon		7.3-15.0	Apr 10?
0652-08	X Mon		<7.4-9.1>	Apr 4
0850-08	T Hya		<7.8-12.6>	Apr 20
1037+69	R UMa		<7.5-13.0>	Apr 6
1315+46	V CVn		<6.8-8.8>	Apr 7
1336-33	T Cen		<5.5-9.0>	Apr 21
1702-15	R Oph		<7.6-13.3>	Apr 23
1811+36	W Lyr		<7.9-12.2>	Apr 22
2009+38	RS Cyg		<7.2-9.0>	Apr 3

Source: AAVSO Bulletin 71

Astrotulsa.com Vanity Email Addresses Now Available

Show your pride in being a member of the Astronomy Club Of Tulsa by getting your own Astrotulsa.com email address! Each address will be in the form of your_name@astrotulsa.com and costs only \$12 per year, payable at the time of membership renewal. If you decide to get an address at another time, the fee will be prorated at \$1 per month until your membership renewal date.

Each Astrotulsa.com email account includes 1GB of storage, anti-spam filtering on incoming emails, as well as the ability to access and send emails from anywhere in the world using either WebMail or traditional POP3/SMTP services with popular email clients such as Outlook and Thunderbird. Additionally, mail sent to an Astrotulsa.com account can be forwarded to any other existing email account.

If you would like to obtain an address, please email Tom McDonough at actpm@astrotulsa.com and include the name you would like to have.

Messier Marathon Reports from the Master

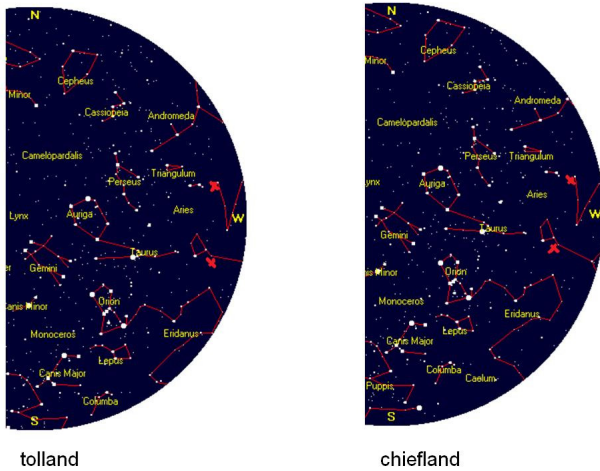
From K. C. Lobrecht's amazing collection of astro-friends & pen pals...

Tom Hoffelder in Conn. (co founder of the Messier Marathon...) writes:

Besides the temperature, what would have been different if we had been in Chiefland (Florida) instead of Tolland (Connecticut) on Tue night (3/24/09)? To find out, I did a little study using Heaven's Above and put the results in the attached ppt file. (Yes, there is software out there, probably even free, that would have done this for me, but what fun is that?!?!)

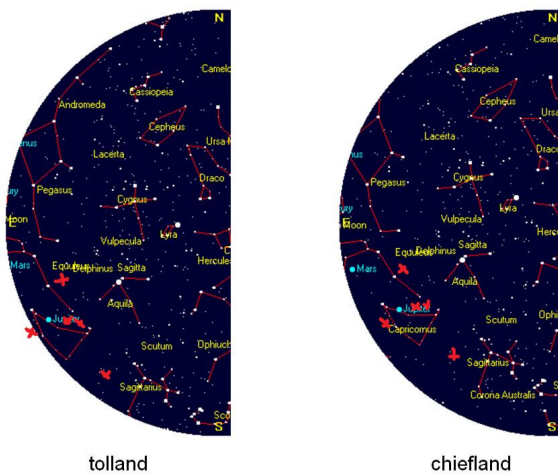
The first slide shows the western horizon at the end of (nautical) twilight for both locations on 3/24. The two red X's indicate the location of the two objects that we missed, M74 and 77. There is no difference in altitude for M74, but M77 is higher at Chiefland and therefore more likely to be found.

3/24 - End of Twilight



The second slide shows the eastern horizon at the beginning of twilight, and the objects that Dick missed are the red X's: M2, 72, 73, 55 and 30. All of the five are noticeably higher in Chiefland, with M30 being the only possible problem.

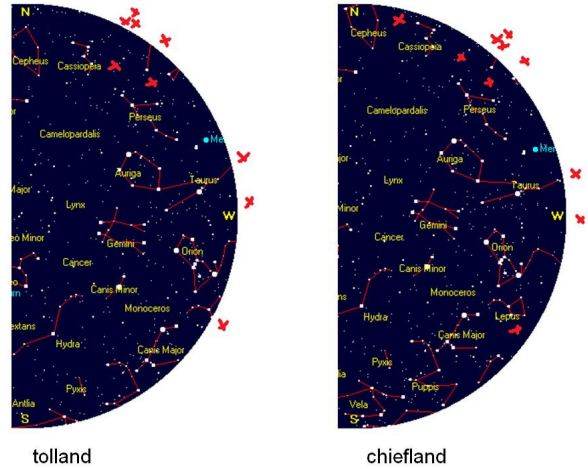
3/25 - Start of Twilight



Conclusion: 107 objects should have been easy in Florida. Since both M77 and M30 are bright, I believe there would have been a good chance of seeing them also, for 109 total. Maybe M74 a slight chance, if it was a crystal and dry night. So, anyone ready to go to Chiefland next year? Actually, it would have to be 2011, since new moon is mid month next March, which is too early for down there, but good for up here, since M74 and 77 would be easier here then.

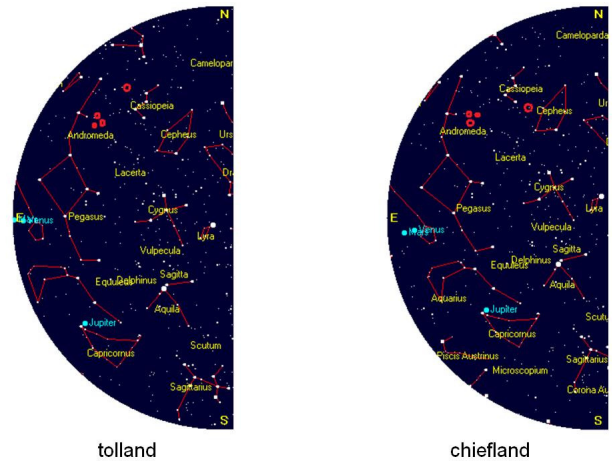
The question was then asked, what about next month? The third slide again shows the western horizon for both locations on 4/24. The red X's are the objects that would be impossible or difficult. They would be the same nine objects for both places, M79, 74, 77, 33, 31, 32, 110, 34 and 76, with an additional one, M52, for Chiefland.

4/24 - End of Twilight



The final slide shows the eastern horizon and the circles indicate the evening objects missed that could now be found. For Tolland they are M76, 31, 32 and 110; for Chiefland, M52, M31, 32 and 110. Therefore the total count would be 104 for Florida and 105 for here. Dick and I actually did do a marathon in Tolland on 4/25-26, back in 2003. Our results match the study, except we were not able to get M55 and M30 because clouds covered them.

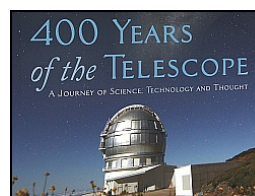
4/25 - Start of Twilight



Full report of this years event to follow soon...

P.S. Regarding that temperature difference, the low here was in the 20's; 50's in Chiefland on Tue night. - tom

(Thought you folks might like a positive report as our TUVa Marathon got snowed out... D. Karcher)



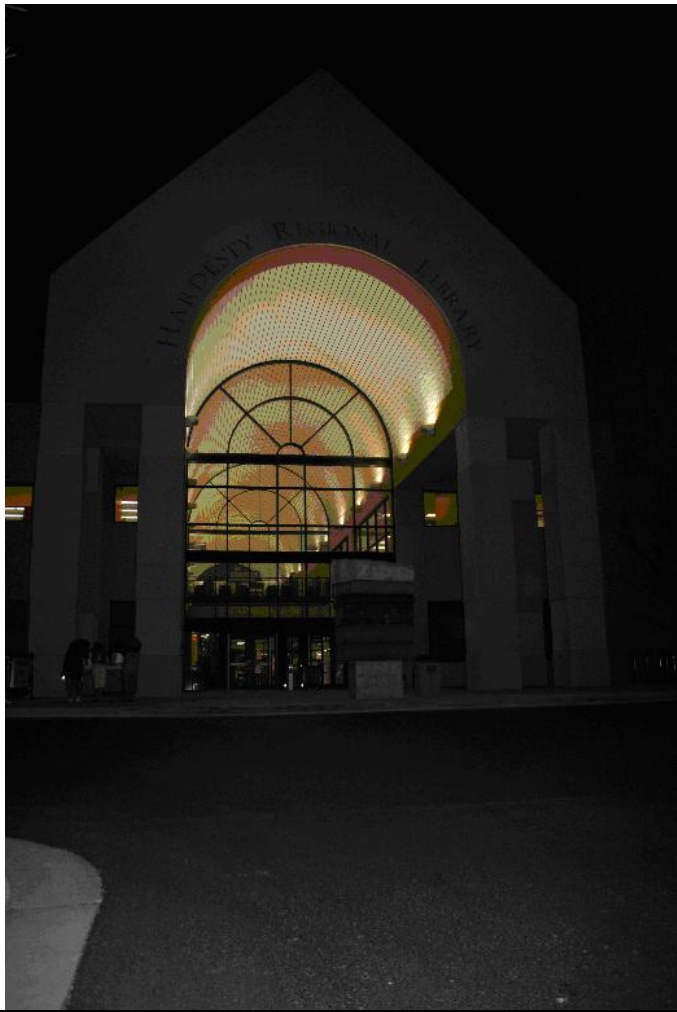
A PBS program called "400 years of the Telescope" is premiering **Friday April 10th**. Their website includes teacher resources. Segments of this program are already available online through streaming video. Links: <http://www.400years.org/> & <http://www.astronomy2009.org/globalproject/specialprojects/400yearsofthetelescope/>

Space Day 2009 is scheduled for May 1, 2009

At their website you will find extensive teacher lesson plans and activities. There are also links to a rocket competition with prize money and a project to design "lunar habitats" to grow plants from seeds that have flown in space. Space Day May 1, 2009 website: www.Spaceday.org

Plants from Space design challenge: <http://www.nasa.gov/audience/foreducators/plantgrowth/home/index.html>

March Public ACT Event Pictures



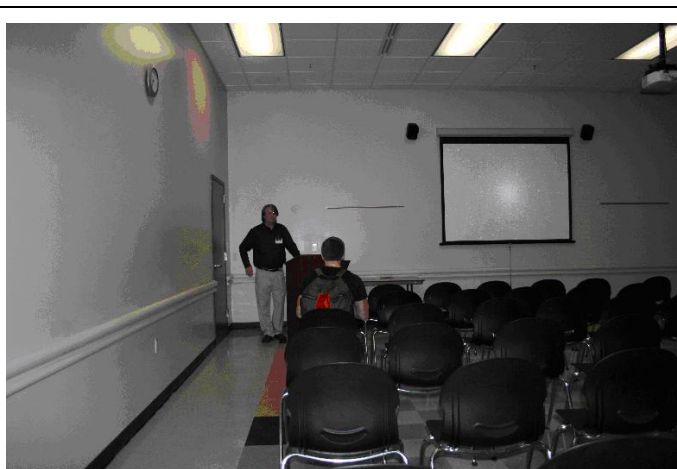
Hardesty Library – Great Sidewalk astro-session despite thin high clouds.



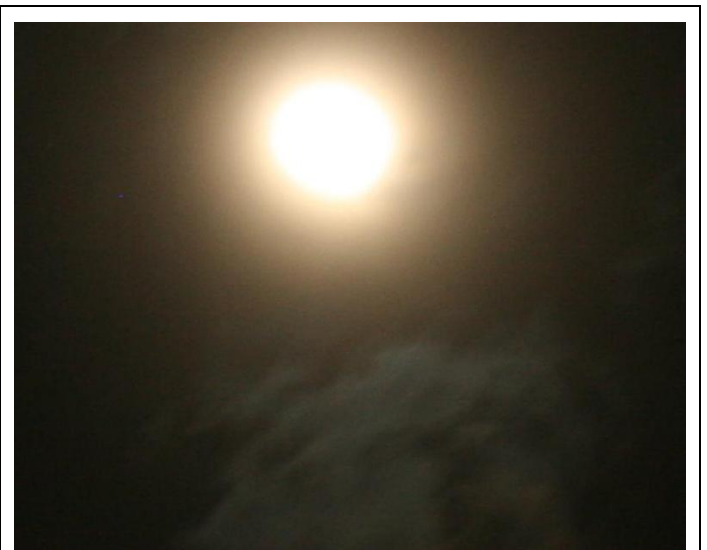
Inspiring the future generation of stargazers.



Fighting the clouds at BassPro on Friday night with some success.



Rod Gallagher's presentation on astrophotography at Hardesty Library.



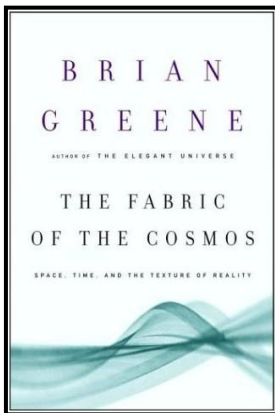
"There's a bad moon on the rise..." / John Fogerty - CCR

Typical weather for Thursday & Friday Sidewalk Astronomy in March

Editor's Note: Photography by Tamara Green

Book Review: *The Fabric of the Cosmos*

By Brian Greene



Publisher: Random House
 Publish Date: 2004
 ISBN-10: 0-375-41288-3
 ISBN-13: 978-0-375-41288-2
 List Price: \$29.95

This is a highly readable book by the likeable Brian Green. Brian Green also wrote the very popular “The Elegant Universe” and has been seen on Nova specials.

The book discusses Relativity and Time and ties them to the latest theories of the Big Bang, astronomy, particle physics, string theory and Time. Reading and comprehending the book does not require use of or even understand of any equations. The book is written to the level of a non-scientist with more than a passing interest in the covered topics.

I found the contents to be easily followed and structured so that I couldn't wait to get to the next topic.

The book also provides a good review of the history of astronomy, particle physics and relativity based on the scientists who made major contributions to these areas. This approach gives one some appreciation of the battle between opposing theories and who won and why. The figures are generally helpful and easy to follow.

A key point made by Dr. Green is that one's motion through space and motion through time combined are equal to a constant and that constant is the speed of light, 300,000 km/sec. This addresses the fact that as one's speed through space increases time slows down. Throughout the book, Dr. Green expresses concern regarding negative time. Apparently none of the mathematics of string theory or the Standard Model prevent a negative time. Dr. Green feels time can never be negative but cannot find a proof for that. One proof might be that if our motion through time is negative, then our motion through space would be greater than the speed of light which is not possible.

For those interested in the latest (up to 2004) understanding of the big bang theory, expansion of the universe, relativity, particle physics and string theory, this is a must read book. It should be included in the half dozen or so books that one should read to get a better understanding of these topics.

Michael Henk – March, 2009

Globe at Night - by Jerry Koenig

OK, raise your hand if you participated to find out your sky's magnitude. How many reported it online? As most of you know I was testing the Sky Quality Meter that Peg won for the club. In last month's newsletter the meter was described so I won't go in to it other than to say “so easy a caveman can do it”.



Our plan was to use it in Inola and Tulsa on different nights but Mother Nature had a different idea. We kind of fudged a little and started on Sunday night. Our readings were taken at 8:30 and again at 10:30 to see if the readings changed any, however, the readings were too close to worry about. We have fairly dark skies in Inola except to our West so on the three nights we had a sky to see we used the Globe at Night's activity packet to judge our magnitude sky. Our skies were between 3.5 to 5 magnitude with a slight breeze and temperature from 58° to 55°, also the meter displays the temperature after your reading. We had readings of 19.45, 19.30 and 20.14 mags per arcsec squared with transparency between 5 to 6 and Seeing around 2. The meter has a field of view of 80° so it sees a big chunk of sky. All you have to do is aim it up press the button once and it gives you your reading then press and hold the button and you get the temperature.

About now you wonder what mags per arcsec squared means, here goes -- it's the magnitude at which each square arcsec of the extended light source shines, got it, thought so. Maybe this will help.... Full moon +3.6, clear sky 30 minutes after sunset +15, moonless clear night +20, dark country sky +24, mercury vapor lamp -2, candle +2.3, all of these figures are mags per arcsec squared. Hope that helps, it passed about 2 feet over my head. All you really need to know is the bigger the number the darker it is. In my search to find out what all this means I keep running in to how it can be used in astrophotography, I think I'll add this to my list of questions to ask Rod about.

Bottom line-- for the average observer who keeps good logs it is another tool to use and if you are looking for a new dark site this would help a lot. I would like to see this at the observatory and a log run when anybody is there at night to see just how our sky changes.

Jerry – March, 2009

Planetarium News (for schedule see, page 15)

Canned food is your key to view the universe this April 4. In celebration of 100 Hours of Astronomy, the Tulsa Air and Space Museum & Planetarium will present three nighttime planetarium shows and have telescopes open for viewing the evening sky on April 4. Bring a canned food item for free admittance. Planetarium shows will be at 7:00 pm, 8:00 pm, and 9:00 pm. All food raised for this event will be given to the Food Bank of Eastern Oklahoma.

COUNT DOWN TO 100 HOURS – Peggy Walker

It's finally here, our official 100 Hours of Astronomy with Saturday being the second time an International Sidewalk Astronomy Night was conducted all over the world. There are plenty of venues to get involved in. Of course we need all the support we can get.

Rick and I faxed 15 pages of A.C.T.'s flyers, calendars, event lists, etc., to the Tulsa World. Rick got an email back and they will be doing an article on the club. WOOHOO!!!! We are going to ask if it could be done for the first week of April. If that's the case, we really, really, really need anyone who is available since we have no idea on the turnout on these events.

Thursday, April 2nd – Sidewalk Astronomy at BassPro Shop of Broken Arrow and Riverwalk Crossing in Jenks. They will set up at 7:30pm and will finish around 10:00pm. The volunteers that signed up at the March 13th meeting are as follows:

BASS PRO

Owen & Tamara Green
Tim Davis
Teresa Kincannon
Steve Chapman
Dewey Smith

RIVERWALK CROSSING

Rick & Peggy Walker
Chris Proctor
Chris Pagan
Jason Fields

Friday, April 3rd – Public Star Party at our Ronald McDonald Children's Charities Observatory in Mounds. Dennis Karcher will give a presentation on Galaxies and Universes in the observatory classroom. We really need snacks since that responsibility has not been faithfully supported this year. So if you could please grab something drink and snack wise, that would be greatly appreciated.

Saturday, April 4th – is the official International Sidewalk Astronomy Night II - (ISAN) at Mohawk Park. We need to start setting up no later than 6:00p.m., and will run until 10:30pm. The park closes at midnight so we need to make sure we are aware of the time. I have gotten tons of stuff from the Night Sky Network to give away on Saturday. I will have a huge bin and will have a table set up for the drawing and one for giveaways. **I WILL NEED HELP AT THESE TABLES.** I have rulers, bookmarks, posters, c.d.'s, heliospheres, 3-D glasses and solar chart, pictures of planets and postcards with new NASA missions on them. The volunteers that signed up at the March 13th meeting are as follows:

SET-UP

Tim Davis
Steve Chapman
Ann Bruun
Rick & Peggy Walker

SCOPES

Owen & Tamara Green
Chris Proctor
Tim Davis
Teresa Kincannon
Steve Chapman
Ann Bruun
Jason Fields
Jerry & Connie Koenig
Rick Walker

SECURITY Bob Boston

BINOCULARS

Rick Walker

TABLES

Peggy Walker

Sunday, April 5th – is our last day of the 100 Hours of Astronomy and you don't have to listen to me talk about my black hole presentation anymore! Well, only until July when I was really supposed to do it at our observatory. If we have stuff left from the Saturday event, I would love to have it to give away here. I would need someone to run the drawing table and giveaway table for me since I will be having extreme fun in Conner's Cove auditorium at Hardesty Library. I will start my presentation at 2:00p.m. and run maybe 45 minutes or so.

If anyone was there for our March 5th Hardesty and Astrophotography class, you will know there is a unique way to get people involved. You can ask Tamara the next time you see her. I talked about the class and if anyone remotely looked interested, I personally walked them into the room. When people left the library, I would ask, "Hey do you want to look at the moon?" and I would get Nah, that's okay. I would retort, "Are you telling me that you are too good to look at the moon?" "You don't have 2 minutes to look at our moon?" "Really?" "Get over there and look at our moon!" And they would go and then talk for 15 to 30 minutes to Rick after telling me they were in a hurry. SO basically, people lied about not having time to look through a telescope. So don't take NO for an answer after my presentation. Just substitute the word SUN for the word MOON when you ask them..... "Are you too good to look at the SUN?"

Hey guys, you have been so great to support all the "stuff" I got us into this year. If you think about it, we are entering month four, of our twelve month commitment. We are one third done. Once we finish with April we have a breather (nothing big) until July in Pawhuska (if that is booked for sure don't know) and September in Bartlesville. We also have that camp for kids of incarcerated parents wanting us through the summer months. So we won't be too bored. Thanks for being so flexible and willing participants. It really has made a difference in the relationships within the club. Much more interaction and laughing and having fun. That's what it's all about. See you in April. P.S. DON'T MISS MY BLACK HOLE PRESENTATION!

[Adams Ranch Dark sky Memorial Day weekend - Friday May 22 through Sunday night May 24](#)

- Registration only open to Astronomy Club of Tulsa Members and their families.
- You will have to sign an insurance Liability Release form required by the Ranch.

Located on a 30,000 acre ranch about 20 miles NW of Pawhuska OK is one of the Darkest places in Oklahoma. Skies easily exceed 6th magnitude viewing naked eye. This ranch once belonged to Oil Tycoon Boots Adams who had his own private airport on the ranch. The ranch has a large bunkhouse with kitchen, baths and living area. This year we will be setting up telescopes in the area around the bunkhouse. (The runway is being used by crop duster planes this time of year) There is also a large area for camping tents near the bunkhouse.

- Registration fee All attendees Cost \$ 5 per person - nonrefundable
- Bunk Reservation fee \$ 10 per person - Non Refundable after May 14th
- 15 bunks are available at cost of \$ 30 per night - payable upon arrival.
- Bunk reservations are 1st Paid first served with preference to those staying two or more nights.
- Setting up you own cot indoors \$ 5 per night subject to available space.
- Tent and Camper space available outdoors.

IF POSSIBLE PLEASE USE THE REGISTRATION FROM POSTED ONLINE AT THE ACT YAHOO GROUP WEBSITE

-or-

eMail John Land at address below for a copy (Microsoft Excel Format...)

Save a copy and EMAIL it in to reserve your spot on SUBJECT LINE put: "[Your Name - Ranch registration](#)"

Email to John Land: <mailto:astroclubbiz@valornet.com>

Then print it off and mail it in with a check to

Astronomy Club of Tulsa: 25209 E 62nd St Broken Arrow, OK 74014

You may phone in reservations to 918-357-1759

Reservations will not be held if payment is not received.

Bunks do have linens but you must bring all your own personal items. NOTE: The Bunkhouse is COED – We will work together to insure areas and times to preserve your privacy. NO SMOKING INDOORS ! You must Bring all you own food and drinks. The club will buy paper plates and plastic ware and such for eating. Plan to bring other materials as you like. There is a large kitchen with two large refrigerators and a freezer.

In the past we have had volunteers to plan at least one large group meal per day. So expect to pay your part on that

Those camping outdoors must keep their areas clean and all trash in containers. No Open Fires! We'll have to abide by whatever burn bans rules may be in effect in the area. Plan to bring jackets and Insect repellent.

There are several nice places to visit in the area. The ranch is adjacent to the Tall Grass Prairie preserve that features 36,000 acres of open range and 5000 head of bison. Pawhuska has several historic buildings and Bad Brad's Barbeque is a favorite eating place. About 40 miles west is Ponca City with its historic Marland Museum. Those not staying at the ranch may inquire about motels in Pawhuska but be sure to tell them you will be sleeping in the day time.



Observing Pages

Information Exchange

The Astronomy Club of Tulsa has started a new Yahoo Group for the club. For those of you who are unfamiliar with Yahoo groups, it is a forum that allows for messages, photos and files that can be shared among the group's members. As stated in the group's description, "This group is for the members of the Astronomy Club of Tulsa to ask questions, share ideas, get information, plan observing sessions, or just communicate in general. Informal club business communications may also be announced here." This group can be found on the web at <http://tech.groups.yahoo.com/group/AstroTulsa/>. It is open to all club members so be sure to check it out! Tony White, our new Club President is the group's moderator.

April 2009 Observing List

	Caldwell	Double Star	Messier	Herschel-1	Herschel-1
1	C61 (NGC4039)	54 Leonis	M65	NGC3245	NGC3813
2	C40 (NGC3626) *	N Hydrae	M66	NGC3277	NGC3877
3	C60 (NGC4038) *		M95	NGC3294	NGC3893
4			M96	NGC3310	NGC3898
5			M97	NGC3344	NGC3900
6			M98	NGC3377	NGC3912
7			M105 (NGC3379) *	NGC3379 (M105) *	NGC3938
8			M108 (NGC3556) *	NGC3384	NGC3941
9			M109 (NGC3992) *	NGC3395	NGC3945
10				NGC3412	NGC3949
11				NGC3414	NGC3953
12				NGC3432	NGC3962
13				NGC3486	NGC3982
14				NGC3489	NGC3992 (M109) *
15				NGC3504	NGC3998
16				NGC 3521	NGC4026
17				NGC3556 (M108) *	NGC4027
18				NGC3593	NGC4030
19				NGC3607	NGC4036
20				NGC3608	NGC4038 (C60) *
21				NGC3610	NGC4041
22				NGC3613	NGC4051
23				NGC3619	NGC4085
24				NGC3621	NGC4088
25				NGC3626 (C40) *	NGC4102
26				NGC3628	NGC4111
27				NGC 3631	NGC4143
28				NGC3640	NGC4147
29				NGC3655	NGC4150
30				NGC3665	NGC4151
31				NGC3675	NGC4179
32				NGC3686	NGC4203
33				NGC3726	NGC4214
34				NGC3729	NGC4216
35				NGC3810	

* - Multiple entries

Details of this list are located in a folder in the AstroTulsa Yahoo group's files section, "ACT Observing Lists." The list contains too many objects to "observe" in one evening but we plan to recognize anyone who observes 20 or more of these objects. The reason that there are so many objects is to give the observer a variety of objects that can also be used for Astronomical League (AL) Observing Clubs. For more information on the Astronomical League and the observing clubs, check it out on the web at: <http://www.astroleague.org/observing.html>. All of the objects cross the meridian between 9PM and 11PM. For this month, the list contains 2 double stars (AL Double Star Club), 9 Messier objects (AL Binocular Messier & AL Messier Clubs), 0 deep sky objects (AL Deep Sky Binocular Club), 3 Caldwell objects (AL Caldwell Club) and 69 Herschel objects (AL Herschel-1 Club). Several of the Herschel objects are also on the Messier and Caldwell lists, so observing any of these with binoculars is the same as multiple observations.

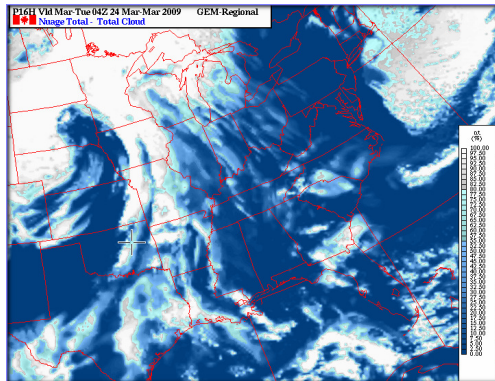
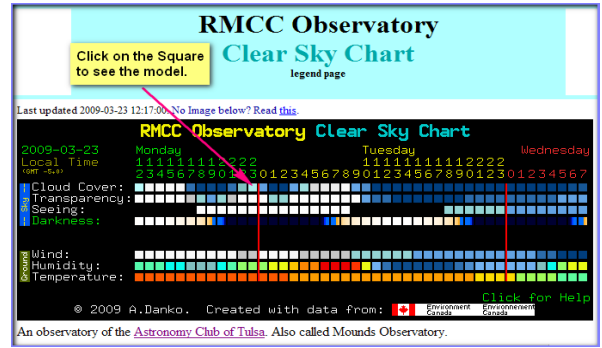
As we continue with these lists, one should be able to complete several of the observing clubs in only one year. Of course the Herschel list will take longer.

Please take a look and give feedback to Ann Bruun or Rod. Also, please provide a copy of your observing logs to Ann Bruun. - Thanks, Rod Gallagher

The Clear Sky Chart and Beyond - By Ann Bruun – ACT Observing Chairperson

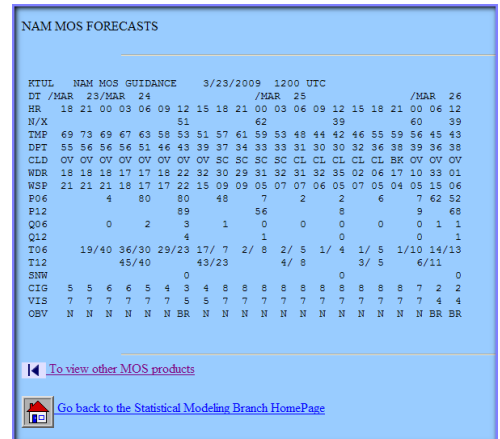
It's that time of year again, when spring rain has us obsessing about the weather. Oh, what am I saying, when astronomy is your hobby you're always obsessing about the weather. Specifically clouds, give me a good old-fashioned thunderstorm any day, then I know there will not be a star party. It's these on-again, off-again clouds that really drive me crazy. Why does it seem to be severe clear all day until I start heading out to the dark site? And why does it turn crystal clear after I've put all my observing equipment away? Is there any way to figure out what the weather is going to do? I can answer that question – NO. But there are some tools that can at least help us better obsess about the weather while we're waiting to see what is really going to happen.

Clear Sky Chart <http://cleardarksky.com/c/RMCCObOKkey.html> is probably the most familiar forecasting tool to amateur astronomers. It lays out the information in an easy to understand grid, which includes cloud cover, transparency, seeing, and darkness. If you want to see the model that the prediction is based on simply click on the square for the time about which you are interested. Once you get to the model you can even animate it or go frame by frame to give yourself time to do the Zulu/GMT to CDT time conversion – minus 5 hours.

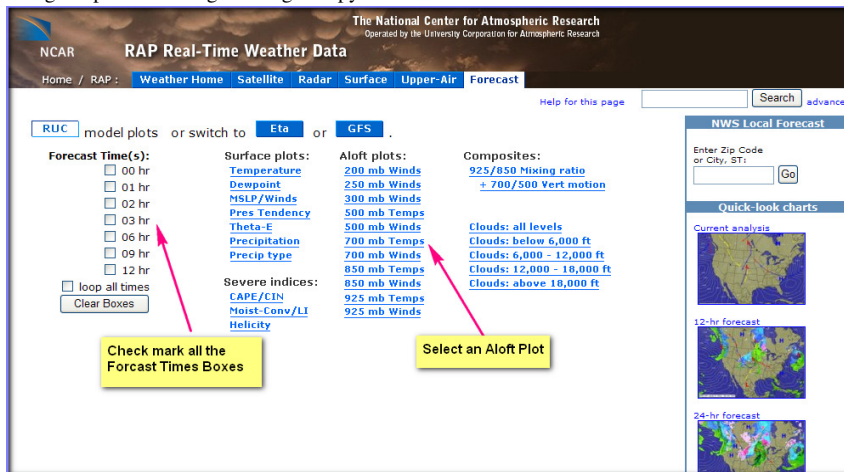


While I am comfortable with Clear Sky Chart I couldn't help thinking there must be other places to check the cloud cover forecast. So I went nosing around the Channel 2 weather center. George Flickinger gave me a couple of web sites I could go to that show cloud cover models. These sites were not nearly as easy to understand as Clear Sky Chart. I just wanted to be able to understand the data without needing a degree in meteorology. Again George came to the rescue, he graciously gave me a private meteorology lesson to help me understand the models.

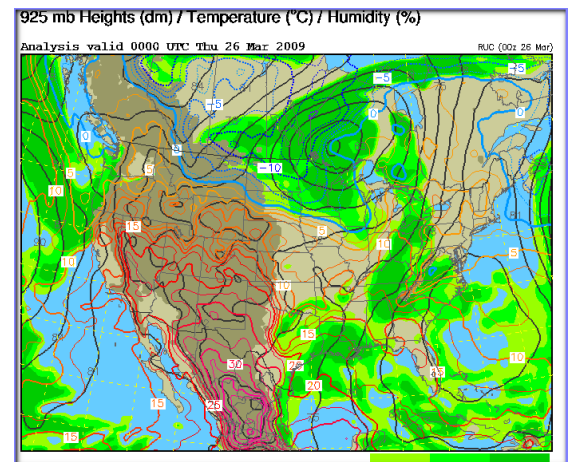
The first site we looked at was the NAM (North American Mesoscale) <http://www.nws.noaa.gov/cgi-bin/mos/getmet.pl?sta=KTUL>. It is sort of a quick and dirty – not too difficult to understand, numerical representation of the data. It is good for 48 to 72 hours out and updates every 12 hours. Times are given in Universal/Greenwich Mean Time. It shows temperature, dew point, clouds, wind direction, and wind speed. Once you get past all those numbers this site is fairly self-explanatory.



The next site RAP Real-Time Weather Data <http://www.ral.ucar.edu/weather/model/> is a bit more confusing. There are three models to choose from RUC, Eta, and GFS. They each look progressively further into the future. First select RUC, this model goes out 12 hours and is updated every 2 hours or so. Go ahead and checkmark all the forecast times: 00, 01, 02 etc. Next select an Aloft Plot Temp. e.g. "850 mb Temps". A panel for each hour selected will display. Here again you have to do the conversion to CDT. Where there is green on the model expect clouds. 925 mb corresponds to around 2000 feet depending on the temperature. 850 mb is around 4000ft, 700 mb 6000ft etc. This allows you to look at different cloud layers. When you get up to 250 mb you are into the jet stream 30,000 ft. Here if you see orange or pink there might be high wispy clouds.



The next model, Eta is really a graphical representation of the NAM. This model looks 48 to 72 hours out. Again select all the hours and then pick one of the cloud levels. There may be one or two levels which show clear while the others show clouds.



The GFS model looks out even further. Of course the further out you look the less accurate the models will be. By comparing the different times and layers you can get a feel for what is expected to happen. There are also other resources available from this page. You can go to the Satellite tab and look at images in visible and infrared and radar and surface winds are available.

Give these sites a try. I have been attempting to come up with my own cloud forecasts since George showed me the ropes. The only thing I have really figured out is I can't understand why anyone would want to do it for a living. Still, knowing I am going to obsess about clouds anyway at least I have more data to look at while I'm waiting for the sky to clear.

Lands Tidbits – by John Land

Welcome Recent New Members / March, 2009: Lieuko Nguyen, Major Cunningham, Bill Poindexter

Our membership rates for 2009 – 2010 will be as follows:

Adults - \$35 per year (includes Astronomical League Membership)

Sr. Adult - discount \$25 per year for those 65 or older (includes Astronomical League Membership)

Students - \$15 (without Astronomical League membership) / **Students** - \$20 (with Astronomical League membership)

The regular membership allows all members in the family to participate in club events but only ONE voting membership and one Astronomical League membership. If an additional member of the family would like to join with voting rights the additional cost is \$15, and/or additional Astronomical League memberships within a family are \$5 each.

Magazine Subscriptions: If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Do NOT mail renewals back to the magazine! To get the club discount you must go through the club group rate.

Astronomy is \$34 for 1 year or \$60 for 2 years. <http://www.astronomy.com>

Sky & Telescope is \$33 / year. <http://www.skyandtelescope.com>

Sky and Telescope also offers a 10% discount on their products.

Note: You may renew your Sky & Telescope subscription directly with out having to mail in the subscriptions to the club.

NEW SUBSCRIPTIONS must still be sent to the club treasurer. Forms are available on the website.

We now have an automated on line registration form on the website for new AND renewal memberships plus magazine subscriptions. You simply type in your information and hit send to submit the information: <http://www.astrotulsa.com/Club/join.asp>

You can then print a copy of the form and mail in your check to:

Astronomy Club of Tulsa / 25209 E 62nd St / Broken Arrow, OK 74014

Address Corrections- Email changes – Questions:

You may forward questions to the club by going to our club website (<http://www.astrotulsa.com/>) and fill out an online form or just click on John Land and send an email. Please leave a clear subject line and message with your name, phone number, your question – along with email.

ASTRONOMY CLUB PUBLIC STAR PARTY – TWO IN APRIL!

FRIDAY APRIL 3RD – NO ALTERNATE DATE DUE TO 100 HOURS OF ASTRONOMY EVENTS FOR IYOA.

GATES OPEN AT 6:30 PM SUNSET -7:48 P.M. / END CIVIL TWILIGHT - 8:14 P.M.

PHASE OF THE MOON ON 3 APRIL: WAXING GIBBOUS WITH 62% OF THE MOON'S VISIBLE DISK ILLUMINATED.

FRIDAY APRIL 17TH - ALTERNATE DATE WILL BE SATURDAY APRIL 18TH IF SKY IS CLOUDY ON FRIDAY.

GATES OPEN AT 6:30 PM SUNSET -7:59 P.M. / END CIVIL TWILIGHT - 8:26 P.M.

LAST QUARTER MOON ON 17 APRIL 2009 AT 8:37 A.M. CENTRAL DAYLIGHT TIME.

IYOA PRESENTATION BOTH DATES @ 7:00PM OBSERVATORY CLASSROOM: GALAXIES AND UNIVERSES

Due to the uncertain weather reports, always check your local weather reports for sky conditions. Our club has an excellent resource for predictions of cloud cover on the observe section of our website: (<http://www.astrotulsa.com/Observe/observe.asp>). Since night-time temperatures can dip to the mid 30's or colder you should plan to bring a **WARM COAT AND DRESS IN LAYERS. IT GETS VERY COLD ON OUR OBSERVATORY HILL – Especially with a little (or lot) of wind!!**

- **Beginners Telescope Set Up on Center Pad:** Several of our new members and guests have new telescopes they are trying to learn how to use. We would like to invite you to set up your equipment near the center concrete observing pad. Members let's all take time to meet these novice astronomers and help them get a good start with their equipment.
- **Wireless Internet now available at the Observatory:** For laptop users - Rod Gallagher has made arrangements for wireless Internet to be broadcast on the observing field. Details for log on are available at the observatory. This is available for members to use for astronomy, observing and weather information and should not be abused for other types of browsing and gaming.
- **Things to bring to a star party:** Of course a telescope or binoculars are great for observing but you don't have to have one to enjoy the evening. You don't have to own a telescope to enjoy an observing night. Our members are eager to share their views with others. There will be plenty of people willing to share the view if you just ask. Also bring a red colored or covered flashlight to see your way around. We have plenty of folding chairs and a clean restroom.
- **Children are always welcome but must be supervised and must stay on observatory grounds.** It's always wise to have an alternate activity such as a favorite book or tapes for younger children who may tire early. Closed toed shoes are preferred and a light jacket as needed.
- We would like to encourage our new members and guests to join us
- Plan to arrive before dark. We have plenty of chairs and a classroom area.
- We have a microwave and you can bring your own snacks. You need to bring your own drinking water!

PARKING MAY BE AT A PREMIUM. Reserve Parking is available next door in old ATT lot for those without equipment or planning to leave early. PLEASE DO NOT PARK VEHICLES near the center-observing pad blocking the view and traffic access.

SAFETY ISSUE: When large groups are present it is better to turn on your park lights or headlights on low beam rather than to try driving in or out without lights... especially if those groups include children. Just warn everyone when you are getting ready to leave.

NEVER try driving down the hill without lights.

A donation of \$1.00 per guest would be appreciated to help us maintain the observatory.



**Planetarium open.
Museum-only closing
4/24 to 4/26
for the Aviator Ball!**

Planetarium Shows

April 1st – 30th, 2009
Presentation Schedule Changes Monthly

**MUSEUM &
PLANETARIUM
Closed on
Mondays!**

**Doors open 10 minutes prior to show time for general seating.
All shows begin on the hour. Admission applies to one show.**

Monday PLANETARIUM CLOSED

Tuesday through Friday

11:00 AM	Secret of the Cardboard Rocket
12:00 Noon	BIG
1:00 PM	Extreme Planets
2:00 PM	Secret of the Cardboard Rocket
3:00 PM	Night Skies over Green Country
4:00 PM	BIG

Saturday

10:00 AM	Extreme Planets
11:00 AM	Secret of the Cardboard Rocket
12:00 Noon	BIG
1:00 PM	Extreme Planets
2:00 PM	Secret of the Cardboard Rocket
3:00 PM	Night Skies over Green Country
4:00 PM	BIG

Sunday

1:00 PM	Extreme Planets
2:00 PM	Secret of the Cardboard Rocket
3:00 PM	Night Skies over Green Country
4:00 PM	BIG

BIG: NEW The Universe is Big, but how Big is Big? Journey to the farthest observable reaches of the universe to find out! Computer animation, claymation, laser graphics and a surround sound musical score bring a really BIG subject down to Earth.

Secret of the Cardboard Rocket:

Join two children, Bonnie and Marcus, on a magical journey through the Solar System, aided by a talking astronomy book, a cardboard rocket, and a vivid imagination. Take an up close look at all of our planets and learn the secret that makes this entire journey possible. Great for young children and their families. *Funded by Sam Viersen Family Foundation and The Oxley Foundation. Community Sponsor -- Tulsa City-County Library.*

Extreme Planets: For ages, humanity has wondered whether we are alone in the Universe. Fifteen years ago we were unaware of planets outside our solar system, but today these "extrasolar" planets appear to be quite common. As the search continues, the possibility exists that one day we might find life elsewhere in the Universe, born in the light of another sun. Join us in the adventure as we explore Extreme Planets.

Night Skies over Green Country: Live Planetarium presentation takes the audience on a journey of the current local night sky. Visual demonstrations will include what constellations and planets are visible that night and include upcoming celestial events like comets, meteor showers, and eclipses. Program changes as the night sky changes.

Notice: Shows are subject to change. Seating is for 110. Admission and seating is on the basis of first-come, first-served. Seating may not be available for all showings. Visitors must be seated before presentation begins. No entry after doors are closed, late arrivals attend next presentation. No food or drinks allowed in Planetarium. Please contact the Planetarium to confirm shows and information at (918) 834-9900 x400.

Tulsa Air and Space Museum Campus 3624 North 74th East Avenue Tulsa, Oklahoma 74115 (918) 834-9900
www.TulsaAirAndSpaceMuseum.com

CLUB OFFICERS

POSITION	NAME	PHONE
President	Tony White	918-258-1221
Vice-President	Tom McDonough	918-665-1853
Co-Treasurers	John Land Jim Miller	918-357-1759 918-627-4551
Secretary	Teresa Kincannon	918-637-1477

BOARD MEMBERS AT LARGE

NAME	PHONE
Ann Bruun	918-834-0757
Steve Chapman	918-342-1643
Rod Gallagher	918-369-3827
Bill Steen	918-251-3062
Chris Proctor	918-810-6210
Rick Walker	918-451-9235
Dennis Karcher	918-619-7097

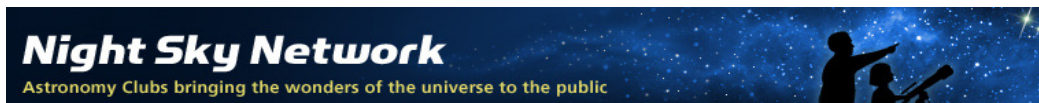
APPOINTED STAFF

POSITION	NAME	PHONE
RMCC Facility Manager		
Membership Chairman	John Land	918-357-1759
Observing Chairman	Ann Bruun	918-834-0757
New Members (co-Chairmen)	Owen Green Rick Walker	918-851-1213 918-451-9235
Observatory Director	Teresa Kincannon	918-637-1477
Webmaster	Tom McDonough	918-665-1853
Newsletter Editor	Dennis Karcher	918-619-7097
Night Sky Network	Peggy Walker	918-640-0832

MEMBERSHIP INFORMATION

Astronomy Club of Tulsa membership (\$35/year) includes membership in the Astronomical League and subscription to ACT's "Observer" and AL's "Reflector". "Astronomy" (\$34/year) and "Sky and Telescope" (\$33/year) are also available through the club. For more information contact John Land at 918-357-1759. Permission is hereby granted to reprint from this publication provided credit is given to the original author and the Astronomy Club of Tulsa Observer is identified as the source.

The Astronomy Club of Tulsa is a member of the Astronomical League and the Night Sky Network



<http://www.astroleague.org>

<http://nightsky.jpl.nasa.gov>

Astro-Triva – Magnitude: This word, used from the earliest times, describes the apparent light-intensity of stars rather than their dimensions. The scale used is a logarithmic sequence because of the known range in luminosity of stars covers differences of several millions. Smaller numbers are used to represent the brighter magnitudes and the factor between one magnitude and the next is 2.51. A star five magnitudes brighter than another is 100 times as bright. (Source: Olin J. Eggen - Astronomical Society of the Pacific Leaflets, Vol. 7, p.233 – 1956)

ACT welcomes your questions, suggestions, comments, and submissions for publication.
Please send all inquiries to Newsletter@astrotulsa.com

Deadline for May Article submissions: April 24, 2009
Target Publication for May Observer = April 27, 2009
eMail article submissions to: djkarcher@cox.net