THE MERIDIAN

Newsletter of the Quad Cities Astronomical Society
www.qcas.org

MAY 2017

QCAS Mission Statement:
To stimulate an interest in the science of astronomy in the Quad Cities Area, to nurture an ongoing desire by Quad Cities Astronomical Society members to study the cosmos and to provide members of our community opportunities to experience the beauty and joy of Astronomy.

Presidents Greeting

Hi all!

Quite the eventful April and May we had and will have! April 1st field trip to the Hawkeyes in Space Exhibit followed by a visit to the Cedar Amateur Astronomers Eastern Iowa Observatory… our regular Society meeting on April 17th… George, Matt, Paul, and Robert working with PAC at the Putnam on April 21st… and upcoming events as follows:

04/29/17 – QCAS Astronomy Day at Bettendorf High School with Solar viewing and Planetarium Shows and Open House at the Jens-Wendt Observatory
05/13/17 – Menke Observatory Public Open House
05/15/17 – Society Meeting
05/27/17 – Open House at the Jens-Wendt Observatory

With the conclusion of our April 29th Astronomy Day, we will be done with half of our annual outings… if you recall, we narrowed down 'our' events to 2 main public events (Astronomy Day in April and the Meteor Shower Party in August) and 2 amateur astronomer events (The Messier Marathon in March and EISP in September), Moving our public nights at Sherman Park to the nights we did should benefit us because we can take advantage of the dark skies for our personal achievement… and if we happen to have a few members of the public join, they can have a chance to experience how dedicated amateurs work… win/win!

So… back to the April 29th QCAS Astronomy Day… I think we have about 7 scopes set up for viewing… 2 of them are Ha and the others are white light, but we can use additional help in talking to folks about what they ae viewing… directing them to the planetarium and restroom facilities, and passing out brochures that I hope we'll have ready (QCAS info and directions to Sherman Park)… So please join in if you can… bring your friends and family, and have a great time!

Also… if you wish to take advantage of Bettendorf High Schools offer to add your astro-pics to their planetarium's standard introduction… bring them to me on a flash drive, and I can submit them!

See you back at the Bettendorf Library for our May meeting and maybe another pre-meeting cartoon!

Clear Skies!
Jeff

Last Society Meeting Minutes

Date/Time Location
6:30 PM on Monday, April 17th
Bettendorf Public Library

Attendance
Jeff Struve, George Bailey, Craig Cox, Paul Levesque, Matt Neilssen, Alan Sheidler, Dave Ruddy, Karl Adlon, Robert, Mitchell, Mike Dannenfeldt

Presentations

- Outings
  - Matt Neilssen and Craig Cox did a bit of imaging at Sherman Park on 4/11… the focal point was Jupiter.
  - Mike Dannenfeldt advised that we will be able to see Jupiter transits on 5/11, 5/18, and 5/27
- New Gear
  - Craig Cox discussed his 16" Explore Scientific Dob (Pic Below), the Hotech Collimator, and his ASI ZWO 120mc camera
  - Alan Sheidler talked about his successes using a wedge on his 10" Meade for astrophotography
  - George Bailey gave an introduction to his ZWO 174 camera that he purchased for solar imaging through his Quark
  - Karl Adlon told us about his 8" F3.8 Newtonian w/Feather Touch focusing and an Ostahoski mirror
  - Jeff Struve talked about his 152mm Carbon Fiber David Levy Comet Hunter Mak
- Eclipse Plans
  - Robert, Mike O, Craig, and Jeff plan on viewing from Aurora, NE
  - Mike D hopes to be in Boise, ID
  - Alan S plans on being in Columbia, MO
  - Paul L plans to be in Linn, MO
  - George B and Dave R will be staying in the QC area
  - Karl is thinking about traveling to Nebraska
  - We are thinking that Dana will be going to Casper, WY, Ken B to Missouri, and Dale H narrating the broadcasted presentation at the Putnam Museum
- Main Presentation
  Christian was not able to attend the meeting so Jeff Struve gave a presentation on "Astronomical Influences in Numismatics" which was a discussion about astronomical occurrences such as comets, occultations, and transits depicted on ancient Roman and Greek coins. Jeff passed around a number of coins as examples.

Treasurers Report

- Matt provided a brief Treasurer's Report… The bank balance as of 04/03/17 was $4,228.93. The report was voted on and passed.
- Jeff received notification from 3M that they were donating, on behalf of Jim Rutenbeck, $250. This would be in addition to the monies reported by Matt.
- Please check with your places of employee to see if they have grant programs that we can take advantage of… We have utilized collecting funds from MidAmerican Energy, 3M, and potentially Verizon… funds are needed to advance the direction of the club!

Review of Minutes

The March Minutes as per the April Meridian passed.

Old Business

- The Messier Marathon was cancelled due to weather
- We are still working on the new web site
- We ae still working on the Bylaws re-write
- The 4/01 Hawkeyes in Space/Eastern Iowa Observatory Field Trip was a great success. (Pics Below)
- Don't forget, if you can help PAC with the 4/21 Putnam Museum Event (Pics Below)
- Don't forget, help with our 4/29 afternoon Astronomy Day Event at Bettendorf High School and that evening at our Jens-Wendt Observatory at Sherman Park

New Business

- Paul Levesque has written an excellent press release for our 4/29 QCAS Astronomy Day Event which will be sent to local television stations, radio stations, and publications
- We had a number of shingles blow off of the block house roof during the last storm… nothing got wet inside, but we have roof work to do… Things got a little understandably wet in the roll off building and dome.
- Karl Adlon provided Jeff Struve with a number of pics for Bettendorf High School to add to their stock introduction to their planetarium… if you have pics that you'd like used, please get them to Jeff via flash drive.

Post Meeting

Jeff, Craig, Matt, and George met at the Village Inn on Elmore to discuss various things including ways to photograph the eclipse.

Next Society Meeting

Date/Time Location

6:30 PM on Monday, May 15th
The Bettendorf Public Library

May Presentation

At our May 15th meeting, Jim Rutenbeck will be giving a talk on the 2017 Winter Star Party and other recent star parties… we can at least live vicariously!

Future meetings include Dana Taylor speaking on his January Star Trek Cruise and Christian Allen on weather forecasting the QCA. Contact Jim Rutenbeck or Jeff Struve if you'd like to make a presentation.

New Business

- We need to further discuss logistics of attending the Solar Exposition in St. Louis
- Discuss our November Banquet
- EISP Prep!

Last Board Meeting Minutes

Date/Time Location

6:30 PM on Thursday, April 3rd
The Village Inn on Elmore and 53rd in Davenport, IA

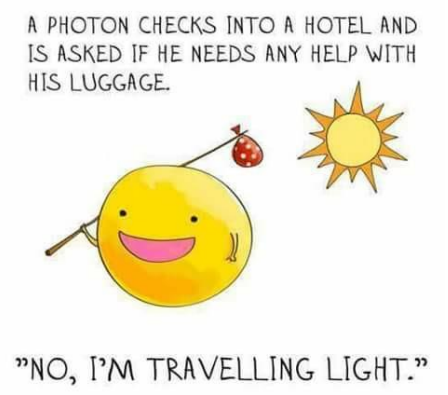
Attendance

Jeff Struve - Present
Craig Cox - Present
Robert Mitchell - Present
Matt Neilssen – Present
Mike Ombrello – Attended
Paul Levesque – Attended

Agenda

Primary Topics

- 3/25 Public Open House
  - Cancelled due to Messier Marathon
- 3/24-26 Messier Marathon
  - Cancelled due to weather. 9 were confirmed for attendance.
- 4/01 Hawkeyes in Space Fieldtrip
  - The trip went as scheduled.
- 4/21 Putnam Museum
  - Matt, George, and Paul will be attending… Matt will have the Lunt, George the Quark and Paul will assist George. We want to solicit QCAS for an assistant for Matt. QCAS will be stationed in the same location.
- 4/29 Astronomy Day
  - Put together flyers inviting folks out to Sherman Park for that night's Public Open.
  - We need to invite PAC… maybe Alan can do this
- 8/12 Meteor Shower Party
  - Matt will make initial contact with Davenport about using the soccer field.
- Web Site
  - Mike O and Matt are still working on the proper tools to build the new site. Mike has a good start on how it will look and what features it will have.
  - We need access to the web and Facebook to post our calendar and cancellations.
  - Matt has secured hosting for the new site… Private hosting via QC Total Tech at no charge… use Matts domain for testing
- Jeff and Matt are nearly finished with the first pass of the Bylaws.



Things to do – Open Items

- 2017 Event calendar
  - Advertisement/Public Notification
    - QCAS Web Site, QCAS Facebook, Davenport Parks and Rec Web Site will be our primary means of advertisement.
    - Paul Levesque has volunteered to do press release for TV, Radio, publications
  - Public Nights
    - Make signs reminding public to shut off lights and park in the side lot…
    - Build trifold with info, membership form, and astronomy courtesy.
  - 8/12 Meteor Shower Party
    - Radio, TV, Newspaper advertising if possible.
    - Food wagon ok.
    - Slide show for back up if cloudy… music ok… advertise for public to check the web for cancellation notice
  - 8/21 Solar Eclipse
    - Dr. Mitchell is lead
    - Robert sent out an application form for a Solar Eclipse Expo meeting in June to be held in St. Louis
    - Robert will ck with SAU for trip funding
    - How much memory is needed to store the whole event as video?
    - Dale will preside at the Putnam, SAU personnel will preside at SAU
    - Reschedule 8/21 Society meeting
  - 9/22 EISP
    - Same as 2016
    - Encourage a swap meet
    - No bunk house
    - Review surveys to further modify the event

- Dues/Membership
  - Jeff modified the application forms – Maybe instead, just use the modified trifold, info/calendar/courtesy/membership form.
  - Let's start using the membership cards as receipts
  - We will talk about fees when we review Bylaws

- Bylaws Rewrite
  - Discuss the standing committees
  - Review the Mission Statement
  - Jeff and Matt will review and edit the Bylaws. The rewrite will be reviewed and edited by the Board. The final draft will be sent to the membership for review. The Society will vote on acceptance at the Society Meeting that is at least 30 days post the sending to the Society

- Misc
  - Block House Inventory
    - We need to go through gear stored in the dome and in (and under) the roll off roof building.
    - We need to take an inventory of what we are keeping.
  - Other
    - Discuss moving our Society Meetings to SAU.
    - Discuss a High School Ambassador Program
    - Club Projects
      - Learn PixInsight
      - Build a Poncet Mount for the club dob
      - Convert the 20" scope into a truss system

Next Board Meeting

Date/Time Location
Unless otherwise noted, Board Meetings will be held on the 1st Monday of the month at 6:30 PM at the Village Inn Restaurant on Elmore and 53rd in Davenport, IA. Please notify Jeff Struve if you plan on attending so seating arrangements can be made. Ordering from the menu is Dutch treat.

Agenda
- Discuss the new web site
- Discuss the 8/12 Meteor Shower Party
- Discuss the 8/21 Solar Eclipse
- Discuss the bylaws

New Business
- 2017 Biennial Report
- We need to talk to the caretaker at Menke Observatory about the club's access to the facility.
- We need to further discuss logistics of attending the Solar Exposition in St. Louis
- Discuss selling our heavy fiberglass step ladder and replacing it with an aluminum ladder for use in the roll off roof building.
- Discuss re-roofing the Block House

Secondary Topics

- Society meeting relocation
- PixInsight meetings

Monsignor Menke's Unitron displayed in the SAU Library

Member Spotlight

I'm Karl Adlon and I'm an AA – *Amateur Astronomer, that is*!

Rather than tell you about me, I'm going to discuss some telescopes I've owned and nebulous thoughts about the future. Here goes!

Telescope	Experiences	Plusses & Minuses	Where it is now
3" Newtonian reflector - 1964	A Christmas gift. Thanks Mom & Dad! Enjoyed the Moon, Jupiter, Saturn, Venus and Orion Nebula.	+ Pretty crisp views, especially of the Moon. - Slide focuser, plastic lens eyepieces, no drive.	The main mirror mount (plastic) broke, the mirror hit the diagonal and broke it and the holder. All gone.
6" F/12 Newtonian reflector – 1967	Obtained an inexpensive spherical mirror – at F/12, who cares? Made a tube from galvanized sheet steel	+ sharp stars - heavy - hard to find things	Dad gave it to a cousin while I was in the Army. Now gone, as far as I know.
Built a 10" F/5.6 Dob - 1980	Fabricated a hexagonal tube from thin plywood. Mirrors from Coulter.	+ nice images of faint objects, fit in car - marginal bearings	Sold to a friend who lost it in a flood.
Orange C8 – 1985 (Used)	Wanted a scope with a drive so I could take pictures	+ did get images of Orion Nebula and Pleiades - collimation; set-up time	Still have it
5.5" Schmidt-Newtonian – 1888 (used)	Wanted a "faster" scope for imaging – this was a Celestron Comet Catcher	+ shorter exposure times - showed off-axis coma; focuser leaked light	Sold on Cloudy Nights
Sky Designs 18 – 1992 (used)	Discussed below.	Discussed below.	See below.
Meade LXD75 Mount – 2008 (used)	I wanted a camera tracker to take wide field images, but this was about the same price!	+ goto made it easier to find imaging targets - goto instructions could have been better	Still have it. Good for public events. May use for more casual observing and imaging.
Byers 58 – 2009 (used)	Soon after the Meade mount, this, which is what I really wanted, came on the market.	+ with careful set-up, tracks for 2+ minute exposures at 540mm focal length. - awkward to transport w/o a hatchback or larger car	A quality Ed Byers product. Will sell at some point since it is redundant to other newer equipment.
TeleVue Genesis - 2009 (used)	I mainly used this for imaging with good results.	+ collimation not required; focus and go. - camera is low when pointed vertically.	A quality TeleVue product. Will sell at some point since it is redundant to other newer equipment.
Celestron C11 - 2012 (used)	Good views of Mars at Credit Island. Would like to use more.	+ carbon fiber tube = steady focus with temperature changes. - needs a solid mount for this focal length	The scope I'll use when longer focal length is required.
Losmandy G11 - 2015 (used)	Works as it is supposed to (after replacing a motor).	+ high quality build; good goto's - as with all mounts of this size, takes time to set up.	THE mount I'll use for best imaging.
8" F/3.8 Newtonian - 2017 (used)	Purchased 4/5/17, this scope has lots of potential	772mm focal length and a fast F/3.8; took a quick image of the Moon and it looks good.	Need a coma corrector; 1.1x1.6 degree field; can hardly wait to get some clear, dark nights.

Notes:

- ★ Basically, almost everything is pre-owned.
- ★ For cameras, I have a modified Canon T3i for deep sky and a ZWO ASI120MC for planetary work
- ★ Regarding my 18": It was originally a Sky Designs scope that was very bulky and heavy (built like a battleship, but I wanted a corvette) slowly, over the years, I built a new telescope around the optics. Except for two wood rings, everything else is new. It now weighs less than 80 lbs total; than ½ the original weight. The original 8 truss tubes were replaced with longer tubes that are now a one-piece, laterally collapsible assembly that is much easier to assemble and transport. The mirror box, altitude bearings and main mirror can be left assembled and is light enough (barely) that I can lift it and put it in the car. The scope movement on the Teflon/ebony star formica bearings is smoother and the whole scope is enjoyable to assemble and use. Finally!. At EISP last year, two objects I enjoyed seeing were M17 – the Swan or Omega Nebula and the M92 Globular Cluster. In the 18", the swan shape was quite obvious and the stars of M92 were bright pinpoints.
- ★ North Carolina was our home for a couple years on the late 80's and we really enjoyed living there. One of the things I liked most was being outside more and seeing more of the sky, day or night. Caswell Beach faces south and we often were there for sunsets, many of which were spectacular. I had heard of the "green flash" but didn't know what to expect unlit I saw my first one. Interesting! Probably because of the proximity to the Atlantic, skies are steady more often but less transparent. The equatorial platform I have for the 18" is designed for 28 degrees latitude – the same as Southport, NC.
- ★ I'll probably aim to do more planetary work from home and head to the Appellation foothills for dark skies. I have the equipment now for either.
- ★ There are a few accessories I want at some point. 1 – Soon, a coma corrector, specifically, a Baader MPCC. 2 – An Atmospheric Dispersion Corrector for planetary work. 3 – A cooled camera (NC nights are warm; sometimes HOT) for planetary or maybe both planetary and deep sky.

A Few "Final" Thoughts

- ★ It would have been nice to know that the current technology was coming so I wouldn't have taken so many dead ends, but how does one know the unknowable?
- ★ If you aren't where you want to be, I hope you can get there in a direct manner.
- ★ I'm pretty satisfied with where I am, though it took many side-steps to get here.
- ★ So if you are thinking "Let's do some astronomy!" I am with you!

Submitted Articles

Total solar eclipses: Between faith and reason
By Paul Levesque

On August 21, the path of a total solar eclipse will sweep across the continental United States. The moon's shadow will blot out the sun within a narrow band that will cover a dozen states from Oregon to South Carolina. Millions of Americans living in this band will have the good fortune of seeing one of nature's greatest shows without leaving home; millions more – myself included – plan to travel to the path of totality to see it for themselves.

Solar eclipses predate *homo sapiens* by millions of years, and inspired awe and more than a little fear in early humans. Various myths surrounding eclipses show that they were seen as a celestial battle of the gods, or perhaps as a monster attempting to devour the sun. An eclipse could also portend evil or signal a deity's displeasure.

We may dismiss these beliefs as superstitious and primitive, but our ancient ancestors are owed some respect. Using only the naked eye and a few crude instruments, they mapped the locations and movements of the sun, moon, planets and stars with astonishing accuracy. Centuries before Christ, it was understood among the learned that eclipses occurred in patterns, and so could be predicted.

Riches and esteem could accrue to anyone able to predict a solar eclipse. But great reward often comes at great risk, as seen in the story of the two astrologers in the court of the emperor of China who failed to forecast a solar eclipse circa 2100 B.C. The emperor had them beheaded.

While this tale may be apocryphal, Bible scholars do know that the mid-day darkness which, according to three of the canonical Gospels, shadowed Jerusalem during the crucifixion was not due to a total eclipse. This is because Jesus' crucifixion took place at Passover, during a full moon, and a solar eclipse can only happen during a new moon. Natural explanations for the darkness include a dust storm or a thick layer of clouds. It's also thought that Matthew, Mark and Luke were speaking metaphorically, tapping into commonly held beliefs about eclipses.

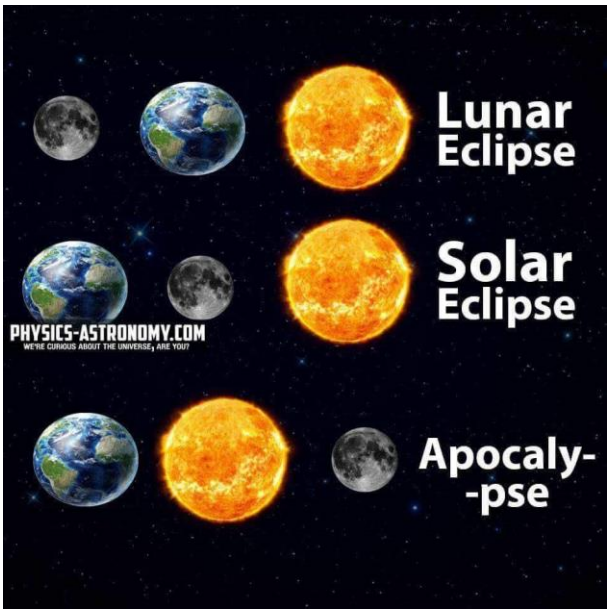
More observations over the years led to a greater understanding of eclipses. In 1715, Edmund Halley, namesake of the famous comet, predicted the time and path of a solar eclipse to within a few minutes and about 20 miles. Forecasting eclipses soon became a routine part of astronomy, and the world's organized religions began to see eclipses as natural phenomena, not as signs from God.

Yet even today, eclipses have not completely moved from the realm of faith to that of reason. Solar eclipses are possible because the sun happens to be approximately 400 times larger than Earth's moon, but also approximately 400 times further away. There are those who see this as something more than a cool coincidence. To these believers, eclipses are messages from God displaying His glory and stating His presence, and may be intended to trigger our natural curiosity about His creation.

While this can never be proven definitively, we can toggle back to science to shed some light on the subject. In recent years, astronomers have discovered hundreds of planets orbiting other stars in our galaxy, with some of these so-called exoplanets found in habitable zones that could support life as we know it.

It is very likely that moons orbit some of these planets, though none have been discovered to date. When and if astronomers find these moons, they might also eventually be able to determine whether or not eclipses occur on distant planets. They may conclude that eclipses are common throughout the known universe – but what if the data show that eclipses are apparently exclusive to Earth? Now *that* would give future philosophers and theologians something to chew on.

Whatever you believe, you can regard the August 21 solar eclipse as a miracle, a word derived from a root meaning "wondrous to behold." From all accounts, a total solar eclipse truly is a wonder that all of us should try to behold at least once in our limited time on this planet. I intend to take this rare opportunity to experience a miraculous event, and I hope that you're able to as well.



Solar Eclipse Exposure Guide

ISO	f/Number								
25	**1.4**	**2**	**2.8**	**4**	**5.6**	**8**	**11**	**16**	**22**
50	**2**	**2.8**	**4**	**5.6**	**8**	**11**	**16**	**22**	**32**
100	**2.8**	**4**	**5.6**	**8**	**11**	**16**	**22**	**32**	**44**
200	**4**	**5.6**	**8**	**11**	**16**	**22**	**32**	**44**	**64**
400	**5.6**	**8**	**11**	**16**	**22**	**32**	**44**	**64**	**88**
800	**8**	**11**	**16**	**22**	**32**	**44**	**64**	**88**	**128**
1600	**11**	**16**	**22**	**32**	**44**	**64**	**88**	**128**	**176**

Eclipse Feature	Q	Shutter Speed								
Partial[1] - 4.0 ND	**11**	–	–	–	1/4000	1/2000	1/1000	1/500	1/250	1/125
Partial[1] - 5.0 ND	**8**	1/4000	1/2000	1/1000	1/500	1/250	1/125	1/60	1/30	1/15
Baily's Beads[2]	**11**	–	–	–	1/4000	1/2000	1/1000	1/500	1/250	1/125
Chromosphere	**10**	–	–	1/4000	1/2000	1/1000	1/500	1/250	1/125	1/60
Prominences	**9**	–	1/4000	1/2000	1/1000	1/500	1/250	1/125	1/60	1/30
Corona - 0.1 Rs	**7**	1/2000	1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1/8
Corona - 0.2 Rs[3]	**5**	1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4	1/2
Corona - 0.5 Rs	**3**	1/125	1/60	1/30	1/15	1/8	1/4	1/2	1 sec	2 sec
Corona - 1.0 Rs	**1**	1/30	1/15	1/8	1/4	1/2	1 sec	2 sec	4 sec	8 sec
Corona - 2.0 Rs	**0**	1/15	1/8	1/4	1/2	1 sec	2 sec	4 sec	8 sec	15 sec
Corona - 4.0 Rs	**-1**	1/8	1/4	1/2	1 sec	2 sec	4 sec	8 sec	15 sec	30 sec
Corona - 8.0 Rs	**-3**	1/2	1 sec	2 sec	4 sec	8 sec	15 sec	30 sec	1 min	2 min

Instructions

Choose the ISO speed in the upper left column. Next, select the f/number of the lens or telescope (on same line as ISO). Finally, drop straight down to the bottom table to get the correct exposure for each feature of the solar eclipse.

Note that the brightness of the corona varies dramatically with distance from the Sun's edge. All exposure values in this guide are estimates. For best results, use them only as a guide and bracket your exposures.

Exposure Formula: $t = f^2 / (I \times 2^Q)$ where: t = exposure time (sec)
f = f/number or focal ratio
I = ISO film speed
Q = brightness exponent

Abbreviations: ND = Neutral Density Filter.
Rs = Solar Radii.

Notes: [1] Exposures for partial phases are also good for annular eclipses.
[2] Baily's Beads are extremely bright and change rapidly.
[3] This exposure also recommended for the *Diamond Ring* effect.

www.mreclipse.com/SEphoto/SEphoto.html *©2008 Fred Espenak*

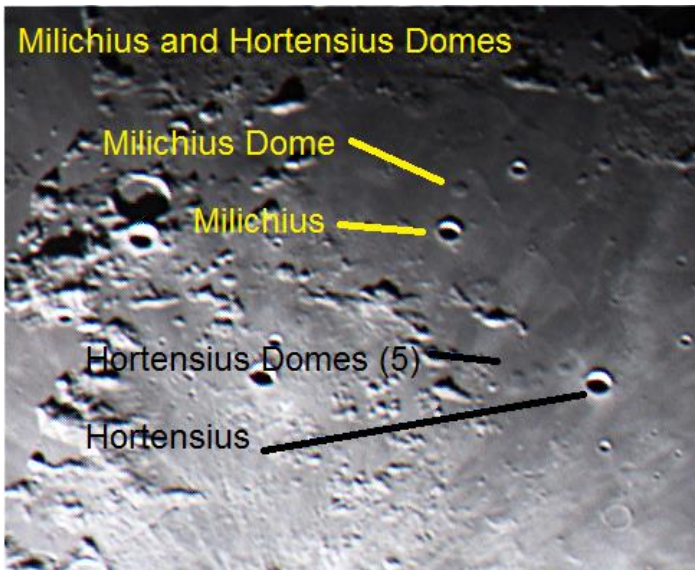
Seeing Lunar Domes
By Ken Boquist

It is well known that most lunar features are of impact origin, being formed by asteroids and meteorites slamming into the Moon. However, some features were formed by volcanic or magmatic processes. Lunar domes are one of these features. These features are similar to Earth's shield volcanoes, being broad and having very gentle slopes. One article stated that the typical dome is about 5 to 7.5 miles across, and about 900 feet high.

The article mentioned that there are about 300 domes that have been cataloged. Not all of them are visible to telescopic observers, but there are quite a few that can be seen with telescopes as small as 3". Observing domes can be an interesting challenge. Due to their shape and very low heights, they are usually visible only for a day or so after the Sun rises on them, so they are best seen when the terminator is nearby. The only way to see most of them is by noting a shadow at the base, and noting that one side usually appears a little brighter than the other. Good seeing is very helpful. When the seeing is bad, observing domes can be quite difficult.

I recently had a chance to observe some of the domes in "Domeland", which is the area around Hortensius and Milichius, which are located a little ways to the west of Copernicus. The accompanying pictures show what I saw on the evening of April 6 at about 11:40 pm CDT. I used a 5.1" f/8 apochromatic refractor with a 2X barlow to take these pictures. To orient yourself, Copernicus is just outside the field of view at the bottom, with lunar west (actually east on the sky) being towards the top. Five of Hortensius' six domes are visible in this image. Milichius' dome, known as Milichius Pi, is visible a little ways above the Hortensius domes. The picture shows the Hortensius domes a little better than they were visually because of image processing. The seeing was pretty bad, being about 2 out of a scale of 1 to 5, with 5 being perfect.

There are many other domes that are visible, and there are quite a few articles and information on the web if you are interested in learning more about domes.

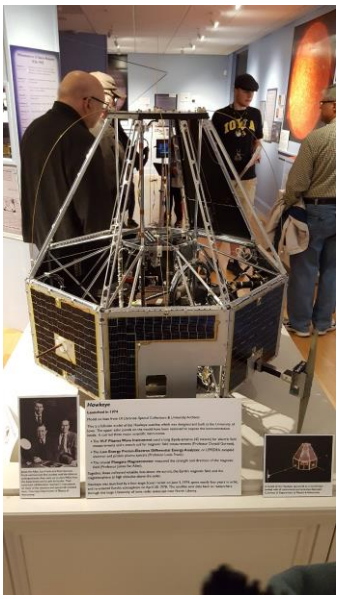


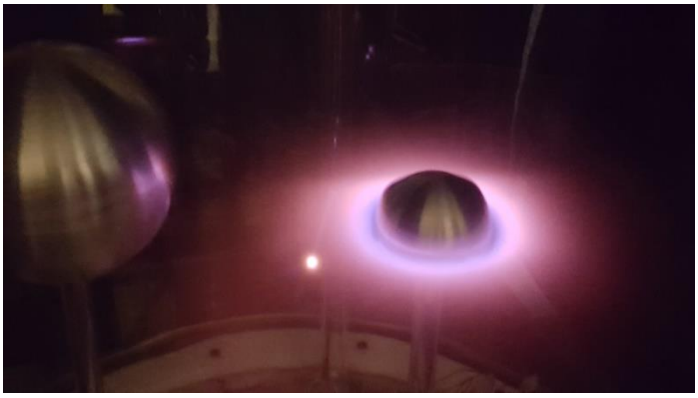
George's Jupiter:

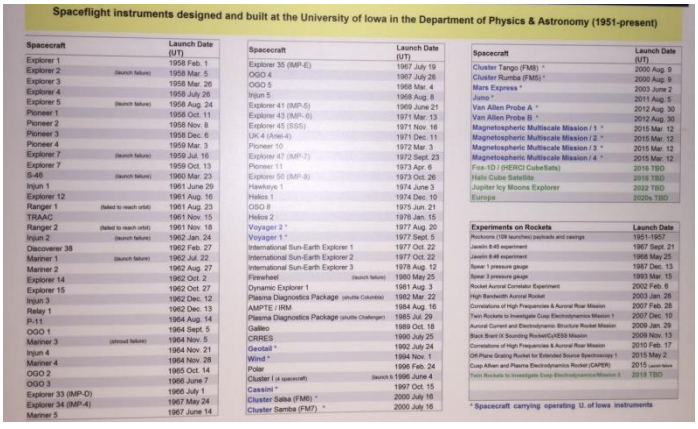
About 6000 frames used (50%) of a 2 min run for the Jupiter photo.

The little Orion MAK (127mm, f/12, but used a 2x barlow so f/24) seems to do well on planets; and the iOptron mount tracked Jupiter with it (and the Sun on Friday and today with the AR102) perfectly - it kept Jupiter in a roi box without any adjustment over the 2 min exposure, and a sunspot group centered while I ate lunch, so I'm very happy with its tracking ability!

4/01 Field Trip – Hawkeyes in Space – 10,000 words…:







Spaceflight instruments designed and built at the University of Iowa in the Department of Physics & Astronomy (1951-present)

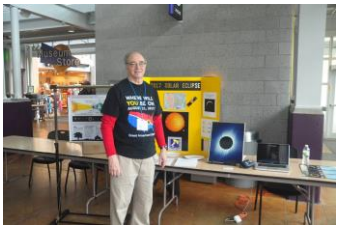
Spacecraft	Launch Date (UT)
Explorer 1	1958 Feb. 1
Explorer 2 (launch failure)	1958 Mar. 5
Explorer 3	1958 Mar. 26
Explorer 4	1958 July 26
Explorer 5 (launch failure)	1958 Aug. 24
Pioneer 1	1958 Oct. 11
Pioneer 2	1958 Nov. 8
Pioneer 3	1958 Dec. 6
Pioneer 4	1959 Mar. 3
Explorer 7 (launch failure)	1959 Jul. 16
Explorer 7	1959 Oct. 13
S-46 (launch failure)	1960 Mar. 23
Injun 1	1961 June 29
Explorer 12	1961 Aug. 16
Ranger 1 (failed to reach orbit)	1961 Aug. 23
TRAAC	1961 Nov. 15
Ranger 2 (failed to reach orbit)	1961 Nov. 18
Injun 2 (launch failure)	1962 Jan. 24
Discoverer 38	1962 Feb. 27
Mariner 1 (launch failure)	1962 Jul. 22
Mariner 2	1962 Aug. 27
Explorer 14	1962 Oct. 2
Explorer 15	1962 Oct. 27
Injun 3	1962 Dec. 12
Relay 1	1962 Dec. 13
P-11	1964 Aug. 14
OGO 1	1964 Sept. 5
Mariner 3 (shroud failure)	1964 Nov. 5
Injun 4	1964 Nov. 21
Mariner 4	1964 Nov. 28
OGO 2	1965 Oct. 14
OGO 3	1966 June 7
Explorer 33 (IMP-D)	1966 July 1
Explorer 34 (IMP-4)	1967 May 24
Mariner 5	1967 June 14
Explorer 35 (IMP-E)	1967 July 19
OGO 4	1967 July 28
OGO 5	1968 Mar. 4
Injun 5	1968 Aug. 8
Explorer 41 (IMP-5)	1969 June 21
Explorer 43 (IMP- 6)	1971 Mar. 13
Explorer 45 (SSS)	1971 Nov. 16
UK 4 (Ariel-4)	1971 Dec. 11
Pioneer 10	1972 Mar. 3
Explorer 47 (IMP-7)	1972 Sept. 23
Pioneer 11	1973 Apr. 6
Explorer 50 (IMP-8)	1973 Oct. 26
Hawkeye 1	1974 June 3
Helios 1	1974 Dec. 10
OSO 8	1975 Jun. 21
Helios 2	1976 Jan. 15
Voyager 2 *	1977 Aug. 20
Voyager 1 *	1977 Sept. 5
International Sun-Earth Explorer 1	1977 Oct. 22
International Sun-Earth Explorer 2	1977 Oct. 22
International Sun-Earth Explorer 3	1978 Aug. 12
Firewheel (launch failure)	1980 May 25
Dynamic Explorer 1	1981 Aug. 3
Plasma Diagnostics Package (shuttle Columbia)	1982 Mar. 22
AMPTE / IRM	1984 Aug. 16
Plasma Diagnostics Package (shuttle Challenger)	1985 Jul. 29
Galileo	1989 Oct. 18
CRRES	1990 July 25
Geotail *	1992 July 24
Wind *	1994 Nov. 1
Polar	1996 Feb. 24
Cluster I (4 spacecraft) (launch fa	1996 June 4
Cassini *	1997 Oct. 15
Cluster Salsa (FM6) *	2000 July 16
Cluster Samba (FM7) *	2000 July 16
Cluster Tango (FM8) *	2000 Aug. 9
Cluster Rumba (FM5) *	2000 Aug. 9
Mars Express *	2003 June 2
Juno *	2011 Aug. 5
Van Allen Probe A *	2012 Aug. 30
Van Allen Probe B *	2012 Aug. 30
Magnetospheric Multiscale Mission / 1 *	2015 Mar. 12
Magnetospheric Multiscale Mission / 2 *	2015 Mar. 12
Magnetospheric Multiscale Mission / 3 *	2015 Mar. 12
Magnetospheric Multiscale Mission / 4 *	2015 Mar. 12
Fox-1D / (HERCI CubeSats)	2016 TBD
Halo Cube Satellite	2018 TBD
Jupiter Icy Moons Explorer	2022 TBD
Europa	2020s TBD

Experiments on Rockets	Launch Date
Rockoons (109 launches) payloads and casings	1951-1957
Javelin 8-40 experiment	1967 Sept. 21
Javelin 8-40 experiment	1968 May 25
Spear 1 pressure gauge	1987 Dec. 13
Spear 3 pressure gauge	1993 Mar. 15
Rocket Auroral Correlator Experiment	2002 Feb. 8
High Bandwidth Auroral Rocket	2003 Jan. 28
Correlations of High Frequencies & Auroral Roar Mission	2007 Feb. 28
Twin Rockets to Investigate Cusp Electrodynamics Mission 1	2007 Dec. 10
Auroral Current and Electrodynamic Structure Rocket Mission	2009 Jan. 29
Black Brant IX Sounding Rocket/CaXES Mission	2009 Nov. 13
Correlations of High Frequencies & Auroral Roar Mission	2010 Feb. 17
Off-Plane Grating Rocket for Extended Source Spectroscopy 1	2015 May 2
Cusp Alfven and Plasma Electrodynamics Rocket (CAPER)	2015 (launch failure
Twin Rockets to Investigate Cusp Electrodynamics Mission 2	2018 TBD

* Spacecraft carrying operating U. of Iowa instruments

4/21 Astronomy Day w/PAC – Putnam Museum
17,000 + words…:







Above Pics via Alan Sheidler





Above Pics via Paul Levesque

From: **Lakin Sheeder** <LSheeder@putnam.org>
Date: Tue, Apr 25, 2017 at 1:01 PM
Subject: RE: Astronomy Day 2017 photos set 2
To: Alan Sheidler <adsheidler@gmail.com>

Hi Alan,

We had 342 visitors check-in, from the guest school groups, plus the general public during the events (It's hard to get an exact count of the general public, if they didn't purchase a ticket or check-in). I took a few photos, I can send them to you. It was a great event, with everyone involved, always happy to collaborate with passionate people who are willing to share their knowledge and resources with the community! Thanks again, for all the preparation and commitment to making April 21st a great Astronomy filled day!

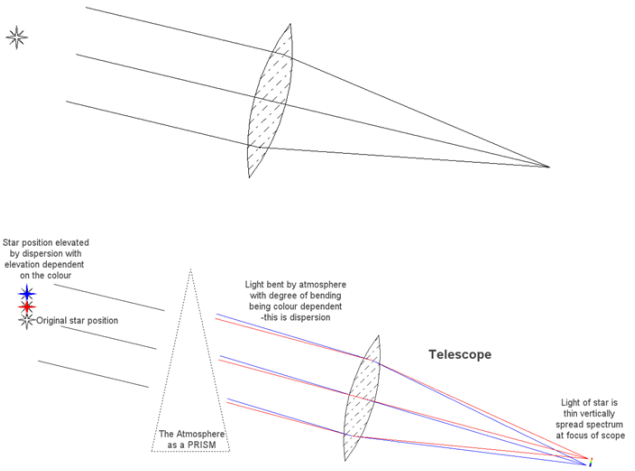
Atmospheric Dispersion Corrector (ADC)

The ADC dramatically reduces the prismatic smearing caused by the passage of the light through our atmosphere and allows planetary images to be taken which show noticeably finer detail.

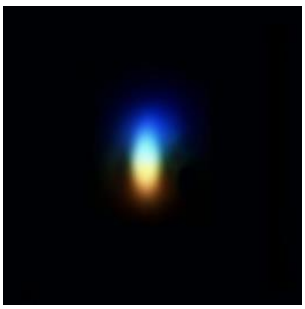
Commercial ADCs are relatively new and their significant benefits justify more astronomers knowing about them. As well as being an advantage to imagers, they can also help visual planetary observers, increasing the amount of surface detail seen through the eyepiece.

Light from any star or planet that enters our atmosphere at an angle will suffer refraction effects which bend to light to a slightly steeper angle. This refraction effect makes the object appear higher in the sky than if the atmosphere wasn't there. The degree of refraction depends to a small degree on various things like temperature, humidity, and height above sea level, but does increases strongly with decreasing altitude of the object - for example, the image of the sun at sunset can actually be elevated by over 0.5°, which is slightly more than one solar diameter.

Like most optical media the refractive (bending) power of the atmosphere is actually dependent on the wavelength of light. This is called optical dispersion. Atmospheric dispersion means that the degree of 'lift' that the refraction causes depends not only on the angle of the light, but also the color of that light. Atmospheric dispersion spreads the light from any point source into a vertical spectrum of colors whose length increases the lower the object is in the sky.

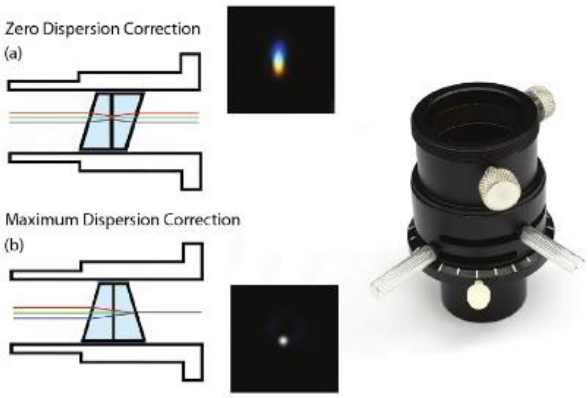


You can see an example of this dispersion effect on the image of Polaris below for an altitude of 52° and taken with a color digital video camera with no atmospheric dispersion corrector in place. The airy disc is spread into a small vertical spectrum whose height is considerably longer than the diameter of the airy disc.



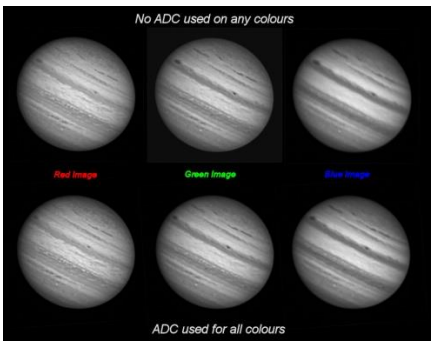
A correctly adjusted ADC placed between the camera or eyepiece and a lens will reduce this spectral spread, improving image resolution as a result. It does this by applying the opposite amount of dispersion to that caused by the atmosphere, re-converging the light of the different wavelengths at the focal plane.

To recombine the separated colors caused by atmospheric dispersion an ADC generally uses a double-prism arrangement to generate a user-settable dispersion of the opposite direction to that induced by the atmosphere. The clever double-prism arrangement allows the correcting effect to be smoothly varied over a wide range by moving one prism clockwise and the other anti-clockwise so they are always symmetrical about the vertical and the corrective dispersion is in the vertical plane too. The user adjust the prism pair so that at the right setting the separated images of different colors are brought back together again at the focal plane.

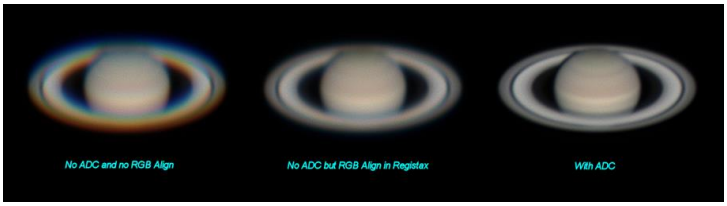


Traditionally monochrome imagers take videos through separate red, green and blue filters and then combine the three final processed images into one full-color image. The method does actually partially suppress the effects of atmospheric dispersion without resorting to using an ADC. This is because the dispersion spread within each separate color band is significantly less than across the whole of the visible spectrum and so by realigning the three separate red, green and blue images, prior to creating the final color image, the overall amount of atmospheric dispersion is reduced. This method works reasonably well for the red and green bands, especially when the planet is quite high in the sky, but is less successful for the blue wavelength band. Because the magnitude of the dispersion increases at shorter wavelengths, for the blue band atmospheric dispersion is great enough to cause significant vertical smearing within the blue image, even at quite high altitudes of the planet.

As an example of the benefits of monochrome imaging, see the image below. This compares Jupiter when images are taken through red, green and blue filters, with and without the ADC in place. You can clearly see the improvements in the image quality in the blue image whilst red and green are virtually identical.



One would think that a color camera would benefit from use of an ADC to the same degree as a mono camera with RGB filters, but actually it benefits more. This is because the filters in a color camera are not nearly as good as the filters used in RGB mono imaging. The filter bandwidth is wider for the Bayer matrix filters as there are far more considerations to be taken into account when choosing the filter material apart from the wavelength window (ability to photographically pattern then for example). This wider wavelength window of the filters for the color camera make them more prone to the smearing caused by atmospheric dispersion, hence the benefit from using an ADC is that much greater.



Gallery

Craig's 16" Explore Scientific Dob w/ homemade shroud

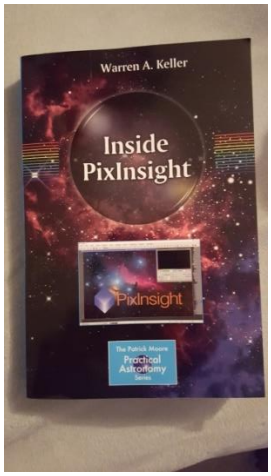
Quick process of Jupiter –
Taken by Matt and Craig using the clubs 20" Newt

For Sale – Wanted

For Sale

– Orion 90mm short tube refractor. 500 mm focal length. Equipped with 1.25 inch focuser, 45 degree diagonal, 26mm Sirius Plossl ep, 6x30mm finder and tube rings that are larger than the tube. There is a plate on the bottom of the tube assembly with 1/4 inch x 20 threaded hole for mounting to a camera tripod. Excellent condition. Price $100.00
Contact Jim Rutenbeck at JRutenbeck@frontier.com

– Baader Planetarium Hyperion 8-24mm Mark III Zoom Eyepiece with original box, great shape, needs cleaning (I'm afraid to clean my eyepieces as I don't want to risk damaging the glass). Great for quality outreach as you don't have to change eyepieces and it is easy to view through. Price $175.00 Contact Jeff Struve at PwrHsePro@aol.com



– New 2nd Addn "Inside PixInsight" by Warren Keller. $30.00 – 1 left!
Contact Jeff Struve at PwrHsePro@aol.com

I have the following from previous telescopes or for telescopes I decided not to build:

1.25" OD
Five, 72" long, 0.035" wall thickness, never used, (current new price: $18.49), $8 each
One, 50" long, 0.035" wall thickness, painted blue, $6

1.25" OD - from a mid-80s Sky Designs scope
Eight, approx 1/16" wall, painted black, ends flattened, bolt at one end and hole at other, approx 44.75" center-to-center, $7 each

1" OD
Eight, approx 1/16" wall, painted black, one end flattened, bolt at flattened end and hole at other, approx 53" center-to-center, $6 each
Five, approx 38" long, unpainted, $5 each
One, approx 34.75" long, $4
One, approx 32.75 long, $4

Various shorter lengths in 1.25" OD and 1" OD at reasonable prices.

If you've checked prices, you'll see that these are unreasonably low. I need them gone and I prefer not to scrap them.
Contact Karl Adlon at KMJA79@yahoo.com

May Flowers

Here are some celestial flowers for your picking. They are in order (mostly) by apparent size, largest to smallest.

Name	R A	Dec	Size	Mag
M44	08 40	+19 59	95'	3.1v

The Beehive is an open cluster that is best in low power scopes and it is one of the few brighter objects in Cancer.

Name	R A	Dec	Size	Mag
M3	13 42	+28 23	16'	6.3v
M67	08 50	+11 49	30'	6.9v

A globular star cluster (M3) and an open star cluster (M67).

Name	R A	Dec	Size	Mag
M81	09 55	+69 04	14'x26'	6.9v
M82	09 55	+69 41	4'x11'	8.4v

A low power, wide angle eyepiece will show them both in the 20". If skies are transparent, each galaxy is deserving of individual attention at higher power.

Name	R A	Dec	Size	Mag
M101	14 03	+54 21	25'x26'	7.7v

The Pinwheel Galaxy is interesting in images, having a bent spiral arm. Can you see it visually?

Name	R A	Dec	Size	Mag
M51	13 29	+47 12	7.8'x11'	8.4v

From photos, you can't tell that The Whirlpool is a very small object in the scope. Best to use a large scope but may be disappointing if the skies are just average.

Name	R A	Dec	Size	Mag
M97	11 14	+55 01	3.4'x3.3'	9.9v

The Owl Nebula is the only planetary nebula on this month's list.

Name	R A	Dec	Size	Mag
Antennae	12 01	-18 52	26'	11.3b

NGC 4038 and NGC 4039 are a pair of colliding galaxies. The size above is with the antennae, which are very faint and difficult. Can you see or image them?

Name	R A	Dec	Size	Mag
3C 273	12 29	+02 03	stellar	12 to 13

Star-like (quasi-stellar = Quasar), this is the brightest one in the sky. You'll need a finder chart to ID it from other stars in the field.

Here's wishing for dark, clear, steady skies! – Karl Adlon

Calendar of Events

2017

01/16/17 – Society Meeting
01/28/17 – Open House at the Jens-Wendt Observatory
02/18/17 – Menke Observatory Scouts Tour
02/20/17 – Society Meeting
02/25/17 – Open House at the Jens-Wendt Observatory
03/18/17 – Open House at the Jens-Wendt Observatory
03/20/17 – Society Meeting
03/24-25/17 – Messier Marathon at Menke Observatory
04/01/17 – Hawkeyes in Space Field Trip
04/17/17 – Society Meeting
04/21/17 – Assist PAC at the Putnam Museum
04/29/17 – Astronomy Day
04/29/17 – Open House at the Jens-Wendt Observatory
05/13/17 – Menke Observatory Public Open House
05/15/17 – Society Meeting
05/27/17 – Open House at the Jens-Wendt Observatory
06/03/17 – Menke Observatory Public Open House
06/19/17 – Society Meeting
06/24/17 – Open House at the Jens-Wendt Observatory
07/15/17 – Menke Observatory Public Open House
07/17/17 – Society Meeting
07/29/17 – Open House at the Jens-Wendt Observatory
08/12/17 – SAU/QCAS Perseid Meteor Shower Party
08/21/17 – Solar Eclipse
08/21/17 – Society Meeting
08/26/17 – Open House at the Jens-Wendt Observatory
09/18/17 – Society Meeting
09/22-24/17 – Eastern Iowa Star Party
09/23/17 – Menke Observatory Public Open House
09/30/17 – Open House at the Jens-Wendt Observatory
10/16/17 – Society Meeting
10/28/17 – Open House at the Jens-Wendt Observatory
11/18/17 – Open House at the Jens-Wendt Observatory?
11/20/17 – Society Meeting – Annual Dinner
12/16/17 – Open House at the Jens-Wendt Observatory?
12/18/17 – Society Meeting

Editor's Note:

Please help improve the substance of our newsletter by submitting articles and pictures for publication. Variety is the spice of life… be spicey!

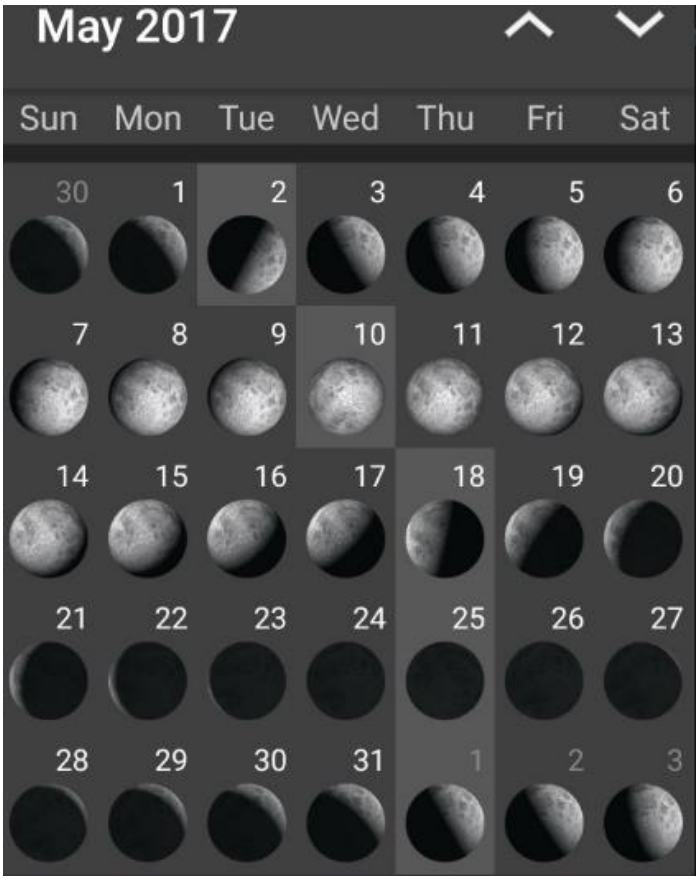
Types of articles that would really be interesting could include What's In the Sky This Month, equipment reviews, experiences you've had in astronomy, sketches you've drawn, trips you've taken to observatories or star parties, a high level overview of your favorite astronomer, movie, book or article reviews, list astronomy gear that you want to buy or sell, and of course pictures you've taken and how they were done…

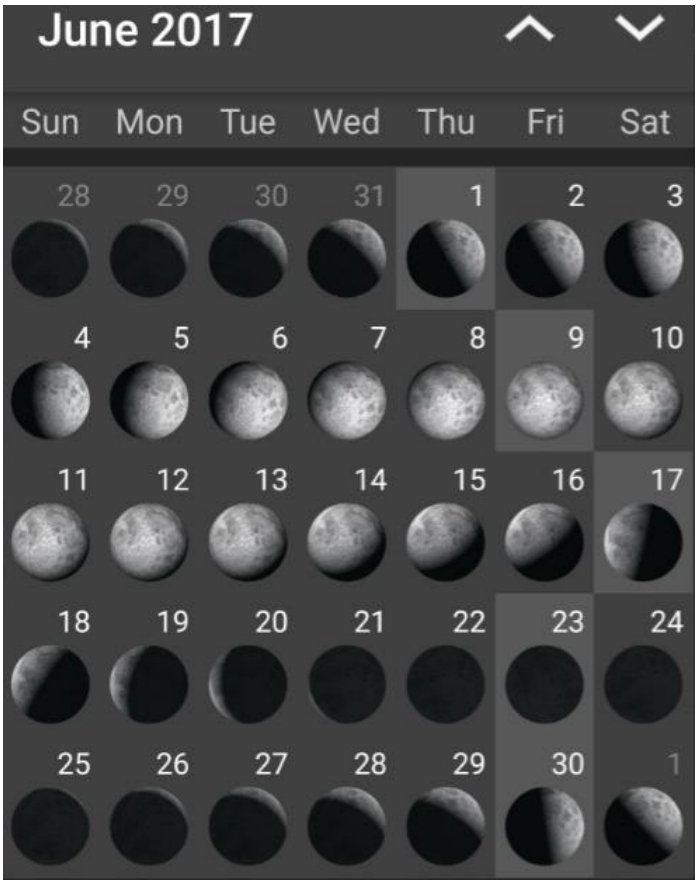
If each member submitted 1 article per year we could have an incredibly varied and interesting newsletter… that is my challenge to you!

Also…. Drop an email, text, or make a phone call or two… members want to get together outside of normal club events to discuss and work on our hobby!

Jeff

PS… A special thank you to, George, Paul, Robert, and Matt (and dual members Alan and Sara) for helping with the Putnam Family Night, Ken, Paul and Karl for their articles, Craig, Matt, Alan, Paul, and George for the pics, and Karl Adlon for his May Flowers!





QCAS Correspondence:

Please contact the society at: P.O. Box 3706, Davenport, IA, 52808.

Members are welcome and encouraged to submit articles for The Meridian. Submit any and all interesting items (via e-mail) to: PwrHsePro@aol.com and/or MitchellRobertC@sau.edu

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