PAC Logo

Reflections

John Deere Planetarium by Paul Castle

Newsletter of the Popular Astronomy Club April 2016

THE PRESIDENTS CORNER

Alan Sheidler

2016 is shaping up to be an incredible year so far. So far in 2016, club members have been involved in eight planned public events reaching a total of approximately 866 visitors. In January and again in March, the Putnam museum invited PAC to partner with the Quad Cities Astronomical Society to put on excellent public outreach sessions at the museum. During the March session, 18 PAC members participated in the "Starry Night" program with deployment of the Star Lab, operation of the PACMO, individual telescopes, exoplanet display, raffle ticket sales, information tables, free handouts, Weight Station, craft tables, and a presentation in the IMAX theater of "The Coolest Things in Astronomy". This is a fine example of the Popular Astronomy Club really making astronomy "popular". It was also nice to collaborate with QCAS for this event. Their very talented and creative members set up several tables of really outstanding astro-photos of planetary and deep sky objects. I believe we could probably learn a lot from these guys. The skies were clear enough to enable us to introduce literally hundreds of visitors to views of the sun, the moon, Jupiter and even the Orion Nebula. I am still amazed by the number of visitors coming to club outreach events who say they have never had the opportunity to look through a telescope. When these folks observe the moon, their comments of awe are so very gratifying. This is what keeps bringing us out to these events.

As you all know, the PACMO is our most significant single tool to introduce the public to telescopic views of the cosmos. Because the PACMO has been in service since 2000 and is showing its age, the club decided this was the time to start refurbishing. This winter we started this process which has been marked by a number of emotional highs and lows (for me at least):

PACMO refurbishing "Ups and Downs":

1) **High Point:** The Community Foundation of the Great River Bend awarded PAC a $1000 impact grant to finance refurbishing of the PACMO. Our thanks to the Foundation for their generosity. It should be noted, however, that our success in securing this grant comes after submission of numerous grant applications to various groups over the last several years. Tenacity pays—literally!

2) **High Point:** The PACMO was pulled out of winter storage a month early this year to enable our observatory director, Rusty Case, to begin the refurbishing of the PACMO. Under Rusty's usual high levels of competence, the PACMO now has shiny new wheels and repairs to the wiring harness. We also started the difficult process of removing the weather worn decals on the PACMO.

3) **Low Point:** Removing the decals proved to be impossible without damaging the PACMO's paint. Repainting was going to run into the several thousands of dollars--too expensive!

4) **High Point:** Rusty contacted Edwards Creative in Milan to design new vinyl-wrapped graphics for the sides and rear doors of the PACMO. With Edwards' design help, we developed a really fantastic, "stellar" new design for the PACMO.

5) **Low Point:** While cheaper than repainting, the quoted cost of wrapping was significantly over budget ($1400).

6) **High Point:** At the March business meeting, the club voted unanimously to order the wrap for the PACMO and various club members have made pledges to donate money to supplement the $1000 impact grant and meet the needs to fully refurbish the PACMO. Managing these financial needs is keeping our treasurer, Bryan Raser, very busy indeed!

7) **Future High Point:** The goal is to have the PACMO ready for Astronomy Day, April 23rd, including Edwards' wrap.

President's Corner continued on next page.

As I write this column, the club has agreed on the wrap design and is working to secure enough pledges to pay for the wrapping. Barring any other "ups & downs", we will have the shiny new PACMO back in time for Astronomy Day at the Moline Public Library.

Meanwhile, Adam Beals has been very busy developing a new club Facebook page and creating a new club website. The Facebook provides an additional avenue for informing the public about the club's activities, and is immediate and interactive. For example, we can provide up to date information about observing events that have to be canceled due to bad weather. Folks can also register comments and post photos as well. This will be a valuable tool for us going forward. Adam is also building a new website for the club with a much more intuitive domain name: www.popularastronomyclub.org. Go ahead and give this a try. The old site still works, but this one is going to be the site we convert to in the near future. The new domain name will also be emblazoned on the rear door of the new PACMO wrap.

While public outreach is a major focus for the PAC, club members are also engaged in group and individual observing sessions. A number of club members have been experimenting with astro-photography. Roy Gustafson, Bryan Raser, Rusty Case, Broc Golden, Ken Boquist, Wayland Bauer and I have been experimenting with astro-photography.

Ken has shown an unusual aptitude for capturing really amazing solar images using his H-alpha scope. Roy Gustafson has also made some excellent H-alpha images. Rusty Case, Bryan Raser and I have also made some nice images of planets and some of the brighter deep sky objects. Speaking for myself, I have a lot to learn. Ken's deep sky and lunar images are really very amazing.

We have had several observing sessions this winter at the Castle Memorial Observatory where we have played with our cameras in an attempt to hone our skills. These observing sessions are learning opportunities and fun. While public outreach is an important part of what our club is about, we should also get together as a club for learning and fellowship. We might want to think about inviting QCAS members to attend one of these sessions to foster learning and fun with fellow astronomers.

Moreover, I believe our club is reaching a new stage of growth which reflects the amazing capabilities of our members, technologies, upgrades to the PACMO, networking in the community and growth of member observational knowledge. As I was making my presentation in the IMAX Theater at the Putnam's Starry Night program, I noticed the audience was dominated by grade school students. As I discussed the close approach of the planet Mars this summer, I realized there was a non-zero probability of one of these young people actually going to Mars within their lifetime. It is very gratifying to realize we may be playing a role in introducing these young people to that possibility!

Keep looking up! Al Sheidler.

OUR VERY OWN - KATIE MELBOURNE

KATIE MELBOURNE WITH OUR RAFFLE SCOPE

During my first year at Yale, I have decided to stick with my original plan and just recently declared as an Astrophysics major. Both semesters have been heavy in calculus and physics classes and I am taking my first college-level astronomy class this spring.

I have been lucky with fantastic professors! One of the researchers I met in the astronomy department agreed to work with me this past October to set up a connection with someone from the Universidad de Chile in Santiago so that I could do research there this summer. After a few months of contacting professors there, I finally got a response from Dr. James Jenkins and will be going to Santiago for 9 weeks this summer to research with him!

I received the Tetelman International Research Fellowship to fund my trip as well. In Chile, I will be studying how stellar activity, and in particular magnetic flux density, affects our detection of exoplanets with the radial velocity technique. I'm excited to update you on my progress and on how everything turns out after this adventure!

HAPPY BIRTHDAY LILLIAN NELSON

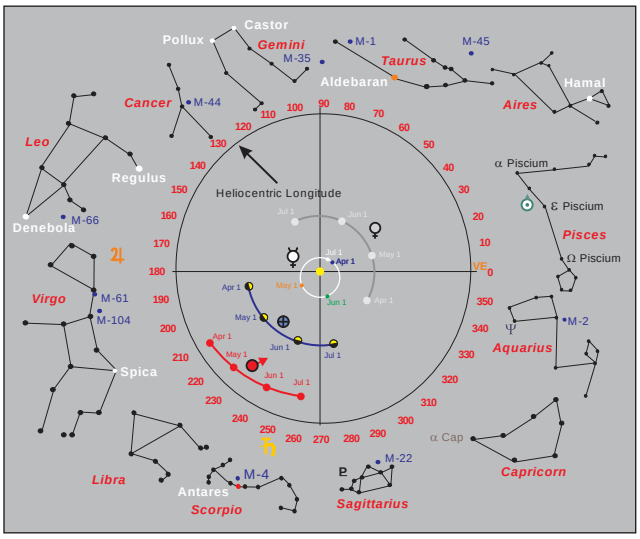
Lillian Nelson, wife of past PAC President, Dr. Harry Nelson, reached the Century mark on March 20, 2016.

ASTRONOMICAL CALENDAR OF EVENTS
(PAC Activities in Bold print)

(Possible Observing Challenge photo Op dates shown in red)

Apr 7, 2016 – New Moon
Apr 9, 2016 – Uranus is in conjunction with the Sun
Apr 11, 2016 PAC Monthly Meeting - Augustana Planetarium, 7:00 p.m. Program: John Douglas "The Missing Planet in our Solar System"
Apr 13, 2016 – First Quarter Moon
Apr 13, 2016 – Public Outreach – Orion Public Library
Apr 16, 2016 – Public Viewing night at Niabi Zoo.
Apr 18, 2016 – Mercury is at greatest eastern elongation, 19.9° east of the sun
Apr 22, 2016 – Full Moon
Apr 22-23, 2016 – Lyrids Meteor Shower. This year the shower will be competing with the glare of a full moon.
Apr 23, 2016 – Astronomy Day Moline Public Library.
Apr 29-30, 2016 –NCRAL Convention Normal, Illinois.
Apr 29, 2016 – Last Quarter Moon
May 6, 2016 – New Moon
May 6-7, 2016 – Peak of the Eta Aquarids Meteor Shower.
May 9, 2016 PAC Monthly Meeting - Augustana Planetarium, 7:00 p.m. Program: "Augustana Student Presentation"
May 9, 2016 – Transit of Mercury Niabi Zoo viewing 6:00 am to 2:00 pm
May 13, 2016 – First Quarter Moon
May 21, 2016 – Public Viewing night at Niabi Zoo.
May 21, 2016 – Mars is at opposition tonight
May 21, 2016 – Full Moon
May 29, 2016 – Last Quarter Moon
May 30, 2016 – Mars is closest to Earth, 18.6" disk
May 31, 2016 – Geneseo Kiwanis – Roy and Jan Gustafson.
Jun 2, 2016 – Saturn is at opposition tonight
Jun 3, 2016 – Public Outreach – Sherrard Public Library/Fire Station.
Jun 4, 2016 – New Moon
Jun 5, 2016 – Mercury is at greatest western elongation, 24.2° west of the sun
Jun 6, 2016 – Venus reaches superior conjunction.
Jun 12, 2016 – First Quarter Moon
Jun 13, 2016 – Earliest sunrise of the year, 5:27 am
Jun 13, 2016 PAC Monthly Meeting - Augustana Planetarium, 7:00 p.m. Program: Ben Nordic "Optics"
Jun 18, 2016 – Public Viewing night at Niabi Zoo.
Jun 20, 2016 – Full Moon
Jun 25, 2016 – Public Outreach – Rock Island Conservation Club.
Jun 26, 2016 – Latest sunset of the year, 8:40 pm
Jun 27, 2016 – Last Quarter Moon

PLANET CHART – SECOND QUARTER 2016



Mercury makes a complete 88 day sidereal orbit around the Sun, and moves the three additional earth days covered in this quarterly newsletter. The positions of Mercury on the first day of each month are shown with color coded circles on the chart shown above. Mercury makes one orbital revolution around the Sun in 87.969 of our days, but due to the motion of Earth around the Sun, the synodic period of Mercury is about 116 days. This is why there are only three entries on the list to the left, instead of four. Refer to the calendar to the left to view the major orbital events for Mercury as viewed from Earth during the period.

There is a morning transit of Mercury on May 9th visible from the QCA.

Venus is a daytime object for the entire quarter and reaches superior conjunction with the Sun on June 6th.

Earth travels ¼ of its yearly twelve month orbital period around the Sun during this three month period, and arrives at our Summer solstice on June 20.

Mars: rises around midnight at the beginning of the period, about six hours ahead of the Sun. It is heading toward opposition on May 21st when it is visible all night.

Jupiter is a night time object during the entire quarter and sets around midnight on June 30th.

Saturn rises around 1:00 am on April 1st and is visible in the dark early morning sky until sunrise. It arrives at opposition on June 2nd and is visible all night.

Uranus reaches conjunction with the Sun on April 10th and is lost in the glare of the Sun during this quarter.

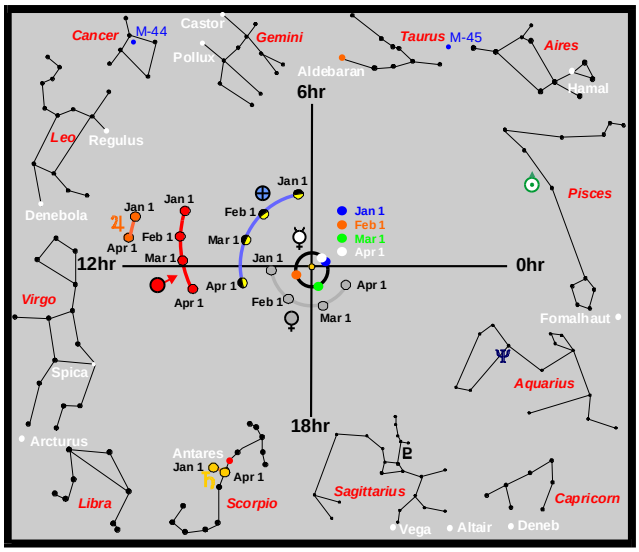
Neptune is a day time object during the entire quarter.

Pluto is located near Sagittarius and is visible only in the very early morning western dark sky, and is very close to the horizon shortly before it sets.

QUARTERLY PLANET CHART CHANGES
Lee M. Farrar

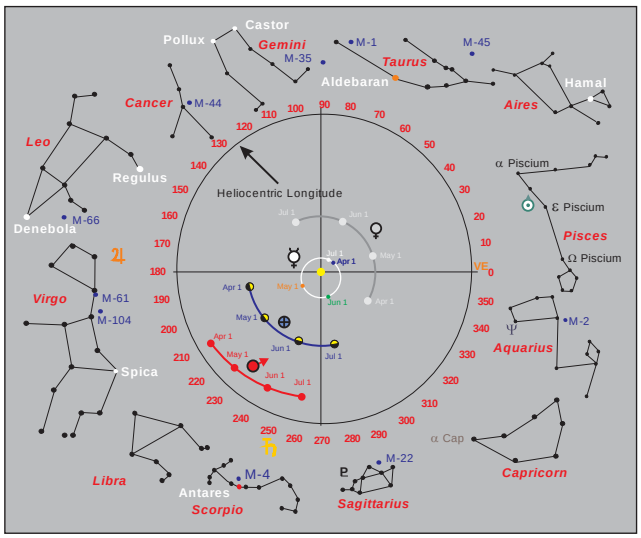
Starting with this quarter, I have made a few changes to the Planet Chart found on page 2 of our newsletters.

Our previous Planet Charts included the orbital tracks for Jupiter and Saturn. But both Jupiter and Saturn are large bright planets and easy to find and observe, move very little during the quarter, and I wanted to use their orbital track space to enlarge the orbital tracks of Mercury, Venus, Earth, and Mars, and to add some other details to the chart.



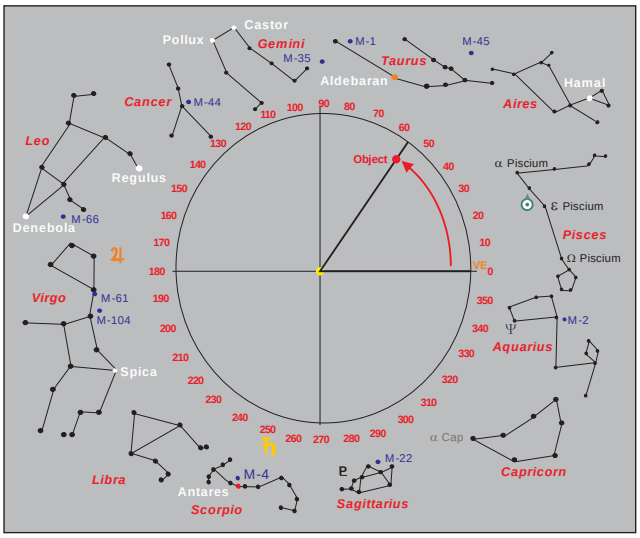
This is the Old Planet Chart

So I removed the quarterly orbital tracks of Jupiter and Saturn from the graphic and placed their planet symbols near the constellations that they appear close to each quarter. At the same time I adjusted the heliocentric positions of some constellations, added a heliocentric longitude graphic to the chart, and indicated the position of the Vernal Equinox on the planet chart.



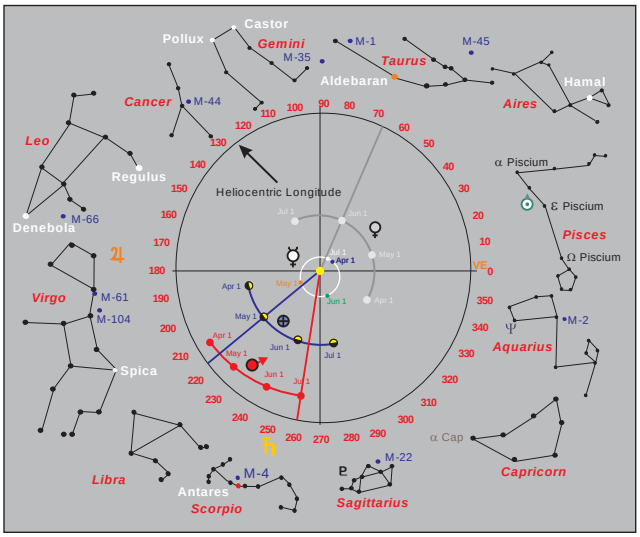
This is the New Planet Chart

Knowing the position of the Vernal Equinox is important because the Heliocentric Longitude of an object is the angle of a line from the Sun through the object, as measured **counterclockwise** from the Vernal Equinox to the object.



The Heliocentric (Sun Centered) Longitude

The following graphic for this quarter shows three lines from the sun through Venus, the Earth, and Mars and intersecting the Heliocentric Longitude. A visual inspection of this graphic shows the HL values for Venus on June 1st to be about 66°; Earth on May 1st to be about 216°, and Mars on July 1st to be about 259°.



Heliocentric Longitudes for Venus, Earth, & Mars

Actually, for the newsletters I use online yearly tables to provide the **exact** HL planet values as of the first of each month.

From the 2016 table, for the second quarter, the online published Heliocentric Longitude values for these dates are Venus 67°; Earth 221°; and Mars 263°.

ASTRONOMY DAY APRIL 23, 2016

The Popular Astronomy Club is again partnering with the Moline Public Library for Astronomy Day on April 23 from 1:00 pm – 5:00 pm. We will have the Star Lab Planetarium, Moon Rocks collected during Apollo missions, and various displays, demonstrations, and solar observing. We'll also have children's crafts, door prizes, and refreshments for the children.

Special guest, Dr. Paul Sipiera of the Planetary Studies Foundation Earth and Space Science Museum, Elizabeth, Illinois will be bringing some of his meteorite collection to display and will be presenting a program at 3:00 titled **"Asteroids and Meteorites: Their Impact on Earth."**

Dr. Paul Sipiera

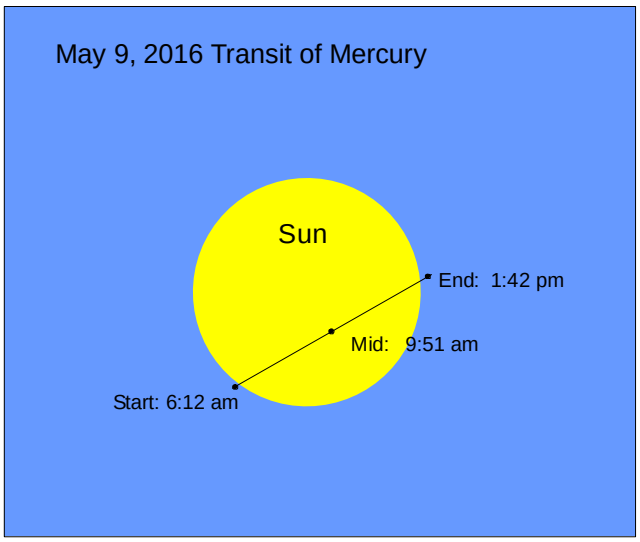
According to Dr. Sipiera "My April program will deal with the relationship between meteorites and asteroids, the home of most meteorites. I will also deal with meteorites and asteroids hitting the Earth both on a large (climate-changing) basis and smaller impacts. This will be in conjunction with International Asteroid Day on June 30th."

Dr. Sipiera is a professor emeritus of geology and astronomy at William Rainey Harper College in Palatine, Illinois. He has research interests in the classification of stony meteorites and their relationship to planetary formation. He has led 3 scientific expeditions to Antarctica in search of meteorites.

Please mark your calendars and plan on helping or attending our annual celebration of Astronomy!

THE MAY 2016 TRANSIT OF MERCURY

There will be a transit of Mercury visible from the Quad Cities during the morning hours of Monday, May 9, 2016.



Transits of Mercury presently occur within a few days on either side of May 8 and November 10.

May transits take place on the **descending node** of Mercury's orbit. November transits occur on the **ascending node** of Mercury's orbit.

The posted sunrise time for Davenport Iowa on May 9th is 5:49 am. The transit starts at 6:12 am, so depending upon your view of the eastern horizon, you should be able to catch the beginning, or at least a very early stage of the transit.

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PACMO NEWS

GRANT AWARD

PAC has been applying for various grants for the last several years. Many of you may know PAC was granted funding in 1999 for PACMO to be constructed, which, after seventeen years, is now showing its age and wear.

The Popular Astronomy Club has been awarded a $1000 grant from the Community Foundation of the Great River Bend (CFGRB) to update our PACMO.

With this grant we will be able to do some much needed upkeep over the winter months so that it will be "like new" when we resume our outreach activities in 2016.

PAC'S VISIT TO THE COMMUNITY FOUNDATION
March 7, 2016
Al Sheidler

Rusty Case, Wayland Bauer and I met at the Community foundation and set up the PACMO there to do some solar observing for those at the foundation. About half of them actually got to see the sun during the intermittent opportunities through the clouds. Nevertheless, this was a good session with about 15 guests.

RESPONSE FROM THE CFGRB FOUNDATION

Al, we so enjoyed having your group and mobile observatory out to visit! We look forward to hearing about your progress in further updating the PACMO.

"Since I've been doing this, the community seems so much larger." Kayla Behrens, one of the community volunteers who reviews grants at the Community Foundation, loves learning about all the great projects that are making the Quad Cities even more cool, connected, creative, and prosperous.

Yesterday our Q2030 Grants Committee welcomed a past CFGRB grantee, the Popular Astronomy Club, Inc. - Quad Cities. Our grant is helping them make updates to their Mobile Observatory, which travels all over the QC to let everyone to see stars, planets, and other celestial objects. (Even during the day - which we did!)

WELCOME NEW PAC MEMBERS

The following new members have recently joined the Popular Astronomy Club. Welcome to PAC.

Terry L. Dufek, Davenport Iowa
Broc Golden, Davenport Iowa
Jeff Struve, Riverdale Iowa

OUR NEW PACMO "WRAP" GRAPHICS

As you are aware, the Popular Astronomy Club was the recipient of a $1,000 Impact Grant from the Community Foundation of the Great River Bend to perform some maintenance upgrades to the PACMO. Our PAC Board decided to pull the PACMO out of winter storage a month early this year to start working on refurbishing. We obtained some new tire/wheel assemblies and Rusty Case made some repairs on the wiring harnesses and a number of other small items.

Because the PACMO paint job had faded and the decals were badly cracked and peeling, PAC did some checking around on what it would cost to repaint the PACMO. We found out that traditional painting would run well into the thousands of dollars.

Rusty Case found out about a process called "wrapping" which has been recommended as an alternative to painting. Wrapping is used by many of the commercial vehicles, trucks, vans, etc., that have nice looking graphics and advertising. I'm sure that many of you have seen these vehicles on the road without realizing the technology involved.

Wrapping is essentially the application of a thin adhesive-backed vinyl sheet with computer generated graphics which is then applied right over the existing paint job on the vehicle.

We received quotes from Edwards Creative for partial and full wrapping of the PACMO. The partial wrap of the two sides and decals on the rear doors (Option C1) would cost $1,000. The full wrap of both sides and decals on the rear doors (Option C2) would cost $1,400.

The following pictures show how these options would look on the PACMO.

PACMO LEFT DOOR SIDE VIEW

PACMO RIGHT SIDE VIEW

PACMO REAR VIEW

PAUL R. CASTLE OBSERVATORY NEWS

This section is devoted to news about activities at our Paul R. Castle Memorial Observatory.

MARCH 11, 2016 OBSERVING

Bryan Raser, Ken Boquist and Al Sheidler convened on March 11, 2016 at the observatory to take advantage of the relatively warm weather and rare clear skies for mid-March. It had been sunny that afternoon with the temperature in the 60's.

Left to right, Al Sheidler, Ken Boquist, and Bryan Raser

We met at the observatory just as it was getting dark and targeted the crescent moon, which presented a tempting target in the Western sky.

There was significant haze present due to high clouds causing a fairly bright halo around the moon. We started by attaching Bryan's camera to the 6" refractor and using Al's laptop with Digicamcontrol software to capture images. Using liveview (video feed), all three of us were able to comfortably view the images of the moon on the laptop's screen.

This enabled Bryan to achieve clear focus and capture a nice image of the moon.

Camera settings:

1) Moon image: Canon EOS Rebel T3, ISO 400, 1/30 sec exposure time, 6" F12 refractor and camera at prime focus (1829 mm focal length)

2) M42: Canon EOS Rebel T3, ISO 3200, 30 sec exposure time, 6" F12 refractor and camera at prime focus (1829 mm focal length)

3) Jupiter: composite image of two exposures using the Nikon D90, using 17 mm eyepiece projection and ISO 400. Planet image exposure was 1/30 sec, while 1.0 sec exposure time was used for the Galilean moons. The two images were combined in Power Point and saved in jpeg interchange format.

THE MOON

After photographing the Moon, we pointed the scope at M-42 and used Bryan's camera to capture a nice image of the Orion Nebula, before swinging over to Jupiter, which by this time had risen fairly high in the sky for better imaging. Jupiter was near opposition, and all four Galilean moons were easily visible. We played with using a Barlow lens and experimented with eyepiece projection with Bryan Raser's Canon camera and Al Sheidler's Nikon camera.

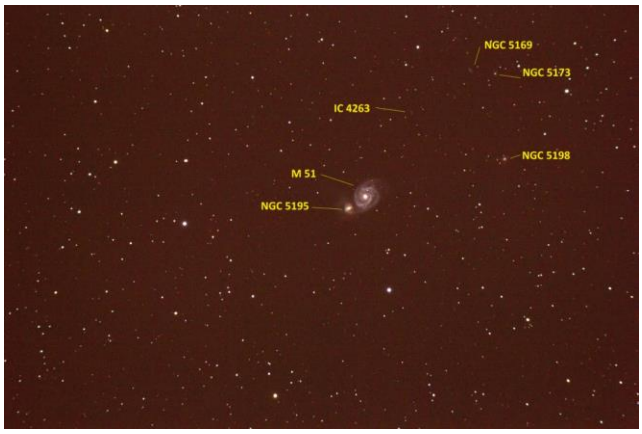
M-42 THE ORION NEBULA

JUPITER AND FOUR OF ITS MOONS

A SELECTION OF DEEP SKY PHOTOGRAPHS
Ken Boquist
February 27 and 28, 2016

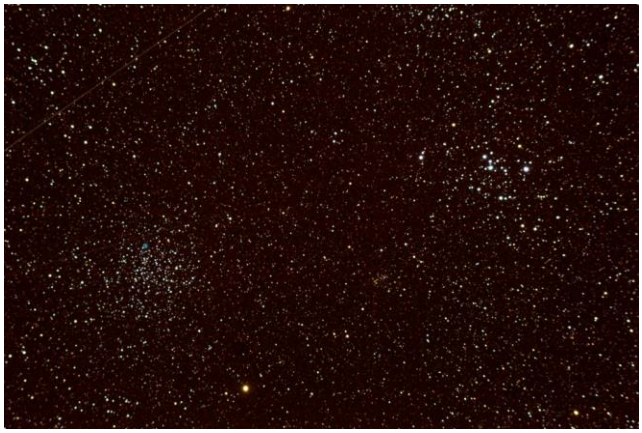
The following photographs of Deep Sky objects were taken on February 27 and 28, 2016.

While studying the photograph of M-51, I noticed that I was seeing a number of other galaxies in the field. I ended up identifying them using charting software. IC 4263 is the faintest at about 15.3 magnitude. Pretty good for an 80 mm under Illinois skies!



M-51 and Five NGC Objects

M-1 Crab Nebula



M-46 and M-47

M-76 Little Dumbbell Nebula

NGC 2024 Horse Head Nebula

M-78 and NGC 2071

M-81 and M-82

PAC OUTREACH ACTIVITIES

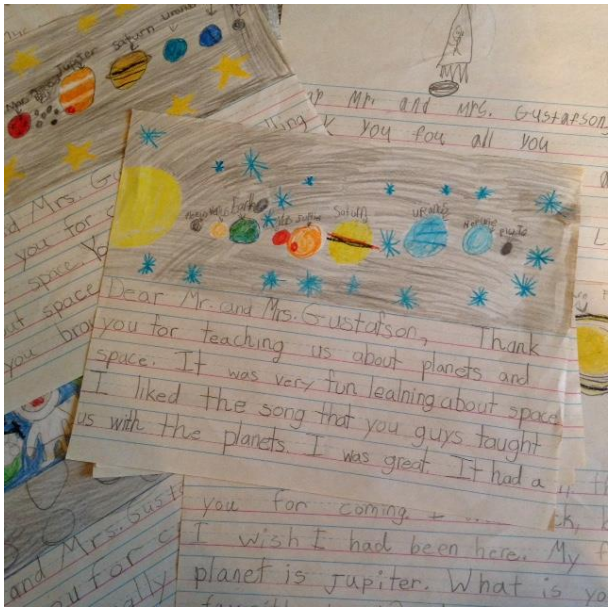
This newsletter section is devoted to reports about the various Public Outreach activities of the Popular Astronomy Club.

January 6, 2016
Kewanee Wethersfield Elementary School
Roy and Jan Gustafson

Our first PAC public outreach program: Jan and I went to the Kewanee Wethersfield Elementary School (2nd grade) this morning. We talked about the planets and space to 45 kids and teachers for one hour. Shown below is a picture Mrs. Tanya Vincent took on her IPhone.

Jan and Roy Gustafson at Wethersfield School

We thought this was cute. These are letters to Jan and I when we were at Kewanee Wethersfield on January 6th. We sometimes get these from the students.



January 27, 2016
PAC Outreach Message
Roy and Jan Gustafson

I wanted to share this with you as to how an outreach program can affect people for life. Following is a note Jan got from one of her former students and neighbor.

When Jan was teaching we always had her class out to our house to look through a telescope (a 17" Dobsonian I built) and also point out the constellations. The kids and adults were very excited to see the Moon, Jupiter, Saturn, Venus, Mars, M-42, etc. or whatever else could be seen. For years this was the only outreach available on astronomy and it was always the highlight of a Saturday night for the families. Sometimes we would have at least 100 people in our yard out front waiting for their chance at the telescope.

Of course, because it is Jan, she had cookies and drink for the kids! Hopefully you have read this far, and maybe I should have started with this sooner, but, this student remembers our outreach from 35 years ago and is now sharing her excitement with her son. They are re-living old and making new "memories"! It seems that when we attend some social event in Orion and the topic gets on astronomy we always hear about our outreach with the telescope from years past.

I wanted to pass this along to say that we must continue with our outreach because it has far reaching effects that continue to stir the viewer and their offspring for years to come

We must always have an outreach program just like Carl Gamble believed was the task of the Popular Astronomy Club.

The message to Jan,

Braxton has been learning about the planets at school, and I have been waiting for a clear morning that wasn't too cold to take him out as I had heard there were 5 planets visible before sunrise in SE. This was the morning, and he was so very excited! It made this mama so happy to see him light up like that. I remembered having that same feeling at your place looking through Roy's telescope.

Keenan said that we were "making memories" this morning, and I felt compelled to tell you of the wonderful memory that you all were a part of.

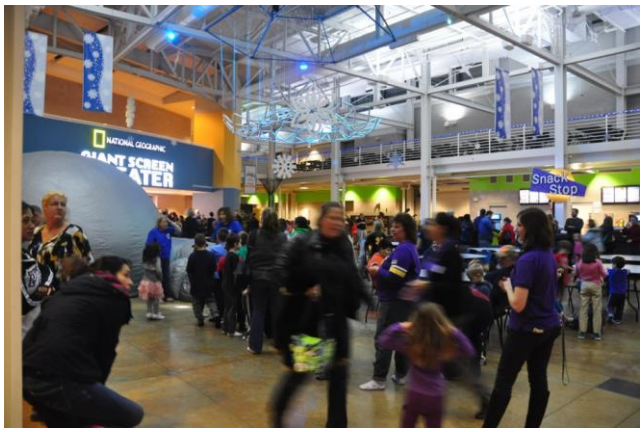
Thank you!!

Holly Montgomery

PUTNAM MUSEUM SPACE OUT PROGRAM
January 22, 2016
Al Sheidler

Following are a few pictures from the Putnam Museum's "Space Out" public outreach program held last night, January 22, 2016. This program was held in conjunction with another local astronomy club, the Quad Cities Astronomical Society. I think this was a very nice opportunity for both of our clubs.

It went very well and I would like to thank everyone that participated in the program last night. Well done!



Hundreds of Visitors at the Space-Out Program

Another View of Visitors at the Putnam Program

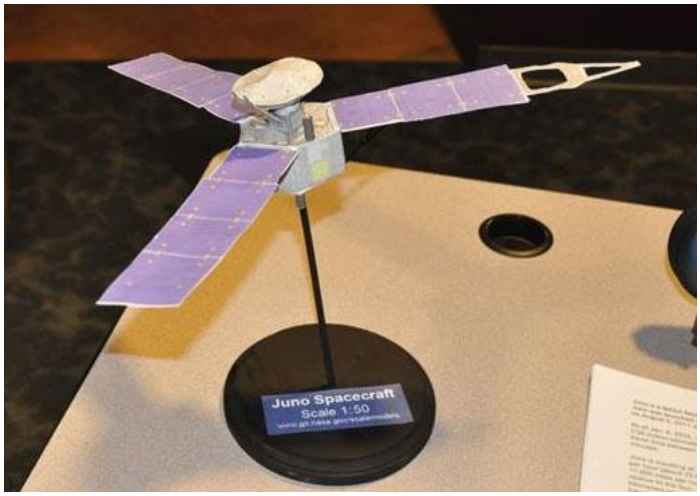
The Museum Visitors Checking the Craft Tables

Ann Bauer Helping Kids with Astronomy Projects

Rusty Case Helps Visitors "Observe" Distant Objects

Displays of the Quad Cities Astronomical Society

Tanya Duncan & Rusty Case with the Raffle Scope



Wayland's Model of the Juno Space Probe to Jupiter

Wayland Bauer at the PAC Display Table

Al Sheidler Fields Questions about Meteorite Impacts

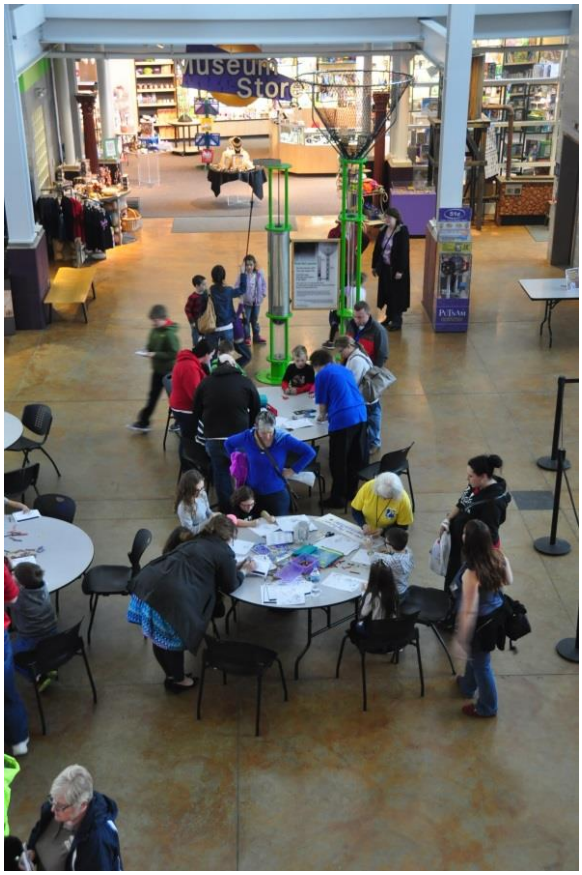
Gail Sederquist with Jan and Roy Gustafson

Jeff Struve of the QCAS Displays his Equipment

PUTNAM MUSEUM SPACE OUT PROGRAM
March 18, 2016
Al Sheidler

PAC and the Quad Cities Astronomical Society joined forces for the second time this year with the Putnam Museum to put on a "stellar" program of observing, learning about astronomy, and what our clubs have to offer.

Main Floor and Astronomy Displays at the Putnam



Sara Sheidler and Anne Bauer at Craft Tables

PACMO and Other Telescopes at the Putman Museum

Jeff Struve of PAC and the QCAS

Dana Taylor's Shuttle Craft with Photon Torpedoes

Mike Haney, Tanya Duncan and Katie Melbourne

Matt Neillsen - Quad Cities Astronomical Society

Broc Golden, Terry Dufek and Rusty Case

The PACMO 12" Meade Schmidt Cassegrain Telescope

Rusty Case helps a visitor look at the moon

Wayland Bauer and Cindy Pippert

LOCAL QC NEWSPAPER OUTREACH ACTIVITY

Members of Popular Astronomy Club are writing periodic monthly articles appearing in the Moline Dispatch/Rock Island Argus newspaper about astronomical events that can be viewed in the Quad-Cities area.

PAC Newsletter Editor Note: The following is the submitted version of our PAC member's monthly article to the Dispatch/Argus, but is not necessarily an exact reproduction of the possibly final edited article as printed in the newspaper.

Pluto sends its Love

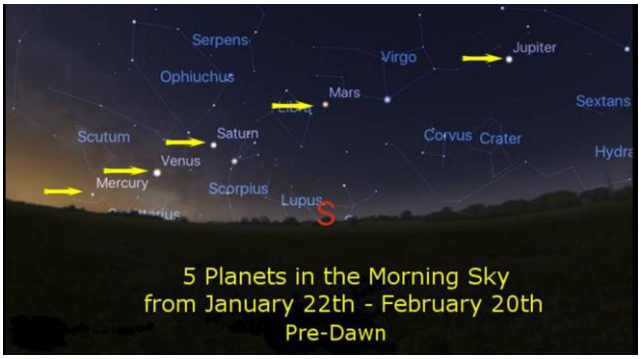
By Roy E. Gustafson
Popular Astronomy Club

Valentine's Day is soon approaching and we have one of our planets, well, Dwarf planets, sending its love to Earth. That planet is Pluto. The New Horizons spacecraft sped by Pluto July 2015 and took the following picture.

Even though Pluto was demoted to a Dwarf planet, it still sends its love to Earth by showing a heart on his surface. If to want to impress your significant other on Valentine's Day, show them this article and tell them your Love for them is special, and you can prove it by telling them your heart is out of this world for them! But don't forget the flowers and chocolate too! This heart can't be observed from Earth because we do not have a big enough telescope, but the picture will do.

Now let's see what is available in the night sky that we can see with the naked eye. Five planets will be in the predawn sky, and early in the month we can use the moon to find three of them. On February 1st the Moon will be right next to Mars. Mars will be the reddish object just below the Moon. On February 3rd the Moon will have moved toward the horizon and will be right above Saturn. Look to the left and down to see the ringed planet. On February 6th the Moon will form a triangle with Venus and Mercury. Venus will be the bright object to the right and Mercury will be the dot of light just below the Moon. To find Jupiter look almost due west and up about 25^0 and you will see the brightest object in that part of the sky.

If you really want to impress your friends tell them they can see 6 planets; just have them look down at their feet and see the Earth! Six planets by just getting up early in the morning! Here is a picture to help you find them. You can see this event from now until February 20th. The last time this happened was 11 years ago and the next time will be in August 2018.



If you don't want to get up early you can see my favorite constellation, Orion, the Hunter, in the evening. This one is easy to find by just looking toward the South where you will see 3 stars in a row. This is the belt of Orion. If we look up and to the left of the first star we see an orange star and this is Betelgeuse, a super red giant star in the armpit of Orion. This star is several times larger than our Sun. In fact, if we replaced our Sun with Betelgeuse we would orbit inside that star! Across from Betelgeuse is another star of Orion named Bellatrix. Below these two stars and the belt stars we find two more stars and these complete the torso of Orion. If you draw a line through the 3 stars of the belt and extend it toward the horizon you will come to the brightest star in the night sky, Sirius, in the constellation of Canis Major, a hunting dog of Orion. If you look above and to the left of Sirius you will another bright star, Procyon, in the constellation Canis Minor, the other hunting dog of Orion. If we draw lines between Betelgeuse, Sirius, and Procyon, we form a triangle. This is called the winter triangle. Now if we extend our line from Orion's belt the other way, we come to a "V" of stars and this is the face of the constellation Taurus, the Bull. To the right of the "V" is a grouping of stars called the Pleiades. This looks like a small dipper, but this is a star cluster of 6 stars seen with the naked eye and hundreds of stars seen through a telescope. Pleiades is an open star cluster over 400 light years away. The light we see tonight left this cluster when Galileo first started to use his telescope in 1609!

For a romantic evening (or morning) take your "sweetie" for a walk on Valentine's Day and see our amazing night sky!

Meteorite Kills Man In India? Maybe Not!

By Ellen Tsagaris
Popular Astronomy Club

Recently, international media was abuzz with a story about a man in India allegedly killed by a meteorite shooting its way to earth. Supposedly, history was made, since this unfortunate person would have been the first in modern history to have been killed by a meteorite.

The events occurred in Vellore, state of Tamil Nadu, India, on Saturday February 6, 2016. Something fell from the sky and crashed into the campus of an engineering college located in Vellore. A water tank exploded when the object fell, and a bus driver standing close to the point of impact, Mr. V. Kamaraj, was killed. Three others were injured. The chief minister of Tamil Nadu, Ms. Jayalalithaa Jayaram then proclaimed that the victim was killed by a falling meteorite, according to Delhi correspondent Soutik Biswas of the BBC News. *The New York Times* reports that there were no predictions of any meteorite showers in the area, and no meteor showers occurred.

Not so, said NASA. What fell was not a meteorite. Among other things, the rock recovered nearby was too small to kill someone, and crater left by whatever object fell was not the kind that meteorites leave. For one thing, there were no fragments surrounding it. Besides the folks at NASA, other scientists, including one investigating the site of the crash in India, have voiced skepticism. The rock discovered at the scene has not been analyzed yet, but it is small enough to fit in the palm of one's hand; Derek Sears, meteorite and asteroid expert at NASA's Space Science Division observed that a stone that killed someone should have been larger.

At this point, it looks like the falling object was space junk that entered the earth's atmosphere.

Meteorite falls are fairly common, but they usually land at sea or unpopulated areas. Movies and science fiction, however, are full of apocalyptic stories of meteorites, or their larger relatives, Asteroids, hitting the earth causing death and destruction. The myth of the meteorite fall is alive and well in popular culture, yet a meteorite did land in Russia in a major metropolitan area in Chelyabinsk region in 2013. Some 100 people were injured, and there was a lot of property damage, but no deaths. That meteorite weighted 10 metric tons and was several yards in diameter.

There are unconfirmed reports of perhaps five or six people killed in China over 1000 years ago, and another about someone killed in India 200 years ago. There is also a historical claim of someone in Ancient Egypt being killed by a meteorite. There are many other unsubstantiated international reports of animal deaths, and property damage, by meteorite falls.

In 1954, a rare confirmed report notes that a woman in Alabama was badly bruised by an actual meteorite that crashed through her roof into her bedroom. That meteorite weighed 9 pounds.

So what are meteorites? According to New England Meteoritical Services, they are pieces of "other bodies' in the solar system that fall to earth when "a meteor or 'shooting star' flashes through our atmosphere" at speeds of 32,000 to 150,000 miles per hour. Most are created when asteroids collide. A few fall from the moon, and the rest from other planets, comets, and a very rare few from Mars. For example, around 60,000 meteorites have been found on Earth; only 124 have been confirmed to be Martian. The oldest are chondrites, stone meteorites formed 4.56 billion years ago. The other very rare type of stone meteorite is called an achondrite. Because of their rarity and primitive origins, meteorites are sought after by collectors and scientists.

The night of March 19th would be a great opportunity to join the Popular Astronomy Club in the Niabi Zoo parking lot to observe the planet Jupiter and the moon. Jupiter will be as close to Earth as it will be for the rest of the year and will provide great views in the telescopes we will have at Niabi that evening.

You are invited to join our public star party. Sunset is at approximately 7:15 PM. See you there.

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Mars and Close Objects in our Sky

By Dino Milani
Popular Astronomy Club

Unusual things are happening in our sky. Mars is closer; Jupiter meets the moon. Mercury transits the sun, *and* is a large planet hiding in orbit? You can see them... with one exception.

Every 2.5 years Mars' orbit brings it close to Earth. This April and May it will be closer - and appear larger - than it has in the last ten years, close enough that you can see its landscape with a reasonably sized telescope. It will grow in size until May 30th then slowly grow smaller until August, when it disappears from our view. April 1st Mars will be 11.9" in size - 11.9 arc seconds* - a way to measure its size in the sky. May 1st it is 16.1" - larger in size. May 30th it will be 18.4" in size; the closest it will be to our Earth and the largest size this year - HUGE! To see Mars, look to the South East where it rises. The beginning of April it will not rise before 12:00 am (midnight). Late April and early May, it rises before 11:00 pm. Late May you can see it before 10:00 pm. In June you can see it at 9:00 pm. Also, seen East of Mars is the planet Saturn. Both are close enough that you can photograph them together - the red planet Mars (yes, its color *is* red) and the ringed planet Saturn.

Speaking of photographing pairs; at 9:00 pm on April 17th, Jupiter will be very close to our moon. It will be a waxing, 3/4-full, moon and an excellent chance for a photograph of the pair. Use a camera with long lens – 200 mm or longer or attached to a telescope - and if you wish to shoot it manually, use the “Lunar 11 Rule” for the f-number and exposure times. The “Lunar 11 Rule” uses f-11 for the moon, as the “Sunny 16 Rule” uses f-16 for the sun. You can combine several photographs - a long exposure for Jupiter and a short exposure for the moon - in Photoshop or other programs to see more detail.

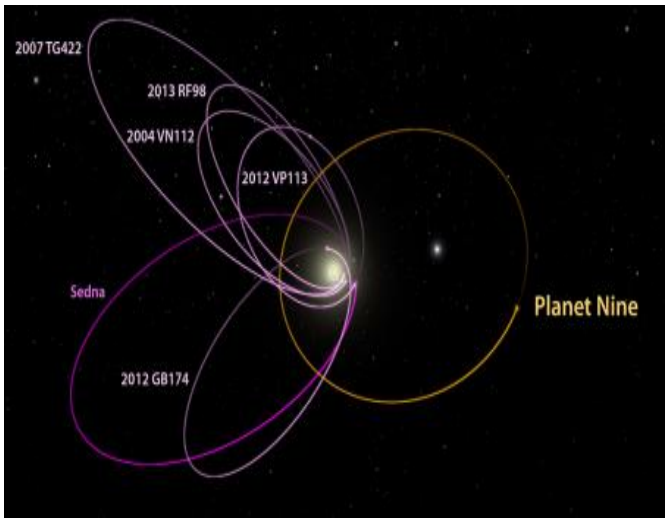
May 9th Mercury passes in front of our sun. Quad City residents can see the Mercury transit starting at 6:12 am CDT and ending at 1:42 pm CDT. *I need to say this...* DO NOT LOOK DIRECTLY AT THE SUN! Using sunglasses will *not* work and viewing the sun through them could damage your eyes! To see the transit you will need a shadow box (you see the sun's shadow on paper inside the box) or a solar telescope (that's a telescope with a sun filter on it that blocks 99.999% of the sunlight going through it). You can also use Solar Eclipse Viewing Glasses (typically $1.99 each, make sure they are CE Certified, transmission requirement EN 169/1992 which blocks 100% Ultra Violet light, 100% Infra Red light and 99.999% visible light). Mercury is close to our sun, so transits happen frequently. The transits happen 10 or 11 times each century, unlike the transit of Venus - our next closest neighbor - which won't happen again until the year 2117. During the transit, Mercury appears as a dot on the surface and you can see it traveling across the sun. As it nears the edge of the sun Mercury shows unusual visual images, such as the appearance of a bright "white ring" around it, if viewed with a shadow box. Our club is holding a public viewing of the transit at Niabi Zoo, from sunrise until 1:42 pm.

Now, here is the last unusual thing... and there will always be more! Is there a large planet hiding in orbit? It may be orbiting us through the Kuiper Belt. The belt is a sphere of objects around our sun, which is 30 to 50 AU in size ("Astronomical Unit" is a distance measurement, the distance from our Earth to the sun) and contains micro planets, asteroids and comets. The hidden planet is not small. It could be 10 times the size of our Earth, but we can't see it; it's too far out and too dim to be seen with our current telescopes. How do we know it's there? Mathematically! In February, two astronomers, Konstantin Batygin an Michael Brown from Caltech, found that 11 large bodies in the Kuiper Belt (11 small planets and large asteroids, including Sedna - 995 km in size but smaller than Pluto's moon Charon) had orbits that clustered together; their orbits all went into the same area (clustered orbits), without hitting each other, but were less the 30º apart. This couldn't have happened by chance; the probability is only 0.007% for it to have "accidentally" happened and the clustering couldn't happen unless there was a large planet forcing the orbits of the 11 large bodies together. The hidden planet may have an orbit that's 300 AU by 700 AU in size and it passes through the orbits of the 11 other bodies. An orbit this large could take 10,000 to 20,000 years to complete and it could be many years before the hidden planet is close enough for us to see it. You can find more information on-line: Search for "9th planet Kuiper Belt" to see the Caltech article.

The author, Dino Milani, is a member of the Popular Astronomy Club. The club meets on the 2nd Monday of each month at 7:00 pm in the John Deere Planetarium, Augustana College, Rock Island, Illinois. The club also has night-time public observing sessions every 3rd Saturday of the month, March through November, at Niabi Zoo, Coal Valley, Illinois. It also hosts the April 23rd Astronomy Day presentation, starting at 1:00 pm in the Moline Public Library, 3210 41st Street, Moline, Illinois.

* [To see the size of an object in the sky we use its "degree of view". Imagine drawing a circle around the sky and marking it equally 360 times - the 360º "degrees of view". For smaller sizes one degree (1º) can be divided into 60' arc minutes and one (1') arc minute into 60" arc seconds: 1º = 60' = 3200". For example; the full moon is 1/2 a degree in size or 30' arc minutes or 1800" arc seconds: 1/2º = 30' or 1/2º = 1800".]

(The image and text below are included if re-publishing rights are available for the Dispatch.)



Credit: Caltech/R. Hurt (IPAC); [Diagram created using WorldWide Telescope.]

https://www.caltech.edu/news/caltech-researchers-find-evidence-real-ninth-planet-49523

01/20/2016
Caltech Researchers Find Evidence of a Real Ninth Planet

"The six most distant known objects in the solar system with orbits exclusively beyond Neptune (magenta) all mysteriously line up in a single direction. Also, when viewed in three dimensions, they tilt nearly identically away from the plane of the solar system. Batygin and Brown show that a planet with 10 times the mass of the earth in a distant eccentric orbit anti-aligned with the other six objects (orange) is required to maintain this configuration."

PAC TELESCOPES/BINOCULAR FOR RENT

The Popular Astronomy Club has two telescopes and one pair of binoculars for rent to members. The equipment in our rental inventory is:

Meade 90 mm ETX Astro Telescope

This telescope comes with a homemade mount and tripod, and a solar filter. It has a 26 mm eyepiece and a 2x Barlow.

The focal length of the telescope itself is 1250 mm, so the effective magnification is 48x with the eyepiece, and 96x with the addition of the Barlow.

8" Orion Dobsonian.

This telescope has three eyepieces: a 25 mm Ploessl, a 12 mm RKE, and a 9 mm Ploessl.

A moon filter is also provided with this scope.

Zhumell 20 X 80 Binoculars

These binoculars come with an integrated tripod mount for a standard photographic tripod.

The rental rate is $5.00 per month. Contact Al Sheidler at (309)-797-3120 or email at adsheidler@gmail.com

PAC MEMBERS OBSERVING FORUM

This feature column is devoted to the contributed articles from our members regarding recent observations, thoughts, and other comments about astronomical phenomena and events.

January 2, 2016
Imaging near Dixon Iowa
Ken Boquist

I was out doing some imaging last night near Dixon, IA. The following images might be appropriate for people to see what they are going to have to wait for until next fall! Here's some information on each:

HINDS CRIMSON STAR

Hind's Crimson Star: 120 second exposure at ISO 1600 using a 9.25" f/10 Schmidt-Cassegrain. This is a classic carbon star, and it is also known as R Leporis (R Lep). It is the bright orange star located just right of center in the image. R Lep has a wide magnitude range of 5.5 to 11.7 per the American Association of Variable Star Observers (AAVSO).

According to recent observations on the AAVSO web page, this image shows R Lep at around magnitude 8.4. R Lep is located about 6 degrees below and slightly west of Rigel, the bright star marking the lower right foot of Orion. R Lep becomes more redder as its magnitude dims, and with a period of slightly more than a year, it will be a few more years before it is much dimmer, and thus, even redder than it currently appears.

M-42 and M-43: 180 second exposure at ISO 1600 using a 9.25" f/10 Schmidt-Cassegrain. M-43 is the comma-shaped patch of light near the top, while M-42 is below it. In order to show the fainter outer regions of M-42, the Trapezium region (the very bright inner region near the center of the picture) unfortunately ends up being greatly overexposed, so the detail therein is lost. M -42 is far and away my favorite deep sky object, and I've always seen M-42 as a majestic eagle soaring in the southern skies.

M-42, M-43, AND CARBON STAR 3UC170-022389

A close inspection of the image reveals yet another carbon star, which is arrowed. My computer atlas indicates this star is 3UC170-022389, and lists it as being magnitude 12.41. At this magnitude, it is too faint to easily see, and I don't ever recall seeing it, which isn't too surprising given the presence of M 42!

January 14, 2016
The January 1, 2016 Sun from Ken Boquist
Al Sheidler

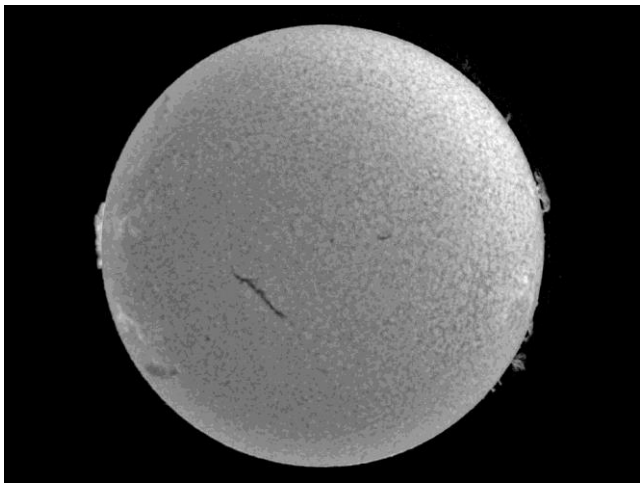
I took one of Ken Boquist's recent January 1, 2016 pictures of the sun and played around with some image enhancement.

Ken had two images taken at two different exposure times: one with a short shutter speed to provide a good image of surface detail and another with longer exposure time to tease out the prominences. Essentially what I did was start with his short-exposure time image and made two copies. I dropped these into Photoshop Elements software. One image I enhanced the contrast which helped to show the granularity and surface structure. With the other image, I enhanced the brightness to highlight the prominences. Essentially I had two exact copies of the same snapshot but each one tweaked to show the structure I wanted to bring out.

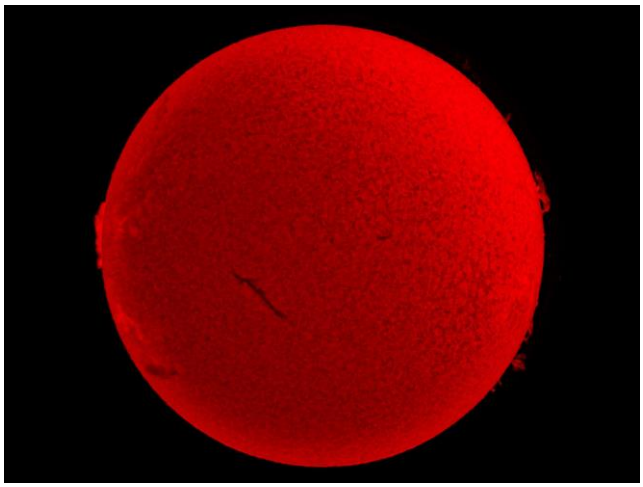
I then imported these two images into Microsoft PowerPoint. For the image optimized to show surface detail, I cut away everything except for the sun's disk using the cropping tool which allows cropping to a circle. I then copied this "round" image of the sun optimize for surface detail and superimposed it onto the other image optimized to show the prominences.

Once these were aligned, I had a nice composite image showing both sets of features. The black and white image shows details a little better, but I also created a red colorized version which mimics what one would see looking at the sun through Ken's H-alpha scope.

This really displays Ken's photographic skills and high quality optics.



Black and White Image of the Sun



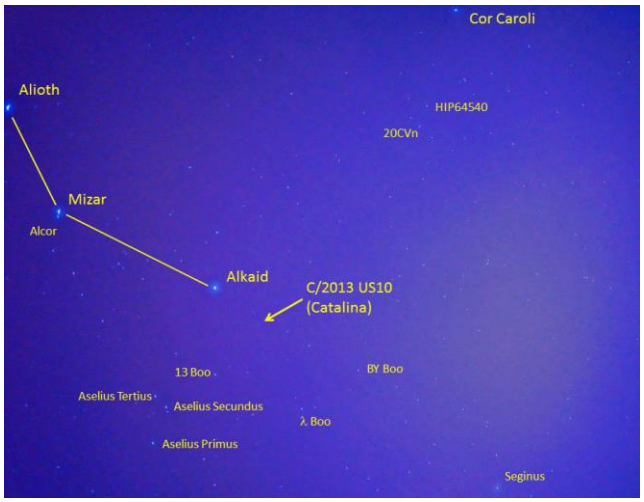
Red Colorized Image of the Sun

January 14, 2016
Comet C/2013 US (Catalina)
Al Sheidler

I got up this morning and was able to photograph Comet Catalina. At least there is a smudge of a little greenish fuzz ball exactly where the comet is supposed to be located (near the first star in the handle of the Big Dipper). It was very hazy this morning. Jupiter and the brighter stars were naked eye visible, but that was about all that could be seen by eye. I set up my camera on a tripod and pointed it where I thought Catalina should show up and snapped this picture.

Camera settings: 10 second time exposure, ISO 1600, 35 mm focal length and F1.8. A Nikon D90 SLR camera was used.

I also used Photoshop Elements software to enhance the picture after downloading.



Comet Catalina on January 14, 2016

January 15, 2016
Comet C/2013 US (Catalina)
Al Sheidler

I made another observation of Comet Catalina this morning. The conditions were slightly better this morning than they were yesterday, but there were still quite a few clouds and haze to obscure viewing. Nevertheless, I did manage to get a couple of decent images. All photos were taken with a Nikon D90 camera. Those taken with the 35 mm lens were done with the camera attached to a standard tripod.

There was lots of haze in the sky and I had to dodge the clouds to get these images. I drank several cups of coffee while waiting for opportunities.

Comet Catalina on January 15, 2016

Close Up of Comet Catalina on January 15, 2016

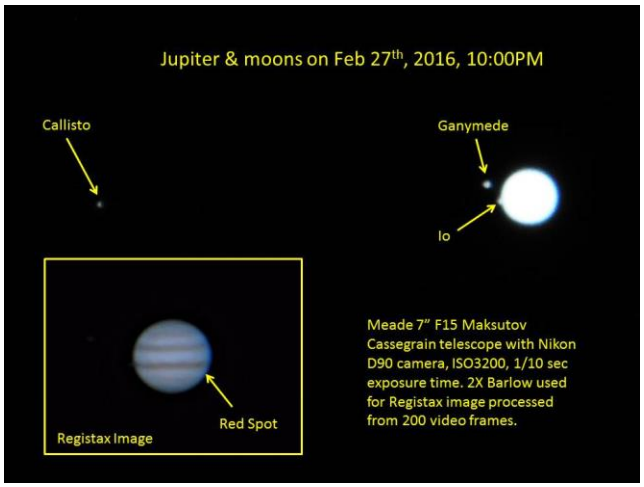
The Sun Today
January 21, 2016
Al Sheidler

Since the sun was shining nicely here in the Quad Cities this afternoon I decided to try and photograph the sun. Attached is my image shot using the Meade ETX90, white light filter, ISO 1600, and 1000 second shutter speed using a Nikon D90 SLR. There are a few small sunspots, but nothing too dramatic.

Jupiter Tonight
February 27, 2016
Al Sheidler

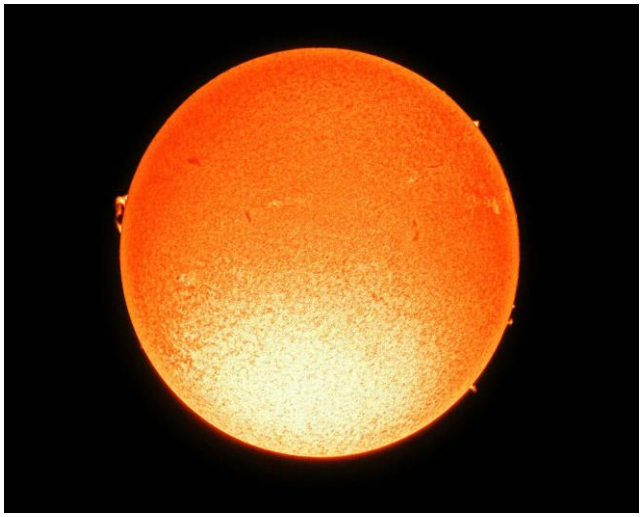
Since it was clear and fairly warm last night, I decided to take a crack at imaging the planet Jupiter. I did this from my back yard and using my camera connected to the club's 7" Maksutov. I controlled my camera using my laptop with the Digicamcontrol software which enables one to view live video from the camera which is great for ease of focusing. This software provides full control of camera settings and image capturing. The only big issue I had last night was high wind gusts which caused significant image vibration and contributed to overall poor atmospheric conditions. But it was clear and unseasonably warm, so I took the opportunity.

Io, Ganymede and Callisto were visible as well as the Great Red Spot. Io was just on the edge of Jupiter when I captured these images.



The Sun Today
March 2, 2016
Roy Gustafson

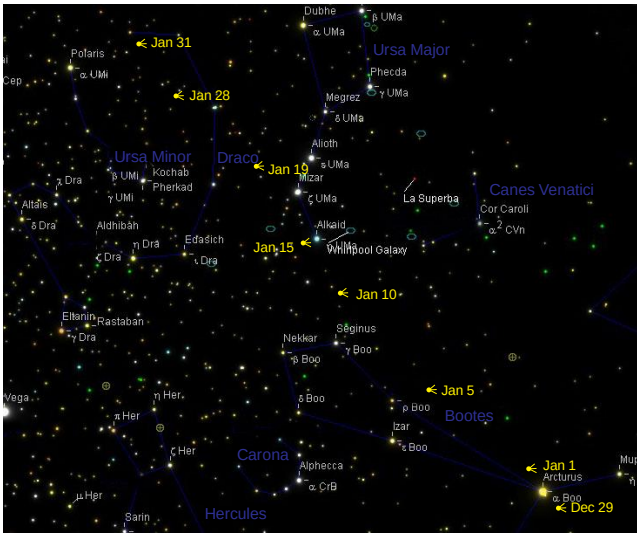
The following picture was taken today with my Hydrogen-alpha camera.



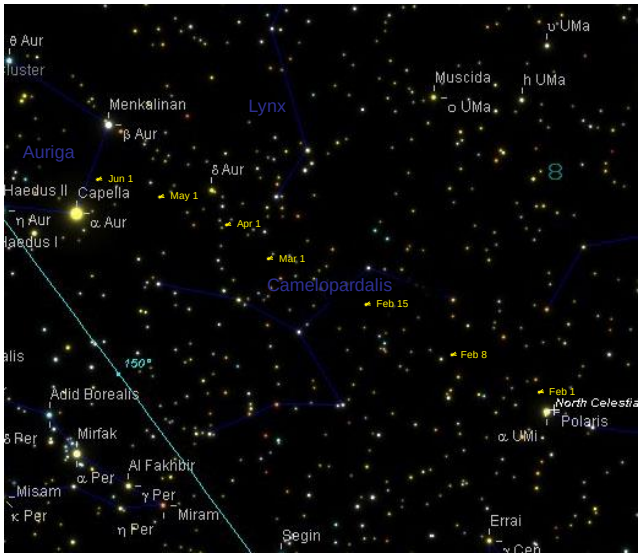
Tracking Comet C/2013 US (Catalina)
January 1 through June 1, 1016
Lee M. Farrar

The very strong El Nino weather pattern is currently affecting our weather across the United States with cold, rain, heavy snow, and/or clouds. This is making visual observations for the next several days or weeks difficult or fairly impossible to observe Comet C/2013 US (Catalina) as it leaves our solar system forever.

Not bothered by the current El Nino weather pattern, I thought it might be an interesting project to electronically document for the record the positions of this comet from January 1 through June 1, 2016.



Comet Catalina January 1 thru January 31, 2016



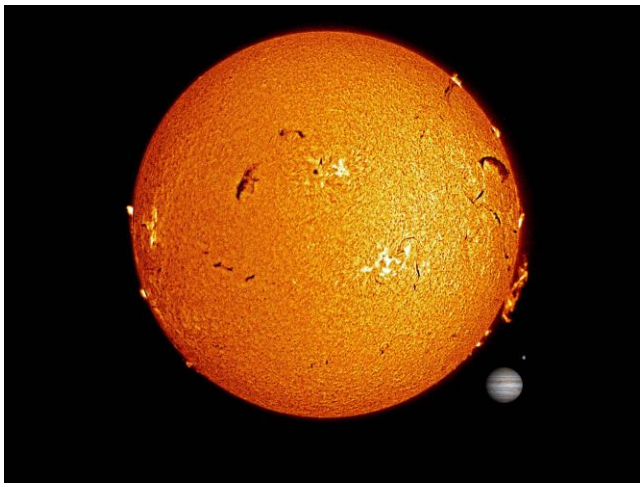
Comet Catalina February 1 thru June 1, 2016

The Sun Today
February 1, 2016
Al Sheidler

On February 1st, Ken Boquist took pictures of the Sun using his Hydrogen-Alpha telescope. Ken sent me the raw photos (one optimized to show the surface details and a longer exposure one to bring out the solar prominences. I took these and combined them and tweaked them with Photoshop Elements to get this picture.

In addition, I inserted an image of Jupiter and the Earth on the lower right of the sun, near the large solar storm. Not only is this really a neat image, it also clearly demonstrates how large the sun is (and how small our diminutive planet Earth is in comparison).

Thanks Ken for the nice images and allowing me to share the result.



The Classical Five
January 30, 2016
Al Sheidler

I took pictures this morning of the five naked eye planets, together with the moon. I stitched them together to make a panorama which approximates the view at the running track at Blackhawk College looking south.

These photos were taken at about 6:15 this morning with a Nikon D90 SLR camera and 35 mm lens, ISO 800 and shutter speeds of 1-3 seconds. This alignment of Mercury, Venus, Saturn, Mars, and Jupiter will continue to be visible for the next week, after which Mercury will pass from view as it swings around behind the sun in February.

FIRST QUARTER 2016 BUSINESS MEETING

President Al Sheidler called the First Quarter PAC business meeting to order in the John Deere Planetarium at 7:00 p.m. local time, on Monday, March 14, 2016. The Fourth quarter business meeting notes were read and approved.

Treasurer's Report

Treasurer Bryan Raser reported on the financial status of the club. He has everything switched over from the preceding Treasurer. He also has the insurance certificate for PACMO. He has information for the Birdies for Charities fund raising available.

If you want further details about the club's financial status, please contact Treasurer Brian Raser.

Vice Presidents Report

Vice President Adam Beals reported that equipment for sale includes the Bushnell Telescope and a tripod. We also have several telescopes for rent. Adam has Facebook up and running and already has several hundred people clicking on our page. He is also planning to update our website.

Observatory Director Report

Rusty Case reported that some minor maintenance issues need to be attended too on the Paul Castle Memorial Observatory.

PACMO needs more work. We did get new wheels, but the paint is peeling on the trailer and is fading and peeling. To repaint, it will cost between $2,500.00 to $4,000.00, which does not include replacing the graphics. Vinyl wrapping is less costly. Edwards Creative in Milan can do a half wrap for $1,000.00. This includes ¾ of each and some vinyl on the back doors. If we want a full wrap on the sides and some on the back, that cost will be $1,400.00.

We received a $1,000.00 grant from Riverbend, however we spent $250.00 on the new wheels. Rusty is going to sell the old wheels. PAC member voted to purchase the full wrap from donations provided by members to cover the additional expense.

The first 15 members to donate $50.00 or more will receive a night sky pin. As we are a non-profit organization, upon request you will receive a Donation receipt that can be applied towards your tax return next year. This vinyl wrap should last several years. Rusty will design a cover that will protect it from the elements while in storage and should extend the life of the vinyl even further. We will need to remove the old decals before the vinyl can be installed.

Other Business

Programs for PAC meetings are all set up as well as Outreach programs thru July.

We have an Outreach event on March 18th at the Putnam Museum from 5 pm – 8:30 pm. PACMO, Starlab, children crafts, Astronomy information table, telescope raffle and programs for the public will be set up. The Quad City Astronomy Club will be there as well.

Roy and Jan Gustafson will be doing an outreach session on April 13th at the Orion Public Library. They need members to bring empty toilet paper rolls to the April meetings. They will be used for a children's activity.

Joel Carter created a poster with our Logo and the sun. He will get quotes from Vista Print and Camera Corner in Davenport, for various size options, quantity options and pricing on each.

Tonight's Program

Tonight's program was a smorgasbord of short astronomy related reports.

The Constellation report was given by Liz Robinson about the constellation Cancer.

Meeting adjourned

Respectfully submitted, Cindy Pippert, Secretary

Popular Astronomy Club
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