



EPHEMERIS

The official newsletter of the Prescott Astronomy Club (PAC)
e-phem-er-is: a time-based listing of future positions of solar system objects

JULY 2016

UPCOMING EVENTS

Wednesday, July 6 - Regular PAC meeting @ 6:30 PM in Rm 107, Bldg 74, Embry-Riddle Aeronautical University. Club member Marilyn Unruh will present on 'Star Hopping', describing how to navigate through the sky and find objects without a GOTO telescope/mount. In addition, if time allows, there will be an open discussion about happenings and experiences at the recent Grand Canyon Star Party.



Wednesday, July 13 - METASIG @ 5:00 PM at a local restaurant. Sign up at meeting on July 6.

Wednesday, July 20 - Board Meeting @ 6:30 PM.

Tuesday, July 26 - Friendly Pines @ 8:15 PM star party for children with heart disease. Sign up at meeting on July 6.

OBSERVING MINI-MARATHONS

The first mini-marathon, focusing on double stars and scheduled for July, has been postponed until September when weather will be cooler and the event can start earlier in the evening. The event would be held at Jeff Stillman's home in Chino Valley, pending organizing and agreement of interested individuals. Details will be described and discussed at the July 6 general club meeting.



ASTRONOMICAL LEAGUE OBSERVING AWARDS

PAC member Rob Esson has become the 281st to be awarded for completing the Astronomical League's Globular Cluster Observing Program.



HUBBLE'S BUBBLE LIGHTS UP THE INTERSTELLAR RUBBLE

By Ethan Siegel

When isolated stars like our Sun reach the end of their lives, they're expected to blow off their outer layers in a roughly spherical configuration: a planetary nebula. But the most spectacular bubbles don't come from gas-and-plasma getting expelled into otherwise empty space, but from young, hot stars whose radiation pushes against the gaseous nebulae in which they were born. While most of our Sun's energy is found in the visible part of the spectrum, more massive stars burn at hotter temperatures, producing more ionizing, ultraviolet light, and also at higher luminosities. A star some 40-45 times the mass of the Sun, for example, might emit energy at a rate hundreds of thousands of times as great as our own star.



The Bubble Nebula, discovered in 1787 by William Herschel, is perhaps the classic example of this phenomenon. At a distance of 7,100 light years away in the constellation of Cassiopeia, a molecular gas cloud is actively forming stars, including the massive O-class star BD+60 2522, which itself is a magnitude +8.7 star despite its great distance and its presence in a dusty region of space. Shining with a temperature of 37,500 K and a luminosity nearly 400,000 times that of our Sun, it ionizes and evaporates off all the molecular material within a sphere 7 light years in diameter. The bubble structure itself, when viewed from a dark sky location, can be seen through an amateur telescope with an aperture as small as 8" (20 cm).

As viewed by Hubble, the thickness of the bubble wall is both apparent and spectacular. A star as massive as the one creating this bubble emits stellar winds at approximately 1700 km/s, or 0.6% the speed of light. As those winds slam into the material in the interstellar medium, they push it outwards. The bubble itself appears off-center from the star due to the asymmetry of the surrounding interstellar medium with a greater density of cold gas on the "short" side than on the longer one. The blue color is due to the emission from partially ionized oxygen atoms, while the cooler yellow color highlights the dual presence of hydrogen (red) and nitrogen (green).

The star itself at the core of the nebula is currently fusing helium at its center. It is expected to live only another 10 million years or so before dying in a spectacular Type II supernova explosion.



Image credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA), of the Bubble Nebula as imaged 229 years after its discovery by William Herschel.

PAC MEMBER SPOTLIGHT

PAC member John Carter is in this month’s PAC Member Spotlight with a description of how he built his Sunrise Observatory, a roll-off observatory to house his Meade 12” SCT and Losmandy G11 German equatorial mount. The observatory is based on an 8’x10’ Arrow Highpoint aluminum shed with significant modifications to handle the potential wind and weather of Prescott Valley.



Step 1: Install an 8' x 8' concrete pad with a 10" diameter steel pipe in the center. The pier was

sunk 36" into the ground and stands 36" above the ground.

Step 2: Lay additional foundation for the shed. Extend the 8' x 8' concrete pad to 8' x 10' with concrete blocks.

Step 3: Install wooden frame on the pad. This wooden frame is what the shed's aluminum frame will be installed on.

Step 4: Install the shed aluminum frame on the wooden frame.

Step 5: Assemble the shed walls. Cover all screws with clear silicon caulking compound to prevent water leaks.

Step 6: Install the sliding doors. This includes adding a small extension on one of the doors to prevent rain from entering at the point where the doors come together.

Step 7: Install a wooden frame inside metal shed. This frame stiffens the shed and provides the foundation for supporting the roll-off roof.

Step 8: Install the aluminum L-shaped angle brackets on top of the roof assembly on the long side. The roof rolls inside these rails.

Step 9: Assemble the roof frame.

Step 10: Assemble the shed roof on the roof frame.

Step 11: All of the holes in the roof are covered with clear silicon caulking compound and all joints between pieces are sealed with the same silicon compound to prevent water leakage.

Step 12: Install insulation material in the upper inside of the roof. Paint that insulation with flat black paint to prevent light reflections.

Step 13: Paint the shed roof with the same metallic silver paint used to paint the tops of mobile homes.

Step 14: Install the roller wheels in the shed roof frame.

Step 15: Place the roof in the shed rails. This is best done with four people.

Step 16: Install the skirts on the four walls of the shed. These skirts are attached to the roof frame to prevent rain from entering the shed.

Step 17: Install insulation material on the inside walls of the shed and paint with flat black paint.



Step 18: Cover the floor of the shed with interlocking rubber mat sections.

Step 19: Install a hasp lock on the door. Do not rely on attaching a lock to the holes in the door handles.

Step 20: Install hold-down latches to secure the roof to the shed. And don't forget to always latch the roof when it is not open.



Anyone wishing to obtain greater detail on the specifics about building this observatory can contact John at 928-458-0570.

IF IT'S CLEAR

By Fulton Wright, Jr., PAC

Celestial events (from Sky & Telescope magazine, Astronomy magazine and anywhere else I can find information) customized for Prescott, Arizona. Remember, the Moon is 1/2 degree or 30 arcminutes in diameter. All times are Mountain Standard Time.



This month is a good time to look for Pluto. The Moon is out of the way for the first week of the month. Pluto is at opposition on July 7. You can see finder charts in July's magazines, p. 64 in Astronomy, p. 48 in Sky & Telescope. Pluto is very slowly getting dimmer each opposition, so catch it while you can.

On Sunday, July 3, it is new Moon and you have all night to hunt for faint fuzzies.

On Thursday, July 7, from dusk (about 8:30 PM) till 10:36 PM, Io's shadow will be on Jupiter. Jupiter sets at 11:00 PM. This may be the last chance to observe a shadow transit on Jupiter for a few months.

On Monday, July 11, the Moon is at first quarter phase and sets at 12:21 AM (Tuesday).

On Friday, July 15, between dark and 2:30 AM (Saturday), the Moon passes within 3 degrees of Saturn.

On Saturday, July 16, Venus (magnitude -4) and Mercury (magnitude -1) are within 1/2 a degree of each other but are very low in the west north-west. The sun sets at 7:47 PM. Venus sets at 8:25 PM, Mercury at 8:28 PM.

On Tuesday, July 19, at 7:29 PM (12 minutes before sunset), the full Moon rises spoiling any chance of seeing faint fuzzies for the night.

On Tuesday, July 26, the Moon is at last quarter phase and rises at 12:12 AM (Wednesday).

FOR SALE

Please visit the Classified Ads section of the club website to view the items posted there for sale:

<http://prescottastronomyclub.org/classified-ads/>

New items are added now and then, so don't miss out on something that you would like to get for yourself...or a friend.



PAC MENTORS

If you need advice on the purchase of astronomy equipment, setting up equipment, astrophotography, etc., contact a PAC mentor.

John R. Carter Sr. - General - 928-458-0570

Jeff Stillman - Astrophotography - 928-379-7088

David Viscio - General - 928-775-2918

Greg Lutes - Visual Observing - 928-445-4430



OBSERVING LISTS

Observing lists are available on the PAC website to provide guidance and goals for visual and astrophotography programs. Current lists are:

Astroleague Lunar 100

Bright Nebulae

Dunlop 100

Globular Clusters

Herschel II

Messier

Planet Maps

Royal Astronomical Society of Canada Finest NGC

Saguaro Astronomy Club Best NGC

Telescope Showpieces

Binocular Showpieces

Caldwell

Face-On Spiral Galaxies

Herschel 400

Hidden Treasures

Open Clusters

Planetary Nebulae

S&T Lunar 100

The Secret Deep



The lists are in PDF format and can be downloaded and printed for use.

PAC WEBSITE & YAHOO GROUPS

Website: <http://www.prescottastronomyclub.org>

E-mail: <mailto:pacinfo@prescottastronomyclub.org>



Astrophotography special interest group:

<https://groups.yahoo.com/neo/groups/pacastrophotography/info>

BOARD OF DIRECTORS

President: David Viscio

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Magazine Subscriptions: Stephen Eubanks

METASIG: Marilyn Unruh

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Third Thursday Coordinator: Corinne Shaw & Pat Birck

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Refreshments: Janie Thompson

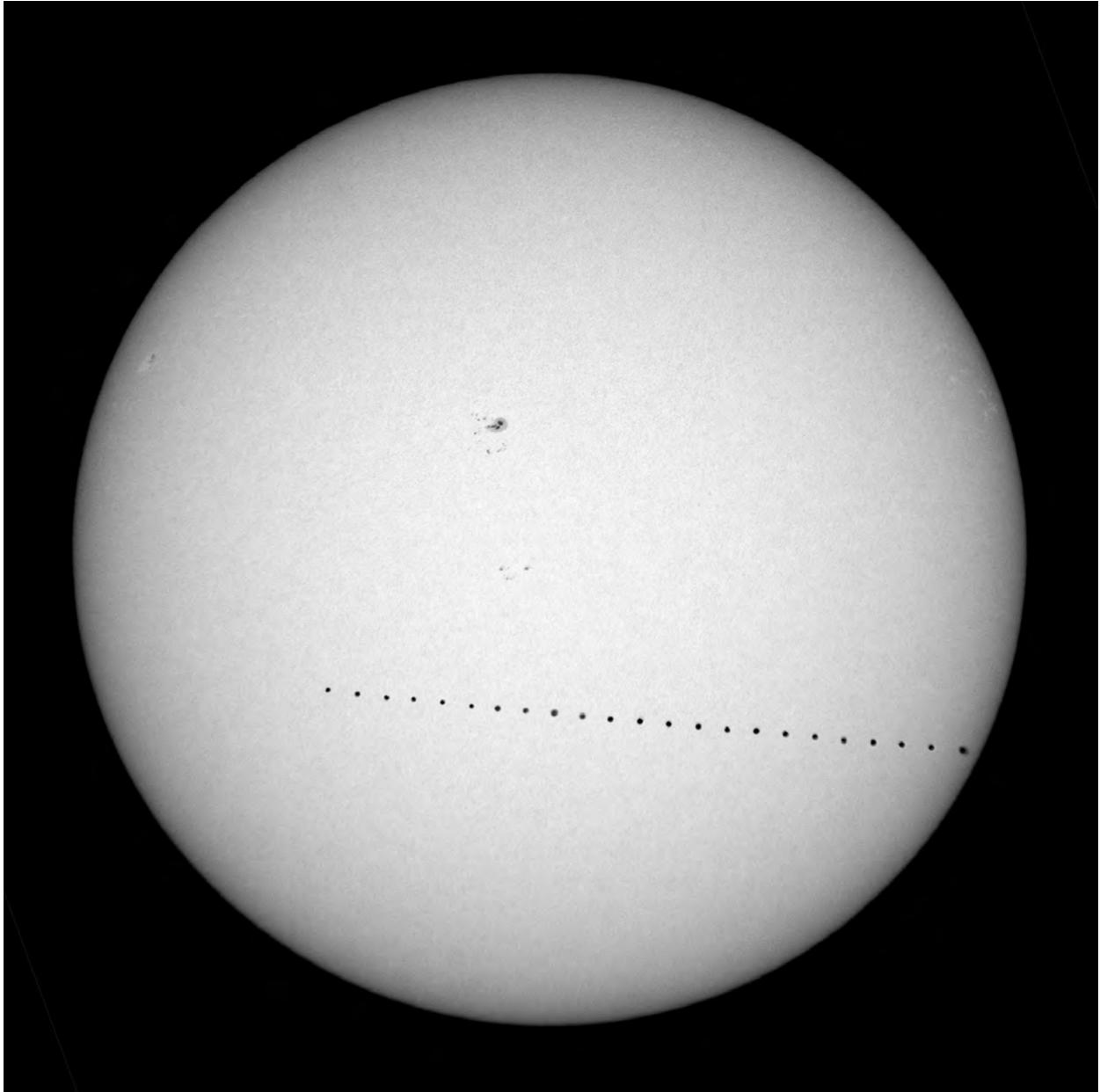
Publicity Coordinator: John Carter

Starry Nights Coordinator: Open



MERCURY TRANSIT IN WHITE LIGHT MAY 9, 2016

David Viscio



Composite image of 23 images showing Mercury's transit across the face of the Sun every 15 minutes.

Takahashi Sky 90 plus TeleVue 2.5x Powermate (90mm dia, 1250mm FL, f/13.9)

Kendrick Solar Filter

Canon EOS 60Da dSLR, 1/1000 sec at ISO 400