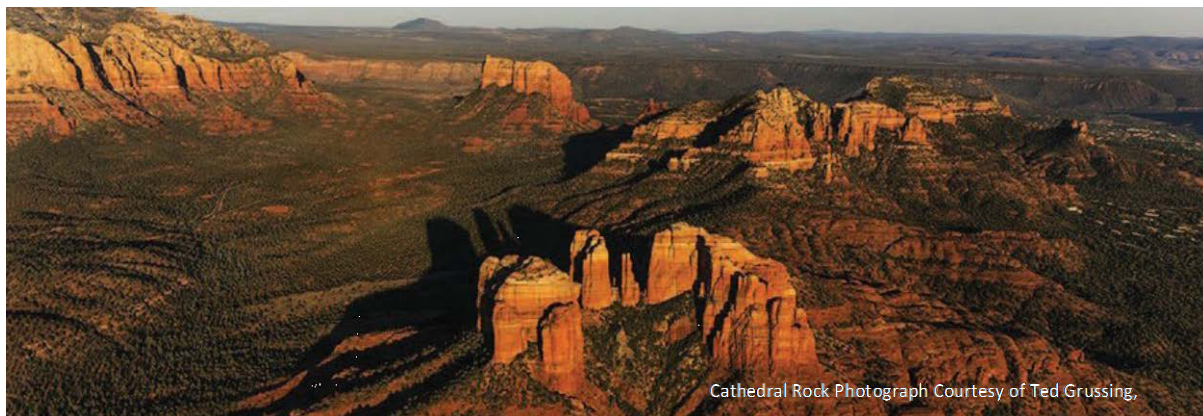




SEDONA, ARIZONA

KEEP SEDONA BEAUTIFUL
DARK-SKY COMMITTEE
2016 ANNUAL REPORT

TO THE INTERNATIONAL
DARK-SKY ASSOCIATION



The Keep Sedona Beautiful (KSB) Dark-Sky Committee is pleased to report progress in 2016 toward its goal of bringing more community awareness of light pollution and preserving our magnificent natural resource—our dark night sky. This was accomplished through the Committee's dark-sky outreach program, which included educational events and assisting other communities in pursuing the International Dark-Sky Community designation.

EDUCATIONAL EVENTS

April 9, 2016: Star Party at Red Rock State Park



The KSB Dark-Sky Committee partnered with Astronomers of Verde Valley and Rangers of Red Rock State Park in Sedona to enjoy the night skies at Red Rock State Park. J.D. Maddy, President of Astronomers of Verde Valley, gave an introductory presentation on current sky events and what's "up" in the spring skies, which was followed by night viewing through telescopes. Dark-Sky brochures were available as well as other dark-sky information. There was a "Star Jar" craft project for the children. Space cookies, moon juice, and other complimentary beverages were provided.

April 17, 2016: National Astronomy Day Star Party

The Sirius Lookers Astro Club, Sedona Public Library, and KSB Dark-Sky Committee sponsored the event. Astronomy Day was started over 40 years ago by Doug Berger of California to promote public awareness of science and the dark sky. The star party was at the Safeway Plaza in West

Sedona and started with solar viewing of our closest star, the Sun. The night sky viewing highlighted the Crescent Moon, the Seven Sisters Star Cluster, the planet Jupiter, and more. Large telescopes and binoculars were available for viewing the heavens. Dark-sky brochures and other dark-sky information were available.



April 23, 2016: Earth Day, Keep the Earth and Sedona Beautiful

The KSB Dark-Sky Committee joined Sedona Recycles to celebrate Earth Day. Other vendors included Gardens for Humanity, Verde River Basin Partnership, Arizona State Parks, and others. The event was celebrated at Sedona Recycles in Sedona.



May 11, 2016: Keep Sedona Beautiful Speaker Series

J.D. Maddy, President of Astronomers of Verde Valley, spoke at KSB's popular Speaker Series on "Under the Dark Skies of Sedona".



June 8, 2016: Night Photography Workshop by Jim Peterson

Jim Peterson of American Commercial and Fine Art Photography gave a hands-on workshop at Keep Sedona Beautiful. The workshop included essential information such as what camera to use, how to set the camera for night sky images, how to focus in the dark, and how to process night sky images.

August 6, 2016: Sedona National Night Out

Sedona National Night Out was hosted by the Sedona Police Department and its Police Volunteer program at the Posse Grounds in Sedona. The KSB Dark-Sky Committee participated in this event with an exhibit table of dark-sky literature, which was available for attendees. The Committee spoke with residents, children, and visitors about using fully shielded light fixtures, reducing light pollution, and preserving the dark sky.



SUPPORT OF INTERNATIONAL DARK-SKY COMMUNITY DESIGNATIONS

During the summer of 2014, the KSB Dark-Sky Committee started working with the Big Park Regional Coordinating Council about pursuing the International Dark-Sky Community designation for Big Park/Village of Oak Creek, a community adjacent to Sedona. In February 2016 Big Park/ Village of Oak Creek was designated the fourteenth International Dark-Sky Community in the world!

The KSB Dark-Sky Committee is now helping Camp Verde AZ to pursue the International Dark-Sky Community designation.

In June 2016 the KSB Dark-Sky Committee made a presentation for the Cottonwood AZ Mayor and City Council about Cottonwood's

obtaining the International Dark-Sky Community designation. The Cottonwood Mayor and City Council unanimously approved pursuing the designation. The KSB Dark-Sky Committee will assist with the application process.

DARK-SKY BROCHURES

The Keep Sedona Beautiful Dark-Sky Committee distributes its Dark-Sky Brochures at educational events as well as to residents, business, and visitors.

KEEP SEDONA BEAUTIFUL WEBSITE

The Dark-Sky tab at KSB'S website, www.KeepSedonaBeautiful.org, is kept updated about dark-sky events. The Dark-Sky Tab includes annual community dark-sky awareness events. It links to the International Dark-Sky Association Video, "Losing the Dark," as well as to the following:

- Arizona Night Skies Are Under Threat!, March 9, 2016
- Spring Skies by J.D. Maddy, President of Astronomers of Verde Valley, March 2016
- Dark-Sky Information, June 13, 2016

NEW AND REMODELED BUSINESSES IN SEDONA

The following new buildings in Sedona were completed and received their Final Certificates of Occupancy (CofO): Sedona Rouge Expansion and Tlaquepaque North.

Part of the City's inspection process includes a lighting night-time inspection. Issuance of a final CofO is evidence that all inspections, including a lighting inspection, were passed.

The following remodels in Sedona were completed: Christ Lutheran Church, Whole Foods Façade Remodel, and Forest Plaza (Chipotle Building). This is not a comprehensive list and only includes projects that involved extensive exterior renovations, new building area, or new lighting.

If the remodeling project includes new lighting, part of the inspection process is a night-time lighting inspection. Final sign off on the permit is evidence that all inspections, including a lighting inspection for all new lighting, were passed.

The City of Sedona will send a courtesy mailer reminding businesses of Sedona's Outdoor Lighting Ordinance and the importance of turning off outdoor lighting where and when appropriate.

SKY QUALITY MEASUREMENTS

The KSB Dark-Sky Committee takes Sky Quality Measurements to ensure that Sedona continues to protect its dark night skies and to reduce light pollution. The measurements were taken in four locations on July 4, 2016, and August 30, 2016. The readings were taken at the same locations as in previous years. Below are the measurements:

SKY QUALITY READING IN SEDONA CITY LIMITS PERFORMED ON JULY 4, 2016, NEW MOON									
Time	Location	Percent of Cloud Cover	First Sky Quality Reading	Second Sky Quality Reading	Third Sky Quality Reading	Fourth Sky Quality Reading	Fifth Sky Quality Reading	Sixth Sky Quality Reading	Average Sky Quality Reading
0:23	Saddle Rock Cir and June Bug Cir; about 1.2 miles west from Y (right before Sedona Bar&Grill)	0%	21.0	21.0	21.0	21.0	21.0	21.0	21.0
0:30	Whitetail Rd and Rodeo Ln; 2.1 miles W of Y off Rodeo Road/89A (by Safeway)	0%	21.1	21.0	21.0	21.0	21.0	21.0	21.0
0:17	Keep Sedona Beautiful parking lot, 340 Brewer Road, facing away from KSB office	0%	21.3	21.3	21.2	21.2	21.3	21.2	21.3

SKY QUALITY READING IN SEDONA CITY LIMITS PERFORMED ON August 30, 2016, 2 DAYS BEFORE NEW MOON									
Time	Location	Percent of Cloud Cover	First Sky Quality Reading	Second Sky Quality Reading	Third Sky Quality Reading	Fourth Sky Quality Reading	Fifth Sky Quality Reading	Sixth Sky Quality Reading	Average Sky Quality Reading
20:30	Saddle Rock Cir and June Bug Cir; about 1.2 miles west from Y (right before Sedona Bar&Grill)	0%	20.87	20.91	20.79	20.85	20.84	20.85	20.85
20:23	Whitetail Rd and Rodeo Ln; 2.1 miles W of Y off Rodeo Road/89A (by Safeway)	0%	20.96	20.92	20.94	20.93	20.92	20.98	20.94
20:36	Keep Sedona Beautiful parking lot, 340 Brewer Road, facing away from KSB office	0%	21.04	21.05	21.03	21.04	20.99	21.04	21.03

SEDONA DARK-SKY COMMUNITY SIGNS

The Sedona International Dark-Sky Community signs are scheduled to be installed soon. The sign structures will be installed in three different areas in Sedona, pending ADOT approval.

PRESS ARTICLES

Red Rock News, Sedona, February 12, 2016 – “Westerners track stars in sky”

The Villager, Village of Oak Creek, May 1, 2016 – “J.D. Maddy presents ‘Under the Dark Skies of Sedona’”

Red Rock News, Sedona, April 20, 2016 – “Astronomy Day gets a Sirius look”

Red Rock News, Sedona, April 22, 2016 – “Sedona Recycles celebrates Earth Day”

Below are the articles.

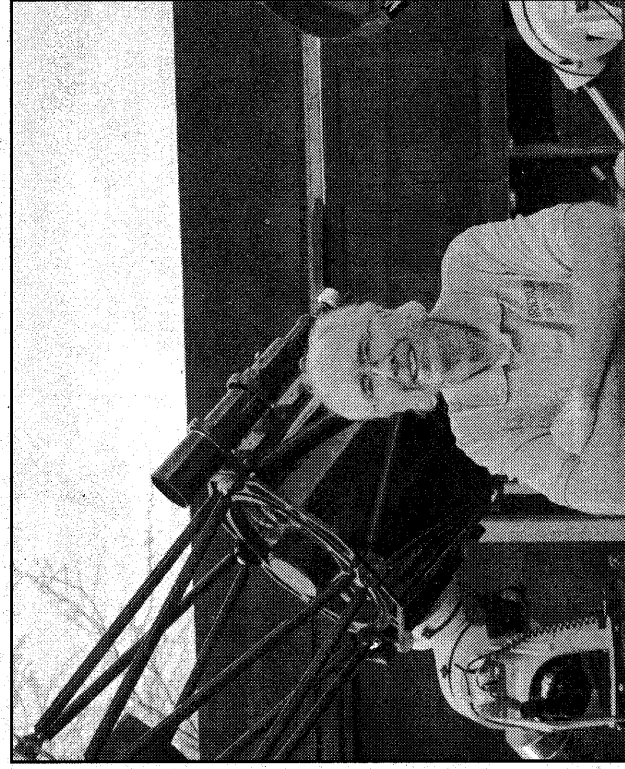
Report submitted by Joanne Kendrick, Chair
Keep Sedona Beautiful Dark-Sky Committee
360 Brewer Road, Sedona AZ 86336

JD Maddy presents 'Under the Dark Skies of Sedona'

"What is all the Hub-Bub about 'dark skies?'" asks JD Maddy. Come to Keep Sedona Beautiful's Wednesday, May 11, Preserving the Wonder™ Speaker Series to discover the wonder of dark skies during JD Maddy's presentation, which will be full of night-sky photographs along with a discussion on what to expect from dark-sky viewing.

The evening's discourse will "travel" through our own Milky Way and go to galaxies beyond by way of pictures taken from the Sedona area, according to Maddy.

He further stated "Current astronomical events will be shown and explained and what to expect when looking up to the sky. We are saying goodbye to the winter constellations and welcoming the central area of the Milky Way as summer approaches. We'll describe what you'll be able to



JD Maddy's presentation will be full of night-sky photographs along with a discussion on what to expect from dark-sky viewing.

see with the unaided eye, binoculars and telescopes ... view through several large

After the presentation, telescopes to actually 'see'

what the Hub Bub is all about."

After retiring from big city life and working for a Fortune 500 company, JD and his wife, who is also interested in astronomy and an amateur astronomer, decided to move to the dark skies of Arizona to follow their life-long interest in astronomy.

Soon after joining the Astronomers of Verde Valley, JD found a love for astronomy outreach with the local community that eventually reached state-wide.

When not conducting volunteer astronomy outreach programs for the National Park Service, Arizona State Parks, local community parks, local schools or the Forest Service, JD spends time under the stars in his own observatory or teaching astronomy programs occasionally through OLLIE at the Clarkdale Campus of Yavapai College.

Members, residents and visitors are all welcome to join Keep Sedona Beautiful ("KSB") at 5:30 p.m. at its historic Pushmataha Center on 360 Brewer Road. The evening will include complimentary appetizers donated by El Rincon Restaurante Mexicano and refreshments provided by KSB.

Keep Sedona Beautiful's monthly Preserving the Wonder™ Speaker Series is held the second Wednesday of each month from September to June. It focuses on presenting a diversity of programs relevant to the unique environment of our region.

For more information about Keep Sedona Beautiful, please call 928.282.4938, or visit <http://www.keepsedonabeautiful.org/>.

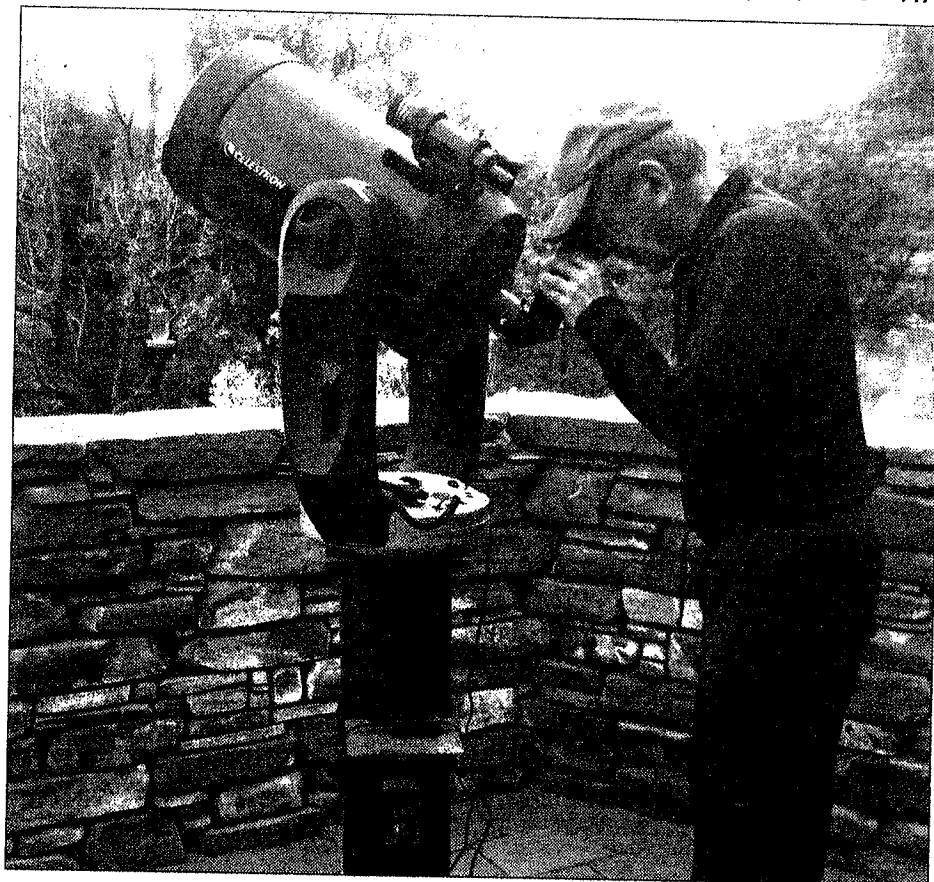


Photo courtesy of Michael Henry

A.J. COOK looks through his Celestron CPC Schmidt-Cassegrain catadioptric telescope. Cook and Mark Ducharme used the telescope to show members of the Sedona Westerners Tracker hike group stars, planets and galaxies of the Sedona sky.

Westerners track stars in sky

The December Sedona Westerners Tracker Hike was an evening of enjoying the stellar beauty of Sedona's dark skies. The event was organized by the Westerners' Tracker Boss, Helen Ducharme, and hosted by A.J. and Peg Cook.

Prior to viewing the stellar objects chosen for that evening, Mark Ducharme and A.J. Cook conducted a slide show presentation to provide information on each star, planet or galaxy we were to observe that evening. The purpose of the presentation was also to give a perspective of the vastness of the universe.

With their presentation, Ducharme and Cook reminded the group why light years have been used to measure the astronomical distance rather than miles. For example, Proxima Centauri, the star nearest our own sun, was approximately 24.8 trillion miles away. That's a lot of zeros! Clearly miles would be far too cumbersome to use as a measurement. So a more convenient method, the light year, had been used to measure inter-

A light year is a unit of astronomical distance equivalent to the distance that light travels in one year, and is approximately 5.88 trillion miles. Proxima Centauri is about 4.3 light years away from our sun. Because of the extreme vastness of the distances involved, the concept of using light years makes understanding interstellar distances much simpler.

Using the opportunity to look through a professional size telescope, Cook then showed the group some of the most magnificent stars, planets and other objects visible that evening. His telescope was a fork-mounted Celestron CPC with an 11-inch mirror. It used a Schmidt-Cassegrain catadioptric optical system and GPS computer with automated tracking technology. The telescope was mounted on a permanent pier. He usually views using an eyepiece giving 150 power magnification.

Uranus was the only planet viewed that evening. It is the seventh planet from our sun and was discovered by the astronomer William Herschel in 1781. It was also the first planet discovered by telescope. The orbit of Uranus around the sun takes 84 years and there have been at least 27 moons discovered orbiting Uranus.

The group was treated to a view of a triple star system, Albireo, located in the constellation Cygnus and was approximately 430 light years from Earth. Albireo was a great example of a complex star system, with the stars rotating around each other.

With the naked eye, Albireo appeared as a single star. From the telescope it was

clear these were at least two stars; Albireo A appeared gold and Albireo B appeared blue. The color differentiation was vivid through the telescope. Albireo A is itself a close binary of two stars: Albireo Aa and Albireo Ac.

The leaders then turned the group's attention to two nebulas in our galaxy. A nebula is a cloud of dust of hydrogen, helium and other ionized gases. The first nebula viewed by the group was the Dumbbell Nebula.

The Dumbbell Nebula is a planetary nebula discovered in 1764 by Charles Messier. Planetary nebulae are formed when stars eject their outer envelopes, exposing the hot core of the star. The exposed core then ionizes the surrounding cloud of expelled material. The clouds keep expanding until they dissipate into the surrounding space.

The second nebula the group viewed was the Orion Nebula. It is one of the brightest nebulas visible from Earth and situated about halfway down the line of stars that form Orion's Sword. The new stars forming in this nebula are part of what astronomers call an open cluster. When all of the stars are fully formed, what remains is a special tight grouping of four newly born stars called the Trapezium.

Viewing the Orion Nebula segued into viewing the Pleiades star cluster. Ancient Greek mythology described the Pleiades as the seven daughters of the titan Atlas and the sea nymph Pleione. After Atlas was forced to carry the heavens on his shoulders Orion, began to pursue all of the Pleiades. Zeus transformed them first into doves and then into stars to comfort their father. The constellation of Orion was said to still pursue them across the night sky.

The Pleiades star cluster is 440 light years from Earth and most people can see only the seven brightest stars that represent the Seven Sisters. However, with the telescope the group could see that this open star cluster is composed of hundreds of fainter stars. A representation of the Pleiades star cluster is used as the corporate symbol for Japanese car manufacturer, Subaru.

The clear night skies made it a wonderful opportunity to view these magnificent sights in the beautiful Sedona skies.

If you are interested in joining the club, visit the Sedona Westerners website or just come to one of our monthly meetings. The next one will be Thursday, March 3, at 7 p.m. at Saint John Vianney Catholic Parish, 180 St. John Vianney Lane in Sedona.

Sedona Westerners, written this week by Michael and Velma Henry, appears every Friday in the Sedona Red Rock News.

Sedona Recycles celebrates Earth

Sedona Recycles is hosting a community Earth Day Celebration on Saturday, April 23, from 10 a.m. to 3 p.m. at the facility, located at 2280 Shelby Drive in West Sedona.

More than 20 educators will have hands-on exhibits, such as solar cooking, watersheds, hiking, composting and organic gardening. Seedlings from Verde Valley School garden will be on sale. Herpetologist Russell Dunn will have live snakes for handling and teach how to recognize local species. Art with recycled content will be for sale and a demonstration given on making art with spray paint.

This is a family event with crafts and games for the kids as well as a magic show with magician Michael Steele. Verde Valley School will show their Rags to Riches creations in a Recycled Runway show. Raffle tickets for local gift certificates will be on sale at the event as well as the week prior in Sedona Recycles lobby. Winners will be announced at 2 p.m. that day. Also to be announced is the recipient of the Environmental Steward of the Year award. All proceeds go to Sedona Recycles to help with operating costs.

Call 204-1185 for more information.

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Astronomy Day gets a Sirius look

By Andrew Pardiac
LARSON NEWSPAPERS

The stars looked very different Sunday, April 17.

The Sirius Lookers — one of the Verde Valley's stargazing clubs — celebrated Astronomy Day with a slew of equipment in the parking lot of the Safeway complex as the sun faded behind the rocks.

The parking lot, with its lighting and proximity to the road, may not seem like an ideal place for stargazing — and it isn't — but Sirius member Bill Smith said it was a good way to bring the public in.

The telescopes were brought in by fellow club member Dennis Young. The first focus of the evening is readily identifiable — the moon.

Several telescopes pointed in its direction, but it was Young's own creation that made Earth's sole satellite stand out. Young created a tubeless telescope with an 8-foot turning radius. He fabricated the whole thing himself, with the exception of the glass, which he said in today's market costs around \$18,000 with a \$1,000 coating on it.

Shoppers-turned-stargazers waited their turn to climb up two steps of a ladder to look through the viewer. Young joked that the steps to the viewer were akin to walking on the moon, and looking through the viewer it nearly seemed so.

"And you're on the moon, little Neil Armstrong," Young said to a child

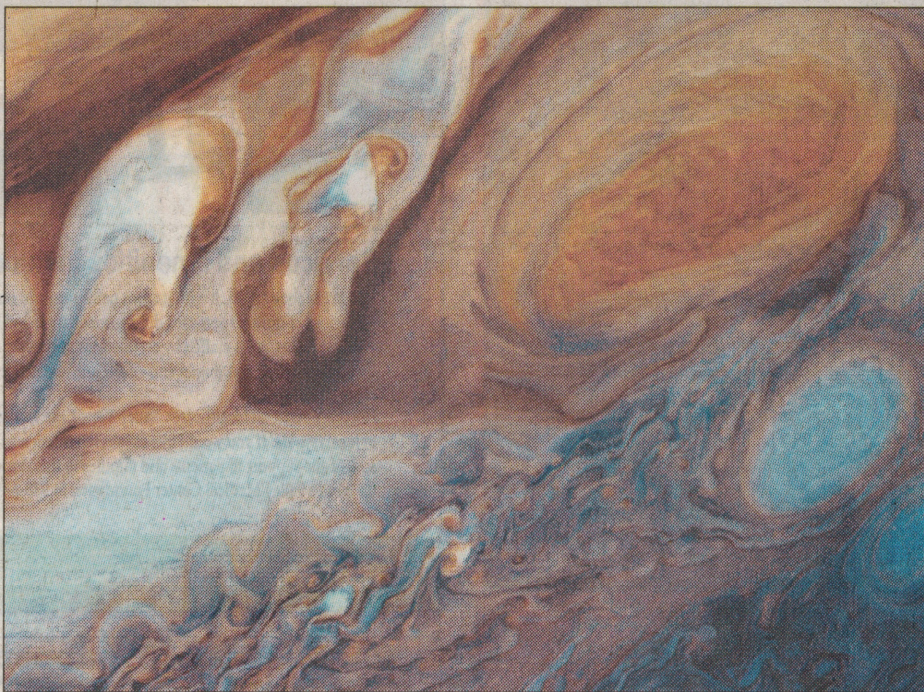


Photo courtesy of NASA

THE GREAT RED SPOT of Jupiter, as seen by Voyager 1, is a hurricane that has existed since man could first view the planet closely enough to see it. The spot was visible through Sirius Looker member Dennis Young's homemade telescope, which he brought out for Astronomy Day, Sunday, April 17, at the Safeway parking lot.

as he ascended.

Young said the telescope brought the viewer to the perspective of being 200 miles above the surface of the moon. For the Apollo missions, orbit was achieved 60 miles above.

The wait for the viewer took several minutes, as crowds gathered.

"The best sights are the last ones," Young said, though. He said that helped people be

» see SIRIUS | 8A



Andrew Pardiac/Larson Newspapers

BILL YOUNG, of the Sirius Lookers, sights in a telescope for a patron to view the moon and Jupiter on Astronomy Day, Sunday, April 17, at the Safeway parking lot. This was the only time of the year the Lookers bring out their equipment for the public to use.

SIRIUS: Astronomers share views of the stars

From Page 1A

more patient during previous showings, he has had thousands of individuals line up through the years, and that it was pretty much true. As the night goes on, many objects move higher in the sky, where there is less atmosphere to look through and therefore, a clearer view. Another tip Young gave was to look at the terminator — the point where night meets day — on the moon for sharper contrast.

Before moving onto the next object, those in attendance were able to see the International Space Station make its orbit. Though traveling too fast to put a telescope on, the football-field size ISS could easily be seen as a bright spot of light.

Then it was on to the heavyweight of objects orbiting the sun — Jupiter. The planet was just above and to the left of the moon that night, and even through some of the smaller telescopes, some of its moons were visible.

Jupiter has 67 known moons. Looking through Young's creation, spectators could also see the planet's swirling bands, with faint color, as well as its most recognizable feature — the red spot.

The spot is a hurricane some two-and-a-half times the size of Earth. It rotated as viewers took their turns, as Jupiter has a fast orbit compared with Earth.

Looking at the planet was also looking back in time. The light from Jupiter reflected from the sun takes about 40 minutes to reach Earth, whereas the light from the moon arrives in 1.3 seconds.

Young said that if Jupiter were as close as the moon — barring other effects — the disc of it would encompass 75 percent of the night sky.

After everyone had seen the planet bigger than all others in the solar system combined — it was off to view objects not visible with the naked eye.

The Sirius Lookers meet the third Wednesday of every month at the Sedona Public Library. The next one is one April 20, at 7 p.m.

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