The High Desert Observer

February 2018

The Astronomical Society of Las Cruces (ASLC) is dedicated to expanding public awareness and understanding of the wonders of the universe. ASLC holds frequent observing sessions and star parties and provides opportunities to work on Society and public educational projects. Members receive the *High Desert Observer*, our monthly newsletter, plus membership to the Astronomical League, including their quarterly publication, *Reflector*, in digital or paper format.

Individual Dues are $30.00 per year

Family Dues are $36.00 per year

Student (full-time) Dues are $24.00

Annual dues are payable in January. Prorated dues are available for new members. Dues are payable to ASLC with an application form or note to: Treasurer ASLC, PO Box 921, Las Cruces, NM 88004. Contact our Treasurer, Patricia Conley (treasurer@aslc-nm.org) for further information.

ASLC members receive electronic delivery of the HDO and are entitled to a $5.00 (per year) Sky and Telescope *magazine discount.*

ASLC Board of Directors, 2018

Board@aslc-nm.org

President: Howard Brewington; President@aslc-nm.org

Vice President: Rich Richins; VP@aslc-nm.org

Treasurer: Patricia Conley; Treasurer@aslc-nm.org

Secretary: John McCullough; Secretary@aslc-nm.org

Director-at-Large: Steve Barkes; Director1@aslc-nm.org

Director-at-Large: Ed Montes Director2@aslc-nm.org

Past President: Chuck Sterling; csterlin@zianet.com

Committee Chairs

ALCor: Patricia Conley; tconley00@hotmail.com
Apparel: Howard Brewington; comet_brewington@msn.com
Calendar: Chuck Sterling; csterlin@zianet.com
Education: Rich Richins; Education@aslc-nm.org
Grants: Sidney Webb; sidwebb@gmail.com
Loaner Telescope:Sidney Webb; sidwebb@gmail.com
Membership: Open
Observatories:
Leasburg Dam: David Doctor; astrodoc71@gmail.com
Tombaugh: Steve Shaffer, sshaffer@zianet.com
Outreach: Chuck Sterling; csterlin@zianet.com
Web-Site: Steve Barkes; steve.barkes@gmail.com
HDO Editor: Charles Turner; turner@milkywayimages.com

Masthead Image: February 10, 2017 From Las Cruces, Moon rising over the Organ Mts in Penumbral Eclipse.

Table of Contents

February Meeting --

Our next meeting will be on ***Friday, February 23***, at the Good Samaritan Society, Creative Arts Room at 7:00 p.m.

The speaker will be Steve Barkes and the topic will be Using Arduinos in Astronomy, Part 2.

Member Info Changes

All members need to keep the Society informed of changes to their basic information, such as name, address, phone number, or emai address. Please contact Treasurer@aslc-nm.org with any updates.

Events

ASLC hosts deep-sky viewing and imaging at our dark sky location in Upham. We also have public in-town observing sessions at both the International Delights Cafe (1245 El Paseo) and at Tombaugh Observatory (on the NMSU Campus). All sessions begin at dusk.

At our Leasburg Dam State Park Observatory, we hold monthly star parties. Located just 20 miles north of Las Cruces, our 16" Meade telescope is used to observe under rather dark skies. Please see *Calendar of Events* for specific dates and times.

What's Up ASLC?

February **2018**

Although I grew up in South Carolina, I moved to New Mexico in the fall of 1990 because the southwest offered many more clear nights to enjoy amateur astronomy. After arriving, my previous wife and I rented a house in Cloudcroft for a few months but soon bought a small home on a 7300-foot ridge just west of Mayhill. At that time, we owned the only house in that part of the Mount Joy Subdivision. In our front yard, I built a two-story observatory, which was used for my passion of comet hunting each clear and moonless night.

Then in 1997, I was hired as the director of the Tombaugh Planetarium & IMAX Theater in Alamogordo. So, we rented our Mayhill home and bought another house closer to town. By that time, though, other amateur astronomers had begun buying property near our old home in Mount Joy. Leon Rice, for example, purchased more than twenty acres just across the dirt road from my observatory. His intention was to operate an astronomy-type bed and breakfast, but his property soon became known as New Mexico Skies. Leon then rented observatory space to amateurs worldwide, and they operated their telescopes and cameras remotely over the Internet. Such progress far exceeded my meager efforts of manually sweeping the night sky with homemade telescopes. Nevertheless, my comet hunting years in New Mexico will always be a treasured part of my life.

Another pleasure of living in southern New Mexico is the proximity to Fort Davis and the Texas Star Party. When I lived in South Carolina, I often made the 1000-mile trek to the Stellafane Astronomy Convention in Springfield, Vermont. That star party was only a weekend event, but the drive time added four days to the adventure. TSP, however, is a week-long event with a drive time of only four hours from Cruces. So, I look forward to it each year. In fact, I just paid my registration fee for 2018, and I have an RV site reserved for my motorhome. Unfortunately, I may be the only ASLC member present at TSP this year since the Cosmic Campground and Rusty's RV Park have become more attractive locations to the astro-imagers in our club. Yet, I've been going to TSP since 1991; and for me, it's a tradition. If you're interested in the upcoming star party, visit their web site at https://texasstarparty.org/ to make arrangements. The deadline for preregistration is 10 April. I hope to see you there!

Howard Brewington
ASLC President
February 2018

* * *

Outreach
Outreach is a very important part of ASLC. We are always looking for more volunteers to help us educate the public. Even if you do not have a portable telescope to bring to the events, please consider attending our public outreach programs to help answer questions, share knowledge and point out objects in the sky.

Outreach Events

2018 January Report

by Jerry McMahan

Leasburg, Saturday, January 6, 2018

We had a bad start to 2018. We were clouded out again. Chuck Sterling, Bob Armstrong, Sid Webb and Rich Richins made the attempt. I even had the ETX go to the first alignment star, Capella. I nearly had it when it disappeared behind a cloud, never to reappear. Chuck set up the refractor and Rich assembled his 16 inch Dobsonian. The others were in the observatory. Total observations, zero.

Tombaugh Elementary School, Thursday, January 18

It was an evening of club member returns. Tracy Stuart was back for outreach after a brief time out. Ed Montes was out of Africa and brought an out of town visitor. Nils Allen made an appearance with his home made 15 inch Dobsonian after dropping out of the club for a while. I heard, but didn't see, Sid Webb. It was dark out there! Chuck Sterling and myself, along with members of the University Astronomy also attended, as did Howard Brewington. I may have missed someone if they came after dark. If so, I apologize.

Howard applied a mild form of extortion to Nils to re-join the club. It scared me into getting out my check book and paying my dues for this year. As usual, we had a very large turn out at this school. It was a cold, but very successful event.

Columbia Elementary School, Thursday, January 25

The event started at 5:30 so it was still daylight. This meant that all 6 telescopes were pointed at the Moon until it got dark enough to see anything else. Chuck was finally able to get the Pleiades's. Rich Richins had his 16 inch on the Orion Nebula. Tracy Stuart targeted Betelgeuse. I stayed on the Moon. Sid Webb was also aimed at something. Sorry, I forgot what he was on. Howard Brewington manned his 8 inch Dobsonian.

It was was a very busy evening. This was the largest crowd we have had at this school. This made it a very good night even with the late start. I also avoided the car eating sand box, so it was a good night for me as well.

Tombaugh Observatory, Friday, January 26

The open house happened, but we did not participate. Steve Shaffer was not feeling well so it was a rare time that he missed the event. I opted out since I was not sure I could handle it alone. It turned out that Chuck Sterling was going to help, but we wound up going to the club meeting which was on the same night.

Moongaze, Saturday, January 27

We had a very good turn out of club members. Present were Chuck Sterling, Howard Brewington, Ed Montes, Steve Wood, Jerry McMahan and Mike Kop attended. Steve had higher magnification view of the Moon than the scopes. He also let observers use the arrow buttons to move around to different parts of the Moon.

* * *

Calendar of Events (Mountain Time - 24 hr. clock)

Feb	01	17:41	Sun Sets
	07	08:54	Last Quarter Moon
	10	17:45	OUTREACH; Dark Sky Observing at Leesburg Dam State Park
	15	14:06	New Moon
	15	17:30	Desert Hills Elementary School Star Party
	23	01:09	First Quarter Moon
	23	19:00	ASLC Monthly Meeting; Good Samaritan Society, Activities Meeting Room
	23	20:00	OUTREACH; Tombaugh Observatory open at NMSU
	24	18:00	OUTREACH; MoonGaze, International Delights Café
Mar	01	18:05	Sun Sets
	01	17:52	Full Moon
	01	18:00	OUTREACH; Sunrise Elementary School Star Party, 6:00 - 7:30 pm
	09	04;20	Last Quarter Moon
	10	18:00	OUTREACH; Dark Sky Observing at Leesburg Dam State Park
	11	02:00	Daylight Saving Time begins
	16	21:00	OUTREACH; Tombaugh Observatory open at NMSU; 9 -10 pm
	17	07:12	New Moon
	20	09:15	Spring Begins: Spring Equinox
	23	19:00	ASLC Monthly Meeting; Good Samaritan Society, Activities Meeting Room
	24	09:35	First Quarter Moon
	24	18:30	OUTREACH; MoonGaze, International Delights Café
	31	06:36	Full Moon, the second one this month!

Be sure to visit our web site for ASLC information: *www.aslc-nm.org*

* * *

Announcements

1. The program for the February meeting will be a presentation by Steve Barkes on using Arduinos in Astronomy, Part 2. This will be a hands on discussion of practical applications with examples.

2. January is the time to pay your dues. If you have not yet paid dues for 2018, it is not too late. You can also view and download information at our website: ***www.aslc-nm.org*** Check out the first page of this HDO for rates and instructions for mailing your dues or you can pay at the February meeting.

3 The agreement to use the facilities at Good Sam for our meeting prohibits members from bringing in ANY food or beverages, except water in a container with a screw lid. Take note: no more Starbucks or Saturn Cookies!

* * *

Meeting Minutes

ASLC Monthly Meeting
January 2018 Minutes

Show & Tell:

No topics were offered for discussion.

Call to Order:

Howard Brewington, President, Astronomical Society of Las Cruces (ASLC, the Society), called the January 2018 business meeting to order at 7:10 pm, 26 January 2018, Creative Arts Room, Good Samaritan Society Las Cruces Village, 3011 Buena Vida Circle, Las Cruces, New Mexico

President's Comments:

Howard Brewington, President, welcomed the group to tonight's meeting. There were several guests present. Stephen Wood is from the Orlando, FL-area who is considering relocating to New Mexico and became a new member of the Society tonight. Phyllis Pilcher, wife of member Fred Pilcher, is visiting tonight's meeting. Bruce Leverett, an amateur astronomer, is also visiting tonight and is considering joining the Society. Howard asked that all members and guests sign-in on the roster sheets available at the rear of the room.

Howard noted that membership dues were payable as of the first of the year and current dues status affects the Society's ability to protect members and the public with liability insurance at outreach events. He also announced that a new alarm system has been installed in the Observatory at Leasburg Dam State Park (LDSP) and that users will need to obtain the password from him.

Howard thanked Charles Turner for the January edition of the High Desert Observer (the Society's newsletter, the HDO) which included an article on the Orion Nebula by member Bert Stevens and an image and poem by John Kutney. Charles says the HDO offers a platform for imagers in the Society and other local astronomers to display their work, but asks that images be limited to 10" x 7½" to avoid undesirable cropping for publication.

The minutes of the November 2017 meeting were also published in the HDO. If there are no corrections or discussion, Howard asked that the minutes be accepted as submitted; they were accepted by acclamation.

.

Treasurer's Report:

Trish Conley, Treasurer, presented a status of the Society's accounts. She also noted that the insurance premium is payable in February 2018. Sid Webb reported that he had conducted an audit of the Society's accounts for the period September 2016 to September 2017 and found no issues.

Outreach:

Chuck Sterling, Outreach Coordinator, reported on upcoming events. There will be a Moon Gaze at International Delights Café (IDC) on 27 January. The next Open House at the Observatory at LDSP will be 10 February. Upcoming school star parties will be 15 February at Desert Hills Elementary and 22 February at Sunrise Elementary. Check for details on the yahoo group.

RASC Observers Handbook:

Bert Stevens has the copies the 2018 Royal Astronomical Society of Canada (RASC) Observers Handbook (US version) and 2018 RASC Calendars for payment and pickup.

Announcements:

Fred Pilcher reminded those present that member Dr. Reta Beebe will make a presentation at the Las Cruces Museum of Nature and Science on 07 February.

Rich Richins would like members to consider giving brief talks at LDSP prior to the night's viewing. Charles Turner suggested that abbreviated sky tours of the objects likely to be seen that evening are also possible.

Bert Stevens reminded members that a blue super blood total lunar eclipse will occur before dawn on 31 January and will be visible in Las Cruces, weather permitting.

Presentation:

This month's presentation is by ASLC member Christopher Brownewell on "Astronomy from the Mimbres Valley". Chris presents work he has been doing at his Covered Bridge Observatory.

The February presentation will be hands-on Arduino projects by Steve Barkes. This is a follow-up to his introductory presentation in November.

The January meeting of the Astronomical Society of Las Cruces concluded at 8:25 pm. A social time followed at Pecan Grill.

-Respectfully submitted by John McCullough, ASLC Secretary

* * *

Back at the Telescope

by Bert Stevens

Around midnight during April, a small nebula reaches its highest point in our sky, just barely three degrees above our southern horizon. The Boomerang Nebula (R.A. 12h 44 m 46 s.1, Dec -54˚ 31' 13".3) is just 1.44 arcminutes high by 0.72 arcminutes at its widest point. It is fairly faint, at magnitude 13.1 in the R-band. This nebula is located in Centaurus, about 16 degrees northeast of Alpha Centauri.

The Boomerang Nebula is sometimes called the Bow Tie Nebula, but NGC 40 (Caldwell 2) in Cepheus is also known as the Bow-Tie Nebula, so use of this name can be confusing. The Boomerang was named in 1980 by Keith Taylor and Mike Scarrott after they examined a low-resolution image of this small object taken with the 153-inch Anglo-Australian telescope at the Siding Spring Observatory. This observatory is located in the Warrumbungle National Park on Mount Woorat which is situated in the state of New South Wales, Australia, providing an excellent view of the southern skies.

This nebula is almost a light-year in length, about 21,000 AU. Located about 5000 light-years from Earth, the Boomerang Nebula is a protoplanetary nebula. Protoplanetary nebula are the precursors of full-blown planetary nebula. They are the very outer atmospheres of an old red giant star that have drifted away from the star as it expands during the end of its life. This surrounds the star with an expanding cloud of dust and gas. Note that a protoplanetary nebula should not be confused with the protoplanetary disk that forms around a very young star which will be the source of materials for planetary formation.

Figure 1: *The Boomerang Nebula is depicted in this 1998 image from the Hubble Space Telescope. Faint arcs and ghostly filaments are visible in the diffuse gas of the more uniform "bow tie" lobes. This young nebula is only around four thousand years old, so it has not had time to form the bubble-shape of older planetary nebulae. This is a one-thousand-second exposure through a yellow-green filter. We are seeing dust particles in the nebula lit up by the central star.*

When nuclear fusion starts to die in the red dwarf's core, the star will contract, heating up the surface. The newly heated surface of the star will radiate more strongly in the ultraviolet, illuminating the surrounding gas that was once part of its structure. The gas will absorb the ultraviolet and re-emit it as visible light that we see as part of a mature planetary nebula.

In the Boomerang Nebula, we are seeing light from the star reflecting off the dust surrounding it. The dust is thickest around the waist of the nebula. It is mostly millimeter-scale particles that block the visible light from the central star. This leaves only the light escaping out through the two opposite poles, giving the hourglass shape.

When it was first observed, this nebula, also known as PGC 3074547, was seen to be elongated with a slight curve, reminiscent of a boomerang, hence the name. Later higher resolution observation showed the Boomerang to have the hourglass shape typical of objects with outflows from a central star. In 1995, the 50-foot Swedish-ESO Submillimeter Radio Telescope observed this object in the radio spectrum and discovered that it was absorbing microwave radiation from cosmic microwave background.

Figure 2: *Another Hubble view of the Boomerang is not what it appears to be. This image is a false-color image coding the polarization of the light reflecting off the dust particles in the nebula. The observed polarization angle was assigned to a color and then combined into this colorful image. It traces the small dust particles responsible for polarizing and scattering the light from the central star.*

The cosmic microwave background (CMB) is the afterglow from the Big Bang. The Big Bang's "flash" has been expanding outward and echoing throughout space, continuously losing energy. When a photon loses energy, it does not slow down, since photons always travel at the speed of light no matter how much energy they have. A photon that loses energy changes its "color", becoming redder. This can mean a gamma ray may become a lower-energy x-ray.

Even with the incredibly energetic flash of the Big Bang, the energy has slowly drained away over the last thirteen billion years with the wavelength (color) dropping slowly through the spectrum into the microwave region. Its strength now peaks around a frequency of 163.23 GHz. This is the same frequency that a black body with a temperature of 2˚.73 Kelvin (-454˚.76 Fahrenheit) radiates its energy. This, as you can guess, is extremely cold.

Figure 3: *The volume of space cleared by the jets coming out of the central star are outlined in this image. The orange represents the data taken by ALMA, while the blue is the Hubble image seen earlier. The ALMA data provided a better understanding of the structure of this nebula.*

Normally, the gas in space would be warmed to at least the temperature of the CMB. The gas would then emit radiation at the same wavelength as the CMB. Since the Boomerang Nebula is absorbing this radiation, it must be even colder than the CMB. The temperature of the Boomerang is actually around 1˚ Kelvin. It was a mystery how the outflow from a hot star can be so much colder than empty space.

Detailed observations from the ALMA radio telescope have outlined the bipolar jets being fired outward from the central star in opposite directions. These jets have cleared out a peanut-shaped volume in the cold outflowing gas. In addition, there is a here-to-for-unknown envelope of dark cold gas surrounding the entire nebula that stretches 120,000 astronomical units from the parent star.

The ALMA observations have allowed a more precise modeling of this system. It shows the four-solar-mass dying red giant star is not floating alone in the void. There is a small companion star that plunged into its heart. They became so close that they shared a common envelope. The two stellar cores finally merged and the gravitational interaction threw the red giant's atmosphere outward at the incredible speed of ninety-three miles per second. As the gas moves away from the merged star, it expands and cools to that exceptionally low temperature.

A gas will cool as it expands and warm when it is compressed. This is the principle behind our refrigeration systems. The refrigerant gas (Freon in older systems) is compressed by the compressor outside where the heat produced can be vented into the air. The highly compressed gas then travels through tubing to the area to be cooled. There it is allowed to expand, cooling it and absorbing the heat from the surrounding environment. The expanded and warmer gas now flows back to the compressor to start the cycle again.

The gas streaming so rapidly from the red dwarf star expands as it moves away from the star, cooling and absorbing the energy around it. Its extremely rapid expansion keeps it very cold. This makes the Boomerang the coldest (known) place in the universe. But it is not a title that it will hold for long. Even now, the outer edges of the Boomerang are warming up and eventually the entire nebula will warm up as the outflow slows down.

* * * *

Shadows

The sun always shined when we were young
We never acknowledged our black velvet shadows
Loyal friend never biased
Observer to the right and the wretched
For all to see, but not to please you
No ambition, no malice, just being
Separate shades for dusk and dawn
Sees no cowards nor rewards a hero
Distorted only by the external
Blocks the ordinary to protect for the impossible
The tenacity of time flows like the sap of an ancient tree
Near the end extending longer, the last witness

Night shadows from distant light
Let the faded gray turn back to black
See the truth beneath the covered lens of our frailty
Climbing ahead the blended shades follow
You may ignore but it never leaves, bypassing good or evil
Protects from the scourge of light that reveals
Fear from shadows but not yours
To love means to really know
Send the clouds from where they come
Let it be seen in the light
Don't leave it behind in the veil of emptiness and tears
The shadow is ours, do we know the reflection.

J. Kutney '18

Photo of the Month

NGC 2403 in Camelopardalis

NGC 2403 (also Caldwell 7) is a spiral galaxy in the constellation Camelopardalis. The galaxy is similar with the Triangulum Galaxy in shape and star forming areas. The Camelopardalis area is masked in HII as one looks thru the halo of the Milky Way.

RC10/ FLI ML16200/ RGB 2x2 5x5min/ L 2x2 10x5min/ CCDstack/ SGP /PS6 /
Las Cruces / 1-14-18 by John Kutney

Photo of the Month

On January 31, 2018 Rich Richins set up his Canon T2i camera and Canon 200 mm lens to try to get a wide field photo of the Beehive Cluster from his driveway in Las Cruces.

He was “photobombed” by the Moon - in eclipse no less. How lucky is that?

Photo of the Month

OBJECT NGC 1535 is a 9th magnitude planetary nebula in Eridanus. Also known as “Cleopatra’s Eye.” NGC 1535 is very similar to the Eskimo nebula in both color and structure. NGC 1535 is at least 1,500 light years away..

Telescope C-14 at f/ 1.9

Camera QHY183C CMOS

Settings Resolution is 0.73 arcsec per pixel

Date/Location Covered Bridge Observatory, Mimbres Valley, NM 02-03-2018
. by Chris Brownewell

OBJECT **M33 - NGC 598 (Triangulum Galaxy)** **Distance: 3 million light years**
Telescope: Takahashi TOA-130F @ f/7.7 **Mount:** Takahashi EM200 Temma II
Camera: QSI 690wsg @ -15C
Filters: Astrodon Tru-Balance I-Series LRGB Gen 2
Guider: SX Lodestar
Settings: 9x10min L (bin1x1); 4x5min ea RGB (bin2x2); AstroArt5, CS4 (slightly cropped, 10xdarks/flats/fdarks/bias)
Date/Location: 15 December 2017 - Las Cruces, NM This image is LRGB and was imaged over 2 nights.