

# The High Desert Observer



December 2019



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 electronic delivery of *The High Desert Observer*, our monthly newsletter, plus, membership in the Astronomical League, including their quarterly publication, *Reflector*, in either paper or digital format. ASLC members are also entitled to a \$5 (per year) discount on *Sky and Telescope* magazine.

**Annual Individual Dues are \$30**

**Annual Family Dues are \$36**

**Annual Student (Full Time) Dues are \$24**

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, P.O. Box 921, Las Cruces, NM 88004. Contact our Treasurer, Patricia Conley ([treasurer@aslc-nm.org](mailto:treasurer@aslc-nm.org)) for further information.

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## Member Info Changes

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

## September Meeting

Our next meeting will be on **Friday, January 24th**, Our guest speaker TBA.

## Events

ASLC hosts deep-sky viewing and imaging at our dark sky location in Upham. We also have public in-town observing sessions at the Pan Am Plaza (on University Ave.) 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" telescope at this site is used to observe under rather dark skies.

# From the Desk of the ASLC President

Tracy Stewart

Happy Holidays!

This past year has been an interesting one for me! The club, once again has spent the year ‘BRINGING THE UNIVERSE TO EVERY-ONE’. Ren Fair was a success, as always, although we could have used some more help. While I would have liked to have seen more schools involved in star parties, the ones we did have were very successful. Moon Gaze and LDSP kept the public informed and entertained. All in all a good year. Let’s hope next year is even better. To each of you I wish Dark Skies and Bright Stars!

**THE ANSWER IS 42.**



Adoration of the Magi by Florentine painter [Giotto di Bondone](#) (1267–1337). The Star of Bethlehem is shown as a [comet](#) above the child. Giotto witnessed an appearance of [Halley's Comet](#) in 1301.



The [Star of Bethlehem](#), or [Christmas Star](#),<sup>[1]</sup> appears only in the [nativity story](#) of the [Gospel of Matthew](#) where "wise men from the East" ([Magi](#)) are inspired by the star to travel to [Jerusalem](#).<sup>[2]</sup> There, they met King [Herod of Judea](#), and asked him, "Where is the one who has been born king of the Jews? We have come to pay homage to the [newborn king of the Jews](#)." Herod calls his scribes and priests who quote to him that [a verse](#) from the [Book of Micah](#) interpreted as a prophecy, states that the [Jewish Messiah](#) would be born in [Bethlehem](#) to the south of [Jerusalem](#). Secretly intending to find and kill the Messiah in order to preserve his own kingship, Herod invites the wise men to return to him on their way home.

The star leads them to Jesus' home in the town, where they worship him and give him gifts. The wise men are then given a divine warning not to return to Herod, so they return home by a different route.<sup>[3]</sup>

Many [Christians](#) believe the star was a [miraculous](#) sign. Some [theologians](#) claimed that the star fulfilled a prophecy, known as the [Star Prophecy](#).<sup>[4]</sup> [Astronomers](#) have made several attempts to link the star to unusual [celestial events](#), such as a [conjunction](#) of [Jupiter](#) and [Venus](#),<sup>[5]</sup> a [comet](#), or a [supernova](#).<sup>[6]</sup>

Some modern scholars do not consider the story to be describing a historical event but a [pious fiction](#) created by the author of the Gospel of Matthew.<sup>[7]</sup>

The subject is a favorite at [planetarium](#) shows during the [Christmas](#) season,<sup>[8]</sup> although the account describes Jesus with a broader Greek word [παιδίου](#), which can mean either "infant" or "child" ([paidion](#)), rather than the more specific word for infant ([brephos](#)), possibly implying that some time has passed since the birth. The visit is traditionally celebrated on [Epiphany](#) (January 6) in [Western Christianity](#).<sup>[9]</sup>

## Minutes, October 2019 ASLC Meeting

### Show and Tell:

Alex Woronow presented images he had processed from data obtained from observatories in the southern hemisphere. The images included were NGC 6726 and NGC 2070 (Tarantula Nebula).

There were no additional items or topics offered at tonight's Show & Tell session.

### Call to Order:

Tracy Stuart, President, called the October meeting of the Astronomical Society of Las Cruces (ASLC, the Society), to order at 7:28 pm on 25 October 2019, in the Creative Arts Room, Good Samaritan Society □ Las Cruces Village, 3011 Buena Vida Circle, Las Cruces, New Mexico.

### President's Comments:

Tracy welcomed the group to tonight's meeting, noting this is the Society's Annual Meeting. The minutes for the September meeting were published in the October issue of the *High Desert Observer* (HDO), the Society's newsletter, thanks to editor Robert Westbrook. Tracy asked if there were any changes or corrections required. It was noted that several members are not receiving the newsletter, including Fred Pilcher, RDee Sherril, and Alex Woronow. Ed Montes moved that the minutes be accepted as submitted, Kim Morgan seconded. The minutes were accepted by acclamation.

Tracy asked if there were any guests or visitors present. Robb Brush has recently moved to Las Cruces after retiring from TRW in California.

### Treasurer's Report:

Trish Conley, Treasurer, was not present at tonight's meeting. Tracy Stuart gave an overview of the Society's accounts. The Society had a net positive balance of \$410 for the accounting year.

### Outreach:

Chuck Sterling, Program Coordinator, was not present at tonight's meeting. Known upcoming events were announced. There will be a Moon Gaze at El Milagro Coffee y Espresso in Pan Am Plaza on 02 November. The Tombaugh Observatory will have an open house on 01 November. Members should check the Yahoo.groups for additional event announcements.

### Old Business:

**2020 Elections Committee** – Rani Bush, Mike Nuss, and Stephen Woods volunteered to serve as election tellers. With twenty □ one (21) ballots received, the proposed slate of candidates was elected to serve as officers and the Board of Directors for the Society for 2020. Officers are as follows:

President:	Tracy Stuart
Vice-President:	Ed Montes
Secretary:	John McCullough
Treasurer:	Patricia "Trish" Conley

## October 2019 Minutes cont...

Director-at-Large #1: Tim Kostelecky

Director-at-Large #2: Kevin Brown

**Renaissance ArtsFaire 2019** – This year's Faire will be next weekend, 02-03 November, at Young Park. Volunteers to set up the ASLC booth on Friday, 01 November, tear-down on 03 November, and man the booth in costume the two (2) days of the Faire, are needed. Contact Trish Conley if you can help at any time.

**Holiday gathering** – The probable date is 14 December at Tracy Stuart's home. The format will be a pot luck with the Society providing the main course and members supplying side dishes. There will not be an additional December meeting, but there will be Moon Gaze at Pan Am Plaza and a Winter Solstice event at LDSP on 07 December.

### **New Business:**

No new business was offered for discussion.

### **Presentation:**

This month's presentation was by ASLC Member Fred Pilcher. His topic was "Satellites of Asteroids". Fred has participated as an amateur on the professional astronomer level. His observations have contributed to the discovery of satellites of two (2) minor planets. Most asteroids, especially those in the 500-kilometer size range, occur between the orbits of Mars and Jupiter. Meticulous planning is required to acquire the light curves necessary to determine shape and rotation of individual asteroids. These observations have also led to the discovery that some asteroids are miniature systems with satellites orbiting a primary body. Fred described several of the methods that are used to find satellites of asteroids. A period of questions and answers followed.

The October meeting of the Astronomical Society of Las Cruces concluded at 8:53 pm. A social time followed at Pecan Grill.

-Respectfully submitted by John McCullough, ASLC Secretary

## Minutes, November 2019 ASLC Meeting

### President's Comments:

ASLC President, Tracy Stuart, was ill and not present tonight. In his stead, the Vice President, Ed Montes, welcomed the group to tonight's meeting. Ed announced that a revised agenda will be used for tonight's and, possibly, future meetings. A brief discussion of events and activities of interest to the Society will take place at the beginning of the meeting followed by the evening's Presentation to start no later than 7:15 pm. The Presentation will be followed by a business meeting and the monthly meeting will be adjourned following the business portion. Ed then opened the floor to discussion.

Member Rich Richins reported on conditions in the area of the Society's Dark Sky Observing (DSO) area near Upham. The white lights on the radio broadcast tower to the west are as bad as ever, possibly worse. However, there is a pullout on the paved road north to Spaceport America that can accommodate several vehicles and telescope setups. This road currently sees very little vehicular traffic and may serve as an alternate viewing location.

Member Stephen Wood has additional Great Courses CDs/DVDs to give away at tonight's meeting.

Treasurer Trish Conley informed interested parties/potential new members of the new meeting time.

Outreach Coordinator Chuck Sterling announced that a Moon Gaze and Leasburg Dam State Park (LDSP) event (Solstice event) will both occur on 07 December. Additional member participation will be required to support these events at two separate locations, El Milagro Coffee y Espresso and LDSP.

Several members reported on recent star party events, including the recent one at Rusty's RV Campground in southwest New Mexico.

### Presentation:

This month's presentation was by ASLC member Steve Barkes on "The Zeeman Effect". Steve chose this topic after some consideration because it involves both astronomy and spectroscopy, two of his primary interests. He provided a brief recap of several of his previous presentations on spectroscopy. He noted that electricity and magnetism are intricately related and included a brief discussion of electromagnetism and polarization of light including the "picket fence" analogy.

In the late 1800s, Pieter Zeeman, working under Hendrik Lorentz (shared the 1902 Nobel Prize for Physics), combined a spectrograph with a magnetic field to discover spectral line splitting in the sodium doublet. This effect is like the Stark Effect which splits a spectral line into its several components in the presence of an electrical field. The Zeeman Effect continues to have modern applications such as Magnetic Resonance Imaging (MRI).

## November 2019 Minutes cont...

### Call to Order:

Ed Montes, Vice President, called the November meeting of the Astronomical Society of Las Cruces (ASLC, the Society), to order at 7:52 pm on 22 November 2019, in the Creative Arts Room, Good Samaritan Society Las Cruces Village, 3011 Buena Vida Circle, Las Cruces, New Mexico. Ed noted that the October meeting minutes were not available for inclusion in the November issue of the Society's newsletter, the *High Desert Observer* (HDO), but were distributed to the membership by the Secretary via email. If there are no corrections, additions, or amendments, Ed moved that the October minutes be accepted as distributed; Fred Pilcher seconded. The October minutes were accepted by acclamation.

### Treasurer's Report:

Trish Conley, Treasurer, gave a brief report on the Society's accounts. The Society took in \$21.45 in October. Society membership dues for 2020 are receivable as of 01 January 2020. Trish will accept payments tonight as well.

### Business:

**Internet Groups** – Steve Shaffer is moderator for the general group. He will prepare instructions for joining the various groups for publication in the HDO. Rob Westbrook, HDO editor, confirmed his intent to publish an issue of the HDO in December.

**Holiday gathering** – Ed Montes announced the date for the gathering will be 14 December, 6:00 pm, at Tracy Stuart's home, 777 Scenic View Drive. The format will be a pot luck with the Society providing a main course and members supplying side dishes. More details will be coming via email. At least sixteen (16) members present at tonight's meeting expressed intent to attend. There will not be an additional December meeting.

The November meeting of the Astronomical Society of Las Cruces concluded at 8:03 pm. A social time followed at Pecan Grill.

-Respectfully submitted by John McCullough, ASLC Secretary

# **Outreach report for November, 2019**

by Jerry McMahan

## **Tombaugh Observatory**

Steve Shaffer operated the 12.5 inch telescope. He was assisted by Steve Wood and Jerry McMahan. We stayed on Saturn the entire evening. As usual the planet was a hit with the observers.

## **Moongaze**

Steve Wood, Howard Brewington and Jerry McMahan set up telescopes. I think that Ed Montes also made an appearance If I remember correctly. That is what I get for not writing about something soon after the fact. The Moon, Saturn and Jupiter were the targets of the night.

## **Leasburg Open House.**

We did not have a telescope operator show up, so the 16 inch was not in use. Howard Brewington and Jerry McMahan were in the observatory. Howard worked on the alarm system and I, as usual watched.

Steve Wood operated the 11 inch Celestron. Ed Montes provided a laser guided tour of the sky.

## **New Beginnings Christian School**

I was not able to attend this event, but Steve Wood did give me a report. He said that he and Tracy Stuart brought scopes. There was a large crowd but Steve said that even with only two scopes the two hours gave people a chance to view several times.

## **Year End Summary**

We had a number of successful outreach events during 2019. For the third straight year, the number of events were below average due to weather and fewer school events. Chuck Sterling did his usual job of organizing events and maintaining the event calendar including the one on Facebook.

Steve Wood wins the MVP award for the most events attended with honorable mention to Chuck Sterling, Howard Brewington and Ed Montes.

## The Uranograph - December 2019.

By Bert Stevens

### How Bright is that Star: The Magnitude Scale.

Rather than look at one of the eighty-eight constellations this month, we are going to look at how astronomers measure the brightness of objects in the sky. For any object, all the light from the object is assumed to be coming from a single point. A star is already a point (or close enough), but a planet, comet or nebula is much harder to imagine as a point. Nevertheless, using this measure allows us to talk about the magnitude of a star, planet, comet, the Sun or the Moon on the same brightness scale.

The system of magnitudes started in ancient times. Hipparchus, an ancient Greek astronomer, was the first to catalog the heavens around 129 B.C. In the process, he sorted the stars into brightness groups. He took the brightest stars and called them "first magnitude" stars. These stars would appear in the sky within the first ten minutes after sunset. The next group of fainter stars he called "second magnitude". Hipparchus worked his way down, visually estimating the brightness of each star, until he had classified the faintest stars that he could see as "sixth magnitude". These stars would appear in the sky an hour after sunset, when the sky was fully dark.

The first improvement on this system was made by Claudius Ptolemy, another Greek who lived in Alexandria (in Egypt) from approx. 87-150 A.D. Ptolemy took Hipparchus' idea and extended it by marking certain stars as "greater" or "smaller", thus beginning the process of separating the six magnitudes into finer divisions. This is where the scale stood for fifteen hundred years.

In the early 1600s, Galileo was amazed to discover that when he looked almost anywhere in the sky with his telescope, he saw hundreds of fainter stars than those of the sixth magnitude. In keeping with tradition, Galileo named the brightest of these newly discovered stars "seventh magnitude", extending the scale toward the fainter end. As telescopes got larger, the stars astronomers could see got fainter.

By the middle of the 18<sup>th</sup> century, astronomers realized that more precision was required in the magnitude scale. They had already measured that a first magnitude star was one hundred times brighter than a sixth magnitude star. At Oxford University in 1856, Norman R. Pogson suggested that a brightness ratio of 100 be made exactly 5 magnitudes. This proposal was quickly adopted, making a one magnitude change being equivalent to a brightness change of 2.512 times. So, if you want to go 5 magnitudes, you would multiply 2.512 times itself five times which would give you the 100 times brightness ratio. Since the instrument Hipparchus used was the human eye, the magnitude scale is a logarithmic scale.

With this system in place, astronomers discovered the very brightest stars in the sky are significantly brighter than the average first magnitude star. These brightest stars in the sky are actually much brighter than magnitude one, with magnitudes that are in the zero range up into the negative numbers. The brightest star in the



...sky, Sirius, is actually magnitude -1.44. Going up the brightness scale, you find the Full Moon around magnitude -10, and the brightest object in our sky, the Sun, is magnitude -26.8. At the other end of the scale, the Hubble Space Telescope has observed stars at magnitude +30.

By defining five magnitudes as a brightness change by a factor of one hundred, astronomers have mimicked the human eye's response to light. As a logarithmic function, when the brightness goes up by a factor of one hundred, the magnitude goes down by five. The formula for converting the brightness of two stars into a magnitude difference is:

$$m_2 - m_1 = -2.5 \log_{10} \frac{b_2}{b_1}$$

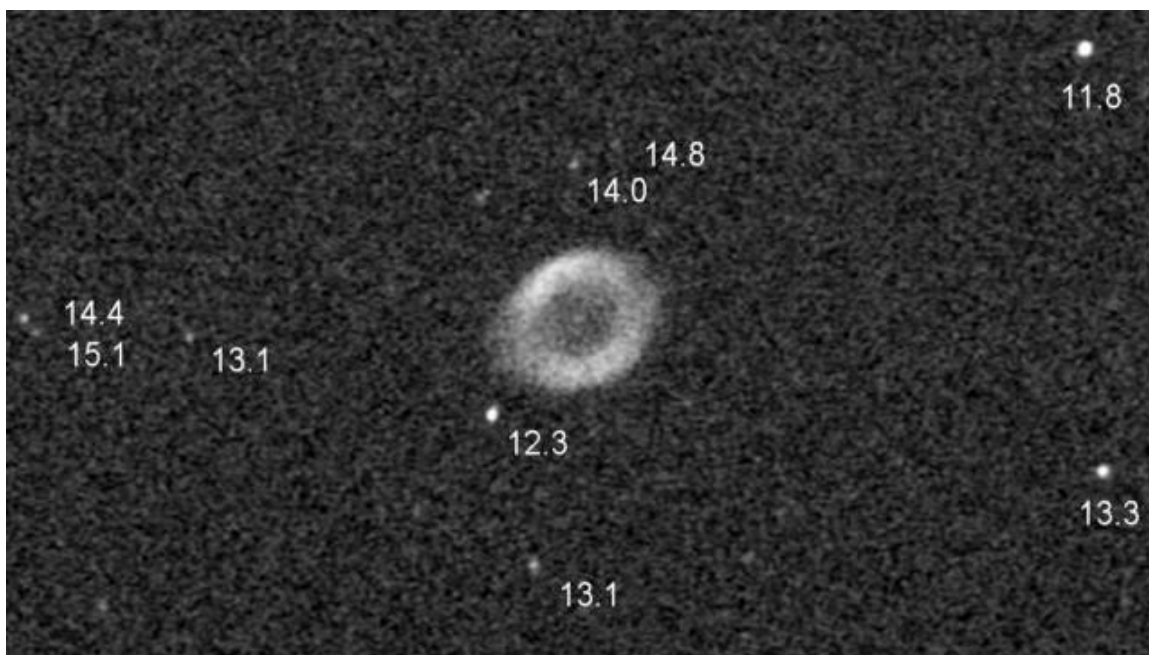
So as long as we can measure the brightness of stars, we are able to compute the magnitude of the stars relative to each other.

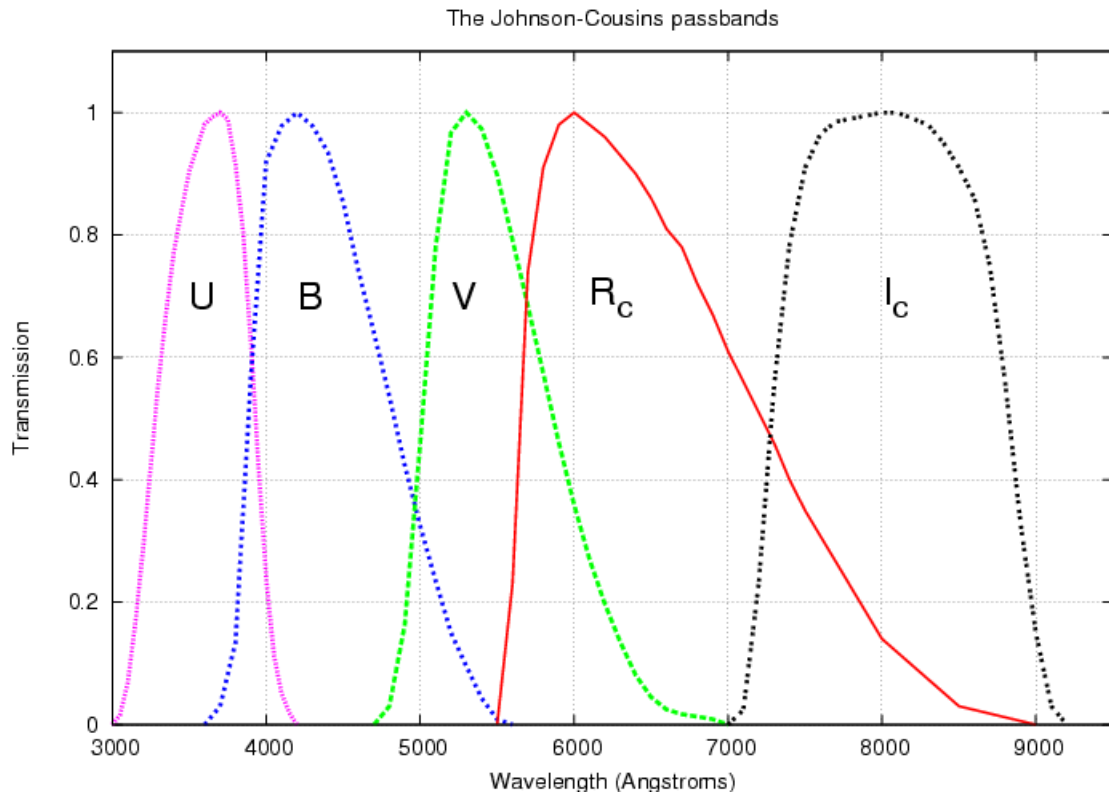
When Pogson defined his system of magnitudes, he set Polaris as exactly magnitude +2.0. Astronomers later discovered that Polaris was slightly variable. They then set Vega to be exactly magnitude 0.0. Vega was not always high in the sky, so a group of circumpolar stars in the northern sky were picked that would always be visible for calibration purposes. Their brightnesses were measured and magnitudes assigned in such a way that the first magnitude stars would still be first magnitude (brighter than magnitude +1.50). This group of stars are called the North Polar Sequence and the calibration became the International System.

So, in terms of looking at the night sky, only the very brightest objects have negative magnitudes. Most of the bright stars in the sky are around magnitude one. Second magnitude stars are still easy to see in the city sky. By the time you get down to the third magnitude, it is getting more difficult to see these stars from the city, but still easy in the desert. By fourth magnitude, the star is almost impossible to see from a city, but still visible from the desert or the outskirts of the city. Fifth magnitude stars are invisible in the city, barely visible from the outskirts, and still visible in the desert. Finally, sixth magnitude is only visible in the desert. If you get out into the desert far from any artificial light and are looking through young eyes, you might be able to glimpse seventh magnitude stars.

Why did I mention "young eyes"? Just like a telescope, your eye has a lens that focuses the light onto the retina at the back of the eye. Right behind the lens is a pupil. This circular opening controls the amount of light entering the eye, allowing us to look at bright mid-day scenes and dim nighttime scenes. When we are young, the pupil can open as wide as a quarter inch. As we age, the pupil does not open as wide, forcing us to look through a smaller and smaller "telescope". Since less light gets to the retina in the aged eye, the star has to be brighter for it to be able to be seen by "older eye".

Number	Magnitude (V)	Bayer Designation	Proper Name	Spectral Class
1	-1.46	$\alpha$ CMa	Sirius	A1 V
2	-0.74	$\alpha$ Car	Canopus	F0 Ia
3	-0.27	$\alpha$ Cen AB	Rigel Kent, Toliman	G2 V/K1 V
4	-0.05 var	$\alpha$ Boo	Arcturus	K1.5 III
5	0.03	$\alpha$ Lyr	Vega	A0 V
6	0.08	$\alpha$ Aur	Capella	G8 III, G1 III
7	0.12	$\beta$ Ori	Rigel	B8 IaB
8	0.34	$\alpha$ CMi	Procyon	F5 IV-V
9	0.42 var	$\alpha$ Ori	Betelgeuse	M2 IaB
10	0.50	$\alpha$ Eri	Achernar	B3 Vpe
11	0.60	$\beta$ Cen	Agena, Hadar	B1 III
12	0.77	$\alpha$ Aql	Altair	A7 V
13	0.77	$\alpha$ Cru	Acrux	B1 V
14	0.85 var	$\alpha$ Tau	Aldebaran	K5 III
15	0.96	$\alpha 2$ Aur	Capella B	G1 III
16	1.04	$\alpha$ Vir	Spica	B1 III-IV, B2 V
17	1.09 var	$\alpha$ Sco	Antares	M1.5 IaB-b
18	1.15	$\beta$ Gem	Pollux	K0 IIIb
19	1.16	$\alpha$ PsA	Fomalhaut	A3 V
20	1.25	$\alpha$ Cyg	Deneb	A2 Ia
21	1.30	$\beta$ Cru	Mimosa, Becrux	B0.5 IV
22	1.35	$\alpha$ Leo	Regulus	B7 V





Some favorite holiday movies... Can you name them?



## Member Astrophotos



*Image of Omega Centauri. I had no idea we could see it from our latitude but accidentally spotted it while sweeping the horizon with a pair of binoculars! We also saw it from Leasburg last Spring. This cluster is huge! 10 million stars. Easily seen with the naked eye from a dark site, it is as big as the full moon! Anyway I took this last year from my observatory in Mayhill. It skirts the horizon for just a couple of hours and reaches a whopping 8 degrees maximum altitude! This was just an hour and half total exposure time. 3 sets of images including 30 sec, 1 min and 3 min all combined in Pixinsight. I used a Takahashi 180ED and Canon 60 Da.*

— Dave Doctor



*Here are some Mercury transit pics that I was able to capture during the last 30 minutes. I got clouded out at my first choice NW of Silver City, because it looked like it was going to be cloudy at my home that day. I got up at 0200 and drove up near the Cosmic Campground, but then a cloud started to form there right at sunrise. I finally was able to skirt it and setup at Bill Evans Lake south of Cliff, NM. Take your pic of which one(s) to use. They were shot with my mirrorless Sony DSLR through my 4" refractor with a Lunt Herschel wedge. It was too bad that the sun was so featureless that day. Pretty bland images. No processing done other than removing some dust spots with the spot removing tool in Microsoft Photos, included in Windows 10.*

*Did not have time to set up my remote focuser, so I had to touch the telescope and no time to set up my planetary camera for Lucky Imaging. ISO of 100 and 1/800 of a second @ 1350 mm focal length for the full disk image. ISO of 100 and 1/125 of a second @ 2700 mm focal length for the others.*

*But it's always cool to see how massive the sun really is when it has something to scale it against.*

*November 11, 2019 from about 1033 to 1103*

— Mike Nuss

## Member Astrophotos *cont...*



*Here is the info on this (still working color for it).*

*Full-size crop of M81 and M82 (full image is much wider field - so this image isn't large size), with Holmberg IX showing below M81. In this image, as well as in what I am still processing, I am also seeing the Integrated Flux Nebula (IFN)...very faint, but visible when stretched. This is a result from the first night of imaging (25 Oct 19) I have done at our new home in much darker skies (still in the Las Cruces vicinity). Huge difference in light pollution and obvious this night when I pulled down the first image from the camera.*

*This is LUM only, 20x10mins.*

*Scope: Tak FS-60C*

*Mount: Tak EM200*

*Camera: QSI 690wsg*

*Guider (OAG): SX Lodestar*

*— Jeff Johnson*

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Merry Christmas! Happy Hanukkah! Happy New Year!  
Hope to see you safe in 2020!