

# The High Desert Observer

## July 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 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, 2019

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



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### July Meeting --

Our next meeting will be on **Friday, July 26**, at the Good Samaritan Society, Activities Meeting Room at 7:00 p.m.

The speaker scheduled for this month is Drew Chojnowski. He will tell us about his research with Magnetic Stars..

### 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.

### 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 Pan Am Plaza (on University) 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.

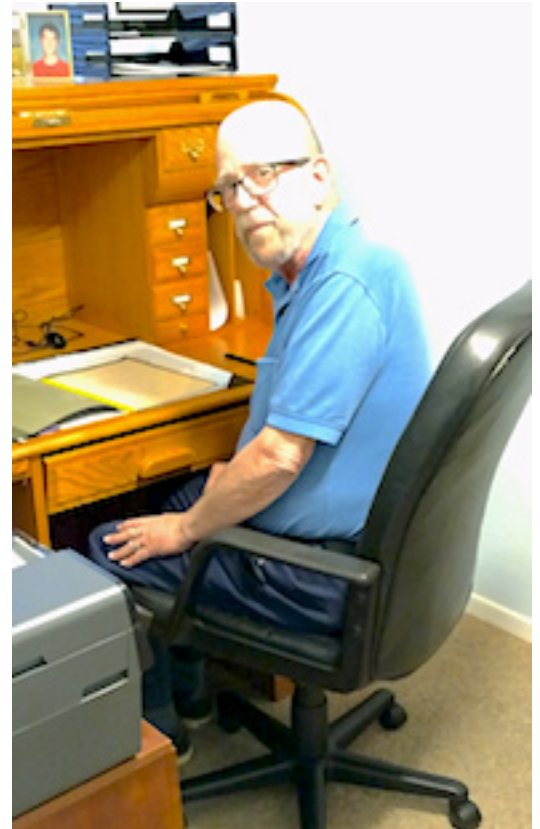
Please see *Calendar of Events* for specific dates and times.

# From the President's Desk

July 2019

## ***Something to think about!***

Dark matter is an idea that is used to explain many behaviors in the universe that don't quite fit with Newtonian gravity. The problem is that we haven't been able to find this elusive substance. Moritz Platscher has another idea modifying gravity. Gravity is tweaked by a phenomenon known as Vainshtein screening. This suggests that each sufficiently dense object generates an invisible sphere around it which determines how the laws of gravity behave with growing distance. The larger the mass the larger the bubble surrounding it. Within the bubble gravity is Ordinary Newtonian gravity. Outside the sphere the theory suggest that gravity can be enhanced even though there is not more mass present. According to the author the theory explains stellar velocities in galaxies a lot better than Einstein's general relativity which allow for dark matter. The article is Long Range Effects in Gravity Theories with Vainshtein Screening. Journal of Cosmology and Astroparticle Physics



Our speaker this month is Drew Chojnowski a doctoral candidate at NMSU. He will be discussing his work at Apache Point on magnetic stars.

Preview of coming attractions: Sept—Dr Nancy Chanover  
Oct—Fred Pilcher  
Nov—Steve Barkes

We still need a speaker for August.

THE ANSWER IS 42!

Tracy Stuart, ASLC President

July 2019

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**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  
2019 June Report by Jerry McMahan

**Moongaze, Saturday, June 8**

Chuck Sterling and Jerry McMahan were at the International Delights. This may have been the last Moongaze at the International Delights since the restaurant may be closing down. I had the ETX 125 ten Omm refractor. We had good weather and were both on the Moon. It was a good session. Steve Wood and Howard Brewington were at Pan Am Plaza, or at least I assume they were. I have not yet had a report on their session. I will let you know what happened latter. The report is in. Rob Westbrook and Ed Montes joined them.

**Friday, June 21, Space Port.**

Steve Wood and Mo Bush attended the event at Space Port USA. Steve said that they spent about 3 hours each at the event. He said there were some people from El Paso there as well.

**Leasburg Dam State Park, Saturday, June 22**

Steve Wood operated the 11 inch Celestron. Chuck Sterling, assisted by Jerry McMahan, were in the observatory. Ed Montes was there to help everyone. There were a lot of clouds, but we had enough holes in the clouds to make it a successful event.

**City Of Rocks SP, Saturday, June 22**

The weather looked very promissing all day at CoR and fortunately, it did turn out to be a very good night. Even the seeing was good.

We had a small but very engaged crowd of about 35-40 people, mostly adults,

Mike Nuss handed out our loaner red flashlights and then explained how to use them and how not to use them. He also covered dark adaption and why it is important, plus how to look through a telescope and other practical topics.

John Gilkison did the main presentation and constellation tour. He brought a 5 inch refractor and was thrilled when he was able to split Antares in it. Mike Nuss manned the 14 inch Meade in the observatory. Charles Turner brought a 6 inch telescope and Kevin Brown brought two telescopes to entertain our guests with views of the heavens. Mike is still having a very difficult time with the Meade 14. We just bought a new hand control from our donation money, and it was still not working. Turns out we were zapped by the dreaded GPS Rollover Bug. We have patched and updated the firmware and hope to have it working normally at the June Starparty. Not happening! The firmware patch and update has turned out to be far more difficult than anyone let on.

\* \* \* \*



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

Jul	01	20:18	Sun Sets
	01	21:38	Mars Sets
	01	18:28	Jupiter Rises
	01	20:40	Saturn Rises
	02	13:16	New Moon
	06	20:30	OUTREACH; MoonGaze, Pan Am Plaza on University Ave
	09	04:55	First Quarter Moon
	16	15:39	Full Moon
	20	09:00	OUTREACH,Lynn Middle School: Over the Moon for Apollo 50 th Aniversary.
	24	19:18	Last Quarter Moon
	26	19:00	ASLC Monthly Meeting; Good Samaritan Society, Activities Meeting Room
	27	20:30	OUTREACH; Dark Sky Observing at Leesburg Dam State Park
	31	20:12	New Moon, Again!
Aug	01	20:05	Sun Sets
	01	16:16	Jupiter Rises
	01	18:30	Saturn Rises
	07	11:31	First Quarter Moon
	10	20:00	OUTREACH; MoonGaze, Pan Am Plaza on University Ave
	15	06:30	Full Moon
	23	19:00	ASLC Monthly Meeting; Good Samaritan Society, Activities Meeting Room
	23	08:56	Last Quarter Moon
	24	20:00	OUTREACH; Dark Sky Observing at Leesburg Dam State Park
	30	04:37	New Moon

Be sure to visit our web site for ASLC information: [www.aslc-nm.org](http://www.aslc-nm.org)

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### Announcements

1. The July ASLC meeting will be held on July 26, 2019 at 7:00 PM at the Activities Meeting Room, Good Samaritan Society Las Cruces Village, 3011 Buena Vida Circle, Las Cruces, New Mexico. The program for the July meeting will be Drew Chojnowski a doctoral candidate at NMSU. He will be discussing his work at Apache Point on magnetic stars..
2. 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!
3. The NPO does not usually have presentations at the Deming State Parks in the months of July and August. Experience has shown that rain and clouds are so common in these months that the chances of having a star party are very slim. If you look at a graph of average rain by month, July and August have double the rainfall, on average, as any other months.

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### **Budget:**

The committee has met and has formulated a proposed Society budget for 2019-2020. The proposed budget will be presented to the membership at the July monthly meeting. This year's committee consisted of the Society President (Tracy Stuart), Treasurer (Trish Conley), and Rani "Mo" Bush, the non Board member-at-large.

### **Old Business:**

1. Presentations – Monthly meeting presentations for the remainder of 2019 are set. A NMSU graduate student will present on magnetic stars in July. Marcus Cohen will provide a presentation on his theory of relativity and unified field theory in August. Nancy Chanower will present in September. Fred Pilcher has a presentation for October. Steve Barks will be the presenter in November.
2. The AAVSO meeting will be held in Las Cruces in October. The Society has been asked to help support this event.
3. Okie Tex Star Party registration is open.

### **New Business:**

1. Deming-area star parties – The Society's Board of Directors will meet with John Gilkison to discuss details of the Society assuming responsibility for public presentations at City of Rocks and Rock Hound State Parks.
2. Radio forum – The community radio program that previously hosted Society members for an informal science discussion last year would like to repeat that. Ed Montes will coordinate with the station.

### **Presentation:**

This month's presentation was planned to be a Texas Star Party (TSP) 2019 overview. Unfortunately, the speaker was ill. No presentation was made.

The June meeting of the Astronomical Society of Las Cruces concluded at 8:07 pm. A social time followed at Pecan Grill.

-Respectfully submitted by John McCullough, ASLC Secretar

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# The Uranograph - July 2019.

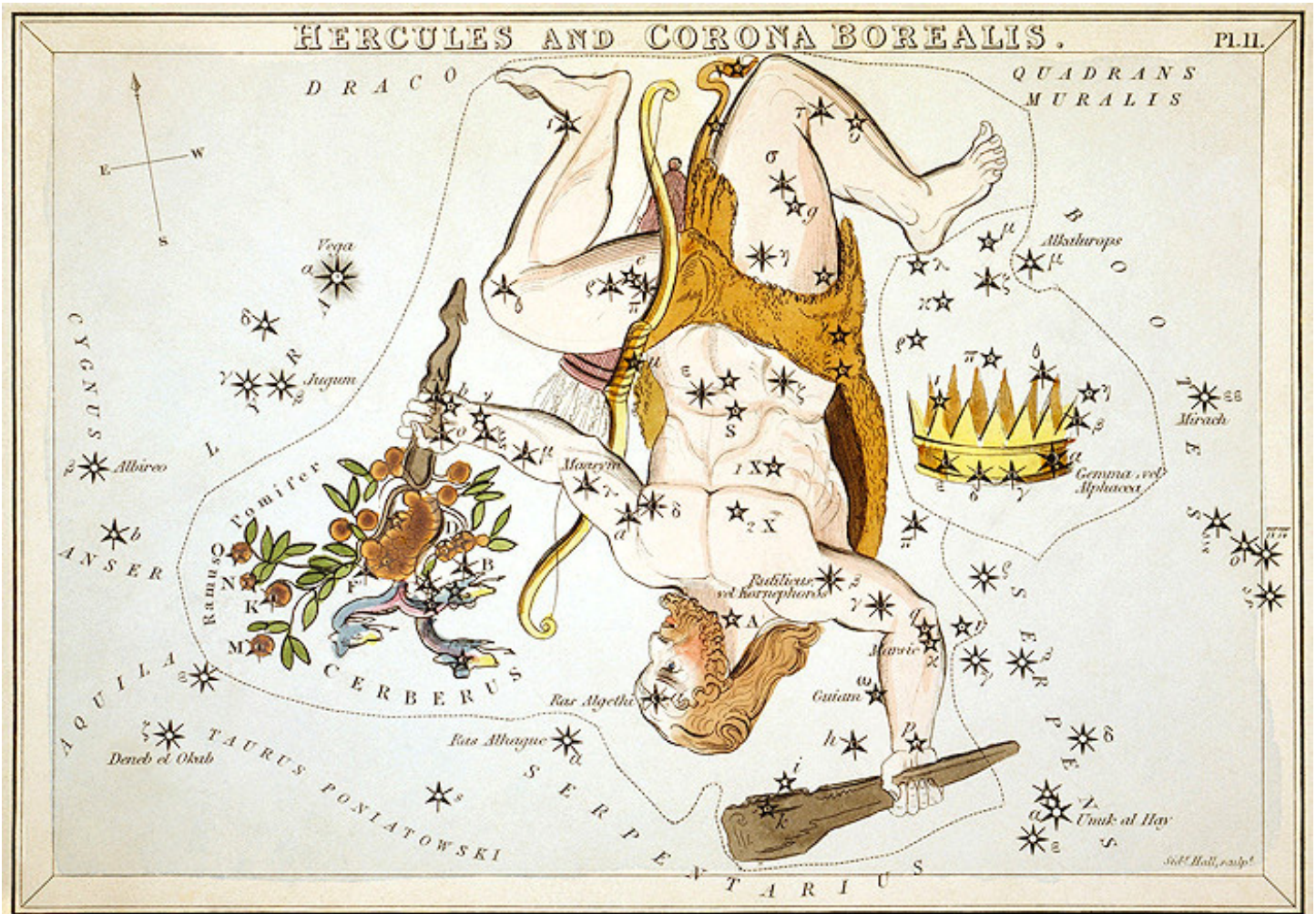
By Bert Stevens

## Constellation of the Month: Hercules, Son of Zeus

The hero Hercules is famous from his appearances on television, in movies and in animated features as well. Most of these stories simply use the name Hercules without following any hints of the Greek myth. Here is the real story behind our constellation of the month.

Hercules was the son of Zeus and Alcmene. Up to his old tricks again, Zeus, disguised as Alcmene's husband, tricked her into an amorous tryst. When her husband, Amphitryon, returned home the next day, she realized she had been duped. When Alcmene gave birth to Hercules, she also gave birth to Iphicles, the natural son of her husband. Knowing that Zeus' wife, Hera, would be infuriated by the child, she named him Herakles (which means glorious gift of Hera in Greek) to honor her. But, like with everything that Hercules himself did, Hera only became more enraged at this. Most of the dangers Hercules faced were the result of Hera's rage.

As an infant, Hera sent two snakes to try and kill him. With his great strength, he was able to crush both of them. Later, he became a shepherd and while caring for his sheep, he killed all the predators that may have preyed on them. In gratitude, the King of Thebes allowed Hercules to marry his daughter, Megara, and they had several children. They slowly settled into a happy and quiet life.



**The Constellation of Hercules.** Hercules, the Greek hero, is actually standing on his head when he is high in our sky, if you are looking south before looking up at him. If you look north and then look up at him, then he is standing upright.

Unfortunately, Hera was not finished with Hercules and she made him insane. While in this state, he killed his wife as well as their children. When he regained his sanity and realized what he had done, he went to the Oracle at Delphi to see how he could atone for these misdeeds. The oracle told him to go and serve his cousin Eurystheus, King of Mycenae, and to perform ten labors for him.

Eurystheus assigned him almost impossible and dangerous tasks. Each is worthy of a story in its own right, but here they are in list form:

- Dispatch the Nemean Lion;
- Dispatch the Lernaen Hydra (Hercules made his arrows deadly by dipping them in the Hydra's gall bladder, but Eurystheus did not count this one because Hercules had help from a cousin.);
- Capture of the Cerynean Hind (deer);
- Capture the Erymanthian Boar;
- Cleaning the Augean Stables in one day (Hercules got one-tenth of the stable's owner's cattle, so Eurystheus would not accept this feat either);
- Drive off the Stymphalian Birds (beaks of brass!!);
- Capture the Cretan Bull;
- Capture the man-eating Horses of Diomedes;
- Obtain Hippolyte's (Queen of the Amazons) Belt;
- Capture the red cattle of the monster Geryon (who had three bodies joined together at the waist-Hercules erected the Pillars of Hercules at Gibraltar during this labor);
- Obtain the Golden Apples of the Hesperides.
- Finally, Capture of Cerberus, the three-headed dog who guards the Gates of Hades.

Having completed his Labors, Hercules could look again for happiness. He still had many adventures before he finally won the hand of the beautiful maiden Deianeira. They settled down, but the centaur Nessus kidnapped Deianeira. Hearing her cries, Hercules set out to rescue her and shot the centaur with one of his deadly arrows. The arrow killed the centaur, but as the centaur died, he told Deianeira that a drop of his blood would restore Hercules' interest in her if ever he should stray.

A while later, thinking her Hercules was losing interest, Deianeira put the drop of Nessus' blood on Hercules' tunic. When Hercules put the tunic on, the blood, which had been poisoned by the Hydra's gall fluid that had been on Hercules' own arrow, burned Hercules' skin and making a very painful wound. Deianeira, in despair over what she had done, hanged herself. Hercules again had lost his wife and in sorrow incinerated himself. Zeus then gave Hercules immortality by putting him in the sky as our constellation of the month.



*Image1: Messier 13, Globular Cluster in Hercules*





The constellation Hercules has one famous object in it, the globular cluster M13. Through a telescope, this is one of the best-looking globular clusters in the sky. The only one that really outshines M13 is Omega Centari, which is only barely visible from here in the desert southwest, just above the southern horizon. M13 is magnitude +5.8 and it is about 20 minutes-of-arc across.

Globular clusters are huge conglomerations of ancient stars. M13 is 11.5 billion years old, as are most of the stars in it. These stars are bound together by their mutual gravity. Those near the center of these giant spheres of stars are very close together, tightly held in place by their mutual gravity.

The strength of gravity is proportional to the mass and inversely proportional to the square of the distance. The stars packed closely together in the center of a globular cluster feel each other's gravity more strongly due to their proximity. Many of the stars are massive and the combination of proximity and mass make for a strong gravitational field emanating from the core.

This gravitational field keeps the core stars tightly packed together. Farther from the core, the member stars are farther apart. The density of stars drops rapidly with the distance from the core, giving most globular clusters a very distinctive look compared to the more evenly distributed stars in an open cluster

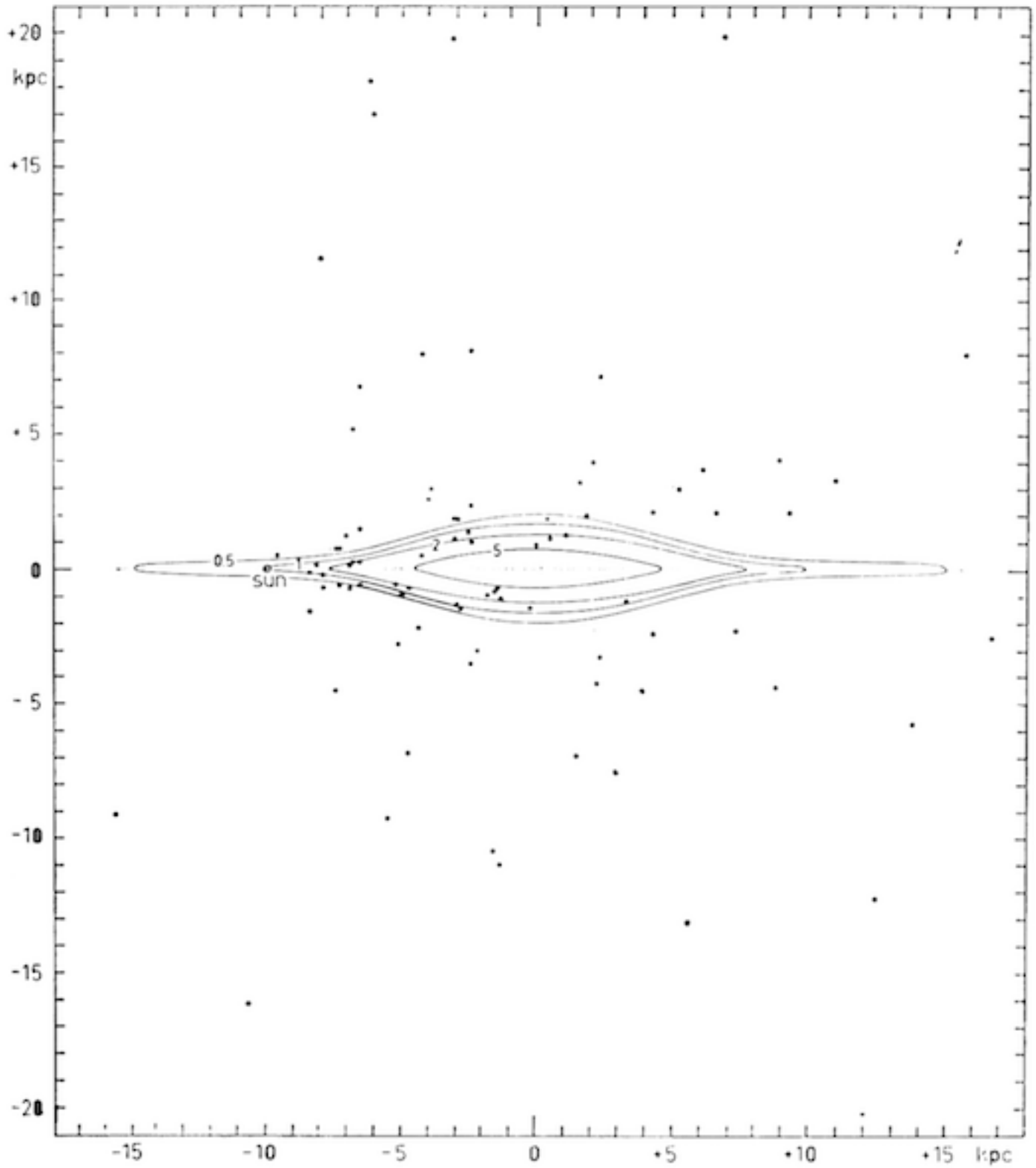
While open clusters are generally in the plane of our galaxy, globular clusters are generally far from the galactic plane. Each globular cluster has its own unique orbit around our galaxy's center, far from any other globular. Not being in the galactic plane, these globular clusters hang all alone in space, with few neighboring stars.

Our galaxy is of the barred-spiral type. Most of the remaining gas and dust from the galaxy's formation is trapped in the galactic plane, where it condenses to form the stars that illuminate and define the plane. Globular clusters are mostly found outside of the plane of the galaxy, indicating they did not form in the plane of the galaxy but that they formed from the same gigantic gas cloud as our galaxy, but before our galaxy started to compress and spin.

The proto-galactic gas cloud was somewhat spherical. Pockets of higher density in the cloud would collapse to form star clusters. These clusters would be in random orbits that were tilted at various angles to the rotational axis of the overall cloud. Eventually, the gas and dust started to migrate into the plane of rotation, until the star clusters were left all alone outside of the galactic plane.

Occasionally, a globular cluster will pass through the plane of the galaxy as it orbits the nucleus. This is a time of danger for the outer stars in the globular, since they could be pulled off the cluster by the gravity of stars in the galactic plane as the globular passes them. The core stars are too tightly bound by their gravity to be in jeopardy of being plucked out of the cluster. The strong gravity of the cluster keeps most of the stars together, surviving the passage through the galactic plane.

One can but wonder what the night sky on a world orbiting one of those stars near the center of M13 would look like. Thousands of brilliant pinpoints would pepper the sky, like diamonds piled on black velvet. The sky on such a planet would be many times brighter than our sky is when the glare of the full moon brightens our night sky.



**Distribution of "Globular Clusters around the Milky Way**

*Globular clusters are scattered in a spherical space around the center of our galaxy. They are old clusters that formed before our galaxy assumed its barred-spiral shape. Since they orbit around the Milky Way's nucleus, they go through the dust, gas, and stars in the plane of the Milky Way twice each orbit.*

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## Laser Guided Star Tours Content Guide

\*(Caution do not point laser at airplanes and only behind satellites for safety)\*

Purpose: To acquaint the lay public with the general principles organizing the sky for astronomical purposes. A laser guided tour should include the following points if practical.

1: Show the North Polar Coordinate and how the sky appears to rotate around this point near the pole star Polaris. Describe the Little Dipper (Ursa Minor) and the Big Dipper (Ursa Major) and how the two end stars of the Big Dipper point right at Polaris which is useful for finding the North Star. Describe how this can a 24 hour clock that rotates counter clockwise.

2: Describe other constellations in the circumpolar region the Region of Perpetual Apparition and their relationship to the dippers. Describe what a constellation is and why it is a useful guide to areas of the sky. Those constellations would be Cepheus, Cassiopeia, Perseus, and Draco. Explain that there is a corresponding area of the sky below the South Point called the Region of Perpetual Occultation that never rises here in the Northern Hemisphere.

3: Describe how stars, the Moon, and the Sun appear to rise in the east and set in the west but that this is really the Earth just turning on its axis. Describe how the actual motion of the Sun and the Moon through the sky is really from west to east. The Sun for example appears to move less than one degree per day  $360/365.24 = .958$  degrees on average. How the Moon in its orbit around the Earth moves approximately 13 degrees per day  $360/27.5 = 13.09$  degrees.

4: Using the already described constellations explain how it is best to learn the constellations two or three at a time using their relationship to one another. For example, explain using the arc of the Big Dipper handle as a guide, describe how to reach Arcturus in Bootes, and then go on to Spica in Virgo.

5: Using any Zodiacal Constellation begin to fill in the sky by linking the ecliptic and stringing the Zodiacal Constellations together across the sky. If the Zodiacal Light is visible show and explain it in the western sky. Explain how the Sun and the Moon as well as the planets will all be found near the ecliptic in the sky. Point out the First Point of Aries the Winter Solstice or the Summer Solstice as well as the First Point of Libra. Describe how all these coordinates points are now shifted one constellation towards the west since the time of the Greeks 2,000 years ago.

6: Go back to the Little Dipper and using it find Thuban pointing out this was the Pole Star in the time of the Egyptians in 3,000 BC and how the pole has drifted to its present day location of Polaris. Describe Precession and how the Earth's axis wobbles once every 25,800 years and how it is responsible for changing the cardinal points (the Solstices, and Equinoxes) in the sky.

7: You can go on to describe how this has thrown off your Sun Signs in your Horoscope (if you like) as your birth Sun Sign is based upon where the Sun was 2,000 years ago when Astrology was invented. I feel that since most people are aware of the signs this is a connection to the sky they may be interested in and your information about how the signs are off cast doubt about the validity of astrology without really you saying anything else about it.

8: I usually ignore really dim or hard to see constellations. For example while I may show off the Three Leaps of the Gazelle (not a constellation) I will usually ignore Leo Minor. There are so many constellations to describe in one session anyway it is good not to throw in too much information at once. Be sure to point out the Alpha stars in each constellation and their names where practical. Show

asterisms where practical like The Summer Triangle or The Winter Hexagon which are a good guide to learning several constellations at once.

9: After showing and explaining the Ecliptic show off the Milky Way Galaxy when it is readily apparent. Explain and point out the direction of the center of the Galaxy in Sagittarius and the point opposite the center towards the outer edge in the foot of Gemini. Show how the Ecliptic is tilted 81 degrees relative to the Galactic Equator (the plane of the Milky Way) and explain what that means for the orientation of the solar system in the galaxy.

10: For example in the spring when the Galactic North Pole is high in the sky the galactic equator is on the horizon all around us in the Northern Hemisphere. In late spring the center of the Milky Way begins to rise in the southeast as Gemini sets in the NW. We are looking out the northern portal of the Milky Way.

11: Away from the plane of the galaxy, stars only extend out for about a 1,000 light years and we can see thousands of galaxies that run down the 13th hour Right Ascension line. In the fall we look out the southern portal of the galaxy towards Sculptor and there is a similar trail of galaxies running down the 1st hour Right Ascension line.

12: It is in the fall that we see the great Andromeda Galaxy. It is the only galaxy (other than the Milky Way and the Magellanic Clouds) that is readily visible to the unaided eye. Point out to your audience how to find Andromeda Galaxy and that it is 2.5 million light years away. Point out that it is the most distance object that can be seen by the human eye.

13: After filling in the southern constellations (as well as the constellations north of the ecliptic earlier) you are finished. At this point you can take questions although I often tell folks to ask questions as we are conducting the program because they may forget them later in the program.

14: Explain that there are only about 6,000 stars that can be seen by the human eye and only half of them are above the horizon at a time. Because of extinction we typically only see 2,000 to 2,500 stars at any one time. If stars were sand that many stars could be held in a thimble.

15: There may be as many as 200 billion stars in the Milky Way Galaxy and if they were all grains of sand it would take a dump truck to hold them all. We generally only see stars out to not much further than 2,000 light years. This is the relative scale of the visible night sky.

John A Gilkison / President National Public Observatory 2019

Here are all three parts of the YouTube Videos Laser Guided Star Tours for presenters. Sorry, you will have to copy and paste the links into your browser. --Charles

Part 1: [https://youtu.be/4MTtFP\\_ZH14](https://youtu.be/4MTtFP_ZH14)

Part 2: <https://youtu.be/YN8ZLue1ZjA>

Part 3: <https://youtu.be/-CsCTQh8pgI>

## **Editor's Comments:**

Most of you know that I really like the idea of a Sky Tour Presentation at a star party. I feel that it makes a huge difference in the engagement of our guests. They get to sit back, relax and have someone show them the sky and explain some of the basic concepts of sky motion, how to find the north star, what is the ecliptic, where is the Milky Way, etc. It gives us a chance to educate, inform, and entertain them. I think that is our ultimate goal.

I also do not think that we should think of the Sky Tour as a substitute for looking through a telescope. Most people do not have access to a telescope, so this is a rare opportunity for most. One thing that I try to do is mention the telescopic objects that they will view, so they will be prepared for some of the different objects. I usually tell them to ask questions of the person operating the telescope they are using. The idea is to link the Sky Tour with the telescope viewing.

Another thing that I try to do is prepare for the event.. I use star charts or a planetarium program to look up 6 or 8 bright and interesting objects. I make sure I know how to find them and try to note some interesting facts about the objects. Somebody always asks, "How far away is it?" "How big is it?" etc. It is good to have some key facts readily available.

One downside to a Sky Tour is that we have to wait for the faint stars to become visible. That is about 1 hour after sunset. People get impatient. When are we going to start? etc. What we have started doing is to begin a Welcome to our star party talk about 30-35 minutes after sunset. Who are we? Why are we here? What does it cost? etc. We also use the time to talk about some housekeeping items. Flashlights! Red or white. Why do we like red? Dark adaption. What is it and why is it important? How to look through a telescope. Some people are not born with the knowledge of how to use a telescope. I have seen people grab the OTA and pull it to their eye. A little explanation goes a long way. I tell them to take their time when looking through the eyepiece. Let their eye relax and take in the view. They don't have to rush because there is a line of people. Others don't mind waiting a little longer for their chance.

Another issue for a Sky Tour is that a presenter who is very knowledgeable about a subject will sometimes tend to talk too long, without realizing that the audience is going to sleep. I have been guilty of this myself in a different context, so I know that it is hard to be aware of people's interest when you are trying to cover everything. The truth is that you don't have to cover everything. As a general rule, I would say that if you are still talking after 30 minutes, and the audience is not asking questions, you should shut up and send people off to look through telescopes. You can tell them that you will be glad to answer questions, just come on up to ask.

It is important to note that the list of items given by John is not a recipe that has to be followed to the letter. Bill Nigg, who has been doing Sky Tour presentations for the National Parks for a few years, has arrived at a similar program. Both of these guys have spent a lot of time thinking about what concepts to cover, how to present them and what to leave out. When you start doing your own presentations, you will develop your own personality, based on your experience and strengths. If you practice and think about the best way to present, you will probably come to a program that is similar to John or Bill.

I hope some of you will try this technique out. It is not difficult and it is fun, at least after the beginner jitters. Several months ago, at the end of one of our presentations and star party, an audience member came up to me after the event and said, "Thank you for doing this. I feel like I learned a lot, and I really enjoyed it."

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## Photo of the Month



NGC 6914

OTA: Star-Fire 175 (f/8)    Camera    FLI - PL16070AE Observatory    Deep Sky West

EXPOSURES:

Red: 7 X 900 sec    Blue: 8 X 900    Green 6 X 900    Lum. 16 X 900    Hydrogen 25 x 900  
Total exposure    15.5 hours    Image Width: ~1.25 deg

Processed by Alex Woronow using PixInsight, Matlab, StarNet++, Gimp in 2019

NGC 6914 is the blue reflection nebula at the center of the picture. The red cloud is an extensive emission nebula, which, in part, is ionized by a group of young stars, the Cygnus OB2 association. Cygnus OB2 is an “OB association” that is home to some very young, and most massive and most luminous stars known. It also includes one of the largest known stars, NML Cygni. The region is embedded within a wider region of star formation known as Cygnus X, which is one of the most luminous objects in the sky at radio wavelengths. The region is approximately 1,400 parsecs from Earth.

The young star cluster is one of the largest known and the largest in the northern hemisphere. Although the associated nebula is over ten times more massive than the Orion Nebula, which is easily seen with the naked eye, Cygnus OB2 is hidden behind a massive dust cloud known as the Cygnus Rift, which obscures many of the stars in it. This means that despite its large size, it is hard to determine its actual properties. The estimated number of massive stars range from 50 to 100.

The Cygnus Rift, aka Northern Coalsack, is a dark, background-obscuring cloud that is similar to the dark equatorial clouds seen in many edge-on galaxies. Parts of it can be seen in the left part of, and below the blue cloud in, this image. The estimated cloud size is about 1 million solar masses.



**M 27 Dumbbell Nebula**

This object is in the constellation Vulpecula, and is the first planetary nebula to be discovered (by Charles Messier in 1764). It is about 1400 Light years distant and is roughly 10,000 years old. Planetary Nebulae have nothing to do with planets but looked round and small, like planets, to early observers.

Planetary nebulae are formed when a star of up to 8 times the mass of the sun uses up its hydrogen core and expands to become a Red Giant. A subsequent collapse causes a shell of gas to be emitted as the star shrinks to become a white dwarf. The light and heat from the star ionizes the gas causing it to glow. Our sun will do this someday, long after we won't care about it.

If the star is very massive, a supernova occurs instead, where the star explodes and becomes very bright for a time. A shell of ionized gas (the supernova remnant) is left that glows while the central star becomes an incredibly dense neutron star observable only with radio telescopes. See M1 for an example.

Imaging Details: 10x30sRGB, total integration time: 15 minutes.

This is a "first light" image taken in 2012 by the Whiskey Creek Observatory main telescope. Winops was used to acquire the image. Maxim DL was later used to combine the images with recent enhancements done in PixInsight and GIMP.

By Kent DeGroff

## Photo of the Month



### **M81 (Bode's Galaxy) & M82 (Cigar Galaxy)**

OTA: Star-Fire 175 (f/8) Camera FLI - PL16070AE Observatory: Deep Sky West  
EXPOSURES: Red: 25 x 900 sec Blue: 30 x 900 Green: 29 x 900 Lum.:18 x 900  
Total exposure 25.5 hours Image Width:~1.4 deg

Processed by Alex Woronow using PixInsight, StarNet++, Matlab, Aurora Photo in 2019

Messier 81 (aka Bode's Nebula) is the largest galaxy in the "M 81 group" of 34 galaxies located in the constellation Ursa Major. At approximately 11.7 Mly from the Earth, it makes this group a member of the Local Group, which also contains our Milky Way Galaxy. In turn, the Local Group is within the Virgo Supercluster. Both M 81 and M 82 were discovered by the German astronomer Johann Elert Bode on December 31, 1774 and independently by Johann Gottfried Koehler around the same time.

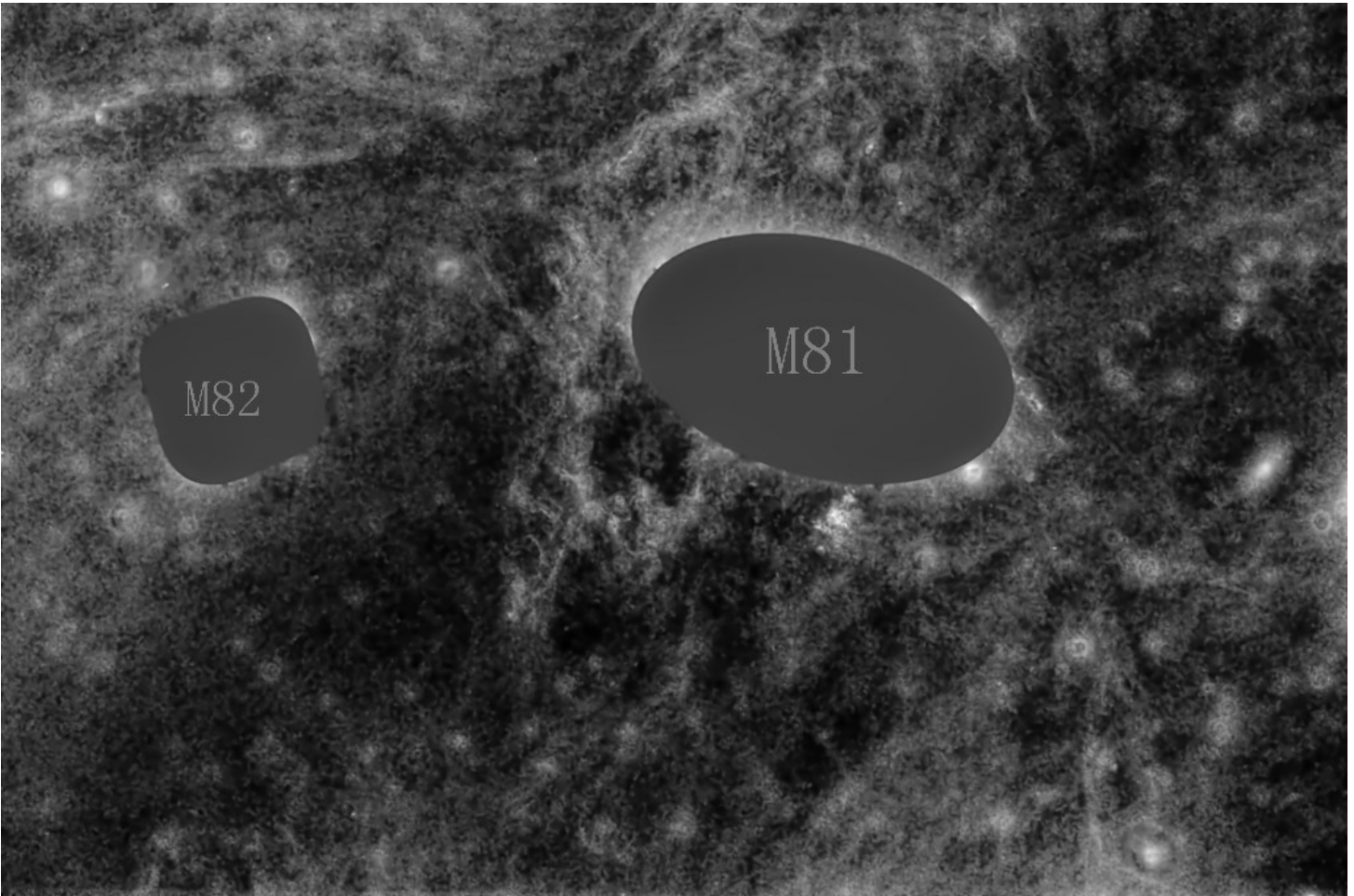
Gravitational interactions of M 81 with M 82 (aka Cigar Nebula) have allowed interstellar gas and dust to fall into the centers of M 82, leading to vigorous star formation known as "starburst."

M 81 contains a 70 million solar mass "super massive" black hole at its center. The blue hues in the image are young bright stars. The red hues are gas and dust clouds that largely owe their color to ionized hydrogen. The young blue stars contribute greatly to the ionization of the hydrogen.

M 82, with its impressive starburst (red streamers) is a major radio-frequency emitter and the brightest infrared source in the sky. Like M 81, M 82 has a super massive black hole at its center, "weighing in" at about 30 million solar masses. (Black holes commonly lie in galactic centers.)



## Photo of the Month



### **IFN - Integrated Flux Nebulae in more detail**

M 81, M 82, and more than 50 other galaxies lie behind a diffuse cloud in our own galaxy and known as the IFN (Integrated Flux Nebula), which casts a thin veil over most of our northern-most sky. It is lit not as by reflection of local star light, but by the integrated glow of the Milky Way. The IFN is composed of dust, hydrogen, carbon dioxide and many other chemical constituents, as are most interstellar clouds. One of the interesting components of the dust is the Polycyclic Aromatic Hydrocarbons (PAHs), which are organic hydrocarbons that can result from the incomplete combustion of organic materials. Not too surprisingly, PAHs have been tagged as a possible progenitor of early forms of life. (Source: largely Wikipedia & messier-objects.com)

Hi, I took the last image (to the left or above) and focused on the IFN, trying to bring out as much structure in it as possible. Starting from combination of all stacks (RGB HA L), and blocking out the bright galaxies, I removed the stars and went to work. Here's the result.

Comments, suggestions, etc. always welcomed and appreciated. Alex



**Messier 63** Here is a preliminary image of M63 from data collected April 2019. Total RGB exposure was 12 hours. I also collected H-alpha data, but it is not included in this image. RGB data was taken as 10-minute unguided exposures with my Planewave L500 mount. PixInsight processing indicates FWHM values between 1.1 - 1.9 arcsec, with a 1.6 average. (Best I've been able to collect for a full data set.)

This is my second PixInsight project, so I am still in a steep learning curve. The image FOV is 43X43 arcmin, with north up. At this time I have not cropped it since I like the 50+ little galaxies scattered throughout the background stars (not sure how many show up in the jpeg file.) After I learn more about PixInsight, perhaps I can revisit and improve this M63 effort.

Messier63 (M63, NGC5055, Sunflower Galaxy) is located in the Canes Venatici constellation at a distance of 27 – 29 Mly. It is about 50% larger than the Milky Way. It is slightly asymmetrical with H-alpha regions showing new star formation; which suggests the galaxy may have recently cannibalized another galaxy. The numerous, incomplete spiral arms indicate that it is an old galaxy (some sources speculate ~13 billion years). It is not readily apparent to me why it is called the Sunflower Galaxy, anyway I hope you enjoy it. Clear skies, rdee

## Photo of the Month



### **SH2-155 (The Cave Nebula)**

SH2-155 'Cave Nebula'

OTA: Star Fire (175mm f/8)      Camera: FLI PL-16070AE      Observatory: Deep Sky West

EXPOSURES:

Red: 32 x 900 sec    Blue: 17 x 900      Green: 20 x 900      Luminosity: 23 x 900

Total exposure = 23 hours    Image Width: ~1.5 deg (North is to the right)

Processed by Alex Woronow in 2018 using PixInsight, StarNet++, Matlab (LRGB stacks by Lloyd at DSW)

(Source: largely Wikipedia )

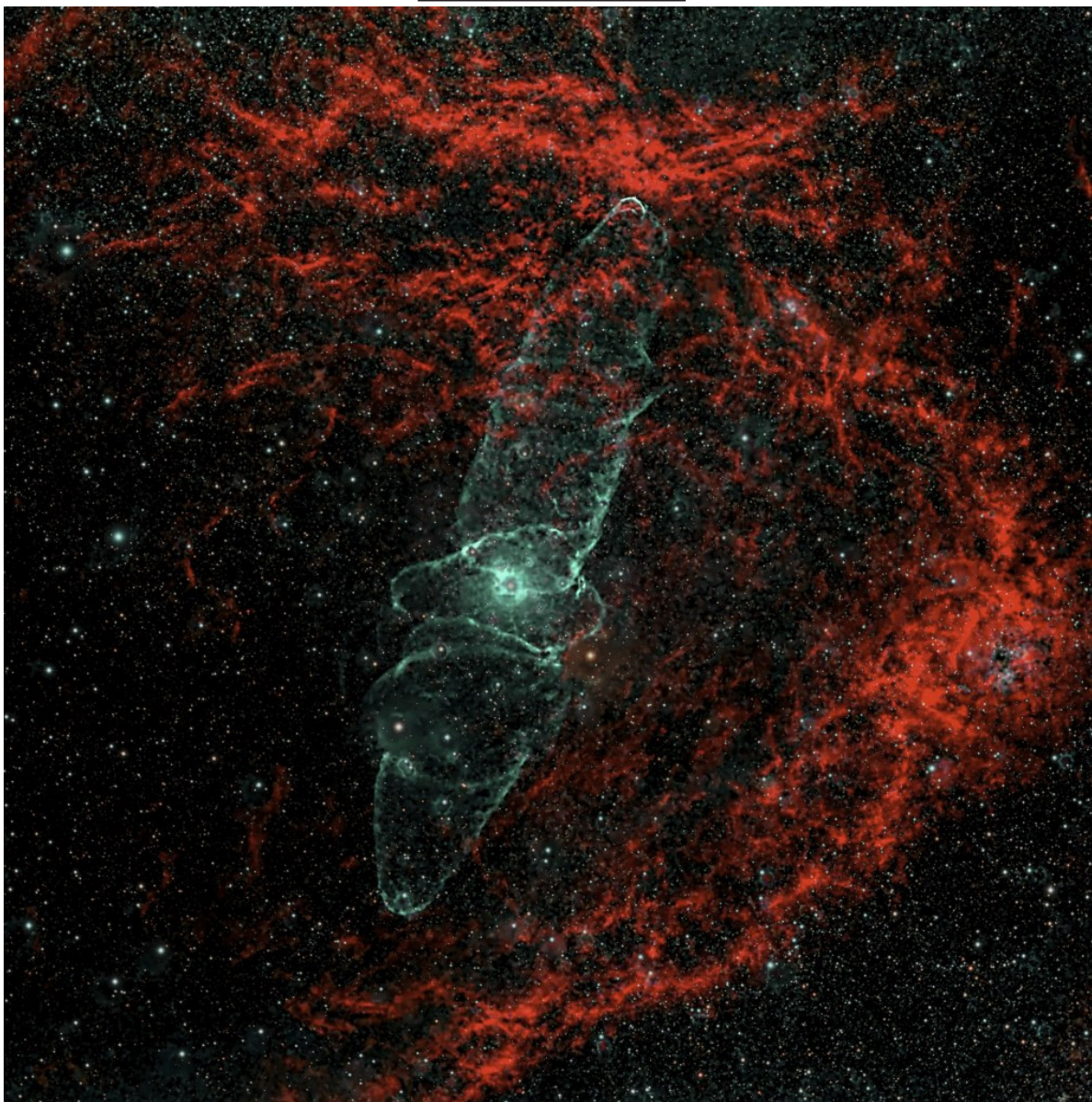
The Cave Nebula, a molecular cloud, lies at a distance of about 2400 light-years, in the constellation of Cepheus. This nebula is a complex of dark nebulae and bright emission nebula and is an active star-formation site. The outer edge of the crescent is illuminated by several massive OB stars. OB stars are short lived, and therefore seldom move very far from where their birth place before they expire. They emit much ultraviolet radiation, which stimulates the H $\alpha$  emissions in the cloud, and, perhaps compresses it to stimulate further star-birth.

Although Sh2-155 is relatively faint for amateur observation, some of its structure may be seen visually through a moderately sized telescope under dark skies.

Processing Highlights: Stars were removed (i.e., separated) in the L channel only, using StarNet++, and the nebular component was sharpened using Local Laplacian Pyramids in Matlab. The starless L was then inserted into the RGB image and further processing was done in PixInsight before reintroducing the stars' L component.

Comments - criticisms - suggestions? All very welcomed! Alex

**Photo of the Month**



**Ou4 (the Squid Nebula) and Sh2-129, LBN 445,449,453**

OTA: RH-305 (12" f/3.5)	Camera	SBIG STX-16803	Observatory: Deep Sky West
EXPOSURES:Red: 14 x 300 seconds	Blue	8 x 300	Green: 13 x 300
Luminosity 13 x 300 (see below)	Hydrogen:	19 x 1200	Oxygen: 23 x 1200
Total exposure ~18 hours	Image Width:	~1.75 deg	North is toward the bottom

Ou4, (the blue nebula) was discovered in 2011 by an amateur astronomer, Nicolas Outters. Its faintness and the fact that it is emitting faint light primarily in the OIII (blue-green part of the spectrum) made it difficult to detect. The surrounding red hydrogen-emission nebula (Sh2-129) also called the 'Flying Bat Nebula' (don't knowwhy).

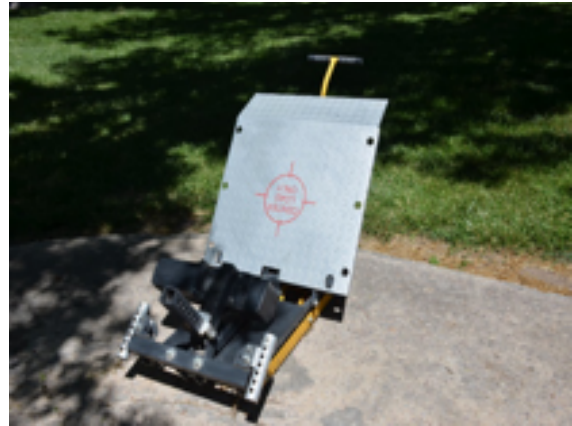
Recent studies (R.L.M. Corradi, et al, 2014) suggest that OU4 lies within Sh2-129 at a distance of about 2,300 light-years. At this distance, the Squid would be about 50 light-years in length (projected size??). OU4 possibly results from an outflow of gasses from the triple star system, HR8119, located in the center of the nebula. The Squid has an estimated age of only 90,000 years, based on its measured expansion rate.

Processing: The Luminosity images were not used in this version. The Hydrogen alpha was blended into the red channel using an algorithm that proportions the hydrogen contribution according to the relative exposure times and bandwidths of the red and Ha filters. The same was done with the OIII with equal contributions going into the blue and green channels.

Sharpening utilized the Local Laplacian Pyramid algorithm based on Paris, et al. 2011 (Proc. SIGGRAPH, 2011) and implemented in Matlab. The StarNet++ used for this image was the recently-available version for PixInsight procedure. Processed by Alex Woronow using PixInsight, StarNet++ and custom Matlab code in 2019;

## **Items For Sale**

We hope that members will use this section of the HDO to advertise and sell astronomical items. When we have items for sale, we will put them in at the end of the HDO. The club does not take responsibility for the transaction or the quality or usefulness of the item. The buyer and seller must agree on what is being sold and the price. Listing an item here is not a recommendation by the Club or its Board and Officers



### **18 Inch Equatorial Telescope For Sale**

**An observatory-quality Next Generation Telescope (NGT-18) is for sale again by a longtime ASLC member Roy Willoughby. This is a Newtonian 18-inch telescope with a “Galaxy” F4.5 mirror on a portable equatorial split ring tracking mount with an NGC-MAX sky object finding computer system. Included is a motorized lifting system for transport to observing sites.**

**I have enjoyed observing galaxies, nebulas and planets with this telescope, but at my age it is time for me to part with this fine instrument. I am now asking \$2,900 for the complete telescope and transport system. Please contact me at 524-9395 or email me at [rswillowbee@comcast.net](mailto:rswillowbee@comcast.net)**

**Thanks, Roy Willoughby**

## Zoom Eyepiece and 2 X Barlow Available

Hello I am contacting you because I have a telescope eyepiece and barlow lens that have been sitting around my closets and garage for about 35 years. I don't have any telescope equipment at this time and do not plan to have any in the near future. I thought that someone in your organization might get some use out of them as opposed to just sitting in their boxes.

They are both Meade products and I believe they are 0.965 size but not sure. The eyepiece is 7.5-22 mm and the barlow is 2x. Please email me and let me know if you could use these and I would be glad to take them to you.

Thank you Thomas Hayth <thayth24@yahoo.com>



**Sky Shed POD for Sale: Includes 3 bays and one slide-out shelf.**

**\$1200 OBO**

Only the Sky Shed is for sale. NO mount, OTA, pier, or decking is included. This is an old Sky Shed. It has all the rollers and the dome rotates fine. There are some cosmetic challenges, but I did not consider them important.

If interested, I urge you to come and look at it to be sure it suites your needs. I can help with delivery between Santa Fe, El Paso, and Tucson for the costs associated with driving, eating, and sleeping (if necessary). I am selling because it is just too small for my scopes. You can see the Meade 14 on the large Mathis mount barely fits. I am always bumping into it and there is only room for one person inside.



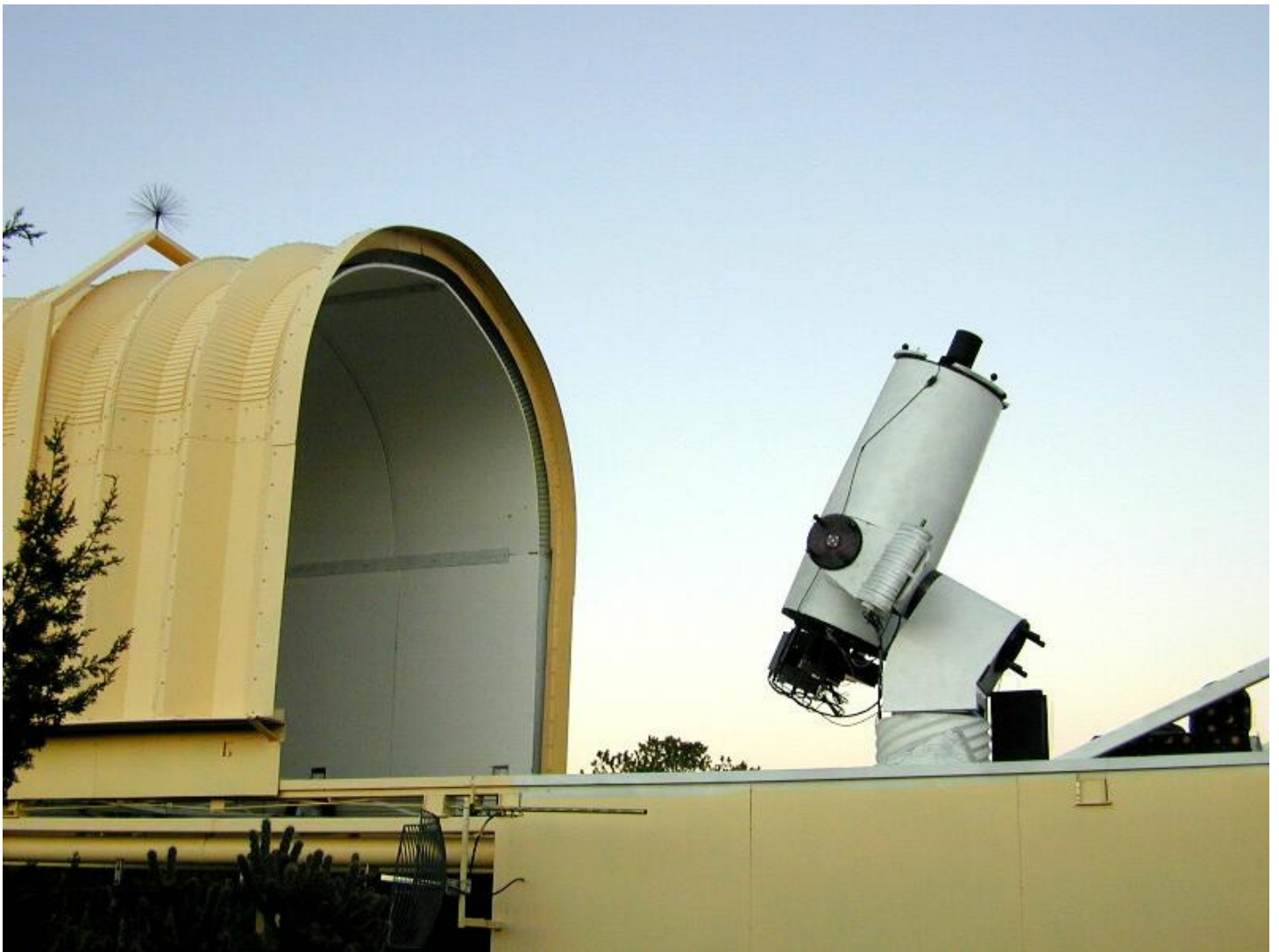
You can see how far I had to offset the mount. It did not hit the dome anywhere, but there was some vignetting above 60 degrees. It was not cramped until I put the finished telescope inside.

The Sky Shed is located about 20 miles north of Deming, NM. You can contact me via email at [turnerc@milkywayimages.com](mailto:turnerc@milkywayimages.com)

**Available to a Good Home, 24 inch Classical Cassegrain with everything needed to do serious research!**

Do I have your attention? When I first heard about this, I just sat there for several hours, drooling! Wow! This telescope is located about 30 miles North east of Silver City. It has been in use for about 15 years in its current configuration as a Webscope. They have collected about 400,000 images. People could log in from the web, schedule time on the scope and download the data when it was obtained.

This is a research telescope. It has been used for photometry, astrometry, supernova searches, etc. At f/10, it is not for widefield pretty pictures. And it comes with everything you would need to continue that research. A massive mount is included, an appropriate camera with filters are included, custom field flatteners are included, computers and custom software for controlling the motion of the mount is included, computers and custom software for scheduling observing time and data archival are included. Of course you will have to pay to move it. And, you will have to pay to maintain the custom software, which is based on olde operating systems and olde programming. And, of course, you will need a site with necessary services, so it won't be totally FREE.



### **24 inch Classical Cassegrain with mount in roll off roof observatory**

A guy named Bill Neely came to the last ASLC meeting to tell us about this scope. He has been working on the project since the 1990s. He said that everyone who has been involved in the project is now retired or retiring shortly. There is nobody to continue the legacy. His interest is in seeing that the work that has been poured into this project will be continued by someone

They have a web site where there are lots of photos and info about the construction and use of the telescope. If you are interested in reading more about it, go to: **[www.nfo.edu](http://www.nfo.edu)**

If you would like to talk to Bill Neely about the scope, his email is: [neely.nfo@gmail.com](mailto:neely.nfo@gmail.com)  
and his phone number is: 575-574-7111

Personally, I think the best place for this instrument is in a small college with an existing astronomy department. They will have people who know about telescopes and how to use them. They may already have research programs ongoing. They will also have access to programming capabilities to maintain and upgrade the custom software. And they probably have the ability to raise money to expand their astronomy program.