The High Desert Observer

June 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.*

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ASLC Board of Directors, 2018

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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.

June Meeting --

Our next meeting will be on ***Friday, June 22***, at the Good Samaritan Society, Creative Arts Room at 7:00 p.m.

Chris Brownewell will present "Equatorial Mounts: History, Design, and Application"

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?

***June* 2018**

In the beginning, telescopes were small and could be handheld. As aperture and focal lengths increased, mounting fixtures became necessary to steady the instrument. The first mounts were simple but allowed a scope to be moved in altitude and azimuth directions. For astronomy applications, however, clock-driven equatorial mounts eventually became the norm. For ASLC's June meeting, Chris Brownewell will tell those present about the history, design, and applications of equatorial mounts. These precision electro-mechanical devices were revolutionary for astronomy but often proved too complicated for the averaged skilled amateur telescope maker. Yet, the ATM hobby would be reborn in the sixties with the invention of the Dobsonian telescope/mount.

As described in Wikipedia, "A Dobsonian telescope is an altazimuth-mounted Newtonian telescope popularized by John Dobson starting in 1965 and credited with vastly increasing the size of telescopes available to amateur astronomers. Dobson's telescopes featured a simplified mechanical design that was easy to manufacture from readily available components to create a large, portable, low-cost telescope. The design is optimized for observing faint, deep-sky objects such as nebulae and galaxies. This type of observation requires a large objective diameter (i.e., light-gathering power) of relatively short focal length and portability for travel to relatively less light-polluted locations. Dobsonians are intended to be what is commonly called a 'light bucket' operating at low magnification, and therefore the design omits features found in other amateur telescopes such as equatorial tracking." At our nation's large star parties, one will currently find the observing fields highly populated with Dobson's telescopes.

Although the term "Star Party" has now become the way large organized gatherings of amateur astronomers are defined, these events were originally known as telescope maker conferences. In early photos of Stellafane, for example, amateurs displayed beautiful instruments, which included handmade optics and equatorial drives. These mounts were usually created with no more than a hacksaw, mill file, and lots of patience. During those early days, a 12.5-inch reflector was considered a monster light bucket. As decades passed, though, much larger scopes began to appear at major star parties. This was the result of the Dobsonian Era. Much less skill was necessary to build these type instruments, and several manufactures offer the necessary hardware that eased construction. Amateur telescope making is now no more that a glimmer of its former self. Some may argue that John Dobson cheapened and ruined the ATM hobby with his simple design while others LOVE owning a 25-incher. Such arguments are futile since Dobs and their simple alt-az mounts are here to stay. You can learn more about John Dobson and his telescopes at sites like Wikipedia. And, you can learn more about equatorial mounts at ASLC's 22 June meeting. I hope to see you there!

Howard J. Brewington
ASLC President
June 2018

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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

May 2018 Report

by Jerry McMahan

Tombaugh Observatory, May 11, 2018

This marked the last open house until the Fall Semester. The Astronomy Department has a slide show based on Harry Potter. This included such topics as Sirius (get it, Sirius Black?).

Steve Wood set up his 8 inch outside the observatory fence, to get an early view of Jupiter. He later joined Steve Shaffer and Jerry McMahan inside our dome with the club's 12.5 inch Cassegrain. The subject was Jupiter again. The scopes in the other domes were used for the Globular M3 and a small open cluster.

Steve Shaffer counted 31 observers at our site.

Dripping Springs Star Party, Friday May 18

This was the first of an intended annual star party at Dripping Springs at the Eastern base of the Organ Mountains. Members of the Alamogordo Astronomy club were in attendance as were several members of the Astronomical Society of Las Cruces.

The event was well advertised so the attendance was impressive. We had long lines of people waiting to look through the telescopes.

Chuck Sterling brought his 10 inch scope and viewed Jupiter as well as other objects. Steve Wood had his 8 inch on Venus, early, and Jupiter later. Rich Richins showed up with a 10 inch Dobsonian and showed the audience the galaxies M81 and M82 which were both visible at the same time in the eyepiece. I (Jerry McMahan) pointed the ETX 125 at the Moon.

The sky was dark and it was pretty cold as soon as the Sun went down. You would think we were in the mountains. I assume that we will participate in future events at the site.

Moongaze, Saturday, May 19

We had two set up locations this time. Chuck Sterling and I were at the International Delights. The new, tall building at this, our normal site, prevents Jupiter from clearing the building until for a while. To get Jupiter earlier, Howard Brewington an Steve Wood set up at the Pan Am Plaza. At least I think they did. At the time of this writing, I haven't heard a report of how it went at that location.

Chuck and I observed Venus, the Moon and Jupiter when it cleared the building. Three Galilean Moons were visible with the fourth, Europa passing in front of the planet. We were supposed to see the Shadow of Europa crossing the cloud tops. We did not see the shadow either because it was to be visible not long before we shut down. Since Jupiter is near opposition, the shadow was probably near the position of the moon. The seeing was not very steady which may have been the reason we could not see a shadow. The Great Red Spot was supposed transit at that time, but we really had no chance to see it with the poor seeing conditions.

BREAKING NEWS

I have heard from Howard and Steve. Moongaze at Pan Am Plaza went very well. They had a large crowd, mostly of young people. I assume they had a lot of New Mexico State students. Steve said they asked intellegent questions, again indicating that many were university students.
Highland Elementary, Friday, May 4

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

Jun	01	20:09	Sun Sets
	01	17:56	Jupiter Rises
	01	21:55	Saturn Rises
	06	12:32	Last Quarter Moon
	09	20:00	OUTREACH; Dark Sky Observing at Leesburg Dam State Park
	13	13:43	New Moon
	20	04:51	First Quarter Moon
	22	18:30	OUTREACH,Spaceport America Cup Star Party at Spaceport America
	22	19:00	ASLC Monthly Meeting; Good Samaritan Society, Creative Arts Room
	23	20:00	OUTREACH; MoonGaze, International Delights Café
	23	20:00	OUTREACH; MoonGaze, Pan Am Plaza on University Ave.
	27	07:14	Saturn Opposition
	27	22:54	Full Moon
	30	20:00	OUTREACH; Dark Sky Observing at Leesburg Dam SP, Cub Scout Pack 384
July	01	20:18	Sun Sets
	01	15:49	Jupiter Rises
	01	19:48	Saturn Rises
	06	01:51	Last Quarter Moon
	07	20:15	OUTREACH; Dark Sky Observing at Leesburg Dam State Park
	12	20:48	New Moon
	19	13:52	First Quarter Moon
	21	20:00	OUTREACH; MoonGaze, International Delights Café
	21	20:00	OUTREACH; MoonGaze, Pan Am Plaza on University Ave.
	26	20:16	Mars Opposition
	27	14:20	Full Moon
	27	19:00	ASLC Monthly Meeting; Good Samaritan Society, Creative Arts Room

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

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Announcements

1. The program for the June meeting will be a presentation by Chris Brownewell on “Equatorial Mounts: History, Design, and Application.” Equatorial mounts allow tracking of celestial objects with a telescope using purely mechanical means. While it is now possible to do this with electronics, equatorial mounts remain important tools for astronomers

2. The field trip to Safford, AZ to see the Pope’s Telescope and the Large Binocular Telescope has been set for September 22nd. Unless the mountain catches on fire again or some other calamity occurs, Mike Nuss will be presenting information and details of the trip in the near future.

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!

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Meeting Minutes

ASLC Monthly Meeting
May 2018 Minutes

Show & Tell:

Howard Brewington has a power supply that was donated to the Society. It isn't working "well", but he offered it for sale if any members are interested in attempting to refurbish it – price $10. After some haggling, Steve Barkes purchased it for $2.

Glenn Brookshear is looking for a manual on an equatorial mount for educational purposes. Several members offered suggestions where information might be obtained.

Ed Montes presented a short video promoting the 2018 Astronomical League Convention (ALCon) being held in Minneapolis/St. Paul, MN, in July

Call to Order:

Howard Brewington, President, Astronomical Society of Las Cruces (ASLC, the Society), called the May 2018 business meeting to order at 7:12 pm, 25 May 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. He asked all members and visitors to sign in on the rosters at the rear of the room. Howard recognized visitor Bob Miller, retired from NASA in Virginia, is relocating to the area; he has a telescope. Chuck Harper, a new resident of Good Samaritan, is considering joining the Society. He is a candidate for the Loaner Telescope Program.

Howard thanked Charles Turner for the April edition of the High Desert Observer (the Society's newsletter, the HDO); articles are always welcome and needed. He also thanked Jerry McMahan for his update on Outreach events and other members for their contributions.

The minutes of the April meeting were 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 reported a negative net income (out go) for the month of $66. However, status for the year, so far, is a positive $1969.

Outreach:

Chuck Sterling, Outreach Coordinator, reported on upcoming events. The monthly event at the Observatory at Leasburg Dam State Park (LDSP) will be 09 June. This will also be a “Music and Stars” event. There will be a Moon Gaze at International Delights Café (IDC) on 23 June. Howard and Stephen Wood may offer another parallel event at the clock tower in Pan Am Plaza that evening as well. Other events are posted on the web site. Howard noted that Moon Gazes and public star parties are excellent opportunities to get to know other members of the Society as well as interact with the public. He encourages all members to participate when possible.

Presentation:

This month’s presentation was a “two-fer” by Society President Howard Brewington.

The first presentation was the 2018 version of the Annual Astro-Imaging Contest. Five (5) Society members submitted images for consideration. The members present selected Steve Barkes’ Spectra of Vega as this year’s winner.
e a review of his attendance at Texas Star Party (TSP) 2018. Other Society members had opted for different venues during the week of this year’s TSP. Some went to the Cosmic Campground, others to Rusty’s RV Park. Howard presented images from each with commentary by the attendees.

The May meeting of the Astronomical Society of Las Cruces concluded at 8:30 pm. A social time followed at Pecan Grill.

-Respectfully submitted by John McCullough, ASLC Secretary

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Surface Magnitude by Jerry McMahan

Bert Stevens did an article about magnitudes, for the HDO, a few months ago so it would be a good idea to look it up for details.

Several months ago an article in one of the magazine talked about surface brightness and stated that the equation was too compicated to go into for that article. I didn’t think it would be all that complicated since it involed an area, so I started to work on it and compare my results to those given in several issues of both Sky and Telescope magazines. I could not get it to work.

My first mistake was assuming that it was always given in magnitudes per square arc second. It turned out the values were given in magnitudes per square arc minutes. They did not mention this, but I finally noticed that the dimensions of the deep sky objects were given in minutes of arc. I tried again, and got something that was very close to their values.

I had made an assumption , to I went back and did the derivatation from scratch. I decided to write it up a few months later and forgot what I had done before, so I did it again. The following is the result. First, a little science back ground.

The Science Part 1

The visual magnitude of a deep space object is given as though the total brightness is due to a point source. The light is actually spread out over the surface area of the object. The result is that the surface brightness is less than the total brightness.

The Science Part 2

The difference in brightness of two objects one magnitude apart is defined as the fifth root of 100, or 100 to the one fifth power. Since calculators do base 10 logarithms, and 100 is 10 to the power of 2, we can adjust this as the brightness difference, between two magnitudes is equal to 10 to the power of 2/5 times (magnitude1- magnitude 2)

over b sub 2 is the ratio of the change in brightness. A difference of 5 magnitudes make this a change in brightness of 100 . I set this up with the the numerator as the brighter and the denominator as the fainter. The next equation sets b sub 2 as one to get the actual ratio. Also m sub f is the fainter magnitude while m sub b is the brighter magnitude.

$$\frac{b_1}{1} = 10^{\frac{2}{5}\left(m_{f-m_b}\right)}$$

Taking the log of both sides of the equation results in the following equation.

$$\log\left(b_1\right) = \frac{2}{5}\left(m_f - m_b\right)$$

Or

$$\frac{5}{2}\log\left(b_1\right) = \left(m_f - m_b\right)$$

b sub 1 is the brightness which depends on the area of the target. Also, m sub f is the fainter, or surface magnitude and m sub b is the brighter, or visual (point source) magnitude.

More problems

My original attention was to due a derivation of the equation, but in trying to go step by step, I found that Microsoft Office no longer supports Microsoft Equation Editor. This makes it difficult to write eqution with mathmatical symbols. I did find an equation editor that plugs into Microsoft Word, called Math Type It is a 30 day free trial and I have no idea what the price is going to be. Do you think Trish will bail me out with club money if it turns out to be vary expensive?

The Equation

$$S_m = v_m + \frac{5}{2}\log A$$

S sub m is the surface magnitude, v sub m is the visual magnitude and A is the absolute value of the surface area.

Disclamers

An equation is not the best way to measure brightness. I am sure the real work is done using photometers. The dimensions given in the magazines are treated as though deep sky objects were rectangles. These measurements can vary depending on the method, or telescope aperatures, used. Deep sky objects do not have smooth, consistant shapes. The equation just gives something to play with. What I was really doing, playing with the math. I tell my students that is good to play with the math, even if what you do did not work. You still learn something. After all, I have proven, several times, in class, that 2 = 1, some times even on purpose.

I did make an assumption that the log of the brightness was the equivalent to the log of the surface area. I think it is true, but may have been a leap in logic. Can I claim quantum effects in my logic?

Jerry Oltion, in the December, 2017, issue of Sky and telescope, says that Surface Brightness only appies to extended objects, not stars, since stars are for all practical purposes point sources without a measurable surface area to spread the light out. He also says that your can never make an extended target brighter than its surface area, no matter the size of your telescope. Surface bightness does apply to the Sun and the Moon.

I want to point out that any mistakes in spelling is due to the fact that I forgot to make changes recommended by my spelling checker……named Chuck.

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Book review:

Searching for the oldest Stars. Anna Friebel. 2015.

Anna Friebel is an astronomer from Germany interested in finding the oldest stars. In an interesting book she describes her career-long passion for this project both in a personal narrative and a scientific description of why it is interesting and important.

In the minutes after the Big Bang, the only elements to form were hydrogen, helium and lithium. Where did the other elements come from? How did they evolve? How did earth collect all the elements that allow us to sustain life?

The people interested in this problem include astronomers, chemists, physicists, and computer analysts/mathematicians who have tools in the 21st century that are truly amazing. The author describes a cohort of professionals across these fields who work closely together collecting data to help develop the theories of astronomical evolution. The author describes herself as a stellar archeologist.

The book begins with a review of the last 200 years of progress in astronomy, arranged to highlight coordination between the various disciplines. The German optics expert Joseph Fraunhofer discovered in 1814 the black lines that are part of the color spectrum of the sun. In the following 50 years Angstrom, Bunsen and others contributed their findings to develop the field of spectroscopy, which is vital in developing theories of astronomical evolution. At the same time the study of physics led to better appreciation of the elements and their characteristics. An appreciation of how stars create energy followed, with advances in atomic physics and quantum theory, as developed by such scientists as Albert Einstein, Max Planck, and Neils Bohr. When Hubble discovered that Andromeda could not be part of our galaxy because it is so far away, much of the science already in place led to more theories on evolution and eventually the theory of the Big Bang and an expanding universe ever since that time. In the last 40 years, massive computers using statistical analysis have helped developed scenarios of the most likely paths to our current status.

The author's career was greatly influenced by Pickering's work at Harvard in the early 20th Century categorizing vast numbers of stars based on their spectral characteristics, color and luminosity (e.g. Hertzprung-Russell diagram). This research led to the finding that older stars have only hydrogen and helium, while younger stars are where most of the heavy metals are found. While small telescopes and basic spectroscopy can help identify possible candidates as "old stars", it takes the most sophisticated astronomical equipment to confirm data and this involves working at all the worlds newest, largest telescopes. Initial formation of heavier elements first happened in the core of some of the biggest stars. Study of supernova, which can be divided according to what kind of stars preceded them, allowed further understanding of the genesis of heavier elements. These became incorporated into younger stars. Moreover, as the heavier elements developed more of a presence, in the setting of multiple star systems gravitational forces may cause one star to shed its outer layer to its companion star to further enhance the spread of these elements and further modify the universe in the process.

After presenting basic ideas relating to stellar evolution, the author explains why some stars are large and some are small; why some stars end their lives as supernovae and others do not; why some stars contribute more to astronomical evolution that do other stars. It is a very complicated set of processes, requiring a comfort with current nuclear theory beyond some readers (myself included).

Chapter 7 brings us back to astronomical descriptions of our own Milky Way Galaxy and its various regions. In its perimeter it has incorporated some dwarf galaxies and has multiple globular clusters, where some of the oldest stars are found. This is her playground. Using the world's largest telescopes, combined with highly sensitive and dedicated spectrographic equipment she can find faint distant stars and develops her analyses of element abundance.

Throughout the book, the author includes many of the personal experiences that have made her life what it is. She obviously has the highest regard for her colleagues and has interacted with them from the start. Adding this human interest to the immense topic of stellar archeology makes for very interesting reading. As a beginning, amateur astronomer, I recommend this book.

The book is available at the Brannigan Library.

Sid Webb 2018

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Photo of the Month

OBJECT M1 - NGC 1952 (Crab Nebula) Distance: 6,500 light years
Telescope Takahashi TOA-130F @ f/7.7
Mount Takahashi EM200 Temma II
Camera QSI 690wsg @ -15C
Filters Astrodon Ha (3nm), Astrodon Tru-Balance I-Series LRGB Gen 2
Guider SX Lodestar
Settings 6x10min Ha, 2x5min L (bin1x1); 2x5min ea RGB (bin2x2); AstroArt5, CS4 (slightly cropped, 10xdarks/flats/fdarks/bias)

Date/Location
23 January 2018 - Las Cruces, NM

Notes

This image is LHaRGB, where Ha was used in combination with Luminance and Ha:R (80:20) was used for the Red channel.

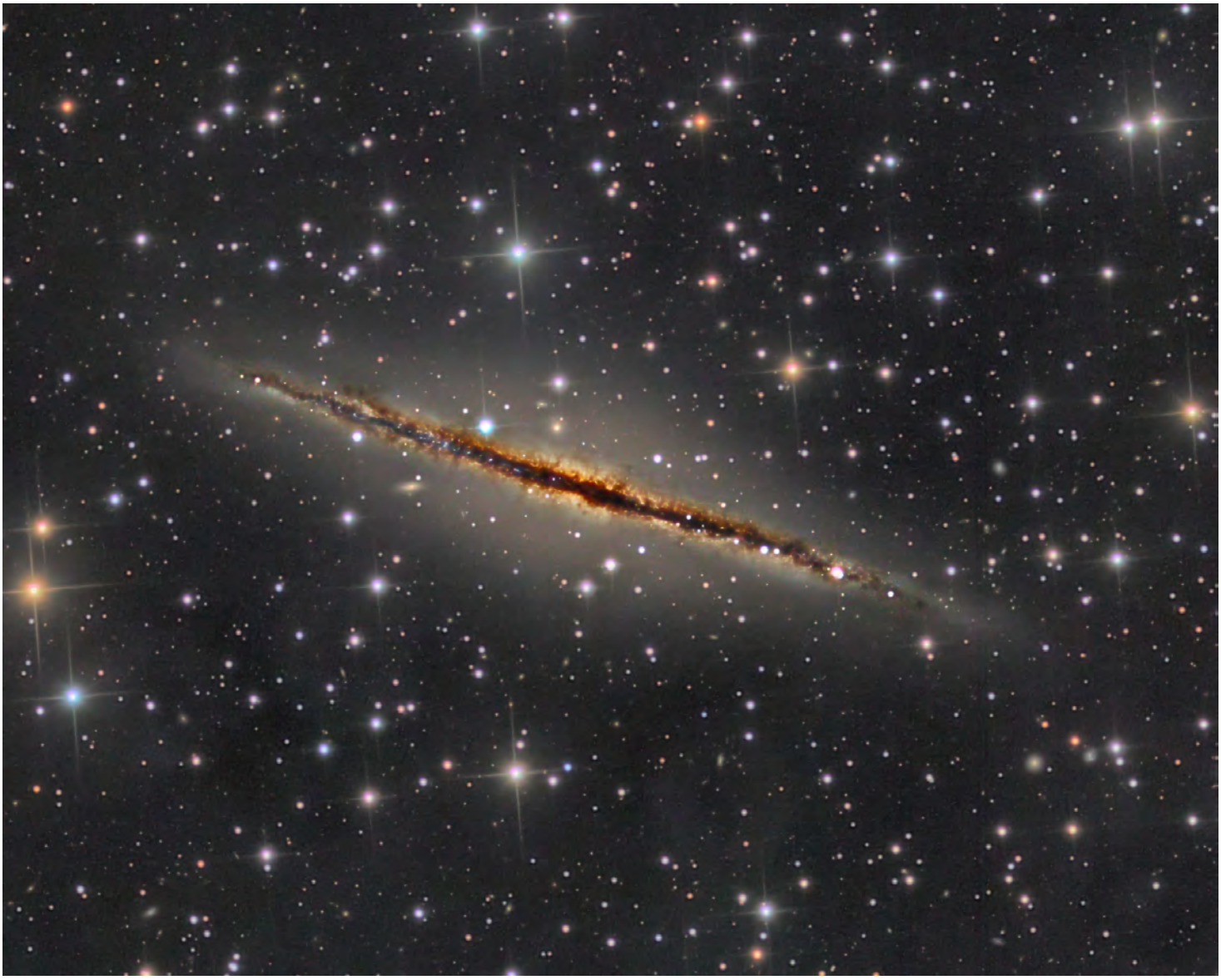
Photo of the Month

Attached is an image of the Spring Milky Way through the Summer Triangle. In this shot you'll find the Summer Triangle and its constituent constellations, centered on Cygnus. Also Delphinus and Sagitta. You can just make out the North America Nebula, just left of center. If you look carefully you can find the Coathanger asterism.

Taken from my back yard with Canon 60Da, 14mm lens at f2.4. ISO 2000 for 30 seconds.

-- Ed Montes

Photo of the Month



OBJECT: NGC 891 **OTA:** RCOS 14.5” f/8 **Camera:** SBIG STX-16803

EXPOSURES: Red: 10 x 600 seconds Blue: 12 x 600 Green: 14 x 600
Lum.: 36 x 600 Total exposure 12 hours

Image Width: ~18 arcminutes **Observatory:** Deep Sky West
Processed by Alex Woronow using PixInsight and ON1 in 2018

The spiral galaxy NGC 891 is seen edge-on revealing the intricate dark cloud structure within the galactic plane, as well as above and below that plane. NGC 891 and our Milky Way galaxy are similar in luminosity and size. Not unreasonably, we might suppose that the Milky Way would look similar to NGC 891 if view edge-on from a great distance. (NGC 891 lies at 27M light-years from earth.) The stringers of dust extend out from the galactic plane are thought to result from supernovae explosions and/or intense star formation.

This image has been processed in an attempt to show the structure of the dust clouds as best a small telescope can. Each image stack, L, R, G, and B were deconvoluted separately before being combined, stretched, and processed. While this deconvolution regimen worked to well delineate the dust structure, it had the side effect of causing color aberrations in the stars. Oh well! Alex