DEEP SKY TREASURES

Presented by the Cincinnati Observatory Center and the Xavier University Center for Excellence in Education

2016

DEEP SKY TREASURES

The Cincinnati Observatory Center, Friends of the Observatory, and Xavier University present the 2016 Deep Sky Treasures Calendar. The eighteen deep sky images included in this calendar showcase the magnificent photos of nine of our talented astro-photographers: Eric Africa, Fred Calvert, Steve Rismiller, Judy Bay, Eric Dunn, David Griggs, Aaron Eiben, Kathleen Shea, and Chris Kean.

As the birthplace of American astronomy, the Cincinnati Observatory has a long history of providing an inspired vision of wonders of the cosmos. Our founder and first director, Ormsby MacKnight Mitchel, was a professor at the Cincinnati College in 1842. Mitchel's lectures on astronomy were so eloquent and enlightening that students invited family and friends to attend. This enthusiasm blossomed into a series of public lectures that culminated in the plan by Mitchel to build the nation's first significant astronomical observatory here in Cincinnati. The tradition of seeking and sharing celestial awareness, begun 174 years ago by Mitchel and the forward-thinking citizens of Cincinnati, is alive and thriving at the Observatory today, with the same passion to learn and teach about the mysteries of the universe.

Many scientific achievements have taken place at the Observatory, advancing the knowledge of the cosmos and other areas of study. The Observatory has a rich educational schedule with day and evening classes to reach students of all ages. The Cincinnati Observatory and a large number of dedicated volunteers support the educational and special programs at the Observatory, in schools and at many public locations. Our astronomy evening programs offer lectures and telescope viewing for the public, and a chance to hear the ***WOW*** as someone gets a first look at Saturn's rings, Jupiter and its moons, or some other larger-than-life wonder in the sky.

Our goal in this calendar is to display another level in the observing experience of amateur astronomers. With many hours of hard work, the nine astro-imagers represented in this calendar have reached out and captured an essence of the magic out there for us to linger on. We can contemplate and marvel with a quiet smile at the extraordinary beauty created as the universe unfolds. Many of these images were taken in the greater Cincinnati area, using privately owned telescopes and imaging equipment. Some of the images were taken with remote imaging telescopes, and one image was made using a smart phone attached to one of the observatory's telescopes.

Caution: Prolonged viewing of these images could result in unusual amounts of curiosity and uncontrollable urges to learn more about astronomy. For information on how to treat this condition, contact:

Cincinnati Observatory Center 513.321.5186
Visit our website: www.cincinnatiobservatory.org

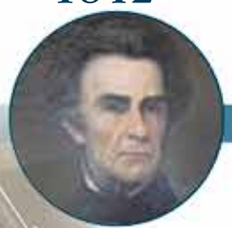
Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

"We show you the past for a better vision of the future!"

1842



Ormsby MacKnight Mitchel founded the Cincinnati Observatory.

11-1/4" Merz und Mahler Telescope

1843

John Quincy Adams laid the cornerstone of the first Observatory. The hill upon which it was erected was renamed Mt. Adams in his honor.

1873

The Observatory was relocated to Mt. Lookout. The new Observatory building was designed by Samuel Hannaford, who would later design Cincinnati's Music Hall.

1904

The Observatory acquired the 16" Alvan Clark & Sons Telescope, now located in the Herget Building of the COC campus.

1991

Friends Of The Observatory was established, offering benefits, activities and educational opportunities for aspiring astronomers and their families.

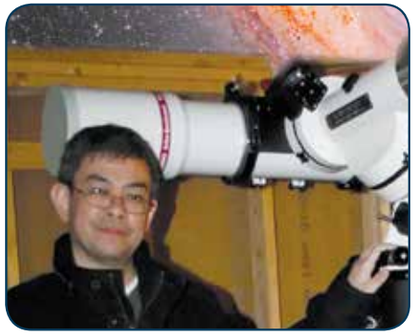
2016

In 1998, the Cincinnati Observatory Center was incorporated to assume control of the Observatory and now provides educational programs, lectures and other events of astronomical value.

For current activities & information visit our website: cincinnatiobservatory.org

All events are Universal Time unless otherwise specified.
Stargaze at Stonelick State Park events are weather dependent.

ASTRO-PHOTOGRAPHERS



ERIC AFRICA Eric has been interested in astronomy since he was a child, but he did not take up the hobby until the apparition of the spectacular comet Hyakutake in 1996. He ventured into astro-photography in 1997 when another bright comet, Hale-Bopp, made its appearance.

Eric started off photographing solar system objects, first with film then with digital cameras. That was followed in 2003 with digital photography of deep space objects using astronomy-specific digital cameras. This has been the medium that he has embraced since.

Eric lives in West Chester with his wife Josephine. He images from their backyard or from a remote observatory in New Mexico.

To view his astrophotography: skiesbyafrica.com.

FRED CALVERT An aircraft mechanic, pilot and photographer, Fred became interested in astronomy and aviation during the era of the Mercury, Gemini and Apollo Space Programs. Starting in 2003, he spent three years building his private observatory in Cold Spring, Kentucky. Over the years Fred's images have appeared in Astronomy Magazine, Sky & Telescope Magazine, international astronomy publications and numerous books on amateur astronomy. Images for this year's calendar were taken remotely using telescopes located in Mayhill, New Mexico & New South Wales, Australia. His images in this calendar are dedicated to his Father-in-law Ray Pflueger who passed away in August 2015.

Fred lives in Northern Kentucky with his wife Ann. Observatory Web Site: coldspringobservatory.org.

ERIC DUNN Eric became interested in Astronomy while attending third grade in the early 50's. He was fortunate to be growing up in the Adirondacks Mountain range of New York where the night sky was clear of light pollution. He got a 2 inch refractor telescope for Christmas in 1956. He was able to see the aurora borealis and explore all that the night sky had to offer. He watched the fly-over of Sputnik 1, launched on October 4, 1957.

He received a 4 inch telescope for Christmas in 2005 and with his fiancée Judy joined the Cincinnati Observatory where they have attended many classes. He has a great interest in Astrophotography and rents time at locations in New Mexico, Spain and Australia.

He resides in Liberty Township, Ohio

STEVE RISMILLER Steve has been fascinated with astronomy since childhood. His earliest recollections of astronomy include watching the early satellites Echo and Echo II pass overhead. His grandfather's description of the passage of Haley's Comet in 1910 inspired him to build his first telescope. Steve has built many telescopes ranging in size from 3 to 20 inches in diameter. He and his wife Sue built their own "Starfield" roll-off roof observatory under dark skies in Northern Kentucky.

Steve, now retired, uses the daylight hours for solar observations and imaging. He uses an H Alpha solar filter to observe and image the ever-changing solar features. Some of his images have been published in the local media, the internet, and in several solar astronomy books.

STUDENT ASTRO-PHOTOGRAPHERS

JUDY BAY Judy and her husband, Fred would set up his Celestron C8 (now upgraded to C11) telescope at their home and invite neighbors to "have a look" as they walked by. Her interest in macro nature photography and astronomy challenged her to take the Astrophotography class at COC, where she learned to capture the Eta Carinae Nebula. She is a co-founder of Warren County Astronomical Society.

AARON EIBEN Aaron's fascination with the Universe stretches as far back as he can remember. It has led him to pursue a career as a physicist and science educator as well as the hobby of amateur astronomy. He is currently the "Outreach Scientist" at the Cincinnati Observatory, where he shares his enthusiasm for the Cosmos with thousands of people across Cincinnati and beyond.

DAVID GRIGGS David is a life long resident of the Cincinnati area and has been a photography and science/technology enthusiast since his early years. His middle son, Justin, introduced Astronomy as a new hobby about 5 years ago. He and Justin have been members and volunteers at the Cincinnati Observatory ever since and now own over four telescopes for both visual and astrophotography uses.

KATHLEEN SHEA & CHRIS KEAN Astrophotography is a relatively new venture for Chris & Kathleen. Their passion for astronomy began when they enrolled in an Intro to Astronomy class at the COC in late 2013. Shortly after, astrophotography became the focus of their new hobby.

2016 JANUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			December 2015 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	February 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	**1** *New Year's Day*	**2** *Moon at apogee* *Earth at perihelion* *Stargaze at Stonelick State Park*
3 *Mars 1.5° S. of Moon*	**4**	**5**	**6**	**7**	**8**	**9** *Venus 0.09° N. of Saturn* *Stargaze at Stonelick State Park*
10	**11**	**12**	**13**	**14** *Mercury in inferior conjunction*	**15**	**16**
17	**18** *Martin Luther King Day*	**19**	**20** *Aldebaran 0.05° S. of Moon*	**21**	**22**	**23**
24 **31**	**25**	**26**	**27**	**28** *Jupiter 1.4° N.of Moon*	**29** *Neptune at opposition*	**30**

NGC 3372
Eta Carina Nebula

Fred Calvert, Cold Springs Observatory

Eta Carina is one of the largest diffuse Nebulae, some four times the size of the Orion Nebula and much brighter. The nebula is estimated to be 7,500 light-years away from Earth in the southern constellation Carina.

The two most notable and well known features of the Eta Carina Nebula are the Eta Carina stellar system and the Key Hole Nebula, both located in the center section of the image.

The Eta Carina stellar system contains at least two stars with the largest estimated to be 100 times the mass of our sun, and a combined luminosity of over five million times that of our sun. Because of the star's age, size and the speed that the main larger star is losing its mass, the larger star is expected to explode as a supernova or hypernova in the near astronomical future.

The narrowband data was acquired with a Takahashi FSQ ED 106 / f/5 telescope and SBIG STL- 11000M cooled CCD camera. Exposure was 1 hour each using Sulfur II, Hydrogen Alpha and Oxygen III narrowband filters. Combining the light from the 3 different filters tracing emission from oxygen (blue), hydrogen (green), and sulfur (red). The color is also representative of the temperature in the ionized gas: blue is relatively hot and red is cooler.

The bi-color image below shows the Key Hole Nebula with the Eta-Carina star (the brightest) located below and to the left.

2016 FEBRUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	**2**	**3**	**4**	**5**	**6** *Stargaze at Stonelick State Park*
7 *Mercury greatest elong W. (26°)*	**8**	**9**	**10** *Ash Wednesday* *Neptune 2° S. of Moon*	**11**	**12**	**13** *Stargaze at Stonelick State Park*
14 *Valentine's Day* *Valentine's Night*	**15** *Washington's Birthday* *Moonday Monday*	**16** *Aldebarab 0.2° S. of Moon*	**17**	**18**	**19**	**20**
21	**22**	**23**	**24** *Jupiter 1.7° N. of Moon*	**25**	**26**	**27**
28	**29**					

January 2016

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31						

March 2016

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27	28	29	30	31		

Comet C/2014 Q2 (Lovejoy)

Eric Africa

This comet was discovered August 27, 2014 by Terry Lovejoy, and is the fifth of his discoveries. Its characteristic blue-green color is the result of diatomic carbon burning off the comet from exposure to the sun's radiation during its solar fly-by.

At its peak, the comet was visible to the unaided eye by keen-eyed experienced observers under dark skies. I was able to see it from our light-polluted backyard through a 66mm refractor. I was even able to make out its greenish hue through that small telescope! No tail was visible, though.

This image was shot from a remote observatory in New Mexico with a 4" telescope (Takahashi FSQ-106) and astronomy CCD camera (SBIG STL-11000) for a total imaging time of about 1 hour.

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2016 MARCH

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
February 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	April 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**1**	**2**	**3**	**4**	**5** *Stargaze at Stonelick State Park*
6	**7**	**8** *Jupiter at opposition*	**9**	**10**	**11**	**12** *Jupiter Night* *Stargaze at Stonelick State Park*
13	**14** *Aldebaran 0.3° S. of Moon*	**15**	**16**	**17** *St. Patrick's Day*	**18**	**19**
20 *Equinox*	**21**	**22** *Jupiter 2° N. of Moon*	**23**	**24**	**25**	**26**
27 *Easter*	**28**	**29**	**30**	**31**		

NGC 6888
Crescent Nebula

Eric Africa

NGC 6888 (the Crescent Nebula), is the bright nebula at the center of this busy picture. It is an emission nebula in the constellation Cygnus. Its crescent shape is visible in telescopes and wideband (i.e., LRGB/RGB) photographs. The fine tendrils inside the crescent shape are visible in images shot through narrow-band filters. Had those tendrils been visible in the past, this object might have been nicknamed the Moon Jelly Nebula instead.

The Crescent Nebula was formed by the fast stellar wind of WR 136 (the bright star near the center of the nebula). WR 136 is a Wolf-Rayet star which is a massive star that is approaching the end of its life. That star is blowing off an outer shell of gas from an earlier phase of its life, which is creating the nebula.

This image was shot from a remote observatory in New Mexico with a 4" telescope (Takahashi FSQ-106) and astronomy CCD camera (SBIG STL-11000) for a total imaging time of 12 hours.

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2016 APRIL

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			March 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	May 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**1**	**2** *Stargaze at Stonelick State Park*
3	**4**	**5**	**6** *Venus 0.7° S. of Moon*	**7**	**8**	**9** *Stargaze at Stonelick State Park*
10 *Aldebaran 0.3° S. of Moon*	**11**	**12**	**13**	**14** *First Light Night*	**15**	**16** *Mercury & Jupiter Night*
17	**18** *Jupiter 2° N. of Moon* *Mercury greatest elong. E. (20°) of Moon*	**19**	**20**	**21**	**22**	**23** *Passover (first day)*
24	**25**	**26**	**27**	**28**	**29**	**30**

M33
Triangulum Galaxy

Fred Calvert, Cold Spring Observatory

The Triangulum galaxy is the third largest of the local group of about 44 galaxies. It has an estimated diameter of 60,000 light years and is composed of an estimated 40 billion stars. The largest galaxy in the local group is the Andromeda galaxy with an estimated diameter of 220,000 light years and 1 trillion stars. Our home the Milky Way galaxy is the second largest of the group with an estimated diameter of 120,000 light years and 400 billion stars.

The Triangulum galaxy is thought to be gravitationally bound to the larger Andromeda galaxy. Both are approaching our Milky Way galaxy at about 68 miles per second and all three will collide in about 4 billion years to form a new, larger galaxy.

The galaxy was first described around 1654 by Italian astronomer Giovanni Battista Hodierna in his written works. Charles Messier also independently discovered the galaxy in 1764 and cataloged it as object 33; hence the name M33.

Data for this image was acquired with a Planewave 17" f/4.5 telescope and FLI-PL6303E CCD Camera. Total exposure time was 2.5 hours.

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2016 MAY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	**2**	**3**	**4**	**5** Cinco de Mayo	**6**	**7** Stargaze at Stonelick State Park
8 Mother's Day; Aldebaran 0.5° S. of Moon	**9** Mercury in inferior conjunction, transit over Sun; Transit of Mercury	**10**	**11**	**12**	**13**	**14** Mars Midnight Madness
15 Jupter 2° N. of Moon	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28** Stargaze at Stonelick State Park
29	**30** Memorial Day; Mars closest approach	**31**				

April 2016

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24	25	26	27	28	29	30

June 2016

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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

M 20
Trifid Nebula

Eric Dunn

Also known as NGC 2514, this is a nebula and star cluster located in Sagittarius . It was discovered by Messier in 1764. Its name means "divided into three lobes". The object is an unusual combination of an open cluster of recently born stars, an emission nebula (red portion) of gases ionized by the hot young stars, a reflection nebula (blue portion) and a dark nebula (the apparent gaps within the emission nebula that cause the trifurcated appearance; these are also designated Barnard 85).

The Trifid Nebula is a star forming region in the Scutum arm of the Milky Way. M 20 is about 5,000 light years away and its diameter is 40 light years across. It contains greater than 3100 stars and estimated age is 0.3 – 0.4 million years.

This photograph was made in June 2014, using iTelescope.com at SSO Australia.

LRGB+Ha 5 ea. at 300 sec bin 1:1 total 2.8 hrs.

Processed with Maxim DL 6 and Photoshop CS2

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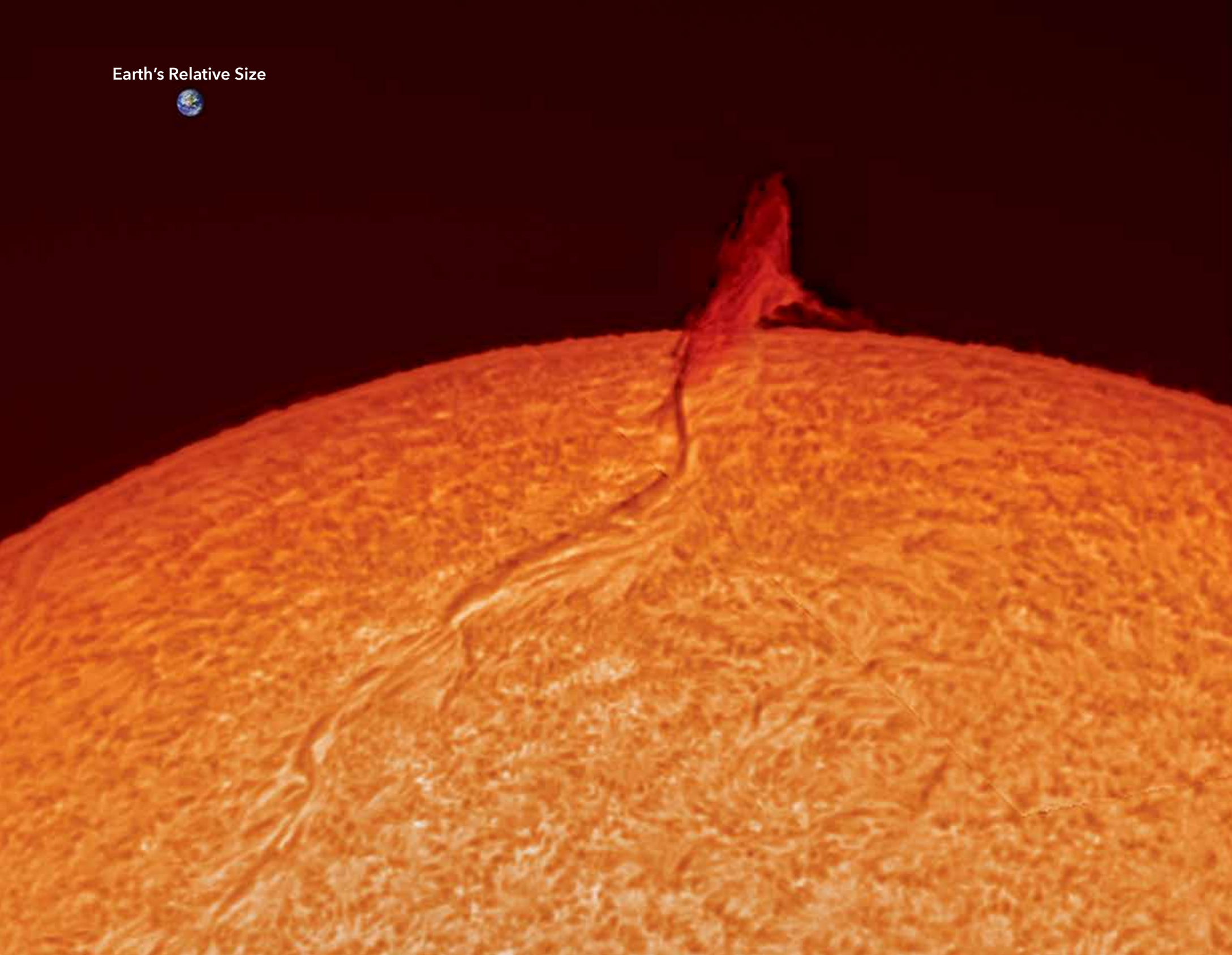
Earth's Relative Size



2016 JUNE

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	May 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	July 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**1**	**2** *Ramadan starts*	**3** *Saturn at opposition* *Mercury 0.7° N. of Moon*	**4** *Stargaze at Stonelick State Park*
5 *Mercury greatest elong. W. (24°)*	**6**	**7**	**8**	**9**	**10**	**11** *Jupiter 1.5° N. of Moon* *Marsapalooza*
12	**13**	**14**	**15**	**16**	**17**	**18**
19	**20** *Solstice*	**21**	**22**	**23**	**24**	**25** *Stargaze at Stonelick State Park*
26 *Sunday* *Sun-day* *Sundae*	**27**	**28**	**29**	**30**		

Solar Activity

Steve Rismiller

The Sun is our nearest star. From our vantage point, we can see hydrogen being converted to helium. Through a filtered telescope, many features are visible as they constantly move. The limb is not smooth but shows small jets of gas called spicules. These spicules totally cover the solar disk causing the disk to have texture in its appearance. Snaking from the lower left upward to the center is a feature resembling a rope. This cloud of gas is known as a filament and is suspended above the surface by the Sun's magnetic field. Filaments usually appear dark in color when viewed against the solar surface. The large feature on the solar limb is a continuation of the filament. However, when viewed against the darkness of space, it is called a prominence. This prominence is suspended nearly 75,000 KM above the solar disk.

Warning: Observing the Sun with a telescope can be dangerous. Permanent eye damage and blindness will result from an improperly filtered telescope.

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2016 JULY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			June 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	August 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**1**	**2** *Aldebaran 0.4° S. of Moon* *Stargaze at Stonelick State Park*
3	**4** *Independence Day*	**5**	**6**	**7** *Jupiter 0.9° N. of Moon*	**8**	**9** *Saturnday*
10	**11**	**12**	**13**	**14**	**15**	**16** *Mercury 0.5° N. of Venus*
17	**18**	**19**	**20**	**21**	**22**	**23**
24 *Sunday* *Sun-day* *Sundae*	**25**	**26**	**27**	**28**	**29** *Aldebaran 0.3° S. of Moon*	**30** *Mercury 0.3° N. of Regulas* *Stargaze at Stonelick State Park*
31						

M78
Barnard's Loop
LDN 1622

Eric Africa

M78 is the small blue and brown nebula to the upper left of this picture. LDN 1622 is the dark brown nebula to the lower right. Barnard's Loop is the bright red nebula in between.

Barnard's Loop is a huge emission nebula in Orion. It is so large that only a section of it was captured in this picture. It is part of the Orion Molecular Cloud Complex that includes the famous Orion Nebula and Horsehead Nebula. It is named after astronomer Edward Emerson Barnard, who first photographed it in 1894.

M78 is a nice mix of reflection and dark nebulae, and is a dust cloud that reflects light from bright stars nearby. LDN 1622 is a dark nebula with a small reflection nebula at its upper left.

M78 and Barnard's Loop are estimated to be about 1500 light-years away, while LDN 1622 is about 500 light-years distant

This image was shot from a remote observatory in New Mexico with a 4" telescope (Takahashi FSQ-106) and astronomy CCD camera (SBIG STL-11000) for a total imaging time of about 21 hours.

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2016 AUGUST

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4 *Mercury 0.6° N. of Moon*	5 *Venus 1.1° N. of Regulus*	6 *Jupiter 0.2° N. of Moon* *Stargaze at Stonelick State Park*
7	8	9	10	11	12	13
14	15	16 *Mercury greatest elong. E. (27°)*	17	18	19	20
21	22	23	24 *Mars 1.8° N. of Antares*	25 *Aldebaran 0.2° S. of Moon*	26	27 *Venus 0.7° N. of Jupiter* *Stargaze at Stonelick State Park*
28	29	30	31			

July 2016

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September 2016

S	M	T	W	T	F	S
				1	2	3
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

IC 443
NGC 2174
Sharpless 247

Eric Africa

IC 443 on the upper left is popularly known as the Jellyfish Nebula. NGC 2174, the Monkey Head nebula, shines to the lower right. The little blob above NGC 2174 is Sharpless 247.

NGC 2174 is an emission nebula in Orion and encloses the open star cluster NGC 2175. It is estimated to be about 6400 light-years away. Sharpless 247 (catalogued as SH2-247) is also an emission nebula at a similar distance, with evidence suggesting that it is connected to NGC 2174. Both nebulae are star-forming regions and glow from the energy of the stars created within them. While the former nebulae are star-birth regions, IC443 is a remnant of stellar death, as it is the expanding shock wave of a supernova that exploded about 35,000 years ago.

This image was shot from a remote observatory in New Mexico with a 4" telescope (Takahashi FSQ-106) and astronomy CCD camera (SBIG STL-11000) for a total imaging time of 28 hours.

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2016 SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		August 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	October 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**1**	**2** *Jupiter0.4° S. of Moon*	**3** *Venus 1.1° S. of Moon* *Stargaze at Stonelick State Park*
4	**5**	**6**	**7**	**8**	**9**	**10** *ScopeOut*
11	**12**	**13**	**14**	**15**	**16**	**17**
18	**19**	**20**	**21** *Aldebaran 0.2° S. of Moon*	**22** *Equinox*	**23**	**24** *Stargaze at Stonelick State Park*
25	**26**	**27**	**28** *Mercury greatest elong. W. (18°)*	**29** *Mercury 0.7° N. of Moon*	**30**	

M31 Andromeda Galaxy
Upper Left Image

David Griggs

M31 was photographed using a Nikon D700 DSLR and a 30 year old manual focus 200mm Vivitar Series 1 lens. An Astrotrac mount allowed for longer exposures necessary to gather the light of the distant galaxy. 30 digital images were processed with DeepSkyStacker and Adobe Lightroom/Photoshop to create this image. This photo was taken in Death Valley National Park in Feb. 2013.

The Moon
Upper Right Image

Aaron Eiben

This image was recorded with a Samsung Galaxy S III smartphone using an app called DSLR Camera. Using a camera adapter, variable f l eyepiece, an Orion/ Vixen 102-FL DX Apochromatic 4" Refractor using a CNC Parts Supply Universal Smart Phone Adapter.

NGC 3372 Eta Carina Nebula
Lower Left Image

Judy Bay

Eta Carinae is extremely volatile and is expected to have at least one supernova explosion in the future. Judy took the photo in Morrow OH on iTelescope's remote T13 Tak Sky 90, Driver V2, Siding Spring Observatory located in Australia. Total imaging time was 15 minutes and 10 seconds.

M 42 Orion Nebula
Lower Right Image

Chris Kean & Kathleen Shea

M42, or the Orion Nebula, is a diffuse nebula located in the Milky Way Galaxy. M42 is roughly 1,344 light years from Earth and is estimated to be 24 light years across.This image was taken in Kenwood, OH with an Orion EON 130mm ED Triplet Apochromatic Refractor and Canon T3i with light pollution filter.

2016 OCTOBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				September 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 November 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 ◯ *Stargaze at Stonelick State Park*
2	3 *Rosh Hashana*	4	5	6	7	8
9 ◐	10 *Columbus Day*	11 *Mercury 0.9° N. of Jupiter*	12 *Yom Kippur*	13	14	15 *Supermoon*
16 ○	17	18	19 *Aldebaran 0.3° S. of Moon*	20	21	22 ◑
23 ● 30	24 *Halloween* 31	25	26	27	28 *Jupiter 1.4° S. of Moon*	29 *Stargaze at Stonelick State Park*

Sharpless 173
Phantom of the Opera Nebula

Eric Africa

Sharpless 173 is a very faint emission nebula in Cassiopeia. Similar to other such objects, it (and the other emission nebulae around) is a star-forming region that is glowing from the radiation of stars born within it. Its resemblance to a certain Broadway musical character has given it the nickname "Phantom of the Opera Nebula".

The nebula's nickname feels very appropriate to the hobby of astronomy, as one of the Phantom's signature songs in the Broadway musical is "The Music of the Night".

This image was shot from a remote observatory in New Mexico with a 4" telescope (Takahashi FSQ-106) and astronomy CCD camera (SBIG STL-11000) for a total imaging time of 14.5 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
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2016 NOVEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
October 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	December 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**1**	**2**	**3**	**4**	**5** *Stargaze at Stonelick State Park* *Meet a Meteorite*
6	**7**	**8** *Election Day*	**9**	**10**	**11** *Veterans Day*	**12**
13	**14**	**15** *Aldebaran 0.4° S. of Moon*	**16**	**17**	**18**	**19**
20	**21**	**22**	**23**	**24** *Thanksgiving Day*	**25** *Jupiter 1.9° S. of Moon*	**26** *Stargaze at Stonelick State Park*
27	**28**	**29**	**30**			

NGC 5129
Galaxy Centaurus A

Fred Calvert, Cold Spring Observatory

One of the closest active radio galaxies to Earth, Centaurus A contains a super massive black hole in it's center estimated to be over a billion times the mass of our sun - the result of a elliptical galaxy merging with a smaller companion spiral galaxy. Centaurus A is a peculiar elliptical galaxy spanning some 60,000 light years across at a distance of 11 million light years from Earth.

It was discovered by Scottish astronomer James Dunlop in 1826 from his home in New South Wales, Australia and is located North of the Southern Cross in the constellation Centaurus.

In 2015 the European Space Agency's Very Large Telescope in Chile observed in Centaurus A what is proposed as a new class of star clusters call dark globular clusters because of their unusually high mass and dark matter components when compared to the amount of stars in the cluster. Normal globular star clusters are considered to be almost devoid of dark matter.

Data for this image was collected using a Planewave 27" f/6.6 telescope and FLI PL 09000 CCD camera. Exposure times were 45 minutes Luminous and 15 minutes each for Red, Green and Blue.

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2016 DECEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		November 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 January 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**1**	**2** *Venus Friday*	**3** *Stargaze at Stonelick State Park*
4	**5**	**6**	**7**	**8**	**9**	**10**
11 *Mercury greatest elong. E. (21°)*	**12** *The Prophet's Brithday*	**13** *Aldebaran 0.5° S. of Moon*	**14**	**15**	**16**	**17**
18 *Regulus 1.0° N. of Moon*	**19**	**20**	**21** *Solstice*	**22** *Jupiter 2° S. of Moon*	**23**	**24** *Stargaze at Stonelick State Park*
25 *. Christmas Day*	**26** *Christmas Day Observed*	**27**	**28**	**29**	**30** *New Year's Eve observed*	**31** *New Year's Eve*

NGC 5139
Omega Centauri

Fred Calvert, Cold Spring Observatory

Appearing almost as large as a full moon to the naked eye, Omega Centauri is the biggest and brightest of the 150 known globular clusters in the Milky Way galaxy.

About 10 million stars orbit the center of the cluster which stretches 150 light years across at a distance from Earth of about 15,000 light years. It is estimated that the stars in the core of the cluster are only 0.1 light years apart.

In recent years Hubble Telescope Data indicates evidence of an intermediate-mass black hole at the center of the cluster, suggesting that Omega Centauri is actually the core of a failed dwarf galaxy which was disrupted during formation and absorbed by the Milky Way galaxy.

Omega Centauri has been cataloged as many different types of object as far back as 150 A.D., but was first recognized as a globular cluster by Scottish astronomer James Dunlop in 1826.

Data for this image was acquired with a Takahashi FSQ ED 106 / f/5 telescope, Paramount PME mount using an SBIG STL-11000M CCD camera to collect the LRGB data. Exposure: Luminance 60 minutes and Red, Green and Blue 30 minutes each for a total of 2.5 hours.

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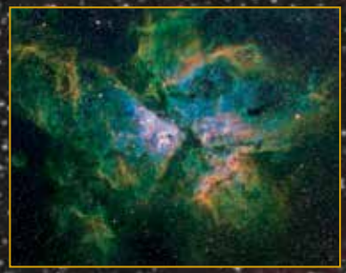


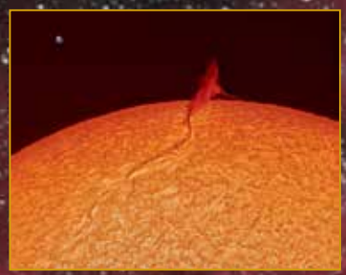
Eta Carina Nebula
Fred Calvert

Comet Lovejoy
Eric Africa

Cresent Nebula
Eric Africa

Triangulum Galaxy
Fred Calvert

Trifid Nebula
Eric Dunn



Solar Activity
Steve Rismiller

Barnard's Loop
Eric Africa

Sharpless 247
Eric Africa

Andromeda Galaxy
David Griggs

The Moon
Aaron Eiben

Eta Carina Nebula
Judy Bay

Orion Nebula
Chris Kean - Kathleen Shea

Phantom of the Opera
Eric Africa

Galaxy Centaurus A
Fred Calvert

Omega Centauri
Fred Calvert

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