DEEP SKY TREASURES

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

2010

DEEP SKY TREASURES

The Cincinnati Observatory Center, Friends of the Observatory, and Xavier University present the 2010 Deep Sky Treasures Calendar. The seventeen deep sky images included in this calendar showcase the magnificent photos of three of our talented astro-photographers: Eric Africa, Fred Calvert and Steve Rismiller.

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 168 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. Staff 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 three 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.

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 the Cincinnati Observatory Center at (513) 321-5186, or visit our website: www.cincinnatiobservatory.org.

" 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 benifits, activities and educational opportunites for aspiring astronomers and their families.

2009

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 the most up to date activities information please visit our website: www.cincinnatiobservatory.org

ASTRO-PHOTOGRAPHY ARTISTS

ERIC AFRICA

Eric has always 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 astrophotography in 1997 when another bright comet, Hale-Bopp, made its appearance.

Eric's astrophotography was limited to film images of solar system objects until he ventured into digital solar system photography in 2001. That was followed in 2003 with digital photography of deep space objects. This has been the medium that he has embraced since.

Eric's preferred imaging targets have been galaxies and nebulae, but he has been known to shoot an occasional star cluster or two. Using a digital camera configured specifically for astronomical imaging, he has been working on rendering images as close to true color as possible, though he is also working on the art of false-color narrow-band imaging.

Eric's work has been featured in two Ohio-area art exhibits so far:

The View from Dione (http://www.absolutearts.com/artsnews/2005/05/09/32988.html), Columbus, Ohio, May 2005.

Cluster at the Mockbee (http://steadystrain.com/clusterfaq/), Cincinnati, Ohio, July 2005.

Eric is constantly working to improve his image acquisition and processing skills, and he is out imaging whenever conditions permit.

Eric lives in West Chester with his wife Josephine, and can be reached at eja24601@yahoo.com.

FRED CALVERT

Cold Spring Observatory

An aircraft mechanic and photographer by profession, Fred has been interested in astronomy since the age of nine. He spent three years building his own observatory in Cold Spring, Kentucky where he does both visual observing and CCD imaging.

Fred's images have appeared in numerous issues of Astronomy Magazine, Sky & Telescope Magazine and international astronomy publications.

Messier 24 which appears in this calendar can also be seen in "The Illustrated Atlas of the Universe" (M.A.Garlick), the new book "Teach Yourself Visually - Astronomy" (R.Talcott) and was featured as a NASA Astronomy Picture of the Day in September 2004.

His images in this year's calendar were taken at Cold Spring Observatory, Kentucky, Kitt Peak National Observatory, Arizona and remotely using a telescope located in Pingelly, Australia.

Cold Spring Observatory is a member of the "Sonoma University / NASA Global Telescope Network" the "NASA/JPL/University of Maryland Small Telescope Science Program" and the American Association of Variable Star Observers (AAVSO).

Fred lives in Northern Kentucky with his wife Ann and puppies Samantha and Max.

Observatory Web Site: http://home.fuse.net/coldspringobservatory

*ABlock/NOAO/KPNO/AURA/NSF

STEVE RISMILLER

Steve has been fascinated with astronomy since childhood. His earliest recollections of astronomy include looking at the sky with his family and seeing those early satellites of Echo and Echo II. His grandfather's description of the passage of Comet Halley in 1910 inspired him to build his first telescope. Through the years, Steve has built many telescopes ranging in size from 3 to 20 inches in diameter. Steve also enjoys woodworking. Some of his telescopes have been made from Black Walnut. It is as nice to look through them as it is to look at them. Along with his wife Sue, he built their own "Starfield" roll off roof observatory under dark skies in northern Kentucky.

Steve is retired after 31 years of service with Darke, Warren, and Clermont Soil and Water Conservation Districts in southwest Ohio. This retirement provides Steve with the daylight hours needed for solar observations and imaging. Having traveled to 5 total solar eclipses, Steve and Sue now use a Hydrogen-Alpha solar filter to observe and image the ever changing solar features that they glimpsed during those total solar eclipses.

With digital photography, Steve enjoys imaging the sun, moon and planets. Several of his images have been published in the local media, on TV, in several books, and on the Internet.

You can see more of his work at:
http://home.fuse.net/starfield

2009 OCTOBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*		September 2009 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 2009 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**	**2**	**3**
4	**5**	**6** *Mercury greatest elong. W. (18°)*	**7** *Venus, Mercury & Saturn conjunction 7am*	**8**	**9**	**10**
11	**12** *Mars 1.2° N. of Moon* *Columbus Day*	**13** *Venus, Saturn & Mercury conjunction 7am*	**14**	**15**	**16**	**17** *Star Gaze at Stonelick State Park**
18	**19**	**20**	**21** *Antares 1° S. of Moon*	**22**	**23**	**24** *Star Gaze at Stonelick State Park**
25	**26**	**27** *Jupiter 3° S. of Moon*	**28**	**29**	**30**	**31** *Halloween*

NGC 1499
The California Nebula

Eric Africa

The constellation of Perseus is host to a large cloud of gas and dust that looks like a map of California, which gives this nebula its popular nickname. NGC 1499 is an emission nebula, a large cloud of gas and dust 100 light-years long and about 1,500 light-years away. Unlike other emission nebulae depicted in this calendar, NGC 1499 is not glowing from the ionizing radiation of hot stars embedded within. It is thought that Xi Persei, the bright star to the lower right of the nebula in the picture, is the source of the radiation that is causing this cloud to glow.

NGC 1499 is almost visible to the naked eye under a very dark sky. It is very dim and diffuse, meaning that telescopic views of it are not easy, and it lends itself better to astrophotography.

This is a false-color image taken through filters passing light of scientifically-interesting wavelengths. Colors were mapped more for a pleasing effect of the RGB shades than for scientific interest. Three hours of Hydrogen-Alpha data taken in October, 2006 were combined with three hours of Sulfur-II data taken in November, 2007 to create this composite. All were taken from my backyard in West Chester, Ohio.

Equipment used was a 4" Takahashi FSQ-106 refractor on a Takahashi EM200 Temma-PC mount. The camera used was a SBIG STL-6303 camera with 8-position filter wheel and Astrodon narrowband filters.

Software used to process this image was MaximDL and Adobe Photoshop CS.

2009 NOVEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 Daylight Savings Time Ends	**2**	**3**	**4**	**5** Mercury in superior conjunction	**6**	**7**
8	**9** Mars 3° N. of Moon	**10**	**11** Veterans Day	**12**	**13**	**14** Star Gaze at Stonelick State Park*
15	**16**	**17** Leonids Meteor Shower	**18**	**19**	**20**	**21** Star Gaze at Stonelick State Park*
22	**23** Jupiter 4° S. of Moon	**24**	**25**	**26** Thanksgiving	**27**	**28**
29	**30**					

October 2009

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 2009

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		

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

NGC 2403
Galaxy in Camelopardalis

*Fred Calvert, Cold Spring Observatory**

This beautiful face-on spiral galaxy in Camelopardalis (The Giraffe) is an outlying member of the M 81 Group of galaxies.

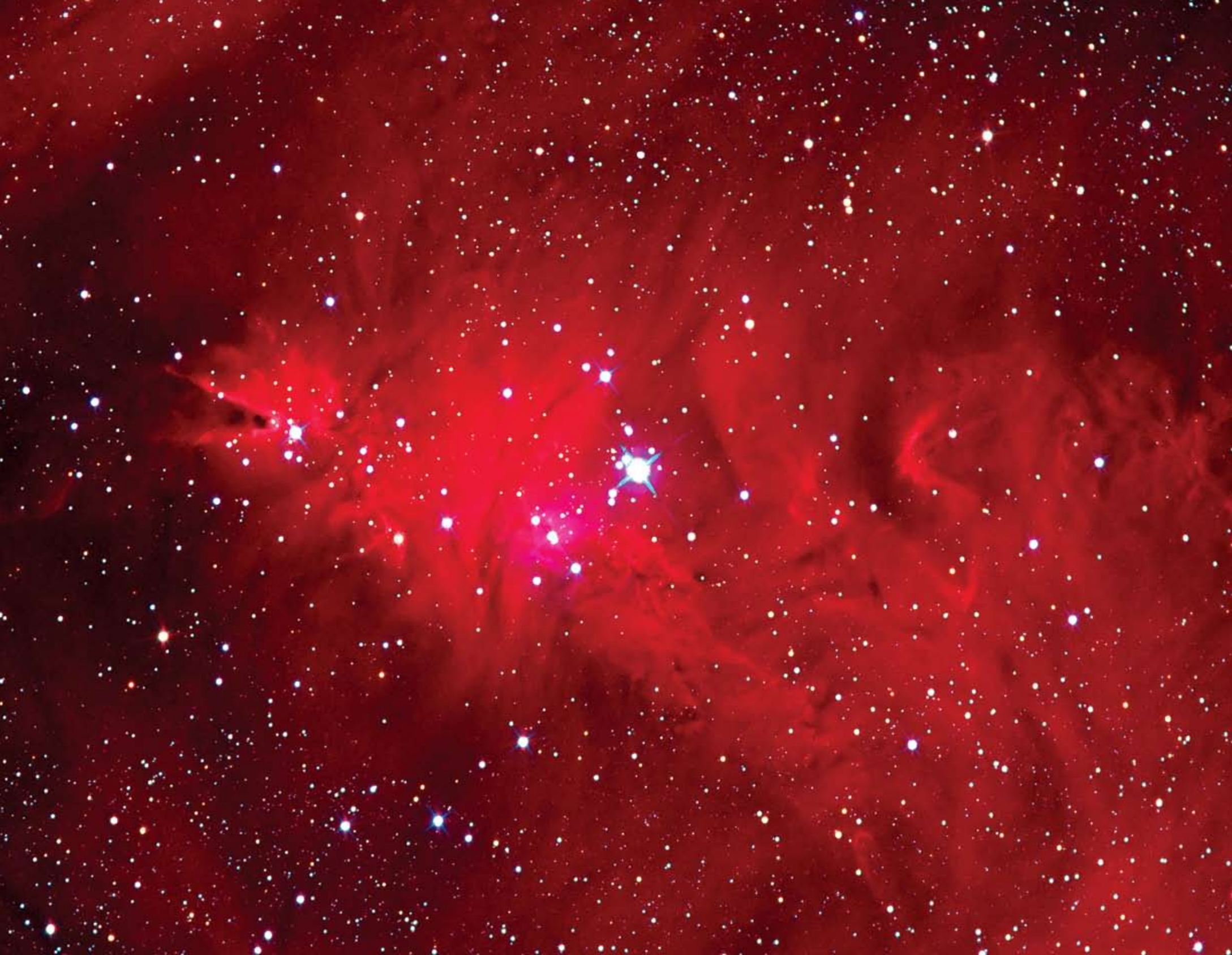
NGC 2403 is among the more conspicuous Northern objects which Charles Messier missed when compiling his catalog. Thus its discovery was left to William Herschel.

NGC 2403 resides about 12 million light years from Earth. The pink areas are areas of star birth.

At the nine o-clock position half way out from the galaxy core (a small round red bright area) is Supernova (SN2004dj) that was discovered by Japanese amateur astronomer Koichi Itagaki on July 31, 2004. A team of astronomers from the Space Telescope Science Institute discovered that the supernova was part of a compact cluster of stars known as Sandage 96, whose total mass is about 24,000 times the mass of the Sun.

Many such clusters — the blue regions — as well as looser associations of massive stars, can be seen in this image. The large number of massive stars in NGC 2403 leads to a high supernova rate. Two other supernovae have been seen in this galaxy during the past half-century [ESA].

This image was taken at Kitt Peak National Observatory using the 20" RC Optics Systems Telescope @ F 5.5 on a Paramount ME Robotic Mount and SBIG ST10XME w Color Filter Wheel & AO-7 Adaptive Optics. Total exposure time was 2.6 hours.



2009 DECEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
November 2009 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 2010 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**
6	**7**	**8** ◑	**9**	**10**	**11**	**12** *Star Gaze at Stonelick State Park** *First Day of Hanukkah*
13 *Geminids Meteor Shower*	**14**	**15**	**16** ●	**17**	**18** *Mercury 1° S. of Moon* *Mercury greatest elong. E. (20°)*	**19** *Star Gaze at Stonelick State Park**
20	**21** *Jupiter 4° S. of Moon* *Solstice*	**22**	**23**	**24** ◐ *Christmas Eve*	**25** *Christmas*	**26**
27	**28**	**29**	**30**	**31** ○ *Partial eclipse of Moon not visible in USA*	*All Dates and Times are Eastern Standard / Eastern Daylight Time* ** Stonelick events are Weather Dependent*	

NGC 2264

*Fred Calvert, Cold Spring Observatory**

This wide-field image of the Christmas Tree Cluster, Cone Nebula, Fox Fur Nebula and the Snowflake Cluster, collectively known as NGC2264, is located in the constellation of Monoceros, the Unicorn some 2600 light years from Earth and was discovered by William Herschel in 1785.

The image also contains two famous nebulae. At the left center of the image is the Cone Nebula, and to the lower center is the Fox Fur Nebula. The cone's shape comes from a dark absorption nebula consisting of cold molecular hydrogen and dust in front of a faint emission nebula containing hydrogen ionized by S Monocerotis, the brightest star of NGC 2264 located in the center of the image.

The gentle arcs in orange and blue near the center of the image are Herbig Haro objects, jets of gas from protostars embedded in the nebula.

This image was taken at Kitt Peak National Observatory with a Televue (480mm f6.3) telescope with a Televue Field Flattener. SBIG ST10XME w Color Filter Wheel Piggybacked to a RC Optics 20" on a Paramount ME mount.

Total exposure time was 6.0 hours using Hydrogen Alpha, Red, Green and Blue filters.

2010 JANUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			December 2009 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 2010 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	**1** *New Year's Day*	**2** *Earth at perihelion*
3 *Quadrantids Meteor Shower*	**4** *Mercury in inferior conjunction*	**5**	**6**	**7** ◑	**8**	**9** *Star Gaze at Stonelick State Park**
10	**11** *Antares 1° S. of Moon* *Venus in superior conjunction*	**12**	**13**	**14**	**15** ● *Annular ecipse of Sun not visible in USA*	**16** *Star Gaze at Stonelick State Park**
17 *Jupiter 5° S. of Moon*	**18** *Martin Luther King, Jr. Day*	**19**	**20**	**21** *Marsapalooza 8-10pm*	**22** *Marsapalooza 8-10pm*	**23** ◐ *Marsapalooza 8-10pm*
24 *Marsapalooza 8-10pm* **31**	**25**	**26** *Mercury greatest elong. W. (25°)*	**27** *Mars closest approach*	**28**	**29** *Mars at opposition*	**30** ○

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

M3
Globular Cluster

Eric Africa

Approximately 200 globular clusters orbit the Milky Way, swarming around its halo like bees around a flower. M3, the third entry in the famous Messier catalog of deep sky objects, is one of the best examples of these intriguing objects. It contains about a half million stars, and it is famous for a large number of variable stars discovered within it. It lies about 34,000 light years away, and it has one of the densest core regions for a globular cluster, with 50% of its total mass within its central 22 light-years. This object is pleasing both photographically and visually, and can be observed with moderately-sized telescopes even from light-polluted locations. It lies in the constellation Canes Venatici, or the Hunting Dogs, which is better known for its galaxies.

M3 is comparatively bright as far as deep space objects are concerned, and for this reason satisfying results can be obtained when shooting this with short exposures from light-polluted locations. Total exposure time for this image is five hours and 40 minutes (100 minutes luminance, 4 hours RGB).

Equipment used was a 8.26" Takahashi Mewlon 210 Cassegrain on an Astro-Physics AP1200GTO mount. The camera used was a SBIG ST-10XME camera with CFW-8a filter wheel and Astrodon filters.

Software used to process this image was MaximDL and Adobe Photoshop CS.

2010 FEBRUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4	5 ◑	6 *Star Gaze at Stonelick State Park**
7 *Antares 1° S. of Moon*	8	9	10	11	12 *Mercury 2° S. of Moon* *Lincoln's Birthday*	13 ● *Star Gaze at Stonelick State Park**
14 *Valentine's Day*	15 *President's Day*	16	17 *Ash Wednesday*	18	19	20 ◐ *Mars Madness 7:30-9:30pm*
21	22 *Moonday Monday 6:30-8:30pm* *Washington's Birthday*	23	24	25	26	27
28 ○ *Jupiter in conjunction with Sun*						

January 2010

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						

March 2010

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			

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

M42
Orion Nebula

Eric Africa

The constellation Orion and the Orion Nebula are among the most recognizable constellations and nebulae in the sky. They are equally visible in both the Northern and Southern Hemisphere, providing most of the world's population a great view of one of the night sky's showcase objects. Step out on a clear winter evening in the Northern Hemisphere (summer in the Southern Hemisphere), locate Orion's belt and look south of the center star, towards Orion's sword. With reasonably dark skies, one of the "stars" in Orion's sword could be seen to be a bit fuzzy. Guess what? That's the Orion Nebula!

This is a false-color image taken through filters passing light of scientifically-interesting wavelengths. The data for this image was taken in a single night in December, 2005 from a friend's dark sky site in Highland County, Ohio. Short exposures of 3 minutes through each filter (Hydrogen-Alpha, Sulphur-II, Oxygen-III) to prevent overexposure of the brighter areas were combined with 20 minutes' worth of exposure through the same three filters to create this composite.

Equipment used was a 4" Takahashi FS-102 refractor on a Takahashi EM200 Temma-PC mount. The camera used was a SBIG STL-6303 camera with built-in filter wheel and Astrodon narrowband filters.

Software used to process this image was MaximDL and Adobe Photoshop CS.

2010 MARCH

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4	5	6
7 ◑	8	9	10	11	12	13 *Star Gaze at Stonelick State Park**
14 *Daylight Savings Time Begins* *Mercury in superior conjunction*	15 ●	16	17 *St. Patrick's Day*	18	19	20 *Star Gaze at Stonelick State Park** *Equinox*
21 *Saturn at opposition*	22 *Moonday Monday 8-10pm*	23 ◑	24	25	26	27
28 *Palm Sunday*	29 ○	30 *Mercury & Venus 4° separation* *Passover*	31			

February 2010

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						

April 2010

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	

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

M81 & M82
A Galactic Waltz

Eric Africa

M81 and M82 can be found near the famous Big Dipper. They are a pair of large galaxies similar to but outside our own Milky Way and lie about 12 million light-years away. In comparison, the stars of the Big Dipper lie "only" about 80-90 light-years away.

M81 and M82 are trapped in a cosmic waltz by their immense gravitational fields. They already had a close encounter with each other several millions years ago, warping the spiral shape of M81 and triggering frantic star formation in M82. The effect on M82 is especially visible as the red filaments blasting from its center – possibly the result of hot winds from supernovas spawned with the star formation. This waltz will continue with the galaxies circling and closing with each other for eons. This will eventually end in a grand merger of the two galaxies to form an even bigger galaxy. For now, we can watch this waltz from a safe distance.

M81 and M82 can easily be seen with a small telescope. The two will fit within the field of view of a telescope at low power. In a dark enough sky, they can be seen with binoculars.

This image was acquired over three nights from late January through early February, 2005. Equipment used was a 4" Takahashi FS-102 refractor on a Takahashi EM200 Temma-PC mount. The camera used was a ST-8XE utilizing Astrodon LRGB filters. Total exposure time was 6 hours (3 hours luminance, 1 hour each RGB). CCDSoft and Adobe Photoshop were used for processing.

2010 APRIL

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*		March 2010 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	May 2010 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** *Good Friday*	**3** *Venus-Mercury Conjunction 8pm*
4 *Easter*	**5**	**6** ◑	**7**	**8** *Mercury greatest elong. E. (19°)*	**9**	**10** *Mercury & Venus 5° separation* *Star Gaze at Stonelick State Park**
11	**12**	**13**	**14** ● *Moon & Mercury conjunction 6:30am*	**15** *Mercury 1° S. of Moon*	**16** *Venus 4° S. of Moon*	**17** *Saturndays 9-11pm* *Star Gaze at Stonelick State Park**
18	**19**	**20**	**21** ◑ *Lyrids Meteor Shower*	**22**	**23**	**24** *Saturndays 9-11pm*
25	**26**	**27**	**28** ○ *Mercury in inferior conjunction*	**29**	**30**	

M24, NGC 6590, & IC 1284 Sagittarius Region of the Milky Way Galaxy

*Fred Calvert, Cold Spring Observatory**

An image like this shows that our galaxy is always "partly cloudy."

Not unlike Earthly clouds that block parts of the sky (say on a starry night), tremendous clouds of gas and dust obscure the things that are beyond them. However, breaks in these galactic clouds can also be seen- even towards the densest part of our galaxy.

M24 is the large oval collection of bluish stars that stands out among the others in the bottom right of this picture. To look at this stellar association of young and bright stars is to peer through a break in the obscuring clouds to places much deeper towards an inner spiral arm.

The stars of M24 are 10,000 light years away and span across 330 light years of space.

The northern part of this starcloud boasts several dark nebulae that provides contrast for all of the stars in the background. Near the right center of the frame, IC 1284 glows bright red; while NGC 6590 scatters bluish light around a few bright stars.

This image is the center section of a three image mosaic taken at Kitt Peak National Observatory using a Televue (480mm f6.3) SBIG ST10XME w Color Filter Wheel Piggybacked to a RC Optics 20" on a Paramount ME mount.

Total exposure time was 4.0 hours.

2010 MAY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	**3**	**4**	**5** Eta Aquarids Meteor Shower	**6**	**7**	**8** Star Gaze at Stonelick State Park*
9 Moon & Jupiter conjunction 6am Mother's Day	**10**	**11**	**12**	**13**	**14**	**15** Star Gaze at Stonelick State Park*
16 Sunday, Sun-day, Sundae 1-4pm Venus 0.08° S. of Moon	**17**	**18**	**19**	**20**	**21**	**22**
23 **30**	**24** Memorial Day **31**	**25** Mercury greatest elong. W. (25°)	**26**	**27**	**28**	**29**

April 2010

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	

June 2010

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			

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

M83
Southern Pinwheel Galaxy

Fred Calvert, Cold Spring Observatory

Messier 83 is one of the most conspicuous spiral galaxies in the sky. Situated in the constellation Hydra, it is the southernmost galaxy in Messier's catalog and located approximately 15 million light years from Earth.

Shining with the light of billions of stars and the ruby red glow of hydrogen gas, it is a beautiful example of a barred spiral galaxy

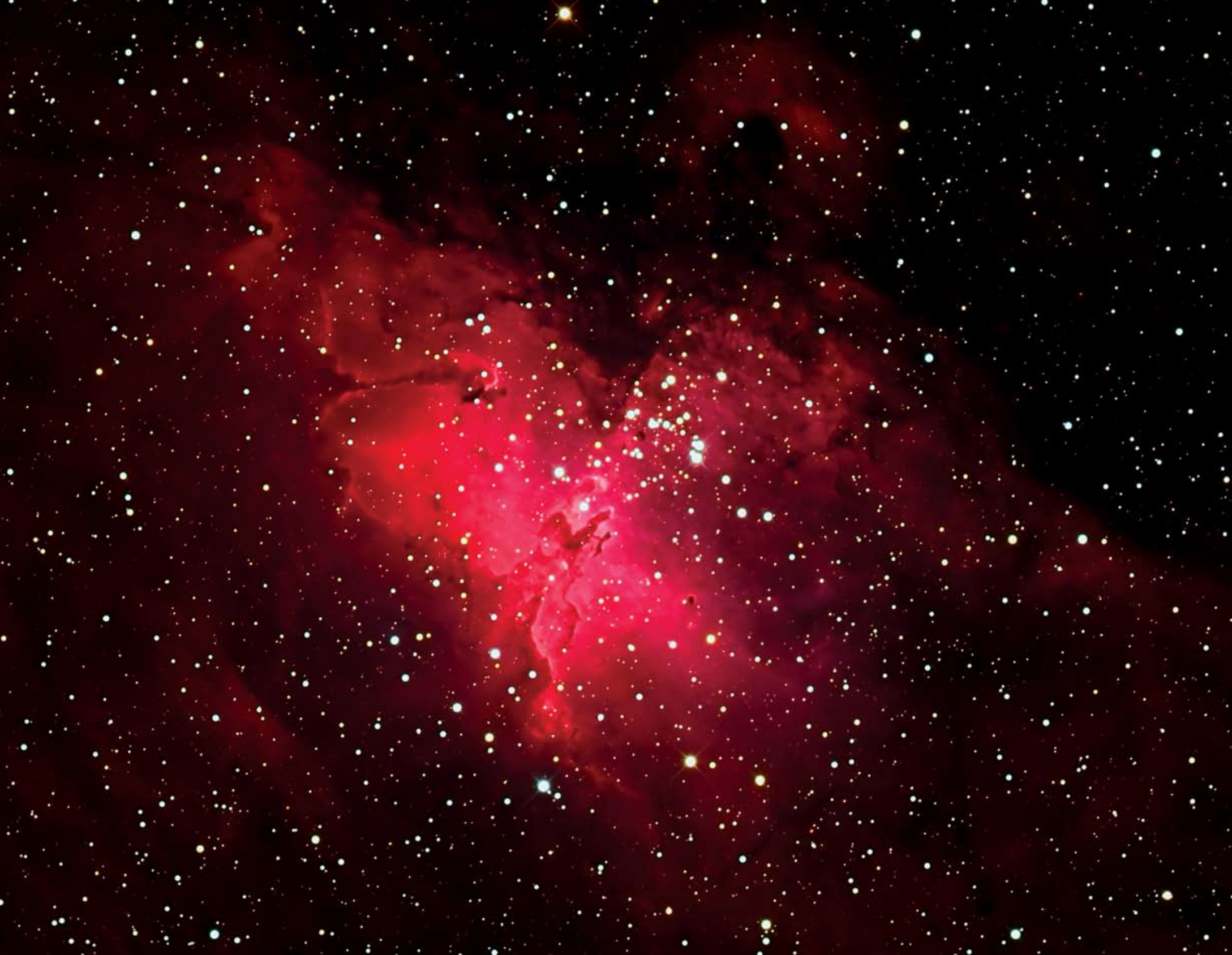
M83 stretches over 40,000 light-years across, making it roughly 2.5 times smaller than our own Milky Way. However, in some respects, Messier 83 is quite similar to our own galaxy. Both the Milky Way and Messier 83 possess a bar across their galactic nucleus, the dense spherical conglomeration of stars seen at the centre of the galaxies.

M83 was discovered by Nicholas Louis de Lacaille at the Cape of Good Hope on February 23, 1752. It became the first galaxy to be discovered beyond the Local Group, and the third of all galaixes, after M31 and M32. Six Supernovae (SN 1923A, SN 1945B, SN 1950B, SN 1957D, SN 1968L and SN 1983N) have been observed in M83.

It was cataloged by Charles Messier on February 17, 1781.

The data for this image was obtained remotely from the Cold Spring Observatory Control Room using a 14.5 inch RC Optics telescope and Apogee Instrument, Alta U16M CCD camera located in Pingelly, Austlaria.

Total exposure time for this image was 3.9 hours.



2010 JUNE

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
May 2010 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 2010 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** *Star Gaze at Stonelick State Park**
6 *Moon & Jupiter conjunction 5:30am*	**7**	**8**	**9**	**10**	**11**	**12** ● *Star Gaze at Stonelick State Park**
13	**14** *Venus 4° N. of Moon* *Flag Day*	**15**	**16**	**17**	**18**	**19** ◐
20 *Father's Day*	**21** *Solstice*	**22**	**23**	**24**	**25**	**26** ○ *Partial eclipse of Moon*
27	**28** *Mercury in superior conjunction*	**29**	**30**			

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

M16
The Eagle Nebula

Fred Calvert, Cold Spring Observatory

The Eagle Nebula (Messier 16) is a dazzling stellar nursery located 7000 light-years away near the constellation of Serpens - the Snake. The center section of this image is well known to the public as the "Pillars of Creation" image taken by Hubble Space Telescope.

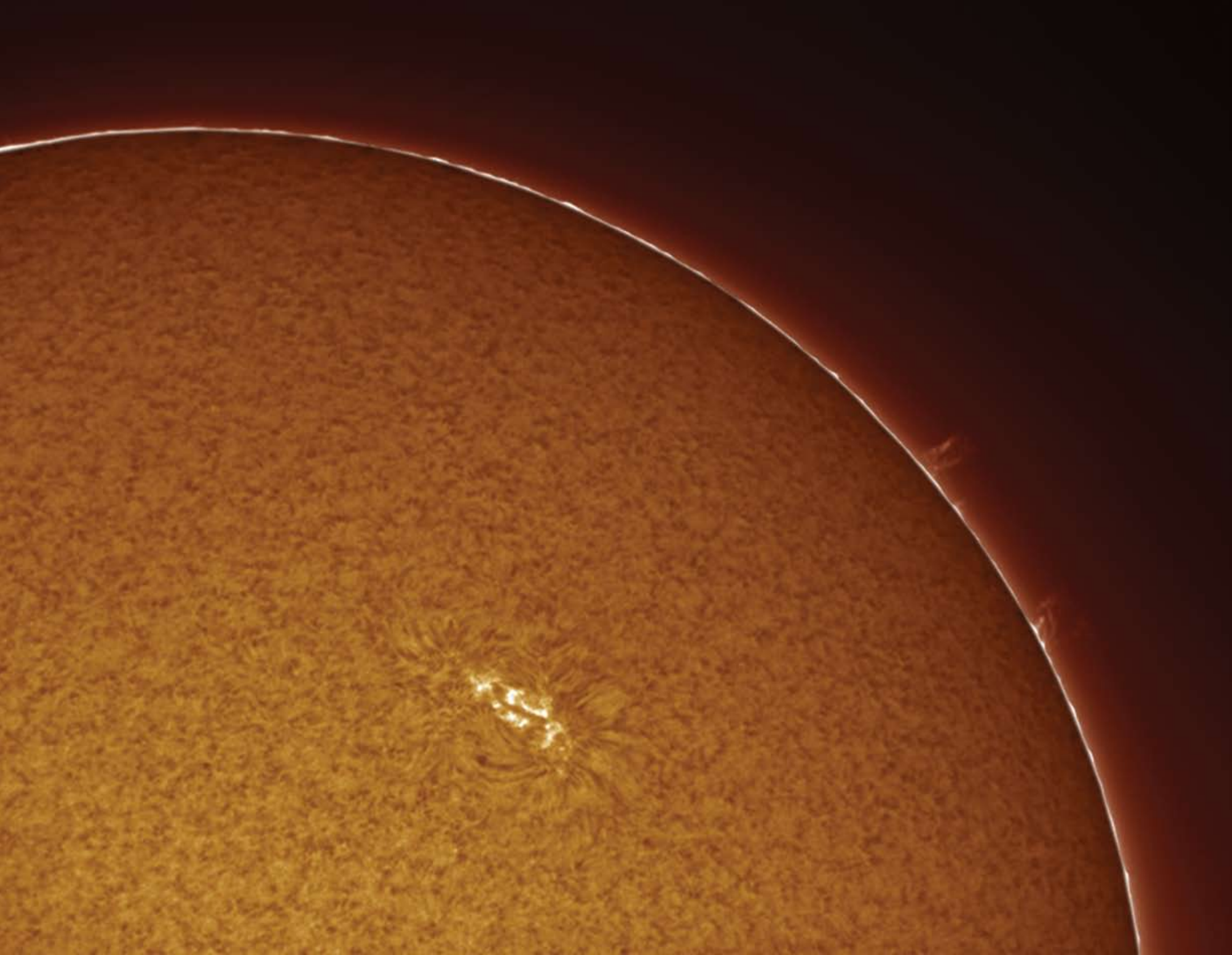
This wide field image shows that M16 is both an Emission Nebula and Open Star Cluster which spans some 315 light years across or around 20,000 times the diameter of our solar system.

The cluster of young stars formed from the nebula and located above and to the right of the "Pillars of Creation" is known as NGC 6611.

The "Pillars of Creation" light-year long columns of gas and dust are being simultaneously sculpted, illuminated and destroyed by the intense ultraviolet light from massive stars in NGC 6611.

M16 is one of eight nebulas discovered by Swiss astronomer Jean-Philippe de Cheseaux. (1718-1751).

This image was taken at Cold Spring Observatory with a 102mm f/5 Celestron telescope piggy-backed on a Meade LX200 telescope using an Santa Barbra Interments Group (SBIG) ST2000XM CCD Camera, ST-8 color filter wheel with Hydrogen Alpha, Red, Green and Blue Filters. Total exposure time was 2.4 hours.



2010 JULY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*		June 2010 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 2010 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 ◑ *Independance Day*	**5**	**6** *Earth at aphelion*	**7**	**8**	**9**	**10** *Star Gaze at Stonelick State Park**
11 ● *Total eclipse of Sun not visible in USA*	**12** *Mercury 4° N. of Moon*	**13**	**14**	**15** *Moon, Venus, Mars & Saturn line up*	**16** *Venus Fridays 8:30-10:30pm*	**17** *Star Gaze at Stonelick State Park**
18 ◐	**19**	**20**	**21**	**22**	**23** *Venus Fridays 8:30-10:30pm*	**24**
25 ○	**26**	**27**	**28**	**29**	**30**	**31**

The Sun
Our Star

Steve Rismiller

The sun, as seen in Hydrogen-Alpha light, shows many surface and edge details. In this picture, the chromospheric network covers the northwest quadrant of the solar disk and looks like a series of veins or webs. This image was acquired on June 5, 2009 when active region 1019 was producing small white flares in this magnetic storm. On the limb or edge of the sun, two prominences surge up from the surface. The sun's features are constantly changing, which provides many dramatic views.

Warning: Observing the sun with a telescope can be very dangerous. Permanent eye damage and blindness will result from an improperly filtered telescope. Contact the Cincinnati Observatory for more information on solar filter safety.

Equipment used was a Vixen 102ED refractor fitted with a Coronado Solar Max 60 Hydrogen-Alpha filtering system. This solar telescope was mounted on a Vixen GP equatorial mount tracking the sun. Attached to the solar telescope was a Teleview 2.5x Powermate and a DMK31 CCD camera. This camera created a video file on the computer in which 200 frames were stacked for the disk and prominence composite.

Software used to create this composite image included Registax 5 and Adobe PhotoShop CS3.

2010 AUGUST

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 *Mars 1° S. of Saturn*	**2**	**3**	**4**	**5**	**6** *Mercury greatest elong. E. (27°)*	**7** *Star Gaze at Stonelick State Park**
8	**9** *Venus 3° S. of Saturn* *Mars, Venus & Saturn line up*	**10**	**11** *Mercury 2° N. of Moon*	**12** *Perseids Meteor Shower*	**13**	**14** *Star Gaze at Stonelick State Park**
15	**16**	**17**	**18**	**19** *Venus greatest elong. E. (46°)*	**20**	**21**
22	**23** *Venus 2° S. of Mars*	**24**	**25**	**26**	**27**	**28**
29	**30**	**31**				

July 2010

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 2010

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		

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

NGC 6992-6995-6960
The Veil Nebula

Eric Africa

The Veil Nebula is a still-expanding shock wave from a supernova that blazed in glory about 10,000 years ago in the constellation Cygnus. It shows up as several delicate gas tendrils covering about 3 degrees of sky (6 times the diameter of the Full Moon). Though the components have different catalog entries, wide-field images like this reveal them to display a circular shape, hinting at their origins. These tendrils of gas are not the remnants of the dead star but the shock wave from the blast crashing into and interacting with interstellar gas at speeds of over a million kilometers per hour! This nebula is visible with small telescopes at dark sites, and can be seen with proper filtration from light-polluted skies. Views of this nebula from dark sites with big telescopes are memorable.

This is a narrow-band/RGB emulation, mapping H-alpha data (7.5 hours total exposure) to Red, OIII (6.5 hours exposure) to green and a blend of H-alpha and OIII (simulating H-beta) to blue. 70 minutes each of RGB data was also imaged to give the stars a natural RGB color. The data for this image was taken over several nights in July, 2008 from my backyard in West Chester, Ohio.

Equipment used was a 4" Takahashi FSQ-106 refractor on an Astro-Physics AP1200GTO mount. The camera used was a SBIG STL-6303 camera with 8-position filter wheel and Astrodon narrowband filters.

Software used to process this image was MaximDL and Adobe Photoshop CS.

2010 SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4
All Dates and Times are Eastern Standard / Eastern Daylight Time * Stonelick events are Weather Dependent			Venus 1° N. of Spica		Mercury in inferior conjunction	Star Gaze at Stonelick State Park* Mars 2° S. of Spica
5	6	7	8	9	10	11
	Labor Day			Jewish New Year		ScopeOut 2010 1-10pm Star Gaze at Stonelick State Park* Venus 0.3° N. of Moon
12	13	14	15	16	17	18
						Yom Kippur
19	20	21	22	23	24	25
Mercury greatest elong. W. (18°)		Jupiter at opposition	Equinox			
26	27	28	29	30		

August 2010

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 2010

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						

NGC 869 & NGC 884
The Perseus Double Cluster

*Fred Calvert, Cold Spring Observatory**

The famous double cluster in Perseus was known in antiquity (probably even pre-historically), and first cataloged by the Greek philosopher and astronomer Hipparchus.

Both clusters are situated in the Perseus OB 1 association, and are only a few hundred light-years apart, at a distance of over 7,000 light years from Earth.

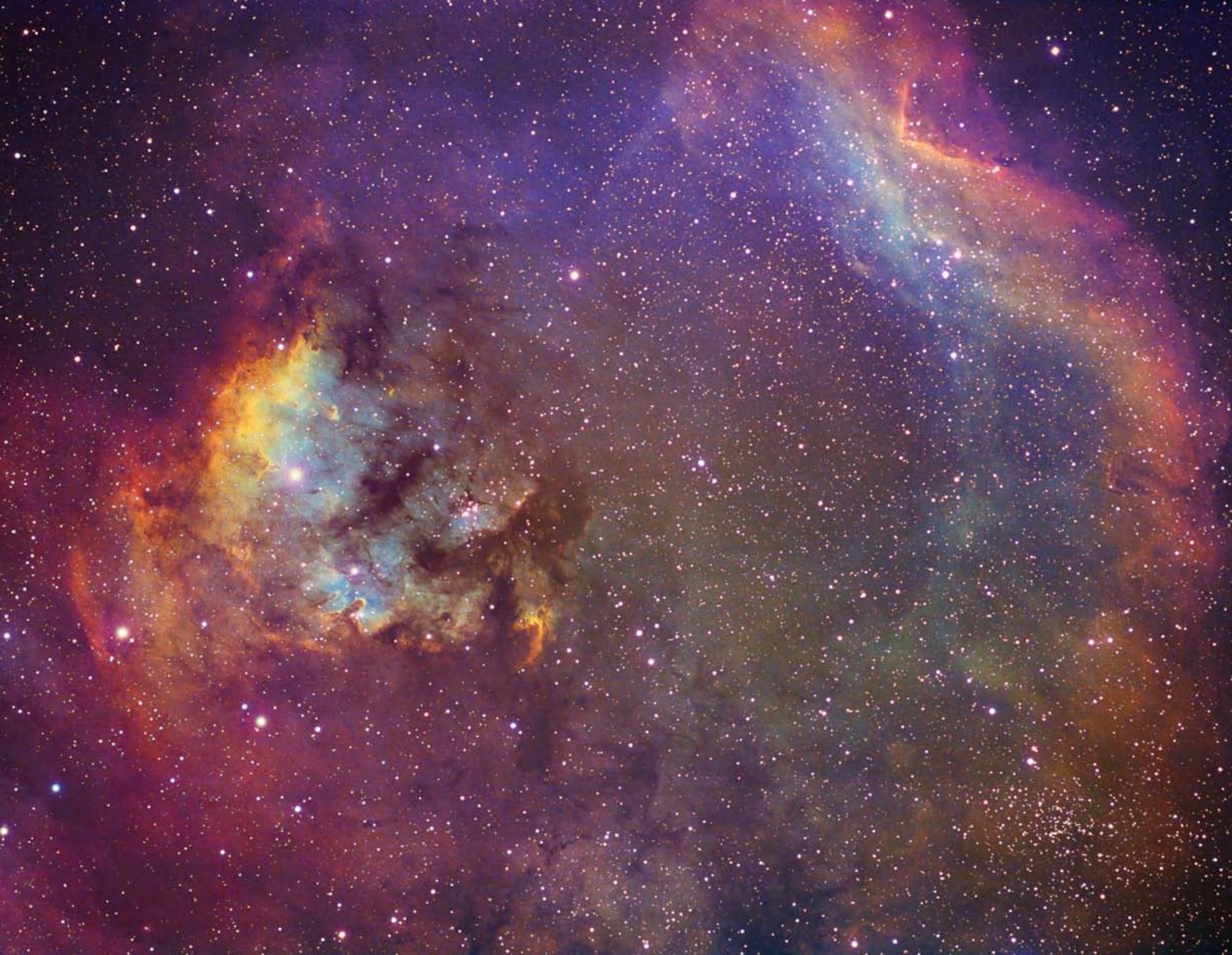
They are both quite young: h is listed at 5.6, chi at 3.2 million years (Sky Catalog 2000). Their hottest main sequence stars are of spectral type O & B.

Both clusters are blueshifted, (meaning that they are approaching earth) with NGC 869 approaching at a speed of 22 km/s and NGC 884 approaching at a similar speed of 21 km/s.

Both clusters are naked eye objects just a short distance from the 'W' of Cassiopeia. The star clusters are an ideal target for binoculars or a low power telescope. Both red and blue stars are visible.

This image was taken at Kitt Peak National Observatory using a Televue (480mm f6.3) and SBIG ST10XME w Color Filter Wheel piggybacked to a Mead 16" LX200 telescope.

Total exposure time was 1.0 hour.



2010 OCTOBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			September 2010 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 2010 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** Saturn in conjunction with Sun	**2** Star Gaze at Stonelick State Park*
3	**4**	**5**	**6**	**7**	**8**	**9** Star Gaze at Stonelick State Park* Venus 3° S. of Moon Mars 4° N. of Moon
10	**11** Columbus Day	**12**	**13**	**14**	**15** Jupiter Nights 8-10pm	**16** Jupiter Nights 8-10pm Mercury in superior conjunction
17	**18**	**19**	**20** Jupiter 7° S. of Moon Uranus 6° S. of Moon	**21**	**22**	**23**
24 Halloween **31**	**25**	**26**	**27**	**28** Venus in inferior conunction	**29**	**30**

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

Cederblad 214 & NGC 7822 Emission Nebula

Eric Africa

The northern kingly constellation of Cepheus IC 1396 is host to many emission nebulae, including Cederblad 214, the bright nebula to the left, and NGC 7822, the fainter arc on the right. Like many emission nebulae (designated from the light emitted by gases ionized by stars embedded within them), this object is a huge star nursery. Stars born within the giant clouds of gas and dust of this object light up its gases with ionizing radiation and blow away their shrouds of dust with strong stellar winds. The latter is evidenced by the comet-like shapes of the dark dust clouds, pointing back at the stars causing their erosion.

This is a false-color image taken through filters passing light of scientifically-interesting wavelengths. The data for this image were taken over several nights in September and October, 2007 from my backyard in West Chester, Ohio. Exposure times are 6 hours through a Hydrogen-Alpha filter, 7 hours through a Sulfur-II filter, and 7 hours through an Oxygen-III filter (20 hours total). In addition, 18 minutes of RGB data (6 minutes Red, 6 minutes Green and 6 Blue) were added to provide natural color data to the stars in the image.

Equipment used was a 4" Takahashi FSQ-106 refractor on a Takahashi EM200 Temma-PC mount. The camera used was a SBIG STL-6303 camera with 8-position filter wheel and Astrodon narrowband filters.

Software used to process this image was MaximDL and Adobe Photoshop CS.

2010 NOVEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2 *Election Day*	3	4	5	6 *Star Gaze at Stonelick State Park**
7 *Daylight Savings Time Ends* *Mars 1° N. of Moon*	8	9	10	11 *Veterans Day*	12	13 *Star Gaze at Stonelick State Park**
14	15 *Mercury 2° S. of Antares*	16	17 *Leonids Meteor Shower*	18	19	20 *Mercury 1° S. of Mars*
21	22	23	24	25 *Thanksgiving*	26	27
28	29	30				

October 2010

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 2010

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	

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

NGC 7538
Emission Nebula

*Fred Calvert, Cold Spring Observatory**

NGC 7538 is an Emission Nebula located about 7,000 light years away in the constellation Cepheus in the Perseus Spiral Arm of the Milky Way Galaxy. It is home to the biggest yet discovered protostar which is about 300 times the size of our Solar System.

A Protostar is a cloud of hot dense gas and dust that is collapsing under it own gravity to form a star.

Little is still know about High-Mass Protostars, but it is assumed that they are surrounded by an acceleration disk that drives molecular outflow, such as seen in Low-Mass Protostars.

This image was taken at Kitt Peak National Observatory using the 20" RC Optical System Ritchey Chretien telescope on a Paramount ME robotic mount and SBIG ST10XME with Color Filter Wheel and 6.3 Focal Reducer. Total exposure time was 2.3 hours.

The Moon and the Earth's Shadow

2010 DECEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	November 2010 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 2011 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** *Venus, Saturn & Moon triangle 6:30am* *Mercury greatest elong. E. (21°)*	**2** *Hanukkah*	**3**	**4** *Star Gaze at Stonelick State Park**
5	**6**	**7** *Mercury 1° S. of Moon*	**8**	**9**	**10**	**11** *Star Gaze at Stonelick State Park**
12	**13** *Geminids Meteor Shower*	**14**	**15**	**16**	**17**	**18**
19 *Mercury in inferior conjunction*	**20**	**21** *Total Lunar Eclipse 1:30-4:30am* *Total eclipse of Moon* *Solstice*	**22**	**23**	**24** *Christemas Eve*	**25** *Christmas*
26	**27**	**28**	**29**	**30**	**31** *New Year's Eve*	

Total Lunar Eclipse

Steve Rismiller

The moon orbits the earth every 29 ½ days. Its orbit is tilted nearly 5 degrees to the earth. When the moon is opposite the sun in our sky, we see a full moon. Because of the tilted orbit, we usually see a full moon outside of the earth's shadow. But two to four times a year the full moon passes directly through the shadow of the earth and then we see a lunar eclipse. As the moon slips into the center of the earth's shadow, the bright white full moon appears as a crescent moon, turns orange or red, and becomes dim.

This image was acquired on February 21, 2008 during the Total Lunar Eclipse. Throughout the 3 hour 25 minute eclipse, I took 442 images from the snow covered Cincinnati area. From these shots, I chose 5 to illustrate the size of the earth's shadow and how the moon moved through it. No special filters were used for this image.

Equipment used was a Vixen 102ED refractor on a Vixen GP equatorial mount tracking the moon. Attached to the telescope was a Canon 30D DSLR camera at the prime focus of the telescope. Effective focal length was 650 mm. Camera exposure times varied throughout the eclipse based on the brightness of the moon. Software used to create this composite image was Adobe PhotoShop CS3.

2011 JANUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				December 2010 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 2011 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	**1** *Star Gaze at Stonelick State Park** *Earth at perihelion* *New Year's Day*
2	**3** *Quadrantids Meteor Shower*	**4** *Partial Solar Eclipse not visible in USA*	**5**	**6**	**7**	**8** *Star Gaze at Stonelick State Park**
9	**10** *Mars & Jupiter conjunction*	**11**	**12**	**13**	**14**	**15**
16	**17** *Martin Luther King, Jr. Day*	**18**	**19**	**20**	**21**	**22**
23 / **30**	**24** / **31**	**25**	**26**	**27**	**28**	**29**

All Dates and Times are Eastern Standard / Eastern Daylight Time

** Stonelick events are Weather Dependent*

IC 1396
Emission Nebula

Eric Africa

IC 1396 is a large emission nebula in the constellation of Cepheus (The King). This object is 3 degrees, or 6 full moons, wide! Since it is estimated to be 3,000 light years away, that makes this cloud hundreds of light-years wide! The huge nebulosity is very faint, but the star clusters associated with it are pretty bright and can be seen with the naked eye in a dark site far from big cities. This object contains not just huge clouds of glowing ionized gases, but also dark dust clouds sculpted into interesting comet-like shapes by the intense stellar winds and radiation from the stars embedded within.

This is a false-color image taken through filters passing light of scientifically-interesting wavelengths. The data for this image was taken over several nights in July and August, 2007 from my backyard in West Chester, Ohio. Exposure times are 7 hours through a Hydrogen-Alpha filter, 10 hours through a Sulfur-II filter, and 9.5 hours through an Oxygen-III filter (26.5 hours total).

Equipment used was a 4" Takahashi FSQ-106 refractor on a Takahashi EM200 Temma-PC mount. The camera used was a SBIG STL-6303 camera with 8-position filter wheel and Astrodon narrowband filters.

Software used to process this image was MaximDL and Adobe Photoshop CS.

The California Nebula
E. Africa

Galaxy in Camelopardalis
F. Calvert

NGC 2264
F. Calvert

M3
E. Africa

Orion Nebula
E. Africa

A Galactic Waltz
E. Africa

M24, NGC 6590, IC 1284
F. Calvert

Southern Pinwheel Galaxy
F. Calvert

The Eagle Nebula
F. Calvert

The Sun
S. Rismiller

The Veil Nebula
E. Africa

The Perseus Double Cluster
F. Calvert

Cederblad
E. Africa

NGC 7538
F. Calvert

Total Lunar Eclipse
S. Rismiller

IC 1396
E. Africa

Inspired by the fantastic astrophotography used in this calendar and the desire to share these cosmic wonders, the following individuals and organizations have come together to publish this calendar. The Cincinnati Observatory Center, Xavier University Center for Excellence in Education, Eric Africa-imager, Fred Calvert-imager, Graham Davis-production consultant, Scott Gainey-project team leader, Scott Naylor-project team, Craig Niemi-project team, Steve Rismiller-imager, Stacey Stith-composition/graphics, John Ventre-project team, Ket-Moy Printing Inc., Front & Back Cover: Eric Africa, IC405/IC410.

XAVIER UNIVERSITY
Center for Excellence in Education

KM KET-MOY PRINTING INC.

STITH GRAPHICS

CINCINNATI OBSERVATORY

The Cincinnati Observatory Center
3489 Observatory Place, Cincinnati, Ohio 45208 | (513) 321-5186
www.cincinnatiobservatory.org

9 780964 708358 51500
ISBN 978-0-9647083-5-8
$15.00