DEEP SKY TREASURES

presented by the Cincinnati Observatory Center

2008

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The Cincinnati Observatory Center and Friends of the Observatory present the 2008 Deep Sky Treasures Calendar. The sixteen deep sky images included in this calendar showcase the magnificent photos of three of our talented astro-photographers: Eric Africa, Fred Calvert and John Noble.

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 165 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 founds the Cincinnati Observatory.

12" 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

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

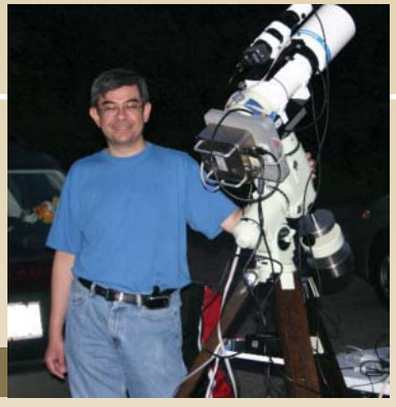
1991

Friends of The Observatory was established, offering benifits, activities and educational opportunites for aspiring astronomers and their families.

2008

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.

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 1996 apparition of the spectacular comet Hyakutake. He followed this by venturing 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 tri-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://www.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.

He 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 from the age of nine. He spent three years building his own observatory where he does visual observing and CCD imaging. The majority of his pictures featured here were taken using equipment at Kitt Peak National Observatory, Arizona where atmospheric conditions are more favorable for high resolution deep sky imaging.

Fred's images have appeared in Astronomy Magazine, Sky & Telescope Magazine, NASA Astronomy Picture of the Day (wide field image of M24) which also appears in The Illustrated Atlas of the Universe (M.A.Garlick). His image of NGC6946 (featured in this calendar) appears in a new science textbook published by Holt, Rinehart & Winston scheduled for release in 2008. His observatory is a member of 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, daughter Andrea and two puppies Samantha and Max.

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

**Kitt Peak National Observatory additional credit line:
A. Block/NOAO/AURA/NSF

JOHN NOBLE

John has been fascinated by astronomy for as long as he can remember, but he did not actually take up the hobby until about 9 years ago when he bought his first telescope, a Meade ETX90. After about a year of hunting down all of the Messier catalog objects he could find he started to look into astrophotography. John first used a SLR camera piggy back on his telescope, then prime focus film work and, finally about 6 years ago he bought his first CCD camera.

John is a project manager by day, a husband and father of two by night, so life is never dull. When weather allows he squeezes in as much imaging as he can and often has the company of his daughters who also like to come along.

John feels this is a wonderful hobby and it's a great pleasure to share his images and help the Observatory at the same time.

You can see more of his work at :
www.jnoble.darkhorizons.org

2007 OCTOBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2 *Mars 5º S. of Moon*	3 ◑ *Sputnik Launched 50 Years Ago*	4	5	6 *Venus 3º S. of Moon* *Stargaze at Stonelick State Park* (Primary)*
7 *Saturn 1.3º N. of Moon*	8 *Columbus Day*	9	10	11 ●	12 *Mercury 1.3º N. of Moon*	13 *Stargaze at Stonelick State Park* (Rain Day)*
14	15 *Venus 3º S. of Saturn*	16 *Jupiter 5º N. of Moon*	17	18	19 ◐	20
21 *Orionids Meteor Shower*	22	23	24	25	26 ○	27 *Hunter's Moon* *Full Moon Night* *7:30 PM*
28 *Venus Greatest W. Elongation*	29	30 *Mars 3º S. of Moon*	31 *Halloween*	September 2007 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 2007 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*

M45
Pleiades

John Noble

On clear winter evenings the constellation of Taurus the bull rides high overhead with the beautiful Pleiades leading its stars across the sky. Clearly visible to the naked eye this open cluster has captured the imagination since the dawn of history. With the naked eye you can make out at least seven stars but as the picture shows there are tens if not a hundred stars in the cluster. These very hot young stars (about 70 million years old) are entwined in the Merope Nebula which is reflecting the beautiful blue light from the stars.

This image was taken over several nights from the FOTO dark sky site at Stonelick, Ohio. It's a Luminance, Red Green Blue composite of 180:30:30:30 for a total of 270 minutes of exposure made up of 10 minute sub frames.

Equipment used was a Takahashi Epsilon E160 hyperbolic Newtonian astrograph at f3.3, a SBIG STL11K CCD camera and a Takahashi EM200 mount.

Software used in processing includes CCD Soft for capture, Images Plus for calibration, alignment and stacking and Photoshop CS2 for image processing.

2007 NOVEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	October 2007 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 2007 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** *Saturn 1.8º N. of Moon* *Stargaze at Stonelick State Park* (Primary)*
4 *Daylight Savings Time Ends*	**5** *Venus 3º N. of Moon*	**6**	**7**	**8** *Mercury 7º N. of Moon* *Mercury Greatest W. Elongation*	**9**	**10** *Stargaze at Stonelick State Park* (Rain Day)*
11 *Veterans Day*	**12** *Jupiter 5º N of Moon*	**13** *Humanities Lecture by UC's Greg Hand 7:30 PM*	**14**	**15**	**16**	**17** *Shooting Stars Meteor Program 7 - 9 PM*
18	**19**	**20**	**21**	**22** *Thanksgiving Day*	**23**	**24**
25	**26**	**27** *Mars 1.7º S. of Moon*	**28**	**29**	**30**	

NGC 2244 & NGC 2239 Rosette Nebula

Eric Africa

The Rosette Nebula blooms in the fall constellation Monoceros. Similar to other emission nebulae, the Rosette is a star-forming region. The star clusters in its center, NGC 2244 and NGC 2239, were born of the dust and gas that comprises this nebula. Their stellar radiation and "winds" have blown away the surrounding gas and dust. A cavern has thus been born in the heart of the nebula, giving it its characteristic rose-like shape.

The data for this image was taken over two nights in November 2006 from my backyard in West Chester, Ohio. Exposure times are four hours Luminance data through an Astrodon Hydrogen-alpha filter and 60 minutes each for Red, Green and Blue. Total exposure time is 420 minutes, or 7 hours.

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 built-in filter wheel and Astrodon filters.

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

2007 DECEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	November 2007 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 2008 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** ◑ *Mars 'Til Midnight 8 - 12 AM* *Stargaze at Stonelick State Park* (Primary)*
2	**3**	**4** *Chanukah Begins at Sundown*	**5** *Venus 7º N. of Moon*	**6**	**7**	**8** *Stargaze at Stonelick State Park* (Rain Day)*
9 ●	**10**	**11**	**12**	**13**	**14** *Geminids Meteor Shower*	**15** *Marsapalooza 8 - 11 PM*
16	**17** ◐	**18** *Mars Closest Approach*	**19**	**20**	**21**	**22** *Winter Solstice* *Marsapalooza 8 - 11 PM*
23 ○ *Mars 0.9º S. of Moon*	**24** *Mars at Opposition*	**25** *Christmas Day*	**26** *Kwanzaa Begins*	**27**	**28** *Saturn 3º N. of Moon*	**29**
30	*New Year's Eve* ◑ **31**					

M42
Orion Nebula

Fred Calvert,
*Cold Spring Observatory***

The Constellation Orion and the Orion Nebula are one of the most recognizable constellation and nebula in the Northern skies. Just step outdoors on any crisp winter morning and if you live in an area that even resembles a dark sky, the nebula can be seen naked eye as a gray patch just below Orion's belt.

The past decades of research on the Orion Nebula have revealed that the visible nebula, M42, the blister of hot, photo-ionized, luminous gas around hot Trapezium stars, is only a thin layer lying on the surface of a much larger cloud of denser matter, the Orion Molecular Cloud 1 (OMC 1). In 1880, M42 was the first nebula to be successfully photographed, by Henry Draper.

This image was taken with a Televue 76 piggybacked on a 20" RC Optics Telescope and SBIG ST10XME CCD Camera (LHaRGB) at Kitt Peak National Observatory. Total exposure time was 4.5 hours. Two hundred and seventy five individual data frames were taken for this image.

2008

JANUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	All Dates and Times are Eastern Standard / Eastern Daylight Time * Stonelick events are Weather Dependent	**1** New Year's Day	**2** Earth at Perihelion	**3**	**4** Quadrantids Meteor Shower	**5** Venus 7º N. of Moon Stargaze at Stonelick State Park* (Primary)
6	**7**	**8**	**9**	**10**	**11**	**12** Stargaze at Stonelick State Park* (Rain Day)
13	**14** Moonday Monday 6:30 - 8:30 PM	**15**	**16**	**17**	**18**	**19** Mars 1.1º S. of Moon
20	**21** Mercury Greatest E. Elongation Birthday of Martin Luther King, Jr.	**22**	**23**	**24**	**25** Saturn 3º N. of Moon	**26**
27	**28**	**29**	**30**	**31**	December 2007 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 2008 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

NGC7023
Iris Nebula

John Noble

NGC7023 is a beautiful blue reflection nebula in the constellation of Cepheus (The King) associated with star cluster Collinder 429. It is an amazing object in wide and narrow field views with a mass of intricate detail close up and streams of dark nebulosity arcing off in all directions in a wider field. The nebula surrounds a 7th magnitude star and on a good night both can be seen in binoculars from a dark site.

This image was acquired remotely over the internet using Global Rent a Scope equipment in New Mexico. It's a Luminance, Red Green Blue composite of 160:40:40:40 for a total of 280 minutes of exposure.

Equipment used was a Takahashi Epsilon E250 Hyperbolic Newtonian astrograph, a Paramount ME mount and an SBIG ST8XE CCD camera.

Software used in processing includes CCD Soft for capture, Images Plus for calibration, alignment and stacking and Photoshop CS2 for image processing.

2008 FEBRUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	January 2008 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 2008 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 0.6º N. of Jupiter*	**2** *Stargaze at Stonelick State Park* (Primary)*
3	**4** *Jupiter 4º N. of Moon* *Venus 4º N. of Moon*	**5**	**6** *Annular Eclipse Of Sun* *Ash Wednesday*	**7**	**8**	**9** *Stargaze at Stonelick State Park* (Rain Day)*
10	**11**	**12**	**13**	**14** *Valentine's Day*	**15**	**16** *Mars 1.6º S of Moon*
17	**18** *Washington's Birthday*	**19**	**20** *Total Eclipse Of Moon*	**21** *Saturn 3º N. of Moon*	**22**	**23**
24 *Saturn at Opposition*	**25** *Mercury 1.3º N. of Venus*	**26**	**27**	**28**	**29**	

IC2177
Gum 1 (VdB 93)

Fred Calvert,
*Cold Spring Observatory***

IC2177, The Seagull Nebula is an emission nebula located at the border of Canis Major and Monoceros. One of the prominent features of the nebula is the Head of the Seagull pictured here. IC2177 is believed to be a Super Nova Remnant that is some 840,000 years old.

The head of the Seagull nebula is both an HII region and reflection nebula (VDB 93). The head is ionized by the subgiant star HD 53367, a young 20 solar mass star orbited by a 5 solar mass companion in a highly elliptical orbit. This ionization in part is what causes the nebula to glow. The Seagull nebulosity complex lies at a distance of approximately 1,800 light years.

This image was taken using the 20" RC Optics Telescope and SBIG ST10XME CCD Camera (LRGB) at Kitt Peak National Observatory.

Total exposure time was 120 minutes.

2008 MARCH

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	February 2008 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 2008 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* (Primary)*
2 *Jupiter 4º N. of Moon*	**3** *Mercury Greatest W. Elongation*	**4**	**5** *Mercury 0.2º N. of Moon* *Venus 0.2º S. of Moon/Occultation*	**6**	**7**	**8** *Stargaze at Stonelick State Park* (Rain Day)*
9 *Daylight Savings Time Begins*	**10**	**11**	**12**	**13**	**14** *Mars 1.7º S. of Moon*	**15** *Saturn Days 8 - 10 PM*
16 *Saturn Days 8 - 10 PM* *Palm Sunday*	**17** *Saturn Days 8 - 10 PM* *St. Patrick's Day*	**18** *Saturn Days 8 - 10 PM*	**19** *Saturn 3º N. of Moon*	**20** *Vernal Equinox*	**21** *Good Friday*	**22**
23 *Easter Sunday*	**24**	**25** *Humanities Lecture by Reverend Michael Graham, President of Xavier University*	**26**	**27**	**28**	**29**
30	**31**					

IC1805
Heart Nebula

Eric Africa

The Heart Nebula, or IC1805, lies in the bright and popular W-shaped constellation Cassiopeia. This object is very large and faint, and is a challenging object to see visually. Dark skies and larger telescopes are required to view this object. Long-exposure photographs have revealed the extent of this nebula and similar surrounding objects, which are busy star-forming regions.

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 August and September, 2006 from my backyard in West Chester, Ohio. Exposure times are 4.5 hours through a Hydrogen-Alpha filter, 4 hours through a Sulfur-II filter, and 5 hours through an Oxygen-III filter (13.5 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 built-in filter wheel and Astrodon narrowband filters.

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

2008 APRIL

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	All Dates and Times are Eastern Standard / Eastern Daylight Time * Stonelick events are Weather Dependent	**1**	**2**	**3**	**4** Venus 5º S. of Moon	**5** Stargaze at Stonelick State Park* (Primary)
6 Sun-day Sunday Sundae 1 - 4 PM	**7**	**8**	**9**	**10**	**11**	**12** Mars 1.2º S. of Moon Stargaze at Stonelick State Park* (Rain Day)
13	**14**	**15** Saturn 3º N. of Moon	**16**	**17**	**18**	**19**
20 First Day of Passover	**21**	**22** Humanities Lecture by Roxanne Qualls, Former Mayor of Cincinnati 7:30 PM	**23**	**24**	**25**	**26**
27 Jupiter 3º N. of Moon Last Day of Passover	**28**	**29**	**30**	March 2008 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 2008 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	

M5
Globular Cluster

Fred Calvert,
Cold Spring Observatory

Globular cluster M5 (NGC 5904) is one of the largest, 130 light years across - and oldest star cluster, (around 13 billion years old). Under good seeing conditions the cluster can be seen with the naked eye. The cluster is located in the constellation Serpens at a distance of around 25,000 light years from Earth. It's estimated that there is around 250,000 stars in the cluster. M5 contains the considerably large number of 105 known variable stars.

What are the Blue Stars About? Blue stragglers are stars in open or globular clusters that are hotter and bluer than other cluster stars having the same luminosity. The cause of this is not yet clearly known, but the leading hypothesis is that they are current or former binary stars that are in the process of merging or have already done so. The merger of two stars would create a single star with larger mass, making it hotter and more luminous than stars of a similar age.

This image was taken with a 10" Meade LX200 Telescope and a SBIG ST2000 XME CCD camera (LRGB). Total exposure time was 105 minutes.

2008

MAY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	April 2008 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 2008 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** *Stargaze at Stonelick State Park* (Primary)*
4	**5** *Eta Aquarids Meteor Shower*	**6** *Mercury 3º S. of Moon*	**7**	**8**	**9**	**10** *Mars 0.2º S. of Moon* *Stargaze at Stonelick State Park* (Rain Day)*
11 *Mother's Day*	**12**	**13** *Saturn 3º N. of Moon* *Mercury Greatest E. Elongation*	**14**	**15**	**16**	**17**
18	**19**	**20**	**21**	**22**	**23**	**24** *Jupiter 2º N. of Moon* *End of School Year Open House*
25	**26** *Memorial Day*	**27**	**28**	**29**	**30**	**31** *Stargaze at Stonelick State Park* (Primary)*

NGC 7000 & IC 5070 North American and Pelican Nebula

Eric Africa

The familiar-looking North America Nebula (NGC 7000) and the Pelican Nebula (IC 5070) lie close to the bright star Deneb in the summer constellation Cygnus. Both nebulae belong to a large collection of gas and dust clouds that lie along the Milky Way's disk, which happens to (from our perspective) cut across Cygnus. Similar to other emission nebulae, NGC 7000 and IC 5070 are star-forming regions, and both have open clusters of stars already associated with and formed from them.

This is a false-color image taken through narrow-band filters passing data of scientifically-interesting wavelengths. The data for this image was taken over three nights in July, 2006 from my backyard in West Chester, Ohio. Exposure times were 3 hours through a Hydrogen-Alpha filter, 3 hours through a Sulfur-II filter, and 3 hours through an Oxygen-III filter (9 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 built-in filter wheel and Astrodon filters.

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

2008 JUNE

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7 Mars 1.1º N of Moon Stargaze at Stonelick State Park* (Rain Day)
8	9 Saturn 3º N. of Moon	10	11	12	13	14
15 Father's Day	16	17	18	19	20 Jupiter 2º N. of Moon Summer Solstice	21
22	23	24	25	26	27	28 Stargaze at Stonelick State Park* (Primary)
29	30					

May 2008

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 2008

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*

M27
Dumbbell Nebula

Fred Calvert,
*Cold Spring Observatory***

The Dumbbell Nebula - also known as Messier 27 or NGC 6853 - is a typical planetary nebula and is located in the constellation Vulpecula (The Fox). It was the first planetary nebula ever discovered. On July 12, 1764, Charles Messier discovered this new and fascinating class of objects, and describes this one as an oval nebula without stars. The distance is rather uncertain, but it is believed to be around 1200 light-years. Despite its class, the Dumbbell Nebula has nothing to do with planets. It consists of very rarefied gas that has been ejected from the hot central star (well visible on this photo), now in one of the last evolutionary stages. The gas atoms in the nebula are excited (heated) by the intense ultraviolet radiation from this star and emit strongly at specific wavelengths. The central star of M27 is quite bright at magnitude 13.5, and it is an extremely hot blueish subdwarf dwarf star.

Around 6 billion years from now our sun might go through the same process adding new materials to the universe for creation of new stars.

This image was taken with a Meade LX200 10 inch & Meade LX200 16 inch Schmidt-Cassegrain Telescope and a SBIG ST8E and ST2000XME CCD Cameras (LRBG). Total exposure time was 2.4 hours

2008 JULY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	All Dates and Times are Eastern Standard / Eastern Daylight Time * Stonelick events are Weather Dependent	**1** Mercury 8º S. of Moon Mercury Greatest W. Elongation	**2**	**3**	**4** Earth at Aphelion Independence Day	**5** Stargaze at Stonelick State Park* (Rain Day)
6 Mars 3º N. of Moon Saturn 3º N. of Moon	**7**	**8**	**9** Jupiter at Opposition	**10**	**11** Mars 0.7º S. of Saturn	**12**
13	**14**	**15**	**16**	**17** Jupiter 3º N. of Moon	**18**	**19**
20	**21**	**22**	**23**	**24**	**25**	**26** Stargaze at Stonelick State Park* (Primary)
27	**28**	**29**	**30**	**31**	June 2008 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 2008 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

M20
Trifid Nebula

John Noble

M20 in Sagittarius lies in a 2 degree wide stretch of sky which, for Northern hemisphere observers, is one of the most stunning for visual and photographic observing alike. M20 alone contains a rich star cluster, a lovely blue reflection nebula and a dramatic red emission nebula. The nebula is very bright and is clearly visible to the naked eye from our Stonelick observing site and the views of this object through binoculars and telescopes are a true joy.

This image was acquired remotely over the internet using Global Rent a Scope equipment in New Mexico. It's a Luminance, Red Green Blue composite of 60:20:20:20 for a total of 120 minutes of exposure.

Equipment used was a Takahashi Epsilon E250 Hyperbolic Newtonian astrograph, a Paramount ME mount and an SBIG ST8XE CCD camera.

Software used in processing includes CCD Soft for capture, Images Plus for calibration, alignment and stacking and Photoshop CS2 for image processing.

2008 AUGUST

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	July 2008 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 2008 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** *Total Eclipse of Sun*	**2** *Stargaze at Stonelick State Park* (Rain Day)*
3 *Saturn 4º N of Moon*	**4** *Mars 4º N. of Moon*	**5**	**6**	**7**	**8** *Jupiter Days 9 - 11 PM*	**9** *Jupiter Days 9 - 11 PM*
10	**11**	**12** *Perseids Meteor Shower*	**13** *Jupiter 3º N. of Moon* *Venus 0.2º S. of Saturn*	**14**	**15**	**16** *Mercury 0.7º S. of Saturn* *Partial Eclipse of Moon*
17	**18**	**19**	**20**	**21**	**22**	**23** *Mercury 1.2º S. of Venus* *Stargaze at Stonelick State Park* (Primary)*
24 *Pluto: 2 Years After Its Demotion 7 PM* **31**	**25**	**26**	**27**	**28**	**29**	**30** *Stargaze at Stonelick State Park* (Rain Day)*

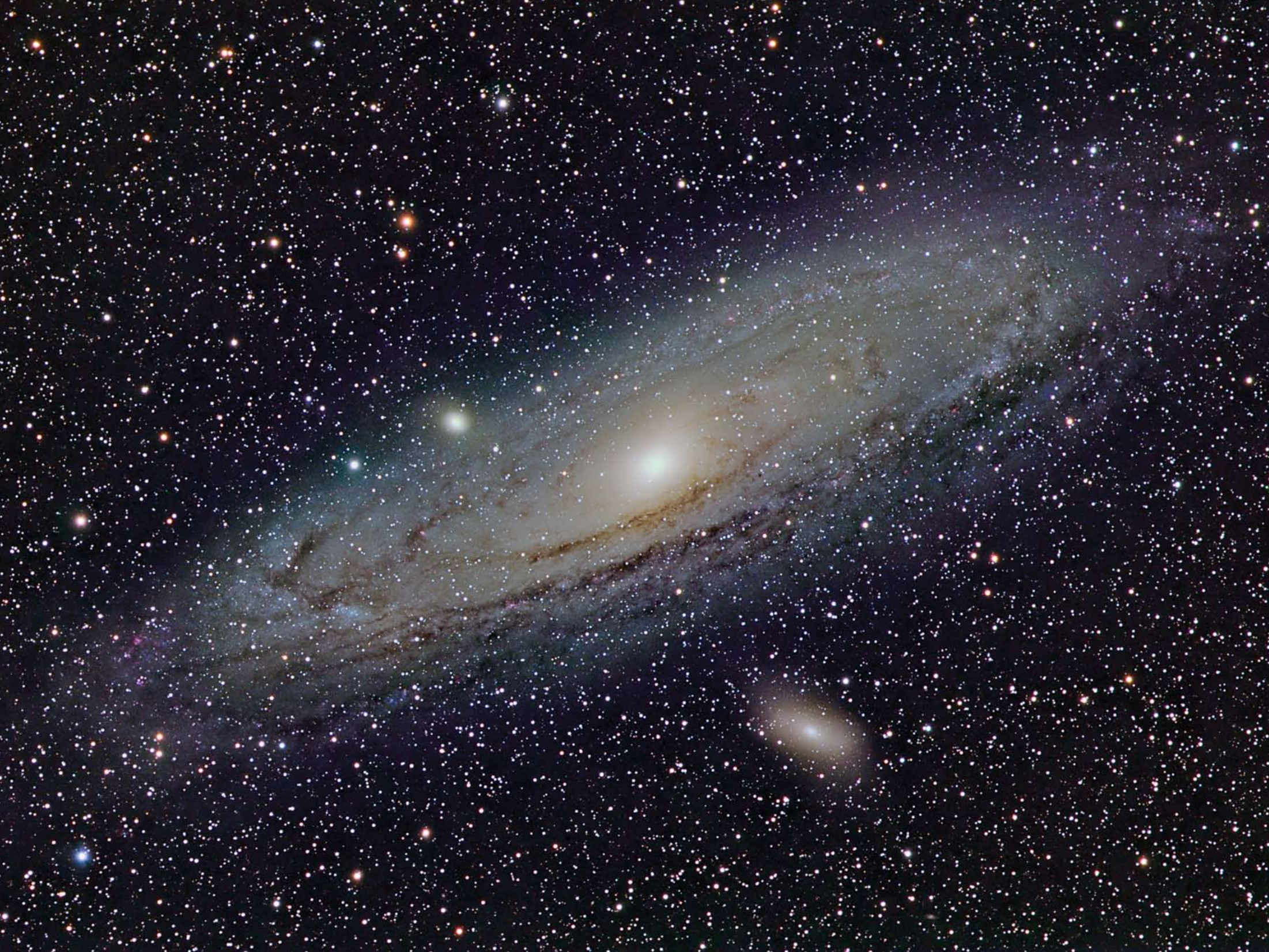
NGC6946
Spiral Galaxy

Fred Calvert,
*Cold Spring Observatory***

In this image, the face-on spiral galaxy NGC 6946 is ablaze with colorful galactic fireworks fueled by the births and deaths of multitudes of brilliant, massive stars. Over the past century, eight supernovae have exploded in the arms of this stellar metropolis making NGC 6946 the most prolific known galaxy for supernovae during the past 100 years.

By comparison, the average rate for such catastrophic stellar outbursts in the Milky Way is about one per century. For reasons not completely understood, it experiences a much higher rate of star formation than all the large galaxies in our local neighborhood. NGC 6946 lies between 10 and 20 million light-years away on the border between the constellations of Cepheus and Cygnus, and was discovered by Sir William Herschel (1738-1822) on September 9, 1798.

Imaging equipment: 20" RC Optical Telescope / 6.3 Focal Reducer and SBIG ST10XME CCD Camera (LRGB) at Kitt Peak National Observatory. Total exposure time was 2.8 hours.



2008 SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1 *Venus 5º N. of Moon* *Mercury 3º N. of Moon* *Labor Day*	**2** *Mars 5º N. of Moon*	**3**	**4**	**5**	**6**
7 ◐	**8**	**9** *Jupiter 3º N. of Moon*	**10** *Mercury Greatest E. Elongation*	**11** *Mercury 4º S. of Venus* *Venus 0.3º N. of Mars*	**12** *Mercury 3º S. of Mars*	**13**
14	**15** ○	**16**	**17**	**18**	**19** *Mercury 4º S. of Mars*	**20**
21	**22** ◑ *Autumnal Equinox*	**23**	**24**	**25** *Telescope Invented 400 Years Ago Today Hans Lippershey Applies for Patent*	**26**	**27** *Saturn 5º N. of Moon* *Stargaze at Stonelick State Park* (Primary)*
28	**29** ● *Rosh Hashanah Begins at Sundown*	**30** *Mars 5º N. of Moon*	August 2008 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 2008 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*	

M31
Andromeda Galaxy

Eric Africa

The great galaxy in Andromeda, or M31, is the finest example of a galaxy in our night sky. Under moderately dark skies, this galaxy is visible as a faint smudge to the naked eye in the constellation Andromeda. It is a breathtaking sight with a pair of binoculars, and spectacular to behold through a telescope. This is an object bigger than our own Milky Way galaxy, lying over two million light years away!

The data for this image was taken over several nights in November 2006 from my backyard in West Chester, Ohio. Exposure times are 78 minutes for Luminance and 120 minutes each for Red, Green and Blue. Total exposure time is 438 minutes, or 7 hours and 18 minutes.

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 built-in filter wheel and Astrodon LRGB filters.

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

2008 OCTOBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	September 2008 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 2008 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** *Venus 5º N. of Moon*	**2**	**3**	**4** *Stargaze at Stonelick State Park* (Rain Day)*
5	**6**	**7** *Jupiter 2º N. of Moon*	**8** *Yom Kippur Begins at Sundown*	**9**	**10**	**11**
12	**13** *Columbus Day*	**14**	**15**	**16**	**17**	**18**
19	**20**	**21** *Orionids Meteor Shower*	**22** *Mercury Greatest W. Elongation*	**23**	**24**	**25** *Saturn 5º N. of Moon*
26	**27** *Mercury 7º N. of Moon*	**28**	**29**	**30**	**31** *Halloween*	

IC2118 Witch Head

John Noble

IC2118 is a striking blue reflection nebula in the constellation of Eridanus although it lies very close to the brilliant blue star Rigel on Orion's southwest foot. In fact it is Rigel's light which the nebula is reflecting back to us on Earth. Try turning the page through 90 degrees and see if you can see how this object gets its nickname.

This is a two frame mosaic acquired remotely over the internet using Global Rent-a-Scope equipment service in New Mexico. Each frame is a Luminance, Red Green Blue composite of 60:30:30:30 for a total of 300 minutes of exposure.

Equipment used was a Takahashi TOA150 Apochromatic Refractor, a Paramount ME mount and SBIG STL11000 CCD Camera.

Software used in processing includes CCD Soft for capture, Images Plus for calibration, alignment and stacking, Registar for mosaic alignment and Photoshop CS2 for image processing.

2008 NOVEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			All Dates and Times are Eastern Standard / Eastern Daylight Time ** Stonelick events are Weather Dependent*	October 2008 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 2008 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 3º N. of Moon*
2 *Daylight Savings Time Ends*	**3** *Jupiter 1.9º N. of Moon*	**4**	**5** ◐	**6**	**7**	**8**
9	**10**	**11** *Veterans Day*	**12**	**13** ○	**14**	**15**
16	**17** *Leonids Meteor Shower*	**18**	**19** ◑	**20**	**21** *Saturn 6º N. of Moon*	**22** *Stargaze at Stonelick State Park* (Primary)*
23 *Venus 2º S. of Jupiter* **30**	**24**	**25**	**26**	**27** ● *Thanksgiving Day*	**28**	**29** *Stargaze at Stonelick State Park* (Rain Day)*

NGC891
Edge on Spiral Galaxy

John Noble

This magnificent visitor to our Autumn skies lies in the constellation of Andromeda and is a fine example of an edge on spiral galaxy. Its prominent dust lane and central bulge make it very photogenic. It's a tough object to find visually, but it can be tracked down with the right instrument at a reasonable dark site, and those who persevere in the search will not be disappointed.

This image was acquired remotely over the internet using the ITP telescope BlackBird Observatory in Mayhill New Mexico. It's a Luminance, Red Green Blue composite of 300:60:36:72 for a total of 468 minutes of exposure.

Equipment used was the ITE 20" RC Optical System Ritchey Chretien telescope, SBIG STL11k and a Paramount ME mount.

Software used in processing includes CCD Soft for capture, Maxim DL for calibration, alignment and stacking and Photoshop CS2 for image processing.

2008 DECEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1 *Jupiter 1.3º N. of Moon* *Venus 0.8º S. of Moon*	**2**	**3**	**4**	**5** ◐	**6**
7	**8**	**9**	**10**	**11**	**12** ○	**13** *Geminids Meteor Shower*
14	**15**	**16**	**17**	**18**	**19** ◑ *Saturn 6º N. of Moon*	**20** *Stargaze at Stonelick State Park* (Primary)*
21 *Chanukah Begins at Sundown* *Winter Solstice*	**22**	**23**	**24**	**25** *Christmas Day*	**26** *Kwanzaa*	**27** ● *Stargaze at Stonelick State Park* (Rain Day)*
28 *Mercury 0.7º S. of Moon*	**29** *Jupiter 0.6º N. of Moon*	**30**	**31** *Venus 3º S. of Moon* *Mercury 1.3º S. of Jupiter* *New Year's Eve*	November 2008 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 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*

IC 434
Horsehead Nebula

Eric Africa

Pictures of the Horsehead Nebula are among the standards of astronomy textbooks. This object is so familiar-looking and relatively easy to point a telescope to: it is near the south-easternmost of the three stars of Orion (the star to the lower left from a northern-hemisphere perspective). Unfortunately, it is one of the toughest to spot visually, as it needs very dark skies and large telescopes to see. Photographically though, it is a beauty.

This is a false-color image taken through narrow-band filters, processed to look more like its natural, predominantly red, color. The data for this image was taken over several nights in January and February, 2006 from my backyard in West Chester, Ohio. Exposure times were 3 hours through a Hydrogen-Alpha filter, 3 hours through a Sulfur-II filter, and 1 hour through a blue filter, with the blue data acquired at a friend's dark-sky site in Highland County, Ohio. Total exposure time was 7 hours.

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

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

YEAR AT A GLANCE 2009

January 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 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

March 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				

April 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		

May 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						

June 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				

July 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	

August 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					

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			

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

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					

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		

IMPORTANT DATES & TASKS

DATE	DESCRIPTION

DATE	DESCRIPTION

Pleiades
J. Noble

Rosette Nebula
E. Africa

Orion Nebula
*F. Calvert ***

Iris Nebula
J. Noble

Gum 1 (VdB 93)
*F. Calvert ***

Heart Nebula
E. Africa

M5 Globular Cluster
F. Calvert

North American &
Pelican Nebula
E. Africa

Dumbbell Nebula
*F. Calvert ***

Trifid Nebula
J. Noble

NGC6946 Spiral Galaxy
*F. Calvert ***

Andromeda Galaxy
E. Africa

Witch Head
J. Noble

NGC891 Spiral Galaxy
J. Noble

Horsehead Nebula
E. Africa

Inspired by the fantastic astrophotography used in this calendar and a desire to share these cosmic wonders, the following individuals and companies have come together to publish the Cincinnati Observatory's first astronomy calendar.

Eric Africa - imager; Fred Calvert - imager; Graham Davis - production consultant; Scott Gainey - project team; Scott Naylor - project team; Craig Niemi - project team; John Noble - imager; Stacey Stith - composition/graphics; John Ventre - project team; Cincinnati Graphic Coaters; Milford Printers; Nekoosa - paper

Additional Photo Credits: Front & Back Cover: John Noble, Sagittarius Star Field; Interior First Page: Scott Naylor, Current photo of Herget building.

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