DEEP SKY TREASURES

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

2012

DEEP SKY TREASURES

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

The Cincinnati Observatory Center, Friends of the Observatory, and Xavier University present the 2012 Deep Sky Treasures Calendar. The eighteen deep sky images included in this calendar showcase the magnificent photos of four of our talented astro-photographers: Eric & Josephine 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 170 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.

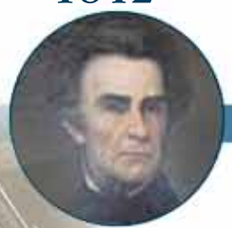
Many scientific achievements have taken place at the Observatory, advancing the knowledge of the cosmos and other areas of study. The Observatory has a rich educational schedule with day and evening classes to reach students of all ages. The Cincinnati Observatory and a large number of dedicated volunteers 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 four 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 benefits, activities and educational opportunites for aspiring astronomers and their families.

2012

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.

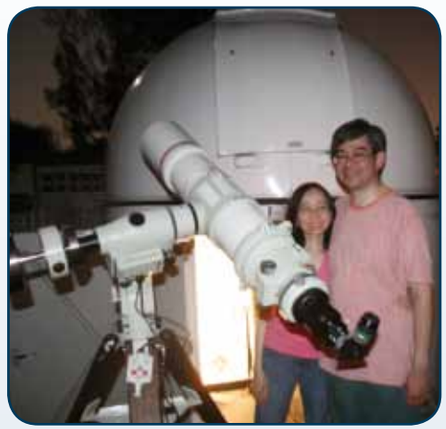
For the most up to date activities information visit our website: www.cincinnatiobservatory.org

ASTRO-PHOTOGRAPHY ARTISTS

ERIC & JOSEPHINE 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 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.



Josephine is a casual observer and enjoys the occasional stargaze with her husband. She also enjoys playing with photography, and gets a kick out of capturing a lucky astrophotograph or two.

Eric's work has been featured in the following Ohio-area art exhibits:

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.

The World at Night, Cincinnati, Ohio, October 2009.

Eric and Josephine live in West Chester. Eric images from their backyard or their remote observatory in New Mexico. Eric recently launched a website featuring his astrophotography, www.skiesbyafrica.com.

FRED CALVERT

Cold Spring Observatory

A photographer, private pilot and aircraft mechanic by profession, Fred became interested in astronomy and aviation during the era of the Mercury, Gemini and Apollo Space Programs, when he was nine years old. Starting in 2003, he spent three years building his own private observatory in Cold Spring, Kentucky where he does visual observing, hunts for supernovae and makes "pretty pictures" doing CCD imaging.

Fred's images have appeared in Astronomy Magazine, Sky & Telescope Magazine, international astronomy publications and numerous books on amateur astronomy. NGC 6520, in this year's calendar will appear in the new Sky and Telescope book "Deep Sky Wonders" scheduled for release later this year.

His images in this year's calendar were taken at Cold Spring Observatory, Kentucky; Kitt Peak National Observatory in Arizona, and remotely from his observatory using telescopes located in Pingelly, Australia.

Cold Spring Observatory is a member of the "Sonoma University/ NASA Global Telescope Network" 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

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

2011 OCTOBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				September 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	November 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	**1** *Star Gaze at Stonelick State Park**
2	**3**	**4**	**5**	**6**	**7** *Yom Kippur begins at Sunset*	**8** *Yom Kippur last day*
9	**10** *Columbus Day*	**11**	**12**	**13** *Saturn in conjunction with Sun*	**14**	**15**
16	**17**	**18**	**19**	**20**	**21**	**22** *Star Gaze at Stonelick State Park**
23 **30**	**24** *Halloween* **31**	**25**	**26**	**27**	**28** *Mercury 0.2° N. of Moon* *Venus 1.8° N. of Moon*	**29** *Jupiter Night + 8-10pm* *Star Gaze at Stonelick State Park** *Jupiter at opposition*

All events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

IC 2118
The Witch Head Nebula

Fred Calvert, Cold Spring Observatory

"Double, double toil and trouble; Fire burn, and caldron bubble; Cool it with a baboon's blood, then the charm is firm and good." (William Shakespeare-Macbeth) Welcome to Halloween and the start of the third Cincinnati Observatory Center Calendar.

The Witch Head Nebula (IC2118) is believed to be an ancient supernova remnant illuminated by the star Rigel which also gives the nebula its blue color. Rigel is a B-Type Supergiant Magnitude 0.18 blue star located in Orion. The nebula's blue color is caused not only by Rigel, but because the dust grains in the Witch Head reflect blue light more efficiently that red light. The Witch Head is about 1000 light years away in the Constellation Eridanus.

A Little Halloween TV Trivia. For "Star Trek" fans, 40 Eridani A is the fictional home star of planet Vulcan and Mr. Spock. For Kevin Sorbo and "Andromeda" fans the Witch Head Nebula was the site of the last major stand between the Old Commonwealth and the Nietzschean Alliance. "Live long and prosper".

This image was taken at Kitt Peak National Observatory (NOAO/AURA/NSF) using a SBIG ST10XME CCD Camera, Televue (480mm f6.3) telescope, piggybacked to a RC Optics 20" telescope on a Paramount ME mount.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2011 NOVEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All events are Universal Time unless otherwise specified. *+ Eastern Standard / Eastern Daylight Time* ** Stonelick events are weather dependent*		**1**	**2**	**3**	**4**	**5** *Jupiter Night + 8-10pm*
6 *Eid-Ul-Adha*	**7**	**8** *Election Day*	**9**	**10** *Mars 1.4° N. of Regulus* *Mercury 1.9° N. of Antares*	**11** *Veterans Day*	**12**
13	**14** *Mercury greatest elong. E. (23°)*	**15**	**16**	**17** *Leonids Meteor Shower*	**18** *Leonids Meteor Shower*	**19** *Star Gaze at Stonelick State Park**
20	**21**	**22**	**23**	**24** *Thanksgiving*	**25** *Partial Solar Eclipse*	**26** *Al-Hijira* *Star Gaze at Stonelick State Park** *Mercury 1.7° S. of Moon*
27 *Venus 3° S. of Moon*	**28**	**29**	**30**			

October 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					

December 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

M1
The Crab Nebula

Eric Africa

In the year 1054 AD Chinese astrologers recorded a brilliant "guest star" in the sky. The star was so bright it was visible during the day, but faded after almost a month and eventually disappeared. Today, telescopes aimed at the same point in the sky where this star was will spot M1, or the Crab Nebula.

M1 is the first entry in the catalog of French amateur astronomer and comet enthusiast Charles Messier. He chanced on this object in 1758 as he was observing a comet. Because this object could be mistaken for a comet, Messier decided to create a "these are not comets" catalog to help comet hunters like him from making the same mistake. And thus was born the famous Messier list of deep sky objects!

M1 is now known to be a supernova remnant. This is the material blasted away by a dying massive star about 6,000 light-years away. Nothing is left of the original star other than this expanding cloud of gas and dust with a madly rotating pulsar at its center.

This image was taken in New Mexico with a 10" telescope (10" f/9 RCOS) and astronomy CCD camera (SBIG ST-10XME) for a total imaging time of 15 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2011 DECEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		November 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	January 2012 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 *Mercury in inferior conjunction*	**5**	**6**	**7**	**8**	**9**	**10** *Total Lunar Eclipse*
11	**12**	**13** *Geminids Meteor Shower*	**14** *Geminids Meteor Shower*	**15**	**16** *Mythology Night for Kids + 7-9pm*	**17** *Mythology Night for Adults + 7-9pm* *Star Gaze at Stonelick State Park**
18	**19**	**20** *Chanukah begins at Sunset*	**21** *2012 Hoax: The Real Story + 7-9pm*	**22** *Solstice*	**23** *Mercury greatest elong. W. (22°)* *Mercury 3° N. of Moon*	**24** *Christmas Eve*
25 *Christmas*	**26**	**27**	**28** *Chanukah last day*	**29**	**30**	**31** *New Year's Eve*

All events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

IC 5067
Neck of the Pelican Nebula

Fred Calvert, Cold Spring Observatory

IC 5067 is the region pictured here representing the "neck" of the Pelican Nebula located in the Constellation Cygnus, the Swan. The rich "red" emission is associated with star formation and it is expected that this area of the sky will look dramatically different in a few million years owing to the birth of new stars and a significantly reduced amount of hydrogen in their formation.

Herbig-Haro object, HH 555 is the horizontal jet in this image that you can easily see shooting out of the tip of the long dark central pillar, indicating the presence of an unseen protostar.

Herbig-Haro objects are small patches of nebulosity associated with protostars in the process of forming from the surrounding gases and are formed when gas ejected by young stars collides with clouds of gas and dust in the nebula.

The Pelican Nebula, itself cataloged as IC 5070, is about 2,000 light-years away. To find it, look with a telescope northeast of the bright star Deneb in the constellation Cygnus.

This image was taken at Kitt Peak National Observatory (NOAO/AURA/NSF) using a 16 inch Meade LX200 Telescope and a SBIG ST8E CCD Camera. Total exposure was 2 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 JANUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 New Year's Day	**2**	**3** Quadrantids Meteor Shower	**4** Quadrantids Meteor Shower	**5** Earth at perihelion	**6**	**7**
8	**9**	**10**	**11**	**12**	**13**	**14**
15	**16** Martin Luther King Day	**17**	**18**	**19**	**20**	**21** Star Gaze at Stonelick State Park*
22	**23**	**24**	**25**	**26**	**27** Venus Friday + 7-9pm	**28** Star Gaze at Stonelick State Park*
29	**30**	**31**				

December 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

February 2012

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			

All events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

M81, M82 and the Integrated Flux Nebula: Galaxies and Dust Clouds in Ursa Major

Eric Africa

M81 (the spiral galaxy on the left) and M82 (the cigar-shaped galaxy on the right) float in a region of the sky close to the bowl of the famous Big Dipper. While this pair can be described as being "close" to the Big Dipper, they are actually galaxies outside our own Milky Way and sit about 12 million light-years away. In comparison, the stars of the Big Dipper lie "only" about 80-90 light-years away.

The wispy tendrils floating between and around the galactic duo are part of a large cloud of dust floating above the Milky Way's disk and only recently studied and identified by amateur imager Steve Mandel. Unlike reflection nebulae inside our galaxy, this huge cloud of dust is not reflecting light from a single nearby star. It is reflecting the combined, or integrated, light, or flux, of all the stars in the Milky Way. Hence, it has been dubbed the Integrated Flux Nebula.

This image was acquired from the dark skies of Rancho Hidalgo in New Mexico with a 5" diameter refracting telescope (Takahashi TOA-130) and astronomy CCD camera (SBIG STL-6303) for a total imaging time of 19 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 FEBRUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			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			

All events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

Mercury in superior conjunction

Valentine's Day

Star Gaze at Stonelick State Park*

President's Day

Star Gaze at Stonelick State Park*

Venus 3° S. of Moon

Jupiter 4° S. of Moon

Leap the Moon + 7-9pm

January 2012

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 2012

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

M78
Reflection Nebula in Orion

Eric Africa

This busy area is located in the constellation Orion, with reflection nebula Messier 78 at the center. M78 is about 1,600 light-years away and not too far (from our perspective) from the famous Horsehead Nebula.

Reflection nebulae such as M78 are dust clouds that reflect the light from bright stars in their vicinity. Reflection nebulae are blue in color for the same reason that the Earth's daytime sky is blue: the dust preferentially scatters blue light in a manner similar to the Earth's atmosphere.

This region is also the site of a recent amateur discovery. In February 2004, Jay McNeil of Paducah, Kentucky, was trying out a new telescope and CCD camera, and chose M78 for a test shot. Being an astute observer, he spotted something in his image that was not in other photos of the area. The object, which is a variable nebula, has been dubbed McNeil's Nebula. This proves that even today, amateurs can make discoveries!

This view of the region was taken from the dark skies of New Mexico with a 5" diameter refracting telescope (Takahashi TOA-130) and astronomy CCD camera (SBIG STL-6303) for a total imaging time of 4-1/2 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 MARCH

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All events are Universal Time unless otherwise specified. *+ Eastern Standard / Eastern Daylight Time* ** Stonelick events are weather dependent*		February 2012 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 2012 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*** *MARSAPALOOZA* *+ 8-10pm* *Mars at opposition*
4	**5** *Mercury greatest elong. E. (18°)* *Mars closest approach*	**6**	**7**	**8**	**9**	**10**
11 *Daylight Savings Time Begins (USA)*	**12**	**13**	**14**	**15** *Venus 3° N. of Jupiter*	**16**	**17** *Star Gaze at Stonelick State Park**
18	**19**	**20** *Equinox*	**21** *Mercury in inferior conjunction*	**22**	**23**	**24** *Star Gaze at Stonelick State Park**
25	**26** *Jupiter 3° S. of Moon* *Venus 1.8° N. of Moon*	**27** *Venus greatest elong. E. (46°)*	**28**	**29**	**30**	**31**

The Moon

Fred Calvert, Cold Spring Observatory

Sit back and imagine sitting in the pilot's seat of the Orion Space Shuttle from "'2001: A Space Odyssey" flying over the top of this image of our moon as the Blue Danube Waltz plays in the background.

The Moon has fascinated mankind throughout time. By simply viewing with the naked eye, one can discern two major types of terrain: relatively bright highlands and darker plains. The Moon's gravitational influence produces the ocean tides and the lengthening of the day and its current orbital distance, about thirty times the diameter of the Earth, causes it to appear almost the same size in the sky as the Sun, allowing it to cover the Sun nearly precisely during total solar eclipses.

The giant impact hypothesis proposes that the Moon was created out of the debris left over from a collision between the young Earth and a Mars-sized body.

The Moon has no atmosphere, but evidence from recent un-manned lunar missions, suggested that there may be water ice in some deep craters near the Moon's North and South poles.

This image was taken at Cold Spring Observatory using a Astro-Tech 66 Telescope and a Canon D40 Digital Camera.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 APRIL

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	**2**	**3**	**4**	**5**	**6** ○ Passover begins at Sunset	**7**
8 Easter	**9**	**10**	**11**	**12**	**13** ◑	**14** Passover last day Star Gaze at Stonelick State Park*
15 Saturn at opposition	**16**	**17**	**18** Mercury greatest elong. W. (27°)	**19**	**20**	**21** ● Star Gaze at Stonelick State Park*
22 Jupiter 2° S. of Moon	**23**	**24**	**25**	**26**	**27**	**28** Saturnday + 9-11pm Astronomy Day
29 ◐	**30**					

March 2012

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 2012

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 events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

NGC 3628, M65 and M66 The Trio in Leo

Eric Africa

The Trio in Leo is a popular galaxy grouping in the constellation Leo. In this picture, you are seeing NGC 3628 as the leftmost galaxy, M65 to the upper right and M66 to the lower right. M65 and M66 represent galaxies in a catalog of the 18th century French comet hunter Charles Messier. They actually represent objects that in his time are "not to look at" objects!

The three galaxies lie about 35 million light-years away in the constellation Leo. This constellation is highest around midnight at this time of year; its most conspicuous feature is known as "The Sickle", looking quite like a mirror-image question mark.

The three galaxies are interacting, meaning that they are pulling on each other gravitationally, and may have even collided in the past. Evidence of this can be seen in M66's distorted arms. Some day in the distant future, the three galaxies may eventually merge into one huge galaxy.

This view of the region was taken from the dark skies of New Mexico with a 5" diameter refracting telescope (Takahashi TOA-130) and astronomy CCD camera (SBIG STL-6303) for a total imaging time of nearly 11 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 MAY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
All events are Universal Time unless otherwise specified. *+ Eastern Standard / Eastern Daylight Time* ** Stonelick events are weather dependent*						
6	7	8	9	10	11	12 *Star Gaze at Stonelick State Park**
13 *Mother's Day* *Jupiter in conjunction with Sun*	14	15	16	17	18	19 *Star Gaze at Stonelick State Park**
20	21 *Annular Solar Eclipse*	22	23	24	25	26 *Saturnday* *+ 9:30-11:30pm*
27 *Mercury in superior conjunction*	28 *Memorial Day*	29	30	31		

April 2012

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 2012

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

NGC 362
Globular Star Cluster

Fred Calvert, Cold Spring Observatory

Globular clusters are densely packed spherical collection of old stars that orbit a galactic core as satellites and are found in galaxies throughout the universe. A total of 152 globular clusters have been discovered so far in our Milky Way galaxy.

NGC 362 is one of the most southern globular clusters, sitting next to the Small Magellanic Cloud in the constellation Tucana some 40,000 light years away.

NGC 362 is often overlooked because it's in the same area of sky as its brilliant bigger cousin NGC 104. It was discovered on August 1, 1826 by James Dunlop.

Globular clusters typically contain a number of variable stars, in particular RR Lyrae stars. Radial velocity measurements have revealed that most globulars are moving in highly excentric elliptical orbits that take them far outside the Milky Way Galaxy, forming a halo of roughly spherical shape which is highly concentrated around the Galactic Center.

The data for this image was obtained remotely from Cold Spring Observatory using a 14.5 inch RC Optics telescope and Apogee Instrument, Alta U16M CCD camera located in Pingelly, Austlaria. Total exposure time was 1.5 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 JUNE

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			May 2012 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 2012 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
	Partial Lunar Eclipse	Transit of Venus + 6-8:30pm Transit of Venus across the Sun	Transit of Venus across the Sun Venus in inferior conunction			
10	11	12	13	14	15	16
						Star Gaze at Stonelick State Park*
17	18	19	20	21	22	23
Father's Day Sunday Sun-day Sundae + 1-4pm Jupiter 1.1° S. of Moon	Venus 2° S. of Moon		Solstice			Star Gaze at Stonelick State Park*
24	25	26	27	28	29	30

All events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

A Lucky Shot
The Venus Transit of 2004

Josephine Africa

Mark your calendars for June 5, 2012 (for the Western Hemisphere - June 6 elsewhere). For that will be the last time in our lives that we will have a chance to see Venus cross the face of the Sun!

Because of the pattern of Venus' and Earth's orbits, Venus transits (i.e., crossing the face of the Sun from our perspective) are over 100 years apart. The first transit after that 100-year gap is followed by a repeat event eight years later. Consequently, the first Venus transit since 1882 occurred in 2004. And following the subsequent pattern of the "eight-year encore", another transit is scheduled to occur in 2012. Barring any major medical breakthroughs, no one alive today is likely to see the next transit in 2117.

This is the best of several casual snapshots taken during the transit. This was imaged with a handheld point-and-shoot camera (Olympus 3040Z). The lens of the camera was aimed down the eyepiece of a small (76mm), properly-filtered (with Baader solar film) Borg refractor and snapped using the camera's automatic settings. This was imaged on June 8, 2004 at the Voice of America Park in West Chester, Ohio.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION


relative size of the Earth

2012 JULY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	**2**	**3**	**4** *Independence Day*	**5** *Earth at aphelion*	**6**	**7**
8	**9** *Venus 0.9° N. of Aldebaran*	**10**	**11**	**12**	**13**	**14** *Star Gaze at Stonelick State Park**
15 *Sunday Sun-day Sundae + 1-4pm* *Jupiter 0.5° S. of Moon* *Venus 4° S. of Moon*	**16**	**17**	**18**	**19**	**20** *Ramadan (Start)*	**21** *Star Gaze at Stonelick State Park**
22	**23**	**24** *Mars 4° N. of Moon*	**25**	**26**	**27**	**28** *Mercury in inferior conunction*
29	**30**	**31**				

June 2012

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 2012

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 events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

Our Closest Star, the Sun

Steve Rismiller

This is an image of the sun taken with an H-Alpha filtered telescope showing details that are invisible to our unaided eyes. On the solar surface, the chromospheric network looks like dark webs covering the orange disk. Dark threads called filaments show magnetic lines of energy around the active region. A small, round, black sunspot is visible to the right of the active region. Below the long curved filament white faculae are seen in the active region. Surrounding the curved edge of the sun is a white line that has a serrated appearance. These serrations are known as spicules. Suspended above the spicules and looking like tongues of fire are gasses and plasma called prominences. Many of these features are larger than the Earth and are short lived. Prominences can last for days then fade, or may become unstable and lift off from the surface in a violent explosion. The sun's surface is constantly changing and provides many dramatic views.

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

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 AUGUST

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	July 2012 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 2012 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**	**7**	**8**	**9** ◑	**10**	**11** *Star Gaze at Stonelick State Park**
12 *Perseids Meteor Shower*	**13** *Perseids Meteor Shower* *Mars 1.9° N. of Spica* *Venus 0.6° S. of Moon*	**14**	**15**	**16** *Mercury 4° N. of Moon*	**17** ● *Mars 3° S. of Saturn*	**18** *Star Gaze at Stonelick State Park**
19 *Eid-Ul-Fitr*	**20**	**21** *Spica 1° N. of Moon*	**22** *Mars 2° N. of Moon*	**23**	**24** ◐	**25**
26	**27**	**28**	**29**	**30**	**31** ○	*All events are Universal Time unless otherwise specified.* *+ Eastern Standard / Eastern Daylight Time* ** Stonelick events are weather dependent*

Comet 17P/Holmes

Fred Calvert, Cold Spring Observatory

Although normally a very faint object, comet 17P/Holmes became notable in October 2007 when it temporarily brightened unexpectedly from a magnitude of about 17 to a magnitude of about 2.8 in a period of only 42 hours, making it visible to the naked eye.

This represents a change of brightness by a factor of about half a million, in what was the largest known outburst by a comet.

Comets normally are recognized by their long tails. But during the outburst of 17P/Holmes, shown in this image, its orbit took it to near opposition with respect to Earth, and since comet tails point away from the Sun, Earth observers were looking nearly straight down along the tail of 17P/Holmes, making the comet appear as a bright sphere.

Comet 17P/Holmes was discovered by British amateur astronomer Edwin Holmes on November 6, 1892.

This images was taken at Cold Spring Observatory using a 10 inch Meade LX200 Classic telescope and SBIG ST2000XM CFW8 CCD Camera. Total exposure time was 40 minutes.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY

CENTER FOR EXCELLENCE IN EDUCATION

2012 SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				August 2012 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 2012 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** *Labor Day*	**4**	**5**	**6**	**7**	**8** *ScopeOut Telescope Fest + Noon-10pm* *Star Gaze at Stonelick State Park** *Jupiter 0.6° N. of Moon*
9	**10** *Mercury in superior conjunction*	**11**	**12** *Venus 4° N. of Moon*	**13**	**14**	**15** *Star Gaze at Stonelick State Park**
16 *Rosh Hashanah begins at Sunset*	**17**	**18** *Rosh Hashanah last day* *Spica 0.8° N. of Moon*	**19** *Mars 0.2° N. of Moon*	**20**	**21**	**22** *Equinox*
23 **30**	**24**	**25** *Yom Kippur begins at Sunset*	**26** *Yom Kippur last day*	**27**	**28**	**29**

All events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

IC 1848
The Soul Nebula

Eric Africa

IC 1848 floats within the boundaries of Cassiopeia. It lies next to IC 1805, another large nebula in Cassiopeia that has a distinct heart shape and consequently dubbed the Heart Nebula. Because of this, IC 1848 has been given the nickname Soul Nebula (after the song "Heart and Soul"). That's almost a shame, because IC 1848 has a distinct shape of its own, giving it other nicknames such the Embryo Nebula or the Teddy Bear nebula. Hint: it's lying on its "back".

IC 1848 is a huge emission nebula that is the birthplace of new stars. Just like other emission nebulae, the stars it gives birth to will eventually destroy it with their intense radiation and strong stellar winds. In the meantime, these same forces cause the nebula to glow and give it its interesting shape.

This image was taken from our backyard in West Chester, Ohio with a 4" diameter refracting telescope (Takahashi FSQ-106) and astronomy CCD camera (SBIG STL-6303) for a total imaging time of 9 hours. Colors were captured and mapped into a false-color palette similar to the filters and techniques employed for the Hubble Space Telescope.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 OCTOBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All events are Universal Time unless otherwise specified. *+ Eastern Standard / Eastern Daylight Time* ** Stonelick events are weather dependent*	**1** *Mercury 1.8° N. of Spica*	**2**	**3** *Venus 0.1° S. of Regulus*	**4**	**5** *Jupiter 0.9° N. of Moon*	**6** *Mercury 3° S. of Saturn*
7	**8** *Columbus Day*	**9**	**10**	**11**	**12**	**13** *Star Gaze at Stonelick State Park**
14	**15**	**16**	**17** *Mercury 1.3° S. of Moon*	**18** *Mars 2° S. of Moon*	**19**	**20** *Star Gaze at Stonelick State Park**
21	**22**	**23**	**24**	**25** *Saturn in conjunction with Sun*	**26** *Eid-Ul-Adha*	**27**
28	**29**	**30**	**31** *Halloween*			

September 2012

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 2012

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	

NGC 7380
The Wizard Nebula

Eric Africa

NGC 7380 is an emission nebula in the constellation Cepheus. This is yet another star forming region within the Milky Way lying around 7,000 light-years away. Radiation from young, energetic stars born within the nebula is causing the gas to glow like a neon sign. Intense stellar winds are also shaping the nebula, giving it an interesting shape.

So where's the Wizard? He's facing right, and a spell is blowing out from his mouth like a bubble. The dark dust lanes above the bubble form his pointed hat, and the flowing clouds of gas and dust below form his robe and his gesturing arms.

This image was taken from our backyard in West Chester, Ohio with a 5" diameter refracting telescope (Takahashi TOA-130) and astronomy CCD camera (SBIG ST-10) for a total imaging time of 6 hours. Colors were captured and mapped into a false-color palette similar to the filters and techniques employed for the Hubble Space Telescope.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 NOVEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All events are Universal Time unless otherwise specified. *+ Eastern Standard / Eastern Daylight Time* ** Stonelick events are weather dependent*		October 2012 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 2012 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** *Jupiter 0.9° N. of Moon*	**3**
4 *Daylight Savings Time Ends*	**5**	**6** *Election Day*	**7**	**8**	**9**	**10** *Star Gaze at Stonelick State Park**
11 *Veterans Day*	**12** *Spica 0.8° N. of Moon* *Saturn 4° N. of Moon*	**13** *Total Solar Eclipse*	**14**	**15** *Ai-Hijira*	**16** *Mars 4° S. of Moon*	**17** *Star Gaze at Stonelick State Park** *Leonids Meteor Shower* *Mercury in inferior conjunction*
18 *Leonids Meteor Shower*	**19**	**20**	**21**	**22** *Thanksgiving*	**23**	**24** *Jupiter Nights + 8-10pm*
25	**26**	**27** *Venus 0.6° S. of Saturn*	**28** *Penumbral Eclipse*	**29** *Jupiter 0.6° N. of Moon*	**30**	

SH2-157, NGC 7538, M52 and the Bubble Nebula Nebulae and Star Clusters in Cassiopeia

Eric Africa

This is a busy region in Cassiopeia containing SH2-157 (nicknamed "The Claw"), NGC 7538 (the bright nebula to the lower right), the Bubble Nebula to the upper right, and M52 at the extreme upper right corner.

SH2-157 and NGC 7538 are emission nebulae, large clouds of gas glowing from the radiation of nearby bright stars. M52 is an open cluster of stars and the 52nd entry in Charles Messier's famous "these are not comets" list. And the Bubble Nebula is a shell of gas being ejected by a massive star that is approaching the end of its short but spectacular life.

Note to owners of the 2010 COC calendar: NGC 7538 was the subject of the November 2010 image!

This image was taken from our backyard in West Chester, Ohio with a 4" diameter refracting telescope (Takahashi FSQ-106) and astronomy CCD camera (SBIG STL-6303) for a total imaging time of 21 hours. Colors were captured and mapped into a false-color palette similar to the filters and techniques employed for the Hubble Space Telescope.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2012 DECEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
All events are Universal Time unless otherwise specified. *+ Eastern Standard / Eastern Daylight Time* ** Stonelick events are weather dependent*	November 2012 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 2013 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** *Jupiter at opposition*	**4**	**5**	**6**	**7**	**8** *Chanukah begins at Sunset* *Star Gaze at Stonelick State Park**
9 *Spica 0.8° N. of Moon*	**10** *Saturn 4° N. of Moon*	**11** *Venus 1.6° N. of Moon*	**12** *Mercury 1.1° N. of Moon*	**13** *Germinids Meteor Shower*	**14** *Germinids Meteor Shower*	**15** *Star Gaze at Stonelick State Park**
16 *Chanukah last day*	**17**	**18**	**19**	**20**	**21** *December 21 is NOT the end of the World Event +* *Solstice*	**22** *The World Continues Event + 7-9pm*
23 **30**	**24** *Christmas Eve* *New Year's Eve* **31**	**25** *Christmas*	**26** *Jupiter 0.4° N. of Moon*	**27**	**28**	**29**

NGC 6520 & Barnard 86 Open Star Cluster with Dark Nebula

Fred Calvert, Cold Spring Observatory

NGC 6520 is an Open Star Cluster. The dark object to the upper right is Barnard 86, a Dark Nebula. NGC 6520 spans about ten light years and is about 5500 light years away toward the direction of the constellation of Sagittarius.

The stars in NGC 6520 most likely formed from Barnard 86. Dust from the leftover star forming material block light from the stars that are behind the cloud. Stars in NGC 6520 are new blue stars that are only millions of years old, compared to the 4.5 billion year age of our Sun. In the background of NGC 6520 is the central bulge of the Milky Way Galaxy.

Barnard 86 is also sometimes called the Ink Spot Nebula. The nebula is a Bok globule located about 5500 light-years from us. A Bok globule is a compact dark nebula named after Dutch-American astronomer Bart Bok (1906-1983) who was the first to recognize and correctly characterize them

This image was taken at Kitt Peak National Observatory (NOAO/AURA/NSF) using the 20" RC Optical System Ritchey Chretien Telescope, Paramount ME Robotic Mount and a SBIG ST10XME CCD Camera. Total exposure time was 1.8 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

2013 JANUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
December 2012 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 2013 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**	**3** *Quadrantids Meteor Shower*	**4** *Quadrantids Meteor Shower*	**5** ◑
6	**7**	**8**	**9**	**10**	**11** ●	**12** *Star Gaze at Stonelick State Park**
13	**14**	**15**	**16**	**17**	**18** ◐	**19** *Star Gaze at Stonelick State Park**
20	**21** *Martin Luther King Day*	**22**	**23**	**24**	**25**	**26**
27 ○	**28**	**29**	**30**	**31**		

All events are Universal Time unless otherwise specified.
+ Eastern Standard / Eastern Daylight Time
** Stonelick events are weather dependent*

NGC 613
Barred Spiral Galaxy

Fred Calvert, Cold Spring Observatory

NGC 613 is a barred spiral galaxy 65 million light-years away in the southern constellation of Sculptor. Over 100 thousand light-years across, NGC 613 seems to have more than its fair share of spiral arms laced with cosmic dust clouds and bright star forming regions near the ends of a dominant central bar.

Radio emission indicates the presence of a massive black hole at its center. Prominent dust lanes are visible along the large-scale bar. The galaxy is inclined by 32 degrees and, contrary to most barred spirals, has many arms that give it a tentacular appearance.

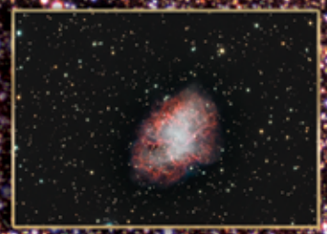
This image was taken at Kitt Peak National Observatory (NOAO/AURA/NSF) using the 20" RC Optical System Ritchey Chretien Telescope, Paramount ME Robotic Mount and a SBIG ST10XME CCD Camera. Total exposure time was 2.5 hours.

Presented By:

CINCINNATI OBSERVATORY

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

The Witch Head Nebula
F. Calvert



The Crab Nebula
E. Africa

Neck of the Pelican Nebula
F. Calvert

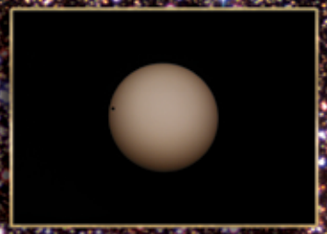
M81, M82 & More
E. Africa

Reflection Nebula in Orion
E. Africa

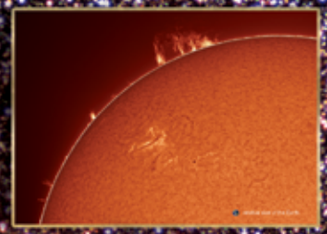
The Moon
F. Calvert

The Trio in Leo
E. Africa

NGC 362
F. Calvert

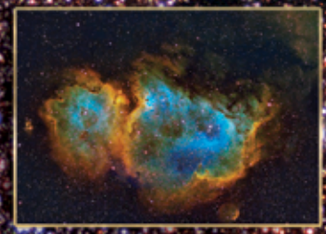


Venus Transit of 2004
J. Africa

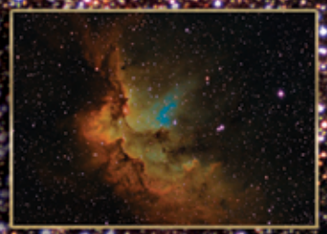


The Sun
S. Rismiller

Comet 17P Holmes
F. Calvert



The Soul Nebula
E. Africa



The Wizard Nebula
E. Africa

SH2-157, NGC 7538 & More
E. Africa

NGC 6520 & Barnard 86
F. Calvert

Barred Spiral Galaxy
F. Calvert

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 & Josephine Africa, imagers; 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.

Covers: Front, Eric Africa, M8 The Lagoon Nebula. Back, Fred Calvert, M24 Sagittarius Star Cloud.

XAVIER UNIVERSITY
CENTER FOR EXCELLENCE IN EDUCATION

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 708389 51500
ISBN 978-0-9647083-8-9
$15.00