

# D I S T A N T L I G H T

Rockland Astronomy Club Journal ~ December 2007



## SEASONS GREETINGS FROM THE UNIVERSE

SPECIAL COMET HOLMES ISSUE

HOLMES FOR  
THE HOLIDAYS

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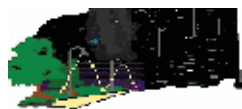


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Complete and mail the Membership Application Form below today.



International Dark Sky Association



**OUR ADDRESS IS:**  
Rockland Astronomy Club,  
225 Route 59, Suffern, NY 10901-5203

**WHO WE ARE:**  
Rockland Astronomy Club is a non-profit organization founded in 1958. We are dedicated to expanding public awareness of the Universe and to furthering an appreciation of astronomy and space science education. In 2005 the Rockland Astronomy Club received the prestigious PRIDE OF ROCKLAND award for our on-going community involvement and pursuit of our mission.

## FROM THE EDITOR

# Seasons Greetings- No Matter How You Say It!



In every language and expressing every belief, the Rockland Astronomy Club extends our warmest wishes to all of you, our members, and to your families, for a happy and healthy holiday season.

As the year draws to a close, I'd like to take this opportunity to reflect on the wonderful events, and gatherings, that have taken place during the course of the year. We have been fortunate to have had favorably clear skies and many successful observing sessions. With increased club membership and outstanding public attendance, 2007 allowed us the chance to broaden the minds of many who had yet to see the beauty that our universe has to offer.

We can close the chapter to another great year knowing that 2008 will bring many more wonderful times full of friendship, fun and excitement!

*With dark skies above and the stars  
shining bright,  
We gather together on the newest moon's  
night.  
Bundled up warm on a evening so clear,  
We find laughter and joy with those who  
are dear.  
Our hopes and our wishes will surely  
come true,  
When a bright falling star streaks into  
view.  
Good fun and good times are what we  
all share,  
Until the late hours when dew fills the  
air.  
We pack up our things and wish all a  
good cheer,  
To carry them forth throughout the New  
Year.  
"Seasons best under all the same sky!",  
Until our next evening, "Adieu and  
goodbye." ★*

Angela

## RAC MEMBERSHIP APPLICATION

Club members receive this journal, enjoy special prices for annual subscriptions to S&T and ASTRONOMY magazines, discounts to club events and much more. Make checks payable to RAC and mail with this form to: Rockland Astronomy Club, Attn: Memberships, 225 Route 59, Suffern, New York 10901-5203.

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Note: The Journal is sent to Members via email. For mailed hard copies, add \$18/year.

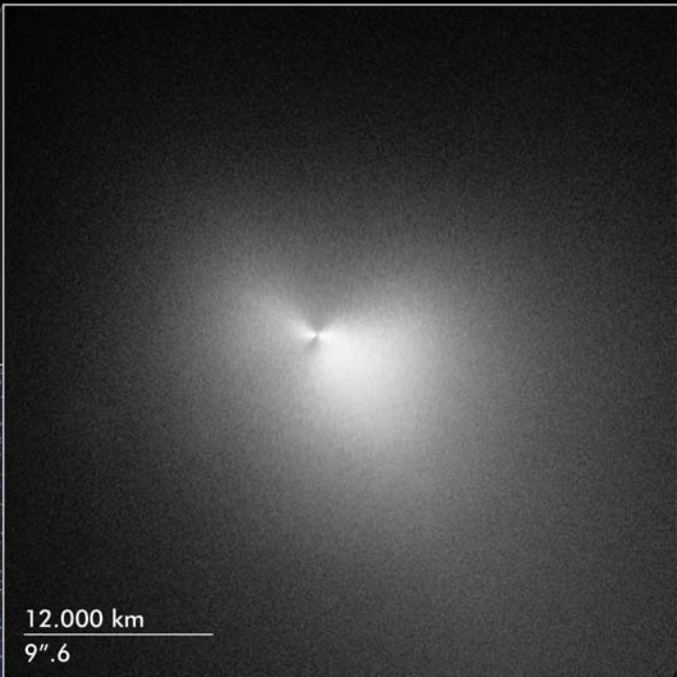
Membership Type	1 Year	2 Year (Save \$2)	3 Year (Save \$5)	5 Year (Save \$10)	Hard Copy (by US Mail)	Total
Family	\$30	\$58	\$85	\$140	+\$18/yr.	_____
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Senior Citizen (65+)	\$15	\$28	\$40	\$65	+\$18/yr.	_____
High School Student	\$10	\$18	\$25	\$40	+\$18/yr.	_____
<b>Grand Total</b>						_____

COVER STORY

November 1, 2007  
A. Dyer, Alberta, Canada



12,000 km  
9".6



November 4, 2007  
HST WFPC2

The Hubble image at right, taken on Nov. 4, shows the heart of Comet 17P/Holmes. About twice as much dust lies along the east-west direction, giving the comet a "bow tie" appearance. The image at left, taken Nov. 1 shows the complex structure of the entire coma, consisting of concentric shells of dust and a faint tail emanating from the comet's right side.

Credit: NASA, ESA, and H. Weaver (The Johns Hopkins University Applied Physics Laboratory)

# Hubble Zooms in on Heart of Mystery Comet- 17P/Holmes

## ESA/HUBBLE INFORMATION CENTER-

The NASA/ESA Hubble Space Telescope has probed the bright core of Comet 17P/Holmes which mysteriously brightened by nearly a million-fold in a 24-hour period beginning October 23, 2007.

Astronomers have used Hubble's powerful resolution to study Comet Holmes' core for clues about how the comet brightened. The orbiting observatory's Wide Field Planetary Camera 2 (WFPC2) monitored the comet for several days, snapping images on 29 Oct., 31 Oct. and 4

Nov. Hubble's crisp "eye" can see details as small as 54 kilometres across, providing the sharpest view yet of the source of the spectacular brightening.

The nucleus — the small solid body that is the source of the comet's activity — is still swaddled in bright dust, even 12 days after the spectacular outburst. "Most of what Hubble sees is sunlight scattered from microscopic particles," explained Hal Weaver of The Johns Hopkins University Applied Physics Laboratory of Laurel, Maryland in the USA, who led the Hubble investigation. "But we may finally

Cover photo: taken by Jim Burnell on Nov. 7, 2007. The image is a color composite taken through a luminance filter and 4 stacks of sixty-second exposures through red, green and blue filters. The images were calibrated, defect-corrected, stacked, color-combined, and auto-balanced using AIP4Win v2. The image has been strongly gammalog-stretched to show the details in the comet's tail.

be starting to detect the emergence of the nucleus itself in this final Hubble image."

Hubble first observed Comet 17P/Holmes on June 15, 1999, when there was virtually no dusty shroud around the nucleus. Although Hubble cannot resolve the nucleus, astronomers inferred its size by measuring its brightness. Astronomers deduced that the nucleus's diameter was approximately 3.4 kilometers, about the distance between the Arc de Triomphe and the Louvre glass pyramid in Paris. They hope to use

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## COMET 17P/HOLMES

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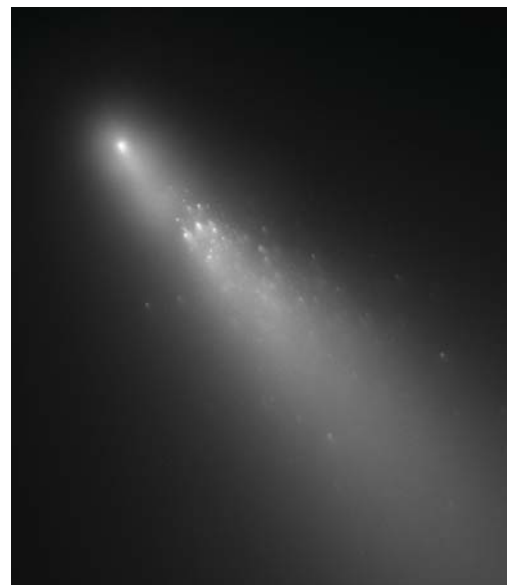
the new Hubble images to determine the size of the comet's nucleus to see how much of it was blasted away during the outburst.

Hubble's two earlier snapshots of Comet Holmes also showed some interesting features. On 29 Oct. the telescope spied three "spurs" of dust emanating from the nucleus while the Hubble images taken on 31 Oct. revealed an outburst of dust just west of the nucleus.

The Hubble images however do not show any large fragments near the nucleus of Comet Holmes, unlike the case of Comet 73P/Schwassmann-Wachmann 3 (SW3). In the spring of 2006 Hubble observations revealed a

multitude of "mini-comets" ejected by SW3 after the comet increased dramatically in brightness.

Ground-based images of Comet Holmes show a large, spherically symmetrical cloud of dust that is offset from the nucleus, suggesting that a large fragment broke off and subsequently disintegrated into tiny dust particles after moving away from the main nucleus. Unfortunately, the huge amount of dust near the comet's nucleus and the relatively large distance from Earth (240 million kilometers, or 1.6 astronomical units for Holmes versus 15 million kilometers, 0.1 astronomical units for SW3), conspire to make detecting fragments near Holmes nearly impossible right now, unless the fragments are nearly as large as the nucleus itself. ✪



*The breakup of periodic Comet 73P/Schwassmann-Wachmann 3 in April 2003. It disintegrated into scores of icy bits as captured in this Hubble Space Telescope view.*

Additional information on the latest developments with Comet Holmes is available at the ESA/Hubble Information Center: <http://www.spacetelescope.org>

## SOLVING THE MYSTERY

[Can science explain the mystery behind the strange behavior of Comet Holmes?](#)

Except for the double outburst observed during and shortly after its discovery in 1892, periodic Comet 17P/Holmes has been a run-of-the-mill interloper from the outer solar system. So why did it erupt so suddenly and dramatically in late October?

Most certainly it was not struck by an asteroid as some have speculated. Although the comet occupies the space between Mars and Jupiter, its orbital inclination of 19° keeps 17P/Holmes separated from the hazards of the asteroid belt. Moreover, counting the outbursts that occurred during and after its discovery in 1892, three such collisions would be needed to explain all the activity.

Another, and also unlikely scenario,

is that the nucleus is accompanied through space by one or more satellites that "reentered" and released a torrent of dust and gas when they struck the main mass.

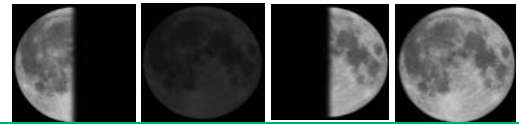
Astronomers currently speculate that repeated warmings by the Sun caused a dusty, ice-free "crust" to form on the nucleus, sealing the interior. Over time the pressure beneath this seal steadily grew as once-frozen ice became gas, eventually breaking through and sending large chunks of crust flying into space that quickly disintegrated into microscopic dust. The alternative explanation speculates that sinkholes formed in its nucleus, due to the repeated warmings, giving it a honeycomb like structure. A collapse ensued that exposed the interior ice to the sun, which in turn quickly transformed into an expanding halo of gas.

One clue as to what has triggered the outburst now — as opposed to its previous appearance in 1999 — may be its vacillating perihelion distance.

Comet chronicler Gary Kronk noted recently in an online posting, "The comet's orbit was altered by Jupiter during December 1908 so that the perihelion distance increased from 2.12 AU to 2.34 AU. The comet was lost until 1964 and it remained faint during that apparition."

"An approach to Jupiter during April 1968 decreased the perihelion distance back to 2.16 AU," Kronk continues, "but no outbursts were observed at any apparition between 1972 and 2000. Another approach to Jupiter in January of 2004 decreased the perihelion distance to 2.05 AU, [followed by] an outburst at the very next apparition."

Even if there were scientific agreement on the leading hypothesis, realistically, we may never know the cause. This comet's behavior, particularly the perfectly spherical outer halo, has confounded even the experts. Remarkably, 17P/Holmes has mimicked almost perfectly the behavior seen during its discovery 115 years ago. ✪



Last Qtr Dec 1    New Dec 8    First Qtr Dec 15    Full Dec 23

DECEMBER SKYDATA

## Highlights

- Dec 1    Saturn 2° north of Moon
- Dec 5    Venus 7° north of Moon
- Dec 13    **Geminid meteors**
- Dec 17    Mercury in superior conjunction
- Dec 18    Mars closest approach
- Dec 22    Winter solstice
- Dec 23    Jupiter in conjunction with Sun
- Dec 23    Mars 0.9° south of Moon
- Dec 24    **Mars at opposition**
- Dec 28    Saturn 3° north of Moon

## Mars Opposition Party 2007

Join the Rockland Astronomy Club at SUNY Rockland Community College on Saturday December 8th for a Free Public Event. This fall, Mars reaches opposition which brings it closer to earth than at any other time in a two year period. Due to the close proximity to Earth, many albedo surface features will be visible which otherwise could not be seen. Surface feature maps of Mars will be given out at this event, so you too can make your own discoveries!

With Mars high in the crisp autumn sky, don't miss the opportunity to view this mysterious planet up close through some of the best telescopes available. So join us for this exciting event at the observing field, south of the main Field House at SUNY Rockland Community College. There'll be plenty of snacks and hot

refreshments, music, and your very own Mars map, so dress warmly & bring the family for a fun filled evening. Viewing begins at 9 P.M.

## Comet Holmes Now Bigger Than the Sun

The sun remains by far the most massive object in the solar system, with an extended influence of particles that reaches all the planets.

But the comparatively tiny Comet Holmes has released so much gas and dust that its extended atmosphere, or coma, is larger than the diameter of the sun.

"It continues to expand and is now the largest single object in the solar system," according to astronomers at the University of Hawaii.

The coma's diameter on Nov. 9 was 869,900 miles (1.4 million kilometers), based on measurements by Rachel Stevenson, Jan Kleyna and Pedro Lacerda of the University of Hawaii Institute for Astronomy. They used observations from the Canada-France-Hawaii Telescope.

The sun's diameter, stated differently by various sources and usually rounded to the nearest 100, is about 864,900 miles (1.392 million kilometers). ★

## Prime Observing Window

Tuesday Dec 4 through Thursday Dec 13

## Sun & Moon Rise & Set Times

Date	Sunrise	Set	Moonrise	Set
December 1	07:00	16:29	00:00	12:27
December 5	07:05	16:28	03:16	13:49
December 10	07:09	16:28	08:17	16:58
December 15	07:13	16:29	11:13	22:26
December 20	07:16	16:31	13:22	03:17
December 25	07:19	16:34	18:26	08:58
December 31	07:20	16:38	00:04	11:31

## Planetary

### Visible Planets in the Night Sky

#### December 1

	Rise	Transit	Set	Mag
Mercury	06:16	11:08	15:59	-0.8
Venus	03:17	08:53	14:29	-4.2
Mars	18:20	02:04	09:43	-1.3
Jupiter	08:22	12:58	17:35	-1.8
Saturn	23:18	05:58	12:35	0.7

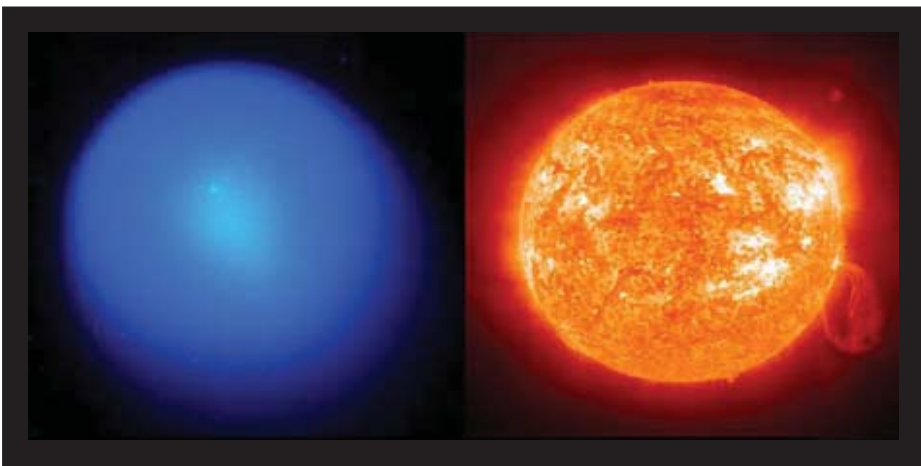
#### December 15

	Rise	Transit	Set	Mag
Mercury	07:10	11:43	16:16	-1.1
Venus	03:42	09:00	14:18	-4.1
Mars	17:08	00:56	08:38	-1.5
Jupiter	07:44	12:20	16:56	-1.8
Saturn	22:28	05:08	11:45	0.7

#### December 31

	Rise	Transit	Set	Mag
Mercury	08:03	12:35	17:08	-0.9
Venus	04:17	09:15	14:11	-4.1
Mars	15:29	23:14	07:06	-1.5
Jupiter	06:54	11:30	16:06	-1.8
Saturn	21:21	04:01	10:38	0.6

Below: In a side by side comparison, the Sun and Comet 17P/Holmes shown at the same scale as of Nov 16, 2007.



# The RAC Essentials

## MONTHLY CALENDAR

**201-768-2238  
or 845-47STARS**

**Message Hotline: The latest information or last minute changes to club events.**

### Prime Observing

**December 4 thru 13**

Fri. Nov 30

Lecture Series #2 - "Seeing the Light, the Nature of Astronomical Color" at Rockland Community College

Fri/Sat, Dec 1, 7, 8

Observing at Wawayanda (members night)\*

Sat. Dec 8

Mars Opposition Party at Rockland Community College

Sat, Dec 8

Up all night Observing at Taghkanic State Park (members night)\*

Tue. Dec 11, 8pm

Advisory Committee Meeting LHVCC, Airmont, N.Y.

## LOCATIONS

### Clarkstown South Planetarium

31 Demarest Mill Rd,  
West Nyack, NY

### Rockland Community College

College Road, Suffern, NY

### Lower Hudson Valley

### Challenger Center

Rt. 59, Suffern, NY

### Anthony Wayne

### Recreation Area\*

Exit 17, P.I.P., NY

### Silvermine Ski Area\*

Exit 18, P.I.P., NY

### Wawayanda State Park\*

973-853-4462,  
Highland Lakes, NJ

### Taghkanic State Park\*

Taconic State Parkway,  
Ancram, NY

\*Special permits required to observe at these locations. Contact Frank Bifulco for permit info.

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Don Urban (L)

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