

The **★**ASTERISM

as' ter ism ~ a recognizable pattern of stars
con stel la' tion ~ an internationally designated area of the sky

Volume XXV No. 2

October/November 2013

Scott Carpenter (1925–2013)

What's Inside...

[General Membership Meeting](#) Pg 2

[Stewart's Skybox](#) Pg 3

[Brian's Books](#) Pg 5

[Contacts](#) Pg 6

[Theatre ^{IN} THE Sky](#) Pg 7,8

Note: Use bookmark panel in Adobe Reader.

On May 24, 1962, Scott Carpenter the second American Astronaut to circumnavigate the earth from space, died. One of the original Mercury Astronauts, his reason for volunteering for the Mercury Project, "immortality." He did attain something close to that, as his accomplishment will be remembered as an American hero. Overcoming faulty equipment to manually assist gravity in landing in the Pacific.

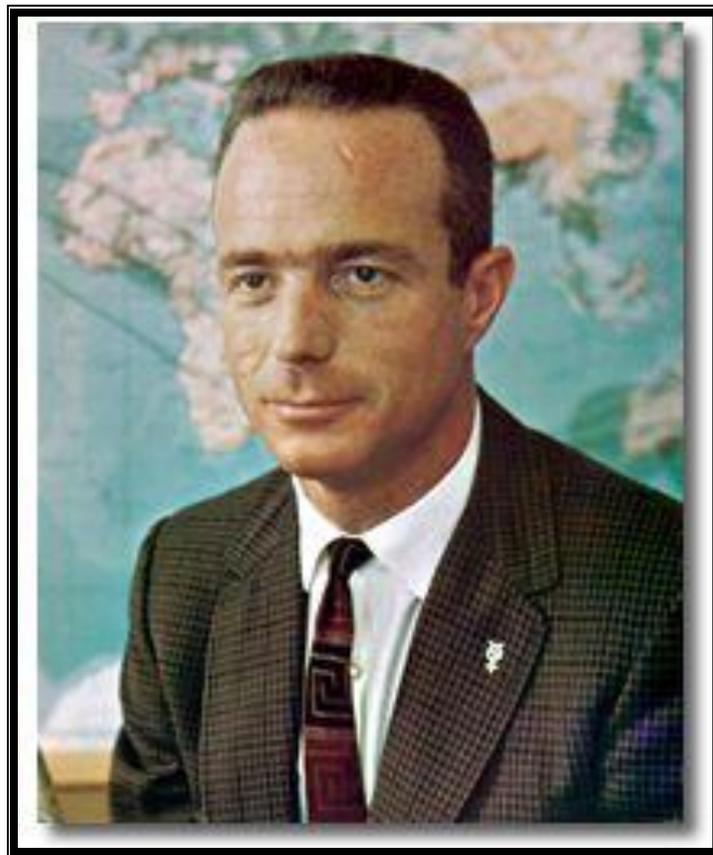


Image courtesy of NASA

GENERAL MEMBERSHIP MEETING NOVEMBER 15, 2013

ROY SMITH THEATER - UCC CAMPUS

8:00 p.m.



**Dense Gas in
Distant, Dusty
Galaxies**

Dr. Andrew Baker,
Rutgers, The State
University

hydrogen is largely molecular, constitutes one of the most important yet elusive components of galaxies' interstellar media. Dr. Baker will describe how radio astronomers use molecular emission lines to detect and characterize dense gas in galaxies and also explain how observations of distant galaxies allow us to determine their dense gas masses and their exact distances.

To understand how galaxies evolve across cosmic time, we must understand not only their dark matter and their stars, but also the properties of their interstellar gas. Cold, "dense" gas, in which

PLEASE JOIN US!!!

New Members Wanted!!

Amateur Astronomers, Inc. has no new members to report from the October Executive Committee meeting! Speak to your friends and colleagues on the merits of membership.

Irene Greenstein, Membership Chair

**STAR PARTY
SPERRY OBSERVATORY
FRIDAY NOVEMBER 8
DECEMBER 13
at 7:30 p.m.**

The next **General Membership Meeting** is the third **Friday, December 20, 2013**. Our speaker is **Dr. Jeff Hall, Director** of The Lowell Observatory his topic is **Fifty Years of Stargazing: Solar and Stellar Cycles Research at Lowell Observatory.**

PLEASE JOIN US!

**MEMBER ONLY STAR PARTY
JENNY JUMP STATE PARK
HOPE, NJ
SATURDAY DECEMBER 7,
AND JANUARY 4, 7:30PM**

It is getting difficult to come up with topics for this column. In an effort to keep this column going, this month will feature an experiment. I will present several topics, none of which merits a whole Skybox column. I'll call it the "this and that" format.

Solved at Last?

Last June marked the 105th anniversary of the Tunguska impact. Recently, a Russian scientist, Andrei Zlobin, achieved what Leonid Kulik's heroic efforts back in the 1920s and 1930s could not – finding actual pieces of the object that exploded in 1908 and caused all the havoc.

Since the astronomical world first learned of the event, there has been much speculation as to what blew up over Siberia. Once the obviously nonsensical and the overly exotic theories were eliminated, that left either a comet fragment or a small stony asteroid. The comet advocates cited the lack of a crater as well as a coincidence of date that linked it to Encke's Comet. The asteroid advocates cited a study of the likely orbit of the impactor done by Zdenek Sekanina that suggested the orbit had no connection to Encke's Comet and that it was unlike any comet orbit. Also supporting the asteroid claim was the study of the breakup of small stony asteroids in the Earth's atmosphere as well as observations of fireballs.

In 1988, Zlobin and his team journeyed to the Tunguska region and then searched a feature known as the Suslov depression where it was thought that impactor fragments would most likely land. After digging a number of deep holes in the peat bogs and coming up empty, Zlobin decided to check out the bottom of the Khushmo River and found about 100 rocks that were worthy of further investigation back in Moscow.

For a number of reasons, including the chaos surrounding the dissolution of the Soviet Union in 1991, Zlobin did not study the rocks until 2008. Of the 100 rocks, he found three that were meteorites. They exhibited the classical signs of melting and sported remaglypts, thumbprint-like features that form when bits of material ablate off a meteorite.

These pieces, as well as the findings from the Chelyabinsk airburst earlier this year, should put to rest permanently any claims that a piece of comet nucleus exploded in 1908. Those desiring the details

On Again, Off Again

One of the few bits of actual science that somehow made it into the movie "The Day After Tomorrow" was the fact that, almost 13,000 years ago, the warming after the end of the most recent ice age suddenly reversed for a time. This is referred to as the Younger Dryas and was also the time when many species of large Ice Age mammals disappeared in North America as well as when Clovis point tools stopped being made. The exact cause of this event is uncertain. The movie invoked stratospheric downdrafts (an old, discredited, Soviet theory that was used to explain the frozen mammoths found in Siberia). More credible theories propose that it was the shutdown of ocean currents like the Gulf Stream caused by the influx of fresh water into the oceans from the melting ice sheets.

In 2007, a team of scientists led by Richard Firestone (University of California, Berkeley) went to Arizona and found there was a thin layer of dark material, known as a black mat, at the time the Younger Dryas started. Upon further analysis, the dark layer appeared to contain a mix of substances – microscopic spheres of carbon as well as metal ones, soot, a trace of iridium, and fullerene (60-atom carbon crystals). When ice cores from the period were later studied, large numbers of nanodiamonds, diamond particles that were thought to have formed from cosmic impacts, were found.

The impactor hitting one of the large ice sheets that still covered quite a bit of North America explained the lack of a crater. It was also thought that the ice melted in the impact flowed into the ocean and caused the currents to grind to a halt. Everything seemed to be neatly resolved and PBS even had an episode of "Nova" about it.

However, other scientists raised objections. In April of 2010, C. Vance Haynes of the University of Arizona's School of Anthropology studied the same black mat deposit that Firestone's team studied and came to different conclusions. The metallic spherules, according to Haynes, can also be produced by combustion in engines and power plants. Haynes also argues that these spherules are evidence that the site, which is near a riverbed, was

(Continued on Page 4)

(Continued from Page 3)

contaminated by these modern spherules and samples taken from areas further from the riverbed do not show them in large numbers. The carbon and soot, Haynes explains, came from the campfires of the Clovis-era hunters who occupied the site at the time. A colleague of Haynes also refuted the nanodiamond evidence claiming that extraterrestrial nanodiamonds fall on Earth all the time and that any high quantity of them is the resulting of an Earthly process that concentrates them.

Other objections include the fact that the extinctions only happened in North America and that Ice Age mammals in other parts of the world went extinct at different times. Even the disappearance of the Clovis tools has been explained as sign of a cultural change (much like humans' recent sudden shift to using smart phones over land-line telephones) rather than a disaster.

In June of 2011, another extraterrestrial theory to explain the extinctions came forth. Paul LaViolette of the Starburst Foundation claimed that the extinctions were the result of an enormous solar proton event. He cites as his evidence the sharp increase in carbon-14 and beryllium-10 detected in sediments from that era in a core taken from the Cariaco Basin off the coast of Venezuela. LaViolette believes this was caused by a solar proton event that was strong enough to overwhelm Earth's magnetic field, damage the ozone layer, and expose creatures on the ground to a lethal dose of cosmic radiation. He also claims to have detected a sharp increase in nitrate ions as well as acidity in Greenland ice cores from that era.

Unfortunately for LaViolette, the strongest solar proton event ever recorded was in 1956 and it was only about 1% the strength of the putative Younger Dryas one. To get around this, he claims that the Sun was experiencing a flashback to its younger T-Tauri days, brought on by a large concentration of interstellar dust reaching the Sun. This is quite implausible. Such dust would be blown away from the Sun by the force of light pressure as well as the charged particles streaming from the Sun. Even if something did reach the Sun and sink down to its core, it would take millennia for it to make the trip and millennia for the change in the core to manifest itself on the surface. LaViolette's paper can be found at <http://starburstfound.org/downloads/superwave/SPE.html>.

This past Spring, James Kennett of the University of California, Santa Barbara has revived the cosmic impact theory by studying sediments from the layer corresponding to the Younger Dryas from 18 sites spread out over four continents. Kennett and his colleagues subjected the spherules found in the layer to detailed analysis. The results were that these spherules were composed of local materials that were subjected to temperatures of at least 2,200 degrees Celsius. The composition and magnetic properties of the spherules pretty much rule out volcanism and lightning strikes. An abstract of the paper from Kennett's team is at

<http://www.pnas.org/content/early/2013/05/17/1301760110.abstract>.

When Smooth May Not Be So

The Fermi gamma ray satellite has been a major success. Based on its ability to rapidly detect and locate gamma ray bursts, our understanding of these objects has improved considerably. This remarkable satellite has also had its observations used to support other areas of research.

One recent example concerned the arrival times of gamma rays of various frequencies from a burst. Most theories of physics propose that, at the smallest of levels, spacetime has a foam-like consistency due to quantum mechanical effects. This foam would have an effect on the travel of very high frequency gamma ray photons as the wavelength is so small, they would take extra time to traverse the foam. The reasoning was that the highest frequencies of gamma rays have wavelengths comparable to the size of an atomic nucleus.

The result was that no variation in travel time was detected. Scientists associated with Fermi were quick to claim that this was proof that spacetime was actually quite smooth at the smallest of scales.

When I mentioned this on the AAI Soapbox group, Clif Ashcraft pointed out that this result could raise a cosmological problem. It is thought that random quantum fluctuations in the earliest moments of the universe were what caused some regions of the universe to have a greater density and that these density variations would later lead to the formation of galaxies and galaxy clusters. If spacetime was smooth at the smallest levels, these variations would never have happened.

(Continued on Page 5)

(Continued from Page 4)

At a meeting of the Amateur Astronomers Association of Princeton, I put this question to one of their physicists. He explained that the results were less significant than the Fermi team would have people believe. Fermi was not designed to test out the concept of quantum spacetime foam and lacked the time resolution to detect the likely level of fluctuations. This is borne out by statements made by Lynn Cominski in a recent NSN teleconference where, she

mentioned that Fermi could only resolve time variations on the order of a second or so.

So, based on what I have heard about this, spacetime foam and the density variations in the early universe are safe for now.

Your Thoughts?

Do you like the "this and that" format for Skybox? If so, let me know.

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Brian's Books

Reviews by Brian Lemley

NEW TO THE AAI LIBRARY

"The End of Night: Searching for Natural Darkness in an Age of Artificial Light" by Paul Bogard (Publisher, Little, Brown, 9July2013)

Book Review by Brian Lemley

Today we no longer experience true darkness at night due to light pollution. Exposure to artificial light at night has been cited as a factor in diseases ranging from sleep problems to cancer. According to the author, eight of ten children born in the USA today will never see the Milky Way from their home skies. This book is about what we lose when artificial lights steal the natural darkness at night, and how we might regain it.

The author travels from the brightest place on earth (Las Vegas) to some of the darkest (Bryce Canyon, Death Valley, Cadillac Mountain, Maine, and the Canary Islands) in search of the night sky.

He finds that light pollution has made even the skies over rural towns a shadow of what they were even twenty years ago. Anyone who has been observing the night sky for even less time than that is familiar with the phenomenon.

Because of light pollution we lose parts of the earth's ecology. Artificial light is a factor in damaging the health of shift workers who have their natural biological rhythms disrupted. We lose a sense of wonder about nature. Of course, excess artificial light also wastes energy and resources. The book discusses these factors and much more. Interestingly, the chapters are numbered in reverse (from nine to one) mimicking the Bortle scale of sky brightness from most light polluted down to darkest.

I consider this book to be an absolute "must read" for any amateur astronomers. It will soon be available for borrowing from the A.A.I. library.

A related book in the club library is "City Astronomy" by Robin Scagell, which offers amateur astronomers some methods to cope with the expanding scourge of excess artificial light.

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MEMBERSHIP DUES

Regular Membership:	\$21
Sustaining Membership:	\$31
Sponsoring Membership:	\$46
Family Membership:	\$5
First Time Application Fee:	\$3
<i>Sky & Telescope:</i>	\$32.95
<i>Astronomy</i> subscription:	\$34

(Subscription renewals to *S&T* can be done directly. See "Membership-Dues" on website for details.)

AAI Dues can be paid in person to our Membership Chair, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111

DOME DUTY

Nov	1	Team B
Nov	8	Team C
Nov	15	Team D
Nov	22	Team E
Nov	29	Team A
Dec	6	Team B

FRIDAYS AT SPERRY

Nov 8, 2013

Topic TBA

Dr. Al Gottlieb

Nov 22, 2013

Topic TBA

Helder Jacinto

Nov 29, 2013

Comet ISON

Alan P. Witzgall

Dec 6, 2013

What's Up? A Down to Earth

Sky Guide Kathy Vaccari

Space Missions Briefing

Bill Whitehead

Dec 13, 2013

From Greenwich Time to Times

Square

Bonnie Witzgall

Dec 27, 2013

Sperry Not Available

Highlights of the Sky for 2014

Alan P. Witzgall

Will be delivered date and location

uncertain presently

All schedules above were accurate at time of publication. Please check

www.asterism.org *for latest information*

(click on "Club Activities")

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Theaterⁱⁿthe Sky

by Ron Ruemmler

November 2013 has a major wild card in the form of Comet ISON. This long-anticipated visitor is now racing through our morning sky. The best time to look for it is from the 17th, when it skims just above Spica, through the 28th, when its head passes within one solar diameter of the surface of the **Sun**. Although the path is predictable, the brightness is not, so binoculars may be necessary.

From the East coast of the US the rising **Sun** on the 3rd may have a tiny bite out of its lower left edge. This is part of a very strange Annular-Total Solar Eclipse visible, mostly, from Africa. For the first 15 seconds the **Moon's** total shadow does not quite reach the surface of the **Earth**, so a thin ring of solar surface is visible. After that the **Moon** fully covers the **Sun's** disk along the central eclipse track.

Ever since April, **Venus** has been moving to the South without gaining much altitude. This behavior reaches an extreme this month. Not since October 28, 1938 has **Venus** been as far South as it is on the 6th. Note how far to the lower left of the crescent **Moon Venus** passes on that evening. On the morning of the 29th the **Moon** passes over Spica as seen from almost all of North America.

November (times are PM unless noted)

- 1 Fri 4:00 AM **Venus** at greatest elongation from the **Sun** (47.1 degrees)
- 1 Fri 4:00 **Mercury** at conjunction with the **Sun** entering the morning sky
- 3 Sun 2:00 AM Turn clocks back one hour; return to Standard Time
- 3 Sun 6:29 AM Sunrise; very slight partial solar eclipse visible from NJ
- 3 Sun 7:50 AM New **Moon**; hybrid solar eclipse visible from central Africa
- 6 Wed 7:00 AM **Saturn** at conjunction with the **Sun** entering the morning sky
- 6 Wed Noon **Venus** at greatest southern declination (latitude) since 1938
- 6 Wed 5:30 **Venus** lower left of crescent **Moon**
- 10 Sun 12:57 AM First Quarter **Moon**
- 17 Sun pre-dawn Leonid meteor shower ruined by moonlight
- 17 Sun 5:45 AM Comet ISON upper right of Spica
- 17 Sun 10:16 AM Full **Moon**
- 17 Sun 9:00 **Mercury** at greatest elongation from the **Sun** (19.5 degrees)
- 25 Mon 2:28 Last Quarter **Moon**
- 28 Thu 6:00 Comet ISON closest to the **Sun**; tail reaching toward Spica
- 29 Fri 6:15 AM Crescent **Moon** upper right of Spica (occultation)



Theaterⁱⁿthe Sky

by Ron Ruemmler

December 2013 shows us whether or not comet ISON survived its hairpin turn just above the surface of the **Sun**. In either case, the comet is primarily a morning object. If you watched it rush toward the rising **Sun** from the upper right for the last half of November, you can follow it chasing its tail to the upper left for the first half of December. As for most comets, the brightness is unpredictable so take binoculars.

Evening comet fans are not totally shut out. As ISON moves North it keeps setting soon after the **Sun**. For a few days its tail might be visible while the head is still below the horizon. By the time its head is high enough to see it is probably too dim to appreciate.

If ISON disappoints, the planets compensate. **Venus** begins the month at its maximum brightness of 4.9 magnitude. Telescopes or good binoculars reveal the planet's increasing apparent diameter. This makes up for its rapidly narrowing crescent phase. **Venus** will pass between us and the **Sun** next month.

As you watch **Venus** set, turn around and try to see **Jupiter** just rising. The Giant Planet is nearing its opposition from the **Sun** early next month. **Jupiter** spends the whole month near Delta Geminorum (Wasat). If you're tracking comet

ISON, look for **Saturn** about the same altitude above the sunrise point. The comet is on the left and the planet on the right. **Mars** is starting to get brighter and is high in the South just before sunrise, while **Mercury** is to the lower left of **Saturn** for the first half of December.

December (times are PM unless noted)

1 Sun 6:20 AM	Very thin crescent Moon below Saturn and above Mercury
2 Mon 7:22	New Moon
5 Thu 5:30	Venus lower left of crescent Moon
7 Sat	Earliest Sunset
9 Mon 10:12 AM	First Quarter Moon
17 Tue 4:28 AM	Full Moon
18 Wed 7:00	Jupiter upper left of Moon
19 Thu 7:00	Jupiter above Moon
21 Sat 12:11	Winter Solstice; shortest day, longest night
25 Wed 6:00 AM	Mars upper left of Moon
25 Wed 8:48 AM	Last Quarter Moon
26 Thu 6:00 AM	Mars upper right of Moon
28 Sat 6:00 AM	Saturn left of crescent Moon
29 Sun 6:00 AM	Saturn upper right of crescent Moon

This is an October/November issue of The Asterism, there will be no separate November issue.

