

Night in the Blast Zone
Greg Smith - editor

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The Star Party at the mountain was a great hit. Lots of people came to see the mountain, hear the speakers and marvel at the dark night sky. The kids who came were terrific. They knew so much about the stars, and were asking great questions. We had fun joking about the constellations and the western myths behind them.

Many people were awed by the fact that we could see the four bright planets all at the same time; and so were we. Venus in the west was brilliant and when viewed through a telescope, you could see that it was in a partial phase. Bright Jupiter high in the sky and its moons made for great viewing. The air was so clear that we were treated to seeing the Great Red Spot on the face of the giant planet, not to mention the colorful banding. The rings of Saturn were so clear and many were able to identify the moon Titan off to the side. Mars was so brilliant, and the deep red was made more prominent by the ongoing dust storm. The four planets distribution across the sky made for a very precise marking of the ecliptic line of the solar system.

Near that line of planets between Jupiter and Saturn was the bright star of Antares in Scorpio so we were able to switch back and forth between Mars and 'not mars'. Had fun doing that several

times as different people came up to me asking what the red star low in the sky was while I was doing the constellation tour.

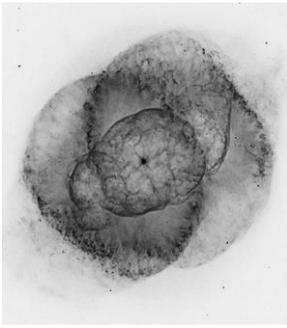
During this constellation tour, it was the kids who amazed me. They even understood some of my jokes. They were very polite while standing so close to me. Not afraid to ask simple questions and some even had tricky questions.

My own telescope decided that it was going to go nuts on me and tell me that it could not find north. So frustrating, but then I was able to go around and see what others were looking at.

I have to give kudos to Mark Thorson and Ted Gruber who were giving fantastic 'show and tells' of the various deep sky objects to the visitors who crowded around their scopes. Everyone was closely listening to their explanations and enjoying the views. I heard several people admit that they had never looked through a telescope before. So their views of Saturn and Jupiter must have been major memory makers for them.

I hope we can get the great weather next year that we had this year.

Every Day is a Star Filled Day
Every Night is a Starry Night



What a Blast it Was



Astronomers blown away by historic stellar blast

Imagine traveling to the Moon in just 20 seconds! That's how fast material from a 170 year old stellar eruption sped away from the unstable, eruptive, and extremely massive star Eta Carinae.

Astronomers conclude that this is the fastest jettisoned gas ever measured from a stellar outburst that didn't result in the complete annihilation of the star.

The blast, from the most luminous star known in our galaxy, released almost as much energy as a typical supernova explosion that would have left behind a stellar corpse. However, in this case a double-star system remained and played a critical role in the circumstances that led to the colossal blast.

Over the past seven years a team of astronomers led by Nathan Smith, of the University of Arizona, and Armin Rest, of the Space Telescope Science Institute, determined the extent of this extreme stellar blast, by observing light echoes from Eta Carinae and its' surroundings.

Light echoes occur when the light from bright, short-lived events are reflected off of clouds of dust, which act like distant mirrors redirecting light in our direction. Like an audio echo, the arriving signal of the reflected light has a time delay after the original event due to the finite speed of light. In the case of Eta Carinae, the bright event was a major eruption of the star that expelled a huge amount of mass back in the mid-1800s during what is known as the "Great Eruption." The delayed signal of these light echoes allowed astronomers to decode the light from the eruption with modern astronomical telescopes and instruments, even though the original eruption was seen from Earth back in the mid-19th century. That was a time before modern tools like the astronomical spectrograph were invented.

"A light echo is the next best thing to time travel," Smith said. "That's why light echoes are so beautiful. They give us a chance to unravel the mysteries of a rare stellar eruption that was witnessed 170 years ago, but using our modern telescopes and cameras. We can also compare that information about the event itself with the 170-year old remnant nebula that was ejected. This was a behemoth stellar explosion from a very rare monster star, the likes of which has not happened since in our Milky Way Galaxy."

The Great Eruption temporarily promoted Eta Carinae to the second brightest star visible in our nighttime sky, vastly outshining the energy output every other star in the Milky Way, after which the star faded from naked eye visibility. The outburst expelled material (about 10 times more than the mass of our Sun) that also formed the bright glowing gas cloud known as the Homunculus. This dumbbell-shaped remnant is visible surrounding the star from within a vast star-forming region. The eruptive remnant can even be seen in small amateur telescopes from the Earth's Southern Hemisphere and equatorial regions, but is best seen in images obtained with the Hubble Space Telescope.

The team used instruments on the 8-meter Gemini South telescope, Cerro Tololo Inter-American Observatory 4-meter Blanco telescope, and the Magellan Telescope at Las Campanas Observatory to decode the light from these light echoes and to understand the expansion speeds in the historical explosion. "Gemini spectroscopy helped pin down the unprecedented velocities we observed in this gas, which clocked in at between about 10,000 to 20,000 kilometers per second," according to Rest. The research team, Gemini Observatory, and Blanco telescope are all supported by the U.S. National Science Foundation (NSF).

"We see these really high velocities all the time in supernova explosions where the star is obliterated." Smith notes. However, in this case the star survived, and explaining that led the researchers into new territory. "Something must have dumped a lot of energy into the star in a short amount of time," said Smith. The material expelled by Eta Carinae is traveling up to 20 times faster than expected for typical winds from a massive star so, according to Smith and his collaborators, enlisting the help of two partner stars might explain the extreme outflow.

The researchers suggest that the most straightforward way to simultaneously explain a wide range of observed facts surrounding the eruption and the remnant star system seen today is with an interaction of three stars, including a dramatic event where two of the three stars merged into one monster star. If that's the case, then the present-day binary system must have started out as triple system, with one of those two stars being the one that swallowed its sibling.

"Understanding the dynamics and environment around the largest stars in our galaxy is one of the most difficult areas of astronomy," said Richard Green, Director of the Division of Astronomical Sciences at NSF, the major funding agency for Gemini. "Very massive stars live short lives compared to stars like our Sun, but nevertheless catching one in the act of a major evolutionary step is statistically unlikely. That's why a case like Eta Carinae is so critical, and why NSF supports this kind of research."

Chris Smith, Head of Mission at the AURA Observatory in Chile and also part of the research team adds a historical perspective. "I'm thrilled that we can see light echoes coming from an event that John Herschel observed in the middle of the 19th century from South Africa," he said. "Now, over 150 years later we can look back in time, thanks to these light echoes, and unveil the secrets of this supernova wannabe using the modern instrumentation on Gemini to analyze the light in ways Herschel couldn't have even imagined!"

Eta Carinae is an unstable type of star known as a Luminous Blue Variable (LBV), located about 7,500 light years from Earth in a young star forming nebula found in the southern constellation of Carinae. The star is one of the intrinsically brightest in our galaxy and shines some five million times brighter than our Sun with a mass about one hundred times greater. Stars like Eta Carinae have the greatest mass-loss rates prior to undergoing supernova explosions, but the amount of mass expelled in Eta Carinae's 19th century Great Eruption exceeds any others known.

Eta Carinae will probably undergo a true supernova explosion sometime within the next half-million years at most, but possibly much sooner. Some types of supernovae have been seen to experience eruptive blasts like that of Eta Carinae in only the few years or decades before their final explosion, so some astronomers speculate that Eta Carinae might blow sooner rather than later.

The Gemini Observations utilized the Gemini Multi-Object Spectrograph on the Gemini South telescope in Chile and used a powerful technique called Nod and Shuffle that enables greatly improved spectroscopic measurements of extremely faint sources by reducing the contaminating effects of the night sky. The new results are presented in two papers accepted for publication in the *Monthly Notices of the Royal Astronomical Society*.

Story Source:

[Materials](#) provided by [Association of Universities for Research in Astronomy \(AURA\)](#).

Minutes of the July Meeting

Ted Gruber called the meeting to order because Greg Smith had to leave early. Sue Piper would like a group picture for the Columbia River Reader. After the picture, Ted thanked Tom Meek for reserving our spot at Willow Grove, Becky Kent for the table cloths, and everyone for the food. He also thanked Mike Fiest for the Star Party that was held at his house last Friday night where everyone had great views of the Red Spot on Jupiter.

This Friday, with Saturday as a back up, we will have Sidewalk Astronomy at Starbucks on Ocean Beach Hwy (the north side of OB Hwy). Be there by 9 to get set up before dark.

Our next Star Party is Mt. St. Helen's! Mark has sign ups for anyone who is not signed up already. Check to make sure your information is correct. There is still room for anyone helping who needs a bed inside the facility. **The Star Party opens to the public at 3 pm Saturday August**

4th. There will be children's activities, guest speakers, solar viewing (weather permitting), model Solar System Walk, planetarium, dinner, and even Sky Viewing (weather permitting). Volunteers from our club and RCA will receive free dinner, so make sure you are signed up to help.

Solar view is available right now. Bill Norvell has 10x50 binoculars with solar filters. Anyone can take a peek. Mike Fiest has moon view binoculars available to look through also.

Ted Gruber gave the Sky Report. Venus and Jupiter still dominate the early evening sky. Saturn is also in the evening sky. Mars rises in the southeast about 9:30 pm. This is the brightest it has been since 2003 and won't be this bright again until 2035. The Perseid Meteor Shower is active from July 17 to August 24th, peaking the night of August 12/13. It is expected to produce a rate of up to 110 meteors per hour at its peak. It should be very good viewing since the moon won't be a factor. The Messier of the Month is M92. It is a globular cluster in Hercules. At magnitude 6.3, it is one of the brighter globular clusters visible. It contains about 250,000 stars and is about 26,000 light years away. Through binoculars it appears as a blurry star with a bright core. Small telescopes reveal individual stars near the edges. Large scopes reveal an oval shaped cluster surrounded by a halo of stars.

Mark Thorsen thanked Mike Fiest for showing the Red Spot of Jupiter during Friday's star party at his home. Mike was using his new 9 1/4" Schmidt Cassegrain telescope.

Ted talked about a great app from Sky & Telescope called Jupiter's Moon. Mike said another great app is called Sky Safari. Both apps have a lot of great features.

Meeting adjourned

Becky Kent, Secretary

FOG Viewing Schedule

AUGUST

18 RCA Star Party @ Stub Stewart Park,
Vernonia, OR
17>18 Sidewalk Astronomy @ Starbucks @
808 O B Hwy
26 FULL MOON

SEPTEMBER

3 Labor Day
7>8 Club Star Party @ Ted's
9 NEW MOON
19 7 pm Club Mtg. @ MMHS
21>22 Sidewalk Astronomy @ Starbucks @
808 O B Hwy
22 EQUINOX
24 FULL MOON

☞ August 2018 Meeting ☞

DATE:	Wednesday, August 15, 2018
TIME	7:00 pm
PLACE:	Canterbury Park Presidents Room
PROGRAM:	Astro DVD
SNACKS:	Carolyn Hail
DRINKS:	Ted Gruber

Friends of Galileo Club Officers

PRESIDENT	Greg Smith	636-1515
VICE-PRESIDENT/ PROGRAM CHAIR	Ted Gruber	1-702- 523-6263
SECRETARY	Becky Kent	578-0774
TREASURER	Steve Powell	636-3721
WEBSITE	Roy Gawlick	353-1233
NEWSLETTER ED.	Greg Smith	636-1515
ALCOR	Tom Meek	749-1016

Next Month's Newsletter Deadline

The deadline for items in next month's newsletter is:
Wednesday, September 12th.

Please feel free to send in your thoughts and experiences about your astronomical adventure.

Submit your material by E-mail to:
grlyth@msn.com – or regular mail to 1632 22nd Ave., Longview.

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