



# STARGAZER

*Rappahannock Astronomy Club*

|   |   |
|---|---|
| <b>September Program:</b>   |   |
| September 2001  |   |
| Next Meeting<br>September 12, 2001 @ 7:30                             |   |
| <b>Inside this Issue</b>  |   |
| <b>2</b>  | August Meeting Notes  |
| <b>3</b>  | Star Parties  |
| <b>4</b>  | Source of oldest, rarest meteorite found                    |
| <b>5</b>  | Observation List for September<br>Moon Phases for September |
| <b>6</b>  | Moon Theory Comes Full Circle                               |
| <b>7</b>  | World's Population Losing Sight of Dark Skies               |
| Rappahannock Astronomy Club<br>P.O. Box 868<br>Spotsylvania, VA 22553 |   |



Hi Everyone,

I want to let you know I will be setting up my 16 inch telescope at **Fundamentals** this **Friday at about 6:30 PM** to whenever to help raise money for our club. I will be selling raffle tickets for the scope, as well as trying to generate interest in our club. If any of you can join me, that would be great! We need to show Barbara Brock some support for her generous donation of the telescope.

I would like to try to get a telescope set up there each Friday-even if for only an hour-it will help immensely with fundraising and publicity. Please look at your schedules and see if there is a Friday you could volunteer some time to help. I will be there almost every Friday as well. This could be a lot of fun and very good for our club!

Myron Wasiuta, Vice-President

## August Meeting Notes

- Beginning in October, Spotsylvania County will begin charging \$25 per month for use of the community center where our meetings normally take place. As this represents nearly a third of our average annual budget, it was decided that beginning in October we will hold the meetings at the Fredericksburg City Library. The library requires us to vacate the room by 9:00pm, so it was also decided that we will move the meeting time up to 7:00pm. Another reminder of this change will be included in the October newsletter.
  
- Update on the telescope fund drive. We have a 4" reflector telescope that was donated by Fundamentals. We will be raffling the scope off later this year. Myron Wasiuta has contacted people at Zany Brainy and at Border's, and both of these places have agreed to let us come out and setup our scopes for an evening. We will have raffle tickets for sale at both events. The date for the Zany Brainy event is **Friday, Sept. 21<sup>st</sup>, from 5:00 – 9:00pm**. We have flyers available to hand out. **(Attached to Newsletter)** Contact Myron if you would like some flyers to hand out at your work, school, etc. Everyone who gets one of these flyers can bring it in on that evening and receive 10% off any purchase at the store. The 10% that Zany Brainy discounts will go to the club. This is a great opportunity for us to make some money to use towards building a better club telescope (and an observatory, once we secure a location for it.) If you can make it, please come out and help us with this event. Our success in raising money for the club depends on member participation. The date for the event at Border's will be announced at a later time.
  
- If anyone is interested in participating in a telescope making party, please contact Jeff Anderson at (540) 899-3912 (home), or (540) 372-9890. Jeff has all of the materials (except for the optics) and plans to build several 6" f/3.3 or f/4 reflecting telescopes. He also has information on vendors who will sell optics for the completed telescopes. This is an opportunity to get a decent telescope for a fraction of the cost of a commercial brand.

# Star Parties 2001

| Star Party    | Rain Date |
|---------------|-----------|
| Apr 21        | Apr 28    |
| May 19        | May 26    |
| Jun 16        | Jun 23    |
| Jul 14        | Jul 21    |
| Aug 11        | Aug 18    |
| <u>Sep 15</u> | Sep 22    |
| Oct 13        | Oct 20    |

Caledon Natural Area is located on Rt. 218 in King George, Virginia.

- Information phone number is 540-663-3861
  - Located along the Potomac River northwest of the Hwy 301 bridge, near King George, Virginia
  - Take I-95 exit 45, Rt. 3 east thru Fredericksburg, east on Rt. 218 for about 20 miles, Area on left Or Take 301 south from Maryland, cross the Potomac, right on Rt. 206, then right on Rt. 218 to Area
- Note: While a star party may not actually get "rained out", it may still be "clouded out". If conditions are cloudy on the evening of a star party, you can rest assured that it will be cancelled.

**STARGAZER** is the monthly newsletter of the Rappahannock Astronomy Club, a non-profit organization for amateur astronomers. Information can be obtained by writing:

Rappahannock Astronomy Club  
P.O. Box 868  
Spotsylvania, VA 22553

Society members build telescopes, observe the celestial heavens, contribute to scientific research, and provide opportunities for the public to do the same.

Visit our web site at:  
[www.kgva.com/rac](http://www.kgva.com/rac)

President: Mark Slade (540-972-0023)  
Vice-Pres: Myron Wasiuta (540-972-3290)  
Treasurer: Bill Steward (540-891-1777)  
Editor: Tina Rogers (540-775-0233)

*If you want the  
newsletter  
E-mailed to you,  
please let  
Tina Rogers know at  
[RogersTM@nswc.navy.mil](mailto:RogersTM@nswc.navy.mil)*

## Source of oldest, rarest meteorite found

August 24, 2001 Posted: 7:45 AM EDT (1145 GMT)

By Richard Stenger

CNN.com



**(CNN) -- A mysterious space rock that defies conventional classification contains material that predates the solar system, and likely came from the outer edge of the asteroid belt, scientists said Thursday.**

The alien boulder stunned onlookers last year when it streaked over Canada, exploded into a giant fireball and slammed into a frozen lake in the Yukon.

The landing site helped keep preserve the fragile remnants of the space rock, including frozen volatile gases that otherwise might have evaporated.

"This meteorite turned out to be the most primitive meteorite we know," said Brown University planetary geologist Takahiro Hiroi, lead author of a report in the August 24 edition of the journal *Science*.

The Tagish Lake meteorite resembles space rocks known as carbonaceous chondrites, but contains much more carbon and pre-solar grains, which predate the solar system.

"It contains more pre-solar grains than any other meteorites," Hiroi said.

Pre-solar grains, which predate the birth of the solar system 4.6 billion years ago, were produced in the fiery death of an ancient star. The explosion provided the raw materials for our sun and planets, according to scientists.

Most of the building blocks of our solar system vaporized and reformed, but pre-solar grains never melted.

The Tagish Lake rock fragments match nothing found on Earth. But Hiroi and colleagues at Brown and NASA analyzed their chemical fingerprint and determined that the meteorite came from a particular class of space boulders, the oldest known, in the asteroid belt between Mars and Jupiter.





Hiroi is hardly surprised that such meteorites have not been recovered before. Few of the D-type asteroids reside in areas where space rocks collide and produce fragments that might drift to Earth. And the rare D-type meteorites that reach our atmosphere likely burn up completely because they are so fragile.

"This particular meteorite was so big and had a soft landing on ice and snow. That may be why it survived," he said.

On January 18, 2000, the 250-ton Tagish Lake monster stunned British Columbia onlookers when it ignited into a giant fireball and produced the explosive equivalent of 5 to 10 tons of TNT, according to Purdue University researchers.

# Observation List for September 2001

| <u>September</u> |          |                       |         |        |          |      |                                     |
|------------------|----------|-----------------------|---------|--------|----------|------|-------------------------------------|
| #                | NGC#     | Cons Name/Description | R.A     | Decl   | Size     | Mag  | Comments                            |
| C44              | 7479 Peg | Spiral Galaxy         | 23 04.9 | +12 19 | 4'x3'    | 11.0 |                                     |
| C11              | 7635 Cas | Bright Nebula         | 23 20.7 | +61 12 | 15'x8'   | 7.0  |                                     |
| M52              | 7654 Cas | Open Cluster          | 23 24.2 | +61 35 | 13'      | 6.9  |                                     |
| C22              | 7662 And | Planetary Nebula      | 23 25.9 | +42 33 | 0.3/2.2  | 9.2  |                                     |
| C43              | 7814 Peg | Spiral Galaxy         | 00 03.3 | +16 09 | 6'x2'    | 10.5 |                                     |
| C2               | 40 Cep   | Planetary Nebula      | 00 13.0 | +72 32 | 0.6'     | 11.6 |                                     |
| C72              | 55 Scl   | Spiral Galaxy         | 00 14.9 | -39 11 | 32'x6'   | 8.2  |                                     |
| C106             | 104 Tuc  | Globular Cluster      | 00 24.1 | -72 05 | 31'      | 4.0  |                                     |
| C17              | 147 Cas  | Elliptical Galaxy     | 00 33.2 | +48 30 | 13'x9'   | 9.3  |                                     |
| C18              | 185 Cas  | Elliptical Galaxy     | 00 39.0 | +48 20 | 12'x9'   | 9.2  |                                     |
| M110             | 205 And  | Galaxy                | 00 40.4 | +41 41 | 17'      | 8.0  | Satellite of Andromeda Galaxy (m31) |
| M32              | 221 And  | Elliptical Galaxy     | 00 42.7 | +40 52 | 8'x6'    | 8.2  | Can see at 7x; 10x recommended      |
| M31              | 224 And  | Spiral Galaxy         | 00 42.7 | +41 16 | 160'x40' | 3.4  | Andromeda Galaxy                    |
| C1               | 188 Cep  | Open Cluster          | 00 44.4 | +85 20 | 14'      | 8.1  |                                     |
| C56              | 246 Cet  | Planetary Nebula      | 00 47.0 | -11 53 | 3.8      | 8.0  |                                     |
| C62              | 247 Cet  | Spiral Galaxy         | 00 47.1 | -20 46 | 20'x7'   | 8.9  |                                     |
| C65              | 253 Scl  | Spiral Galaxy         | 00 47.6 | -25 17 | 25'x7'   | 7.1  |                                     |
| C70              | 300 Scl  | Spiral Galaxy         | 00 54.9 | -37 41 | 20'x13'  | 8.7  |                                     |

| <b>Moon Phase Calendar for September 2001</b>                                       |                         |             |
|---|-------------------------|-------------|
| <u>Phase</u>  |                         | <u>Date</u> |
|  | Full Moon               | 2           |
|  | Last Quarter            | 10          |
|  | New Moon                | 17          |
|  | 1 <sup>st</sup> Quarter | 24          |

.....

## Moon Theory Comes Full Circle

*Researchers have solved some of the problems with the "large impact" theory of our moon's formation.*

*by Vanessa Thomas  
Astronomy.com*



**The moon's north pole**

*NASA / JPL*

The origin of Earth's moon has been one of the enduring mysteries of our solar system. First proposed in the mid-1970s, the "large impact" theory has become the favorite explanation during the past 15 years. Yet, computer-generated impact models have failed to adequately account for all of the characteristics of the Earth-moon system — until now. Researchers from the Southwest Research Institute (SWRI) and University of California at Santa Cruz (UCSC) have developed a high-resolution model that shows how an impactor could have slammed into a nearly developed Earth and produced its large but lightweight moon.

The main problem in solving the mystery behind the moon's formation has been its low density, which is far less than any of the terrestrial planets (Mercury, Venus, Earth, and Mars). This deficiency indicates that the moon lacks high-density iron, which constitutes 30 percent of Earth's mass.

Since the mid-1980s, scientists have tried to use computer models to find an impact scenario that could produce the Earth-moon system we know today. Two situations could produce our iron-deficient moon, but both explanations have problems.

In one scenario, the impact would have occurred when Earth had only about 60 percent of its current mass. This meant that our planet had to accrete the remaining 40 percent of its mass after the moon-forming collision. During this time, it is unlikely that Earth could have "bulked up" without the moon also acquiring a comparable amount of material (including iron).

The other situation called for the impactor to strike during the later stages of Earth's development. However, that impactor would have created an Earth-moon system with twice the angular momentum it has today. This would require a second significant impact to slow down the two whirling bodies.

The model we propose is the least restrictive impact scenario, since it involves only a single impact and requires little or no modification of the Earth-moon system after

the moon-forming event," says Robin Canup, SWRI scientist and lead author of an August 16 Nature article describing the new model.

The SWRI-UCSC simulation recreates an indirect collision between Earth and a Mars-sized object (with about 10 percent of Earth's mass) during the final stages of our planet's accumulation process. The result produces the correct arrangement, angular momentum, masses, and compositions for the Earth and moon.

Additionally, the new model uses the smaller, Mars-sized impactor that was originally proposed in the 1970s. Early computer simulations had found that a Mars-sized body couldn't blast enough iron-free material into orbit to form the moon, which forced future models to create a more incredible impact with an even larger impactor.

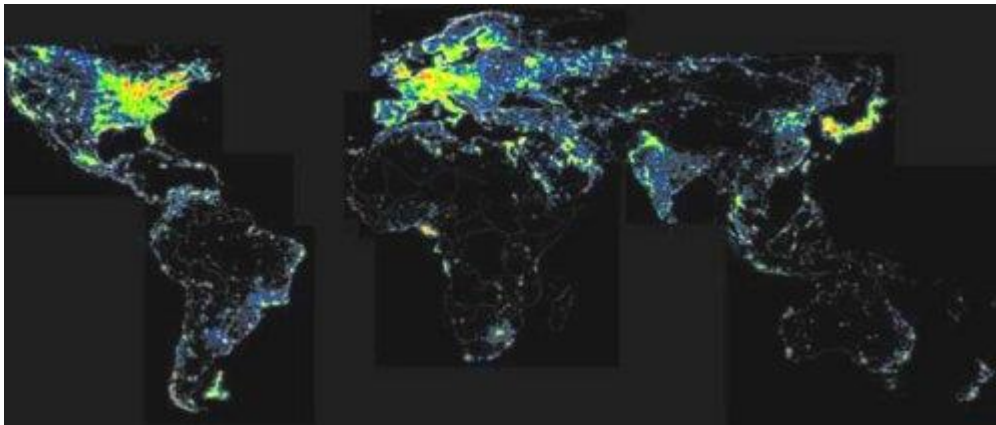
But as UCSC researcher and co-author, Erik Asphaug, points out, "Our model requires a smaller impactor than previous models, making it more statistically probable that Earth should have a moon as large as ours."

The key to the new model's success, says Canup, is its enhanced resolution. While the original models broke up the Earth-moon system into about 3,000 discrete particles during a simulation, the SWRI-UCSC model uses tens of thousands of particles, providing a resolution 10-20 times higher than the models of the mid-1980s. In the SWRI-UCSC model, "the best size for the impactor was the small, Mars-sized one proposed in the mid-70s," Canup said. "We've come full circle."

### World's Population Losing Sight of Dark Skies

*A new world atlas shows that light pollution is robbing most people of dark sky views at home.*

*by Vanessa Thomas  
Astronomy.com*



**A display of light pollution around the world.**

*P. Cinzano, F. Falchi (Univ. of Padova), C. D. Elvidge (NOAA National Geophysical Data Center)*

Thanks to light pollution, only one percent of citizens in the continental United States and European Union countries can enjoy truly dark skies from their backyards. Around the world, about two-thirds of the planet's inhabitants are in some way shielded from the night sky by artificial lights.

These are some of the findings of the first international assessment of artificial light pollution's effects on nighttime sky viewing. Although satellite images have documented the spread of light pollution across the globe during the past few decades, the "First World Atlas of Artificial Night Sky Brightness" is the only such map that offers a human perspective. It calculates the sky's brightness by comparing satellite images with such factors as where people live, regional topography, and how far light pollution spreads.

The atlas shows that many dark regions in satellite images actually have polluted skies due to the propagation of light pollution through the atmosphere.

Not only do most night skies suffer from light pollution, the skies above half the world's population — including 97% of U.S. and 96% of E.U. citizens — are always at least as bright as those of premier observing sites with a quarter moon. Many live under skies that are as bright as the best skies lit by a nearly full moon.

Additionally, one in five people around the world, two out of three in the U.S., and every other person in E.U. countries cannot see the Milky Way (unaided) from where they live. One-tenth of Earth's population, one-sixth of E.U. citizens, and two-fifths of U.S. residents have home skies that are too bright to fully adapt to night vision.

The atlas was constructed by Pierantonio Cinzano and Fabio Falchi of the University of Padua in Italy, along with U.S. scientist Chris Elvidge of the National Geophysical Data Center with support from Italy's Light Pollution Science and Technology Institute (ISTIL).

The team began with data acquired in 1996 and 1997 by the U.S. Air Force Defense Meteorological Satellite Program, which monitors Earth's atmospheric, oceanographic, and solar-terrestrial environments. They determined the spread of light pollution seen in satellite images by taking into account the atmospheric aerosol content and how effectively these aerosols scatter light. They also factored in the altitude of specific areas, light blockages by nearby mountains, Earth's curvature, the atmospheric extinction of starlight, and natural sky brightness to construct the light pollution map. Cinzano, Falchi, and Elvidge then compared their results to the U.S. Department of Energy's 2000 global population density database to get an idea of how polluted the skies of Earth-bound observers are.

"Large numbers of people in many countries have had their vision of the night sky severely degraded," Cinzano said. "And our atlas refers to the situation in 1996-97. It is undoubtedly worse today."

In a paper to be published by the Royal Astronomical Society's *Monthly Notices*, the researchers warn that increasing light pollution could affect more than astronomy. The destruction of night may have adverse effects for nocturnal animals and insects, and in turn, the biosphere. It could even hinder the advancement of society and culture. "The night sky, which constitutes the panorama of the surrounding universe, has always had a strong influence on human thought and culture, from philosophy to religion, from art to literature and science," they write.



WERE ON THE WEB!  
www.kgva.com/rac

P.O. Box 868  
Spotsylvania, VA 22553

**STARGAZER**



RAPPANNOCK  
ASTRONOMY CLUB



***RAC Meeting at the  
COSNER COMMUNITY CENTER  
Wednesday 12 September 2001 at 7:30 PM***

*From Old Town Fredericksburg, take Route 2 South, Tidewater Trail, to Hugh Cosner Drive. (You have already passed the airport and country club. Look for a sign for Cosner Park, right past Tidewater Market - Green Road sign says, HCC) Turn left onto Hugh Cosner Drive. The community center is at the end of the road, on the left.*