# Star Gazer News

**Newsletter of the Delmarva Stargazers**
www.delmarvastargazers.org

## From the Prez….

Three nights of clear sky! What more could any star party ask for? Throw in a comet, good food, great friends and some real nice door prizes and you have No Frills Delmarva Stargazers' style.

This November's meeting should be exceptional with Dr. Gianluca Masi from Italy of Virtual Telescope fame as our Skype speaker. This will be followed with Doug Norton presentation on Meteorites. If you were at No Frills you'll recall our Sahara Desert Stone Meteorite door prizes from David Holden of Sky Stones acquired by Chuck Jennings for us. Pj Riley performed an elemental analysis of said door prize meteorites. He found some surprises so don't miss the results.

In December we'll have a Skype update on the James Webb by Colleen Quinn-House. We have set for February 2011 from the Solar Dynamics Observatory and University of Delaware alumni Dr. Dean Pesnell. Our friend from NASA Hubble Telescope team Ed Reznac will be with us in person for March 2011.

I'm also actively working with Dr. Howard Gordon, a Fellow from the U.S. Department of Energy's Brookhaven National Laboratory. Dr. Gordon helped coordinate the design and construction of the ATLAS detector and still works on the ATLAS Experiment at the Large Hadron Collider. We'll get the opportunity to have a talk on this ground breaking particle physics machine in the near future by this distinguished scientist.

Sky and Telescope's Deep-Sky Wonders contributor Sue French is also trying to schedule a Skype talk with us in the spring of 2011. I always enjoy Sue's column and look forward to getting this talk set for us.

Don Surles has everything set for our Eleventh Mid-Atlantic Mirror Making Seminar March 11 through March 13, 2011, at the Mallard Lodge, Smyrna, DE. This is an event that really separates our club from others. If you've never made a telescope mirror here is your chance. I ask club members to remember these events don't just happen; they take hard work from dedicated people in our club. Please join in and help with the work required Friday morning to prepare the facility, build mirror stands and the mirror testing apparatus. Help is always needed during the event too to run it and the last day we tear down the facility, pack the trailer and return the Lodge to pristine shape.

Our Sky & Telescope CD collection has arrived. I've done a little research with them and it is very impressive. I'm looking for ideas of how we can incorporate the collection in our meetings. Any suggestions are welcome.

Don't forget our Holiday Party Saturday December 11th at 1 PM at the Christiana Care Meeting location in Smyrna Delaware. The club will provide the turkey and stuffing's, you are welcome to bring a covered dish or dessert but it is not required, the important thing is that you come and join the fun. All are welcome, membership is not required to celebrate the holiday season with us.

**Upcoming Events:**

| | | | |
|---|---|---|---|
| **Meeting !** | **Nov. 2nd** | **7 PM** | **SHWC** |
| **Observing !** | **Nov. 5,6th** | **Dusk** | **Eq. Cntr. or Blackbird** |

# Meteor, Meteoroid or Meteorite?

*Doug Norton*

Recently, I bought a meteorite as a birthday gift for my son as well as two more for myself. I had never owned a meteorite before and had only ever known one person who owned one. The most I knew about them prior to this was they were from space, rare and in museums. I learned more about meteors, meteoroids and meteorites in the last two weeks than I had ever known in all my years of interest in astronomy. I have found them to be extremely fascinating. Here is a brief summary of what I have learned.

The suffix "oid" is used for all rocky bodies of subplanetary size and mass in an independent orbit in space. For example, an asteroid is a body of subplanetary size. A meteoroid is a body smaller than an asteroid. It is probably a chip off a "parent" body like an asteroid or a comet. The luminous phenomena occurring when a meteoroid enters Earth's atmosphere is called a meteor. If the body survives passage through the atmosphere and lands on Earth, it is called a meteorite.

To reach Earth intact, all meteoroids must survive passage through Earth's dense atmosphere. The atmosphere provides an effective shield against most incoming meteoroids. With this protective shield in place, they stand little chance of reaching Earth's surface without considerable damage. Particles that are smaller than two or three millimeters in diameter normally don't survive intact. They are totally consumed by frictional heating in the atmosphere. Larger bodies can survive their passage, though reduced in mass and size. About 40,000 tons of meteoritic debris reaches the Earth worldwide every year. Among them are the meteorites we see preserved in museums and in private collections.

**Fireballs**

The most spectacular meteors are called fireballs or bolides. They are produced by relatively large meteoroids ranging from walnut sized to several feet across. A fireball is any meteor that has attained an apparent magnitude of -5 or brighter with no real upper limit. The brightest fireballs often have magnitudes exceeding the brightness of the full moon (-12.5). These chunks of rock are often large enough to survive atmospheric passage.

A large meteoroid hitting the top of the atmosphere at a typical entry velocity of 25 miles per second has enormous momentum. The atmosphere reduces the meteor's momentum by creating a drag on it, and, at the same time, slows its velocity. Further reduction of its momentum occurs when the meteor is instantaneously heated to the point of melting, causing it to lose mass by ablation.

Over the last two decades there have been numerous stony meteorites that have passed through rooftops and landed on city streets where they were picked up immediately after landing. Never has there been a report of a meteorite too hot to handle. The reason is simple. At an average altitude of 50,000 ft, the temperature is about -50 °F. The meteorite's cosmic speed has been reduced to zero. Now it is subject to the laws of gravity which maintains its fall at a few hundred miles per hour, too slow to produce heating. Long before hitting the ground the meteorite's surface temperature has been reduced to between lukewarm and stone cold. The meteorite may even be coated with

*(See Meteorites on page 6)*

**How to Join the Delmarva Stargazers:** Anyone with an interest in any aspect of astronomy is welcome

NAME_____

ADDRESS_____

CITY, STATE & ZIP_____

E-MAIL ADDRESS (If any)_____

Do you need the newsletter snail mailed to you (Y/N)?_____

Please attach a check for $15 made payable to Delmarva Stargazers and mail to Kathy Sheldon, 20985 Fleatown Rd, Lincoln, DE 19960. Call club President Tim Milligan at 410-841-9853 for more information.

# Avoiding Amateur Astronomy Disasters

*Tom Koonce*

The weather is turning cold and all of us want to maximize our observing time and minimize how long we're exposed to the bitter cold. In circumstances like this, we amateur astronomers tend to get in a hurry, or perhaps not think things through before doing something… and disaster can strike. Disasters come in many forms, among them, dropping an eyepiece to the ground because it wasn't held securely. Hearing the thud/crunch/tinkle sound is sickening, even for those observers around you. Having your secondary mirror come loose and drop onto your primary mirror is pretty bad, but what about dropping an expensive precision filter into the dirt? And then there are the truly dangerous mistakes such as not making sure a stepstool or ladder is on firm ground or loading your dobsonian telescope lengthwise into the car with the secondary at the front and the primary at the back of the car. I'll explain each of these and how to reduce the risk of these happening to you.

The cold affects each of us to a differing extent. I'm assuming you already know to dress for weather 20 degrees cooler than weather reports predict. After all, you're going to be standing still in freezing weather, not chopping a cord of wood. I also assume that you know to remain hydrated since this can affect your thought processes and reaction times. Some people get cold just thinking about going out at night, some must have a furnace built inside of them because they seem to remain warm with little notice of the thermometer. Most of us are in between these extremes. Fingers and toes get cold first, and then grasping objects becomes difficult, thought processes slow down, and our logic becomes blurry. The trick is to recognize how **you** respond and take steps to counteract it before you damage equipment.

Disaster: Dropping eyepieces. Think ahead about which eyepieces you will need for the next hour. Keep a fanny pack on over your jacket that makes storing and switching eyepieces convenient and minimizes how long your fingers have to grasp them. Stick your hands inside of your jacket and under your armpits for a couple of minutes before you do the eyepiece switch. Another trick is to place a packing quilt or old rug under your entire telescope setup so that if something is dropped even after taking precautions it might survive the plunge.

Disaster: Secondary Mirror Drop. Always check your equipment. Before you start your evening's observing, do a "walk-around" of your telescope. Are there any frayed wires? Are there any loose bolts? If you have a Newtonian, is the secondary secured to its mount? Have you placed a small safety wire between the spider and the secondary… just in case? This is a disaster that can be avoided. I have seen/heard this happen to my buddies 6 week-old 14" dob at a public outreach event. It destroyed his primary mirror. During your walk-around, be conscious of any tools that you need to setup your telescope. Wrenches and screwdrivers can be devastating when applied to any optical surface. Tools tend to slip when brains and fingers are cold. Consider drilling a hole through the handle and affixing a cord loop to each tool to wrap around your wrist to eliminate the possibility of despair.

*A filter slide provides safe and easy access to your filters. Photo used with permission. www.Astrocrumb.com*

Disaster: Filter Drop. Think ahead about the dexterity you're going to need to take the small filter out of its case and screw it onto the eyepiece. It's possible that filters can be only partially screwed onto the eyepiece and may drop off onto the primary mirror during observing. In my dobsonian, I

*(See Disasters on page 5)*

## Your 2010-2011 Officers

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|---|---|---|---|
| President | Jerry Truitt | 410-885-3327 | Truittjs@Atlantic.bb.net |
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| Secretary | Michael Lecuyer | 302-284-3734 | mjl@terpacis.org |
| Treasurer | Kathy Sheldon | 302-422-4695 | memomsheldon@comcast.net |
| Past President | Don Surles | 302-653-9445 | don.surles@verizon.net |

# No-Frills Wrap-up
## Bill Hanagan

This is a photo of Comet 103P/Hartley as it appeared just below the double cluster in Perseus on Friday night. The only processing was cropping the original and adjusting the brightness and contrast. The photo was obtained with a Canon 50D DSLR equipped with a Canon 100 mm f/2 lens and mounted on an old CG-5 equatorial mount. This was a 2 minute exposure at f/3.2 using an ISO of 800. The green color of the comet is real and caused by CN and C2 molecules in the gas expelled by the comet.

DAS and DSG members Greg Lee (foreground) and Bill McKibben (mid-scene) are seen here observing on 10/8/2010. Jupiter is the bright object visible near the center and just below the "Circlet".

This is a photo of the Pleiades made early on the morning of October 9 with the equipment described earlier, with the following exceptions: a Canon 70-200 f/4 L IS zoom lens was used at 200 mm and f/4 (unstabilized) with an ISO of 2500.

This photo shows DAS and DSG member Bill McKibben (in the upper harness) approaching the landing strip near Tuckahoe in a tandem hang glider. In addition to solar observing at the star party, there are several other daytime activities at Tuckahoe State Park, including archery, canoeing, and hiking. There is also a nearby airfield that offers demonstrations and instruction in hang gliding and sky diving.

This photo shows part of the DAS contingent taking a break along with Delmarva Stargazer Don Surles. (L to R: Bill Hanagan, Lindsay Karzon, Rob Lancaster, Bill McKibben, Greg Lee, and Don Surles). Many of the DAS members in attendance at the No Frills are also members of the DSG.

(Disasters from page 3)
can vouch for the fact that a two inch O-III makes a heart-stopping sound when it bounces off of the primary mirror. Not good. To remedy this situation, take the time to make sure that your fingers are warmed up and the filters are fully screwed on. Alternatively, consider installing a filter slide on newtonian or dobsonian telescopes. I have made this modification on my dob and it makes using filters simple, convenient and safe. If you have this type of telescope, check out http://www.astrocrumb.com/ for the best filter slides I've found.

Disaster: Stepstool and Ladder Tilt. Anyone who is showing the night sky to the general public or ho has a larger dobsonian knows the pitfalls of using stepstools or ladders. They need to be sturdy and lightweight, but rarely are they made to be placed upon bare earth. Sometimes ground can be frozen hard on the surface, but mushy just an inch or two below. Take the time to be sure of the placement of their feet to avoid a fall in the darkness. Test the stepstool with your full weight with someone standing in the safety position to catch you before trusting it to anyone else.

Disaster: Mirror Missile. Avoid this disaster by loading your newtonian / dobsonian telescope correctly into the back of your SUV. Think of what might happen during an emergency stop or front crash. If the tube is loaded so that the primary mirror and mirror cell are forward and the secondary mirror closest to the rear of the vehicle, an emergency stop will just press the primary mirror more securely into the mirror cell. However, if the secondary mirror is forward and the primary mirror is closest to the back of the vehicle, such a stop will likely rip the mirror from the three small protrusions that keep it centered on the mirror cell, sending it crashing forward, through the secondary mirror and likely into the back of the head of a person sitting in the front seat. Having your life saved in a crash by an airbag only to have your telescope's mirror kill you in a shower of glass shards milliseconds later is a serious disaster easily avoided. OK… Take a deep breath… there is only a miniscule chance that any of these disasters will happen to you, and they are even less likely to happen if you take a few simple precautions involving just a bit of forethought and cost. Stay warm and keep safe out there.

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I'd like to draw your attention to the Astronomy Outreach Foundation which is trying to combat the "Graying" of our hobby by attracting Generations X and Y into the fun of amateur astronomy. This is a non-profit foundation started by a combination of amateur astronomical industry leaders "to stimulate greater public interest in astronomy and to assist everyone in becoming more engaged in activities that allow them to learn more about the universe." For more information, please visit http://www.astronomyoutreachfoundation.org

## No Frills Wrap up

The October 2010 NO FRILLS Starparty was fantastic! Great Weather, Perfect Skies and, as always, Great Companionship.

Friday after feasting on the fish and hush puppies Bill, Maggi and I attended the raffle. We won the last meteorite. Then low and behold, the final prize the TMB 100 16mm eyepiece ticket was pulled. Quoting Don Surles "Well Folks you'll never believe this" and Bill won the eyepiece.

I was so glad I put Bill's name on the tickets so that if anyone wanted to throw their meteorites at someone it would be him.

The eyepiece is beautiful. Joe Cain was given the honor of looking through it with our 10" Meade first and then I looked at Jupiter and M13. They were outstanding.

Next year we will hold our own raffle for people to carry Maggi up for the drawing as she seems to be the lucky charm.

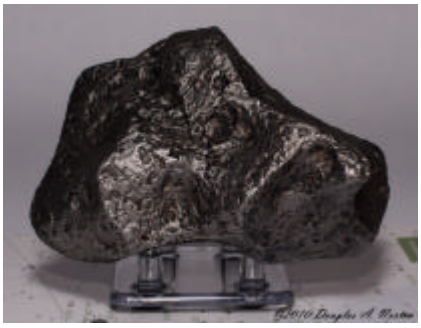
Thank you to all for a great time. **The Ellis Family**

P.S. Bill planted the meteorite rock to see if it would grow bigger!

**Magazine Subscriptions**

(Meteorites from page 2)
a thin layer of ice. In fact, some meteorites have been found minutes after landing, resting on top of a snow bank—without melting the snow.

The fall of the Sikhote-Alin meteorite is a classic example of a witnessed fall of a large iron meteorite. On the morning of February 12, 1947, an enormous fireball appeared over the Sikhote-Alin Mountains in eastern Siberia leaving a train of vaporized and recondensed material estimated to weigh over 200 tons, the most massive ever witnessed. The Russian artist, P.I. Medvedev, had just set up his easel pointing eastward over the Sikhote-Alin Mountains. At 10:38 a.m. the fireball appeared, traveling from north to south heading toward the mountains. Medvedev, an eye-witness to the spectacular event, managed to sketch the fireball and long train immediately. Thousands of beautifully sculpted iron meteorites pelted the ground, making over 100 impact craters and penetration holes, the largest being 87 ft across and nearly 20-ft deep from rim to floor. The remaining material that reached the ground was estimated to be about 70 tons. After more than 50 years of searching, over 25 tons of meteoritic material has been found at the impact site. Today, Sikhote-Alin meteorites are highly prized in public and private collections throughout the world.



**Fall or Find?**

A meteorite that is found without being witnessed by an observer is called a find. A meteorite that is found after being witnessed by an observer is called a fall. There are approximately 1,086 witnessed falls having specimens in the world's collections. In contrast, there are over 38,660 well-documented meteorite finds.

The Strewn Field

When a large meteoroid enters Earth’s atmosphere it very quickly breaks into pieces as a result of abrupt changes in atmospheric pressure, especially if it has been fractured in the past. When meteoroids fall together we call it a multiple fall. The vast majority of stony meteorite falls are multiple. Once the main mass has fragmented, the pieces continue to travel more or less together during the remainder of their flight. They don’t fall randomly but instead their fall is determined by their remaining kinetic energy. The more massive pieces are carried further by their greater momentum. When they finally reach the ground the meteorites distribute themselves across a strewn field, usually covering an elliptical area.

The Fusion Crust

All meteorites that successfully pass through the atmosphere have one feature not seen in any terrestrial rock—the fusion crust. A fresh stony meteorite that has not fragmented during its atmospheric passage usually is completely covered by a dark brown to black crust. These meteorites have suffered temperatures of more than 1800° C and their external morphology has gone through extraordinary changes in the process. The most definitive test used by field workers to authenticate a possible new find is to verify the presence of a fusion crust in one of its many forms.

Iron meteorites also form fusion crusts but they are substantially thinner than the average stony crust, being only a fraction of a millimeter thick. A fresh crust appears blue-black in color and looks like freshly welded steel. Silicate minerals are not involved in crust-forming in irons. Iron crusts are composed almost entirely of iron oxide. Of all the fusion crusts, iron crusts are by far the most fragile. They are much more subject to chemical weathering (rusting) which can easily destroy the thin veneer.

**Shapes and Features**

Meteorites have definite shapes. They are the product of the ablative process and fragmentation. One product of ablation that occurs during a meteoroid’s brief atmospheric passage is the development of surface pits or regmaglypts, or “thumb prints”, on stones and irons alike. Regmaglypts in stones tend to be shallower than in irons, and therefore not as well defined. If an iron meteoroid breaks up explosively, the meteorites may be distorted and may resemble bomb fragments. For this reason they are referred to as shrapnel.

(More Meteorites on page 7)

(More Meteorites from page 6)

When the meteoroid is incandescent during its brief passage through the atmosphere it is melting and rapidly losing mass. Sometimes this results in meteorites that display distinctive flow features. Often fine lines are seen radiating from the leading edge of the meteorite, reflecting its flight orientation in radial flow lines.

**Meteorite Types**

Meteorites can be divided into three very general categories. Stones, irons, and stony-irons. Modern classification of meteorites is complex.

Most meteorites are stony meteorites, classed as chondrites and achondrites. About 86% of the meteorites that fall on Earth are chondrites which are named for the small, round particles they contain. These particles, or chondrules, are composed mostly of silicate minerals that appear to have been melted while they were free-floating objects in space. Certain types of chondrites also contain small amounts of organic matter, including amino acids, and presolar grains. Chondrites are typically about 4.55 billion years old and are thought to represent material from the asteroid belt that never formed into large bodies. Like comets, chondritic asteroids are some of the oldest and most primitive materials in the solar system.


About 8% of the meteorites that fall on Earth are achondrites (meaning they do not contain chondrules). Most achondrites are also ancient rocks, and are thought to represent crustal material of asteroids. Two small groups of achondrites are special, as they are younger and do not appear to come from the asteroid belt. One of these groups comes from the Moon, and includes rocks similar to those brought back to Earth by Apollo and Luna programs. The other group is almost certainly from Mars and are the only materials from other planets ever recovered by man.

About 5% of meteorites that fall on Earth are iron meteorites with intergrowths of iron-nickel alloys. Most iron meteorites are thought to come from the core of a number of asteroids that were once molten. Due to the low abundance of irons in collection areas such as Antarctica, where most of the meteoric material that has fallen can be recovered, it is possible that the actual percentage of iron-meteorite falls is lower than 5%. Irons are heavier than any terrestrial rock of the same size and they are strongly attracted to a magnet.

Stony-iron meteorites constitute the remaining 1%. They are a mixture of iron-nickel metal and silicate minerals. Placing a magnet against a stony meteorite we find it too has an attraction, though not as much as the irons. Cutting the stone to expose its interior reveals tiny silver-colored flakes of metal. This is called elemental iron, meaning iron in its most reduced chemical state. Elemental iron is almost never found in terrestrial crustal rocks because iron rusts.

**My Meteorites**

The six meteorites I now own are from different places around the planet. The first is from a find in Campo del Cielo, Argentina. It is a 6 pound 4 ounce iron meteorite first discovered in 1576. The time of the fall was between 4,000 and 6,000 years ago. It is composed of 94% iron and 6% nickel. The second iron meteorite I have is a Sikhote-Alin meteorite from the fall in 1947 in Russia. Its weight is 53 grams and has many regmaglypts on its surface. The third meteorite is a stony meteorite, Al Haggounia 001 from Northwest Africa in the Sahara Desert. It weighs 1 ¾ pounds. I have several smaller meteorites; one is a 10 gram stone from Northwest Africa 869. Another is a stony-iron pallasite from Northwest Africa 4482 weighing .98 grams. It has been quite a lot of fun learning about these “rocks” from space. Knowing that these have been floating around the solar system for millions of years and finally landing on Earth for us to study is really something to get your imagination fired up.

# Astrophotos

by Members and Friends


Orion Nebula

Took this with my Canon 40D and 100-400mm lens piggybacked on my C8. ISO 1600 and a 30-second exposure.

Doug Norton

This is a picture of the Crab Nebula that I took very early in the morning of Oct. 10th while at the Spruce Knob Observatory during my last trip there during the new moon. The telescope used was my homemade 16" Newtonian and the camera used was a SBIG ST-10XME. It is a LRGB combination totaling 3.75 hrs of exposure. The twenty seven RGB shots were 5 min each and the nine Luminance shots were 10 min each.

The Crab Nebula (also M 1) is a supernova remnant from an explosion in 1054 AD that was recorded by early astronomers. A pulsar was discovered in the middle of the Nebua in 1968 by radio astronomers using the Greenbank Radio Telescope not far down the road from Spruce Knob.

Joe Morris

A pic by Don Surles of the Double Cluster and the comet using his new T2i