

The **ASTERISM**

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A New Dawn

by Joe Arcaro

In my recent letter to club members I welcomed all to a new year of astronomical information, education, and community service. I repeat that welcome here. And again, I would like to thank Mr. Vincent Henderson, AAI's president for the past three years, and his Executive Committee, for all the good work they have done in keeping AAI one of the pre-eminent astronomy clubs in the nation.

As I explained in my letter, I am setting a direction for AAI which I believe continues where Vince has left off. The goals I have set down are important and are repeated here.

First, we want to *ensure AAI's continued access to Sperry Observatory and the College*. It has been almost 40 years that we have been "plying our trade" at Sperry Observatory for the good of the community and the College. While Dr. Brown, President of Union County College, has assured me that the College wants us to continue our efforts at the observatory, we will try to insure that our work here is worthy of that assurance.

In doing that we will continue to *enhance our relationship with the College*, our second goal. We will work to show that we are not a burden on them. We will work with them to provide help and guidance to their students where possible. We will also continue to provide a positive face to the public who possibly see us as representatives for the College.

As you also know by now, our third goal, *expanding awareness of Sperry Observatory and appreciation of*

AAI by the local communities, has really taken off this summer. It started on June 11 with a major article in the Newark Star-Ledger. It continued with an interview on TV36 (Westfield "07090"). Those of you who receive *Astronomy Magazine* saw us featured in the September 2007 issue in an article titled, "Visit your friendly neighborhood observatory". And, thanks to Kathy Vaccari, even more people heard about us at a Public Astronomy Viewing in Maplewood this August.

Of course, I hope to continue this direction but we cannot do it without you. Which is why our fourth goal is *to increase AAI's active membership rolls*.

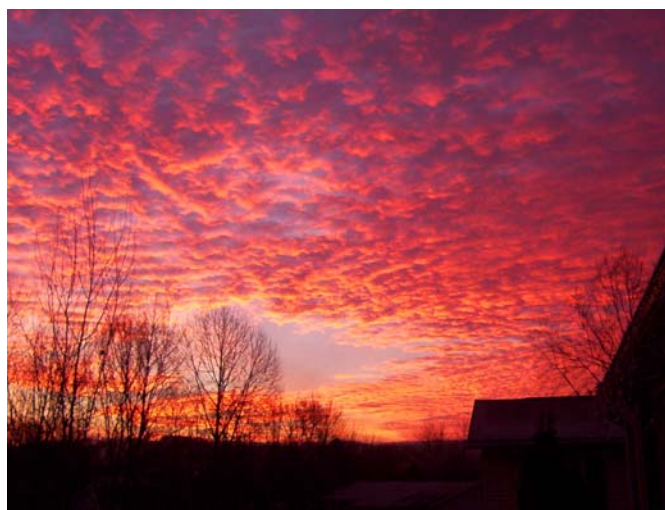
Every club seems to have a core of people who do all the work. How about stopping by and helping them out?

We have a number of projects of a technical nature that could use your expertise. We could always use help with promoting the club to the public, or maybe you want to take the Qualified Observers course. Observers are always needed. If you are a new member and are not sure what you can do or where you can help we will team you up

with an "old warrior" who can show you around.

If you can't help at this time, at least stop by and listen to the fine array of speakers we have put together for our General Meeting program. Click on "Public Talks" at www.asterism.org.

I look forward to seeing you, or let me know your thoughts by writing to me at president@asterism.org.



The Sun rises on a new season at AAI. (credit Nethawk cbl.net/weblog/archive/index/0,12,2006)

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Many AAI members know that I try to promote amateur astronomy at every reasonable opportunity. Most of my efforts do not meet with much success (such as with the production staff of a certain TV game show). Sometimes, it works, though it may take time. A recent case was with the East Brunswick Environmental Commission. I had gotten involved with the organization as a result of a contest. While I corresponded with the leaders of the group, I also brought to their attention the existence of AAI. Eventually, they posted the link on their site and I thought that was it. Then I read that they had a Perseid watching session at a local field. Evidently I did have some influence.

This prompts me to devote this month's column to meteors. I already dealt with asteroid and comet impacts and meteorites, so why not deal with the smallest of cosmic impacts?

Ancient Daze

While meteors were seen as soon as human beings evolved enough to have an awareness of things in the sky, ancient civilizations had little to say on the subject, probably due to the fleeting nature of meteors and that they were less attention-grabbing than other phenomena such as eclipses, comets, etc. As a result, only exceptional meteor showers wound up in the old chronicles. Probably the earliest record referring to meteors is a Chinese report of the Lyrid meteor shower in 687 BC when the Lyrids were more active than they are today.

Other ancient reports, mostly from the court astrologers of China and Korea, pop up occasionally until the 1500s. These mostly concerned displays of the Perseids, though other meteor showers such as the Lyncids and Leonids were represented. Outside of the Orient, there were Arab accounts of a Leonid display in 902. In Europe, a spectacular meteor shower seen in 1095 in Clermont, France, was interpreted as a call for a crusade against the Muslims. Aside from that example, Christian Europe held the Aristotelian view that meteors were merely atmospheric phenomena, a kind of weather, with no connection to space at all. For once, Aristotle was partly correct. The atmosphere does play a role, though not the way Aristotle thought it did.

A Little Night Trigonometry

As astronomy advanced, following the work of Kepler, Galileo, and Newton, the Aristotelian view of meteors was slowly rendered obsolete.

In 1686, Sir Edmund Halley witnessed a fireball and began to suspect that meteors came from space. Despite Halley's impressive credentials, the idea was slow to catch on.

But definitive proof would come more than a century later. Ernst Chladni wrote in 1794 that a way to measure the altitude of meteors was to observe them from two separate locations and use triangulation. Four years later, two German university students, Johann Benzenberg and Heinrich Wilhelm Brandes, tried it, and found that meteors did indeed come from space and traveled at very high speeds. Even in modern times, meteor triangulation is still done and has even determined orbits of meteors. Years ago, AAI tried meteor triangulation, though with limited success.

Shower Power

The next development took place in Venezuela in 1799. Alexander von Humboldt was on an expedition and on the night of November 12th, he noticed a very large number of meteors. This was a Leonid meteor storm. Humboldt wrote of his experience, but it was largely ignored. However, there was another Leonid storm in 1833, which was not ignored. This intense (thousands an hour) display was seen in North America and it made a big impression. It was depicted in Native American art and it even inspired music (the song "Stars Fell on Alabama"). One notable discovery from this event was that the meteors seemed to be coming from one part of the sky, a point known as the radiant. But this turned out to be an illusion caused by perspective, much the same way as the parallel rails of a railroad track converge in the distance.

The Source

In the years following the Leonid display of 1833, astronomers took serious notice of meteors. Denison Olmsted correctly concluded that meteor showers were the result of swarms of small particles hitting the Earth's atmosphere. But where did the particles come from? Edward Herrick, in 1838, wrote that debris from comets might be responsible for meteors. This was given support by Giovanni Schiaparelli when, in 1867, he showed that the Perseids were the debris from the tail of Comet Swift-Tuttle. More proof soon came.

In 1846, Biela's comet, a short period (six years) comet was observed to have split in two. The 1852 return had the two nuclei further separated. Due to unfavorable conditions, the 1859 return was missed and the comet was not seen in 1865.

Astronomers in Europe had deduced that debris from Biela's Comet could have been responsible for the Andromedid meteor storms seen in 1798 and 1838. One of them, Edmond Weiss, predicted that there would be increased Andromedid activity in 1872. While the comet failed to appear, the meteor storm did. This, along with a storm in 1885, confirmed

the idea that the Andromedids were the debris (and the remains) of Biela's comet.

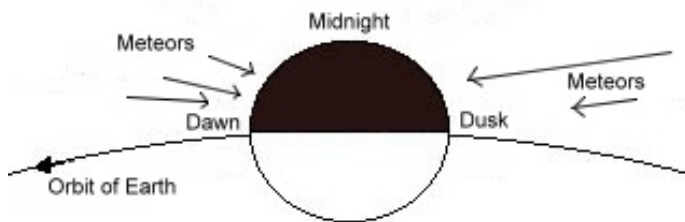
Today, we know that meteor showers (and most sporadic or non-shower meteors) come from dust particles left by comets with one possible exception. For years, the source of the Geminid meteors was a mystery. It turns out that the source for this shower is an asteroid, 3200 Phaeton. But, this may not be an exception, as it is possible that Phaeton is simply the dead, crusted-over nucleus of a comet.

This meteor-comet connection has allowed great improvements in meteor predictions as our knowledge of comet orbits has increased. Peter Jeniskens is a pioneer in this field and his computer models have predicted the performance, at least to some extent, of the recent Leonid storms as well as the 2007 Aurigid display.

Meteors and You

Meteor observation is best done without optical aid, since the larger the field of view, the better.

Naturally, meteors are best seen under dark skies. Also, it is almost always better to look for meteors after midnight. The reason is best explained in this diagram I created below.



Why Meteors are more frequent after midnight

When one looks in the night sky between sunset and before midnight, it is like looking out the rear window of a car driving through a rainstorm. Not too many drops catch up with the moving car. After midnight and especially just before dawn, it is more like looking through the windshield as the Earth catches up with meteor particles.

Another tip is that the ZHR (Zenithal Hour Rate) of a meteor shower is misleading. This is an idealized value for how many meteors one could see if the radiant was at the zenith in a perfectly dark sky with no

obstructions. Your rates will be much lower. In my experience, the only time I saw a normal meteor shower perform (not a meteor storm like the 2001 Leonids) even close to its ZHR was a display of the Perseids I witnessed in Utah in the hour or so before astronomical dawn when I saw 70 meteors.

Beating the Weather

Of all areas of amateur astronomy, meteor observing is about the only one that allows amateurs a way to overcome cloudy skies. This is because of what happens when we see a meteor. When a meteor strikes the Earth's atmosphere, it is going at a high rate of speed, so fast that it heats and ionizes the gases in its immediate vicinity. It is this trail of heated and ionized gas that we see when we see a meteor, as the particle itself is usually no larger than a grain of rice. It turns out that ionized gas is also a good reflector of radio signals and radar. In fact, there are some meteor showers that peak in daylight and can only be observed via radar. However, amateurs can do likewise without the need for radar. All that is needed is an FM radio. The radio has to be tuned to a frequency where there are no local stations and there is nothing to be heard. When a meteor streaks by, the ionized trail might reflect the signal of a distant station, allowing it to be briefly heard. This technique works with ham radio and even with TVs (on the low end of the broadcast VHF band - not with cable or satellite nor HD). Spaceweather.com offers some tips for observing meteors via radio at:

<http://www.spaceweather.com/glossary/meteorcounts.html>

Now, you can even detect meteors on the web, as there are several websites that continually monitor meteors via radio and radar, such as G7IZU Radio Reflection Detection Page at <http://www.tvcomm.co.uk/radio/live.html> and the Radio Meteor Observatory On Line at <http://radio.data.free.fr/main.php3>.

Change of Pace

So, if you are looking for something to do astronomically that doesn't require lots of equipment, give meteor observing a try when the next shower comes around.

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Let's Keep In Touch

Are you sure we have your correct U.S. Mail address, your email address and your phone number? If you have any doubt about it, please send a note to membership@asterism.org and we promise to keep you in the loop. Another great way to keep informed is to join the free Yahoo discussion groups created exclusively for AAI members. If you want in, send a note to ray@asterism.org. Be sure to include your full name.

GENERAL MEETING SEPTEMBER 21, 2007



Jim Burnell is perhaps best known as the co-author (with Richard Berry) of *The Handbook of Astronomical Image Processing* (now in its second edition)—which includes the AIP4Win image processing software that is used by amateur and professional astro-imagers alike. His presentation will address issues of color rendering in CCD imaging. Burnell has been interested in astronomy since he was a kid. Professionally, he has worked eighteen years in research and development at Bell Labs and presently develops photonic hardware for Fujitsu.

(MAIN LECTURE HALL)

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“Seeing the Light: The Nature of Astronomical Color and The Use of Filters in CCD Imaging” – Jim Burnell

MEMBERSHIP DUES

Regular Membership: \$21
Sustaining Membership: \$31
Sponsoring Membership: \$46
Family Membership: \$5
First Time Application Fee: \$3

Sky & Telescope: \$32.95
Astronomy 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 Membership Chair or Treasurer, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111

DR. LEW’S SEMINARS

See Dr. Lew Thomas for possible upcoming seminar topics.

(Choice of topic at Dr. Lew’s seminars is determined by participants’ interest)

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Executive Committee plus Trustees

All schedules above were accurate at time of publication. Please check www.asterism.org for latest information (click on “Club Activities”)

DOME DUTY SCHEDULE

September 21	Team C
September 28	Team D
October 5	Team E
October 12	Team A
October 19	Team B

FRIDAYS AT SPERRY

September 28, 2007

Sundials: A Journey Through Space and Shape Bonnie Witzgall

October 5, 2007

Sputnik 1 - the 50th Anniversary Al Witzgall

October 12, 2007

What’s Up: A Down-to-Earth Sky Guide Kathleen Quinn Vaccari

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Astronomy Picture Of the Day September 17, 2007

NASA's Opportunity rover is now inside Victoria Crater on Mars. Last week the robot rolled about 20 meters into the largest crater any Martian rover has yet encountered, the crater next to which Opportunity has been perched for months. Currently, the rolling explorer is situated in Duck Bay alcove, peering across at the internal crater wall dubbed Cape St. Vincent. The above wide-angle view is from Opportunity's front hazard-identification camera. Over the next few weeks, Opportunity is scheduled to explore this telling alien indentation, searching for clues to the ancient past of Mars before the huge impact that created Victoria Crater ever took place.



Inside Victoria Crater on Mars

Credit: Mars Exploration Rover Mission, Cornell, JPL, NASA

Please contact me for further information or public outreach presentations. My upcoming talks include:

Rittenhouse Astronomical Society venue is at the Franklin Institute Museum, Philadelphia, PA, Oct 10 at 8 PM. *“Launching DAWN (and Phoenix) : From Behind the Scenes at Kennedy Space Center Press Site”*

Website: <http://www.rittenhouseastronomicalsociety.org>

Stella Della Valley Star Party, Bucks-Mont Astronomical Society, Ottsville PA, Sat, Oct 13, 3 PM. *“Exploring Mars, the Search for Life and a Journey in 3-D”*. Website: <http://www.bma2.org/Sdv.html>

Amateur Astronomers, Inc. (AAI) at Union County College: Cranford, NJ, Fri, Oct 19, 8 PM. *“Mars, Saturn, Comets and Beyond (in 3-D)”*

Dorothea House: Princeton, NJ, Sun, Dec 2, 5 PM. *“Italian Contributions to Space Exploration”*. Website: <http://www.dorotheashouse.org/>

Dr. Ken Kremer

NASA JPL Solar System Ambassador

Email: kremerken@yahoo.com

Theater In The Sky

by Ron Ruemmler

October 2007 saves most of its wonders for early risers, but don't despair. Thanks to Daylight Saving time, the sky is still dark at 6 AM. One of the best sights of the year falls just before dawn on the 7th. Unfortunately, it may require setting the alarm on a Sunday.

Venus, Saturn and Regulus fly in a small triangle for the first half of the month. What makes the morning of the 7th special is the thin crescent Moon flying right through this triangle. Three hours earlier, the Moon actually passed over Regulus. This occultation was visible in western Europe. Eight hours after that event, the Moon occulted Saturn. That was visible in the south Pacific. Our lovely grouping of the four objects is neatly sandwiched between these two events.

It is highly recommended that you get outside before dawn at least once this month. Not only are Saturn and Venus high in the southeast, but Mars is very high in the south and it is rapidly brightening as it heads toward a lovely opposition in December. Just as the month begins, binoculars show Mars passing less than an eighth of a degree above a small star in Gemini.

Every October morning provides an opportunity to get a preview of the bright constellations of winter without having to bundle up against frigid weather. Orion and the entire Winter Hexagon sail high over the southern horizon just before dawn.

Evening planet watchers are not left out entirely. Jupiter is still an impressive object in the southwest until about two hours after sunset. After that, no naked eye planets are above the horizon until about two hours before midnight when Mars rises. Mercury is too close to the Sun all month to be observed.

Every 27.5 days the Moon reaches perigee, the lowest point in its orbit around the Earth. Every 29.5 days we have a Full Moon. This month these two events are only 7 hours apart. That means October has the closest (and largest) Full Moon of the year. The exact moment of Full Moon even occurs when the Moon is directly over our time zone and at its highest altitude due south. Ocean tides are expected to be extreme around this time, especially if a storm is in our area.

October SKY CALENDAR

1 Mon 2:30 AM Mars 7 minutes of arc above 1 Geminorum

1 Mon 11:55 PM Mars far below Moon

2 Tue 11:55 PM Mars to right of Moon

3 Wed 6:07 AM Last Quarter Moon

7 Sun 3:30 AM Regulus, Venus, Moon and Saturn rise in quick succession

7 Sun 5:30 AM Best time to see tight Regulus-Venus-Moon-Saturn formation

7 Sun 7:00 AM Sunrise

8 Mon 5:30 AM Venus closest to Regulus (2.8 degrees)

10 Wed 5:00 AM Mars just above Castor's Foot (Mu and Nu Geminorum)

11 Thu 1:01 AM New Moon

14 Sun 6:00 AM Venus closest to Saturn (3 degrees)

15 Mon 7:15 PM Crescent Moon below Jupiter and left of Antares

19 Fri 4:33 AM First Quarter Moon

23 Tue 8:00 PM Mercury passes between Earth and Sun into the morning sky

26 Fri 12:52 AM Closest Full Moon of the year high in the south just 7 hours before perigee

26 Fri 8:00 AM Closest Moon of the year (221,676 miles from Earth); expect high tides

28 Sun 10:00 AM Venus at maximum elongation from Sun