THE METEORITE

M-76
"The Little Dumbbell"

Newsletter of the Mahoning Valley Astronomical Society, Inc.

IN THIS ISSUE:

OCTOBER 2011

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1982 Mathews Rd. #2
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Newsletter of the Mahoning Valley Astronomical Society, Inc.

OCTOBER 2011

MVAS CALENDAR

OCT 22	Business meeting at the MVCO 8:00 PM
OCT 29	Halloween Party at the MVCO 7:00 PM
NOV17/18	Leonid Meteor watch. On your own? Midnight…
NOV 19	Business meeting at YSU. Show at 8:00 PM
NOV 26	Star Party at the MVCO. 7:00 PM till….

NATIONAL & REGIONAL EVENTS

OCT 24 - 30 **CSPG Fall Star Party**, held in Chiefland, FL . 20 acre dark sky site with ac power, food vendors. Fall Star Party details at: http://fallstarparty.com/

FEB 22 - 26 **Orange Blossom Special Star Party 2012** Held at Withlacoochee River County Park, Dade City, Fl - 35 Miles NE of Tampa. http://www.stpeteastronomyclub.org/

WARD BEECHER PLANETARIUM

OCT 15	8:00 PM	*Skywatchers-Mexico*. Aztec, Maya, Toltec star gazing in ancient Mexico.
OCT 22-29	8:00 PM	*Nightlights.* The Halloween Show.
NOV 5	8:00 PM	*Skywatch.* Locate different planets and constellations, learn constellation lore, and current space events. General audiences.

MVAS, P.O. BOX 564 NEWTON FALLS, OH 44444-9998

MVAS Homepage- http://mvobservatory.com

NEWS NOTES

The Big Ear. Lofar (Low Frequency Array) is a new kind of radio telescope. It can see radio waves with low frequencies, similar to those that give us FM radio. Rather than collecting signals from individual radio sources, Lofar continuously monitors large swathes of sky. Lofar is more sensitive to the longest observable radio waves than any other telescope. It can see many billions of light years out into space, back to the time before the first stars formed, a few hundred million years after the Big Bang. On Monday, September 21, 2011, Sweden's Minister for Education and Research, Jan Bjorklund, opened the Onsala Space Observatory's newest telescope; to become part of Lofar, which is the world's largest radio telescope.

The 192 new radio antennas at Onsala's Lofar station will be linked together with 47 similar stations over the whole of Europe, and sent over the Internet to a central supercomputer in the Netherlands. A huge amount of data will be produced: the equivalent of over 7000 DVD films per day just from the Swedish station. The Lofar telescope creates images of the sky using a unique combination of computer power and innovative software. Together, Lofar's antennas form a single telescope with a diameter of 1300 kilometers.

A New Spin on Things: The signature spiral arms of the Milky Way galaxy were likely formed by an epic collision between the Milky Way and the Sagittarius Dwarf galaxy, according to a University of Pittsburgh researcher and his collaborators. Supercomputer simulations by Christopher W. Purcell, a postdoctoral associate in the Department of Physics and Astronomy at Pitt, and his colleagues report their findings in a paper titled "The Sagittarius Impact as an Architect of Spirality and Outer Rings in the Milky Way." This paper was published in the prestigious British journal *Nature*. It is the first paper to identify Sagittarius as the architect of spiral structure in our Milky Way: This presents a new and somewhat unexpected way of thinking about the Milky Way.

This demonstrates the idea that relatively small impacts can have a dramatic impact on the structure of galaxies throughout the universe. This idea had been assumed theoretically, but never demonstrated. Purcell's simulations revealed that even more important than the stars of the Sagittarius Dwarf was its halo of invisible "dark matter" which is equal in mass to all the stars in the Milky Way. Every galaxy, including the Sagittarius Dwarf (precollision) and our own Milky Way, resides at the center of a giant halo of dark matter several times larger in radius and many times greater in mass than the parent galaxy.

In 2003, infrared telescopes and supercomputers that traced the orbital motions of its stars revealed that the Sagittarius Dwarf had actually collided with the Milky Way twice; once 1.9 billion years ago and again 0.9 billion years ago. "When all the dark matter smacked into the Milky Way, 80 to 90 percent of it was stripped off," Purcell says. That first impact- two billion years ago-produced instabilities that were quickly stretched out and amplified, eventually forming the spiral arms and ring structures in the outskirts of our own galaxy.

Today, long streamers of stars from the dismembered dwarf galaxy arch over and around the Milky Way. We're just a few million years short of a third impact, Purcell says. The dwarf galaxy is just about to smash the disc in only another 10 million years. *-Above Notes from Space Daily - staff writers.*

MINUTES OF THE JULY MEETING

SEPTEMBER 17, 2011 at the MVCO

The meeting was called to order at 8:03PM by President Sam DiRocco. Roll Call was taken which showed 14 members present. There were three guests: Virginia and Stephen Bartos as well as former member Bob Foos. Bob was interested in re-instating his membership in the MVAS. This would be handled under New Business. A Call for the Reading of the Minutes was given. Greg Higgins moved to suspend the reading and accept the Minutes as published. Dan Schneider seconded the motion. With no further discussion or corrections noted, the motion was adopted by a unanimous voice vote.

TREASURER'S REPORT: The Report was read by Steve Bartos. Steve noted that the OTAA tent, table and chair rental costs will be in the next Report. Greg moved to accept the Report. Larry Plante seconded the motion. With no discussion or questions, the motion carried by a unanimous voice vote.

General Fund	**8/1 thru 8/31 2011**
OPENING BALANCE:	$ 10,023.77
CLOSING BALANCE:	$ 10,422.13
AVAILABLE FUNDS (NON-RESERVED):	$ 2,758.01
ACCOUNT NET GAIN/LOSS FOR THIS PERIOD:	$ +398.36
INCOME:	
OTAA RAFFLE	$ 587.00
OTAA REGISTRATION	365.00
MVAS CLOTHING MERCHANDISE	65.00
ASTRONOMY CALENDAR (2012)	10.00
INTEREST	0.86
TOTAL INCOME	$ 1,027.86
EXPENSES:	
CK# 2761 (20) 2012 ASTRONOMY CALENDARS	$ 129.50
2762 MVCO RENT (2011-2012)	500.00
TOTAL EXPENSES	$ 629.50

Reserved Funds (Unavailable for MVAS-MVCO operations)

KEY DEPOSITS (MVCO)	$ 250.00
YTD: 50" PROCEEDS RESERVED FOR OAD FUND	$ 3,500.00
CASH FROM ORIGINAL OAD FUND (FOR LAND)	$ 3,914.12
TOTAL AMOUNT IN OAD FUND	$ 7,414.12
TOTAL RESERVED FUNDS	**$ 7,664.12**

CORRESPONDENCE: No correspondence reported.

COMMITTEE/OFFICER REPORTS: *RADIO SIG:* No report given. (Current status is "off-line" due to updates). *IMAGING COMMITTEE:* No reports. *VISUAL COMMITTEE:* No reports. *LIBRARIAN'S REPORT*: Rosemary received a book titled "Obsession For Mars" by Andrew Chaiken. It was donated by Phil Plante for the Library. This was on a suggestion from Chris Stephan (MVAS Honorary member).

OBSERVATORY DIRECTOR'S REPORT: Larry Plante matched color codes for the electrical circuits at the MVCO, once the OTAA event was over. Some of the wiring is mis-matched wire gauge to what is needed. He and Steve will soon replace the breaker box in the 16" building to provide proper service for such things as running crock pots without tripping the breakers. Matching wire gauge to load use will be part of the replacement. He asked if we wanted an outlet on the outside north wall- for use at OTAA meetings. The general consensus was to install one; it wouldn't be hard to do. The wiring in general (box to stage) seemed a haphazard array of using what was available. A complete overhaul in the 16" building was briefly discussed but the rising costs for wire and the "impossible" tangle of wiring killed the thought for now.

Other needed repairs include fixing there receptacle in the outhouse, replacing a T-111 panel on the 12" building (starting to rot) and dealing with the leak around the dome. First we must locate the leaks and determine if a repair or patch will solve the problem before tearing out wood for replacement. Sam said this might be a good springtime project.

OLD BUSINESS: It was asked if we had any data on the proceeds from the OTAA. As reported, we had a total income of $952.00. Steve thought that raffle ticket sales may have been down from previous years. It was pointed out by Larry that several people from Black River liked the old "Chinese Auction" style we had used the last decade or so, rather than one big ticket can. Something to reconsider for next year. Sam thanked everyone that donated prizes to the OTAA event. Greg pointed out that we still need to post banners (thank you's) on our website recognizing Orion and OPT for their generous contributions to the event. We also need a link to the video from the *Youngstown Business Journal* that featured a report on the OTAA meeting. Sam has not had access to the website, as Bill Pearce had redesigned it. Bill has been reluctant to communicate or return emails since the removal of his "monolith" shed; covering the 10" SCT and pier on the deck.

Greg wanted to know why Bill was still a Trustee after nearly a year of no participation. We held far more stringent Trustee requirements for Dave Ruck when he was unable to attend meetings. It would be unfair to Dave, if Bill can get away with this, many thought. It was not known what Bill's intentions were. He first said he resigned then said he wanted to stay on. Since Bill was appointed by the Trustees, they have the power to replace a Trustee. There were 4 Trustees present with the VP available via text message (a quorum of 4 is needed). They would discuss the situation after the meeting and reach a decision on the issue.

Greg also asked about the status of the 50" sale. This deal should have been over by the OTAA. Again, Bill Pearce was the connection in the sale and the communication impasse (above) presents a problem. A check of old e-mails or deposited checks may reveal the address of the individual that wants the 50" (it's believed O'Rielly is the last name). O'Reilly needs to be contacted to see if he still wants the mirror and what his health condition is. He has paid $3,500 towards the purchase price of $5,000.00. Some felt the payment money should be returned or made ready to return, terminating the sale which has run on long past the agreement. Closing Old Business; Margie Dimoff sent a thank you to all the other OTAA members that brought food and drink. Phil Plante was physically slapped on the wrist for leaving the dome open and leaving the ladder outside after the last meeting. It had rained overnight getting the stage and equipment wet. Other means of punishment were offered by Greg, but none were implemented.

NEW BUSINESS: We were reminded to come out to the MVCO the next weekend for a star party (weather permitting). The grill will be used, depending on what individuals bring. Check with the email group. Greg Higgins nominated Bob Foos for re-instatement. Dan Schneider seconded the nomination. Bob was given membership back by a unanimous voice vote. Bob was first introduced to the MVAS as a 15 year old. Jack Draper and Ron Domen brought him to meetings. He has paid visits to the MVCO on and off over the last few years. He has 4" and 8" reflectors. He was last a member in the mid 90's. Welcome home Bob- good to have you back.

Sharon Shanks may be able to arrange a talk by Dr. Jay Reynolds of NASA Glenn. Reynolds was to speak at the OTAA but had to cancel. They know each other and a speaking venue at YSU was discussed. This is open for review- possibly next year sometime. Speaking of next year, Sam and the Radio SIG was thinking of having a joint HAM -MVAS event at Scenic Vista next June during the national HAM Field Day June 23. It's a 24 hour event. But there might be light issues and other options were being investigated (a separate event from Field Day?). Meanwhile, members are asked to think if they would like for such an event to happen. Steve had Astronomy 2012 Calendars for sale at $10 each. Less than 15 are left.

Dennis Marko asked about the binocular star party. This idea was posed by the editor in the September issue, as an event for the new moon weekend at Thanksgiving (weather permitting). It seems a few were interested and it should go on unless parking conditions at the MVCO present a hazard. Binoculars are easier to use in cold weather rather than setting up a scope, thus the binocular theme came to mind.

GOOD OF THE SOCIETY: Rosemary spoke up about the outrageous behavior of members, leaving their trash laying about as they leave the meetings. It always seems to fall on the same few people (lately her and Greg) to clean-up the mess. We can no longer blame it on children since there were none at the last meeting. The leaving of the dome open seemed to spark this issue. It was noted that we are adults and we need to start cleaning-up after ourselves, be certain things are stowed properly, things are closed and locked and turned off before the last person leaves. Steve had MVAS hats and caps for sale.

VISUAL REPORTS: Nearly 15 members had a good night at Scenic Vista for the public night. Two observers set up scopes at the Black River OTAA. Eric and Dick Klesch have been observing Jupiter while Phil Plante managed 5 variables so far.

ADJOURNMENT: Adjournment came at 9:05 PM. We thank our host Dan Schneider for the great Italian lunchmeat tray and rosemary for desserts. The next meeting will be at the MVCO on October 22, 2011. Meeting begins at 8:00 PM. Scheduled hosts are Harry Harker and Sam DiRocco. PASSWORD: give an optical or mechanical design of a telescope or of a mount. Examples: Cassegrain, Shiefspiegler, SCT, split ring equatorial, English yoke, cross-axis, etc. *-minutes by Phil Plante*

MVAS REMINDERS

The Saturday after the October meeting is the 29th, and we'll have the annual Halloween Party at the MVCO. We can finalize plans regarding food and drink at the meeting. Costumes are always welcome. Now is the time to start thinking about what you'll come as, besides hungry. Try to incorporate some warm clothing in the costume design.

We have 2012 Astronomy Calendars for sale at $10 each. We should also be getting the RASC Handbooks for 2012. Price was $20 each last year. It's not likely to go down but do consider buying a copy. We should have taken orders but it slipped by during the September meeting.

The last decent chance we have for a group observing session at the MVCO is the Saturday on November 26. It's a New Moon weekend but also Thanksgiving weekend. Sometimes the weather is bearable. We rarely see each other over a holiday weekend, but this seems like a good time for us to observe at the MVCO. Thanksgiving is usually a long weekend and should provide the extra free time. The idea of a binocular star party has had some interest, so we have two more meetings to discuss it. Hunting down Messier objects might be a good project for the group.

MVAS ACTIVITIES

The report is that nearly 15 members went to Scenic Vista for the September 3rd Public Star Party. Only about 10 public observers showed up. It was clear up till midnight when everyone packed up and left. But they had a good observing session. Two members made it to the Black River OTAA. They brought the MVAS raffle luck by each winning a prize. Battin' 100%. Bob won a scope and Larry won an eyepiece. It was a warm, humid night for everyone. At least BRAS has some air conditioning going in the meeting hall. The BRAS-OTAA rounds out the regular OTAA season. Next year we begin on May 19, 2012 at Scenic Vista for the OTAA-Scenic Vista Public Night. Meanwhile, on September 3rd, Jake and Ellwood skipped town to attend a Blues concert in Cleveland. 'Nuff said.

Observer's Notes.....

Variable Heroines

This October 2011, the American Association of Variable Star Observer's (AAVSO) celebrates its 100th Anniversary of existence. A special meeting in Woburn, MA is planned with a dedication at the AAVSO Headquarters in Cambridge. The first few days of the event are slated to have paper sessions on the history of the organization. Undoubtedly the role that women played in those early years of the AAVSO will be highlighted. It was the diligent work of many women that gave astronomers a vital tool needed to validate stellar evolution models-- variable star activity. Sadly, it seems most astronomy enthusiast, male and female, do not know of or at best, under appreciate the valiant effort of these women. This is a short synopsis of those early days leading up to the AAVSO and beyond.

One must remember that at this time in history, very few women were involved in astronomy and even fewer in variable star work. Due mainly to male domination in astronomy and laws that undermined female advancement in science. Astronomy writer Mary Summerville (1788-1872) once pointed out that the laws insulted the sex by granting civil liberties to the newly emancipated slaves while blocking as much to even the most highly educated women. But a change was in the air by 1877. At the Harvard College Observatory (HCO), Professor Edward C. Pickering was fulfilling the dream of his late friend and astrophotographer pioneer Henry Draper; that dream was photographing the entire sky. Pickering was using his newly developed objective prism, which projected each star recorded on the plate as a tiny spectrum. Pickering was quickly acquiring a vast number of photographic plates. He needed someone to analyze and record the spectral data recorded on these plates. It was a tedious, time consuming job checking thousands of stars; getting the data correct. He started hiring the help.

Pickering soon came to the opinion that men did not have temperament for such wearisome work. Women, he felt, had the patience and perseverance to stay with the task at hand. He went on to hire about a dozen women "computers" to tally-up the data. Eventually hiring 45 women in total. But more likely it was an economic thing rather than a temperament issue. Although some of Pickering's female staff were astronomy graduates, their wages were similar to those of unskilled workers. They usually gained between 25 and 50 cents per

hour, more than a factory worker but less than a clerical worker. Pickering could double his staff by hiring women instead of more expensive male workers. This staff of women came to be known as "Pickering's Harem" or, more respectfully, as the "Harvard Computers". It is unknown if they were bothered by the "Harem" moniker, but they seemed to appreciated the opportunity to work in the science they loved.

It was here that women and the variable star connection has its roots. Amongst these women were future AAVSO members Annie Jump Cannon and Henrietta Swan Leavitt. When not analyzing spectra, they discovered variable stars on the plates. Cannon found 300, Leavitt found 2,400 and Williamina Fleming found over 300. Fleming was one of the first that Pickering hired in 1877- she was his maid at the time. Fleming would pass away before the AAVSO took shape. As a result of those many women "computers", Pickering was able to publish the first Henry Draper Catalog in 1890 - a catalog with more than 10,000 stars classified according to their spectrum.

In October of 1911, attorney William Tylor Olcott began the AAVSO. He made it clear that the AAVSO was to obtain variable star data for the HCO's variable star program. At that time only one woman expressed interest in joining the AAVSO; Dr. Anne S. Young of Mount Holyoke Observatory. By December 1911, Olcott published the first *Monthly Report of the AAVSO*, in which he listed seven new members that now included Dr. Carolyn Furness, Director of the Vassar Observatory and Miss Helen M. Swartz of South Norwalk, CN. For the next several years, Olcott actively recruited members. At the November 10, 1917 AAVSO Meeting, a constitution was drawn up. Anyone that joined by December 31st would then be considered a charter member of the AAVSO. Of the 90 or so individuals that had joined, eleven were women. In 1918 honorary membership was given to Annie Jump Cannon. In 1919 the same honor was given to Henrietta Leavitt. Both of these women were professional astronomers and at one time, HCO computers.

From the mid 1880s to mid 1950s, women, especially at HCO, contributed more data on variable stars than their male counterparts. By 1959 women had discovered over 75% of the 14,708 named variables known at that time. In addition, Annie J. Cannon went on to redefine spectral classifications to the standard used today (the Harvard Spectral Classification). We all know it as the O, B, A, F, G, K, M system. Then Henrietta Leavitt discovered the Cepheid period-luminosity connection that gave us a first ruler in which to measure distance in the cosmos. Variable star studies became vital to efforts in understanding the history of the cosmos.

The tie between the HCO and AAVSO was strong; in fact the AAVSO Headquarters was at the HCO. During the 30's and 40's, Cecilia Payne-Gaposchkin studied pulsating and eclipsing variables at the HCO. Meanwhile AAVSO observers, under Director William Campbell, concentrated on long period variables. In 1949 Margaret Mayall was appointed as Director of the AAVSO, succeeding the retiring Campbell. She had worked at the HCO since the mid 1920's and had been Annie Jump Cannon's assistant. In 1952, budgetary issues at the HCO forced AAVSO out, as it could no longer fund the organization. Mayall and the AAVSO found a new home in Cambridge, MA. Financial aid came from then AAVSO Secretary Clinton B. Ford and from the AAVSO council.

In 1973 Mayall retired and Janet Mattei took the reigns as AAVSO Director- until her untimely death in 2004 (leukemia). Under her responsive leadership, the AAVSO flourished. She fostered collaboration of visual observers with satellite alerts of flare stars The entire AAVSO variable star data base was finally digitized. Last but not least, the MVAS had a connection to the women of the AAVSO. Most notably was Carolyn Hurless, a prolific Ohio observer with 78,678 observations made from 1959 to 1986. Hurless was no stranger to an MVAS-OTAA meeting. She would often use the 16" Cassegrain with MVAS variable star observers of the day.

One can see that women played very significant roles in variable star astronomy. Past and current digital sky surveys may have refined the heroic work of the Harvard Computers, but their accomplishments are not and cannot be diminished. They have proven that despite male dominated science, women are often the unsung heroes. Next time you're observing, try to remember and appreciate the women that helped us decipher the universe. Check-up on a "Homework" variable star now and then to pay homage. Perhaps you'll get a sense of what it was like to work in the new field of variable stars. It's still a stellar exploration any observer may embark on. *- P. Plante*

Pickering's "Computers" on May 13, 1913. Anne Jump Cannon is second face to the right of Pickering. Three of these women would go on to receive observing awards from the AAVSO (including Cannon).

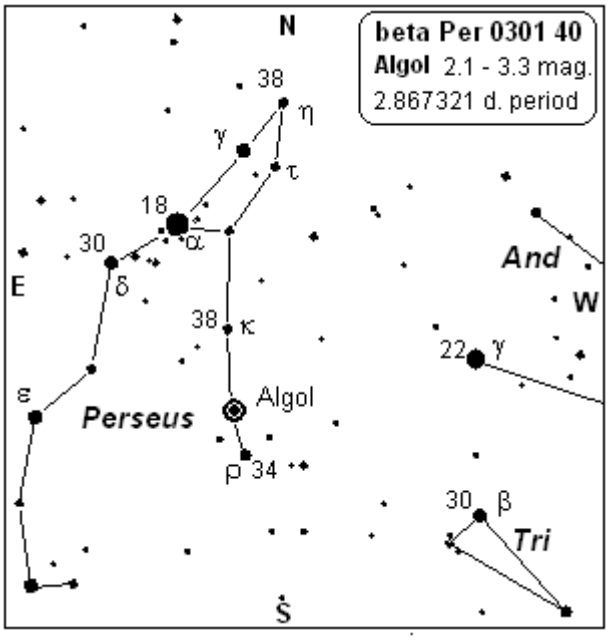
MVAS Homework:

The Little Dumbbell

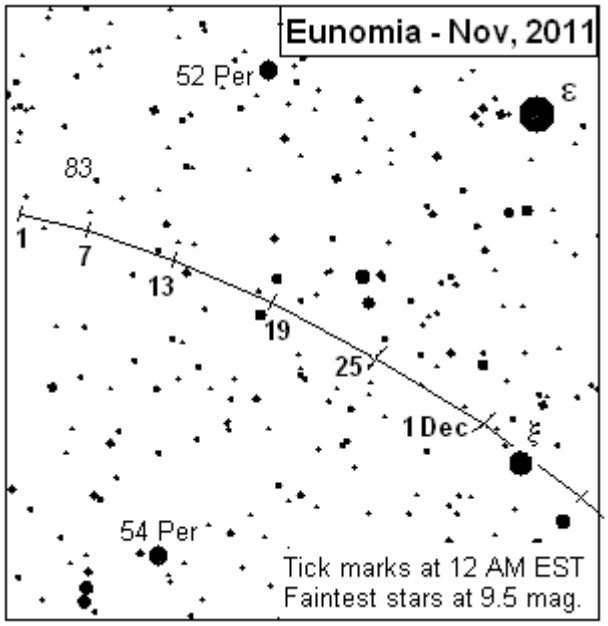
Messier 76 (NGC 650/651) is one of the faintest Messier Objects, and one of only four planetary nebulae in Messier's catalog. It's in the eastern part of constellation Perseus. It was discovered by Pierre Méchain on September 5, 1780, who then reported it to Charles Messier. Messier observed it on October 21, 1780, and added it to his catalog. At first it was thought to be two separate nebula (NGC650/651). M-76 is known under the names **Little Dumbbell Nebula** (most common), Cork Nebula, Butterfly Nebula, and Barbell Nebula. M-76 can resemble its namesake, the Dumbbell Nebula M27. A 4" scope under dark skies might be a minimum for the M27 look. An OIII filter on 8" or larger scopes might enhance the view. The bright part of the nebula is of about 65 arc seconds in diameter. It is surrounded by a faint halo about 290 arc seconds in diameter. This halo was probably ejected as stellar winds from the central star when it was still a Red Giant. Today the central star is of mag. 16.6 and at a temperature of 60,000 K. It will cool down into a white dwarf in ten billion years. You can find M-76 less than a degree northwest of phi (ϕ)Persei.

MVAS OBSERVER CHARTS

Variable star of the month: **β Per** (*common name:* Algol).
Algol is the famous eclipsing variable star. Every 2.8 days the dimmer companion star passes in front of the bright primary star causing the combined magnitude to drop 1.2 magnitudes. The whole eclipse last less than 5hrs. From initial drop to full recovery. Time of minimum light visible in Eastern Time Zone:
Oct 23- 2:49am, Oct 25- 11:38pm, Oct 28- 8:27pm,
Nov 15- 12:21am, Nov 17- 9:10pm, Nov 19- 5:59pm.



Asteroid of the month: (**15) Eunomia.** In the theme of Perseus, our asteroid of the month is cruising through the constellation. It is arching south of epsilon Persei which is a double star witj lemon and cobalt colors. This should be incentive to find the binary then search for Eunomia. It gains 0.4 magnitude during November reaching 7.9 mag. By the 31st. It passes just north of xi Persei around Dec. 3rd. You know the drill; scope or binocs!



MVAS OBSERVATIONS - DUE NOVEMBER 2011

OBSERVER_____

Featured object: M-76 . If you have the chance, observe with various sized scopes. Try higher magnifications - up to when it disappears. Then back off on the power and let your eye dark adapt at the eyepiece for 20-30 seconds. Try not to let stray light shine between the eyepiece and your eye. It's an old trick, but it works. Memorize the view then try an outline sketch. Dark adapt again- to fill in details. Repeat as needed. Good luck!

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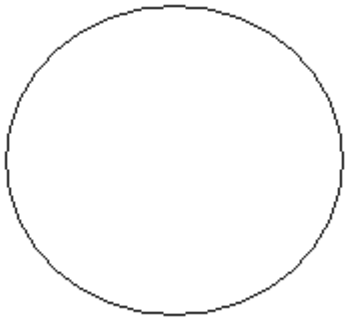


M- 76 Observation:

Date:_____ Time(EDT)_____ Scope_____

Algol magnitude estimates:

Date:	Time:	estimate:	Instrument:
_____	_____	_____	_____
_____	_____	_____	_____

(15) Eunomia Observations:

Date:	Time:	Instrument:	magnification:
_____	_____	_____	_____
_____	_____	_____	_____

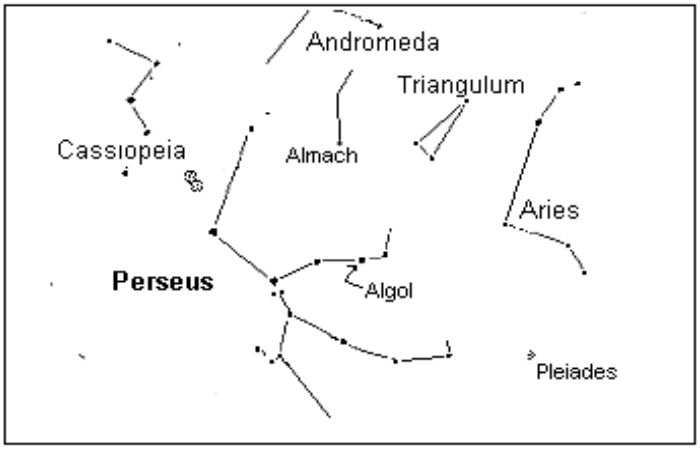
Other Objects in Perseus to observe

D. Sky	Date	Scope	**Dbl.**	Date	Scope	SEP	MAG	SPLIT?
M- 34	_____	_____	η Per	_____	____	28.0"	3.8 - 8.5	Y / N
N884/869	_____	_____	ε Per	_____	____	9.0"	2.9 - 8.9	Y / N
N- 1528	_____	_____	Σ 331	_____	____	11.9"	5.2 - 6.2	Y / N

Lunar Occultations (see Sky Almanac):

Star	(UT) Date	Time	Scope	magx.	Event(circle)
_____	_____	_____	_____	_____x	R D
_____	_____	_____	_____	_____x	R D
_____	_____	_____	_____	_____x	R D

Constellation of the Month — Perseus



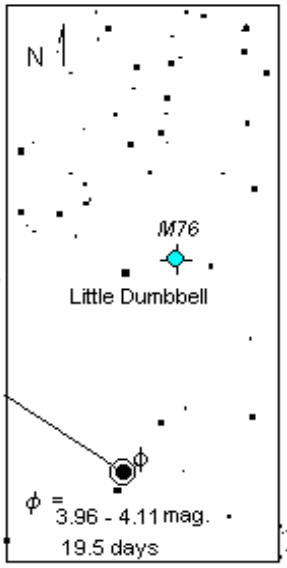
Look for Perseus high in the NE sky soon after sunset, Sep. & Oct. It passes overhead later on, and will be difficult to aim a fork mounted scope at it. But it is worth the effort to explore the region. With your naked eye you should be able to follow its famous eclipsing variable star called Algol. A double star; we can't see the companion, but we can tell when it passes in front of the primary. Algol gets dimmer at that time. Binoculars might help you follow it. They will also give a good view of the alpha Perseus Cluster. The cluster stars between alpha and delta are about 750 light years away. Binoculars give a fine look at the Double Cluster. A showpiece object indeed. With a telescope you can take in the many fine double stars as well as M76 and M34. About 3 degrees east of Algol is a cluster of galaxies. One is Perseus A-- a strong radio source. There may be as many as 2 dozen galaxies in this group. How many can you catch? You will need at least a 10" scope or bigger. A good atlas is an essential tool as well. There are several open clusters and faint galaxies shown on the map, but not in the list. Give them a try.

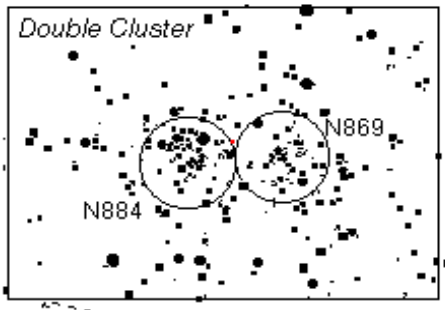
The California Nebula needs an H-beta filter and a low power RFT or large binoculars, under pristine skies. It is a popular astrophoto target as well. Enjoy!

M-76 Transit Times:

Sep 15	@	3:30 AM
Sep 30	@	2:30 AM
Oct 15	@	1:30 AM
Oct 30	@	12:30 AM
Nov 15	@	10:30 PM*
Nov 30	@	9:30 PM*

* = EST





Algol varies from 2.1 mag to 3.3 mag. every 2.867 days. Refer to S&T as it usually lists the time of minimum light. Listed below are comparison star magnitudes to use on Algol.

α Per = 1.81
ε Per = 2.90
κ Per = 3.79

DEEP SKY

	type	mag.	size	notes
M76	PN	12.2	67"	Little Dumbell
M34	OC	5.2	35'	60 stars
884/869	OC	6.1	29'	Double Cluster
N1023	Gal	10.4	7' x 2'	
N1582	OC	7.0	37'	20 stars
N1513	OC	8.4	9'	50 stars
N1528	OC	6.4	23'	40 stars
N1342	OC	6.7	14'	40 stars
N1499	NEB	--	160'	California Neb

DOUBLE STARS

	mags.	sep.	"colors"
ζ	2.8 - 9.2	13"	greenish, ash
η	3.8 - 8.5	28"	yellow, blue
θ	4.1 - 9.5	77"	yellow, orange
ε	3.0 - 7.5	8.8"	lemmon, cobalt
57	6.1 - 6.8	120"	yellow, lilac
Σ331	5.2 - 6.2	12.0"	white, blue
Σ336	7.0 - 8.3	8"	yellow, blue
Σ369	6.8 - 7.7	3.0"	yellow, blue
Σ533	7.6 - 7.7	1.1"	red, blue
Σ521	7.5 - 9.6	2.1"	gold, red

Check list

- ____ M76
- ____ M34
- ____ 884/869
- ____ N1023
- ____ N1582
- ____ N1513
- ____ N1528
- ____ N1342
- ____ N1499
- ____ ζ
- ____ η
- ____ θ
- ____ ε
- ____ 57
- ____ Σ331
- ____ Σ336
- ____ Σ369
- ____ Σ533

Instruments used:

____ on ____
____ on ____
____ on ____
____ on ____

Algol was ____ mag. on ___/___/____
Algol was ____ mag. on ___/___/____

2011 NOVEMBER SKY ALMANAC

Solar and Lunar (EST).

Date	Sunset		Moonrise		Moonset	
1	6 : 20		x : xx		x : xx	
5	6 : 15		x : xx		3 : 05a	
9	6 : 11	EST	x : xx	EST	6 : 59a	EST
13	5 : 07		7 : 14p		x : xx	
17	5 : 03		11 : 23P		x : xx	
21	5 : 00		2 : 53a		x : xx	
25	4 : 58		7 : 51a		x : xx	
29	4 : 56		x : xx		9 : 50p	

PLANET WATCH

	Mercury	Mars	Saturn
	Sets	*Rises*	*Rises*
1	7:06 PM	1:37 AM	6:29 AM
5	7:06 PM	1:32 AM	6:16 AM
9	7:07 PM	1:27 AM	6:02 AM
13	6:08 PM	12:22 AM	4:49 AM
17	6:07 PM	12:16 AM	4:36 AM
21	6:02 PM	12:10 AM	4:22 AM
25	5:51 PM	12:04 AM	4:08 AM
29	5:31 PM	11:55 PM	3:55 AM

November 2011

S	M	T	W	T	F	S
		1	2 ☽	3	4	5
6	7	8	9	10 ○	11	12
13	14	15	16	17	18 ☾	19
20	21	22	23	24	25 ●	26
27	28	29	30			

Asteroid for November 2011 (15) Eunomia

Date	TRANSITS		RA hr. min	Dec. deg.		Alt.	Azm	Magnitude
			topocentric					
1	3 : 14 AM	EDT	4 : 30.8	+38.6	EDT	53º	78º	8.3
7	1 : 46 AM	EST	4 : 26.5	+38.5	EST	70	89	8.2
13	1 : 17 AM		4 : 21.1	+38.2		75	95	8.1
19	12 : 47 AM		4 : 15.0	+37.7		80	107	8.0
25	12 : 17 AM		4 : 08.5	+37.1		85	140	7.9
31	11 : 42 PM		4 : 02.1	+36.3		84	208	7.9
			(at midnight)			*(at midnight)*		

Variable Star of the Month: **Algol** 2.1 - 3.3mag 2.8673 day period

Celestial Highlights

Date	UT hr	
2	17	**FIRST QUARTER MOON**
2	00	Mercury- Venus 2º apart
6	00	Taurid meteor show er
10	20	**FULL MOON**
12	08	Algol at minimum
14	00	Mercury greatest 23º E.
15	05	Algol at minimum
18	15	**LAST QUARTER MOON**
18	02	Algol at minimum
18	04	Leonid meteors peak
25	06	**NEW MOON**

LUNAR OCCULTATIONS FOR NOVEMBER 2011

Civil (24hr) date	hr	min	sec	UT date	hr	min	sec		Ph	Moon % illum.	Moon alt	Moon azimuth	Star name	Star Mag.	event PA	dbl./ sep.
2	19	00	42	*2*	23	00	42		D	53+	35º	170º	SAO 164025	7.5	087º	NA
2	20	08	51	*3*	00	08	51		D	53+	35	190	ZC 3070	6.6	059º	NA
12	6	24	19	*12*	11	24	19		R	98-	24	279	51 TAU	5.6	251º	166.0"
13	22	05	31	*14*	03	05	31	start	R	90-	29	086	BERKLEY 21	7.0	285º	open cl.
14	3	01	11	*14*	08	01	11		R	89-	70	186	ZC 905	6.9	254º	0.007"
15	22	49	18	*16*	03	49	18		R	74-	16	080	74 GEM	5.0	282º	0.03"
19	4	46	39	*19*	09	46	39		R	41-	42	133	ZC 1528	6.7	333º	117.0"
20	2	53	30	*20*	07	53	30		R	31-	12	103	ZC 1629	6.6	275º	NA
20	5	21	25	*20*	10	21	25		R	30-	36	133	SAO 138129	7.9	321º	9.5"
29	18	56	59	*29*	23	56	59		D	26+	25	219	SAO 163793	7.8	089º	2.8"
29	21	08	24	*30*	02	08	24		D	27+	6	245	ZC 3027	6.9	117º	NA

D= disappearance. Good occultation event.

d= disappearance, the star's magnitude approaches the observing limits of 200mm objective

R= reappearance. Good occultation event

r= reappearance, the star's magnitude approaches the observing limits of 200mm objective

All disappearances (D) occur on the eastern limb (left side in the sky). Reappearances (R) alw ays occur on the w estern limb.

Position Angle (PA): tells w ere along the w est limb to w atch for a reappearance.

PA is referenced to celestial north: North=0º East=90º South=180º West=270º

Occultations computed using Occult v3.6 (I.O.T.A.)

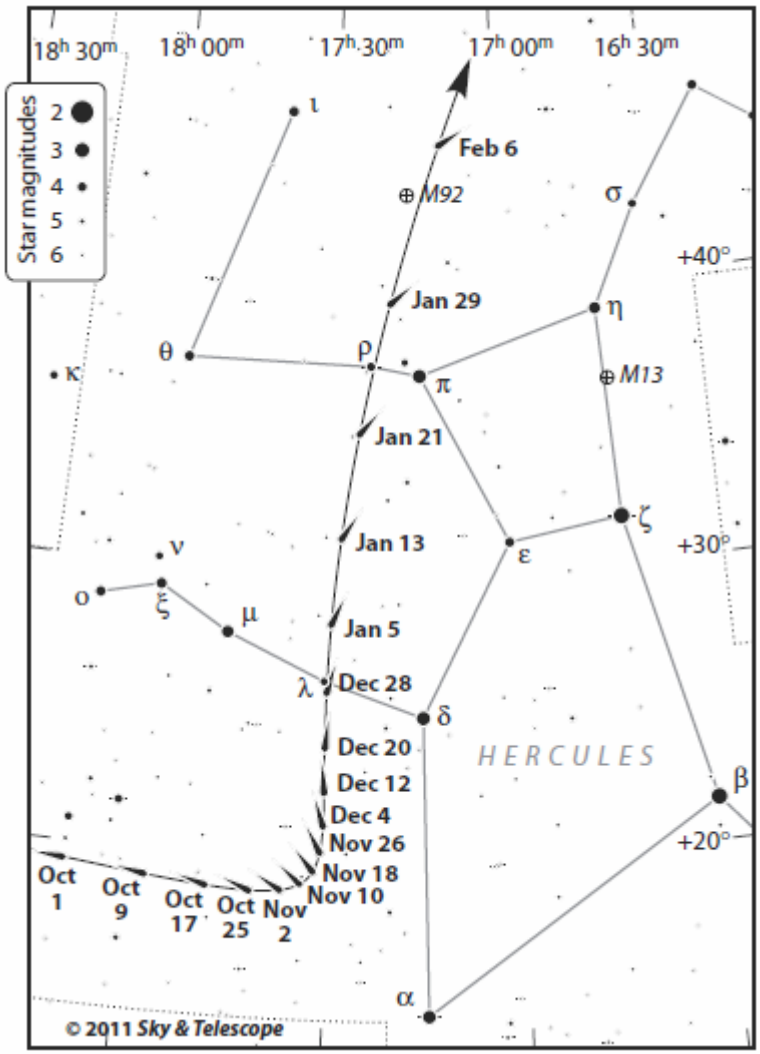
Variable star data from AAVSO. All other data computed w ith MICA 1800-2050 (Willman-Bell)

GALLERY…..

Comet Quest.

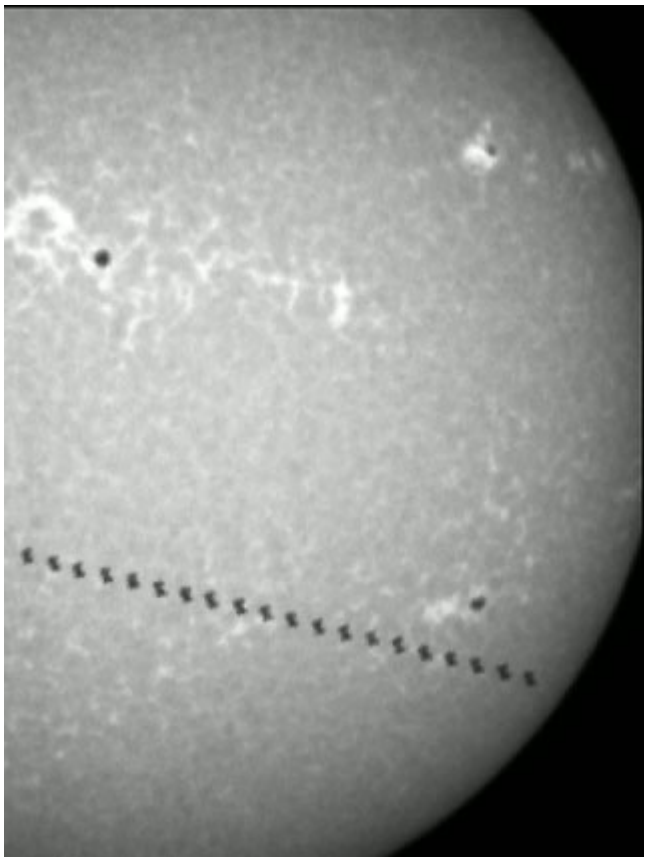
Comet Garrad will remain Hercules until February 2011. It will be high in the west just after sunset during October, and lower by November. The comet lays at the west-northwest horizon at the end of twilight around Christmas. But it is also rising in the morning sky and is higher before the first light of dawn drowns it out. The best viewing starts in the morning sky around mid December. On the morning of February 3rd, 2012, Garrad passes ½ degree west of globular M-92. It is predicted to remain near 6th magnitude until mid-March. Sounds like a good target for a quick binocular look before sunrise this winter. Photo-op with M-92? Who will brave the weather?

Astronomer Gordon J. Garradd discovered the comet at 17th magnitude on August 13, 2009, at Australia's Siding Spring Observatory while hunting for near-Earth objects. Use the Sky & Telescope chart below to help you locate the comet.
Find out more from the *S&T* webpage below:



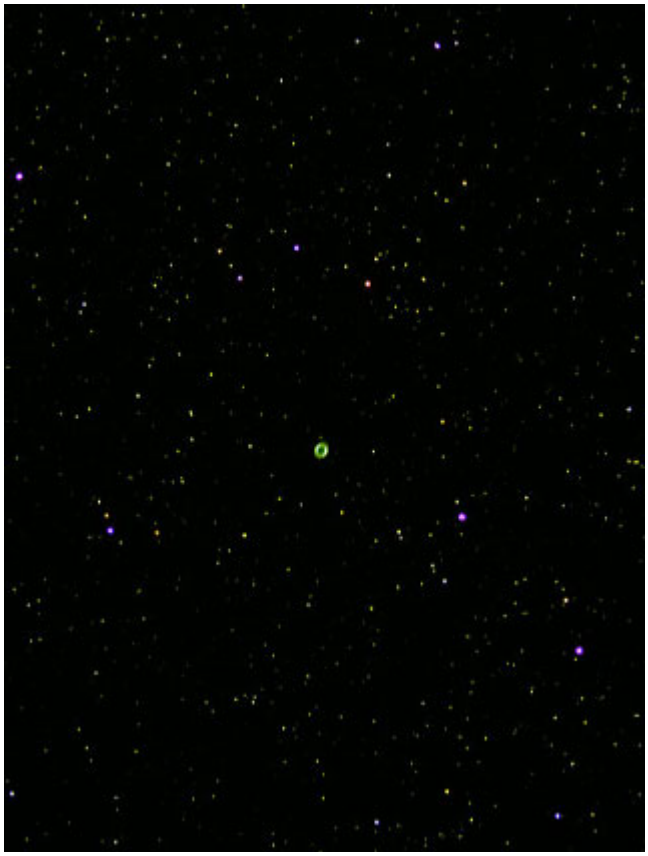
http://www.skyandtelescope.com/observing/highlights/128836743.html

Summer Photos.
A few MVAS members were busy with camera and telescope this past summer. Here is a round-up of available images (mostly from the e-mail group). This is a good time (and there is space for it) to look back at their outstanding work.



JIM HAKLAR: On July 17th, he used a Lunt LS60T CaK telescope to image an ISS transit across the solar disk. He Used a DMK 21 AU04.AS camera operating at 60 FPS with a 1/10,000 second exposure. Some 20 frames were extracted using Registax and combined using Photoshop.

BILL PEARCE: On June 15, 2011, he used a Celestron C-9.25 & F/6.3 focal reducer with his Canon 500D to capture the new supernova (arrowed) in M101. It's a 3 minute exposure at ISO 800. Processed using Photoshop CS4.



M-57

LOU DiNARDO: At top-- Using a 10" SCT, Lou captured M-20 (Trifid Nebula) on August 29, 2011. Camera used was a Canon Rebel Xti. 45 at seconds per image. 15 images stacked with 10 dark frames. Processed with Images Plus.

For the image of Comet Garrad (above, at center), he used the same set up but went with 25 second exposures. Stacked 5 images with 10 dark frames. Taken August 29, 2011.

M-51

BILL PEARCE used a 110mm APO and his unmodified Canon to capture the Whirlpool (M-51at bottom left), then the Dumbbell Nebula M-27 (at top right). Then a wide view of the Ring Nebula M-57directly above. All around July 1, 2011.

(Note: Just as this went to press, Lou sent a few new astrophotos. They should be in the next issue.)