THE METEORITE

Globular Cluster M-3

in Canes Venatici

Photo: Kitt Peak

Newsletter of the Mahoning Valley Astronomical Society, Inc.

IN THIS ISSUE:

MARCH 2010

Meteorite Editor: Phil Plante
1982 Mathews Rd. #2
Youngstown OH 44514

THE METEORITE

Newsletter of the Mahoning Valley Astronomical Society, Inc.

MVAS CALENDAR

MAR12/13	Messier Marathon at MVCO. Dusk
MAR 27	MVAS Business Meeting at YSU. At 8:00 PM.
APR 10	Galaxy Quest at MVCO. 9:00 PM
APR 17	Chili Cook-off at MVCO 7:00 PM
APR 24	MVAS Business Meeting at MVCO. 8:00 PM

NATIONAL & REGIONAL EVENTS

APR 16 - 17 NCRAL 2010. Astronomical League meeting. Bloomington-Normal, IL
http://www.ncral2010.org/Home.aspx

APR 17-18 19th Annual NEAF in Suffern, NY.
http://www.rocklandastronomy.com/neaf.htm

MAY 5-16 Texas Star Party. http://www.texasstarparty.org/

MAY 14-16 Annual Michiana Star Party. Potawatomi, IL
http://michiana-astro.org/

OTAA MEETINGS 2010

MAY 15 OTAA Scenic Vista Stargaze. Lisbon, OH

JUN 12 Chagrin Valley (CVAS) at Indian Hill. 6PM

YSU WARD BEECHER PLANETARIUM

MAR 12/13 8:00 PM. Black Holes: The Other Side of Infinity. (Also on remaining March weekends.)

APR 2/3 8:00 PM. Strange Planets. The search for exoplanets with audience participation.

MVAS, P.O. BOX 564 NEWTON FALLS, OH 44444-9998
MVAS Homepage- http://mvobservatory.com

MARCH 2010

NEWS NOTES

Mars in 39 days. The U.S. Space agency is listening closely to Franklin Chang-Diaz, a veteran astronaut (7 missions) and a physicist at MIT. He has developed a rocket propulsion system called VASIMR (Variable Specific Impulse Magnetoplasma Rocket). This system uses electricity to turn a fuel like hydrogen or helium into a jet of plasma 51.8 million F hot. This is then fed/channeled to an exhaust port via magnetic fields. Speeds of up to 35 mi/sec could be obtained. This technology could shorten a trip to Mars from seven months to just 39 days. Current technology would involve a 3 year round trip with a forced 18 month stay on the planet, waiting for a return opportunity. Scaled-down models of the VASIMR craft have been built and tested in a vacuum, under a deal with NASA. The next major step, according to Chang-Diaz, will be orbital deployment at the end of 2013 of a vessel using the 200-kilowatt prototype VASIMR engine, the VX-200. Talks are underway with fellow space firms SpaceX and Orbital Science Corp to make that a reality.

Mars to the Core. Mars Rover Spirit has spent six years exploring the surface of Mars. But Spirit has been stuck in the sand at the area called Troy. A faulty right front wheel sealed the deal and so Spirit must now serve as a stationary probe. It will now probe the core of Mars without using any mechanical parts. Engineers will monitor the radio signals coming from the feisty little Rover. These signals will accurately track the motion of the planet as it spins on its axis. Scientists know the orbit of Mars quite well so the precise rotation of Mars can be extracted from the data. By detecting the tiny Doppler shifts in the radio signal, an analysis of the core is possible.

Mars wobbles (precesses) as it spins, much like Earth. It takes about 170,000 years to complete on wobble. By detecting the rate of wobble via the radio signal, scientist can get a better characterization of the core; is it sold or liquid. This also leads to values of density and possible elements mixed with the iron in the core. But first, Spirit must survive the upcoming Martian winter. It was unable to aim its solar panels to the north to draw power from the Sun. Soon Spirit will go into hibernation using only enough power to run the onboard clock and occasional power status checks. Spirit will wake as soon as it detects there is enough power to resume operation. Hopefully.

Phobos Flyby. Mars Express began a series of close fly-bys of Phobos- Mars' largest moon. The peak of the series came on March 3, 2010 when the craft flew within 50km of the surface. The close fly-by will allow a detailed mapping of the moon's gravitational field. Previous fly-bys have provided accurate mass estimate while the High Resolution Stereo Camera allowed estimates of density. First results indicate that parts of the interior may be hollow. Mapping the gravity field will help resolve questions about the structure on the interior. This in turn will shed light on how Phobos formed, and how it came to orbit mars. Three scenarios are under consideration: Phobos is a captured asteroid, it formed along with Mars, it formed after mars from material in orbit, possibly thrown up by an impacting body. High resolution photos will only be possible from March 7 and later since the first close passes approached from the night side of Phobos. Stay tuned.

Members enjoyed a repeat performance of the YSU Planetarium show "Stars", followed by a sky tour given by Sharon Shanks. It was good to stars instead of snow and clouds, even if they were artificial stars projected on a dome.

MINUTES OF THE FEBRUARY MEETING

February 27, 2010 at YSU

The meeting was called to order by President Sam DiRocco at 9:22 PM. Roll Call was taken with 21 members giving the password. A visitor, T.J. Graham and his father were guests as well as Virginia, Joanne and Steven Bartos. A Call for the reading of the Minutes was made by the President. Bob Danko moved to suspend the reading; it was seconded by Rosemary Chomos. All were in favor. Phil Plante apologized for omitting the discussion on a field trip to Cleveland Science Center, as printed in the Meteorite. The approved January minutes will be corrected to include this.

TREASURER'S REPORT: The Report was read by Steve Bartos. On a motion from Bob Danko and a second from Brian Hoffman, the Report was accepted as read.

General Fund	**1/1 thru 1/31 2010**	
OPENING BALANCE:	$ 8,108.83	
CLOSING BALANCE:	$ 8,158.79	
AVAILABLE FUNDS:	$ 7,908.79	
INCOME:		
ASTRONOMY RENEWAL ($34) AND DONATION ($8.95)		$ 42.95
DUES		40.00
INTEREST		1.01
TOTAL INCOME		$ 83.96
EXPENSES:		
CK# 2712 ASTRONOMY RENEWAL		$ 34.00
TOTAL EXPENSES		$ 34.00
Reserved Funds		
KEY DEPOSITS		$ 250.00

CORRESPONDENCE: The only item found in the MVAS P.O. Box was a flyer from the Michiana Astronomical Society, which described their 3rd Annual Michiana Star Party on May 14-16, 2010. It will be at the Potawatomi Wildlife Park in Tippecanoe, Indiana. Pre-registration fee was $20. It was noted this is the same weekend as the OTAA-Scenic Vista Stargaze. If you want a copy of the registration form, contact Phil Plante.

COMMITTEE/OFFICER REPORTS: *OAD FUND:* Tony Mehle reported that the Wells Fargo Money Market Fund closed on February 26 at $3914.12. No change since the last report. Yield was at 0.01%. Tony recommended that we redeem this fund and place the money in our general account until a decision is made on a new investment vehicle. It would at least be earning the meager interest we are getting with the general fund account. This is a step that would be needed in any case. The President agreed this was a good plan and approved that Tony could proceed with the redemption. The process would take a few weeks to complete.

OBSERVATORY DIRECTOR'S REPORT: No official report to be given tonight, due to the resignation of the O.D. Bob Danko and Larry Plante have both been to the MVCO within the past week. It is basically snow bound. Getting into the 8" building is difficult (door tight from ground swell). And the 12" is snowed-in as usual. Mike Sprague has the drive plowed down to the tool shed and hopes to have the drive and parking cleared for the Messier Marathon. It was recommended by Bob that members shouldn't try to use the MVCO until the snow has left. With this in mind, the President moved the location of the Messier Marathon to Scenic Vista. The paved road and parking lot in the park is usually cleared and available to set-up on. This was the case last year. Harry Harker will check on conditions and email a go, no-go to the group. But we need clear skies first.

OLD BUSINESS: Jodi McCullough will order 10 tickets to the Cleveland Science Center for March 21st. This is a Sunday and it's planned to make a field trip there to see the new IMAX movie on fixing the Hubble Telescope (around 1PM or 2PM). There is a group discount be Jodi wasn't sure how large the group had to be. A car pool arrangement needs to be worked out. The MVCO is a logical meeting point but the snow conditions for parking there could make this impractical. Stay tuned to the emails. Rich Mattussi noted that after the Brother Guy Consolmagno lecture (on March 4) at YSU, we are invited to join him at Inner Circle Pizza for refreshments (your own treat). Many were planning to go to the lecture.

NEW BUSINESS: Sam DiRocco announced that Roy McCullough would take over as Trustee and that Larry Plante would become the Observatory Director. These would cover the remaining year of Greg Higgins terms. Greg resigned these positions in a dispute over voting for the elected membership Trustee position at the last meeting. The MVAS Constitution states that this particular vote is reserved for the general membership, excluding (recuse) the Board of Trustees. This was designed as a measure to prevent the trustees from "loading up" the board with cronies. The four elected officers already appoint two Trustees. This "membership" trustee serves as a tie breaker vote (7 trustees total) and to serves as a representative of and to the general membership. Rosemary was concerned about the "not voting" thing since it later states in the Constitution that all members are permitted to vote. But Sam pointed out that this restriction applies only to this particular vote for the reasons given above. [e.g. a judge may be legally permitted to hear a case but would recuse if he/she personally knew one of the parties: a conflict of interest -Sec.]

Sam also noted he has been in contact with Greg several times since, and Greg is still a member of MVAS. He passed along that Greg realized he was due for a break from the job anyway. We thank Roy and Larry for stepping in to these positions. Roy McCullough moved that we officially thank Greg for his efforts as O.D. Bob Danko seconded the motion. By unanimous consent the MVAS expresses it gratitude for all of the effort and donations by Greg Higgins made during his time as Observatory Director. He is responsible for much of the recent progress at the MVCO (12" telescope, etc).

Phil Plante noted that the Chagrin OTAA would be on June 12th. There was a casual and brief discussion about attending other OTAA events. Visitor T.J. Graham presented himself for junior membership. T.J. was at the telescope workshop at YSU and is interested in astronomy. Sam nominated him, Roy seconded the nomination. All in favor. Welcome to the club T.J. We hope you will have fun learning astronomy from us and looking through our telescopes. Rich Mattuissi had a print out about the annual Globe at Night program. This year it runs from March 3 thru March 16. It is a world-wide effort to monitor light pollution by making estimates of the faintest star you can see in Orion, with out optical aid (binocs, scopes). They had 15,000 observations sent in last year.

GOOD OF THE SOCIETY: Steve has two RASC Handbooks left. Rosemary suggested we begin thinking about the 75Th MVAS anniversary (in 2014) and what special event we might want to do. It's not too early to start planning. Bob Danko donated a book and a Celestron eyepiece for use as OTAA door prizes. Phil noted that Allen Heasley had previously donated a new book for the same purpose. Thanks to both members.

VISUAL REPORTS: Roy and Jodi have caught some views of Mars. Bob has viewed some sunspots lately. Phil got 8 variables from his parking lot using 10 x 50mm binoculars. The security light *was* a problem. Harry Harker went to see the last night launch of the Space Shuttle. There were a few negative comments about President Obama's cancellation of the Constellation project as well as a few positive takes on what is now possible by freeing up the NASA budget for other projects.

ADJOURNMENT: Adjournment came at 10:06 PM. We thank our hosts Ed and Sheila Bishop for the sandwiches. The next meeting will be at YSU on March 27, 2010. Meeting begins after the 8:00 PM planetarium show. Scheduled hosts are Joe and Shirley Capello. PASSWORD: give the proper name of a galaxy. Like Milky Way, Blackeye, etc. *-minutes by Phil Plante*

MVAS REMINDERS

April will have two events. There is a Galaxy Quest April 10th at the MVCO. This is the weekend after Easter. We will look for galaxies in the bowl of the Big Dipper. The following weekend is the annual chili cook-off also at the MVCO. It usually turns out to be a "gut-buster" (full bellies). Observing is not an official activity, but you may open up an MVAS scope or two if the skies allow. One last reminder: Please pay dues pretty soon if you have not already. It is getting close to the cut-off month (April) for membership in good standing. Thanks in advance and thanks to those that have paid.

MVAS ACTIVITIES

On March 4th, Brother Guy Consolmagno from the Vatican Observatory gave a talk at the YSU Planetarium. A native of Michigan and graduate from M.I.T. - you may know him as the co-author of the book *Turn Left at Orion*. He was in town to address the First Friday Club of Youngstown and through the efforts of MVAS member Rich Mattuissi, this YSU event was arranged. About 15 members joined a "full house" to hear the talk. It was an engaging account of his world travels and experience at the Vatican Observatory. The main theme of the talk centered on the mis-conception there is a conflict between science and religion. Rather, there is a common ground in beliefs and in what inspires each group. He presented many instances where early scientist such as Galileo, Secchi were supported by the Church and were religious individuals themselves. He pointed out major influences the Church had in early astronomical discoveries and concepts. After a Q&A session, members Joined Brother Guy at Inner Circle Pizza for coffee and snacks. The discussions ranged from E.T.s to telescope optics. A most splendid evening. (Thanks Rich).

Observer's Notes.....

A Bowl of Galaxies

April is just around the corner. As in past years, the MVAS will have its annual Chili Cook-off and another Galaxy Quest that same month. This year the cook-off happens the weekend after the Galaxy Quest. A perfect time to swap tales of your Galaxy Quest as you share bowls of chili. For either event, success depends on the right recipe. For chili, it's the right mix of spices, ingredients and cooking style. For galaxies (or in fact any deep sky stuff), success is a complex brew of aperture, exit pupil, magnification, surface brightness and the condition of your eyeball. For any galaxy quest, there are a number of galaxy groupings to home in on. This time we'll go into the bowl of the Big Dipper. In and around this bowl are about 14 galaxies and a planetary nebula. During April at mid-latitudes, the bowl will be passing nearly overhead after the sky darkens. It will pass through the dome of best viewing; the sky from the zenith down to about 60° altitude. It is here that atmospheric extinction (dimming from air mass) is at its lowest. Sky glow is usually at its darkest here as well. These are the first ingredients needed.

Next we need to determine if the scope will be big enough. Check the visual magnitude of the galaxy to see if it within range of the faintest star your scope can detect. You can find a practical limiting magnitude (M_L), for your scope with:

$$M_L = 1.1 + 5(\log D), \text{ where D= aperture in millimeters.}$$

The *RASC Handbook* gives a value of 2.7 for the constant, but this is for high power, under ideal conditions. It may be a bit too optimistic for our area. From 15 years of variable star work, I derived the 1.1 value above. It reliably matches the usual magnitude limit I actually see. It's based on using 35mm to 25" diameter optics. It is also reflects the average limits under MVCO, Scenic Vista and Boardman skies. The quick advice for our Bowl of Galaxies is to use a 5" or bigger scope to have a chance at seeing all of the objects in the list. Check the list for a minimum size and magnification you might need for each galaxy. But aperture is only one part of the recipe.

The human eye performs much of the magic involved in seeing such faint objects. If photons from a faint object fall on only a few rod or cones in the eye's retina (a small image), the brain ignores those signals as "noise". However, if more of the retina is covered by the faint image (a bigger image), the brain detects the extra signals (details) and begins processing the image. Thus we need to magnify the faint image to make it big enough to trigger the brain's image processing. There is a minimum magnification needed for detecting any faint object. It is based on the object's size and surface brightness. This magnification is different for each object since they come in all sizes and brightness's. But we can simplify a bit by using a worst case scenario, hoping the brighter galaxies fall into view.

Let's start with surface brightness. You may be familiar with the term. It is a measure, in stellar magnitudes, for a square arc-second on the sky *(mg../sec.^{2})*. In essence, it is how bright a star would have to be, if one occupied every square arcsecond of the object's surface area, in order to make the object appear as bright as it does. The fainter the surface brightness, the more magnification you'll need to detect a galaxy. Galaxy M109 has a surface brightness of 22.4 mg./sec.^{2} and a small dimension of 4.6 arcminutes. Based on data from *Visual Astronomy of the Deep Sky* (Roger Clark- 1990), to detect an object this faint in the eyepiece, it needs to appear about 68 arcminutes across. This is about how big the Ring Nebula looks at 60x. For M109, you'll need around 15x for a 50/50 chance of detection. (math: 65' needed size/4.3' actual size= 15.1x) Now we come-up against exit pupils. The exit pupil is the diameter of the image formed by the eyepiece. It is the aperture in millimeters, divided by the magnification in use (D/magx.= exit pupil). If the exit pupil is LARGER than 7mm (for teenage observers), or about 5-6mm

for older folks, you will be stopping down your scope's aperture with your eye's pupil. Like an iris stop in a camera lens. You'll block some of the light from the objective. Rule: Keep the exit pupil 6 mm or less to be safe. This sets a useful lower limit to magnification for any scope. The rule is to use 4-5 power per inch of aperture. Use this for the minimum detection magnification with any scope for sweeping up the galaxy. For our minimum 5" scope, this works out to 20x to 25x. So, the 15x detection limit for M109 would be bumped to 20x for the 5" scope. A 10" scope would have 40x to 50x as a lower useful limit. There is a chance you could see M109 with a 4" scope at 15 to 20x. Much depends on how dark the sky background brightness is, also measured in surface brightness.

For skies overhead, I find the darkest surface brightness of local areas to be: MVCO ~22.5 mg./sec.^{2}, Scenic Vista ~23.7 mg./sec.^{2} and Boardman ~20.8 mg./sec.^{2}. These are my own estimates based on the visibility of several objects- all seen from these locations with a 6" Newtonian. They include the N. American Neb (23 mg./sec.^{2}), M65 (21.6 mg./sec.^{2}), and M110 (22.9 mg./sec.^{2}). Your mileage will vary.

Another thing to consider is that the eye-brain combo needs contrast between the object and sky background. The galaxy can be a bit dimmer than the sky. The eye just picks-up the contrast. Seeing a galaxy against a darker background sky is obviously preferred. Increasing the magnification will darken the background sky but it also darkens the galaxy the same amount. The contrast remains the same. The only benefit is that the higher magnification increases the object detection size for the eye. The scopes at the MVCO are big enough for the task, but don't despair your smaller scope. You won't know if your 4" will work unless you try. Having a GoTo mount will certainly ease locating the target. Otherwise you will need to have some star-hopping skill. A good star atlas helps.

One last ingredient: you need to dark adapt the eye for at least 10 minutes. This allows the visual purple (rhodopspin, a photo chemical in the eye) to build up, increasing sensitivity. Visual purple begins building up in the retina during dark adaption and continues for up to 30 minutes (full dark adaption). Exposure to bright light destroys visual purple. Next trick, is to use averted vision- by placing the target off center, toward the nose side of your eye's vision. This puts the image on the area of the retina that has the highest density of rods. Try to hold the object in the same spot for about six seconds. The eye can build up an image something akin to a photographic exposure, but with more limited extent.

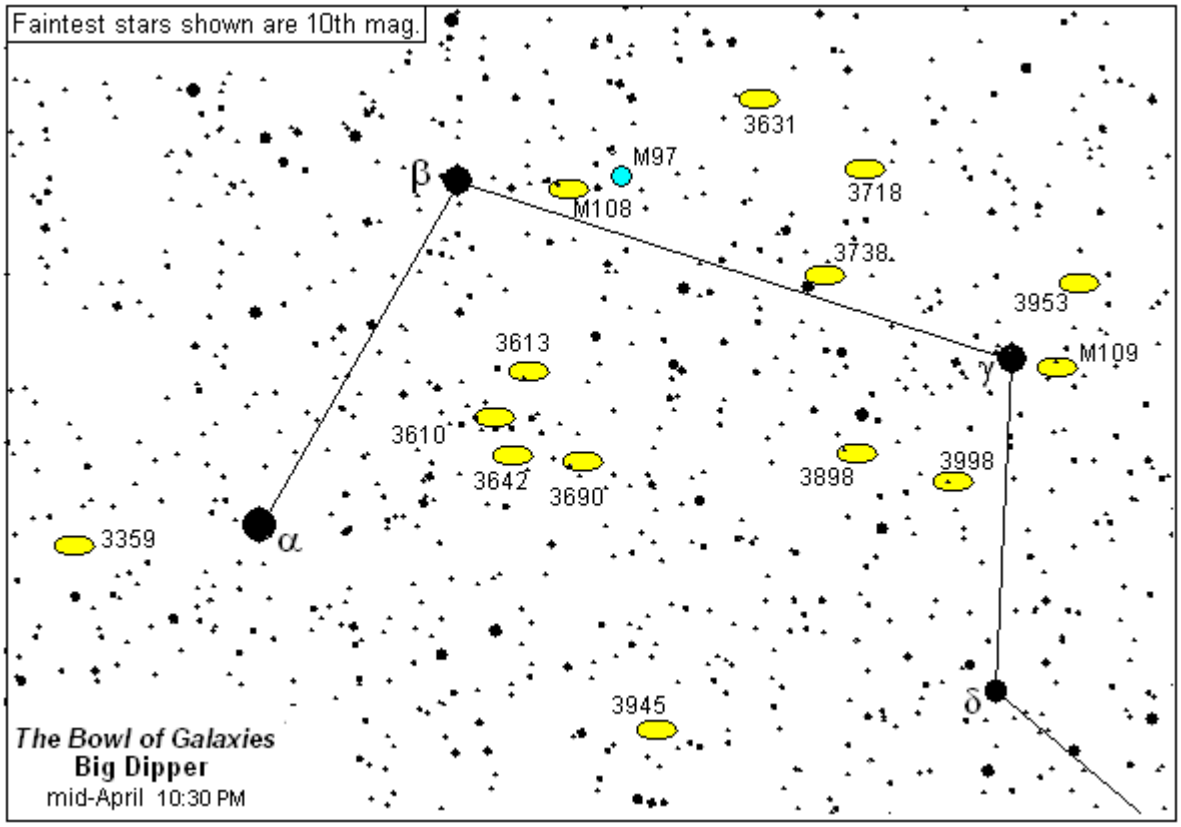
The eye's low light response is also adversely affected by alcohol, prolonged exposure to bright lights during the daytime, low oxygen levels and low blood sugar. Thus avoid bright lights (sun) during the day, save the beer for after observing, have a few snacks while observing to keep blood sugar normal and breathe easily. Try not to hold your breath while at the eyepiece. You may find yourself doing this unconsciously- perhaps holding yourself in an awkward position at the eyepiece. Remember: be comfortable and warm- wear a hat if it's chilly out…..Chili? Hmmm. That might go good with that beer later on in the night.

A Bowl of Galaxies

Obj.	visual mag.	Size		mag. sec^2	scope diam.	detect size	min. power	exit pupil
M97	9.9	3.2' x	3.2'	21.1	57.5	62'	19x	3.0mm
M108	10.0	8.1	2.1	21.7	60.3	60	29	2.1
M109	9.8	7.6	4.3	22.2	55.0	65	15	3.8
N 3359	10.6	7.3	4.4	23.0	79.4	68	15	5.1
N 3610	10.8	3.2	3.2	22.0	87.1	62	19	4.5
N 3613	10.9	3.4	1.9	21.6	91.2	58	31	3.0
N 3631	10.9	5.5	4.6	23.0	91.2	80	17	5.2
N 3642	11.2	5.7	4.6	23.4	104.7	90	20	5.4
N 3690	11.5	2.5	2.1	21.9	120.2	62	30	4.1
N 3718	10.8	10.0	4.7	23.6	138.0	110	23	5.9
N 3738	11.7	3.2	2.8	22.7	131.8	70	25	5.3
N 3898	10.7	3.3	1.9	21.3	83.2	58	31	2.7
N 3945	10.8	5.9	3.7	22.8	87.1	67	18	4.8
N 3953	10.1	6.0	3.2	21.9	63.1	62	19	3.3
N 3998	10.7	3.0	2.6	21.6	83.2	58	22	3.7

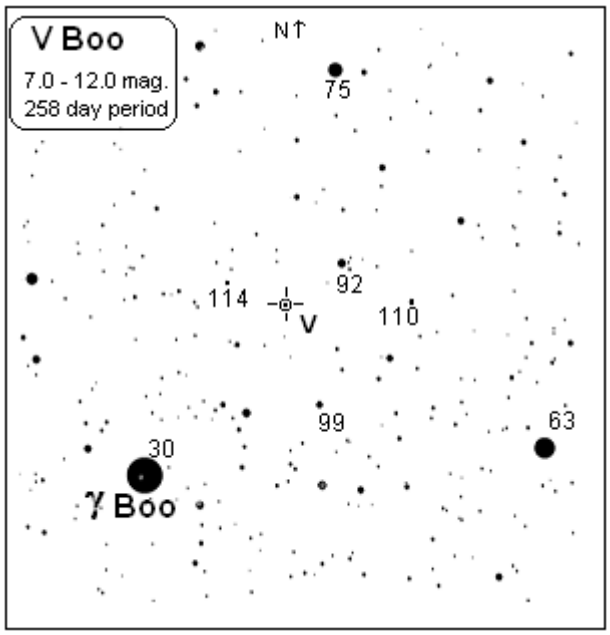
-BY P. PLANTE

*Given: **scope dia**. Is minimun suggested size (mm). **Detect size** is minimum size needed to detect. **Min. power** is mimum power needed to detect the object. Be advised these are recommend starting points. Try this Quest anytime you can, it will boost your deep sky skills.*

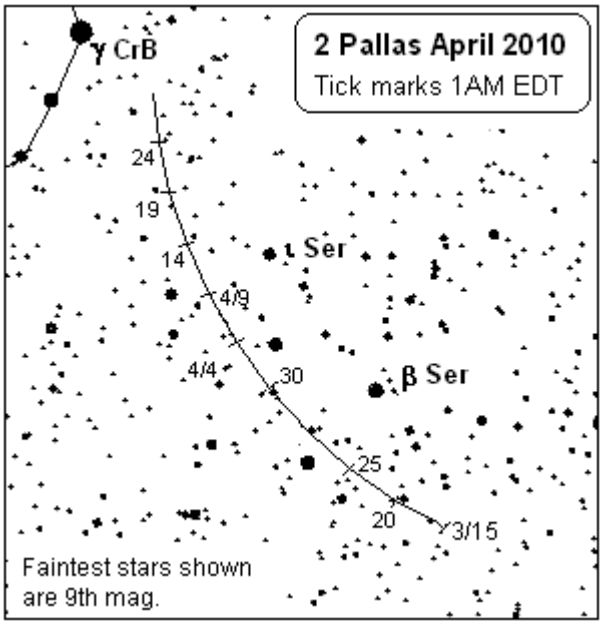


MVAS OBSERVER CHARTS

Variable star of the month: **V BOOTES** (*abbrev:* V Boo). Found NW of gamma Bootes, V Boo is a nice variable to follow in binoculars. Especially near maximum light which should occur in early April. Watch it fade the next few months. Keep tack of the progress by using the comparison magnitudes given on the chart below. Enter time, date and estimate in your homework!



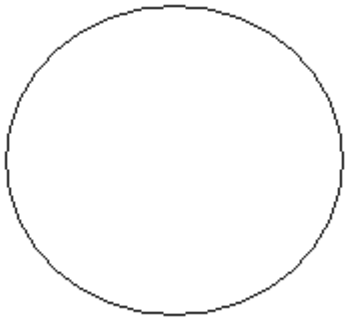
Asteroid of the month: (**2) Pallas.** You can find Pallas SW of Corona Borealis, trekking through Serpens. It traces out an arc about 11 degrees long. By the end of April it will be close to gamma Coronae Borealis. At around 8.7, Pallas should be just brighter than the faintest field stars shown below.



MVAS OBSERVATIONS - DUE APRIL 2010

OBSERVER_____

Featured object: M-3. Easy deep sky objects in Bootes are scarce. So this month we'll step next door into Canes Venatici to find one of the better globular clusters, namely M-3. Please try a sketch. Draw the field stars first then use pencil smudges for the globular-- Shading to match the view, best you can.



M-3 Observation:

Date:_____ Time(EDT)_____ Scope_____

V Boo magnitude estimates:

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

(2) Pallas Observations:

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

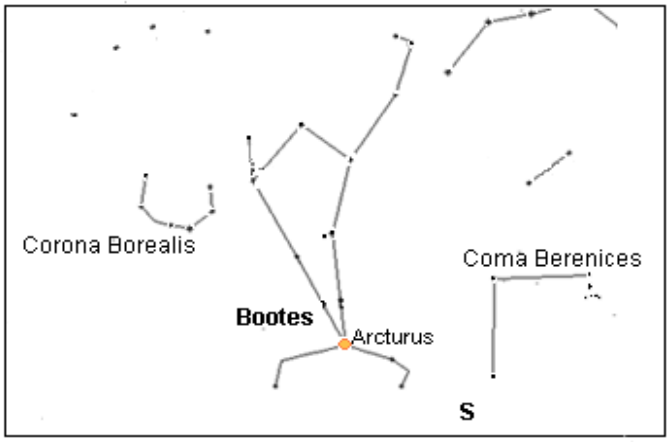
Objects in Bootes to observe

Object	Date	Scope	Object	Date	Scope	Split?
N- 5248	_____	_____	ξ Boo	_____	_____	Y / N
N- 5466	_____	_____	π Boo	_____	_____	Y / N
ε Boo	_____	_____	δ Boo	_____	_____	Y / N

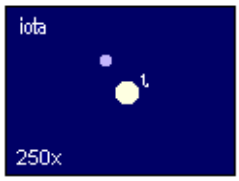
Lunar Occultations (see Sky Almanac):

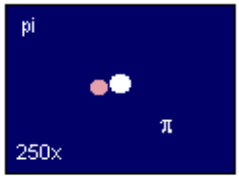
Date (UT):	Time(UT):	Scope/magx	Phenom (circle)
_____	_____	_____	_____x R D
_____	_____	_____	_____x R D
_____	_____	_____	_____x R D

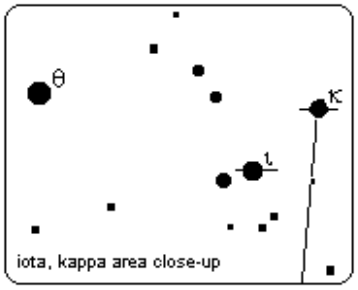
Constellation of the Month — Bootes



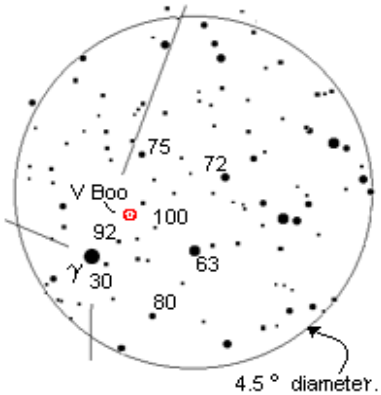
By mid May the bright orange star Arcturus is just west of the meridian and fairly high up around 11pm. It marks the base of the kite shaped figure of Bootes. More than one kite has sailed aloft on the cool winds of spring. Like its daytime counterparts, we can watch Bootes sail through the night sky, east to west, as the night wears on. With binoculars, you can find a few pairings of stars that could be called " binocular doubles". Check out delta or rho. Bootes may lack in bright deep sky objects for the smaller scope. But as compensation, we are given an assortment of double stars for the telescope; many with good color contrast. The most famous is epsilon Boo, also called Izar. It has a golden yellow primary with a bluish companion. In theory it should be an easy split for a 3". But the companion lies close to the diffraction ring of the primary. High magnification and a steady sky are usually needed. The double star diagrams below show the center of an eyepiece field at the same magnification (except Izar). This should give you some idea of how each double will compare to the others. Take note of the color contrasts you may see. Do they change from one observing session to the next? You can use binoculars to follow the variable star V Boo during the brighter part of its magnitude range.

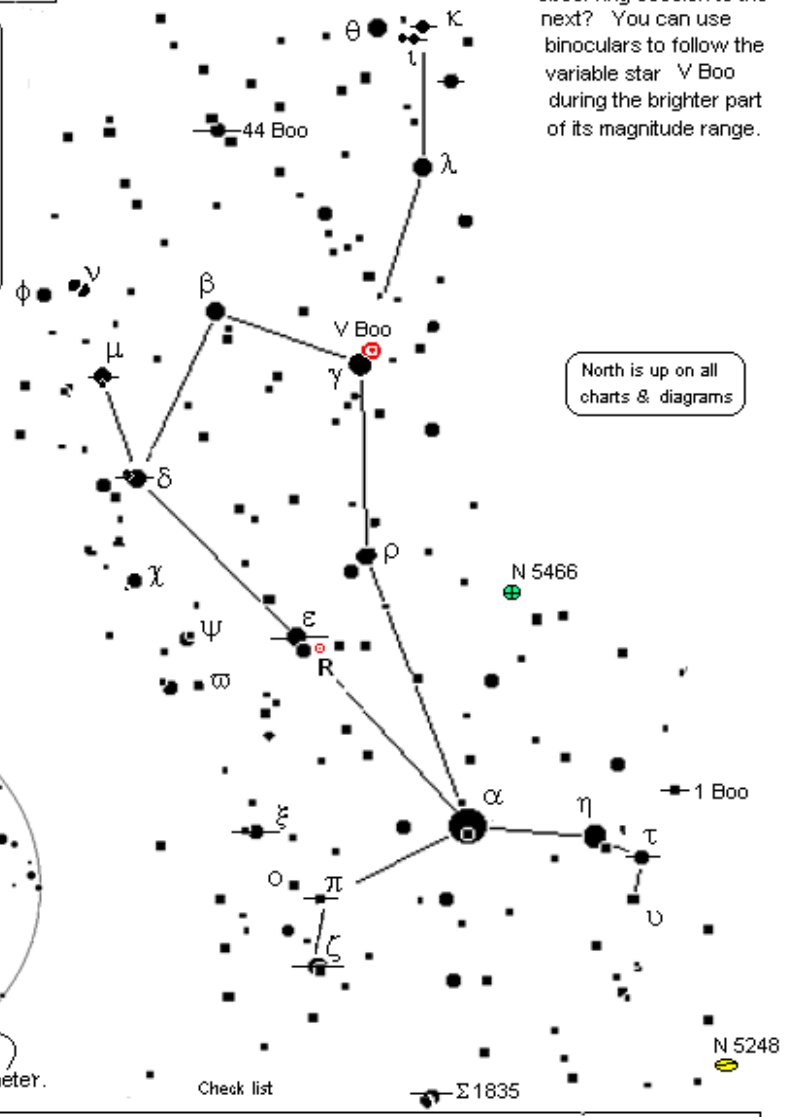






V Boo close-up chart.





DEEP SKY

N5248 11.0 mag Galaxy, 6' x 4'

N5466 9.2mag. Globular Cl. 9' diam.

STARS:

1 Boo	4.8 - 8.2,	38"	blue, white
44 Boo	5.2 - 6.2,	1.8"	yell, purple
Σ1835	5.1 - 6.9,	6.2"	white, lilac
κ	4.6 - 6.7,	12.6"	green, blue
ι	4.8 - 8.2,	38.1"	yellow, lilac
μ	4.3 - 6.5,	108"	green, white
δ	3.5 - 7.8,	105"	yellow, blue
ε	2.8 - 5.1,	2.6"	yellow, blue
ξ	4.7 - 7.0,	7.2"	yellow, purple
π	5.0 - 5.9,	5.6"	white, rose
ζ	4.4 - 4.8,	1.2"	white, white
τ	4.5 - 11.1	4.8"	green, orange
V Boo	7.0 to 12.0 mag.		258 day period

____ N5248 ____ δ

____ N5466 ____ ε

____ 1 Boo ____ ξ

____ 44 Boo ____ π

____ Σ1835 ____ ζ

____ κ ____ τ

____ ι

____ μ

V Boo was _____ mag. on ___/___/____

Instruments used:

_____ on _____

_____ on _____

_____ on _____

_____ on _____

2010 APRIL SKY ALMANAC

Solar and Lunar (EDT).

Date	Sunset	Moonrise	Moonset
1	7 : 49	11 : 23P	x : xx
5	7 : 53	2 : 17A	x : xx
9	7 : 57	4 : 28A	x : xx
13	8 : 02	5 : 58A	x : xx
17	8 : 06	x : xx	11 : 56P
21	8 : 10	x : xx	2 : 28A
25	8 : 14	x : xx	4 : 31A
29	8 : 19	x : xx	6 : 41A

PLANET WATCH

	VENUS	MARS	SATURN
	Sets	*Transits*	*Transits*
1	9:26P	9:07P	12:52A
5	9:36P	8:55P	12:35A
9	9:46P	8:44P	12:18A
13	9:56P	8:33P	12:02A
17	10:06P	8:23P	11:41P
21	8:13P	8:13P	11:24P
25	10:25P	8:03P	11:08P
29	10:35P	7:53P	10:51P

April 2010

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 April 2010 (2) Pallas

Date	Rises	RA hr. min	Dec. deg.	Alt.	Azm	Magnitude
		topocentric				
1	9 : 31 PM	15 : 54.1	+16.7	26º	90º	8.7
7	8 : 59 PM	15 : 52.5	+18.3	32	93	8.7
13	8 : 27 PM	15 : 50.0	+19.9	37	96	8.7
19	7 : 54 PM	15 : 46.6	+21.5	43	99	8.6
25	7 : 20 PM	15 : 42.6	+22.7	49	103	8.6
1	6 : 47 PM	15 : 38.1	+23.9	55	108	8.7
	EDT	*(at 4:00 UT)*		*(at 4:00 UT)*		midnite EDT

Variable Star of the Month: **V BOO** 7.0 - 12.0mag 258 day period

Celestial Highlights

Date	hr. UT	
6	8.5	**LAST QUARTER MOON**
8	1.0	Mercury 3.4º N. of Venus
12	4.0	Algol at minimum light
13	0.0	Mars: Solis Lacus @ CM
14	0.0	Mars: Solis Lacus @ CM
14	13.5	**NEW MOON**
16	1.0	Mercury 1.2º S. of Moon
17	3.0	Mars 0.7º N. of Beehive
21	18.3	**FIRST QUARTER MOON**
22	4.0	Lyrid meteor shower
28	13.3	**FULL MOON**

LUNAR OCCULTATIONS FOR: APRIL 2010

Civil (24hr) EDT date	hr	min	sec	***UT*** date	hr	min	sec	Ph	Moon % illum.	Moon alt	Moon azimuth	Star name	Star Mag.	event PA	dbl./ sep.
1	2	36	59	*1*	06	36	59	R	93-	28º	171º	SAO 158556	6.8	313º	35.0"
1	2	38	24	*1*	06	38	24	R	93-	28	171	ZC 2066	6.6	313º	35.0"
3	1	47	51	*3*	05	47	51	D	79-	10	137	sigma Sco	2.9	173º	20.0"
3	2	50	52	*3*	06	50	52	R	79-	17	150	sigma Sco	2.9	059º	20.0"
18	5	04	29	*18*	09	04	29	D	13+	18	287	SAO 76651	7.8	096º	NA"
18	22	06	06	*19*	02	06	06	D	21+	27	280	ZC 835	7.0	080º	NA"
18	22	56	03	*19*	02	56	03	D	22+	18	287	SAO 77276	6.8	142º	NA"
19	23	24	45	*20*	03	24	45	D	32+	23	281	ZC 1014	7.0	096º	NA"
21	0	01	26	*21*	04	01	26	D	43+	25	276	ZC 1150	6.7	093º	0.100"
30	1	14	04	*30*	05	14	04	R	96-	21	158	ZC 2269	5.4	289º	0.100"
30	4	08	55	*30*	08	08	55	R	96-	22	199	ZC 2289	5.4	274º	NA"

at MVCO

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) always occur on the western limb.

Position Angle (PA): tells where along the west limb to watch 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 with MICA 1800-2050 (Willman-Bell)

GALLERY…..

BROTHER SPEAKS….

Brother Guy Consolmagno, Vatican Observatory astronomer, gave a talk at the Ward Beecher Planetarium at YSU on March 4th, 2010. The main theme was an exploration of the current perception that there is a conflict in beliefs between science and religion. Brother Guy presented historical evidence that the Church and science (astronomy) shared common goals in the past. The Vatican continues in this tradition by utilizing the Vatican Observatory and the * meter telescope on Arizona's Mt. Graham, for all aspects of modern astronomical research. It was an enlightening and entertaining lecture. We all laughed at the right time and got the "inside" jokes, we were told later. It was well attended by the public, YSU faculty and MVAS members.

After the talk Brother Guy meet with audience members to chat briefly and autograph books he had authored suchs as *Turn Left at Orion*, and *Worlds Apart: A Textbook in Planetary Science*. Brother Guy hails from Michigan and is a graduate of M.I.T.

Brother Guy poses with the YSU C-11; a photo-op for the shutterbugs in the audience.

We owe thanks to MVAS Member Rich Mattuissi for arranging this lecture. Brother Consolmagno was in Youngstown to speak to the First Friday Club of Greater Youngstown. Rich seized the opportunity to have the First Friday Club co-sponsor the YSU event. It was a most enjoyable evening, indeed.

After the main crowd departed, Brother Guy joined a group of YSU and MVAS people and other friends, at Inner Circle Pizza. The coffee and light snacks went well with the informal chatter on subjects big and small, from sci-fi to real research. It was like a typical MVAS get-together. Food and astronomy. No conflicts here! *- Photos by P.Plante*

BARLOW BOB'S CORNER

ETALON DEMONSTRATION

BY BARLOW BOB

For many years, amateur solar astronomy icon Alan Daroff has attended the daily solar observing at NEAF Northeast Astronomy Forum. He is the senior member of our NSSP NEAF Solar Star Party solar staff. Using a prism spectroscope, he has demonstrated how the parts of a modern Hydrogen-alpha solar filter create a breathtaking image of the Sun. He placed the H-alpha Fabry – Pérot etalon, plus blocker and trimmer filter parts, in front of the spectroscope slit. When sunlight passes through these filter parts, you observe the spectra of these parts.

At NSSP I will use the *Lhires Lite,* a high resolution grating spectroscope, to present Alan's impressive demonstration. The Lhires Lite produces an unforgettable image of the solar spectra. This new product is manufactured by Shelyak Instruments, a French NEAF exhibitor. This product was designed as a simple user-friendly educational resource, to demonstrate spectroscopy. By moving a side lever, you can observe different parts of the spectrum through an eyepiece.

Lhires Lite can be used to observe the bright emission spectra of street lights or Geisler spectrum tubes, containing various gas elements. The dark absorption spectra of the Sun can also be observed. You would have to use the more sophisticated Lhires III high resolution spectrograph, to observe and image the absorption spectra of the other stars.

The Lhires Lite has a 1/2" round short metal rod attached to the top near the slit. The rod is called a gnomon. The gnomon is used to align the slit with the Sun, so that sunlight enters through the slit into the spectroscope. To align the Lhires Lite spectroscope on the sun, when attached to a photographic tripod, you move the spectroscope until the gnomon faces the Sun. Sunlight on the gnomon forms a shadow on the top of the spectroscope. The spectroscope is moved, until the gnomon does not form a shadow. At this point the sunlight is shining directly on to the top of the spectroscope, passing through the slit into the spectroscope. When sunlight reflects off of the holographic grating, it is separated into the colors of the electromagnetic spectrum.

When you observe the spectra of an incandescent light bulb, you see a rainbow of colors, from red to violet. However, when you observe the solar spectra, you see the same rainbow of colors, with hundreds of thin vertical dark lines covering every color. These dark lines are the Fraunhoffer absorption spectra lines of the solar spectra. These Fraunhoffer lines are the fingerprints of stars, used by astronomers to analyze the physical properties of stars and other celestial objects. Instead of holding the parts of the H-alpha etalon parts in front of the spectroscope slit with my hand, I will use a holder that I designed to position the filter parts over the slit.

The holder consists of three parts. Each part is a 2 ½ X 7" rectangular shaped piece of Masonite. A four inch long notch slightly wider than the width of the gnomon notch is cut into the center of the left side of the holder. A hole is drilled into the right side, centered to hold the filter part in position over the spectroscope slit. The middle part has a hole, slightly larger than the diameter of a filter part. The top and bottom parts have a hole, smaller than the middle part.

Lhires Lite: Notice gnome on top with the home-made etalon holder (blue taped on sides) attached at the gnome.

The middle holder part is placed over the bottom holder part. Blue painter's masking tape is placed over the right and left edges. A filter part is placed in the middle hole. The top holder part is placed over the middle holder part. Masking tape is placed over the right and left edges and folded over covering the three holder parts. When the three filter holder parts are held together, the filter part will be securely held in place between the holder parts. This prevents damage to the filter.

When viewed through the Lhires Lite spectroscope, each filter part appears differently. The etalon shows a series of thin bright H-alpha red colored lines separated by thin black lines, similar to a picket fence. The Fabry – Pérot etalon creates peaks and valleys of only the bright red Hydrogen – alpha electromagnetic wavelengths. This etalon consists of two pieces of flat glass separated by mica. The glass is spaced a specific distance apart. When light passes through the etalon, only the wavelength of the red H-alpha spectra line, which fit between the two glass surfaces, pass through. When you observe red solar prominences through an H-alpha solar filter, you observe only the bright peaks of this red wavelength.

The blocker and trimmer filter parts allow only the wavelength of the red H-alpha spectra line, blocking the other lines. You see either the dark Fraunhoffer absorption spectra line with only a thin line of bright red color on both sides of this dark line, or no color over large areas.

Please attend **NEAF** and experience this unique educational spectroscopy demonstration at NSSP.

For further information, and to check out Barlow Bob: please visit rocklandastronomy.com (use link in box below).

Or www.neafsolar.com or www.shelyak.com

19th Annual NEAF in Suffern, NY.

APR 17-18, 2010

http://www.rocklandastronomy.com/neaf.htm