AMATEUR Astronomer

The Newsletter of the Miami Valley Astronomical Society * Dayton, OH

March 2014

How Far Can You See?

How many times have you been asked that question at a public stargaze?

In Defense of Astrology

Not an article you'd expect to see in an astronomy newsletter

Astronomical League Messier Program

A "How-To" guide By A Master Observer

Astronomical League Messier Program

By Rick Allnutt, AL Master Observer
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Observers start to think about an 18th century comet hunter as the snow melts and it gets warm enough to spend a night outdoors. That comet hunter of fame was Charles Messier (1730-1817). (Pronounced "Mezzie-A")

Messier spent morning after morning searching the eastern horizon, the haystack, for new comets, and he found quite a few. He was famous for finding those comets, but that is not what most astronomers remember him for. What most modern observers remember him for was his list of false comets – faint fuzzies that he did not want to waste time on because they are present year after year in exactly the same place. He listed about a hundred of them and published them in scientific journals of the day.

The idea of the Messier program is to find, observe, and describe objects on the Messier list of objects. This amounts to a "training club" for many other AL programs. It is often the first observing program an astronomer attempts. I completed the Messier program in 2008. I did just about everything wrong. I exhausted myself and my interest several times. I got bored of seeing similar objects and having nothing to say about them. For several objects, my full description was something like "Another small GC" and "Looks like M5." When I turned in my list to the AL, I got my pin, but I also received criticism that there was no hurry to finishing a club and that my descriptions needed to be MUCH better. Perhaps my being warned will keep you from similar results.

I used that critique to build a system for collecting observations that has worked for many AL observing programs since then. This is not the only practical system, but it is one of the easiest and fastest ways to create observations.

The first thing I do is to read the rules for the program. Here is the list of what needs to be recorded for the Messier Program:
a. Date of observation;
b. Time of observation;
c. Seeing conditions;
d. Aperture size of telescope;
e. Power used;
f. A short description of the Messier object.

The second thing I do is to build a word processor document that contains all the objects in the AL program I am interested in. The Messier objects have been divided by the AL into several seasonal groups which are very useful. That list is here:

http://www.astroleague.org/al/obsclubs/messier/messlist.html

First, I write a prologue for the observing list. It contains information about each observing session, some of which is required for the completion of the program.

I start the document with the name of the program, my name, address, and then name of my observing club: Miami Valley Astronomical Society

I describe each telescope I use in the program and the resulting power from each eyepiece.
For example:
10in Dob: Orion 10in, FL 1200mm, 80mm finder scope, Telrad 1X finder
Magnification: L (32mm eyepiece: 37.5X) H (10mm eyepiece: 120X)

Observing Sessions get listed next:

Date	Location	Conditions	Seeing

The first session might be:

3/14/14	Beavercreek OH	Clear, calm, 37F	Mag 5 stars, naked eye

I would suggest taking each line of the list and transforming it into the word document as follows: From the chart – These are the first two objects from that list:

NGC	RA		Dec	Mag	Type	Con	Size	Messier
224	0	42.8	41 16	4.5	Gal	AND	178'	31
221	0	42.8	40 52	10	Gal	AND	8 x 6	32

This is what the first two entries on my document would look like:

M31 NGC224 RA 0 42.8 Dec 41 16 Mag 4.5 AND Size 178'
Location: Date: Time Z Scope: 10in Dob L H
Description:

M32 NGC221 RA 0 42.8 Dec 40 52 Mag 10 AND size 8' x 6'
Location: Date: Time: Scope: 10in Dob L H
Description:

I would then carry a pocket voice recorder with me to the telescope and dictate my description of each object I looked at. I find it is MUCH easier to describe objects to a voice recorder while I am actually looking through the eyepiece. After listening to my recorder from the night's observation, I type up the formal observation.

My observation, typed up the next morning for these two might look something like this:

M31 NGC224 RA 0 42.8 Dec 41 16 Mag 4.5 AND Size 178'
Location: Beavercreek OH Date 3/15/14 Time 0223Z
Scope 10in Dob L H
Description: The Andromeda Galaxy. Faintly visible by naked eye. Easily seen through 80mm finder. With scope, innumerable stars are visible in ground glass appearance with perhaps some granularity at high power. Obviously 3-4 times longer than its width. The length of the galaxy is longer than the field of view at low power. The longer I look, the more potential detail begins to be seen, though it is not nearly so remarkable to my eye as is shown in photographs.

M32 NGC221 RA 0 42.8 Dec 40 52 Mag 10 AND size 8' x 6'
Location: Beavercreek OH Date 3/15/14 Time 0226Z
Scope 10in Dob
Eyepieces 32mm, 10mm
Description: This galaxy is contained in the substance of M31 as a separate glow. The galaxy is nearly round and concentrates toward the center. No individual stars can be seen, even at high power, as might be expected of a globular cluster. The diameter is about 1/6 of the lower power field of view.

The rest of the rules for the program are listed here: http://www.astroleague.org/al/obsclubs/messier/mess.html

Let's check that we are getting all the required information:

- Date of observation; Yep… this is part of the individual observation.
- Time of observation; Dittos
- Seeing conditions; This is tied to the date of the observation and is listed under the observing sessions
- Aperture size of telescope; This shows up in the list of telescopes used. The nickname of the scope in the observation ties the information to the full description of the scope.
- Power used; For M31 and M32 I observed with both L and H power. Actual magnification is listed in the scope description.
- A short description of the Messier object. This was recorded and then transcribed.

To simplify the overall rules, to get a certificate you need to turn in observations of 70 of the objects. To get an "honorary" certificate and pin, you need to complete the full list. Your list needs to be verified by one of our club officers and a letter turned in by them attesting to their review to the chair of the Messier Program listed on the web page.

I hope this spurs you into working on the Messier observing program and gets you started out on the right foot.

In the next column I will share some hints and tricks for dictating and then transcribing observations of different kinds of objects in the night sky.

Dark Skies!

Messier Program Award Pin

In Defense of Astrology

by Col Keith E. Brandt, MD, MPH, FAAFP
keith.brandt@gmail.com

Not an article you'd expect to see in an astronomy newsletter, is it? Let me say at the outset I do not believe astrology is a valid system of analyzing or predicting human behavior, or can show influence of celestial bodies on events here on Earth. As an amateur historian focusing on Medieval Natural Philosophy, I have studied a bit of astrology's history and principles.

The basic tenets of astrology are flawed, it is argued, because the zodiac doesn't match the positions of constellations along the ecliptic, that there are actually 13 constellations of the zodiac, and that the constellations aren't evenly spaced around the ecliptic. While these are essentially true astronomical facts, using them as proof against astrology is a "straw man" argument, i.e., it does not represent the astrological point of view. Note the key difference in terminology: astrology refers to 'signs of the zodiac', not 'constellations of the zodiac'. These are two very different things. Trained astrologers (both modern and in antiquity) were and are well aware of the signs of the zodiac have drifted against the background of stars and don't align with the constellations which lend them their names. The signs as used in astrology are simply a (the original?) celestial coordinate system that depicts ecliptic longitude. The sign Aries starts at the vernal equinox point on the ecliptic (which currently resides in the constellation Pisces) and spans the first thirty degrees, followed by the 30 degrees of the sign Taurus (ecliptic longitude 31 - 60 degrees), and so on around the ecliptic with each sign occupying 30 degrees. Therefore, the twelfth degree of Gemini would be ecliptic longitude 72 degrees and the second degree of Sagittarius corresponds to ecliptic longitude 242 degrees. This method originated in antiquity and was used in scientific literature into the 19th century.

While the claim that the signs of the zodiac don't line up with the constellations of the same name is true, it is comparing apples (constellations) to oranges (signs). But when an astrologer says the "Sun is in Leo", that can still be a true statement giving the Sun's ecliptic longitude, even if the Sun resides within the boundaries of the constellation Cancer.

There are many aspects of astrology deserving critical scientific critique, but their historically-based method of utilizing the signs of the zodiac as a celestial coordinate system is not one of them.

For more detailed information, the Wikipedia article 'Zodiac' handles the topic well.

March General Meeting

M42/43 – Reflection/Emission Nebula in Orion
Telescope: Meade SN8, Orion Atlas EQ-G
Camera: Gary Honis Baader Modified Canon Rebel T2i
Filter: Orion Imaging Sky Glow Filter
Guide scope: DSX-90, DSI Pro III, PHD
Exposure: 41x30sec, ISO 800 saved as RAW
Darks: Internal
Flat: Synthetic
Software: Backyard EOS, Deep Sky Stacker, Nebulosity, Photoshop

This is one of my better images of the Great Orion Nebula. I don't think that I've caught so much of the outer loop before. I'm sure I can get a bit more if we get a night with better transparency.

Facebook/Twitter

The MVAS is now on social media Facebook and Twitter. MVAS members can now go and " like us" on Facebook at ***https://facebook.com/miamivalleyastro/*** and "follow us" on Twitter at ***https://twitter.com/MVAS_Dark_Sky***.

Please be aware that this is social media for the entire world to see, when posting items to these locations. If we are having a private event, such as a school event or a Members night at JBO, these cannot be posted to the site. They are NOT open to the public.

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How Far Can You See?

by John Graham

How many times have you been asked that question at a public stargaze? Of course it has no easy answer since it depends on so many things such as the quality of the sky, the size of the telescope, the skill of the observer, and so on. However, we may now have a definitive answer to this question.

While visiting the Video and Electronically Assisted Astronomy Forum on Cloudy Nights I came across a post by the British amateur astronomer Maurice Gavin (Nytecam) titled "12 billion light years far enough?". In it he shows an image of APM 08279+5255, a quasar in the constellation of Lynx. (As you might have guessed, the name is derived from its location, though not in the present Epoch.) On investigating this a bit I found that this object is well placed right now, high overhead in the late evening, so I just had to give it a try and on the evening of February 26th I finally had my chance. The evening was bitterly cold but my camera hung in there long enough to get enough images to work with.

With the help of Maurice's image as a finder chart I was able to see the quasar in the real-time images and being a stellar object it easily stood out in the stacked images even without any processing. However, as I process the image to suppress the noise and bring up the hidden details the image really started to effect me deeply. And the more I look at it the more amazing it becomes. All of the stars in the foreground are members of our own galaxy, no more than a few thousand light years away. As I worked on the image increasing numbers of faint galaxies began to appear, perhaps 10s of millions to 100s of millions of light years away. An in the center of the field, this faint little red 'star' 12 billion light years away; 87% of the way back to the Big Bang, the very birth of the universe itself. This light from this object is nearly 3 times older than the Sun, or the Earth for that matter. It dawned on me that this is the most amazing image that I've ever taken, the most amazing image that I will likely ever take. The end. The edge. The farthest object we can ever see with amateur equipment.

The superlatives used to describe APM 08279+5255 are also impressive. The most luminous object in the sky shining with the brightness of 100 billion suns. At its heart is a supermassive black hole with a mass of 20 billion suns. Its apparent brightness is enhanced by a gravitation lens formed by the galaxies in the foreground. Its redshift is 3.87, meaning that it is not red, but fiercely blue-white. It is receding from us at such a great speed that its color has been redshifted all the way across the visible spectrum from blue to red. Last, bit not least, at magnitude 15.2 it should be within reach of large telescopes, particularly from a dark sky site.

So, we can finally give a definitive answer to that ever-present question; "how far can you see?" The answer; 12 billion light years, given a big enough scope and a dark enough sky.

APM 08279+5255 – Quasar in Lynx
Telescope: Meade SN8, Orion Atlas EQ-G
Camera: Gary Honis Baader Modified Canon Rebel T2i
Filter: Orion Imaging Sky Glow Filter
Guide scope: DSX-90, DSI III, PHD
Exposure: 28x60sec, ISO 1600 saved as RAW
Darks: Internal
Flat: Synthetic
Software: Backyard EOS, Deep Sky Stacker, Nebulosity, Photoshop

OLD TOOL, NEW USE: GPS AND THE TERRESTRIAL REFERENCE FRAME

BY ALEX H. KASPRAK

Flying over 1300 kilometers above Earth, the Jason 2 satellite knows its distance from the ocean down to a matter of centimeters, allowing for the creation of detailed maps of the ocean's surface. This information is invaluable to oceanographers and climate scientists. By understanding the ocean's complex topography—its barely perceptible hills and troughs—these scientists can monitor the pace of sea level rise, unravel the intricacies of ocean currents, and project the effects of future climate change.

But these measurements would be useless if there were not some frame of reference to put them in context. A terrestrial reference frame, ratified by an international group of scientists, serves that purpose. "It's a lot like air," says JPL scientist Jan Weiss. "It's all around us and is vitally important, but people don't really think about it." Creating such a frame of reference is more of a challenge than you might think, though. No point on the surface of Earth is truly fixed.

To create a terrestrial reference frame, you need to know the distance between as many points as possible. Two methods help achieve that goal. Very-long baseline interferometry uses multiple radio antennas to monitor the signal from something very far away in space, like a quasar. The distance between the antennas can be calculated based on tiny changes in the time it takes the signal to reach them. Satellite laser ranging, the second method, bounces lasers off of satellites and measures the two-way travel time to calculate distance between ground stations.

Weiss and his colleagues would like to add a third method into the mix—GPS. At the moment, GPS measurements are used only to tie together the points created by very long baseline interferometry and satellite laser ranging together, not to directly calculate a terrestrial reference frame.

"There hasn't been a whole lot of serious effort to include GPS directly," says Weiss. His goal is to show that GPS can be used to create a terrestrial reference frame on its own. "The thing about GPS that's different from very-long baseline interferometry and satellite laser ranging is that you don't need complex and expensive infrastructure and can deploy many stations all around the world."

Feeding GPS data directly into the calculation of a terrestrial reference frame could lead to an even more accurate and cost effective way to reference points geospatially. This could be good news for missions like Jason 2. Slight errors in the terrestrial reference frame can create significant errors where precise measurements are required. GPS stations could prove to be a vital and untapped resource in the quest to create the most accurate terrestrial reference frame possible. "The thing about GPS," says Weiss, "is that you are just so data rich when compared to these other techniques."

You can learn more about NASA's efforts to create an accurate terrestrial reference frame here: http://space-geodesy.nasa.gov/.

Kids can learn all about GPS by visiting http://spaceplace.nasa.gov/gps and watching a fun animation about finding pizza here: http://spaceplace.nasa.gov/gps-pizza.

Artist's interpretation of the Jason 2 satellite. To do its job properly, satellites like Jason 2 require as accurate a terrestrial reference frame as possible. Image courtesy: NASA/JPL-Caltech.

APOLLO RENDEZVOUS 2014
MIAMI VALLEY ASTRONOMICAL SOCIETY

Saturday, June 14, 2014
Boonshoft Museum of Discovery

Our Speakers

- Thomas Beatty-The Ohio State University, Astronomy Department- Speaking on " Extrasolar Planets".
- Ben Davidson- Suspicious Observer- speaking on "Starwater".
- Mike Taylor- Mike Taylor Photography- speaking on astrophotography

Our Vendors

- Oberwerk
- Burgess Optical

Door Prizes/Raffle Items will be posted to the MVAS website as we receive them.

Dinner and Observing at our dark sky site, located at John Bryan State Park Observatory that evening. See BBQ flyer on the website for all the information.

Visit the MVAS website at www.mvas.org for all the details and registration forms.
For questions, contact Linda at AR@mvas.org

Up-Coming Programs/Events

General Meeting Speakers
April 11, 7:30, Boonshoft Museum- Dr Paul Sutter-Department of Astronomy The Ohio State Univeristy,-TBA
May 9, 7:30, Boonshoft Musuem- Rick Wills- An Introduction to Orbital Mechanics & Issues in Asteroid Mining
No General Meeting in June due to Apollo Rendezvous

Members Nights
March 29- 6:00 JBO- Dinner- Pot Luck- Program- Messier Marathon
April 26- 6:00 JBO- Dinner- Comfort Food- Program- assistant professor of physics, Andrew Wagers- Cedarville Collage- Type Ia Supernovae.* we will move this program to the Boonshoft Museum if it should rain that evening.
May 31- 6:00 JBO- Dinner-Mexican- Program- Workshop TBA

Member /Private Events
April 12- 8:00- Scouts at JBO (members/private)
April 30- 8:30- Weller Elementary in Centerville

Member/Pubic Events
March 8, 6:30-8:30- Centerville Washington Park
March 22, 8-10- Washington Mill Park
April 23, 7:00- Mound Museum- Alexus McLeod –Native American Astronomy- Observing to follow.
May 10, 11-4-Astronomy Day at the Boonshoft Museum
May 16, dusk- Star gazing at the NMUSAF
May 24, 8:30- help with your telescope with Camper star gaze to follow. John Bryan State Park, day lodge parking lot.

Classifieds Section

The Amateur Astronomer now has a classified section. Please consider posting your items for sale or throwing out a greeting to one of your fellow members.

Various Items for Sale:

I have several 1.25" Meade Super Plossls for sale- 6.4 mm, 9.7mm, 12.4mm, and a 15mm. --$10.00 each

1.25" 2X Meade Barlow--$10.00
1.25" Orion 90 degree diagonal--$15.00
T-Ring for a Canon--$10.00

I also have a German Equatorial Mount. It is an older mount with one weight, wooden tripod, and an RA drive motor. I'm not sure if the drive motor works or not, but it has the battery pack, motor, and controller pad. --$35.00

Lastly, I have a Meade Classic LX200 10" SCT for sale. It is the OTA only. In addition, I have a zero-image shift SCT Crayford focuser made by JMI, a Telerad, a Meade Dew Shield (metal and the same color as the scope), a 10" dew strap, and Losmandy rail. Taking offers, perfer to sell together, but will consider parting out.

Contact Rick Weiss at rick.weiss@mvas.org

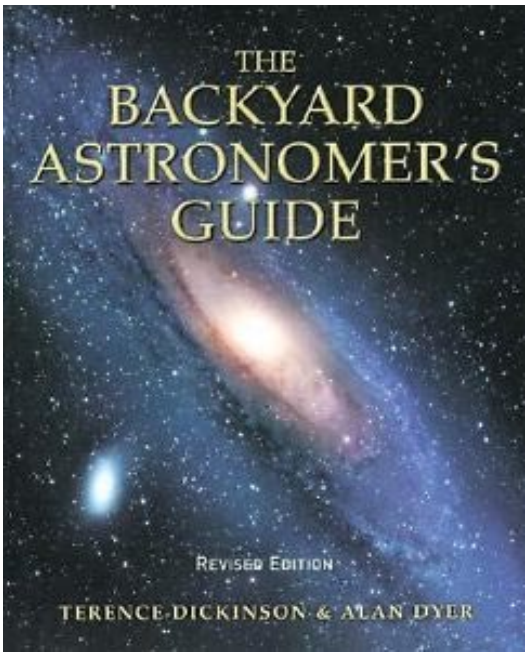
Did You Know?

That as a Miami Valley Astronomical Society member you will receive a 10% discount off of your purchases at Oberwerk. The beauty of that is that they are a local vendor right here in Dayton.

March is Membership Renewal Month!

Please get your membership renewals in soon. You must complete your renewals immediately or risk losing your society benefits. John Byan Observatory key-holders must renew or relinquish their key. The secretary has sent renewal forms via email.

April General Meeting Raffle Item:
Tickets are 1 for $1.00 or 6 for $5.00



About The Cover

A close-up of Astronaut John Grunsfeld shows the reflection of Astronaut Andrew Feustel, perched on the robotic arm and taking the photo. The pair teamed together on three of the five spacewalks during Servicing Mission 4 of the Hubble Space Telescope in May 2009.
Photo Courtesy of NASA.

Birthdays –

March….
Rick Weiss

April …..
John d'Entremont
Greg Scoumis

Welcome New Members

We'd like to welcome the following new MVAS Members

The Family of Christopher Clifford
Bruce Shuman