The Guide Star

Newsletter of the Amateur Astronomers Association of Pittsburgh Inc
Founded June 9, 1929 by Chester B. Roe and Leo J. Scanlon
Website: 3ap.org

January 2011 ***Volume 45, No.1***

January AAAP General Meeting

Friday, 14 January, 2011 7:30pm
Carnegie Science Center

Featured Speaker: John Holtz
Topic: Observational Astronomy for the Beginner

John Holtz, a member of the AAAP since 1986, will present Observational Astronomy for the Beginner. This presentation will cover the basics of astronomy for observers and is based on a 5 night course that John taught at Wagman Observatory back in August of 2004, although condensed into an hour.

Designed for the beginner, the class focuses on topics of interest to a backyard observer such as what can be seen with the unaided-eye, binoculars, and telescope; types of telescopes and their use; and other basic terms and concepts. So if you are new to astronomy or just want to brush up on the basics, this meeting topic is for you! ***- Craig Lang***

January's Quadrantid Meteor Shower

With a predicted zenith hourly rate of 120 and variable maximum of 60 to 200 January's Quadrantid meteor shower ranks among the top three showers along with the Geminids and Perseids. It is however, the most difficult to observe. Long time meteor watcher, Robert Lunsford describes Quadrantid behavior: "(their) rates remain low until only a few hours before maximum …. climbing steadily with rates nearly doubling each hour. The actual maximum is short-lived and rates plummet just as fast as they climbed." He mentions that in 35 years of observing, he's seen maximum activity only once. This year there's good and bad news.

Good: The predicted time of maximum, according to both the International Meteor Organization and the RASC handbook – 20:01 local time on January 3rd - is due to occur about eight hours ahead of New Moon.

Bad: The shower radiant in northern Bootes at 15h 20m +49° while technically circumpolar will be touching the northern horizon at 20:01 local. The radiant won't "rise" above the eastern horizon until after midnight, climbing throughout the early morning of the 4th.

A possible saving grace is another prediction that puts the peak between 21:00 on the 3rd and 01:00 on the 4th.

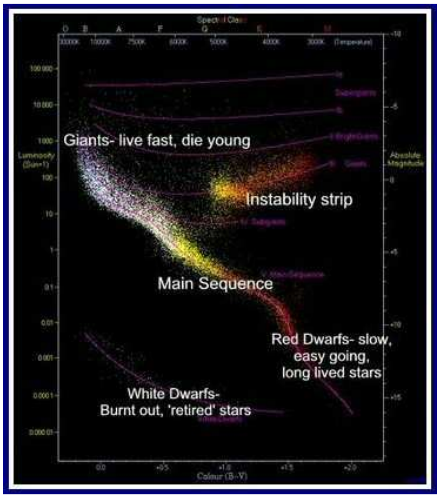
Quadrantids are moderate in speed – moving about 40 kilometers a second – with meteors brighter that those of most other showers.

Quadrantids, by the way were first recognized as a shower in 1825 and received their name from Quadrans Muralis or the Mural Quadrant, a now defunct constellation created by the French astronomer J.J. de Lalande. The constellation first appeared in a star atlas in 1795.

- Guide Star Editor

A Classification Scheme for Amateur Astronomers: Mike Simonsen's T-M Diagram

You've heard of the H-R Diagram. It's a plot of luminosity versus color for stars. Up through the middle runs the main sequence, where typical stars, like our Sun, spend the majority of their lives, steadily converting hydrogen into helium. Veering off to the right and up is the instability strip, where we find stars that have undergone changes in their interiors and are now pulsating, like Miras and Cepheids. You knew I had to slip in something about variable stars, right?

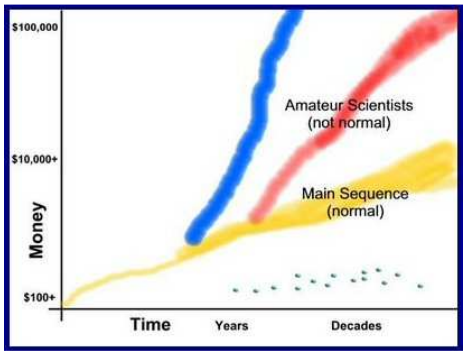


Near the top left is where huge, massive, ultra-luminous stars spend their short lives (for stars anyway), gobbling up their interior resources at a fatal rate. Near the bottom we find the burnt out cinders of evolved stars, the white dwarfs.

Many things can be illustrated using the H-R Diagram, but mostly it is an excellent way to track stellar evolution, the birth, life and death of stars.

I have invented something similar to describe the evolutionary track of amateur astronomers. I call it the T-M Diagram. The vertical axis represents money, in dollars. It is a log scale. The horizontal axis represents time, in months, years and decades; also a log scale.

Through the middle of the diagram we find our normal amateur astronomer as he progresses from an initial minor investment of time and money, say a few books and some binoculars, to more sophisticated and expensive items.



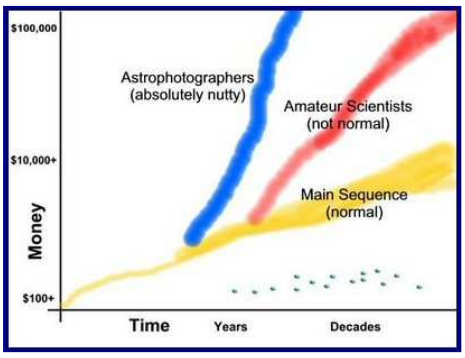
After a few months or years the amateur probably purchases a telescope and some accessories, and over a period of years to decades may invest several thousand dollars.

For some, once they have tracked down and observed the Messier objects and some other faint fuzzies, they get the bug to try something else,

maybe even contribute to science in some way. After a few years they break from the main sequence and form their own branch of the T-M Diagram. They may become variable star observers, search for novae, supernovae, asteroids or comets, or they may become planetary imagers, employing digital SLRs or CCD cameras.

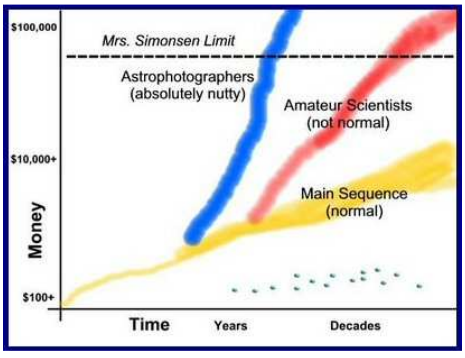
This invariably leads to larger aperture instruments, computers, CCDs, home observatories and an extreme laundry list of accessories, nay, ***necessities!*** Before they know it, usually in a matter of years, they have spent tens of thousands of dollars on their hobby. This is not normal behavior and may lead to serious consequences later.

Even more worrisome is the path taken by the serious astrophotographer. These poor people give up their souls, money and in extreme cases, family ties, to pursue the ultimate images of galaxies and nebulae.

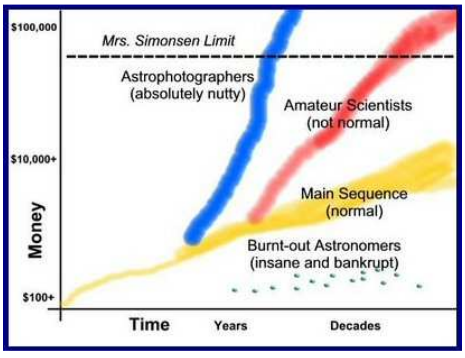


The addiction takes hold quickly, and there seems to be almost no limit to the time and money they will invest to get the 1000th perfect image of the Eskimo Nebula.

Across the top of the next T-M Diagram we see a dashed line. In spite of its interrupted appearance, this line represents a definite limit: Mrs. Simonsen's Limit, which no amateur in this house will dare to cross.



Lastly we find, represented by small circular impressions near the bottom of the T-M Diagram, the burnt out remains of once promising amateur astronomers, who after decades pursuing a hobby that has grown into an



obsession, or worse, find themselves insane and bankrupt. We will discuss this troubling trend in astronomy in future blogs, when we address such things as aperture fever and the signs you or your loved one may be suffering from 'astronomy obsession'. Stay tuned.

This article by noted variable star observer Mike Simonsen is available courtesy the AAVSO Writer's Bureau We'll run Mike's "obsession" article soon – GS Editor

A Unique Challenge Object: Our Moon

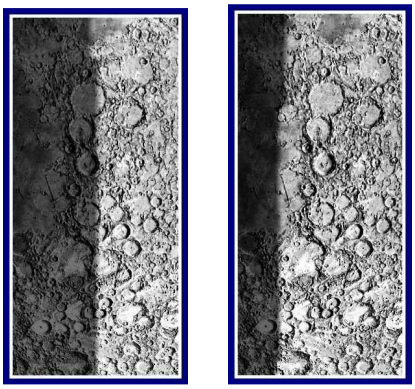
What you see on the Moon depends on both topography and lighting. A change in lighting conditions can radically alter a feature's appearance, in some instances it might actually disappear. Compare crater Clavius under moderately high lighting on the left versus full Moon lighting conditions on the right:

Some events depending on illumination are only visible at specific times, so planning is a must. Here's an example:

At exactly 20:30 EDT on 17 June 2002, the Moon, visible over Pittsburgh, reached first quarter. At that time, the light of lunar morning spilling onto the floor of crater Ptolemaeus was truly spectacular. Over the next two and a half hours, what started as dim patches became four fan shaped projections of light brightening as they stretched 70, 80 then 90 kilometers across the normally level floor of the crater which now showed all manner of depressions and swells. Bottom line: It was a great show. The challenge: When could I view the Ptolemaeus sunrise again?

Failed solution # 1: Wait a month and catch it the next first quarter moon. This doesn't work because a synodic month, or the period between identical lunar phases, is about 29 and a half days. The next first quarter Moon was due on July 17, 00:48 EDT. Trouble was, that Moon would be less than a degree off our western horizon. So, the "Moon I wanted to see" - the Moon at the instant of first quarter - wasn't even in my sky in July. In fact, a precise first quarter wouldn't be over Pittsburgh until April 9 of 2003 at 19:41 EDT.

Failed solution #2. Wait 10 months for the April first quarter. These two panels show the Ptolemaeus area precisely at first quarter when observable in Pittsburgh skies. At my June 2002 first quarter, light was startting to spill into crater Ptolemaeus, the largest and uppermost of the triple crater chain, while at the April 2003 first quarter, the whole crater is already in full sunlight and the terminator has progressed many miles to the west.



First Quarter Terminators
June 2002 ***April 2003***

These panels show that using ***lunar phase*** – noting the Moon as first quarter - or using ***lunar age by day*** - noting the Moon as 7 days old - or even using ***percentage of illumination*** - noting that the moon is 50% illuminated at first

quarter - none of these is an accurate indicator of lighting conditions in relation to a particular feature. For critical, time sensitive observations, they're actually rather useless. Why?

The variable gumming up the works is libration, a wobbling or swaying of the moon which over time allows us to see about 59% of the lunar surface but which also plays havoc with the location of features relative to incident sunlight from one lunation or lunar phase cycle to another. Lunar age does not tell us how the Sun is positioned.

The best way to describe illumination conditions for a given observation is to note the longitude of the terminator, called ***selenographic colongitude***. On our Moon, it's calculated from 0^o which marks a line that approximately bisects Sinus Medii. It increments in a lunar westward direction around the circumference a full 360^o .

The terminator was at 1^o selenographic colongitude during my June 17, 2002 Ptolemaeus sunrise event. So the challenge becomes: Determine when a moon with a given selenographic colongitude will be observable in your sky.

The time-honored - meaning hard - way to determine a colongitude is to take the start-of-month colongitude value in the Observer's Handbook and increase or decrease it using the daily increment of 12.2^o. Subsequently, determine if the Moon with the desired value will be observable in your sky that month. It's a slow, give-yourself-an-education kind of process.

By far the easier way is to use a freeware package. Something like the Lunar Terminator Visualization Tool referred to below. You input your location and the time of the observed event. It determines lighting conditions for that time and predicts when those same conditions will be present on a future Moon visible at your location. Software like this is different than some lunar mapping packages because its primary aim is to accurately position the terminator, not provide a map or name features. It's no exaggeration to say that what you see on the Moon this evening, you may never see again in exactly the same way.

I. A Critical Lighting Event: The Lunar "X"

A few years ago, observers began to mention a lunar illumination event called the Lunar X, the Werner X or the Purbach Cross. It too can be seen around first quarter, but unlike some other lighting events, the best and most elusive view - when sunlight touches the rims of craters Purbach, laCaille and Blanchinus and the entire surrounding area is still in shadow - is limited to a very short interval of only about an hour. This is called the "Peak X" in this paper :
http://idisk.mac.com/chapmandave-Public/WernerX2.pdf

This image of the "Peak X" was captured by Ron Bee on 17 November 2007 at 02:26 UT. The selenographic colongitude at the time of observation was 357.35^o. Note: the web site to obtain the Lunar Terminator Tool is given in the paper. Using the above time as input, the Lunar Terminator Visualization Tool predicts that the next occurance of the "Peak X" will be visible in our skies on 11 January 2011 at 23:37:28 UT or 18:37 local.

The Moon will be a bit west of the meridian and almost 60^o off our southern horizon at that time.

II. Easily Visible in Binoculars: "Golden Handle"

Visible in binoculars and even to an attentive naked eye, the Jura Mountains, forming the "shore" of the Bay of Rainbows or Sinus Iridum, when catching the rising sunlight, displays a lighting event which lasts for about four hours or so. It's called the "Golden Handle".

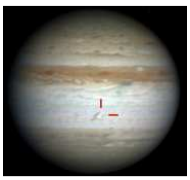
The last time I observed it was October 17, 2010 at 23:00 local time. Using this as input to the Lunar Terminator tool the Handle should be next visible in our skies on January 14, 2011 beginning 13:00 local time. The Sun will also be up however. Best bet would be late afternoon.

III. Ptolemaeus Sunrise

And last, the first lighting event we spoke of – the morning sun pouring into Ptolemaeus. This year, in our skies, the conditions that held on 17 June 2002 will occur only once, on January 11, 2011 at 22:34 local time. Unfortunately the Moon will be only 21^o off our western horizon. And of course all of these predictions assume clear skies over Pittsburgh. Challenge indeed! ***- Guide Star Editor***

Jupiter's SEB Revival Continues

The outbreak, first noted in November, in the region of the Southern Equatorial Belt that signals its revival, continues to expand. Note the dark material winding its way around the northern edge of the SEB area in the later images.



12 Nov. 2010

Images Courtesy: Christopher Go
Cebu, Philippines
http://jupiter.cstoneind.com/

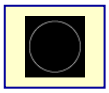
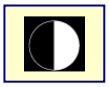
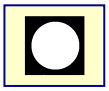
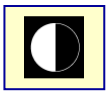
24 Nov. 2010

13 Dec. 2010

15 Dec. 2010

18 Dec. 2010

- Guide Star Editor

Sun	Mon	Tue	Wed	Thu	Fri	Sat
All times given are local. Details for AAAP Events can be found at: https://nightsky.jpl.nasa.gov/event-list.cfm?Club_ID=675&EventEra=Future						**1**
2 Mercury 5 ° N of the crescent Moon. Jupiter & Uranus Conjunction 09:00 (14:00 UT)	**3** Quadrantid Meteor Shower Peak 20:00 (01:00 UT)	**4** 	**5**	**6**	**7**	**8** Venus 47 ° W of the Sun. Greatest Elongation
9 Mercury 23 ° W of the Sun. Greatest Elongation	**10**	**11**	**12** 	**13**	**14** AAAP General Membership Meeting Carnegie Science Center 7:30	**15**
16	**17** Mu Geminorum Occultation start approx 23:55 Jupiter Double Shadow Transit	**18** Mu Geminorum Occultation ends approx 00:55	**19** 	**20**	**21**	**22**
23	**24** Jupiter Shadow & Double Transit	**25**	**26** 	**27**	**28**	**29**
30	**31**					

Some Celestial Highlights for January

Mercury is low in the southeastern dawn sky all month and will achieve its greatest elongation at 23° W on the 9th. ***Venus*** is well placed in the morning sky all month. ***Mars*** is not visible. ***Jupiter*** and ***Uranus*** begin the evening west of the meridian and by month's end both will set before 22:00 . These planets achieve conjunction on the 2nd at 09:00. This is their last conjunction until 2024. ***Saturn*** rises around midnight and is visible all month. Note in 2011 we'll see the northern surface of the planets rings. Their inclination will vary from 10.1° in early January, decreasing to 7.3° in early June and increasing to 14.8° at end of year. Also note that Saturn now lies below the celestial equator, a situation which will hold until March of 2026. ***Neptune*** lies is in the west in the early evening sky, by month end setting little more than an hour after sunset.

For those using programs to predict GRS transits, ***Jupiter's System II longitude*** is 155°.

Selenographic Colongitude is 212.02° at 0h UT at beginning of the month. Add 12.2° each day.

(All times below are local)

1 18:22 ***Io*** transit begins
19:42 ***Io*** shadow transit begins
20:37 ***Io*** transit ends
21:55 ***Io*** shadow transit ends

3 20:00 ***Quadrantid Meteor Shower Peak***

17 17:49 ***Ganymede*** transit ends
18:02 ***Io*** shadow transit begins
19:05 ***Io*** transit ends
19:43 ***Ganymede*** shadow transit begins
(at this point a double shadow transit)
20:16 ***Io*** shadow transit ends

23:55 ***Mu Geminorum*** mag. 2.8 occulted by 14.8 day old Moon

18 00:55 ***Mu Geminorum*** occultation ends

24 18:01 ***Great Red Spot*** transits Central Meridian
18:50 ***Io*** transit begins
19:03 ***Ganymede*** transit begins
(at this point a double satellite transit)
19:58 ***Io*** shadow transit begins
(at this point a double satellite & a shadow transit)
21:05 ***Io*** transit ends

27 17:40 ***Europa*** transit begins
19:52 ***Europa*** shadow transit begins
20:25 ***Europa*** transit ends

Welcome New Members

Eric Butterbaugh
Linda Janus & Family

Congratulations Service Award Winners

Special awards:
Brashear Award - Flaccus Stifel

Annual awards:
Nova Award - Michael Markiw III
Lois Harrison Award - Lori Seitz
George Lindbloom Award - Craig Lang

For Sale: Takahashi 102mm Apo and Mount

Mint condition, used maybe twice.

Takahashi 4 inch APO refractor, Takahashi Temma EM11 equatorial mount, finderscope, quartz dielectric diagonals, Takahashi 24 volt 110/220 external power source

TMB 4mm planetary eyepiece, Takahashi 18mm Plossl, Televue 32mm Plossl ND(moon) and planetary filters

The entire set up is less than 1 year old. Original purchase price was $7200. I am asking $6000 or best offer.

Call Marc Wolkoff at 412-257-1958 or 412-951-0115 (cell)

Guide Star Submissions

All AAAP members are encouraged to submit items to the club newsletter.

Articles, images, observations, notices, ads, book, software and equipments reviews, all are welcome.

Only submissions received before the 15th of the prior month are assured of inclusion in the coming issue.

The Guide Star is posted online and sent to print on the 20th of the prior month.

Send submissions or questions to: gseditor@3ap.org

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