

New Braunfels Astronomy Club

Texas, USA

August 15th, 2019

242nd Meeting

Larry's Celestial Calendar & Newsletter

-by Eric Erickson

August 15th to September 19th, 2019 265th Edition

Harvest Moon

**The Moon Dances with Planets and Stars
Jupiter and Saturn Rule the Night Sky**

Observer's Highlight Calendar for Clear Skies

Month	Date	Time/Direction	Event
Aug	15	7:29 am CDT	Full Moon
Aug	22-25	Pre-dawn/SE	Watch a waning Crescent Moon slide through Taurus and get close to Aldebaran on the 24 th
Aug	23	9:56 am CDT	Last Quarter Moon
Aug	28	Dawn/E	Try to catch a very thin Crescent Moon and M44 (Beehive cluster) in Cancer
Aug	30	5:37 am CDT	New Moon
Sep	4-8	After Sunset/S-SW	Watch a waning Moon travel the sky from Sagittarius through Scorpius, getting close to Jupiter then Saturn
Sep	5	10:11 pm CDT	First Quarter Moon
Sep	12-15	9 pm CDT/ESE	Experience the "Harvest Moon Effect", a nearly Full Moon appears low in the sky at the same time over these evenings. Perfect for extending the harvest day.
Sep	13	11:33 pm CDT	Full "Harvest" Moon, is at apogee (farthest from Earth). A Harvest Moon is the full Moon occurring closest to the autumnal equinox.

Solar System Roundup

- ✚ **Mercury** is a morning “star” more than 10° above the ENE horizon but heading into the Sun’s glare. Catch it before August 26th when it is lost from view. Mercury arrives at superior conjunction on September 3rd and will not be a good target
- ✚ **Venus** is lost in the Sun’s glare until mid-September
- ✚ **Earth** still spins, and we are still here to marvel at the wonders of our universe
- ✚ **The Moon** dances with planets and stars
- ✚ **Mars** is lost in the Sun’s glare for a few months...see you in October?
- ✚ **Jupiter** is visible most of the night and it is a very good target
- ✚ **Saturn** is a beautiful target but slowly fading and decreasing in apparent size so check it out now
- ✚ **Uranus** is best viewed in the early am hours and is in Aries
- ✚ **Neptune** is at opposition on September 10th and visible in Aquarius
- ✚ **Comet(s)**
 - Africano (C/2018 W2): First time visitor 11th magnitude comet and is traveling WSW in Camelopardalis
- ✚ **ISS Viewing for New Braunfels (works for Canyon Lake too). After 5 am and before midnight. From Heavens Above.**

Date	Start Time	Start Loc	Max Alt °	Travel Toward
08/22	06:15	S	13	E along the horizon
08/24	06:14	SSW	44	NE
08/26	06:13	WSW	45	NE
09/10	06:46	NNW	10	E along the horizon
09/12	06:43	NW	25	E
09/14	06:39	NW	87	SE – high
09/16	06:39	NNW	24	SSE
09/17	20:48	SW	87	NE – high
09/18	19:58	SSW	37	NE
09/19	20:45	WSW	27	NNE

My Observing Pick: Globular Star Clusters

The ancient ones, globular star clusters are some of the oldest objects out there. They have been studied and studied, yet we don't know how they formed. They contain very old, metal poor stars, typically hundreds of thousands of them packed into ball shaped wonders. They are delightful in binoculars, and small telescopes. They are spectacular in larger instruments. Here are some gems to check out.

Object Location/Description

M13	Hercules. Northern hemispheres premier globular
M4	Scorpius, near Antares. Makes a beautiful juxtaposition
M22	Sagittarius near the teapots top
M5	Serpens (Caput)
M92	Hercules, northeast of M13
NGC 6723	Sagittarius, bonus nebulae in eyepiece
M12	Ophiuchus

The Day Our Universe Changed

It didn't happen that fast. The universe had been just fine for 1400 years, since Ptolemy published his grand design. So, why should anyone believe a guy from Poland who claims it's wrong? If it ain't broke, don't fix it eh?

An Earth centered universe had been the accepted model from before Old Testament times. Everything seemed to work up there, so astronomers were not exactly excited about the proposed change. This proposal was huge! Moving the Sun to the center and placing Earth in orbit with the other planets was nothing short of heresy. Saying this proposal met with resistance is a gross understatement.

Nicolas Copernicus turned the astronomy world upside down by switching the Earth and Sun positions. What prompted him to make this controversial change? The Equant. Ptolemy invented the equant, a secondary point around which the planets revolved (epicycles) that produced a constant speed, perfect circle, and explained retrograde motion. This was the Greek ideal for planetary orbits. Copernicus thought the equant an artificial concept.

Interesting, Ptolemy invented the equant to solve planetary orbit geometry because he believed Earth was the center of our universe. He did this while his observations were telling him...maybe the Sun is at center? Another great mind invented an artificial construct to make our universe fit his beliefs. Albert Einstein invented the cosmological constant to fit his belief in a static universe, while his equations described an expanding universe.

Copernicus worked out the geometry of planetary orbits, noting that the Sun better fit the center. With his *Heliocentric* model of the universe the planets moved at a constant speed and in circular orbits. While he considered Ptolemy's equants artificial, Copernicus ended up relying on a few planetary epicycles to explain retrograde. Copernicus waited decades, not publishing, yet his heliocentric model became well known, and controversial. Astronomers asked, if Earth now orbits the Sun why do we not see parallax with the stars?

Copernicus finally published his *De revolutionibus orbium coelestium* (On the Revolutions of the Heavenly Spheres) in 1543. His good friend and collaborator Georg Joachim Rheticus encouraged Copernicus to finish it and helped with publication. Copernicus originally wanted its title to be *De revolutionibus* (On the Revolutions) but the publisher added *orbium coelestium* (heavenly spheres) to make it more palatable. Even the books preface was changed, written by Lutheran clergyman Andreas Osiander, to spin it as a mathematical exercise, avoiding potential religious conflicts.

By the time his book was published Copernicus was dying and didn't have the strength to challenge his publisher. An original manuscript survives in the Jagiellonian Library in Krakow, with Copernicus's original title and preface.

Today we know planetary orbits are elliptical, change speed, planetary orbital speed differentials cause retrograde, and we can measure tiny stellar parallax. Technology.

Eric Erickson

Coming up: OUR 243rd ASTRONOMY CLUB MEETING

Thursday, **September 19th**, 2019, from 7 – 9:00 p.m., held in the conference room of TJ's restaurant on Loop Road (337). Have dinner, snack, dessert, and/or a beverage if you like. The New Braunfels Astronomy Club can be reached at www.astronomyntx.org

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