

Spring Has Sprung?



March 2	019								
Sun		Mon	Tue		Wed		Fri	Sat	
		25	26		27	28	Mar 1	2	
March / Vernal – the imaginary		equinox marks the line in the sky abov	e moment the Su ve the Earth's ec	un crosses the celestial equator quator – from south to north		estial equator h to north	Meteorological Spring	Means spring is on the way	
3		4	5	5 New Moon 11:03 am		7	8	Wiarton ⁹ Willie Punxsutawney Phil	
	10	11	12		13	14	15	16	
Daylight Saving Time starts		Commonwealth Day		Verr Mar 20t		Vernal Equinox Mar 20th 5:58 pm El	ernal Equinox 20th 5:58 pm EDT		
17		18	19		20	21	22	¥ 3	
St. Patrick's Day		St. Patrick's Day (Newfoun	c ,	uper Worm Full Moon					
×			50	9:53 pm; 3rd & fi	nal	/11			
24		25	26		27	28	29	Means 6 more weeks of winter	
	Sun	rise / Sunset (Dayligh	:) Astronomical	Astronomical Twilight (Night)				Shubenacadie Sam	
Mar 1	6:54 ₁ a	am / 6:05 pm (11:11)	5:19 am / 27:41 pm (9:38)		3		5	6	
Mar 17 🎇	7:26 a	am / 7:26 pm (11:59:2	6) 5:50 am / 9:02 pm (8:48)					National Tartan Day	
Mar 20	7:21 a	am / 7:29 pm (12:08)	5:44 am / 9:06 pm (8:38)						
Mar 31	7:01 a	am / 7:42 pm (12:41)	5:22 am / 9:21 pm (8:01)						
					_	Fact: approx 8 r Equinox at mid-te	nin more Daylight mperate latitudes	on the due to	

- Our disk-like sun 1.
- 2. Atmospheric refraction

πλανήτης (planēt) or Wanderers

Earth

🔮 e 🊳 O

Moon

You can fit all the planets in the Solar System back to back into the distance from the Earth to the Moon (about 384,400 km), with room to spare (8,030 km.)

ref: https://www.universetoday.com/115672/you-could-fit-all-the-planets-between-the-earth-and-the-moon/

Rocky Planets

Mercury visible evenings for 1st wk of Mar (GEE Feb 26)

Day old Moon left of 2nd mag Mercury on Mar 7th





... a brief interlude... Mars Weather Forecast



Source: https://mars.nasa.gov/insight/weather/

Gas Giants

- Jupiter is a -2 mag morning planet rising at 2:30 am EST in the SE early in March. Diameter 40" by end March
 - Jovian Transits



- Saturn is low in the SE morning sky, rising about 4 am (+0.6 mag; 16" diameter)
 - On Mar 1st, it is within 5° of the crescent Moon with Venus and Jupiter to either side
- Uranus is an early evening target in the west until late March
- Neptune is too close to the Sun until late April
- Name 5 new moons of Jupiter: https://carnegiescience.edu/namejupitersmoons (tweet to @JupiterLunacy by Apr 15th)



- Straight Wall (Rupes Recta)
 - Visible on 8-9 day old Moon, (try Mar 14th), when Sun casts a wide shadow looks like steep cliff, but is actually a shallow slope
 - Linear fault in the SE part of the Mare Nubium
 - 110 km long, 2–3 km wide, and 240–300 m high







Moon (6 da old) in Hyades Mar 12th



Space Debris

- Meteors [Gr. ta meteora: "the celestial phenomena" or "things in heaven above"] -> Sporadics only try ecliptic on "antihelion"
- Asteroids. [Gr. asteroeides: "star-like"] -> Juno
 - Comets

 [Gr. komētēs: "long-haired (star)"] —> C/2018 Y1 (Iwamoto)
- Zodiacal Light [Gr. zodiakos: "circle of animals"] —> West pm
- ISS Passes in morning until March 20

Zodiacal Light fromThe Sky this Month, RASC Canada, Mar 2017

Asteroids

• (3) Juno (9th mag) in Orion's Shield

• Mar 11-18 moves past sparse open cluster NGC 1662; Mar 16th only 0.1° N of Pi¹ Orionis



9

Comets



http://www.aerith.net/comet/weekly/current.html

Zodiacal Light

- Reflection of leftover cosmic dust (i.e. comets, asteroids) from our solar system
- Best seen in the spring or fall on dark moonless nights when the ecliptic is at a steep angle to the horizon, within ½ hr
 - of the end of evening astronomical twilight (Mar)
 - before the beginning of morning astronomical twilight (Sept)
 - Photo Op: catch it with Pleiades during the 2 wks starting Feb 21st or Mar 22nd

Red Sprites at La Silla Observatory 20 January 2015

> Credit: P. Horálek/ESO https://www.eso.org/public/images/potw1505a/

RAS infrared image of Milky Way http://coolcosmos.ipac.caltech.edu/ image_galleries/IRAS/allsky.html



11





Some Things Explained...



Star Struck



"I love looking at the stars. I think of us as celestial paparazzi"

Objects In The Heavens (OITH)

Objects in the Heavens							
CONSTELLATION	N	Common Name	Season,	on Meridian	Авв	REVIATION	
ITEM IDENTIFIE	R TYPE	DETAILS	SIZE	RA	DEC	Mag	
Virgo		the Virgin, the Maiden	Spring	May25		VIR	
"A con	stellation	remarkable for the wonderfu	l nebulous i	region, in	which a	far	
greate	er numbe	r are accumulated than in an	y other equ	ial area oi	f the hea	ivens."	
See C	Coma Be	renices for other objects ir	h this area.				
ৰ্মন্ন Spica	α	Eclipsing variable, 4 day Blue super giant; 262LY;	/s; 2.5' 1,300x br	13:25.8 ighter th	-11°13' an sun	.96/12 1	
ಕನ್ Porrir	na γ	Fine binary was 3.5" sep,	now 0.35	" 12:42.2	-01°31'	3.4/5.5	
ನ್ನ Theta	a θ	Triple; white/violet/gray	7"/72"	13:10.5	-05°36′	4-10	
tar Tau	τ	Optical double; easy	80″	14:02.2	01°29'	4/9.5	
☆ SS		! Carbon 🌣; variable 355	days	12:25.8	00°42'	6.8	
O M494	4472 EG	E4; round; bright core; 70	MLY 10x9'	12:30.4	07°56'	8.3	
O M58	4579 SG	Sb; round; bright core; com	npact 6x5'	12:38.3	11°45′	9.4	
O M59	4621 EG	E3-E4; elongated; bright of	core 5x4'	12:42.6	11°35′	9.6	
O M604	4649 EG	E1-E2; round; bright core	8x6'	12:44.2	11°29'	8.8	
O M614	4303 SG	Sc; bright spiral; 60mLY	7x6.6'	12:22.5	04°25'	9.7	
O M84	4374 EG	E1; face-on; bright core	7.4x6.5'	12:25.6	12°49′	9.1	
O M86	4406 SG	E3; round; bright core	10x6'	12:26.8	12°53'	8.9	
O M87	4486 EG	E0-1; Virgo A/Smoking Gui	n; 9x7'	12:31.4	12°20'	8.8	
Roun	d; brigh	t core; powerful radio sour	ce; center	of ~3,000) galaxi	es	
O M89	4552 EG	E0; round; bright core; 6	5мLY 5х4'	12:36.2	12°30′	9.6	
O M90	4569 SG	Sb; well-formed oval; bright	core 9x4'	12:37.4	13°06′	9.4	
O M104	4594 SG	! Sa; Sombrero Galaxy; edge	-on; 9x4'	12:40.6	-11°41′	8.1	
~		800m ¹ / ₂ ; 28 ^{MLY} ; larger sco	pes can se	e dust lo	ane		
O NGC42	16 EG	Sb; edge-on; 4206/22 nea	rby 8x2'	12:16.5	13°05′	9.9	
О ысс42	61 EG	E2-3; "An average galaxy 3 dim spirals nearby	7"; 4x3.5'	12:19.9	05°46′	10.4	
O NGC43	65 EG	E2-E3; in dim group WSW of	M49 7x5'	12:25.0	07°15'	9.6	
O NGC442	29 SG	S0-Sa; large outer ring	6x3'	12:28.0	11°03'	10.0	
O NGC44	38 SG	Sa/p; The Eyes; resolvable	9x3'	12:28.3	12°57'	10.0	
O NGC444	42 SG	SBO; oval halo magnifies we	ll 4.5x2'	12:28.6	09°44'	10.4	
O NGC45	17 SG	Sc; narrow streak; m12 SG 20	'N 10x2'	12:33.3	00°03'	10.4	
O NGC452	26 EG	E7-S0; <i>The Lost Galaxy</i> ; Very bright core; edge-or	7x2' n; betweer	12:34.6 n 2 mag	07°38′ 7 ☆	9.7	
O NGC452	27 SG	SBbc; edge-on; near stellar	core 6x2'	12:34.7	02°35'	10.5	
O NGC45	35 SG	SBc; face-on, S-shaped	6x5'	12:34.9	08°08′	9.9	
O NGC45	36 SG	Sc/SBc; larger of the pair	7.4x3.5'	12:35.0	02°08'	10.4	
O NGC454	46 EG	ESO; circular; stellar core	3x1.4'	12:36.1	-03°51′	10.4	
O NGC45	96 SG	SBOa; softly barred oval	4x3.4'	12:40.5	10°07'	10.4	
O NGC46	36 EG	E1; round; brighter core	5x4'	12:43.4	02°38'	9.5	
O NGC46	54 SG	SBc; bright, knotty arms	5x3'	12:44.5	13°04'	10.5	
		Galaxy designations, p.20					
120 VIF	2			CO	NTINUE		



Detail below: "Realm of the Galaxies" showing sweeping patterns in Markarian's Chain using M84/M86, bright spots mid-way on a line between Denebola and Vindemiatrix, as a starting point. Detail dimensions are roughly 20 Right Ascension minutes wide x 4 degrees high.



Star Struck

µ Cephei	Сер	Herschel's Garnet Star @ 2,400 LY. Red supergiant. One of reddest. Carbon star. Diameter > Jupiter's orbit. <i>Has it supernova'd yet to form black hole??</i>				
M38,36,37	Aur	 Bevy of fine open clusters. Best in 🔭. Rest in Auriga @ 4,000+ LY				
M35	Gem	Rich open cluster at foot of Castor twin with 200 \bigstar s @ 2,800 LY with tiny NGC 2158 @ 6x distance. Compare to M37 Aur.				
M1	Tau	Crab Nebula. Remnant from supernova which was visible in 1054. Dist=6,500 LY				
M42	Ori	 Great Orion Nebula. Star Nursery. Reflection nebula. Diameter 24 LY. 1,500 LY				
θ Orionis	Ori	Trapezium. Can you see stars e & f?Trapezium in M42• B• B• Can you see stars e & f?				
β Mono- cerotis	Mon	Triple star. Blue-white. Mags 4.6, 5.0 & 5.4.				
M44	Cnc	Beehive Cluster or Praesepe. 75 \bigstar s in binos, 350 \bigstar s in \bigstar .B 8.0-8.5 Eclipsing C 5.1 D 6.7 E 10.3 F 10.2One of closest @ 610 LY. Same origin as Hyades?F 10.3 F 10.2				
M81, M82	UMa	Bright Bodes Nebula (M81) and thin smudge, Cigar Galaxy. @ 12M LY				
M66, M65, NGC 3628	Leo	Leo Triplet. Spiral galaxies. NGC is "Hamburger". M66 brighter. @ about 40M LY				
Markarian's Chain	Vir	Curved chain of galaxies in Virgo Cluster. Most appear to have similar motion. Includes two Messier (M84, M86) and half a dozen NGC's.				
Melotte 111	Com	4.5° Coma Star Cluster @ 400M yr old; 288 LY, 3 rd closest after Ursa Major Cluster and Hyades				

In the Eyepiece: a Hamburger, Sombrero & Chain



Messier Marathon



What?: the attempt to find as many of the 110 Messier objects as possible in one night. Started by amateurs in the 1970's (Don Machholz)

• Location?

- Number of objects visible depends on the observer's *location,* the *season* and the *weather*
 - Best chance to observe all is at low northern latitudes (optimum around 25° N)
 - Objects range from declinations of Scorpius and Sagittarius to Cassiopeia and Ursa Major
 - Virgo Cluster and the Galactic Center are rich in Messier's, but few are found between RA 21:40 and RA 23:20 (i.e. RA of Pisces (Sun) and Aquarius)
 - Most difficult objects: M74 and M77 in the evening; M30 as well as M55, M75, M72, and M73 in the morning

Best time?

- Once every year, around *mid- to end-March for our latitude*
- Best time is when the Moon is near its new phase. In 2019, New Moon occurs Mar 6 and again on Apr 5
- Two opportunities for 2019
 - Secondary date: On March 9/10, the full 110 will be possible between latitudes 9° and 25° N, limited by M52 and M30⁻¹
 - Primary date: On March 30/31, the full 110 will be theoretically possible between 18° N to 40° N latitude, limited by M110 and M30, with M74 and M110 extremely difficult ¹

¹ According to well known amateur Tom Polakis' investigation from Tempe, AZ

Poster by Hartmut Frommert http://messier.obspm.fr/xtra/poster.html

http://www.messier.seds.org/xtra/marathon/marathon.html

Occultations



https://occultations.org/observing/occultation-predictions/ (incl RASC handbook predictions)

Space Missions



By Olaf Frohn - http://www.planetary.org/multimedia/space-images/charts/whats-up-in-the-solar-system-frohn.html

Space Launches

- Mar 2 SpaceX "Crew" Dragon: Falcon 9 launch of Dragon for Demo-1 test flight of the Dragon capsule with no crew, but set up for a crew
- Mar 7 Arabsat-6A: Falcon Heavy launch of Saudi geostationary comm sat
- Mar 13 WGS-10: Delta IV Medium+ launch of DOD comm sat. (10th of 12)
- Mar 15 SOYUZ MS-12: Soyuz launch of 3 crew to ISS
- Mar 16 CRS-17: Falcon 9 launch of 17th Dragon supply cargo to ISS
- ★ Mar 25 Chandrayaan-2: India's 2nd robotic Moon mission launched by GSLV Mk II. Consists of Orbiter, Lander & Rover (1st mission was orbital from Oct 2008 - Aug 2009)
 - Goals: soft-land & operate rover; study lunar topography, mineralogy, elemental abundance, the lunar exosphere, and signatures of hydroxyl and water ice







Sky at a Glance

March 2019						< Today >
Sun	Mon	Tue	Wed	Thu	Fri	Sat
24 Zodiacal Light To Mar 7 th	25	26 Mercury GEE	27 Me Sp	28 teorological —— ring (Mar 1 st)	Mar 1 Venus, Saturn, Moon & Jupiter	SpaceX Dragon ² Launch <i>Venus & Moon</i>
3	4.	5	6 New Moon 11:03 am	7 Mercury & Moon	8	9 Messier Marathon
10 Daylight Saving Time starts Messier Marathon	11 Commonwealth Day	¹² Moon in Hyades	¹³ Venus, Saturn & Jupiter Herschel 1781 ₩	14 Straight Wall Einstein 140 th	15	16 Juno 0.1° N of Pi¹ Orionis
17 St. Patrick's Day	18 St. Patrick's Day (Newfoun Jupiter Transits	19 Su	per Worm Full Mo 9:53 pm; 3 rd & final	21 on	22 Zodiacal Light (next 2 wk)	23 Mars Near Pleiades
24	25 Chandrayaan-2 Moon Launch	26	27 Ma	28 Vernal Equinox ar 20th 5:58 pm EDT	29	30 Messier Marathon
31 Messier Marathon	Apr 1	2	3		5	6 National Tartan Day NEAF (Apr 6-7) Biggest Astro Show

Legend: Morning events are in Italics



• <u>www.heavens-above.com</u> ISS, Satellites, Comets, Asteroids, etc.

RASC Observer's Handbook 2019

• <u>www.aerith.net</u> Comet Information

- Birren, Peter, Objects In The Heavens (OITHv6), http://www.birrendesign.com/astro.html in PDF or "pocket" book. Excellent! Objects to 10th Mag by constellation, plus handy ref lists
- http://www.messier.seds.org/xtra/marathon/marathon.html Machholz, Don, The Observing Guide to the Messier Marathon, New York: Cambridge Univ Press, 2002
- https://occultations.org/observing/occultation-predictions/ Lunar and Asteroid Occultations (incl. RASC data)
- http://www.planetary.org/multimedia/space-images/charts/whats-up-in-the-solar-system-frohn.html by Olaf • Frohn, Map of Space Missions
- https://www.spaceflightinsider.com/launch-schedule/ https://spaceflightnow.com/launch-schedule/ https://www.spacelaunchschedule.com/launch-schedule/ Space Launches and Missions
- http://www.skymaps.com for monthly star chart, observing highlights & visual/bino/telescope targets •