





ASTRONOMICAL DIARY

PREPARED BY ASTRONOMICAL PUBLICATION AND PLANETARIUM UNIT, SPACE SCIENCE AND ASTRONOMY SECTION

ASTRONOMICAL EVENTS, JULY 2024

DATE	EVENT	TIME
01	Close approach of Waning Crescent Moon and Mars	11:47 p.m.
02	Conjunction of Waning Crescent Moon and Mars	02:26 a.m.
03	Conjunction of Waning Crescent Moon and Jupiter	04:28 p.m.
12	Moon at Apogee (Distance = 404,293.413 km)	04:11 p.m.
17	Mercury at Highest Point in Evening Sky	---
19	Mercury at dichotomy	06:45 a.m.
22	Mercury at Greatest Elongation East	02:39 p.m.
24	Moon at Perigee (Distance = 364,983.557 km)	01:41 p.m.
25	Close approach of Waning Gibbous Moon and Saturn	04:27 a.m.
25	Conjunction of Waning Gibbous Moon and Saturn	04:46 a.m.
28	Piscis Austrinid meteor shower (ZHR = 5)	---
30	Southern δ -Aquariid meteor shower (ZHR = 25)	---
30	Close approach of Waning Crescent Moon and Mars	04:34 p.m.
30	Conjunction of Waning Crescent Moon and Mars	06:37 p.m.
31	Close approach of Waning Crescent Moon and Jupiter	06:23 a.m.
31	Conjunction of Waning Crescent Moon and Jupiter	07:53 a.m.

PHASES OF THE MOON

	New Moon Jul 06 06:57 a.m.
	First Quarter Jul 14 06:49 a.m.
	Full Moon Jul 21 06:17 p.m.
	Last Quarter Jul 28 10:52 a.m.

RISE AND SET TIMES OF PLANETS

DATE	MERCURY		VENUS		MARS		JUPITER		SATURN	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
Jul 01	06:49 am	07:46 pm	06:03 am	07:00 pm	01:54 am	02:32 pm	03:19 am	04:09 pm	10:44 pm	10:38 am*
Jul 11	07:21 am	08:05 pm	06:19 am	07:11 pm	01:41 am	02:24 pm	02:49 am	03:39 pm	10:04 pm	09:58 am*
Jul 21	07:34 am	08:05 pm	06:34 am	07:19 pm	01:28 am	02:15 pm	02:17 am	03:08 pm	09:24 pm	09:18 am*
Jul 31	07:25 am	07:44 pm	06:47 am	07:25 pm	01:16 am	02:06 pm	01:46 am	02:37 pm	08:43 pm	08:37 am*

COMET NEOWISE C/2020 F3 NEOWISE

In July of 2020, the Northern hemisphere skies were graced by Comet Neowise or C/2020 F3 Neowise. Its name was derived from Near-Earth Object Wide-field Infrared Survey Explorer (NEOWISE), a NASA spacecraft that discovered the comet. Comet Neowise has an elliptical orbit and its next entry to our Solar System will approximately be 6,800 years from its last sighting.

After our solar system was formed around 4.6 billion years ago, it left masses of dust, rock and ice we know as Comets. The colorful glow on comets we observed here on Earth is produced from the gases and dust the Comet emits on their glowing head and tail as they get closer to the Sun. The Comet Neowise was the brightest comet to grace our skies for decades. The last comet visible with our naked eye or can be observed through a binoculars was in 1995-1996 with the Comet Hale-Bopp.

Comet NEOWISE
July 24, 2020 | 08:02 PM PST
Camera EOS 90D MII 70-200mm f2.8L ISO 1600, 6 sec

L.P. Mendoza | PAGASA Astronomical Observation and Time Service Unit

Notes:

[1] All times displayed are in Philippine Standard Time (PhST)

[2] *following day

"tracking the sky...helping the country"

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Stars and Constellations

July is the best time to view the northern constellations **Draco**, **Hercules**, **Corona Borealis**, and **Serpens** and the southern constellations **Ophiuchus**, **Scorpius**, **Norma**, **Ara**, **Circinus**, and **Triangulum Australe**. Shown in Figure 1 are the major July constellations placed directly overhead at 09:00 p.m. on 15 July 2024. [1,2]

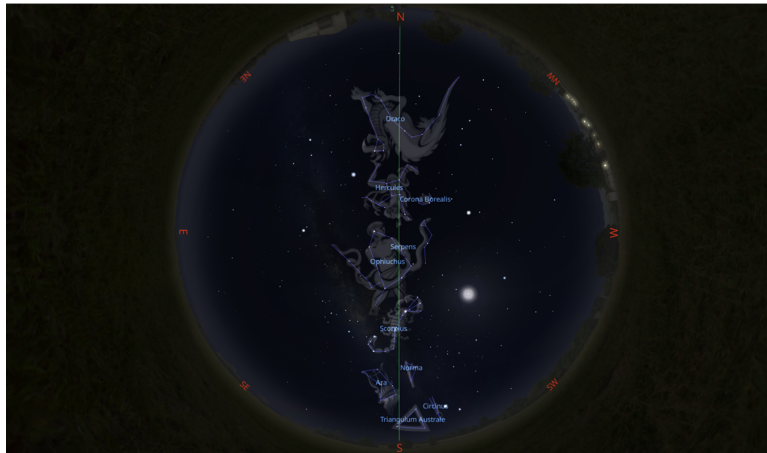


Figure 1: The view of the night sky featuring the prominent July constellations at 09:00 p.m. on 15 July 2024 using the Stellarium software

Draco, the most northern of the July constellations and the eighth-largest in the sky, is home to fascinating deep-sky objects and rare stars. The constellation hosts some significant stars like Eltanin and Thuban. Eltanin, or Gamma Draconis, is the brightest star in Draco and was utilized to verify the light aberration. Thuban, on the other hand, was formerly a pole star – the star nearest to the North Pole – due to the equinoxes’ precession. Several noteworthy deep-sky objects are located in Draco, such as the Cat’s Eye Nebula (NGC 6543) [Figure 2a], one of the most intricately structured nebulae; and the Tadpole Galaxy (ARP 188), a barred spiral galaxy that resembles a tadpole. [2,3]

Hercules is the fifth largest constellation among the 88 modern constellations. However, despite its massive size, the constellation does not contain particularly bright stars. Its brightest star, Beta Herculis, is a yellow giant of visual magnitude 2.78. Other notable stars – Pi, Eta, Zeta, and Epsilon Herculis – form the Keystone asterism, a large quadrangle that symbolizes Hercules’ pelvis and torso. One of the brightest globular clusters in the northern sky can be located in Hercules, the Messier 13 or the Hercules Globular Cluster. Hercules also contains the planetary nebula NGC 6210 [Figure 2b]. [2,4,5]

Corona Borealis, or the Northern Crown, is a small but easily identifiable semi-circular constellation located between the asterisms, the Keystone in Hercules and the Kite in Boötes. The constellation has two well-known variable stars: R Corona Borealis, the Fade-Out Star, and T Corona Borealis, the Blaze Star, a recurrent nova. Corona Borealis contains a noteworthy quantity of galaxy clusters, including the most outstanding galaxy cluster in the northern sky, the Corona Borealis Supercluster. [2]

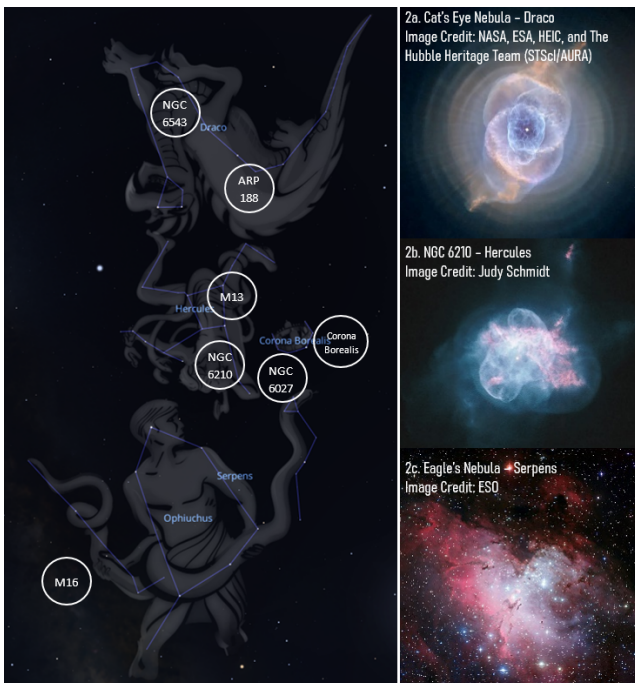


Figure 2: The Northern Constellations

Lying south of Corona Borealis and Hercules are the constellations **Ophiuchus** and **Serpens** which symbolize the snake bearer and the snake, respectively. Ophiuchus splits the constellation Serpens into two: Serpens Cauda, the serpent’s tail, and Serpens Caput, the serpent’s head. [2]

Serpens is the only constellation divided into two unconnected parts. Regardless of its split structure, this constellation houses a number of interesting deep-sky objects including, Seyfert’s Sextet (NGC 6027), a cluster of colliding galaxies, and the most prominent Eagle’s Nebula (M16) [Figure 2c], a vast star-forming region that contains the well-known astronomical feature of three enormous pillars of gas, the “Pillars of Creation”. [2]

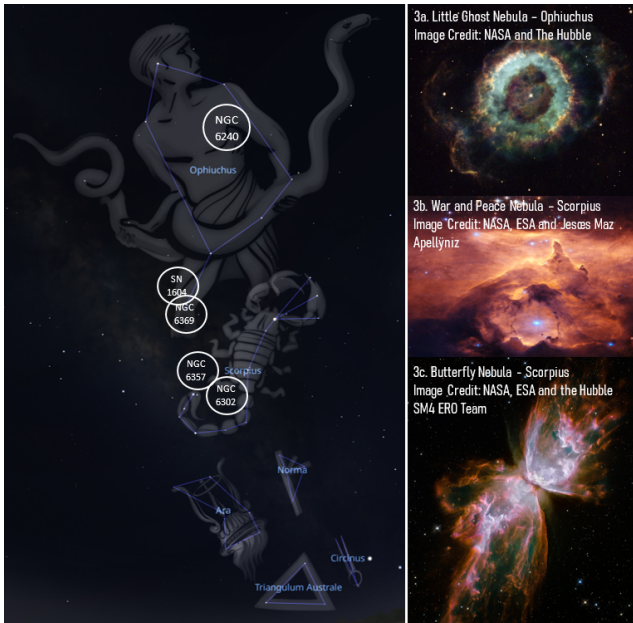


Figure 3: The Southern Constellations

Ophiuchus is also rich in fascinating deep-sky objects. It contains the Little Ghost Nebula (NGC 6369) [Figure 3a], the dazzling infrared galaxy NGC 6240, and Kepler’s Supernova (SN 1604), a remnant of the Milky Way’s most recent supernova observable to the naked eye. Ophiuchus is located along the apparent path of the Sun, however, it is not formally recognized as one of the zodiac constellations. [2,6]

One of the most peculiar and luminous constellations in the southern sky is **Scorpius**, the Scorpion. The red supergiant star, Antares, which appears red to the naked eye, is the constellation’s brightest star that represents the heart of the scorpion. Several amazing deep-sky objects can be located in Scorpion, among them are the Lobster Nebula, also known as the War and Peace Nebula (NGC 6357) [Figure 3b], and the Butterfly Nebula (NGC 6302) [Figure 3c]. [2]

Planetary Location

Mars and **Jupiter** are early morning objects rising on the eastern horizon, while **Saturn** rises in the late evening, exhibiting their visibility throughout the month. **Mercury** can be seen sitting low on the western horizon as it sets after dusk. **Venus** will not be visible as it just passed behind the Sun at superior solar conjunction. [1,7,8]

The **Waning Crescent Moon** and **Mars** will make a close approach passing within $3^{\circ}49'$ of each other at 11:47 p.m. on 01 July. The two objects will share the same right ascension about three (3) hours later, separated by $4^{\circ}05'$, lying in the constellation Aries. The exact event will not be observable since the two planets are still below the horizon, but their close pairing is best seen at 04:00 a.m. on 02 July [Figure 4]. [9,10]



Figure 4: The view of the eastern sky showing the Waning Crescent Moon and Mars on 02 July at 04:00 a.m. using Stellarium.



Figure 5: The view of the eastern sky showing the Waning Crescent Moon and Jupiter on 03 July at 04:30 a.m. using Stellarium.

On 03 July, the **Moon** and **Jupiter**, both in the constellation Taurus, will be in conjunction at 04:28 p.m., with the Moon passing $5^{\circ}01'$ to the north of Jupiter. Due to the presence of the Sun, the exact event will not be visible, however, the optimal time to view the pair will be at 04:30 a.m. above the eastern horizon [Figure 5]. [11]

Mercury will reach its highest point in the evening sky on 17 July, shining at a magnitude of 0.3. On 19 July at 06:45 a.m., the planet will undergo **dichotomy**, when a planet is inferior to the Sun enters its half phase. Mercury will attain its **Greatest Elongation East** on 22 July at 02:39 p.m., when it will be farthest from the Sun by 26.9° . The actual occurrence will not be observable due to the Sun's brightness, but it will appear among the background stars of Leo. [7,12,13,14]



Figure 6: The view of the southwestern sky showing the a) close approach at 04:27 a.m. and b) conjunction at 04:46 a.m. of the Waning Gibbous Moon and Saturn on 25 July using Stellarium.

On 25 July at 04:27 a.m., the **Waning Gibbous Moon** and **Saturn** will make a close approach passing within 20.8 arcminutes of each other. At about the same moment, the two planets will share the same right ascension, with the Moon passing $23'$ to the north of Saturn. The exact timing of the two events can be observed above the southwestern horizon as shown in Figure 6. [15,16]



Figure 7: The view of the eastern sky showing the trio: the Moon, Mars, and Jupiter forming a triangular shape on 31 July at 04:30 a.m. using Stellarium.

Another close approach of the **Waning Crescent Moon** and **Mars** will occur at 04:34 p.m. on 30 July, passing within $4^{\circ}54'$ of one another, followed by their conjunction at 06:37 p.m., separated by $5^{\circ}01'$. Similarly, a close approach and conjunction of planets **Moon** and **Jupiter** will occur once again on 31 July. The two objects will make a close approach at 06:23 a.m. passing within $5^{\circ}18'$ of each other, followed by them sharing the same right ascension at 07:53 a.m., separated by $5^{\circ}22'$. The glare of the Sun will make it difficult to see the precise occurrence of these events, but the trio is best observed at 04:30 a.m. on 31 July as they formed a triangular shape above the eastern horizon [Figure 7]. [17,18,19,20]

All the conjunctions and near approaches mentioned between the planet and the moon, or planet to planet, will be visible enough to fit within the field of view of a telescope and can also be viewed with the naked eye or using a pair of binoculars.

Meteor Shower

The **Piscis Austrinid** meteor shower will be viewed from **15 July to 10 August**, peaking on **28 July**. About 5 meteors per hour are expected to be produced by the meteor shower. It will be observable once its radiant point, the constellation Piscis Austrinus, is above the eastern horizon around 08:48 p.m. each night and remains active until around 05:12 a.m. the next day. The radiant point is highest in the sky around 02:00 a.m. and will likely produce its greatest show just before sunrise as seen in Figure 8. [21]

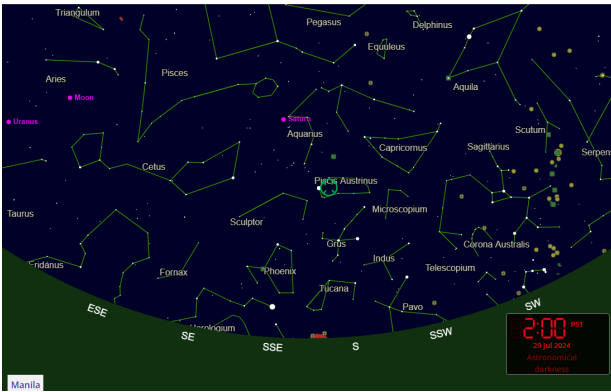


Figure 8: The view of the south southeastern sky during the peak of Piscis Austrinid on 28 July 2024 at 02:00 a.m. when the shower's radiant is represented by the green solid circle.

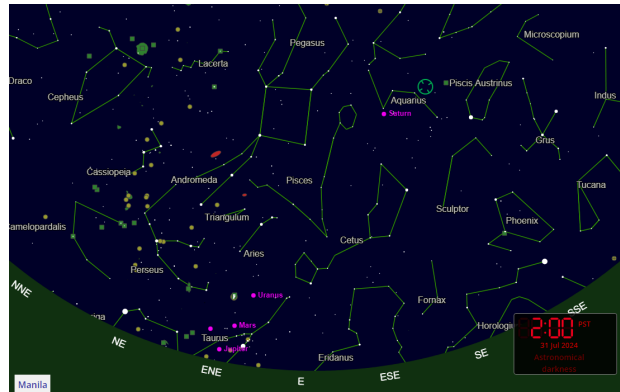


Figure 9: The view of the south southeastern sky during the peak of Southern δ -Aquariid on 31 July 2024 at 02:00 a.m. when the shower's radiant is represented by the green solid circle.

The **Southern δ -Aquariid** meteor shower can also be witnessed from **12 July to 23 August**, with peak activity on **30 July**. In Manila, the shower will be active each day from 08:19 p.m. until around 05:13 a.m. the following day, when its radiant point, the constellation Aquarius, is highest in the eastern sky. An estimate of 25 meteors per hour is expected to be produced at the shower's peak. The radiant point is highest in the sky around 02:00 a.m. producing the best view of the meteor as depicted in Figure 9. Moonlight will present minimal interference on the meteor-watching as the shower will peak around the new moon phase.

Meteor showers are observable through the naked eye, and no special equipment such as telescopes or binoculars is needed. Maximize the viewing experience by choosing a dark observation site away from the city lights under clear and moonless sky conditions.

Calendar of Astronomical Events for July 2024

Table 1 shows a summary of the astronomical events for July 2024. All times displayed are in Philippines Standard Time (PhST).

Table 1: The summary of astronomical events for July 2024

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14 July 2024

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