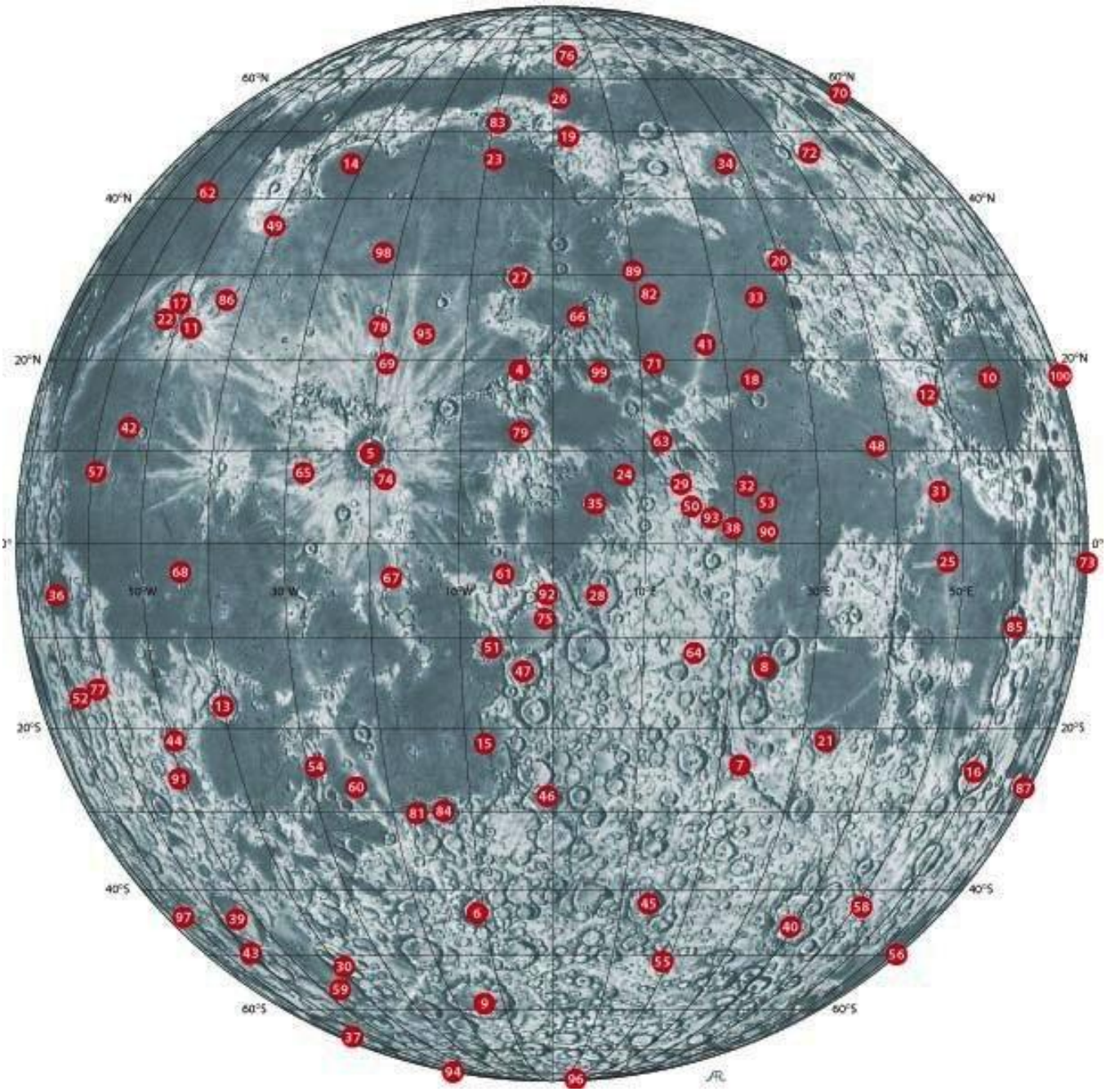
# Lunar Observers' Feature Finder

This feature finder is a modified version of Charles Wood's original "Lunar 100" list as published in April 2004 Sky & Telescope.




Notes:

- The orientation is as seen with the naked eye and binoculars. Different telescopes may reverse the image vertically or laterally or both depending on telescope type and whether a star diagonal is used or not.
- Feature visibilities are correct for viewing at about 2200-2300 hrs on the dates given.

- See the guidance at the end of this article for help on using the table. That guidance also includes how the table can be used for dates following May 2021.

| Moon Age (days) | May Date 2021 | L | V | Feature Name | Significance | Diam. or length (km) | Lat. (°) | Long. (°) E -ve W +ve | Term. Long. |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 14 | 85 | C | Langrenus rays | Aged ray system | 132 | 8.9S | -60.9 | -52 |
| | | 16 | A | Petavius | Crater with domed & fractured floor | 177 | 25.1S | -60.4 | |
| | | 10 | A | Mare Crisium and (DA) | Mare contained in large circular basin | 540 | 18.0N | -59.0 | |
| 4 | 15 | 58 | B | Rheita Valley | Basin secondary-crater chain | 445 | 42.5S | -51.5 | -40 |
| | | 25 | A | Messier & Messier A | Oblique ricochet-impact pair | 11 | 1.9S | -47.6 | |
| | | 12 | A | Proclus | Oblique-impact rays | 28 | 16.1N | -46.8 | |
| | | 31 | A | Taruntius | Young floor-fractured crater | 56 | 5.6N | -46.5 | |
| | | 72 | C | Atlas dark-halo craters | Explosive volcanic pits on the floor of Atlas | 87 | 46.7N | -44.4 | |
| 5 | 16 | 40 | B | Janssen Rille | Rare example of a highland rille across floor of Janssen | 190 | 45.4S | -39.3 | -27 |
| | | 48 | B | Cauchy region | Fault, rilles, & domes | 130 | 10.5N | -38.0 | |
| | | 21 | A | Fracastorius | Crater with subsided & fractured floor | 124 | 21.5S | -33.2 | |
| | | 88 | C | Peary | Difficult-to-observe polar crater | 74 | 88.6N | -33.0 | |
| | | 96 | C | Leibnitz Mountains | Rim of South Pole-Aitken basin | — | 85.0S | -30.0 | |
| | | 20 | A | Posidonius | Floor-fractured crater | 95 | 31.8N | -29.9 | |
| | | 34 | A | Lacus Mortis (also see) | Strange crater with rille & ridge | 152 | 45.0N | -27.2 | |
| 6 | 17 | 33 | A | Serpentine Ridge | Basin inner-ring segment (a must see) | 155 | 27.3N | -25.3 | -15 |
| | | 8 | A | Theophilus, Cyrillus, Catharina | Crater sequence illustrating stages of degradation | — | 13.2S | -24.0 | |
| | | 53 | B | Lamont | Possible buried basin | 106 | 4.4N | -23.7 | |
| | | 90 | C | Armstrong, Aldrin & Collins | Small craters near the Apollo 11 landing site | 3 | 1.3N | -23.7 | |
| | | 18 | A | Mare Serenitatis dark edges | Distinct mare areas with different compositions | N/A | 17.8N | -23.0 | |
| | | 7 | A | Altai Scarp | Nectaris basin rim | 425 | 24.3S | -22.6 | |
| | | 32 | A | Arago Alpha & Beta | Volcanic domes | 26 | 6.2N | -21.4 | |
| | | 38 | A | Sabine & Ritter | Possible twin impacts | 30 | 1.7N | -19.7 | |

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|---|---|---|---|---|---|---|---|---|---|
| | | 55 | B | Baco | Unusually smooth crater floor & surrounding plains | 69 | 51.0S | -19.1 | |
| | | 41 | B | Bessel ray | Ray of uncertain origin near Bessel | N/A | 21.8N | -17.9 | |
| | | 93 | C | Dionysius rays | Unusual & rare dark rays. (Look gain, near full moon.) | 18 | 2.8N | -17.3 | |
| | | 64 | B | Descartes | Apollo 16 landing site; putative region of highland volcanism | 48 | 11.7S | -15.7 | |
| | | 50 | B | Cayley Plains | Light, smooth plains of uncertain origin (round Cayley crater) | 14 | 4.0N | -15.1 | |
| 7 | 18 | 29 | A | Ariadaeus Rille | Long, linear graben | 250 | 6.4N | -14.0 | -3 |
| | | 45 | B | Maurolycus | Region of saturation cratering | 114 | 42.0S | -14.0 | |
| | | 63 | B | Imbrium sculpture | Basin ejecta near & overlying Boscovich & Julius Caesar | — | 11.0N | -12.0 | |
| | | 82 | C | Linné | Small crater once thought to have disappeared | 2.4 | 27.7N | -11.8 | |
| | | 71 | C | Sulpicius Gallus dark mantle | Ash eruptions northwest of crater | 12 | 19.6N | -11.6 | |
| | | 89 | C | Valentine Dome | Volcanic dome | 30 | 30.5N | -10.1 | |
| | | 24 | A | Hyginus Rille | Rille containing rimless collapse pits | 220 | 7.4N | -07.8 | |
| | | 99 | C | Ina | D-shaped young volcanic caldera | 3 | 18.6N | -05.3 | |
| | | 28 | A | Hipparchus | First drawing of a single crater | 150 | 5.5S | -04.8 | |
| | | 35 | A | Triesnecker Rilles (DA) | Rille family | 215 | 4.3N | -04.6 | |
| | | 76 | C | W. Bond | Large crater degraded by Imbrium ejecta | 158 | 65.3N | -03.7 | |
| | | 19 | A | Alpine Valley | Famous lunar graben (straight sunken parallel fault) | 165 | 49.0N | -03.0 | |
| | | 66 | B | Hadley Rille (DA) | Lava channel near Apollo 15 landing site | — | 25.0N | -03.0 | |
| 8 | 19 | 26 | A | Mare Frigoris | Arcuate mare of uncertain origin | 1600 | 56.0N | -01.4 | 9 |
| | | 92 | C | Gylden Valley | Part of the Imbrium radial sculpture | 47 | 5.1S | -00.7 | |
| | | 46 | B | Regiomontanus central peak | Possible volcanic peak (in centre of lower crater in image) | 124 | 28.0S | 00.6 | |
| | | 75 | C | Ptolemaeus B | (Ghostly) Saucerlike depression on the floor of Ptolemaeus | 16 | 8.0S | 00.8 | |
| | | 47 | B | Alphonsus dark spots | Dark-halo eruptions on crater floor | 119 | 13.7S | 03.2 | |

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|---|---|---|---|---|---|---|---|---|---|
| | | 79 | C | Sinus Aestuum | Eastern dark-mantle volcanic deposit | 90 | 12.0N | 03.5 | |
| | | 4 | A | Apennines | Imbrium basin rim | 70 | 18.9N | 03.7 | |
| | | 27 | A | Archimedes | Large crater lacking central peak | 83 | 29.7N | 04.0 | |
| | | 61 | B | Mösting A | Simple crater close to center of lunar near side | 13 | 3.2S | 05.2 | |
| | | 51 | B | Davy crater chain | Result of comet-fragment impacts | 50 | 11.1S | 06.6 | |
| | | 15 | A | Straight Wall | Best example of a lunar fault | 110 | 21.8S | 07.8 | |
| | | 23 | A | Pico | Isolated Imbrium basin-ring fragment (Move mouse over images) | 25 | 45.7N | 08.9 | |
| 9 | 20 | 83 | A | Plato | Distinctive flat-floored crater | 101 | 51.6N | 09.4 | 22 |
| | | 83 | C | Plato craterlets | Crater pits at limits of detection | ≤2 | 51.6N | 09.4 | |
| | | 6 | A | Tycho | Large rayed crater with impact melts | 85 | 43.4S | 11.1 | |
| | | 84 | C | Pitatus | Crater with concentric rilles | 97 | 29.8S | 13.5 | |
| | | 9 | A | Clavius | Lacks basin features in spite of its size | 225 | 58.8S | 14.1 | |
| | | 95 | C | Procellarum basin | The Moon's biggest basin? (Wait until nearly full moon.) | 3200 | 23.0N | 15.0 | |
| | | 81 | C | Hesiodus A | Concentric crater | 15 | 30.1S | 17.0 | |
| | | 67 | B | Fra Mauro formation | Apollo 14 landing site on Imbrium ejecta | — | 3.6S | 17.5 | |
| | | 74 | C | Copernicus H | Dark-halo impact crater | 5 | 6.9N | 18.3 | |
| | | 69 | B | Copernicus secondary craters | Rays & craterlets near Pytheas | 4 | 19.6N | 19.1 | |
| | | 5 | A | Copernicus (DA) | Archetypal large complex crater | 93 | 9.7N | 20.1 | |
| | | 78 | C | Lambert R | A buried "ghost" crater | 54 | 23.8N | 20.6 | |
| | | 98 | C | Imbrium lava flows | Mare lava-flow boundaries | — | 32.8N | 22.0 | |
| 10 | 21 | 60 | B | Kies Pi | Volcanic dome (lightly arrowed in centre of shot) | 45 | 26.9S | 24.2 | 34 |
| | | 65 | B | Hortensius domes | Dome field north of Hortensius | 10 | 7.6N | 27.9 | |
| | | 54 | B | Hippalus Rilles | Rilles concentric to Humorum basin | 240 | 24.5S | 29.0 | |
| | | 14 | A | Sinus Iridum | Very large crater with missing rim. (Gorgeous bay & two promontories) | 260 | 45.0N | 32.0 | |
| 11 | 22 | 30 | A | Schiller | Possible oblique impact | 180 | 51.9S | 39.0 | 46 |

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|---|---|---|---|---|---|---|---|---|---|
| | | 49 | B | Gruithuisen Delta & Gamma | Volcanic domes formed with viscous lavas (Gamma on left) | 20 | 36.3N | 40.0 | |
| | | 13 | A | Gassendi | Floor-fractured crater | 101 | 17.6S | 40.1 | |
| | | 86 | C | Prinz Rilles | Rille system near the crater Prinz | 46 | 27.0N | 43.0 | |
| | | 68 | B | Flamsteed P | Proposed young volcanic crater & Surveyor 1 landing site | 112 | 3.0S | 44.0 | |
| | | 59 | B | Schiller-Zucchius basin | Badly degraded overlooked basin | 335 | 56.0S | 45.0 | |
| 12 | 23 | 11 | A | Aristarchus | Very bright crater with dark bands on its walls | 40 | 23.7N | 47.4 | 58 |
| | | 44 | B | Mersenius | Domed floor cut by secondary craters | 84 | 21.5S | 49.2 | |
| | | 91 | C | De Gasparis Rilles | Area with many rilles | 30 | 25.9S | 50.7 | |
| | | 17 | A | Schröter's Valley | Giant sinuous rille | 168 | 26.2N | 50.8 | |
| | | 22 | A | Aristarchus Plateau | Mysterious uplifted region mantled with pyroclastics | 150 | 26.0N | 51.0 | |
| | | 42 | B | Marius Hills | Complex of volcanic domes & hills | 125 | 12.5N | 54.0 | |
| | | 39 | A | Schickard | Crater floor with Orientale basin ejecta stripe | 227 | 44.3S | 55.3 | |
| 13 | 24 | 62 | B | Rümker | Large volcanic dome | 70 | 40.8N | 58.1 | 70 |
| | | 57 | B | Reiner Gamma See also | Conspicuous swirl & magnetic anomaly (lower left centre) | 70 | 7.7N | 59.2 | |
| | | 43 | B | Wargentin | A crater filled to the rim with lava or ejecta | 84 | 49.6S | 60.2 | |
| | | 77 | C | Sirsalis Rille | Procellarum basin radial rilles | 425 | 15.7S | 61.7 | |
| | | 52 | B | Crüger | Possible volcanic caldera | 45 | 16.7S | 66.8 | |
| | | 36 | A | Grimaldi basin | A small two-ring basin | 440 | 5.5S | 68.3 | |
| | | 37 | A | Bailly | Barely discernible basin | 303 | 66.5S | 69.1 | |
| 14 | 25 | 97 | C | Inghirami Valley | Orientale basin ejecta (No suitable image available) | 140 | 44.0S | 73.0 | 82 |
| 15 | 26 | 94 | C | Drygalski | Large south-pole region crater | 162 | 79.3S | 84.9 | 95 |
| | | 80 | C | Orientale basin | Youngest large impact basin | 930 | 19.0S | 95.0 | |

## Columns Guide

**Column 1 – Moon Age**

This is the number of days since new moon. This allows the table to be used for other months. See the instructions below on how this can be done.

**Column 2 – May Date 2021**

The date when – at about 2200 -2300 on that date - the terminator reaches the lunar longitude given in the last column "Term. Long". This is therefore the first date the sunlight reaches the feature and the first date the feature may be seen

**Column 3 – L**
The original number as shown on the map and assigned to the feature by Charles Wood, indicating the ease with which the feature can be seen. The higher the number (maximum is 100), the more difficult it is. His original list was sorted into order of ease of viewing. No.1 is the Moon itself; No.2 is earthshine, and No.3 is to note the difference between the mare and the highlands. These three can of course be observed without any optical aid and are not included here. From No.4 onwards, you increasingly need binoculars then small and finally medium sized telescopes.

**Column 4 – V**
The visibility of the feature. This is a rough guide. A – easy, B – Not so easy, C – Challenging.

**Column 5 – Feature Name**
In most cases, the name is also a clickable hyperlink to an image of the feature. See "Image Links" below for further information about these images. Any image links followed by a second link "(D.A.)" are to images by YAS's Dave Armeson.

**Column 6 – Significance**
Feature description and/or why it has been included. Most of the entries are Charles Wood's words. Any text in brackets has been added by myself.

**Column 7 – Diam. or Length**
A rough guide to the size of the feature in Km.

**Column 8 – Lat**
The lunar latitude of the feature.

**Column 9 – Long**
The lunar longitude of the feature. For simplicity in this table, and particularly for comparing the feature longitude with the longitude of the terminator, I have used the east negative west positive system.

**Column 10 – Term Long**
This is the longitude of the terminator at roughly 2200 to 2300 on the date in question. It is important to understand that any feature with a longitude on or east of the terminator will be illuminated by the Sun, and any feature with a longitude west of the terminator will still be in darkness (except for mountaintops that will catch the sunrise before it gets down to the plains).

## Image Links

Many of the image links are to images on the following two web sites.
http://www.astrospider.com/Lunar100list.htm
http://www.lunar-captures.com/lunar_100.html
The first of these sites has images of over 2/3rds of the Lunar 100, and although it doesn't specifically state this, they all look as if they were taken from Earth-based telescopes. The second

site has images for all but ten of the features. Some of them are of exceptional quality and I believe were taken by the site owner.
Four images are followed by "(DA)". These are images taken by Dave Armeson (York Astronomical Society). More of Dave's images can be seen in the Gallery on the YAS site.
In some cases, I have scoured the internet to find photos of the feature as seen from Earth but in many cases have had to use shots from Apollo missions or the Lunar Reconnaissance Orbiter. Note too that not all shots were taken during the lunar morning, when the sunlight was coming from the east, so in these cases the appearance of the feature may be radically different from how it will look when you observe it. If you want to observe it when the sunset terminator reaches it (so it's lit from the west) observe the feature 14 and ¾ days later. Note too that many shots do not show scale or orientation, and in some cases it is difficult to know where on the image, the subject is. Finally, many of these features require the observer to detect only very subtle contrast variations; this can at times be challenging.

## Terminology

Arcuate
: Shaped like a bow.

Caldera
: A large depression formed when a volcano erupts and collapses.

Dome
: A shield-like volcano with a gentle slope and low profile.

Ejecta
: Surface deposits formed by material ejected from an impact site.

Fault
: The line between an uplifted or sunken section of the surface and the neighbouring terrain.

Graben
: A linear depression bordered by parallel faults, producing a valley.

Lunation
: Used by some to mean the age of the Moon in days since the previous new moon.

Mare
: Dark, basaltic plains formed by ancient volcanic eruptions.

Putative
: Generally thought to be or to exist

Pyroclastic
: A dense, originally fast-moving flow of solidified lava.

Ray

One of a number of radial streaks of fine ejecta thrown out during the formation of an impact crater.

Rille (*rima*, plural *rimae*)
A long, narrow depression. Formation theories include lava channels and collapsed lava tubes.

Swirl
See the Wikipedia entry.

## Viewing Guide

For nearly all of these features, the best and easiest time to see them is when they are just on the sunlit side of the terminator. Then, the Sun is shining on them from low in the lunar sky, and creating extended shadows that bring the details of the feature into sharp relief. Indeed, many features can *only* be seen under such conditions. So I thought the best way to help spot these sights was to list them by the date the terminator reached them.

The terminator moves across the lunar surface at a rate of 12.2° of lunar longitude per day (or 1° every 2 hours). This means of course that a day after the Sun rises at a given feature, it will be 12° high the next day and about 24° high the day after that. This period of 2 days following sunrise is the very best time to observe the feature. Leave it much later than that, and apart from high profile features such as steep-sided mountains and crater walls, there will be no shadows, making things increasingly difficult to see.

## Using the Table

Let's pretend it's May 16th and you decide to observe. Late that evening the terminator has reached a longitude of -27° (or 27° east of the Moon's central meridian). The Sun is just 0.2° above the horizon as seen from Location 34 (Lacus Mortis), and from all the rows in the table above that, it is ever higher in the lunar sky. From Janssen Rille (6 lines above) the Sun is just over 12° above the horizon, but at this time yesterday (15th) the Sun hadn't quite got there because the terminator longitude was -40° and Janssen Rill's longitude is -39.3° (0.7° into darkness). And if you wanted to observe Location 33 (Serpentine Ridge) that night, you would need to wait about 3½ hours for the terminator to move from -27° to Serpentine Ridge's longitude of -25.3. So better to try to spot Serpentine Ridge the next evening.

So I hope you get the picture. The features on *any row* on or above a particular date can be seen. The closer they are to the last row on that date, the lower will be the Sun in the lunar sky and the longer will be the shadows cast. The further up the table they are from your observing date, the higher in the lunar sky will be the Sun and the shorter will be the shadows.

My recommendation is that you start by seeing if you can make out any feature in your observing date block or the previous block that has an "A" visibility rating. If you're doing well, go for the "B"s next and finally the "C"s.

## Using the Table After May 2021

The visibility of lunar features on dates not in the table can be approximated if you know the date of the preceding new moon. Subtract the new moon date from the date on which you wish to observe to give a Moon Age value, then use that value rather than the May Date value. But please note this

procedure will only give very approximate results because the exact time of any new moon could be at any time within a 24 hour range during the new moon date (as given in such things as pocket diaries).
The new moon preceding the dates above was at 2000 hrs exactly on the 11th May 2021. That happened to be fortunate because for the recommended viewing time of 2200-2300, the ages of the Moon given in the table are a very good approximation to its accurate age. If however you only know the new moon date and not the time, you could be up to a day out with your feature visibilities. Therefore, try to find out the new moon time then apply suitable adjustments to the moon age. For example, say you discovered that the new moon was at 0230 on a particular date. If you observed in the evening three days after that, the moon age would actually be nearer 4 days than 3.

Finally, good luck. I hope this has made lunar observing a bit more interesting.



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May 2021