CELESTIAL OBJECTS TO OBSERVE

THE LUNAR 100

BY: CHARLES A. WOOD | NOVEMBER 27, 2012 | 0

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Many Lunar 100 selections are plainly visible in this image of the full Moon, while others require a more detailed view, different illumination, or favorable libration. North is up.

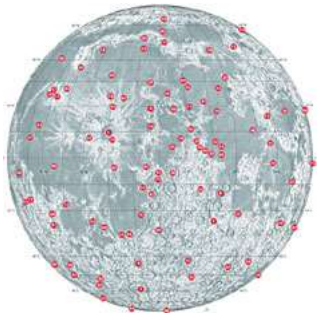
S&T: Gary Seronik

Just about every telescope user is familiar with French comet hunter Charles Messier's catalog of fuzzy objects. Messier's 18th-century listing of 109 galaxies, clusters, and nebulae contains some of the largest, brightest, and most visually interesting deep-sky treasures visible from the Northern Hemisphere. Little wonder that observing all the M objects is regarded as a virtual rite of passage for amateur astronomers.

But the night sky offers an object that is larger, brighter, and more visually captivating than anything on Messier's list: the Moon. Yet many backyard astronomers never go beyond the astro-tourist stage to acquire the knowledge and understanding necessary to really appreciate what they're looking at, and how magnificent and amazing it truly is. Perhaps this is because after they identify a few of the Moon's most conspicuous features, many amateurs don't know where to look next.

The Lunar 100 list, featured in the April 2004 issue of *Sky & Telescope* is an attempt to provide Moon lovers with something akin to what deep-sky observers enjoy with the Messier catalog: a selection of telescopic sights to ignite interest and enhance understanding. Presented here is a selection of the Moon's 100 most interesting regions, craters, basins, mountains, rilles, and domes. I challenge observers to find and observe them all and, more important, to consider what each feature tells us about lunar and Earth history.

Objects in the Lunar 100 are arranged from the easiest to view to the most difficult. This is more systematic than the haphazard approach that produced the Messier list. Indeed, just by knowing a feature's Lunar 100 number, you have some idea of how easy or challenging it will be to see. For example, the Moon itself is L1, while L2 is earthshine and L3 is the light/dark dichotomy between lunar highlands and maria ("seas"). I'd be surprised if anyone reading this couldn't tick those off the list right now. Higher-numbered objects are smaller, less conspicuous, or positioned closer to the limb, making them more challenging to locate and view.



Planetary scientist Charles Wood's Lunar 100 is a list of telescopic sights designed to ignite interest in the Moon and enhance understanding of its geology.

Source: Antonín Rükl

The Messier objects are scattered all over the sky, but all are theoretically observable during marathon nights in March and April every year. By contrast, the Lunar 100 are concentrated in just ½°of sky, yet they can't all be seen in a single night, or even in a single month. Some lunar objects can be observed only with grazing solar illumination, while others are albedo features that require full-Moon conditions to be seen. And others are positioned near (or sometimes even over) the limb of the Moon, requiring a very favorable libration to bring them into view. I don't know how quickly all 100 can be observed, but I'm sure that some competitive amateur will complete it faster than I dare guess!

How big a telescope do you need to view the Lunar 100? The smallest features listed are 3 kilometers in diameter and thus nominally visible in 3-inch (75-millimeter) telescopes employing magnifications of about 150× to 200×. And many can be found with smaller scopes at lower power. But a few Lunar 100 objects — such as narrow rilles — are best seen with 6- or 8-inch telescopes used at high power. The goal, however, is not just to find the objects, but to understand what they tell us abut the Moon.

Any selection of lunar features is bound to lead to many difficult judgments, and I'm sure that at least a few of my choices and rankings will generate considerable debate. Some of my choices were obvious, some were not. Some were influenced by my personal sense of what crater appears more dramatic than another, or which rille best demonstrates an aspect of the Moon's evolution. Aesthetics aside, my choices were principally governed by a desire to include features that tell us something important or interesting about the Moon itself.

I invite you to use the Lunar 100 to guide your explorations of the Moon.

The Lunar 100

L	Feature Name	Significance	Lat. (°)	Long. (°)	Diam. (km)	Rükl Chart

1	Moon	Large satellite	—	—	3,476	—
2	Earthshine	Twice reflected sunlight	—	—	—	—
3	Mare/highland dichotomy	Two materials with distinct compositions	—	—	—	—
4	Apennines	Imbrium basin rim	18.9N	3.7W	70	22
5	Copernicus	Archetypal large complex crater	9.7N	20.1W	93	31
6	Tycho	Large rayed crater with impact melts	43.4S	11.1W	85	64
7	Altai Scarp	Nectaris basin rim	24.3S	22.6E	425	57
8	Theophilus, Cyrillus, Catharina	Crater sequence illustrating stages of degradation	13.2S	24.0E	—	46, 57
9	Clavius	Lacks basin features in spite of its size	58.8S	14.1W	225	72
10	Mare Crisium	Mare contained in large circular basin	18.0N	59.0E	540	26, 27, 37, 38
11	Aristarchus	Very bright crater with dark bands on its walls	23.7N	47.4W	40	18
12	Proclus	Oblique-impact rays	16.1N	46.8E	28	26
13	Gassendi	Floor-fractured crater	17.6S	40.1W	101	52
14	Sinus Iridum	Very large crater with missing rim	45.0N	32.0W	260	10
15	Straight Wall	Best example of a lunar fault	21.8S	7.8W	110	54
16	Petavius	Crater with domed & fractured floor	25.1S	60.4E	177	59
17	Schröter's Valley	Giant sinuous rille	26.2N	50.8W	168	18
18	Mare Serenitatis dark edges	Distinct mare areas with different compositions	17.8N	23.0E	N/A	24
19	Alpine Valley	Lunar graben	49.0N	3.0E	165	4
20	Posidonius	Floor-fractured crater	31.8N	29.9E	95	14

The Lunar 100 (continued)

L	Feature Name	Significance	Lat. (°)	Long. (°)	Diam. (km)	Rükl Chart
21	Fracastorius	Crater with subsided & fractured floor	21.5S	33.2E	124	58
22	Aristarchus Plateau	Mysterious uplifted region mantled with pyroclastics	26.0N	51.0W	150	18
23	Pico	Isolated Imbrium basin-ring fragment	45.7N	8.9W	25	11

24	Hyginus Rille	Rille containing rimless collapse pits	7.4N	7.8E	220	34
25	Messier & Messier A	Oblique ricochet-impact pair	1.9S	47.6E	11	48
26	Mare Frigoris	Arcuate mare of uncertain origin	56.0N	1.4E	1600	2–6
27	Archimedes	Large crater lacking central peak	29.7N	4.0W	83	12, 22
28	Hipparchus	First drawing of a single crater	5.5S	4.8E	150	44, 45
29	Ariadaeus Rille	Long, linear graben	6.4N	14.0E	250	34
30	Schiller	Possible oblique impact	51.9S	39.0W	180	71
31	Taruntius	Young floor-fractured crater	5.6N	46.5E	56	37
32	Arago Alpha & Beta	Volcanic domes	6.2N	21.4E	26	35
33	Serpentine Ridge	Basin inner-ring segment	27.3N	25.3E	155	24
34	Lacus Mortis	Strange crater with rille & ridge	45.0N	27.2E	152	14
35	Triesnecker Rilles	Rille family	4.3N	4.6E	215	33
36	Grimaldi basin	A small two-ring basin	5.5S	68.3W	430	39
37	Bailly	Barely discernible basin	66.5S	69.1W	303	71
38	Sabine & Ritter	Possible twin impacts	1.7N	19.7E	30	35
39	Schickard	Crater floor with Orientale basin ejecta stripe	44.3S	55.3W	227	62
40	Janssen Rille	Rare example of a highland rille	45.4S	39.3E	190	67, 68

The Lunar 100 (continued)

L	Feature Name	Significance	Lat. (°)	Long. (°)	Diam. (km)	Rükl Chart
41	Bessel ray	Ray of uncertain origin near Bessel	21.8N	17.9E	N/A	24
42	Marius Hills	Complex of volcanic domes & hills	12.5N	54.0W	125	28, 29
43	Wargentin	A crater filled to the rim with lava or ejecta	49.6S	60.2W	84	70
44	Mersenius	Domed floor cut by secondary craters	21.5S	49.2W	84	51
45	Maurolycus	Region of saturation cratering	42.0S	14.0E	114	66

46	Regiomontanus central peak	Possible volcanic peak	28.0S	0.6W	124	55
47	Alphonsus dark spots	Dark-halo eruptions on crater floor	13.7S	3.2W	119	44
48	Cauchy region	Fault, rilles, & domes	10.5N	38.0E	130	36
49	Gruithuisen Delta & Gamma	Volcanic domes formed with viscous lavas	36.3N	40.0W	20	9
50	Cayley Plains	Light, smooth plains of uncertain origin	4.0N	15.1E	14	34
51	Davy crater chain	Result of comet-fragment impacts	11.1S	6.6W	50	43
52	Crüger	Possible volcanic caldera	16.7S	66.8W	45	50
53	Lamont	Possible buried basin	4.4N	23.7E	106	35
54	Hippalus Rilles	Rilles concentric to Humorum basin	24.5S	29.0W	240	52, 53
55	Baco	Unusually smooth crater floor & surrounding plains	51.0S	19.1E	69	74
56	Australe basin	A partially flooded ancient basin	49.8S	84.5E	880	76
57	Reiner Gamma	Conspicuous swirl & magnetic anomaly	7.7N	59.2W	70	28
58	Rheita Valley	Basin secondary-crater chain	42.5S	51.5E	445	68
59	Schiller-Zucchius basin	Badly degraded overlooked basin	56.0S	45.0W	335	70, 71
60	Kies Pi	Volcanic dome	26.9S	24.2W	45	53

The Lunar 100 (continued)

L	Feature Name	Significance	Lat. (°)	Long. (°)	Diam. (km)	Rükl Chart
61	Mösting A	Simple crater close to center of lunar near side	3.2S	5.2W	13	43
62	Rümker	Large volcanic dome	40.8N	58.1W	70	8
63	Imbrium sculpture	Basin ejecta near & overlying Boscovich & Julius Caesar	11.0N	12.0E	—	34
64	Descartes	Apollo 16 landing site; putative region of highland volcanism	11.7S	15.7E	48	45
65	Hortensius domes	Dome field north of Hortensius	7.6N	27.9W	10	30

66	Hadley Rille	Lava channel near Apollo 15 landing site	25.0N	3.0E	—	22
67	Fra Mauro formation	Apollo 14 landing site on Imbrium ejecta	3.6S	17.5W	—	42
68	Flamsteed P	Proposed young volcanic crater & Surveyor 1 landing site	3.0S	44.0W	112	40
69	Copernicus secondary craters	Rays & craterlets near Pytheas	19.6N	19.1W	4	20
70	Humboldtianum basin	Multi-ring impact basin	57.0N	80.0E	650	7
71	Sulpicius Gallus dark mantle	Ash eruptions northwest of crater	19.6N	11.6E	12	23
72	Atlas dark-halo craters	Explosive volcanic pits on the floor of Atlas	46.7N	44.4E	87	15
73	Smythii basin	Difficult-to-observe basin scarp & mare	2.0S	87.0E	740	38, 49
74	Copernicus H	Dark-halo impact crater	6.9N	18.3W	5	31
75	Ptolemaeus B	Saucerlike depression on the floor of Ptolemaeus	8.0S	0.8W	16	44
76	W. Bond	Large crater degraded by Imbrium ejecta	65.3N	3.7E	158	4
77	Sirsalis Rille	Procellarum basin radial rilles	15.7S	61.7W	425	39, 50
78	Lambert R	A buried "ghost" crater	23.8N	20.6W	54	20
79	Sinus Aestuum	Eastern dark-mantle volcanic deposit	12.0N	3.5W	90	33
80	Orientale basin	Youngest large impact basin	19.0S	95.0W	930	50

The Lunar 100 (continued)

L	Feature Name	Significance	Lat. (°)	Long. (°)	Diam. (km)	Rükl Chart
81	Hesiodus A	Concentric crater	30.1S	17.0W	15	54
82	Linné	Small crater once thought to have disappeared	27.7N	11.8E	2.4	23
83	Plato craterlets	Crater pits at limits of detection	51.6N	9.4W	101	3, 4
84	Pitatus	Crater with concentric rilles	29.8S	13.5W	97	54
85	Langrenus rays	Aged ray system	8.9S	60.9E	132	49

86	Prinz Rilles	Rille system near the crater Prinz	27.0N	43.0W	46	19
87	Humboldt	Crater with central peaks & dark spots	27.0S	80.9E	207	60
88	Peary	Difficult-to-observe polar crater	88.6N	33.0E	74	4, II
89	Valentine Dome	Volcanic dome	30.5N	10.1E	30	13
90	Armstrong, Aldrin & Collins	Small craters near the Apollo 11 landing site	1.3N	23.7E	3	35
91	De Gasparis Rilles	Area with many rilles	25.9S	50.7W	30	51
92	Gylden Valley	Part of the Imbrium radial sculpture	5.1S	0.7E	47	44
93	Dionysius rays	Unusual & rare dark rays	2.8N	17.3E	18	35
94	Drygalski	Large south-pole region crater	79.3S	84.9W	162	72, VI
95	Procellarum basin	The Moon's biggest basin?	23.0N	15.0W	3200	—
96	Leibnitz Mountains	Rim of South Pole-Aitken basin	85.0S	30.0E	—	73, V
97	Inghirami Valley	Orientale basin ejecta	44.0S	73.0W	140	61
98	Imbrium lava flows	Mare lava-flow boundaries	32.8N	22.0W	—	10
99	Ina	D-shaped young volcanic caldera	18.6N	5.3E	3	22
100	Mare Marginis swirls	Possible magnetic field deposits	18.5N	88.0E	—	27, III

Chart numbers refer to Antonín Rükl's *Atlas of the Moon.*

For the convenience of observers, the Lunar 100 is also available on *Sky & Telescope*'s 9-by-12-inch laminated Lunar 100 Card ($6.95), featuring a high-quality Moon map by Antonin Rukl on the front. The reverse side shows the locations and sizes of 100 features, together with brief descriptions of each.

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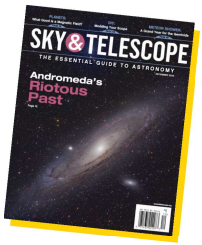

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