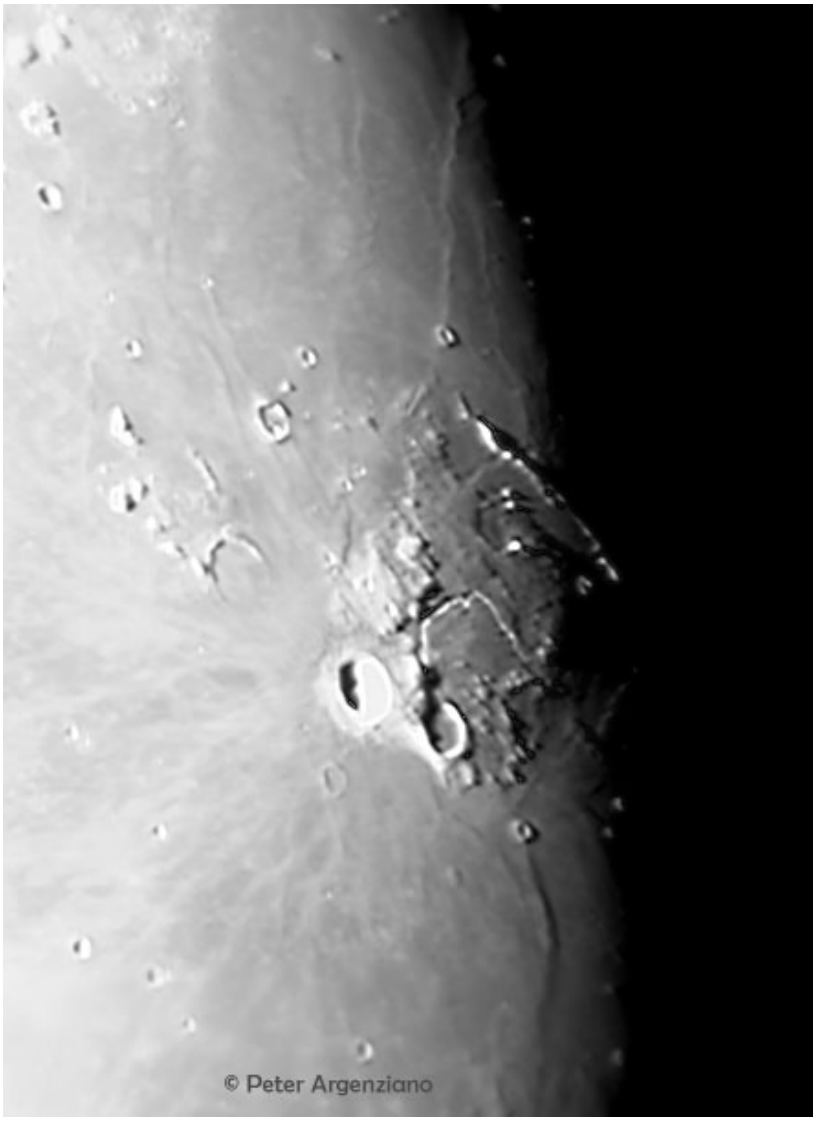
Observing



the Lunar 100

OBSERVING THE LUNAR 100

by
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In the April 2004 issue of Sky&Telescope noted planetary scientist and author Charles A. Wood presented the astronomical community with his answer to deep sky observing lists such as the Messier and the Herschel 400 - *The Lunar 100*. His stated intention was to provide the observer with a list of features that provide visual interest while at the same time offering an opportunity to learn about the Moon's fascinating history and geography. The challenge he presents through the list is to not only see these features on the surface of the Moon, but to think about them, and to try to understand what they mean about the Earth's natural satellite. Some of the items on the list are as obvious and visible as earthshine on the young Moon and the basic light and dark pattern that we interpret as The Man in the Moon or the Hare. Others will challenge the most experienced and diligent of observers. How far can you go on the Lunar 100? (As a general rule, the higher the number on the list, the more challenging the feature will be to see.)

The following is a brief guidebook and log for use in tracking down and observing the Lunar 100 by providing an observation checklist and a list of the features sorted by best viewing opportunity. It was compiled using material from the Lunar 100 list itself, along with Peter Grego's *Moon Observer's Guide* (Firefly Press 2004) and the *Atlas of the Moon* by Antonin Rukl.

The Lunar 100 is the property of Charles A. Wood and Sky Publishing Corporation. Copies of the list in the form of a card bearing a map of the 100 features are available from Sky Publishing. The list can also be viewed at the S&T website.

Recommended references:

Lunar 100 (card) by Charles A. Wood (Sky Publishing)

Atlas of the Moon by Antonin Rukl

Moon Observer's Guide by Peter Grego

Exploring the Moon Through Binoculars and Small Telescopes by Ernest H. Cherrington Jr.

The Hatfield Photographic Lunar Atlas edited by Jeremy Cook

Photographic Atlas of the Moon by S.M. Chong, et al

The Modern Moon: A Personal View by Charles A. Wood

Consolidated Lunar Atlas – Lunar and Planetary Institute

Lunar Quadrant Maps, available from Sky Publishing Corporation

Lunar Map Pro, high resolution lunar GIS software, available from Reading Information Technology, Inc.

Virtual Moon Atlas software by Christian Legrand and Patrick Chevalley

For a list of online lunar observing resources, visit the "Lunar Links" thread in the Lunar Observing Forum at *Cloudy Nights.*

The Lunar 100

#	Feature	Significance	Lat. °	Lon.°	Diameter (km)	Date Observed	Telescope	Eyepiece / Mag.
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	18.9 N	3.7 W	400			
5	Copernicus	Archetypal large complex crater	9.7 N	20.1 W	93			
6	Tycho	Large rayed crater with impact melts	43.4 S	11.1 W	102			
7	Altai Scarp	Nectaris basin rim	24.3 S	22.6 E	425			
8	Theophilus, Cyrillus, Catharina	Crater sequence illustrating stages of degradation	13.2 S	24.0 E	110			
9	Clavius	Lacks basin features in spite of its size	58.8 S	14.1 W	245			
10	Mare Crisium	Mare contained in large circular basin	18.0 N	59.0 E	540			
11	Aristarchus	Very bright crater with dark bands on its walls	23.7 N	47.4 W	40			
12	Proclus	Oblique-impact rays	16.1 N	46.8 E	28			
13	Gassendi	Floor-fractured crater	17.6 S	40.1 W	101			
14	Sinus Iridum	Very large crater with missing rim	45.0 N	32.0 W	260			
15	Staright Wall (Rupes Recta)	Best example of a lunar fault	21.8 S	7.8 W	130			
16	Petavius	Crater with domed and fractured floor	25.1 S	60.4 E	188			
17	Schroter's Valley	Giant sinuous rille	26.2 N	50.8 W	168			

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#	Feature	Significance	Lat. °	Lon.°	Diameter (km)	Date Observed	Telescope	Eyepiece / Mag.
18	Mare Serenitatis dark edges	Distinct mare areas with different compositions	17.8 N	23.0 E	-			
19	Alpine Valley	Lunar graben	49.0 N	3.0 E	165			
20	Posidinius	Floor-fractured crater	31.8 N	29.9 E	95			
21	Fracastorius	Crater with subsided and fractured floor	21.5 S	33.2 E	112			
22	Aristarchus Plateau	Mysterious uplifted region mantled with pyroclastics	26.0 N	51.0 W	150			
23	Pico	Isolated Imbrium basin-ring fragment	45.7 N	8.9 W	25			
24	Hyginus Rille	Rille containing rimless collapse pits	7.4 N	7.8 E	220			
25	Messier & Messier A	Oblique ricochet-impact pair	1.9 S	47.6 E	11			
26	Mare Frigoris	Arcuate mare of uncertain origin	56.0 N	1.4 E	1,600			
27	Archimedes	Large crater lacking central peak	29.7 N	4.0 W	83			
28	Hipparchus	Subject of first drawing of a single crater	5.5 S	4.8 E	150			
29	Aridaeus Rille	Long, linear graben	6.4 N	14.0 E	250			
30	Schiller	Possible oblique impact	51.9 S	39.0 W	180			
31	Taruntius	Young floor-fractured crater	5.6 N	46.5 E	56			
32	Arago Alpha & Beta	Volcanic domes	6.2 N	21.4 E	26			

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#	Feature	Significance	Lat. °	Lon.°	Diameter (km)	Date Observed	Telescope	Eyepiece / Mag.
33	Serpentine Ridge	Basin inner-ring segment	27.3 N	25.3 E	155			
34	Lacus Mortis	Strange crater with rille and ridge	45.0 N	27.2 E	152			
35	Triesnecker Rilles	Rille family	4.3 N	4.6 E	215			
36	Grimaldi basin	Small two-ring basin	5.5 S	68.3 W	410			
37	Bailly	Barely discernible basin	66.5 S	69.1 W	303			
38	Sabine & Ritter	Possible twin impacts	1.7 N	19.7 E	30			
39	Schickard	Crater floor with Orientale basin ejecta stripe	44.3 S	55.3 W	206			
40	Janssen Rille	Rare example of a highland rille	45.4 S	39.3 E	199			
41	Bessel ray	Ray of uncertain origin near Bessel	21.8 N	17.9 E	-			
42	Marius Hills	Complex of volcanic domes and hills	12.5 N	54.0 W	125			
43	Wargentin	Crater filled to the rim with lava or ejecta	49.6 S	60.2 W	84			
44	Mersenius	Domed floor cut by secondary craters	21.5 S	49.2 W	84			
45	Maurolycus	Region of saturation cratering	42.0 S	14.0 E	114			
46	Regiomontanus central peak	Possible volcanic peak	28.0 S	0.6 W	108			
47	Alphonsus dark spots	Dark-halo eruptions on crater floor	13.7 S	3.2 W	119			
48	Cauchy region	Fault, rilles and domes	10.5 N	38.0 E	130			

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#	Feature	Significance	Lat. °	Lon.°	Diameter (km)	Date Observed	Telescope	Eyepiece / Mag.
49	Gruithuisen Delta & Gamma	Volcanic domes formed with viscous lavas	36.3 N	40.0 W	20			
50	Cayley Plains	Light, smooth plains of uncertain origin	4.0 N	15.1 E	14			
51	Davy crater chain	Result of comet-fragment impacts	11.1 S	6.6 W	34			
52	Cruger	Possible volcanic caldera	16.7 S	66.8 W	45			
53	Lamont	Possible buried basin	4.4 N	23.7 E	106			
54	Hippalus Rilles	Rilles concentric to Humorum basin	24.5 S	29.0 W	240			
55	Baco	Unusually smooth crater floor and surrounding plains	51.0 S	19.1 E	69			
56	Mare Australe	Partially flooded ancient basin	49.8 S	84.5 E	132			
57	Reiner Gamma	Conspicuous swirl and magnetic anomaly	7.7 N	59.2 W	70			
58	Rheita Valley	Basin secondary-crater chain	72.5 S	51.5 E	68			
59	Schiller-Zucchius basin	Badly degraded overlooked basin	56.0 S	45.0 W	335			
60	Kies Pi	Volcanic dome	26.9 S	24.2 W	45			
61	Mosting A	Simple crater close to middle of lunar near side	3.2 S	5.2 W	13			
62	Rumker Hills	Large volcanic dome	40.8 N	58.1 W	70			
63	Imbrium sculpture	Basin ejecta	11.0 N	12.0 E	-			

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#	Feature	Significance	Lat. °	Lon.°	Diameter (km)	Date Observed	Telescope	Eyepiece / Mag.
64	Descartes	Apollo 16 landing site; highland volcanism?	11.7 S	15.7 E	-			
65	Hortensius domes	Dome field north of Hortensius	7.6 N	27.9 W	10			
66	Hadley Rille	Lava channel near Apollo 15 landing site	25.0 N	3.0 E	-			
67	Fra Mauro formation	Apollo 14 landing site on Imbrium ejecta	3.6 S	17.5 W	-			
68	Flamsteed P	Proposed young volcanic crater & Surveyor 1 landing site	3.0 S	44.0 W	-			
69	Copernicus secondary craters	Rays and craterlets near Pytheas	19.6 N	19.1 W	4			
70	Humboldtianum basin	Multi-ring impact basin	57.0 N	80.0 E	650			
71	Sulpicius Gallus dark mantle	Ash eruptions northwest of crater	19.6 N	11.6 E	12			
72	Atlas dark-halo craters	Explosive volcanic pits on floor of Atlas	46.7 N	44.4 E	87			
73	Smythii basin	Difficult-to-observe basin scarp and mare	2.0 S	87.0 E	740			
74	Copernicus H	Dark-halo impact crater	6.9 N	18.3 W	5			
75	Ptolemaeus B	Saucerlike depression on the floor of Ptolemaeus	8.0 S	0.8 W	164			
76	W. Bond	Large crater degraded by Imbrium ejecta	65.3 N	3.7 E	158			

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#	Feature	Significance	Lat. °	Lon.°	Diameter (km)	Date Observed	Telescope	Eyepiece / Mag.
77	Sirsalis Rille	Procellarum basin radial rilles	15.7 S	61.7 W	425			
78	Lambert R	Buried 'ghost' crater	23.8 N	20.6 W	54			
79	Sinus Aestuum	Eastern dark-mantle volcanic deposit	12.0 N	3.5 W	90			
80	Orientale basin	Youngest large impact basin	19.0 S	95.0 W	930			
81	Hesiodus A	Concentric crater	30.1 S	17.0 W	15			
82	Linne	Small crater once thought to have disappeared	27.7 N	11.8 E	2.4			
83	Plato craterlets	Crater pits at limits of detection	51.6 N	9.4 W	109			
84	Pitatus	Crater with concentric rilles	29.8 S	13.5 W	97			
85	Langrenus rays	Aged ray system	8.9 S	60.9 E	132			
86	Prinz Rilles	Rille system near the crater Prinz	27.0 N	43.0 W	46			
87	Humboldt	Crater with central peaks and dark spots	27.0 S	80.9 E	189			
88	Peary	Difficult-to-observe polar crater	88.6 N	95.3 E	104			
89	Valentine Dome	Volcanic dome	30.5 N	10.1 E	30			
90	Armstrong, Aldrin, Collins	Small craters near the Apollo 11 landing site	1.3 N	23.7 E	3			
91	De Gasparis Rilles	Area with many rilles	25.9 S	50.7 W	30			
92	Gylden Valley	Part of the Imbrium radial sculpture	5.1 S	0.7 E	47			

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#	Feature	Significance	Lat. °	Lon.°	Diameter (km)	Date Observed	Telescope	Eyepiece / Mag.
93	Dionysius rays	Unusual and rare dark rays	2.8 N	17.3 E	18			
94	Drygalski	Large South Pole-region crater	79.3 S	84.9 W	149			
95	Procellarum basin	Moon's biggest basin?	23.0 N	15.0 W	3,200			
96	Leibnitz Mountains	Rim of South Pole-Aitken basin	85.0 S	30.0 E	-			
97	Inghirami Valley	Orientale basin ejecta	44.0 S	73.0 W	140			
98	Imbrium lava flows	Mare lava-flow boundaries	32.8 N	22.0 W	-			
99	Ina caldera	D-shaped young volcanic caldera	18.6 N	5.3 E	3			
100	Mare Marginis swirls	Possible magnetic-field deposits	18.5 N	88.0 E	-			

Day 2	
2	Earthshine
10	Mare Crisium
16	Petavius
56	Mare Australe
70	Humboltianum Basin (Mare Humboltianum)
73	Mare Smythii
85	Langrenus rays
87	Humboldt
100	Mare Marginis swirls

Day 3	
58	Rheita Valley (Vallis Rheita)

Day 4	
12	Proclus
25	Messier & Messier A
31	Taruntius
40	Janssen Rille (Rima Janssen)
48	Cauchy region
72	Atlas dark halo craters

Day 5	
7	Altai Scarp (Rupes Altai)
8	Theophilus, Cyrillus, Catherina
18	Mare Serenitatus dark edges
20	Posidonius
21	Fracastorius
26	Mare Frigoris
32	Arago Alpha & Beta
33	Serpentine Ridge (Dorsa Smirnov)
34	Lacus Mortis
38	Ritter & Sabine
53	Lamont
55	Baco
90	Armstrong, Aldrin, Collins

Day 6

24	Hyginus Rille (Rima Hyginus)
28	Hipparchus
29	Ariadaeus Rille (Rima Ariadaeus)
35	Triesnecker Rille (Rimae Triesnecker)
41	Bessel ray
45	Maurolycus
50	Cayley Plains
63	Imbrium sculpture
64	Descarte
71	Sulpicus Gallus
82	Linne
89	Valentine dome
93	Dionysius rays

Day 7

4	Apennines (Montes Apenninus)
19	Alpine Valley (Vallis Alpes)
27	Archimedes
46	Regiomontanus central peak
66	Hadley Rille (Rima Hadley)
75	Ptolemaeus B
76	W. Bond
88	Peary
92	Gylden Valley

Day 8

15	Straight Wall (Rupes Recta)
47	Alphonsus
51	Davy crater chain
61	Mosting A
79	Sinus Aestuum
83	Plato craterlets
96	Leibnitz Mountains
99	Ina caldera

Day 9

5	Copernicus
6	Tycho
9	Clavius
14	Sinus Iridum
60	Kies Pi
65	Hortensius dome
67	Fra Mauro formation
69	Copernicus secondary craters
74	Copernicus H
78	Lambert R
81	Hesiodus A
84	Pitatus
94	Drygalski

Day 10

13	Gassendi
30	Schiller
49	Griuthuisen Delta & Gamma
54	Hippalus Rilles (Rimae Hippalus)
59	Schiller-Zucchius basin
68	Flamsteed P
98	Imbrium lava flows

Day 11

11	Aristarchus
17	Schroter's Valley
22	Aristarchus Plateau
39	Schickard
42	Marius Hills
44	Mersenius
57	Reiner Gamma
86	Prinz Rilles (Rimae Prinz)
91	De Gasparis Rilles (Rimae De Gasparis)

Day 12

37	Bailly
43	Wargentin
62	Rumker Hills (Mons Rumker)
77	Sirsalis Rille (Rima Sirsalis)

Day 13

36	Grimaldi basin
52	Cruger
80	Orientale Basin (Mare Orientale)
97	Inghirami Valley (Vallis Inghirami)

Day 14

1	Moon
3	Mare/highland dichotomy
95	Procellarum Basin

Days 15-16-17

10	Mare Crisium
12	Proclus
16	Petavius
25	Messier & Messier A
31	Taruntius
40	Janssen Rille (Rima Janssen)
56	Mare Australe
58	Rheita Valley (Vallis Rheita)
70	Humboldtianum basin
72	Atlas dark-halo crater
73	Smythii basin (Mare Smythii)
85	Langrenus rays
87	Humbolt
100	Mare Marginis swirls

Days 18-19-20

7	Altai Scarp (Rupes Altai)
8	Theophilus, Cyrillus, & Catharina
18	Mare Serenitatus dark edges
20	Posidonius
21	Fracastorius
29	Ariadeus Rille (Rima Ariadeus)
32	Arago Alpha & Beta
33	Serpentine Ridge (Dorsa Smirnov)
34	Lacus Mortis
38	Sabine & Ritter
41	Bessel ray
45	Maurolycus
48	Cauchy region
50	Cayley plains
53	Lamont
55	Baco
63	Imbrium sculpture
64	Descarte
71	Sulpicius Gallus dark mantle
82	Linne
89	Valentine dome
90	Armstrong, Aldrin, Collins
93	Dionysius rays

Days 21-22	
4	Apennines (Montes Apenninus)
5	Copernicus
6	Tycho
9	Clavius
15	Straight Wall (Rupes Recta)
19	Alpine Valley (Vallis Alpes)
23	Pico
24	Hyginus Rille (Rima Hyginus)
26	Mare Frigoris
27	Archimedes
28	Hipparchus
35	Triesnecker Rilles (Rimae Triesnecker)
46	Regiomontanus central peak
47	Alphonsus dark spots
51	Davy crater chain
61	Mosting A
66	Hadley Rille (Rima Hadley)
67	Fra Mauro formation
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74	Copernicus H
75	Ptolemaeus B
76	W. Bond
78	Lambert R
79	Sinus Aestuum
81	Hesiodus A
83	Plato craterlets
84	Pitatus
88	Peary
92	Gylden Valley
94	Drygalski
96	Leibnitz Mountains
99	Ina Caldera

Days 23-24-25	
13	Gassendi
14	Sinus Iridum
30	Schiller
49	Gruithuisen Delta & Gamma
54	Hippalus Rille (Rima Hippalus)
59	Schiller-Zucchias basin
60	Kies Pi
65	Hortensius domes
68	Flammsteed P
98	Imbrium lava flows

Days 26-27-28	
11	Aristarchus
17	Schroter's Valley
22	Aristarchus Plateau
36	Grimaldi
37	Bailly
39	Schickard
42	Marius Hills
43	Wargentin
44	Mersenius
52	Cruger
57	Reiner Gamma
62	Rumker Hills (Mons Rumker)
77	Sirsalis Rille (Rima Sirsalis)
80	Orientale basin
86	Prinz Rilles (Rimae Prinz)
91	De Gasparis Rilles (Rimae De Gasparis)
97	Inghirami Valley (Vallis Inghirami)

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