

Binocular Universe: Jack and Jill

June 2011

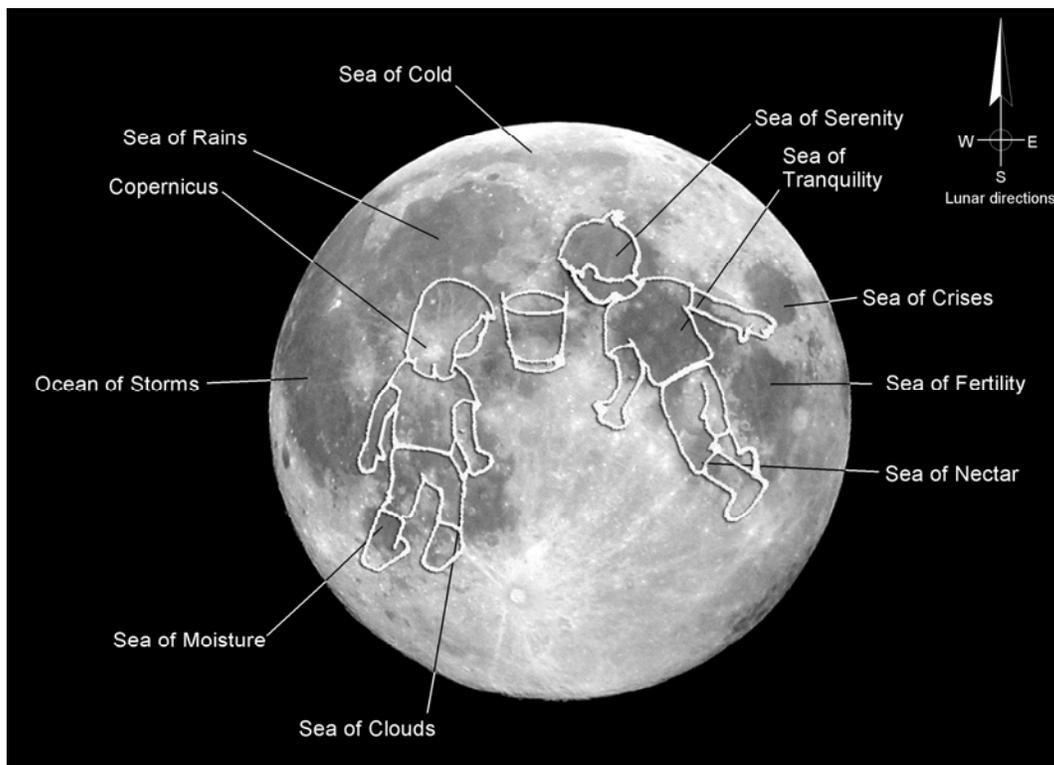
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*Jack and Jill went up the hill
To fetch a pail of water.
Jack fell down and broke his crown,
And Jill came tumbling after.*

In all likelihood, you learned that nursery rhyme long before you became interested in stargazing. But did you know that Jack and Jill may have also been your first astronomy lesson?

That's because some say that the familiar verse traces its origin back to ancient Scandinavia, where it was called *Hjuki and Bila*. And that the rise and fall of Jack and Jill is based on the appearance of the lunar maria as the Moon goes through its monthly cycle of phases. Hjuki is derived from the Scandinavian word *jakka*, which means "increase," while Bila means "dissolve" or "decrease." Hjuki represents the Moon's waxing phases, when it appears to be getting larger night after night, while Bila is analogous to the waning phases.



Let's follow the misadventures of Jack and Jill as the terminator crosses the face of the Moon night after night this month. As we do, it's easy to see that the Moon is made up of two distinct types of terrain. The brighter areas, littered with craters and mountains, are the lunar highlands, while the darker, smooth regions are called lunar maria. The word "maria" is the plural form of "mare," the Latin word for sea. Long before the invention of the telescope, our ancestors interpreted these dark areas as oceans of water. Although we've known for centuries that there are no bodies of water on the Moon, we still refer to these as lunar maria even today. In reality, lunar maria are huge impact basins that formed nearly 4 billion years ago as the Moon was pelted with huge space boulders left over from the formation of the solar system. The impact basins subsequently filled with lava, which solidified to leave flat, relatively crater-free plains.

We'll begin our visit a few days after the New phase, but you can join the voyage anytime. Check the calendar below for this month's phases.

2011 June 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 	2	3	4
5	6	7	8 	9	10	11
12	13	14	15 	16	17	18
19	20	21	22	23 	24	25
26	27	28	29	30		

The first lunar maria to see sunrise, about two days after New Moon, is Mare Crisium, the Sea of Crises. The Sea of Crises is an oval plain measuring 435 km by 565 km, and is located along the eastern limb of the Moon.

This same evening, the edge of the Sea of Fertility, Mare Fecunditatis, also sees first light. Unlike the Sea of Crises, which stands alone, the Sea of Fertility is linked to the other major lunar seas by a series of imaginary canals and straits. Over the next few nights, more and more of the Sea of Fertility is bathed in sunlight, as are the Sea of Nectar (Mare Nectaris) and the Sea of Tranquility (Mare Tranquillitatis).

By the night of First Quarter, we can see Jack (Hjuki). His head is marked by the Sea of Serenity, his body by the Sea of Tranquility, and his legs by the Seas of Nectar and Fertility. You can even imagine that he's holding a "bucket," the Sea of Vapors (Mare Vaporum). The Seas of Serenity and Tranquility span 707 km and 873 km, respectively. The Sea of Nectar is about 333 km in diameter, while the Sea of Vapors is 245 km across.

If you look carefully along the northeastern shore of Mare Serenitatis, you may see that it flows into a segmented light gray area referred to as the Lake of the Dead and the Lake of Dreams. These, in turn, connect to the Sea of Cold (Mare Frigoris). The Sea of Cold is the longest and thinnest of the maria, spanning some 1,800 km end to end, but only 200 km or so at its widest.

We don't begin to see Jill (Bila) until after First Quarter. As the Moon continues through its waxing gibbous phases over the next several evenings, sunlight washes into the Sea of Vapors (Mare Vaporum) to unveil the brilliant island crater Copernicus some 9 days after New Moon. Sunlight continues into the Sea of Rains (Mare Imbrium) and Sea of Moisture (Mare Humorum) the next night, and finally lights the largest lunar mare, the Ocean of Storms (Oceanus Procellarum), two nights before Full Moon.

We might imagine the bright crater Copernicus as Jill's head, her body extending to the south, and the Seas of Clouds and Moisture creating her two legs. Both figures appear to "climb" as the waxing phases progress, Jack first, followed by Jill. Finally, at Full Moon, both are standing next to each other, with the pail between them.

But soon, the Moon's terminator will begin to sweep back over Jack, causing him to fall into darkness. At Last Quarter, Jack is gone, leaving Jill alone. But as the waning crescent phases continue toward New Moon, she will soon come tumbling after.

Did you ever wonder what happened to Jack and Jill after the fall? Have no fear, the poem's lesser known second verse tells the tale.

*Then up Jack got and home did trot
As fast as he could caper;
And went to bed to mend his head
With vinegar and brown paper.*

I'm not so sure that vinegar and brown paper is a good remedy for a potential concussion, but you can be sure that he and Jill will be back again after they rest for a few days, to repeat their trek across the face of the Moon.

Questions, comments? I always enjoy hearing from readers, so be sure to send them to me at phil@philharrington.net. Until next month, remember that two eyes are better than one.



About the Author:

Phil Harrington is the author of nine books on astronomy, including [Touring the Universe through Binoculars](#) and [Cosmic Challenge](#). Visit his web site at www.philharrington.net

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