

## The Moon & Us

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The versatile poet and Bollywood lyricist Shamsul Huda Bihari, once in a radio interview lamented the landing of humans on the Moon. He rued the fact that technology and science have ruined the poetic imagination where the Moon, especially the full moon, was frequently used to describe the beloved's beauty. He should know- he had penned the memorable "*Yeh Chaand sa raushan chehra*" for the sixties hit *Kashmir ki Kali*.

An otherwise unremarkable object in the vast cosmos, our natural satellite the Moon has of course fascinated humans for millennia. The regularity of its phases was the reason why most calendar systems in human history have been lunar. Poets, philosophers and astrologers took keen interest in it. Aristotle in the 4<sup>th</sup> century BCE argued for a spherical earth by observing the earth's shadow during a lunar eclipse. After the 16<sup>th</sup> century, telescopes made more detailed observations of the Moon possible. And yet, it was still a heavenly object out there- amenable to observations but not direct contact.

All that changed on September 13<sup>th</sup>, 1959 when the Soviet lunar probe, Luna 2 crashed into the Moon. Suddenly that familiar, near-yet-so-distant object seemed amenable to human ingenuity. Of course, the Luna 2 mission did more than that- it suddenly made the Americans realize that their cold war opponent was competent not just to launch a satellite (Sputnik had been launched a year earlier), but also capable of the complex guidance technology required for an operation to send a spacecraft to the Moon. The Space Race was on in earnest.

With the announcement in 1961 by President Kennedy of the commitment to land humans on the Moon in a decade, the American space program got a huge boost. That it happened soon after Yuri Gagarin's maiden space flight was not a coincidence. The

Apollo program, from 1961 to 1972 became the focus for NASA. Developing rockets which were powerful enough for the mission of taking humans to their closest heavenly neighbor, guidance and communication systems to ensure the exact trajectory and most importantly, making sure that the risks to human life were minimal were daunting tasks. The commitment was total- costing \$25 billion and employing nearly half a million people and supporting thousands of industries, it seemed that the whole economic and technological might of America was put to use.

And then on July 20, 1969, mankind (sic) took the giant leap- Neil Armstrong became the first human to step on lunar soil. The pictures of the Stars and Stripes on the desolate lunar landscape being reflected in Armstrong's visor were flashed all over the globe. And for people like S.H.Bihari , the poetic mystique of the Moon was shattered for good.

After the landing on the Moon, the Apollo program continued for a few more years but once the chest thumping patriotism had petered out, it was realized that the program was too costly to justify its continuation and so was axed in 1972. The Soviets continued sending unmanned spacecraft to the Moon and performing experiments and collecting samples till 1976 when the Luna program was also terminated. The awe and wonder of the Moon had waned and the human ambition took up other challenges in the solar system- Mars, Venus, Jupiter and even beyond. The Moon was passé.

But like retro fashion, the Moon has made reappearance in the scientific firmament in the 21<sup>st</sup> century. More than a dozen missions have been sent to the Moon (including our very own Chandrayaan I) though these have been lunar orbiters and not landers till recently.

Why the Moon? The answer to this question is actually less frivolous than the classic retort (misattributed to Hillary but actually said by Mallory) "Because it's there". The study of the geology and chemistry of lunar rocks has proved to be of immense use in expanding our understanding of the solar system. Moon is believed to have formed when a Mars-sized body impacted the Earth some 4.5 billion years ago. The impact hypothesis is one of the several theories about the origin of the Moon. Catastrophic impacts were quite common in the early history of the solar system and the study of the composition of rocks gathered from the lunar surface by the Apollo astronauts as well as the many unmanned missions, has thrown light on the origins of the Moon as well

as the early solar system. With the latest Chinese mission Chang'e 4 landing on the far-side of the moon, a new era in the study of lunar geology has begun.

In 2008, an instrument called the Moon Mineralogy Mapper onboard the lunar orbiter Chandrayaan 1 confirmed the presence of surface ice on the Moon. This is extremely significant because one of the motivations for the recent resurgence of interest in the Moon has been the setting up of a lunar base for interplanetary travel. And with entrepreneurs like Elon Musk and Jeff Bezos getting into the game, space is no longer a not-for-profit venture. If all goes according to schedule, the first commercial landing on the Moon could be as early as 2020 and within a couple of decades we might see semi-permanent habitation on the Moon.

In the five decades since Armstrong stepped on the Sea of Tranquility scientific interest in the Moon has waxed and waned- from a dark period at the end of the 20<sup>th</sup> century to the surge in exploration now. In fact, we might even witness people staying on the Moon in our lifetimes. The *chaand* might have lost its shine for the poets but this is surely the *Shukla Paksha* for the scientists.

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