

The Moon Landings: History, Politics, and Social Responsibility in Science

by

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Introduction

Many scientific and technological advancements have been made as a result of our quest to explore space. However, scientific achievement happens within a broader social, historical, and political landscape. The purpose of this case study is to use the manned moon missions as a jumping off point to introduce socio-political issues that impact scientists and the publics they serve.

On July 20, 1969, the United States landed the first man on the moon. This was followed by five additional US missions to land men on the moon, the last of which occurred in 1972. The manned moon landings were part of the broader US civilian space program administered by the National Aeronautics and Space Administration (NASA), an executive agency in existence since 1958.

The US sentiment regarding the manned moon landings is frequently portrayed by images of eager families huddled around TVs to watch the landing, and the oft-recited statement made by Neil Armstrong, “That’s one small step for man, one giant leap for mankind.” However, there were different social and political perspectives also being voiced at this time.

The goal of this exercise is to look at a range of historical, political, and social issues that were occurring in the US at the time of the manned moon landings, and consider how these shape science and vice versa.



Historical Context

Pre-Reading Questions

- Brainstorm some ideas of why NASA may have been created. What information did you use to come up with these ideas?
- How would you describe the ethical integrity of the staff and scientists who were chosen to work for NASA on the manned moon missions? How did you formulate this idea?

The predecessor organization to NASA was the National Advisory Committee to Aeronautics (NACA). NACA was established in 1915 during WWI (1914–1918) “to supervise and direct the scientific study of the problems of flight with a view to their practical solution” (Suckow, 2009). Over the years, NACA greatly expanded and established its own laboratories.

After WWII (1939–1945), NACA focused on supersonic flight and, during the cold war of the 1950s, worked on missile development and turned an eye toward manned spaceflight (Suckow, 2009). The Soviet Union, who was the primary cold war adversary of the US, launched the first satellite, Sputnik, into space in 1957. This prompted Congress to ramp up space exploration, leading to the establishment of NASA in 1958 by consolidating most of the staff and resources of the former NACA. NASA pursued spaceflight with vigor, ultimately leading to the manned moon landings between 1969–1972.

The declassification of documents as part of the 1998 Nazi War Crimes Disclosure Act illuminates the history of some of the individuals who worked for NASA. The documents reveal that, as part of a US government sanctioned program called Operation Paperclip, approximately 1,600 former Nazi scientists were recruited and brought to the US to work (Jacobsen, 2014). Several of these individuals occupied top leadership positions in NASA, including four who played critical roles in the manned moon missions: Wernher von Braun, Walter Dornburger, Hubertus Strughold, and Arthur Rudolph.

Discussion Questions

- Does learning about the historical context alter your answers to the pre-reading questions? What, if any, misconceptions did you have about the origins of NASA and its employees?
- What information is lost if only scientific results are reported and the historical context is not considered? Is this lost information relevant if the science gets done?
- Can science be ethical if the scientists conducting the work are not ethical? How would you determine this?

Political Climate

Pre-Reading Questions

- Who do you think plays a bigger role in deciding which scientific projects are funded, scientists or politicians? What information did you use to make your decision?
- What do you envision the process to decide scientific priorities looks like? What do you think it should look like? Who, if anyone, should be consulted? Who should make the final decision?

In April of 1961, the Soviet Union put the first man, Yuri Gagarin, into space. Losing this “first” to our cold-war rivals, coupled with the embarrassment of the Bay of Pigs in the same year, prompted President Kennedy to ask Vice President Johnson to look into possibilities for the US to catch up. Johnson consulted Wernher von Braun, the Director of NASA’s Marshall Space Flight Center, who stated in a letter that the US has “an excellent chance of beating the Soviets to the first landing of a crew on the moon” (von Braun, 1961).

On May 25, 1961, President Kennedy gave a speech to Congress arguing that space advancements were necessary “if we are to win the battle that is now going on around the world between freedom and tyranny,” a statement in reference to the ideological war against communism. He outlined the ambitious goal of landing a man on the moon by the end of the decade and requested a seven to nine billion dollar increase in spending on the space program over the next five years. Kennedy’s vision was embraced by Congress, but he did not live to see the results. President Kennedy was assassinated in 1963, and he was succeeded by his Vice President, Lyndon B. Johnson.

Johnson continued the space program and also made significant progress in passing legislation to alleviate poverty, advance civil rights, and protect the environment. Abroad, he escalated military action in Vietnam resulting in massive casualties. There was intense vocal opposition to the war, and scrutiny intensified when a comprehensive report about the war, referred to as the Pentagon Papers, was partially leaked in 1971. The documents, which weren’t fully declassified and released until 2011, revealed that “the Johnson Administration had systematically lied, not only to the public but also to Congress” (Apple, 1996).

Johnson was succeeded in 1969 by President Richard Nixon, who was in office when the first men landed on the moon. He continued the Apollo program until 1972, but later argued that “space expenditures must take their proper place within a rigorous system of national priorities” (Callahan, 2014). Nixon’s last years in office were characterized by ending the Vietnam war in 1973, and his resignation in 1974 amid the Watergate scandal.

Discussion Questions

- Can scientific work be described as objective if the choice of which projects are funded is motivated by political forces?
- What steps could scientists take to keep abreast of the motivations behind the funding of their research? Do you think scientists have an ethical obligation to be aware of such motivating forces? If so, how would you encourage scientists to be more attuned to this issue?
- What role does the general public have in deciding scientific priorities? Are there ways in which the public could be more involved? What would be required for this to happen?

Social Landscape

Pre-Reading Questions

- Picture in your mind all of the NASA personnel who worked on the manned moon missions. Where did you develop this sense of what the membership of this team looked like?
- Do people who are not represented in the sciences have their points of view equally considered by practitioners of science? How do you know? How would unrepresented groups be able to determine if this is the case?

The Apollo program spanned the years of 1961–1972, and there were a total of six US manned moon landings between 1969 to 1972. In total, to date, 12 Caucasian men have set foot on the moon, 0 women, and 0 African Americans. The science and technology team leaders of the Apollo missions were also primarily Caucasian men. Some subordinate roles were filled by individuals from marginalized groups, but, as highlighted in the recent book and film *Hidden Figures*, these employees were often treated poorly and unrecognized for their work (Shetterly, 2016).

In general, the 60s and early 70s were a turbulent era of social awakening in the US. There were sit-ins, protests, Freedom Riders, and, in 1963, Martin Luther King gave his famous “I Have A Dream” speech. The Civil Rights Act (1964), which prohibited racially-based employment discrimination and segregation of public spaces, and the Voting Rights Act (1965), which prohibited racial discrimination in voting, were signed by President Johnson. This progress was followed by the assassination of two instrumental leaders; Malcolm X in 1965 and Martin Luther King in 1968.

The public was also becoming aware of unethical practices in the US regarding public health. In 1972, news broke about a government-sanctioned study, known as the Tuskegee Study, in which African American men with syphilis were severely mistreated. There had been many publications in the scientific literature about this study, so scientists were aware of its existence, but the public only learned of it when an article was published in the *New York Times* (Heller, 1972). The study involved following the course of the disease until death in these men, despite the fact that penicillin had been available as an effective treatment since the 1940s. The study was terminated in 1972, but the government did not offer an apology or remuneration until 1997. The Tuskegee Study was only one of many such unethical studies conducted on marginalized populations in the US, despite the US outrage upon learning of similar ethical violations that were committed by the Nazis in prior decades.

Other marginalized groups were also finding their voices in the US. Women organized to form the National Organization for Women (1966), and Title IX of the Education Amendments was passed (1972) which prohibited sex discrimination in schools. In 1969, the Stonewall riots in New York gave birth to the fight for LGBTQ+ rights, and Native People occupied Alcatraz to spearhead the movement for native rights.

The publication of *Silent Spring* by Rachel Carson in 1962 also led to a different social awakening; a recognition of the need to protect the environment (Carson, 1962). Organizations such as Greenpeace and the World Wildlife Fund were started, and, in 1970, the Environmental Protection Agency was founded and the Occupational Safety and Health Act (OSHA) was signed into law.

Discussion Questions

- Some of the spin-off benefits of the Apollo missions include freeze-dried food, cooling suits, kidney dialysis advancements, Alaskan pipeline insulation, green buildings, athletic conditioning equipment, flame-resistant textiles, and water purification technologies (National Aeronautics and Space Administration, *n.d.*). Do you think all US citizens gain comparable levels of lifestyle advancement from these products?
- Who, if anyone, most benefitted from the success of the moon landings in the 1970s? Consider, for example, were there more benefits for women or men? Politicians or average citizens? Wealthy or poor? African Americans, native people, or white Americans? Heterosexual Americans or LGBTQ+ Americans?
- Should science and technology initiatives strive to benefit all citizens equally? If so, how could this be implemented? If not, what criteria would you apply to determine how to prioritize the needs of citizens?
- Should scientists consider the societal implications of their work? What recourse do they have if they disagree with the project for which they are paid to undertake? How could non-scientists support scientists in such an endeavor?

The Next Mission

Below is an opportunity to consider a current situation and decide how you would proceed.

Suppose you are part of an international collaboration of space scientists and engineers. Your team is planning to launch a spacecraft to explore a nearby planet and the total cost of the mission is \$400 million dollars. You receive an email asking why this mission is being funded given the extreme poverty and starvation in the world.

- What steps would you take to consider this question?
- How would you respond to the email?
- Would this change your plans for working on any similar future missions?



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