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Art and Craft of Writing

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From Apollo to Artemis

A flash of fire lit up the launchpad at Kennedy Space Center. The bright-yellow jet of flame burning out of the bottom of the rocket looked like a fourth-of-july sparkler in the night as it crackled under the rocket, an off-white river rapid of sparks and fire. The rocket lurched suddenly upwards, released from the grip of the loving arms connecting it to the earth, its bulk heaving upwards as it was pulled like a toy on a string. 53 years prior, a similar scene played out on an air force base in Cape Canaveral. The sparkling of the rocket in the sky was like the morning star as Apollo 11 launched on its eight day mission. That mission? Nothing less than to put the first men on the Moon.

My grandfather remembers watching Walter Cronkite on the television that night - he mentioned to me how Cronkite seemed as giddy as a kid on

christmas. Reviewing the footage, I have to agree - and who, besides our soviet rivals, wouldn't be giddy at the outset of this massive achievement? It must have been a nervous day in Moscow on the 20th of July, 1969, when the lunar lander landed on the surface of the moon.

I wonder what the Soviet space leadership thought, to know that their previous accomplishments - first satellite, first dog in space, first man in space - had been wiped out in a single step. The first man on the Moon, Neil Armstrong, planted his booted foot on the nearest part of the final frontier. "One small step for a man, one giant leap for mankind." - those immortal words rang out across the airwaves as mankind made its ascent among the stars.

Fifty-three years later, on a similar field in a different part of the country, another launch took place. The first of the Artemis missions said "Bon voyage!" to Earth and "Bonjour!" to space. This mission, the first of its kind in recent history, has a similar goal as the Apollo missions, but with a subtle difference - Where Apollo simply stopped by to check on the Moon a few times, Artemis plans to stay. Designed as the preliminary step for an eventual Mars mission, the Artemis program plans to erect a base on the Moon starting at the Lunar south pole.

While usually considered confined to the realm of science fiction, the Artemis program's goal is well within reach. The moon, once so far outside

the human scope that it was worshiped by some cultures as a deity, is now made tangibly and tantalizingly close to the human “world”. Our first steps were momentous for our nation, and, arguably, humanity as a whole. The conquest of Space, once thought to be impossible, has begun. But will this new frontier bring us what we want, or will it be a fruitless endeavor?

This mission has been a long time coming, and as such it’s not without its detractors. Originally started in 2017, and with a budget expected to reach 93 billion dollars by 2025, many are considering whether or not the Artemis program - or, indeed, any new moon missions - are worth it. Lori Garver, former deputy administrator of NASA, is one of these detractors, though not without good reason. She believes that, while a new set of moon missions may be exciting and perhaps good for national pride, the bigger issue right now is climate change, and, as such, that should be the government’s main focus. “Climate change,” she writes, “not Russia, much less China — is today’s existential threat.” (Garver)

However, Garver does note that the new moon landings are a good way for humanity to get perspective on the problem. As she writes in a later article, “I really don’t think it is an either-or. I think it is a question of priorities, and right now, I’d prioritize utilizing the unique vantage of space to help us understand and solve the climate crisis.” (Stirone et. al)

For example, one of the main reasons the new Moon landings are happening is the ever-important quest for scientific knowledge and new resources. Specifically, NASA is hoping to get an easy supply of Helium-3 - a possible candidate for creating fusion energy. The proliferation of fusion energy would solve quite a few climate-related problems, as it's an environmentally-friendly energy source that produces massive amounts of the stuff. If it gets off the ground, it could lead to untold prosperity - if we manage to grid that kind of power, we could put oil and coal out of business entirely simply because of their inefficiency.

Another major benefit of a potential moon base would be the potential for space mining, which could bring in a vast quantity of resources now considered rare - gold, lithium, and aluminum, to name a few. The moon is rich in resources, and the first people to claim them will be wealthy like they're successful gold-rush prospectors in the late 1800s. Regardless, the massive cost is still off-putting to some - as well as the fear of armed conflict with rival powers. After all, we're not the only nation concerned with the metals in "them there lunar hills."

Another concern is the potential for human rights abuses and the international competition for Space - the new space race. The original space race, part of the cold war between the United States and Soviet Union, was the reason we first traveled to the moon. That international rivalry, much like the modern one, was far from friendly. Only a year or so after John F.

Kennedy declared that "[the United States] should commit itself to achieving the goal … of landing a man on the Moon and returning him safely to the earth," (Kennedy), the eruption of the Cuban missile crisis - the tensest and most volatile moment of the cold war - nearly led to nuclear catastrophe.

A similar situation is arising with the Chinese Communist government, and we may be about to go into a second cold war. What does that mean for the Moon base plan? China is now not merely a rival, but a major space power, according to Wired magazine: China recently completed their Tiangong space station, a competitor to the US-lead International Space Station that's been in orbit since 1998.

The new space station, though, is only one aspect of the Chinese space program. The new International Lunar Research Station, or ILRS, is designed as a direct competitor to the Artemis program. The station, which is expected to be completed by 2035, will also be located on the Lunar south pole. These stations, Artemis and ILRS, will therefore be close to one another - potentially close enough for conflict. How long will it take before the Chinese Communist and United States spheres of influence overlap in space as they do on earth?

A lot of this controversy over space is predicated on the modern expansion of international space law. Originally established during the Space Race, international space law is designed to keep these kinds of national

conflicts in space to a minimum. It consists of a series of treaties between countries, both about how to deal with problems in space - astronaut rescue and damage liabilities, for instance - as well as in preventing the nuclear conflict I mentioned before. However, the nations involved today may be less inclined to follow such space law if they see it as dominated by the USA, as countries such as Russia and China may. Russia, in fact, threatened to pull out of the International Space Station as a result of their invasion of Ukraine. If China follows suit over another break in relations, it could spell disaster for Space Law as we know it.

One way the modern space agencies are dealing with these challenges is insisting that their space programs are to be used for peaceful purposes only. One such example of this initiative is the recent creation of the Artemis Accords - an American-led effort to codify the norms for companies and countries competing and collaborating in space exploration projects.

The accords, according to space lawyer Micheal Gold in an article from Space.com, are meant to be “conducive to international collaboration, and conducive to growth" (Gold, Howell). This growth, however, may come at the expense of security for all. If people begin to settle in bases on the moon, it’s only a matter of time before conflicts - originating either on earth or in space - erupt. This assertion is not without precedent: In fact, a similar situation in the late 1400s may give us some clarity. Spain and Portugal wanted to decide how to split the world for their own colonization. After

much agitation between the two kingdoms, they came to an agreement: the Treaty of Tordesillas.

This treaty, much like the new Artemis accords, was brokered by the world powers, and was designed to mitigate the possibility of conflict over resources in a frontier unclaimed by the powers of the time. Ratified (though not initially) by the Pope, the treaty stipulated that, at an imaginary line 370 leagues west of the Cape Verde Islands, Spain would be able to colonize, and east of that line would be Portugal's domain.

The treaty, of course, did not hold up. Spain and Portugal may have held to the agreement, but France, England, and many other powers - especially the ones which had become protestant by this point, denying the authority of the Pope - ignored the treaty, and proceeded to fight over the "New World".

This, I believe, is the eventual fate of the Artemis Accords and the United Nations space treaties. Even if the USA and most of the rest of the world agrees to the treaty, it takes only one non-signatory or rule breaker to militarize space and ruin the whole thing for everybody. In fact, China - as well as Russia and many other nations aligned with them - have not signed onto the Artemis accords, and seem to have no plan to do so.

The militarization of space, if it is achieved, has the potential to kill millions, or at least to hold the lives of millions by a thread. It was an

asteroid that killed the dinosaurs and created the ice age that followed their demise. If space is militarized, countries could - hypothetically - do similar things to their rivals with nuclear bombs or even wayward comets.

Even international rules may not help us here: Gas attacks were banned during the Hague conventions of 1899, shortly before World War 1, but once one great power began to use them, the rest of them quickly followed suit. Gas attacks in WW1 are one of the most prominent horrific memories of that war. If people could not prevent mere chemical weapons from being used, then I believe that they cannot prevent the use of space-borne weapons, either. International rules and regulations must be backed up with enforcement for them to be relevant.

I think this shows that the conquest of space comes with incredible danger as well as incredible opportunity. These opportunities must not be squandered, however - an incredible source of power and resources, a second home for humanity in case of accident or emergency (If there's a major disaster on earth, the Moon could be a good safe haven for humanity to flee to - a "second home", so to speak), and the first steps towards the exploration of the cosmos are all important goals, relevant to both our current lives and our survival as a species. However, their massive operating cost - and potential cost in lives - cannot be denied.

The massive cost of the Apollo program raised concerns during its time too. In news articles, radio broadcasts, and TV programs, people lamented what they considered to be the "waste" of money - in the intro to a comedic song from that time period, for instance, the singer Tom Lehrer lamented "[what is it] that will make it possible to spend twenty billion dollars of your money to put some clown on the moon?" (Genius)

The answer in the song is a link to one of the darker sides of the original Moon missions - the inclusion of captured Nazi scientist Wehrner von Braun, among others. The original moon landings, in fact, were not intended merely to provide scientific data and to glorify American authority - they were intended to justify the development of long-range ICBMs. I wonder, then, what the Artemis program's ulterior motives might be?

Lori Garver, too, admits that science has always taken a backseat to global politics in the quest for space. In her words, "I think it's about geopolitical leadership. Human spaceflight has largely been motivated in this way." (Stirone et al.) In fact, global leadership has always been a big focus for exploratory missions - especially considering the potential for lucrative benefits.

The conquest of the New World was not desirable until gold was discovered, for instance. The need for humans to explore and to conquer whatever's over the next hill has been prevalent for all of history, for better

and for worse. It was with the same spirit of adventure that Neil Armstrong felt upon lunar touchdown that the Pilgrims felt when they landed on Plymouth rock - though, as was demonstrated by said Pilgrims, after the Thanksgiving comes the violence.

But is European colonialism a good model for moon colonization efforts? After all, nobody lives on the moon, so it can't be colonialism in the same way that it was in the past. Another way that space colonialism differs from historical colonialism is in who is doing the colonizing. The colonies Spain created in Aztec lands were not government expeditions for the most part; it was over-zealous explorers who conquered these civilizations, as exemplified by conquistadors like Hernan Cortes.

These lands were already lush with life, as Cortes discussed in his letters to King Charles V of Spain, his patron. Cortes described the city of Temixtitlan (Now Mexico City) thusly: "This great city of Temixtitlan [Mexico] is situated in this salt lake, and from the main land to the denser parts of it, by whichever route one chooses to enter, the distance is two leagues. … This city has many public squares, in which are situated the markets and other places for buying and selling … This great city contains a large number of temples, or houses, for their idols, very handsome edifices, which are situated in the different districts and the suburbs…" (Cortes)

In contrast, the Moon is a desolate wasteland with almost no atmosphere and no life indigenous to it - the Moon is the premier desert in earth's orbit. A lack of breathable air, drinkable water, a gravitational field, and many other necessities make the Moon a formidable challenge to colonize. The first moonlings will have a hard time living in such terrible conditions, which brings up concerns about the stability of the entire mission system. To even have a chance of living there long-term, we may have to terraform the surface - which will, of course, come with its own problems.

Another concern in the history and the future of colonization is the problem - and solution - of private enterprises. In the classic Thanksgiving story, the first English colony of Jamestown was a colonial charter company, not a government program - and, if there is any modern parallel to these corporate claims, Elon Musk's SpaceX is the most prominent.

SpaceX was founded in 2002 with the goal of reducing the costs of transportation for space missions. The company was the first to support the idea of the age of "commercial" space exploration - as well as being the first commercial entity to release a spacecraft into orbit and successfully return it to earth. One of the main advantages SpaceX has over NASA in the space exploration game, and why NASA is fairly keen to work with them, is that SpaceX is using reusable rockets to conduct its missions, saving on cost as well as testing useful new ideas. On the Artemis Program, however, NASA is barred from working with SpaceX.

Leroy Chiao, a former astronaut, is therefore not too confident with the way NASA is approaching the Artemis program: "The ideal way to do this would be to expand the collaboration between NASA and SpaceX in this effort, and leverage the strengths of each: operational excellence and experience from NASA, and innovation and speed from SpaceX." (Stirone et al.)

The fact that private companies have begun their own space exploration efforts - and the fact that they seem to be competing with NASA - is possibly another reason that the Artemis Accords have been in focus lately. More than merely dealing with other nations, the accords are meant to demonstrate the government's willingness to deal with private entities too. If the government is willing to deal with private space corporations, it could lead to new opportunities as well as new problems with space regulation. According to space law, any spacecraft that launches from a country's territory is necessarily considered that country's responsibility. What happens if a space company launches a spacecraft that crashes into a city?

I had an opportunity to interview with one of my history professors as I was writing this essay. Professor Benjamin Serby, whose attire consisted of jeans and a collared shirt, talked jovially with me as I fiddled with my recording software. As a history professor, he and I discussed a wide range

of topics, but one that I felt was relevant to this essay was the potential of some companies to put advertisements into the night sky by use of drones.

His face became clouded, and his eyes went dark. He hadn't heard of what I had brought up- "That's horrifying." he replied, laughing darkly. "I wish you hadn't told me that." Personally, I wished I hadn't heard of it either, and I told him that. But it made me wonder: Why do we feel that there's something sacred about the night sky, but not about the moon? Perhaps it's because the Moon, while it does move the tides, is closer than the stars - it's "tangible", whereas the stars and night sky are further away and "intangible". What, then, will post-moon colonization do to our perception of the shimmering stars?

I believe that, as humanity conquers the moon and beyond, our image of space will take on a less "holy" caste - it will become profaned by a certain earthliness, a certain sameness. I believe that will be sad, but I also believe that the benefits outweigh the drawbacks: If we can harness the metals of the moon, imagine what wonders we could create with them. Batteries would be far easier to produce with an easy supply of lithium. Skyscrapers, reinforced by steel and built up as high as possible, could be used as space elevators or launch platforms in low earth orbit.

The reason I focus on the benefits as opposed to the drawbacks of this lunatic scheme is simple: I believe it is inevitable, and we must learn to live

with what is inevitable. Humanity will always explore, always profane whatever we touch with our footprints. This is not a moment to weep, merely to notice what the world looks like as it passes itself by in the grand celestial orchestra. The world will grow and expand as we, humanity, grow and expand. Humanity will conquer. There is nothing any of us can do to stop it.

I think you can understand my frustration and my joy at these events - my beleaguered optimism dragging in the proverbial mud. I am frustrated that we cannot control our impulses, but I am grateful that we will expand nonetheless. The moon, for all of its power, cannot stop us from claiming it.

The Artemis program is, therefore, a symbol: Of American pride, of human hubris, of the world in motion. Apollo 11 left an indelible impression on the human psyche, and we must be able to live up to that legacy - and after the Moon, Mars is next on the menu. After that, who knows? As crooner Bobby Darin sang, “It's far beyond the stars / It's near beyond the moon / I know beyond a doubt / My heart will lead me there soon.” (Genius, “Bobby Darin – Beyond the Sea”)

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