The Missile Knows Where it is, But Does the Rocket Know Where It Came From? Examining the Origins and Politics of Early Military Rocketry

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

In the late eighteenth century, the British East India Company was campaigning to establish direct rule of the Indian Subcontinent. Established in 1600, the Company's mission was to colonize India and profit off her people and natural resources. They would spend 250 years as the dominant British tool of oppression in India before giving way to the British Raj in 1858. India would only retake self-governance in 1947, when the British left the country and the Indians established a constitutional republic.

The earliest victory for the company came in 1757, when the British won the Battle of Plassey and replaced the former leader of Bengal with the loyal Mir Jafar (Reid, 2017). The British used this battle as a steppingstone to conquer the rest of India. They succeeded before running into unexpectedly stiff opposition. On the other side of the subcontinent, in the southeast, lay Mysore. Mysore was a kingdom that had stood since the 1300s, but as the British advanced, Mysore's nobility lost control of the country to military leader Hyder Ali. From 1767-1800, Hyder and his son and successor, Tipu Sultan, fought four wars with the British, finally falling due to attrition and their opponent's superior conventional arms and naval power.

However, the Mysoreans had a secret weapon. They had developed the first functional military rocket artillery in history—Europe had concurrent military rocketry, but it was widely ineffective and had poor range. The Mysoreans used superior material techniques and decentralized artisan manufacturing to make hundreds of rockets. The nation's forces used rockets to significant effect during the wars. Mysore paired the rockets with cavalry in conventional attacks and even in guerilla combat to scare, scatter, and overwhelm the British. The goal of these wars was to keep the Mysorean people free from British tyranny, and they

succeeded far longer than expected. However, Mysore eventually fell, leading to centuries of enslavement and mistreatment from the new overlords at the British East India Company.

The British would later use the Mysorean rockets as the basis for Europe's first functional military rocket: the Congreve Rocket. At the end of the Mysore Wars, British traders and soldiers purchased rockets from neutral artisans and imported them to Britain. There, scientist, inventor, and member of the Royal Society William Congreve spent the early years of the nineteenth century developing a rocket that could be mass produced and easily used by soldiers and sailors alike. The Congreve Rocket was used by the British military in many ways during the first half of the 1800s, ranging from war to whaling. The Mysorean and Congreve rockets provided the blueprint for military rocketry into the twenty-first century.

In this paper, I am arguing that the rocketry developed by Mysore is a political artifact of liberation, and that the British stole, modified, and utilized the technology as a tool of oppression. In my literature review, I am discussing the British and the British East India Company, the Mysoreans, the rockets, and their uses over half a century of military and political action. I am then going to lay out my methods, which will involve historical analysis. Next, I am using Winner's "Do Artifacts Have Politics?" as a framework to analyze the uses and users of the rockets. Finally, I am summarizing my findings in my conclusions section.

Literature Review

The Kingdom of Mysore was a great military foil to the British colonial forces. In 1761, Hyder Ali usurped the Wodeyars, who had ruled Mysore since the fourteenth century, and sought a temporary alliance with the British to conquer several neighboring states (Lewis, 2016). Over time, relations deteriorated between the sides and war broke out in 1767 when the Maratha

Kingdom preemptively invaded Mysore, egged on by the British (Barua, 2011). At first, Hyder tried to fight the British in a more European style—lined up across an open field with muskets and cannons—but he was outgunned and swapped tactics in favor of scorched-earth, guerilla warfare. This worked for a spell, and rocketry suited the hit-and-run tactics well. However, Hyder eventually died, and his son, a military genius in his own right named Tipu Sultan, could not fight off the British advance forever. Britain's superior firepower and the Royal Navy eventually triumphed, and in 1799, Tipu was killed and the Wodeyars were reinstated (New World Encyclopedia, 2024). Throughout all four wars, rockets saw use on the Mysorean side and often proved decisive in battle (Jaim, 2011).

The British treated the Mysoreans as a racial underclass and scoffed at their rocketry tactics. The British thought the 'hit-and-run' ambush style of the Mysoreans was disrespectful and that the two should fight like Europeans powers in open warfare. (Robson, 1948). The British also generally treated native Indian people as lower beings, feeling the need to 'care' for them and protect them from themselves. "Your new-caught, sullen peoples,/Half devil and half child/Take up the White Man's burden (Kipling, 1899)". Kipling's classic poem, *The White Man's Burden,* illustrates this point—the predominant colonial attitude was that the Indian people were a childish society that needed Europeans to conquer and care for them. Because of this attitude, the natives were taxed more aggressively than any other British holding of the time. This high rate of taxation allowed for the colonial authorities to pay a large army to conquer the area and create a robust, European-style civil service to "care" for it (Marshall, 1997).

The British sought colonial dominance over the Indian subcontinent for several reasons. Their main rival, the French, had holdings in India that Britain would not let stand. India saw

combat between British, French, and proxy forces during both the Seven Years War (1756-1763) and the Napoleonic Wars (1799-1815) as a result (Barua, 2011). The British East India Company also aimed to profit economically from India's colonization (Blackwell, 2008). Indian labor harvested Indian resources, which were shipped back to Britain, turned into goods, and resold to the Indian people (Thakur, 2013).

It's worth examining how the rocketry that the Mysoreans used so successfully worked. Rocketry is a simple science—igniting a combustible charge inside a pressure vessel and directing the resulting gas flow out of a small opening will cause the pressure vessel to move rapidly in the opposite direction from the flow. There were practical limitations that kept engineers from developing effective miliary rocketry. One main challenge for early users was finding a propellant that was stable, effective, and durable. Constructing a pressure vessel that could withstand the pressures generated by the propellant was also difficult. Accuracy on early Chinese and Indian prototypes was also unreliable. (Lyon, 1991). Before Mysore, no military had made effective combat rockets. The Chinese had invented rocketry in the tenth century through fireworks and had used them as diversions, but this had debatable levels of success. Other Indian peoples failed with comparable results. Europeans had some success pre-1800, but again lacked sufficient pressure vessels and powder to build on their knowledge (DeLuca, 2017).

The Mysoreans' innovation was using more effective materials for their rockets than other powers. They used iron tubing in their rockets that created a stronger pressure vessel, allowing for higher powder density in their rockets and therefore more acceleration, range, and accuracy. Other contemporary rockets used wood or cardboard-like pressure vessels that were ineffective. The independent artisans that made the Mysorean rockets also used a type of powder that was more resistant to moisture, increasing the reliability of the rockets in all weather. A final

design change that led to increased rocket effectiveness was using long bamboo poles as launching rods. These gave the rockets extra accuracy as they were guided for a slightly more significant portion of their flight. These innovations gave them the first viable military rockets in history and gave them a military advantage over the British during the Mysore Wars. The rockets were not used as precision weapons, but they were effective in ambushes, cavalry support, and terror roles where accuracy was less important than firepower and spectacle This worked well against British troops for substantial portions of the wars (Narasimha, 1985).

The British had a strong distaste for Mysorean rockets due to years of being shelled constantly by them and a belief that the guerilla tactics that the enemy was using were unmanly (Hook, 1833). This did not prevent them from obtaining rockets from local merchants who were not totally loyal to Tipu. They then shipped these rockets to Woolwich Arsenal in London. (Narasimha, 1985). There, t\Royal Society member William Congreve recreated and improved Mysorean rockets (Werrett, 2009). Working out of the facilities of Woolwich Arsenal in 1801, he developed a sturdier iron casing and a more effective propellant, providing upgrades over the Mysorean rockets. He also created an easily reproducible process for making the rockets so that they could be mass produced in the new factories popping up across the island of Britain (Hobbs, 1968). Congreve's rockets outperformed the best competing products in Europe for the cost of £1 ($88 in 2024) (1985). By 1806, over 13,000 rockets had been produced (Narasimha, 1985).

The British successfully used Congreve Rockets for a variety of military operations between 1810-1850. According to Hobbs, they saw service in the Napoleonic Wars, the Opium Wars, the Anglo-Burmese Wars, and the New Zealand Wars, among others (1968). During the War of 1812, their use in the siege of Fort McHenry is memorialized by the line in Francis Scott Key's

poem “The Star-Spangled Banner”: “And the rocket’s red glare” (1812). Congreve Rockets were even tested for non-combat purposes, like whaling. (Sharpe, 1977).

In cases where a technologically “superior” nation colonizes another, there is usually a one-sided exchange. Most societies saw an increase in technology post-colonization. Rodriguez-Alegria points out that most societies saw an increase in technological prowess after interacting with or being colonized by European nations. This is not always the case, however, as the natives of Xaltocan, Mexico, refused to adopt steel knives after interacting with Spanish colonists (Rodriguez-Alegria, 2008). Technology transfer from colonized to colonizer was much more likely than common knowledge would dictate. The Mysorean rockets are a good example of this. Indian shipbuilding was also considered to be at least as good, if not better than European shipbuilding, and ideas and techniques were often traded between Indian and English shipwrights (Adas, 1997). It can be noted Britain could have obtained rocketry and shipbuilding technology from the Indians through trade instead of conquest but did not choose that route. Because the British chose that route, we do not know if the Mysoreans wouldn’t have developed even better rocketry on their own.

Some scholars argue that colonialism was good for technology in India. While British colonialism in India was exploitative, it did establish technical education and brought modern industry to India. Railroads and schools were built by the British after conquest of the continent to allow for resource and labor transfer around the massive subcontinent (Donaldson, 2018). The British built infrastructure that allowed India to form a textile industry that was globally competitive (Tripathi, 1996). A similar claim can be made about Indian shipbuilding, with Adas stating that it was a world-leading industry thanks to British infrastructure (1997). However, the

British were not creating this infrastructure for the benefit of the people. It was a for-profit enterprise that happened to have some benefits along the way.

The STS framework I will use in this paper is Winner's "Do Artifacts Have Politics?" The basis of this framework is that all technological artifacts have politics, whether they seem like it on the surface or not (1980). An artifact is any piece of technology over history. Its politics are its eventual use in a social setting. Note that this is not dependent on an artifact's intended use, but its actual use. The classic example is the spinning machines at the end of the nineteenth century, which indirectly set the standard for the modern nine-to-five workday. There are many ways for an artifact to have politics, but the one that will see the most use here is the gradient of whether an artifact is supportive of liberation or oppression. This is not akin to labelling a technology good or evil—that is far too subjective, and no one would argue that every cause seeking liberation is inherently good. It is just a measure of whether the artifact is used to uphold existing power structures or tear down those power structures of inequity and exploitation and establish new, more fair and sustainable ones in their place.

Methods

In this paper, I used the Historical Analysis process to draw conclusions about the British, the British East India Company, and the appropriation of the Mysorean rocket. To do this, I reviewed primary and secondary sources on both sides of the British and Mysorean interactions on how each developed and used the rockets. On the British side, there were a handful of accounts of soldiers who survived rocket attacks and the diaries and writings of William Congreve, the man who improved and renamed the Mysorean rocket. There were good primary sources on both sides of society on how poorly the natives were treated before and after the

conquest. However, there were few primary sources from the Mysorean side that outline their use and manufacture of the rocket in the late eighteenth century.

Outside of primary sources, I found secondary sources from various places and author backgrounds. There are great papers on all aspects of this topic—general rocketry, Mysorean military tactics, and social impacts—that have been written by both Western and Eastern authors alike. I attempted to strike a balance of the number of each of those referenced in this analysis.

As previously mentioned, I used the STS framework derived from Winner's "Do Artifacts Have Politics" (1980). Using this, I showed that the Mysorean rocket began its life as a way of overthrowing the power structure of more dominant kingdoms in India. Then, they were used to fight off the oppression of the British. Finally, they became a tool of British oppression on four continents. I used the politics of artifacts to analyze the path from politics of liberation to politics of oppression, and any grey areas along the way.

Analysis

Under the definition put forth by Winner's "Do Artifacts Have Politics" (1980), the Mysorean rockets are artifacts. In his writings, Winner states that artifacts can either be indirectly or inherently political. Indirectly political artifacts are, "…instances in which the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in a particular community" (Winner, 1980, p. 123). Inherently political technologies are "…man-made systems that appear to require, or to be strongly compatible with, particular kinds of political relationships." Mysorean rockets are more of an indirect type of artifact. They are not inherently political objects, but they are an object that can be used to a political end. An example of this is the highway overpass. It is often not used for anything oppressive, but in the hands of

the wrong person, it can become a tool of oppression. This occurred when Robert Moses used his highway overpasses to keep public transit, and therefore its poorer users, away from New York beaches (Winner, 1980, p 123-125). Instead, these rockets are an object that can be used to a political end, where the issue they settle is the debate of colonization versus independence. We have established that the Mysorean rockets are a means to settling an issue—war—but are they an artifact of liberation or oppression?

The rockets started out as artifacts with politics of liberation. The British were explicitly trying to colonize the Kingdom of Mysore for the profit of the British East India Company and her shareholders. Mysore was fighting for cultural survival and quality of life to not live under the boot of colonial oppression from an island 5,000 miles away. The Mysoreans used their rocket weapons to fight off British colonizers more successfully than any other local kingdom had managed. "Colonel Wellesley, advancing at the height of his regiment, the 33rd, into the tope, was instantly attacked, in the darkness of the night, on every side, by a tremendous fire of musketry and rockets. The men gave way, were dispersed, and retreated in disorder. Several were killed, and twelve grenadiers taken prisoners" (Hook, 1833).

Over the course of the Anglo-Mysorean wars, Mysore employed between three and seven thousand rocketeers and expended tens of thousands of rockets. The Mysorean rockets used often in asymmetrical warfare. The British had a numerical advantage from alliances with other kingdoms and a technological advantage in firearms thanks to European musketry, but Mysore made up the deficit by using guerilla warfare tactics. This included ambushing units with rocket attacks and using small formations of rocketeers using their native environment as cover (Chandra, 2018). The rockets were specially adapted for guerilla warfare. The long bamboo poles they launched from provided good accuracy, and the propellant used in them made a loud

"bang" and impressive, fear-inducing show that would break enemy lines and haunt soldiers that survived encounters with the rockets (Chandra, 2018). This was all in the service of keeping their homeland and people free from colonial oppression and the structural changes it would bring.

However, the politics of the Mysorean rockets evolved as their users changed. The British took the Mysorean rockets, modified them, and used them as an artifact of oppression. The modifications that Congreve made to the rocket, discussed in the literature review, lent the rockets to a more European form of warfare. The more water-resistant propellant that he developed led to the first uses of shipborne rockets (find citation). He also worked on ways to make the rocket more mass-producible so that newly industrialized Britain could mass manufacture the weapons. Then, instead of making the rockets a specialized guerilla weapon, they could be used by regular soldiers and sailors across the imperial army. The Congreve Rocket was used in countless colonial and oppressive conflicts over the first half of the nineteenth century: the War of 1812, the Opium Wars, the bombardment of Algiers, and the Anglo-Burmese War—all struggles where Britain was a colonial oppressor to a native, often non-white people (McCaig, 2000). The use of this rocket flipped from being a weapon of liberation to oppression by repeated use in situations where the British were clearly an oppressor. The rocket was toppling power structures, but only to replace them with more repressive, colonial British power structures. Congreve even used to oppress nature by personally adapting the rockets for whaling (Liven, 1937). The British used Congreve Rockets to oppress aquatic mammals and then used the oil from the whales as fuel to keep their colonial empire's lights on. The British used the Congreve rocket in many theatres of war against both man and nature, but usually with the same goal: establishing exploitative, authoritarian rule away from the home islands.

The British adoption of the rocket shows their racism towards colonized minority ethnicities. It is well established that the British treated the Mysoreans as a racial underclass before, during, and after their wars. This treatment came despite the Mysoreans being an evolved society with sophisticated miliary weaponry and hundreds of years of societal traditions. British troops slandered Mysorean use of the rockets, calling them cowardly in their writings of the time (Howard, 2020). Despite all this hate towards the users, Britain eventually adopted the rockets and used them as successfully as Mysore had. This disparity between racism towards the people and adoption of their technology is a racist logical fallacy.

Congreve Rockets were not always a tool of oppression in the hands of the British, nor were rockets always an artifact of liberation for the Mysoreans. It can be argued that the first war the British used the Congreve Rockets was a war of liberation. The British used the rockets against Napoleon, who was turning Europe into his personal fortress. Congreve's rockets began to see operational use in naval vessels in 1806. Under that deployment method, they destroyed Napoleon's invasion force destined for England. The rockets were then used extensively in the Peninsular War against Napoleon in French-occupied Spain. The British coalition eventually liberated Spain and exiled Napoleon for the first time (Robson, 1948). In the same way, the Mysoreans initially used the rockets to invade their neighbors before the start of the Anglo-Mysore wars, with Hyder Ali aggressively trying to expand the land under his authoritarian rule in order to secure his personal base of power (Lewis, 2016).

Rocket use by guerilla fighters is another way they have been used as an artifact of liberation. Rocket techniques have become incredibly common in nations fighting for freedom, especially in the Middle East and Southeast Asia. They can be important tools in asymmetrical warfare. In the Middle East and Vietnam, imperial America ran into repeated problems of rebel

factions with rockets causing mayhem among their troops and armor (Goulding, 2000). This sowed discord and saw a high casualty rate. In addition, rockets are relatively straightforward to make and smuggle. The rockets used by the weaker side in asymmetrical warfare are direct descendants of Mysorean and Congreve rockets, used for liberation politics even to this day.

The rocket was not always used as an artifact of liberation by the Mysoreans. Before fighting Britain, they also invaded neighboring territories using rockets as weapons. Their intentions were decidedly anti-liberation in these cases. In addition, while Hyder Ali and Tipu Sultan were brilliant military leaders, they were also essentially dictators (Balakrishna, 2013).

All these historical facts lead to a logical counterargument: while Mysore generally used rockets for liberation and the Congreve Rockets were usually used for oppressive wars, there is a lot of grey area in the politics of the uses of these rockets. Trying to make a strict dichotomy of which one user had which permanent politics is impossible.

Conclusion

Modern military rocketry was born in India in the mid-eighteenth century and was immediately politicized. The native inventors of the rockets, the Mysoreans, used rockets as a means of fending off British occupation and preserving national liberty. The British adopted this artifact, developed their own version of the rocket with unique tactics, and used it almost exclusively as a tool of global subjugation.

This is an excellent case study of the politics of artifacts throughline. There are several other examples of colonized-to-colonizer transfers of technology where the colonial powers industrialized what had been an effective process for the natives and adopted it for use in their own society—often with negative effects. This happened with the transfer of tobacco from the

Americas to Europe, where the British industrialized the making of products like cigarettes. Overgrowing tobacco was bad for the soil environment, and cigarettes are a health hazard to their users and surroundings (Hahn, 2007). While we are no longer in a colonial era of time, there is still a technology transfer from the developing world that could see similar appropriation. Another more modern example is the process of traditional herbal medicine slowly being marketed as pills in the modern pharmaceutical industry. In a sense, herbal medicine has been colonized, just like rocketry and tobacco (Wahlberg, 2008). As the twenty-first century continues, it will be interesting to see what new forms this counterintuitive transfer of technology takes on in an increasingly connected world.

Rocketry is prevalent in modern militaries. It is still used as both the British and Mysoreans applied it in the scope of this paper. Similar to the Mysoreans, the Houthi rebels in Yemen have used homemade projectiles in guerilla rocket attacks to hold out against various global colonial powers and try to resist authoritarian power structures in the Middle East (El-baz, 2019). Meanwhile, the United States, Britain, and other world powers continue to use sophisticated, mass-produced rockets to maintain their imperial power structures and economic interests in distant lands. Even today, the spirit of the Anglo-Mysore conflict lives on through neo-colonialism and rocketry.

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