

Bittersweet Empire: Clements Robert Markham,  
Cinchona, and Botanical Exploitation

by

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...For all those at home, and all those at school, that I love.



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## Introduction

Clements Robert Markham was a British explorer who used botany as a tool to further the ambitious aims of the British Empire. The Royal Botanic Garden at Kew commissioned Markham to a post at the India Office in 1854 in order to collect cinchona seeds in Peru and transport them to India. At the time, cinchona was valued as an antimalarial treatment that proved important in maintaining the health of the British army as they embarked on extensive colonial operations. Other global powers, such as the Dutch, had already tried their hand at cinchona cultivation; thus, the inhabitants of the cinchona forests in Peru were wary of those attempting to procure their precious trees.

By cultivating cinchona in India, the British hoped to thwart South American control over the bark; this meant the classification, removal, and appropriation of these plants. Markham successfully transported seeds and saplings of cinchona bark to southern India for planting in the hills of the Nilgiri mountains, but not without meeting resistance from those in Peru who viewed this as theft. The tale of Markham's mission to Peru and the transplantation of the cinchona tree is simultaneously a story about environmental imperialism and the commodification of medicine for the British market.

In the eighteenth century, malaria was one of the world's deadliest diseases. The cinchona tree produced the alkaloids necessary for the production of quinine, establishing the "fever tree" as one of the most valuable medicinal products in the world, one that cured or protected against a variety of diseases including malaria. The isolation of quinine took place in the 1820s when Joseph

Pelletier and Jean Bienaimé Caventou discovered that cinchona's health benefits were chemical, the curative agent being the alkaloids in the bark. These early nineteenth-century scientists isolated and analyzed alkaloids from the various species of cinchona, indicating which barks were most effective. In his 1821 *Formulary*, Pelletier would encourage other pharmacists to begin manufacturing quinine. While the reception to their discovery was underwhelming, the discovery would soon garner an interest in cinchona that would be sustained for most of the 19th century.<sup>1</sup>

Throughout Markham's travel narrative, *Travels in Peru and India: While Superintending the Collection of Chinchona Plants and Seeds in South America, and their Introduction into India*, he described the nomenclature related to the bark to highlight his scientific knowledge of the particulars of bark varieties.<sup>2</sup> The mythical origins surrounding the bark's earliest use often point to the Countess of Chinchon's recovery from malaria in 1638 as the impetus for the medicine's introduction into Europe. The story was first recorded in 1663 by Sebastiano Bado, who claimed to have received the information from a merchant in Peru. No original records of this letter are known to exist, and the truth and details of the story have been debated.<sup>3</sup> The impact that this tale had on European perceptions of the value indigenous South American ascribed to cinchona was profound. As Norman Taylor describes: "Somewhere about 1630 there was hatched the most

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<sup>1</sup> Rohan Deb Roy, *Malarial Subjects: Empire, Medicine and Nonhumans in British India, 1820–1909* (Cambridge: Cambridge University Press, 2017), 21.

<sup>2</sup> Clements R. Markham, *Travels in Peru and India: While Superintending the Collection of Chinchona Plants and Seeds in South America, and Their Introduction into India* (Cambridge: Cambridge University Press, 2012), 4.

<sup>3</sup> A. W. Haggis, "Fundamental Errors in the Early History of Cinchona," *Bulletin of the History of Medicine* 10, no. 4 (1941): 568.



colorful, romantic, and wholly untrue legend about cinchona."<sup>4</sup> Despite the potential fallacies of the story, Linnaeus named the genus of the healing bark "Chinchona" in honor of the countess. Markham indicated that modern writers (myself included) have dropped the first "h" from the word and it "is now almost invariably, but most erroneously, spelt Cinchona."<sup>5</sup> Markham purposely included the first "h" throughout his account out of reverence for the Countess Ana de Osario, who was famously cured with the use of the antimalarial bark. Markham stated, "The godmother of these priceless treasures of the vegetable kingdom has, therefore, some claim upon our attention."<sup>6</sup> Though modern scholars believe that Markham had misidentified the Countess of Chinchon, others referred to the medicine as "Countess' Bark" or "Jesuits' Bark," in memory of these historic events.

Long before European interest in the bark emerged, the indigenous inhabitants of the cinchona forests had applied a different name to the genus. Charles Marie de La Condamine cited a dictionary of the ancient Peruvian language Quechua, in which he found the word "Quina." According to La Condamine, the word was no longer in use by the indigenous people of the country as a result of the integration of their language with Spanish. He explained that when translated, Quina refers to "a kind of mantle or cape worn by the natives." However, the word takes on a dual meaning, which, according to La Condamine, was common in a language with so few words. He noted that the Quechua language "has hardly any words for which the meaning isn't

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<sup>4</sup> Norman Taylor, "Quinine: The Story of Cinchona," *The Scientific Monthly* 57, no. 1 (1943): 20.

<sup>5</sup> Markham 1863, 5.

<sup>6</sup> *Ibid.*, 4.

metaphorically extended to various others, [so] it is plausible to presume that Quina, which is normally used for coat, could also signify bark in the case of a tree.”<sup>7</sup> Markham confirmed that the inhabitants in the forests of Loja referred to the tree as “‘quina-quina,’ ‘bark of bark.’”<sup>8</sup> He explained that when the name was repeated twice it indicated that the bark possesses medicinal properties. This would serve as one of the many indications to Markham that the indigenous people of Ecuador had a long history of cinchona use before European involvement. Whether “quina,” “quina-quina,” “Jesuit’s bark,” “chinchona,” or its more popular contemporary counterpart “cinchona,” these names all refer to the same genus of medicinal bark.

In his 1859 expedition to Peru, Markham insisted upon European preservationist environmental practices, particularly because of what he viewed as the apparent abuse of the land by the South American people. This point of view created the scientific and economic rationale that elevated the British East India Company as the savior that could both extract resources and conserve forests. Markham’s 1863 publication discussed his views of the South American mistreatment of their land by the Peruvian and Bolivian governments as well as by indigenous bark collectors locally known as *cascarilleros*. Markham presented European horticulture as the cure to the forest’s degradation. He conceptualized his mission as based upon the protection of the South American environment, and this paternalistic view, based on the idea that European knowhow would usher in an enhanced economic and humanitarian era, shaped his understanding of

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<sup>7</sup> Charles Marie de La Condamine, *Mémoires de l’Académie Royale des Sciences* Paris, 1738, 226-243.

<sup>8</sup> Markham, 2.

indigenous knowledge. Convinced of the humanitarian and economic benefits of his project, Markham regarded indigenous knowledge as unscientific.

However, as this thesis demonstrates, Markham relied on Andean knowledge even as he dismissed it for its ignorance. Ultimately, it was Markham's colonial motivations to strengthen the Raj that blinded him to the realities of early cinchona use and the value they applied to the bark. In his 1859 expedition to Peru, Markham wrongly discredited indigenous scientific knowledge, further justifying the colonial logic of his mission, an endeavor he represented as grounded in environmental conservation, health initiatives, economic productivity, and the colonial success of the British empire.

The effects Markham's mission would have on British colonial health and finances raised the stakes of his endeavor. A British-controlled cinchona plantation would create a supply of anti-malarial cinchona bark unaffected by the whims of the South American and Dutch markets. This would prove particularly important in the wake of the Sepoy Rebellion when the strength of the British East India Company in India was threatened. Markham emphasized the benefits that his mission would bring to the people of India, who he hoped would come to realize the advantages that the East India Company and ultimately the Raj could facilitate.<sup>9</sup> He believed that these benefits would not be limited to subjects of the crown. Rather than damaging the South American market, Markham believed the British plantation would inspire South Americans to adopt a more effective and sustainable method of agriculture.<sup>10</sup> In an effort to justify his mission, Markham

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<sup>9</sup> Lucile Brockway, *Science and Colonial Expansion: the Role of the British Royal Botanic Gardens* (New York: Academic Press, 1979), 105.

<sup>10</sup> Markham, 338.

ignored environmental obstacles that made this kind of plantation system impossible in the Amazon.

Throughout his expedition, several British scientists assisted Markham with collecting efforts. Markham had primarily explored the Peruvian province of Carabaya. Richard Spruce facilitated collection in Chimborazo, Ecuador. Spruce had spent 17 years of his life in South America and had undertaken several expeditions for Kew Gardens.<sup>11</sup> Cross was a gardener for Kew who explored the forests of New Granada. G. J. Pritchett had been recruited by Markham to collect seeds from Huanuco in Peru. Markham believed each of these men demanded respect for their labor that they completed so satisfactorily: “the warmest recognition, for all those intrepid and courageous explorers worked zealously and successfully, and did good service in furthering this most important public enterprise.”<sup>12</sup> Also Essential to the perceived success of Markham’s mission were John Eliot Howard and William Graham McIvor. McIvor was a gardener at Kew Gardens in London who was sent to consult with Markham about a potential plantation in the Nilgiris and whose knowledge proved indispensable in successfully cultivating the cinchona plants in a new environment.<sup>13</sup> Howard was a British chemist whose work was instrumental in determining which species of cinchona were most valuable based on alkaloid content. Markham also referenced the work of certain Spanish Botanists such as José Pavón and Hispólito Ruiz, the former directors of the Royal Botanical Expedition to Peru and Chile. This

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<sup>11</sup> Markham, 65.

<sup>12</sup> *Ibid.*, 330.

<sup>13</sup> McIvor’s interest in cinchona may have proceeded markhams cultivation “He has long taken a deep interest in the Question of the introduction of chinchona-plants into India, and he brought the subject to the notice of Lord Harris, then Governor of Madras, as long ago as 1855.” Markham, 484.

community of European botanists, chemists, and environmental surveyors became a cohort whose efforts at devising an epistemology about cinchona production and use were critical to Markham.

Beyond this cohort of scientists, the documented expeditions and experiences of European explorers in the Andean forests shaped Markham's understanding of indigenous medicinal knowledge. Markham was unable to view indigenous knowledge as scientific. For Markham, true knowledge came from people like Alexander von Humboldt, Charles Marie de La Condamine, and Joseph de Jussieu, whom Markham praised for their scientific contributions. These European "men of science" examined the shrouded history of cinchona and the way it was introduced to Spanish colonizers.<sup>14</sup> Throughout his account, Markham favored certain narratives over those that did not accommodate or validate his mission.

Charles Marie de La Condamine had a tremendous impact on the British naturalist's perception of the indigenous people of Ecuador's earliest uses of cinchona bark. La Condamine took part in the French Geodesic Mission to measure the length of the equatorial line and the distance between the polar ice caps. The question of which line had a greater circumference was hotly debated by the scientific community in the 18th century. La Condamine, along with the French Astronomer Louis Godin, led the equatorial expedition in Ecuador. They were joined by the naturalist Joseph de Jussieu, whose notes concerning the use of cinchona bark in Malacatos provided influential details regarding the Spanish adoption of quina and the role that the indigenous community played in this

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<sup>14</sup> Markham, 9.

proliferation of knowledge. La Condamine provided the first “enthusiastic but un-botanical” descriptions of the cinchona tree while he was traveling through Loja. This spurred the botanist Jussieu to make his own expedition to the Loja region.<sup>15</sup> The French expedition to Ecuador provided Markham with particular details concerning both the first uses of cinchona and the customs associated with the bark.

Equally important to Markham’s understanding of the culture surrounding cinchona bark was the writing of the German explorer Alexander Von Humboldt. Humboldt recorded his notes and observations in an abundance of volumes over his 5 years in South America. Particularly impactful on Markham was Humboldt’s *Illustration of the Genus Cinchona*, in which the explorer made a variety of claims that were contradictory to those made by Jussieu and La Condamine. Deliberation between the various explorers, such as La Condamine, Humboldt, and Markham, over the earliest uses of the bark obscured the South American ability to take advantage of their natural commodities. Some European explorers gave evidence of long traditions of the Andean use of the medicine, while others deemphasized their interest in the bark. The latter would prove more effective in justifying Markham’s extractive mission. European views of Amazonian society as lazy and wasteful would ultimately form Markham’s understanding of the scientific worth found in the local populations of the Andes. Markham’s discourse both with his predecessors and the cohort of scientists who assisted him in the Andes and India contributed to what Michael Dove calls a divide between

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<sup>15</sup> Larrie D. Ferreiro, *Measure of the Earth: The Enlightenment Expedition That Reshaped Our World* (New York: Basic Books, 2011), 146-147.

scientific practice and perceived indigenous knowledge: “When the origins of knowledge can be revealed, the validity of this divide...becomes questionable.”<sup>16</sup> The different narratives that these explorers produced regarding the earliest uses of cinchona either elevated or elided the indigenous applications of the bark, which, in turn, shaped how Markham viewed the Andean people’s ability to manage the cinchona forests.

Markham’s expedition is part of a much larger history of what scholar and activist Vandana Shiva refers to as biopiracy, both by the British Empire and other colonizers. Throughout the 19th and 20th centuries, European governments made a conscious effort to collect and adapt useful foreign plants to a new environment. Shiva argues that biotechnology is neo-imperialist and should be linked to a European and reductionist perspective that debases or ignores indigenous understanding of raw material. Shiva offers a well-established critique of imperialism. However, the same Europeans who typically exploited indigenous know-how for their own purposes also contended that they were colonizing a landscape devoid of possibility and opportunity. While Shiva focuses most of her book on contemporary multinational corporations, her argument can help explain Markham’s mission.<sup>17</sup>

Many colonial governments believed that they could improve upon cultivation methods and adapt plants for global commerce.<sup>18</sup> Similar expeditions to Markham’s focused on different natural commodities, such as rubber and tea,

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<sup>16</sup> Michael Dove, *The Banana Tree at the Gate: A History of Marginal Peoples and Global Markets in Borneo* (New Haven: Yale University Press, 2011), 101.

<sup>17</sup> Shiva discusses this throughout her book, see Vandana Shiva, *Biopiracy: The Plunder of Nature and Knowledge* (Boston: South End Press, 1997).

<sup>18</sup> Brockway, 37.

that colonists transplanted into British-controlled territories. For instance, Michael Dove describes the transplantation of rubber from South America into Asia during the nineteenth and early twentieth centuries.<sup>19</sup> And Corey Ross offers an extensive overview of the tropical empire and the European obsession with commodities.<sup>20</sup> In a narrative that is very similar to the journey I discuss for cinchona, rubber became an important colonial crop, a raw material that could change the nature of industrialization. Markham also turned his attention to rubber after his attempts with cinchona. Because of its potential power, the British attempted to grow rubber, which was found in South America, in occupied Singapore. The hope was that Asian rubber could be controlled and harvested for greater use. Much like what I describe in the case of cinchona, rubber became a part of a larger European economy that prized tropical commodities.<sup>21</sup>

Markham did not view his mission as a departure from a long tradition of transplantations between South America and India.<sup>22</sup> Markham pointed to a variety of species that India owed to South America, such as aloe, sumac, and peppers, which had become staples in Indian cuisine. Similarly, by the mid-19th century, Southern India was home to many American commodities such as tobacco, coffee, corn, pineapples, cotton, and, of course, cinchona. Not only is Markham's mission part of a long history of European extraction and

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<sup>19</sup> Dove.

<sup>20</sup> See Corey Ross, *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World* (Cambridge: Cambridge University press, 2017).

<sup>21</sup> "In the 1870s, a number of attempts were made to transplant rubber out of the Amazon Basin, the most successful of which was made in 1876 by an Englishman named Henry A. Wickham. He collected seventy thousand *Hevea* seeds and brought them to the Royal Botanic Gardens in Kew, England; where twenty-seven hundred were successfully germinated, twenty-five hundred of which were then shipped to England's colonies in Asia and became in large part the foundation of the region's rubber industry." Dove, 102.

<sup>22</sup> Deb Roy, 34.



commodification of foreign natural goods but also one of introducing different species into colonized landscapes that grew to become an important part of empire.<sup>23</sup>

The first chapter of my thesis discusses the European discourse about pre-colonial contact and the indigenous use of cinchona. It then assesses how European contact with South America changed ideas related to cinchona's use, especially in regard to the idea of bio-piracy. Building on this early history, the second chapter describes Markham's perception of indigenous cultivation methods. Markham contended that indigenous attempts at harvesting cinchona were inefficient and lacking. Opposed to Markham's notion about indigenous failures, the chapter then assesses the rather-involved role that indigenous people in South America had in helping Markham proceed with his plan. Finally, the third chapter is about the imperial motivations for the transplantation of cinchona from South America to India. It also explores Markham's plantation methods in India and details Markham's claims about what his success with cinchona would mean for the South Americans, Indians, and, of course, the British Empire. Reflecting on his project seventeen years later, Markham would point to the apparent success of his mission in creating a supply of cinchona for the British market. He diminished the ever-increasing Dutch presence in the Market that would soon make the British plantations obsolete. Ultimately the failure of the British cinchona plantation and the damage Markham's mission had on the South American market became apparent.

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<sup>23</sup> Markham, 60.

Most of my thesis relies on Markham's own language and the work of other European botanists who wrote about Cinchona and its medicinal qualities. However, there are a number of historians whose writing about this topic has been enormously useful. Kavita Philip's scholarship explores the importance of indigenous knowledge and how it affected European understanding of cinchona.<sup>24</sup> Lucille Brockway describes the larger socio-economic aspects of cinchona growth and how the machinations of empire led Markham to proceed in specific ways.<sup>25</sup> Matthew Crawford explores the relationship between the Spanish Royal Pharmacy and the indigenous communities whose knowledge and labor they extracted.<sup>26</sup> Rohan Deb Roy discusses how cinchona was upheld as a symbol of the peaceful transition of power in British India. The works of Greg Grandin and Barbara Weinstein were instrumental in demonstrating the natural obstacles to plantation systems that existed in South America and that Markham had overlooked.<sup>27</sup> These secondary sources were all critical to my project.

The history of empire is inextricably linked to disease. As colonial powers sought to maintain their empires, they mechanized the cultivation of prized tropical commodities, thus eliminating their reliance on foreign markets. Often these agricultural commodities related to the prevention or treatment of disease.

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<sup>24</sup> Kavita Philip, "Imperial Science Rescues a Tree: Global Botanic Networks, Local Knowledge and the Transcontinental Transplantation of Cinchona," *Environment and History* 1, no. 2 (1995): 173–200.

<sup>25</sup> Brockway.

<sup>26</sup> For more on this, see Matthew James Crawford, *The Andean Wonder Drug: Cinchona Bark and Imperial Science in the Spanish Atlantic, 1630-1800* (Pittsburgh: University of Pittsburgh Press, 2016).

<sup>27</sup> For more on this, see Greg Grandin, *Fordlandia: The Rise and Fall of Henry Ford's Forgotten Jungle City* (New York: Picador, 2009) and Barbara Weinstein, *The Amazon Rubber Boom, 1850-1920* (Palo Alto: Stanford University Press, 1983).

Developments in epidemiology throughout the 20th and 21st century revealed the biological ramifications associated with trans-continental expeditions like Markham's. While the history of European colonization continues to be written, more attention needs to be paid to how ideas about disease and its potential prevention through natural resources, such cinchona, could lead to imperial success. Focusing on Markham's claims provides particular insight into the often paradoxical and self-affirming nature of these kinds of missions.



# Chapter 1

## Early Applications of Cinchona

The following chapter will examine how European explorers like Clements Markham understood the indigenous South American use of cinchona bark and the implications that this perception of negligence perpetuated their inability to take advantage of natural resources. Markham emphasized the superiority of Northern European science and the names and efforts of individual explorers, disregarding how indigenous discovery preceded European knowledge of the bark. He engaged in the ongoing academic discourse that had debased the medical contribution made by the indigenous South Americans, ignoring those who initially came to understand the benefits of the famous bark.

It is important to consider how the European explorers who came before Markham may have wrongly interpreted indigenous use of cinchona and the effects this had on Markham's views. He noted that while the indigenous people may have been aware of the fever-reducing properties of the bark, it was of little significance to them and in some cases, they were even averse to its use. However, it remains true that long before Markham took interest in the trees, the bark was a natural object of cultural and medical significance to the people of the Andes. Markham had voiced a somewhat different opinion than his predecessors: one that hesitantly posited that the indigenous community in South America had been aware of the barks' healing properties. Even so, as detailed further in the second chapter, Markham presented a narrative that deemphasized the important

role the indigenous community had played, influenced by his commitment to those earlier explorers. Discourse surrounding pre-colonial indigenous Andean use of cinchona avoided crediting the native people with the discovery of the bark's medicinal properties, implying that they were incapable of managing their natural resources and thus unworthy of being its sole possessor.

Markham predicated his mission on whether or not the indigenous people of South America knew about the health benefits of the bark before Spanish arrival. The indigenous ability to take advantage of their natural commodities was demonstrated by local uses of cinchona. Jussieu, Ruiz, and La Condamine all attested that the indigenous Peruvian people had shown the Spanish the health benefits of the bark. Others, like Humboldt, wrote about indigenous humoral systems of understanding sickness as “hot” and “cold” and the position that cinchona held in this system.<sup>28</sup> But Humboldt remained adamant that the indigenous role in proliferating knowledge about the bark was limited. Though heavily influenced by Humboldt, Markham claimed that there was little doubt that the indigenous people of Ecuador knew about the health benefits of the bark but he retracts from this by stating that they “attached little importance” to it.<sup>29</sup> There seems to be no evidence for this lack of interest, however, as several of the botanists Markham cited highlighted the indigenous understanding prior to Spanish arrival. Deliberation between the adventurers who discussed the various origin stories concerning cinchona's usage only pushed Northern European

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<sup>28</sup> Alexander von Humboldt, Aylmer Bourke Lambert, Charles Jean Laubert, and Hispólito Ruiz. *An illustration of the Genus Cinchona: Comprising Descriptions of all the Official Peruvian Barks, Including Several New Species, Baron de Humboldt's Account of the Cinchona Forests* (London: Printed for J. Searle, 1821), 21.

<sup>29</sup> Markham 1863, 3

writing further away from the role the indigenous community had played in proliferating one of the medical world's greatest treatments.

Markham's views of South American society were largely shaped by European scholars and adventurers who preceded him. Despite many of these people pointing to the indigenous communities as the source of knowledge surrounding cinchona's medicinal applications, Markham did not view their contributions as scientific and instead lauded the European explorers for their contributions to medicine. According to Markham, "The first description of the quinquina-tree is due to that memorable French expedition to South America, to which all branches of science owe so much"<sup>30</sup> The man who led this expedition was Charles Marie de La Condamine, a French naturalist who Markham credited as the first "man of science" to describe the Cinchona tree, which came in the 1738 publication "Mémoires de l'Academie."<sup>31</sup> Again, Markham gave little credence to the indigenous knowledge of cinchona bark's medical applications before the Spanish arrival.

The indigenous communities that had long made use of cinchona's medicinal properties are not deemed by Markham to have the scientific capacity of European academics like Condamine. Long before anyone Markham would deem a "man of science" would come across cinchona, curanderos were part of a "dynamic tradition of specialized knowledge about the natural world."<sup>32</sup> Highlighting the cultural and medical significance of cinchona bark is one of many ways to reinsert the Andean population into the history of science and

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<sup>30</sup> Ibid., 8.

<sup>31</sup> Ibid., 9.

<sup>32</sup> Crawford, 25.

medicine. In contrast, Markham engaged in the ongoing academic discourse that had pushed the tremendous medical contribution the natives of the cinchona forests had made further away from the limelight, ignoring the realities of those who initially came to understand the benefits of the famous bark.

Markham prioritized the writing of his European predecessors, particularly those who had been reluctant to admit that the indigenous people of South America had made use of cinchona. He was less concerned with his predecessors who had pointed to indigenous ingenuity and long-lasting traditions of cinchona use. In his 1849 publication, *Histoire Naturelle des Quinquinas*, Hugh Algernon Weddell referenced the unpublished writing of Joseph de Jussieu, the French botanist who accompanied Charles Marie de la Condamine on his 1735 expedition to measure the length of the equator. Jussieu's notes discussed the origins of the knowledge of cinchona's medicinal benefits. Weddell wrote of the French naturalist's notes: "other authors, Ruiz and Pavon included, seem to believe that the Indians of Loxa knew of the uses of quinquina well before the Spanish invasion. Joseph de Jussieu, who visited Loxa in 1739, definitively places the origin of this precious remedy in the Indian village of Malacatos, a few leagues south of Loxa."<sup>3334</sup> Here Weddell, and by extension Jussieu, confirmed something very important: Indigenous knowledge of cinchona and its medicinal uses preceded the Spanish invasion. Joseph de Jussieu's narrative concerning the discovery of the effective uses of the bark provides particular insight into early

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<sup>33</sup> My translation from the French: "d'autres auteurs, et avec eux Ruiz et Pavon, semblent croire que les Indiens de Loxa connaissaient l'usage du quinquina bien avant l'invasion espagnole. Joseph de Jussieu surtout, qui visita Loxa en 1739, place positivement parmi les Indiens du village de Malacatos, à quelques lieues au sud de Loxa, le berceau de la science de ce précieux remède."

<sup>34</sup> Hugh Algernon Weddell, *Histoire Naturelle des Quinquinas* (Paris: Victor Mason, 1849), 15, quoting from Joseph de Jussieu's unpublished manuscript.



cinchona usage, but it would not be enough to sway Markham's opinion that the Andean people had little interest in the medicine.

One of the more plausible origin stories came to light from Jussieu's expedition, as he was able to provide a specific date and location for the initial European discovery. He revealed the all-too-often overlooked truth that the Europeans learned of cinchona from indigenous healers who had been using the practice for centuries. Jussieu explained that a *cacique* (chief) had cured a Jesuit missionary with an infusion of cinchona; "The missionary then returned to his native land, taking with him a quantity of the bark, but he did not know from which species it had been obtained."<sup>35</sup> This account does not indicate how long the indigenous people may have known about the effectiveness of the bark or the name of the missionary who was treated. However, Saul Jarcho posits "the incident could hardly have occurred earlier than 1618 when missionary work in the remote region was begun."<sup>36</sup> Jussieu's notes reveal that long before colonial interest in the bark emerged it had been an object of interest to the people living in the cinchona forests. Markham's critique of South American harvesting practices hewed closely to the methods established under Spanish colonial rule.

Part of Markham's hesitancy to firmly attribute the discovery of the bark to the native community in Ecuador stemmed from his predecessor's inability to come to a consensus concerning indigenous oral tradition and the variety of mythical origin stories surrounding the topic. In a prominent academic journal *Mémoires de l'Académie royale des Sciences*, La Condamine tentatively

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<sup>35</sup> Saul Jarcho and Francesco Torti, *Quinine's Predecessor: Francesco Torti and the Early History of Cinchona* (Baltimore: Johns Hopkins University Press, 1993). 12.

<sup>36</sup> *Ibid.*

referenced the story of a lion who cured its illness by drinking from a pond filled with cinchona. He wrote, “According to an ancient tradition, the truth of which I do not vouch for, the Americans owe the discovery of this remedy to lions, which naturalists claim were subject to a kind of intermittent fever, it is said that the locals noticed these animals ate the cinchona bark that is fairly common in the region and recognized its healthy virtue.”<sup>37</sup> Alexander von Humboldt would later state that La Condamine’s “petit-lions” was most likely a misidentified puma, the “maneless-lion” not being a natural inhabitant of South America.<sup>38</sup> Humboldt referenced a similar origin for which he does not claim credit that established that it was a man, and not a lion, who cured himself of fever by drinking from a pond infused with the trunks of cinchona trees. The slight difference between the two narratives proves significant. La Condamine’s story emphasizes that the animals of the forest had discovered the health benefits and that the indigenous population copied that behavior. Humboldt’s story gives slightly more credence to the indigenous discovery as he explained that it was a man and not an animal that drank from the pond and found his illness cured. The ability to understand the medicinal bark would indicate the native people’s grasp of their advantageous land. Humboldt provided a narrative that discredited indigenous use of cinchona more than any of his cohort, but his work concerning mythical origin stories gave more agency to their choice to adopt the medicine than others had. Long before Markham arrived in South America, some of his predecessors had de-emphasized

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<sup>37</sup> La Condamine, 226.

<sup>38</sup> Humboldt, 21.

the indigenous understanding of the medicine, which would influence the British explorers' motives to claim it as their own.

Alexander von Humboldt had studied the tree both north and south of the equator and felt that his four years in South America had equipped him to contribute to the discourse surrounding the discovery of cinchona. Published in 1821, Humboldt's *An Illustration of the Genus Cinchona* had largely been influenced by the likes of La Condamine and Ruiz. His work further perpetuated a narrative that discredited the role the indigenous community of Loxa had played in observing the medicinal properties of the bark. "It would be superfluous to repeat the fictions concerning the history of the discovery of the medical powers of the Cinchona bark," claimed Humboldt, reiterating what many before him had voiced.<sup>39</sup> Through narratives molded by Humboldt, Markham, and many others, the myths, legends, and facts surrounding the discovery of the bark's medicinal powers have become blurred. This has resulted in a mode of thinking that degrades the indigenous community's value of the bark and further justified Markham in his attempts to steal it.

Humboldt's assertions about the lack of cinchona use for treating fever by the indigenous population would have a profound impact on Markham. According to Humboldt, the indigenous people in the mountains of Catamago, Rio Calvas, and Macara, where fever is common, refused to use the bark as a remedy. He explained, "The natives there, as well as in Loxa, of whatever cast, would die rather than have recourse to Cinchona bark, which, together with opiates, they

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<sup>39</sup> Ibid.

place in the class of poisons exciting mortification.”<sup>40</sup> This narrative would be perpetuated by certain writers throughout the 19th and 20th centuries who contributed to the growing tendency to debase indigenous knowledge of cinchona. Humboldt provided insight into indigenous medicinal practices that proved influential on Markham. He described the indigenous humoral system of “hot” and “cold” sickness, the two maladies requiring different treatments. The European humoral theory establishes that in Latin America there is a widespread health model based on this equilibrium of hot and cold, in which different temperatures indicate different treatments.<sup>41</sup> Humboldt’s discussion of cinchona not only as an ineffective treatment for “hot” illnesses but as a toxin to be avoided had a profound impact on Markham.

The place that cinchona held in this complex system based on principles of hot and cold became contentious. Humboldt claimed that in most regions cinchona was akin to poison, especially in regards to a “hot” sickness such as fever, which would instead be treated with a concoction infused with aromatic lemon peels.<sup>42</sup> He elaborated on the state of cinchona usage versus other remedies during his visit. “The Indians cure themselves by lemonades,” he described, “by the oleadginous aromatic peel of the small green wild lemon, by infusions of *Scoparia dulcis*, and by strong Coffee. In Malacatis [sic] only, where many bark peelers live, they begin to put confidence in the Cinchona bark.”<sup>43</sup> Jussieu had

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<sup>40</sup> *Ibid.*, 22.

<sup>41</sup> George M. Foster, “On the Origin of Humoral Medicine in Latin America,” *Medical Anthropology Quarterly* 1, no. 4 (1987): 355.

<sup>42</sup> Richard Spruce, a Kew Gardens collector, reiterated Humboldt’s claims. In his 1860 journal, he writes that to the natives cinchona was a heating cure meant for cold sicknesses—fevers would be treated with cool drinks he referred to as frescoes. Brockway, 111.

<sup>43</sup> Humboldt, 22.

pointed to Malacatos as the location where Europeans had been taught of the medicinal uses of cinchona. However, Jussieu proved more willing than Humboldt to accept the indigenous role in proliferating the use of the bark. Humboldt was more heavily influenced by the lack of use he found in places other than Malacatos, emphasizing the absence of formal documentation. He explained, “In Loxa, there is no document to be found which can elucidate the history of the discovery of the Cinchona.”<sup>44</sup> However, it could be argued that what Humboldt discovered during his exploration was irrelevant, as it occurred after the beginning of Spanish colonial rule and the subsequent increase in demand for cinchona. As Brockway notes, “It does not reflect aboriginal practices, but the practices of Indians who had been subjected to two and half centuries of Spanish contact.”<sup>45</sup> What Humboldt had observed was not relevant to indigenous practices, as treatments had already been altered by colonial contact. Despite the possibility that Humboldt had wrongly interpreted his findings, Markham would be most heavily influenced by the German explorer, whose rendering of a lack of interest in cinchona on the part of the Indigenous people of Ecuador provided further justification for the extractive British mission.

Markham turned to his European colleagues to understand indigenous uses of cinchona, aligning himself more closely with narratives that deemphasized the value they placed upon the bark and their ability to take advantage of their environment. He placed less emphasis on the ideas presented by La Condamine and Jussieu, which gave more credence to early indigenous use. Markham noted

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<sup>44</sup> Ibid.

<sup>45</sup> Brockway, 110.

that while the native people may have been aware of the fever-reducing properties of the bark, it was of little significance to them and in some cases, they were even averse to its use. Markham's assertions that the indigenous people "attached little importance" to medicinal barks hold little merit.<sup>46</sup> La Condamine, Jussieu, and Ruiz had all pointed to the Spanish adoption of the bark as coming from indigenous guidance. This transference of knowledge pointed to a society connected to the medicinal commodities on their land and held it in great esteem. Instead, Markham referenced the work of Alexander von Humboldt and Eduard Poeppig, who claimed that in the forests of Loxa there was no tradition of using the bark as a remedy. Markham explained, "This indifference to, and in many cases even prejudice against the use of the Peruvian bark, amongst the Indians, is very remarkable. Poeppig, writing in 1830, says that in the Peruvian province of Huanuco the people, who are much subject to tertian agues, have a strong repugnance to its use."<sup>47</sup> The Huanuco province was home to the gray-barked cinchona Markham would grow in India, yet he claims the indigenous community there was ignorant to the value of their natural resources. This served as one of the many justifications for his extractive mission.

As scholars in recent years have emphasized, cinchona held a more significant position in the indigenous medical system predicated on "hot" and "cold" diseases.<sup>48</sup> Despite Humboldt and Spruce's assertions, it is believed that cinchona bark did have its uses in the system of "hot" and "cold" healing properties. Markham had voiced an opinion more closely in line with his

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<sup>46</sup> Markham, 3.

<sup>47</sup> Ibid.

<sup>48</sup> Crawford.

predecessors. He stated, “They justly believe bark to be very heating, and hence their prejudice against its use in fevers, which they treat with *frescos* or cooling drinks.”<sup>49</sup> This sensation of heat could be a reference to the “bitterness” and “astringency” that Markham attributed to the inner coating of the bark.<sup>50</sup> Philip established that while cinchona may not have been used for its febrifugal properties, or else for “hot” illnesses, it still held an important position in a healer’s toolkit. While cinchona would ultimately become the source of the antimalarial quinine extolled for its ability to quell malaria’s fevers, in the Andean world fevers were categorized as a “hot” illness for which the bark was not the most comfortable treatment. It was not that the indigenous community was reluctant to use cinchona but a disagreement related to the maladies it should be used for. Markham’s claim that the native people living in cinchona forests were indifferent to the natural resource at their disposal is not consistent with both the findings of some of his predecessors and the developments made with more modern analysis. Europeans, such as Markham, missed the true implications of Humboldt’s observations: “That is, that Indian curing practices had been supplanted by the medical beliefs of their Spanish conquerors. Instead, they implied that Andean Indians were unable to appreciate a valuable natural resource in their midst”<sup>51</sup> Humboldt’s observation that the communities in the forests of Loxa did not use the bark demonstrated the effect that Spanish imperialism had on their medicinal practices, which European explorers like Markham interpreted as indicative of their lack of interest in the trees.

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<sup>49</sup> Markham, 3.

<sup>50</sup> *Ibid.*, 556.

<sup>51</sup> Brockway, 11.

While Markham and Humboldt had wrongly assessed the indigenous use of cinchona, it remains true that long before the Spanish Empire took interest in the trees, the bark was a natural object of cultural and medical significance to people of the Andes. As Matthew Crawford describes, cinchona was not “an unknown natural object waiting for science to make it intelligible and useful to empire.”<sup>52</sup> *Curanderos* and *cascarilleros* (bark collectors) played important roles in a society that already had a scientific understanding of the medicinal properties of the bark and the various species that proved most effective. Markham and Humboldt’s dismissal of indigenous Andean use of the bark came into conflict with the extensive system of medicinal classification that had existed long before their arrival. Not only were they the first to make use of cinchona and pass along their knowledge to the Spanish, they had their own methods to evaluate the different species of cinchona tree and the various kinds of bark. As Crawford explains, “the relationship between the Royal Pharmacy in Madrid and the royal reserve in Loja was not one between European center and colonial periphery, as many imperialists imagined, but between two centers of knowledge production.”<sup>53</sup> Both held their own unique beliefs about the South American environment. This system of “hot” and “cold” classifications that Markham, Humboldt, and Spruce spent time discerning to understand indigenous use of the bark, went beyond medical treatment: “Various indigenous groups in the Andes apply this system to a broad variety of phenomena including geographical features, food sources, the body and the diseases that affect it.”<sup>54</sup> This was a phenomenon that predated

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<sup>52</sup> Crawford, 20.

<sup>53</sup> *Ibid.*, 93.

<sup>54</sup> *Ibid.*, 27.



European invasion and indicated a more advanced scientific understanding of their natural environment than had previously been attributed to the indigenous people of South America.

That the Indigenous people of the Andes had a relationship with cinchona, before Spanish interest in the bark arose, was a reality Markham was unable to concretely accept. Markham had stated that it was “probable, nevertheless” that the native people of Loxa had known about the medical effect of the bark.<sup>55</sup> The indigenous healers and bark collectors had maintained a relationship to the natural commodity since the earliest Spanish expeditions to South America: “With the outbreaks of malaria in the Andes that occurred in the wake of Spanish conquest of the region in the 1540s, these healers would have found themselves along one of the many epidemiological frontiers created by Spanish colonization.”<sup>56</sup> The *cascarilleros* and *curanderos* whom Markham belittled for their destructive practices had made use of cinchona long before it was first imported to Europe in 1630: “These healers would have had more than a century to pit their local pharmacopeia against these new diseases that ravaged their communities.”<sup>57</sup> In other words, Andean healers had more than enough time to figure out that this bark was effective against the intermittent fevers caused by malaria. The various explorers of the 18th and 19th centuries would fail to come to terms with the indigenous connection to cinchona. Instead, they deliberated over both the indigenous community’s interest in cinchona bark and their ability to manage their natural resources, thus justifying their extractive missions. Not only were

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<sup>55</sup> Markham, 2.

<sup>56</sup> Crawford., 26.

<sup>57</sup> Ibid., 33.

they aware of the febrifugal properties of cinchona but they had used it to protect themselves from disease in the wake of Spanish invasions. An indigenous community capable of using the bark for its medicinal effects would prove detrimental to Markham's justifications for his mission. Thus, he would align himself with narratives that deemphasized this important factor.

That cinchona had been used to treat old-world illnesses like Malaria came into conflict with Humboldt and Spruce's observations that the indigenous healers would not use cinchona to treat "hot" illnesses. According to Crawford, these native healers saw Cinchona as a "cold plant" that could help cure the heat of a fever.<sup>58</sup> This confusion could be attributed to the fact that what Humboldt and Spruce were observing were the medicinal practices of a community after centuries of Spanish influence. Thus they may have misunderstood cinchona usage when the first new world diseases were emerging in South America. In this sense Markham's mission became paradoxical: While colonial missions such as his provided a means of supplying Europeans a fever-reducing remedy, they were the medium that spread malaria and other diseases; "Major developments in the Atlantic World in late seventeenth century actually created more demand for the bark by facilitating the spread of malaria, the disease against which quina was most effective."<sup>59</sup> Not only did Markham struggle to come to terms with the Indigenous use of the bark, but he also failed to see the internal conflict within his mission, that it was precisely his type of colonial practice that necessitated the use of the anti-malarial in the first place. However, Markham could not be expected to

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<sup>58</sup> Ibid., 27.

<sup>59</sup> Ibid., 44.

have the same modern understanding of the imperial role in spreading endemic disease. This point only serves to further demonstrate the contradictions within Markham's mission as he strove to free the cinchona tree from people who were supposedly blind to the medical wonders at their disposal. In reality, the Indigenous relationship of cinchona bark far preceded European interest and Markham's accusations of ignorance are unmerited.

Markham and his crew prepared to set out from Gironda's farm they entered the dense forest which Markham claims had not been traversed since 1847 when the bark trade diminished. He declared himself the only European and the first human in thirteen years to explore this part of the entangled jungle.<sup>60</sup> Though indigenous communities like the Collahuayas, medicinal plant collectors who Markham claims had no interest in cinchona, had explored this forest, they did not possess the drive for profit that Markham would later bring.<sup>61</sup> Ultimately Markham's experiences with the Collahuayas, also called Chirihuanos on the coast of Peru would fortify his notion that the people of South America applied little importance to their natural commodities. This would reinforce the value of a mission that Markham believed would demonstrate the true capability to take advantage of one's environment.

Markham saw the Collahuaya's lack of interest in cinchona as indicative of their inability to understand the magnificent healing bark they had been blessed with access to. When Markham encountered the tribe emerging from the depths of

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<sup>60</sup> "Gironda's little farm is the last inhabited spot; beyond is the illimitable virgin forest, stretching away for hundreds, nay thousands of miles, to the shores of the Atlantic. This forest has not been traversed since 1847, when the bark trade ceased, and it is quite closed up." Markham, 246.

<sup>61</sup> Ibid.

the forest, he described them as “wan and cadaverous,” and as “men risen from the dead” whose calling in life was to spread their knowledge of medicine all across the Americas. They emerged from the “illimitable” forest “pale” and “haggard,” with their wallets of medicinal drugs on their backs.<sup>62</sup> According to Markham the Collahuaya come from the Bolivian province of Larecaja, from three villages called Charasaui, Consata, and Quirbe. Since the time of the Incas, they had passed down their knowledge, but Markham believed that cinchona use never had a place in this tradition. He claims that the bark is conspicuously absent from the wallets of the native doctors, who knew of countless herbs and treatments. He stated, “it is remarkable that the Collahuayas should never have discovered the febrifuge of chinchona bark.”<sup>63</sup> For Markham, their lack of interest in cinchona proved even more remarkable considering their engagement with a variety of other kinds of medicinal plants. He described that their ancestors had made use of powdered tobacco (sayri) for headaches, or schinus molle for wounds, along with a variety of other herbs such as sasaparilla. Though they had traveled from Quito to the “extreme limits of the Argentine republic,” cinchona had apparently eluded them.<sup>64</sup> Markham’s notion that the indigenous communities in South America didn’t value the medicinal properties of cinchona bark was reinforced by his experiences with the Collahuayas.

The academic discourse surrounding the Countess of Chinchon has revealed a further inability of European explorers to come to a consensus on the role the indigenous community played in the mythical story and the European

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<sup>62</sup> Ibid., 247.

<sup>63</sup> Ibid., 248.

<sup>64</sup> Ibid.

adoption of the medicinal bark. Markham described how the Countess of Chinchon was a daughter of the noble House of Osorio named Ana, born to the eighth marquis of the family in 1576. According to Markham, at the age of sixteen, she was married to Don Luis de Velasco, the count of Chinchon and a member of one of the most important families in Habsburg Spain who would soon become viceroy of Mexico and then Peru. He goes on to explain that in 1638 when the Countess was suffering from a fever, the Corregidor of Loxa, Don Juan Lopez de Canizares, sent her physician a parcel of cinchona, which was used to cure her of her illness. The Countess and her husband returned to Spain in 1640, “bringing with her a quantity of the healing bark, [and] was thus the first person to introduce this invaluable medicine into Europe. Hence it was sometimes called Countess's bark, and Countess's powder.”<sup>65</sup> A.W. Haggis would point out that Markham had most likely misidentified the protagonist. He explained that it was “unfortunate that the English cinchonologist” was unable to discover that Ana de Osorio had died in 1625 before she returned to Spain, and thus could not have been the one to introduce the bark to Europe.<sup>66</sup> The details of Markham’s account have been scrutinized by more modern historians, but more significant is the debate around the indigenous role in the Countess’s story, in which various amounts of emphasis are placed on their involvement. As one of the most commonly referenced stories concerning the proliferation of cinchona bark, emphasis on indigenous Andean involvement would shed light on their

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<sup>65</sup> Ibid., 6.

<sup>66</sup> Haggis, 570.

contributions to medicinal history and depict them as worthy of the commodities indigenous to their land.

Despite his assertion that the indigenous people in the Andes were indifferent to their medicinal trees, Markham described a different narrative concerning the Countess of Chinchon than some of his predecessors, one which placed more emphasis on the indigenous role. However, their role still falls to the wayside for what Markham considers to be the true hero of the story: the countess and her husband who brought their knowledge back to Europe. The potential role that native healers in Ecuador may have played was most often discussed in reference to Don Juan Lopez. Humboldt had made a groundless claim: “I do not believe...that the corregidor of Loxa, Don Juan Lopez de Cannizares, who is said to have cured the Countess of the ague, received this remedy from the Indians.”<sup>67</sup> Markham provides a different narrative, “an Indian of Malacotas is said to have revealed to him the healing virtues of quinquina bark, and to have instructed him in the proper way to administer it.”<sup>68</sup> Markham’s ideas about how Don Juan Lopez had been taught by an Indian at Malacatos fall more in line with the notions put forth by Jussieu, who points to Malacatos as the location where the Spanish had first learned of the medicinal uses of the bark. This would indicate that the indigenous community there not only had an understanding of the bark’s medicinal properties, but they also valued it enough to share it with others in need. This proves contradictory to what Markham had claimed: That they may have known of the bark but applied little value to it. The contradictions within his

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<sup>67</sup> Humboldt, 22.

<sup>68</sup> Markham, 3.

writing point to his attempt to balance the truth of the story with a narrative that would justify his extractive mission.

Discourse surrounding the earliest uses of cinchona, as well as the mythical story of the Countess of Chinchon, were key in setting the framework for Markham's mission. The role that the native healer from Malacatos may have played in the Countess's story was viewed through multiple lenses, some of which described him as the source of the Jesuit's knowledge and others which deemphasized this factor. Whether or not the indigenous people of South America had known of the health benefits of cinchona bark proved essential in shaping Markham's notions of their inability to care for their natural resources. From Markham's perspective, the extraction and transplantation of the cinchona trees became justified when those who had been blessed with the medicinal plant were deemed ignorant of its virtues. Markham tended to align himself with previous Northern European encounters with the plant in South America, such as those found in the writing of Humboldt. These narratives accentuated a sense of European privilege that deemphasized the use of cinchona on the part of the natives. The details about how the effects of cinchona first revealed themselves to the native people in South America proved to be of much importance to Markham, as their ability to understand their natural resources would be indicative of their ability to care for them.





## Chapter 2

### Shortsighted *Cascarilleros*

Clements Markham stood in opposition to the systems of bark collection he witnessed while traveling the Andes, as he viewed them as harmful to the health of the cinchona tree and thus the British Empire's supply of life-saving treatments. He specifically pointed to the methods used by the *cascarilleros*, to whom he attributed putative laziness and as the source of the cinchona's destruction. He failed to recognize the true perpetrators of the malpractice as European botanists and his obsessive debasing of South American practices overshadowed his subjectivity. Markham would also condemn the governments of South America for their misplaced focus, as they prioritized thwarting his mission over the health of their trees. Though he envisioned a system in which the purpose of the *cateador* (bark searcher) and *cascarillero* as well as the government became diminished or non-existent, in some cases Markham demonstrated his respect for their craft and their lucrative missions. Indigenous *cascarilleros* led and taught Markham at key moments in his expedition. Despite the prominent role indigenous science and forestry played in his mission, Markham's assertions about the *cascarilleros'* incompetence overshadowed his obvious indebtedness towards his indigenous guides.

Markham opposed the methods of bark collection used in Peru, Ecuador, and Bolivia, which he viewed as unsustainable and detrimental to his mission of creating a consistent supply of cinchona for the British Empire. He claimed the

*cascarilleros* showed little forethought for the future supply of cinchona trees, “a characteristic that is ubiquitous to most of their fraternity.”<sup>69</sup> This lack of insight into agricultural practice made it evident to Markham that the *cascarilleros* did not deserve to partake in the benefits of the bark. In his eyes, his historic mission was essential to both British imperial health and the strength of the Empire, all of which depended on the survival of the cinchona tree. European botanists anxiously watched what they perceived to be ignorant practices occur under the watch of the ignorant South American governments. Markham described a myopic *cascarillero*: “The bark-collector enters the forest and destroys the first clump of chinchona-trees he finds, without a thought of any measure to preserve the continuance of a supply of bark.”<sup>70</sup> He explained the method used in the forests of Loxa, where *cascarilleros* strip all the bark from the tree aside from one long strip that gradually regrows. Once regrown a second cutting called a “*cascarilla* resecada” can then be performed.<sup>71</sup> However, Markham explained that this method was ultimately harmful to the trees as insects soon penetrated their trunks. His attitude toward the *cascarilleros* disregards the fact that it was the demand for cinchona from the Spanish Empire that had necessitated the use of these practices in the first place. Throughout Spanish colonial rule, bark collection was reoriented towards more efficient methods that proved to be more destructive than small-scale harvesting. He described that in reality, the true threat to the cinchona tree was not the mismanagement that he would pin on the bark collectors and governments of South America.

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<sup>69</sup> Markham, 25.

<sup>70</sup> *Ibid.*, 44.

<sup>71</sup> *Ibid.*, 25.

Markham attributed the destruction of the supply of cinchona trees to the *cascañeros*' ignorance of proper European methods of bark collection and their laziness during harvesting. According to Markham, the thoughtless *cascañeros* accelerated the decline in the cinchona tree population by failing to establish a sustainable system of regrowth. He related their harmful practices: "So utterly improvident are the collectors that, in the forests of Cochabamba, they bark the tree without felling, and thus ensure its death; or, if they cut it down, they actually neglect to take off the bark on the side touching the ground, to save themselves the trouble of turning the trunk over."<sup>72</sup> According to Markham, the Cochabamba people's tendency to strip the trees before felling led to their imminent destruction. Furthermore, their ignorance about Markham's preferred method of cutting the trees before harvesting the bark fostered waste, since it left much of the bark behind. These destructive methods would prove unsustainable for the British Empire, which depended on an abundance of cinchona to maintain the health of their colonies. Markham's notion that the *cascañeros* were responsible for the environmental toll on the cinchona tree disregarded the effect that European incursions had on local practices. In other words, Spanish demand had affected the method of extraction, which Markham deemed detrimental to the health of the trees. Markham was unable to see the nature of his hubris, thus, in an ironic misunderstanding, he implied that the indigenous population could not care for the remarkable resources they had access to.

Markham's writing about the *cascañeros* emphasized what he saw as their unscientific approach to bark collecting. In an ironic dismissal of his own

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<sup>72</sup> *Ibid.*, 44.

role, Markham discussed their approach to the forest as akin to invasion: “They penetrated for several days into the virgin forest until they came to the region of the chinchona-trees, when they built some rude huts and commenced their work.” Markham belittled their approach to harvesting by describing their efforts as invasive and reliant on primitive tools such as “rude huts” and the “wood-knife.”<sup>73</sup> Their approach to stripping the forest focused on gathering massive quantities of bark instead of devising a method that would yield a long-term sustainable supply. Markham would also describe the *cascarillero* as unable to cope with the dangers of the forest, a factor that could be alleviated in a controlled plantation. He relayed the story of Dr. Weddell, who described a horrific scene: “He found the hut of a *cascarillero*, and near it a man stretched out on the ground in the agonies of death. He was nearly naked, and covered with myriads of insects, whose stings had hastened his end.” He described the bark collector's death “in the midst of the forests, far from all friends—a death without help, and without consolation.”<sup>74</sup> Although Markham does not debase the *cascarillero's* harvesting in this instance, his graphic language makes it evident that he was suspicious of the indigenous South Americans' abilities to cope with the dangers of the forest. Again, a lack of education and a primitive attempt to invade the forest does not, in Markham's calculus, create success. This is not in line with the realities of what had made Markham's mission successful, as assistance from *cascarilleros* and other people familiar with the land proved essential.

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<sup>73</sup> Ibid., 34.

<sup>74</sup> Ibid., 41.

Markham's view of the European arboricultural methods as superior to the ones taking place in South America can be seen in multiple instances. Markham described the important role of the German Naturalist Eduard Poeppig, who along with the Spanish botanist Hispolito Ruiz, stood in opposition to the destruction of cinchona trees. Markham had highlighted the South American tendency to strip the trees of bark before cutting them down, which, according to Poeppig, allowed insects to penetrate the stem of the tree and infect the roots, leading to rot.<sup>75</sup> Malpractice on the part of the bark collectors proved detrimental to the supply of cinchona. Markham explained, "This practice was in use in the days of the botanist Ruiz, who protested against it, and declared that it was very injurious to the trees, many having been destroyed by it."<sup>76</sup> From Markham's perspective, the European voice spoke for the forests, defending trees against the bark collectors who were sure to bring cinchona to the brink of extinction. He overlooked the effect that Spanish colonization had on the harvesting methods of the *cascañeros*. Ruiz had arrived in Lima from Spain in 1778, at which point European demand had drastically affected bark-collecting practices. He further disregards the more symbiotic relationship that the indigenous people of the Andes had with their environment before Spanish intervention.

According to Markham, the flaws in the Andean systems that were destroying his essential supply of cinchona trees went beyond malpractice on the part of the *cascañeros*. He claimed that the Bolivian government "meddled with the trade, attempted to regulate European prices by the most barbarous legislation,

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<sup>75</sup> Ibid., 25.

<sup>76</sup> Ibid.

and allowed the forests to be denuded of cinchona-trees.”<sup>77</sup> This “barbarous” meddling refers to Bolivia’s attempt to restrict the removal of cinchona bark by foreign invaders.<sup>78</sup> This legislation, according to Markham, was representative of the country’s misplaced efforts as they strove to keep foreigners out rather than, “taking measures to prevent the reckless destruction of the trees, to establish extensive nurseries for young plants, and thus ensure a constant and sufficient supply of bark.”<sup>79</sup> This accusation of shortsightedness stems from Markham’s notion that were the cinchona tree in the hands of the environmentally conscious and scientifically advanced Europeans, the species would not be facing extinction. Again, Markham returned to the theme that only European know-how deserved the right to cultivation. He hoped to find a receptive audience that would view his mission as beneficial to the health of the global cinchona population. Rather than relinquish control of cinchona production to the British, the Bolivian and Peruvian legislators took measures to prevent Markham from stealing the samples of the plants. These measures were undertaken by the *Juntas Municipales* of Sandia and Quiaca, who, according to Markham, were “influenced by motives which exposed their ignorance of political economy, while it displayed their activity and patriotic zeal.”<sup>80</sup> While Markham admired the patriotism of the people, they had once again proven themselves to him as ignorant and undeserving as they attempted to fend off a mission that had been described as bent on saving the trees and profiting from their cultivation.

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<sup>77</sup> Ibid., 36.

<sup>78</sup> Philip, 190.

<sup>79</sup> Markham, 36

<sup>80</sup> Markham, 224.

The Dutch cinchona project would present obstacles to Markham's mission, which he believed reflected the misguided environmental efforts made by the South Americans. He found a hostile population ready to defend their natural commodities. In 1852, the Minister of Colonies decided it was time the Dutch tried their hand at cultivating the bark.<sup>81</sup> The Dutch hired the botanist Justus Charles Hasskarl to sail to Peru to collect a variety of plants for the gardens in Java, among them cinchona. The purchase of cinchona by foreign agents was illegal in Peru, and Hasskarl's expedition had received some publicity in a German newspaper.<sup>82</sup> To avoid detection, Hasskarl traveled using a fake passport under the name José Carlos Müller. Markham claimed that Hasskarl used this pseudonym to get in contact with the Governor of Sina in the province of Carabaya. The Governor then "introduced the stranger to a Bolivian named Clemente Henriquez, a clever and intelligent, but dishonest and unscrupulous man."<sup>83</sup> Henriquez would hire an indigenous worker to collect the plants, which he would then deliver to Hasskarl for an unspecified amount of money.<sup>84</sup> Hasskarl's attempts to transplant the cinchona tree had ramifications for Markham, who found that the inhabitants surrounding the cinchona forests resistant to similar extractive missions. Markham described the perceived origin of this resistance after Hasskarl, assisted by Henriquez, escaped Peru with his bark samples. Markham explained, "An outcry was afterwards raised against Henriquez, by the people inhabiting villages bordering on the cinchona forests,

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<sup>81</sup> Lorin I. Nevling and Thomas S. Elias, "Calliandra Haematocephala: History, Morphology, and Taxonomy," *Journal of the Arnold Arboretum* 52, no. 1 (1971): 72.

<sup>82</sup> *Ibid.*

<sup>83</sup> Markham, 49.

<sup>84</sup> *Ibid.*

who considered that their interests would be injured by the exportation of the plants.”<sup>85</sup> This “outcry” would have repercussions for Markham’s expedition as he faced the same threats Hasskarl had received, “they declared they would cut his feet off if they caught him.”<sup>86</sup> Markham was well aware of the resistance to his expedition, but he felt that the Bolivians had misplaced priorities as they strove to maintain their control over cinchona production rather than prioritize the health of the trees. According to Markham, “This feeling has rendered any future operations of a like nature exceedingly difficult.”<sup>87</sup> Faced with these circumstances, Markham became more frustrated and when given the opportunity with his British-run plantation he would ensure no interference would be possible.

Markham came into contact with those whose cinchona businesses had been impacted by foreigners like Hasskarl. In the mountains of northern Peru he met a “red-faced man” named Don Manuel Martel. Perhaps this description could be a racial slur, a reflection of Martel’s resentment at his losses in the cinchona market, or else a reference to his angry tendency to threaten the removal of feet. Martel explained that he had lost money in the cinchona trade as a result of the Dutch attempt to acquire seeds for translation to Java. Martel said he resented Hasskarl, and stated that “if he, or any one else, ever again attempted to take *cascarilla* (cinchona) plants out of the country, he would stir up the people to seize them and cut their feet off.” Markham noted that Martel must have been making some reference to him in his “bluster.”<sup>88</sup> The security of his plants was of

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<sup>85</sup> Ibid.

<sup>86</sup> Ibid.

<sup>87</sup> Ibid.

<sup>88</sup> Ibid., 217



the utmost importance to Markham who would take efforts to defend them from the unwarranted actions taken by those like Martel. Markham felt that this was one of the many indications of the misplaced priorities of the South Americans as they attempted to hinder his mission rather than attending to the health of the cinchona trees. This would become one of the many ways Markham hoped to differentiate his project from the South Americans; through a clear delineation of methods and titles, this kind of interference would not be tolerated.

The residual effects of Hasskarl's expedition were felt by Markham, who found that in the wake of the Dutch theft of cinchona plants, the inhabitants of the forests were ready to defend their property. Despite the challenges that Hasskarl's mission had created, "the highest praise and admiration" was due to the botanist for his "untiring perseverance."<sup>89</sup> Not mentioned are the indigenous workers who had procured Hasskarl's samples of bark, although this is not unexpected as far more important to Markham would have been Hasskarl, the European explorer who traveled to Peru in the name of his country. Markham had often aligned himself with others who he considered to be intrepid explorers. However, he was unable to avoid pointing out the "comparative failure" in the Java expedition. Despite this, he noted that "the highest praise and admiration are due both to M. Hasskarl and to his successors."<sup>90</sup> The impediments created by Hasskarl's expedition were blamed on the misguided efforts of the indigenous community, whose contributions to modern science did not entitle them to the same accolades that Hasskarl would receive.

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<sup>89</sup> Ibid., 59.

<sup>90</sup> Ibid.

Martel would take measures to thwart Markham's mission, raising an outcry against Markham's efforts that would result in Don Jose Mariano Bobadilla ordering the collecting operations to cease. While Martel spurred the people of Sandia to defend their property, Bobadilla sent a letter by way of his son to Markham's group, which appealed directly to the moral reasoning of Markham's indigenous guides. According to Markham, the goal of the ominous letter was to "prevent me from taking away a single plant; to arrest both myself and the person who had acted as my guide; and to send us to Quiaca."<sup>91</sup> This would have a significant impact on Girona, who "though friendly and hospitable, feared that the finger of scorn would be pointed at him, as the man who had allowed the stranger to injure his countrymen."<sup>92</sup> Markham explained that this induced a great trepidation in Girona, who felt it would be most prudent to throw all the plants away, something Markham would never have condoned. Markham described the new imperative of protecting his bounty: "I saw that in an immediate retreat was the only hope of saving the plants; and I explained to Girona that his views were incorrect, and that, if necessary, we were prepared to defend our property by force."<sup>93</sup> The energetic and obliging old man whose services Markham relied on so heavily could be dropped as quickly as his moral trepidations begin to emerge. Interference by the likes of Martel would not be tolerated by Markham who was bolstered by his knowledge that the cinchona production would be better off in British hands.

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<sup>91</sup> Ibid., 275.

<sup>92</sup> Ibid.

<sup>93</sup> Ibid., 276.

A quick escape from the forest with his bounty became essential for Markham once the threats to the mission's success became clear. He had expressed his irritation with both the Juntas Municipales and Martel, though the two parties were largely unresponsive to his criticisms. Markham learned from a native in the region that Martel's son and several cohorts were "were coming down the valley to seize me, and destroy my collection of chinchona-plants."<sup>94</sup> On countless occasions, Markham would face challenges as a result of resistance by the inhabitants of the forests. Whether stating his annoyance at their inability to recognize the global benefits of his mission or belittling their horticultural practices, the indigenous South Americans would appear to be nothing but obstacles in Markham's way. In reality, the aid and experience of the indigenous people familiar with the land would prove essential to his mission. Markham would not leave the forests before addressing Bobadilla's unfortunate lack of foresight into the true benefits of the cinchona transplantation. In a letter, Markham stated that the interference would not be tolerated. He claimed the Juntas Municipales of Quiaca and Sandia had overstepped their jurisdiction in preventing him from procuring the bark samples: "As I understood the provisions of the Constitution of 1856, the functions of the *Juntas Municipales* were purely consultative and legislative, conferring no executive powers."<sup>95</sup> Markham felt that the South American's inadequate management of their bark went beyond malpractice on the part of the *cascarillero* and was evident in the legislative attempts to stop his mission. He described Bobadilla's interference as an

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<sup>94</sup> Ibid.

<sup>95</sup> Ibid.

“unwarrantable step” that he would not tolerate. Markham concluded his letter by examining Bobadilla’s sense of “patriotic zeal” and his “regret that it should be accompanied by such misguided and lamentable ignorance of the true interests of his country.”<sup>96</sup>

While he found their approach to bark collection unacademic and primitive, in some cases Markham demonstrated his respect for the *cascarilleros* and the dangerous tasks they undertook. The job was not solely dependent on the *cascarilleros*’ abilities with a knife; Markham described how a Cateador, or searcher, would climb towering trees and, “with the aid of experience and sharp sight,” was able to direct the party toward the cinchona. Markham described a process dependent on tremendous experience. At the top of the tree, the cateador would search for “manchas,” or “clumps” of cinchona, which could be distinguished by their dark color and the “peculiar reflection of the light from their leaves, easily observable even in the midst of these endless expanses of forest.” Markham’s respect for and dependence on the experience of the South American collectors is evident, even if he would label their practices primitive and damaging to the forest. He describes the cateador’s next steps “then, with never-erring instinct, conducted the party for hours through the tangled brushwood, to the chinchona clump, using the wood-knife at every step.”<sup>97</sup> The cateador’s ability to locate these manchas and lead the party to them could prove very lucrative. One “clump” could produce a thousand pounds of bark, which would be sent to dry before it became moldy. Markham envisioned a more

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<sup>96</sup> Ibid.

<sup>97</sup> Ibid., 33.

systematic approach to cinchona production in which a harvest is not dependent on a cateador's ability to locate these bunches of trees. A plantation system would not be subject to the whims of the forest as it was in the Andes. Though he envisioned a system in which the cateador and *cascarillero's* purpose is diminished or non-existent, in some cases Markham demonstrated his respect for their craft and their lucrative missions.<sup>98</sup>

Indigenous *cascarilleros* had led and taught Markham at key moments in his expedition. In 1846, Weddell entered the Peruvian province of Carabaya where he examined the cinchona forests of Tambopata. Weddell told Markham that, at the time of his visit, Tambopata had been a “great rendezvous for *cascarilleros* or chinchona-bark collectors” whose services Markham hoped to employ. Markham had said that upon arriving in Tambopata they continued along the Llami-llami river until they found themselves on the property of “a very energetic and obliging old Bolivian, named Don Juan de la Cruz Gironda.”<sup>99</sup> Living along with Gironda was a *cascarillero* named Mariano Martinez, who Markham claimed assisted Weddell when he was in the region. Gironda lived with his two sons who helped him plant the produce that had been available to them in the region. Markham described, “Gironda was cultivating sugar-cane, maize, and edible roots ; and, at the time of my visit, he was just commencing his miehca, or small sowing of maize.”<sup>100</sup> One of Markham's indigenous guides had deserted him before the journey to Tombapata, leaving Markham ill-prepared to carry enough food for the journey: “I found that I had only sufficient food to last for six days.

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<sup>98</sup> Ibid.

<sup>99</sup> Ibid., 244.

<sup>100</sup> Ibid.

Gironda himself was little better off, and was living on roots.”<sup>101</sup> As Markham reentered the dense forest in search of the Cinchona Weddell had described, the roots provided by Gironda proved essential: “Our party consisted of seven...The Indians, each with their chuspas of coca, and a chumpi or belt round their waists, carried the ceepis or bundles of provisions.” Martinez had led the way, clearing Markham’s path to the most bountiful parts of the forest as other unrecognized assistants carried the supplies. The aid provided by Gironda and Martinez played a crucial role in facilitating Markham’s mission; one that is ultimately overshadowed by claims of the *cascarillero*’s ignorance.

Markham would require the assistance of those with more experience in the Amazonian forests to be successful in his mission. Markham described Martinez as having a great familiarity with the land, which would prove indispensable in acquiring particular knowledge about cinchona and its whereabouts. He wrote of the skilled *cascarillero* Martinez who would lead him on the expedition, “He was thoroughly acquainted with all the different species of chinchona-trees, and, reared from a child in these forest solitudes, he was a most excellent and expert woodman, intelligent, sober, active, and obliging.”<sup>102</sup> He noted that Martinez spoke limited Spanish, and since Markham could not speak Quechua there was a vast language barrier between the two men. Regardless of these barriers, “he had a most complete and thorough knowledge of all forest-lore, and was acquainted with the native name of almost every plant, and with the uses to which they were or might be applied.”<sup>103</sup> Often in the face of the extreme

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<sup>101</sup> Ibid., 246.

<sup>102</sup> Ibid., 247.

<sup>103</sup> Ibid., 250.

biodiversity of the Andean world, European explorers found their traditions of natural history to be an insufficient tool in identifying the correct kind of plants for extraction. Not only this, but Tambopata was home to “great quantities of a false chinchona, called by Martinez *Carhua-carhua blanca*.”<sup>104</sup> Markham had previously described that carhua-carhua was a name given to the inferior kinds of bark. Led by Martinez, Markham traversed several groves of these trees which he claimed “differed in several respects from the *L. chinchonides*, mentioned by Dr. Weddell as growing in the Caravayan forests.”<sup>105</sup> According to Markham, the earliest botanist had applied the name “Chinchona” to a much wider genus, which since then has been regrouped under different names. Few characteristics distinguished the “true cinchona” from the *Carhuacarhua blanca* described by Martinez. Markham describes the particular phenotype of the true cinchona, for instance, “curly hairs bordering the laciniae of the corolla” or else the axils of the veins on the underside of the leaves. “These characters distinguish the chinchona from many trees which grow with it, and which might at first sight be taken for the same genus” and only with the assistance of Martinez would Markham be able to identify the bark he was after.<sup>106</sup> An acute botanical eye was needed to distinguish between the wide variety of plants in the Amazon forests. European scientists had identified some of the characteristics of the kind of cinchona they were looking for, but the guidance from Martinez and assistance in avoiding false cinchona were the key to accessing the best bark for antimalarial use.

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<sup>104</sup> Ibid., 251.

<sup>105</sup> Ibid.

<sup>106</sup> Ibid., 13.

Markham continued to rely on the experience of indigenous guides to provide him with access to the cinchona trees. Martinez led Markham's crew, guiding them through the forests of Tambopata: "Martinez went in front as pioneer, clearing away obstructions with his machete, and the rest of our little party followed."<sup>107</sup> He passed along his extensive knowledge of cinchona harvesting: "as Martinez assured me that chinchona-trees were most abundant on the right or eastern bank."<sup>108</sup> Markham was not oblivious to the debt he owed his travel companions. "I owe much to the intelligent assistance of our guide Martinez," Markham explained, whose "lynx's eye" added a skillful perspective that could "distinguish these treasures, amidst the close entanglement of the undergrowth, in the dense forests."<sup>109</sup> Markham's British cohorts, John Weir and Richard Spruce, often received credit for their noble contributions to medicinal history. Despite the prominent role indigenous science and forestry had played in his mission, Markham's attitude of indebtedness towards his indigenous guides would be overshadowed by his assertions that it was the *cascarillero* who was to blame for the fate of the cinchona tree.

Markham's relationship with the indigenous population of South America was inconsistent. On the one hand, he debased what he viewed as the South Americans' ignorance of their most precious resource. On the other hand, Markham relied on this local knowledge to guide his project. In some cases he expressed his admiration for their mastery of difficult harvesting practices and in others he condemned their use of methods that were harmful to the cinchona trees.

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<sup>107</sup> Ibid., 248.

<sup>108</sup> Ibid., 253.

<sup>109</sup> Ibid., 249.



The assistance of guides like Girona and Martinez was essential to the success of the mission; without the *cascarillos* he would have been at a loss when it came to navigating the Andes and devising what would become, as detailed in the next chapter, a global enterprise.



## Chapter 3

### A Global Cinchona Market

Chapter three brings the earlier discussion about knowledge and production into a larger imperial context. Above all, the cinchona mission was a means of reinstating British power in India during a period of political unrest, as it became a clear sign of the benefits of colonial rule. For Markham, the South Americans had proved themselves to be shortsighted in their environmental and legislative actions and thus unfit to have sole possession of the cinchona tree. Markham envisioned a calculated method of production that would demonstrate the academic superiority of the British Empire over the South Americans and the Dutch. His approach to assessing the most suitable location for the cinchona plantation focused on issues related to climate and geography, which led him to other British colonies. Selecting a site required assessing humidity, temperature, elevation, soil, and other factors that would influence the plant's ability to germinate.

Ultimately, Markham decided on the Nilgiri hills in southern India as the most acceptable location for the ongoing cinchona operation. India has a similar climate to that of South America, but Markham had plans that would illuminate the differences between his methods of cultivation and those used in South America. Through deliberate assessment and evaluation of his plants, Markham hoped to set the British Empire's cinchona experiment apart from the naturally occurring methods used in South America. The South American inability to take

full advantage of the opportunities that their natural resources had provided further justified Markham's colonial mission.

To achieve success, Markham used a system of trial and error to maximize the germination and alkaloid content of his plants. He believed that this would set his experiments apart from the natural cultivation that was happening in South America. Assisted by William Graham McIvor, Markham thought that through his plantation he could demonstrate the aspects of British cinchona cultivation that would prove superior to any that had occurred before it. British superiority would be demonstrated through the production of higher quality bark, limited foreign interference, and the benefits that the plantation would have for the British colonies. In a sense, Markham both learned from and revised his past experiences in South America, describing a new method of agriculture that he hoped would lead to fecundity in India.

Cinchona transplantation was a marker of colonial trade networks that integrated knowledge, the control of land, and the ideology of empire. Thus, it is important to consider Markham's motives for undertaking the cinchona transplantation. First, it would ensure a cheap and consistent supply of quinine, giving access to millions who until then had been unable to access it. Markham goes so far as to suggest that history could have been altered had this mission been undertaken earlier. He brings up Alexander the Great who died from fever "merely from the want of a few doses of quinine." He continues, "In time to come the lives of men of equal importance to their generation may be saved by its use, while the blessings which it will confer on the great mass of mankind, and

especially on the inhabitants of tropical countries, are incalculable.”<sup>110</sup> Markham felt he had changed the course of history by making the medicine accessible. He claimed that the highest debts are owed to those who conducted the successful project, though Markham’s cohort of British scientists received more praise than his indigenous guides in the Andes. The transplantation would also protect against the reckless practices Markham had witnessed by the indigenous people in both South America and India.

Markham’s interest in cinchona was its potential power within the context of the British Empire, which, in his estimation, could only be realized if the British adopted a more sustainable agricultural program than what had been used in South America. During his expedition, Markham began to imagine a possible plantation system - one that existed on Andean land rather than a distant British colony - when he realized a flaw in his European method of production. He described his fears that “with the increasing demand, there should be long intervals of time during which the supply would cease, owing to the forests being exhausted, and requiring periods of rest.”<sup>111</sup> Here Markham revealed the true motives of his mission: he was not interested in the protection of the South American environment but rather in the abundant supply of cinchona to Europe for the health of the Empire. Markham framed *Travels in Peru and India* as a tome of environmental wisdom and foresight and the epic tale of his efforts to secure cinchona seeds for the British. But, as Kavita Philip explains, “While the book is clearly framed in the rhetoric of a conservationist agenda, in the details of

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<sup>110</sup> Markham, 519.

<sup>111</sup> *Ibid.*, 46.

the story are embedded explicit declarations of the economic motives of this project.”<sup>112</sup> Markham positioned his mission as one bent on saving cinchona from its looming fate of extinction, while his ambitions remained imperial and predicated on market concerns.

The Sepoy Mutiny and the development of the Raj increased cinchona’s importance during the second half of the nineteenth century. The rebellion of 1857 was an expression of unrest over the harsh land practices and displacement of rulers. It was part of a larger series of Indian revolts against the oppressive British East India Company. The rebellion against Britain began when Hindu and Muslim troops in the Bengal regiments took up arms against rapid Westernization.<sup>113</sup> As the fighting spread to central India, Britain felt increasing pressure to respond. Thus, reinforcements were called upon to quell the rebellion and reestablish control. The “mutiny” lasted 18 months and was made up of a series of smaller revolts against the oppressive Company and the British troops. Many Indian people would come to view Sepoy as the first large-scale independence movement against the Raj. The use of the term “mutiny” to describe the uprising diminished the political ramifications of the event.<sup>114</sup> The rebellion was ultimately unsuccessful and this period marked the transition from the influence of the East India Company to direct control by the British Raj.<sup>115</sup> Brockway explains, “The revolt and its suppression marked the end of British commercial capitalism in India, under the aegis of the Company, and a shift to

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<sup>112</sup> Philip, 60.

<sup>113</sup> Brockway, 105.

<sup>114</sup> *Ibid.*, 104.

<sup>115</sup> Deb Roy, 273.

industrial capitalism on the part of the British masters.”<sup>116</sup> The Raj was a period of intense and more organized colonial control over India. Reinforcements became imperative so that Britain could maintain its colonial strength through manpower and the introduction of new mandates for everything from infrastructure to education to, as discussed here, medicine. Markham pointed to the medical contribution that his cinchona project would confer upon Britain’s military and its subjects, emphasizing the lives of British soldiers that it would save.

The health of the British troops was of the utmost importance as they attempted to control the spread of malaria. Now more than ever, cheap and plentiful access to cinchona would keep soldiers healthy and help make certain that the British could maintain control over India. As cinchona was the key to the production of life-saving quinine, the project became synonymous with a humanitarian and economic rationale, but the British priority was the political and military advantages that it would offer the Raj.<sup>117</sup> To demonstrate the effect of quinine implementation, Markham cited that while in 1830 the mortality rate of those with malaria was 3.6 percent, by 1856 it was only 1 percent. The establishment of a British-controlled cinchona plantation would not only become a profitable enterprise, but it would also facilitate the supply of quinine to the 18,000 soldiers stationed from Peshawar to Pegu. It provided access to cheaper and more abundant quinine than had ever been available before. Thousands, if not millions of lives would be saved as those who were unable to access the drug would now be able to procure it. Military success in British India after the events

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<sup>116</sup> Brockway, 105.

<sup>117</sup> Ibid., 104.

of the Sepoy mutiny would be facilitated by the use of quinine, which would keep colonial soldiers healthy and help them avoid infection.<sup>118</sup>

Not only was cinchona used in maintaining the health of colonial forces, it was also invoked as a symbol of the transition of imperial power, indicative of the benefits British rule would confer upon the people of India. While clearly indicative of military ambitions, the cinchona project could also be seen as a humanitarian effort with benefits for the subjects of the Raj. Markham believed that the “most durable monument” to the benefits of British colonial rule was the “fever dispelling chinchona-trees” which could be found in the southern hills of the Nilgiris for centuries to come.<sup>119</sup> Markham compared the everlasting benefits of the cinchona transfer to the melons that Emperor Babur of the Mughal Dynasty had introduced into India and which “caused him to shed tears while thinking of his far-off mountain home.” Centuries after their introduction, these melons still flourished around Dehli [sic] and Agra, and Markham believed cinchona would follow suit in the Nilgiris.<sup>120</sup> The fever-dispelling cinchona trees were the greatest gift that British colonial rule would leave behind for the people of India.<sup>121</sup>

During and after the Sepoy Mutiny, cinchona was used as one of the many indications that British rule in India was beneficial to both the Crown and its subjects. Roy quotes D. Hanbury’s writing about the Countess of Chinchon, in which he described this period of the Raj as the “pleasantest episode of British rule in India.”<sup>122</sup> This had been facilitated by the advertisement and distribution of

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<sup>118</sup> Markham, 519.

<sup>119</sup> Ibid., 61.

<sup>120</sup> Ibid., 61.

<sup>121</sup> Deb Roy, 273.

<sup>122</sup> Ibid., 34.



British cinchona which would be an incalculable benefit to all subjects of the crown. Markham minimized imperial violence by conveying what he believed to be the more peaceful period of British rule, in which the gifts the Empire could supply would become apparent. Roy claims that in the face of unrest, the cinchona that had been transplanted in India's Southern hills were "upheld as objects which symbolized the benevolent transition of imperial power in British India from the East India Company to the Crown."<sup>123</sup> To confer the benefits of the medicinal bark to the British and Indian people, a calculated method of production would be required to create a sufficient supply.

While Markham had pondered the idea of a plantation on South American land, the British ultimately decided on the Nilgiri hills in Southern India as the most suitable location for the cinchona trees as their conditions were comparable to those in the Andes. The rolling hills provided an extensive opportunity to plant the cinchona at its ideal altitude, which differed between species. The hills received an ample supply of water during monsoon season and the temperature was the most fitting that could be found in India. Markham described the need for a similar environment to cinchona's natural habitat, "For the first experimental sites," he wrote, "it was of course important that the resemblance, as regards elevation, temperature, and humidity, should be as close as possible."<sup>124</sup> While the project began with small experimental sites, Markham hoped that under British botanic supervision, the cinchona would soon spread across the Nilgiris. Markham explained, "These precious plants will, it is to be hoped, before very

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<sup>123</sup> Ibid.

<sup>124</sup> Markham, 379.

long, form large plantations on all parts of the hills, and become one of the most important products of the Neilgherries.”<sup>125</sup> He firmly believed that this plantation would provide the necessary amount of cinchona to create a private British enterprise and maintain the health of the British soldiers.

The Nilgiri Hills would be the medium through which Markham demonstrated the success and sustainability of his plantation. The British efforts struck a balance between replicating the natural environment of the cinchona plant and shifting it towards a scientifically calibrated plantation system. Through a system of trial and error, Markham and his cohorts would establish which soil resulted in the greatest percentage of germinated trees. The first batch of seeds to arrive in Ootacamund, Markham’s home base in the Nilgiris, was the *C. Peruviana* “grey-bark” from Huanuco, which was delivered on January 13, 1861. The *C. succirubra* “red-bark” from Chimborazo arrived at the end of February. Markham stated that the seeds were in “very good condition, considering the length of time they had been in Wardian cases...and thus the experiment was fairly commenced.”<sup>126</sup> Markham was optimistic that he would be able to adopt a method of cultivation that used the ideal soil to maximize the germination of his plants. He believed that this unique system demonstrated the superiority of the European agricultural techniques, as they would accelerate germination and thus the production of the life-saving bark. This sentiment disregards that, due to

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<sup>125</sup> Ibid., 383.

<sup>126</sup> Ibid., 486.

natural inhibitors, the plantation system was impossible in the Andean environment.<sup>127</sup>

Markham believed one of the many shortcomings of South American environmental practice was its inability to take full advantage of cinchona trees by adopting a method that facilitated more production. He hoped his experiments would demonstrate the superiority of the European method, which would maximize germination through the selection of the ideal soil. The first sowing took place in January when only the “red bark” had arrived, but as Markham described it was not very successful because McIvor had “induced to use too retentive a soil, having been misled by the treatment of seeds adopted in Java.”<sup>128</sup> As a result, only three to four percent of the seeds germinated. The second sowing took place two months later in early March. McIvor decided to use an airier soil, half composed of burned earth, which yielded a promising germination rate of around twenty percent. Thus one month later when the third sowing of *C. Calisaya* “yellow bark” had commenced, McIvor used soil entirely composed of burned earth resulting in sixty percent of the seeds germinating. This decision demonstrates a key difference between the European and South American relationship to the cinchona tree. Choices about which soil would yield the best results were not made in the Andes, where cinchona was a natural part of the landscape. As a result, there was a stark contrast between the practices of the *cascañeros* and *cateadores* in South America who searched the dense forests and the plantation system adopted by the British. By May 1861 Markham claimed all

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<sup>127</sup> Ralph Barkemeyer and Frank Figge, “Fordlandia: Corporate Citizenship or Corporate Colonialism,” *Corporate Social Responsibility Environmental Management* 19 (2012) 75.

<sup>128</sup> Markham, 486.

of his plants had taken to the burnt soil; While in June of the same year, there were 2114 plants in Ootacamund, by January 1862 the number had increased to 9732 plants.<sup>129</sup> He believed the process of trial and error, by which the most suitable soil for the cinchona was selected, indicated his British project's superiority over both the naturally occurring methods in South America. For Markham, the South American inability to capitalize on their natural resources by establishing sustainable groves of cinchona trees indicated that they were unworthy to tend to the trees.

Markham's efforts to maximize cinchona production by cultivating each species at the ideal altitude differentiated his practices from the naturally occurring trees in the Andes. As a result of the extensive experimentation undertaken by McIvor over a year-long period, it was deduced that while all the trees required rough, aerated soil, the ideal elevation for each species differed. The Nilgiri hills provided Markham with hundreds of acres of uncleared forest on the mountain slopes, where the elevation varied between approximately 5,000 and 8,600 feet above sea level. Multiple sites of cinchona cultivation would be established; the lowest elevations would suit the more delicate trees while the more resilient species would be planted higher up in the mountains. Sholas high in the Nilgiris were well suited for the growth of hardier species of cinchona. Markham had taken copious notes that allowed him to cross-reference the growing conditions in South America with the conditions available to him in the Nilgiris. While Markham and his team ensured climatic conditions between South America and the Nilgiris were comparable, they strove to improve upon the

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<sup>129</sup> Ibid., 487.

natural production of cinchona by growing each species at the highest elevation possible.

Observations made in the South American cinchona forests influenced the British method of growing species at a different altitude than they would be found in their natural habitat. Spruce observed that the trees growing at greater heights produced a far thicker bark than those low in the plains. The thickest bark tended to produce the largest percentage of alkaloids, which influenced Markham's decision to grow each species at the "highest point at which these plants will flourish, and the greatest exposure they will bear without injury."<sup>130</sup> *C. Nitida*, *C. Condaminea*, *C. Crispa*, and *C. Lancifolia*, were all well suited to the site at Dodabetta, which boasted an altitude of 8,610 feet, the highest in the Nilgiris. Pritchett observed that in its natural habitat, the *C. Nitida* tree flourished at 4000 feet. But Markham proclaimed, "I think there can be no doubt that the elevation of that mountain is much greater than Mr. Pritchett supposes."<sup>131</sup> He realized that these more resilient species could survive undamaged at the greater elevations of the Dodabetta site. Markham and his associates used their observations of South American growing patterns to establish each species at its optimal height.<sup>132</sup>

The Neddiwuttum site offered Markham the opportunity to grow more delicate species at a lower altitude, but still one that would maximize the alkaloid

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<sup>130</sup> Ibid., 387.

<sup>131</sup> "He describes the climate as moist and warm, and says that the difference in the degree of moisture and warmth between the lower slopes where the *C. micrantha* flourishes, and the higher parts of the mountains inhabited by the *C. nitida*, is very striking, while on the lower slopes the soil is much deeper and richer. He reports the elevation of Cocheros above the level of the sea to be about 4000 feet, but he made no meteorological or other observations...We shall not, therefore, be very far from the truth if we place the region of *C. nitida* on the Cocheros and Carpis mountains at from 6000 to 7000 feet above the sea, and of *C micrantha* at from 4000 to 5000 feet." Ibid., 324-325.

<sup>132</sup> Ibid., 330.

content used for the production of quinine. In their natural South American environment *C. Succirubra*, *C. Calisaya*, *C. Peruviana*, and *C. Micrantha* all flourish at heights ranging between 4,000 and 7,000 feet above sea level. These more delicate species of “red-bark” would not survive at the great heights of Dodabetta. Cross visited the cultivation site to give Markham his input on the project. Markham explained of Cross’ visit: “It is exceedingly satisfactory to find that he not only approves of it for the cultivation of plants of the ‘red-bark’ species, but that, from the superior depth and richness of the soil, he considers that they are likely to thrive even better than in their native forests”<sup>133</sup> The visit demonstrated one of the key differences between the European and South American methods of cinchona cultivation. While Spruce had claimed that species of “red-bark” would only be able to grow at elevations below 6,000 feet, Cross claimed that on his way to Loxa, he witnessed *C. Condaminea* growing at heights of 8,000 feet. Markham reconsidered the production method for *C. Condaminea* to maximize the alkaloid content of the bark. He believed that the ability to increase the alkaloid content of the different species of cinchona by cultivating them at the highest possible altitude would distinguish the deliberate, planned European method from the inefficient natural growth patterns found in South America.<sup>134</sup>

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<sup>133</sup> Ibid., 387.

<sup>134</sup> “On 30 August 1751, the Crown sent a second order to the viceroys of Peru and New Granada asking them to load “three or four hundred pounds of the most select and efficacious quina” on every ship headed for Spain from South America. The purpose of this enterprise was to build up the supply of bark in Madrid, while also providing the Royal Pharmacy with the material to determine which barks were best by conducting “observations and experiments” on the various kinds of bark submitted.” Crawford, 83.

The cinchona grown on the British plantation was distinct from the naturally occurring South American trees due to the deliberate assessment of the effects of sunlight. Observations on the effects of light on each species in the Andes influenced their decisions about how to use shade and sun exposure for their own plants. Spruce observed that the trees standing in the open ground were “more luxuriant than those growing in the forest, where they are hemmed in and partially shaded by other trees; and while many of the former had flowered freely, the latter were, without exception, sterile.” Cinchona could successfully grow in both shaded and exposed conditions, but these explorers’ experiences showed that trees with little access to sunlight produced less effective bark for quinine production. Markham expressed his opinion that it would be fruitless to undertake their cinchona mission if they adopted the inefficient methods in non-ideal conditions they had witnessed in South America. He explains, ‘I not only think, with Mr. Spruce, Dr. Weddell, Mr. Howard, Mr. McIvor, and Mr. Cross, that the chinchona- plants must be planted in the open, and freely exposed to the influence of fresh air and sunshine; but I am most strongly of opinion that, if the opposite system was unfortunately adopted, it would have been far better if the expense and trouble of introducing these precious trees into India had never been incurred.’<sup>135</sup> Sunlight had a significant impact on both the plants’ rate of growth and their eventual alkaloid content. Markham argued that had the methods he had observed in South America been adopted, the successful transplantation of cinchona to India would not have been feasible.

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<sup>135</sup> Markham, 197.

The focus on alkaloid content was not exclusively a means of cultivating bark that would produce the most effective quinine, it was also a profit-driven move in a time when alkaloid content directly coincided with the price of the bark. Traders were dependent on chemists for information regarding the alkaloid chemistry of different barks. This determined which barks were most effective and valued in the production of quinine, and thus which barks would be most profitable. Markham claimed that his fully established plantation would offer both the government and private enterprises the opportunity to reap the financial profits of the bark. He described the profits from four South American ports, which together exported an average of 912,900 pounds of bark each year, valued at 59,076 pounds.<sup>136</sup> Markham and his crew's efforts in ascertaining which elevation, soil, and climate best suited each species exemplified the kinds of practices that they believed would allow them to capitalize on this commercial opportunity.

Through calculated assessment of soil, elevation, and sunlight, Markham believed that he could demonstrate the superiority of European agricultural methods, thus justifying the extraction of the South American resource and its transplantation into British-controlled territory. The British had brought cinchona to a new controlled environment, establishing a system in which trees were consolidated into groups rather than sporadically spread throughout the forest. This logical move towards a more efficient and convenient method of production represented a departure from the plant's natural growth conditions. Markham was of the opinion that just because the cinchona tree "suffered from overshadowing" in

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<sup>136</sup> Ibid., 571.



its natural habitat, did not mean that they had to adopt similar practices on the British plantation in southern India. He explained “Mr. Mclvor has very aptly illustrated this point, by mentioning that Bruce found wheat growing wild in Upper Egypt, struggling for existence with rushes and other weeds. An English farmer would be surprised if he was told to sow his wheat in the hedges, instead of in the fields, because in its wild state it is found amongst weeds and briars!”<sup>137</sup> Markham referred to the 18th-century Scottish writer James Bruce, who pointed out that around the Nile, wheat grows in competition with other plants.<sup>138</sup> The farmers would not abandon their practice of efficient land use simply because, in its natural environment, wheat is threatened by weeds. This method of cultivation eliminated natural competitors and other weeds detrimental to the plant’s health.<sup>139</sup> The deliberate assessment of the different growth conditions would set the British adaptation apart from the trees that originated in South America. Markham argued that while the South Americans proved unable to expedite production through the assessment of soil, elevation, and sunlight, this did not mean that the British should adopt the same procedures. If the British deployed natural methods of growth, it would take thirty years before any return could be expected from the project. Colonial conflict necessitated an abundant supply of quinine-producing bark for the health of the British forces, which became even more important during the 1850s. Markham believed that had the erroneous South

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<sup>137</sup> Ibid., 501.

<sup>138</sup> James Bruce, *Travels to Discover the Source of the Nile in the Years 1768, 1769, 1770, 1771, 1772, and 1773* (Edinburgh: J Ruthven, 1790).

<sup>139</sup> Brockway, 36.

American methods of production been adopted, his efforts in India would be a failure.

Markham pointed to the superior results of his cinchona experiments as an indication of his scientific success that surpassed what was possible under South American control. Markham proudly proclaimed that after two “anxious” years of experimentation, all of the aforementioned species of cinchona had been successfully transplanted into Southern India. In regards to the progress that had been made in breeding the plants, Markham explained, “The number is now increasing at the rate of several thousands every month...and in December the seedlings had attained a size sufficient to give wood for propagation.”<sup>140</sup> Markham believed that as a result of his advanced method of production, one that prioritized open spaces, access to sunlight, and suitable elevations, the British cinchona project would soon be a profitable and powerful enterprise. He claimed, “quinine-yielding chinchona-bark will become an article of commerce within eight years from the first introduction of the plants into India. After the first harvest the supply will rapidly increase.”<sup>141</sup> Markham highlighted the impressive results of his experiment as evidence of the superior British horticultural practices.

Markham would not only strive to improve upon the efficiency of South American harvesting methods but also hoped that through direct communication with the government and clear delineation of tasks and titles, he could prevent the kind of interference to his mission he had experienced in the Andes. The

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<sup>140</sup> Markham, 489.

<sup>141</sup> Ibid.

unquestionable faith that Markham put into William McIvor, the superintendent of the British cinchona plantation, provides a stark contrast to the ways that Markham referred to the indigenous collectors who had guided him in South America. He congratulated the Madras Government on acquiring such a talented expert. He noted, “The practical knowledge which he [McIvor] has acquired of the requirements of chinchona-plants during the fifteen months that he has now superintended . . . [cinchona’s] cultivation, in addition to his previous qualifications, makes him fitter than any other person that could be found for the direction of this most important experiment.”<sup>142</sup> Markham had been relieved to find that McIvor’s views on the proper methods of cinchona production were not dissimilar to his own, despite their knowledge having been gleaned from different sources. Markham believed he became qualified through his experiences in the cinchona forests, while McIvor had learned through his extensive experiments in India. Markham described the importance of protecting McIvor from any interference. In July 1861, McIvor became Superintendent of Chinchona Cultivation “with full and entire control over the operations, in direct communication with the Government, and subject to no interference from any intermediate authority.” Markham believed that it was imperative that McIvor’s position be “authoritatively defined,” as this would help prevent any attempts to thwart the project’s success.<sup>143</sup> Any hindrance to the project would be an unwarranted detriment to a mission Markham argued would have incalculable benefits for the British Empire and the people of India. Preventing the type of

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<sup>142</sup> Ibid., 485.

<sup>143</sup> Ibid., 484.

interference he experienced in South America was, in Makham's estimation, key to future success in India.

Markham believed that introducing cinchona bark to British India and establishing colonial plantations would not only be beneficial to the people of India but also to those of South America. He believed that the cinchona transplantation would become beneficial for both parties due to the influence British agricultural methods could have on South American practices. Markham believed that rivalries with other bark producers could demonstrate to the South Americans the value of their natural commodities and the importance of maintaining their trees' health in a competitive market. He wrote, "but it may be that the influence of peace and education will inaugurate a new system in time to come, that more enlightened views will prevail, and that they themselves may undertake the cultivation of a plant which is indigenous to their forests, but which up to this time they have most foolishly neglected."<sup>144</sup> Markham believed the South American's careless methods of harvesting demonstrated that lack of interest in the bounties their landscape offered. Their inability to adopt a plantation style of production in which cinchona trees were closely situated to one another demonstrated a lack of economic ambition and scientific prowess. As Roy claims, "Therefore in the abstruse logic of colonial exchange, he eventually situated the South Americans as beneficiaries."<sup>145</sup> For Markham, the unfortunate methods of production and harvesting would be remedied by the influence of the British cinchona transfer.

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<sup>144</sup> Ibid., 338.

<sup>145</sup> Deb Roy, 35.

Markham's belief that the success of the British cinchona industry would encourage the development of similar plantations in South America disregarded that this close-quarters method of production is impossible in the Andes due to environmental obstacles. This would become evident through Henry Ford's failure to bring his utopian vision of Fordlandia to fruition. Work on the project began in 1926, as Ford sought to elude the British rubber monopoly.<sup>146</sup> His efforts to establish a mechanized rubber plantation shed light on the rainforest's capacity to adapt to systems focussed on mass production: "Bugs, caterpillars, and in particular a type of leaf blight that was endemic to the Amazon basin started to cripple the seedlings and spread across the plantation. Eventually, it became clear that the Amazon basin was not a suitable environment for rubber plantations." Ultimately, Ford's project failed because of his difficulty with local workers and his ignorance about the Brazilian climate.<sup>147</sup> The same cannot be said of Ford's previous plantations in Southeast Asia in which these natural obstacles did not exist. Markham minimized the damage his project had on the South American market by highlighting the efficient and lucrative methods used on their plantations in India. He believed these countries would surely be inspired by the British efforts and they soon would adopt similar practices. As Ford's drastic failures in Brazil had demonstrated, the Amazon basin was not suitable for growing trees in close proximity as it provided a breeding ground for harmful pests. Markham had wrongly discredited the efficiency of the South American agricultural methods.

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<sup>146</sup> Barkemeyer and Figge, 76.

<sup>147</sup> *Ibid.*, 76.

The Rubber Boom of 1850 and the Portuguese and Brazilian attempts to facilitate production revealed the labor complexities and agricultural obstacles that impacted plantation systems long before the 20th-century Fordlandia project. The parasites in the soil and inconsistent rainfall were impediments to the plantation system of production. Furthermore, despite the arduous lifestyle, rubber tappers valued their independence and were resistant to a system of wage labor and the transformation of tapping methods. As Barbara Weinstein notes, “Production continued to be highly decentralized, unregimented, and to a considerable extent controlled by the tapper.”<sup>148</sup> As a result, the Portuguese and Brazilian men seeking to take advantage of an extractive rubber enterprise had to rely on naturally grown rubber trees and independent tappers. According to Brockway, this resistance is a part of the impetus for the British establishment of colonial plantations, as it provided them with “complete control of land, labor, and the organization of production.”<sup>149</sup> Weinstein points to the limited changes that had been made to this system of rubber production under Portuguese control, describing how Condamine who had been in the region in the 1730s would have been astonished to see how little the methods had changed. Production had intensified but remained dependent on sources of wild rubber trees. Weinstein describes how this fragile foundation for what had become an essential foreign industrial product was, in part, what led to extractive missions and the transplantation of natural goods into foreign territories.<sup>150</sup>

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<sup>148</sup> Weinstein, 157.

<sup>149</sup> Brockway, 133.

<sup>150</sup> Weinstein, 9.

Markham's belief that the British cinchona transfer would inspire those in the Amazon to adopt a similar plantation came into conflict with the environmental possibilities of the region. It further disregarded that the Portuguese had organized an economic system in the 17th and 18th centuries that relied on "highly mobile groups of Indian gatherers who dispersed throughout an area to extract natural substances."<sup>151</sup> These substances would then be traded for tools and occasionally wages in what was ultimately an extractive system. This mobilization of collecting missions distinguished Amazonian agricultural practices from the plantation methods used elsewhere. Challenges posed by the environment made this compromise between settlers and indigenous inhabitants essential: "By relying on a system of extraction, the colonists not only avoided tackling the extremely complex Amazonian environment head on but were also able to exact the maximum profit from a dwindling labor force that they considered to be both unstable and inadequate."<sup>152</sup> Though considered to be at the bottom of this commercial pyramid, the rubber tappers' methods demonstrated the kind of harvesting techniques that could plausibly be used in the Amazonian forests.

Tappers employed a systematic method of walking trails of rubber plants that was simultaneously efficient and applicable to the delicate Brazilian ecosystem. Starting from their homes, the trappers would walk in a calculated elliptical route around the trails to compensate for the great distance between trees and be able to end up back where they started. Each tapper was responsible for

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<sup>151</sup> Ibid., 10.

<sup>152</sup> Ibid.

two trails of rubber that would be traversed on alternate days. Tappers stopped along the trails making slashes in the rubber trees and attaching buckets to collect the dripping latex. Each trail allowed the workers to pass between 100 and 200 trees along the looping path. During the second half of the day, the tappers retraced their steps, collecting the buckets of latex they had set out. The final step in the process was the centuries-old process of coagulating the latex to form a hard ball or *pelle* of rubber that could be traded at outposts.<sup>153</sup> Markham's inability to improve upon this thoughtful system of production that was suitable to the Amazonian environment should have served as an indication that his view of the British cinchona transplantation as benefiting the people of the Andes was unmerited. Attempts to establish plantation systems met with the complex biology of the Brazilian environment and a workforce that valued their independence. However, in ignoring this important factor in his travel narrative, Markham was able to downplay the damaging effects of his mission.

In Southern India, Markham adopted agricultural practices that would not have been effective in the Andes. Through an assessment of the cinchona plant's natural conditions, he believed that he could facilitate the production of a higher quality bark. Alkaloid content was reflective of this higher quality, which could be maximized through proper engagement with soil, sunlight, and elevation. Markham's method of mass production relied on a close-quarters plantation system that would have succumbed to pests in the Amazon. He depicted his mission as beneficial, not only to the strength of the British colonial nation but also to the health of India and the potential economic strength of South America.

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<sup>153</sup> Ibid., 16.



However, in making these claims about the advantages his mission would confer, Markham overlooked important factors regarding the South American ecosystem.

These same agricultural obstacles present in South America were not present in India where the British were able to cultivate cinchona trees in conjoined rows. Markham was committed to the methods he and his colleagues had devised in order to maximize production. By suggesting that the same methods would be applicable to the Andean environment, Markham implied that the largest South American cinchona producers would be able to maintain their position in an increasingly competitive market.



## Conclusion

Markham's enthusiasm about the benefits of cinchona was palpable. Reflecting on his project 17 years later, Markham would label the cinchona transfer a "complete financial success." For Markham the economic benefits were gratifying, but profit was not the main goal of the project. Though the mission had been relatively inexpensive, Markham boldly claimed that British money would have been well spent even if the project had cost half a million dollars to accomplish.<sup>154</sup> The true purpose of the mission was to establish a valuable tropical commodity in India and to create a new supply for European and Indian markets.

Markham hoped that his mission would be remembered as a humanitarian effort that brought one of the world's great remedies within reach of millions of Indian and British people. In reality, the cinchona produced in the Nilgiris did not reach the open market, where the Indian population could access it, instead, it was sold directly to the government where it would be used to strengthen the Raj.<sup>155</sup> The detriments to the South American cinchona market, which began to decline after 1885, were not the byproduct of the *cascañeros*' ignorance of proper environmental practices, as Markham had posited, but of the competition between the British and South American markets. His project had not only failed to create a reliable supply for the Indian population, but, despite Markham's assurances to the contrary, the competitive market created in the wake of the British cinchona transfer was damaging to South American interests.

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<sup>154</sup> Clements Robert Markham, *Peruvian Bark. A Popular Account of the Introduction of Cinchona Cultivation Into British India* (London: John Murray Albemarle Street, 1880), 435.

<sup>155</sup> Brockway, 121, 124.

Despite a purported indifference to the economic outcomes of the mission, Markham pointed to the British position in the British cinchona market as evidence of the project's success. According to Markham, British cinchona was now the most important, second only to Colombia's. 1,172,060 pounds had been produced in the Nilgiris for the London market compared to over six million pounds of bark supplied from Colombia alone. Markham justified the British second-place finish by pointing to the superior quality of their bark, citing how in 1877 cinchona from the Nilgiri plantations was the most expensive ever sold.<sup>156</sup> The Dutch plantation in Java came in a distant third after the British and South American supplies.

Markham provided little information regarding the British position in the global cinchona market. However, by the early 1900s, the Dutch project's superiority over the British had become evident; their plantations produced 90 percent of the cinchona for the global market. While the British position in the global market had dwindled, India remained one of the largest consumers of quinine in the early 20th century. While they accounted for one-sixth of annual quinine consumption, only 12 percent of this came from British India.<sup>157</sup> The other 88 percent had to be imported to meet the enormous demand. By 1880, the dwindling state of the British cinchona supply had become evident and Markham was aware that the British influence was diminishing. This could be one of the reasons he downplayed the importance of economic return and highlighted

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<sup>156</sup> Markham, *Peruvian Bark*, 438.

<sup>157</sup> Deb Roy, 224.

humanitarian services. As the ever-rising Dutch numbers became obvious, Markham seemed intent on protecting his legacy.

As Markham strove to justify his mission and preserve his legacy, he debased the indigenous contribution and applied ideas about tropical commodities and their position in the global market in unfit ways. It is important to reposition the indigenous actors as key in the mission and highlight how their value was undermined. The current historiography surrounding cinchona strives to reposition the contributions of the Peruvian, Ecuadorian, and Colombian people in a valuable story about the proliferation of medicine. Though quinine use has greatly decreased over the past century, it remains an important tool in the fight against malaria.

In recent years, applications of quinine have been reassessed. Throughout the COVID-19 pandemic, quinine was considered as a possible treatment for the virus. Donald Trump regularly tweeted unverified claims regarding potential treatments, among them the synthetic forms of quinine: hydroxychloroquine and chloroquine. This led to a widespread acceptance of the efficacy of these unproven treatments, which many warned could be harmful. Regardless of how this plays out in the future of COVID treatments, Trump's comments reflect his desire to downplay the future ramifications of the pandemic through a demonstration of the kinds of treatments supposedly available to the American people. Markham adopted a similar strategy in downplaying the detriments to the South American cinchona market and highlighted the benefits to the subjects of the British Crown. His fallacious scientific-humanitarian rhetoric required a

denigration of indigenous knowledge that had been so important to the British enterprise. In a sense, the medicinal Andean bark never strayed too far from everyday use - quinine being the essential ingredient in tonic water - and every time we say cheers with a gin and tonic in hand we are involved in a much larger history of extraction.

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