In Search of *Precious Bark*:

Circulation of Quina and Colonial Medical Culture in the New Kingdom of Granada at the End of the Eighteenth Century

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Abstract

At the end of the seventeenth and the beginning of the eighteenth centuries, European physicians, botanists, chemists, apothecaries, missionaries, and agents from imperial courts began to believe that the highest quality *cinchona* bark, or quina, considered a precious medication for fevers, could be found in the Andean mountains in the region of Loja (*Loxa*) -a small town 425 kilometres from Quito, capital of the Spanish colonial administrative centre, the *Audiencia de Quito*, modern Ecuador. However, it was unknown at the time that other types of Loja's genus *Cinchona*, with the same therapeutic qualities, could be found northwest of Quito in the New Kingdom of Granada's mountains, modern Colombia. This thesis explores the circulation of new kinds of quina found in the New Kingdom of Granada, as well as the colonial medical culture at the end of the eighteenth century in this viceroyalty. While quina circulated within the colonial territory, processes of colonial medical knowledge and practices were developed, which were related to circulation of Spanish medical treatises and the practice of experiments with quina. The interaction and exchange of medical knowledge and practices included the participation of a wide range of actors such as American *criollos*, slaves, physicians, pharmacists, and surgeons, as well as viceregal and Spanish authorities. Overall, this thesis attempts to describe how the medical knowledge of quina was shaped within and from the margins of Atlantic peripheries at the end of the eighteenth century.

Résumé

Vers la fin du XVIIe siècle et le début du XVIIIe siècle, des physiciens, des botanistes, des chimistes, des apothicaires, des missionnaires et divers acteurs européens provenant des cours impériales étaient convaincus que l'écorce de *cinchona* de la meilleure qualité ou la quinine, considérée comme un médicament précieux contre les fièvres, pouvait être trouvée dans les montagnes des Andes, dans la région de Loja (*Loxa*) – un petit village à quelque 425 kilomètres de Quito, capitale du centre administratif de la colonie espagnole, la *Audiencia de Quito*, dans l'Equateur moderne. Elle était pourtant inconnue à cette époque où d'autres espèces appartenant au même genre *Cinchona* de Loja, possédant les mêmes qualités thérapeutiques, pouvaient être trouvées au nord-ouest de Quito, dans les montagnes du Nouveau Royaume de Grenade, dans la Colombie actuelle. Cette thèse explore la circulation de nouveaux types de quinine découverts dans le territoire du Nouveau Royaume de Grenade et la culture médicale coloniale vers la fin du XVIIIe siècle dans ce territoire colonial. La circulation de la quinine dans le territoire colonial est inscrite dans des processus du savoir médical colonial et du développement des pratiques de santé. Ces processus étaient liés à la circulation des traités médicaux et à l'expérimentation de la quinine. Cette interaction et cet échange du savoir médical et des pratiques comprennent une variété d'acteurs tels que les *criollos* américains, les esclaves, les physiciens, les pharmaciens, les chirurgiens, mais aussi les autorités du territoire colonial et de la couronne espagnole. Cette thèse veut décrire dans son ensemble la façon dont le savoir médical sur la quinine a été mis en forme à l'intérieur et à partir des marges des pourtours de l'Atlantique à la fin du XVIIIe siècle.

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Introduction

"I manifest to your royalty [the Spanish King] the marvelous effects of the quina [cinchona bark] of Barinas and La Grita on slaves who fell ill with daily and tertian fevers. First, I ground Barinas quina and gave it in drinks [*tomas*] to a slave woman who, for many days, had suffered daily fevers. She was rearing her child, who also fell ill with these fevers. I gave the quina to the woman, infused with chamomile water."[1]

Taken from an account by Francisco Ponce, a Neogranadine *criollo,* this information relates his successful therapeutic experiments made with quina[2] from the Barinas forests and the provinces of La Grita in the Captaincy General of Venezuela in 1783. Francisco Ponce traveled from Santa fé de Bogotá, the main city and capital of the New Kingdom of Granada viceroyalty (see **Figure 1**), to Barinas in order to administrate the *Hacienda los Estanques* (Spanish colonial ranch or plantation), where these trials took place. Barinas was a province already famous for trading tobacco, cacao, and cotton between the seventeenth and eighteenth centuries[3], but European and Hispanic-American merchants, as well as colonial administrative officials and individuals such as Francisco Ponce, also became interested in opening a quina trade there.

In addition to Francisco Ponce's case, Fernando Miyares, governor of Barinas, identified quina trees in the area. He contacted physicians in Caracas who, after receiving Miyares' quina samples, approved the therapeutic virtue of the bark. He sent a portion of the quina to Spanish court physicians, who confirmed the quality of the bark and gave permission to import this quina in 1789. Finally, Miyares wrote to José Celestino Mutis, a well-known Spanish naturalist who

[1] "Relación de Don Francisco Ponce," Archivo Real Jardín Botánico de Madrid (ARJBM), RJBM0005/0001/0069, 1783, fol.1r.

[2] This thesis will refer to cinchona bark as quina, which was the most common nomination in use within the viceroyalty of the New Kingdom of Granada. Other common nominations were: fever bark or fever wood (*palo de calenturas*), *cortezón,* or *cascarilla.* This last nomination was often used in the Audiencia de Quito in the eighteenth century. "Peruvian bark" was common in the European context during the seventeenth and beginning of the eighteenth centuries.

[3] Virgilio Tosta, *Historia de Barinas, 1577-1800. Tomo I* (Caracas: Biblioteca de la Academia Nacional de la Historia, 1986), 59, 336.

was leading the Royal Botanical Expedition in the New Kingdom of Granada (1783-1808), in order to learn about methods of stripping bark from quina trees. When Mutis replied to Miyares, a new trade had begun to grow in Barinas.[4]

It is of interest to note the use of medical terms and practices as means to validate the therapeutic properties of the quina from Barinas and La Grita. Throughout Ponce's account, he used pathological and therapeutic terms, such as enemas and fever paroxysms, and even dared to prepare a mixture of powdered quina with *melado de panela* (whole thick sugarcane).[5] Ponce was not a licensed physician, but as the ranch's administrator, he had to take over the slaves' and ranch labourers' health. However, how did he acquire the medical knowledge which he performed in this account? Did he receive medical information from regions in the New Kingdom of Granada? Did he exchange therapeutic knowledge with the ranch's slaves? If concepts and definitions referring to diseases and ailments often overlapped in colonial societies,[6] how did Ponce differentiate between a tertian and daily fever? Did he refer to these diseases in order to validate quina's authenticity? In addition, why did he dare to prepare a mixture of sugarcane with powdered quina? Was it to lessen the quina's bitterness? These are questions that could be related to understanding how medical legislation worked for medical practitioners in Spanish America, but John T. Lanning has shown that legal measures used to regulate colonial medical practices "were never clear and explicit."[7] Beyond the fact that medical legal policies were often forgotten in daily colonial life, the historical problem which unveils Ponce's case is related to knowing how colonial medical knowledge and information circulated within the

[4] Ibíd., 392.
[5] "Relación de Don Francisco Ponce," ARJBM, fols.1-1v.
[6] See Germán Colmenares, *Historia Económica y Social de Colombia. Popayán una Sociedad Esclavista 1680-1800* (Bogotá: Tercer Mundo Editores, 1979), 71.
[7] John Tate Lanning, *The Royal Protomedicato*. *The Regulation of the Medical Profession in the Spanish Empire* (Durham: Duke University Press, 1985), 19.

Spanish kingdoms, specifically in the viceroyalty of the New Kingdom of Granada, late in the eighteenth century.

Figure 1: The New Kingdom of Granada encompassed the modern territories of Colombia, Ecuador, Venezuela, and Panama. Its capital was the *Audiencia of Santa fé de Bogotá*. Francisco Moreno y Escandón, a *criollo* bureaucrat, made the *Plan Geographico del Virreinato de Santafé de Bogotá* in 1772, which is the map shown above.[8]

Social, cultural, and local circumstances conditioned the meaning of colonial medicine in the New Kingdom of Granada. Indeed, the European medical system ended up imposing over the acceptance of different forms of medical knowledge (indigenous, popular, African, etc.).

[8] Biblioteca Nacional de Colombia; Mapoteca Digital; "Plan Geográfico del Virreinato de Santa fé de Bogotá, 1772 [facsimilar 1936].

Nevertheless, it was undeniable that social interactions and cultural exchanges of all different forms of medical knowledge influenced the reality of medicine in the viceroyalty. For instance, the adoption of local medicinal plants was implicit in the daily routine of colonial life. By the eighteenth century, this was not solely an activity subject to indigenous people, nor was it an isolated activity by an individual aiming to fulfill a scientific curiosity - Europeans, American *criollos,* descendants of Africans, and individuals from different multiethnic backgrounds (mixed-race people like *mestizos*, mulattos, *zambos,* etc.) also needed to manipulate the natural world around them. Experimenting on slaves with local plants, as well as the appropriation of local knowledge about plants such as *guaco*[9]*,* were regular practices among specific individuals such as American *criollos* or viceregal colonial authorities.[10] The cultural exchange of different forms of medical knowledge was a reality in this viceroyalty.

This thesis explores colonial medical culture through the circulation of quina within a group of colonial individuals such as physicians, pharmacists, surgeons, viceregal colonial authorities, *criollos ilustrados* (Enlightened Creoles)[11], and slaves in the viceroyalty of the New Kingdom of Granada at the end of the eighteenth century. The circulation of quina as a medicinal plant allowed for the development and exchange of different colonial medical forms of knowledge and practices, so it is important to take into account that the notion of circulation allows for setting knowledge – medical in this case - in motion. Circulation not only binds

[9] *Guaco* was an antiserum plant used among slaves and peoples in rural areas. See Adriana Alzate Echeverri, "Las Experiencias de José Celestino Mutis sobre el Uso del Guaco como Antiofídico," *Asclepio*, Vol. LV, no. 2, (2003): 257-280.

[10] Silverio de Zuñiga, another colonial *criollo,* experimented with the therapeutic use of the plant *Mimosa* or *Adormidera* on his slaves in Cartagena de Indias. Andrés Soriano Lleras, *La Medicina en el Nuevo Reino de Granada durante la Conquista y la Colonia* (Bogotá: Editorial Kelly, 1972), 109.

[11] The historian Renán Silva coined the name *criollos ilustrados* (Enlightened Creoles) to refer a social group of American individuals who shared interests in knowledge fields such as economy, politics, arts, and science in the New Kingdom of Granada at the end of the eighteenth century. Renán Silva, *Los Ilustrados de la Nueva Granada 1760-1808* (Medellín: Fondo Editorial Universidad EAFIT, 2002), 21-23.

cultural and social exchanges, but also constructs interactions between objects and communities, individuals, or spaces.[12] Two events shaped the social interaction and cultural exchange between forms of colonial medical knowledge in the process of quina circulation - first, the circulation of Spanish medical treatises related to the therapeutic and innovative use of quina, and second, the performance of local medical experiments involving quina carried out in hospitals, apothecaries, and healing projects, which were mentioned in letters of correspondence. According to the Royal Spanish Academy Dictionary from 1783, the meaning of the word "experiment", from the Latin *experimentum,* was related to the act or production of making experience of something. Moreover, the experience was related to the knowledge or information acquired from the use or practice of things, and experimenting (*experimentar*) was related to knowing and recognizing, through use and practice, the qualities and virtues of things carried by the actions of observing, testing, and making experience of things.[13] Therefore, in this thesis, local medical experiment refers to the act of experimenting, testing, or conveying a trial in order to validate the medical use of native quina in the New Kingdom of Granada at the end of the eighteenth century, leaving aside the theoretical comprehension of the medical action mode of quina.

In addition, this thesis is an effort to refresh the narrative of the colonial history of medicine in the New Kingdom of Granada at the end of the eighteenth century. In recent years, some scholars[14] of the history of medicine have detached themselves from a traditional picture of

[12] Liliane Hilaire-Pérez, "Savoirs et Mobilités à l'Echelle du Monde: Un Paradigme Au Prisme de la Recherche Collective," ed Pilar González Bernaldo and Liliane Hilaire- Peréz, *Les Savoirs- Mondes. Mobilities et Circulation des Saviors Depuis le Moyen Âge* (Rennes: Press Universitaires de Rennes, 2015), 19-24.

[13] *Diccionario de la Lengua Castellana Compuesto por la Real Academia Española, Reducido A Un Tomo Para Su Más Fácil Uso*, 2nd ed. (Madrid: Joaquin Ibarra, 1783), s.vv. "experimento," "experiencia," "experimentar."

[14] Adriana María Alzate Echeverri has reconstructed the colonial history of medicine during the eighteenth century through the lens of the impact of Bourbon health policies in the viceroyalty. Her last work focuses on the social, cultural, and political role of the hospital led under the religious San Juan de Dios in this

colonial medicine in this viceroyalty. This picture has placed at the centre of history the role of self-motivated actors, such as José Celestino Mutis, as motors of colonial medicine amongst a community or group of *criollos*. In addition, this picture has cast aside how the role of medical practitioners was embedded in daily colonial life.[15] Indeed Mutis' role in colonial medicine was significant, but not transcendental. Although this thesis will eventually analyze his role in the process of the circulation of quina, it has an objective to perceive it as being related to the interaction and exchange of knowledge in tandem with other colonial medical practitioners and individuals.

In order to have other historical narratives of the history of colonial medicine, this must be perceived through the lens of culture. In this case, as Zygmunt Bauman has suggested, culture operates within and through the human praxis - the way meaning is produced relies on the way in which the act of the practice itself is performed by a specific group of individuals or a community.[16] In other words, medicine must not be understood as a unified and progressive body of knowledge. In agreement with historian of medicine Michael Brown, the unified conception of medicine distorts "the many marked discontinuities which have characterized the meanings,

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viceroyalty. For instance, she analyses cultural aspects related to why, how, and what was in the patients' diet in the hospital. She presents a daily quotidian life of the meaning of sickness, death, and health in this colonial society. See Adriana María Alzate Echeverrí, *Geografía de la Lamentación, Institución Hospitalaria y Sociedad Nuevo Reino de Granada, 1760-1810* (Bogotá: Editorial Pontificia Universidad Javeriana and Universidad del Rosario, 2012. In addition, the historian Paula Ronderos has analyzed the colonial medical practices of surgeons and pharmacists in Santa fé de Bogotá during the seventeenth century. See Ronderos, Paula, *El Dilema de los Rotúlos. Lectura del Inventario de una Botica Santafereña de comienzos del siglo XVII* (Bogotá: Editorial Javeriana, Taller y Oficio de la Historia, 2007); the historian Estela Restrepo compiled, along with other historians, the circulation of medical books between the eighteenth and nineteenth centuries. See Estela Restrepo Zea ed., *Biblioteca Médica Neogranadina 1755-1833,* (Bogotá: Universidad Nacional de Colombia, Universidad Santo Tomás, Centro de Estudios Sociales, 2013).

[15] Carlos Vladimir Villamizar Duarte, "La Medicina durante la Época Colonial Colombiana: Una Aproximación Historiográfica," *Anuario Colombiano de Historia Social y de la Cultura*, no.30 (2003): 124-128.

[16] Zygmunt Bauman, *Culture as Praxis* (Boston, Mass.: Routledge and Kegan Paul, 1973), 117.

interpretations and practices of medicine through the historical past."[17] Therefore, for him, medicine must be concerned with understanding how it has had a "malleable body of knowledge and practice shaped by both local circumstances and wider historical forces."[18] Finally, the way this conception of medicine can be perceived is through a medical culture "enacted on the ground of everyday experience" [19], and moreover, by shedding light on medical practices related to fields of experimentation or therapeutics. Taking this into account, colonial medical culture was quite diverse and dynamic in the New Kingdom of Granada during the late eighteenth century.

Quina is a singular case illustrating the exchange between specific social groups or individuals with different forms of colonial medical knowledge in the New Kingdom of Granada. Plants, in different ways as medicinal and valuable drugs, have been involved in the transatlantic movement of people, trade, and most importantly, knowledge, allowing for cultural, political, and economic intraregional interactions to broaden.[20] Although some scholars have tended to perceive the displacement of plants as objects moving through linear trajectories from unknown peripheries to European centres, the focus these scholars have given to the way plants have shaped and reshaped societies on a global scale has been important to this thesis.[21]

Indeed, quina became a powerful and popular medicinal plant in the Atlantic world in the early modern period. This plant became known for its "heroic"[22] role in history as a miraculous remedy to cure intermittent fevers, one of the most typical and frequent diseases in Europe in the

[17] Michael Brown, *Performing Medicine. Medical Culture and Identity in Provincial England, c1760-1850* (Manchester: Manchester University Press: 2011), 2.
[18] Ibid., 8.
[19] Ibid., 8.
[20] Harold J. Cook and Timothy D.Walker, "Circulation of Medicine in the Early Modern Atlantic World," *Social History of Medicine*, Vol. 26, No. 3 (2013): 340.
[21] Londa L. Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge, Mass: Harvard University Press, 2004), 6.
[22] Ibid., 4.

seventeenth and eighteenth centuries. Although people often died of fevers, and it is undeniable that quina brought important health benefits to the Atlantic world, this "heroic" image tends to erase not only the political, economical, and cultural interests, but also the environmental consequences involved in the production and circulation of this medicinal plant. In addition, the "heroic" image did not recognize the role played in the Spanish colonies and geographic spaces such as the New Kingdom of Granada and the Audiencia de Quito.

It is important to consider a brief biogeographic description of the plant in order to broaden an understanding of the process of quina circulation. A special feature of cinchona bark is its heterogeneity - the genus *Cinchona* includes different species spread along the Andean mountains. Belonging to cloud forests, quina trees grow in areas where humidity ranges between 60% and 100% throughout the year (therefore, dry seasons, from August to September, were ideal for collection and trade). In addition, quina trees in these forests coexist with a variety of plants, creating spots (*manchas* or *manchones*), and quina trees from the same or different species can be found either next to each other or completely separated. In South America (including Venezuela, Colombia, Ecuador, Peru, Bolivia, and even Costa Rica) the genus *Cinchona pubescens,* is both the genus with the highest content of quinine – the natural alkaloid found within the bark that counters fevers - and the most widespread, as not all cinchona species contain the same amount of quinine.[23]

Aside from the work of the collector, packaging quina required the work of carpenters for wood boxes, mule drivers to transport the bark along with other materials (dried leather,

[23] Alfonso Garmendia Salvador, *El Árbol de la Quina (Cinchona spp.)* (Ecuador: Universidad Técnica Particula de Loja, 2005), 49-51.

machetes, knifes), and seamstresses to sew the internal lining of the boxes.[24] Overall, the production chain of quina was endless, touching upon and affecting the social dynamic of a number of different individuals. In the eighteenth century, bark collectors (from different multiethnic backgrounds) distinguished types of quina by their physical appearance. While in the forests, they would first distinguish spots, selecting which were the best trees to cut down. The shapes of leaves, colours of flowers, as well as the texture and smell of the bark conditioned the work of these collectors. Moreover, the ways in which they worked depended on criteria that stemmed from commercial and medical demands. For instance, while it was preferable at first to cut the *cortezones* (tree bark) from the trunk and roots, it later became useful to cut *canutillos* (bark branches).[25] The cutting process altered forest vegetation - cutting down quina trees meant that other trees were destroyed as well. However, some collectors preserved trees by leaving the trunks to sprout again.

Economic and political circumstances triggered the development of experimentation processes involving quina in Andean colonial societies such as Quito, Lima, and Santa fé de Bogotá in the New Kingdom of Granada. Cases such as those of Francisco Ponce and Fernando Miyares mentioned above were not rare - like them, *criollos*, merchants, physicians, naturalists, as well as colonial and royal bureaucrats also performed experiments with quina in the New Kingdom of Granada. Due to a rumour that the trees in Loja had been depleted, there was a new economical need to explore other quina harvesting areas during the second half of the eighteenth

[24] Alba Luz Moya, *Auge y Crisis de la Cascarilla en la Audiencia de Quito Siglo XVIII* (Ecuador: FLACSO, 1994), 135.
[25] Alba Luz Moya, *Auge y Crisis…,*140-142.

century.[26] Despite this rumour, cities and towns from the *Audiencia de Quito* still supplied and traded cinchona bark until the end of the century. In addition, much of the bark shipments coming from Quito and Peru were adulterated and mixed with similar barks, such as the Peruvian balsam which was known as *quinaquina* or *kina.kina* (from the genus *Myroxylon*), arriving in a corrupted and futile state for medicinal and pharmaceutical use.

Considering the previous circumstances, experiments made with quina in the New Kingdom of Granada were enforced in order to display a colonial medical knowledge reflected in the process of medical practices which tried to validate medicinal quina. The development of quina experiments embraced not only the circulation of new quina species into the demand for the drug, but also the circulation of colonial medical knowledge in the New Kingdom of Granada.

Andreas-Holger Maehle's *Drugs On Trial: Experimental Pharmacology And The Therapeutical Innovation In The Eighteenth Century* has been a significant influence for this thesis. To him, "experimental pharmacology was not a nineteenth century but essentially an eighteenth century creation,"[27] and in order to explain this, he studied medical, pharmaceutical, and therapeutic experiments developed with opium, lithontriptics, and "Peruvian bark" in English, German, Dutch, and French contexts between the seventeenth and eighteenth centuries. In his work, he describes different styles of therapeutic and pharmacological experiments which were carried out with these drugs, such as in vitro trials on blood, chemical analyses, animal experimentation, observations on healthy and sick patients, etc. This is an important suggestion, because it places experimentation at the centre in order to understand how ideas have been

[26] Manuel Salvador Vásquez, "Las Quinas del Norte de Nueva Granada," ed. José Jesús Hernández Palomo, *Enfermedad y Muerte en América y Andalucía (siglos XVI-XVIII)* (Madrid: Consejo Superior de Investigaciones Científicas, 2004), 403.
[27] Andreas-Holger Maehle, *Drugs on Trial: Experimental Pharmacology and Therapeutic Innovation in the Eighteenth Century* (Amsterdam: Rodopi, 1999), 1-6.

developed, or whether or not they have persisted or changed over time. In other words, Maehle binds the production of medical and pharmaceutical ideas as social, political, economical, and cultural processes rather than just analyzing these ideas as isolated cases.

In relation to "Peruvian bark", Andreas-Holger Maehle's main contribution was analyzing the gradual change and innovation from considering the bark as having a specific purpose – healing fevers - to a remedy capable of curing diseases such as gangrene.[28] In addition, he explains in detail quina's different medical debates and opinions produced amongst European physicians, surgeons, religious figures, and apothecaries and mentions important aspects throughout his work, which this thesis will take into account. For instance, while most trials in America were carried out in order to validate the virtues of quina or to differentiate its species, experiments carried out in Europe were focused on analyzing the theoretical mode of action of the drug on human bodies. Nevertheless, the need for experiments was carried out on both sides of the Atlantic, and it is important to keep in mind that the New Kingdom lacked universities and medical academies, changing the dynamics and nature of the experiments on both sides even more. Another aspect is the fact that Maehle's work does not focus on Spanish trials made with quina, which will be analyzed in Chapter two. Overall, the circulation of quina went through different social and cultural processes that shaped medical knowledge and practices in different corners of the Atlantic during the eighteenth century.

To analyze American medicinal plants as objects, commodities, remedies, or artifacts is a methodological tool offering other ways to refresh the history of the circulation of quina and the

[28] Ibid.,13.

colonial medical culture in the context of the New Kingdom of Granada.[29] This methodology is not new in the case of quina. The Colombian historian of medicine Álvaro Casas Orrego analyzed the medical and pharmaceutical knowledge of quina at the end of the eighteenth and during the nineteenth centuries as part of his research postgraduate thesis in 1993 - for him, quina was objectified through scientific and economical practices, and this process of objectification produced knowledge which was represented through medical texts in the eighteenth and nineteenth centuries.[30] For instance, in relation to the eighteenth century, Orrego analyzed printed sources such as *El Arcano de la Quina* written by José Celestino Mutis, and *Noticias Varias sobre las Quinas Oficinales* written by the merchant José Ignacio de Pombo in Cartagena de Indias. Other sources were related to physicians of the nineteenth century in the Republican context.

The importance of Orrego's study is that it likely constitutes the only study about the medical use of quina in Colombia from the approach of the social history of medicine. However, one remark included in this work is that he placed the beginning of the medical and pharmacological knowledge about quina in the New Kingdom of Granada with José Celestino Mutis - aside from Mutis, no other colonial medical practitioner was part of the production of quina's medical knowledge. This ignores the cultural and social processes involved in the production of colonial medical knowledge in the New Kingdom of Granada at the end of the eighteenth century.

[29] Joan Bristol, "A Trail of Precious Goods: Colonial Latin American Commodity History," *History Compass*, 11/11 (2013): 953.
[30] Álvaro Casas Orrego, "El Saber Sobre Quinas en Colombia Siglos XVIII y XIX" (Master thesis: Universidad Nacional de Medellín, 1993), xx-xxii.

Science historian Matthew James Crawford has recently studied quina through its materiality as an object and medicament extract.[31] Crawford's general interest is studying the intertwined and complex relationship between science and empire, so he analyzed the Spanish Atlantic imperial government in an effort to include and make science into an imperial tool[32] - for instance, studying the case of quina within the context of the implementation of a royal monopoly in the *Audiencia de Quito* – the *estanco*.[33] The interesting contribution of this study is Crawford's effort to describe an imperial culture of knowledge which included the role of Spanish colonial and royal bureaucrats, Spanish botanists, and *criollos*, even mentioning the case of one colonial empirical healer - actors often forgotten when compared to the role of American and European botanists on quina.

A distant aspect between this thesis and Crawford's work is that he focuses "on the scientific object rather than the practitioner or institution"[34], describing the role of social, political, and cultural interactions that emerged through the development of the *estanco* in the *Audiencia de Quito*. This thesis will instead follow the circulation of quina in relation to how

[31] This thesis has made use of Matthew James Crawford's quina research based on his PhD. Dissertation and articles. The publication of his book based on his previous research on quina appeared late to incorporate into this thesis. Moreover, his book constitutes a contribution to the history of quina and to science overall in the Spanish Atlantic world. See *The Andean Wonder Drug: Cinchona Bark and Imperial Science in the Spanish Atlantic, 1630-1800*. (Pittsburgh: University of Pittsburgh Press, 2016).
[32] Matthew James Crawford, "Empire's Experts: The Politics of Knowledge in Spain's Royal Monopoly of Quina (1751-1808)", (Ph.D diss., University of San Diego, 2009), xviii.
[33] Royal monopolies — state-controlled and regulated resource production — had already existed in Spanish colonies such as those on tobacco, *aguardiente* (hard liquor), playing cards, and fireworks. Aiming to end the need for intermediaries and centralize economic activity, *estanco* planification varied between regions and colonial administrations. In the *Audiencia de Quito* and the Audiencia de Santafé, almost five projects were presented before Spanish ministers as means to formalize the royal monopoly. While a monopoly did exist in Quito, it did not, at least officially, exist in Santafé de Bogotá. See Anthony McFarlane, *Colombia Before Independence. Economy, Society, and Politics under the Bourbon Rule* (Cambridge: Cambridge University Press, 1993) 219-223; Alba Luz Moya, *El Árbol de la Vida. La Cascarilla en los Andes Ecuatorianos en el siglo XVIII* (Ecuador: FLACSO, 1994); and Matthew James Crawford, "'Para Desterrar las Dudas y Adulteraciones': Scientific Expertise and the Attempts to Make a Better Bark for the Royal Monopoly of Quina (1751-1790)," *Journal of Spanish Cultural Studies*, 8:2, (2007): 193-212.
[34] Matthew James Crawford, "Empire's Experts…," xviii.

practitioners were involved in the process of producing and developing medical knowledge in the New Kingdom of Granada.

In addition to Casas Orrego's and Crawford's works, the aim of this thesis is to broaden the picture of how medical knowledge moved through the circulation of quina in the eighteenth century in the viceroyalty of the New Kingdom of Granada. It is also concerned with the need to make the inner social and cultural dynamics of colonial societies visible, along with their role in the development of powerful empires or scientific knowledge. Two interesting approaches have been significant to understanding this point. Neil Safier makes use of the word "itinerary" as a means to explain how knowledge was transported by means of 'moving laboratories' - this notion "deemphasizes static center-periphery schemes."[35]

In a similar way, Samir Boumediene focused on studying the circulation of medicinal plants through the engagement of the history of the circulation of medical and scientific knowledge, including a case study related to quina in the sixteenth, seventeenth, and early eighteenth centuries. For him, there were specific spaces other than laboratories, academies, and universities where medical knowledge was produced. For instance, maritime ports, rather than just being intermediation points between a centre and its periphery, were places where scientific and medical knowledge was gathered, accumulated, and most importantly, appropriated. An important aspect is that he retrieved the notion of peripheries as places where knowledge was transformed and constructed.[36] Moreover, Boumediene conceived the importance of placing medical knowledge as practical knowledge, which is set upon social relations that transformed,

[35] Neil Safier, *Measuring the New World: Enlightenment Science and South America* (Chicago: University of Chicago Press, 2008), 14.
[36] Samir Boumediene, "L'Acclimation Portuaire Des Savoirs sur le Lointain: Les Drogues Exotiques à Séville, Cadix et Livourne (XVI, XVII siècles)," ed Pilar González Bernaldo and Liliane Hilaire- Peréz, *Les Savoirs- Mondes. Mobilities et Circulation des Saviors Depuis le Moyen Âge* (Rennes: Press Universitaires de Rennes, 2015), 133-134.

re-qualified, and configured the meaning of medical practices in the European and American contexts during the early modern period.[37]

Overall, these recent studies are important in the way they insist that, instead of looking narrowly at how scientific knowledge – medical knowledge - moved from traditional centres to unknown peripheries, it is necessary to twist the formula and analyze how scientific ideas and practices circulated or changed from one periphery to another, or from peripheries to centres or vice versa.

Quina in Context: the Second Half of the Eighteenth Century

Much has been written about the challenge of the Spanish Bourbon government to improve the production of resources in its colonies.[38] The need to increase fiscal rent was achieved through the imposition of measures such as increasing taxes or assuring trade control (the *estanco*). From the early eighteenth century until 1776, quina moved without commercial restrictions and under minor legal procedures. In fact, the English first stimulated the productive demand of quina, using it for trade in Portobelo.[39] In addition, aside from the English, the Dutch were illegally trading most Spanish American staples such as dyewood, brazilwood, sugarcane, cacao, as well as quina.[40]

For the New Kingdom of Granada's viceregal colonial administrators, quina was an interesting opportunity to expand trade and increase internal wealth in the viceroyalty. In a 1772 report, Francisco Antonio Moreno y Escandón, a famous *criollo fiscal* (crown attorney) from the

[37] Samir Boumedienne, *La Colonisation Du Savoir. Une Histoire des Plants Médicinales du "Nouveau Monde" (1492-1750)* (Vaulx-en-Velin: Les Éditions des Mondes À Faire, 2016), 21-30.
[38] Margarita Gónzalez, "La Política Ecónomica Virreinal en el Nuevo Reino de Granada: 1750-1810", *Anuario Colombiano de Historia Social y de la Cultura*, Núm.11 (1983): 130-132.
[39] Alba Luz Moya, *Auge y Crisis...,* 32-33
[40] John Lynch, *La España del Siglo XVIII* (Barcelona: Editorial Crítica, 1991), 303.

New Kingdom of Granada, remarked on the importance of producing and harvesting the "precious febrifuge or fever wood"[41] with care. It was humiliating for him to beg other European nations for goods that were being produced by the Spaniards,[42] so his intention was related to controlling the quina trade of the *Audiencia de Quito* through the *Audiencia de Santa fé de Bogotá*. However, an event changed colonial projects - in 1776, the mulatto physician Sebastián José López Ruiz sent samples of a sort of quina similar to the one from Loja to the New Kingdom of Granada's viceroy. Harvesting quina from the New Kingdom of Granada would not represent a dependence on the quina trade from the *Audiencia de Quito,* and would also bring economic benefits to the viceroyalty.

In this thesis, attention will be given to the processes of experimentation carried out in López Ruiz's quina collections between 1776-1783. When the viceroy received López Ruiz's samples, he became the viceroy's *Secretario de Cámara*. López Ruiz travelled to Madrid in order to be officially named as royal botanist and commissioner of quina and cinnamon of the New Kingdom of Granada in 1778, then returned to Santafé de Bogotá and led the first quina commission shipped to Cadiz in 1781. Colonial authorities, the *criollo* elite, and most of all, José Celestino Mutis alleged and claimed López Ruiz to be a false physician, and as the discover of quina for Spanish authorities, he quit his commission in 1783.

After the incident between Mutis and López Ruiz, José Celestino Mutis became the director of the Royal Botanical Expedition in the New Kingdom of Granada and led the production of quina commissions from 1783 until the end of the eighteenth century. López Ruiz continued working under Mutis' orders and also conferred the exploration and collection of quina

[41] Germán Colmenares, *Relaciones e Informes de Gobernantes de la Nueva Granada, Tomo I* (Bogotá: Fondo de Promoción de la Cultura del Banco Popular, 1989), 210.
[42] Ibid., 211.

upon the Franciscan Fray Diego García from 1787 to 1790 while Louis Rieux, a physician from Montpellier, continued to supervise quina commissions in 1800. The experimentation of quina was in progress, and during the second phase of being under Mutis' leadership, experiments involving quina were carried out in the viceroyalty.[43]

Assembling the Case of Quina

One of the initial questions in this thesis was to find out when native quina began to circulate and be used for therapeutic purposes in the New Kingdom of Granada, and another was to find out about the role of Jesuits missionaries in the circulation and consumption of quina in this viceroyalty. Although it is has not been possible to know if the indigenous people from the New Granada territories used quina prior the Spanish arrival, it is certain that most of the quina circulating in the New Kingdom came from Quito. An early description of quina is found in the history of San Antonio, in the New Kingdom of Granada, written in 1691 by Dominican priest Alonso de Zamora[44]. In this document, he describes the European zeal for the fever-healing properties of the Loja tree, also mentioning that it smells like cinnamon and can be found in the New Kingdom as well. Unfortunately, Zamora does not provide more details about the plant or specific places where he saw quina trees[45] - what he refers to in his work may or may not have been quina, and given the case that he had indeed observed quina trees, Zamora did not register any therapeutic use or experience with it.

[43] Manuel Salvador Vásquez, "Las Quinas del Norte de Nueva Granada," 404-420.
[44] Fray Alonso Zamora was born in Santafé de Bogotá in 1635. His work is an important but forgotten source for the history of the New Kingdom of Granada. José Luis Valverde and José A. Perez Romero, *Drogas Americanas en Fuentes de Escritores Franciscanos y Dominicos* (España: Universidad de Granada, 1988), 42.

[45] Fray Alonso de Zamora (O.P), *Historia de la Provincia de San Antonino del Nuevo Reino de Granada (1691) Tomo I* (Bogotá: Editorial Kelly, Instituto Colombiano de Cultura Hispánica, 1980), 123.

Similarly, Vicente Basilio de Oviedo, a curious *criollo* priest, wrote about the presence of Loja trees in this region sometime in the eighteenth century.[46] As with Fray Alonso Zamora, Oviedo's description is short on details. In relation to the role of the Jesuits and quina, historical accounts different from inventories left by apothecaries have not documented its production, circulation, or consumption in the New Kingdom of Granada. However, this question about the role of the Jesuits in the history of quina will be analyzed in Chapter 1. The historical problem, therefore, was not to ask since when has quina circulated, but rather why did it circulate in the viceroyalty of the New Kingdom of Granada. Applying an inductive method to historical and fragmented documentation allowed the circulation of quina to become part of a process related to understanding the New Kingdom of Granada's colonial medical culture.

Gathering sparse documents in order to understand how quina shaped the New Kingdom of Granada's medical culture presented a difficult task for this thesis. If much has been written on the subject, why does it lack sources? The difficulty is not the topic itself, but rather the historical problem and the questions arising from it, including the ways in which historians have approached problems and questions.

Although the National Archive of Colombia has a catalogue specifically for quina, it does not include sources about therapeutic or medicinal uses, nor any about medical experiments. Therefore, it became necessary to search through different archival data such as that from hospitals, *miscellanea,* militias, and royal marines. Although incomplete, information collected from the archives helped to recreate the process of experimentation with quina carried out in López Ruiz's commissions through colonial spaces, including hospitals and colonial pharmacists,

[46] Vicente Basilio De Oviedo, *Cualidades y Riquezas del Nuevo Reino de Granada: manuscrito del siglo XVIII* (Bogotá: Imprenta Nacional, 1930), 26.

and also provided information about experiments involving quina during times of disease. In addition, the National Library in Bogotá has digitalized manuscripts related to specific archives from the physician Sebastián José López Ruiz, which still offer interesting information about medicine in the viceroyalty.

Historical documents from the Royal Botanical Garden in Madrid and the Archive of the Indies in Seville helped to fill in the gaps in the Colombian archives. Most of these archival documents were royal decrees and relations that shed light on Spanish actions related to quina's commissions. In addition, these archives helped to reconstruct sparse cases of quina experiments performed during the time of the New Kingdom's Royal Botanical Expeditions, as well as documents such as letters, which were key for this research. Fortunately, a common way to communicate and exchange information in Hispanic American colonies was through the flow of correspondence relationships among *criollos*, colonial and royal administrators, and Spanish inhabitants in the New Kingdom of Granada. Finally, printed sources from Spanish and European medical treatises contributed to analyzing conceptual frameworks about fevers and the therapeutic use of quina in the second half of the eighteenth century. In a broader picture, all of these documents attest to how important the circulation of quina became for the understanding of a medical culture not only in a colonial context, but also in an Atlantic one.

This thesis is divided into three chapters. Chapter One is a historiographical review about the early history of quina, and its main objective is to answer the question of how the history of quina has been written. Considering that much has been written about quina, this chapter analyzes historical questions which have been proposed as means to understand the history of the plant. In addition, another objective of this chapter is to examine both Spanish and English literature about quina related to the local context of the New Kingdom of Granada.

The circulation of quina implied the production of cultural forms of medical knowledge, and one of these was related to the circulation of books discussing the therapeutic use of quina. According to Andreas-Holger Maehle, the European idea of conceiving quina as a specific medication for fevers changed during the eighteenth century.[47] This medical gradual shift – from a specific to a universal remedy - had an influence on the Spanish physician José Alsinet's medical treatise, *Nuevas Utilidades de la Quina* (1774). Therefore, Chapter Two focuses on analyzing the way in which José Alsinet conducted experiments in Spain in order to justify a new way of using of quina by removing its bitterness. The interest of this Spanish and medical treatise within this thesis is that it circulated in the library of a Franciscan school. Did this treatise influence colonial medical knowledge and practices related to quina? It is difficult to give a straight answer to this question, but the fact that Alsinet's treatise has circulated in different colonial libraries can be taken as an important clue for understanding the role of quina in colonial medical culture.

Last, but not least, Chapter Three describes how the process of medical experimentation with native quina was carried out in the New Kingdom of Granada. This chapter attempts to situate the history of quina within a cultural and social context. Therefore, the carrying out of experiments involving quina explains forms of medical practices in the viceroyalty in the late eighteenth century. This chapter also seeks to prove that the circulation of quina, as part of a medical culture, also led to social, cultural, and political tensions. Indeed, the perception of quina as part of a cultural process helped to demystify the role of José Celestino Mutis as a leading explorer and discoverer of quina in the New Kingdom of Granada. Overall, this thesis attempts to

[47] Andreas-Holger Maehle, *Drugs on Trial…*, 258.

offer a refreshing landscape of the history of quina, as well as to place medical culture as a motor of colonial society in the New Kingdom of Granada at the end of the eighteenth century.

CHAPTER ONE

The Early Modern History of Quina: a Historiographical Balance

Why has the early modern history of quina awakened, over the last century, a research interest among physicians, botanists, pharmacologists, historians, diplomats, chemists, and even novelists?[48] In 1878, Edward John Waring, an English surgeon and member of the Royal College of Physicians in London, published *Bibliotheca Therapeutica* - a Materia Medica bibliographical catalogue in which he listed approximately two hundred publications about quina appearing between 1642 to 1800.[49] Despite quina's popularity in history, for instance, quina's role in the history of medicine remains obscure for Andreas-Horgel Maehle.[50] Rather than considering the causes for its obscurity, it is of better interest to examine the historical problems arising from the early modern history of quina.

This chapter will present an analysis of different historical approaches to the early modern history of quina. Although it is impossible to cover all the written literature concerning the topic, for the purpose of this chapter, a selection of some representative authors of the twentieth and twenty-first centuries has been considered. Some of these works are in English, while others have

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[48] During the nineteenth century, novels about the American fever tree came on the scene, and one of the most famous plays was written by a French female writer: Stéphanie Félicite Du Crest de Saint-Aubin, *Zuma Or The Tree Of Health: To Which Are Added, The Fair Pauline; Zeneida; the Reeds Of Tiber; And, The Widow Of Luz* (New York: Published by David Longworth, 1818).

[49] Edward John Waring, *Bibliotheca Therapeutica, Or Bibliography of Therapeutics, Chiefly In Reference To Articles Of The Materia Medica* (London: The New Sydeham Society, 1878), 337-362. Not to mention that Waring kept listing more publications under the categories of *Cinchona Substitutes* and *Cinchona Cultivation*. By 1875, Waring had listed around three hundred publications about quina. Another known author in quina's historiography had also done the same, years before Waring. In the prologue of *El Arcano De La Quina* by José Celestino Mutis, first published in 1828 in Madrid, the Spanish physician Manuel Hernandez Gregorio mentioned having read a monographic essay in Hamburg written by Enrico von Bergen around 1826. According to him, von Bergen listed six hundred and thirty-two publications about quina. See José Celestino Mutis, *El Arcano De La Quina: Discurso Que Contiene La Parte Médica De Las Cuatro Especies De Quinas Oficinales, Sus Virtudes Eminentes Y Su Legítima Preparación* (Madrid: Ibarra, 1828), viii.

[50] Andreas-Holger Maehle, *Drugs On Trial*, 13.

been published in Spanish - mainly by scholars from Colombia and Ecuador. This selection contrasts the general features of the way in which the history of quina has been studied. These works are separated into two groups according to their date of publication and their geographical focus - the first set of publications focuses on presenting progressive and chronological historical accounts of the early history of quina in Europe, while in the second group of publications, quina acts as a prism through which it is possible to get a glimpse of different historical problems which took place after the second half of the eighteenth century, mainly in the New Kingdom of Granada. This viceroyalty played a significant role for the processing and circulation of quina at the end of the eighteenth century. However, as this chapter will show, few studies in English and Spanish have been interested in analyzing the local social, cultural, and political dynamics which developed in the New Kingdom of Granada in relation to quina late in the eighteenth century.

In addition, this chapter is based on developing two objectives. The first is to reconsider the historical contributions involving quina which were made in the last century, and the second aims to answer the following questions: Which historical debates have been undertaken in the early modern history of quina? How has the study of this American plant influenced the way in which the early modern period is understood? More importantly, how has the history of this plant influenced the history of medicine? Finally, by way of concluding this chapter, which aspects of this history need to be further investigated?

1.1. Dismantling Facts.

Part of the history of quina written between the 1930s and 1940s has involved an attempt to answer questions related to the circumstances which led the Old World to discover quina. Historians during that period were working, directly or indirectly, in several disciplines such as

medicine, botany, pharmacy, and politics. They delved into archives, libraries, and museums in both Europe and South America in order to find a source, a manuscript, or a printed book that contained the first accounts of the American fever tree. Two representatives of this trend were the British historian Alec William James Haggis[51] and the Colombian diplomat Jaime Jaramillo-Arango[52]. Their research was based on re-evaluating previous accounts of the early history of quina mainly from the nineteenth century, though they also examined early written records from the seventeenth and eighteenth centuries which allowed for the tracing of chronological accounts of quina.[53] Part of this first group of publications in the historiography of quina came from the Jesuits, whose role in this history deserves a brief analysis.

[51] A.W Haggis was member of the Medical Historical Museum staff (Wellcome Trust). The Celebration of the Cinchona Tercentenary sponsored research related to quina's history. In the 1930s, I. W. Wright found the official diary of Chinchón in the Archive of Seville. It does not mention any events related to quina or the Countess' cure story. Several years later, the Jesuit Ruben Vargas Ugarte published and transcribed the diary (1935), and A. W. Haggis analyzed it and published his famous article rejecting the story of the Countess of Chinchon. See George Urdang, "The legend of Cinchona," *The Scientific Monthly*, vol 61, no.1 (Jul.1945): 19; and Fernando Ignacio Ortiz-Crespo, *La Corteza Del Árbol Sin Nombre. Hacia Una Congruente Historia Del Descubrimiento Y Difusión De La Quina* (Quito: Fundación Fernando Ortiz, 2002), 18. In order to understand the Countess of Chinchón story, see Saul Jarcho M.D., *Quinine's predecessor. Franceso Torti and the early history of Cinchona* (Baltimore: The John Hopkins University, 1993).

[52] Jaime Jaramillo-Arango was a Colombian surgeon, diplomat, and historian. Between 1940 and 1945, Jaramillo filled diplomatic posts in Great Britain, first as Colombia's minister and then as ambassador. Along with his political duties, Jaramillo had an interest in botany and tropical diseases, and after doing some research in the British Museum in London and the Archives of Indies in Seville, he published *The Conquest of Malaria (1950)*. Before and after this publication, Jaramillo-Arango compiled several monographs and essays in which quina was a major subject. See Richard Evans Schultes,"Jaime Jaramillo-Arango (1897-1962)," *Taxon*, vol.12, no.2 (Mar.1963): 42.

[53] It is not rare to find several publications in scientific journals during the first half of the twentieth century about the early history of quina. It is also no surprise that these publications were written by botanists, physicians, and chemists who were all interested in exploring and contributing to the field of history. For instance, see George Urdang, "The Legend Of Cinchona," *The Scientific Monthly*, vol 61. no.1 (Jul.1945): 17-20; also see George J. Bergman, "The history and importance of Cinchona bark as an anti-malarial febrifuge," *Science Education*, 32.2 (1948): 93-103; Misael Acosta Solís, *Cinchonas del Ecuador* (Quito: 1946), and Francis Raymond Fosberg, "Temprana Historia De la Quina," *Revista de la facultad de Ciencias Médicas*, vol 1, no. III-IV (1950): 75-79.

It is not a coincidence that an interest in the history of quina arose during these decades, nor that most of the research came from Great Britain and the United States. One reason for this is that during and after the Second World War, the demand for quinine increased. Indeed, it was during the 1940s that research institutions in Great Britain and the United States funded research projects to investigate not only the Cinchona trees, but also other agricultural staples such as rubber, bananas, and cacao from South America. These projects led to the publication of articles, essays, and monographs on the early history of quina. In addition, in 1943 and 1944, the United States Office of Economic Warfare (OEM) sponsored the Mission Cinchona to carry out expeditions in search for more Cinchona forests in South America, intending to calculate and estimate the quantity of Cinchona trees covering territories in Colombia, Ecuador, Peru, and Bolivia. Some of the botanists, anthropologists, biologists, etc who were enrolled in these expeditions included Francis Raymond Fosberg, William C. Steere, Gerald W. Prescott, Martin L. Grant, and Misael Acosta Solís.[54] However, the development of a new drug synthesis, the chloroquine in 1934, decreased the demand for quinine worldwide. Chloroquine and new synthetic drugs for malaria prevention started to significantly replace drugs of vegetal origin.[55] It is within this historical context that the need to re-evaluate how the early history of quina came about.

Dismantling previous historical accounts and errors that surrounded the early history of quina became the objective of A.W Haggis' research. In 1941, he published a suggestive essay under the title "Fundamental Errors In The Early History of Cinchona", in which he sought to

[54] Nicolás Cuvi, *Ciencia E Imperialismo En América Latina. La Misión De Cinchona Y Las Estaciones Agrícolas Cooperativas* (Alemania: Editorial Académica Española, 2009), 13-23. This is an interesting study that links twentieth imperialism and science in relation to the role of a new nascent *empi*re: the United States.
[55] Alfonso Garmendia Salvador, *El Árbol De La Quina (Cinchona spp.)*…, 14.

answer the following questions: What were the controversies that gave rise to the polarized use of quina as a way to cure fevers in some European regions? What was the etymology of the word quina? What led to the confusion between Peruvian balsam (*Myroxylon peruiferum*)[56] and quina before the contributions of La Condamine? In the second part of his essay, Haggis argues that the "fabulous story of the Countess of Chinchon" turned out to be nothing more than a fable.[57]

The examination of manuscripts, early printed books, and even nineteenth century accounts allowed Haggis to suggest what he considered to be historical errors in the early history of quina in the Old World. He asked about the ambiguities in the story of the Countess and wrote, "the *truth* of the story has, it appears, never been challenged, although Humboldt regarded it as a fable without *stating any grounds* for his conclusion."[58] Haggis provided the grounds to dismiss the story of the Countess of Chinchon as a mere fable by identifying its chronological discrepancies, and managed to do so by examining several yet unstudied historical accounts that dealt with this period.

Haggis also revised the writings of the British explorer Clements Markham who, at the end of the nineteenth century in cooperation with the British botanist Richard Spruce and Robert Cross (of Kew Gardens), started to successfully transplant Cinchona seeds in British India and Ceylon.[59] As a result of these explorations and transplantations, Clements Markham published *A*

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[56] Alec W. J Haggis, "Fundamental Errors in the Early History of Cinchona. Part I and Part II,*" Bulletin of the History of Medicine*, 10 (1941): 568-592

[57] Earlier chronicles of the West Indies mention Indian balsam, Tolu balsam (*Myroxylon toluiferum*) or balsam. For instance, the Jesuit priest Joseph de Acosta observes that "they bring balsam to Spain from New Spain, from the province of Guatemala, from Chiapas, and other places where it abounds most, although the most esteemed be that which comes from the Island of Tolu, which is in Tierra Firme, not far from Carthagena. Monardes saith that the Indians cured their wounds therewith, and from thence the Spaniards learned it." José Acosta and Clements R. Markham, *The Natural And Moral History of The Indies: Volume I* (England: Ashgate, 2010), Internet resource, 259.

[58] Alec W. J Haggis, "Fundamental Errors…," 570.

[59] Nicolás Cuvi, *Ciencia E Imperialismo…,* 32.

Memoir Of The Lady Ana De Osorio, Countess Of Chinchon And Vice-Queen of Peru (AD 1629-39) in 1874. According to Haggis, "before examining *the truth* of the story of the cure of the Countess, the question of the actual identity of this lady need[ed] to be settled."[60] Much had been said about the Countess of Chinchon, but Haggis' research led him to establish that Markham had made a mistake in identifying the Countess of Chinchon as Ana de Osorio rather than Franscisca de Rivera.[61] Apart from clarifying the confusion over the Countess' name, Haggis was also able to reveal errors related to the dates and details of certain events based on these new documents which he had gathered.

Other sources enabled Haggis to match information for the questions regarding the etymology of the word "quina" and the confusion between Peruvian balsam and quina. The etymology "quina" led Haggis to better understand the confusion between Quina-Quina (also known as *chinæ-chinæ,* or Peruvian balsam) and the famous quina (*Cinchona*):

"The fact that Quina-Quina was originally the name for the Peruvian balsam, for close upon three centuries the name has been inseparably associated with the genus Cinchona. Thus has led to such abundant confusion of error and truth that the history of Cinchona as it stands to-day has become baffling for even the ablest of investigators."[62]

The main sources which enabled Haggis to correct this 'historical error' came from the New World and religious chronicles. The Augustinian Antonio de la Calancha and the Jesuit Bernabe Cobo wrote what could be considered early descriptions of quina in their chronicles of the West

[60] A. W. J Haggis, "Fundamental Errors…," 570.
[61]The Ecuadorian botanist and historian Fernando Ortiz-Crespo claimed that before Haggis, it was the historian Felix Cipriano Zegarra who corrected the Countess' name from Ana de Osorio to Francisca Henriquez de Rivera. Ana de Osorio was the first wife of the Count of Chinchón, but she died before settling in Peru. Soon after this, the Count married Francisca Henriquez de Rivera, the famous Countess in the story of quina powder. See Fernando Ignacio Ortiz-Crespo, *La Corteza Del Árbol...*, 20.
[62] A.W. J Haggis, "Fundamental Errors," 427.

Indies, but they referred to it as the fever tree (*árbol de calenturas*). In addition, these chroniclers reserved the term "Quina-Quina" to refer to the Peruvian balsam.[63]

Haggis's essay opened the doors for historians and other researchers of the time to deepen their knowledge of the early history of quina. Jaime Jaramillo-Arango also raised some of the same questions as Haggis, such as the time and circumstances under which quina was first introduced in Europe and the etymology of quina. In his essay, "A Critical Review of the Basic Facts in the History of Cinchona", Jaramillo-Arango also added "new lights on the early history of Cinchona."[64], but his primary contributions dealt with aspects concerning medicine which had not been done before, and included written works by Spanish naturalists and American *criollos*. In regards to medicine, Jaramillo-Arango sought to find whether malaria[65] existed in the New World before the arrival of the Spaniards, as well as the extent of the indigenous population's knowledge of the virtues of quina.

The historical question related to the indigenous knowledge of quina deserves attention because it is absent from nineteenth century narratives. Arguing the existence of malaria was an issue in which some scholars could advocate for a non-indigenous knowledge of quina.

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[63] Antonio de la Calancha, *Crónica Moralizada De La Orden De San Agustín En El Perú, (1639)* and Bernabé Cobo, *Historia Del Nuevo Mundo (1653).* It is important to note that in this essay, Haggis also mentions that in the account of the physician Nicolás Monardes, *Historia Medicinal De Las Cosas Que Se Traen De Nuestras Indias Occidentales (1565)*, Monardes refers to one of the species of Balsam, but Monardes could have also been unknowingly giving an early account of quina. For Fernando Ortiz-Crespo, earlier accounts of quina existed, but under a different name. In *La corteza del árbol sin nombre. Hacia Una Congruente Historia Del Descubrimiento Y Difusión De La Quina*, Ortiz-Crespo proposes a hypothesis stating that aside from Nicolás Mondardes Juan Fragoso, another earlier Spanish physician had also written a description of quina in his *Discurso De Las Cosas Aromaticas, Arboles Y Frutales, Y De Otras Muchas Medicinas Simples Que Se Traen De La India y Oriental y Sirven Al Uso De La Medicina (1572)*. See Fernando Ignacio Ortiz-Crespo, Ibid., 60-74.

[64] Jaime Jaramillo-Arango, "A Critical Review of the Basic Facts in the History of Cinchona," *Journal of the Linnaean Society of London, Botany,* no. 53 (1949): 273.

[65] The term malaria comes from Italian *mal d'aria* meaning bad air. In early modern times, the word was used to describe bad air expelled from swampy places, but it is unknown to what extent the word was used for medical purposes such as describing a specific disease. Saul Jarcho, *Quinines's Predecessor*, 188-189.

Jaramillo-Arango argued that the concept of malaria was unknown to the indigenous population, but that fevers did exist among them. According to him, explorers and naturalists such as Alexander von Humboldt, Jose Celestino Mutis, Edward Pöppig, Richard Spruce, and Clements Markham thought that the natives considered it dangerous to use Cinchona to cure fevers. These explorers believed that the indigenous people were ignorant of any knowledge of quina's virtues, and that it was the Europeans who first discovered Cinchona's healing properties.

It is interesting to note that Jaramillo-Arango would not explain why European explorers ignored indigenous knowledge in the nineteenth century. Instead, he quoted other European naturalists such as La Condamine, Joseph Jussieu, or the surgeon William Arrot, who "all explicitly state that the current opinion in Loxa was that the qualities of quina bark were known to the Indians long before the arrival of any Spaniard."[66] He was concerned with establishing congruent facts in the early history of quina, "it is an established fact supported by the accounts of the early missionaries and chronicles, that the Indians were both natural observers and talented botanists, with a wide knowledge of medicinal plants."[67] Jaime Jaramillo-Arango and A.W Haggis broadened the early history of quina not only to ascertain facts and correct what could be considered historical errors, but also to promote further research based on new written records. For instance, as a result of Jaramillo-Arango and A.W Haggis' research, the early modern history of quina began to be linked to the role played by the Jesuits in Europe and the Americas.

The Jesuits produced a network for the exchange of scientific, political, economic, social, and cultural issues through different geographical angles.[68] It has constantly been said that, between 1630 and 1640, Jesuit missionaries took samples of quina from the Kingdom of Peru to

[66]Jaime Jaramillo-Arango, "A Critical Review," 275.
[67] Ibid., 275.
[68] Steven J Harris,"Confession-Building, Long Distance Network, and the Organization of Jesuit Science," *Early Science and Medicine*, 1:3 (1996), 296-298.

the Old World. According to research, the Jesuit College in Rome along with its apothecary were the first places in Europe to have cinchona trees, and after several tests in the Roman hospital *Ospedale de Santo Spirito*, the therapeutic use of quina spread throughout several European cities. However, it is uncertain how the Jesuits brought quina to Rome.[69] Although the Spanish priest Bernabe Cobo has been recognized as the first Jesuit to have described quina in his *Historia del Nuevo Mund*o *(1653)*, Cobo never returned to the Old World.[70] In a later account, the Moravian Jesuit Juan Esteyneffer described the Peruvian bark and made a distinction between it and the Peruvian tree in his famous medical handbook *Florilegio Medicinal de todas las enfermedades (1712),* published in New Spain.[71] Aside from these two references by Jesuit missionaries from the Spanish Americas, earlier written resources related to the Jesuits and quina were produced in Europe.[72]

The role of the Jesuits has not been well-studied in the historiography of quina in Europe. From the beginning of the eighteenth century onwards, this role almost disappeared, giving way to other well-known events within the history of quina such as Charles M. La Condamine's

[69] Samir Boumediene has shed light on the relation between the Jesuits in Rome and quina at the end of the seventeenth century. See Samir Boumediene, *La Colonisation Du Savoir...,* 204-206.
[70] Scholars attributed the first known Jesuit description of quina to father Bernabé Cobo. See the works of: A. W. Haggis, Jaime Jaramillo-Arango, Fernando Ortiz-Crespo, and Saul Jarcho; among contemporary works, see Sabine Anagoustus and Andres Prieto.
[71] Father Juan Esteyneffer also mentioned that in the case of the absence of grape wine to mix the Peruvian powders, he recommended administering quina with local New Spain herbs. He considered the Peruvian bark to be the most useful drug to heal fevers and chills. Juan Esteyneffer and B.M.C, Anzures, *Florilegio Medicinal de todas las enfermedades (1712) Libro 1*, Capítulo XXXV (México: Academia Nacional de Medicina, 1978), 295-296.
[72] This also includes the perpetuation of the Jesuits within the legends that were created in order to explain the discovery of quina at the end of seventeenth and eighteenth centuries. Other famous earlier sources relating to the role of the Jesuits can be found in the *Schedula Romana (1651)* by Pietro Paolo Puccerini, Honoratus Fabri's *Pulvis Peruvianus Vindicatus De Ventilatore (1655),* and Sebastian Badus' *Anastasis Corticis Peruviae (1663)*. For a more thorough account of the early role of the Jesuits and quina, see Saul Jarcho M.D., *Quinine's predecessor. Franceso Torti and the early history of Cinchona* (Baltimore: The John Hopkins University, 1993), 14-25.

memoir *Sur l'Arbre du Quinquina*. The Jesuit Pedro de Mercado[73] did not mention any relationship between the Jesuits and quina as being a remarkable event in the New Kingdom of Granada, nor was there any such mention in the *Annual Letters* reports of this viceroyalty.

However, more recently, scholars have used quina as a case study to illustrate the Jesuits' scientific role in the early modern history of science and medicine. Such is the case of Sabine Anagoustus, who has given much attention to the role of the Jesuits in the history of pharmacology.[74] Nevertheless, it remains necessary to back this view through new written historical sources in the Archives, which could give evidence about the extent to which quina influenced the Jesuit missionaries' activities in their trade in the Spanish Americas, or details on the nature of the alliances between Jesuits and merchants as a way of tracing not only commercial circuits, but access to indigenous knowledge.

Saul Jarcho published an important study of the early history of quina - *Quinines's Predecessor, Francesco Torti And The Early History of Cinchona,* which is a detailed and rigorous study of the history of quina from the end of the seventeenth to the early eighteenth centuries. Jarcho's study resembles studies produced earlier in the twentieth century in the way that it follows a chronological view of quina's history through European written records of the period. For instance, the author examines the dissertation *Anastasis Corticis Peruviae, Seu Chinae Defensio* (1663) by the Genoese physician Sebastianus Baldus (most known as Sebastianus Badus), in which Badus mentions the famous story of the Countess of Chinchón.

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[73] Pedro de Mercado, *Historia De La Provincia del Nuevo Reino de Granada y Quito de la Compañía de Jesús* (Bogotá: Biblioteca de la Presidencia de Colombia, 1957).

[74] Sabine Anagnostou, "Jesuits in Spanish America: Contributions to the Exploration of the American Materia Medica," *Pharmacy in History,* 47 (2005-1): 187. Also see Andrés I Prieto, *Missionary Scientists Jesuit Science in Spanish South America, 1570-1810* (Nashville: Vanderbilt University Press, 2011).

Additionally, Jarcho thoroughly analyzes the role of the Jesuits in introducing quina to Europe, along with the trial between the physician Jean-Jacques Chiflet and the Jesuit Honoré Fabri, writing under the pseudonym Antimus Conygius. Saul Jarcho also reviews popular earlier-written sources about quina in detail, but shifts from earlier twentieth century narratives by using a methodology based on geographical regions as units of historical analysis, allowing the author to filter the information taken from written records as well as consider political, geographical, commercial, medical, and social factors which were almost absent in the research from the first quarter of the twentieth century.[75]

Saul Jarcho's interests in writing about the history of quina lie firstly in his training as a physician and his specialization in tropical diseases. Secondly, Jarcho wrote during a time when the historiography of medicine had gone through renovations during the previous three decades of the twentieth century.[76] The author is aware of the fact that "when other scholars were filling gaps in knowledge of cinchona, the entire field of medical historiography was being broadened, with the result that is no longer acceptable or permissible for the medical historian to offer a mere catalog or chronicle of events".[77] Therefore, in *Quinines's Predecessor,* Saul Jarcho poses historical questions such as: What was the implication of the introduction of a new drug to the European Materia Medica? Did quina bring innovations to early modern medical knowledge?

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[75] Saul Jarcho, *Quinines's Predecessor*, xiii. Saul Jarcho found an early manuscript that deserves further research. He translated the manuscript; see Jarcho Saul, *Tractatus De Cortice Peruviano. A Plain Treatise Of The Peruvian Bark*, (Boston: The Francis A. Countway Library of Medicine, 1992).

[76] The historiography of medicine has been transformed by social, cultural, and political approaches, refreshing and offering new historical narratives over the last decades. According to Roy Porter, "a historical understanding of medicine is far more than a cavalcade of triumphs. It involves the attempt to explain the more distant and indirect antecedents of modern changes, to show why one path was taken and not another." In: Roy Porter (ed), *The Cambridge History of Medicine* (New York: The Cambridge University Press, 2006), 4. A relevant article about the circulation of medical knowledge in the Atlantic world is: Harold J. Cook and Timothy D. Walker, "Circulation of Medicine in the Early Modern Atlantic World", *Social History of Medicine*, (Vol.26, No.3, 2013): 337-351.

[77] Saul Jarcho, *Quinines's Predecessor…*, xiii.

How did quina come to be understood as a febrifuge? To address some of these questions, Saul Jarcho presents the case of Francesco Torti, a professor of medicine from Modena who published *Therapeutic Specialis* in 1712. Torti's *Therapeutic Specialis* constitutes a revealing treatise about the taxonomy of fevers and quina's therapeutic use in the early eighteenth century. The key feature in Jarcho's work is a concern to give written sources their own meaning in time.[78]

The early modern European history of quina was not confined to presenting a progressive historical narrative which was initiated in 1640 and ended with the isolation of quinine in 1820. Up to this point, a panorama of some relevant works about the early history of quina in Europe has been presented. However, what about the Hispanic regions that supplied quina? What is to be said about the historiography of quina in a Spanish colony such as the New Kingdom of Granada (modern Colombia)? These and other questions will be addressed in the next section.

1.2. Quina's Historiography: A South American Angle.

This section will examine the literature of the early modern history of quina from the second half of the eighteenth century to the beginning of the nineteenth century, in the viceroyalty of the New Kingdom of Granada and Quito. With the exception of two works, attention will be given to Colombian scholars' publications from the twentieth and the beginning of the twenty-first centuries. To begin, some clarifications need to be made. First, the focus on this period is not arbitrary, it is almost impossible to make a claim about an early history of quina that begins somewhere between the second half of the seventeenth and the early eighteenth centuries in the New Kingdom of Granada, at least for the region covering modern Colombia.

[78] Ibid., 213.

Although most of the literature selected here focuses on the second half of the eighteenth century to the beginning of the nineteenth, when the demand for quina reached its highest peak, it is interesting to note that quina was not the main research subject for most of the works in this literature. Without a doubt, quina has been an important subject of study, but its history often serves as a case study to illustrate the historical concerns related to political, cultural, and economic problems in this Spanish colony. Moreover, quina's history has been intrinsically related to the influence of four historical events which occurred as a result of the relationship between the metropole and its American colonies: the Bourbon Reforms, the Spanish Enlightenment, the arrival of José Celestino Mutis in the viceroyalty of the New Kingdom of Granada in 1760, and the development of the New Kingdom of Granada's Royal Botanical Expedition (1783-1810).

Quina played a major role in understanding economic and social colonial structures after the second half of the eighteenth century in the viceroyalty of the New Kingdom of Granada and the *Audiencia de Quito*. Luz del Alba de Moya's *Auge y Crisis de la Cascarilla en la Audiencia de Quito, siglo XVIII* is one of the most representative works on quina historiography. She addresses these questions: To what extent can the rise of quina explain colonial economic structures? How can it help us to understand the political, economical, and social relations between the Spanish empire and its colonies?[79] Additionally, how can an extractive economy be understood during the colonial period? Finally, how empowered was the local elite in relation to the administrative officials? [80]

[79] Luz del Alba Moya Torres, *Auge y Crisis de la Cascarilla en la Audiencia de Quito, siglo XVIII* (Ecuador: FLACSO, 1994), 22-33.
[80] For Colombian studies related to economic and social history, see Camilo Echandía and Yesid Sandoval's "La Historia De La Quina Desde Una Perspectiva Regional. Colombia 1850-1882", *Anuario Colombiano de Historia Social y de la Cultura*, no. 13-14 (1986).

Alba Moya examined documents from Ecuadorian archives, which allowed her to establish the rise of quina demand in two cycles: the first in Loja from 1750-1775, and the second in Cuenca from 1775-1787. This temporal division is helpful for methodological purposes because it offers a detailed explanation of the regional impact of quina's exportations while elucidating the reasons behind the implementation of certain political and administrative measures, as well as by comparing the differences and similarities between the extractions in Loja and Cuenca.[81] In addition, attention is given to the tensions and strains developed between various actors involved in quina's commerce, such as the *quiteño*, *loxano*, and *cuencano* merchants, the *criollo* elite, the bark collectors, the unskilled day labourers, the naturalists, and the viceregal administrative officials. By bringing attention to these tensions, Moya is interested in emphasizing quina's role in social and economic development in contrast to other well-documented commodities, such as cacao and textiles. This work constitutes a fundamental resource to understanding the role of quina in the macro- and micro-economic and social structures of colonial times.[82]

Most Colombian scholars have studied quina not only as an appendix of the Spanish botanical expedition, but have also focused on the historical relation between this plant and Jose Celestino Mutis.[83] These relations have been considered in order to analyze historical problems

[81] For instance, an interesting difference is the reasons for the rise in quina exports - in Loja, it was due to direct state intervention, while in Cuenca, it was due to the investment of wealthy families. Alba Moya, *Auge y Crisis …,* 237.

[82] Alba Moya includes relevant works in the historiography of quina in the Audiencia of Quito. It is important to mention works such as: Alfonso Anda Aguirre, *La Quina o Cascarilla En Loja*, (Quito: Universidad Técnica Particular de Loja, 2003), Martine Petit Jean and Yves Saint-Geours, "La Economía De La Cascarilla En El Corregimiento De Loja," *Cultura. Revista del Banco Central del Ecuador*, vol. V, no. 15 (1983): 171-207.

[83] Literature about the two Spanish Botanical Expeditions is extensive. Some relevant works include: Steele Robert, Arthur, *Flowers for the King: the Expedition of Ruiz and Pavon and the Flora of Peru*, (N.C: Duke University Press, 1964); Frías Núñez, Marcelo, *Tras el Dorado Vegetal: José Celestino Mutis y la Real Expedición Botánica del Nuevo Reino de Granada (1783-1808)*(Sevilla: Disputación Provincial

related to science in the New Kingdom of Granada, the cultural and political infiltration of the Spanish Enlightenment in this colony, and the reinforcement and construction of identity in the *criollo* community. [84]

Searching for the foundational origin of the establishment of modern science in the colony became an important subject in Colombian historiography. This historiography progresses in a linear manner by narrating indigenous botanical knowledge and the rise of modern science with the arrival of Mutis and the development of the botanical expedition.[85] Why is the figure of Jose Celestino Mutis relevant in this historiography? The Cadiz physician did indeed leave a mark in the New Kingdom of Granada - for many historians, an important quantity of documents exists which refer to Mutis in one way or another, and in addition, many written resources have a direct or indirect relation to him. The nature of these documents is wide and includes correspondence, Mutis' diaries, royal treasury accounts, and botanical illustrations.

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de Sevilla, 1994); Lafuente Antonio, Sellés Manuel, and Peset José Luis, *Carlos III y la Ciencia de la Ilustración* (Madrid: Alianza Editorial, 1998), Bleichmar, Daniela, *Visible Empire: Botanical Expeditions and Visual Culture in the Hispanic Enlightenment* (Chicago: The University of Chicago Press, 2012).

[84] See Guillermo Hernández de Alba, *Quinas Amargas*. *El Sabio Mutis y la Discusión Naturalista del Siglo XVIII*, (Bogotá: Biblioteca Familiar Colombiana, Imprenta Nacional de Colombia, 1996), Enrique Peréz Arbeláez, *José Celestino Mutis y la Real Expedición Botánica del Nuevo Reino de Granada* (Bogotá: Instituto Colombiano de Cultura Hispánica, 1983), Mauricio Nieto Olarte, *Remedios para el Imperio. Historia Natural y la Apropiación del Nuevo Mundo* (Bogotá: Instituto Colombiano de Antropología e Historia, ICANH, 2000) 192-227, José Antonio Amaya, *Mutis, Apóstol de Linneo. Historia de la Botánica en el Virreinato de la Nueva Granada (1760-1783), Tomo 1* (Bogotá: Instituto Colombiano de Antropología e Historia (ICANH), 2005). Alberto Gómez Gutierrez, *Academia Mutisiana. Documentos preneogranadinos de José Celestino Mutis y la promoción de sociedades científicas en la Nueva Granada* (Bogotá: Pontificia Universidad Javeriana-Academia Nacional de Medicina, 2011).

[85] See Florentino Vezga, "Memoria sobre el estudio de la historia de la botánica en la Nueva Granada," *Boletín de la Sociedad de Naturalistas Neo-Granadinos* (Bogotá: Imprenta el Mosaico, 1860). Botanists such as Enrique Perez Arbelaez and Santiago Diaz-Piedrahita have made important contributions. See Enrique Pérez Arbelaez, *José Celestino Mutis y la Real Expedición Botánica del Nuevo Reino de Granada* (Bogotá: Instituto Colombiano de Cultura Hispánica, 1983) and Santiago Díaz-Piedrahita, "Las Quinas en el Mundo y en Colombia," *Revista Medicina*, vol.25, No.2, (2003): 128-130. In addition, the Colombian commemoration of the expedition's bicentenary stimulated more research in 1983. As a result, a relevant amount of publications exists in Colombian historiography on this topic. See Diana Obregón T., "Historiografía de la Ciencia en Colombia," edited by Bernardo Tovar Zambrano, *La Historia Al Final Del milenio. Ensayos de Historiografía Colombiana y Latinoamericana* (Bogotá: Universidad Nacional de Colombia, 1994), 562.

It is important to recognize the archival research these have produced and their contribution to this historiography, although it seems that the history of quina is centred on praising Mutis' adventures and hurdles.

An important work to mention is *Quinas Amargas*: *El Sabio Mutis y La Discusión Naturalista del Siglo XVIII (1991),* written by Gonzalo Hernández de Alba. In this work, he focuses on José Celestino Mutis the savant and his experiences as a physician, botanist, expeditionary, and royal administrator in the viceroyalty. Important sections are dedicated to explaining Mutis' findings of different species of quina, the dispute between him and the Panamanian physician Sebastian José López Ruiz, and Mutis' periodical publications of quina in Santa Fe de Bogotá's *criollo* journal *Papel Periodico Ilustrado (1794).*[86]

For Hernández, Mutis was the father of modern science in the viceroyalty, which brings up traditional biographical works about the *criollos* or Spanish men of science written at the end of the nineteenth and the beginning of the twentieth centuries.[87] The difference between those and Gonzalo Hernandez is that the latter takes into account the political situation between the metropolis and New Granada, bringing the actors who influenced Mutis' work, such as viceroys and American *criollos,* to the forefront. Furthermore, Gonzalo Hernández does not make use of archival sources, but rather refers to chronicles and European travel accounts such as those of La Condamine, Alexander Humboldt, and Hipólito Ruiz.[88] In general, this work unquestioningly restates Mutis' authority on quina knowledge.

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[86] Gonzalo Hernández de Alba, *Quinas Amargas*…, 188.
[87] Ibid., 188.
[88] The *Quinologia o Tratado del Árbol De La Quina,* published in 1792 by Hipolito Ruiz, prompted commentaries and disputes among Spanish naturalists in America and Madrid. A controversy arose between Hipólito Ruiz and Mutis, see Gonzalo Hernández de Alba, *Quinas Amargas*…, 130-131; also Mauricio Nieto Olarte, *Remedios Para el Imperio. Historia Natural y la Apropiación del Nuevo Mundo* (Bogotá: ICANH, 2000); and Arthur Robert Steel, *Flowers for the King. The Expedition of Ruiz and Pavon and the Flora of Peru* (United States: Duke University Press, 1964).

New approaches in the social sciences have helped us to rethink the historiography of science, especially the one related to the impact of José Celestino Mutis on the Royal Botanical Expedition in the New Kingdom of Granada. The history of science and cultural history has been particularly influenced by theories and concepts which stem from anthropology, sociology, and philosophy of science.[89] These approaches have been interested in re-evaluating concepts such as the centre-periphery, community of actors, social networks, knowledge appropriation, and also exploring the social and cultural circulation of ideas and practices or the institutionalization of knowledge.[90] Within this framework in historiography, the history of quina ceases to be one which belongs only to a few historical figures. Quina is related to the social, political, and cultural implications of the production of knowledge from and within the margins, which leads us to understanding the way power was exerted as well as the social and political complexities that existed between the Spanish empire and its colony in the eighteenth century.

It is of interest to note the political dimension that science acquires in this historiography. Some historians interested in imperial history and the history of sciences have given attention to the relationship between science and the Spanish empire in the early modern period. The production of scientific knowledge represented a powerful tool for any European empire to prosper, and this historiography perceives naturalists, botanists, and physicians as actors involved in an imperial project that allowed them to legitimize medical and botanical knowledge.[91] For

[89] See Renán Silva, *Los Ilustrados De La Nueva Granada 1760-1808…,* 422-432. José Antonio Amaya, *Mutis, Apóstol De Linneo. Historia De La Botánica En El Virreinato De La Nueva Granada (1760-1783) Tomo 1* (Bogotá: ICANH, 2005).

[90] Most of the concepts refer to contributions made by the Program of Sociology of Scientific Knowledge, through which Bruno Latour influenced this historiography with his work *Science in Action. How To Follow Scientists and Engineers Through Society* (1987).

[91] See "La Condesa, los Jesuitas, el Cardenal, el Demonio, Linneo y sus Polvos," in *Remedios para el Imperio. Historia Natural y La Apropiación del Nuevo Mundo*. (Bogotá: ICANH, 2000). Additionally, in relation to this historiography, it is relevant to mention the work of Daniela Bleichmar: *Visible Empire:*

instance, Mauricio Nieto Olarte examines the process of scientific construction through practices such as natural history, taxonomy, and cartography within the context of Spanish botanical expeditions at the end of the eighteenth century. His theoretical framework is based on contributions made by Bruno Latour, Michel Callon, Barry Barnes, Anthony Padgen, and Mary Louise Pratt. With regards to quina, the author studies the intertwined relationship between trade and the knowledge of quina, which was carried by a process of translation that went through knowledge from merchants, bark collectors, and indigenous people to naturalists, botanists, and physicians in European centres. Overall, one particular aspect to consider within this new historiography is its interest in demystifying the historical search for scientific origins, or questioning the idea regarding the introduction of modern science in America.

This chapter sought to offer a general understanding of the history of quina through different angles. By no means has it pretended to make judgments about the approaches used by historians or scholars in relating this history, but has instead tried to reflect on how and why certain historical problems have been considered over the last two centuries. It also seeks to find out which questions have been used to interpret documents about quina in the early modern period.

In addition, this chapter showed that the scholars analyzed represent important contributions to the history of quina in English and Spanish literature. Finally, a few remarks ought to be kept in mind - one related to the first group of publications, and another regarding proposed historical revisions and questions that must be rethought in further research. In the first set of publications, it is relevant to note how the final stages of World War II and modern

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Botanical Expeditions and Visual Culture In The Hispanic Enlightenment (Chicago: The University of Chicago Press, 2012).

imperialism had an influence in promoting research on the history of quina among a varied group of scholars, most of whom shared the particularity of being scientists interested in historical writing. Moreover, the key feature of this historiography is the emphasis on writing about the foundations of the history of quina. March Bloch referred to this as, "the obsession with origins,"[92] and remarked the ambiguity of the word 'origin' for historians - was the word referring to the search for beginnings or for causes? In this first set of publications, the search for origins was accompanied by judgments of some written stories about quina produced in the nineteenth century. It is interesting to observe that no theoretical framework emerges, and this was because these scholars' main interest was demystifying stories and establishing objective truths and facts about quina's history. Yet, in a certain way, it is recognized that they unveiled a large collection of documents about quina. Until the 1990s, the only exception to this trend was Saul Jarcho, who reviewed more written and unknown documents within the social context of the history of medicine.

The replacement of the vegetal alkaloid by synthetic chemicals could perhaps explain the decline in interest in the history of quina – as a plant - from the end of World War II to the beginning of the 1990s. In the Hispanic-American context (especially in Colombia and Ecuador), interest in the early modern history of quina became slightly more visible only at the beginning of the twenty-first century. However, in this historiography, quina became a reason to understand other problems and realities in the Hispanic context, and more importantly, it gave social dynamism to the colonial world and diminished the extent of the role given to the Spanish

[92] Marc Bloch, *The Historian's Craft* (New York: Caravelle Edition, Vintage Books, 1953), 32.

empire. For instance, recognizing the expert knowledge of other actors, such as bark collectors, represents a piece of the social aspect often forgotten in the historiography.[93]

Moreover, new contributions from the history of science and the use of social scientific theories reveal the complex social network of actors involved in the early history of quina. Reinventing the history of a recurrent theme in historiography is part of the historian's craft, which definitely demands the alliance of various historical perspectives and new documents. For instance, exploring the intersection of the economic and scientific histories of quina in the early modern period could shed light on connections not yet considered, and moreover, the environmental history could open interesting debates related to extraction activities in the colonial context. In fact, the history of medicine regarding quina is still a perspective which needs to be explored from the local or colonial point of view - How did quina shape colonial medicine in the New Kingdom of Granada? The following chapters seek to address this question.

[93] Alba Moya, *Auge y Crisis*, 135.

CHAPTER TWO

A "Prodigious" Remedy: Spanish Atlantic Medical Innovations with Quina

The New Kingdom of Granada's viceregal authorities referred to quina as a prodigious remedy capable of curing all sorts of fevers and other diseases.[94] The reference to 'all sorts of fevers' embraced the recognition of fever as a disease, including different types of fevers such as intermittent, tertian, yellow, or malignant fever. In addition, in *El Papel Periódico de Santa fé de Bogotá* (1793), José Celestino Mutis published a study on quina under the name "El Arcano de la Quina. Revelado al Beneficio de la Humanidad." This study presented different articles commenting on subjects such as the early history of quina, the European struggle to recognize true quina from false ones, and how to make therapeutic use of the four different species of quina found in Santafé de Bogotá - the official one (similar to the one from Loja), as well as orange, red, and white quina.[95] These four types of quina were botanically classified when Mutis led the New Kingdom of Granada's Botanical Expedition.

The purpose of Mutis' articles in the *El Papel Periódico* was to validate the botanical existence and therapeutic properties of the New Kingdom of Granada's native quina. In one of the articles, for instance, Mutis mentioned the divided opinions between European physicians who praised the use of quina and those who did not. For him, many of these misunderstandings were due to the lack of botanical and medical knowledge about the medicinal plant.[96] He also commented on European-innovated methods of administering quina to patients, such as the way

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[94] "Expediente al Consejo Pleno. Respuesta a los dos Fiscales sobre la Quina que Nace en Varios Territorios de la Nueva Granada", 1773, Indiferente, 1554, Archivo General de las Indias (hereafter cited as AGI), 733r.
[95] José Celestino Mutis, "El Arcano de la Quina. Revelado a Beneficio de la Humanidad," *El Papel Periódico de Santafé de Bogotá,* mayo-enero, 1793-1794 (Bogotá: Banco de la República, Impresión Litrografía Arco, 1978), 286-289.
[96] Ibid., 286-289.

the Spanish physician Joseph Alsinet introduced a quina maceration in order to reduce its bitterness, or how the British administered quina in the form of a starch.[97] Indeed, for European physicians, it was important to find the best way to administer quina to patients - not only for those who felt ill with intermittent fevers, but also for those with other diseases. In this way, Mutis introduced his methods of preparing a local therapeutic beer, vinegar, and infusion[98] with the different sorts of native quina from the New Kingdom.[99]

The proliferation of epidemic diseases related to different types of fevers, constant wars between empires, as well as the trade and consumption of quina promoted the need to publish medical treatises on quina in the Spanish Atlantic world during the second half of the eighteenth century.[100] Therefore, a cultural and social dialogue between Spain and its kingdoms related to quina medical knowledge and information emerged, and this dialogue was carried out thanks to the production of "correspondence networks"[101] that developed through the circulation and exchange of printed books, manuscripts, letters, or newspapers. Individuals involved within these networks included friars, American and Spanish physicians, the community of *criollos*, and viceregal colonial authorities. Quina as a physical object - plant, bark, or medication - circulated

[97] Ibid., 438, 441-442.
[98] An *extract* was obtained from the evaporation of any vegetable or animal substance diluted in water or alcohol. First, the liquid that gave the extract was prepared, then this was evaporated into a solid, dried, or made to have a squishy consistency. The infusion consisted of boiling water with plants. See Félix Francisco Pastor Frechoso, *Boticas, Boticarios y Materia Médica en Valladolid (siglos XVI y XVII)* (España: Estudios de Historia de la Ciencia y de la Técnica, No.8, Junta de Castilla y León, 1993) 61-74, 83.
[99] The best way for José Celestino Mutis to take advantage of quina's therapeutic use was through the preparation of a fermentation process. In order to understand more about Mutis' quina beer and other preparations in vinegar and infusions published in the "Arcano de la Quina", see Álvaro Casas Orrego, *El Saber Sobre Quinas en Colombia Siglos XVIII y XIX…,* 104.
[100] Juan Riera, *Capítulos de la Medicina Española ilustrada. (Libros, cirujanos, epidemias y comercio de quina)* (Valladolid: Universidad de Valladolid, Secretariado de Publicaciones, 1992), 88-91.
[101] Francois-Xavier Guerra, *Modernidad e Independencias. Ensayos sobre las Relaciones Hispánicas* (México: Fondo de Cultura Económica, Editorial Mapfre, 1992), 107-109.

in tandem with the production of medical knowledge and information of its therapeutic use in the Atlantic world.

In addition, the circulation of medical treatises or handbooks on quina and topics related to its therapeutic use in pharmacopeias or fever treatises could be seen as part of a cultural and political process of Spanish implementation of modern state reforms and policies related to improving public hygiene during the second half of the eighteenth century. For instance, the historian Adriana Álzate has identified an increasing circulation of European medical treatises in the New Kingdom of Granada during this period. Criollos, physicians, friars, and merchants involved in correspondence networks were interested in reading and exchanging medical knowledge and practices through treatises such as Madame Fouquet's *Recueil des Remedes Faciles et Domestiques* (1675), Georges Cheyne's *Méthode Naturelle de Guerir les Maladies* (1749), and S. A. Tissot's *Avis au Peuple Sur sa Santé* (1761).[102] According to Alzate, this circulation of printed records helped to reinforce and shape the political and cultural roles of these individuals within colonial society.[103] In relation to treatises or handbooks related to the therapeutic use of quina, Alzate briefly mentioned Mutis' "El Arcano de la Quina", but no other treatises or manuscripts which circulated during the second half of the eighteenth century. However, she emphasized the fact that the observation, experimentation, and use of local plants increased, along with the circulation of European medical treatises or handbooks, correspondence, and newspaper articles in this period.[104]

Considering the increasing circulation of medical treatises related to therapeutic knowledge involving quina in Europe and the Spanish Atlantic world, this chapter focuses on

[102] Adriana María Alzate Echeverri, "Los Manuales de Salud en la Nueva Granada (1760-1810) ¿El Remedio al Pie de la Letra?," *Fronteras de la Historia*, No.10, ICANH, (2005): 210-220.
[103] Ibid., 211-215.
[104] Ibid., 231.

analyzing a Spanish approach to quina's therapeutic use through *Nuevas Utilidades de la Quina (1774)*[105]*,* written by Joseph Alsinet. Indeed, like many other European physicians, surgeons, or pharmacists of the eighteenth century, Alsinet was a physician imbued with the medical culture of experimenting with and recreating traditional therapeutic uses for American drugs such as ipecaucauna, guaiac, coca leaves, or quina.[106]

This chapter also attempts to answer these questions: How did Joseph Alsinet introduce a new way of using quina? Why did he advocate for a medical innovation of quina? Of what did Alsinet's quina maceration consist, which José Celestino Mutis mentioned in newspaper articles? Although scholars and historians of medicine have given little attention to Joseph Alsinet's medical work, his work represents a Spanish effort which innovated quina's therapeutic use. Indeed, a signal of his popularity was that his work circulated throughout Spain and its Atlantic colonies, and he became an authority in matters related to the use of quina. Even Spanish literary journals made his work public and reviewed it.[107] In addition, at least two physicians in New Spain kept Alsinet's *Nuevas Utilidades de la Quina (1776),* according to records from library

[105] A copy of Alsinet's *Nuevas Utilidades de la Quina* is located in the Colombian National Library, in which the Ex libris states that the book belonged to the Colegio de San Buenaventura de Santafé, a Franciscan school. The first two pages are missing from that book. See Alsinet de Cortada, José, *Nuevas Utilidades de la Quina. Demostradas, Confirmadas y Añadidas por el Doctor Don Josef de Alsinet, Médico de la Familia de su Majestad* (Madrid: Imprenta de D. Miguel Escribano, 17774), Libros Raros y Curiosos, RG 3580, BNC. For this chapter, I have used two copies, the Colombian National Library's digital copy and Spain's National Library's digital copy of Alsinet's text's first edition published in 1763. The edition from 1774 includes an appendix, which was not written for the first edition. Aside from the content in the appendix of the second edition, both editions keep the same content. See Joseph Alsinet, *Nuevas Utilidades de la Quina*. (Madrid: Imprenta de D. Antonio Muñoz del Valle. 1763) Biblioteca Nacional de España (hereafter cited as BNE).

[106] Pedro Laín Entralgo, *Historia de la Medicina Moderna y Contemporánea* (Barcelona: Editorial Científico-Médica, 1963), 319.

[107] Unsigned review of *Nuevas Utilidades de la Quina, Demostradas, Confirmadas, y Añadidas 1774*, by D. Joseph Alsinet, *Memorial Literario Instructivo y Curioso de la Corte de Madrid Número XXXIV*, October 1786, nos. 187-188,Hemeroteca Digital, BNE.

inventories.[108] Another printed book that circulated in colonies such as New Spain, Peru, as well as the New Kingdom of Granada, was a medical treatise on quina - *Tratado del Uso de la Quina (1791),* written by the Spanish physician Thomas de Salazar. In this treatise, he recommended to his readers that they follow Joseph Alsinet's therapeutic use and preparation on eliminating quina's bitternes.[109]

In the New Kingdom of Granada, for instance, Alsinet's printed copy belonged to the library of a Franciscan school in Santafé de Bogotá. Franciscans performed as empirical healers (*curanderos*),[110] and more importantly, they interacted with American nature through their work in journeys as missionaries and in natural expeditions.[111] Although it is difficult to establish how many readers or how many libraries kept a copy of Alsinet's book, as it has been mentioned before, an interesting indicator is the existence in libraries of Thomas de Salazar's treatise in which he points out Alsinet's quina use. Therefore, the purpose of this chapter is to understand the way in which the therapeutic use of quina circulated through medical printed books that were part of the colonial medical culture in the New Kingdom of Granada.

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[108] Patricia Aceves Pastrana, "Bibliografía Médico-Farmaceutica del Siglo XVIII Novohispano," in *Costruyendo las Ciencias Químicas y Biológicas* (México: Universidad Autónoma Metropolitana, Unidad Xochimilco, 1998), 107-113.

[109] Thomas de Salazar, *Tratado del Uso de la Quina* (Madrid: Imprenta de la Viuda de Ibarra, 1791) BNE, 111-112.

[110] The social phenomenon of empirical healers (*curanderos*) is an unexplored field of study for the New Kingdom of Granada. It was not only priests who were empirical healers - a famous case was Domingo Rota, who learned medicine by reading French or Spanish treatises. Some *curanderos* practiced medicine illegally, and others under administrative approval in moments when the absence of physicians was exceptional. See Antonio Martínez Zulaica, *La Medicina del Siglo XVIII en el Nuevo Reino de Granada. De Europa a América a través del Filtro Español. Una Gesta y un Drama* (Tunja: Ediciones La Rana y el Águila,1973), 160-163, 214.

[111] Santiago Díaz Piedrahíta and Luís Carlos Mantilla, *La Terapéutica en el Nuevo Reino de Granada. Un Recetario Franciscano del Siglo XVIII* (Bogotá: Academia Colombiana de Ciencias Exactas, Físicas y Naturales, No. 7, 2002), 50-55.

However, before analyzing *Nuevas Utilidades de la Quina,* it is important to have a general overview in mind about the way physicians administered quina for intermittent and tertian fevers. Therefore, through the lens of another Spanish physician, Andrés Piquer de Arrufat, the next section will describe Piquer's understanding of intermittent fevers and the way he used quina. Piquer's conception was not different from that of other European physicians, but his work has been selected because it was another Spanish medical bibliographical reference that circulated within the colonial cultural and medical spheres in the New Kingdom of Granada. Andrés Piquer's printed book *Tratado de Calenturas (1777)*[112] belongs to Santafé de Bogotá's Public Library.[113]

2.1 Quina and Fever.

Defining the concept of fever was an elusive task for European physicians in the early modern period - instead, they understood fever according to physiological and anatomical observations of corporeal and external events.[114] Andrés Piquer, for instance, focused on describing the development of fevers in the body in his treatise. Three elements were involved at the moment to obtain a medical description of fevers: observation, experimentation, and experience. Observing meant the use of the senses, experimenting referred to practicing what the senses had perceived, and experiencing was related to obtaining a rational deduction from the

[112] Andrés Piquer y Arrufat, *Tratado de las Calenturas* (Madrid: Joaquin Ibarra, Impresor de Cámara de S.M, 1777), Libros Raros y Curiosos, RG3726, BNC.
[113] The Colombian National Library holds twenty-one of Andres Piquer's works, such as: *Fisica Moderna Racional y Experimental (1745)*, *Lógica Moderna, o, Arte de Hallar la Verdad y Perfeccionar la Razón (1747)*, and *Institutiones Medicae (1773).* Four copies of Piquer's work *Tratados de las Calenturas* exist: two from the fourth edition in 1777, one copy from the second edition in 1760, and another from the first edition in 1751.
[114] Johanna Geyer-Kordesch, "Fevers and Others Fundamentals: Dutch and German Medical Explanations c.1680 to 1730," in *Theories of Fever from Antiquity to the Enlightenment,* ed. W.F.Bynum and V.Nutton (London: Wellcome Institute for the History of Medicine, 1981), 99.

observations and experiments carried out.[115] Piquer was an unsystematic physician, and upheld observation and experimentation over the synthesis of a particular medical author. He moved between the ancient and the modern, and between the Spanish and the foreign.[116]

However, this eclecticism did not exclude him from referencing medical classical authorities. Indeed, he kept a classical conception based on corporeal humours, and according to the humoural theory, a surplus of bile was responsible for generating fevers.[117] In the specific case of yellow bile, it was thought, for instance, that a person with an excess of bile was irascible, choleric, and impulsive. In some cases, a consequence of overheated bile within the body was that it turned into black bile, and this variation transformed the nature of the fever.[118] Indeed, Andres Piquer mentioned that "the mixture of bile with other humours produced fevers varieties."[119] He also followed a traditional division of fevers into three main groups: daily (*diarias*), putrid (*pútridas*), and hectic (*héticas*). In his medical treatise, Piquer focused on analyzing putrid fevers - which were frequent, epidemic, and dangerous during the second half of the eighteenth century - and implied putrefaction within humors. In addition, he also separated two species of putrid fevers: intermittent (*intermitentes*) and continuous (*continuas*).[120]

Andrés Piquer understood that heat altered body humours, causing the body to experience an increase in corporeal temperature, an unstable pulse, and damage to life functions all at the

[115] Jorge M. Ayala, *Andrés Piquer (1711-1771)* (Madrid: Ediciones de Orto, 1996), 30.
[116] Manuel Mindán Moreno, *Andrés Piquer. Filosofía y Medicina en la España del Siglo XVIII* (Zaragoza: Sociedad Económica Aragonesa, 1991), 215.
[117] Noga Arikha, *Passions and Tempers. A History of the Humours* (New York: Harpers Collins Publishers, 2007), prologue, 6-11.
[118] Ibid., xviii.
[119] Andrés Piquer de Arrufat, *Tratado de las Calenturas,* (Madrid: Joaquín Ibarra, Impresor de Cámara de S.M, 1777), Libros Raros y Curiosos, RG3726, BNC, 28.
[120] Ibid.,5.

same time.[121] Moreover, in order to understand the role of putrid fevers, physicians also needed to attend to particularities that allowed them to establish which bodies were conditioned to experiencing these types of fevers. Although most of the different putrid fevers (intermittent or continuous) shared common physiological symptoms, these fevers varied, depending on how the body was capable of igniting humours. For instance, a case of specific continuous fevers could often be seen in young people, who tended to develop an ardent fever in summer. Most of these patients had ingested alcoholic drinks such as wine or spirits, and their developed passion was wrath. These patients complained of excessive heat and thirst, looked sad and jaundiced, and did not have the strength to eat or get out of bed.[122] In this case, the alteration and predominance of yellow bile was visible. Experiencing thirst was a sign of the excessive burning sensation which was usually located in the patient's chest or stomach, and delirium was an effect of overheating as well. Since there was a presence of phlegmatic humour, the patients also felt coldness in their limbs and their tongue was usually white and dry. These fevers lasted almost forty days, and if the patients sweated or bled through their nose, it meant they would soon recover. Nevertheless, these fevers could mutate into a pulmonary disease during winter or spring, or also turn into intermittent or tertian fevers.[123]

External causes that would provoke a morbid cause within the body were diet and non-natural causes, such as passions and the air. According to Piquer, the air was the common and universal cause among all the possible causes known at the time. It was corrupted, depending on the influence of the stars[124] or fumes inhaled from the ground.[125] and in addition, its corrupted

[121] Ibid., 2.
[122] Ibid., 34-37.
[123] Ibid., 49-70.
[124] For Piquer: "stars had a powerful influence on diseases." Andrés Piquer, *Tratado de las Calenturas*, 27. In early modern times, astrology could explain causes for diseases and could even determine when and

quality was not the same every year, which explained why different types of fevers existed. Also, bodies' dispositions played a role in the way the corrupted air caused fever - for instance, Hippocrates observed that men sometimes became ill more easily than women, and that hypochondriac men did not fall ill because their blood did not become putrefy easily.[126] The theory of the air or miasmas to explain epidemic and marsh diseases dominated the medical world until the nineteenth century.[127]

Intermittent fevers did not afflict patients with fever constantly - they had it on some days, but not on other days. Patients experienced remission periods of fever or ague.[128] Two types of intermittent fevers existed: tertian and quartan - tertian involved febrile fits every third day, and quartan every fourth day. Climate and geographical aspects conditioned the disposition of bodies to develop tertian fevers. Based on his own experience in Valencia, Piquer explained, "Those who live near lakes or swampy places where water is corrupted tended to have tertian fevers."[129] In addition, he added that, "places which usually have a prolonged hot and wet climate are favourable for this fever."[130] Andres Piquer had witnessed the way intermittent fevers had killed people in Valencia, and observed the relationship between swampy rice fields and its influence on the spread of fevers. Indeed, Valencia confronted sanitary problems during a time when its population was increasing. Putrefied organic matter contaminated the water that people drank,

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how to apply medicines and perform surgical procedures. See Jesús María Galech Armillano, *Astrología y Medicina para todos los Públicos: las Pólemics entre Benito Feijoo, Diego Torres y Martín Martínez y la Popularización de la Ciencia en la España de Principios del Siglo XVIII* (Ph.d Dissertation: Universitat de Barcelona, 2010), 53-59.

[125] Andrés Piquer, *Tratado de las Calenturas*, 23.

[126] Ibid., 21-22. Marcelo Frías Núñez, "El Discurso Médico a Propósito de las Fiebres y de la Quina en el *Tratado de Calenturas* (1751) de Andrés Piquer," *Asclepio,* Vol. LV (2003): 224-225.

[127] See Carlo M. Cipolla, *Miasmas and Disease: Public Health and the Environment in the Pre-Industrial Age* (New Haven: Yale University, 1992) and Alain Corbin, *The Foul and the Fragrant: Odor and the French Social Imagination* (Cambridge, Mass: Harvard University Press, 1986).

[128] Ague or paroxism was a stage of the fever presenting the triad: chills, fever, and sweating.

[129] Andrés Piquer, *Tratado de las Calenturas,* 291.

[130] Ibid., 292.

and sometimes this putrefaction emanated pestilent air when stagnant waters dried, especially during summer and autumn.[131]

Therefore, corporeal humours produced the tertian fever when they were saturated with excessive humidity, overheated, and were acrid. During autumn and spring, these fevers were epidemic, but in autumn, the igneous substance within the air worsened them. Tertian fevers were uncertain to physicians - although it was not known where in the body the tertian fever resided, it was thought to be the stomach because the intestines were extremely humid. In relation to the irregularity of the fever's repetition, Piquer confessed, as Sydenham had previously done, "he simply did not know the reason for the repetition."[132] In addition, bodies with quartan fevers experienced the same symptoms as those with tertian fevers. The difference between the two was related to the time of the febrile attacks during the six hours when the patient experienced shakes and coldness - these symptoms disappeared in two days and reappeared every fourth day. Overall, putrid fevers did not represent a danger to any patient as long as they did not mutate into a different disease. It was important to let the body fight naturally against the morbid cause, though in addition to nature's effect, the proper use of medicinal therapy would also guarantee recovery.

It is important to note that therapeutic treatments gave attention to traditional practices related to the patients' diet and lifestyle, so bloodlettings, purges, and clysters were practiced in the early modern period. Although the introduction of new drugs became common in the European medical world and European physicians were experimenting with ipecacuana, guaiac,

[131] Ruben Bueno Marí and Ricardo Jimenez Peydró, "Crónicas de Arroz, Mosquitos y Paludismo en España: El caso de la Provincia en Valencia," *Hispania. Revista Española de Historia*, no.236, vol. LXX (2010): 689.
[132] Andrés Piquer, *Tratado de las Calenturas,* 293-294.

mercury, some physicians still preferred to trust in nature's power to heal a disease.[133] Citing Hippocrates, Piquer mentioned that nature itself knew how to heal diseases, and this was why it was able to expel everything harmful from the body and restore order back into it.[134] Piquer, therefore, was against the use of several pharmaceutical remedies to cure fevers. He believed that physicians sometimes worsened a disease with the excessive use of balsams, emetics, pills, and purgatives. He thought that although remedies such as opium and quina had been proven to relieve pain, some physicians had abused these and prescribed them without any control, altering not only the use of the drug but also the disease itself.[135]

Nevertheless, for Piquer, the therapeutic use of quina was confined to tertian and quartan fevers. After observing and experiencing the development of these fevers in patients, he could prove that quina was an effective treatment. In cases of semi-tertian or tertian fevers, he recommended natural powdered quina after performing a bloodletting or administering an emetic. For these fevers, Piquer also mentioned that if the patient had a high temperature, dry tongue, and fiery face, the physician had to bleed them first, but if the patient had humidity within his or her body, the physician had to use an emetic.[136] However, for the case of a tertian malignant fever, he suggested using quina without performing any evacuation procedures - the body needed to be free from any alteration caused by these. Tertian malignant fevers were, according to Piquer, one of the most dangerous fevers because the patient suffered even with the absence of fever by experiencing sweating. Humours would become inflamed, and this fever was often related to environmental causes.[137]

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[133] Roy Porter, *Blood and Guts. A Short History of Medicine* (New York: W.W. Norton, 2002), 100.
[134] Andrés Piquer, *Tratado de las Calenturas,* 17-18.
[135] Ibid., 80-81.
[136] Ibid., 295.
[137] Ibid., 296.

Piquer suggested quina for quartan fevers, but it was not always useful because instead of healing the fever, quina could cause it to return. For this type of fever, Piquer recommended time and good diet.[138] He supported the therapeutic use of quina because physicians such as Francesco Torti, Richard Morton, or Thomas Sydenham recommended it, but he recommended using it prudently because he thought that an excessive use of quina produced inflammation and death in patients. This traditional way of using quina, in which its therapeutic use was confined to a powdered remedy for tertian fevers, remained in Spanish medicine. However, as it will be explained in the next section, Joseph Alsinet made an effort to introduce a new therapeutic method to use quina - not only to heal fevers, but also for other diseases, and as a black dough without the bitter taste.

2.2 Quina: A "Prodigious" Remedy.

It was not surprising that a Franciscan library kept Joseph Alsinet's *Nuevas Utilidades de la Quina* - a Franciscan medical handbook from the eighteenth century that circulated in the New Kingdom of Granada, which recommended "to take one ounce[139] of quina powdered with four or five spoons of *aguardiente* (local brandy liquor) and boiled water, this infusion relieved any stomach pain when taken as one or two cups per day."[140] It was known that making use of wine or any other alcoholic spirit such as *aguardiente* was important for therapeutic purposes - wine, for instance, acted as a warm and dry drink capable of reducing cold in the body.[141] Another prescription to alleviate any type of fever recommended "to mix two ounces of quina with half

[138] Ibid., 296- 297, 299-300.
[139] According to Spanish Pharmacopeias of the eighteenth century, an ounce was equivalent to twenty-four grams and eight decigrams. Drachmas were another important measure - they were equivalent to three grams and six decigrams. See Antonio, Montes Ruíz, "Pesas y Medidas en las Farmacopeas Españolas de los Siglos XVIII al XIX," *ARS Pharmaceutica* 51, Suplemento 3, (2010): 670.
[140] Santiago Díaz Piedrahíta and Luis Carlos Mantilla, *La Terapéutica en el Nuevo Reino de Granada…*, 149.
[141] Adriana María Alzate Echeverrí, *Geografía de la Lamentación…,*129.

orange and cinnamon rinds and half of *aguardiente*, prepare an infusion with the previous mixture and filter; drink the mixture according to recommended doses."[142] Although the specific author and date of this medical handbook are unknown, it allows us to suppose that the Franciscans empirically experimented with and practiced unconventional therapeutic methods involving quina in the viceroyalty.

Joseph Alsinet's *Nuevas Utilidades de la Quina* and the Franciscan medical recipes were part of a common space - the Franciscan library. Although it is impossible to know if reading Alsinet's work inspired the preparation of Franciscan medical recipes, both medical works shared a common purpose - making medicine accessible to a wide audience apart from that in universities and among physicians. This was possible through the circulation of medical handbooks written in vernacular and informal language. In this way, Alsinet underlined the importance of publishing his medical text on quina in Spanish rather than Latin, as well as the fact that patients did not understand technical terminology and preferred to hear clear and practical terms from their physicians.[143]

Therefore, it is important to note that medical treatises experienced shifts in the way that these conveyed and produced medical knowledge and practices, which also had an influence on how physicians presented therapeutic methods involving quina during the second half of the eighteenth century. Not only was it significant to write medical treatises in vernacular languages, but in addition, Joseph Alsinet and other European (especially Dutch and German) or American physicians and practitioners were interested in expressing their observations in a detailed and comprehensive way, almost to the point "that even those who know nothing would then

[142] Santiago Díaz Piedrahíta and Luis Carlos Mantilla, *La Terapéutica…,* 149.
[143] Joseph Alsinet, *Nuevas Utilidades de la Quina (1763)...*, no.9-11.

comprehend as much as if he himself experienced it and had treated the patient."[144] Another way for them to present their medical knowledge was to gradually detach themselves from classical and modern references, and instead give attention to experiences and observations made in towns, hospitals, or private homes. Finally, presenting a new method of using quina, as well as other medications in general, represented an end for the benefit of public health.

Joseph Alsinet began his work as a physician in 1731 - he was, like Andrés Piquer, a royal chamber physician. Additionally, Alsinet was recognized as the "physician of tertian fevers" because he would visit and observe patients with intermittent fevers throughout different towns in Spain.[145] Aside from the publication of his first and second edition of *Nuevas Utilidades de la Quina,* in 1776, Alsinet also published a Spanish translation of Pierre Pomme's *Traité des Affections Vaporeuses des Deux Sexes (1767).* However, how did Alsinet present his experiment and new therapeutic method of using quina? It has been mentioned before that drawing attention away from classical and modern authorities became an aspect that physicians considered when they were writing medical treatises during this period. For Alsinet, this was expressed through the physician's free will.

Although medical authorities on the subject of quina such as Francesco Torti, Thomas Sydenham, Richard Morton, and Gerard van Swieten influenced Alsinet's work, in order to present his new method, it was not enough for him to simply follow them. The purpose, however, was not to forget these authorities - instead, it was to stop making medical observations through their gaze and become able to compare his own observations with those of Torti, Sydenham, or

[144] Johanna Geyer-Kordesch, "Fevers and Others Fundamentals…," 113.
[145] Anastasio Chinchilla, *Anales Históricos de la Medicina General: Historia de la Medicina Española, Tomo Tercero* (Valencia: Imprenta de D. José Mateu Cervera, 1846), 50. Juan Riera, *Capítulos de la Medicina…* 85.

Hippocrates.[146] After all, Alsinet believed that any physician had his own way of observing and understanding the disease in his patient - he knew his patient's age, temper, and way of life.[147] Moreover, physicians' free will was also related to the social role that the physician began to develop.[148]

According to Alsinet, his work on quina would contribute to the benefit of public health.[149] At the time when he published his first work on quina in 1763, the Spanish state had started to apply policies to improve public health throughout its territories, and later within its colonial domains as well. Spanish public health policies also sought to benefit economic productivity, so medicine became an important tool for the instauration of social order. This social order was linked to producing healthy bodies and fighting against diseases through the implementation and innovation of therapeutics being conceived collectively, rather than individually. Signs of social disorder were manifested not only through disease or body disequilibrium, but also through filth and pestilent air. Reformative measures, for instance, entailed relocating graveyards away from the city and restructuring hospitals' infrastructure.[150] Also, Alsinet esteemed that the Chief Minister Ricardo Wall was sent to demolish and build up other houses, improving the circulation and ventilation of air.[151] The relationship between the body and the urban space had begun to acquire an important role in medicine during this period. Overall, Alsinet was a physician interested in promoting the virtues of quina that were related to creating a collective proper use for the benefit of public health.

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[146] Joseph Alsinet, *Nuevas Utilidades de la Quina (1763)...*, no. 2.
[147] Ibid., 7.
[148] Pedro Laín Entralgo, *Historia de la medicina ...,* 356.
[149] Joseph Alsinet, *Nuevas Utilidades de la Quina (1763)...*,no. 3.
[150] Adriana María Alzate Echeverri, *Suciedad y Orden. Reformas Sanitarias Borbónicas en la Nueva Granada 1760-1810* (Bogotá: Universidad del Rosario, 2007), 33-34.
[151] " Por las alegres y espaciosas calles corre, y se agita el aire con la mayor libertad, lograndose por este medio una copiosa, y sana ventilación." See José Alsinet, *Nuevas Utilidades (1763)*…, no. 5-6.

Promoting a new therapeutic use for quina benefited public health, according to Alsinet. The purpose of this was not to promote self-medication - Alsinet knew that a patient valued a physician's knowledge as much as the physician appreciated his patient's collaboration in order to make the disease understandable to the physician.[152] Observing the development of diseases in the patient's daily life offered more tools to experiment and observe than a closed library or academic cloister, and this also shaped the relationship between the physician and the patient. Alsinet, for instance, stated that patients preferred physicians who would not distract them with medical theories or discussions[153], so he believed that a good physician did not need a book to cure disease because he was the one who visited, explored, and observed his patient.[154]

However, how did a physician know how and when to use quina to cure fevers? Was quina useful for curing other diseases? How did Alsinet change the method of using quina? The methods of using quina were at the physician's discretion, but nonetheless, it was possible to prove quina's efficacy through observation and experience. Alsinet knew that physicians rejected quina because it was shown to fail in healing fevers, but for him, a bad quality of the bark and the method of administering the medication was the problem, not the plant itself or the physician. The problem was knowing how and when to apply quina - which method to use. Therefore, a physician should register and experience as many observations as possible in order to validate his method of using quina. Senses would not fail physician practices because they were validated through the experience of observing the process several times.[155]

[152] Ibid., no.11-12.
[153] Ibid.,no.12.
[154] Ibid., 8.
[155] Ibid., 9.

Back in the seventeenth century, however, Spanish pharmacologists interested in understanding natural substances[156] recognized that quina as a medication was bitter in smell and taste, and hot in sensation. The effect of the quality of bitterness on the body was that it warmed up, set up, attenuated, and dissolved unbalanced humours.[157] Changes became visible with that method of administering quina during the second half of the eighteenth century. Indeed, quina kept its specific virtue of curing intermittent fevers, though this remedy began to be used for other diseases or ailments such as gangrene or malignant fevers. In fact, it is important to keep in mind that the therapeutic use of quina went through different processes of experimentation all through the eighteenth century until the mid-nineteenth century.

According to Andreas-Holger Maehle, British surgeons introduced empirically new uses for quina starting in 1730. In order to gain upward social recognition of their role as surgeons within the medical world, British surgeons experimented with quina on patients with gangrene. This medical condition included different sorts of ailments related to external and internal wounds, leg ulcers, and mortifications on body limbs, and quina became helpful because patients with gangrene experienced fever - surgeons believed that quina attacked the patients' fever, improving the recovery process. For instance, John Rushworth gave quina during fever remission to a patient who suffered foot mortification, and as a result, the fever did not return and the patient recovered.[158]

Andreas Holger also explained that quina was administered as a bolus (or the starch to which Mutis was referring in the *Papel Periódico de Santafé de Bogotá*) that the patient needed

[156] Paula Ronderos, *Discurso Farmáceutico sobre los Cánones de Mesue. Migue Martínez de Leache. Boticario Natural de la Ciudad de Tudela* (Bogotá: Instituto Colombiano de Antropología e Historia, 2010), 17-24.
[157] Estela Restrepo Zea and Hugo A. Sotomayor Tribín, *El Medicamento en la Historia de Colombia* (Bogotá: Editorial Nomos, Schering-Plough S.A. 1997), 94-95.
[158] Andreas-Holger Maehle, *Drugs on Trial*…248.

to swallow every four hours,[159] and John Shipton summarized different experiments involving quina by surgeons before him and concluded that quina was effective as a styptic "in internal and external bleedings, and that it stopped excessive evacuations."[160] The effectiveness of these experiments spread throughout different regions in Europe, such as France. Although these new experiments with quina included failures, quina's therapeutic use for gangrene had proven that it was not confined to curing intermittent fevers, but could also cure external ailments related to injuries or wounds when applied topically or used in clyster forms.[161] Quina came to be known as a prodigious remedy.

These innovations with quina influenced Alsinet's work on experimenting with quina. For him, quina was a prodigious remedy that should not only be used for intermittent fevers, but also for other diseases, imitating what foreign physicians - British or French - had been doing in the eighteenth century.[162] Trials with quina were important in order to understand that physicians had to put their medical ideas into practice in their daily lives. These trials were also meant to support the use of quina - for Alsinet, since the problem was not quina's lack of efficacy, it was necessary to know how the patient could better digest it.[163]

Alsinet's *Nuevas Utilidades*, therefore, focused on approaching different methods of administering quina to patients. Spanish physicians usually gave quina to the patient during the remission period of the fever paroxysms. However, Alsinet believed that the problem with this method was that during the free hours of remission, patients became exposed to cold air, causing

[159] Ibid.,247-255.
[160] Ibid., 252.
[161] Ibid., 255.
[162] José Alsinet, *Nuevas Utilidades (1774)…,* 134, 147.
[163] Joseph Alsinet, *Nuevas Utilidades (1763)…, 27*-28.

a relapse.[164] According to a foreign physician - whose name is unknown - Alsinet's first new method of giving quina consisted of giving an emetic during the day of relief. The next day, which was the ague's day, he gave one drachma of quina, another two hours later, then half a drachma after six hours, finishing with two drachmas after ten hours. After taking these drinks (*tomas*), the ill patient's fever ended with benign sweating and the patient recovered. However, Alsinet was not satisfied with the irregular distribution of this method, so he changed this and distributed one ounce of quina in eight parts. Therefore, he first gave two drinks, a third drink after three hours from the second one, and then the rest of the drinks every four hours.[165]

According to Alsinet's observations, quina should be given on an empty stomach in order to prevent any sort of evacuation expelled from the body. Although physicians recommended that the patient take quina after recovering, he believed this was not necessary so he avoided it. Instead, the important matter was that patients did not retain quina in their stomach because this hardened the spleen, obstructed the entrails, and thickened fluids.[166] Overall, Alsinet needed to observe the patient's daily rhythms in relation to the rhythm of paroxysms, and also if their stomach was inflamed or not, among other corporeal reactions related to its use which the physician needed to learn how to read.

Like many other European physicians, Alsinet thought that the virtue of quina was a mystery. A "casualty", however, made him claim that it was not in its bitterness or its "astringent particles" that the medical properties resided[167], and thanks to this "casualty" in his work, he introduced his method of removing quina's bitterness without making it lose its medical virtue. Indeed, he described his new second method as a "casualty", as a way to justify his experiment of

[164] Ibid., 4-5.
[165] Ibid.,10-12.
[166] Ibid., 24-26.
[167] Ibid., 31-32.

transforming quina into a macerated black dough remedy. After all, Alsinet was not an empirical healer or charlatan.

Therefore, he researched classical and modern medical authors' arguments in order to support his new method of using quina. Although the authors he mentioned did not explain how to remove quina's bitter taste, he mentioned, for instance, that Jean-Jacques Manget suggested that the best way to administer quina was diluted and concocted - this would improve the digestion process developed within the stomach's juices and fluids. For Manget, the process of cooking quina removed its bitter taste, although his patients recovered with the quina he administered. Another one of Alsinet's references was Anton de Haen who, according to Alsinet, improved his preparation of quina over nine years - this preparation consisted of cooking quina with water in order to obtain liquor.[168]

Alsinet experimented with his black quina dough on feverish patients and obtained positive results. The method used to remove quina's bitterness consisted of first adding a half quart of red or white wine and two or four ounces of powdered quina into a glass casserole. After stirring with a wooden spoon, the mixture of wine and powdered quina would boil and turn into dough. The dough would cool down and be stored in a canned pot, then be kneaded and allowed to settle on brown paper every second or fourth day.[169]

The learned person or physician interested in preparing the quina dough would see black remains in the canned pot until winter. If someone preferred to have the quina without any bitterness, Alsinet recommended leaving the maceration inside the canned pot. However, if

[168] José Alsinet, *Nuevas Utilidades (1774)*, 157-158.
[169] Ibid., 160-162.

someone preferred to use the dough in order to keep its bitter taste, this was possible as well.[170] As a result of this experiment, Alsinet deduced that quina's virtue was related to its tonic particles, which communicated with the cause of fever. Thanks to the effect of quina on the body, it became flexible, the fatigue disappeared, and the ill patient recovered.[171] Alsinet became known for this black quina maceration in the New Kingdom of Granada, and it is probable that his effort to apply an empirical method may have influenced the way in which colonial actors experimented with quina late in the eighteenth century.

This chapter has described how the process of the circulation of quina stayed in tandem with the circulation of medical knowledge and became part of colonial medical culture. This cultural process developed not only the intersection of production of a cultural medical dialogue between the metropolis and its viceroyalty, the New Kingdom of Granada, during the second half of the eighteenth century.

Joseph Alsinet's work has illustrated the importance of not only approaching a different method of using quina, but also promoting the instauration of public health and social order.[172] In this way, in agreement with the historian Adriana Álzate, this chapter has been an attempt to add another example of the increasing circulation of printed medical books in the viceroyalty. Indeed, as Álzate has mentioned, despite the lack of stable medical lectures or universities in the New Kingdom of Granada, and even the lack of licensed physicians, other spaces such as public or private libraries, social gatherings, and correspondence exchanges in periodical newspapers or letters became means to transmit colonial medical knowledge.[173]

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[170] Ibid., 163-165.
[171] Joseph Alsinet, *Nuevas Utilidades (1763),* 32-33.
[172] Adriana María Álzate Echeverri, "Los Manuales de Salud…", 210-211.
[173] Ibid., 211-252.

Another aspect to consider was that Piquer and Alsinet were chamber physicians, and the reason why their work circulated was that these medical treatises were valuable printed books to be circulated within the Spanish kingdoms. Many of these medical treatises were brought by Spanish or European physicians and religious members, while other books came intra-regionally from the displacement of American *criollos* from Quito, Lima, or New Spain, and others came as provisions for commissions or royal expeditions, as in the case of commissions with quina and during the development of royal botanical expeditions.

Printed books moving from one side of the ocean to another reflected the cultural and social dynamic developed in the Spanish Atlantic world. Another interesting consequence of the proliferation of books was that medical information about quina and fever was not only confined to reach the learned group of *criollos* and Europeans. If Joseph Alsinet presented his book to a wide audience of learned people, physicians, patients, or any one interested in learning about the use of quina, it is possible to suggest that medical treatises and handbooks circulated between empirical healers and common people (*vulgo*) who could have practiced and appropriated medical information about quina and its therapeutic use.[174] Moreover, due to the lack of research on the topic about colonial medical libraries, reading practices, and the exchange of medical information through printed books, this chapter suggests the need for further research based on understanding the role of European medical printed books in the Spanish Americas.

The roles of observing and experimenting were important in order to understand possible shifts in the use of quina during this period. European and colonial physicians went through an identity process that implied the gradual change, not only of their practice, but also of the medical theories and ideas that different physicians were following in the eighteenth century. However, an

[174] Antonio Martínez Zulaica, *La Medicina del Siglo XVIII...,* 214.

ambiguity determined a physician's identity between that of someone who was sharing medical knowledge from a learned physician and that of an empirical healer. Alsinet did not actually recognize that he was mixing and creating other versions of quina as an empirical healer would do. Instead, he preferred to explain that "strange casualties" led him alter quina, and he even tried to support his experiments with classical or modern medical authorities.

Nevertheless, as Alsinet claimed, it was necessary for physicians to become aware of the fact that ideas had to be taken into practice through the development of trials and clinical observations. Experimenting with quina became an important matter of discussion and a way of exchanging and producing medical knowledge and information in the Spanish Atlantic world. In the New Kingdom of Granada, for instance, the process of the circulation of quina developed social and cultural interactions through the development of local experiments. This process on how the New Kingdom of Granada's quina became known within the medical Spanish Atlantic world at the end of the eighteenth century will be developed in the next chapter.

CHAPTER THREE

In Search of the *Precious Bark*: Quina on Trial in the New Kingdom of Granada (1770-1806)

Ilaria was a forty-three year old female slave with a robust complexion, who became ill with tertian fever and recovered by taking powdered quina. Another slave, Juan María, was twenty years old and also robust, and took quina to cure severe chills. Soberina was a fifty year old slave who had given birth many times in her life, so she was weaker. She took also powdered quina to cure tertian fever chills.[175] All three worked in the *Hacienda Materrodonda,*[176] in Popayán, along with eleven other slaves who also took powdered quina to heal chills and tertian fevers. The *Hacienda's* administrator and a physician named Cortés supervised the effects of the powdered quina on these slaves.

Not far from Popayán, in the jurisdiction of Caloto, more than seventeen slaves working in the mines of San Antonio and Santa Maria (including women, men, and children) who experienced tertian fever, quartan fever, and chills took the same powdered quina. The dosage varied depending on the slave's age, gender, body complexion, and type of fever.[177] In addition, eight cases of free people and other "uncountable cases" of slaves from the mines of Jelima and Quinamayó, again near Caloto, were cured from all "kinds of chills" with extracted and

[175] "Relación de Personas Que Han Sido Curadas de Calenturas con Quina en la Jurisdicción de Caloto," 1805, RJB03/0005/0001/0030, ARJBM, 1r-v.

[176] The *Hacienda Matarredonda* was a Jesuit ranch. After their expulsion from Spanish American territories, the Arboleda family, whose members were wealthy mine managers, bought it in 1778 in Popayán. According to Germán Colmenares, the *Hacienda* owned more than a hundred slaves. Most of the lands that covered the geographical area of Popayán, Caloto, and Cauca were gold mining centres with extensive ranches. See Germán Colmenares, *Historia Económica y Social de Colombia. Popayán una Sociedad Esclavista 1680-1800, Tomo II* (Bogotá: Tercer Mundo Editores, Primera reimpresión, 1999), 173-196.

[177] "Relación de Personas Que Han Sido Curadas de Calenturas...," 1r-v.

powdered quina.[178] Overall, more than forty-three slaves, including eight free people, were cured with quina. All these cases were registered on an account written between 1805 and July 1806.

In the New Kingdom of Granada, slaves' medical complaints were related to diseases such as yaws, smallpox, leprosy, syphilis, and musculoskeletal defects (hernias, broken bones, sprains), as well as skin ailments.[179] Although the hot and dry climate, as well as the difficult working conditions in mines, would produce tertian, quartan, or intermittent fevers, these specific types of fevers had not been common ailments among slaves in the interior of the viceroyalty. Nevertheless, the central point of the slaves' account mentioned above was not to illustrate their health condition or their value for trade when they were ill[180] - instead, it was to know the therapeutic success of "a red type of quina with white flower"[181] native from the Popayán, Caloto, and Cauca mountains.

The New Kingdom's native quina had gained acceptance and rejection for its medical properties at the beginning of the nineteenth century. In travel diaries written between 1801 and 1802, Alexander von Humboldt and Aimé Bonpland recognized red and yellow quina trees once they entered the Andes forest to explore it. When Humboldt met José Celestino Mutis, he praised the medical virtues of the New Kingdom's quina.[182] In addition, the upcoming generation of *criollos* and naturalists from the nineteenth century such as Francisco José de Caldas, Jorge

[178] Ibid., 1v.
[179] David Chandler identifies "fevers" and "chills" in colonial slaves of the New Kingdom of Granada, but he does not identify specific types of fever; he probably refers to fevers as symptoms or causes from other diseases. David Lee Chandler, *Health and Slavery: A Study of Health Conditions Among Negro Slaves in the Viceroyalty of the New Kingdom of Granada* (PhD diss., University of Tulane, 1972), 179, 255.
[180] To understand the role of colonial slaves's bodies in medicine, see Piedad Peláez Marín, "El Cuerpo, la Salud y la Enfermedad en los Esclavos del Nuevo Reino de Granada. Siglo XVIII," *Historia Crítica*, No. 46, Enero-Abril (2012): 161-168.
[181] "Relación de Personas Que Han Sido Curadas de Calenturas…," 1r.
[182] Alexander von Humboldt, *Alexander von Humboldt en Colombia: Extractos de sus Diarios Preparados y Presentados por la Academia de Colombiana de Ciencias y la Academia de Ciencias de la República de Alemania* (Bogotá: Ediciones Flota Mercante Gran Colombiana, 1982) 43-44a.

Tadeo Lozano, Antonio Zea, as well as physicians, merchants, and viceregal authorities knew that untouched quina trees existed aside from the ones near Santafé de Bogotá.

The account of the experiment on slaves mentioned above was one of several different experiments carried out with quina from the New Kingdom of Granada in the early nineteenth century.[183] However, going backwards, how did viceregal and peninsular authorities, learned *criollos,* physicians, and pharmacists convey medical trials in order to promote native quina? What did Sebastián López Ruiz do when he found quina in this viceroyalty? Also, what did José Celestino Mutis and the viceroy do as soon as López Ruiz was dismissed as quina commissioner?

This chapter is an attempt to reconstruct medical experimentation with native quina, perceived as a process which began with López Ruiz in the New Kingdom of Granada during the second half of the eighteenth century. More than theorizing about the mode of action for the new quina on fevers or any other diseases, colonial trials were efforts to validate quina's medicinal use for economic purposes, so they required the display and performance of colonial medical knowledge. According to the historian Renán Silva, quina experimentation was a "collective activity" that reinforced a community of learned *criollos* who shared social, economical, and cultural values.[184] However, which medical practices and knowledge were involved in the development of this collective activity, and how did quina experimentation shape colonial medical culture?

In order to answer these questions, this chapter describes quina trials which were part of the process of the circulation of quina during López Ruiz's commission between 1776-1782. This

[183] The Colombian historian Renán Silva coined the phrase "quina dream" (el sueño de la quina) to illustrate how a group of learned *criollos* desired to earn economic and political profit from an emerging quina trade. For instance, Silva explains the case of Jerónimo Torres in his quest to harvest quina in Popayán. See Silva, Renán, *Los Ilustrados de la Nueva Granada (1760-1808)…,*422-427.
[184] Ibid., 425.

process continued with efforts made during José Celestino Mutis' phase as director of the Royal Botanical Expedition and new quina manager (1782-1800). A second part of this chapter describes the method of using native quina in a healing plan for a military expedition in Darién in 1786. The objective of this subsection is to illustrate that Mutis cannot be considered a protagonist figure in the circulation of the New Kingdom of Granada's quina.

3.1 A Mulatto Wanderer's Rediscovery.

Juan Pimienta, Cartagena de Indias' governor, informed the viceroy Manuel Antonio Flores that he had received two kinds of quina in January of 1777. Mompox's mail administrator had delivered both in a henequen poke - one was marked with the letter **A.** and the other with **B**. As soon as the governor received the package, he sent it to Cartagena's *Protomédico*, Francisco Xavier Pérez, in order to have it used in experiments on fever patients. They needed to verify that those quina samples had, indeed, similar medical properties to the quina from Loja. The governor promised to report the medical results of observations made with both kinds of quina.[185]

Overall, this account will unveil two key aspects important for the development of this chapter's section. First, quinas **A.** and **B.** mentioned in this report were López Ruiz's quina sample collection from Tena's mountains near Santafé de Bogotá. Thanks to the development of this collection, López Ruiz obtained the royal charge as first quina commissioner of the viceroyalty. Second, it will illustrate the efforts of colonial administrative authorities, as well as that of physicians, pharmacists, and surgeons, whether or not they were licensed, to make local medical observations with quina before it could be sent to the Spanish court. However, how did

[185] "Quina su Aplicación Terapéutica en Cartagena," 1777, Fondo Milicias y Marinas, SC: 37, Legajo 77, Archivo General de la Nación de Colombia (hereafter cited as AGN), 159r-v, 160v.

López Ruiz collect the samples, how did colonial authorities become involved in this process, and which results brought observations of trials made in Cartagena de Indias?

In order to answer these questions, it is important to keep in mind the context that made it possible for López Ruiz to become a quina commissioner. From 1750 onwards, colonial administrative authorities from the New Kingdom, the Kingdom of Peru, and the *Audiencia de Quito* began to intervene on the circulation of quina. Alongside rumours about Loja's possible shortage of quina, other events led to a readjustment of economic and political policies on quina. These events were meant to stop the circulation of fake quina (adulteration),[186] increase money coming into the Real Hacienda (royal treasury), and control smuggling.[187] Also, the demand for quina increased during wartime (the Seven Years' War and the American War of Independence) due to the spread of malarial diseases, and this would bring economic and political benefits for the empire.

Considering these series of events, José Pizarro, the New Kingdom's viceroy (1749-1753), sent the Panamanian Miguel de Santiesteban on a mission to explore different regions in order to harvest quina from trees near Quito and Loja. As a result, Santiesteban mentioned in a 1753 report that he had found quina trees in the north of the *Audiencia de Quito* (Jaén and Riobamba) and had also recognized trees near Popayán and Santa fé de Bogotá in the New Kingdom of Granada. He drew a quina plant and collected dried samples from Loja, but never took or illustrated samples from the trees he saw in the New Kingdom of Granada.[188]

[186] Matthew James Crawford, "Para Desterrar las Dudas…," 195-197.
[187] Alba Luz Moya Torres, *Auge y Crisis…*, 25.
[188] David J. Robinson, *Mil Leguas por América. De Lima a Caracas. Diario de Don Miguel de Santiesteban, 1740-1741* (Bogotá: Banco de la República, 1992), 27-29, 37.

Santiesteban's report circulated widely in Spanish colonial regions. He shared his drawings and dried samples with José Celestino Mutis in 1761, and although these samples corresponded to a different species from the one in Loja, Mutis sent them to Carl Linnaeus in 1764, who ended up describing the information about this quina as a *Cinchona Officinalis* in his *Systema Naturae* (1767).[189] In addition to Santiesteban's report, he also advocated for the establishment of a royal monopoly - according to him, an *estanco* of quina would represent a mechanism capable of bringing public health and economic benefits for the kingdom.[190] This *estanco* proposal was discussed again between 1773 and 1775 among viceregal authorities such as viceroys from the New Kingdom of Granada, crown attorneys from New Spain and Peru, and viceregal accountants,[191] and the meeting (*Consejo Pleno*) was organized in order to inform the Spanish court about the need for the *estanco*.[192] In the meantime, while colonial authorities were expecting to implement policies for the *estanco*, the physician López Ruiz claimed to have discovered quina trees in territories adjacent to Santa fé de Bogotá in 1774.[193] For López Ruiz, his findings on native quina would represent upward social mobility, and for the New Kingdom of Granada's viceregal authorities, this would represent and end to the dependence on the *Audiencia de Quito*'s quina trade.

It is important to mention that colonial medicine went through a period of social transformation when Sebastián José López Ruiz arrived in Santa fé de Bogotá around 1767.

[189] José Antonio Amaya, *Mutis, Apóstol de Linneo…*, 247. Gonzalo Hernández de Alba, *Quinas Amargas*…,119-125. Mauricio Nieto Olarte, "La Condensa, los Jesuitas…," 198.
[190] The first *estanco* project was made by Loja's attorney in April 1752. Santiesteban's project was the second project. Martine Petit and Yves Saint-Geours, "La Economía de la Cascarilla en el Corregimiento de Loja," in *El Norte en la Historia Regional. Siglos XVIII-XIX*, ed. Scarlett O' Phelan and Yves Saint-Geours (Lima: IFEA, 1998) 46-49.
[191] "Expediente al Consejo Pleno. Respuesta a los dos Fiscales sobre la Quina…," fols. 726-775.
[192] Ibid., 767r-v, 768r-769r-v.
[193] Pilar Gardeta Sabater, *Sebastián José López Ruiz (1741-1832) Sus Escritos Médicos y el Ejercicio de la Medicina en el Virreinato de la Nueva Granada durante la Segunda Mitad del Siglo XVIII.* (Málaga: Universidad de Málaga, Gráficas, 1996), 27.

Before his arrival, he spent less than one year in Panamá, and according to the historian Pilar Gardeta, local Panamanian administrative authorities rejected his presence in the province. They did not accept López Ruiz's criticism against the traditional custom of burying corpses inside churches because it caused the spread of diseases, although in 1787, the Spanish crown began to forbid this custom.[194] In addition, the practitioner and pharmacist Santiago Maytin denounced López Ruiz's mulatto origin, which prohibited him from practicing medicine.[195] However, was the problem truly related to his mulatto origin? Or, since he was a licensed physician, did unlicensed or empirical healers see him as a threat against the development of their "illegal" medical practices?

López Ruiz was, indeed, one of the few licensed physicians available in the New Kingdom of Granada. He had graduated from San Marcos University of Lima, and had also studied jurisprudence.[196] The medical faculty of San Marcos University had embraced mulatto surgeons and physicians during the second half of the eighteenth century, and mulatto Peruvian medical practitioners became an important cultural community of learned *criollos*. Even though social frictions existed against mulatto medical practitioners in colonial Lima, these frictions did not limit the circulation and development of medical knowledge from Afro-Peruvian surgeons or physicians.[197] Moreover, the interesting aspect to point out was that most of these medical practitioners searched for ways to move up socially and culturally, so they crossed colonial

[194] Ibid., 24.
[195] José Antonio Amaya and Vladimir Torres Moreno, "Ciencia y Economía en el Nuevo Reino de Granada. Las Comisiones de Sebastián López Ruiz (1778-1803)," *Historia Caribe*, no.29, julio-diciembre (2016), 193.
[196] Pilar Gardeta Sabater, *Sebastián José López Ruiz…,*16-17.
[197] José R. Jouve Martín, *The Black Doctors of Colonial Lima. Science, Race, and Writing in Colonial and Early Republican Peru* (McGill Queen's University Press: Montreal and Kingston, 2014), xvii.

frontiers in search of titles, activities, or studies that could reinforce their intellectual authority.[198] López Ruiz was an example of this social and cultural movability in the colonial Andes, but when he moved to the New Kingdom of Granada, he encountered another social reality.

Economic and social conditions of medicine were not the best in Santa fé de Bogotá, nor in other regions such as Popayán, which could represent the fact that medical practice was not socially and economically esteemed in Santafé de Bogotá and in the interior of the viceroyalty. The *Colegio Mayor de Nuestra Señora del Rosario* offered López Ruiz a medical chair, but he refused it for the salary proposal of 400 pesos.[199] In contrast, medical conditions were much better, or at least more dynamic, in provinces such as Cartagena de Indias, Santa Marta, and Mompox. For instance, in Cartagena de Indias flow of people was constant, and since it was also a port vulnerable to foreign attacks, there was a need for the presence of surgeons and physicians.[200] This diversified colonial medicine in the viceroyalty.

Imperial aspects also had an effect on the internal dynamic of colonial medicine. The Spanish crown gradually implemented plans to reform public health all over their kingdoms, and these policies eventually had a social and cultural impact on the colonial medical reality during the second half of the eighteenth century.[201] It was no coincidence that demands related to illegal medical practices increased during this period.[202] Complaints and judgments produced social conflicts that became visible among licensed and unlicensed physicians who had established their

[198] An interesting case was José Manuel Dávalos. Dávalos obtained a title as a Latin Surgeon and ended up studying medicine at the University of Montpellier in France. See José R. Jouve Martín, *The Black Doctors of Colonial Lima…,* 26-27.
[199] Pilar Gardeta Sabater, *Sebastián José López Ruiz…,* 25-26.
[200] Emilio Quevedo, *Historia de la Medicina en Colombia*…, 227.
[201] Adriana Alzate, *Suciedad y Orden*…, 267-268.
[202] Marcelo Frías Núñez, *Enfermedades y Sociedad en la Crisis Colonial del Antiguo Régimen* (Madrid: Consejo Superior de Investigaciones Científicas, 1992), 114-115.

practice during long periods of time.[203] Overall, this medical context framed López Ruiz's role in his activities as commissioner of quina, and the pursuit of these activities brought bitter reactions between medical and colonial authorities.

The New Kingdom's viceregal authorities and the Spanish crown returned to reviewing the quina *estanco* project until 1776, and the crown asked the viceroy Manuel Antonio Flores for an administrative meeting (*Junta de Tribunales*) in order to execute the *estanco* of quina from Loja.[204] In search of a reliable and knowledgeable person to manage the project, the viceroy Flores asked José Celestino Mutis, who declined the offer because he had been working on the mining project *Nuestra Señora del Rosario* since 1772.[205]

However, in a 1776 petition (*pedimento*), López Ruiz informed Flores about his findings on quina, which had been made since 1774. In this petition, he emphasized his discovery in the hope of colonial administrative promotion. He also guaranteed that the quina he found was the same as that coming from the mountains of Loja, Cuenca, Alausí, and Chimbo, and mentioned that it was useful not only to cure diseases, but also as a possible dye. Along with the petition, he described the shape of fruits, flowers, leaves, and botanical features of both kinds of quina, and also divided these samples into two packages: **A.** and **B**. Package **A** contained the finest (*selecta*) quina. Differences between the two samples were related to flower colour and shape of leaves and branches, although they shared similarities such as roughness and bitterness. In order to test the samples, López Ruiz recommended that the viceroy send them to José Celestino Mutis.[206]

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[203] Antonio Martínez Zulaica, *La Medicina del Siglo XVIII…*, 153.
[204] "Testimonio Integro del Expediente sobre el Descubrimiento de las Quinas por parte de Sebastián José López Ruiz" [recurso electrónico], 1753-1778, CO-BoBN spa CO-BoBN, BNC, 135v, 136r-v
[205] José Antonio Amaya, *Mutis, Apóstol de Linneo…*, 289-290.
[206] "Testimonio Integro del Expediente…," 137r-v, 138r-v, 139r.

The viceroy sent the samples to Miguel Santiesteban and José Celestino Mutis in August 1776. The following were testimonies of their reports: in Santiesteban's reply, he mentioned quina's authenticity in both samples, but found that sample **A.** was superior to **B**. He compared sample **B.** to the quina harvested from the Alausí, Cuenca, and Chimbo mountains, which was not appreciated in Spain.[207] In José Celestino Mutis' report, he considered the fact that both samples could have been from different species of the genus *Cinchona*, but that sample **A.** was similar to the one from Loja, which he could compare with samples given by Santiesteban. Mutis recommended that the viceroy proceed with local experiments involving both samples in order to confirm their authenticity.

In addition to his report, Mutis mentioned that he and the *criollo* Pedro de Ugarte had discovered quina in the mountains of Tena and Honda in 1772.[208] However, he had not collected any samples from the journey with Ugarte, and even up to now, there is no evidence that confirms these findings.[209] As for 1782, Mutis and López Ruiz began an intense argument over the claim of who had been the true discoverer of quina in the New Kingdom of Granada. Mutis claimed to have been the true discoverer and that López Ruiz had stolen his botanical findings, and although López Ruiz had political and financial support from the Madrid court, the minister of Indies dismissed him as royal commissioner due to his "false announcement as quina discoverer."[210] Thus, Mutis ended up being recognized as quina's true discover, and López Ruiz

[207] Ibid.,139r-v.
[208] Ibid., 139v, 140r-v, 141r.
[209] Emilio Quevedo V., "Las Relaciones de Poder en la Investigación y la Construcción de una Comunidad Científica," *Nómadas*, Universidad Central, no. 7, (September, 1997): 23.
[210]Manuel Salvador Vásquez, "Las Quinas del Norte de Nueva Granada…," 415.

lost his royal honours and privileges as a physician, and became stigmatized during his lifetime and beyond.[211]

However, in 1776, the viceroy Flores ordered López Ruiz to collect 400 arrobas of the new quina he found in Tena, and this order was registered in an administrative meeting (*Junta de Tribunales*). As a way of confirming quina's therapeutic virtues, Flores ordered a program of experiments in the viceroyalty, as well as in Spanish hospitals and apothecary shops.[212] Experiments in Cartagena de Indias, Santafé de Bogotá, and Lima were set up before sending shipments of quina to Madrid. However, how were these experiments carried out? Who were the physicians or pharmacists, as well as the patients, involved in this process? What were the results of the process? Did the assays validate the viceroyalty's new quina?

Trials carried out with quina unveiled that the practice of colonial medicine was ambiguous, and above all, complex. For the first and only trial in Santafé de Bogotá, López Ruiz sent one pound of quina to *San Juan de Dios* - known first as Jesús, María, and José - hospital in October 1776 due to their daily activity.[213] As Adriana Alzate has shown, the hospitals in the New Kingdom of Granada were not institutions of social hardships of the urban colonial cities,

[211] It is not a topic of this chapter to discuss who first discovered native quina. Colombian scholars such as Emilio Quevedo, Santiago Díaz Piedrahita, Pilar Gardeta, and José Antonio Amaya have given attention to Sebastián López Ruiz's role as a naturalist, physician, and botanist. However, since historiography has marginalized the mulatto physician in relation to the historical figure of the *savant* José Celestino Mutis, up to the present time, the discussion between Mutis and López Ruiz remains ambiguous. There has not been any thorough research regarding the development or chronology of this discussion. See José Antonio Amaya and Vladimir Torres Moreno, "Ciencia y Economía en el Nuevo Reino de Granada. Las Comisiones de Sebastián López Ruiz (1778-1803)" *Historia Caribe*, no.29, julio-diciembre (2016): 183-213. Emilio Quevedo V., "Las Relaciones de Poder en la Investigación…," 23-25. Santiago Díaz-Piedrahita, "Sebastián López Ruíz y el Hallazgo de Azogue en Panamá," *Revista Academica Colombiana de Ciencias*, no.69, vol. XVIII, (1991): 191-192.
[212] "Testimonio Integro del Expediente…," 141v, 142r-v, -143r-v.
[213] Ibid., 146v, 147r.

they were institutions offering shelter and protection to the sick and poor colonial people.[214] In addition, they were propitious spaces for the exchange and circulation of colonial medical knowledge. The father prior Friar Salvador Salgado received the quina for the assay, and although it is unknown how many patients went to the hospital in 1776, it is known that 12.435 patients entered the hospital between 1760 and 1767.[215] Father Salgado mentioned that the hospital assisted "a great number of sick people", which allowed him to administer the quina intermittently to fever patients as well as others with syphilis (*gálicos*) or an upset stomach. Salgado confirmed the successful application on patients, especially those with fevers,[216] and the clinical observations' success relied on the use of quina on intermittent fever patients. After this trial, assays were carried out in Cartagena de Indias.

Colonial medical practices played a major role in Cartagena de Indias, or at least this was perceived in the way that quina trials were developed. As previously mentioned, Cartagena's *Protomédico* received quinas **A.** and **B.** from its governor in January 1777, and following Juan Pimienta's order, administered quina to "several individuals of the royal militas". He said that he did not observe any good or bad effects on these patients, but nevertheless, he did not doubt the medical specifics because he thought that medications sometimes had a late effect on patients. In addition, he also sent quina to the reverend father prior and to Andres Estrella hospital's physician in order to supervise the effect of quina on patients with intermittent fevers. Both

[214] Adriana Alzate Echeverri, *Geografía de la Lamentación*…, 209-212.
[215] The *Orden Hospitalaria de San Juan de Dios* administrated hospitals to assist the needy, to provide charity, and to guarantee health social services in colonial cities. The first *San Juan de Dios* hospital was founded in Cartagena de Indias (1596), and throughout the colonial period, the religious order founded hospitals in Panamá, Portobelo, Mompox, Santa Marta, Santafé de Bogotá, Mariquita, Cali, and Tunja. The *San Juan de Dios* hospital went through different infrastructural innovations in Santafé during the second half of the eighteenth century. See Adriana Alzate Echeverri, *Geografía de la Lamentación*…, 12-27, 60.
[216] "Testimonio Integro del Expediente…," 147r-v.

reported that patients were cured.[217] Afterwards, Francisco Xavier Pérez sent letters to town physicians, surgeons, and pharmacists in February and nine trials were carried out, producing more negative than positive results.

The surgeon Manuel Antonio Gastelbondo, who came from a family of Cartagena physicians that dated back to the seventeenth century,[218] gave the quina to a Dominican prior who had been afflicted by an intermittent fever for several days. Gastelbondo followed a then-current method of administering quina - according to him, this consisted of giving quina after the body had already evacuated. He gave the native quina as an opiate every two hours, which did not work, so he then decided to administer a *Peruvian cortex* - the generic name for quina that came from Peru or Quito - and the Dominican was relieved. He explained that he did the same to a Carmelite nun.[219] While Gastelbondo had a radically negative result, others had a neutral experience. Pedro Antonio Ramirez mentioned in his report that he had administered quina on intermittent fever patients following the correct method – he does not explain which one - and carrying a precise observation. He concluded that he did not observe any favourable or adverse effects on patients.[220]

Testimonies related to pharmacists allow us to understand their colonial practice. It is uncertain if Juan Parejas was a practitioner or licensed pharmacist, but after his analysis with quina, he said, "although we have not had information about from which trees we have received the two bark species, I feel that both samples have different qualities from true quina." He

[217] Ibid., 147v-148r.
[218] Álvaro Casas Orrego, "La Enfermedad del Vómito Negro y la Medicina en Cartagena durante el siglo XVIII," *Biblioteca Médica Neogranadina 1755-1833,* ed. Estela Restrepo Zea (Bogotá: Universidad Nacional de Colombia, Universidad Santo Tomás, Centro de Estudios Sociales, 2013), 22.
[219] "Testimonio Integro del Expediente…," 148v.
[220] Ibid., 148v-149r-v.

concluded that since he did not have "any faculty" to make use of the samples, he could not make any judgment about their virtues."[221]

Two aspects can be inferred from this testimony. First, training the senses was an aspect that distinguished pharmacists from other medical practitioners. The "I feel" expression in his speech was not arbitrary - pharmacists' knowledge was based on the development of their senses. Since they were used to manipulating substances from the vegetable, animal, and mineral world, they knew what the physical appearance of any simple or compound substance should be, and they also needed an acute eye and a sensitive touch and smell in order to identify the medications they would sell in their apothecary stores.[222] Indeed, Juan Parejas did know about quina - in a 1776 pharmacy shop inventory, he was an evaluator along with other pharmacists, and they inventoried four ounces of powdered quina.[223] It can probably be inferred that he was training to be a pharmacist. He recognized the fact that he did not have "the faculty", but he was still capable of recognizing and making a drug inventory in 1776.

Even more interesting was that among the pharmacists of the inventory, Miguel Serrano y Lara was a licensed pharmacist. He testified in relation to quina samples that were circulating in Cartagena, and believed that the two samples were not quina. He mentioned that one of the species looked like *Copache* – a native name referring to the Michoacán tree bark - and that the other came from another tree used to falsify true quina, which had delicate fibres and assorted smells and tastes.[224] José López produced the final pharmacist assay - to him, the exterior of the samples did not have a dark colour, they were not thick, and they had an unpleasant taste less

[221] Ibid., 148v.
[222] Paula Ronderos, *El Dilema de los Rótulos*…, 64,75.
[223] "Cartagena, Inventario de una Botica", 1776, Fondo Miscelánea, SC:39, 55, D.47, AGN, 76v.
[224] "Testimonio Integro del Expediente…," 150r-v.r

bitter than the one from Peru, so he concluded that this quina was not the best.[225] Overall, these pharmacists did not produce satisfactory testimonies, but what happened with the other three?

Andrés González y Estrella was a surgeon and physician who attended the *Real Hospital San Lázaro*, the leprosy hospital in Cartagena.[226] According to his analysis, he first applied the quina to three patients who had tertian fevers - he tested powdered quina on two patients and used quina as a bark on the other, but did not see any success in any of the three patients. However, he thought that the reason this did not work was because one of the patients was in *sigilo gálico* (had a trace of syphilis or other venereal disease) and the others had felt obstructions in their bodies (probably in the stomach). In addition, during a second trial, González y Estrella tested the quina on nine persons - four had intermittent fevers, three had tertian fevers, and the other two had quartans fevers. He followed the method of administering quina until the body had evacuated, and proceeded to give the powdered quina. On the third day, the patients were all cured and "freed" of fevers. His testimony was supported with another reference - he reported that Ignacio Muñoz, a hospital practitioner, had used six drachmas of the quina, and the patient was relieved. He inferred that both samples contained alkaline salts, which were abundant in the thinnest bark (*corteza delgada*).[227]

The last two testimonies were related in one way or another to Andrés González y Estrella's previous report. In *San Juan de Dios,* Cartagena's hospital, the prior Friar Juan Antonio Gago confirmed González y Estrella's assays - he mentioned how González y Estrella first applied quina to patients from the *sala de forzados* (the prisoners' room) and black people, who

[225] Ibid., 151r.
[226] According to Martínez Zulaica, Andrés González y Estrella was a surgeon of the militias. Antonio Martínez Zulaica, *La Medicina del Siglo XVIII…*, 293. Also see Virginia Gutiérrez de Pineda, *Medicina Tradicional de Colombia. El Triple Legado Volumen I* (Bogotá: Universidad Nacional de Colombia, 1985), 196.
[227] "Testimonio Integro del Expediente…," 149v-150r-v.

experienced no success in the hospital. However, it worked on nine patients, and Francisco Alais confirmed the effects of the quina experiment on these patients. He seemed to be another practitioner, or perhaps an empirical physician. Finally, he notified a testimony in which Alais confirmed that quina had favourable and unfavourable effects on patients - he said, "I do not know which is the reason that makes this quina good or bad."[228]

Trials made with native quina produced more negative than positives results, but experiments carried out in Madrid had the final say about quina's authenticity. In addition, López Ruiz sent the two samples of quinas **A.** and **B.** to the Spanish physician Cosme Bueno, who was his professor of medicine at the Universidad de San Marcos in Lima.[229] Unfortunately, Bueno did not test López Ruiz's quina - instead, he experimented with quina brought over from Cuenca and Bracamoros, which was similar to the one from Loja. Moreover, he replied to López Ruiz that experiments meant to validate the quina carried out in Lima would not be as important as the ones to be carried out in the Spanish court - for Bueno, the latter would decide its authenticity.[230]

During the development of local trials, López Ruiz arranged four boxes of quina waiting to be tested in Spain in 1778. The viceroy financed a trip to Spain for López Ruiz in order for him to receive royal instructions from Charles III. These instructions included working on a project about Santafé de Bogotá's flora in which López Ruiz needed to expand his botanical and natural knowledge. The Flora project was meant to be an appendix of the Royal Botanical Expedition of Perú and Chile leaded by Hipólito Ruíz and José Antonio Pavón, so López Ruiz had to keep in touch with Ruíz and Pavón and send them samples once he returned to Santafé de Bogotá. In addition, he also had to collect (*acopiar*) and supply the viceroyalty with native quina

[228] Ibid., 151r.
[229] Pilar Garderta, *Sebastián José López Ruiz…*, 20. "Testimonio Integro del Expediente…," 154r.
[230] "Testimonio Integro del Expediente…," 152r-v, 153r-v.

on behalf of the Royal Treasury, but this distribution of quina could not compete or interfere with the Quito or Loja quina trade.[231] In addition, as part of the commission, the Spanish king provided López Ruiz with printed books, instruments, and paper. Indeed, most of the books covered subjects of natural history, botany, law, and theology, and the medical books included Thomas Fuller's *Pharmacopeia*, the medical *Dictionary of Trévoux*, John Allen's *Medical Compendium*, and Andres Piquer de Arrufat's works.[232] Finally, López Ruiz met Casimiro Gómez Ortega, the first Royal Botanical Garden director, in order to begin the analysis of quina.

Casimiro Gómez Ortega and the Spanish King approved the therapeutic virtues of this quina. Indeed, Ortega spread the word about it and wrote to André Thouin, Paris' Royal Gardener, about the existence of a new kind of quina in Santafé de Bogotá.[233] However, what did Ortega do when he received the quina from López Ruiz in 1778?

In Madrid, the methodology in the process of experimentation with quinas **A.** and **B.** was not very different from that carried out in the New Kingdom of Granada. The Royal Pharmacy[234] had assayed quina from Quito and Peru, and their royal pharmacists usually had the last word about quina's medical authenticity. Quina shipments often arrived corrupted in Spain - adulteration, humidity, and precarious box packing were factors that affected these shipments. Therefore, the Royal Pharmacy would proceed with experiments in order to verify its quality, and

[231] José Antonio Amaya and Vladimir Torres Moreno, "Ciencia y Economía en el Nuevo Reino de Granada...," 196.
[232] "Lista de los libros que para su vía lleva a América Don Sebastián José López Ruiz provisto en Santafé," 1779, RM 191, BNC, fols. 68-69.
[233] José Antonio Amaya, *Mutis, Apóstol de Linneo…*, 295-296.
[234] In order to supply drugs to the royal court, Philip II founded the Royal Pharmacy in 1594. Along with the development of Galenic medical preparation, Luis Riqueur, for instance, introduced drugs' chemical methods and preparations in the eighteenth century. Drugs' chemical analyses were related to the distillation and extraction processes. See Pilar García de Yébens and M. ª Luisa de Andrés Turrión, "La Introducción de la Práctica Química en la Real Botica Española," *Asclepio*, Vol. XLIX-2, (1997): 179-182.

if royal pharmacists thought the quina was useless, they would burn it or use it as a dye.[235] It is important to note that the Royal Pharmacy did not experiment with quina in order to understand its mode of action, although Spanish pharmacists gradually began to analyze the "proximate principles of plants"[236] during the second half of the eighteenth century.

In a 1778 report to the Minister of Indies Jose de Galvez, Gómez Ortega, first recognized the bark's freshness. Although the quina did not resemble that from Loja at first sight, he proceeded to analyze the anatomy of the plant - its fruits, flowers, and branches - and verified that it came from the same genus as the one from Loja. Ortega reported the successful effect of the quina on his gardener's wife, who suffered from fevers, and other fever patients were also relieved with this quina in Madrid. He did not doubt that it was the same as the one from Peru, but he clearly stated the differences between quinas **A.** and **B.** - to him, quina **A.** was slightly bitter and more aromatic than **B.**, which was styptic. He agreed with López Ruiz's claim that climatic and geographical aspects had an effect on the physical and internal appearance in the two samples, and finally explained that chemical methods such as distillation, extract decoction, tincture, salt extraction, etc. had been part of his analysis. Gómez Ortega approved the new quina, although he suggested continuing with further experimentation, including in Royal Hospitals and the Royal Pharmacy.[237]

[235] To understand the role of the Royal Pharmacy as an "imperial site of science" see Matthew James Crawford, "Empire's Experts...," 102-108.
[236] Matthew James Crawford, "An Empire's Extract: Chemical Manipulations of Cinchona Bark in the Eighteenth Spanish Atlantic World," *OSIRIS*, 29, (2014): 225.
[237] "Expediente sobre la Comisión Real a D. Sebastián José López Ruiz, Naturalista y Vecino de Santafé," 1778, Santa_Fé, 757, AGI, 111r-v, 112r-v, 113r-v.

Figure 2. Sebastián López Ruiz quina's illustration based on La Condamine's memoir *Sur L'Arbre de Quinquina*.[238]

During López Ruiz's time spent in Madrid, he became a member of the Royal Academy of Medicine and the Paris Society of Medicine.[239] He also transcribed into Spanish the first unpublished translation of *Sur l'Arbre du Quinquina* written by La Condamine, in which he included a reproduction of La Condamine's quina illustration (See **Figure 2**) and added commentaries related to quina findings during his journeys near Santafé de Bogotá. For instance, in agreement with La Condamine's quina uses, López Ruiz experimented with quina as a dye - he narrated how he had obtained a yellowish-orange colour (*anteado*) with a piece of the bark on a canvas while he was collecting this plant.[240]

Moreover, an interesting case in López Ruiz's commentaries was related to the experimentation with the therapeutic use of native quina. He commented on how one day while

[238] "Descripción del Árbol…," 13r.
[239] Pilar Gardeta Sabater, *Sebastián José López Ruiz.*., 31-33.
[240] "Descripción del Árbol de la Quina hecha en 1737 por La Condamine. Sebastián Josef López Ruiz," 1778, RJB03/004/0011/0010, ARJBM, 16v, 17r.

he and his bark collector were stripping bark from a tree, his assistant cut his hand. López Ruiz observed how his assistant applied the white substance spurred from the bark to his wound, and this substance became a sort of gum that covered and protected the wound. He admired the positive therapeutic results of the quina,[241] which could be compared to experiments made by the British in order to heal external wounds. It is important to remember that during his stay in Madrid, López Ruiz could have exchanged medical knowledge through Parisian and Spanish academies[242] - it is possible that he may have seen a relationship between his own experiences and British experiments made with quina two decades earlier.

López Ruiz returned to the New Kingdom of Granada to begin his commission in 1779. Although trials with native quina were no longer registered, coordinating the circulation of native quina and promoting its use was not an easy task. He claimed the right to regulate quina remittances from Santa Fé de Bogotá, to the exclusion of remittances from Quito, but quina from Quito was still moving within the viceroyalty. In search of a price to sell the native quina, the general visitor Juan Francisco Gutiérrez Piñeres[243] asked about the existence of quina in Panamá, while López Ruiz did the same in Cartagena and Santafé de Bogotá. Piñeres suggested 8 *reales* per pound, while López Ruiz suggested 2 *reales* per pound.[244] He thought that at this price, native quina would be sold easily. Despite disagreements on quina's worth, viceregal reports testified about a dynamic quina trade and consumption in Panamá, Cartagena de Indias, and Santafé.

Gutiérrez Piñeres required Ramón Carvajal, Panama's governor, to ask local physicians and pharmacists how much quina they needed per year and how much they had in their stores

[241] "Descripción del Árbol de la Quina…," 17v.
[242] Pilar Gardeta Sabater, *Sebastián José López Ruiz…*, 45.
[243] About the political role played by Juan Gutiérrez de Piñeres in the New Kingdom, see *Anthony McFarlane, Colombia Before Independence*… 125-126.
[244] "En Cuatro Copias Que Incluye da Parte a V.E. de los Perjuicios que Sufriria la Real Hacienda Si Se Estableciera el Precio de 8 Reales por la Libra," 1782, Santa_Fe, 781, Documento No. 47, AGI, 1r-v.

between 1799 and 1780. The governor asked five pharmacists and physicians and two of the pharmacists mentioned the difficulty of establishing a quantity needed per year. Santiago Maytin, who had accused Lopez Ruiz of being of impure blood, mentioned that the need for quina varied, depending on the number of sick people entering the province, but he sold around twelve pounds of quina per year. The physician Nicólas Uselas could not quantify the amount of quina needed - according to him, climates varied, affecting the spread of epidemics in the region, which had an effect on the amount of quina required. Another pharmacist, Martín Vanegas, commented that he had three pounds of quina and spent 6 pounds of it annually. In Francisco Manuel Cuevas' apothecary, the pharmacist said he did not have any quina at the moment of declaration, but he usually kept half arroba per year. Finally, in the *San Juan de Dios Hospital* apothecary, the pharmacist Friar Jose de la Sierra claimed to have 2 arrobas of quina and to spend around twenty pounds of quina per year.[245]

López Ruiz asked three licensed surgeons - Francisco de Paula Pallares in Cartagena, as well as Bartolomé Fernández and José Antonio Rojas in Santafé de Bogotá. Pallares mentioned that whenever he needed powdered quina, he acquired it in Cartagena for 2 *reales* and in Portobelo for 14 or 16 *reales* per pound. In Santafé de Bogotá, Bartolomé Fernández saw quina sold for 1 real per drachma in pharmacy stores, while José Antonio Rojas bought a poor quality quina for 12 *reales* per pound and also knew physicians who prescribed quina for 1 *real* drachma.[246] Three unlicensed, but authorized pharmacists testified about quina's worth - Antonio Gorraez, the Dominican friar Francisco Gutiérrez, and Alejandro Gastelbondo in Cartagena. Gorraez mentioned that quina from Loja was valued at eight *reales* and ordinary quina from

[245] "Consumo de Quina en Boticas de Panamá," 1779, Fondo Miscelánea, SC: 39, D. 47, Legajo 081, AGN, fols. 531-534.
[246]"Copia de Varias Certificaciones de Distintos Sujetos Que Acreditan lo que Expuse en Representación del 16 de Mayo de 1782," 1782, Santa_Fe, 781, Documento No. 4, AGI, 1r-v, 2r-v.

Quito was four *reales,* the Dominican had sold quina for one *real* drachma in his store, and the last pharmacist, Gastelbondo, mentioned that powdered quina was sold for one *real* drachma, eight *reales* per ounce, or sixteen *reales* per pound. In the last certification, Ramón José Moreno y Guerrero, an unknown practitioner who lived in Cartagena for almost ten years, saw powdered quina sold for four, six, and eight *reales*.[247]

The prices and quantities of quina were slightly different in the testimonies of Gutiérrez de Piñeres and López Ruiz. Moreover, it is difficult to know to what extent physicians and pharmacists were applying quina for therapeutic purposes, or if they were experimenting with quina. Aside from its use for intermittent fevers, for what other diseases did physicians and pharmacists use quina? According to López Ruiz, quina consumption was clandestine, which meant that physicians prescribed quina as they pleased to their patients, most of whom did not understand "the signs on their medical recipes."[248] Indeed, physicians or pharmacists could have been using and prescribing quina to treat many different kinds of ailments, and as López Ruiz mentioned, cargoes of quina arrived in Panamá after the crown abolished the revenue and transit of quina shipments from Guayaquil, so there was an oversupply of quina that had to circulate for economic and medical ends.[249]

Considering the lack of known historical documents related to López Ruiz's activities as a commissioner, it is impossible to trace his performances until the end of the royal commission. López Ruiz was immersed in achieving his botanical duties, although medicine was not left aside. The arrival of the new viceroy, Antonio Caballero y Gongóra (1782-1789), implied to strengthen political, cultural, and economic relations with José Celestino Mutis, but not with López Ruiz

[247] Ibid., 1r-v, 2r-v.
[248] Ibid., 3r.
[249] "En Cuatro Copias Que Incluye da Parte a V.E. de los Perjuicios que Sufriria la Real Hacienda Si Se Estableciera el Precio de 8 Reales por la Libra…," 1v.

even though Gongóra and Mutis kept requiring López Ruiz's services as a commissioner in quina and natural explorations in 1782.

It is important to mention that during the years under Mutis' supervision, López Ruiz explored Santa Marta, Rio Hacha, Mompox, Barranquila, and Ocaña in search for quina, cinnamon, and other natural remedies. His impressions were written in a 1784 travel relation[250] revealed by two aspects. First, it confirmed the existence of quina forests in northern regions, especially in the area of modern Santander which later became an extractive and productive zone for quina during the second half of the nineteenth century.[251] Second, as a different viceregal reported at the time,[252] López Ruiz protested against the clandestine quina trade between the native indigenous people and the Dutch, English, and French merchants. Shipments of quina and other commodities were taken to Curacao, Jamaica, or Martinique, so for López Ruiz, quina collection had become difficult to achieve in the north. Not only did the presence of rebellious and unfaithful indigenous (the *guajiros* and *chimilas*) represent a threat for the circulation of quina, but constant rain, humidity, and the bad state of roads also made this activity difficult,[253] so quina cargoes were better off being collected in a *factoria* located in Honda and Mariquita.[254] Political conflicts in the north continued to be a constant and unsolved matter for the crown and viceregal authorities.

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[250] "Relación de Viaje que Don Sebastian Josef Lopez Ruiz hizo desde Santafé de Bogotá a las Montañas de las Provincias de Ocaña, Simití, Sta. Marta, Rio Hacha, Valle-Dupar, y Otras de sus Contornos, en los Años de 1784 y 1785," 1784-1785, Santa_Fe, 757, Documento No.13, AGI, fols. 1351-1357.

[251] Frank Safford, *Commerce and Enterprise in Central Colombia* (Ph.D diss., Columbia University, 1965), 282; Yesid Sandoval and Camilo Echandía, "La Historia de la Quina Desde Una Perspectiva Regional…," 166.

[252] Indigenous people had an active role in the development of Atlantic trade late in the eighteenth century. For instance, the Guajira indigenous people were constantly exchanging goods with the Dutch, English, or French. *Palo de Brasil*, an American dyewood, was a common commodity in the Atlantic clandestine trade. See Camilo Torres, *Un Rojo Fugitivo: Extracción, Circulación y Consumo del Palo de Brasil de la Nueva Granada. 1770-1850* (Master thesis: Universidad de los Andes, 2013), 45-46.

[253] Relación de Viaje…," 1354v, 1355r.

[254] Manuel Salvador Vásquez, "Las Quinas del Norte de Nueva Granada," 411.

The Franciscan friar Diego García, born in Cartagena de Indias, permanently replaced the López Ruiz commission in 1787-1789. Between 1784 and 1786, García had already worked as a naturalist, exploring the New Kingdom's flora and fauna, and Mutis exchanged correspondence with the viceroy in order to nominate him as the next quina commissioner. García's appointment was meant to reduce expenses - while López Ruiz charged 2000 pesos for his commission, García received 50 pesos.[255] In 1785, the Franciscan led the commission in the north, starting in Santa Marta and moving between Rio Hacha, Mompox, and Ocaña until 1789, and carried out an already-known experiment with quina. He included a bottle of quina extract in boxes containing a collection of red and yellow quina in Ocaña in 1788. The process used to obtain the extract consisted of boiling water with freshly ground quina, then using a metal alembic to still a white liquid without bitterness, but after compressing the liquid, a bitter smell came out. He recommended grinding quina and cooking it over a fire, or it would mould[256] (similar advice was given by Joseph Alsinet, **Chapter 2**).

In correspondence with Mutis, the Franciscan dismissed López Ruiz's explorations and commissions on quina in Santa Marta, Ocaña, and Rio Hacha, although he agreed with López Ruiz on political matters such as the need to fortify vulnerable zones like Santa Marta, the penurious roads between provinces, and the threat of indigenous presence.[257] He also suggested fifth and sixth species of quina, which Mutis did not accept because he believed that only four

[255] Luis C. Mantilla R., OFM, *Fray Diego García, Franciscano de Cartagena de Indias y su Obra en la Expedición Botánica* (Cartagena: Publicaciones de la Universidad de San Buenaventura, 2005), 95-98.
[256] "Carta de Fray Diego García a José Celestino Mutis Comunicando el Envio de Dos Cajones de Quina Roja y Amarilla,"1788, RJB03/0001/0001/0156, ARJBM, 1r-v.
[257] Luís C. Mantilla R., OFM, *Fray Diego García…,* 121.

kinds of quina existed in the New Kingdom of Granada.[258] This Franciscan's other works remain unknown, and many of his explorations dedicated to animals are still waiting to be studied.

In addition, in friar Diego García's career as a naturalist, documents related to his work in quina such as relations, letters, or dried samples never arrived to their recipients - indeed, this was Garcia's most frequent complaint in his correspondence with José Celestino Mutis and the viceroy Góngora.[259] Another project to achieve was the exploration of quina in Guiana, but the viceroy Góngora was moved from his post in 1788 and the project remained unfinished.[260] During friar Diego Garcia's commission and the collection of quina under Mutis' supervision, Madrid pharmacists stated that this quina was useless. Nevertheless, despite this prohibition and the spread of rumours about the New Kingdom quina's bad quality, quina still circulated and shipments arrived in European and Atlantic ports.[261]

The *Savant's* Appropriations

Experimentation with native quina came along with the need to relieve fever outbreaks which took place in the Atlantic and the Caribbean late in the eighteenth century. Aside from European and American physicians' struggle to understand the nature of fevers, the outbreaks became a public health and geopolitical problem for European empires interested in continuing their colonizing projects. Moreover, local physicians, pharmacists, merchants, and learned public figures were debating ways of preventing and understanding the nature of these outbreaks.[262] In

[258] Ibid.,124-125.
[259] Ibid., 119-143.
[260] Ibid., 130-134.
[261] Manuel Salvador Vásquez, "Las Quinas del Norte de Nueva Granada," 415.
[262] See Katherine Arner, "Making Yellow Fever American: The Early Modern American Republic, the British Empire and the Geopolitics of Disease in the Atlantic World," *Atlantic Studies*, 7:4, (2010): 448. John R. McNeill, *Mosquito Empires: Ecology and War in the Great Caribbean, 1620-1914* (New York: Cambridge University Press, 2010), 2-4, 306.

general, economic and political interests were demanding quina, but fevers outbreaks – including intermittent, as well as yellow or malignant fevers - ended up conditioning a need for the circulation of quina in the Atlantic world. However, how did this reality of fever outbreaks shape the experimentation and use of quina in the viceroyalty?

The impact of fever outbreaks has been an ignored topic in Colombian medical historiography from the second half of the eighteenth century.[263] Nevertheless, yellow fever, known as black vomit (*vómito negro*)[264] or malignant fever, shaped the dynamics in the New Kingdom of Granada. Indeed, the presence of fevers has been related to the sixteenth and seventeenth centuries[265], but sporadic fevers struck ports such as Cartagena de Indias, Portobelo, and Panamá. The presence of malignant fevers reflected scarcity in Panamá and Portobelo at that time. A pestilent fever killed many between 1799 and 1800, including Francisco Beltrán who was the only surgeon in Portobelo, and the fever also spread in Panamá. José María Belis was the only Latin-American surgeon[266] available near Portobelo, and had come from the University of San Marcos in Lima in order to work in Panamá's *San Juan de Dios* hospital.[267] The epidemic unveiled problems related to the lack of licensed surgeons and also brought up the problem of a lack of sufficient funds to pay the surgeon's annual salary, a problem which had already been

[263] Álvaro Casas Orrego, "La Enfermedad del Vómito Negro…," 21.
[264] This allusion to the black colour, according to the physician Juan Joseph Gastelbondo, was related to the fact that "after seeing four corpses in the hospital these had a black liquor within their bodies and the bladder was also black." The black liquor alluded to parts of the body with gangrene. Juan Joseph Gastelbondo, *Tratado de Método Curativo, Experimentado, y Aprobado de la Enfermedad del Vómito Negro, Epidémico, y Frecuente en los Puertos de las Indias Occidentales* (Cartagena de Indias: 1753), BNE, 10.
[265] Gutiérrez de Pineda, *Medicina Tradicional de Colombia,* 115-117.
[266] In Spanish Peruvian colonial medicine, Latin surgeons were at the top above Romance surgeons and Phlebotomists. They needed to attend "classes at the University of San Marcos, train under the supervision of senior physicians, and pass a demanding exam before they could be granted their title and allowed to practice in the city hospitals." See José R. Jouve Martín, *The Black Doctors of Colonial Lima…,* 20.
[267] "Portobelo: Solicitud de Médicos, por Fiebres y Vómito Negro," 1801-1805, Fondo Miscelánea, SC: 39, D.17, 11, AGN, fols. 1-6.

known by viceregal authorities since 1786.[268] Aside from the need for licensed surgeons and physicians in Panamá and Portobelo, fever outbreaks helped in understanding why some physicians, pharmacists, and surgeons did not know the amount of quina they required every year when Gutiérrez Piñeres asked them about it between 1779 and 1781.

Darién, or *Santa María Antigua del Darién*, was another region struck by fever outbreaks. This region was – and still is - a geopolitical territory. The Spanish empire could not exert control for almost four centuries in Darién - instead, control of the region had been established by the presence of indigenous groups who fostered military and trade alliances with British corsairs or filibusters, as well as French and Dutch people who were interested in controlling this territory.[269] In order to recover political and military control of the zone, the Spanish crown ordered an expedition commanded by the viceroy Caballero y Gongóra in 1784.[270] Along with the exploration, control, and fortification of Darién, environmental and landscape transformations led to the outbreak of malignant fevers amongst viceregal militias that year.

López Ruiz mentioned the existence and circulation of a type of quina in Darién, which he called *capecito* (it was probably the *Cinchona antioquiae*[271]), in his travel relation between 1784 and 1785, but did not give details for its therapeutic use.[272] However, in a letter correspondence from 1786 with the viceroy Góngora, José Celestino Mutis commented that he

[268] The friar of the San Juan de Dios hospital claimed to need financial aid from Panama's governor in order to cure sick people in 1786. See Adriana María Alzate Echeverrí, *Geografía de la Lamentación…,* 148-153.
[269] Ivonne Suárez Pinzón, "La Provincia del Darién y el Istmo de Panamá: Siglos en el Corazón de las Disputas por la Expansión del Capitalismo," *Anuario de Historia Regional y De las Fronteras*, Vol.16, (2011): 20-25.
[270] Nelsón Rodríguez, "El Imperio Contraataca: Las Expediciones Militares de Antonio Caballero y Gongóra al Darién (1784-1790)," *Historia Crítica*, No.53 May-August, (2014): 208-209.
[271] An interactive map of Colombian *Cinchonas* regional distribution can be found in: R., Bernal, S.R. Gradstein and M. Celis, *Catálogo de Plantas y Líquenes de Colombia* (Bogotá: Universidad Nacional de Colombia, 2015) http://catalogoplantasdecolombia.unal.edu.co
[272] Relación de Viaje…,"1353r-v.

was aware of the epidemic that was happening in Darién. In addition, Mutis mentioned that he had sent two boxes of quina to be used by the militia's surgeons and hospitals, and also added a healing plan explaining the method of applying the quina, which was to also prevent against the spread of epidemic fevers.[273] Mutis commented to the viceroy that quina was not being applied properly, and it was a waste in the viceroyalty - licensed physicians or empirical healers were either not using quina and continuing with bleedings or purges[274], or were abusing its use. Finally, according to Mutis, this was a sign of disorder in colonial medical practices, which should not have been present amongst surgeons, physicians, and militia hospitals. [275]

Góngora's role was important for the process of circulation and experimentation of quina during Mutis' commission. In a 1786 letter, Góngora replied to Mutis and wrote that he had received the two boxes of red quina as well as the healing plan, and also confirmed that he had sent the boxes to Darién.[276] That same year, Góngora was informed that the French physician Louis Rieux had arrived in Darién, both to meet with surgeons and physicians who would explain the "healing method" to him, and to supervise the hospitals.[277] In relation to Mutis' quina, a document could suggest that the surgeons and physicians in Darién had received it. In a 1787

[273] "Plan de Curación para las Enfermedades Agudas que se Padecen en el Darién,"1786, RJB03/0002/0002/0069, RJBM, 264r-v, 265. The transcription is available in: Guillermo Hernández de Alba, *Archivo Epistolar del Sabio Naturalista José Celestino Mutis, Tomo I* (Bogotá: Imprenta Nacional, 1947), 93-94; Guillermo Hernández de Alba, *Escritos Científicos de Don José Celestino Mutis* (Bogotá: Editorial Kelly, 1983), 143-144.

[274] In rural areas, bloodletting was a common practice late in the eighteenth century. Franciscan Joseph Palacios narrated an interesting anecdote about how local healers practiced bleedings near Cartagena de Indias. See Joseph Palacios de la Vega and Gerardo Reichel-Dolmatoff, *Diario de Viaje del Padre Joseph de Palacios de la Vega. Entre los Indios y Negros de la Provincia de Cartagena en el Nuevo Reino de Granada 1787-1788* (Bogotá: Editorial A.B.C, 1955), 6, 81.

[275] "Plan de Curación para las Enfermedades Agudas…," 264r-v.

[276] "Oficio del Arzobispo Virrey Antonio Caballero y Góngora a José Celestino Mutis Comunicandole Que Ha Recibido la Instrucción Para el Gobierno de los Cirujanos del Darién y Curación de Fiebres de Estas Gentes," 1786, RJB03/002/0001/0016, ARJBM, 1r-v.

[277] "Rieux, Monsieur: Su Ida al Darién a Hacer Algunas Observaciones," 1786, Fondo Milicias y Marina, No. Orden 049, Legajo. 140, AGN, fol. 300.

relation, surgeons listed medications and tools they needed in order to cure the sick, and although quina was not listed, they requested rhubarb and opiate medications[278] - Mutis had recommended preparing a mixture (*conserva*) of quina and rhubarb or opiates in case the patient disliked quina's bitterness.[279] A network of connections produced between the viceroy, José Celestino Mutis, viceregal general captains and surgeons, and physicians such as Louis Rieux enabled the circulation of quina as well as the scenarios to make a therapeutic use of it. The healing plan materialized this process of experimentation with native quina.

Malignant effects on the body were a reason to apply quina. In his healing plan, Mutis approached causes related to the climate to explain the spread of fevers in Darién and other similar regions - his etiological principle was that the climate, with its hot and humid seasons, had an effect on the atmospheric fluid responsible for corrupting body humours.[280] Although Mutis did not mention the effect of stagnant water, reports mentioned that soldiers were drinking this type of water[281] - stagnant water or fetid odours were both causes which spread fevers. As a preventive action, Mutis recommended cutting down trees for new roads during dry seasons, instead of doing this during hot, rainy seasons.

In addition, soldiers' lifestyles altered their bodies' humours - excess food and drinks and sleeping uncovered at night (*sereno*)[282] were causes which produced malignant effects that distorted their bodies' living functions (sleeping, eating, vomiting, diarrhoea…). Finally, the method for using quina consisted of administering good amounts (3 or 4 ounces) of powdered

[278] "Comandancia del Darién: Su Comunicación Sobre Recibo de Medicinas y Utensilios," 1787, Fondo Milicias y Marina, No. Orden 337, Tomo 123, AGN, fols. 276-278.
[279] José Celestino Mutis, "Plan de Curación para las Enfermedades Agudas que se padecen en el Darién…," 148.
[280] Virginia Gutiérrez de Pineda, *Medicina Tradicional de Colombia…,* 116-177.
[281] Nelsón Rodríguez, "El Imperio Contraataca: Las Expediciones Militares…," 212.
[282] José Celestino Mutis, "Plan de Curación para las Enfermedades Agudas…," 145-147.

quina infused in boiled water and giving the drink during the remission and intermission of the paroxysm attacks. After several trials, the malignant effect would disappear along with the fever.[283] He agreed that no purgative medication was needed after the use of quina.[284] Overall, the healing plan and the promotion of native quina could not be understood as individualistic initiatives stemming from Mutis - the need to promote the use and test the effects of quina was a concern which came from Mutis, local physicians, *criollos*, and viceregal authorities.

The search for the precious bark was an activity that did not stop in the viceroyalty - regular experimentation and exploration of quina continued in practice. The 'savant' Mutis and his team of assistants from the Royal Botanical Expedition focused on producing botanical works related to the New Kingdom of Granada's types of quina.[285] Alongside this botanical project, Mutis and the viceregal authorities remained in charge of quina commissions for benefit of the Royal Treasury, and in addition, the *criollo* physician Miguel de Isla listed the value and quantity of red, orange, and white quina as part of medications to be sold in local apothecary stores in 1799.[286]

This chapter has described local experiments with native quina, which must be perceived as a process that began with the role played by viceregal authorities and López Ruiz. Chapter two showed how, in Europe, Joseph Alsinet and British surgeons experimented with quina in order to both understand the bark's therapeutic action mode, and explore its therapeutic use on gangrene and other diseases.

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[283] Ibid., 147-148.
[284] Ibid.,148-149.
[285] See Daniela Bleichmar, *Visible Empire…,*113-114.
[286] Miguel de Isla, "Sustancias Que Debe Tener una Botica," 1799, AGN, in Virginia Gutierrez Pineda, *Medicina Tradicional de Colombia. El Triple Legado Volumen I* (Bogotá: Universidad Nacional de Colombia, 1985), 168.

However, this chapter has explored how the circulation of quina moved between the need to experiment and the need promote its use for economic and medical purposes. Trials were conveyed to validate the legitimacy of different kinds of quina from the New Kingdom of Granada.

CONCLUSION

Figure 3. Left side: samples of cinchona bark from Ruíz and Pavón *Quinología*, 1795.[287] Right side: samples of local quina found in Colombian (left) and Peruvian (right) herbal markets, 2014.

If the two images above did not have an explanatory text of their origin, it would be difficult to guess the type of tree bark to which they belong or to know about their use. The bark samples of these two images are taken apart from their context, but both images refer to the same type of cinchona tree.

[287] "Etiqueta Sps.23/ No. 4/ Cinchona Viridifolia Kinologia Pavon Fl. Per./ Cascarilla Verde Llamada Cucharilla 1795/," Col. Carpológica Ruiz & Pav. Nº 100012 (MA 780940), 1795, ARJBM.

However, the meaning of both images has changed. For instance, in the left image, the cinchona bark was considered to be one of the most precious tree barks of the early modern period not only in European regions, but also in the Middle East[288] and Spanish America, while in the right image, the cinchona bark is nowadays an almost unknown and worthless bark sold in South American herbal markets. However, if both images are tree barks from the same tree, on what does their difference in meaning rely? Indeed, this has been related to how the circulation of medical knowledge and practices has displaced, shaped, and transformed social interactions throughout time.

This thesis is an attempt to clarify how the circulation of quina was conveyed within the viceroyalty of the New Kingdom of Granada at the end of the eighteenth century. First, it was important to remark, as literature related to the history of quina has shown, that quina was not solely the pursuit of José Celestino Mutis after his arrival in the New Kingdom of Granada, nor that this quina was first found during the New Kingdom of Granada's Royal Botanical Expedition in 1783. In addition, although it was outside the scope of this thesis to trace every event related to the use of quina after the second half of the eighteenth century in this viceroyalty, it focused on exploring colonial medicine based on two processes: local experimentation, and the circulation of medical treatises, healing plans, or medical handbooks on quina. These two processes were situated in the dynamics of the colonial medical culture during the second half of the eighteenth century in the New Kingdom of Granada.

The circulation of native quina reaffirms the politically, socially, and culturally powerful presence of viceregal colonial authorities, the role of the *criollo* elite in administrative charges,

[288] An interesting Arab anecdote on quina can be found in: N.I Matar, *Europe Through Arab Eyes (1578-1727)* (New York: Columbia University, 2009), 237-238.

and the connections between groups of learned *criollos* interested in shared natural subjects as ways to reinforce and construct their identities within the viceroyalty.[289] If no one in Madrid had cared about López Ruiz's mulatto origin, why had it become a reason to reject him in the viceroyalty? Why was he locally perceived with mistrust? Was his mulatto origin the main issue, or was it his role as an imperial agent who was controlling the circulation of quina that bothered local merchants, viceregal administrative authorities, colonial physicians, and *criollos*? Aside from aspects that obstructed the development of quina such as wars between Spain and England or the interior uprising in the *Comuneros* rebellion (1781), fragmented social and political lines between the metropolis and the viceroyalty conditioned and shaped the circulation of quina. Indeed, these fragmented relations had an influence between López Ruiz's development of the first quina commission and the later control of José Celestino Mutis in this project.

European medical schools or theories did not condition colonial medical culture - instead, the role of daily medical practices enabled the production of forms of performing and shaping colonial medicine during the second half of the eighteenth century. In addition, hospitals, apothecary stores, and colonial ranches played an important role as spaces where medical knowledge was exchanged. Moreover, according to the historian Paula Ronderos, the absence of American medications in apothecary shops reflected the fact that shamans, empirical healers, and indigenous or black people tended to use more of these medications in the seventeenth century.[290] However, important amounts of quina were circulating within apothecary shops, along with other

[289] In relation to New Kingdom of Granada's local power and autonomy, see Anthony McFarlane, *Colombia Before the Independence*…231-240. In relation to quina and economic and political conflicts between the crown and colonial local elite, see Manuel Salvador Vásquez, "Las Quinas del Norte de Nueva Granada," 424. Also, José Antonio Amaya and Vladimir Torres Moreno, "Ciencia y Economía…,"195.
[290] Paula Ronderos, *El Dilema de los Rótulos*…, 130.

American medicinal plants such as sarsaparilla, reflecting that the use of American plants had become important in the viceroyalty during the second half of the eighteenth century.

Indeed, European medical treatises circulated, but the absence of stable universities or schools allowed free will in colonial medical practitioners. This generated a social openness in medical performance which produced social conflicts, but it did not forbid licensed or unlicensed physicians, empirical healers, surgeons, or pharmacists, as well as viceregal colonial authorities from displaying their ways of perceiving and performing medicine. Moreover, an interesting research idea for the future could be focused on analyzing and updating information based on a prosopography study of colonial medical practitioners in order to obtain data about how many empirical healers or unlicensed physicians were moving, or how many were merchants or kept alliances with merchants in the New Kingdom of Granada. As far as it could be perceived through the circulation of quina, an important presence of unlicensed physicians or pharmacists was moving within the viceroyalty, along with local merchants, probably from the *Audiencia de Quito*, who established connections with pharmacists or physicians in order to circulate quina and/or other medications.

An important aspect related to the circulation of quina was that aside from the fact that not all physicians were licensed, they shared common medical codes related to identifying diseases and the use of therapeutics. They knew that if quina would be tested, they needed to deal with fever patients and also with when or how to apply quina. Indeed, concepts of diseases overlapped, but from Popayán to Santafé de Bogotá, colonial licensed or unlicensed medical practitioners knew that quina was, first and foremost, a medication for fevers, and that it was better administered as a powdered substance infused in water or with another medical substance such as an opiate, as they were familiar with its bitter taste.

The circulation of colonial medical knowledge was possible thanks to all sorts of circumstances and events which occurred within Spanish colonies such as the exchanging of printed books, meetings in *tertulias* (private meetings) or in public and private libraries, hospitals or apothecary shops, and colonial ranches, transatlantic journeys, botanical expeditions, etc. Thinking about all these possibilities has allowed us to understand the role of peripheries as important centres where medical knowledge and practices were being transformed and appropriated.

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