Deconstructing Memories of Modern Medical Heroes: Robert Koch and the Bugalla Sleeping Sickness Camp, 1900-1910

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A Graduating Essay Submitted in Partial Fulfillment of the Requirements in the

Honours Programme.

For the Degree of

Bachelor of Arts

In the

Department

Of

History

University of Victoria
April 25, 2023

Table of Contents

Acknowledgements

First and foremost I would like to thank my friends and family for supporting me as I wrote my thesis. I would like to especially thank my mom, who read every draft and answered every anxious phone call so I could talk through a new idea, revision, or vent about a particularly tricky section. Mom, I am so grateful for the time and effort you put into supporting this project, your support means the world to me and I am so lucky to have such a dedicated friend and editor.

Thank you Dr. Alade for being such an excellent supervisor. Thank you for taking me on and believing in my ideas even when they were in their very early stages. The primary and secondary sources you provided for my research proved to be invaluable. Your feedback and guidance helped shape my work, and I greatly appreciate the time you invested in my research.

Lastly, I would like to thank the Canadian Society for the History of Medicine and AMS Healthcare for awarding me the 2023 Hannah Studentship and funding my research.

Chapter One: Introduction

> Quite a few patients soon withdrew from this stronger treatment because it was too painful for them and also caused other unpleasant sensations, such as nausea, dizziness, colicky pains in the body. *Since these complaints were only temporary, the strong treatment was continued.* However, some of the patients developed a symptom which we had never encountered before, neither in the untreated patients nor in those who had not received doses larger than 0.5 g. At first, we hoped this symptom, like the others, would disappear, especially since temporary blindness had been observed several times in Europe after Atoxyl treatment. Unfortunately, there was no change in our patients, and they remained permanently blind.[1]

On April 25th, 1907, the *Deutsche Medizinische Wochenschrift* (German Medical Weekly) published a report by Robert Koch, a prominent German scientist charged with travelling to East Africa to cure human trypanosomiasis, also known as sleeping sickness. By the time of his report, sleeping sickness had garnered significant attention from scientists throughout Europe. In the report, Koch detailed how he attempted to treat the disease with Atoxyl, an arsenical compound developed in 1905.[2] Notably, Koch reported 22 cases of blindness resulting from the drug.[3] Despite this adverse consequence, Koch continued the treatment. From Koch's report quoted above, one can glean his little respect for the dignity of African bodies. Also, the severe and even life-threatening consequences of his experiments on African human subjects hardly reflect how some white people fondly remember his contributions, which are often devoid of adequate recognition of his unethical research practices. More importantly, when situated in the broader context of colonial health policies, Koch's research practices help to illustrate European attitudes, not only to vulnerable people in colonial societies but also to colonial health and disease control. His work in East Africa provides insight into broader trends in colonial

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[1] Robert Koch, "Final report on the activities of the German expedition for research into sleeping sickness," Deutsche Medizinische Wochenschrift 46 (April 25, 1907): 536; trans DeepL. My emphasis added.
[2] Michael Worboys, "The Comparative History of Sleeping Sickness in East and Central Africa, 1900–1914." *History of science* 32, no. 1 (1994): 92
[3] Koch, "Final report on the activities of the German expedition for research into sleeping sickness," 536.

medical research, such as its connection to the colonial economy, national glory, scientific competition, and racialized understandings of health.

European scientists took notice of sleeping sickness and began to investigate it in the late nineteenth century as part of the broader goal of legitimizing and expanding the emerging field of tropical medicine, which focused on the study and treatment of diseases in tropical colonies. This field was also founded on the Eurocentric belief that tropical climates and their "diseased" inhabitants were inherently different from Europeans and therefore required a different medical and scientific approach. The ensuing race among white medical professionals to discover a cure for sleeping sickness, which posed a significant threat to the European "civilizing mission" in Africa, provided scientists with an opportunity to advance their careers. Moreover, the disease struck at a time when European imperial powers sought to strengthen their influence in their colonies. Intervening to "save" Africans provided the perfect opportunity to pursue social engineering masked as medical research and disease control.

This study seeks to explore colonial disease control and treatment in Uganda by examining Koch's research on the Ssese Islands, an archipelago on Lake Victoria in the South-East corner of the country. The study uses the outcomes of European research in Uganda to question the early triumphant history of science and medicine that portrays medical research as inherently productive and positive. It argues that we reconsider institutional memory in medical research and consider the harm done to African patients.

In order to understand the dynamic of the disease, its characteristics must be established. At the turn of the twentieth century, the sleeping sickness epidemic that first appeared in Busoga,

an area in Eastern Uganda, spread across thousands of square kilometers in only a few years.[4] A series of ecological, social, and political disturbances in the region throughout the nineteenth century created an ideal environment for this vector-borne disease. African states around the Great Lakes consolidated throughout the nineteenth century, and there was a significant increase in trade between Great Lake nations and international traders. In addition, environmental disturbances had led to droughts and significant food shortages.[5] Between 1900 and 1905, the peak of the epidemic, the disease killed over 250,000 people, decimating communities and impacting demographic patterns.[6] There were two variants of the disease, each caused by different trypanosome parasites: *trypanosoma brucei rhodesiense* (mainly found in Southern and Eastern Africa) and *trypanosoma gambiense* (mainly found in Western and Central Africa).[7] The former caused an acute form of the disease, while the latter caused chronic symptoms and could lay dormant for years after initial exposure.[8] Both variants were transmitted exclusively by the tsetse fly, and symptoms began with malaise, fever, swelling in the face, gland inflammation, and headaches.[9] As the disease progressed, the individual experienced neurological symptoms such as behavioural changes, tremors, motor challenges, disturbed sleep, and general weakness.[10] All of these symptoms would eventually lead to the unconscious state that gives the disease its

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[4] Douglas M. Haynes, ""Framing Tropical Disease in London: Patrick Manson, Filaria Perstans, and the Uganda Sleeping Sickness Epidemic, 1891–1902." *Social History of Medicine: the Journal of the Society for the Social History of Medicine* 13, no. 3 (2000): 467.

[5] Richard Reid, *Political power in pre-colonial Buganda: economy, society and warfare in the nineteenth century*. (Ohio, Ohio Univerisity Press, 2002), 36.

[6] Maryinez Lyons, *The Colonial Disease: a social history of sleeping sickness in Northern Zaire 1900-1940*, 37–63. (Cambridge: Cambridge University Press, 1992), 37.

[7] Mari Webel, *The Politics of Disease Control: Sleeping Sickness in Eastern Africa, 1890-1920.* (Ohio University Press, 2020), 4.

[8] Lyons, *The Colonial Disease,* 44.

[9] Webel, *The Politics of Disease Control,* 4.

[10] Mari Webel, "Trypanosomiasis, Tropical Medicine, and the Practices of Inter-Colonial Research at Lake Victoria, 1902-07." *History and technology* 35, no. 3 (2019): 266.

name.[11] Between 1902 and 1908, over two-thirds of the inhabitants of the Ssese Islands died from the disease, with about eighteen-thousand lives lost.[12] The severity of the outbreak upended life on the Ssese Islands, creating demographic change, exhausting healthcare resources. This created an opportunity for European researchers to profit from the Islanders' misery and present themselves as saviours.

Historiography on Colonial Health in East Africa

After the arrival of Europeans in East Africa in the mid-1880s, African bodies became the subject of colonial biomedical research and control. Scholars have attempted to understand how existing colonial relationships and structures influenced relationships between scientists and patients. [13] Some have depicted tropical medicine as one of the few positive aspects of colonialism, suggesting that overall health improved and that colonized peoples benefitted from new medical systems.[14] Other scholars have argued that it served primarily as a tool for social and economic control and gave colonial powers the ability to impose harsh restrictions and regulations.[15] However, suggesting that the introduction of a new healthcare system is entirely negative or positive is reductive. Scientific endeavours and new understandings of disease at the turn of the twentieth century had a profound impact on the lives of Africans. Approaches to the subject have varied, ranging from interpreting colonial medical interventions as a form of social

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[11] Webel, "Trypanosomiasis, Tropical Medicine, and the Practices of Inter-Colonial Research at Lake Victoria, 1902-07," 266.
[12] Mari Webel, "Ziba Politics and the German Sleeping Sickness Camp at Kigarama, Tanzania, 1907–14." *The International Journal of African Historical Studies* 47, no. 3 (2014): 405; Editorial, "Professor Koch on Sleeping Sickness." *The British Medical Journal*, (January 19, 1907): 152.
[13] Melissa Graboyes, "Introduction: incorporating medical research into the history of medicine in East Africa," *The International Journal of African Historical Studies* 47, no. 3 (2014): 379.
[14] Ryan Johnson, "The West African Medical Staff and the Administration of Imperial Tropical Medicine, 1902–14." *The Journal of Imperial and Commonwealth History* 38, no. 3 (September 2010): 423.
[15] Johnson, "The West African Medical Staff and the Administration of Imperial Tropical Medicine," 423.

engineering to examining racialized divisions in healthcare, the rise of modern medicine as an institution, African responses to colonial medical policies, and the collaborative ventures of colonial powers. This study contributes to these debates, departing from them in a few key areas.

The very concept of "tropical medicine" is inherently racist, for its creation denotes an attempt to establish sharp divisions between Europeans and people from tropical climates. Many scholars have discussed the origins of tropical medicine, including its initial funding by European traders and investors with material stakes in the colonial world.[16] The colonial response to sleeping sickness helps to highlight the economic motivation behind tropical medicine; the field pivoted and suddenly focused on African patients as soon as diseases in the region began to threaten European economic and political interests.

Neill notes that the field of tropical medicine emerged around the same time European scientists believed in phrenology, the degeneration theory, and eugenics, all of which relied on racist ideologies.[17] She highlights how these conditions in Europe influenced the field of tropical medicine, but her analysis does not show how these beliefs separated research practices and protocols in Europe from African colonies. She acknowledges that initially, colonial health in East Africa focused predominantly on ensuring the safety of colonial officials and personnel and highlights how the sleeping sickness epidemic forced them to introduce public health measures aimed at controlling Africans.[18] Again, her study fails to adequately acknowledge how colonial health policies that were heavily motivated by social control separated medical care in Europe from colonial healthcare in Africa.

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[16] For example, see Deborah Neill, *Networks in Tropical Medicine: Internationalism, Colonialism, and the Rise of a Medical Specialty, 1890-1930* (Stanford, California: Stanford University Press, 2012).
[17] Neill, *Networks in Tropical Medicine,* 4.
[18] Neill, *Networks in Tropical Medicine,* 61.

Many scholars have demonstrated that colonial health primarily focused on European goals of social engineering and scientific progress and that patient health was less important. At the turn of the twentieth century, doctors and researchers held considerable power over their patients, and research outcomes were often prioritized over patient health.[19] Neill argues that European patients, especially if they were researchers who had contracted the disease, were often better informed on treatments.[20] She further suggests that there were structural and ethical problems in medicine at the time that led to harmful research but generalizes these on a global scale, ignorance the nuance of individual regions. Grayboyes' argument is similar, she situates research in East Africa in its temporal global context, arguing against African exceptionalism by suggesting that the drug research conducted there was "well within the norm," and present in several other areas.[21] She claims that in the early twentieth century, Western medical research involved the use of force and coercion and suggests that biomedical research in Africa fit into international trends. She compares experiments in Africa with those taking place in the United States and Europe, with no mention of other colonized regions. Moreover, and perhaps most damning, in discussing harmful research practices in the United States, she primarily cites studies on the Tuskegee Syphilis Study or other experiments on Black people, while failing to adequately acknowledge the racist ideologies reflected in these practices.[22] Her assertions are highly problematic. Her failure to address how colonial power dynamics distinguish research in East Africa from experiments on Americans and Europeans creates a substantial gap and encourages a historical narrative that minimizes the impact of colonialism on the health of minorities. It is apparent that if the very humanity of the patient is in doubt, research protocols

[19] Neill, *Networks in Tropical Medicine,* 73.
[20] Neill, *Networks in Tropical Medicine,* 74.
[21] Grayboyes, "Introduction: incorporating medical research into the history of medicine in East Africa," 380.
[22] Grayboyes, "Introduction: incorporating medical research into the history of medicine in East Africa," 380.

will be inherently different than when a researcher is treating a fellow white person. Tilley makes a similar argument, claiming that human experimentation occurred less frequently in colonial Africa than in other areas during the twentieth century.[23] These authors' claims that biomedical research at the turn of the twentieth century was exploitative and harmful on a global scale are valid. However, they did not extend their analysis to adequately account for how the European quest for medical discoveries and inventions, as well as career advancement, influenced scientists' research practices in the colonial landscape. More importantly, their studies do not show that the experiences of colonized Africans cannot be compared to the experiences of free people in the metropole. However, racialized research on Indigenous peoples and Black Americans warrants significant attention, but should not be used to create a single cohesive narrative that ignores individual nuance.

In addition to the scholarly critique of colonial health as a tool of empire, Anderson argues that Western medicine helped to "support" the European argument of genetic superiority and served as a tool for political, social, and economic control. It is of note that tropical medicine largely dealt with diseases caused by colonial incursions.[24] For example, ecological disturbances brought on by forced migrations and changes to the landscape impacted insect habitats which hastened the spread of insect-borne diseases in the tropics.[25] Moreover, colonial wars of expansion impacted water quality in many places, leading to increased water-borne diseases.

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[23] Helen Tilley, "Conclusion: Experimentation in Colonial East Africa and Beyond." *The International journal of African historical studies* 47, no. 3 (2014): 497.
[24] Johnson, "The West African Medical Staff and the Administration of Imperial Tropical Medicine," 424.
[25] See David Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth Century India.* (Berkeley: University of California Press, 1993.

Hoppe highlights how colonial efforts to control sleeping sickness served to conduct social engineering and manipulate African mobility and access to resources.[26]

Several studies have explained the role African agency played in establishing sleeping sickness camps and implementing other colonial health policies in East Africa. Webel's work shows how the camps were integrated into the political, social, and economic landscape, illustrating how colonial officials were forced to negotiate with local African leaders to construct the camps.[27] By exploring how the relationship between Ziba royal authorities and colonial officials influenced the establishment of a sleeping sickness camp at Kigarama, a region in Eastern Rwanda, Webel submits that attitudes towards the camps were often reflective of broader dynamics in the area which changed as their relationships evolved.[28] The Kigarama camp initially fit into traditional power dynamics in the region and gave Africans access to treatments that were actively sought out.[29] However, over time the perception of the camp changed, and it was avoided, thereby demonstrating a gradual rejection of both royal and colonial authority.[30] Similarly, Grayboyes claims that while the relationship between African patients and colonial researchers sometimes relied on force, Africans often had an active role in determining treatment regimens and refused to participate in projects that did not match their understanding of health or meet their needs.[31]

This thesis builds on these studies, arguing that popular attitudes toward colonial sleeping sickness camps are indicative of broader relationships between European colonizers and

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[26] Kirk Arden Hoppe*, Lords of the Fly: Sleeping Sickness Control in British East Africa, 1900-1960*. (Connecticut: Praeger, 2003), 1.
[27] Mari Webel, "Ziba Politics and the German Sleeping Sickness Camp at Kigarama, Tanzania, 1907–14." *The International Journal of African Historical Studie*s 47, no. 3 (2014): 401.
[28] Webel, "Ziba Politics and the German Sleeping Sickness Camp at Kigarama, Tanzania, 1907–14," 400.
[29] Webel, "Ziba Politics and the German Sleeping Sickness Camp at Kigarama, Tanzania, 1907–14," 400.
[30] Webel, "Ziba Politics and the German Sleeping Sickness Camp at Kigarama, Tanzania, 1907–14," 400.
[31] Grayboyes, "Introduction: incorporating medical research into the history of medicine in East Africa," 379-380.

colonized Africans. It examines the role of African agency in determining research practices while also acknowledging that their initial engagement with the Bugalla camp relied on coercion, false promises, and incomplete information.

Scholars have addressed how an accurate institutional memory, though not enough to prevent recurring trends in history, helps to mitigate this threat.[32] Grayboyes and Carr claim that by striving for an accurate institutional memory in medicine, one that solidifies recollections of past encounters and failures, mistakes are less likely to be repeated.[33] The importance of understanding how Western biomedicine was received and the role of consent in research protocols cannot be overstated. Moreover, understanding the motivations both for introducing and accepting Western medical practices must be understood. Grayboyes and Carr argue that the administration of Western biomedicine in East Africa was not always harmful and coercive, as people in the region were receptive to new ideas.[34] This complicates the notion that Western medicine was generally imposed on Africans.

Although many Africans explored Western biomedicine in East Africa, its European administrators, scientists and doctors, arrived in Africa as part of a "civilizing mission," aimed at Westernizing Africans.[35] These scientists were highly motivated by national, economic, and personal goals. Eckart argues that it is often tempting to construct the history of medicine in a linear fashion that highlights lifesaving progress and ignores insidious research practices.[36] In addition, it can be tempting to focus on a single figure and depict them as a brilliant mind and

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[32] See Melissa Grayboyes and Hannah Carr, "Institutional Memory, Institutional Capacity: Narratives of Failed Biomedical Encounters in East Africa." *Canadian Journal of African studies* 50, no. 3 (2016).
[33] Grayboyes and Carr, "Institutional Memory, Institutional Capacity," 362.
[34] Grayboyes and Carr, "Institutional Memory, Institutional Capacity," 363.
[35] Grayboyes and Carr, "Institutional Memory, Institutional Capacity," 367.
[36] W. Eckart, "The Colony as Laboratory: German Sleeping Sickness Campaigns in German East Africa and in Togo, 1900–1914," *History and Philosophy of the Life Sciences*, 2002, vol. 24, 69.

saviour. For Eckart, neither approach is suited to writing the history of sleeping sickness research in East Africa.[37] Eckart's article focuses on Robert Koch, and he claims that neither Koch nor Western biomedicine warrants celebration in this context. The author describes Koch as "an aged man far beyond the zenith of his scientific productivity and more or less detached from modern developments."[38] Koch, therefore, arrived in East Africa after a substantial decline in his career, discussed below, and was unwilling to implement modern protocols. He sought to restore his reputation through whatever means were necessary and relied on African bodies to accomplish his goal. This study highlights Koch's harmful research practices and by examining his portrayal in history, it questions how scientific endeavours are romanticized in Western historiography to portray science as productive and progressive.

Koch's research in Africa was heavily influenced by existing competition between colonial powers and individual scientists. Neil cautions against using one case study as a means of understanding the complexity of this competition, claiming that analyzing the international networks formed by scientists helps to create a more comprehensive narrative.[39] These networks empowered European medical "experts" while impacting their research practices and this can be proved with a case study. My work situates Koch's research in its global context and sheds light on the transnational relationships that made his research possible. Moreover, by reflecting on his career before he travelled to Africa, I highlight how the scientist advanced his reputation in the tropics. Koch relied on preexisting scientific networks to establish his camp in Bugalla, highlighting how international cooperation and competition enabled harmful research practices

[37] Eckart, "The Colony as a Laboratory," 69.
[38] Eckart, "The Colony as a Laboratory," 69.
[39] Deborah Neill, "Paul Ehrlich's Colonial Connections: Scientific Networks and Sleeping Sickness Drug Therapy Research, 1900–1914." Social History of Medicine: The Journal of the Society for the Social History of Medicine 22, no. 1 (2009): 62.

that prioritized research outcomes over patient health in Africa.

There are inherent challenges to using an extreme event, such as an epidemic or a war, to understand societies. Lyons argues that attempting to use an epidemic to understand relationships and structures in the affected region risks omitting circumstances before and after the epidemic.[40] However, he argues epidemics can nevertheless be used to highlight existing inequalities and conflicts, so long as the author realizes that the state of a society during an epidemic cannot be generalized.[41] Although I acknowledge the risk of generalizations, this study argues that the epidemic's severity allows us to analyze not only power dynamics in the region but also the state of Western science and tropical medicine at the turn of the twentieth century.

The collaboration among European colonial powers helped establish some disease control measures and influenced how biomedical research was conducted in Africa. Neill and Webel suggest that colonial powers had to cooperate for research to be conducted. Neill's work demonstrates the degree of international cooperation required to conduct research in the emerging field of tropical medicine.[42] She uses Paul Ehrlich, a prominent German scientist, to demonstrate that even during tension and rivalry among European governments, scientific research relied on a combination of cooperation and competition among individual scientists.[43] She asserts that despite European scientists being highly competitive and nationalistic, they were also driven to collaborate across borders, which in turn influenced the implementation of healthcare policies in several colonial administrations.[44] Webel focuses on international competition to find a cure for sleeping sickness. She suggests that the need for cooperation,

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[40] Lyons, *The Colonial Disease,* 54.
[41] Lyons, *The Colonial Disease,* 54.
[42] Neill, ""Paul Ehrlich's Colonial Connections," 62.
[43] Neill, ""Paul Ehrlich's Colonial Connections," 63.
[44] Neill, *Networks in Tropical Medicine,* 205.

strident nationalism, and personal interests of researchers, created a complex series of relationships that played out on the shores of Lake Victoria.[45]

It is now clear that colonized Africans did not merely reject colonial health programs, but rather negotiated some of the interventions to meet their health needs. In some cases, their reactions had to be accommodated by colonial officials.[46] In her study of how Africans perceived isolation camps and depopulation zones, Webel's discussion of the Ssese Islands reveals that when research practices changed and no longer met the expectations of African patients, there was a substantial decrease in the number of individuals enrolled for treatment. This decrease demonstrates that patients chose to receive Koch's treatment, rejecting it when it failed to meet their expectations, thereby highlighting the role of African agency.

From the foregoing, this study draws from and builds on the burgeoning literature in the social history of medicine by critiquing how medical heroes are portrayed in history. The argument is that we rethink institutional memory in medical research by considering the harm European researchers did to African patients. By examining Koch's work, this study critiques how the European scientist is remembered and sheds light on the insidious side of his biomedical research. In addition, it explores the relationship between European coercion and African agency, and submits that initial African engagement with the camp, and their later departure, reflect the degree of influence Africans had over their healthcare. However, it also acknowledges that this engagement was partly based on the false promise of a cure and a lack of comprehensive information regarding the risks of the treatment. These factors enabled European researchers to take advantage of their "patients" and use them as guinea pigs in their research.

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[45] Mari Webel, "Trypanosomiasis, Tropical Medicine, and the Practices of Inter-Colonial Research at Lake Victoria, 1902-07." *History and Technology* 35, no. 3 (2019).
[46] Eckart, "The Colony as a Laboratory."

The study also explores broader trends within colonial health in East Africa to situate the Bugalla sleeping sickness camp within the invasive European medical systems. The operation of the camp involved cooperation between British and German colonial officials. How Africans responded to measures such as population displacement and attempts to isolate the sick highlights the limits of colonial power in the area.[47]

The project focuses on events from 1900 to 1910, with particular emphasis on 1907, when research practices changed as a result of drug shortages and pressure to find a permanent cure.[48] This change occurred shortly before a sharp decline in patient enrolment at the Bugalla sleeping sickness camp. Of the approximately two thousand patients in the Bugalla camp in December 1906, which does not include those waiting outside the camp for treatment, only six hundred remained in May 1907.[49]

Chapter Two: Colonial Rule in Uganda

European medical research in Uganda benefitted from colonial power dynamics. In addition, colonial incursions caused significant ecological, political, and social disruptions that altered the region's disease landscape. Therefore, understanding British colonial rule in Uganda will help to contextualize Koch's research practices and how African patients responded. In 1894, the British government took over Uganda from the Imperial British East Africa Company (IBEAC), declared it their protectorate, and established an indirect rule system allowing

[47] Hoppe, *Lords of the Fly*, 5.
[48] Mari K. Webel, *The Politics of Disease Control: Sleeping Sickness in Eastern Africa, 1890-1920.* (Ohio: Ohio University press, 2020), 104.
[49] Webel, *The Politics of Disease Control,* 103.

European officials to govern through local leaders and chiefs. Between the late nineteenth century and the First World War, the British implemented colonial policies and programs that significantly reshaped African social conditions, including public health. Scholars still debate what led to the eruption of sleeping sickness in the early twentieth century. However, they generally agree that increased migration and international trade in the area helped to create conditions for the outbreak of an epidemic.[50] In other words, the social, economic, and political changes that took place due to colonial incursions altered the ecological landscape of the area, which created an atmosphere where disease could flourish and spread. While this study focuses on the Ssese Islands, it also considers the varied forces that altered social, political, and economic landscapes in the surrounding regions.

Prior to the arrival of Europeans, East Africa was already undergoing significant changes. The kingdoms of Buganda, Rwanda, Bunyoro, and Urundi shifted towards expansion during the eighteenth and early nineteenth centuries.[51] These expansions were made possible through increased government centralization and growing trade networks.[52] Buganda, which became the most influential nation in the region, assumed control of the Ssese Islands in 1900 after the Uganda Agreement was signed between the Baganda and the British. The agreement solidified the relationship between the two powers, stating that the King of Buganda would remain the ruler of the area so long as he was loyal to Britain. It turned the Baganda state into a constitutional monarchy connected to Britain, significantly reduced the authority of the kabaka, and outlawed any collection of tributes from beyond Buganda's borders.[53]

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[50] Maureen Malowany, "Unfinished Agendas: Writing the History of Medicine of Sub-Saharan Africa." *African Affairs* (London) 99, no. 395 (2000): 331.
[51] Webel, *The Politics of Disease Control, 25*
[52] Webel, *The Politics of Disease Control,* 25.
[53] Richard Reid. "Rukidi's Children: The Trials and Tribulations of Kabalega and Mwanga" in *A History of Modern Uganda* (Cambridge: Cambridge University Press), 159. doi:10.1017/9781107589742.005

Before becoming a British protectorate, the Baganda government followed a monarchical structure, with power concentrated in the monarch, the Kabaka. As Buganda expanded and reshaped trade networks in the area to suit their needs, they also participated in international trade.[54] Trade landscapes also changed when British imperial officials arrived in the late nineteenth century. Buganda profited geopolitically from British support as they sought to gain control over their neighbours, whom the Europeans considered "uncivilized."[55] After 1890, members of the IBEAC saw Buganda as the center of the region and the surrounding areas as "peripheral." The Uganda Agreement of 1900 solidified Buganda's power by incorporating Buvuma and the Ssese Islands into their territory.[56] British-Baganda expeditions against neighbouring states further solidified this alliance and led to British officials viewing the Baganda as "cooperative and effective."[57] Despite this, it is important to avoid reducing Baganda's actions to mere collaboration with the British, as this would ignore the complex circumstances that prompted their decision to align with them.

The Baganda economy was structured around social class and division of labour, wherein the Kabaka wielded power and authority to redistribute land. Agricultural labourers often followed landowners if they relocated, leading to even more migration in the area during times of political change.[58] In 1901, a European Christian missionary remarked:

> The whole population was in movement. Streams of men, women, and children going east with all of their household goods, cattle, sheep, goats, and fowls, met similar streams going west. Evicted tenants from the north were able to greet their friends in a similar condition from the south.[59]

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[54] David W. Cohen, "Peoples and States of the Great Lakes Region," in *General History of Africa Vol. VI: Africa in the Nineteenth Century until the 1880s."* International Scientific Community for the drafting of a General History of Africa, 289.
[55] Hoppe, *Lords of the Fly*, 44.
[56] Hoppe, *Lords of the Fly*, 45.
[57] Hoppe, *Lords of the Fly*, 45.
[58] Hoppe, *Lords of the Fly*, 48-49.
[59] Hoppe, *Lords of the Fly*, 49.

This migration pattern altered landscapes, allowing diseases to spread rapidly through travelling individuals.

The Ssese Islands were relatively unaffected by this mobility, despite being officially incorporated into Buganda. Lake Victoria and its islands were important to Buganda and had longstanding political, economic, military, and symbolic significance.[60] Their land allotment remained largely intact, with the largest demographic changes occurring as a result of slave raids.[61] The attendant disruption changed political, economic, and social dynamics in the area, which proved instrumental in shaping the sleeping sickness problem.

Before the outbreak of sleeping sickness, Ssese Islanders had developed complex medical systems to address illnesses. Many of their approaches to disease were shared with neighbouring Buganda, with whom they had been closely connected for centuries.[62] Medicine and public healing extended into the political sphere and were closely connected to the environment.[63] People travelled to shrines throughout the region, either alone or to participate in group gatherings and ceremonies. Individuals likely sought out local shrines first, before travelling to a more prominent one if needed.[64] The Ssese Islands were among the many important spiritual sites in the region and were oriented around Bugala Island and Buembe Island, the site of the shrine for Mukasa, a key deity responsible for prosperity and health.[65] In addition to shrines, Ssese Islanders relied on several medical and therapeutic resources, including support from

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[60] Hoppe, *Lords of the Fly*, 44.
[61] Hoppe, *Lords of the Fly*, 49.
[62] Reid, *Political power in pre-colonial Buganda: economy, society and warfare in the nineteenth century*, 238.
[63] Neil Kodesh, *Beyond the Royal Gaze, Clanship and Public Healing in Buganda*. (Charlottesville, Virginia University of Virginia Press, 2010), 6.
[64] Kodesh, *Beyond the Royal Gaze,* 2.
[65] Webel, The Politics of Disease Control, 38; Hoppe, *Lords of the Fly*, 44.

family members, healers, and pharmaceutical interventions.[66] They not only understood disease etiology and the causal relationship between vectors and disease, including the risks of the tsetse fly, Africans also practiced inoculation against common diseases. Sources show that recommendations circulated from Kampala, the seat of the Baganda government, about ways to manage the disease before British scientists confirmed that the tsetse fly transmitted the disease.[67]

Health practitioners responsible for public healing played active roles in maintaining the wellbeing of communities by stressing the connection between morality and public health.[68] During widespread illness, healers explained the phenomena as disruptions in social relationships or linked them to the behaviour of the Kabaka, who was responsible for the health of the kingdom.

In addition to their robust medical resources, Ssese Islanders and the Baganda occasionally sought help from Christian missionaries. Early missionaries understood that proving the 'superiority' of their methods was a useful tool for conversion. The Anglican Church Missionary Society (CMS) and the Catholic Society of the Missionaries of Africa (White Fathers) were the two most influential groups on the Ssese Islands.[69] For both groups, health was ideologically important and served as a path to conversion. The diary of A. M. Mackay, a missionary in Uganda in the 1870s and 80s reveals the popular view of Western medicine as a tool for religious conversion:

> It has struck me at this time more forcibly than ever before that, all missionaries should have good knowledge of surgery and medicine, or at least have one of their number in

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[66] Gloria Waite, "Public Health in Pre-Colonial East-Central Africa," *Social science & medicine (1982)* 24, no. 3 (1987): 199.
[67] Michael W. Tuck, "Kabaka Mutesa and Venereal Disease: An Essay on Medical History and Sources in Precolonial Buganda," *History in Africa* 30 (2003): 314.
[68] Kodesh, *Beyond the Royal Gaze,* 17.
[69] Webel, *The Politics of Disease Control,* 50.

> each station qualified to take in hand any disease or accident. It is the fact that all native gods and sorcerers are cure-workers, and all medicine-men looked up to as being possessed of more than natural powers, that leads me to see the great influence in favour of Christianity that a medical mission can exert if prudently conducted.[70]

The realization that medicine was politically and spiritually important may have encouraged the establishment of permanent Christian missions with medically trained personnel, including the establishment of the CMS Mengo Hospital in 1897 by Albert Cook, a prominent missionary.[71] By the time of the sleeping sickness outbreak a few years later, Ssese Islanders could seek medical treatment at the White Fathers' Mission at Bumangi on Bugala Island and at the Church Mission Society locations on Bukasa and Bugala Island.[72] Islanders occasionally sought out help from these missions, but their methods were ineffective, prompting many to disengage.

The medical and religious significance of the Ssese Islands continued after the outbreak of sleeping sickness. According to Webel, missionary sources from 1902 and 1903 describe the Islanders' isolation practices, noting that infected individuals were removed from their households but were still cared for by family members. On Bugala Island specifically, missionaries reported that several villages had established sites to isolate the sick, giving each individual a hut where they were treated and cared for by their relatives.[73] Ssese villages were generally situated inland from the lake, while these isolation sites were constructed closer to the shore, ensuring that individuals still had access to basic necessities.[74] These missionary reports

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[70] A.M Mackay, "January 2, 1880," in *A.M Mackay, A Pioneer Missionary of the Church Society of Uganda,* p. 197
[71] Yolana Pringle. "Chapter Two: Crossing the divide: medical missionaries and government services in Uganda, 1897-1940," in *Beyond the state: The colonial medical service in British Africa*, ed. Anna Greenwood (Manchester: Manchester University Press), 21.
[72] Webel, *The Politics of Disease Control,* 51.
[73] Webel, *The Politics of Disease Control,* 63.
[74] Webel, *The Politics of Disease Control,* 66.

often characterized the Islanders responses as fatalistic and brutal, citing examples of the sick being left to die alone. This biased narrative depicts missionaries as the "saviours" of Africans ejected from their communities, highlighting the importance of missionary work.

The lack of a cure on the Islands created the perfect opportunity for European scientists to position themselves as experts and disguise their dangerous research as treatment. Within a few years of the initial outbreak, the Ssese Islands and the Lake Victoria littoral became the focus of scientific study. The camp Koch established in 1906 profited from longstanding associations of the islands with health. The treatment camp became the foundation for much larger sleeping sickness control measures throughout East Africa.

Chapter Three: Tropical Medicine and the "Scientific Scramble"

The outbreak of sleeping sickness in Eastern and Central Africa at the beginning of the twentieth century was influenced by many factors including disturbances caused by colonial

incursions and expanding trade networks in Uganda. This chapter explores how these factors and the scientific endeavours to address the epidemic are represented in history, shedding light on the often triumphant and linear approach to the story of Western biomedicine. It is necessary to understand the emerging power structures in tropical medicine prior to Robert Koch's arrival in Uganda in order to situate his research in the broader context of colonial medical exploitation. To question the celebratory history of his works, this section examines the cultural and economic shifts in science and empire-building that birthed tropical medicine and the field's connection to power and wealth in the late nineteenth and early twentieth centuries. These shifts shed light on the growing authority of scientific researchers, which empowered them to conduct exploitative research.

Tropical medicine originated and developed at the intersection of economic, scientific, national, and colonial interests. This distinguished it from other medical specialties like psychiatry, dermatology, obstetrics, and gynecology. In addition to being motivated by colonial economic and political goals, white doctors were also influenced by the career opportunities afforded to them by the new medical specialty.[75] In addition to commercial interests, the new specialty, though linked to new revolutionary scientific discoveries, was also closely connected to European expansion.[76] Robert Koch, a pioneering German physician and microbiologist who made significant contributions to the field of bacteriology, profited from these changes in medicine alongside his contemporaries, including Joseph Lister, Paul Ehrlich, and Louis Pasteur. These changes, coupled with access to tropical colonies, enabled Koch to experiment on colonized peoples, thereby advancing his career and reputation.

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[75] Anna Crozier, *Practicing Colonial Medicine: The Colonial Medical Service in British East Africa* (London: I.B. Tauris Publishers, 2007), 21.
[76] Neill, *Networks in Tropical Medicine,* 17.

Before European scientists invented "tropical medicine" in the late nineteenth century, medicine had become more regulated, stratified, and professionalized in Europe. During the period, scientific advancements restructured Western biomedicine, establishing a microbiological basis for their practices.[77] One of the most significant discoveries was germ theory, the idea that diseases were caused by specific pathogens. Following the discovery of germ theory, scientists attempted to connect most diseases to microbes, and between 1880 and 1900, they identified more than twenty causal links between pathogens and diseases in Europe.[78] The ability to isolate specific pathogens, and diagnose and treat the diseases they caused led to a sudden rise in the reputation of Western biomedical professionals.[79] In addition, findings based on the theory led to significant collaboration between field and laboratory scientists seeking to understand and cure diseases.[80]

In the context of the growing acceptance of germ theory, many European scientists promptly responded to the threat posed by sleeping sickness. The disease endangered the health of colonial officials, the colonial economy, and labour in Africa, making it a priority for study. Like other diseases that threatened colonial rule elsewhere on the continent, the sleeping sickness epidemic in Uganda kickstarted a "scientific scramble" among European medical professionals with a keen interest in seeing who would be the first to understand the causative agent and cure the new disease.[81] As subsequent sections of this thesis show, their decades of dedicated research using newly discovered theories and tools, suggest that European scientists were eager to make a name for themselves. More importantly, sleeping sickness and African patients provided

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[77] Alan M. Brandt and Martha Gardner, "The Golden Age of Medicine?" In *Medicine in the Twentieth Century*, eds. Roger Cooter and John V. Pickstone (Amsterdam: Harwood Academic Publishers, 2000), 21.
[78] Brandt and Gardner, "The Golden Age of Medicine?" 22.
[79] Brandt and Gardner, "The Golden Age of Medicine?" 22.
[80] Malowany, "Unfinished Agendas," 326.
[81] Hoppe, *Lords of the Fly*, 28.

opportunities for the advancement of tropical medicine and the careers of these experts.

Before the nineteenth century, scientists in Europe paid little attention to diseases in Africa and other parts of the tropical world unless these diseases threatened international trade and colonial interests.[82] They nevertheless attempted to uncover biological determinants of race, especially elements that separated Europeans from the "inferior" people they colonized in these regions.[83] The supposed differences found by scientists, including physical characteristics and differences in "civility" and "morality," especially in Africa, were instrumental in shaping how colonial health research was implemented in the colonies.[84] The idea that race influenced disease susceptibility was pervasive among European scientists and colonial officials observing health and diseases in the tropics during the eighteenth and nineteenth century.[85] By the early twentieth century, European understanding of immunity to certain diseases shifted from the belief that some groups had innate immunity from birth to one that suggested certain races acquired immunity to specific pathogens after several exposures.[86] Still, this shift did not pull European scientific focus away from race, but rather strengthened the dangerous stereotype of "the tropics" and its inhabitants as "different" or "exotic," which made European health officials perceive them as germ reservoirs.

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[82] Douglas Haynes, "The Social Production of Metropolitan Expertise in Tropical Diseases: The Imperial State, Colonial Service and the Tropical Diseases Research Fund." *Science, technology & society (New Delhi, India)* 4, no. 2 (1999): 212.

[83] See Harriet Deacon, "Racism and Medical Science in South Africa's Cape Colony in the Mid-to Late Nineteenth Century," Osiris 15 (2000) for more.

[84] See Philippa Levinne, "Anthropology, Colonialism, and Eugenics', *The Oxford Handbook of the History of Eugenics*, eds. Alison Bashford, and Philippa Levine (Oxford: Oxford University Press), for an overview of the perceived differences and their impact on attitudes towards colonialism.

[85] Warwick Anderson, "Immunities of Empire: Race: Disease, and the New Tropical Medicine, 1900-1920," Bulletin of the History of Medicine 70 (1996): 96.

[86] See Anderson, "Immunities of Empire" for an overview of changing American perceptions of immunity in the Philippines.

To be sure, some scholars have demonstrated that the growth of tropical medicine coincided with increasing British interest in Africa and Asia, where the Colonial Office helped to shape the medical profession.[87] The British Colonial Office in London offered these medical experts Africa as a living laboratory where they could experiment and confirm the validity of their theories of disease. In addition, tropical medicine helped the British justify their presence in Africa as part of a "civilizing mission" meant to improve the lives of the colonized people. This, in turn, enabled European colonial officials to enact strict control measures to restrict and confine Africans.[88]

In 1858, the University of Edinburgh offered the first courses dedicated to the study of tropical medicine. These courses solidified the distinction between "tropical" medicine and medicine in the metropole and enforced a racialized understanding of diseases.[89] At the time, European scientists believed that diseases in tropical regions could be conquered using superior technology.[90] In 1895, Patrick Manson, who would eventually be known as the "father of tropical medicine," commenced a series of lectures at St. Georges Hospital in London for graduates hoping to pursue a career outside Britain.[91] Decades later, after Manson was appointed medical adviser to the Colonial Office, he advocated for specialized training in tropical medicine to protect British interests.[92]

Interest in specialized courses and the opportunities they provided led to the establishment of formal schools of tropical medicine, further solidifying the new field and the

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[87] Douglas M. Haynes, "Framing Tropical Disease in London: Patrick Manson, Filaria Perstans, and the Uganda Sleeping Sickness Epidemic, 1891–1902." Social history of medicine: the journal of the Society for the Social History of Medicine 13, no. 3 (2000): 471-2.
[88] Hoppe, *Lords of the Fly*, 27
[89] Johnson, "The West African Medical Staff and the Administration of Imperial Tropical Medicine," 422.
[90] Lyons, *The Colonial Disease*, 39.
[91] Crozier, *Practicing Colonial Medicine,* 4.
[92] Johnson, "The West African Medical Staff and the Administration of Imperial Tropical Medicine," 422.

status of its practitioners. The first of these schools, the Liverpool School of Tropical Medicine, opened in May 1899. A significant portion of the school's funding came from Liverpool elites, whose donations were motivated by their commercial interests in West Africa.[93] Similar schools were soon founded across Europe, provoking competition as national interests and pride were projected onto the new field of medical science. In particular, competition arose between Britain's London and Liverpool schools, Germany's Berlin Institute for Infectious Diseases, and France's Pasteur Institute.[94] European health professionals quickly created new scientific journals and societies and established specific requirements for practice, contributing to the prestige of the new medical field.[95] Through their networks and collaboration, these scientists and doctors positioned themselves as medical authorities, using their knowledge to facilitate colonial expansion and social control for God and the country.[96]

In addition to the enhanced status, authority, and prestige associated with the field, tropical medicine attracted young professionals for several other reasons. These included scientific curiosity, the opportunity to explore the tropical world, and access to new sources of government funding and institutional support. These led to significant variability in the quality of available physicians. Furthermore, many professionals seeking to establish themselves in the scientific community used open positions in Africa and other tropical regions to advance their careers, given the limited clinical and research opportunities in Europe.[97] For these reasons, the relatively low requirements for entry into the colonial medical service, combined with a guaranteed regular salary, attracted many physicians who could not establish themselves in

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[93] Johnson, "The West African Medical Staff and the Administration of Imperial Tropical Medicine," 423.
[94] Neill, *Networks in Tropical Medicine,* 19-20.
[95] Neill, *Networks in Tropical Medicine,* 35-36. See the rest of this chapter for an examination of all the subsequent societies that were founded across Europe.
[96] Neill, *Networks in Tropical Medicine,* 11.
[97] Neill, *Networks in Tropical Medicine,* 53.

Europe.[98] Therefore, colonial officials often relied on experts in the metropole, such as Koch, to address complex medical and public health challenges like sleeping sickness epidemics.

Sleeping sickness created the perfect opportunity for new tropical medicine specialists to reify their expertise. Before the causal agent of the disease was discovered, research efforts to understand sleeping sickness were nearly continent-wide. Reports of early mortality, first from Uganda and then the Belgian Congo, sparked significant concern among European colonial powers, fearing the epidemic would spread to their African colonies.[99] The disease threatened colonial economic interests, given its potential to decimate the African labour force, render viable regions uninhabitable, and undermine colonial goals of resource extraction and control. These threats, rather than humanitarian concerns, drove colonial governments to seek expert opinions on sleeping sickness and fund research on the disease.

Early studies of the disease implicated Uganda as its point of origin, drawing scientific and government attention to the area. Between the onset of the epidemic and the First World War, fifteen European research missions, eight of which were British, travelled to Africa to research sleeping sickness.[100] The first British expedition to Uganda was heavily influenced by Patrick Manson, a Scottish physician and medical advisor to the Colonial Office in London, who wanted to test his theory that *Filaria Perstans* caused sleeping sickness.[101] Manson, whose work helped to establish the field of tropical medicine, seized the opportunity to further advance his reputation and was instrumental in establishing the first British sleeping sickness expedition.[102] It

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[98] Haynes. "The Social Production of Metropolitan Expertise in Tropical Diseases," 210.
[99] Hoppe, *Lords of the Fly*, 11.
[100] Daniel R. Headrick, "Sleeping Sickness Epidemics and Colonial Responses in East and Central Africa, 1900-1940." *PLOS neglected tropical diseases* 8, no. 4 (2014): 2.
[101] Haynes. "The Social Production of Metropolitan Expertise in Tropical Diseases," 216.
[102] See Haynes, "Framing Tropical Diseases in London" to see more on Manson's filaria perstans project, and his use of the press more broadly.

is of note that despite having never visited Africa, Manson used his social standing in London to assert control over government initiatives and utilized the popular press to advance his theory.[103]

Concerns from the European colonial governments led to increased funding and research opportunities, which scientists seized upon. The Lake Victoria area in Uganda quickly became a focal point of sleeping sickness research and attracted international attention from scientists.[104] By 1903, British scientists discovered the disease was caused by trypanosomes transmitted by the tsetse fly.[105] The expedition responsible for this discovery established a small lab at Entebbe, a city near Lake Victoria. The expedition was comprised of George Carmichael Low, Cuthbert Christy, Aldo Castellani and David Bruce. It is of note that Castellani and Bruce publicly fought over who deserved credit for the discovery, highlighting the personal stakes for field scientists.[106] Castellani identified a trypanosome in a patient's blood but had falsely linked it to "trypanosoma fever" rather than sleeping sickness. Bruce later attributed the pathogen to sleeping sickness.[107] These scientists also distinguished between the two strains of the parasite that caused the disease.[108]

News about the sleeping sickness epidemic in Africa was closely followed by the popular press in Europe, further advancing the reputation of the scientists working to cure it.[109] *The Times* noted in August 1902, a few years after the initial outbreak of the disease, that the letters they had received from the Church Missionary Society (CMS) in Uganda continued to detail the horrific nature of the disease, with one missionary noting that:

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[103] Haynes, "Framing Tropical Diseases in London," 470.
[104] Webel, "Trypanosomiasis, Tropical Medicine, and the Practices of Inter-Colonial Research at Lake Victoria, 1902-07," 267.
[105] Neill, ""Paul Ehrlich's Colonial Connections," 61.
[106] Neill, *Networks in Tropical Medicine,* 107.
[107] Malowany, "Unfinished Agendas," 331.
[108] Neill, *Networks in Tropical Medicine,* 107.
[109] Hoppe, Lords of the Fly, 38.

> It would be difficult to exaggerate the rapidity with which this dread scourge is spreading in Uganda, and no one knows how it comes, whether by mosquito, as in the case of malaria, in the water, food, or what, and no one knows a cure…[110]

While this horrific story of the sleeping sickness epidemic may be true, anecdotal evidence suggests that some Christian missionaries exaggerated the public health problem during this period to raise funds in Europe for their evangelical mission. They would write letters and publish reports describing the harsh living conditions and diseases that afflicted Africans, often portraying them as helpless victims needing European aid and intervention. In this frame, they helped construct an image of a diseased and helpless Africa in the mind of Europeans.

Another article in *The Times,* written a few months later, described the disease as "raging in Uganda" and attributed 20,000 to 30,000 deaths to its spread.[111] As scientists acquired more knowledge about the disease, they made their findings available to the press in Europe and Africa for publication, stimulating popular interest in sleeping sickness.[112] Metropolitan newspapers like *The Times* followed the works of reputable scientists, including Koch's expedition to Uganda, suggesting they provided a window into the largely unknown and "exotic" world.[113]

In addition to the popular press, sleeping sickness also dominated scientific discussions and journals. In 1906, an article in *The Lancet*, a prestigious peer-reviewed medical journal, described a discussion that took place at the Edinburgh Medico-Chirugical Society, which detailed the symptoms of the disease.[114] These included a rise in the temperature of an infected

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[110] "Ecclesiastical Intelligence." *Times*, 23 Aug. 1902, p. 5. *The Times Digital Archive*
[111] "The Sleeping Sickness." *Times*, 20 Dec. 1902, p. 8. *The Times Digital Archive*
[112] For examples see "The Natural History Museum and Tsetse-Flies." *Times*, July 9, 1903, 14. *The Times Digital Archive* and "The Sleeping Sickness in Uganda." *Times*, November 7, 1903, 12. *The Times Digital Archive*
[113] Correspondent, "The Sleeping Sickness in East Africa." *Times*, February 13, 1906, 4. *The Times Digital Archive*
[114] "Edinburgh Medico-Chirugical Society: Sleeping Sickness in Uganda - Use of Storaine as a Spinal and Local Anesthetic - Relation of Spirutchute Pillida to Syphilis - Exhibition of Specimen." *The Lancet,* vol 1, (January 27, 1906), 206.

person, followed by a drop shortly before death, enlarged glands containing the pathogen, and the "nervous symptoms" such as tremors and slowed speech that emerged as the disease progressed.[115] Later that year, a *Lancet* editorial noted that:

> The alarming spread of sleeping sickness, or human trypanosomiasis, in Africa and the apparently hopeless prognosis when infection has taken place, render the establishment of effective measures peculiarly urgent… It is obvious that we are face to face with a real danger and that there is a need for some endeavour to stop the advance of the disease. The cause is now known, and the means of combating infection are apparent; it is, therefore, a matter for the administration of the areas in danger of infection to deal with. Neglect to carry out preventative measures must inevitably result in a loss of life among the great native populations concerned alarming to contemplate, especially when it is recalled that the disease has practically depopulated some of the districts in which it has appeared. [116]

Their urgent call not only reflects the colonialist attitudes of the time, which neglected African knowledge of disease and its control but also demonstrates how white doctors used their position of power to advocate for more government support and funding to research control measures as well as produce a cure for the disease threatening colonial rule. However, it also points to a degree of sympathy. This and other factors made debates about sleeping sickness research and prevention in Africa permeate discussions in the House of Commons in Britain.[117]

At the turn of the twentieth century, the new field of tropical medicine solidified its presence in the scientific community and proved its relevance to empire-building. The field was shaped by both the cooperation of rival European nations and the personal interests of physicians. As the demand for medical professionals in tropical colonies increased, and as these

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[115] "Edinburgh Medico-Chirugical Society: Sleeping Sickness in Uganda - Use of Storaine as a Spinal and Local Anesthetic - Relation of Spirutchute Pillida to Syphilis - Exhibition of Specimen." The Lancet Vol. 1, January 27, 1906, 227

[116] Editorial, "The Prophylaxis of Sleeping Sickness." *The Lancet* Vol 2, (July 14, 1906): 101-102.

[117] For example, see "Parliamentary Intelligence: House of Commons Thursday June 28th: Sleeping Sickness" The Lancet Vol. 1 (July 7, 1906), 6; "Parliamentary Intelligence: House of Commons December 10th." *Times,* December 15, 1906, 1698.

postings came to offer career opportunities not present in the metropole, a new breed of ambitious scientists sought specialized training. The field was founded on a racialized understanding of disease causation and the belief that individuals from tropical climates warranted a distinct medical approach. These factors shaped Koch's medical knowledge and desire to conduct exploitative and dangerous research in the Ssese Islands. At a time when some considered Koch's work as being out of step with new developments in medicine, despite his legacy as the pioneer of modern bacteriology, in 1906 he travelled to Uganda with funding from the German government to find a cure for sleeping sickness.

Chapter Four: Robert Koch and Research at the Bugalla Sleeping Sickness Camp

In the previous chapters, this study has shown how the growth and prestige of tropical medicine created unique career opportunities for medical professionals, who used their knowledge to help colonial governments make the tropics exploitable and more conducive for colonial administration. This chapter builds on this narrative, demonstrating that the prestige associated with the field enabled scientists to establish, or in the case of Koch, restore their professional reputations. Drawing from records of his work in East Africa, this chapter reveals that after a series of failures in Europe, Koch sought to reestablish himself in the scientific community by researching the cause of sleeping sickness. To make up for his failures in Europe and restore his prestige as a renowned scientist, Koch ignored the adverse effects his trial-and-error search for a sleeping sickness cure had on his African subjects.

By the time Koch arrived in Uganda in 1906, earlier scientists had created robust research networks and the causal pathogen of sleeping sickness had been isolated. Armed with Atoxyl, one of the earliest drugs used to treat African sleeping sickness, Koch established his camp in an abandoned Christian mission on Bugala, the largest of the Ssese Islands. There, Koch would engage with hundreds of Islanders and patients from the surrounding regions, fail to produce a cure despite aggressive treatment and render over twenty individuals permanently blind. Still, his biography often omits his exploitative practices. Most biographers in Europe did not often consider Koch's failed human research in Africa significant enough to recognize the contributions of his colonized test subjects when discussing the scientist's successful discoveries and legacies. The reason is that, at the time, and even until recently, there was a strong emphasis among Western scientists to celebrate groundbreaking discoveries and successes rather than dwelling on the human lives destroyed or lost when scientific experiments failed.

Globally, Koch was considered a scientific hero for much of his life. After his death, streets and squares across Germany were named in his honour and continue to commemorate him to this day. Germany's chief research institute on infectious diseases was named in his honour in 1942.[118] Interestingly, his remains were preserved in a special mausoleum at the Robert Koch Institute.[119] An article in *Deutsche Medizinische Wochenschrift* (German Medical Weekly) described Koch as "our leader in the fight against infectious diseases."[120] This popular narrative of Koch as the "founding father" of bacteriology and one of the greatest medical minds ignores the more insidious side of his work and professional failures. After a successful career in the emerging field of bacteriology in the 1870s and 1880s, Koch's career took a turn when his cure for tuberculosis, the very disease that had made his name, proved faulty.[121]

Koch was instrumental in establishing the field of bacteriology in the nineteenth century, and his early work enabled many future scientists to study and cure infectious diseases. Although Koch did not introduce the concept of germ theory, his discovery of the anthrax bacillus in 1876 was the first definitive link between a microbe and a disease.[122] He continued to uncover several disease-causing microbes and made significant technological contributions to microbiology. Early microbiologists were confronted with several challenges, including difficulty viewing material on microscopic slides due to poor illumination and the transparency and mobility of the

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[118] Manuela Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa." Freiburg-Postkolonial https://www.freiburg-postkolonial.de/Seiten/robertkoch.htm (accessed 24 March, 2023; "The Robert Koch Institute: one of the world's oldest biomedical institutions," Robert Koch Institute https://www.rki.de/EN/Content/Institute/History/history_node_en.html (accessed 24 March 2023)

[119] "The Robert Koch Institute: one of the world's oldest biomedical institutions," Robert Koch Institute https://www.rki.de/EN/Content/Institute/History/history_node_en.html (accessed 24 March 2023)

[120] F. Loeffler and K. Riihs "The cure of experimental nagana (tsetse disease), Deutsche Medizinische Wochenschrift 33.34 (1907): 1361; trans. DeepL.

[121] Eckart, "The Colony as a Laboratory," 70.

[122] Blevins, "Robert Koch and the 'Golden Age' of Bacteriology," *International Journal of Infectious Diseases* 14, no. 9 (2010): 745.

bacteria.[123] Koch addressed these challenges when he discovered certain dyes could be used to stain bacteria and make them more visible and that bacteria could be dried and immobilized.[124] He also developed a solid medium for culturing bacteria.[125] Koch is credited with discovering the "carrier-state" of a disease, the notion that an individual could be infectious without exhibiting symptoms.[126] He also advanced a series of criteria, dubbed "Koch's postulates," to determine whether a microbe caused a disease. These postulates require the microbe to be isolated, cultured, and then inoculated into an uninfected individual to see if it produced symptoms.[127] Although his contributions to early bacteriology were invaluable, Koch's findings on tuberculosis, a leading cause of death in the nineteenth century, was his most celebrated accomplishment. On March 24, 1882, Koch presented his early work on tuberculosis, and this presentation is still commemorated by a plaque at the Institute for Microbiology and Hygiene in Berlin.[128]

In 1890, Koch announced that he had developed Tuberculin, a cure for tuberculosis.[129] However, it proved ineffective with dangerous side effects, and Koch could not provide any evidence that he had conducted the appropriate drug trials, nor could he identify its active agent.[130] After the drug was found faulty, it was also discovered that Koch had a very lucrative contract with a pharmaceutical company.[131] His reputation was understandably in shambles and was further damaged when it became public that he had had an affair with a seventeen-year-old

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[123] Blevins, "Robert Koch and the 'Golden Age' of Bacteriology," 745.
[124] Blevins, "Robert Koch and the 'Golden Age' of Bacteriology," 745.
[125] Blevins, "Robert Koch and the 'Golden Age' of Bacteriology," 746.
[126] Christoph Grandmann, "Robert Koch and the Invention of the Carrier State: Tropical Medicine, Veterinary Infections and Epidemiology Around 1900." *Studies in history and philosophy of science. Part C, Studies in history and philosophy of biological and biomedical sciences* 41, no. 3 (2010): 232.
[127] Grandmann, "Robert Koch and the Invention of the Carrier State," 233.
[128] Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."
[129] Grandmann, "Robert Koch and the Invention of the Carrier State," 233.
[130] Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."
[131] Grandmann, "Robert Koch and the Invention of the Carrier State," 233.

student despite being married and almost fifty years old.[132] These factors contributed to Koch's fall from grace, leading him to seek new research opportunities outside of Europe. The new field of tropical medicine proved to be an attractive option. In the mid-1890s, Koch shifted his focus from the metropole and travelled to Africa.[133]

In addition to trying to escape scandals in Europe, by the early twentieth century, Koch found himself in an increasingly saturated biomedical research market. Though he had initially been one of the few that could conduct bacteriological research, he quickly lost this advantage as new research centers emerged.[134] In 1903 on his sixtieth birthday, and shortly before he travelled to East Africa, Koch reportedly reminisced about what bacteriology had once been:

> Those happy days are gone when the number of bacteriologists was small and each of them could research wide areas in an undisturbed manner… So now in making the most modest and most careful delineation of a research area you will step on the first colleagues' toes or bump into a second one unintentionally or come too close to the third's field of work. Before you even realise it, you are surrounded by opponents.[135]

Clearly, Koch struggled to adjust to the new scientific environment of the early twentieth century, where he was no longer the leading expert in his field.

In 1904, he travelled to German East Africa to investigate the inoculation of cattle against Texas Fever. On this trip, his work unexpectedly shifted to tsetse flies.[136] He detailed the outcomes of his work in a 1905 report published in the *Deutsche Medizinische Wochenschrift.* He determined that the infected flies did not contain animal red blood cells, meaning they did not transmit the disease by spreading infected blood but were rather part of the parasites'

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[132] Grandmann, "Robert Koch and the Invention of the Carrier State," 233.
[133] Grandmann, "Robert Koch and the Invention of the Carrier State," 233.
[134] Grandmann, "Robert Koch and the Invention of the Carrier State," 233.
[135] Grandmann, "Robert Koch and the Invention of the Carrier State," 233.
[136] Robert Koch, "Preliminary communications on the results of a research trip to East Africa," Deutsche Medizinische Wochenschrift 31.47 (1905) 1865-1869: 477-478; trans. DeepL.

development cycle and spread the parasite directly.[137] He also distinguished between animal and human trypanosomiasis, noting that the parasites behaved differently depending on their hosts.[138] On this expedition, he focused predominantly on trypanosomal infections in livestock and attempted to attenuate the disease by passing the same strain through a rat and a dog, and then two cows.[139] To Koch, this conclusively proved the virulence of trypanosomes transmitted by tsetses.[140] Though he had initially hoped to attenuate the disease and create a means of inoculation, this proved impossible.[141] Of note, Koch determined that even if all animals exhibiting symptoms were isolated, the disease would continue to spread due to the prevalence of asymptomatic carriers.[142] In the report, Koch noted the success of earlier chemotherapy interventions on the parasites and strongly advocated that studies employing arsenic and trypanrot, both strong chemotherapeutic agents meant to target pathogens, be continued.[143] Soon after his return to Europe, his findings were disproven by leading scientists, and he was left searching for another opportunity to save his freefalling reputation.[144]

It seemed luck smiled on Koch when the German government offered him an opportunity to return and research human sleeping sickness in Africa in 1906. In the previous years, the disease had encroached into German territories in Africa, prompting colonial officials to embark on the search for a cure. As the epidemic unfolded in Uganda, officials in German East Africa implemented conflicting measures, prompting disagreements among officials and forcing them

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[137] Koch, “Preliminary communications,” 483.
[138] Robert Koch, "Ueber die Trypanosomenkrankheiten (About Trypanosome Diseases)," Deutsche Medizinische Wochenschrift 30.47 (1904): 1708; trans. DeepL.
[139] Koch, “About Trypanosome Diseases, 1708.
[140] Koch, “About Trypanosome Diseases,” 1709.
[141] Koch, “About Trypanosome Diseases,” 1709.
[142] Robert Koch, About Trypanosome Diseases,” 1710.
[143] Koch, “About Trypanosome Diseases,” 1711.
[144] Grandmann, “Robert Koch and the Invention of the Carrier State.”

to seek advice from German scientists.[145] In 1904, Koch noted the importance of continuing research with arsenicals and human trypanosomiasis, stating that this research is "absolutely necessary."[146] In May 1906, Koch arrived in German East Africa. Although the causal agent of the disease and its vector had been discovered, much remained unknown about sleeping sickness. When he arrived, most of the drugs at his disposal had only been tested on animals and required human "trials" before any of them could be certified safe for humans.[147] Koch undertook this research hoping his observations regarding chemical treatments would apply to other infectious diseases.[148] Together with his team, they sought out human subjects to further their research. At Muansa, where he landed in German East Africa, he found only one case of the disease after testing more than 2,000 patients.[149] In August 1906, Hesketh Bell, the British Governor of Uganda, invited Koch to conduct his research in their territory and provided him with the British lab at Entebbe, a colonial town in central Uganda.[150]

When Koch arrived on the Ssese Islands in the northwestern part of Lake Victoria, the epidemic had already reduced the population from roughly 30,000 to 12,000 in four years.[151] Koch and his team established their research sites on Bugala Island at Bumangi and Bugalla, utilizing abandoned Christian missionary buildings.[152] He separated the sick based on the severity of their illness. Palliative cases were sent to Bumangi, while mild and mobile patients were treated at the Bugalla Camp.[153] Koch selected African patients at the Bugalla Camp based

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[145] Worboys, The Comparative History of Sleeping Sickness in East and Central Africa, 1900–1914," 99.
[146] Koch, "About Trypanosomes," 1711.
[147] Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."
[148] Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."
[149] Editorial, "Professor Koch on Sleeping Sickness." The British Medical Journal, January 19, 1907: 152.
[150] Berlin correspondent, "Sleeping Sickness." *The Lancet* (January 12, 1907), 129.
[151] Editorial, "Professor Koch on Sleeping Sickness." The British Medical Journal, January 19, 1907: 152.
[152] Webel, *The Politics of Disease Control,* 73.
[153] Webel, *The Politics of Disease Control,* 78.

on their relevance to his research. It wasn't long before Islanders and people from the surrounding regions soon travelled to the Bugalla Camp to sign up for treatment. By the end of October 1906, approximately 800 people were receiving treatment at the Bugalla Camp, and another 250 at Bumangi.[154] As news spread of a new and successful treatment for the disease, enrolment in the treatment camps quickly increased, and by early 1907 there were over 1,500 patients at Bugalla and 200 at Bumangi.[155]

The treatment camps had two key functions: to isolate and care for the sick, and to provide Koch with a makeshift laboratory with a pool of African patients to test his theories. Koch and his team studied sleeping sickness there from August 1906 to October 1907 to determine whether Atoxyl was an effective treatment.[156] He administered varying doses to his African subjects, producing various adverse side effects. Initially, the protocol was to administer small doses for two consecutive days, followed by a week-long reprieve, repeated for two months.[157] Eventually, the protocols changed and doses were administered two weeks apart.[158] The team carefully monitored the drug's effects through frequent, sometimes hourly, blood tests on injection days.[159] Often, the injections were administered in the middle of the patient's back, and these injections would frequently become infected.[160] In addition to the painful Atoxyl injections, patients were subjected to gland punctures and blood tests, and in some cases, were

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[154] Webel, "Ziba Politics and the German Sleeping Sickness Camp at Kigarama, Tanzania, 1907–14," 407.
[155] Webel, *The Politics of Disease Control,* 88.
[156] Neill, "'Paul Ehrlich's Colonial Connections," 66.
[157] Webel, *The Politics of Disease Control*, 86.
[158] "Meeting of the Reich Health Council on November 16, 1907. Information on the course and results of the expedition sent by the Reich to study sleeping sickness in East Africa". In: Robert Koch (1912): *Collected Works*. Vol. 2 (2), 930-40; cited in Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."
[159] "Meeting of the Reich Health Council on November 16, 1907. Information on the course and results of the expedition sent by the Reich to study sleeping sickness in East Africa". In: Robert Koch (1912): *Collected Works*. Vol. 2 (2), 930-40; cited in Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."
[160] Webel, *The Politics of Disease Control,* 85.

given quinine. When Koch and his team deemed their African patients ineligible for the drug research, they gave them quinine, a natural alkaloid compound that had no effect on the disease, to mislead them and keep them engaged with the camp.[161]

The Bugalla camp initially benefitted from the region's past involvement with missionary medicine beginning in the late nineteenth century. Health historian Mari Webel suggests that early engagement with the treatment camp reflected the integration of German treatment regimens with African understandings of illness and treatment.[162] British and German officials remarked that a significant number of people travelled to the treatment sites of their own accord. However, they attributed this to their treatment methods, not existing health systems that situated the Ssese Islands as key sites for healing. It is unlikely that Koch had any knowledge of the area's history prior to his arrival, but engagement with his camp was nevertheless influenced by the systems that connected the Ssese Islands with surrounding regions. This significance may have helped to spread information about the camp throughout the region, impacting engagement.

With few colonial personnel present to impose any kind of confinement, successful research required engagement and cooperation from Ssese Islanders and people from the surrounding areas. With this in mind, researchers had to ensure African patients did not refuse treatment or abandon the camps, which sometimes proved challenging given the invasive nature of sleeping sickness treatment.[163] Koch and his team had to negotiate their research with their African patients. Many refused invasive lumbar punctures, preventing Koch from using this procedure in his research. But when blood tests proved ineffective at diagnosing the disease,

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[161] Webel, *The Politics of Disease Control,* 91.
[162] Webel, *The Politics of Disease Control,* 88.
[163] Webel, "Trypanosomiasis, Tropical Medicine, and the Practices of Inter-Colonial Research at Lake Victoria, 1902-07," 282.

Koch relied on coercion to accomplish his goals.[164] The drug initially proved effective because it killed some of the trypanosomes in the blood, leading to a temporary remission, which initially increased local engagement with the camp. Koch remarked that initially it was "apparent" that the drug had a pronounced impact on the disease, causing "the trypanosomes in the lymph… to disappear for at least thirty days."[165]

Misinterpreting the brief remission as a breakthrough in his search for the sleeping sickness cure, Koch's report on November 5, 1906, suggested that Atoxyl provided the same effective treatment for sleeping sickness as quinine for malaria.[166] News of the drug's success travelled across Europe. In December 1906, only a few months after Koch had begun his research, *The Times* remarked that the treatment had "proved successful in all cases" and that Atoxyl was "an effectual remedy against the disease."[167] The same 1907 article that highlighted Koch as Germany's leader in infectious disease, also described the "brilliant success achieved by Robert Koch in Africa with Atoxyl."[168] At least temporarily, Koch had succeeded in restoring his reputation in Europe's scientific community. African patients soon crowded around the outskirts of the camp awaiting treatment.[169] Sadly, remission was only temporary, and the disease relapsed.

With his proposed treatment failing, Koch's research was again influenced by his desire to reemerge as a leading figure in infectious disease research. By the end of 1906, it became clear that despite temporary reductions in trypanosomes in the blood, the parasite soon returned,

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[164] Editorial, "Professor Koch on Sleeping Sickness." *The British Medical Journal* (January 19, 1907): 152.
[165] Koch, "Final Report," 534.
[166] Editorial, "Professor Koch on Sleeping Sickness." *The British Medical Journal,* (January 19, 1907): 152.
[167] "News in Brief." *Times*, December 17, 1906, 6. *The Times Digital Archive*
[168] F. Loeffler and K. Riihs "The cure of experimental nagana (tsetse disease), Deutsche Medizinische Wochenschrift 33.34 (1907): 1362.
[169] Webel, *The Politics of Disease Control*, 66.

and patients either stopped improving or their condition worsened.[170] In addition, a drug shortage meant that the research team had to pause treatment temporarily.[171] Once his supply of the drug was restored, Koch, desperate to find a cure, chose to administer a significantly larger dose of Atoxyl due to the ineffectiveness of lower doses to ensure longer-lasting and perhaps permanent results.[172] He stated in his 1907 report that "in order to obtain better and more lasting results, the treatment was changed to increase the dose," and he increased the frequency of the injections at the same time, magnifying the effects of the drug, and consequently the side-effects.[173] It is highly unlikely that Koch was unaware of the toxicity of Atoxyl, making his decision to experiment with significantly larger doses all the more horrific. Animal tests had already revealed that if the wrong dose was administered, the animal would soon be "unrecognizable" due to swelling of eyelids, ears, genitals, and hair loss.[174] These same tests revealed that the trypanosomes became resistant to the drug over time, necessitating an increase in the dose, which ultimately poisoned the animals.[175] This further suggests that Koch did not prioritize the safety and wellbeing of his African patients in his drug research. He noted in his final report that patients experienced several side-effects from the drug, but "since these complaints were only temporary," he dismissed them and continued the stronger treatment, which eventually caused blindness in several patients.[176] He must have considered the observed adverse effects on Africans acceptable, given his vested interest in the potential success of the experiment.

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[170] Koch, "Final report," 535.
[171] Webel, *The Politics of Disease Control*, 100.
[172] Koch, "Final report," 536.
[173] Koch, "Final report," 536.
[174] F. Loeffler and K. Riihs "The cure of experimental nagana (tsetse disease), Deutsche Medizinische Wochenschrift 33.34 (1907): 1362.
[175] F. Loeffler and K. Riihs "The cure of experimental nagana (tsetse disease), Deutsche Medizinische Wochenschrift 33.34 (1907): 1363.
[176] Koch, "Final Report," 536.

This new aggressive treatment regime contributed to a significant decline in African engagement with the camp, as patients' expectations were not met, side effects increased, and the drug still proved ineffective at curing the disease. Despite their marginalized and disempowered status, the mass withdrawal of patients demonstrated the agency of Africans in resisting and challenging the harmful colonial drug trials. Beyond agency, these changes in treatment protocols, which coincided with the end of many individuals' months-long treatment programs, allowed the patients to seek alternative treatments. After changing the doses, Koch noted that "many patients avoided the stronger treatments."[177] In addition to these factors, individuals may have left the camp and surrounding areas to return to seasonal responsibilities, or because they realized no cure existed and preferred to be with their families. Patients at the camp were also responsible for finding their own food, and after an extended stay, many individuals may have exhausted their resources.[178] Comparing German accounts of dose changes in the camps, to missionary reports of mobility around the camp, one can observe a strong correlation between dose changes and reduced interaction with the camp. This made Koch and his team return to administering smaller injections.[179] However, by September 1907, Koch concluded that he had done everything he could to address sleeping sickness and ended the expedition the following month.

Despite Koch's apparent failure in the Ssese Islands, his methods and recommendations were the foundation for subsequent sleeping sickness interventions in German East Africa.[180] In addition to the use of chemical agents, Koch also advocated for rigorous programs meant to separate the healthy and the sick. In his final report, he claimed that camps ought to be

[177] Koch, "Final report," 536.
[178] Webel, *The Politics of Disease Control,* 100.
[179] Koch, "Final report," 537.
[180] Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."

established everywhere sleeping sickness was present and that other measures, such as border closures and the restriction of movement, should also be implemented.[181] These recommendations contributed to entire communities being resettled and establishing concentration camps to isolate the sick. Some have suggested that Koch advocated for the complete isolation of the sick, hoping the sick would die and the epidemic would end.[182] In addition to being a place individuals were confined until death, he suggested that these camps be used as research facilities as they allowed for sustained observation.[183] After Koch departed in October 1907, a number of subsequent camps were established throughout German East Africa that isolated hundreds of Africans and experimented with dozens of different chemical compounds.[184] The Reich's Health Council implemented the regulations that Koch recommended, leading to the construction of three new camps, two at Kigarama and Schirati near Lake Victoria and one at Niansa near Lake Tanganyika.[185]

Sleeping sickness provoked significant government action in Europe and the colonies, and several measures were introduced, including treatment sites. Around the same time that Koch arrived in Uganda to conduct his drug research, Hesketh Bell, Governor of British Uganda, ordered the depopulation of the region without approval from London.[186] Colonial depopulation measures were implemented in 1906, focusing on the Lake Victoria area due to the region's high

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[181] Koch, "Final report," 545.
[182] "Meeting of the Reich Health Council on November 16, 1907. Information on the course and results of the expedition sent by the Reich to study sleeping sickness in East Africa". In: Robert Koch (1912): Collected Works. Vol. 2 (2), 930-40.; as cited in Bauche.
[183] Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa."
[184] See Bauche, "Robert Koch, sleeping sickness and human experiments in colonial East Africa"; Eckart, "The Colony as a Laboratory;" and Lyons, *The Colonial Disease*; Webel, "Ziba Politics and the German Sleeping Sickness Camp at Kigarama, Tanzania, 1907–14," for more information on research and camps in German East Africa.
[185] Eckart, "The Colony as a Laboratory," 75.
[186] Worboys, The Comparative History of Sleeping Sickness in East and Central Africa, 1900–1914," 92.

rates of the disease.[187] Bell addressed resistance from the local population by working with leaders when possible and resorting to force when necessary.[188] These forced depopulation measures swept across the island in full force around 1910, damaging the social systems and records that may have detailed personal and community experiences with the camp.[189] According to the annual colonial report for Uganda for 1909-1910, 11,766 individuals were removed from the island mostly in June, July, and August.[190] Just as European treatment measures had been incorporated into their existing understanding of health, depopulation measures fit into their past experiences with military incursions and conquests. To be sure, for Ssese Islanders, depopulation measures clearly resonated with their earlier experiences with Baganda raids, which they had resisted.[191] Given the small number of colonial officials enforcing the depopulation measures, many residents remained on the islands. The 1909-1910 annual colonial report for Uganda shows that attempts to depopulate infected areas were successful with satisfactory impacts on the epidemic.[192] Due to these "highly satisfactory" results, the report indicated that depopulation would extend to the shores of the Nile in Northern Unyoro and Lake Albert.[193]

Sleeping sickness provided Koch with an opportunity to rehabilitate his reputation in Europe and reinvigorate his waning career. He travelled to the Ssese Islands in Uganda to conduct his research, where he was able to profit from existing research networks and colonial infrastructure. Though initially sought out and successful, his treatment camps soon failed due to

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[187] Hoppe, *Lords of the Fly*, 55-56.
[188] Worboys, "The Comparative History of Sleeping Sickness in East and Central Africa, 1900–1914," 93.
[189] Webel, *The Politics of Disease Control, 90*; for more on the extent of these depopulations and their impact see Hoppe's *Lords of the Fly.*
[190] Annual Colonial Report for Uganda. No. 670. Report for 1909-1910, 24.
[191] Hoppe, *Lords of the Fly*, 64.
[192] Annual Colonial Report for Uganda. No. 670. Report for 1909-1910, 23.
[193] Annual Colonial Report for Uganda. No. 670. Report for 1909-1910, 25.

his ineffective, careless and painful research practices. Koch's attitude towards his African subjects and the research protocols it enabled are indicative of broader trends in colonial medicine, namely the pervasive belief that the health of colonized peoples was secondary to colonial interests, and the use of 'medical progress' to justify physical harm and exploitation.

Conclusion

This study began with an excerpt from Robert Koch's final report on his work in the Ssese Islands. In his own words, Koch highlights his callous disregard for the wellbeing of his patients and the prioritization of his research goals over their health. The study situates Koch's research in the broader context of colonial biomedical research at the turn of the twentieth century, and in doing so, highlights the pervasive harm done to colonized peoples in the name of "scientific progress." Despite the camp's obvious failures, Koch was nevertheless heralded as a scientific hero, and his work laid the foundation for subsequent sleeping sickness measures.

Though often omitted, the African subjects he harmed remained a crucial part of Koch's legacy and must not be sidestepped in his biography.

Koch's research occurred at the intersection of colonial, scientific, and personal interests, highlighting the potential use of medicine to accomplish many things aside from patient care. This chapter of Koch's career has been largely omitted from his construction in Western historiography, highlighting a desire to portray Western scientific advancements in a linear fashion. Shortly after Koch died in 1910, *The Medical Record,* a prominent medical journal based in New York, published a piece eulogizing him. The author of the piece, Adolphus Knopf, referred to Koch as "the greatest figure in modern medical science" and even more tellingly, informed his readers that:

> The life of Robert Koch should serve as an inspiration, not only to us who are his humble disciples, but to all mankind… In scientistic research, in constant work to combat disease and make mankind healthier and happier this great man has found his reward.[194]

Despite the harm to his patients, and his failure to find a cure, Koch was nevertheless heralded as a hero.

By examining Robert Koch's work on the Ssese Islands, this thesis has demonstrated that Western medicine was used as a tool for colonial social control and personal interests. By using his work to question how medicine is perceived and memorialized, this study shows the tendency in Western historiography to aggrandize European scientists' contributions while ignoring the human cost of their research. Hence, this study cautions against portraying scientific research as entirely beneficial and for the 'greater good.' Instead, I argue that we evaluate the personal, economic, and political stakes involved critically.

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[194] Adolphus S. Knopf, "Robert Koch in Memoriam," Reprinted from The Medical Record: A Weekly Journal of Medicine and Surgery June 4, 1910. New Work: William and Wood Company.

Beyond challenging the historiography of Western biomedicine and its portrayal of "great figures," this study has also highlighted the real consequences of allowing healthcare to be influenced by economic, colonial, and personal interests. The consequences of these approaches to research continue to impact modern healthcare. Western scientists continue to use African countries as "laboratories," often ignoring patient consent in favour of their research. For example, in 1950, researchers in Tanganyika, a region in East Africa, persuaded a chief to convince his residents to receive a nonexistent inoculation against hydrocele and elephantiasis as a ruse to collect blood samples.[195]

This study, and others like it, also help to connect past medical failures with modern policies. The social construct of 'Global Health' is a direct descendent of tropical medicine and colonial impositions, and therefore, practitioners and governments must acknowledge the deeply racist roots of the field and how these impact the implementation of healthcare measures and how they are received.[196] Understanding and acknowledging the extent of the harm done to colonized peoples at the hands of white European scientists and doctors is essential, and may help to create accessible and equitable healthcare policies that help communities, as opposed to their often imposed and undesired predecessors.

[195] Grayboyes, "Introduction: incorporating medical research into the history of medicine in East Africa," 384.
[196] Melissa Grayboyes and Daphne Gallagher, and Jennifer Tappan. "Introduction to the special section: Histories of Global Health in Africa," *Health & Place* 77 (2022), 102863.

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