The Clean Campaigns: Tropical Medicine and the British Army during World War One

By Kathleen Lynch

Kathleen Lynch received her Bachelor of Arts in History (Honors) from the University of Connecticut in May 2013. She concentrated on European history during the twentieth century. She chose this particular topic for her thesis because, as a history and anthropology major with a minor in biology, she was very interested in studying the intersections between empire, medicine, and cultural ideas of health. She found that while historians have extensively studied British use of tropical medicine during the colonial period, as well as medical advancements during WWI, there has not been much research done on the role tropical medicine played on the non-western fronts of the war; in other words, how the colonial dynamic affected military medicine at this time. Her research sought to fill this gap in the existing historiography.

INTRODUCTION

> Moving in silence, the great army of sanitation, with a general staff and leaders of all lands and languages, claims allegiance only to Humanity. In war it has often not fought winning campaigns, but the new knowledge is full of such promise that even the vanquished may be victors.
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> *—Sir William Osler, 1914*

On 14 September 1915, Sir Ian Hamilton, Commander of the British Mediterranean Expeditionary Force at Gallipoli, grumbled that "Armageddon is being fought *here*, at the Dardenelles, and the British outlook is focused on France. We are to sit here and rot away with cholera…while they [in the West] are healthy—while time is on their side."[1] Many of the decisive battles of the Great War were fought on the fields of Europe, and produced staggering levels of casualties.[2] Yet deployment to the non-Western fronts of World War One presented unique and pressing challenges for the health of British troops. As combat

[1] Sir Ian Hamilton, *Gallipoli Diary, volume 2* (1920), 183.

[2] In this thesis, World War One will also be referred to as the Great War.

expanded to colonial territories, many British soldiers were forced to adapt to environments wholly unfamiliar to them. Troops composed of colonial subjects were also sent to a variety of different fronts to supplement the British forces stationed there, and did not always serve within or near their native territories. Not only were the bodies of European and colonial troops subjected to the physical and psychological traumas of warfare—i.e. bullet and shrapnel wounds, poisonous gas, and shell shock—but they were also forced to adjust to unfamiliar climates and diseases. One cannot underestimate how devastating an effect this had on British armies. According to British physician W.J.R. Simpson writing in 1918, in seven months at Gallipoli in 1915 over 96,000 British troops had to be removed from the area due to severe illnesses.[3] This figure, Simpson added, did not include those who remained at Gallipoli despite being ill.[4] In contrast, Simpson noted that "the total number of sick in the Boer War for the 2 ½ years of conflict was 63,644. [And] It has always been held that the sickness in the Boer War was abnormal."[5] While it is true that by 1914 the British Army was no stranger to engaging in conflicts abroad, the number of soldiers falling ill in the Great War's theaters of conflict was unprecedented.

This was not the first time the British had fought large-scale conflicts in a dramatically alien environment. British military experiences in both the Crimean War and the Anglo-Boer War laid a foundation for the British Amy to develop a strategy to protect the health of their troops during World War One. During the Crimean War (1853-1856) the British military had to devise ways to protect the health of their troops in the Eastern Mediterranean and Caucasus regions. In 1855, the British government established the Sanitary Commission, a body independent of the military, to inspect the conditions of the soldiers' camps in Crimea and recommend improvements. The published report judged the sanitary conditions of the camps to be "deplorable" and found "gross incompetence" on the part of the British High Command, creating a public scandal.[6] However, charges were never brought against these officers; sanitary measures were important enough to be investigated, yet not so

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[3] W.J.R. Simpson, "Sanitary Aspects of Warfare in South-Eastern Europe" *Transactions of the Royal Society of Tropical Medicine and Hygiene* 12, no. 2 (October 1918): 4.

[4] Ibid., 4-5.

[5] Ibid., 5.

[6] John Shepherd, *the Crimean Doctors: A History of the British Medical Services in the Crimean War, Volume 1,* (Liverpool: Liverpool University Press, 1991): 403.

important that officers would be punished for failing to maintain them. In the Anglo-Boer War (1899-1902), British troops in South Africa were dramatically affected by disease, particularly plague.[7] At this point the Royal Army Medical Corps was still a new division of the military, having been established in 1898. However, efforts to eradicate plague were complicated by competition between civilian and military doctors and the challenge of inventing effective preventative measures to protect both the European and native African population from infection.[8] While the complications that arose from these two conflicts would be important lessons for the British Army, neither could fully prepare them for the unique troop disposition during World War One.

The diversity of geographic areas in which the British Army needed to implement sanitary policy created a complex situation on a scale that was not seen in either of the previous two conflicts. A vassal to the largest empire in the world in 1914, the British Army was deployed to the most environmentally diverse theatres of war. Resisting and combating disease in tropical areas, as well as treating both colonial and European bodies, was a therefore a larger concern for the British Amy than for other European forces. Due to the extent of their colonial history in tropical areas, British Army doctors drew upon the theory and institution of tropical medicine to help them create a framework that attempted to make the conditions in the non-Western fronts of the war suitable (as "suitable" as any combat conditions can be) for their soldiers.

This thesis explores two major questions concerning the military's efforts to protect the health of British troops—both European and colonial—on the non-Western fronts of World War One. The first is the extent to which European, and especially British, perceptions of the body influenced ideas about sanitation and "cleanliness" for British troops serving in tropical areas. Although Western medicine claimed to operate under the doctrine of order, rationality, and "objectivity" during World War One, it was still produced within a European cultural framework, and was heavily influenced by colonialism. As historian of colonial medicine David Arnold argues, colonial officials regularly used particular normative views of the body to assert European authority in tropical areas.[9] The

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[7] Molly Sutphen, "Striving to be Separate? Civilian and Military Doctors in Cape Town during the Anglo-Boer War" in *War, Medicine, and Modernity,* ed. Roger Cooter, Mark Harrison, and Steve Sturdy (Gloucestershire: Sutton Publishing Limited, 1998): 48-59.

[8] For more detail, see Sutphen, "Striving to be Separate?" 48-59.

[9] David Arnold, *Colonizing the Body,* (Berkeley: University of California Press), 8.

second question addressed is how these British views of sanitation and health, developed and codified by the discipline of tropical medicine in a colonial context, were translated into both military policy and treatment of foreign and British troops on the non-Western fronts of the war.

The history of tropical medicine was rooted in Britain's extensive colonial history. Of especially great importance was the British experience in colonial India, where British officials first began to express concern about the effect of non-European climates on European bodies. By the start of World War One, intense imperial competition still existed among Britain and the other European powers, as tensions from nineteenth century expansionism brimmed over into the twentieth. During this same period, the Royal Society of Tropical Medicine and Hygiene became increasingly influential. Founded in 1907 by physician Sir James Cantile and parasitologist George Carmichael Low, the mission of the school was to conduct research that would help protect the health of English civil servants and soldiers stationed in "tropical" climates. By World War One, it was one of the foremost British authorities in dealing with sanitation and hygiene abroad. Investigating tropical medicine and its influence on the British Army administration in the early decades of the twentieth century thus might open a window into the initial intersection of tropical medicine, empire, and military.

FEARING THE DEVIL FROM THE EAST: THE CASE OF CHOLERA

Before turning to specific theaters of the Great War, it is important to understand the various factors the British Army believed it had to contend with when combating deadly diseases in foreign environments. In 1914 the disease that embodied the challenges to protecting the health of British troops was cholera, "one of the few conditions feared by all."[10] Once in the body's system, cholera causes lethargy, diarrhea, and subsequent dehydration. Even the most physically fit soldiers would be reduced to a state of helplessness after infection. After contracting cholera himself in the spring of 1915, Sir Hamilton lamented "Oh energy, to what distant clime have you flown? I used to be energetic…but see me today…desperate longing to do nothing but rest. More than half my staff and troops are in the same state of indescribable slackness."[11] Cholera struck particularly hard in the Dardanelles and Damascus, where troops

[10] Eran Dolev, *Allenby's Military Medicine: Life and Death in World War I Palestine* (London: I.B. Tauris & Co. Ltd, 2007), 32.

[11] Hamilton, *Gallipoli Diary, volume 2,* 7-8.

had to travel great distances and access to clean water during logistical movements was a chief concern.[12]

By the start of the war in 1914, doctors from the Society of Tropical Medicine and Hygiene knew that cholera was caused by the bacteria *comma bacilli*, and was spread by "the drinking of water polluted with cholera dejecta."[13] In a March 1915 speech to the Society of Tropical Medicine and Hygiene, W.J.R. Simpson emphasized that "disinfection of the latrines, and the protection of water supplies or purification of water, are essential parts of any preventative measures."[14] This emphasis on sanitation was, for Simpson, tantamount to protecting the health of British troops, especially since the institutional practices of the military required soldiers to live in close quarters, allowing a cholera infection to spread rapidly. However, as he described these sanitary practices Simpson also noted that "the conditions of warfare often render this [sanitary measures] difficult... it is important that the soldiers also be protected by inoculation against cholera."[15] After 1915, vaccinations against cholera became a regular practice, especially for soldiers serving in the Middle East. This did not, however, allay fears of contracting the disease.[16]

Although British scientists believed that they had discovered the cause of cholera, beliefs about its geographic origin perpetuated fear of the disease amongst the British military. Cholera was viewed at the time as a "foreign" disease, one that could not originate within European bodies. As early as the mid-nineteenth century, international sanitary conferences were held to discuss the threat "Asiatic cholera" posed to Europe.[17] Indeed, in his 1915 speech Simpson referred to cholera spreading to the Western Front as "an invasion of Europe," and a "foreign attack."[18] Akin to Simpson's beliefs, many British doctors thought that the cholera bacterium had originated in the East and spread to European armies through contact with Turkish, Russian, and Indian troops.[19] Acting on this belief, the British military took special care to inoculate troops serving in

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[12] Bott, *Eastern Night- and Flights; a Record of Oriental Adventure* (New York: Doubleday, Page, & Company, 1919), 68.

[13] W.J. Simpson, "The War and Cholera," *Transactions of the Royal Society of Tropical Medicine and Hygiene* 8, no. 5 (March 1915): 147-148.

[14] Ibid., 150.

[15] Ibid.

[16] Dolev, *Allenby's Military Medicine,* 32.

[17] Arnold, *Colonizing the Body,* 205. For more on cholera in India in particular, see "Cholera: Disease as Disorder" in Arnold, *Colonizing the Body,* 159.

[18] Simpson, "The War and Cholera," 141-2.

[19] Ibid., 146.

the Indian Army as they traveled to aid the British, for fear that they would spread the disease. According to one Indian soldier, on the voyage to Marseille "inoculations for cholera, enteric, and other diseases took place daily."[20] While cholera affected all troops, both British and colonial, the disease itself was viewed as "foreign" regardless of who contracted it.

The example of cholera perfectly encapsulates the complex interplay of issues facing British medical officials during World War One. The first was the large geographic area the army was deployed to and the diversity of the environments that this area included. The British Army needed to figure out how to combat situation-specific diseases as they understood them—cholera was believed to spread rapidly when people lived in close quarters—with climate-specific issues—accessing and maintaining clean drinking water was more difficult in desert environments. The second challenge was the feasibility of planning and carrying out efficient sanitary procedures in a combat zone. According to Simpson in 1918, proper sanitation was difficult to maintain in conditions of war, especially in non-Western environments.[21] Although procedures could be proposed and supported by doctors of the Society of Tropical Medicine in London, when placed in the context of combat and filtered through institutions of military command, they were often difficult to carry out.

The preoccupation with cholera, an old enemy, during the Great War demonstrates just how important sanitation policy was to the British military. As one British Colonel argued in 1918, "I have no hesitation saying sanitation is, or should be, the most important branch of medical work in the field."[22] In the case of cholera, sanitation seems to have literally saved lives. However, ideas of what constituted as sanitary or "hygienic" environments were filtered through a distinctly British lens.

TROPICAL MEDICINE AND THE GREAT WAR: AN OVERVIEW

To understand more fully the impact of tropical medicine and its imagining on British military policy during the Great War, this thesis explores the issues encountered and policy implemented in three key geographic zones. The first section considers Britain's experience in India,

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[20] Heber Maitland Alexander, *On Two Fronts*; *Being the Adventures of an Indian Mule Corps in France and Gallipoli* (New York: E.P. Dutton & Company, 1917), 17.

[21] Simpson, "Sanitary Aspects of Warfare," 2.

[22] Andrew Balfour, "Sanitary and Insanitary Makeshifts in the Eastern War Areas," *Transactions of the Royal Society of Tropical Medicine and Hygiene* 12, no. 2 (November 1918): 19-20.

a country where British military officials first began to think systematically about combating disease in foreign places. Even though India was not technically a theater of war between 1914 and 1918, Indian troops played a large role in the conflict. For instance, the Indian Army served alongside, and under the authority of British command, troops on the European, African, and Middle Eastern fronts of the war. In this context, the British Army had to be concerned with the health of not just Europeans but of so-called "tropical" peoples serving in environments foreign to them. The second section examines the sub-Saharan African theater of war, particularly the conflict in German East Africa, paying close attention to tropical medicine's role in the colonial administration and how practices developed in a colonial dynamic translated into a military context. The third section focuses on the Middle Eastern theater of the war, examining the difficulties and debates that marked the Gallipoli Campaign. Possessing a drier climate than the first two regions, but still studied under the umbrella of "tropical" medicine by British officials, the Middle Eastern theater presented unique challenges to the British military. The geographically diverse locations studied here each worked to shape British military policy, in regards to treatment of the body, in culturally specific ways.

Overall, this project will investigate how British understandings of tropical medicine and sanitary preventions were incorporated into existing structures of power and knowledge within the army, and how British views of the body helped to shape this understanding. While extensive work has been done on tropical medicine as an academic discipline, it will be beneficial to both military historians and historians of medicine, particularly of colonial medicine, to see how medical ideas were filtered through complex, hierarchical institutions such as the British Army. In terms of trauma to the body, cultural encounters and assumptions, and geographic scale, the Great War was truly a global "total war."

SECTION ONE: BODIES IN FOREIGN ENVIRONMENTS—TROPICAL MEDICINE IN INDIA

> It is true that you can to an extent with money enough, *and despotic power*, rectify insanitary conditions, and banish many of the tropical diseases; but you cannot change the heat, the sunlight, the climatic conditions, by either the power of money or the power of knowledge.
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> *—Sir R. Havelock Charles, 1913*

In his speech at the first annual dinner of the Society of Tropical Medicine and Hygiene in 1909, Society President Ronald Ross proclaimed that "Our great subject deals not only with clinical research and sanitary practice, but with the prosperity of whole countries—indeed, of continents."[23] Founded in 1907 by physician Sir James Cantile and parasitologist George Carmichael Low, the mission of this new society was to conduct research on maladies and diseases found in tropical climates. The major impetus behind this research was to protect the health of English civil servants and soldiers stationed in geographically foreign areas of the British Empire. When Ross talked of the "prosperity of continents," he was also talking about British prosperity reaped from their colonial holdings across the globe. In particular, the discipline of tropical medicine focused on the Indian subcontinent, where the British held a colony since the early nineteenth century.[24]

It is a mistake, however, to assume that the Society of Tropical Medicine and Hygiene was the first group to be concerned with the health of British troops in India. According to historian David Arnold, "Unlike many colonial territories in Africa and other parts of Asia, Western medicine [in India] did not arrive abruptly as part of the 'new imperialism' of the 1880s and 1890s…it stretched back to the eighteenth century, and even earlier."[25] Thus, for longer than in most of Britain's imperial holdings, colonial authorities invested time in thinking about the effect of tropical climates on the European body, and how to combat disease in foreign places. This makes India the perfect case study to understand the main lines of British perceptions of the body in foreign environments, and how these ideas were translated into medical and sanitary policy. The ideas of the body's "suitability" and "adaptability" to certain environments, developed throughout the nineteenth and early twentieth century, heavily influenced how the British Army came to regard both British and Indian troops on the non-Western fronts of the Great War.

By the early nineteenth century, British physicians were extremely interested in how the European body reacted to tropical climates. In 1815, physician James Johnson published a pamphlet which outlined major maladies that one could face in India, and preventative measures to take

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[23] Ronald Ross, "The Future of Tropical Medicine," *Transactions of the Royal Society of Tropical Medicine and Hygiene* 2, no. 8 (May 1909): 272.

[24] For more on the British colonial experience in India, particularly in regards to the medical administration, please see Biswamoy Pati and Mark Harrison's *Health, Medicine, and Empire: Perspectives on Colonial India* (London: Sangam Books Limited, 2001) and David Arnold's *Colonizing the Body*.

[25] Arnold, *Colonizing the Body*, 290.

against them.[26] Rather than sickness from disease, parasites, or contaminated food, Johnson cites climate as the main reason for illness: "Of those Europeans who arrive on the banks of the Ganges, many fall early victims to climate," he argued.[27] However, Johnson believed that it was possible for the European body to adapt to foreign conditions: "Till the constitution assimilates to the climate, [one must wear] light clothing, be temperate in eating and drinking, avoiding all exercise in the heat of the day… and last, not least, a determined resolution to resist with stoical apathy its first attacks."[28] His last suggestion to adopt "stoical apathy" reflected a distinctly British value from the late eighteenth and early nineteenth century.[29] If one preserved their quintessential "British" character, one's body might also overcome the adversity of climate.

In addition to climate, throughout the nineteenth century the British also had to contend with a number of tropical diseases in India. Major epidemics of malaria, cholera, influenza, and plague were frequent and resulted in high mortality rates among the Indian population.[30] To stop the spread of disease, the British colonial administration dramatically strengthened their sanitary policies in India. For example, to combat plague in Bombay, the Municipal Act of 1888 authorized a campaign of urban cleansing where sanitary workers flushed drains and sewers, sprinkled disinfectant powder in alleys, and destroyed slums.[31] Through focus on the slums as sites of disease, we see the British belief that disease had a spatial, as well as pathogenic, component. This influenced British doctor's imagining of disease into the twentieth century. For instance, in his 1909 address to the Society of Tropical Medicine, Ross said: "For whatever science may discover, the practical prevention of disease will always remain impossible wherever the poor are compelled to live, like

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[26] James Johnson, *The Influence of Tropical Climates, More Especially the Climate of India, on European Constitutions: The Principal Effects and Diseases Thereby Induced, Their Prevention or Removal, and the Means of Preserving Health in Hot Climates, Rendered Obvious to Europeans of Every Capacity: An Essay* (London, 1815).

[27] Ibid., 3.

[28] Ibid., 28.

[29] For more on the influence of stoicism on British thought and cultural values see: Lois Peters Agnew, *Outward, Visible Propriety: Stoic Philosophy and Eighteenth-Century British Rhetorics* (Columbia: University of South Carolina Press, 2008).

[30] For more on the plague and cholera epidemics in particular, see: "Cholera: Disease as Disorder" and "Plague: Assault on the Body" in Arnold, *Colonizing the Body*, 159-240.

[31] Arnold, *Colonizing the Body*, 204.

animals, in the midst of filth and squalor…I take this as the first great principle of sanitation."[32] Wherever the poor congregated, it was believed that disease would flourish. While the British thought that climate fostered susceptibility to disease, through their experiences in India they viewed slums as primary spaces of infection.

In addition to clearing the slums, the Municipal Act of 1888 also authorized enforced-segregation of suspected plague cases.[33] It was not only the disease that a body carried, but the context in which that body was situated that was believed to determine both risk and infection. The British policy of physical separation from bodies suspected of carrying disease—creating separate spheres for sick and healthy bodies—would later influence policies practiced during the Great War.

Through their experience with debilitating epidemic disease in India in the nineteenth century, and imaginings about geographies of illness, British doctors continued to be concerned with the effect of tropical environments on the European body in the twentieth century. In a 1913 address to the Society of Tropical Medicine and Hygiene, newly elected Society President Sir R. Havelock Charles noted that it was a "matter pregnant to many in this Imperial age—the suitability of the white man for the tropics, and his power of colonizing such lands."[34] However, in contrast to Johnson's optimistic promise of adaptation, Charles focused on the climate's deterioration of the European body. According to Charles, "white men in the tropics universally suffer from neurasthenia," as "the conditions of continuous life in hot countries influences directly the function of the nervous system of the European."[35] Charles and his colleagues in the Society feared this would affect Britain's capacity to sustain colonial dominance in India: "where in the world can be seen a white race, in a tropical climate, maintaining the energy of the people who founded that power?" they asked.[36] According to historians Biswamoy Pati and Mark Harrison, "The Indian climate was said to have made its inhabitants effeminate and fatalistic, while the bracing climate of their northern island had made the British industrious and warlike—natural leaders of men."[37] While these ideas were initially advocated to explain

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[32] Ross, "The Future of Tropical Medicine," 277.

[33] Arnold, *Colonizing the Body,* 203.

[34] Sir R. Havelock Charles, "Neurasthenia, and its bearing on the Decay of Northern Peoples in India," *Transactions of the Royal Society of Tropical Medicine and Hygiene* 7, no. 1 (November 1913): 2.

[35] Charles, "Neurasthenia," 3-4.

[36] Ibid., 9.

[37] Pati and Harrison, *Health, Medicine, and Empire,* 21.

European dominance, it caused physicians to worry that this dominance was not sustainable in foreign climates. The British equated the weakening of the European body with the deterioration of the character; European health and energy, it was feared, were climate-specific.

Ideas of the European body "losing energy" in the tropics were connected to a discourse about bodies that emerged during the late nineteenth century. The advent of industrialism and perpetual motion machines, laboring hours on end at the same rate, coincided with the appearance of "fatigue" in the medical literature. According to historian Anson Rabinbach, the two phenomena are related: "the great discovery of nineteenth century physics led…not only to the assumption of a universal energy, but also to the inevitability of decline, dissolutions, and exhaustion…fatigue became the permanent nemesis of an industrial Europe."[38] A fatigued man was an unproductive one, and he impeded the progress of industry. According to Rabinbach, fatigue came to be regarded as "the body's stubborn subversion of modernity."[39] This vision emerges clearly in the Society of Tropical Medicine's great concern with climate's effect on the body, as neurasthenia was defined as a condition of fatigue. As Charles noted, "progress which is really effective depends not on the bounty of nature, but upon the energy of man."[40] This rhetoric was also used to justify the "natural submission" of the Indian peoples, as heard in Charles' speech: "In this process of time the Honorable and Sovereign Aryan race was, by effects of climate and social influences, reduced to a people with energy deteriorated…to such submission becomes a custom and servitude a pleasure."[41] Succumbing to fatigue, then, was not only viewed as making the British less dominant in India, but it risked making them less *white.*

In the early nineteenth century Johnson argued that climate could be "overcome." In the early twentieth century doctors cautioned that "pursuing habits as if [one] is superior to his surroundings" only serves to make one more susceptible to illness and fatigue.[42] Therefore, a concern within the colonial administration was how to stay healthy and operate in a foreign environment while still "remaining white."[43] One solution was to avoid living in tropical environments for a sustained period, meaning

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[38] Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (United States: Basic Books Inc., 1990): 3-4.

[39] Rabinbach, *The Human Motor,* 6.

[40] Charles, "Neurasthenia," 10.

[41] Ibid., 8.

[42] Ibid., 5.

[43] Ibid., 11.

shorter periods of deployment for members of the British Army and civil servants in India. This solution was supported by Charles, who argued "fresh waves of immigration are essential to make up for the wear and tear due to climatic influence."[44] For the British at this time, the most effective way for the body to remain healthy was physical separation from foreign climates.

Shortening the European body's tenure in India created difficulties for the British medical administration. There was not as large of a supply of doctors to send from England as there were soldiers or civil servants.[45] To compensate, the British supplemented their own medical personnel with Indian physicians, who were trained to enter the lower ranks of the Indian Medical Service. By 1900, it was common to find native practitioners of Western medicine in most major Indian towns and cities.[46] While some may claim that this signified a loss of British control, other historians such as David Arnold argue that the implementation of Western medicine was another way to reinforce colonialism.[47] According to Arnold, the growing acceptance of Western medical norms was evidence of medicine's power as a colonizing force—encouraging the practice of Western medicine was part of a greater British mission to "civilize" India.[48] Rather than lose their "whiteness" and integrate into Indian society, the British administration attempted to integrate Indians into their medical system. By World War One, many Indian doctors had been incorporated into the British medical administration serving overseas.

The focus of tropical medicine on climate and ideas about the adaptation of bodies to certain environments, developed through British experience in India, influenced military policy in both theory and practice on the non-Western fronts of World War One. The Indian Army supplemented British forces on many fronts of the war—Indian troops served in German East Africa, on the Western Front, in Gallipoli, and Egypt. Nearly 700,000 Indian troops served in the Middle East alone.[49] While the British military in India served to reinforce the colonial hierarchy, the situation changed on the various fronts of the war, where British soldiers served alongside Indian troops.

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[44] Charles, "Neurasthenia," 9.

[45] Pati and Harrison, *Health, Medicine, and Empire,* 9.

[46] For more on the westernization of the Indian Medical Service, see: Pati and Harrison, *Health, Medicine, and Empire,* 8.

[47] Arnold, *Colonizing the Body,* 9.

[48] Arnold quoted in Pati and Harrison, *Health, Medicine, and Empire,* 19.

[49] Memorial Gates Trust, "Participants from the Indian Subcontinent in the First World War," http://www.mgtrust.org/ind1.htm (accessed March 29, 2013).

In terms of medical services, Indian doctors would often treat the regiments of the Indian Army. Heber Maitland Alexander, a soldier serving in the Indian Mule Corps in France and Gallipoli, often mentioned the presence of "Hindu Doctors."[50] These doctors, rather than being looked down upon as less capable than the British, on occasion gained distinction for their service during the war. For example, according to Alexander "many stories were told of the gallantry of Captain Singh, the Indian Doctor of the 57th, who was given one of the first Military Crosses."[51] However, these doctors would mainly treat Indian patients; the separate spheres of disease and treatment built up during the nineteenth century extended into the context of war.

It is interesting, however, that in Alexander's account inoculations were still given by members of the British Army Medical Corps.[52] As mentioned in the introduction, inoculating Indian service members was a priority for the British military so that they could not spread "foreign diseases" to British troops. The inoculations occurred so regularly that in 1915, Dr. Simpson of the Society of Tropical Medicine and Hygiene said that the risk of the Indian Army spreading cholera was very low, due to "sanitary precautions taken on the long voyage [to the various fronts of the war]."[53] Therefore, while Indian doctors were given autonomy over their own patients, health and sanitation risks to the Indian Army that possibly affected the health British soldiers was still entrusted solely to British doctors.

In the colonial imagination, the British tended to look down on the Indian body's "adaptations" to its environment. This attitude is seen by examining more fully the excerpt Charles' 1913 speech to the Society of Tropical Medicine and Hygiene:

> In process of time the Honorable and Sovereign Aryan race was, by effects of climate and social influences, reduced to a people with energy deteriorated…Becoming inherently lazy, they eventually became possessed of the virtues which are more negative than positive. Exhaustion and anemia preyed on the people's health, and lowered its vital resistance to disease by a general lessening of natural immunity. They lost their

[50] Alexander, *On Two Fronts*, 215.
[51] Ibid., 60.
[52] Ibid., 17.
[53] Simpson, "War and Cholera," 146.

> independence, and those who do so end by losing their energy: to such submission becomes a custom and servitude a pleasure.[54]

For Charles and other British physicians at the time, the perceived transformation of the Indian body served as a cautionary tale for what could happen to Europeans who stayed in the tropics too long. Through arguing that climate had a direct impact on energy levels, rhetoric such as this was used to justify colonial domination. Fatigue was viewed as the body's natural response to tropical climates; willing submission to colonial rule was, for the British, a logical extension of the symptoms of fatigue.

In the Great War, however, a fascinating reversal took place. Rather than using the Indian body as a platform to justify colonialism, the British military embraced these perceived differences in climatic response as advantageous. During the war, the meeting point between climate and individual bodies was used to explain ability and performance: Sir Ian Hamilton, commander of the Mediterranean Expeditionary Forces at Gallipoli, argued that Indian troops performed well during the Gallipoli Campaign because of their adaptation to the environment. "Those who have watched them [Indian soldiers] closely in India say that a native soldier on the Peninsula… is worth at least two Indian soldiers in France. The climate suits him better."[55] British military officials came to see Indian soldiers as an asset, as they did not have the disadvantage of battling fatigue in a foreign environment. In an area where it was believed that the European body could only degenerate, having a body which had already "succumbed" to the effects of climate made Indian soldiers better equipped to handle the traumas of war; climate was not an additional cause for concern.

In the Great War, the colonial rhetoric which surrounded Indian bodies receded as British military commanders recognized the advantage of using Indian troops on numerous campaigns. For instance, in his 1913 speech Charles had claimed that the Indian body had a lower "natural immunity" to disease.[56] However, when Sir Ian Hamilton requested to the London War Office that Sikh regiments reinforce his troops in 1915, he stated: "we want these men so badly. They don't get sick here; they are worth four European Bodies at present."[57] In the context of war a new value was placed on the bodies of colonial subjects, to such an extent that descriptions of the Indian body's lack of energy, such a concern in pre-war

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[54] Charles, "Neurasthenia," 8.
[55] Hamilton, *Gallipoli diary, volume 2,* 161.
[56] Charles, "Neurasthenia," 8.
[57] Hamilton, *Gallipoli Diary, volume 2,* 197.

medical transcripts, was rarely seen once the Great War was underway. Rather than a scrutiny of the colonial body to justify European authority, the focus shifted to how adaptations, in a wartime context, could be advantageous. As we will explore in later sections, this is exactly what the British themselves had to tackle on the non-Western fronts of the war: how to adapt to foreign environments in a way that was beneficial to military operations, yet not damaging to the European character.

A new perspective on the colonial body does not mean, however, that the British Army considered issues of climate and adaptability to be the main factor in assigning troop locations. For instance, Hamilton criticized the War Office for assigning too many Indian troops to France, and too many European troops to the Middle East: "After a year of war, the Indian Army and the Territorial Army are staggering on their last legs instead of being the best part of our forces."[58] Although the studies of climate and environment were a focus of tropical medicine at this time, large numbers of daily casualties in the war meant that the British military could not afford to give troop assignments solely based on "suitability."

In his book, *The Normal and the Pathological*, Georges Canguilhem writes that "Man is healthy insofar as he is normative relative to the fluctuations of his environment."[59] In the late nineteenth and early twentieth century, we see that British ideas of a healthy body stemmed from ideas about how bodies adapt to, and are situated within, foreign climates. In the colonial context, tropical medicine became interested in how to adapt British bodies to tropical climates without taking away their European energy. Charles expressed the worry of many colonial officials when he stated his belief that, "white races cannot permanently colonize the tropics and remain white."[60] To preserve colonial dominance, the resulting sanitary and medical provisions stemmed from the need to preserve the health of the British Army.[61] In addition to increased vaccinations and shortened terms of service for British officers and civil servants, this also included training Indian physicians, making Western medicine a norm.[62] T his meant that, on the frontlines, regardless of theater, it was often Indian doctors treating Indian troops. Yet, while these troops were praised for being "more suited" to tropical climates, the War

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[58] Hamilton, *Gallipoli Diary, volume 2*, 199.

[59] Georges Canguilhem, *The Normal and the Pathological* (New York: Urzone Inc., 1989), 228.

[60] Charles, "Neurasthenia," 11.

[61] Pati and Harrison, *Health, Medicine, and Empire*, 4.

[62] Arnold, *Colonizing the Body*, 289-293.

Office did not always take this into consideration when giving field assignments.

There were additional consequences to the British obsession with "suitability of the body" in the case of India. One is that, since the British praised the Indian troops for their adaptation to the climates of Gallipoli and Palestine, they often did not realize, or ignored, some additional difficulties the Indian regiments faced. For instance, historian Eran Dolev noted that when forces on the British side were under siege, "Deficiency diseases occurred mainly among the Indian troops, who were vegetarians and did not consume the flesh of horses when it came to that point [when food stores ran out during a blockade]."[63] Often cultural differences, and how this may have affected health and treatment, were overlooked in the British focus on what they believed to be the inherent biological difference—developed through a history of living in tropical environments—of the Indian soldiers.

The British colonial experience in India played a formative role in shaping how British doctors imagined European bodies in foreign environments. From the early nineteenth century, they struggled with the idea of how to cope with tropical climates without adapting too much; the British regarded Indian bodies as ones that had succumbed to the effects of climate and used this to justify colonial rule. In the context of war these differences were seen as advantageous, yet inoculation and separation policies still existed. The case of tropical medicine in India shows that British views of the body—under constant threat of fatigue and subject to shifts in climate—greatly influenced their medical policies abroad.

SECTION TWO: ESCAPING THE "DEVIL OF FEVER"—TROPICAL MEDICINE AND THE EAST AFRICAN CAMPAIGN

> In all this campaign our most deadly enemy was not the human foe who stubbornly retreated before us, but this same devil of fever who had laid waste that miserable village community in the Lumi Swamp. Already I had been prepared to meet him; but this was the first time that I had looked upon his face, and realized how terrible was the power he wielded.
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> —*Captain Francis Young, 1917.*

For British troops fighting in the East African campaign, every day was a struggle against disease; the great unseen enemy in an unfamiliar environment. Situated in what Francis Young, a Captain in the British Medical Corps, christened the "inhospitable heart of Africa," the

[63] Dolev, *Allenby's Military Medicine,* 33.

combat constituted the longest campaign of World War One, lasting from August 1914 to November 1918. [64] For the British military, this campaign presented extreme logistical challenges in terms of transportation and communication across inhospitable environments.[65] The largest challenge that the British Army faced, however, was protecting the health of their troops and maintaining standards of sanitation recommended by doctors from the Society of Tropical Medicine who had worked for the colonial administration in East Africa. Malaria and sleeping sickness in particular were two of the most prominent diseases to affect military operations in East Africa.[66] According to Dr. Young, during a given day "our single ambulance had as many as 300 sick men lying."[67]

It is the primary focus of this section to understand how the British military doctors drew upon the tradition of tropical medicine to treat their troops in an unfamiliar environment, and how the colonial dynamic complicated their understandings of how the body was affected by disease. While some sanitation policies may have been effective for colonial administration, when placed in the context of war they became less practical. Ultimately, British bodies were viewed as un-adaptable to the tropical environment of East Africa; rather than learning from native populations, doctors imposed increased physical separation and a more stringent reliance on biomedicine as the norm. In a foreign land where soldiers felt that they were living like animals, clinging more tightly to "rational" medical beliefs and practices was the way British doctors attempted to cope with the environment around them.[68] In East Africa, the British attempted to "adapt" by re-affirming their own cultural identity.

The East African campaign stemmed from the imperialist power struggles between Great Britain and Germany in the nineteenth century. The colonies possessed by Germany in East Africa prevented Britain from having control of the width of Africa in the equatorial region, from the Western Coast to the Indian Ocean. The Germans recognized this, and hoped that by engaging British forces in Africa, they could re-direct Great

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[64] Francis Brett Young, *Marching on Tanga: With General Smuts in East Africa* (1917), 42.

[65] C.B. Quayle, "To Live Like a Pig and Die Like a Dog: Environmental Implications for World War I in East Africa," *NTIS* 1012, (December 2009): 1-68.

[66] Ibid., 18.

[67] Young, *Marching on Tanga*, 248.

[68] Quayle, quoting Byron Farwell in *The Great War in Africa, 1914-1918* (New York: W.W. Norton & Company, 1986), 294: "'A 25th Fusilier expressed the sentiments of many when he said, 'Ah, I wish to hell I was in France! There one lives like a gentleman and dies like a man. Here one lives like a pig and dies like a dog.'"

Britain's forces from the Western Front in Europe.[69] Despite Britain's superior number of troops, the Germans were able to avoid defeat, not surrendering in Africa until the armistice in 1918. According to historians, this is due to the fact that the Germans were more familiar with the local terrain.[70] In fact, Young openly admits in his journal that they were fighting an enemy with "superior communications" compared to their own disorganized forces, and that they often had to rely on German maps of the area.[71] Compounding British hardship was the prevalence of disease: troop mortality rates from disease exceeded the casualties resulting from combat.[72] Although this campaign may have had similar motives to the "scramble for Africa" which occurred during the late nineteenth century, the scale and location of the East African conflict during the Great War turned it into a logistical nightmare for the British military, particularly in terms of medical administration.

Working in unfamiliar terrain, British military doctors looked to the principles of tropical medicine developed during their own colonial experience in Africa. In the late nineteenth and early twentieth century, the Colonial Office sponsored numerous medical expeditions, mainly to Western Africa, to determine ways to treat the numerous life-threatening tropical diseases that gave Africa the name, "the white man's grave."[73] Dr. Ronald Ross, President of the Society of Tropical Medicine and Hygiene, declared in 1909 that "the doctor ought to have—in this imperial country at least—a clearer view of the list of tropical maladies."[74] Tropical medicine at this time focused particularly on mosquito-borne diseases, such as malaria, yellow fever, and sleeping sickness.

In addition to finding ways to keep the European body free of disease in the tropics, Dr. Ross declared in the same speech that the purpose of tropical medicine was to investigate "why some regions breed strong races and others weak ones."[75] He conjectured that in Africa, the

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[69] Quayle, "To Live Like a Pig and Die Like a Dog," 14.

[70] Quayle, "To Live Like a Pig and Die Like a Dog," 2-3.

[71] Young, *Marching on Tanga*, 71; this was more of a hardship for the British than German military, as the British had experienced more difficulty both coordinating and executing evacuation routes in a unfamiliar terrain.

[72] Quayle, "To Live Like a Pig and Die Like a Dog," 8.

[73] For more on British medical expeditions, see: "West Africa and Tropical Medicine, 1895-1928" in Sheldon Watts, *Epidemics and History: Disease, Power, and Imperialism* (New Haven: Yale University Press, 1997).

[74] Ross, "The Future of Tropical Medicine," 275.

[75] Ross, "The Future of Tropical Medicine," 273.

"weakness" of the people was due to malaria, and echoed this in the 1910 publication, *Mosquito or Man? The Conquest of the Tropical World*:

> Malarial fever…strikes down not only the indigenous barbaric population, but, with still greater certainty, the pioneers of civilization…It is therefore the *principle and gigantic ally of Barbarism*…it has withheld an entire continent from humanity—the immense and fertile tracts of Africa.[76]

For prominent doctors of tropical medicine like Ross, the discipline had a moral as well as a scientific component. Convinced that tropical disease was the reason that populations in Africa lived in a "barbarous" state, he believed that it was the duty of the doctor to lead them to civilization; medicine was a part of the "white man's burden" of which Kipling wrote.[77] In a 1909 speech to members of the Society of Tropical Medicine and Hygiene, Ross claimed that "it is for us to descend and save them [tropical peoples] from the dangers which we know threaten them."[78] In the early twentieth century, many studies surfaced detailing the effects of diseases such as sleeping sickness, tuberculosis, and psychosis on native African populations in addition to Europeans.[79] For doctors of the Society of Tropical Medicine and Hygiene, tropical medicine became not just about curing bodies, but building civilizations.

Embedded in this focus on the "barbaric" component of tropical disease, however, was the implicit assumption that Europeans who stayed in Africa too long would regress to a similar "uncivilized" condition. Through studying native African susceptibility to certain diseases, these populations came to "represent" the diseases themselves. For example, sleeping sickness was known to cause extreme fatigue and lethargy in people who were infected. However, Dr. Hodges, the acting senior medical officer in Uganda, wrote in 1904 that a major obstacle in the fight

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[76] Ross, excerpt from *Conquest of the Tropical World*, quoted in Watts, *Epidemics and History*, 256.

[77] Kipling "The White Man's Burden," 1899.

[78] Ross, "The Future of Tropical Medicine," 284.

[79] Gerald Campbell, "Notes on the comparative immunity from sleeping sickness of the Ngombe tribe, possible due to the Nkusi dye," *Transactions of the Royal Society of Tropical Medicine and Hygiene* 3, no. 6 (April 1910): 318-319; R. Howard, "Emotional Psychoses among Dark-Skinned Races," *Transactions of the Royal Society of Tropical Medicine and Hygiene* 3, no. 7 (June 1910): 323-339; S.L. Cummins, "Primitive Tribes and Tuberculosis," *Transactions of the Royal Society of Tropical Medicine and Hygiene* 5, no. 7 (January 1911): 93-106.

against sleeping sickness was "the unreasoning apathy of the peoples whom it attacks."[80] Rather than being described as victims expressing a symptom of the disease, they were seen as part of the problem; their apathy was presented as somehow innate, illogical, and obstinate.

In spite of their adherence to biomedical etiologies, British doctors would depart from scientific rationality when dealing with infected native populations. Despite the fact that it was known that both the mosquito and tsetse fly were major carriers of tropical disease, African populations were treated as if they were the primary vectors. In Sierra Leone, for example, doctors hypothesized in 1900 that "the anopheles which infect Europeans do not derive their infection from other Europeans, but from natives, i.e., from the native children who almost without exception suffer from continuous malaria."[81] While both Europeans *and* native populations had the capacity to be malarial infective, British doctors believed that the mosquitoes concentrated preferentially near native habitations. As a result of this logic, in 1900 the British Colonial Office sponsored a policy of "residential segregation" in tropical colonies, so that European habitations would be, it was assumed, beyond the flight range of the malarial mosquito.[82] By 1901, these policies of segregation were accepted by the Liverpool and London School of Tropical Medicine as "the first law of hygiene."[83] While the British doctors and medical researchers prided themselves on taking up the "white man's burden," saving the continent with the aid of biomedicine, they ignored existing scientific rationality when creating actual policy. The policy of residential segregation refracted the discoveries of tropical medicine, which were championed as being objective and scientific, through a colonial lens, ensuring that the British would not be changed through contact with the native population. Spurred by the fears embedded in disease prevention, the British desire for cultural separation mandated physical separation as well.

The British policy of residential segregation reflected fears that the European body could be changed not just by the environment, but by

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[80] Hodges, quoted in: Ann Beck, *A History of the British Medical Administration of East Africa, 1900-1950* (Cambridge: Harvard University Press, 1970), 43.

[81] Quoted in: Stephen Frenkel and John Western, "Pretext or Prophylaxis? Racial Segregation and Malarial Mosquitoes in a British Tropical Colony: Sierra Leone," *Annals of the Association of American Geographers* 78, (1988): 216.

[82] For more on British colonial policies of residential segregation, see Frenkel and Western, "Pretext or Prophylaxis?"

[83] Sir Patrick Manson, who is credited as "the founder of tropical medicine", quoted in Watts, *Epidemics and History,* 262.

the people native to that environment. This is clearly seen in doctors' treatment of those infected with sleeping sickness. Sleeping sickness had attracted the attention of both colonial administrators in England and doctors of tropical medicine due to its prevalence and the severity of its symptoms.[84] By the twentieth century British scientists understood that the disease was transmitted through the tsetse fly. However, the methods they proposed to address this situation were more administrative than medical. In 1905, Commissioner M. Hesketh Bell, an administrator in Uganda, wrote in his diary: "I am convinced that the only way to stop the spread of disease is to break one of the links in its transmission. The indispensible link is, of course, the tsetse…as we cannot break the chain by the destruction of the fly, we must withdraw from the insects the source of their infection."[85] What Bell proposed was the mandatory deportation of all infected African persons, without their consent, from areas where the tsetse fly was concentrated; hoping that the protozoa the flies carried would soon die out.[86] This scheme employed a very specific scientific logic; despite existing knowledge, it operated under the assumption that the tsetse was sustaining its abilities as a vector through proximity to infected persons, and that the *victims* were responsible for sustaining transmission.

Like the special case of India examined earlier, the example of sleeping sickness reveals the British belief that foreign environments had a degenerative effect on the European body. Instead of making adaptations to the tropics the focus of prewar sanitary policy in Africa, British administrators chose one of physical separation, both from the land and the people that inhabited it. This is exemplified by the intense efforts to combat sleeping sickness, a disease which as early as the 1780s was characterized as "a species of lethargy" by European explorers.[87] Again, this is an example of British fears of the tropics causing fatigue. If fatigue was the enemy of modernity, then sleeping sickness, one of fatigue's origins in the tropics, was not just a public health concern, but believed to be the reason that African populations could not become "civilized."[88] For the colonial administration, therefore, physical separation was necessary to prevent the contamination of barbarism.

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[84] For a more detailed description of sleeping sickness research and sanitary policy in East Africa, see Beck, *British Medical Administration in East Africa,* 32-48.

[85] Bell, quoted in Beck, *British Medical Administration in East Africa,* 39.

[86] Beck, *British Medical Administration in East Africa,* 40.

[87] Ibid., 33.

[88] See discussion in Section One of this thesis, drawing on ideas presented in Rabinbach, *The Human Motor*.

By 1914 the policy of residential segregation became less practical due to the wartime needs of the British, yet the beliefs underlying the practice persisted. At the start of the campaign in August 1914, British administrators created the East African Carrier Corps to sustain British troops.[89] Acting as porters and stretcher-bearers, the African members of the carrier corps were instrumental to British military operations. Yet, although British soldiers recognized the carrier corps' importance to the campaign, they were wary about the spread of disease through interaction with native troops. As Young wrote in his journal in 1917:

> Many of our porters came from the Great Lakes, where [sleeping sickness] abounds. We could not be sure that some of them had not the seeds of the malady with them, in which case many of the tsetses in the fly belts might easily become carriers of the disease…Thus, by its great movement of savage people, the African War is bound to have spread disease in lands where assuredly there is enough already.[90]

Perhaps it was the underlying fear that the Carrier Corps had the potential to spread disease that relegated their main tasks to transporting the injured and ailing. By being placed with those who were already sick or dying, it decreased the risk that East African troops could infect the healthy. Young also noted that "we did not, like the Germans, depend for our mobility on native porterage;" the British instead preferred to use animals to transport food and supplies.[91] The British cultural fears of contamination through proximity to native troops therefore relegated the carrier corps to the task of transporting those who were already infected with disease.

The issues of proximity and transmission can be clearly seen in Young's writings. In his journal, he wrote of sickness being concentrated in specific spaces. For instance, in early 1917 he described the presence of fever in a village he visited, and was keen to leave before he was infected as well: "I was not eager to try conclusions with their devil."[92] He also described the valley of the Pangani River through which the regiment marched as possessing "a most sinister reputation for disease."[93] The Pangani region was so notorious for fever, in fact, that he said yellow

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[89] See Beck, *British Medical Administration in East Africa,* 61-72 for a detailed discussion of the Corps

[90] Young, *Marching on Tanga,* 244.

[91] Ibid.

[92] Ibid., 16.

[93] Ibid., 34.

acacias were referred to as "fever trees" because "all reaches of the Pangani were bordered by these sinister beauties."[94] Through constructing geographies of fever and disease, bounded by trees or a village border, there emerged a strong spatial component to both illness and infection.

Even though disease was often represented as concentrated in certain areas and that some people were more likely to carry disease, the British believed that all bodies, not just European, were ill-suited to the tropical climates of Africa. Shortly after his visit to the village in 1917, while on the march Young lamented that "I do not think that so great a military movement had ever been made…in a country which even the natives of Africa found to be incompatible with human life."[95] This "incompatibility" became apparent to the British when they witnessed the high mortality rate of the members of the East African Carrier Corps. Out of a total of 350,000 men participating in the campaign between 1914 and 1918, 46,618 East Africans were killed. Of that number, 42,318 of these deaths were attributed to disease rather than combat.[96] In contrast to the situation in India, in East Africa the British began to realize that just because a body was native to a particular environment, this did not ensure that the body was able to survive *warfare* in that environment. The intersection between concern about the effects of climate and the impact of war caused the British to undergo systematic medical assessment of native African bodies. In the context of the Great War, British doctors began evaluating native bodies not just when disease struck, but also to understand how these bodies would respond to the stresses of war. In 1917, the British Army enacted the Compulsory Military Ordinance of 1917, which according to Ann Beck, a historian of colonial medicine in East Africa, "provided for a systematic examination for drafted carriers. For the first time in East African medical history, a complete record of every man examined for the Corps was obtained."[97] In this context, conditions of war not only changed how the British viewed the "suitability" of bodies for their native environments, but also how they viewed colonial bodies as medical patients.

It was perhaps due to the perception that not even the East Africans could adapt to the environment that British doctors avoided recognizing native methods of disease prevention. For instance, when Young stumbled across a village healing ceremony, he viewed the

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[94] Young, *Marching on Tanga,* 74.
[95] Young, *Marching on Tanga,* 37.
[96] Beck, *British Medical Administration in East Africa,* 63.
[97] Ibid.,, 65.

spectacle with fascination but also disdain, writing "the awful atmosphere of that village was born in on me in the picture of this small community living miserably in the twilight of their banana swamp, stubbornly fighting an enemy from whom they could never escape… I was glad to leave them and their horror."[98] The British tended to dismiss East African practices of illness prevention, in favor of a Western scientific knowledge of disease causation. For example, when marching past a pool of water in 1917 Young wrote:

> Here we were at some trouble to keep our African stretcher-bearers in hand; for they think that it is a foolish thing for any man walking in Africa not to drink wherever he may, and we, on the other hand, were not anxious to make acquaintance with dysentery…[99]

This is not to say, however, that native methods of prevention were not studied by doctors of tropical medicine. In 1910, for instance, Gerald Campbell, Vice-Consul of the Congo State, gave a speech to the Society of Tropical Medicine and Hygiene outlining the success of the Nkusi dye in giving the Ngombe tribe immunity against sleeping sickness.[100] However, Campbell could not attribute this to a conscious effort by the natives to prevent disease, saying "it is not to be supposed that the natives dye their bodies with this stuff with the express intention of keeping the flies off."[101] Even when British doctors discovered successful native disease prevention measures, then, conscious and informed agency was taken away from its practitioners: native techniques were not viewed as having medical intent, but as being accidentally effective.

Faced with an environment which they believed to be uninhabitable, while simultaneously distrusting native methods of illness prevention, the British turned to biomedicine as a way to endure in the tropics. When discussing the promise of the Nkusi dye to prevent sleeping sickness, for example, Sir Patrick Manson said that the method "might not be good if properly applied on scientific principles."[102] No method of treatment was valid unless it was deemed scientific by British doctors. For instance, the ingestion of the drug quinine became the chief way to both

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[98] Young, *Marching on Tanga,* 15-16.

[99] Young, *Marching on Tanga,* 23-24.

[100] Campbell, "Notes on comparative immunity from sleeping sickness," 318-319.

[101] Ibid., 319.

[102] Manson "Discussion" in Campbell, "Notes on comparative immunity from sleeping sickness," 319.

treat and prevent malaria; according to Young, it was "a necessity of life."[103] Its use as a prophylactic was sometimes even emphasized over other measures, such as wearing mosquito nets. According to Young, "A man may carry a mosquito-net in his haversack, but he cannot wear it when he needs it most, on picket duty at night… [So] I took special stock of our quinine, to see if I could deal with the regiment in what I took to be the proper way, giving every man in it a regular prophylactic dose."[104] In spite of other available treatment methods and sanitary policies, for the British doctors ingesting drugs was the best way to prevent disease.

British emphasis on drugs such as quinine reflected the culture of pure alliance with allopathic biomedicine occurring in England at the time. According to Beck, "As in other European countries in the nineteenth century, the raising of medical standards was a violently debated issue in England…it is understandable that doctors who had fought the battle in their own country would also guard against the lowering of levels in colonial East Africa several decades later."[105] For British doctors, adhering to scientific standards abroad was a way to further legitimize their profession and prove that the scientific method was the only medically effective method. There was more at stake for these doctors than the health of the troops; they believed that the way they treated soldiers in East Africa would prove the discipline of tropical medicine worthy of being the principal institution for medical research in non-European environments.

The story of tropical medicine during the East African campaign is one of British attempts to mitigate the effects of an environment perceived to be unforgiving. According to Young, "we should have felt that the country had beaten us, even though there was no shame in being beaten by such a country."[106] The British concluded that no bodies could adapt to this environment: not European, East African, or Indian.[107] As a result, they chose to endure through separation into European enclaves, fortifying themselves with Western science. This separation was ideological, as seen in a strict reliance on biomedical, medical treatment, and physical, through the construction of residential segregation and geographies of disease. Ironically, in order to construct the physical spaces of safety the British doctors often had to ignore the scientific

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[103] Young, *Marching on Tanga,* 3.
[104] Ibid., 71.
[105] Beck, *British Medical Administration in East Africa,* 55.
[106] Young, *Marching on Tanga,* 58.
[107] See Ibid., 55 for information on Indian hardship in East Africa.

discoveries they simultaneously sought to uphold, such as the way tropical diseases were transmitted. In a multi-ethnic campaign in a foreign environment, the British used tropical medicine to strengthen their own identity. Through protecting European ideas about medicine, they sought to isolate and protect the European body.

SECTION THREE: IMPROVISING CLEANLINESS: THE BRITISH ARMY AT GALLIPOLI

> What a fiasco! The Dardanelles is not a sanatorium; Sulva is not Southend. With the men we have lost from sickness in the past six weeks we could have beaten the Turks twice over.
> —*Sir Ian Hamilton, 1915*

In the spring of 1915, Sir Ian Hamilton, Commander of the Mediterranean Expeditionary Forces at Gallipoli, quipped "the British General is the product of an improvising nation."[108] Fighting in the desert environment of Gallipoli, the high ranking officials of the British Army were forced to resort to constructing "sanitary makeshifts"—methods of maintaining sanitation and hygiene with materials available to the troops at the time—to protect the rapidly deteriorating health of their troops.[109] In Gallipoli, the troops succumbed to illness at an alarmingly rapid rate. In a 1915 cable to the War Office, Hamilton wrote:

> I think you should know immediately that the numbers of sick evacuated in the IXth Corps during the first three days of October were 500 men on the first instant; 735 men on the second instant and 607 men on the third instant. Were this rate kept up it would come to 45 percent of our strength evacuated in one month.[110]

The environment of Gallipoli was not kind to European bodies. Preserving food, preventing heat exhaustion, gaining access to clean water, and avoiding fly-borne diseases were all major concerns of the British Army. To combat this, commanders hoped that the War Office in London would increase rations and send troop reinforcements.[111] However, when this aid was not forthcoming, the Army Service Corps—a branch of the British

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[108] Hamilton, *Gallipoli Diary, volume 1* (1920), 20.

[109] Numerous examples of these sanitary makeshifts can be seen in: Balfour, "Sanitary and Insanitary Makeshifts," 19-50.

[110] Hamilton, *Gallipoli Diary, volume 2*, 239.

[111] Field Commanders' issues with the War Office are extensively covered in: Hamilton, *Gallipoli Diary, volume 1* and *volume 2*.

Army responsible for sanitation and hygiene—had to rely on improvisations drawn from the local environment. To do this, they needed to make accommodations for the non-European troops serving alongside them, yet also draw upon the knowledge that they had to create a blend of sanitary makeshifts that were not strictly European.

This is not to say, though, that the British soldiers did not read the high incidence of disease through a distinctly English cultural lens. In fact, the hardship they faced in this climate served to reinforce ideas about what made a "healthy" man in the modern industrial age, and how this was complicated by the presence of both non-European troops and climates. Therefore, although the Gallipoli campaign came to be characterized as a "medical breakdown" in military reports, the importance of tropical medicine was not diminished here.[112]

The Gallipoli Campaign took place between April 1915 and January 1916. A few months into the war there was already a stalemate on the Western Front. Some members of the British high command believed that focusing on defeating the Ottomans in the Middle East would be the key to winning the war.[113] A victory at Gallipoli was also seen as key to securing Balkan support for the British military. Before the start of the campaign, Hamilton optimistically wrote that there was incredible "strategic value of the Near East, where one clever tactical thrust delivered on the spot might rally the wavering Balkans. Rifle for rifle, at that moment, we could nowhere make as good use of the 29th Division as by sending them to the Dardanelles."[114] For the British, a swift victory at Gallipoli was vital to both securing the Eastern fronts and protecting their colonial holdings from the rival Ottoman Empire.[115]

Despite Gallipoli's strategic importance, however, the War Office never put the full support of its resources behind the Gallipoli Campaign. Hamilton often complained that the War Office was not responsive to his requests for increased rations and troop reinforcements to replenish his rapidly depleting forces.[116] The War Office's unresponsiveness may have

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[112] The Mesopotamia Commission Report in August 1917 described what happened in Gallipoli as a "medical breakdown," quoted in: Dolev, *Allenby's Military Medicine*, 23.

[113] Ibid.

[114] Hamilton, *Gallipoli Diary, volume 1,* 4.

[115] For more information on the British campaign at Gallipoli, see: Alan Moorehead, *Gallipoli* (Toronto: MacMillan of Canada, 1989).

[116] Hamilton, *Gallipoli Diary, volume 2*. This volume contains much correspondence between Hamilton and the War Office. His complaints increase as the campaign goes on.

been due to the attitude of some members of the British command towards the Campaign itself. Before the Gallipoli campaign began, Hamilton's commanding officer [who in the journal was only referred to as "K"], warned "The 29th Division are only to be a loan…all things earmarked for the East are looked on by powerful interests both at home and in France as having been stolen from the West."[117] Hamilton echoed this complaint later in the campaign, stating in 1915 that "They [the War Office] have forced us to go sick and idle because they have permitted the French offensive to take precedence of ours…there was no violent urgency in France as there is here."[118] While strategically vital, the commanders never intended that the Gallipoli campaign would take as long as it did. The British command in London were frustrated that resources were being diverted towards a failing venture.

In order to protect the health of British troops at Gallipoli, the British Army once again turned to the theme of the European body's ability to adapt to non-European climates. When writing one of his many complaints against a commander in the War Office, Hamilton wrote that "He still believes 'man's a man and a rifle's a rifle'; I still believe that half the value of every human being depends on his environment."[119] There were major concerns about the body's ability to perform in non-European environments; however, this was a concern specifically for white European bodies. Thus, soldiers serving in the Indian Army were highly valued by the British Army on this front of the war because they were perceived as acclimatized. In fact, in September 1915, Hamilton noted in his journal that "latest returns show a daily sick list on ten per battalion of British or Australian troops and of one per battalion of Indian troops."[120] Seeing the difference in disease incidence among European and Indian armies reinforced perceptions that the European body was inherently unsuited for desert conditions.

Due to observed differences between Indian and European disease rates, doctors of tropical medicine working in Gallipoli began to pay close attention to Indian disease prevention measures. Doctor Andrew Balfour, the director of the Wellcome Bureau of Scientific Research in England, traveled to the various non-Western fronts of the War—including Gallipoli, Palestine, and Mesopotamia—documenting, in his words, "the makeshifts of the army hygienist in hot climates."[121] In November 1918

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[117] Hamilton, *Gallipoli Diary, volume 1*, 5.
[118] Hamilton, *Gallipoli Diary, volume 2*, 239.
[119] Hamilton, *Gallipoli Diary, volume 1*, 266.
[120] Hamilton, *Gallipoli Diary, volume 2*, 200.
[121] Balfour, "Sanitary and Insanitary Makeshifts," 19.

he gave an address to the Society of Tropical Medicine and Hygiene in London, where he notes some of the "ingenious" methods of sanitation practiced by the Indian units.[122] For instance, he praised the various water purification techniques of the Indian Medical Service.[123] Water purification and storage were extremely important issues for the British, especially since the water used in Gallipoli was actually, according to Balfour, "Egyptian filtered water, brought in by tank steamers."[124] This transport was tactically very risky. Heber Maitland Alexander, a member of the Indian Mule Corps serving in Gallipoli, wrote that the Ottoman Turks knew exactly what the British water containers looked like, and would target them.[125] The fact that the Indian Medical Service was trusted to purify this precious supply of water illuminates how much the British valued their knowledge of living in hot climates.

One may wonder why British doctors paid attention to the sanitary makeshifts of the Indian Army, if they viewed non-European bodies as more *naturally* adapted to hot climates. This appears to be a contradiction to British understandings of adaptation and health in tropical environments. Rather than being discouraged by their perceived "inadaptability," as seen in the last section on East Africa, the high incidence of disease at Gallipoli spurred the British doctors to examine any preventative measure that might curb sickness rates, even if they originated from the practices of non-European troops. At Gallipoli, the British Army was desperate to find any preventative measure that would work; in September 1915 it was reported that 78 percent of the British troops had dysentery or other intestinal diseases, and 64 percent had septic sores.[126] Moreover, Dolev notes that "what was common to all the diseases [at Gallipoli] was the fact that they could all be prevented by simple measures—proper behavior of the troops and support of the commanders in the field."[127] Through sanitary measurers such as water purification, safe food preparation, and efficient waste disposal, diseases such as cholera and dysentery could be avoided. Without adequate resources from the War Office, the British doctors contradicted understandings of intrinsic adaptation and sought to adopt effective sanitary makeshifts from the environment around them, which included borrowing methods from colonial troops.

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[122] Balfour, "Sanitary and Insanitary Makeshifts," 22.
[123] Ibid., 25.
[124] Ibid., 24.
[125] Alexander, *On Two Fronts*, 210.
[126] Dolev, *Allenby's Military Medicine*, 21.
[127] Ibid., 21.

In adopting these sanitary makeshifts, the British were faced with a dilemma: how could they adapt to the harsh environment of Gallipoli, while still preserving the Western scientific character of their medical service as well as the European nature of their troops' bodies? One of the ways this was done was through co-opting the sanitary makeshifts of the Indian Army, and modifying them with Western technology. For example, Balfour described an Indian method of water purification where a chlorinated lime mixture was added. The "old method" Balfour described, involved Indian orderlies shaking bottles to mix its contents. The "new method," however, was "represented by ingenious hand churns, and worked very well."[128] The process of de-lousing was another example of a simple sanitary makeshift made technological, and thus more European, in nature. While Balfour conceded that picking was "the simplest method for dealing with lice," the captions on photos included in the transcript of his address described the method as "primitive."[129] At one point, it was even said that the practice was "reminiscent of monkeys at the zoo."[130] Viewing this example of the "primitive" with disdain, Balfour argued that "we can do better than this in the army."[131] He goes on to describe various technological methods of lice removal—such as the Serbian barrel and the railway van disinfector—that appear to complicate the process.[132] Although Indian makeshifts were effective, they were modified to suit European values; it would not do to have British soldiers resort to "primitive" methods of hygiene. While the British valued colonial sanitary makeshifts, they viewed it as a foundation upon which they could build their own policies. By doing this, they created a co-opted sanitation as a distinctly European practice, "perfected" by western technology.

In the Gallipoli campaign, non-European, colonial troops were viewed as both naturally suited to the climate, and as able to construct practices to preserve health and hygiene. In reference to the Indian Army, Hamilton himself wrote in his journal that "India could have beaten Turkey single-handed."[133] However, although the two views of non-European troops may seem positive, they are both opinions formed in reference to disease. In fact, non-European troops came to occupy a niche

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[128] Balfour, "Sanitary and Insanitary Makeshifts," 25. Photographs of the two methods are Fig. 32 and Fig. 33 of the transcript.

[129] Ibid., 25; Fig. 39.

[130] Ibid., 25.

[131] Ibid.

[132] For more about the sanitary makeshifts of lice removal, see Balfour "Sanitary and Insanitary Makeshifts," 25-26, and Fig. 41.

[133] Hamilton, *Gallipoli Diary, volume 1*, 12.

space in the European imagining of disease in desert campaigns, often fulfilling roles that dealt with both medical treatment and sanitary provisions. As the first section of this thesis pointed out, Alexander noted the large presence of Indian doctors and stretcher-bearers on the Gallipoli campaign.[134] On Balfour's visit to Gallipoli, he documented Indian orderlies undertaking tasks such as water purification and latrine construction, even specifically mentioning that a "native sentry" needs to be put on guard over the water supply.[135] Perhaps because the British viewed Indian bodies as able to overcome disease through their "suitability" for the environment, it was deemed safer for colonial troops, rather the European, to operate in spheres that dealt closely with illness and unhygienic conditions.

By placing non-European bodies in the realm of disease, however, British authorities created a situation where, as in East Africa, these troops came to be viewed as carriers of disease itself. Although their illness rates were known to be lower than European troops', the British Army doctors could not help viewing non-European troops as aiding the spread of infection. This is seen in the discussion of cholera at the beginning of this thesis: army doctors feared that this disease would "spread from the East," and special precautions were taken to inoculate Indian soldiers traveling to both the Western and non-Western fronts of the war.[136] Concerns with close contact with non-European bodies were also discussed in an article published by the *British Medical Journal* in 1915, where the authors worried about the efficacy of current sanitary measures: "However good these arrangements may be on our own side," they argue, "they are certainly not likely to be very excellent on that of the Turks; and the trenches are not far apart."[137] Due to the nature of trench warfare, the British Army not only had to be concerned with non-European bodies within their own units, but also the sanitary conditions of enemy combatants. Here, they could not afford to adopt a policy of residential segregation, as was seen in East Africa. Even though these non-European bodies may have been viewed as more suitable for the environment, they were also viewed as potentially corrupting to the European body. For this reason, non-European troops often remained relegated to the "disease

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[134] Maitland, *On Two Fronts*, 19.

[135] Balfour, "Sanitary and Insanitary Makeshifts," 24.

[136] Phrase quoted from: Anonymous, "Flies in France and Gallipoli," *British Medical Journal* 2, no. 2848 (1915): 184.

[137] Anonymous, "Flies in France and Gallipoli," 184.

sphere" in Gallipoli, treating the ill and maintaining sanitary makeshifts, thus guaranteeing their continued association with disease.

Finally, as in both India and East Africa, the British Army coped with the stresses of deployment to a non-European environment by holding more tightly to British cultural values. For instance, Sir J. Crichton-Browne, President of the Sanitary Inspectors' association, included the following passage in his October 1915 address on sanitary work during the war, summarized in an article by *The Times*:

> Resistance to microbial poisons which had entered the human system largely depended on the healthful activity of a large number of internal secretions which were under nervous control and were influenced by mental impressions. He regarded the broadsheet specimens of wholesome and appetizing English literature so appropriately selected by Sir Walter Raleigh as prophylactics against failure in health.[138]

Although army doctors viewed disease as having a quantifiable, biomedical origin, Crichton-Browne viewed the reading of English literature as an effective preventive measure. By bolstering the mind with British values, one could combat the invasion of non-European microbes. The fatigue motif also appeared again in this campaign. For example, Hamilton claimed that "sitting idle," by adopting a defensive strategy in Gallipoli, was a major reason the men were going ill.[139] Rather than remaining in perpetual motion, the great machine of the British Army had stalled. By combating fatigue and idleness through military action, Hamilton believed, the rate of sickness among his troops would decrease.

In a 1918 column on army sanitation published by *The Times*, a journalist wrote that in the non-Western war areas "the sanitarian had plenty of ingenuity and needed it, because he was often left in the lurch."[140] The policies of the War Office made it extremely difficult for medical and sanitary supplies to be delivered to the frontlines of the Eastern war areas, causing the British Army's reliance on the observations of doctors of tropical medicine to create improvised syncretic sanitation policy. Here, tropical medicine was not operating within the realm of military policy but in spite of it, often adopting ideas from the Indian Army

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[138] Anonymous, "Health in the Field. Sir J. Crichton-Browne on Army Sanitation," *The Times* (October 30, 1915): 5.

[139] Hamilton, *Gallipoli Diary, volume 2*, 239.

[140] Anonymous, "Food and Disease. Colonel Balfour on Army Sanitation," *The Times*, (November 16, 1918): 3.

and filtering them through a European cultural lens. Through allowing non-European troops to work on sanitary makeshifts, however, a construct was created where the British associated these troops with spaces of disease, both as less susceptible to it and helping its spread. While physical separation was not possible in the Gallipoli campaign, the British again resorted to cultural separation to mask cultural contact, using British technology, literature, and values to set them above the trials of their environment and the people with whom they faced them.

CONCLUSION: BODIES IN FOREIGN ENVIRONMENTS: THE NEW PATH FOR TROPICAL MEDICINE

> The doctors tell me that, short as has been their stay, a large number of the men are already infected with the prevalent disease…if fair play existed in these moonlit lands, every white man here should be credited with 25 percent extra kudos for everything that he does with his brains or his body under the shadow of this pestilence.
> — *Sir Ian Hamilton, 24 July 1915*

In November 1918, one month before the end of the war, Doctor Andrew Balfour spoke the following words to the Society of Tropical Medicine and Hygiene: "It is a trite saying that prevention is better than cure…but only a minority practice it, and that is why Hygiene is…the Cinderella of the Medical Services."[141] Although the British had a long history of military operations in foreign environments during periods of colonial expansion, never before had these operations existed on a scale comparable to that of the Great War. The incidence of disease on the non-Western fronts of the war was staggering: in addition to dodging enemy bullets and shrapnel, British troops also had to combat dysentery, malaria, sleeping sickness, and cholera. Oftentimes, the greatest threat to the British Army was not the Central Powers, but the environment in which they were fighting. The British not only had to navigate treatment for their own bodies but also how they viewed themselves, as Europeans, situated in medically hostile environments. Compounding the issue was the fact that British troops were serving alongside armies from the colonial empire. With a history rooted in colonial administration, the discipline of tropical medicine seemed a promising domain of knowledge from which to address the medical conundrum facing the British Army.

[141] Balfour, "Sanitary and Insanitary Makeshifts," 19-20.

Although influences of tropical medicine were useful to troops on the ground they were not necessarily adopted or recognized in the overarching policies the War Office developed in London. In fact, it seemed that outside of members of the Society of Tropical Medicine and Hygiene, there was little conversation about bodies in foreign environments among British physicians. Through examination of the three areas explored in this essay—India, East Africa, and Gallipoli—it is clear that the chief concern of doctors of tropical medicine was investigating the effect of foreign climate on European bodies. This meant understanding how bodies adapted to certain "non-native" climates, and how the European could survive in tropical areas without succumbing to "degeneration" or fatigue. Yet even though these were central themes to the discipline of tropical medicine, they were seldom mentioned in other medical literature at the time. In a June 1917 article in the *British Medical Journal* discussing dysentery at Gallipoli, there was no mention of environmental influences on the rate of infection or success of treatment.[142] In fact, the article chose to focus solely on Western biomedical treatments in the form of drugs, rather than improved sanitation. Likewise, in a July 1915 article from the same journal discussing the problem of flies in France and Gallipoli, climate is briefly mentioned in the first paragraph, yet is not a central issue.[143] Neither article mentioned if certain groups of people were more affected by these diseases than others.

The themes of climate and a body's "suitability" for it seem to be edited out when tropical medicine appeared in public discourse. For example, in Balfour's 1918 address he emphasized the importance of food in maintaining good health by stating, "Feed a man well- that is, give him plenty of food in sufficient variety adapted to his racial peculiarities, to the climatic conditions under which he is serving, and well cooked, and in the great majority of cases he will defy not only the Boche but the bacillus."[144] However, when his speech was summarized in *The Times* the following day, a sanitized version of the quote was reprinted: "Feed a man well- that is, give him plenty of food in sufficient variety and well cooked, and in the great majority of cases he will defy not only the Boche but the bacillus."[145] The entire quote was reproduced verbatim, except for the line about "racial

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[142] Anonymous, "Dysentery at Gallipoli," British Medical Journal 1, no. 2944 (June 2 1917): 738.

[143] Anonymous, "Flies in France and Gallipoli," 184-5.

[144] Balfour, "Sanitary and Insanitary Makeshifts," 23.

[145] Anonymous, "Food and Disease," 3.

peculiarities and climatic conditions", two central concerns to the discipline of tropical medicine.

In order to establish itself as part of the mainstream army medical discourse in London, tropical medicine needed to be viewed not just as a way to aid the British colonial venture, but as a viable framework in which the military could create policy to protect the health of the troops. One of the ways this was done was through the publication of letters to the editor and speeches by doctors involved in tropical medicine in major newspapers, detailing the ways in which Britain's medical and sanitation policies were having a tangible impact on the outcome of the war. For example, in October 1915 *The Times* summarized a speech given by J. Crichton- Browne, the president of the Sanitary Inspectors Association in London. The speech had grand lines such as "when the history of the war came to be summed up in grand futurity he would not be surprised if the verdict were that this country [Britain] had been saved by sanitation."[146] It also included a clear defense of the effectiveness of tropical medicine, stating "with troops operating in regions which had often been ravaged by plague, cholera, and fever…it was reassuring to know that, with a larger army in the field than ever before, the incidence of disease in it had often been lower than in times of peace."[147] This statement is slightly hyperbolic, based on the extremely high incidence of disease in places like Gallipoli and East Africa. [148] Nevertheless, it was an appeal to the public to support the work of tropical medicine, and such positive messages were necessary to highlight the impact of the army doctors' efforts.

Tropical medicine played an important role to in the administration of Britain's colonial territories. World War One was an opportunity for the discipline to apply its theories in the context of a large-scale multi-theater conflict. For instance, tropical medicine used the events at Gallipoli as a platform to argue that sanitation in foreign environments was vital. Without proper sanitary measurers in place, the rate that soldiers were evacuated due to sickness was extremely high. As Alexander described it, "the health of the troops was falling off, something like 150 men a day being evacuated sick, in addition to the normal wastage of killed and wounded. The restricted space, the flies, and the necessarily insanitary conditions of life had brought dysentery and jaundice."[149]

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[146] Anonymous, "Health in the Field," 5.

[147] Anonymous, "Health in the Field," 5.

[148] For first-hand accounts of life on the non-Western fronts of the war, see Hamilton, *Gallipoli Diary, volume 1 and 2*; Maitland, *On Two Fronts*; Young, *Marching on Tanga*.

[149] Maitland, *On Two Fronts,* 212.

Through the work of doctors of tropical medicine, sanitary makeshifts were documented and advocated for, creating preventative measures to protect the health of the troops. This rhetoric and advocacy swayed commanders such as Sir Ian Hamilton to recognize the importance of sanitary provisions for their troops.[150] It was largely through Gallipoli and other desert campaigns that tropical medicine came to be recognized as a crucial field of study outside the colonial venture.

The policies advocated by the Society of Tropical Medicine were not always sponsored by the War Office in London, however. The resources of the Wellcome Bureau of Scientific research were, according to Balfour, "placed wholly at the disposal of the War Office," yet their recommendations were seldom put into place due either to claims of "impracticality"—such as residential segregation—or expense.[151] Many elements of tropical medicine operated outside the purview of the War Office as makeshifts adopted from foreign troops or adaptations of colonial policies. The actions of the troops in regards to their health were largely dictated by how army doctors viewed the operation of the European body in non-European environments. Often cultural anxieties about fatigue and contamination played a role in shaping medical and hygienic decisions.

Overall, the British would strengthen their own cultural practices, retreating further into their ideas about what it meant to be "European" in order to survive in unfamiliar climates.

The story of tropical medicine during World War One is not so much a story of biomedical triumph and advancement in treatments, as the British wanted to believe at the time, but a cultural history of the body.

The emphasis that British doctors of tropical medicine placed on the European body, as it was situated in tropical environments and interacted with non-European bodies, greatly influenced attitudes towards medical and sanitary policy. Rather than scientific research and discovery allowing the British to adapt to the tropics, it was the entrenched notion that European bodies *could not* adapt without adverse consequence that became the real legacy of tropical medicine in wartime. For all the concerns about injury and disease, loss of what it meant to be "European", rather than loss of limb, eye, or any one body part, dominated the discourse of health and hygiene on the non-Western fronts of the war.

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[150] Hamilton, Gallipoli Diary, volume 2, 237.

[151] Balfour, "Sanitary and Insanitary Makeshifts," 19.