

Science, Modernity, and the Colonial Encounter: Rethinking Biotechnological
Interventions in Thailand's Elephant Trekking Industry

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ABSTRACT

This paper will analyze the integration of biotechnologies in conservation strategies, law enforcement, anti-trafficking efforts, and wildlife tourism through an investigation of Thailand's elephant trekking industry. The conditions of Asian elephants in Thailand is widely acknowledged as one of the world's most challenging conservation cases, existing at the nexus of pressing animal welfare, labor, national development, and ecological considerations. My paper will call upon a social-historical approach to analyze how biotechnologies as tools of valuation in the complex space of elephant trekking have been historically assembled through colonial-capitalist expansion in Thailand. I will argue that the invocation of biotechnology as an "objective" force in this case effaces issues of social inequality, and in doing so isolates the issues of the trekking industry from larger struggles for social and environmental justice. My objective is to highlight the urgent need to address instances of environmental degradation as connected and at times dependent, upon the exploitation of working-class people.

FOREWORD

This paper seeks to address the questions that motivated my studies in the MES program. The research question guiding my Area of Concentration asks: how can we understand environmental crises by tending to the ways in which science and technology are taken up, created, contested, and circulated? To answer these questions, my Major Research Paper analyzes modern scientific development through colonial-capitalist expansion in Thailand to investigate how scientific inquiry and technological interventions are shaped by their social and institutional contexts. This paper speaks to the Learning Components structuring my Area of Concentration that are 1) Modernity and Environment in Thailand, and 2) Science and Technology in Environmental Conservation, reflected through the central questions and themes in this paper.

In gaining an understanding of “Modernity and the Environment in Thailand,” this paper engages with the concept of “modernity” as an analytical framework to understand interconnected processes of colonial-capitalist expansion and the production of the modern Thai state. In Chapter One, this paper focuses on developing a theoretical framework to situate modern scientific development in Thailand within global processes of colonial nation building and capitalist expansion. Chapter Two expands this framework to consider how the foundations of the Thai nation-state have informed labor conditions for working-class people, speaking to component 1.2 that set out to investigate the production of class difference in the service-based tourism industry.

To deepen my understanding of “Science and Technology in Environmental Conservation,” Chapter Three analyzes of biotechnological interventions have materialized in the elephant trekking industry in ways that produce and exacerbate poor employment conditions and animal welfare issues. Component 2.1 of my Plan of Study aims of understand the intersections between scientific development, environmental degradation, and capitalist expansion to consider how science and technology might improve to respond to current environmental problems. In writing this paper I considered how the erosion of local mahout (elephant handler) knowledges in Thailand is contributing to declining animal welfare standards.

This attention to the unequal politics of knowledge production in addressing environmental issues draws upon questions of methodology that have been central to my studies in the MES program that call for critical approaches to research to achieve transformative outcomes and alleviate conditions of marginalization. Fundamentally, my Area of Concentration revolves around these questions of knowledge production and environmental degradation with the objective of linking issues of ecological destruction to larger struggles for justice and inclusion, that guide this Major Research Paper.

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INTRODUCTION

Thailand's elephant trekking industry has become the subject of contentious debates concerning animal welfare, approaches to ethical tourism, competing economic interests, and the conservation of a national icon. Elephant trekking gained international media attention in National Geographic's *Special Report* titled "The Hidden Cost of Wildlife Tourism" (Daly and Luce 2019a). The report investigates high-traffic tourist venues in Russia, Brazil, Peru, and the United States and dedicates extensive coverage to Thailand's market for close interactions with wildlife. Reporters discovered a massive industry offering experiences ranging from photo opportunities with lorises and primates, to intimate encounters with tigers and elephants. The report exposes the miserable conditions suffered by many working elephants, including four-year-old Gluay Hom who was found chained in a Bangkok basement with a withered leg and a bleeding sore on his temple (Daly and Luce 2019a). These problems in tourist venues are not uncommon and are only likely to grow with increased tourist demand. The number of elephant camps in Thailand have increased in number from 22 in 1995 to 223 in 2018, and captive elephants (approximately 4,400) outnumber their 3,200 wild counterparts (Carter 2019). Tourism is not a small business in Thailand: the industry currently accounts for 10% of the country's economy, and wildlife tourism continues to increase in popularity (ibid.). In 2018, an estimated 38 million tourists visited Thailand, and 40% of surveyed visitors expressed that they intended to engage in elephant tourism (ibid.).

Investigations into the conditions of elephant trekking most commonly cite inadequate law enforcement; uneven development at the nexus of rapid urbanization, advances in mechanization, and wildlife management initiatives; and the greed of private individuals profiting from the large volume of international visitors, as the foundational issues sustaining the

industry. The predicament of elephants in Thailand has been described as a transition from “Beasts of Burden to tourist plaything” (Sukpanich 2013b). The 1939 *Draught Animal Act*, colloquially the Beasts of Burden Act, permits the private ownership of elephants for work purposes and trade within Thailand’s borders (Pimmanrojngool and Wanghongsa 2002, *Elephant Ivory Tusks Act* 2015, Cohen 2015b). Under this legislation, mahouts and their elephants have historically enjoyed steady employment extracting teak logs from Thailand’s northern forests, and as general laborers in rural areas and military service. The steady mechanization of the military and transportation services, coupled with the country’s 1989 ban on logging, effectively abolished the last important roles for elephants, leaving over 2,000 elephants and their mahouts without work (Pimmanrojngool and Wanghongsa 2002, Nijman 2014, Cohen 2015b, Shell 2019). Without a ready source of employment, mahouts turned to street-begging where they charged eager tourists a small fee to feed bananas to the elephants.¹ Elephant tourism quickly developed into a highly-organized enterprise, and the majority of mahouts and their elephants are now formally employed in the trekking industry.² Critics of the trekking industry have argued that the ongoing legal ownership of elephants has supported economic opportunism, and provides a legal basis for the industry to proceed without adequate oversight (Wiek 2012b, Nijman 2014, Kopina 2016, Carter 2019). Carter (2019) states that private ownership governed by vague animal welfare laws, combined with the pressures of

¹ For more information on street-begging elephants, see Wildlife Friends Foundation “Street Elephants Campaign” here: <https://www.wfft.org/projects/street-elephants-campaign/>

² While most mahouts and their elephants are now employed at organized tourist venues, street-begging is still common in tourist centers in Thailand. On September 15, 2018, a young begging-elephant was electrocuted when he fell into a road drain in Samut Prakan. The elephant’s fifteen-year-old mahout was detained and charged for illegally working with his elephant in an urban area. The young mahout argued that he was simply trying to make a living, and that begging is a common practice. Although it is illegal to have elephants in urban areas, street-begging continues to be common and laws are loosely enforced (Chan 2019).

growing tourist demand for encounters with elephants “leaves an extremely profitable industry heavily unchecked and creates a culture of near-impunity when it comes to animal welfare”.

Interventions that seek to resolve the problems of the trekking industry have increasingly turned to biotechnological solutions. The desire for a coordinated strategy that incorporates biotechnology as a mode of enforcement to respond to issues of animal welfare in the tourist industry was expressed in 2012 when Edwin Wiek, founder of Wildlife Friends Foundation, published a call to action for government officials and law enforcement in response to two poaching incidents in Kaeng Krachan and Kui Buri National Parks that left six wild elephants dead in a three-week period. Wiek (2012a) argued that the elephants found in the forest are evidence that poaching gangs have begun kidnapping baby elephants from wild herds to meet the increasing tourist demand, and adult elephants are being killed in the fray. Baby elephants are lucrative source of wealth and can fetch low-level poachers large sums of money, where they are then resold for large profits to tourist outfitters.³ These outfitters are able to take advantage of loopholes in lenient registration laws to successfully launder wild-caught elephants into captive populations.⁴ To protect the remaining population of wild elephants (Wiek 2012a) proposed that the government launch a DNA testing project to verify the origins of all tourist elephants:

I strongly believe that over half of all young elephants in tourist camps nation-wide are wild-caught. You can prove me wrong by undertaking a long-overdue DNA check. I challenge you to verify the status of

³ The value of elephants has continued to rise with tourist demand. In 2014 the market value for a healthy baby elephant was cited at upwards of USD 33,000 (Nijman 2014, vii). In 2019 the price of a “tamed” elephant to be sold to a tourist operation was estimated at USD 80,000 (AFP 2019).

⁴ Privately-owned elephants are governed by the *Draught Animal Act 1939*. The registration policy of this act allowed elephants not to be registered with the appropriate government department until eight years of age, which created a major loophole through which wild-caught juveniles and infants could be caught and laundered into the domestic elephant population (Wiek 2019a, Nijman 2014). While it is illegal to possess wild-caught elephants under the *Wild Animal Reservation Act 1992*, domestic elephants are distinguished from their wild counterparts, and ownership of elephants born in captivity is legal (Nijman 2014). Recent amendments to registration laws are currently being negotiated in Thailand through the *Elephant Ivory Tusks Act 2015* that will require elephants be registered by three months of age.

these glorious animals. This is the only way to reveal the true status of all young elephants and to wipe out this evil trade and the slaughter of a national icon (Wiek 2012a).

Wiek's call to action has had far-reaching implications in terms of the political weight of his statement that exposed the illegal activities of corrupt government officials profiting from elephant tourism (Wiek 2012b; Nijman 2014, 2). And, it is now one of many landmark cases that are shaping the integration of biotechnologies into wildlife conservation, law enforcement, anti-trafficking strategies, and wildlife tourism. The mobilization of biotechnologies as vectors of arbitration carries deep implications for the trekking industry, and more broadly in this urgent historical moment of mass extinction and environmental degradation.

My paper will analyze the role of biotechnology in regulating the elephant trekking industry and its associated trafficking activities. I will advocate for the importance of a "social-historical" analysis (Palladino and Worboys 1993) to the development and application of technoscientific interventions by situating contemporary biotechnologies designed to regulate the wildlife tourism economy within the global expansion of colonial capitalist modernity. The aim of the "social-historical approach" in the study of modern science is to "take nothing about science as given or timeless. The aim instead is to explore how boundaries between scientific and social considerations arose and have changed historically" (Palladino and Worboys 1993, 94). My paper will trace the development of modern science in Thailand to demonstrate how shifting conceptions of space and nature, colonial relationships, and a reorientation of class and labor dynamics have shaped applications of biotechnological interventions. A social-historical analysis is crucial to understanding how biotechnological interventions that seek to resolve issues of animal welfare and social inequality are indebted to colonial foundations. My objective is to demonstrate how an engagement with social-historical conditions can change understandings of scientific inquiry and reshape its applications to achieve transformative outcomes. In the case of

wildlife tourism, I argue that in failing to seriously engage with issues of colonial capitalist expansion, “biotechnology” loses its capacity to achieve a moral-ethical imperative, and risks reproducing the very conditions of environmental degradation and social inequality it seeks to address.

The elephant trekking industry is currently one of many high-profile conservation cases that are integrating biotechnological interventions into strategies for law enforcement, animal welfare, economic development, and public policy initiatives. Notable similar cases of biotechnological interventions include the use of hormone therapies and in vitro fertilization on female Sumatran rhinos in Indonesian Borneo, in an effort to save the species whose numbers have been reduced to less than 80 individuals in the wild (Bittel 2018); the relocation of the last two remaining northern white rhinos from European zoos to their native Kenya for in vitro fertilization (Gilliland and Vitale 2019); the partnership between World Wildlife Fund Australia and corporate giant Royal Caribbean Cruises that is using DNA technology to trace illegal tortoiseshell products to their sites of origin towards identifying poaching operations in the Pacific region (Simke 2020); and multipronged approaches to apprehending poachers in National Parks in South Africa, Mozambique, and Botswana that couple DNA technology with highly-militarized, heavy-handed anti-poaching strategies to protect remaining rhino populations (Lunstrum 2018, Lunstrum and Giva 2020). In each of these cases, “biotechnology” is invoked as an objective and moral tool for the good in the apprehension of those accused of destroying nature and heritage (UN Environment Programme 2017, Lunstrum 2018; Krishnasamy and Zavagli 2020), and as the “saving grace” in otherwise irreversible cases of extinction, and some of the world’s most complex wildlife conservation cases.

I set out to question the promises of objectivity and morality that are packaged into biotechnological approaches to management, enforcement, and ethical valuation in complicated cases of wildlife management and crime. Within the veneer of urgency that animates each of these cases and invites biotechnology as a force of objective resolution, are sets of social and historical circumstances that will shape the outcomes of these interventions. Understanding these conditions of emergence links these cases of environmental degradation to larger struggles for social and environmental justice. In addressing each of these instances of distressing conditions for wildlife, biotechnology is being introduced into social relationships involving unequal colonial-capitalist power relations that I argue warrant closer examination to analyze the implications that technologies linked to institutions of corporate and military power are likely to take in these settings. Sheila Jasanoff (2006, 284) poses questions of democracy and power in her analysis of modern forms of technology that inform the central arguments of this paper:

Will the major technological revolutions of our time [...] favor emancipation or recolonization? Will they make people around the world more or less connected, more or less free, more or less comfortable, and most important for our purposes, more or less democratic? How do we hold innovation accountable? What social structures need to be in place to direct that application of biotechnology? Will the radically unequal distribution of wealth and privilege in the contemporary world reinscribe itself through technological means, continuing older forms of hegemony and dominance?

By engaging these questions in the context of the elephant trekking industry, I will demonstrate how the expansion of colonial capitalist modernity in Thailand operates to shape the development and applications of biotechnological interventions. In asking these questions, I am interested in how the technologies that are used to regulate the trekking industry have been historically assembled within Thailand's social history, and in connection to global processes of modern scientific development.

Nijman (2014, 3) describes the conditions of Asian elephants as one of the most challenging conservation cases facing environmental advocates, stating: “[few] species face as

many challenges in addressing their conservation as the Asian elephant, mired as it is within a nexus of confounding social, cultural, political, administrative, legislative, and ecological variables.” The circumstances of elephant tourism in Thailand are unique as the legal ownership of elephants for work purposes operates in connection to poaching networks and illegal wildlife trading. Asian elephants are currently listed as an “Endangered Species” according to the IUCN Red List criteria based on the reduction of their population by 50% over the past three generations, and on a reduction in its area of occupancy and quality of its habitat (Choudhury et al. 2008). Within its surviving range in South and Southeast Asia, the species survives generally in highly fragmented populations (ibid.). As the captive elephant population grows, the wild population suffers from a loss of habitat that puts the possibility of Asian elephant herds outside of artificial environments at risk (Duffy 2015).

Responses to new strategies in regulating elephant ownership in Thailand, led primarily by state natural resource departments and international organizations, demonstrate that trekking industry is deeply connected to notions of national identity, livelihood, and relationships with nature. In October 2013, one year after Wiek’s call to action and the escalation of government-led action in addressing the illegal trading of live elephants, one hundred mahouts promised to march with their elephants to Government House in Bangkok to protest a series of raids and elephant seizures in trekking camps (Sukpanich 2013b). Protest leader Laithongrien Meepan, the owner of a trekking camp in Ayutthaya, argued that raids have unfairly prosecuted legitimate camp owners and are compromising a tradition that holds great cultural significance: “Domesticated elephants have existed in Thai history and society for a very long time. They have cultural value which the DNP [Department of National Parks, Wildlife, and Plant Conservation] does not understand (ibid.). One mahout whose elephant was seized by officials raised concerns

about the lack of proper elephant care in state facilities: “Phang Tangmo is like my daughter we have a long bonding. An elephant caretaker must live with his elephant”.⁵ Responses to ongoing government investigations seeking to monitor the origins and movements of privately owned elephants continue to be controversial. In 2017 the DNP seized three elephants from Mr. Meepan’s trekking camp based on DNA samples that did not match sample records from previous years (Phongpao 2017). As these concerns regarding cultural value, livelihood, and environment continue to be raised alongside the increase mobilization of biotechnology as a tool for regulation and apprehension, the scope of Asian elephant conservation expands from an isolated issue of animal welfare to a phenomenon connected to larger issues of social inequality.

Reynolds (2006a, 134) identifies studies of social history as a gap in studies of Thai history. As a result of the slow acceptance of social history as a field of study, Reynolds (ibid., 134) states that it has been difficult to make visible instances of oppression and exploitation in Thai social relations. This gap in social-historical inquiry in Thai studies has come primarily at the expense of labor history (Reynolds 2006a, 134; Glassman 2004), and feminist studies (Loos 2004, Van Esterik 2000). Meaningful engagement with these histories has either been neglected in favor of extensive studies of monarchical rule (Reynolds 2006a, 135; Loos 2004, 173-174), or are mistranslated into Western frameworks that favor particular categories and stages of social development that obfuscate the complexities of social-political relations in Thailand (Loos 2004, 170-173). My research aims to contribute to addressing this gap by analyzing the mobilization of

⁵ A report published in the *Bangkok Post* “Seized wildlife trapped in legal limbo” (Sukpanich 2013b) documents the death of a 30-year-old elephant who was seized in a raid of a trekking camp in Kanchanaburi when owners failed to produce proper registration documents. The female elephant and 18 others were taken into state custody at the Thai Elephant Conservation Centre in Lampang to await legal proceedings. According to her mahout, the elephant’s death likely occurred due to the stress of such a drastic change in her environment. This case highlights the harm suffered by animals held in under-resourced state facilities that have been overburdened by an influx of dispossessed wildlife. Animals are often kept in overcrowded conditions and their basic needs often left unmet.

biotechnology in the elephant trekking industry through a social historical analysis of modern scientific development through the global expansion of colonial capitalist modernity, and how these processes operated in Thailand through the production of class inequalities. I will primarily rely on a text-based analysis to construct a theoretical framework to situate the development of modern science in Thailand within the way that capitalist economic and social development has proceeded in the country through its integration into the world capitalist market, and its negotiations with colonial imposition. This framework will inform my discussion about the controversies surrounding the elephant trekking industry and the promises of biotechnological advancements to respond to issues of national identity, animal welfare, and economic disparity.

I will draw heavily from research conducted in the fields of Marxist political economy, science and technology studies, development, and political ecology as primary sources in historicizing narratives of nation-building in Thailand to focus on class inequalities and the reconfiguration of the natural world in wildlife tourism. I rely on the works of several historians and theorists of Thailand who have published in English to accommodate my limited proficiency in the Thai language. Where possible, I have drawn from bodies of academic and media work in Thailand that publish in both English and Thai, such as the *Bangkok Post* newspaper, the Centre of Elephant and Wildlife Research at Chiang Mai University, and wildlife conservation organizations Elephant Nature Park and Wildlife Friends Foundation Thailand, as sources for data. Specialists based at the York Centre for Asian Research have assisted me in identifying key publications in the study of science and development from Siam to Thailand.

To identify significant sources of data in the study of wildlife conservation in Thailand, I completed a field visit to Wildlife Friends Foundation in Thailand (WFFT), an active NGO

involved in wildlife rescue and conservation in Southeast Asia.⁶ At WFFT, I attended public information sessions presenting recent developments in anti-trafficking efforts, domestic and international environmental protection legislation, and advances in scientific research and their impacts on wildlife conservation efforts. Information sessions are open to the public and were attended by local people, international visitors, and graduate students interested in Thailand's environmental efforts. This field activity was observational and did not include an interview or participatory component.⁷ During my field visit I realized that my analysis must consider how biotechnologies are mobilized to reorganize labor relations and intensify law enforcement measures. Conversations with officials and mahouts during my field visit reoriented some aspects of my research to give greater focus to the under-theorized positionality of mahouts (elephant handlers) in the trekking industry in terms of the conditions of their labor and terms of employment, their contributions to Thailand's GDP, and the shifting attitudes towards their occupation and relationships with the elephants under their care. The opportunity to focus attention to the roles of mahouts in the trekking industry prompted me to shift my focus to the production of class inequalities in frontier zones of ecological extraction and conflict.

Chapter One will trace the development of modern science in Thailand through the global expansion of colonial capitalist modernity. My paper will call upon a "social-historical" framework (Palladino and Worboys 1993) to understand the production and circulation of

⁶ WFFT was founded in 2001 by Edwin Wiek in partnership with the Abbot of Wat Khao Look Chang Temple in Petchaburi province, who loaned a large piece of land to the foundation to house rescued animals. The major goals of the organization are to rescue captive wild animals, campaign against all forms of animal abuse and exploitation, provide veterinary assistance to sick and injured animals, provide public education opportunities, assist in projects seeking to improve animal welfare, and rehabilitate wild animals for release where possible.

⁷ In accordance with York University's guidelines for ethical research, my research was not subject to an Ethics Review as it relies on information that is not available in the public realm and does not include an interview or participatory component. My attendance at WFFT is classified as an "observational field activity" that was helpful for my research in terms of clarifying my research questions and identifying key library resources. Appropriate "Risk Assessment" protocol was filed and approved by the Faculty of Environmental Studies.

scientific knowledge in the modern world system. A social-historical approach offers a framework to analyze the colonial encounter as a site of “scientific” knowledge production, and to consider the relationship between science and political power towards an understanding of “why these objects [of science and power] should be defined and institutionalized quite differently by different communities of scientists in different social situations and in different periods of history” (ibid., 96). The social-historical framework is a departure from studies in the history of science that focus on tracing the “great and the good” contributions in the making of the scientific canon, to analyze “the place of science in changing social and economic structures and relations” and determine how the social and institutional context shapes “the formation and validation of scientific knowledge” (ibid., 92).

This work that seeks to situate the history of science within global power relations calls for critical attention to contextualizing scientific contributions within their contingency on “different metropolitan, cultural and social traditions and on divergent imperial policies and structures” (Palladino and Worboys 1993, 102). Engaging this framework, I will discuss how modern scientific development in nineteenth century Siam took shape through shifting geopolitical realities and colonial imposition that demanded new conceptions of physical space and the reorientation of social values.⁸ Winichakul (1994, 56) describes the formation of modern science as a process of confrontation and displacement in which “different kinds of geographic knowledge coexisted, collided, and [indigenous frameworks] were finally displaced [resulting in modern methods becoming hegemonic]”. This section will demonstrate how the advent of modern geography and border technologies have made Thailand legible as a modern nation

⁸ Siam is the place of the past that originated as an unbounded kingdom. In negotiations with colonial powers, the kingdom of Siam established fixed national borders. By 1910, the borders of Siam that constitute today’s Thailand were established. The nation’s name was changed to Thailand in 1932 when the absolute monarchy was abolished.

within colonial capitalist modernity, and how this transformation produced a paradigm of science that has introduced new formations of class, and ways of interpreting and relating with the physical world.

Chapter Two will analyze the formation of Thailand's tourism industry during the Post-World War II era of American-led development. This Chapter will demonstrate how the belief in modern science as a moral and civilizing force was called upon in creating conditions for economic growth considered necessary to achieving social and political progress. Here, I will focus on how the technical management of national territory through modern methods reoriented class dynamics for working-class Thai society. I will provide a brief social history of the formation of class and the production of difference in Thailand's service-based economy to demonstrate how the circumstances and characterizations of service-people working in the tourism industry were shaped by unequal power relations established through a system of informal American empire. In Chapter Three I will apply this framework to analyze the circumstances of mahouts working in the trekking industry who experience poor working conditions and are persecuted for their roles in a profitable industry mired in animal welfare issues.

Chapter Three will analyze how biotechnological interventions have been taken up in international and local conservation strategies to maintain "business as usual" in the trekking industry. I argue that the increased reliance on biotechnology as an objective, regulating force, continues to perpetuate a colonial capitalist logic that invokes modern science as a civilizing force. This Chapter will show how the invocation of biotechnology in this case is made possible by displacing the knowledge of mahouts, and concealing the contradiction of capitalism that the problems of the trekking industry reveal. I will show how the invocation of biotechnology as an

“objective” force in this case effaces issues of social inequality, and in doing so isolates the issues of wildlife tourism from larger struggles for social and environmental justice. I will conclude on the point that an uncritical application of science will continue to reproduce the conditions of exploitation and poor animal welfare that these biotechnological interventions set out to address.

In analyzing the invocation of biotechnologies in the elephant trekking industry, this paper sets out to look critically at technological interventions in terms of the social and institutional power dynamics that guide their applications. Asking these questions demands attention to what is promised in centering the biotechnological fix in this complicated industry, and what is achieved. Fundamentally, this paper considers the future that is being produced through the increased reliance on biotechnology to mediate complex social, historical, and ecological problems. In Chapter One, I will begin this analysis by historicizing modern scientific development through the lens of colonial-capitalist expansion in Thailand. By tending to the foundations of technological interventions, this paper advocates for the possibility of transformation in addressing issues of environmental degradation and social inequalities.

CHAPTER ONE: Situating Modern Science Within the Global Expansion of Colonial Capitalist Modernity

Enrique Dussel (1998) proposes a planetary model to conceptualize the global expansion and circulation of Western modernity. Dussel (*ibid.*, 4) defines modernity as the epistemological and material transformation of the world system, and demonstrates the interconnected dimensions of the modern world system such as secularization, global capitalist expansion, the exhaustion of global ecological surplus, the exploitation of labor, and ideas of progress and development that uphold Europe as the cultural center. European modernity in the planetary paradigm “is not the sole fruit of an internal superiority accumulated during the European Middle Ages over against other cultures,” but is the outcome of the “discovery, conquest, colonization, and integration (subsumation) of Amerindia” that has crystallized into a geopolitical system advantaging Europe over the Ottoman-Muslim world, India, and China (*ibid.*, 4-5). Significant here is that European modernity is not a self-referential system travelling intact through space and time; rather, it manages and renews its centrality through ongoing processes of territorial acquisition and the exploitation of labor to maintain conditions for capitalist accumulation (*ibid.*, 19-20).

To maintain accumulation of enormous territories and populations, the management of European centrality required the formation of a hegemonic system that Dussel refers to as the *simplification* of the world:

It is necessary to carry out an abstraction (favoring *quantum* to the detriment of *qualitas*, that leaves out many valid variables (cultural, anthropological, ethical, political, and religious values; aspects that are valuable even for the European of the sixteenth century) that will not allow an adequate, “factual” or technologically possible management of the world-system. The simplification of complexity encompasses the totality of the life-world (*Lebenswelt*), of the relationship with nature (a new technological and ecological position that is no longer teleological), of subjectivity itself (a new intersubjective and political relation). A new economic attitude (practico-productive) will not establish itself: the capitalism. (Dussel 1998, 13).

Jasanoff (2006, 273-276) expands this thesis of *simplification* as a necessary condition in the global expansion of European modernity by explaining how the development of scientific knowledge grounded in colonial expansionist aspirations and institutions is enrolled in contemporary forms of hegemony and capitalism by means of “top-down ideological imposition [and] administrative standardization” in transboundary exercises of political, economic, and cultural power. To understand the role of scientific inquiry in the management of the modern world, Jasanoff (*ibid.*, 278) states that we must tend to the ways in which the physical manipulations of world ecology and the transformation of social-political values materialize as “technologies of standardization” to support colonial capitalist expansion. As tools of standardization, technologies become the means for “authoritatively characterizing” both social bodies and social problems, and the means through which subjects come to see and recognize each other (*ibid.* 278). The history of science then becomes a critical project of understanding how regimes of truth come into existence as natural elements of “knowing” and relating in society, to evaluate the moral imperatives and emancipatory potential of scientific interventions in colonial capitalist society.

Historians of science have theorized the significance of European centrality in the production and circulation of scientific knowledge. Studies that set out to investigate localities beyond European borders find their sites to be deeply embedded within the larger social and intellectual history of Europe “in which the very meaning of rationality, enlightenment, progress, and useful knowledge has been defined on that distant continent” (Chambers and Gillespie 2000, 222). Theories that aim to trace the global expansion of modern science to non-European nations have often favored models of “diffusion” that assume a straight and narrow path to scientific development where “localities peripheral to the European center would progressively receive the

ideas of Western science” and over time would develop to “eradicate [their] recalcitrant philosophical and religious beliefs to found scientific societies and import European technologies” (ibid., 224). Scholars in the field of science and technology studies have challenged the diffusion model on the basis that it relies on a universal and homogenous “arrival” of European science that does not reflect the character of the international science system (ibid., 239).

Paolo Palladino and Michael Worboys (1993) take up the question of diffusion by analyzing the colonial encounter as a site of scientific knowledge production to ask how economic, political, and social circumstances shape the development of modern scientific findings and practice. Engaging historian Lewis Pyenson’s (1989 cited in Palladino and Worboys 1993) distinction between the “exact” and “descriptive” sciences to evaluate the social and political impacts of Western science in colonial dependencies, Palladino and Worboys (1993, 92) argue for the relevance of a “social-historical” approach to understand how the “social context [influences] the formation and validation of scientific knowledge”.⁹ For Pyenson (1989 cited in Palladino and Worboys 1993, 94), the viability of social-historical frameworks is contingent on evidence of the “clear presence of imperialist ideology and practice in publication of physics and astronomy” to demonstrate inconsistencies in the findings of the “exact” (mathematically stable) sciences across the “political, economic, and social gap separating the imperial metropolises and

⁹ Pyenson’s (1989) argument about the place of physics and astronomy in imperial expansion rest on a traditional division between of the sciences into “exact” and “descriptive”. Pyenson’s central thesis is that “descriptive” sciences are those that are produced without a disciplinary consensus as to how data should be assembled or given meaning, and therefore susceptible to ideological or “external” influence. The “exact” sciences are those that are produced when the theoretical framework that governs interpretation and meaning becomes more mathematically precise or “exact”. Put more simply, Pyenson believes that “exact” scientific findings (mainly in the areas of physics and astronomy) are insular from a social or cultural investigation because of an internal mathematical logic that remains stable across space and time. “Exact” sciences for Pyenson are those that carry a mathematical consistency that is not specific to social and historical factors. For more explanations on this, see Kuhn (1977) and Palladino and Worboys (1994, 93-94).

its colonial periphery”. Put more simply, Pyenson’s thesis proposes that the project of social historical studies should be to demonstrate that scientific findings have been compromised for political gain during colonial expansion to reveal a lack of objectivity within a scientific principle. For Pyenson, knowledge production should proceed with the aim of establishing a mathematically stable or objective truth to knowing and interpreting the world.

Pyenson contends that the lack of variance in theories of physics and astronomy demonstrates that the exact sciences have maintained their universality and are therefore insulated from the influence of social-political forces (Palladino and Worboys 1993, 94). Palladino and Worboys (ibid., 94) challenge Pyenson’s conclusion to argue that the aim of social-historical approaches is not to “test” sets of empirical findings: rather, their approach seeks to explore “how boundaries between scientific and social considerations have arose and changed historically”. A social-historical approach offers a framework to consider how the imperial condition produces an environmental and social context that demands particular methods for producing and mobilizing science. The authors introduce the concept of the “ecology of knowledge production” which is the idea that social-historical circumstances influence the form and application of scientific findings (ibid., 94-96). Tending to the “ecology” of scientific knowledge can reveal how scientific findings believed to be “exact” or objective and therefore value-free have not travelled intact through time and space:

We find that in late seventeenth and early century France a body of professional scholars enjoyed strong royal patronage because by building a theoretical system that unified all natural phenomena through the mathematical language of Newtonian mechanics they lent quasi-theological legitimacy to the efforts of the monarchy to undermine all independent centers of political power. Here the “exact” sciences played an explicitly ideological role. A century and a half later the position of the French state was quite different, but the intellectual orientations and the social organization of the “republic of science” established earlier were *too strongly entrenched* to be reformed for the new state: the scientists charged with the task of reform were so imbued with the culture of this republic *that they could not envision alternative organization* (Palladino and Worboys 1993, 95, - emphasis mine).

In this passage we see that the believed “exactness” of scientific findings relies on a certain level of material stability to continue to renew its “truthfulness,” and there is an expressed need for time and an aspect of “forgetting” necessary in naturalizing frames of knowledge. This passage demonstrates that for science to present itself as objective it requires the stability of particular set of environmental, physical, and social conditions to assert itself as “truth”. Here we see that “science” is subject to evolution and change and does not in itself carry a stable or objective meaning independent of material and ideological conditions.

In their analysis of scientific innovation in the colonial context, Palladino and Worboys (1993, 97) find that the majority of the science practiced in and for European colonies was intended to support and service Europe’s economic and political objectives to create conditions for ongoing accumulation and market expansion, and served to displace and disadvantage local populations. The establishment of scientific institutions in the colonies and the transfer of power to colonial personnel was largely accomplished through the displacement of local experts and populations from land and resources. This transfer of power of land and resources to colonial control involved the implementation of new intellectual parameters and norms to govern knowledge production and evaluate its validity. For example, in matters of medicine and disease control, specifically in the development of treatments for malaria and tropical fevers, colonial scientists and administrators often found parasites more convenient to work with than the indigenous population (*ibid.*, 98). This division of labor reveals how the creation and enforcement of social inequalities shapes the development of scientific knowledge.

Many biotechnological developments in the human and natural sciences have been made possible through projects designed to advance colonial capitalist interests, and continue to uphold structures of social inequality and environmental degradation. A British doctor working

in colonial India named Sir Ronald Ross, winner of a Nobel Prize in Medicine for his malaria research, delivered a lecture in 1899 where he stated “in the coming century, the success of imperialism will depend largely upon success with the microscope” (Roy 2018, 2). Ross was through-and-through a subject of British colonial expansion: he was born into colonial rule in India and he practiced a highly decorated career as a surgeon serving the imperial army. Ross’ work with his microscope that identified how malaria was transmitted that had a potential to save thousands of lives, remained in the possession of British colonialists who used it to safeguard the health of troops and officials involved in consolidating rule in India and other tropical colonies (ibid., 2). The benefits of this impactful research were repackaged through public health strategies that aimed to give imperialism a moral character and claim “British goodwill towards colonized people,” and to insinuate that “scientific insights could be redeployed to promote superior health, hygiene, and sanitation among colonial subjects” (ibid., 3). This mobilization of scientific findings in manufacturing social inequality (in this case enforcing a division between health and illness) serves an ideological function when the need for scientific findings shaped by colonial, capitalist relations of power (malaria treatments for ill people) effaces the conditions of inequality and deprivation that produced the conditions for crisis.

Alam (1978, 240) states that modern science in the colonial-capitalist world relies on the careful privileging of the findings of the ruling class as the “impartial organizing force of society” that establishes modern science as the only science. The term “science” takes on a singular authority that erases other systems of knowing, ordering, and interpreting the world as outside of the domain of objectivity:

In fact, the title ‘science’ has been exclusively reserved for that knowledge and those skills which can be systematized and incorporated into the academic culture of the ruling capitalist class. All other knowledge and skills that belonged to the popular culture, and which have accumulated over centuries of careful and selective observations and practice, have been denigrated and labelled unscientific. [...] Thus allopathy,

which relies on vast stores of knowledge accumulated over centuries of observation and practice is declared unscientific and is condemned by the medical profession. It does not command government support for research and development (Alam 1978, 239-240).

Alam (1978) argues that this shift in science from popular knowledge to an elite institution has occurred through the production of social difference in capitalist society and the transformation of nature in an object for mastery and interpretation. He traces the transformation of the natural world into a scientific object to the seventeenth century when the framework of science turned to a focus on “physicalist reductionism” or the belief that all phenomena, whether biological or human and social, could be reduced to their basic physical properties, and then accordingly ordered and interpreted from this understanding of the basic “constituents of matter” (ibid., 241). This physical reductionism is entangled with the workings of colonial capitalist expansion that has allowed the ruling capitalist class to view the world as consisting of natural raw material and “complex raw material” (namely working class men and women) to be used in production (ibid., 241).

Applying a social-historical lens to situate science within its social conditions of emergence demonstrates that findings cultivated in the imperial context while impactful, do not exist value-free. Returning to Pyenson’s thesis addressing variance in the exact sciences of astronomy and physics, Pyenson argues that “even climatology is lacking an imperialist aspiration” (Pyenson 1989 cited in Palladino and Worboys 1993, 98). However, a social historical analysis shows how meteorological observations were crucial to fulfilling the strategic aims of the French empire. As part of their colonial administration, French officials established observatories and presented their findings as proof that the world is governed by a single mathematical logic to justify its colonial policies in Africa. Scientific development in colonial Africa took on an expansionist identity as the pursuit of scientific advancement became the moral justification for large-scale land theft and the destruction of subsistence economies. French

colonizers established cash-crop agriculture that became the testing grounds for agricultural technologies and incorporated displaced populations as laborers to generate surplus value for the French economy (Palladino and Worboys 1993, 98; Escobar 1995, 27; Gill 2018). Scientific inquiry in the colonial context often employed brutal tactics to establish the authority of modern methods, such as the demolition of an observatory in Madagascar by French forces (Palladino and Worboys 1993, 98). These destructive projects served to bolster the authority of colonial science by manufacturing an absence of knowledge where it had previously existed. These findings demonstrate that the “ecology” of scientific knowledge drastically shapes the mobilization of findings and sets the parameters for the questions that are asked in the pursuit of research.

Far from being a smooth diffusion of knowledge, the formation of modern science is sustained by ongoing processes of displacement and accumulation to establish what Dussel (1998, 15) refers to as the “technological ‘factability’ or governmentalism” of the capitalist world-system. The formation of modern science in Thailand was negotiated in response to new geopolitical realities brought on by colonial expansion, and took shape through processes of displacement of indigenous peoples and knowledges. Winichakul (1994; 2015, 76-78) demonstrates how the development of modern science involved processes of confrontation between conceptions of space and boundary that created an “epistemological hybrid” that defines the character of scientific inquiry and contemporary national identity in Thailand. Although Siam was not formally colonized, its semi-colonial conditions demanded the reorientation of social and scientific values to respond to the pressures of colonial imposition and the emergence of the European world-system (Winichakul 2015). By the early nineteenth century, the influence of European expansionism was felt everywhere in Southeast Asia including the presence of Dutch

forces in the East Indies, the expansion of the British empire throughout India and the Malay Peninsula, and British occupation in neighboring Burma (ibid., 80). The pressures of colonial expansion inspired a sense of urgency in Siam to consolidate territory and assert a unified identity to resist colonial occupation. Winichakul (1994, 13) states that to appreciate Thailand's position in global modernity, we need to investigate the narrative of nationalist Thai discourse that prides itself in avoiding formal colonization on the merit of its leaders who were able to steer the modernization of the nation "in the right direction at the right time".

Winichakul (1994, 18) applies a critical lens to the formation of this nationalist narrative by investigating the trajectory of modernization in the transition of Siam from an unbounded kingdom to the modern nation of Siam, through the development of modern geographical science and border technologies. This project analyzes Siam's interactions with colonial forces as a site of knowledge production: "These moments [of confrontation] were in fact the politico-semiological operations in which the new discourses threatened and displaced the existing ones. They occurred whenever the notions of geography, boundary, territorial sovereignty, and margin were in conflict" (ibid., 18). Here the processes of nation-building and the production of the scientific earth are mutually constituting processes. The establishment of modern science as the 'truth' of the physical world in Siam was asserted through the creation of national boundaries to form a distinct sovereign territory in response to colonial imposition and the reorientation of social values to establish national hegemony.

Conceptions of territory and space in nineteenth century Siam underwent a drastic transformation that impacted all aspects of social life and are significant to understanding contemporary inequalities. These transformations involved ongoing processes of redefining frameworks for interpreting space that materialized with the reorientation of social values, and

the displacement of incommensurable frameworks for “knowing” and interacting with the world. A significant spatial conception predating the advent of modern geography was the Traiphum cosmography, an important doctrinal tradition that influences modern Theravada Buddhism.¹⁰ The concept of Traiphum space interprets the relationship between the human realm and the cosmos. Representations of Traiphum Space depicted the world where Buddha was born to navigate the relationship between the physical human realm and spiritual dimensions, and maps were intended to guide the reader through these realms of existence (Winichakul 1994, 22). Existing alongside conceptions of Traiphum Space, the Strategic Map of King Rama I represented space in a way that conveyed the experience of travelers traversing significant merchant and military routes (ibid., 33). While the Strategic Map has been studied extensively and found to be inaccurate in terms of scale in comparison to modern maps (ibid., 33), such comparisons seem to miss the purpose of this method of measuring and presenting space. We can imagine how valuable the Strategic Map would be for a logistician in charge of evaluating options for trade routes, or for military officers who would want to anticipate environmental challenges. These variances in mapping techniques do not indicate a lack of knowledge about the world or interest in instrumentally mapping space, but demonstrate that the material world can be interpreted in more than one way.

Colonial imposition demanded a new understanding of territoriality in Siam and the adoption of modern geography and border technologies to transform the unbounded kingdom into the centralized political-geographical unit of the nation. A significant figure in the formation

¹⁰ The presence of the Traiphum cosmology in Thailand is believed to have originated in the Sukhothai kingdom, a major Thai state in the upper Chao Phraya valley. The presence and influence of this cosmology in Thai history is significant. In the late eighteenth century, in order to restore the kingdom after it was destroyed by Burma in 1767, the monarchy supervised the reconstruction of the Traiphum tasks. It is not the only indigenous conception of space that existed prior to the advent of modern geography, but one that is important to study in terms of its tremendous influence on contemporary Buddhism (Winichakul 1994, 20).

of modern science was Siamese elite King Mongkut, who later became King Rama IV (reign. 1851-1868). Mongkut held a lifelong interest in astronomy geography and discussed issues of scientific method and theory extensively with American missionaries (Winichakul 1994, 36; Wyatt 1982, 181-197). Mongkut's interest in astronomy and mapping was sparked in the early years of his monkhood and his ability to precisely calculate planetary movements was very advanced (Winichakul 1994, 36-38). The concept of the "scientific earth" that could be plotted with precision was very important to Mongkut and he became an intellectual pioneer in the development of a distinct scientific paradigm intended to respond to the challenges posed by colonial officials. Mongkut developed a unique method to calculate planetary movements and map space that combined Western methods and elements of the Buddhist cosmology, that he argued was more insightful and precise than Christian theories (ibid., 38). Mongkut in his correspondence with American missionaries argued for the superiority of Buddhism over Christianity based on its compatibility with precise calculations in the physical realm. He contended that the Bible was full of mistakes about the earth and nature, evidenced by its omission of concern for latitude and longitude (ibid., 38).

The development of Mongkut's method that drew upon Western and Buddhist frameworks involved highly politicized processes of rearranging social values and the physical world in Siam. The Buddhist reform led by Mongkut and his fellow elite in the 1820s set out to rearticulate Theravada Buddhism in response to intellectual pressures posed by Christian missionaries and the increasing political relevance of the Western scientific paradigm (Winichakul 2015, 94-97). This reform was achieved through what Winichakul (ibid., 78) refers to as the "bifurcation intellectual strategy" that argued that the truth of the world "could be divided into two spheres of knowledge: the worldly matters of the material world on one hand,

and the spiritual world on the other”. Reformists framed their objectives through a challenge to the allegedly corrupt *sangha* (Buddhist establishment) at the time, arguing that it deviated from the true teachings of Buddha due to the contamination of Buddhism by wrongful beliefs. This charge of contamination led to the denouncement of associations with the Hindu-Buddhist cosmography that Mongkut and his followers claimed was flawed in its representation of the relationship between the natural and spiritual world (ibid., 94-95). This promotion of a “pure” sect of Buddhism served as one of the fundamental elements in the construction of modern Thai nationalism that fused the creation of an uncontaminated religious doctrine with the belief in the superiority of Siam’s anticolonial leadership (ibid., 94-97). This affirmation of a distinct and uncontaminated sect of Theravada Buddhism was used to assert superiority over Christianity, and to differentiate Siam from its Southeast Asian neighbors experiencing colonial occupation. Reformists were also able to continue to embrace modern scientific rationality and preserve the social significance of Buddhism (ibid., 78). These tensions demonstrate that the value of Western science was not assessed strictly on the basis of merit, but involved highly contentious responses to the interregional pressures posed by Western colonial forces and regional powers (mainly China and Burma) that pushed Siamese elites to adopt the “more influential and superior Western knowledge” (Winichakul 1994, 40).

Mongkut experienced success in his efforts to champion the reconciliation of Buddhism and Western science when he applied his unique formula to correctly calculate the full solar eclipse in Wako in 1868. Mongkut’s calculation relied on Western units of measurement and Mon astrological texts to accurately predict and map the eclipse (Winichakul 1994, 45). While developing his calculation, Mongkut was in a complicated position – seeking to prove the supremacy of Buddhism over Christianity and also in conflict with court astrologers over what

he found to be miscalculations in the Buddhist holy calendar. Mongkut became obsessed with his mission and was determined to validate his expertise to colonial officials and build his credibility as King in Siam. When it was time to observe the eclipse, Mongkut chose Wako, a remote location in the rainforest, as the spot that would best showcase his calculation. He invited high-ranking French and British officials as well as an elite Siamese party to observe this “rendezvous of indigenous astrology and Western astronomy, as well as everything in between” (Winichakul 1994, 46). The full eclipse unfolded exactly as Mongkut has calculated and this was his most important triumph. This event prompted large-scale reforms in education to instruct students on this newly refined geographical science.¹¹ This transformation of the physical world into an object for interpretation confined to the human realm was a drastic departure from previous conceptions of space that viewed the physical world as inextricably linked to the spiritual realm. This transition bounded the physical world as a space that be defined and shaped with modern scientific precision. The detachment of scientific pursuits from the moral and spiritual sphere created a configuration of social values where modern science could be mobilized to reshape the environment and society in Siam, and the tradition or “essence” of society was preserved within a pure doctrine of Buddhism governing over the spiritual realm.

Winichakul (1994, 57) defines the intellectual and political outcome of the Wako event as an “epistemological hybrid” that demonstrated the strong influence of Western science and reinforced the significance of Theravada Buddhism to social life and identity in Siam. It would be an oversimplification to interpret the outcome of the Wako event as the one-way diffusion of Western science in Siam (the cosmological reference of Mongkut’s calculation favored unites of

¹¹ Mongkut ultimately sacrificed his life for this cause. The decision to choose Wako for the observation site proved to be too great a risk as both Mongkut and his son Chulalongkorn contracted malaria on the expedition. Chulalongkorn recovered and assumed the role of King, but the eclipse was a tragic victory for Mongkut who succumbed to his illness (Winichakul 1994, 47).

Western astronomy), or as an act of anticolonial resistance – although Mongkut’s faith in the deities and reliance on Buddhist texts should not be minimized. The complexity of Mongkut’s work demonstrates the limits of an analysis that views knowledge production in the colonial setting through a spectrum of diffusion and refusal: “This idea [an appraisal of the Wako event as either an indigenous maneuver against the Western worldview or vice versa] assumes a patriotic unity of the court against imperial aggression [...] [The] adversaries in Mongkut’s struggle were in fact traditional Thai astrologers, while the European functioned as an international pressure group implicitly supporting Mongkut in his cause” (ibid., 57). It is precisely the “encounter” between knowledge systems defined by confrontations and displacement that will evolve into a distinctly local system of interpreting and managing the physical world, situated within the global circulation of modern science.

The advent of modern geography and border technologies introduced in Siam during the nineteenth century gave rise to new criteria for the interpretation and regulation of the physical world. This transformation facilitated the consolidation of the unbounded kingdom of Siam into a modular nation-state, legible within the modern world-system. Far from being a hopeless victim in colonialism, the Siamese ruling circle under the leadership of King Chulalongkorn (reign. 1868-1910) was armed with the knowledge of tributary relationships and Western political geography. The scheme of power relations in tributary territories in Southeast Asia was hierarchical in nature, involving negotiations between tributary kingdoms and large regional kingdoms like Siam and Burma (Winichakul 1994, 81). Each tributary was headed by a king supported by his own court, administrative and financial system, army, and judicial system, and tributary leaders enjoyed a relative state of independence in negotiation with the “supreme overlord,” who was head of the larger regional kingdom. Tributary relationships were often

negotiated in terms of land-use agreements and taxation. Tributary territories could hold relationships with multiple kingdoms, but when these relationships came into conflict they often resulted in wars between rival kingdoms.¹² Power in these arrangements was exercised in the form of control over labor rather than a modern sense of territoriality (Vanderveest and Peluso 1995, 392). Ruling centers concerned their exercise of authority by enforcing claims on labor power and products of people's labor, but generally did not enforce territorial claims, finding a more mobile labor and land-use arrangements to be more beneficial (ibid., 392). In securing territory in negotiation and conflict with colonial powers, the controversies over the Shan states, Lanna, Cambodia, the Malay states, and the left bank of the Mekhong were critical to the formation of the modern Thai state (Thongchai 1994, 81).

Tributary territories were comprised of diverse populations of people, each with their own political and geographical histories. In the late-nineteenth century when Siam was engaged in negotiations with British and French forces to produce fixed territorial boundaries, these differences and diversities were strategically repackaged in the service of nation-building. For example, during the British occupation of Burma in 1885, some Shan towns requested Siamese protection (Winichakul 1994, 101). King Chulalongkorn in an effort to incorporate this territory within the Siamese polity declared: "The Thai, the Lao, and the Shan all consider themselves peoples of the very same race. They all respect me as their supreme sovereign, the protector of their wellbeing" (ibid., 201). This move is interesting in terms of Chulalongkorn's strategy to

¹² These relationships were mutually beneficial: tributary territories often sought autonomy and security against a particular overlord and regional kingdoms benefited from increased control over territories and populations. Winichakul (1994, 83) states: "In Thai the manner in which a tributary entered this relationship was described as *khpen kha-khopkhanthasima*, to request or be under the holy sphere of the supreme power [...] to give full loyalty to. It meant that, for example, Bangkok had to protect its tributaries from the aggression of any other supreme lord such as Burma or Vietnam". These relationships and battles are an important aspect of conflict between Siam and Burma, dating back to the sixteenth century (ibid., 62). The two kingdoms had launched repeated attacks against the other for control over what was then known as the Mon region, considered to be rich in resources and human labor.

call upon the history of tributary relationships in Siam's favor and also the undeniable pressure to modernize along Western lines by establishing these fixed sovereign boundaries that pushed the Siamese elites to adopt organizing principles that were in contradiction to the kingdom's existing conventions. This reconceptualization of tributary histories is also significant in terms of the production of a homogenous "We" in order to legitimate claims to Siam's "rightful" rule over these territories and the simultaneous erasure of centuries of contentious differences. Chulalongkorn mobilized this strategy in Bangkok's negotiation with French forces and Lao rulers in 1888. He said:

[We] must try to please [Luang Phrabang] by describing the fact that the Thai and Lao belong to the same soil ... France is merely an alien who looks down on the Lao race as savage. whatever the French do to please the rulers of Luang Phrabang is merely bait on a hook ... Although the Lao people habitually regard Lao as We and Thai as They when only the two peoples are considered, comparing the Thai and the French, however, it would be natural that regard the Thai as We and the French as They (Winichakul 1994, 102).

In these negotiations of territories with ambiguous boundaries (ambiguous through a modern lens), both Siam and European powers were engaged in the erasure of indigenous knowledges and identities in efforts to manufacture a sense of territorial and social belonging. These technologies of mapping and boundary-making proved indispensable in enforcing a social and cultural meaning to colonized space.

By 1893, the first boundary map of the Western front between Siam and Burma was finished. The outcome of 1893 has been repackaged in contemporary nationalist discourses that portray Siam as a victim of French territorial acquisition, but it was the chiefdoms in tributary territories that were the true victims of violence and displacement:

Not only were they conquered – a fate by no means peculiar to them- but they were also transformed into integral parts of the new political space defined by new notions of sovereignty and boundary. Another ultimate loser was the indigenous knowledge of political space. Modern geography displaced it, and the regime of mapping become hegemonic (Winichakul 1994, 129).

The mobilization of modern science in the production of a national political entity worked in the service of incorporating diverse peoples and territories into a bounded space. The people incorporated into the nation of Siam that would become Thailand following the 1932 revolution that would abolish the absolute monarchy are strategically included and excluded from the category of “Thai national” (more on this point in Chapter Two). Rather than identifying as Burmese, Laotian, Cambodian, or Malaysian – or, as being Mon, Karen, Kayah, Shan, Lao, Hmong, Lu, Lua, Phuan, Khmer, or Malay, ethnic peoples now negotiate belonging and citizenship through the category of “Thai” (Winichakul 1994, 164).

In the nineteenth and twentieth centuries, Siamese elites continued to further develop technologies in managing newly captured territories and populations. Despite the appeals to a natural sense of kinship employed by Chulalongkorn in his negotiations with colonial powers, the differences between diverse peoples and ways of life were not neutralized by the declaration of national boundaries. Siamese elites sought to reconcile a new sense of identity in relation to its “Others” both within and in relation to Europe. Elites put in place a “Bangkok-centric” approach to national development that would shape the trajectory of the nation’s development strategies and labor organization in the coming years (Winichakul 2000, 529; Glassman 2004, 3). Siamese elites theorized issues of difference, civilization, development, and territory through the evolving concept of *siwilai* that connotes an “achieved state of development or progress”. Notions of *siwilai* were largely influenced by European ideas and practices that were “transferred, localized, and hybridized” in the Siamese setting (Winichakul 2000, 529). Siamese elites were heavily influenced by European colonial anthropological writings and they began to travel through the newly integrated territories to create a library of ethnographic knowledge. These ethnographic records created two domains of spatial “Otherness” in relation to the central Bangkok area: the

chaopoa people living in the mountainous and highland areas, and the *chaobannok* people in rural village areas (ibid., 535).

These ethnographic accounts strengthened the exercise of defining national space by assigning a social and cultural ‘truth’ to social difference and hierarchy in the technical management of territory. The racialized grammar of colonial anthropology influenced these writings that included descriptions of physical appearance, living conditions, and culture to present the ‘distinctive’ features that elites felt would be of interest to their colleagues in Bangkok (Winichakul 2000, 535). In the mountainous and highland areas, Bangkok elites set out to observe the culture and livelihood of the “wilderness” peoples that included the diverse groups of the Karen, the Lua or Lwa, Lahu, Hmong, and the Mrabi that the administrative writings reduced to the homogenous category of *chaopoa*: people here were considered closest to nature and therefore the least civilized (ibid., 536). Those living in lowland agricultural areas including the Tai, Mon, and Khmer called the *chaobannok* were considered to be the “exploitable people,” meaning that these areas were considered to be rich in human and natural resources that could support economic growth and modernization in Siam (ibid.). This construction of ethnic difference based on associations with elevated spaces has continued to be mobilized in nation-building initiatives that portray upland peoples as “non-Thai tribal people outside of development” as opposed to the category of “Thai” that emulates civility in lowland, industrial areas (Vandergeest 2003, 26). Vandergeest and Peluso (1995, 385-388) refer to this process as “internal territorialization” that involves defining the specific activities that should be permitted within spatial boundaries. This process of internal territorialization involves linking the administration of land-use to the legitimate use of violence within state boundaries, which are connected to these productions of technical and racialized space (ibid., 390).

In the years following the 1932 revolution that abolished the absolute monarchy, Thailand emerged as a nation grounded in policies promoting economic nationalism or “Thailand for the Thai” (Wyatt, 1982, 254). External pressures in the years following World War II beginning in 1944 transformed Thailand into a nation navigating a “paradoxical” form of national independence as “an important participant in international affairs, yet still closely (and subordinately allied) economically with Japan and the Western industrial powers, politically with ASEAN neighbors and the United States, and culturally with the West” (Wyatt 1982, 277). Thailand’s elite continue to negotiate that nation’s position in the post-war political economy by portraying Thai society as a “haven of political stability and economic growth” that has maintained its “distinctive cultural identity, its social hierarchy and order, and its Thai and Buddhist values” throughout ongoing processes of modernization (ibid., 278). While contemporary nationalist discourse in Thailand promotes the narrative of a smooth and autonomous path to modernization (Winichakul 1994, 164-170; Padoongpatt 2017, 5-6), in reality the relationship between nation, science, and capital involved drastic processes of remaking livelihoods, landscapes, and social values. These social-historical circumstances carry deep implications into the present crisis of wildlife tourism and the emergence of biotechnologies as a regulating force in the elephant trekking industry. These implications are best demonstrated by looking closer at the emergence of the tourism industry during the post-World War II development era that produced new formations of class in a service-based economy.

CHAPTER TWO: Tourism and Class Difference in Thailand's "American Era"

In the post-World War II period the United States emerged as a major global power and impacts of American expansion were being experienced across Southeast Asia. In Thailand, American presence took shape through a system of informal empire that exerted tremendous influence over the country's social and political life. Modern nationalist discourse in Thailand is largely predicated on being the only Southeast Asian country to have avoided Western colonization. However, an attention to the widespread impacts of American interventionism is critical to understanding the trajectory of modernization in Thailand (Padoongpatt 2017, 5). During the Cold War, Thailand was established as a stronghold of Western values and free-market capitalism in Southeast Asia, and also as a tactical location for the American military in the fight against leftist anticolonial movements in Laos and Vietnam, and the Communist revolution in China (ibid., 5-6). In the pursuit of these foreign policy objectives, the U.S. launched modernization programs in Thailand and promoted the idea of "cultural exchange" as the basis for friendship between the two countries (ibid., 27-30). American presence in Thailand was expressed through formal political institutions in the form of sponsored dictatorships and militarization (Haberkorn 2018) and the rapid development of tourist infrastructure that invited American visitors into the everyday spaces of Thai society (Padoongpatt 2017).

American interventionism in Thailand was initiated as part of the larger American-led global development project that set out to replicate the conditions of the 'advanced' nations of the day in the so-called underdeveloped, independent regions of Asia, Africa, and Latin America (Escobar 1995). On January 20, 1949, then-U.S. President Harry Truman announced a vision for a "fair deal" for the rest of the world under the banner of a development agenda characterized by "high levels of industrialization and urbanization, technicalization of agriculture, rapid growth in

the production of material goods to increase living standards, and the widespread adoption of modern education and cultural values” (Escobar 1995, 3-5). At the heart of this development agenda was the belief in a singular path to successful modernization. Within this modernization paradigm, industrialization and urbanization are the necessary conditions in achieving economic growth and accumulating the material resources considered foundational to social, cultural, and political progress (ibid., 39-40). This Chapter will analyze how these developmentalist values were negotiated in Thai society in tourist institutions that reoriented class dynamics and established a service-based economy.

The formation of the relationship between Thailand and the United States in the post-War period was not a seamless process, despite the centuries-long tradition of varying levels of diplomacy between Siamese and Western elites. In the year following the bombing of Pearl Harbor on December 8, 1941, Japanese troops invaded Thailand seeking passage to fight the British forces in Malaysia and Burma. Thailand’s then-Prime Minister, Plack Phibunsongkhram, sought to align the country with Japan because he believed that Thailand could help Japan in ending Western colonialism in Asia and on January 25, 1941, he declared war against the Allied forces (Padoongpatt 2017, 25). This declaration was rejected in Washington D.C. on the basis that it was deemed unlawful and contrary to the best interests of the Thai people (ibid., 26). Thailand’s military resources were directed to aid the Allied powers, and Thailand emerged from the war as an American ally and a critical base for U.S. efforts in global communist containment. U.S.-Thai relations were re-presented as a natural partnership by American officials despite the contentious foundations of this relationship, and Thailand was granted over \$2.2 billion in economic and military aid to solidify the country’s role in combatting the spread of communism (ibid., 27). In the following years, Thailand would host an increasing number of American

visitors including military officials, academics, and tourists who would play a prominent role in portraying Thai people as naturally subservient to hierarchy and as eager recipients of American-style capitalism and culture.

Glassman (2016) offers a “Pacificist” framework to analyze the construction of Thai society as uniquely suited to American free-market values by tracing the internationalization of the Thai nation-state that linked members of the Pacific ruling class across East and Southeast Asia to American corporate and military regimes of power. From a Pacificist perspective, “the most relevant unit of analysis for particular phenomena is not nation-states as a whole but transnationalized networks of actors that connect social formations on both sides of the Pacific Ocean” (Glassman 2016, 322). In Thailand, a Pacificist lens understands the production of class inequalities in a rapidly growing economy as a product of uneven internationalization, meaning that the Thai state has been able to achieve rapid economic growth through mechanisms of inegalitarianism designed to repress labor and political opposition to facilitate the expansion of corporate and military networks protecting the free-market (Glassman 2016, 322; 2004, 7-8). Put more simply, the internationalization of the Thai state characterized by its integration within the highly militarized American corporate network, became structured to enable the free movement of goods while simultaneously exercising greater discipline over labor power. This development of an internationalized and rapidly growing economy in Thailand was established largely through the destruction of society and economy in Vietnam, as Thai elites actively cooperated with the U.S. military throughout the Vietnam War to strengthen their ties with American economic growth at the expense of regional relationships (Glassman 2004, 156).

To naturalize the establishment of an authoritarian, U.S. elites appealed to racialized thinking and anti-Communist sentiments to inform their relationships with Pacific states, stating

at a 1948 convening of the National Security Council: “By tradition and preference, Asiatic peoples turn to authoritarian government. In contrast with us, they lack historical experience of liberty and personal experience of individualism” (Glassman 2004, 43). This crystallization of notions of tradition and collectivism into the cultural phenomenon of “cultural values” has been instrumentally taken up in the service of specific transnational projects to the advantage of various members of the Pacific ruling class and American hegemony in ways that are “as often as not” in opposition to the desires of large populations of Asian people (Glassman 2016, 327). In Thailand, this understanding of Asian values that characterized the population as naturally subservient to hierarchy and committed to collective national wellbeing and the simultaneous internationalization of the country’s industrial development beginning in the post-World War II period, instituted processes of uneven development and socio-spatial inequalities that produced new vulnerabilities for working class people (Glassman 2004, 3-4). This internationalization of the state and the naturalization of authoritarianism instituted uneven patterns of capitalist development that has exposed many workers to global market fluctuations, and left many workers largely unprotected due to the enduring legacy of labor repression that was instituted during this post-War period (ibid., 153). This Chapter will analyze these issues in the context of the tourism industry that produced new class inequalities through the unequal integration of Thai working-class people into the service-based leisure economy, and processes of industrial development that instituted socio-spatial disparities through environmental degradation and the disciplining of labor.

The promotion of tourism as a key aspect of Thailand’s development strategy was heavily promoted during the country’s financial crisis beginning in mid-1997, and throughout the ‘Amazing Thailand’ campaign (January 1, 1998 – December 31, 1999) that set a target of

attracting 17 million tourists to stimulate economic recovery and promote sustainable development (Kontogeorgopoulos 1999, 321). Promoting tourism proved to be compatible with the export-oriented growth model pursued by the Thai government that features “a built-in need for imported capital and technology which promotes external debt and balance of payment deficits” (ibid., 318). Within this strategy of internationalization, the tourism industry found a niche within Thailand’s larger development plans as it proved to be a good source of foreign exchange and an industry that could host large growth and profits (ibid., 323). This paper will continue to explore how positioning the tourism sector as a site of rapid and perpetual economic growth has contributed to the erosion of working conditions, animal welfare, and introduced a host of pollution problems in many already-strained areas (ibid., 324). The success of the ‘Amazing Thailand’ campaign was its ability to interweave with other aspects of Thailand’s development strategy that promotes export-oriented industry (ibid., 318), and its integration into global flows of wealth that can be traced to the Post-World War II era.

By the mid-1960s, American presence in Thailand and across the Pacific region was well established. At the height of the Vietnam War in 1969, Thailand was host to approximately 45,000 U.S. military personnel who greatly influenced the sexualization of Thai society and created a demand for a service-based leisure industry (Padoongpatt 2017, 30). Military bases quickly developed into full-blown camp towns, and at the center of these economies was a dependence on the sex industry that established a feminized and sexualized regime of service-based labor. These economies attracted marginalized members of the Thai working-class in rural areas by establishing themselves within existing structures of sexual exploitation:

The practice of bonding women for sexual services, which is the gateway through which many rural women enter prostitution in Thailand, is a direct descendant of debt bondage for sexual services, which persisted even after the laws of slavery were rescinded at the end of the nineteenth century. The law now

provides less protection for women obtained in such transactions than it did when the slave laws were in force in Old Siam (Turton 1980 cited in Reynolds 2006a, 132).

Camp towns offered a wide range of services including bars, massage parlors, and other nightlife operations and soon become the primary source of employment for Thai people living in surrounding villages (Padoongpatt 2017, 31-33). Prostitution thrived in these conditions and the Thai government, eager to capitalize on this large source of revenue, took an active role in maintaining this gendered and sexualized labor regime by identifying women offering sexual services as “special job workers” (ibid., 34). Jin-Kyung Lee (2010, 152), who examines camp town sex workers in South Korea, points out that this attitude of valorizing sex work for its contribution to economic development by portraying working women as “warriors of industrialization” operates to produce a sanitized account of the exploitative nature of sex work in camp towns. Camp towns employed thousands of Thai people: the number of “special job workers” at the Udorn Air Base, for example, grew from 1,246 in 1966 to 6,234 in 1972 (Padoongpatt 2017, 34). Camp towns were among the first leisure-based institutions and the culture in camp towns has influenced the culture of Thailand’s expanding tourism industry.

The exploitative nature of the relationships between Thai women and U.S. servicemen created an unequal power dynamic that has contributed to the current inequalities faced by Thai people working in the tourism industry. U.S. soldiers treated Thai women as little more than sexual objects who were desirable for their “exotic” and “subservient” dispositions (Padoongpatt 2017, 33). The demand for sexual services by soldiers serving long terms prompted the development of a rental system where a soldier would pay a small fee to a broker, usually an older Thai woman, to be introduced to Thai girl who he could hire as his *mia chow* or “rented wife” (ibid., 33-34). U.S. servicemen actively sought out Thai women to be their wives because they could “treat them as subordinates without consequence. U.S. servicemen credited Thai

culture for preparing Thai girls through ‘tradition and training to treat men as superiors,’ which produced a ‘sweetly feminine Oriental subordination’ (ibid., 35). These representations from American soldiers that characterized Thai women as deeply traditional, receptive to hierarchy, and as possessing an “exotic” Otherness informed a set of beliefs and standards that would shape the way that nonmilitary U.S. citizens would choose to interact with Thai people during their visits as tourists.

American visitors viewed Thai service-people as eager to please and thought of Thai society as a whole as operating on a path of least resistance. The popular expression *mai bphen rai*, loosely meaning “you’re welcome”, or “just enjoy life” when applied to bad situations, was appropriated as an admission of passivity by American visitors (Padoongpatt 2017, 27). As the rapid expansion of tourist infrastructure invited visitors into everyday spaces, notions of exoticism and Otherness subjected all aspects of Thai society, from religion to dress, as potential commodities for tourist consumption. This attitude of promoting the “everyday” is captured in a report prepared by the Pacific Area Travel Association in 1958 that describes the potential of Thailand as a site for an immersive visitor experience in terms of its “raw materials,” “spectacular temples,” and “exceptionally interesting classical Thai dancing,” stating that “[Someone] just [needs] to package and sell it” (ibid., 40). The Thai government responded to lobby efforts from American travel companies who promoted tourism as an effective postwar development strategy by orienting its economic development plan towards “heritage conservation” and promoting tourism as a viable employment option for “semi-skilled” workers (Reynolds 2006b, 267). Between 1967 and 1971 these investments in tourist infrastructure paid generously, generating 360 million baht in revenue (Padoongpatt 2017, 38).

The value of these investments extended beyond economic gain as the transformation of these heritage sites to tourist destinations also served an ideological purpose in “reinforcing the ‘national imaginaire,’ in which the Thai national community evolved ‘according to its own inner rhythms’” (Reynolds 2006b, 263; see also Van Esterik 2000, 120-122). Here we see the production of class difference where working-class people are recruited into labor-intensive and precarious employment conditions to promote a nationalist narrative that disguises inequalities both within national borders and an internationalized political economy. The U.S.-led tourism industry received criticism from working-class Thai people who argued that the endless construction of tourist-friendly places was creating an economy that would only serve outside interests at the expense of the local population (Padoongpatt 2017, 42). Urban policy in Bangkok from the 1950s onwards became dedicated to expanding and maintaining tourist infrastructure at the expense of improvements to education, housing, and other public works (ibid., 42). These disparities are measurable and demonstrated in the ways that the Thai political economy has systematically failed to translate economic growth into broad-based social gains, particularly in the area of education that has received little emphasis from the Thai state (Glassman 2004, 161). Those who spoke out against the negative impacts of tourism were described as “a small faction of traditionalists who stood in the way of modern progress in Thailand” (Padoongpatt 2017, 43). The concentration of wealth and resources in tourist infrastructure at the expense of the local population produced conditions of deprivation and inequality for working-class people, and a normalized sense of whose labor matters the least.

Tania Li (2007, 7) argues that development initiatives gain their power through the ability to frame their objectives through an evaluation of the “capacities of the poor [rather] than on the practices through which one social group impoverishes another”. The power dynamic established

through the concentration of wealth and resources in tourist infrastructure has been repackaged to promote the tourist as a benevolent figure who creates employment opportunities for “unskilled” local workers. In 1952, the U.S. Secretary of Commerce promoted American tourism as an altruistic institution stating: “[tourists] bring wealth into a country ... in the form of goodwill and understanding ... [and] ... wealth in the form of foreign exchange vitally needed for international trade” (Padoongpatt 2017, 39; see also Luh Sin 2017, Kontogeorgopoulos 2017). A common practice for long-term American visitors during the Cold War was to hire Thai women as domestic servants to do the shopping at local markets and cook meals. A prominent American family recalls their experience with hired help as very negative and complained of being “either ‘squeezed’ on the food money, or forced to care for dozens of the cook’s ne’er-to-do relatives, or fed poorly cooked food, or just not fed enough. [The family] felt put upon, deprived, and bullied” (Padoongpatt 2017, 54).

This relationship between elite American visitors and the local Thai women hired to complete domestic labor is important to analyze in terms of the unwillingness of the family to acknowledge the multidimensional humanity of the hired help who they shared an intimate space (their home) with over a long period of time. The family’s account that stresses the feeling of being ‘put upon’ when exposed to the employees’ familial obligations and full personhood, demonstrate how the dynamics of the service-industry are designed to foreclose the acknowledgement of service-workers as complex people who might negotiate better working conditions. Similar to stereotypes of smiling island people that oversimplify the lives of people living and working in “all-inclusive” vacation environments (Kincaid 1988), Thai service-people are positioned as one-dimensional beneficiaries of tourist-generated employment. Further, this account demonstrates how working-class Thai people have been portrayed as untrustworthy

opportunists who will “squeeze” from the good will of international visitors. The formulations of gender and race at work in the poor employment conditions faced by service-workers in Thailand’s tourism industry act as “modes of mediation” in creating a “color coded,” “commonsense,” devaluation of certain social groups “embodiment and labor power” (Bannerji 2005, 153). These social and cultural factors carry “implied norms and forms” that organize social space (ibid., 153). Capitalism as a mode of production relies on these unequal organizations of society to authorize the exercise of labor extraction as the expression of natural social forces.

The production of these experiences of marginalization is sustained by Thailand’s nation-building projects that embody the tensions of the “epistemological hybrid” discussed in Chapter One, at the nexus of modern scientific advancement and the preservation of the “essential elements” of Thai society. These ideas materialized in the technical management of space to produce the necessary conditions for economic growth alongside projects intended to preserve the grandeur of Siamese anticolonial resistance. This nationalist narrative that celebrates the preservation of national independence has contributed to an exercise of military power that is mobilized as a means of “internal consolidation and control rather than external protection” (Van Esterik 2000, 9). The tourism industry became a space where the politics of nation-building could be exercised and enforced by repackaging nationalist discourses as commodities for tourist consumption:

In the mid-twentieth century the heavily militarized and dictatorial Thai nation-state, bolstered by U.S. support, intensified efforts to craft a unified imagined Thailand out of its diverse citizenry as part of its pursuit of development and anticommunism. They demanded that all adopt the Thai language, to convert to Buddhism, publicly display loyalty, and in essence embrace the national ideology of ‘nation, religion, and king’. [...] In the 1940s, Prime Minister Phibunsongkhram’s nationalist movement led to the creation of what would become the iconic wok-fried noodle dish, *Pad Thai*. Phibunsongkhram wanted a symbolic “Thai” national dish to counter the cultural influence of Thailand’s Chinese population. Thus, when U.S. culinary tourists celebrated Thais for their ability to blend differences and create a common culture they failed to recognize power, as it was a coerced movement into a dominant culture (Padoongpatt 2017, 49).

The tourism industry became an institution for modern nationalist discourses that valorize the narrative of a nation that will “bend not break” when confronted with colonial imposition and difference to take on a normalized and experiential quality by inviting tourists to encounter representations of national pride and authenticity, while enforcing strict structures of class division for working-class people. These issues will be engaged further in Chapter Three in terms of their relevance to debates concerning animal welfare, tradition, and national identity in the elephant trekking industry and how these competing interests consider the circumstances of the workforce in their arguments.

The rapid expansion of Thailand’s tourism industry coincided with a movement by state governments across Southeast Asia in the 1970s to increase their presence and control over forest and coastal zones that had previously been peripheral to centralized rule (Vandergeest 2003, 19). This increased presence was stimulated by the perceived security threat posed by unmonitored forests and the rising value of natural resources. This increased state presence was led primarily by state forests departments in charge of defining and enforcing the boundaries of acceptable land-use practices (*ibid.*). In Thailand, this process involved the creation of socio-spatial differences to authorize resource and labor policies oriented towards rapid economic growth (Glassman 2004, 156-157). The unquestioned desirability of economic growth in the developmentalist era was closely linked to a revitalized faith in science and technology, informed by the belief in “[technology] as some sort of moral force that would operate by creating an ethics of innovation, yield, and result” (Escobar 1995, 36). Informed by the logic of science as progress, the trajectory of development takes on a stable character as a continuum from a state of underdevelopment to an industrialized and economically productive nation (*ibid.*, 36). Under American influence in the postwar period, the Thai government shifted its economic emphasis to

industrial activities including labor-intensive manufacturing, agribusiness, and logging ventures connected to foreign commodity chains (Delang 2005, 230). This industrial boom led to a dramatic increase in deforestation: in 1947, 63% of Thailand was forested and by 1982 (seven years before the country would pass legislation banning logging), only 25% of forested land remained intact (*ibid.*, 230).

The formerly marginal zones experiencing new forms of state surveillance were often inhabited by people classified as ethnic minorities to the category of “Thai,” the latter of which “defines national culture and imagination” (Vandergeest 2003, 20). Vandergeest (*ibid.*, 21) refers to this intersection of the presence of ethnic minorities, valuable natural resources, and conflicting land-use politics as “the racialization of resource tenure conflicts”. State departments intervening in these contested zones view the presence of minority groups as “an inconvenience at best, and a threat to the integrity of valuable resources at worst” (*ibid.*, 21). The long-standing distinctions between “upland” and “lowland” peoples (Chapter One) has been mobilized to justify state-led technical management over resources and stereotype ethnic peoples as being environmentally destructive (Vandergeest 2003, 21; Delang 2005, 235). This spatial politics of difference at the nexus of ethnic difference, conflicting land-use paradigms, and resource conflict is connected to the transition for mahouts and elephants from an important source of labor in the logging, transportation, and military industries to their conditions of precarious employment in the tourism industry.

Mahouts and elephants found themselves at the center of these struggles for control over land-use and supply chains from the beginning of the nineteenth century during colonial expansion, to the present. Beginning in the 1850s and through the 1880s, British teak companies had expended their operations into northern Siam (Delang 2005, 230). During the late

nineteenth-century, the British empire's dependence on teak wood for its shipbuilding enterprise required the skills of mahouts and their elephants to carry out resource extraction (Shell 2019, 2). The unique capacities of elephants to navigate difficult terrain combined with their unique dexterities and cognitive capacities to perform loggings tasks made them an indispensable workforce that could not be replaced by mechanized labor (ibid., 3-8). However, due to the fact that elephants are not domestic animals and cannot be selectively bred to perform tasks, the expertise of mahouts was essential to the interests of empire (ibid., 3). The management of elephants was primarily led by members of Karen communities who ensured the health and reproduction of the elephant workforce, and carried knowledge that could not be replaced by colonial officials.¹³ Mahouts caring for elephants worked to maintain a balance between work tasks and the natural behavior of elephants through a unique practice of releasing elephants into the forest during evening and night times to allow them time and space to socialize, reproduce, and forage (ibid., 10). These practices involved with the careful management of the elephant workforce afforded mahouts some empowerment and autonomy, as their connections to larger regional trade networks allowed them to negotiate some aspects of their pay and working conditions with colonial officials (ibid., 11).

The autonomy and social status of mahouts was slowly eroded as mass deforestation reduced the need for elephant labor that possessed a natural affinity for navigating forested landscapes and as a result, mahouts experienced increased livelihood instability. Returning to our analysis of the post-World War II period, mahouts and elephants continued to enjoy work as logging continued to be encouraged in favor of U.S.-led resource extraction policies and in the

¹³ Karen people are now considered an ethnic minority in Thailand (this point will be engaged in Chapter Three). Shell (2019, 8) states that the blanket term of "Karen" might ebb and flow based on political circumstances and that many ethnic Burmese people (Burmans or Bama) would have been involved in the catching, "breeding", and training of elephants.

fight against communism.¹⁴ Mass logging proceeded with relative impunity for conservation or sustainability. In 1968 the government passed a law granting logging companies 30-year concessions to cut the forests on condition that they would be replanted. These policies proved difficult to enforce and as a consequence some areas were replanted with commercial trees, while many were left bare (Delang 2005, 232). This postwar period marked a shift in resource policy and the state's relationship with upland peoples, as from the 1950s to the 1980s, the policies toward highland areas were linked to industrial ventures that made American industrialists the most powerful interest group in Thai forest politics (*ibid.*, 232).

Attitudes towards logging and forest protection took a drastic turn in 1988 when a massive mudslide carried away two villages in Southern Thailand that caused the death of 251 people (Delang 2005, 233). Environmentalist groups drew attention to decades of unfettered logging and inadequate reforestation, and in 1989 the Thai government officially revoked all logging licenses, leaving thousands of mahouts and their elephants displaced and unemployed (*ibid.*, 233). This ban on logging proved to be beneficial to those who had invested in American-led industrial projects as it bolstered manufacturing ventures as the future of the Thai economy, and businesses benefitted from an influx of a mobile and landless labor force experiencing precarious working conditions after decades of environmental change (Delang 2005, 234; Glassman 2004, 152-154). The closing of the frontier was also a victory of state-led, modern scientific approaches to managing land as the new Bangkok middle class, who had little contact with upland regions, began to demand urgent action in preserving the remaining forest (Delang

¹⁴ Forested land was considered to be a security threat during the fight against communism as it was believed that insurgents using forest cover to mobilize. From 1973 to 1978 when the campaign against communist insurgents was at its peak, the forest in Northern Thailand was being cut down at a rate of 345,600 ha per year (Phongpaichit and Baker 2002 cited in Delang 2005, 233).

2005, 234). This increased attention to upland regions attracted intense scrutiny against ethnic minorities and their land-use practices.

Despite the issues of commercial deforestation, the longstanding prejudices against ethnic peoples (Chapter One) and a sense of urgency from conservationists, has resulted in negative attitudes towards the Karen and Lua peoples practicing swidden agriculture (a system of shifting cultivation, involving periodic deforestation) (Delang 2005, 235). Despite the relatively small population of people practicing swidden agriculture and research describing these practices as a sustainable way to farm in highland areas, state departments and mainstream media continued to promote the idea that ethnic peoples are to blame for environmental degradation (*ibid.*, 235). State departments and their supporters have put forth a strict understanding of conservation that views forest space as areas that should be protected and uninhabited, but remain “inhabited by ‘hilltribes’ of dubious citizenship status and doubtful capacity to manage these forests” (Vandergeest 2003, 26). Government resource agencies have called upon these stereotypes of “destructive hilltribe cultures” to assert that the people living in upland areas have no right to ecologically important forests because they are “not Thai” (Vandergeest 2003, 27; Roth 2008, 376; Delang 2005, 235-237). These racialized discourses have existed in tandem with an increasingly romantic view of remaining forests animated by Western ideas of conservation that promote ideas of pure and “untouched” natural areas (Delang 2005, 234). These ideas promote an ideal of pristine nature “without people,” which has complicated approaches to addressing many land-use issues, including the spaces occupied by mahouts and captive elephants.

Delang (2005, 234) argues that calls to act on issues of environmental degradation gained significant power in Thailand by appealing to a sense of urgency. Due to the rapid deforestation that occurred during decades of underregulated logging, the prospect of the ‘end of the forest’

became imaginable to middle and upper-class urban populations. These influential groups who were heavily influenced by Western conservation paradigms began to promote a conservation model that favored the creation of protected areas with strict borders for land-use (ibid., 234). In the aftermath of 1988, the political will to protect the remaining forest became particularly strong: “when an unexpected disaster suddenly mobilizes a large number of those who already felt the threat ‘to do something about it’, while also persuading the skeptics that indeed the forest is under threat” (ibid., 234). As the loss of biodiversity undeniably demands action, scholarly works studying the militarization of conservation movements caution against an uncritical emphasis on framing environmental degradation as a “threat” that should be treated as a matter of security (Duffy 2015, Holleman 2016, Lunstrum 2018, Weldemichel 2020). Weldemichel (2020, 5) argues that proponents of extinction narratives that frame issues of wildlife management and the loss of biodiversity as “being out of control” gain wide acceptance as they “fit within taken-for-granted scarcity narratives in communicating a sense of urgency and [...] reinforce the prevailing interests of powerful actors in resource control”. Within these crisis narratives that present biodiversity decline as a global emergency driven by humans, this sense of urgency contributes to an over-simplification of conservation issues that amplifies the actions of societies living in areas considered to be the last-standing concentrations of resource and wilderness. In cases involving wildlife, the resulting dichotomy that positions “dangerous encroachers versus victimized wildlife” can play a vital role in justifying highly militarized interventions in securing ecological spaces (ibid., 6).

In Thailand, this sense of urgency acted as a catalyst for government organizations to advance their control over racialized populations living in proximity to now-precious forested areas. Informed by the processes of “internal territorialization” and the technical management of

space that constitute the foundation of Thailand's development into a modern nation, this surge in political will to save the forest served to revitalize the assertion of state power through "the allocation and realization of resource access right" (Vandergeest and Peluso 1995, 387). After the 1989 landslide, the government began to take an increasingly militarized approach to watershed conservation (ibid., 413). This motion introduced a period of intensified conflict over land rights as many villagers have refused to recognize the legitimacy of either the Forest Department or other state land agencies (ibid., 413). More recent efforts to delineate clear boundaries between villages and protected areas has resulted in increased inter- and intra-community conflicts. And there was a resurgence of resistance to park establishment as a result of "a strong sense that whatever was decided now [instituting firm protected areas boundaries] in the landscape would be fixed," and villagers started to "take as much land as possible in a way legible to the Royal Forest Department to secure their future" (Roth 2008, 383-385). This revitalization of state power as a response to urgent appeals to save the environment has had the dual effect of increasing surveillance against already marginalized people and increasing the premium on wildlife tourism experiences.

These issues of large-scale deforestation, the revitalization of modern science as a moral force, the growing contributions of tourist revenue to Thailand's GDP, and formations of class difference converged in the environment of wildlife tourism to produce distressing conditions for thousands of animals and people involved in the industry. In response to the growing global popularity of wildlife tourism, the Thai government and wealthy tourist outfitters were eager to compete in this lucrative market (Cohen 2009, 101-103). Thailand's image as a country rich in "exotic" wildlife was compromised by the fact that mass deforestation had caused the near or complete extinction of many native species, limiting opportunities for visitors to observe wildlife

in its natural setting (ibid., 103). Despite these urgent environmental problems, the Thai government remained committed to advancing wildlife tourism. Under the premiership of Thaksin Shinawatra (2001-2006), wildlife tourism was actively prioritized and expanded as part of a larger strategy “to present Thailand to the world not only as an ‘exotic’ Oriental country, but also a modern cosmopolitan one” (ibid., 103). This strategy marked a definitive shift in relationships with wildlife, introducing an environment where “exotic” animals were now displayed in super-modern, “fully contrived” settings (ibid., 103). Duffy (2015, 533) describes this marketing strategy as “last chance to see” tourism where “arguments about scarcity and precarity [are mobilized] as a rationale for creation of new attractions” as both an opportunity to witness what is under threat of being lost, or, as is the case with elephant trekking, consume encounters with wildlife under the guise of supporting conservation efforts. Shinawatra’s vision that involved housing wildlife in luxury settings to attract high-spending visitors included “establishments featuring animal performances and shows, in which captured animals [...] are trained, tamed, or humanized [...] to enact behaviors which are not part of their natural repertoire” (Cohen 2015a, 195).

Chapter Three will analyze how these issues of class, modern science, economy, and endangerment have been negotiated in the elephant trekking industry as one of the most high-traffic wildlife tourism environments in Thailand, and as a case that is connected to many other wildlife markets globally. In the following Chapter I will show how these perspectives function to isolate mahouts from their positionalities within the layered histories that have produced the conditions for wildlife tourism in Thailand. I will demonstrate how these histories have manufactured an environment for biotechnological interventions to assume a neutral position that reorients the scope of the elephant trekking industry to an isolated issue of animal welfare and

detached from larger issues of social inequality. I argue that the increased reliance on biotechnology as an objective, regulating force, continues to perpetuate a colonial capitalist logic that invokes modern science as a civilizing force. By naturalizing class difference and exploitation, mahouts continue to experience conditions of marginalization as “exoticized”, disposable laborers whose conditions of existence are silenced and rendered invisible. I will show how the invocation of biotechnology as an “objective” force in this case effaces issues of social inequality, and in doing so isolates the issues of wildlife tourism from larger struggles for social and environmental justice.

CHAPTER THREE: Concealing Contradictions in the Elephant Trekking Industry

Nature-based tourism has been widely promoted as a ‘win-win’ solution to resolving economic priorities with the realities of finite resources, and has become increasingly popularized as issues of ecological exhaustion become more visible (Duffy 2015). The tourism industry broadly has been promoted as a force for sustainable development, and tourism’s relevance as solution for environmental degradation have become a new iteration of old debates surrounding notions of sustainable development and “making nature pay its way” (Duffy 2015, 540). Thought to stand in contrast to heavy industries, tourism is being increasingly relied on to reform economies deemed unsustainable by organizations such as the World Bank and the United Nations, via a shift to economic activities deemed as ecologically beneficial (ibid., 530-532). This strategy that proposes tourism as an environmental fix for capitalism has been disproportionately promoted by global institutions as a solution for states in the Global South who are encouraged to diversify their economies with “environmentally sustainable” ventures (Duffy 2013, 606-610).

Duffy (2015, 529) argues that nature-based tourism ventures have fallen short of their promises to do away with issues of exhaustion and depletion by further concealing the contradictions between economic growth and environmental sustainability. Describing the impacts of nature-based tourism as “neoliberalising nature”, Duffy (ibid., 529) argues that the transformation of elements of nature into commodities “cuts the threads that bind ecosystems together,” transforming its constituent parts into new sites of accumulation. This is made possible by repackaging the crises that have emerged as a result of neoliberalism into new opportunities for another neoliberal economic growth under the guise of sustainable growth. In Thailand, this idea was taken up by the private sector that has reconfigured the historical

practices of using elephants as a labor force to attract international tourists (Duffy 2015, 535). Chapters One and Two have demonstrated how the wider socio-cultural contexts of modern colonial capitalist expansion have shaped the ways that modern science has been developed and mobilized in Thailand in service of nation-building and producing conditions for economic growth. This Chapter will apply this framework to analyze the ways that modern science and its current applications continue to maintain the conditions for social inequality and distressing animal welfare standards by simultaneously continuing to promote trekking as a viable solution for Asian elephants.

Increasing scholarly, media, and public attention has been paid to welfare standards for captive elephant populations. Elephants are not domestic animals and do not willingly seek the company of people (Nijman 2014, 1; Cohen 2015b; Bansiddhi et al. 2019, 2). Elephants in the wild live in complex family structures and mothers are incredibly devoted to their calves.¹⁵ The process of “breaking-in” a young elephant for work called the *paah jaan* ceremony, is designed to sever the strong bond between the mother and her baby to transfer the calf to the authority of the mahout.¹⁶ Believed to have originated in Karen communities in Northern Thailand, the *paah jaan* is now a widespread process that is used to prepare all young elephants for work in the tourism industry (Nijman 2014, 19; Cohen 2015b; Kontogeorgopoulos 2009, 430; Daly and Luce 2019b). In 1994, wildlife photographer Thomas Devakul published coverage of the *paah jaan*

¹⁵ The bond between mother elephants and their calves is incredibly strong. Female elephants will spend the duration of their life with their mothers, and male elephants will live with herd until he reaches sexual maturity. The loss of their calf is incredibly traumatic for the mother elephant. During my December 2019 field visit to Wildlife Friends Foundation, I observed Thong Poon, a former breeding elephant who was rescued from a trekking camp in Pattaya. The reason for her relocation was that after two of her babies were taken away, Thong Poon became incredibly aggressive and attacked a mahout and several tourists. Thong Poon will remain under careful care at WFFT for the remainder of her life. Her story and updates can be read here:

<https://www.thaielephantrefuge.org/WFFT-Elephants/thong-poon/?portfolioCats=28>

¹⁶ Refer to materials published by the Elephant Refuge and Education Centre at Wildlife Friends Foundation Thailand at <https://www.wft.org/downloads/elephant-en.pdf> pages 32-40. See also Cohen (2015b), and Daly and Luce (2019b).

that raised questions about the ethics of domesticating elephants (Cohen 2015b, 168). The process begins by tying the mother elephant to a tree and slowly leading the baby elephant out of the mother's earshot to perform the ceremony (ibid., 169). Devakul describes the ceremony as a "harrowing" experience for the calf and himself as an observer, and published explicit photographs and commentary detailing the calf's stubborn fight to get free:

His actions did more harm than good. The centre's trainer hit him with a bamboo stick on his legs and trunk, and poured holy water on his head, believed to tame him. Then came the first iron hook which worked more efficiently than the holy water to calm him. Visiting the cage some time later, the author [Devakul] noticed that the baby elephant's two ears were bathed with blood from the wounds made by the hook. There were tears in his eyes and his neck and legs were chained. At the back of the cage was a pile of his droppings mixed with urine (Devakul 1994, cited in Cohen 2015, 169).

Devakul concludes by stating: "I suddenly realized that behind the scenes of the cute, playful, intelligent and hardworking elephants in sports, tourism, the circus and the timber industry there has always been pain" (Devakul 1994 cited in Cohen 2015b, 170). Visiting Ban Ta Klang (known as the "elephant village") reporters Kristen Luce and Natasha Daly (2019b) reflect on the complexities of elephant-mahout relationships: "Seemingly contradictory realities of the elephant keeping tradition can be difficult to reconcile. Mahouts say they consider elephants to be family, but they also use the bullhook and other fear-based training methods, and they often restrain their elephants with hobbles [a chain attached to the two front legs of an elephant to restrict their movement]". Cohen (2015b, 169-170) finds that the necessity of the *paah jaan* was taken for granted when elephants were seen as a crucial source of labor, and rightly argues that the ethics of this process as a means to provide tourist entertainment needs to be revisited.

Cohen (2015b) analyzes how legal arguments and social attitudes have evolved to evaluate the exploitation of elephants for tourism. He argues that the strategic interpretation of key articles of legislation, such as the *Draught Animal Act*, and the deliberate anthropomorphisation of young elephants have allowed tourist outfitters and government

officials to carefully craft a sanitized account of the lives of captive elephants (Cohen 2015b, 166). An important example that demonstrates how anthropomorphisation serves to reinforce attitudes towards animal welfare is the mandate of the Young Elephant Training Center in Lampang (a government facility operated by the Forest Industry Organization (FIO)) that likens the breaking-in and training of baby elephants to primary education for young children. Cohen (ibid., 167-8) states that these comparisons that set out to erase the substantive differences between “education” for humans and elephants, play a “crucial ideological role” in masking the cruel procedures that make elephants submissive to the commands of their mahouts.

Thai authorities have often called upon an understanding of traditions and its relevance to national identity in their strategic applications of legal arguments to insulate wildlife tourism, and the government more broadly, from critique (Cohen 2015b, 169). In 2012, PETA (People for the Ethical Treatment of Animals), an American-based animal rights organization, wrote an open letter to then-Prime Minister Thaksin Shinawatra to draw attention to the mistreatment of baby elephants. PETA also released accompanying video footage documenting the *paah jaan* that was filmed secretly by a PETA volunteer who had visited a Karen village as a tourist (ibid., 170). PETA officials demanded that the Thai government immediately implement animal-protection laws and launched an international campaign urging vacationers to boycott Thailand. The response from Thai authorities was swift and well-coordinated in challenging both the authenticity of the video footage and the motives of PETA volunteers. The Thai government pointed out that the volunteers did not notify police, and accused them of being complicit in animal cruelty for personal gain (ibid.). Thai authorities were also quick to construct a distinction between legitimate institutions such as the FIO facility and the scene in the forest, calling upon a now-familiar idea of ethnic difference by arguing that the Karen people are an ethnic minority

and therefore not “Thai”, as a Thai citizen would never commit such an offense (ibid., 171). For Cohen (ibid., 176), this incident demonstrates the importance of maintaining a careful spatial and ideological organization “between the public display of young elephants, apparently eagerly performing various tricks and the painful methods deployed in their training”.

Duffy and Moore (2011) expand Cohen’s (2015b) interpretation of PETA’s activities in Thailand through an analysis of the global politics of knowledge production. Arguing that animal welfare NGOs operate as “key epistemic communities”, Duffy and Moore (2011) ask at what scale and with what effects NGOs are positioned to develop and influence the enforcement of global animal welfare standards. The authors observe a critical disconnect between approaches favored by Northern-based international organizations, and local strategies for managing captive elephants in Thailand and Botswana (Duffy and Moore 2011, 592). Interviews with mahouts draw attention to the legitimate challenges that many faced during the period of unemployment following the logging ban, and the very real lack of resources available to support elephants that are not earning a wage. One mahout who had turned to street-begging with his elephant stated that he was aware that his elephant found the city environment stressful but felt that they had no other option and needed to survive (ibid., 597). Street-begging elephants suffered greatly in urban environments due to isolation from their natural environments and proper diet, from being accidentally killed or wounded, and sometimes intentionally shot when moving through spaces where they were unwelcome (Pimmanrojnagool and Wanghonga 2002, 36). Mahouts also suffered from economic precarity (earning a maximum of 50/CAD per day to support themselves and their elephants), from a lack of employment prospects in their hometowns that prompted their migration to urban centers, and from marginalization in the form of fines and negative attitudes towards their begging activities (ibid., 35-38).

For many mahouts and government bodies, the tourist industry was in an ideal position absorb the large population of elephants that were not suitable for release into the wild due to a lack of available habitat and their dependence on human care (Pimmanrojngool and Wanghongsa 2002, 39; Duffy and Moore 2011, 598; Kontogeorgopoulos 2010). The issue of the lack of forested land to secure a viable population of elephants was a significant concern following the country's ban on logging due to the lack of a large enough forested area (see Chapter Two) to support a large elephant population and the issue of fragmented populations threatening genetic viability (Pimmanrojngool and Wanghongsa 2002, 36). Despite these logistical challenges posed to mahout livelihoods and elephant conservation, many international NGOs continue to advocate for a firm distinction between captive and wild animals, arguing that all captive elephants should be re-trained for release into the wild (Duffy and Moore 2011, 590). These hardline arguments remain insensitive to the fact that captive working elephants are largely not suitable for "rewilding", having spent the majority of their lives under human care and do not permit considerations for how mahouts will make a living without keeping elephants (ibid., 594). This analysis demonstrates how the failure of many Northern-based NGOs to engage with local realities have rendered their approaches largely ineffective in implementing any meaningful action towards alleviating the legitimate barriers to improving conditions for captive elephants.

While Duffy and Moore's (2011) analysis is limited in terms of its ability to address the origins of captive elephants detailed in Cohen's (2015b) research and the massive growth of the industry in the decade following their publication, the authors achieve an important objective in terms of addressing the unequal politics of knowledge production that is crucial to understanding the trajectory of the trekking industry. Duffy and Moore (2011) bring critical attention to the

implicit orientalism in PETA's framing of the mistreatment of elephants: where PETA assumed lawlessness in their demand for animal protection, there was an extensive bureaucratic framework in place that has continued to expand to respond to the challenges of regulating captive and wild elephant populations including the Department of Provincial Administration (Ministry of the Interior) in charge of registration under the *Draught Animal Act*, the Department of Livestock Development responsible for the healthcare of elephants and their movement under the 1956 Animal Epidemics Act, the Department of Tourism charged with overseeing public venues, and the FIO that continues to manage 120 government-owned elephants (Pimmanrojngool and Wanghongsa 2002, 35-43; Elephant Ivory Tusks Act 2015; Nijman 2014, 12-14; CITES CoP 2017). The significance of Duffy and Moore's intervention is their attention to how global political inequalities produce regimes of knowledge that operate to obfuscate critical socio-ecological complexities that in turn exacerbate conflict for those negotiating the implications of the trekking industry.

More recent interviews with mahouts have shown that many continue to face hardships in their line of work in the years following the transition from street-begging to a more formal employment in the tourism industry. Many mahouts report poor working conditions and mistreatment from their employers in an occupation that is high-risk and low paying (Nijman 2014, Cadigan 2016, Daly and Luce 2019b). Investigations into labor conditions at trekking camps have revealed a lack of professional standards leading to the recruitment of unexperienced workers who are expected to perform dangerous tasks (Nijman 2014, Daly and Luce 2019b) and are treated as expendable by wealthy employers (Kontogeorgopoulos 2009, 433; Cadigan 2016). In recent years there have been several reported cases of mahouts sustaining serious injuries or being killed while working with captive elephants, demonstrating the extremely dangerous

nature of employment at many trekking venues (Chuenniran 2014, Cadigan 2016, Somvichian-Clausen 2017, Faites 2019, Daly and Luce 2019b). The tragic death of a young mahout named Chai who was trampled to death by a bull elephant while leading a tour in Chiang Mai (Cadigan 2016), sheds light on both difficult working conditions, and the marginalization suffered by many mahouts who shoulder the burden of harsh critiques concerning the problems of the trekking industry. Chai's co-workers stated that prior to the incident they felt that the elephant might be unsafe to handle, but that the camp owner dismissed their warning and assigned Chai (who was unexperienced) with the elephant (ibid.). Chai's death was devastating to his wife and two young children and left his family without an income (ibid.). Chai's workers stated that incidents like this are not uncommon as four other mahouts had lost their lives at trekking camps that month, and that it is typical for wealthy owners to treat these harms as an inconvenience to the operation (ibid.).

Many mahouts have drawn attention to the uncertain terms of their employment and a lack of professional standards as contributing to hazardous conditions in trekking camps for both people and elephants. Many workers report being mistreated by their employers who demand long hours for low compensation (Kontogeorgopoulos 2009, 439-440; Cadigan 2016). As elephants are the property of individuals, the wellbeing of mahouts and elephants are strongly subject to the highs and lows of the competitive business market in the tourism industry. It is a longstanding practice for trekking camps to either purchase elephants from local villages who breed and train young elephants, or to rent the services of mahouts and their elephants during the high tourism season (Kontogeorgopoulos 2009, 440; Daly and Luce 2019b, AFP 2019, Elephant Nature Park 2020a). In the case of Chai's co-workers, many had arrived in Thailand as refugees from neighboring Myanmar and as a result of their uncertain citizenship status they are

vulnerable to exploitation by their employers (Cadigan 2016, Human Rights Watch 2019). A number of mahouts have also argued that these precarious employment conditions, the recruitment of unexperienced workers, and a lack of respect for the mahout profession have led to the use of excessive force against the elephants that has contributed to the worsening of welfare standards.

The casual use of the “mahout” title to describe any person working with elephants has been cited as problematic because it devalues the training of proper mahouts who are typically raised with elephants who possess long-tenured expertise of elephant behavior (Nijman 2014, 11; Daly and Luce 2019b). Due to the ‘boom and bust’ nature of the tourist market, the urgency to sell had led to hasty recruitment practices and decreased animal welfare conditions:

Several *Tammachat* and *Tom Klua* [trekking camps in Northern Thailand whose names have been changed in compliance with the researchers’ ethics requirements] employees commented that injuries seem to increase during the high season, when the need to service larger numbers of guests leads to more shifts for riding elephants, more shows for performance elephants, and more frequent and forceful use of the mahout’s hook (ankus), since a tight schedule requires that elephants stay focused and moving steadily while giving tourist rides. Though the hook should be used directly on the head or in the ear canal only under dangerous circumstances, the need for greater disciplinary control of elephants during the high season leads to more wounds caused by overly rigorous and inappropriate use of the hook (Kontogeorgopoulos 2009, 443).

A mahout named Juthamat Jongjiangam living in Ban Ta Klang or the “elephant village” in Surin province, discussed the train of seeing their knowledge becoming commercialized by the profitable elephant trekking industry. Jongjiangam stated that when she left Ban Ta Klang to work at a trekking camp she received strong pressure from management to get her assigned elephant to perform well in shows, and experienced wage deductions when the performance was considered lacking (Daly and Luce 2019b). Another mahout described instances excessive violence inflicted on elephants who were not receiving enough tips in tourist-hotspots Phuket and Pattaya, explaining “People who don’t raise them don’t understand them. That’s why they hit them” (Daly and Luce 2019b). Despite these issues of uncertain and/or dangerous labor

conditions and a demonstrated unease with the pressures of market-driven animal welfare standards, many critics of the industry continue to promote the idea that the issues of trekking are the responsibility of mahouts who act with impunity towards animal welfare or promote a “save the elephant” agenda that renders mahouts invisible.

Recall the distressing circumstances of the young mahout Chai who lost his life in a workplace accident at a Northern trekking camp. This incident made international headlines, revealing disturbing trends in Western media with comments such as: “I have seen the way they mistreat those animals! [The mahout] deserved what he got,” and “I wish all elephants killed the mahouts! These are sick sadistic sociopaths!” (Cadigan 2016). Embedded within the callousness of these comments is the isolation of mahouts from the political-economic conditions for wildlife tourism in Thailand. This trend of subjecting mahouts to intense tourist scrutiny have been observed to escalate instances of violence and injuries for both elephants and people. It is reported that some trekking camp employees experiencing pressure from both their employers and tourists have implemented more harmful methods to maintain control of the elephants and maintain a tourist-friendly image: “Now, fearing backlash from tourists who find the hooks [bull-hooks, a common tool used to handle elephants in trekking camps] unsightly, some camps have started using smaller objects, such as nails and knives, which are out of the direct line of sight of tourists, but cause greater damage to the animal and pierce the skin” (Carter 2019). These instances of scrutiny in trekking camps have led to increased pressure in Thailand to address these issues of animal welfare.

The turn to biotechnological approaches to resolve these welfare issues promises to establish objective criteria to evaluate the wellbeing of captive elephants and serve as a basis for law enforcement concerning the ownership and trading of live elephants. Researchers seeking to

develop precise modes of measurement towards measuring the physiological and behavioral wellbeing of elephants in captivity, find their entry point into the wide-reaching problems of the trekking industry through the biology of the Asian elephant. The stated objective of a milestone study titled “Elephant Tourism in Thailand: A Review of Animal Welfare Practices and Needs” is to “summarize the current state of knowledge on captive animal welfare” towards the development of “science-based guidelines” that government agencies can use to develop an enforceable set of practical regulations to ensure good management of tourist elephants in Thailand” (Bansiddhi et al. 2019, 2). This merging of science-based guidelines with law enforcement and governance strategies is promoted as a steadfast way “to ensure there are no ‘soft spots’ where wildlife crime can thrive” (Krishnasamy and Zavagli 2020, 3). The incorporation of biotechnology as an impartial organizer of law, policy, and economy to respond to these issues of wildlife welfare and trade continues to be promoted by several influential institutions involved in regulating land-use and wildlife in Thailand and internationally. Science-based approaches to resolving the issues of the trekking industry have generally taken shape through a multipronged approach that allow international organizations to implement anti-poaching strategies that are then combined with more local approaches that aim to answer questions regarding the day-to-day conditions in trekking camps.

In response to the poaching incidents discussed in the introduction of this paper that prompted Wiek (2012a) to call upon government bodies to take action in addressing wildlife crime, prompted the commissioning of a report in partnership with Thailand’s CITES Management Authority. The purpose of the report was to investigate the trade in elephants in Thailand to “document the extent to which elephants are being illegally captures in the wild to supply the tourism industry”, and to quantify occurrences of illegal trading along the Thai-

Myanmar border (Nijman 2014). The report that observes a drastic decrease in occurrences of cross-border trade between June 2012 and March 2013, partially credits this decrease to the intensification of law enforcement measures by Thai authorities and the effectiveness of DNA and microchipping technologies in preventing the laundering of wild-caught elephants into captive populations (ibid., 19). However, the report cautions against celebrating this decrease of detected cases of trading as a sign of an actual decrease in poaching as the previous extent of the trade, as well as the large sums of money involved (Introduction), suggest that the trade has adapted to new law enforcement pressures and has gone further underground by means of “regular shifting of trafficking locations, some level of corruption among border officials,” and lapses in enforcement that allow traders to continue smuggling elephants (ibid., 19). This combination between the suspected effectiveness of law enforcement measures and the simultaneous adaptability of poachers was evidenced by the presence of illegal wild elephants at festivals following the “crackdown” in 2012 (ibid., 24). Given the violent nature of poaching operations, this adaptability should be cause for concern.

Substantiating Wiek’s (2012a) claims that herds of wild elephants were being decimated by poaching operations seeking to supply the tourism industry with baby elephants, researchers observed that automatic weapons are commonly used to kill the protective members of the herd in removing baby elephants (Nijman 2014, 21). Poaching operations have become increasingly sophisticated and at the time that this report (Nijman 2014) was compiled, involved a great deal of premeditation in creating pit-sites that would be pre-dug to herd the baby elephants into. Trapped infants would then be transported to the Myanmar side of the Thai border where they would be subjected to the *paah jaan*, and then walked to holding camps on the Thai side of the border to be paired with surrogate mothers who are forced to accept the calf (ibid., 22).

Elephants would then be transported to Thailand by truck either undetected or with the aid of Thai border officials receiving a bribe to allow the passage of undocumented animals (ibid., 22). The laundering of these elephants would involve registering the new elephant as either captive-born or by using the identification of a previously owned elephant. These laundering practices are the point where technologies such as DNA testing and microchipping become appealing as these technologies promise to intervene in these points of corruption, lax enforcement, and loopholes in registration policies. Despite concerns regarding the ingenuity of poachers, the report reaffirms its stance on strengthening the relationship between law enforcement and biotechnology stating: “technology and the DNA profiling of all of Thailand’s elephants will be paramount in fighting illegal trade in this species and conserving them in the wild (Nijman 2014, 27; see also Krishnasamy and Zavagli 2020, 6).

This investigation concludes with the familiar and largely unquestioned necessity of the trekking industry that continues to guide many inquiries into these issues:

The elephant-tourism industry has long been a target for animal activists and welfare groups over concerns for the treatment of elephants used in the industry. While the welfare of elephants used in tourism stands to be improved, it should also be acknowledged that tourism provides the only means of employment for domestic elephants in Thailand and that without this industry these elephants would certainly be in a worse position than they are today. However, given the findings of this report, it should also be noted that the poaching of wild elephants from both Myanmar and Thailand is almost exclusively due to the elephant tourism industry. As such, there is a strong argument to consider either developing robust systems that prevent poaching and illegal trade, or phasing out elephant tourism in Thailand altogether as a mechanism for safeguarding the wild populations of an already endangered species (Nijman 2014, 28-29).

Within this conclusion we see that both the legal and incentivized practice of keeping captive elephants come into conflict with attempts to make illegal its associated activities of poaching, and the incongruence between attempts to apprehend those guilty of inflicting suffering to elephants and maintain “business-as-usual” in an industry that is both profitable and continues to stand as the place for the large captive elephant population. The possibility of phasing out elephant tourism is raised here, but this prospect was not meaningfully engaged. While it is

reasonable to permit that the phasing out of elephant tourism could not be explored within the parameters of the report, subsequent investigations have favored the escalation of biotechnological possibilities as the panacea for the problems of trekking rather than engaging the social-historical aspects of these findings that motivate the human dimensions of the industry.

The key findings of the 2017 meeting of the Convention of International Trade in Endangered Species of Wild Flora and Fauna (CITES) Conference, conclude that a lack of enforcement for the microchipping and DNA testing of captive elephants, insufficient legal penalties for illegal activities, and inadequate border security are the main challenges to Thailand's ability to curb the illegal trade and poaching of live elephants.¹⁷ Confirming findings from previous reports (Choudhury et al. 2008, Wiek 2012a, Nijman 2014), CITES determines that the key driving factor of illegal elephant trading is increasing demand from tourism in a number of countries, including and not limited to Asian elephant range states (CITES CoP 2017, 11). Experts expressed significant concerns about Thailand's geography and the presence of transient ethnic groups who own elephants as posing a challenge to enforcement officials in charge of monitoring captive populations. They stated:

It is acknowledged that a number of elephants are the property of ethnic groups living on the border of Myanmar and Thailand. These groups migrate to and from the countries and take their elephants with them when they travel. These elephants are not registered and are kept outside Thailand for period of the year, making counts difficult (ibid., 51).

Experts also cite the lack of a robust system for identifying or marking domestic elephants. The most common method is identification through appearance (marks, scars, etc.) for passport

¹⁷ CITES (1963 – Present) is an international agreement between governments that aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The 17th meeting of the Conference of Parties (CoP) was held in Johannesburg South Africa from September 24 – October 4, 2016. Consultants from Thailand who provided information and assistance to complete this review were: the Deputy Director General of the Department of National Parks, Wildlife, and Plant Conservation (DNP); and representatives from the Department of Livestock, Department of Tourism, Forest Administration, Forest Protection Department, Ministry of Interior, and CITES Management Authority (CITES CoP 2017, 8).

identification, and while microchipping and DNA are beginning to be used (WFFT 2017), there is no legal requirement for privately owned elephants to be marked in this way (*Elephant Ivory Tusks Act 2015*, CITES CoP 2017, 52).

Recommendations focus on intensifying biotechnological approaches alongside law enforcement measures to curb illegal trading. The most common offense observed in Thailand was determined to be the illegal possession of elephants without adequate identification certificates, suggesting that the elephant has been wild-caught and laundered (CITES CoP 2017, 55). To address this issue, it is suggested that penalties of financial fines and prison time under the *Draught Animal Act* be increased to prevent illegal activities (ibid., 52). Although CITES finds that despite the introduction of DNA and microchip strategies there remains a high occurrence of illegal trading, experts conclude that this demonstrates the need for a more robust system of implementation and enforcement (ibid., 53-56). Concerning microchipping, the ability to transfer microchips between elephants was raised (ibid., 52), but the system was determined to act as an effective deterrent and Thailand was encouraged to continue further investing in microchipping technologies to strengthen passport (record of physical markers) and DNA testing programs (ibid., 55). The framework that is being promoted here is that biotechnology can be mobilized in a way that supports the good and desirable objective of protecting elephants in a way that establishes a politically neutral truth. By establishing an objective of upholding the law through a DNA test for example, the issues of corruption and poaching will be resolved through the simultaneous production of “indisputable” evidence and the strengthening of the law. The differences between groups including ethnic minorities, business owners, government officials, individual owners, and others, become collapsed in what promises to be an equitable or homogenous application of the law.

At the local level, biotechnological interventions have upheld this objective to apprehend the individual and preserve the trade. Responding to the ways that concerns about animal welfare are increasingly shaping public views about the acceptability of using elephants for human entertainment or economic purposes (Carlstead et al. 2013, Kopina 2016, Luh Sin 2017, Bansiddhi et al. 2019), researchers have set out to conduct behavioral and physiological studies on captive elephant populations to establish uniform welfare standards. Researchers studying captive elephant populations both in Thailand and internationally observe distressing conditions in these highly social and migratory animals that have not historically fared well in contrived environments, including high occurrences of stereotypic behaviors (defined as repetitive, invariant behavior patterns with no obvious goal or function) associated with chaining, limitations of space, and social isolation; shorter lifespans and higher rates of disease in zoo elephants; and acute stress reactions as a response to human interaction (Carlstead et al. 2013, Bansiddhi et al. 2019). An assessment of welfare conditions of 1,688 Asian elephants at 106 tourist venues in Thailand based on nine criteria (animal management, diet quality, entertainment intensity, environmental noise quality, hygiene, mobility, naturalness, shelter, and social interaction) concluded that 86% of elephants were kept in inadequate conditions (Schmidt-Burbach, Ronfot, and Srisangiam 2015 cited in Bansiddhi et al. 2019, 7).

These concerns have been repackaged by researchers as a problem of a lack of objective assessment criteria to support law enforcement measures. To remedy these issues of animal welfare, researchers propose more detailed and controlled studies of captive elephant conditions towards the development of “science-based guidelines” that government agencies can use to develop enforceable regulations to monitor the trekking industry (Bansiddhi et al. 2019, 2). Proposed studies aim to focus on two areas of trekking: the training techniques used by mahouts,

and measuring how particular tourist activities affect elephant wellbeing overall, to identify what the best management techniques are for optimizing health and welfare. Researchers are responding to the criticisms of the industry that draw attention to the harsh training techniques that are used to get elephants to participate in giving rides, performing in shows, and doing tricks like painting and playing the piano. To address issues with training, researchers propose to enact greater oversight over individual mahouts and to develop education programs for all parties involved in caring for individual elephants including mahouts, owners, and veterinarians (ibid., 8). To develop oversight some researchers are proposing that biomarker technologies that involve taking blood samples of elephants to measure their stress levels will allow mahouts to understand their elephants with certainty and experiment with more “positive” training methods to build stronger mahout-elephant relationships (ibid., 8).

The introduction of biomarker technologies to the management of captive elephant populations has been fraught with difficulties as researchers have found that the same physiological responses that they rely on to detect chronic stress are also roused in natural behaviors (for example, elevated glucocorticoids can indicate chronic stress and/or shifts in reproductive health in both male and female elephants) making interpretation a continuously difficult process (Carlstead et al. 2013, 325-326; Bansiddhi et al. 2019, 5). This difficulty in interpreting data gleaned from biomarker testing has prompted researchers to advocate for greater control over experimental conditions to allow for improved accuracy in measurement (Carlstead et al. 2013, 326; Bansiddhi et al. 2019, 9). Greater control over experiment conditions is also desired to determine the amount of work stress that can be tolerated by tourist elephants by doing trials with different weights and surfaces to discern elephant’s bodily limitations (Bansiddhi et al. 2019, 9). Within these approaches there is a purposeful fracturing of the

contemporary captive elephant experience from both their wild counterparts, and their welfare conditions in the teak trade. Significantly, what is also systematically excluded from these approaches is the already existing knowledge of caring for captive elephants possessed by mahout families who continue to experience the shifting conditions and attitudes towards elephant care as a significant dimension of both their family histories and their ongoing, intimate knowledge of animal welfare.

This manufacturing of a “clean slate” in the study of tourist elephants allows the necessity of the trekking industry to remain stable as the only viable solution for the crisis of unemployment faced by mahouts and elephants, and as a “Thai” tradition in need of preservation. This perception of elephant trekking as a “Thai” tradition, despite its origins within Karen communities considered to be of dubious citizenship within Thailand and its reliance on migrant and/or lower class laborers (Chapter Two), places the existence of the industry itself as outside of critique, and the current issues of animal welfare, violence, and inequality are repackaged as problems that require technological interventions to manage. The social-historical conditions that brought the development of modern science, the emergence of the modern Thai state, and the exploitation of labor accompanied by environmental degradation to affect one another become effaced by fixing the trekking industry as a set of unique circumstances requiring “unprecedented” technological innovations to solve. The outcome of this erasure of the wider social and ecological aspects of the trekking industry is the authorization of intense forms of scrutiny and apprehension against mahouts that demand perfection alongside the erosion of their profession. In the same moment that the necessity of trekking and its contributions to the Thai economy are met with attitudes of pragmatism, the ongoing complaints of animal welfare at elephant camps invites further evaluation. Within this set of arguments a contradiction emerges

where continuing to promote the biotechnological fix within its current application does not acknowledge the fact that elephant welfare has continued to worsen in the tourist industry and that the number of elephants living in captivity continues to increase. The intense surveillance of mahouts who are attempting to work alongside biotechnological interventions becomes faulty as the history of their profession (Chapter Two and Three) has demonstrated the degradation of their autonomy and expertise in elephant care.

As both international and local action-plans promise to engage with the problems of trekking in an “objective manner” that upholds moral obligations to protect elephant populations, the disclosures from mahouts that detail their conditions for employment in this profitable industry exposes a deep structure of inequality that is firmly rooted in the development of the modern Thai state. Tania Li (2007, 230) argues that the fixation with the “social” as an object for reform is central to developmentalist programs in the neoliberal era. Here, the realm of the “social” is treated as distinct from political-economic relations (ibid., 230-236). This paradigm affords the economy and the nation a stable character, leaving issues of inequality and environmental degradation as objects in need of reform and intervention. In a neoliberal marketplace that promotes the expression of individual freedom through the deregulation of the market economy, marginalized populations and so-called underdeveloped societies are called to improve themselves through “training and capacity building” (ibid., 236). Neoliberalism and its emphasis on competition and accountability loom large in these multipronged strategies that promise to escalate law enforcement measures alongside plans to train and educate laborers, and uphold vulnerabilities for working-class people employed in the internationalized tourism industry.

The examination of the working conditions for mahouts in this Chapter show how their employment has taken on an “entrepreneurial” quality that exposes livelihoods to the ebbs, flows, and desires of international tourist traffic. Lunstrum and Giva’s (2020) study analyzing the drivers of the illegal wildlife trade determines that the concept of “economic inequality” rather than “poverty” speaks more adequately to the circumstances of people who work in trades that are illicit or endanger wildlife. Through an examination of the drivers of the illegal wildlife trade in the context of individuals and communities who partake in poaching rhinos in Southern Africa, Lunstrum and Giva (*ibid.*, 1) find that “economic inequality” expands the framework of poverty beyond immediate material deprivation to consider the effects of vast disparities between poverty and wealth. Upon concluding their fieldwork, the researchers identify economic drivers to include more complex motivations such as looking for a better life and escaping poverty, earning money, and a lack of available or attractive employment opportunities (*ibid.*, 3). The principle of economic inequality speaks to the impacts of wealth disparities on individuals and communities to highlight that understandings of “economic drivers” should consider how economic inequalities that constitute an organizing feature of society, operate to shape life opportunities and behaviors (*ibid.*, 4).

Taking seriously this issue of unequal life opportunities, researchers highlight that attributing poaching activities as a function of “poverty” fails to capture the profound sense of inequality experienced by communities situated within vastly unequal societies and nations. Lunstrum and Giva (2020, 5) find that some individuals participating in poaching are “motivated by a sense of freedom and self-interest that can be attained through material wealth.” This concept of “economic inequality” that considered patterns of economic development that limit life chances and produce vast gaps between the rich and the working-class speaks to the realities

of Thailand's trajectory of political-economic development where "the terms of success in economic growth have been precisely the terms of failure in goals in egalitarianism or empowerment of peasants and workers" (Glassman 2004, 153). In Chapter Two, it was demonstrated that Thailand was not "inherently" prone to economic growth, rather their integration into the world capitalist market depended on the reorientation of ecologies and social values to enter into the path friendly to global capitalist flows. This transformation relied on the development of modern science that positioned labor and nature as subjects of control and observation in the service of nation-building and anti-colonial struggles (Chapter One). Glassman (2004, 154) points out that the Thai economy has not achieved rapid economic growth *despite* deepening social inequalities and ecological problems; rather, "the Thai state has in fact made the very processes that produce income disparity and socio-ecological disamenities the cornerstone of its growth strategy".

By creating a social history of modern scientific development from the unbounded kingdom of Siam to its current functions in the modern nation of Thailand, I have attempted to demonstrate how the deepening inequalities and socio-ecological problems that Glassman (2004) cites as the foundations of Thailand's economic growth, have been historically assembled. An analysis of the social-historical conditions of the wildlife tourism industry show that the issues of economic inequality faced by people working in the industry are rooted in processes of colonial nation-building and the technical management of space that constitute the grounds of difference and class inequalities in contemporary Thai society. The experiences of marginalization faced by workers in wildlife tourism extend beyond economic concerns and include the ways that the tourism industry continues to transform individuals into service-workers to their own societies and livelihoods. The emergence of the postwar tourist industry that has now become a mainstay

in Thailand's political-economy, people's livelihoods and beliefs were called into the logic of the tourist market as expressions of "authentic" Thai culture. This transformation of livelihoods into commodities was achieved largely through the production of stereotypes that classified working-class Thai people as unskilled, subservient, and in need of development.

For many mahouts, these stereotypes have allowed their profession to be eroded by making the title of mahout a performative category in trekking camps that applies to anyone working with the elephants. For the wider group of workers employed in the trekking industry, these stereotypes have served to naturalize poor employment conditions and have subjected workers to extensive scrutiny. The promotion of elephant trekking in Thailand as a "tradition" comes into conflict with the performative nature of mahout's work in the service of a tourist audience. In the trekking camp that demands perfection in customer service, pushes elephants and workers beyond their limits, and suppresses the natural behaviors of elephants, we see that the reciprocal relationship between mahouts and elephants established during the teak trade (Chapter Two) is displaced in an environment that is shaped by market demand. This is not to romanticize the teak trade as this practice also involved suffering for elephants and the exploitation of labor, but to demonstrate how broadly classifying captive elephants as a tradition has foreclosed critical perspectives that address how these practices have changed over time. The sorts of expectations placed upon mahouts and elephants in the current moment that involves manufacturing photo opportunities, dressing elephants in full costume to give rides to tourists, and selling luxury travel packages, stand in contrast to the familial bonds that many mahouts claim defines the practice of living with elephants. This stabilizing of tradition alongside the market economy as the "bottom line" of this issue invites biotechnology to interpret what Alam (1978) calls the "basic constituents of matter," in this case the physiological functions of the

elephant, to authorize the industry to continue while subjecting the social elements of trekking to evaluation of an alienating standard and criteria. The importance of the social-historical approach in this case, and the history of science more broadly, is that this framework makes drawing these connections between structures of marginalization and extraction possible and makes visible the ways that technologies are mobilized in upholding capitalist social relations.

The relationship between colonial-capitalist expansion and modern science is demonstrated here in the protection of the trekking industry as the invocation of biotechnology promises to reproduce the conditions for accumulation while maintaining control over its labor force. Timothy Mitchell (2002) in his aptly named *Rule of Experts* describes the practices that translate issues of social inequality into issues of social disfunction to be solved by technical interventions. Mitchell (2002, 37) argues that the construction of the field for modern technological intervention requires a reorganizing of knowledge where “in some ways, rather than applying knowledge to the world, the [modern scientific] world took it away”. To achieve claims that modern technical expertise could overcome the obstacles to social improvement, the mobilization of technical interventions involves the “reorganization of knowledge” rather than an introduction of expertise where none had been before (ibid., 42). To maintain the focus of the trekking industry as an isolated issue of animal welfare that can be resolved through biotechnological means, the historical relationship of reciprocity that mahouts established during the teak trade and that many in present moment warn is being lost to commercialization, must be displaced in order for researchers to frame their questions about perfecting captive conditions as new and urgent issues in need of innovative answers. The concept of the “ecology of knowledge” (Chapter One) is useful here as we see that the findings of these biotechnological studies

conducted on captive elephant populations will be impactful as long as the research questions continue to ask how to maintain the industry.

To re-engage the central argument of the importance of the social-historical approach in Chapter One that set out to show how the rise of capitalism made particular aspects of experimental science possible, and at times necessary, the current conditions of the trekking industry demonstrate how biotechnologies in this case are called upon to conceal the limitations of the industry and the contradictions of capitalism more broadly. Drawing from Karl Marx, Duffy (2015, 530) reminds us that capitalist production requires extraction of surplus labor from labor and nature, and that “[as] extraction increases certain contradictions emerge that prevent further growth, and so capitalism sows the seeds of its own destruction.” In order for cycles of accumulation to continue, these contradictions must be overcome and “growth can only continue if there is greater exploitation of (extraction from) labor or the environment” (ibid., 530). As the contradictions and limitations emerge through the use of excessive force to maintain control over elephants, instances of injury and death of workers in trekking camps, and persisting cases of poaching despite an intensification of law enforcement measures, and the fact that conditions in trekking camps appear to be worsening rather than improving, researchers involved in biotechnological research continue to call for increased control over socio-ecological conditions. This trajectory demonstrates that if these uncritical applications of biotechnology continue to be trusted as objective arbiters in this complex case, then the issues of trekking are likely to worsen at the expense of elephants and people working in this dangerous industry. As biotechnologies continue to legitimize the industry and welfare concerns continue to emerge, modern scientific knowledge that is embedded in colonial capitalist expansion will continue to reproduce its own problematics. Environmental degradation through this logic becomes an object of thought that

can only be managed through modern science, rather than social phenomenon that can be actively reshaped.

The role of the “biotechnological fix” in concealing these capitalist contradictions is demonstrated in the ways that biotechnology continues to be promoted in strategies that emphasize the urgency of environmental degradation, while advancing private sector interests as the most promising partners in combatting ecological destruction. A report titled “Southeast Asia at the Heart of the Wildlife Trade” (Krishnasamy and Zavagli 2020) compiled by wildlife monitoring network TRAFFIC in partnership with CITES, investigating the challenges facing the management of biodiversity and management of trade in wildlife, prioritizes private sector partnerships with the transportation, tourism, international business, and financial industries as a primary strategy needed to combat mass biodiversity loss in Southeast Asia. Researchers conclude that the illegal movement of wildlife via poaching and trade routes, and via captive breeding programs with loopholes in regulation, can be addressed through more robust science in establishing wildlife management regulations and through “cross-sector cooperation” involving “increasing knowledge, compliance, and vigilance” by businesses to interrupt the movement of illicit shipments of wildlife (ibid., 7). This report that details the devastating effects of environmental degradation including instances of “empty forest syndrome” in areas of Southeast Asia due to the rapid loss of biodiversity to the wildlife trade (including the exotic pet and tourism industries), puts forth a familiar proposal for “apprehension” at the source by ramping up law enforcement strategies to increase convictions for wildlife crimes (ibid., 43) and investing in improved technologies to monitor trade (ibid., 6), coupled with a strong push to explore partnerships with private sector actors “to be the eyes and ears of enforcement agencies by facilitating the tracking of bank accounts and transactions of businesses and individuals linked to

wildlife crime” (ibid., 92). This strategy that merges private sector interests with the mobilization of biotechnology to advance the apprehension of workers involved in wildlife industries continues to advance the logic of science and market forces as quick and guaranteed fixes of complicated cases of environmental degradation. In the interest of reaching immediate solutions to complicated problems, the larger issues of incentivizing apprehension remain unexamined.

Lunstrum (2018) analyzes how the contributions of economic actors who invest in technological strategies for wildlife protection and management strengthens state power by enabling intensified state control over labor, territory, and resources. Concerned with the state-nature-capital relationship, Lunstrum (2018, 1022) investigates the ways that state militarized conservation is enabled by the pressure to protect biodiversity. In Southern Africa where the poaching of rhinos for their horns is threatening the survival of the species, Lunstrum (ibid., 1024) observes how capitalist social relations are strengthened with the infusion of wealth into militarized conservation initiatives by allowing state conservation authorities to better exercise “their complex monopoly on the legitimate use of violence”. Lunstrum (ibid., 1025) refers to this intersection of challenges in preserving biodiversity and the large-scale securitization of civilian spaces as “green militarization” where instances of environmental degradation are being classified as security threats, fit comfortably into the large scale securitization of society.

In the context of rhino conservation, while militarized rhino protection is not centrally motivated by economic incentives, it has become increasingly shaped by partnerships with for-profit firms and private donors. Partnerships between military corporations that provide South African conservation officers with military technologies and training, intersect with the projects of private donors that are enabling rhino relocations into “safe zones” usually located into heavily-militarized Botswana that proudly advertises a “shoot on sight” policy for poachers

(Lunstrum 2018, 1026-1027). In the Southern African region these intersections are observed in conservation strategies that operate through the “outsourcing of green militarization” (ibid., 1029). In South Africa, the state-owned and for-profit company Denel SOC Ltd. specializing in “innovation, defense, security and related technology solutions”, signed a landmark agreement with Kruger National Park to protect the country’s heritage (ibid., 1028). As Denel SOC Ltd. is South Africa’s largest producer of defense equipment, this deal demonstrates a clear incentive to advance the militarization of this park space. Less explicit are the ways that this deal intersects with projects like “Rhinos Without Borders” that relies on biotechnological research to facilitate rhino relocation to maintain genetic diversity across range states including South Africa, Mozambique, and Botswana. The “Rhinos Without Borders” project that is headed by distinguished wildlife photographers Dereck and Beverly Joubert relies on partnerships with luxury tourist outfitters and large private-donor endorsements (Warren Buffet is a notable contributor) to manage rhino relocations (ibid., 1029-1030). Lunstrum (ibid., 1030) traces this complex web of donor and state relations to demonstrate how the outsourcing of green militarization is achieved by manufacturing political neutrality by viewing rhino relocations to spaces in Botswana that have a shoot on sight policy for poachers as a decision that is statistically motivated (moving the rhinos to where they will have the best opportunity for life), while leaving the violence that makes these spaces statistically desirable unchallenged.

These relationships between for-profit state military corporations, luxury tourism operators, and private donors enables state governments and private sector interests to realize their intersecting agendas (Lunstrum 2018, 1030). Within these social-historical circumstances of market incentives for militarization and state control over labor, we see that biotechnologies become a vector that make the surveillance, management, and apprehension of labor possible.

Returning to TRAFFIC's (Krishnasamy and Zavagli 2020) strategy to combat wildlife trading activities in Southeast Asia, we can see similar relationships between private donors and state enforcement actors being encouraged. Thailand was cited as a country that has a reported low rate of prosecution and strong convictions for wildlife crimes (*ibid.*, 79). To combat this, the Thai government and other enforcement agencies in Southeast Asia are encouraged to pursue relationships with American and European security and technology companies to improve law enforcement and wildlife management (*ibid.*, 8). Further research is needed to determine the extent in which the application of biotechnological tools benefits corporations and the industrial-political complex in Thailand, however the context in Southern Africa and the strategy put forth by TRAFFIC (Krishnasamy and Zavagli 2020) draw our attention to the critical implications of this approach.¹⁸

The arguments that support the biotechnological fix, private sector involvement, and discipline and apprehension at the so-called source of distressing conditions for wildlife (focusing developmentalist programs on individual mahouts, and calling for the harsh punishment of low-level wildlife traffickers) as the mechanisms for responding to issues with haste and certainty, present methodological problems that should be at the crux of critique of current mainstream methods in addressing the problems of elephant trekking and the larger scope of wildlife protection. In this Chapter that has focused on the debates and stakes of the trekking industry has worked to demonstrate that biotechnological approaches that enter into the world of elephant trekking through the biology of the captive Asian elephant, are unable to produce

¹⁸ It is important to note a limitation to my research on this question of tracing market incentives for the application of biotechnology in the elephant trekking industry. As my research is limited to materials published in English, it is likely that this information is available in Thai language publications. Linking my research with Thai-speaking experts will be critical to the mobilization of this research. My limited knowledge of the Thai language is a significant limitation that will need to be navigated in my long-term investment with these research questions through advancing my language skills and pursuing partnerships with experts and organizations in the field.

interventions that can see or transform the capitalist social relations that make the industry possible in its current problematic form that degrades both animal welfare and the lives of working class people. By reducing the trekking industry to strategies that enforce punitive measures for accountability upon individuals and distilling the problems with captive elephants to the molecular level or the “basic constituents of matter” (Alam 1978, Chapter One), the primary function of biotechnology in this case becomes mystifying the social-historical conditions of colonial-capitalist expansion that allow living with elephants to take place in this way.

The reliance on biotechnology as the “truth laid bare” in complex conservation dilemmas, mystifies the reality of struggle in the elephant trekking industry by permitting the further rationalization of labor and nature, and pushing the realities of ongoing extraction and exploitation from view. Within local approaches to developing biomarker tools to interpret elephant behavior and physiology, the long-tenured knowledge of mahouts in caring for elephants is displaced by elite forms of scientific intervention that treat the current challenges of animal welfare as disconnected from the challenges that mahouts have navigated from the teak trade the present. In the push to find time-sensitive solutions to address elephant welfare, the devaluation of the skills of mahout families is being eroded with the widespread rationalization of their profession that first recruits vulnerable laborers to take on a dangerous position that many are ill-equipped to take on safely. What becomes lost are mahouts who love their elephants, are invested in the solution to declining welfare standards, and have been working to navigate the contradictions of caring for elephants throughout rapid industrial development in Thailand. In their place, wealthy land and business owners partnered with scientists in favor of the technological fix, threaten to step into the industry and establish the bare minimum standards

for elephants and continue to profit from the same structures of inequality that have positioned working class people and wildlife for exploitation under the guise of technical factability and improved accountability. Within its current organization, I argue that the implementation of biotechnology in the elephant trekking is not equipped to transform the industry, but will continue to push the contradictions of capitalism from view.

CHAPTER FOUR: Conclusion

This paper set out to investigate how tools for discerning the “truth” of the world have been historically assembled, and how they have been shaped by social relationships over time and space. Chapter One challenged the notion of modern science as an objective or value-free organizer of the world by situating scientific methods and findings within their social-historical conditions of emergence, to demonstrate that “science” as a subject of power operates to reflect a view of nature that does not exist independent of historical-material influence. In Chapter One, I aimed to show how the conditions of the rise of capitalism made particular aspects of experimental science possible (and at times necessary) through the subjugation of gendered and racialized subjects, and a new-found enthusiasm for dominating nature. In the case of Siam, I demonstrated how a distinct modern scientific paradigm emerged as a response to new socio-spatial challenges as a result of colonial-capitalist expansion into Southeast Asia during the nineteenth century. As a product of colonial imposition and the repackaging of premodern knowledges and politics, this “epistemological hybrid” (Winichakul 1994) of modern science has become foundational to contemporary Thai nationalism as a framework for the technical management of territory and labor to produce conditions for economic growth, while preserving the “authentic” and anticolonial essence of “Thai” society.

Chapter Two has analyzed the scientific rationalization of land and labor during Thailand’s Post-World War II “American Era” that established an internationalized and service-based economy. A significant aspect of the dynamics of the service-based tourism industry that this Chapter set out to highlight are the constructions of working-class Thai people as naturally subservient to hierarchy and authoritarianism, as “exotic” and passive, and as unsuited (or undesiring) of better employment and labor conditions. By engaging Glassman’s (2016) analysis

of “Asian Values” as a central concept in theories of political economy and investigations into the sexualization of Thai society at the advent of tourism, this Chapter has attempted to highlight how the exploitation of working class people became naturalized in the service of ruling-class interests. Glassman (2016, 325) points out the concept of “Asian Values” that puts strong emphasis on value systems based on collective wellbeing as the “core” of Asian societies has been co-opted in favor of capitalist accumulation. By taking up arguments that critique Eurocentric perspectives that privilege Western norms as a frame of reference for all societies, ruling class interests have repackaged these arguments to position the exploitation of working-class laborers as outside of critique by positioning “collectivism” as a static and homogenous element of the “Asian” experience. These conceptual moves place an engagement with worker rights and mobilization as a critique of Thailand’s national development as outside the acceptable realm of critical intervention, allowing ruling class ideology to stand in as the universal experience of Thai society.

Chapter Three set out to demonstrate how the reliance on biotechnologies as the solution to the complex problems of elephant trekking function to conceal the contradictions of capitalism. As capitalist modes of production meet the limitations of labor and the exhaustion of ecological surplus, these contradictions must be overcome to allow perpetual growth and expansion to continue (Bannerji 2005, Duffy 2015). The integration of biotechnology into strategies for improving animal welfare, enhancing law enforcement measures, and enforcing accountability for individuals working in the trekking industry and its associated trafficking activities, biotechnologies within the frameworks of colonial-capitalist expansion operate to mystify the conditions of exploitation and extraction that make elephant tourism and other wildlife industries possible. Chapter Three set out to demonstrate that the rationalization of labor

through biotechnological interventions not only reinforces neoliberal logic that demands accountability and perfection from individual workers regardless of life chances and conditions of employment, but also contributes to the declining animal welfare standards that are devastating elephant populations. By devaluing the role of the mahout and reducing the profession to an “entry level” position with poor working conditions, elephants become unwell with this loss of care and consideration for their futures outside of “paying their way” in trekking camps. The uncritical application of biotechnology in this case threatens to enclose elephants into perpetual observation to insulate the tourism industry from critique, while mahouts and other service workers become increasingly vulnerable to market drivers in the unpredictable tourism industry.

By drawing attention to these issues of class inequalities in applying a social-historical approach to the study of biotechnology in the trekking industry, the issues of animal welfare in trekking camps do not become peripheral to discussions about the industry but rather become amplified as they are situated within a constellation of social relationships in urgent need of transformation. Intellectuals and activists in Thailand and internationally have been working to mobilize methods that draws these issues of colonial capitalist development, labor exploitation, and animal welfare together as interconnected issues. Activists successfully drew attention to the issues of captive wildlife during the premiership of Thaksin Shinawatra who was one of Thailand’s biggest proponents of wildlife tourism. Shinawatra’s plans to open a luxury venue in Chiang Mai that would showcase exotic animals from Southeast Asia and Africa and make these animals available for consumption as ‘exotic’ dishes, was halted by environmental activists in both Thailand and Kenya who successfully blocked the import for thousands of wild animals from Kenya for display and consumption (Cohen 2009). In Thailand, ongoing efforts from

NGOs, intellectuals, and activists are working to shape a new landscape for captive elephants that carefully considers the social and economic factors at stake for the labor force. Under the leadership of Lek Saengduean Chailert, who herself grew up with elephants, and her team at NGO Elephant Nature Park in Chiang Mai, many trekking camps are seeking guidance to transform their trekking operations into sanctuary models to protect the employment of their staff and improve employment and welfare standards (Elephant Nature Park 2020b). At Wildlife Friends Foundation, the availability of discounted veterinary services for all animals ranging from elephants to pet dogs are available to the local community to assist those facing financial hardship (WFFT 2018).

These advocacy efforts that are reforming the wildlife tourism industry are critical as they create alternative spaces to repair relationships with nature and create solidarities between people to build a better future. These actions that have blocked the international transit of wildlife for display as “exotic” luxury goods, engaged with trekking camps willing to consider alternatives, and provided affordable animal care, are providing people with the resources needed to build better futures with dignity and respect for their circumstances; and are best positioned to lead action towards social and environmental justice. In writing this paper I have aimed to contribute to these movements by analyzing how the conditions of the current crisis have been historically assembled. In this analysis, I have worked to draw connections to deepen understandings of capitalist social relations and environmental degradation to reconsider the preferred scope and methods for addressing environmental problems. By linking elephant trekking to issues of capitalist expansion, development, and the foundations of the service-based economy, I challenge the biotechnological approach in its current form that reduces the trekking industry to issues of individual accountability and physiological function.

The social-historical approach allows us to link complicated cases like elephant trekking to larger struggles for social justice to inspire transformation. My paper contributes to scholarly works in the field of science and technology studies that aims to situate the promises of science and technology to alleviate some of our most pressing social and environmental problems. Embedded within the promises of objectivity and stability in scientific inquiry in addressing complex problems with absolute certainty and mastery is the belief that with the assistance of technological interventions, societies organized by capitalist social relations can continue to operate unchallenged. This paper has worked to bring technologies into the realm of limitation and accountability. I have worked to demonstrate that the assumptions that the biotechnological fix in its current form relies on class dynamics that are at the heart of environmental degradation. I advocate here for a more holistic approach in addressing the elephant trekking industry from the grounds of the social which will allow us to understand how the social conditions orientate these bio-technological interventions into prefabricated solutions. This investigation calls attention to the need for transformation of, rather than amelioration within a system that relies on exploitation, oppression, and the further rationalization of the labour force.

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