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**Honey and Humble: Bee Introductions, Environment, and
Ideology in Aotearoa New Zealand, 1839-1900**

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of
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Holly Elizabeth Parker



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Abstract

In the nineteenth century, bees were used as biological agents in the transformation of the Aotearoa New Zealand landscape by European settler colonists. This transformation adhered to visions that fit British religious, economic, and imperial ideals. These idealised attitudes were communicated through the development of narratives; about landscape, religion, bees, and of Europeans themselves. These idealised narratives served as a nexus of guiding ideologies. While bumblebees were physical instruments in the transformation of the landscape, honeybees served to reinforce both religious and industrial ideals. A variety of threads weave together to create this web of European ideologies, including gender, religion, and economics – all of which can be examined through the lens of bees. Ultimately, this thesis analyses the environmental transformation of the Aotearoa New Zealand landscape in the nineteenth century, specifically between 1839 and 1900, using bees as a cultural framework and tool to do so.

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Introduction

“The country is good and I like it: before long, it will be a land flowing with milk and honey”.¹

The view of Aotearoa New Zealand as a land ripe and brimming with potential was the consistent narrative throughout the nineteenth century. Propaganda of a fertile and verdant environment, ready and waiting, enticed European settlers to colonise the landscape. Not content with the native flora and fauna, the newcomers imported foreign species, forever changing the ecosystems of Aotearoa New Zealand.

This thesis will examine the importation of new bee species to Aotearoa New Zealand, specifically honeybees and bumblebees, in the nineteenth century, including the cultural and environmental impact of these introductions. While Aotearoa New Zealand was home to many species of native bee, British colonisers introduced several species for their own endeavours. The introduction of foreign bee species into Aotearoa continued well into the twentieth century; however, the greatest impact of introduced species was in the latter half of the nineteenth century. Therefore, this thesis will examine introductions between 1839 and 1900 of both honeybees and bumblebees.

Aotearoa New Zealand has long had the title of ‘a land of milk and honey’. This thesis renegotiates this title, placing a spotlight on the overlooked multispecies histories of Aotearoa New Zealand. Specifically, introduction of the species was *necessary* to Aotearoa New Zealand’s ecosystem for this vision to come to fruition. After all, there is no milk without the pasture and bumblebee pollination, no honey without honeybees, not without costly import at least. The introductions of foreign bee species sits within the wider context of European colonist ideologies and reveal a nexus of connections between these small creatures and land-transforming narratives.

Ultimately, the introduction of bees had a massive, and often overlooked impact on the landscape of Aotearoa New Zealand. This thesis will argue that the inclusion of bees within the wider historical narrative of Aotearoa New Zealand history is a lens that has been missing from previous scholarship. Further, the engagement with bees

¹ ‘Extract of a Letter from a Wellington Settler’, *The New Zealand Journal*, 6.169 (1846), 142, (p.142)

as a focus of historical study highlights more than simply physical landscape, but rather, the underlying ideologies behind colonial transformation. In both a physical and metaphorical sense, bees have contributed to Aotearoa New Zealand history in deeper ways than previously envisioned.

Historiography of Animal, Insect and Environmental Histories

The ‘Animal Turn’ refers to a rising popularity of ‘more than human’ scholarship in historiography. This scholarship concentrates, as the name suggests, on animals as a central focus for investigating historical events.

In *Animalia*, Antoinette Burton and Renisa Mawani discuss the centrality of animals to Britain’s imperial history, endeavouring to rethink the British Empire as a “multispecies project”.² Notably, they comment on the Victorian British tendency to conceptualise the animals they engaged with in a variety of ways—“symbols, companions, and machines”. Indeed, “the importation of animals formed a central part of the British Imperial ethos.”³

Despite the contributions of bees to humanity through their products and pollination, *Animalia* gives them little mention. “B is for Boar” rather than bee. This omission is not unusual for animal histories, which tend to fleetingly mention bees. While there are notable works that do discuss history of bees, such as Eva Crane and Peter Barrett, these works are overwhelmingly focused on the bees themselves and leave little discussion of the place of bees in a wider historical context.⁴ Works such as Karen Raber’s *Animal Bodies, Renaissance Culture* briefly mention bees however they are not central to the narrative.⁵ Authors such as Tammy Horn have made inroads into incorporating bees into wider histories. Her works *Bees in America: How the Honey Bee Shaped a Nation* and *Beeconomy: What Women and Bees Can*

² Antoinette Burton and Renisa Mawani, ‘Introduction: Animals, Disruptive Imperial Histories, and the Bestiary Form’, in *Animalia: An Anti-Imperial Bestiary for Our Times*, ed. by Antoinette Burton and Renisa Mawani, (Duke University Press: 2020), pp. 1-16 (p. 6).

³ Burton and Mawani, p.6.

⁴ Eva Crane, *The World History of Beekeeping and Honey Hunting*, (New York: Routledge, 1999); Peter Barrett, *The Immigrant Bees 1788 to 1898: A Cyclopaedia on the Introduction of European Honeybees into Australia and New Zealand*, (Australia: Peter Barrett, 1996)

⁵ Karen Raber, *Animal Bodies, Renaissance Culture*, (Philadelphia: University of Pennsylvania Press, 2013) p. 131.

Teach Us About Local Trade and the Global Market centralise bees in a wider historical context whilst also keeping them the focus of historical investigation.⁶

This thesis, in a similar manner to Tammy Horn, bridges the gap between larger historiography and niche interest. It introduces bees back into histories, adding further nuance to current historical narratives. Specifically, this thesis attempts to examine *bees in history* rather than a history of bees. By engaging with colonial and environmental histories it contributes to fill the silences. Challenging the focus of traditional imperial histories, as *Animalia* does, by recentring the focus of discussion away from humans specifically and aiming for a holistic discussion that includes animals, insects, and the environment. In this way, the silences of bees in wider literature can begin to be addressed while simultaneously utilising these creatures as vehicles to examine environmental and colonial histories.

Examining history through the lens of ‘more than human’ is a realm of studies that has been expanding for some time now. Harriet Ritvo’s 2007 article “*On the Animal Turn*” acknowledges the existence of animals throughout scholarship. From scientific studies and appearances in art and literature to historical analysis of animal-human institutions such as zoos or humane societies and biographies of famous animals, the animal has always been present.⁷ However, Ritvo distinguishes the animal turn in historiography by stating that it not only creates new research potential, but also allows the exploration of fresh relationships between research and subject, including “new understandings of the role of animals in the past and present” particularly the engagements between humans and other species.⁸ This area of research, while gaining in popularity and respect, lies on the margins of many disciplines whilst also hovering at the intersection of disciplines. This position, Ritvo notes gives power to this area of research, “Its very marginality allows the study of animals to challenge settled assumptions and relationships — to re-raise the largest issues — both within the community of scholars and in the larger society to which they and their subjects belong”.⁹

⁶ Tammy Horn, *Beeconomy: What Women and Bees can Teach us about Local Trade and the Global Market*, (Lexington: University Press of Kentucky, 2012); Tammy Horn, *Bees in America: How the Honey Bee Shaped a Nation*, (Lexington: University Press of Kentucky, 2006)

⁷ Harriet Ritvo, ‘On the Animal Turn’, *Daedalus*, 136.4 (2007), 118- 122 (p. 118, 119).

⁸ Ritvo, ‘On the Animal Turn’, p.119.

⁹ Ritvo, ‘On the Animal Turn’, p.122.

Joshua Specht recognises Harriet Ritvo as a seminal scholar in animal history. Whilst Ritvo was not the first author to investigate the potential of this field, Specht recognises Ritvo's influence in the gaining popularity and acknowledgement of the area. However, while Ritvo in 2007 celebrates the marginality of the area, Specht writing in 2016 recognises the challenges faced by popularity: "no longer can the field play the underdog".¹⁰ Further, with rising popularity comes a development of notable themes within the field: within animal historiography, Specht notes a persistent "animal lens". Described as a tool to understanding "complicated historical phenomena by filtering them through an analysis of human-animal relationships", this seemingly narrow window, in actuality, reveals a greatly diverse array of potential research.¹¹ While there are many varied areas of history that can be examined through an 'animal lens', one of the richest areas of research is colonial and imperial histories. The use of European animals as colonization tools, acclimatization societies and animals as spectacles are all examples of the ways in which the 'animal lens' can be applied in the context of colonial and imperial histories. Indeed, the former two examples are ones which are examined in this thesis. The effectiveness of the animal lens in history analysis is perhaps due to the animal lens acting more so as an 'animal mirror'-reflecting back human behaviour through the mirror of animal behaviour. In other words, "animal behaviour reflects or illuminates broader points about human society or morality".¹² The ways in which humans throughout history understand, discuss and engage with animals is revelatory of human values and assumptions according to Specht.¹³

In the realms of 'other than human' history, authors such as May Berenbaum and Edward D. Melillo extend the 'Animal Turn' to include insects. Berenbaum's 1995 book *Bugs in the System* is an interdisciplinary approach to investigating the impact of insects on human life. Collating history, art, science, literature, and religion, Berenbaum demystifies the world of insects and their intersections with humans. This work, while not entirely a historical study, emphasizes the necessity of including insects in our investigations, which are tied intimately to humanity in widely

¹⁰ Joshua Specht, 'Animal History After its Triumph: Unexpected Animals, Evolutionary Approaches, and the Animal Lens', *History Compass*, 14.7 (2016), 326-336, (p.326).

¹¹ Specht, p.327.

¹² Specht, p.328.

¹³ Specht, p.328.

overlooked ways.¹⁴ Similarly, Edward D. Melillo investigates the interactions between insects and humans throughout history. His 2020 book, *The Butterfly Effect: Insects and the Making of the Modern World*, uses case studies to explore the economic and cultural histories of relationships between insects and humans, highlighting the overlooked ways in which insect life contributes to human activity.¹⁵ Of course, these examples are not the sole scholarship in this area—many authors are researching insects—they merely represent a scholarship growing in popularity.¹⁶

This thesis also borders on the edges of “cultural entomology”, a term coined by Charles L Houge in his 1987 article of the same name. Cultural entomology examines the ways in which human culture has been influenced by insects.¹⁷ I use the term ‘borders’ as cultural entomology does not extend to the practical use of insects, however it does encompass the extent to which insects influence “literature, languages, music, the arts, interpretive history, religion, and recreation”.¹⁸ The cultural influence of insects therefore, cannot be understated. Bees particularly have notable cultural significance in literature, religion, and recreation.

‘Animal Turn’ and ‘Cultural Entomology’ aside, this thesis also approaches history from an environmental perspective. Environmental history is broadly defined as “the study of the relationship between human societies and the rest of nature on which they depended”.¹⁹ The field, which first burgeoned in the 1970s, has since grown into a wealth of scholarship.²⁰ Frank Uekotter describes environmental history as a field which was once “caught between counterculture activism and professional rigor”, but

¹⁴ May Berenbaum, *Bugs In the System: Insects and their Impact on Human Affairs*, (Basic Books, 1995)

¹⁵ Edward D. Melillo, *The Butterfly Effect: Insects and the Making of the Modern World*, (United States: Alfred A. Knopf, 2020)

¹⁶ For examples of this growing literature see: Tammy Horn, *Beeconomy: What Women and Bees can Teach us about Local Trade and the Global Market*, (Lexington: University Press of Kentucky, 2012); Tammy Horn, *Bees in America: How the Honey Bee Shaped a Nation*, (Lexington: University Press of Kentucky, 2006); Thor Hansen, *Buzz: The Nature and Necessity of Bees*, (London: Icon Books, 2019); Robert N. Wiedenmann and J. Ray Fisher, *The Silken Thread*, (New York: Oxford University Press, 2021); Timothy C. Winegard, *The Mosquito: A Human History of Our Deadliest Predator*, (New York: Dutton, 2019); J. F. M. Clark, *Bugs and the Victorians*, (Yale University Press, 2009); Harriet Ritvo, ‘Going Forth and Multiplying: Animal Acclimatization and Invasion’, *Environmental History*, 17.2 (2012), 404-414

¹⁷ Charles L. Houge, ‘Cultural Entomology’, *Annual Review of Entomology*, 32. 1 (1987), 181–99.

¹⁸ Houge, p. 181.

¹⁹ J. R. McNeill and Erin Stewart Mauldin, ‘Global Environmental History: An Introduction’ *A Companion to Global Environmental History*, (Wiley-Blackwell, 2012), pp. xvi–xxiv (p. xvi)

²⁰ Mauro Agnoletti and Simone Neri Serneri. ‘Environmental History and other Histories. A Foreword’, *The Basic Environmental History*, ed. by Mauro. Agnoletti and Simone. Neri Serneri (Switzerland: Springer International Publishing, 2014), pp. vi-xiii (p. viii).

has grown into “an established part of the scholarly community”.²¹ The growth of the field has allowed for greater specialisation enriching the discipline.²² As this thesis engages with discussions of landscape transformation, an environmental history approach is also a relevant sub-discipline to engage with methodologically.

From an Aotearoa New Zealand perspective, Tom Brooking and Eric Pawson are notable authors approaching Aotearoa New Zealand history from an environmental perspective. Their edited book, *Making a New Land: Environmental Histories of New Zealand* stands at a disciplinary crossroads, incorporating history, ecology, geology, and law. Brooking and Pawson discuss the concept of the terms ‘nature’ and ‘environment’, arguing that the two are not interchangeable. Rather, they contend that ‘nature’ is a human category; that is, it is “seen, understood and shaped by human actions, people have always ‘made’ nature”.²³ Further collaborative work by Brooking and Pawson, *Empires of Grass*, highlights the transformative impact of European agriculture on the Aotearoa New Zealand landscape.²⁴ This work is particularly salient as this thesis will also in part examine this topic. However, I aim to extend this discussion, incorporating bees back into environmental histories of Aotearoa New Zealand.

Methodology and Limitations

The focus of this thesis will pay most attention to European—mainly British—settlers and missionaries arriving in Aotearoa New Zealand, their attitudes surrounding the landscape with respect to their narratives and ideologies, and how bees fit into this vision. Māori views on landscape, environment and introduced bees will not feature in this thesis, although there is evidence of engagement with beekeeping practices in the early nineteenth century.²⁵ Sufficiently addressing this perspective extends beyond the bounds of this thesis, despite the relevance to the topic. While it is an area of research that would benefit from further investigation, I lack the linguistic

²¹ Frank Uekötter, ‘Thinking Big: The Broad Outlines of a Burgeoning Field’, *The Turning Points of Environmental History*, ed. by Frank Uekötter (Pittsburgh: University of Pittsburgh Press, 2010) pp. 1-12 (p. 1)

²² Uekötter, p. 3.

²³ Eric Pawson and Tom Brooking, ‘Introduction’, *Making a New Land: Environmental Histories of New Zealand*, ed. by Eric Pawson and Tom Brooking (Otago University Press:2013) pp. 17-31 (p. 22)

²⁴ Eric Pawson and Tom Brooking, ‘Empires of Grass: Towards and Environmental History of New Zealand Agriculture’, *British Review of New Zealand Studies*, 17 (2008) 95-114

²⁵ William Charles Cotton, *Ko Nga Pi*, (Wellington: St Johns College Press, 1849)

understanding and cultural perspective to do this potential research the justice it deserves.

The research for this thesis has predominately used text based sources, published and unpublished, and from a majority European origin. The increasing digitisation of primary source texts made this thesis possible during the COVID-19 pandemic, however not all sources have recieved the digital treatment. This research has been limited by an inability to fully access required archives due to the ongoing pandemic. While I did visit the Alexander Turnbull Library, my research there was cut short by the Wellington protests, lockdowns preventing me from accessing other archives. The effect of the pandemic manifests itself in this reseach as a reliance on digital sources and texts readily available, and unfortunate exclusions, such as William Charles Cotton's diary which was sadly inaccessible. However, these limitations have not prevented thorough analysis of the accessed sources.

There are several limitations of this research however, that require indication. Most notably, this research heavily features sources produced by Europeans. This focus on European-centric source material is not done with intent to contribute to the silence of Māori voices. Rather, several contributing factors result in this disparity. Notably, as my research focuses heavily on British Imperial ideologies of Aotearoa New Zealand, primary sources produced by Europeans are particularly useful in revealing British ideals surrounding the landscape of Aotearoa New Zealand, bees, and the narratives settler colonists produce about themselves. For example, sources such as Acclimatisation Society Records provide a representation of European attitudes towards the introduction of species and are deeply illuminating to examinations of how Europeans viewed ideal landscape use, for leisure and cultivation.

Bee Species

I feel it is necessary to introduce the bee species that I will be discussing throughout this thesis. This introduction will be brief but will serve to distinguish the bee species relevant to this thesis, whilst also illuminating the characteristics of these species that make them notable. Before embarking on this research journey I had preconceived notions around bees that throughout my readings I discovered to be false. Therefore, this outline provides a base knowledge of bee species that enables greater depth of understanding throughout the text. Those comfortable with entomology may find this

outline ‘surface level’, however as this thesis examines (something larger than simply bees) this level of understanding I feel is sufficient.

The species of bee examined throughout this thesis will be those within the *Apis* and *Bombus* taxonomic groups. In other words, honeybees and bumblebees. However, as Michener notes, the word ““bee” connotes honeybees and their social relatives”.²⁶ Indeed, this is a fairly narrow understanding of bees considering the term “bee” represents around 20, 000 diverse species worldwide.²⁷ Further, popular conceptions of bees as social creatures must be discarded as Michener notes “the great majority of bees are solitary creatures”.²⁸ For example; while Aotearoa New Zealand has around 30 native species of bee, it had no insects that stored honey prior to the introduction of *Apis mellifera* in the nineteenth century. Not all bees follow the behaviour patterns that are characteristic of honeybees, rather, the sociality of honeybees is more an ‘exception to the rule’ as it were; other species leaning more towards solitary behaviour.

The Family that honeybees belong to, *Apidae*, contains all the highly social bees which Michener describes as “honeybees, stingless honey bees, and bumblebees-as well as the American Euglossini”.²⁹ The subfamily *Apinae* contains the true honeybees.³⁰ Tribe Apini contains only the genus *Apis*.³¹ This genus contains around 11 species according to Michener, their native habitat being previously contained to the ‘Old World’, Europe, Asia and Africa.³² Human intervention introduced *Apis mellifera*, the most common species in genus *Apis* and typically known as the European honeybee, worldwide.

²⁶ Charles Michener, ‘A Classification of the Bees of the Australian and South Pacific Region’, *Bulletin of the American Museum of Natural History*. 130 (1965) pp.1-362 (p.8)

²⁷ Ibid.

²⁸ Ibid.

²⁹ For those unfamiliar with taxonomic labels, from largest to smallest is as follows-Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species. Tribe, as used in the text (it is absent in *Figure 1*) belongs in between Family and Genus but below subfamily groupings. In some instances, species can also be divided by subspecies.

³⁰ Eva Crane, *The World History of Beekeeping and Honey Hunting*, p.229

³¹ Michener, ‘A Classification of the Bees of the Australian and South Pacific Region’, p. 231.

³² Charles Michener, *The Bees of the World*, 2nd ed. (Johns Hopkins University Press, 2007) p. 830.

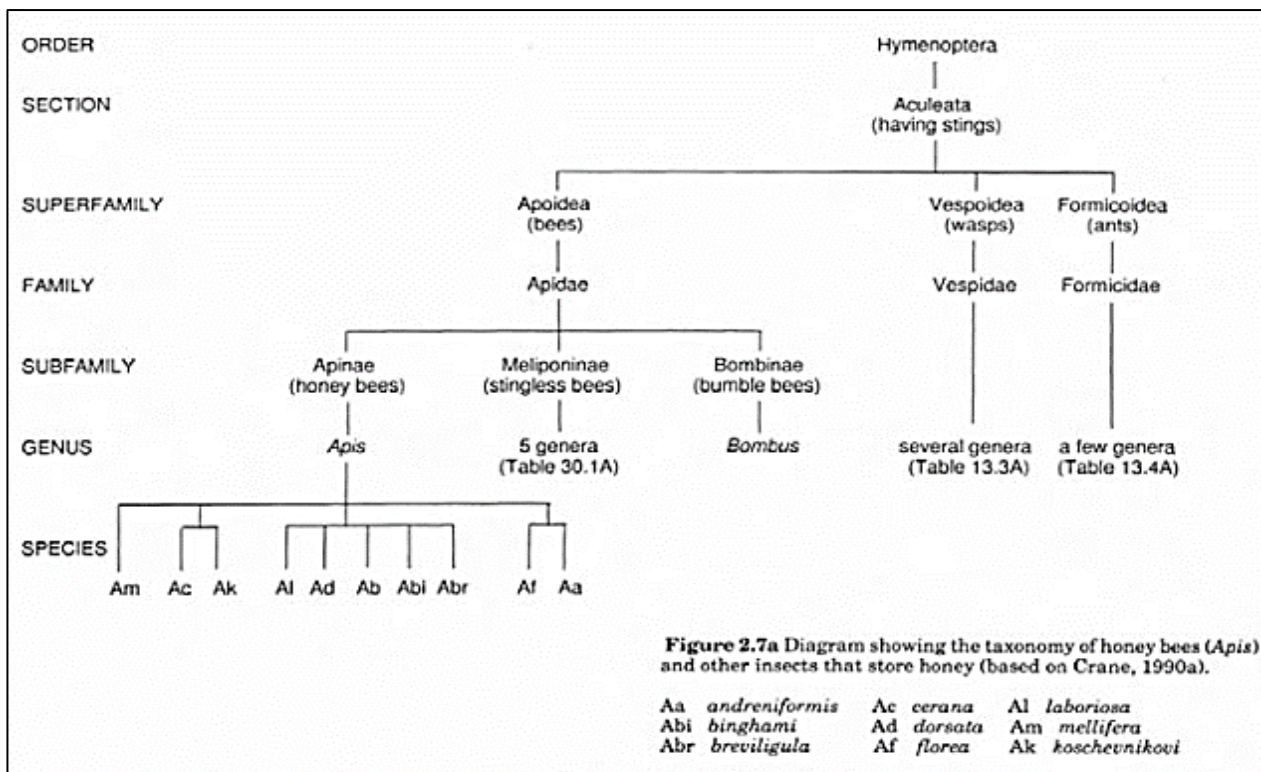


Figure 1: Bee Taxonomy

Apis mellifera is one of the specific species that this thesis will examine. Michener describes it as “one of the best known insects” in terms of physiology and behaviour.³³ Also known as the western honeybee, Eva Crane identifies *Apis mellifera* as “the most important species to man” of all the species in *Apis*, due to its wide geographic spread and domestication.³⁴

As for *Bombus*, or bumblebee, species, this group are (with a few exceptions) “all primitively eusocial” according to Michener.³⁵ Essentially, bumblebees form colonies but not as cohesively as *Apis*. In temperate regions, during the summer they reside in colonies, however, with the advent of winter, the colony dies except for new queens who hibernate alone to raise new colonies in spring.³⁶ Crane notes that bumblebees can be kept in hives and are most often employed by humans for their pollination, though the relatively little honey they produce has also historically been utilised.³⁷ Bumblebees are most useful for their pollination potential rather than any other

³³ Michener, *The Bees of the World*, p. 1.

³⁴ Crane, *The World History of Beekeeping and Honey Hunting*, p. 12.

³⁵ Michener, *Bees of the World*, p. 785.

Eusocial is a term to denote the social structure in groups of organisms. In this context it refers to a colony of organisms that collectively.

³⁶ Crane, *The World History of Beekeeping and Honey Hunting*, p. 17.

³⁷ *Ibid.*

products they produce. In the context of Aotearoa New Zealand, the pollination potential of bumblebees is what encouraged their introduction to Aotearoa New Zealand and their inclusion in this thesis. Specific species within *Bombus* will not be identified.

Overview

The discussion of introduced bee species will begin with Chapter One, which will discuss the introduction of honeybees into Aotearoa New Zealand. Private individuals were responsible for early honeybee introductions with Miss Mary Bumby the very first person to release honeybees in Aotearoa New Zealand in 1839. Chapter one will investigate Mary Bumby, as well as the person originally thought to be responsible for the first introduction, Rev. William Charles Cotton. One further person, Mrs Mary Allom will briefly be mentioned for her role in introducing honeybees to Te Waipounamu, the South Island. Further than simply outlining introductions however, the notable intersection between gender and beekeeping will be discussed, particularly the female role in beekeeping as recognised by British leading up to the early nineteenth century. This considers the ‘invisible’ role of women in such activities, which were often associated with domestic chores. This extends to the inclusion—or rather, exclusion—of women in ‘scientific’ bee spaces and beekeeping societies. I will argue that the contrast between ‘public’ and ‘private’ gender roles in nineteenth century British culture contributed to the dissemination of knowledge around female introductions of bees.

Prior to this discussion, Chapter One will outline the significance of honeybees, as a species, to humanity throughout history. This serves as a context for the wider discussion of introductions throughout the chapter, illuminating potential factors that influenced the decision to transport these insects. Furthermore, Chapter One will also analyse the relevance of discussing ‘firsts’, that is, the significance of who the ‘first’ person to introduce bees to Aotearoa New Zealand.

While Chapter One will analyse honeybees, Chapter Two will examine the introduction of a very different species: bumblebees. European settler activity in Aotearoa New Zealand preceded the introduction of bumblebees, however the insects were soon deemed to be necessary to further agricultural development. In order to enact their specific ideals of agricultural industry upon the Aotearoa New Zealand

landscape, British colonists first had to destroy the native environment. Seen as ‘unproductive’ land by colonists, the native bush was felled and swamps drained to make way for imported grass, transforming the landscape into a pastoral one. This pastoral basis to agriculture was upheld by imported seed stock until the introduction of bumblebees to aid in the pollination of red clover, an important fodder crop. Grass based products became the base of Aotearoa New Zealand’s export economy, hastened by the advent of refrigerated shipping in the 1880s. Hindering the growth of this economy was the reliance of Aotearoa New Zealand on imported seed stock as without a viable pollinator in the country, red clover remained sterile.

The concept of bumblebees as pollinators reached Aotearoa New Zealand through Darwin’s work in the mid-nineteenth century. Darwin experimented with pollination and collaborated with correspondents across the globe, his published work influencing the decision to introduce bumblebees to Aotearoa New Zealand. While private individuals were responsible for the importation of honeybees, Acclimatisation Societies were (eventually) successful in introducing bumblebees to Aotearoa New Zealand. Ultimately, this chapter will argue that knowledge of pollination, a European colonist reimagining of the landscape, and improving technology (such as refrigerated shipping), contributed to what could be called a country wide experiment—bumblebees released by Acclimatisation Societies in the hopes of improving seed yields.

Chapter Three of this thesis reveals the narratives and ideals that underlay European settler colonist exotic bee introductions in Aotearoa New Zealand in the nineteenth century. These narratives and ideals encapsulate European settler colonist ideas surrounding landscape, religion, bees and themselves. Imperial industrial capitalist ideals feature heavily as a driver for European action during this time period, namely, the transformation, destruction, and exploitation of the native landscape. These industrial capitalist ideals are closely associated with ‘improvement’ ideals, conceived by John Locke, who believed that labour ‘improved’ whatever it was applied to. European colonists extended this concept to land, transforming Aotearoa New Zealand into a pastoral-based economy. Religious, specifically Christian, ideals are a further ideology that justified the transformation of the landscape and exploitation of resources. Indeed, as all the ideologies weave together, religion is a dominant strand in the web. Improvement narratives abound in Christianity, ‘dominion theory’ from

the book of Genesis provided legitimacy to the ‘improvement’ of the landscape at the hands of European settlers. Bees interweave through all these ideologies; they were viewed as divine teachers and industrious workers who mirrored an ideal European society. This chapter argues that a nexus of ideologies motivated European settler’s attitudes towards the Aotearoa New Zealand landscape, and bees serving as a physical representation of an idealised society whilst also being wielded as a physical tool.

Chapter One: A Barrel of Bees

Honeybees are an ‘old world’ species. Their arrival in Aotearoa New Zealand contingent on the travels of Europeans. The colonisation of Aotearoa New Zealand in the nineteenth century accelerated the introduction of new species generally. The list of foreign species liberated into Aotearoa New Zealand would eventually come to include the honeybee.

Honeybees were borne across the seas on the whim of private individuals—majority of these being women. Indeed, the 1830s would see a single young woman unintentionally claim the title for first honeybee introduction. This chapter will investigate this woman, Mary Bumby, the first person to liberate *Apis mellifera* in Aotearoa New Zealand, while travelling with her missionary brother, John Bumby. William Charles Cotton, the missionary who, for a time, was believed to have claimed the title of first introduction will also be discussed. While these two people are the earliest considered introductions, several other salient introductions will also be briefly touched upon, such as those of Lady Hobson and Mrs Mary Allom.

However, this chapter will not be solely restricted to outlining introductions. Certain themes can be identified amongst the people who brought honeybees to Aotearoa New Zealand. This is an area where women are represented—Mary Bumby, Lady Hobson, Mary Allom—all names synonymous with the transport of bees into the country. Therefore, the intersection between beekeeping and gender, will be a category of analysis examined. The difference between introductions pre- and post-1840 will also be discussed, particularly the missionary activity that featured prominently in earlier introductions. An in-depth analysis of British religious and cultural ideals and their intersection with beekeeping will be reserved for later discussion in this thesis, however.

Overall, this chapter identifies key actors in the earliest introductions of honeybees into Aotearoa New Zealand in the nineteenth century, the introductions preceding a wider wave of colonisation in Aotearoa New Zealand. The overrepresentation of women and people involved in missionary activities in the introduction of bees highlights the intersection of gender, religion and environment underpinning early European settler movements and landscape transformation in Aotearoa New Zealand, a theme that will be developed further in Chapter Three. The link between

bee species introductions and missionary activity accentuates wider scholarship of missionary roles in species introduction. Furthermore, the role of women in early introductions, while seemingly challenging to nineteenth century gender roles, will be shown to fit within enduring narratives of female beekeeping.

Honeybee significance

While the lives of insects and humans have been intertwined for thousands of years, no order of insects has had as much influence as the order of social insects, Hymenoptera.³⁸ Of this order, honeybees stand above the rest in cultural significance for the Western world.³⁹ The social nature of the honeybee relates directly to their propensity to store their honey in quantities large enough for humans to exploit. Indeed, the products of bees, such as honey and wax, make them valuable commodities. Beeswax can be used in the making of candles, sealing jars or letters, as furniture polish, in making jewellery and art, in pharmacy, and cosmetics to name just a few.⁴⁰ Honey, comparatively, was primarily used as a food and sweetener, although it also had (and continues to be) been used for medicines and cosmetics.⁴¹ Furthermore, other bee products had use, such as pollen, royal jelly, venom, and propolis.⁴² With such a wealth of products and variety of uses for them, honey bees have been the insects most widely utilized by humans-mainly for their honey and wax.⁴³

Indeed, Crane states that beekeeping has been successfully carried out “in many parts of the world by beekeepers who did not understand the origin of bees, their method of reproduction, or the sex and functions of the large ‘ruler’ bee”.⁴⁴ Despite a lack of knowledge, observation was the greatest tool used by people throughout history in their efforts to understand bees. For example, while the Ancient Greeks understood that brood (bee larvae) was raised within the hive and could differentiate the cells of different bees (worker, Queen, and drone), it was not understood that the Queen bee laid the eggs from which the brood would grow. It was believed that bees collected

³⁸ Frederick R. Prete, ‘Can Females Rule the Hive? The Controversy over Honey Bee Gender Roles in British Beekeeping Texts of the Sixteenth-Eighteenth Centuries’, *Journal of the History of Biology*, 24.1, (1991), 113-144 (p. 113)

³⁹ Prete, p. 113.

⁴⁰ Crane, *The World History of Beekeeping and Honey Hunting*, p. 496.

⁴¹ Crane, *The World History of Beekeeping and Honey Hunting*, p. 502.

⁴² Crane, *The World History of Beekeeping and Honey Hunting*, p. 545.

⁴³ Crane, *The World History of Beekeeping and Honey Hunting*, p. 557.

⁴⁴ *Ibid.*

their brood from the flowers they visited. Crane quotes Aristotle as stating, “Some affirm that bees...fetch their young from the flower of [various plants]”.⁴⁵ This observation method would form the foundation of scientific studies of bees in the seventeenth century, and continuing well into the eighteenth and nineteenth centuries, forming the basis of scientific knowledge surrounding bees.⁴⁶

Importance of ‘Firsts’

The prevalence of ‘firsts’ or ‘origins’ as Douglas Booth calls it is a “historiographical paradox”.⁴⁷ That is, history is preoccupied with the origin story, the ‘first’, as a way of constructing historical narrative, despite the discipline being “ill-suited to studying firsts”.⁴⁸ Booth suggests that the typicality of historians to present their work as chronological narratives accounts for the prominence of ‘firsts’ in historical writing.⁴⁹ The ‘first’ for historians is the construction of the ‘origin myth’. However, Booth recognises the paradox that writing about firsts poses for historians—there is no beginning. Indeed, it is said that history ‘recedes’ from the search for origins; the historian clutching at the remnants—or ‘cinders’ according to Jacques Derrida—of historical evidence.⁵⁰

In the case of introductions, these ‘firsts’ serve as historical remnants of a wider context. European exultations of Aotearoa New Zealand as a land of ‘milk and honey’ have little historical frame of reference without the wider acknowledgement of colonisation. The intersection between the European ideals that promote often biblical discourse, and imperial colonisation, is the physical and allegorical use of bees.

The first introductions of bees into Aotearoa New Zealand are therefore representative of many things. They serve as a marker for increasing imperial pressure; the 1840s would see colonisation in Aotearoa New Zealand become widespread, a wave of colonists descending like a swarm of bees. In this manner first introductions serve as a transitional marker between Aotearoa New Zealand ‘before’

⁴⁵ Crane, *The World History of Beekeeping and Honey Hunting*, p. 564.

⁴⁶ Crane, *The World History of Beekeeping and Honey Hunting*, p. 405.

⁴⁷ Douglas Booth, ‘Origins in History and Historiography: A Case Study of the First Swimmer at Bondi Beach’, *Journal of Sport History*, 43.1 (2016) 21-36.

⁴⁸ Booth, p. 22.

⁴⁹ Booth, p. 23.

⁵⁰ Booth, p. 24.

and ‘after’, both in ecological and cultural terms. Further, as the majority of first introductions were conducted by women and missionaries, this opens the doors for religious and gender analysis.

Naturally, the introductions themselves are unintelligible without a broader understanding. An overview of Aotearoa New Zealand will set the stage prior to discussions of bee introduction. However, for the sake of brevity and scope, this summary will remain general and succinct.

Missionary Establishment pre-1840

In the early nineteenth century, Europeans began to visit the south Pacific more frequently. Seals, whales, timber, and flax were all commodities in this region of European interest, and European settlers in Australia forming major trading bases at the turn of the nineteenth century.⁵¹ Over the fifty years from the first penal colony in 1788, Australia, European activity had dramatically increased and so too had European presence in New Zealand.⁵²

As trade was a significant component of Britain’s imperial web, so too was Christian tradition, particularly Protestantism.⁵³ The centrality of religious ideals to imperial networks resulted in the spread of evangelicalism along imperial networks from Britain. Missionaries desired “religious and social change” and focused in on burgeoning trade routes and potential colonies in the Pacific.⁵⁴ Prior to 1840, the most prominent groups of Europeans in Aotearoa New Zealand were traders, many staying briefly, and missionaries. Indeed, Claudia Orange notes that many Europeans “who came to New Zealand at this time stayed only briefly”, apart from a few permanent trader bases and missionary stations.⁵⁵

⁵¹ Michael King, *The Penguin History of New Zealand*, (New Zealand: Penguin Random House New Zealand, 2003) p. 128.

⁵² King, p. 171.

⁵³ Tony Ballantyne, *Webs of Empire: Locating New Zealand’s Colonial Past*, (Vancouver: UBC Press, 2012) p.139.

⁵⁴ Ballantyne, p. 147.

⁵⁵ Claudia Orange, *An Illustrated History of the Treaty of Waitangi*, (New Zealand: Bridget Williams Books, 2004), p. 2.

Christian evangelising in Aotearoa New Zealand began early in the nineteenth century with Samuel Marsden in 1814.⁵⁶ Marsden, visiting from Australia, set up the first mission at Rangihoua in the Bay of Islands on behalf of the Church Missionary Society (CMS), before leaving the mission station in the trust of three missionaries; William Hall, John King, and Thomas Kendall.⁵⁷ A second mission station was opened 5 years later in 1819, at Kerikeri by Reverend John Gare Buter.⁵⁸ The Wesleyan Missionary Society (WMS) was established at Whangaroa in 1823 by Samuel Leigh, Nathaniel Turner and William White. This site would be abandoned in 1827, however a new mission site in Māngungu, Hokianga, would be established in 1828 by John Hobbs and James Stack, both of whom had previously visited the Whangaroa mission site.⁵⁹ This mission station at Māngungu would become the 'base' from where the WMS would spread throughout Aotearoa New Zealand over the 1830s.⁶⁰ The increase and spread of missions in the early nineteenth century resulted in the era between first mission and 1840 can be described as a "microcosm of pre-Colonial missionary endeavour".⁶¹ This involved widespread attempts by missionaries to convert Māori to Christianity, increase literacy (the majority of available literature was scripture), and efforts to impart 'civilised' European culture. In this manner, the missions active in Aotearoa New Zealand in the early nineteenth century had a lasting cultural impact.

Miss Mary Bumby

Miss Mary Anna Bumby arrived in Aotearoa New Zealand in 1839, travelling with her Wesleyan missionary brother John Bumby, by whom she was often overshadowed by. While she claims the first introduction of honeybees to Aotearoa New Zealand, sources that convey evidence of Miss Bumby's beekeeping activities are much harder to find than many others. Those who were outspoken of their bees, who wrote about them frequently, and discussed them with others are more likely to be recorded in the historical narrative. Indeed, it was for a long time that William Charles Cotton was believed to have introduced the first bees into New Zealand, a fact that may be further

⁵⁶ King, p. 158.

⁵⁷ Ballantyne, p. 147.

⁵⁸ King, p. 159.

⁵⁹ Paul Moon, 'Wesleyan wives : the role of women in the Wesleyan Mission to New Zealand in the 1820s', *Stimulus*, 22. 2, (2015) 22-29 (p.23)

⁶⁰ Moon, p. 23.

⁶¹ Carolyn Cordery, 'Hallowed Treasures: Sacred, Secular and the Wesleyan Methodists in New Zealand, 1819–1840.' *Accounting History*, 11. 2 (2006) 199–220 (p. 200)

from the truth than once anticipated. Miss Bumby, however, was not greatly outspoken about her winged charges, even in her own writings. Therefore, the evidence of Mary bringing bees to Aotearoa New Zealand is more difficult to come by. Second hand accounts are the most useful in this regard—such as those of Mrs Gittos who recalled Bumby’s bees at the Māngungu Mission in Hokianga, in the far north of Te Ika-a-Māui, the North Island.

Furthermore, Bumby’s infrequent trace in the historical record could be attributed to her gender and status within her Aotearoa New Zealand missionary world.

Missionary wives were ‘background’ actors in the running of the mission stations, at least this is how it appears in the historical record. The letters and journals of missionary wives rarely survive; the journal of Mary Bumby an exception.⁶² Their activities can be glimpsed through trace mentions alongside their husband’s name in the texts of others, although often in their “husbands’ writings they figure rarely, except when being wooed, or when sick or having babies”.⁶³ Indeed, the demands of mission work whilst raising children often left little time for writing, after her marriage to Rev. Gideon Smales and subsequent children Mary neglected her diary.

It is unclear whether Miss Bumby was aware of the nonexistence of honeybees in Aotearoa New Zealand before she left for her journey in 1838. Word travelled more slowly in the nineteenth century and the British Empire had only recently become invested in a concentrated effort to colonise Aotearoa New Zealand. While there was a great push in the West for scientific knowledge and the cataloguing of biological species, the extent of Mary Bumby’s knowledge about the flora and fauna of Aotearoa New Zealand remains unknown.⁶⁴ With a Missionary brother eager to travel, Mary would ultimately decide to accompany him on his journey, evidently taking her hives with her and subsequently releasing the first honeybees in Aotearoa New Zealand.

The Bumby siblings began their long journey to Aotearoa New Zealand from their native England in 1838. Mary Bumby’s diary begins on 16th August 1838, the first entry reveals the difficult emotions she experienced upon leaving both her childhood home and her father behind, knowing it was most likely she would never see either

⁶² J. M. R. Owens, ‘The Wesleyan Missionaries to New Zealand before 1840.’ *Journal of Religious History*, 7. 4, (1973) 324–41, <<https://doi.org/10.1111/j.1467-9809.1973.tb00349.x>> (p.338)

⁶³ Owens, p. 338; Moon, p. 26.

⁶⁴ David Mackay, ‘Myth, Science, and Experience in the British Construction of the Pacific’, *British Imperial Strategies in the Pacific, 1750-1900*, ed. By Jane Samson (Aldershot: Ashgate, 2003)

again. She writes, “Oh how my heart bleeds at the thought, that I may never see my dear Father again in this world”.⁶⁵ Miss Bumby further reveals her emotions regarding the ship in which they would sail from England. Upon arriving in London and viewing the vessel, Mary remarks that she feels “quite dull at the prospect of the next five months in such a prison”.⁶⁶ The next entries detail their journey from Yorkshire to London, and on to Gravesend, from where they would depart England for good.

While Mary Bumby’s diary details the broad strokes of her journey from England and her first couple of years in Aotearoa New Zealand, it is not an incredibly detailed account. Indeed, her marriage to Rev Gideon Smales warrants a single paragraph, although at this stage, her entries had become shorter and fewer. After the birth of her son on October 21st, 1841, Mary only makes one more entry in her diary before entries cease.

Despite the pioneering nature of her apiaries, Mary Bumby does not mention her hives in her diary at all. Entries are mostly contained to detailing her movements, feelings, especially after her brother dies, and the people she encounters. Perhaps she viewed her hives as mere cargo, not worth noting upon in her diary. Conversely, it is possible that her hives survived the journey, but did not survive for much longer after landing in Aotearoa New Zealand on March 13th, 1839, which would account for limited sources recalling her bees. While she did not write about her hives in her diary, Bumby is remembered through the eyes of those who came into contact with her.

The arrival of the *James* in Aotearoa New Zealand in March 1839, is recalled by Emma Kirk (née Hobbs), born in 1828, who was the eldest daughter of Reverend John Hobbs and as a child spent time at the Mission station at Māngungu. As a child living at Māngungu Mission at the time of the Bumby siblings’ arrival, Emma remembers the event: “the James (Capt. Todd) brought Mr Bumby and his sister Mr & Mrs Creed & Mr & Mrs Ironside. All the houses were rather crowded then.”⁶⁷ Her

⁶⁵ Wellington, Alexander Turnbull Library, Bumby, John Hewgill and Smales Family: Journals and Papers, Smales, Mary Anna Bumby 1811-1862 : Journal and Album 1838-1860, MS-Copy-Micro-0490.

⁶⁶ Bumby, John Hewgill and Smales Family: Journals and Papers, Smales, Mary Anna Bumby 1811-1862 : Journal and Album 1838-1860, MS-Copy-Micro-0490.

⁶⁷ Wellington, Alexander Turnbull Library, Kirk, Emma 1828-1906 : Wesleyan Missionary Society station at Mangungu, qMS-1113.

father, still having work at the Wesleyan mission station, had returned to Māngungu. The family had received a note from Captain Young with the information and Emma states that “we had expected father by the night tide but he was again away for months.”⁶⁸ Of Rev Hobbs, after John Bumby’s death in 1841, Emma noted: “To console the afflicted sister he went with Mr Smales (whose wife she afterwards became) to gather further particulars or any traces that might be found”.⁶⁹ The account of Kirk also does not feature Mary’s bees, however it is notable in that it contains Mary at all; in many sources Mary Bumby was barely referenced by name.

The fifth edition of Isaac Hopkins *The Illustrated Australasian Bee Manual*, published in 1911, did credit Mary Bumby for first introduction of honeybee to Aotearoa New Zealand. Indeed, in an ironic twist, Mary Bumby is referred to by name, John Bumby is mentioned as her ‘missionary brother’, but not named. This is notable as the reverse is true for much of the references to the Bumby siblings I have encountered.

The excerpt that Hopkins devotes to Mary is small and as follows:

New Zealand is indebted to the late Miss Bumby, sister of one of the early Missionaries, for the first of the common bees, which she brought with her from England in the ship *James*. They were landed at Mangungu, Hokianga, on March 13th, 1839.⁷⁰

An earlier edition of *The Illustrated Australasian Bee Manual*, the fourth, published in 1904, gives an extended description with Hopkins including the source for his material. Hopkins laments that in the first three editions of *The Illustrated Australasian Bee Manual*: “I did my utmost...to obtain the true facts of the case, and each time was led into error”⁷¹ In the fourth edition however, Hopkins notes “I have, however, at last managed to get what I feel certain is the correct information, and which I am very pleased to be able to place on record”.⁷² Hopkins credits the information to Mrs Gittos, who sent him a letter “detailing full particulars of the introduction of the bees, and confirming her recollections by the testimony of others

⁶⁸ Kirk, Emma 1828-1906 : Wesleyan Missionary Society station at Mangungu, qMS-1113.

⁶⁹ Kirk, Emma 1828-1906 : Wesleyan Missionary Society station at Mangungu, qMS-1113.

⁷⁰ Isaac Hopkins, *The Illustrated Australasian Bee Manual*, 5th ed. (Wellington: Gordon & Gotch, 1911), p. 3.

⁷¹ Isaac Hopkins, *The Illustrated Australasian Bee Manual*, 4th ed. (Wellington: Gordon & Gotch, 1904) p. 4.

⁷² Hopkins, *The Illustrated Australasian Bee Manual*, 4th ed. p. 4.

who were conversant with the facts”.⁷³ The testimony, and identity, of the ‘others’ mentioned remains unverified.

Indeed, the evidence that Bumby released the first bees is sparse and frequently revolve around the same source: Mrs Gittos. The lengthy extract from the letter sent to Hopkins by Gittos is the most concrete evidence of Mary Bumby’s bees that I am aware of, as her and her brothers diaries reveal nothing regarding bees.

Mrs Gittos was the daughter of Rev. John Hobbs and sister of Emma Kirk. The Hobbs, who had previously lived at the Māngungu Mission, returned there in 1838.⁷⁴ The Hobbs family lived at the mission station in Māngungu till the 1850s. Mrs Gittos, who was born at the station in 1830, would have been eight years old at the time the Bumby siblings arrived in Aotearoa New Zealand.⁷⁵ The letter published by Hopkins, details her first-hand account of the Bumby’s arrival. Unlike her sister Emma’s account, Gittos notes that “This lady [Bumby] brought with her the first bees I ever saw”.⁷⁶ Indeed, since a young Gittos had been born in Aotearoa New Zealand, the only other place she had spent her time was Tonga during her family’s departure from Māngungu, then it is very probably that these were the first *honeybees* she had ever seen.⁷⁷

The excerpt continues:

There were two straw hives, and they were placed in the Mission Churchyard as being a safe place, and free from the curiosity of the Maoris, who, of course had never even heard of the ‘little busy bee.’ Some years later on I was writing to a gentleman friend in Tasmania who had been one of the party I have spoken of. I am anxious to know if he remembered their first Sunday in New Zealand his taking us little children (I was nearly nine years old) to see the bees from England. He replied that he distinctly remembered bees having come in their ship, but what became of them he could not tell, as he removed from that station to another field of labour, and the same thing having happened to our parents, we

⁷³ Hopkins, *The Illustrated Australasian Bee Manual*, 4th ed. p. 5.

⁷⁴ Chris Cochran, *Mission House Mangungu: Conservation Plan for Heritage New Zealand Pouhere Taonga*, (Wellington: Heritage New Zealand Pouhere Taonga, 2018)

⁷⁵ ‘Mrs W. Gittos’, *The Cyclopedia of New Zealand*, (Christchurch: The Cyclopedia Company, 1902)

⁷⁶ Hopkins, *The Illustrated Australasian Bee Manual*, 4th ed. p. 5.

⁷⁷ Aotearoa New Zealand is not bereft of bee species, only species belonging to genus *Apis*, the honeybees. As the bee species in Aotearoa New Zealand are solitary and very dissimilar in look to honeybees, a young girl may very well not recognise them as bees at all, especially considering knowledge of Aotearoa New Zealand’s native bee species was sparse among European settlers at this time.

lost sight of our little new friends, not, however, before we tasted for the first time in our lives real honey in the comb, which Miss Bumby kindly sent to us, knowing our interest in her bees.⁷⁸

Based on this account, Bumby's bees survived long enough for her to obtain a harvest of honey from the hives. Hopkins deemed this evidence compelling and considered the case for the first bees in the North Island settled. It is unknown whether Mary brought her bees with her all the way from England, or, during their extended stopover in Australia, obtained bees there.

Furthermore, little is known about the precise methods Mary Bumby used in transporting her bees. Crane notes that the hives in this time period were often straw skeps. Movable frame hives, otherwise known as Langstroth hives, the most commonly used and recognisable hive today, were not invented till the 1850s. William Charles Cotton, in *Manual for New Zealand Beekeepers* further discusses the sturdiness and widespread use of straw skep style hives in England and Aotearoa New Zealand in the mid-nineteenth century.⁷⁹ This, alongside the evidence provided by Mrs Gittos detailing the "straw hives" (undoubtedly skeps), lends credence to the assumption that Mary most likely would have transported her bees in skep style hives.⁸⁰ This knowledge informs possible methods she may have used to assist the transport of her hives. Techniques such as wrapping the hive in material, feeding the bees, letting them fly in nice weather, and taking them ashore at landing sites are all methods that Bumby could have employed to ensure the success of her transport.

While there is no great abundance of primary source information regarding the first introduction of bees to Aotearoa New Zealand, there is one first-hand account that corroborates the introduction. In this way, Mary Bumby can be recognised for a larger contribution than simply being her brother's sister.

William Charles Cotton

William Charles Cotton had an affinity for beekeeping from his school days, including through his university studies at Oxford.⁸¹ His ultimate calling, however, was to the

⁷⁸ Hopkins, *The Illustrated Australasian Bee Manual*, 4th ed p. 5.

⁷⁹ William Charles Cotton, *Manual for New Zealand Beekeepers*, (Wellington: R. Stokes, 1848)

⁸⁰ Hopkins, *The Illustrated Australasian Bee Manual*, 4th ed. p. 5.

⁸¹ Peter Barrett, *William Charles Cotton Grand Bee Master of New Zealand: 1842 to 1847*, (NSW: BanjoBee Books, 1997)

Anglican faith, becoming Reverend Cotton, and eventually private chaplain to the Bishop George Augustus Selwyn. It was with the Bishop that Cotton would leave England to travel to Aotearoa New Zealand. While Mary Bumby travelled as a housekeeper and companion to her missionary brother, later becoming a missionary wife; Cotton was travelling within divine purpose: to assist the Bishop and answer his missionary calling. Although Cotton was a missionary, his obsession and skill as an apiarist earned him a reputation far past his religious callings.

Leaving England in December 1841 with the Bishop Selwyn, Cotton had devised various methods to carry his winged charges safely to the other side of the Earth. These methods he meticulously recorded in *My Bee Book*, published in 1842, noting that the long sea journey to New Zealand would cross the equator, disrupting the natural hibernation cycle of the bees.⁸² Cotton had a plan for this. In his words, “putting them to sleep, by keeping them at a low temperature, by burying them, and by keeping them dry” was the best conceived method for successful transport. Furthermore, if the bees were trapped inside their hive for extended periods, they could not cleanse their hives and ward against disease. Eva Crane suggests that if the journey began in autumn, bees would fare better through confinement, being more prepared for a period inside the hive.⁸³ The bees can also be assisted during the travel by keeping them cool, reducing their metabolic rate.⁸⁴ This reduces their nutritional needs and activity level, allowing for longer periods of safe captivity.

William Cotton carefully considered the best way to transport his bees to mitigate disaster and conceived a design by which the colony would be kept in a hibernation state. In *My Bee Book* Cotton outlines his intentions: “light and heat will be both excluded, and the Bees will be put into a deep and long sleep; though I hope not an eternal one”.⁸⁵ As their journey began in winter, the bees would have presumably already been in a hibernation state, with Cotton intended to extend this hibernation. This was to be achieved through his “Hogshead” design- a contraption fashioned from a hogshead barrel.

This hogshead would be lined with felt, a material Cotton believed to be “one of the best non-conducting things”, and the bottom lined with broken crockery to aid

⁸² William Charles Cotton, *My Bee Book*, (London: J. G. F. & J. Rivington, 1842)

⁸³ Crane, *The World History of Beekeeping and Honey Hunting*, pp. 354-355.

⁸⁴ Crane, *The World History of Beekeeping and Honey Hunting*, p. 355.

⁸⁵ Cotton, *My Bee Book*, p. 360.

drainage to the tap fixed in the bottom.⁸⁶ The drainage would be essential as the hogshead would be filled with ice. Cotton drew inspiration from shipments of salmon sent to India from North America, packed in ice, which successfully crossed the equator twice and survived the journey with no considerable melt.⁸⁷ For the long journey from England to New Zealand, Cotton accounted for two-thirds of the ice to safely cross the equator, the melt being drawn off and measured daily to assess supply. While Cotton intended to keep the hives cool with the ice, under no circumstance should hive and ice touch, lest “we should have a pretty mess of half-melted ice...together with dead Bees and spoilt honey”.⁸⁸ To prevent this, a wooden frame would be installed inside the hogshead, upon which the hives would rest. These hives would be suspended above the ice, “securely tied, each in a square cloth of dairy canvass” and surround with well dried cinders with for the purpose of keeping the hives free from moisture.⁸⁹

As for air, Cotton created a system of pipes, one to carry away foul air and moisture, the other to provide fresh air. Through this hogshead design, Cotton was assured that he had considered the best method for live bee transport and was greatly hopeful of their safe arrival. However, he continues to outline further possible methods in *My Bee Book*, perhaps wary of putting all his bees in one barrel. Deviating from the ice method, Cotton outlines another, method by which he intended to keep the hives cool. This method relied on evaporation. A hive was to be positioned upon a springboard so it would move in tandem with the ships swaying motion and not disturb the bees. Cotton’s description of the complicated contraption is as follows:

A wall of water entirely surrounds the hive. Fresh water is perpetually running in from the double case in which the Hive is placed, from the ships [sic] cistern. The two cylinders of zinc, in which the Hive is placed, are open at the top, so that the water is exposed to the open air. A piece of rag, which will suck up the water, is laid between the two zinc cylinders. This will conduct the water in to the top of the Hives; evaporation will be always going on, and, as I believe, will keep the Hive so cool that the Bees will remain asleep. A few cinders will also be poured in between the Hive and the cylinder to keep the

⁸⁶ Cotton, *My Bee Book*, p. 358.

⁸⁷ Cotton, *My Bee Book*, p. 357.

⁸⁸ Cotton, *My Bee Book*, p. 359.

⁸⁹ *Ibid.*

Bees quite quiet. A pipe will be fitted to the T hole to supply them with air, just as I did to those in the hogshead.⁹⁰

Cotton also noted that he intended to take with him an observatory hive, kept with him in his cabin and at the whim of every temperature change along the journey. This hive would not remain in a hibernation state as the ship reached the tropics and therefore would have to be fed by Cotton.

While William Cotton's methods for transporting his bees were meticulously arranged, there is a widely recounted rumour, originating from an 1859 *Bee World* article, that suggests a malady befell his bees which he had not envisaged.⁹¹ During a storm aboard the ship *Tomatin*, the sailors apparently became wary of the bees, believing them to contribute to the misfortunate weather. Subsequently, the hives were tossed overboard to the mercy of the waves.

Regardless of the veracity of this rumour Barrett is convinced that Cotton's hogshead found an unfortunate end, either by superstition or ocean motion, and that the barrel found the waves.⁹² However, there is little mention of Cotton's other purported methods and their success. While the hogshead is the most salient and impressive method that Cotton devised, it is unclear whether he employed the others he described in *My Bee Book*. Perhaps he did place all his bees in one barrel after all.

While the letters suggest that Cotton was unsuccessful, a potential eyewitness could confirm his accomplishment. Emma Kirk recalls the arrival of Cotton with Bishop Selwyn in 1842: "Mr Cotton his private chaplain brought Bees to this country".⁹³ Perhaps Cotton had been successful with a hive after all. Emma continues that soon after "the country at the North was full of them building in hollow trees in the forest".⁹⁴ While the sources that Barrett engages with seem to directly suggest a failure in Cotton's transportation from England, perhaps not by superstition, but resulting in a lack of hives nonetheless, this claim by Emma Kirk reinforces claims of success.⁹⁵ However, Kirk does not put a clear date on the observation. It is true that

⁹⁰ Cotton, *My Bee Book*, pp. 361-362.

⁹¹ Barrett, *The Immigrant Bees*, p. 87

⁹² Peter Barrett, *The Immigrant Bees 1788 to 1898, Vol. IV: A Final Insight on the Introduction of European Honeybees into Australia and New Zealand*, (Australia: Peter Barrett, 2010), p. 265

⁹³ Kirk, Emma 1828-1906 : Wesleyan Missionary Society station at Mangungu, qMS-1113

⁹⁴ Kirk, Emma 1828-1906 : Wesleyan Missionary Society station at Mangungu, qMS-1113

⁹⁵ Barrett, *The Immigrant Bees 1788 to 1898, Vol. IV*, p. 265

Cotton brought bees to Aotearoa New Zealand, but there is potential that in her narrative Emma is recalling his later import from Australia of a hive.

The assumption that Cotton was successful is based on several factors. Firstly, Cotton was very outspoken and detailed regarding the methods by which he intended to transport his bees, notably the publication of *My Bee Book*, written prior to his journey. Secondly, a very successful and accomplished career as a beekeeper in Aotearoa New Zealand followed his arrival, with the publication of further bee related books. On the face of these two instances, and notably, “in the absence of any refutation”, it was assumed Cotton was successful.⁹⁶ Barrett, however, is convinced that Cotton’s bees did not survive to Sydney and little aside from Emma Kirk’s unclear statement refutes this.

Evidence that Barrett provides against the claim of Cotton’s success includes the well repeated superstitious sailor narrative – that the sailors believed the bees to be the cause of a storm and tossed them to the waves.⁹⁷ However, Barrett does include some convincing other supporting sources. A translation of *Ko Nga Pi*, a beekeeping manual in Māori written by Cotton, suggests bees had been in Aotearoa New Zealand for four years in 1847.⁹⁸ This would suggest the introduction falling within the year of 1843, the year after Cotton arrived.⁹⁹ Volume two of his journals, which details the journey from Sydney to Auckland, was lost, and according to Barrett, beekeeping does not feature in the journals until Volume 5-July to November 1843.¹⁰⁰

Cotton’s letters, however, suggest the loss of the bees during the journey from England to Aotearoa New Zealand in 1841-1842. A letter dated 30th December 1841, while Cotton was aboard the *Tomatin* contains a suggestion the bees were still alive: “All well-Mrs Selwyn, Bishop and Willie-dogs and bees and self”.¹⁰¹ However, a year after his arrival in April 1843, Cotton writes “the seed which was sent to me last year grew capitally, but does not seed, as there are no bees-indeed this seems the fate of most English seeds”.¹⁰² As Cotton is not specific to the type of seed he is trying to grow, it is impossible to know which species of bee he is referring to here. As Cotton

⁹⁶ Barrett, *William Charles Cotton Grand Bee Master of New Zealand*, p. 33.

⁹⁷ Ibid.

⁹⁸ Barret, *William Charles Cotton Grand Bee Master of New Zealand*, p. 34.

⁹⁹ This also assumes Mary Bumby’s bees did not spread widely.

¹⁰⁰ Barrett, *William Charles Cotton*, p. 31

¹⁰¹ Barrett, *William Charles Cotton*, p. 35.

¹⁰² Ibid.

was known by all who met him for his obsession with honeybees, it seems more likely he is lamenting a lack of honeybees. Furthermore, as honeybees were only introduced four years previously, (albeit with increasing frequency since then), and little is known as to the fate of Bumby's bees, it is possible they did not reproduce widely in this time. The same letter by Cotton expresses his desire to have some bees shipped to him from Sydney, suggesting his first year in Aotearoa New Zealand was spent without them.

While sources lean towards initial failure of Cottons 1842 attempted introduction, this did not prevent him becoming a formidable force in Aotearoa's beekeeping history. Cotton may not have been the first person to introduce bees to Aotearoa New Zealand, or even the second; rather he represents a cresting wave of settlers with interest in introducing exotic species to Aotearoa New Zealand, gathering in momentum. The interest that Cotton had in bees, and his drive to share this knowledge (partially stemming from his missionary background no doubt) pushed him to source hives despite initial failure. In this there is a persistence, echoed in other introduction stories, to continually introduce new species to Aotearoa New Zealand during the nineteenth century.

South Island Introduction

While Mary Bumby and Charles Cotton are considered to be the first to liberate bees in Te Ika-a-Māui, the North Island, honeybees did not reach Te Waipounamu till three years later. This honour can be claimed by a woman named Mrs Allom. Isaac Hopkins notes that the honeybee "arrived in the barque "Clifford" in May, 1842"¹⁰³ The shipment from England was consigned to Captain Wakefield who delivered them safely to Aotearoa New Zealand.

Furthermore, a *Gardener's Gazette* article, reproduced in the *New Zealand Colonist and Port Nicholson Advertiser* in 1843 notes the introduction of honeybees to Nelson, Aotearoa New Zealand effected by Mrs Allom. The article notes that "having prepared, with much ingenuity, several hives, with extra cases and perforated zinc tops, in anticipation of a swarming on the voyage."¹⁰⁴

¹⁰³ Hopkins, *The Illustrated Australasian Bee Manual*, p. 5.

¹⁰⁴ 'Honey and Wax: (From the Gardener's Gazette)', *New Zealand Colonist and Port Nicholson Advertiser*, 28 March 1843, <<https://paperspast.natlib.govt.nz/newspapers/NZCPNA18430328.2.10>> [Accessed 19th August 2022]

In the book, *Adventure in New Zealand from 1839 to 1844*, written by Edward Jerningham Wakefield, an overview is given of Mrs Allom's bees. The brief statement concludes that a hive of bees sent by Mrs Allom arrived safely in Nelson, the bees "the first ever sent to that settlement".¹⁰⁵ Wakefield also mentions another woman, Mrs Wills, who carried a hive of bees with her from England.¹⁰⁶ The bees unfortunately did not survive the journey, however it is notable that yet another woman contributed to the attempts to introduce bees to Aotearoa New Zealand. While Mrs Wills was unsuccessful in safely transporting her bees, she did claim the title of first pheasant introduction to Aotearoa New Zealand. This example, highlights that as settler populations increased in Aotearoa New Zealand, so too did the push to introduce foreign species into the country.

The Female Beekeeper

In a Western context, Crane notes evidence of female beekeepers dating to the 15th century. French herbal illustrations show a woman interacting with a log hive. The early modern period saw further evidence of women engaging in beekeeping practices. Crane notes John Levett's *The Ordering of Bees*, written in the early 1600s, published in 1634 as stating: "The greatest use of this book will be for the unlearned and Country people, especially good women, who commonly in this Country take most care and regard of this kind of commodity".¹⁰⁷ Further, William Lawson's *The Country Housewife's Garden*, published in 1618, noted that the secrets of beekeeping were essential knowledge to the housewife, one of her key responsibilities was ensuring a warm and dry house for her charges.¹⁰⁸ This responsibility was presumably in parallel with the maintenance of the environment in her own home. The examples that Crane provides for the seventeenth century, in the main, regard country housewives-women dedicated to the keeping of their households, indoors and out.¹⁰⁹ As the products of bees such as wax and honey would be important

¹⁰⁵ Edward Jerningham Wakefield, *Adventure in New Zealand from 1839 to 1844*, (Christchurch: Whitcombe and Tombs, 1908), p. 486.

¹⁰⁶ Wakefield, *Adventure in New Zealand*, p. 486.

¹⁰⁷ Crane, *The World History of Beekeeping and Honey Hunting*, p. 587.

¹⁰⁸ Ibid.

¹⁰⁹ Crane, *The World History of Beekeeping and Honey Hunting*, p.588

provisions for a functioning household, housewives would oversee their care and keep.¹¹⁰

The eighteenth and nineteenth centuries saw a continuation of women interacting with bees. For wealthy women, thought to have delicate sensibilities, glass viewing hives were created and advertised, so that ladies may have the pleasure of watching bees go about their business, without the threat of being stung.¹¹¹ The care of the bees in a more involved capacity would be relegated to a gardener. However, many women still engaged with beekeeping on a more practical level, even contributing to scientific advancement. Catherine Elisabeth Vicat (née Curtat) in Switzerland produced 64 reports, experiments and observations that were published by the Economic Association of Bern and she also contributed to advancements in hive design.¹¹²

The nineteenth century saw a rise in the creation of Beekeeping Associations and Journals which Crane suggests increased beekeeping participation by women. Where previously most women tended hives under male instruction, participation with Associations and reading journals allowed women to become active participants in the pastime, acquiring their own knowledge instead of simply enacting their husbands' teachings. This shift in knowledge distribution boosted the numbers of female beekeepers invested in the hobby for their own interests, aside to that of running a household.

However, Crane notes that “for a long time, however, most men were unwilling to recognize that women might be able to manage bees, and most women remained a man’s compliant helper”.¹¹³ Nevertheless, female beekeepers were not unusual—Miss Clementine Stirling Graham a notable Scottish beekeeper in the 1800s, Mrs L. Harrison in the USA a large-scale commercial beekeeper in the same time period.

While interaction with beekeeping associations and journals may have increased participation somewhat, the numbers of female beekeepers still seemed hidden from the public domain. “Women almost never surfaced” in the Western Apiarian Society

¹¹⁰ Lynn Anne Botelho, ‘English housewives in theory and practice, 1500-1640’, (unpublished Masters Thesis, Portland State University, 1991), p. 68.

¹¹¹ Crane, *The World History of Beekeeping and Honey Hunting*, p. 588.

¹¹² Crane, *The World History of Beekeeping and Honey Hunting*, p. 589.

¹¹³ Crane, *The World History of Beekeeping and Honey Hunting*, p. 589.

records between 1799-1809, analysed by Adam Ebert.¹¹⁴ Ebert also notes that “extant membership list reveal a total absence of female members”.¹¹⁵ This absence of female beekeepers contrasts with other bee-related publications directed towards a female audience that were published prior to the Western Apiarian Society’s founding in 1799, such as the *Country House-wife’s Garden*.¹¹⁶

The exclusion of women from the society Ebert concludes to be “derived from socially dictated discrimination against women”, as “a significant population of women engaged in beekeeping”.¹¹⁷ Indeed, a disproportionate representation of masculine activity in the public sphere could be derived from socially constructed gender roles, historically denoting the public sphere as a male space while simultaneously relegating the private space as a female realm. Ebert theorises that the lack of women in the society represents “an early illustration of the masculinization of beekeeping in public discourse”.¹¹⁸ Indeed, the Western Apiarian Society was keen to revolutionize beekeeping. Interest was specifically geared towards scientific enquiry and transforming traditional methods towards more humane practice. While women could, and did, contribute notably towards scientific discourse, this was against an “overrepresentation of men within the realms of public innovation”, Ebert noting that the “popularization surely directed changes in beekeeping toward a disproportionately male audience”.¹¹⁹

While beekeeping had historically been an often silent and overlooked domestic chore of women, attitudes in the nineteenth century began to push beekeeping into the public sphere as a potential hobby for all. In nineteenth century Aotearoa New Zealand, beekeeping was advertised as a suitable pastime, even employment for women. Indeed, the *Otago Witness* suggested that “ladies and young people might become beekeepers in preference to pig feeders. The latter may be attended to by men; the former by children and women”.¹²⁰ The rationale was the ‘natural

¹¹⁴ Adam Ebert, ‘Nectar for the Taking: The Popularization of Scientific Bee Culture in England, 1609–1809’, *Agricultural History*, 85. 3 (2011) 322–343
<<https://www.jstor.org/stable/10.3098/ah.2011.85.3.322>> [Accessed 18th August 2022] p. 337.

¹¹⁵ Ebert, p. 337.

¹¹⁶ Ibid.

¹¹⁷ Ibid.

¹¹⁸ Ebert, p. 338.

¹¹⁹ Ibid.

¹²⁰ ‘Gleanings in Bee Culture: Suitable Employment for Women and Girls.’ *Otago Witness*, 15 December 1883, <<https://paperspast.natlib.govt.nz/newspapers/OW18831215.2.12>> [Accessed 17th August 2022] p.7.

temperament' of women as "more patient, tender, persevering, gentle" made them inherently better suited for beekeeping.¹²¹ Further, the article claims that "In the older countries and in America some of the most successful apiarists are ladies. On some of the most extensive bee farms in America the men are assisted by their wives and daughters."¹²² Indeed, Mrs L. B. Baker of Michigan is quoted as stating:

I find the labours of the apiary more endurable than working hard over a stove, and more pleasant and conducive to health. I believe that many of our delicate invalid ladies would find renewed vigour in body and mind in the labours and recreation of the apiary. My own experience of the apiary is that it is a source of interest and enjoyment far exceeding my anticipations.¹²³

A later *Otago Witness* article echoed the same sentiment, touting beekeeping as a viable method of employment for women. Mrs H. F. Bullor is quoted as stating: "I am of opinion that there is no reason why any woman of moderate strength and intelligence should not be able to take charge of an apiary of from 30 to 50 colonies with very little assistance, and derive both pleasure and profit from the employment"¹²⁴ Indeed, while the pastime of beekeeping is said to combine easily with another occupation, such as farming, it is suggested that daughters may be very successful and very well might "make as great a success of the business as boys".¹²⁵

Missionary Involvement

It is perhaps unsurprising that the first introduction was conducted by a missionary adjacent person. The most frequent visitors to Aotearoa New Zealand's shores prior to 1840 were whalers, sealers, and missionaries. It is unlikely that sailors on whaling boats would carefully transport hives to Aotearoa New Zealand for their often-temporary sojourns on the coast. As discussed, the logistics of transporting hives, especially over such a distance as from England to Aotearoa New Zealand, was difficult and prone to failure. The rumoured fate of Cotton's bees, superstitious sailors tipping them overboard, if true, would give further credence to the

¹²¹ Ibid.

¹²² Ibid.

¹²³ Ibid.

¹²⁴ 'Beekeeping as an Occupation for Women', *Otago Witness*, 3 April 1890, <<https://paperspast.natlib.govt.nz/newspapers/OW18900403.2.18.1>> [Accessed 16th August 2022]

p. 9

¹²⁵ *ibid*

unlikelihood of sailors aboard whaling or sealing vessels carrying bees aboard, as sailors were a notoriously superstitious professional group.¹²⁶

Furthermore, missionaries have a sordid history of introducing new species to the places they visit, facilitating a web of species transfer across the globe.¹²⁷ Missionaries were visitors likely to have extended, even permanent, stays in Aotearoa New Zealand and therefore most likely to transport species that they are familiar with for long stints in foreign lands. Not only this, a process of ‘civilising’ was part of mission process in European colonies. This importation of ‘civil’ European culture was perceived to be under the guise of ‘improvement’, an ideological narrative held by European settlers that will be explored in Chapter Three.

However, the examples of Mrs Allom and Mrs Wills exemplify a burgeoning interest in populating Aotearoa New Zealand with foreign species. What would later become the domain of Acclimatisation Societies was, in the early nineteenth century, the realm of missionaries and private individuals. Indeed, compared to bumblebee introductions occurring in the late nineteenth century, honeybees were almost exclusively imported into Aotearoa New Zealand by private individuals, happening as a first wave of settlers entered the country.

Conclusion

The significance of honeybees as a species to humanity ensured the transference of the species from the ‘old’ world to the ‘new’. The first introductions of honeybees into Aotearoa New Zealand signal a burgeoning wave of European colonists entering the country. Furthermore, as the ‘first’ introduction followed the missionary activities in Aotearoa New Zealand in the early nineteenth century, this allows for an examination of the relationship between missionary activity and species importation. Additionally, as the introduction of honeybees was enacted by private individuals (opposed to Societies such as the bumblebee), an in-depth analysis of key actors can be considered. In this example, there are two salient figures: Mary Bumby and William Charles Cotton. Both Bumby and Cotton were involved in missionary activities;

¹²⁶ Nancy Lusignan Schultz, *Mrs. Mattingly's Miracle: The Prince, the Widow, and the Cure That Shocked Washington City*, (Yale University Press, 2011), p. 161.

¹²⁷ See: Gwyn Campbell, *David Griffiths and the Missionary "History of Madagascar"*. (Netherlands: Brill, 2012), *The Missionary Guide-book*, (London: Seeley, Burnside and Seeley, 1848), John Ryan Fischer, *Cattle Colonialism: An Environmental History of the Conquest of California and Hawai'i*, (USA: University of North Carolina Press, 2015)

Bumby was the first person to introduce bees and Cotton was the assumed first for decades. This analysis therefore, emphasizes the role of missionaries in species transfer across the globe. The comparison of these figures assists an understanding of the meaning of 'firsts' when it comes to historical investigation, most notably as a marker for impending change.

Furthermore, the examination of these figures highlights early nineteenth century European activity in Aotearoa New Zealand. Notably, women are overrepresented in early introductions of honeybees to Aotearoa New Zealand. This allows an engagement with historical roles of domesticity whilst simultaneously challenging assumptions about public and private spheres of engagement with gender roles, and contrasts with the acceptance of women in Beekeeping Societies. While the role of women in introducing bees could be viewed as challenging conceptions of Victorian gender roles, this chapter has shown that this activity can still conceivably fit within persistent gender narratives, particularly surrounding female beekeeping.

Chapter Two: Crimson and Clover, Over and Over

When Britain began to colonise Aotearoa New Zealand in the mid-nineteenth century, the settlers that emigrated from Britain formed a pattern of industry that persists to this day.¹²⁸ Aotearoa New Zealand was viewed by those within the geographically distant but culturally influential, British empire as a land with potential economic benefit.¹²⁹ This benefit was dependent on a transformation of the current landscape, however. Viewed as an Eden of potential, British colonisers were not content to allow the current landscape to exist untouched. In order to be useful to the empire, Aotearoa New Zealand had to become a productive, pastoral landscape in a way familiar to the British settlers immigrating to its shores in increasing numbers. With understandings of pollination spreading more rapidly in the mid-nineteenth century, Aotearoa New Zealand would become the site of an agricultural experiment. To reduce reliance on imported seed stock, the natural pollinator of the English clover species was also introduced. Bees were recognised as this pollinator by Charles Darwin in the mid-nineteenth century, and while honeybees had long been introduced, bumblebees were sought after by Acclimatisation Societies, eager to improve red clover seed yields.

This chapter will discuss the transformation of Aotearoa New Zealand's landscape at the hands of migrant colonists in the nineteenth century. This will include a focus on the role of bees in the transition from native bush and swamplands to a pastoral-based landscape. This clearance of bush and transformation to pasture occurred alongside the dispossession of Māori from their lands. Dispossession was a common effect in European colonies where the indigenous population impeded desired European development of an area.¹³⁰ While the interactions between European colonisers and Māori is a part of any history of Aotearoa New Zealand, the scope of these extends beyond potential of this thesis to adequately examine these

¹²⁸ John R. Fairweather, 'White-Settler Colonial Development: Early New Zealand Pastoralism and the Formation of Estates' *Australian and New Zealand Journal of Sociology*, 21. 2, (1985) 237–57, <<https://doi.org/10.1177/144078338502100205>>; Tom Brooking and Eric Pawson. "Silences of Grass: Retrieving the Role of Pasture Plants in the Development of New Zealand and the British Empire." *Journal of Imperial and Commonwealth History*, 35. 3, (2007) 417–35, <<https://doi.org/10.1080/03086530701523406>>

¹²⁹ Brooking and Pawson, 'Silences of Grass: Retrieving the Role of Pasture Plants in the Development of New Zealand and the British Empire', p. 423.

¹³⁰ Brooking and Pawson, *Seeds of Empire*, p. 16, p. 28.

interactions. Therefore, this chapter will focus on European settler interactions with the landscape as a basis for the introduction of bumblebees.

I argue that the role of bees have been overlooked in narratives surrounding the pastoral development of Aotearoa New Zealand. The increasing awareness and reliance on science in the latter half of the nineteenth century included a focus on pollination and the role of bees, as I will demonstrate, including the influence of Darwin. I will first discuss the nature and development of Acclimatisation Societies in Aotearoa New Zealand and summarize the development of settler colonial agriculture and the economic imperatives driving it. This discussion will form the context for situating the role of bees-the basis for the remainder of the chapter.

Acclimatisation Societies

Acclimatisation Societies were organisations dedicated to the introduction of exotic species.¹³¹ Those that formed the societies were “like-minded but otherwise diverse individuals (aristocrats, landowners, biologists, agriculturalists, sportsmen, and others)”.¹³² The reasons that Acclimatisation Societies wished to introduce exotic species were as diverse as their members: pest control, extra food supply, nostalgia, for game, for the improvement of domestic stock, and “(in Russia) to substantiate the claims of evolutionists”.¹³³ Christopher Lever states that the concept originated in France in the late eighteenth century with Louis Jean Marie Daubenton and the *Jardin des Plantes du Roi*, with one of the interests of the Jardin being the acclimatisation of exotic species.¹³⁴ However, while the concept and practice of acclimatisation was familiar in Europe throughout the early nineteenth century, societies solely dedicated to acclimatisation did not appear until the mid-nineteenth century.¹³⁵ Conversely, Ritvo argues that the concept of acclimatisation is as old as agriculture; the movement of useful, domesticated plants and animals “followed human routes of trade and migration”.¹³⁶ While nineteenth century acclimatisation

¹³¹ Christopher Lever, ‘Acclimatisation Societies’, *Encyclopedia of Biological Invasions*, ed. by Daniel Simberloff and Marcel Rejmanek, (Berkeley: University of California Press, 2011) p. 38.

¹³² Ibid.

¹³³ Ibid.

¹³⁴ Ibid.

¹³⁵ Ibid.

¹³⁶ Harriet Ritvo, ‘Going Forth and Multiplying: Animal Acclimatization and Invasion’, *Environmental History*, 17.2 (2012), 404-414 p. 405.

projects were at a smaller scale than species transfers in earlier centuries, Ritvo describes it as “a kind of Pandora’s box”, in terms of ecological harm.¹³⁷

The first Acclimatisation Society in Aotearoa New Zealand was formed in Nelson in 1861, with around thirty other societies forming between 1861 and the early twentieth century.¹³⁸ Ritvo notes that acclimatisation societies formed and spread quickly in Australasia, the motivation “to repair the defects of the indigenous faunas”.¹³⁹ The ‘defects’ the colonists perceived was the lack of familiar British species. Indeed, the efforts of the Acclimatisation Societies in Australia and Aotearoa New Zealand were the “most persistent and effective”, receiving wide public support from European settler migrants.¹⁴⁰ While the attention of Aotearoa New Zealand Acclimatisation Societies was for the most part captured by deer and fish-game species, there was public demand for the introduction of agriculturally advantageous species like the bumblebee too.

However, R. M. McDowall notes that prior to the establishment of Acclimatisation Societies in Aotearoa New Zealand in the latter half of the nineteenth century, species introduction still occurred frequently.¹⁴¹ Transfer of species across the globe had increased in demand since the ‘discovery’ of useful species in the ‘New World’, with migrant settlers eager to recreate what they left behind.¹⁴² Exotic species were also prized for their novelty, however. While the majority of transferred animals were domesticated species, often travelling from the old world to the new, zoological societies (often in tandem with Acclimatisation Societies) frequently imported exotic species into Europe.¹⁴³ The justification for these importations was predominately science-cataloguing species, and hybridisation experiments, although exotic species were also introduced for consumption— a frequent, if eccentric, excuse.¹⁴⁴

In Aotearoa New Zealand, however, Acclimatisation Societies were mainly interested in stocking the rivers and forests for sport and establishing domestic species familiar

¹³⁷ Ritvo, ‘Going Forth and Multiplying: Animal Acclimatization and Invasion’, p. 412.

¹³⁸ Lever, p. 41.

¹³⁹ Ritvo, ‘Going Forth and Multiplying: Animal Acclimatization and Invasion’, p. 410.

¹⁴⁰ Harriet Ritvo, ‘The World as Zoo: Acclimatization in the Nineteenth Century’, *The Ark and Beyond*, ed. by Ben A. Minteer, Jane Maienschein, and James P. Collins, (University of Chicago Press, 2018) <<https://doi.org/10.7208/chicago/9780226538631.003.0003>> p. 39.

¹⁴¹ R. M. McDowall, *Gamekeepers for the Nation: The Story of New Zealand’s Acclimatisation Societies 1861-1900*, (New Zealand: Canterbury University Press, 1994), p. 10.

¹⁴² McDowall, p. 10.

¹⁴³ Ritvo, ‘The World as Zoo: Acclimatization in the Nineteenth Century’. p. 36.

¹⁴⁴ Ibid.

to the European colonists.¹⁴⁵ The introduction of deer, fish such as trout and salmon, and pheasants were high on the priority list of imports for Acclimatisation Societies. The intent was to provide those of all social classes with game, opposed to limiting it to the wealthy, as it was in Britain.¹⁴⁶ Indeed, while there was general opposition within Acclimatisation Societies to commercialisation of the species they imported, an exception was the brush tailed possum.¹⁴⁷ Hailed as a potential for a burgeoning fur industry, the peak of their importations occurred in the 1890s.¹⁴⁸ Possums very quickly became an issue in Aotearoa New Zealand, firstly for the damage to orchards and gardens and later, in the 1930s and 40s, the species was recognised to have an impact on the forest and bird life.¹⁴⁹ It would not be until the 1970s however that the true devastating ecological impact of possums would be truly recognised.¹⁵⁰

While Acclimatisation Societies were structured around a goal of introducing new species, and therefore are an easy target for blame for introductions ‘gone wrong’, they were not the sole liberators of species. Individuals, such as George Grey, who owned “an extraordinary menagerie”, frequently imported exotic species, although the lasting impact Grey’s animals had in ecological terms is small.¹⁵¹ However, McDowall notes that societies form from groups of like-minded people, therefore individuals already involved in the introduction of species would group together and form the Acclimatisation Societies when the opportunity arose.¹⁵² Furthermore, the nineteenth century was a time of transference; white, European settler culture was generally accepting, even positive, about the introduction of foreign species.¹⁵³ As I will discuss later in this chapter, settlers would call upon the Acclimatisation Societies to introduce species they deemed necessary for agricultural advancement.

Imperial Construction of Aotearoa New Zealand’s Landscape from 1840

The signing of the Treaty of Waitangi in 1840 heralded a shift in British engagements with Aotearoa New Zealand and opened the floodgates for European migration. After 1840, the number of settlers grew quickly: in 1846, settlers numbered thirteen

¹⁴⁵ McDowall, p. 24.

¹⁴⁶ McDowall, p. 26.

¹⁴⁷ McDowall, p. 357.

¹⁴⁸ McDowall, p. 358.

¹⁴⁹ McDowall, p. 362.

¹⁵⁰ McDowall, p. 362.

¹⁵¹ McDowall, p. 34.

¹⁵² McDowall, p. 35.

¹⁵³ McDowall, p. 35.

thousand.¹⁵⁴ By 1881, that number had risen to nearly 490, 000.¹⁵⁵ King notes more than 100, 000 landed in Aotearoa New Zealand between 1871 and 1880.¹⁵⁶ The colonists entering Aotearoa New Zealand after 1840 were key contributors to the transformation of the landscape to a pastoral vision.¹⁵⁷ Brooking and Pawson discuss landscape as cultural product, with colonists eager to recreate what they viewed as foreign to familiar in the name of ‘improvement’.¹⁵⁸

Transformation of the Aotearoa New Zealand landscape was not only a cultural exercise but also an economic one. Richard Somerset Mackie states that “the object of every survey system of colonization should be, not to re-organize society on a new basis, which is simply absurd, but to transfer to the new society whatever is most valuable and most approved in the institutions of the old”.¹⁵⁹ Indeed, alongside cultural initiatives, the British Empire in the nineteenth century was heavily focused on economic gain. This was also applicable in Aotearoa New Zealand. Emigrants to the colonies were expected to benefit the Empire twofold-their “labour and industry in primary production would both fuel British secondary industry and generate personal wealth, enabling them to become ardent consumers of British manufactured goods”.¹⁶⁰

This primary production was concerned with extracting resources from the landscape, exported to a larger British market.¹⁶¹ Essentially, emigrants were expected to extract and produce products that would be exported offshore to benefit the wider empire. Some exports would be processed and transformed into ‘British made goods’ that would in turn, become imports to be sold back to British emigrants overseas.

¹⁵⁴ Orange, p. 66.

¹⁵⁵ Orange, p. 104.

¹⁵⁶ King, p. 229.

¹⁵⁷ King, p. 239.

¹⁵⁸ Brooking and Pawson, ‘Silences of Grass’, p. 419.

¹⁵⁹ Richard Somerset Mackie, ‘The Colonization of Vancouver Island, 1849-1858’, *British Imperial Strategies in the Pacific, 1750-1900*, ed. by Jane Samson (Hampshire: Ashgate, 2003) p. 132.

¹⁶⁰ Robin Haines, ‘“The Idle and Drunken Wont Do There’: Poverty, the New Poor Law and Nineteenth Century Government Assisted Emigration to Australia from the United Kingdom’, *British Imperial Strategies in the Pacific, 1750-1900*, ed. by Jane Samson, (Hampshire: Aldershot, 2003) p. 201.

¹⁶¹ Robin Fisher, ‘The Impact of European Settlement on the Indigenous Peoples of Australia, and New Zealand: Some Comparative Dimensions’, *British Imperial Strategies in the Pacific, 1750-1900*, ed. by Jane Samson, (Hampshire: Ashgate, 2003) p. 206.

Edward Gibbon Wakefield, described by Tom Brooking and Eric Pawson as an “architect of the ‘systematic colonisation’” of Aotearoa New Zealand, wrote extensive theories of colonization.¹⁶² Wakefield would found the New Zealand Company, an endeavour aimed at drawing British emigrants to the Southern hemisphere and bring his colonial theories to realisation. Involved intimately in the colonisation of Aotearoa New Zealand, Wakefield succinctly described the process between Britain and New Zealand in his writings: “The colony produces what the old country wants; the old country produces what the colony wants. The old country and the colony, therefore, are, naturally, each other’s best customers.”¹⁶³ This established system was one in which the British were keen to integrate Aotearoa New Zealand, hoping to accept into the imperial fold a country ripe with economic potential.

The writings of Wakefield portrayed an image of Aotearoa New Zealand as a fertile landscape, a sentiment echoed in much colonial propaganda in the nineteenth century. Indeed, of the Aotearoa New Zealand islands, Wakefield believed “their relative position, their soil, climate, harbours, rivers and valuable natural productions-all invite Englishmen to settle here”.¹⁶⁴ He continued to state that “in whatever part of the island they have been planted, European vegetables, fruits, grasses, and many sorts of grain, flourish remarkably, but not more than the different animals which have hitherto been imported, such as rabbits, goats, swine, sheep, cattle, and horses”.¹⁶⁵ Furthermore, the “rivers and lakes abound with edible fish in great variety and of excellent quality”.¹⁶⁶ Wakefield further suggested that British settlements in Aotearoa New Zealand would benefit economically from having “several kinds of commodities suitable to distant markets”, the excellent harbours and general position to trade routes compounding economic benefit for settlers.¹⁶⁷

Indeed, the productive value of Aotearoa New Zealand according to Wakefield was seemingly endless: fish, flax, timber, all of quality and growing with abundance.

Furthermore, European species supposedly flourishing in Aotearoa New Zealand is a

¹⁶² Tom Brooking and Eric Pawson, ‘Seeds of Empire: The Environmental Transformation of New Zealand’ (Bloomsbury Academic: London, 2011) p. 15.

¹⁶³ *A View of the Art of Colonization, With Present Reference to the British Empire; In Letters Between a Statesman and a Colonist*, ed. by Edward Gibbon Wakefield. (London: John W. Parker, 1849)

¹⁶⁴ E. G Wakefield, ‘The British Colonization of New Zealand’, *The New Zealand Association*, (London, John W. Parker, 1837), pg.43

¹⁶⁵ Wakefield, ‘The British Colonization of New Zealand’, p. 46.

¹⁶⁶ *Ibid.*

¹⁶⁷ Wakefield, ‘The British Colonization of New Zealand’, p. 76.

narrative echoed by many keen to see the country colonised. In terms of colonial propaganda, Aotearoa New Zealand was a verdant paradise, the soil and landscape productive regardless of what plant or animal was released onto it.

For those who settled in Aotearoa New Zealand therefore, there was a preoccupation with the products of the landscape. Emma Kirk describes the planting of an orchard by her father at Māngungu in the early nineteenth century, one of the first tasks he attended to, noting that the “Quinces and peaches did particularly well”.¹⁶⁸ *The Missionary Guide Book* published in 1846 describes this process as “Peach-stones that were scattered at random by the missionaries”, however it does corroborate Kirk, stating that the peach trees “bore most abundantly”.¹⁶⁹ Not all were convinced however. An author, known only as Maggie, who visited Aotearoa New Zealand in the late nineteenth century, and found it lacking, regarded the peaches as “a bait to show forth the charms of the climate, &c., are a mockery”.¹⁷⁰ Maggie continues their tirade, stating that “they may as well throw them to the pigs, as they do, by hundreds”.¹⁷¹ While the author does concede that the “fruits are very prolific”, and the “Apples and pears are very good”, the peaches they consider to be “hard, sour, green stones, no more to be compared to an English peach than a cabbage to a rose”.¹⁷² Not restricting her protests to peaches, Maggie complains that “Vegetables are very abundant, but in flavour many will not equal those at home”.¹⁷³

An entire book, *Taken In*, was written by Maggie, warning those considering emigrating to Aotearoa New Zealand of the ‘realities’ of colonial life.¹⁷⁴ Maggie describes herself as ‘misguided’ and ‘foolish’ to have fallen for colonial propaganda representing Aotearoa New Zealand as “the land of promise, the land of plenty, and the land of hope”.¹⁷⁵ The reason for the propaganda of Aotearoa New Zealand as a land of plenty, Maggie theorises, is due to the “big wigs”, rich men who “merely pass through the country as birds”.¹⁷⁶ These men “see all the bright side of life, and have no idea what the *struggle* of it is”.¹⁷⁷ Upon their return to Europe, buoyed by a

¹⁶⁸ Kirk, Emma 1828-1906 : Wesleyan Missionary Society station at Mangungu, qMS-1113.

¹⁶⁹ *The Missionary Guide Book*, (London: Seeley, Burnside and Seeley, 1846), p. 260.

¹⁷⁰ ‘Hopeful’, *Taken In: Being a sketch of New Zealand Life*, (London: W. H. Allen & Co., 1887), p. 106.

¹⁷¹ *Ibid.*

¹⁷² *Ibid.*

¹⁷³ *Ibid.*

¹⁷⁴ ‘Hopeful’, p.ix

¹⁷⁵ *Ibid.*

¹⁷⁶ ‘Hopeful’, p.205

¹⁷⁷ *Ibid.*

pleasant venture, they write “enthusiastic articles in the paper, and people are more and more confirmed in their view that New Zealand is an El Dorado-poor things!”¹⁷⁸ The account of Maggie hints that the Aotearoa New Zealand landscape was not as fertile and productive as images of it, broadcasted in Britain to entice settlers, portrayed.

James Belich explains these sentiments, stating that from “the late 1830s to the early 1880s, propaganda designed to attract streams of British migrants and money portrayed New Zealand as a latent paradise, peculiarly destined to be brought to fruition by select British stock”¹⁷⁹ A constant perpetuation of this narrative created a name for Aotearoa New Zealand as the “Britain of the South”.¹⁸⁰ Further than Aotearoa New Zealand becoming an integral part of the empire, propaganda supported the vision that one day Aotearoa New Zealand would become greater than Britain itself.¹⁸¹ In particular, The New Zealand Company perpetuated concepts of abundantly fertile soils in the mid nineteenth century to attract European settlers. This propaganda was revealed as myth in the 1860s as “grassland farmers began to observe progressive decline in yields”.¹⁸²

Indeed, the myth of exceedingly fertile soils was concocted by visiting Europeans in the late eighteenth and early nineteenth centuries, who falsely equated the dense forest and lofty kauri of Aotearoa New Zealand with soil fertility.¹⁸³ Vaughan Wood attributes this ‘biometric fallacy’ with eighteenth century European assumptions on soil fertility, derived from ‘humus theory’, the concept that decaying bio-material (mould) was the “singular source of plant food”.¹⁸⁴ As measuring the amount of ‘humus’ was a lengthy process, assessments about soil fertility were judged on the height of vegetation. The dense forests of Aotearoa New Zealand provided evidence to Europeans of fertile soil, a ‘fact’ which the New Zealand Company were keen to promote.

¹⁷⁸ Ibid.

¹⁷⁹ James Belich, ‘Myth, Race, and Identity in New Zealand’, *New Zealand Journal of History*, 31.1 (1997) 9-22, p. 13.

¹⁸⁰ Belich, p. 13.

¹⁸¹ Belich, p. 13.

¹⁸² Pawson and Brooking, *Empires of Grass*, p.46

¹⁸³ Vaughan Wood, ‘Appraising Soil Fertility in Early Colonial New Zealand: The ‘Biometric Fallacy’ and Beyond’, *Environment and History*, 9. 4, (2003), 393–405, <<https://doi.org/10.3197/096734003129342890>> p. 393.

¹⁸⁴ Wood, p. 394.

This vision of an Aotearoa New Zealand flourishing with European species and ripe with potential relied on the assumption that the native species could not possibly be as economically viable as the introduced. Indeed, “the economic, environmental and cultural values” of species native to Aotearoa New Zealand were disregarded in favour of European species, despite the fact that native species “effectively subsidised and supported transformation of the landscape by the first generation of European settlers”.¹⁸⁵ However, the pattern of European interaction with the land shifted throughout the nineteenth century, from one that featured a “hunting and gathering pattern of resource exploitation, to one that featured reorganized production”.¹⁸⁶ This method of resource exploitation by European migrants would increase in fervour throughout the mid-late nineteenth century, bolstered by notions that importing European species would ‘improve’ the landscape.

Indeed, the attitudes of European settlers in Te Waipounamu, the South Island, towards the land were similar to that of the American frontier: “wilderness areas were initially viewed as waste lands awaiting transformation”.¹⁸⁷ The economic potential of the indigenous shrub and grass was believed to be too low to be viable for the intended grazing lands of sheep and cattle. As European colonists intended to transplant familiar agricultural styles, it was imperative that “an artificial system that would facilitate animal management, produce nutritious herbage for as long as possible during the frost-free season” was achieved.¹⁸⁸ To achieve this goal, settler migrants replaced native ecosystems with commercially available, imported European grasses, grown from seed, thereby converting native bush to pasture.

Scientific knowledge was expanding throughout the nineteenth century, knowledge that settlers harnessed to aid their ideals of landscape transformation. Agricultural niches such as “agronomy, animal husbandry, horticulture, pasture management, and plant and animal selection either were or were becoming established scientific disciplines”.¹⁸⁹ Further, Darwin’s theories on evolution were becoming more widely available and understood through the publication and circulation of his books.

¹⁸⁵ Peter Holland, *Home in the Howling Wilderness: Settlers and the Environment in Southern New Zealand* (Auckland: Auckland University Press, 2013), p. 94.

¹⁸⁶ Fisher, p. 349.

¹⁸⁷ Holland, p. 100.

¹⁸⁸ Holland, p. 108.

¹⁸⁹ Holland, p. 107.

While European settlers in the early nineteenth century had required Māori knowledge of the landscape, as the century wore on they would often forego this knowledge in favor of Western theories, a situation compounded by the higher value given to Western science by settlers in comparison to indigenous knowledge.¹⁹⁰ This Western bias “influenced the nature of environmental transformation”, resulting in an ignorance of the potential of native grasses and an overall preference for familiar European species.¹⁹¹

Holland summarises the view of the native landscape by European settlers:

an ensemble of native ecosystems that he had to transform with fire, felling and cultivation, aided by introduced plant and animal species, to ensure an economically productive and congenial environment for himself, his wife and their family. To that end, he brought in decorative and pasture plants, vegetables, and fruit-bearing shrubs and trees to transform the appearance of the land and the species composition of its semi-natural and managed ecosystems, thereby creating his own, and to him more pleasant, version of nature.¹⁹²

This cut and burn approach drastically changed the landscape to satisfy a British market, with little interest or regard to the potential of native species. Species that Europeans had recognised as commercially viable did not escape destruction, however. Kauri was felled in swathes for shipbuilding as timber was a commercialised by-product of clearing the forest for farmland.¹⁹³ Furthermore, with the advent of refrigerated shipping in the 1880s, the meat and dairy trade provided greater impetus for clearances.

With native bush being cleared, swamps being drained for farmland, and the introduction of exotic species, European colonisers actively worked to reimagine the Aotearoa New Zealand landscape in the nineteenth century. However, contrary to colonist desires, not all European species thrived. In 1837, Wakefield quotes a Mr

¹⁹⁰ Pawson and Brooking, *Empires of Grass*, p. 35.

¹⁹¹ Holland, p. 18.

¹⁹² Holland, p. 96.

¹⁹³ Graeme Wynn, ‘Destruction Under the Guise of Improvement? The Forest, 1840-1920’, *Making a New Land: Environmental Histories of New Zealand*, ed. by Eric Pawson and Tom Brooking. (New Zealand: Otago University Press, 2013) p. 128.

Yate, stating that “all English grasses flourish well but the white clover never seeds”.¹⁹⁴ As settlers strove to reshape the Aotearoa New Zealand landscape into a pastoral vision, the difficulty in getting clover to seed proved to be an issue. However, advances in the dissemination of scientific knowledge about insect pollination in the mid-nineteenth century proved to hold solutions to the sterile clover issue for European settlers in Aotearoa New Zealand, the resolution of which proved to solidify Aotearoa New Zealand’s landscape as a pastoral one.

Debating the Role of Bees as Pollinators

The pollination of plants by wild pollinators contributes hugely to crop productivity globally.¹⁹⁵ The honeybee has long been understood as an important pollinator alongside its other productive capabilities. Crane explains that “foraging bees effect pollination by transferring pollen grains from the anthers of one flower to the stigma of the same or another flower of the same species”.¹⁹⁶ There are many methods by which plants can be pollinated, however most require an outside force: wind, rain, gravity or by interaction with an animal. Bee pollination is particularly effective, as they move from “one flower to another *of the same species*, not to a different species as many other insects may do”.¹⁹⁷ Historically, information takes time to spread, and understandings of pollination have taken time to develop. Crane notes that between the 1670s and 1880s knowledge of the processes underpinning plant biology and pollination developed.¹⁹⁸

While there were many earlier understandings of pollination, Charles Darwin undoubtedly popularised the idea in the mid nineteenth century. While the concept of insect pollination was briefly mentioned in *The Origin of the Species* (1859) — his later work *On the Various Contrivances by which British and Foreign Orchids are Fertilised by Insects*, first published in 1862, more thoroughly introduced Darwin’s understandings of insect pollination to a wider audience.¹⁹⁹

¹⁹⁴ Wakefield, *The British Colonization of New Zealand*, p. 308.

¹⁹⁵ Brett R. Blaauw, and Rufus Isaac, ‘Flower Plantings Increase Wild Bee Abundance and the Pollination Services Provided to a Pollination-Dependent Crop’, *The Journal of Applied Ecology*, 51. 4 (2014) 890–98, <doi:10.1111/1365-2664.12257>

¹⁹⁶ Crane, *The World History of Beekeeping and Honey Hunting*, p. 472.

¹⁹⁷ Crane, *The World History of Beekeeping and Honey Hunting*, p. 473.

¹⁹⁸ *Ibid.*

¹⁹⁹ Charles Darwin, *On the Origin of Species by Means of Natural Selection, Or, The Preservation of Favoured Races in the Struggle for Life* (London: John Murray, 1859); Charles Darwin, *On the*

However, Darwin was actively discussing the probability of bee pollination in the 1850s, with the *Gardener's Chronicle and Agricultural Gazette* a site of his musings on the subject. Published in an 1858 edition, *On The Agency Of Bees In The Fertilisation Of Papilionaceous Flowers, And On The Crossing Of Kidney Beans*, outlines Darwin's understandings.²⁰⁰ In this article, Darwin discusses his reasoning for believing that bumblebees are necessary for the pollination of papilionaceous (legume) flowers. Based on his observations of bumblebees interacting with the flowers, Darwin experimented, separating some flowers so that no bee could encounter them. As he suspected, they did not produce any pods. This experiment Darwin considered too small, so in his garden he covered three to four feet of kidney beans with net before they flowered. The covered plants produced much less pods than the uncovered ones which bees had access to.

As justification for his experimentation, Darwin quotes a previous *Gardener's Chronicle* article, 'Bees in New Zealand' (1843), whereby the author expressed surprise that clover did not seed in Wellington until honeybees were introduced.²⁰¹ This article is of note as it includes an analysis of correspondence between Darwin and one of his 2000 global correspondents, Mr William Swale, regarding bee pollination of clover. Swale arrived in Christchurch in 1857, becoming a prominent nurseryman.²⁰² Darwin and Swale came into correspondence when Swale published two articles in the *Gardener's Chronicle*. Interested in previous articles about bee pollination in Aotearoa New Zealand, Darwin reached out to Swale for information, his letter taking nearly 70 days to reach Swale.²⁰³

The excerpt, from the 1843 *Gardener's Chronicle* article, states that introduced honey bees "are not only thriving there, but there is reason to believe that they have been of essential service in rendering seeds fruitful".²⁰⁴ It continues to quote from the *New Zealand Journal*, which stated that "since Bees were established at Wellington, Clover seeds all over the settlement, which it did not before!". This prompted Darwin

Various Contrivances by which British and Foreign Orchids are Fertilised by Insects (London: John Murray, 1862)

²⁰⁰ Charles Darwin, 'On the Agency of Bees in the Fertilisation of Papilionaceous Flowers, and on the Crossing of Kidney Beans', *Gardeners' Chronicle and Agricultural Gazette*, 46 (1858) 828-9

²⁰¹ R, 'Bees in New Zealand', *The Gardener's Chronicle*, 50 (1843) p. 881.

²⁰² Gary J. Tee, 'Charles Darwin's New Zealand Correspondents', *Journal of the Historical Studies Group*, 48 (2014) 44-76, p. 63.

²⁰³ Tee, p. 63.

²⁰⁴ R, p. 881.

to conduct another experiment with white clover, which also belongs to the Faboideae subfamily, concluding that those plants not visited by bees did not produce seeds. Darwin eventually came to the conclusion that bees were mainly responsible for the fertilisation of *papilionaceous* flowers, a group belonging to the Faboideae subfamily of legumes.²⁰⁵

In his article Darwin does not specify what species of bee he is examining with the experiments; however, he is more specific in noting his letter to Mr Swale in Christchurch, Aotearoa New Zealand enquiring “whether Leguminous plants seeded there freely before the hive bee was introduced.”²⁰⁶ At this point, early experimentation Darwin and other correspondents conducted, focused heavily on the pollination potential of the honeybees, however Darwin would later shift this attention to bumblebees.

Swale responded in July 1858 stating that:

The Bees which are here were introduced from the Province of Wellington in 1852 to this Province; and to Wellington from England in the year 1842. When the first Ships with Emigrants arrived here seven years ago to colonise this Province not a Bee was to be seen, and when the right time arrived for sowing Seeds of the Natural Order Fabaceæ they and other usefull Seeds were sown, and during the Summer those kinds sown such as Peas, Beans, Scarlet Runners, Clovers, and so forth; all prospered and matured their Seeds at the end of the season, and when sown the following season germinated and produced crops again in the usual way: but very abundantly. ²⁰⁷

The letter continues with a list of 24 leguminous species, including crimson, red and white clover, all of which Swale indicated seeded freely before the introduction of the hive-bee. It must be noted that honeybees were introduced years before in 1839

²⁰⁵ The faboideae subfamily of legumes also includes peas and clover; Darwin, ‘On the Agency of Bees in the Fertilisation of Papilionaceous Flowers, and on the Crossing of Kidney Beans’.

²⁰⁶ Ibid.

²⁰⁷ William Swale, ‘Letter no. 2308’, *Darwin Correspondence Project*, <<https://www.darwinproject.ac.uk/letter/?docId=letters/DCP-LETT-2308.xml>> [Accessed 19th August 2022]

rather than 1842 as Swale states. Swale also assumed that there was no indigenous bee species in Aotearoa New Zealand. This mistake was observed by Darwin, who gave Swale the benefit of the doubt noting that “perhaps this statement applies to bees resembling hive or humble bees, for some other genera are known to inhabit New Zealand”.²⁰⁸ Initial abundance of seed production in the species Swale identified could be attributed to *Apis mellifera*; or, as Swale suggests, to other insect pollinators. Indigenous bees, however, have not been reported as visiting red clover, nor other introduced plant species.²⁰⁹

Contemporary experiments regarding clover and bees tell a different story than that portrayed by Swale. Pollination is critical for seed production in clover species, and bee pollination is most effective. Efficacy is dependent on clover species and bee species. For example, where white clover is concerned, *Apis mellifera* is the most effective pollinator.²¹⁰ White clover is a common legume pastoral crop worldwide. It has a short corolla (petals) and produces abundant nectar making it attractive to honeybees. In a 2007 study, Semiha Cecen, Ayhan Gosterit & Fehmi Gurel examined the efficacy of honeybees versus bumble bees in the pollination of white clover, using seed yield as the metric of success. Honeybees were deemed the most effective pollinator in the study, followed very closely by bumblebees, both pollinators massively improving seed production in comparison to the control crop.²¹¹

Comparatively, red clover has a long corolla, making it difficult for short-tongued bees (such as honeybees) to access the nectar and potentially limiting visitation.²¹² Bumblebees on average have longer tongues and therefore are more effective pollinators of red clover crops. Indeed, in *Origin of the Species*, Darwin makes the claim that “humble-bees alone visit the common red clover (*Trifolium pratense*), as other bees cannot reach the nectar”.²¹³ However, some shorter tongued species will bite holes at the base of the flower to directly access the nectar through which honey

²⁰⁸ Darwin, ‘On the Agency of Bees in the Fertilisation of Papilionaceous Flowers, and on the Crossing of Kidney Beans’.

²⁰⁹ Linda Newstrom and Alastair Robertson, ‘Progress in Understanding Pollination Systems in New Zealand’, *New Zealand Journal of Botany*, 43.1 (2005) 1-59
<<https://doi.org/10.1080/0028825X.2005.9512943>> [Accessed 18th August 2022]

²¹⁰ Keith S. Delaplane and D. F. Mayer, *Crop Pollination by Bees*, (CABI, 2000), p. 210.

²¹¹ Semiha Cecen, Ayhan Gosterit and Fehmi Gurel, ‘Pollination Effects of the Bumble Bee and Honey Bee on White Clover (*Trifolium repens* L.) Seed Production’, *Journal of Apicultural Research*, 46.2 (2007) 69-72 <<https://doi.org/10.1080/00218839.2007.11101370>> [Accessed 14th August 2022]

²¹² Delaplane, p. 206.

²¹³ Darwin, *The Origin of the Species*, p. 75.

bees have been observed to also make use of, this has little use for pollination however.²¹⁴ Plath's 1925 analysis of the debate surrounding the bumblebees importance to red clover summarised that, for the most part, Darwin was correct: "there is, as we have seen, a large body of evidence which indicates that Darwin's (1859 and 1876) maxim, "the more bumblebees, the more fertile red clover," is probably true of most parts of the world."²¹⁵

While Yates asserted that "white clover never seeds" in Aotearoa New Zealand, if the honeybee population was large enough, they would provide adequate pollination.²¹⁶ Red clover however can only be visited by bumblebees, and therefore it is this pastoral plant required a specific pollinator to be imported from overseas if settlers wished to ensure full commercial value of this crop. If bumblebees were a most necessary pollinator for red clover crops to seed successfully, then it seems Swale was mistaken in his statements to Darwin that all clovers seed freely in Aotearoa New Zealand.

White clover flowers, with their short corollas, were favoured by honeybee visitation and consequently required no additional pollinators for seed production. Conversely, red clover crops in Aotearoa New Zealand, prior to bumblebee introduction, were missing a vital pollinator, stunting seed production. Indeed, Plath notes that "For many years the farmers of New Zealand, especially those of the South Island, had been obliged to import all their red clover seed, because of the fact that this important forage plant would not produce seed freely in their own country".²¹⁷

While bees of all species are understood to be essential pollinators for agricultural crops today, this knowledge was developing in the nineteenth century. The concept was ultimately popularised by Darwin; his experiments, books, articles, and correspondence all served to expand on understandings of bees as pollinators. Although his findings concluded that bees certainly pollinated legumous species such as clover, efficacy of bee pollination varied across species, both of bee and clover.

²¹⁴ *Apis mellifera* and bumblebees are both considered generalists, however observation has shown bumblebees to favour European native plant species. Therefore, bumblebees are more likely to visit introduced plant species, such as clover, while honey bees are equally as likely to visit European species as native Aotearoa New Zealand species.

²¹⁵ O. E. Plath, 'The Role of Bumblebees in the Pollination of Certain Cultivated Plants', *The American Naturalist*, 59. 664 (1925) 441-451, p. 444.

²¹⁶ Wakefield, *The British Colonization of New Zealand*, p. 308.

²¹⁷ Plath, p. 443.

The Value of Bumblebees

Discussions regarding the use of bumblebees for pollination of red clover revealed a divide in opinion in the late nineteenth century. Some European settlers regarded the importation of bumblebees as unnecessary, claiming in letters to the editor that red clover seeded already in Aotearoa New Zealand. Other settlers responded that farmers clamoured for the introduction of the furry insects, and called for the Acclimatisation Societies to take action to correct the dearth of bumblebees. In 1867, James J. Jackson wrote to the editor of the *Daily Southern Cross* newspaper calling for information regarding red clover. Specifically, Jackson questioned “whether it be necessary that the humble-bee should impregnate it, or whether moths or ordinary bees be not sufficient”.²¹⁸ Further, a reward of £3 3 shillings was offered “for the first bushel of red clover (impregnated) seed grown in the province of Auckland”.²¹⁹

In reply to Jackson’s letter ‘An Old Settler’ instructs that the reason for poor seed yield is due to the bees. They state that “the bees in the spring work on other flowers, and rarely frequent the red clover, therefore the blossoms are not sufficiently impregnated”. The letter continues to reason that a lack of flowers in the autumn months draws the bees to the clover, which will then provide good seed.²²⁰ Although the information the correspondent provides has its basis in an English context, the author claims “the same practice stands good here”.²²¹ The same year, a correspondent to the *Otago Witness*, gave further illumination to the issue. The unnamed correspondent notes that while “the soil and climate of this Province appear to be most congenial to its growth, and annually its sown areas are largely on the increase”, “all the seed used in the Colony is imported from England”.²²² In other words, while the red clover grew successfully without issue in Aotearoa New Zealand and settlers were consistently growing clover in larger and larger areas, local seed production was next to non-existent, with growers reliant on European imports of seed. The *Otago Witness* correspondent concluded that while honeybees visit stands of red clover, their efforts to reach the nectar were ineffectual and inappropriate for

²¹⁸ James J. Jackson, ‘Red Clover- Information Wanted’, *Daily Southern Cross*, 25th April 1867, <<https://paperspast.natlib.govt.nz/newspapers/DSC18670425.2.30>> [Accessed 20th August 2022]

²¹⁹ Ibid.

²²⁰ An Old Settler, ‘Red Clover’, *Daily Southern Cross*, 3rd May 1867, <<https://paperspast.natlib.govt.nz/newspapers/DSC18670503.2.30.6>> [Accessed 20th August 2022]

²²¹ Ibid.

²²² ‘Cultivation of Clover’, *Otago Witness*, 9th August 1867, <<https://paperspast.natlib.govt.nz/newspapers/OW18670809.2.25>> [Accessed 20th August 2022]

the adequate spreading of pollen; the bumble bee however, was necessary for the seeding of clover and therefore deserved attention from Acclimatisation Societies.²²³

Every Maclean, in a letter to the editor of the *Weekly News*, claims to have been a grower of red clover for seed in England, observer of the plant in Aotearoa New Zealand, and “paid a great deal of money for the past seventeen years on seed”.²²⁴ While Maclean noted an improvement in red clover seed production in the years leading up to 1867, the year his letter was published, he still lamented that this was not enough for a crop. Like many other correspondents keen to advocate for the introduction of bumble bees, Maclean quotes from Darwin, in this instance, *Origin of the Species*. The partial fertilisation of red clover in Aotearoa New Zealand Maclean deduces to be credited to moth visitation, however, not enough to be profitable. Maclean also calls upon Acclimatisation Societies in his correspondence, stating the ease at which he believes they could introduce bumble bees. If the spread of bumble bees were to match that of the hive bee, Maclean reasoned, then the introduction could “save thousands of pounds sterling per annum to the colony by the saving of our own seed”.²²⁵

The callings for Acclimatisation Societies to take note of the issue was heard in 1870, at the very least, at a meeting of the Dunedin society. 29th January 1870, the *Wairarapa Standard* published a letter, read to the society, from a Mr Allen. The beginning of Mr Allen’s letter covers much the same ground as Every Maclean: red clover, although it grows well, does not seed in Aotearoa New Zealand, a possible explanation for this being a lack of suitable pollinator. Allen however also investigates the logistics of bumblebee introduction, posing the question: “Would it stand the importation over fifteen thousand miles of ocean?”²²⁶ The letter continues with Allen stating that bumblebees can be transported across land, and varieties in Scotland and Ireland are contained in boxes during winter. Therefore, he argued that bumblebees could certainly withstand the sea journey. The article concludes by stating “It was resolved that enquiries should be made as to best means to obtaining humble

²²³ Ibid.

²²⁴ Every Maclean, ‘Acclimatization-The Humble Bee Versus Red Clover’, *Hawke’s Bay Herald*, 21st May 1867, < <https://paperspast.natlib.govt.nz/newspapers/HBH18670521.2.17>> [Accessed 20th August 2022]

²²⁵ Ibid.

²²⁶ ‘The Humble Bee and Red Clover’, *Wairarapa Standard*, 29th January 1870, < <https://paperspast.natlib.govt.nz/newspapers/WAIST18700129.2.10>> [Accessed 20th August 2022]

bees.”²²⁷ The Acclimatisation Societies heard the calls to introduce bumblebees at last.

Not all were convinced, however, of the necessity of bumble bees. A letter to the *Otago Witness* in October 1878, by F.W. Hutton stated that Darwin’s claims regarding red clover have been much misrepresented.²²⁸ Hutton claims that the “New Zealand climate and soil may so stimulate the plant as to make it capable of self-fertilisation”, or that other insects may pollinate the clover, such that do not exist in England. Other insects had indeed been suggested as potential pollinators of red clover by those apparently unwilling to hear suggestion of further insect importation, honeybees and moths being favourable contenders. However, Hutton’s implication that the soil and climate of Aotearoa New Zealand had the potential fecundity to stimulate a plant out of self-sterility had little basis. This sterility, according to Plath, “was changed almost over night by the successful introduction of bumblebees”.²²⁹

Even the Acclimatisation Societies in the latter half of the nineteenth century were growing cautious of careless introductions of new species. The Wellington Acclimatisation Society 1888 Annual Report notes that “These tamperings with the balance of nature in a new country are exceedingly dangerous, and may lead to quite disastrous results in years to come as foolish importations made by private individuals have done in the past.”²³⁰ Indeed, while there was a growing number calling for Acclimatisation Societies to introduce bumblebees, some had taken it upon themselves to import the creatures.

Acclimatisation Societies Influence

The Canterbury Acclimatisation Society first attempted to introduce bumblebees into Aotearoa New Zealand.²³¹ Mr Fereday first brought the suggestion to the Society in 1870, however it would not be for a further two years until the project was decided. The Society discussed the endeavour with Dr Frank Buckland , who agreed to assist the efforts in 1873. This attempt was abandoned as the bumblebees proved too

²²⁷ Ibid.

²²⁸ F. W. Hutton, ‘Fertilisation of Red Clover’, *Otago Witness*, 12th October 1878, <<https://paperspast.natlib.govt.nz/newspapers/OW18781012.2.50>> [Accessed 20th August 2022]

²²⁹ Plath, p. 443.

²³⁰ Wellington, Alexander Turnbull Library, Wellington Acclimatisation Society: Records. MS-Group-1253. Annual Report of the Wellington Acclimatisation Society for the Year Ending 31st August 1888.

p.7.

²³¹ Hopkins, ‘History of the Humble-bee in New Zealand’, p. 7.

difficult to collect. Attempts would not be made for a further three years until in 1876, Mr Farr would receive word of a shipment arriving on the *Orari* with John Hall, sent by Dr Buckland. The bumblebees were all dead.

After the several failed attempts, the Canterbury Acclimatisation Society put the project on hold, however this did not deter private citizens making their attempts. Hopkins states that he was under the impression he had the claim of the first introduction in February 1884. He was however, corrected “by a resident in Timaru, who stated he liberated in 1883 some which came to the order of a lady”.²³² Although Hopkins could not recall the name of the woman who ordered the bumblebees shipped to Aotearoa New Zealand, another source provides the name Mrs Belfield. In February 1881, the *Lyttelton Times* described a semi-successful introduction as two bumble bees were “liberated at Timaru, by the agency of Mrs Belfield”.²³³ The *Nelson Evening Mail* provided more information on the bee release, stating that “two queens the survivors of a shipment of eighteen consigned to Mrs Belfield from Mr Neighbour, were turned out on Mr Bristol’s farm on Saturday”.²³⁴ The two survivors, set free amongst a clover field “were strong and healthy, and flew away briskly against the wind”, presumed to be the first bumblebees introduced to Aotearoa New Zealand.²³⁵ The *Nelson Evening Mail* article details the process of the endeavour, which began when Belfield met with Neighbour in England three years previously.²³⁶ After describing the need for bumblebees in Aotearoa New Zealand, Neighbour accepted the project. Hiring an agent in Scotland to mark nests in summer, each nest was gently dug from the earth when the weather turned cooler and the queens begun their hibernation, during which they would be shipped to their new home.

Hopkins also outlines his personal attempts to introduce bumblebees while in Matamata. His first attempt was a failure. Hopkins ordered 100 queens from Messrs. Neighbour and Sons, London in September 1882. They did not reach Hopkins till May, all bees in the shipment dead. A second order was placed, with instructions for the shipment to reach Aotearoa New Zealand no later than January. They reached

²³² Hopkins, ‘History of the Humble-bee in New Zealand’, p. 7.

²³³ ‘A Popular Error’, *Lyttelton Times*, 21st February 1881, <<https://paperspast.natlib.govt.nz/newspapers/LT18810221.2.27>> [Accessed 18th August 2022]

²³⁴ ‘Humble Bees’, *Nelson Evening Mail*, 17th February 1881, <<https://paperspast.natlib.govt.nz/newspapers/NEM18810217.2.19>> [Accessed 18th August 2022]

²³⁵ Ibid.

²³⁶ Ibid.

Auckland in February 1884, two bees out of 145 alive. Nursed overnight by Hopkins, they were released the following morning, however Hopkins notes that “I never saw any indication afterwards of their having established themselves.”²³⁷ Two further shipments arrived in early 1885, all bees again arriving dead. Hopkins concludes his efforts by stating that “a total of nearly five hundred bees came in several consignments, but all were dead except the two mentioned”.²³⁸

The Canterbury Acclimatisation Society reinvigorated their efforts to introduce bumblebees to Aotearoa New Zealand, again with the assistance of Buckland in the mid-1880s. A shipment of 282 bees arrived in Canterbury in 1884, with 48 survivors—the largest number of bumblebees to survive the journey thus far.²³⁹ The bees evidently established themselves quickly, the Wellington Acclimatisation Society records noting in September 1886: “The Canterbury Acclimatisation Society has kindly promised to supply this society with a few nests of the Humble Bee, which is very plentiful in the South and said to be useful in fertilising red clover.”²⁴⁰ In two years, the 48 released bumblebees flourished and became ‘plentiful’ enough to consider transplanting some to Te Ika-a-Māui.

While settlers in Te Ika-a-Māui were eager to release bumblebees on the island, it would take some years before this came to fruition. The Wellington Acclimatisation Society reported in 1887:

The Humble Bee has been successfully acclimatized in the South Island: But though the Canterbury Acclimatisation Society have for some time been endeavouring to obtain a few nests for us, the attempt has not yet been successful. This Society will gladly pay the expense of collecting a few nests and be grateful to anyone who will bring this useful insect to the North Island to fertilise our clovers.²⁴¹

While members of the general public had previously called upon the Acclimatisation Societies to introduce bumblebees to Aotearoa New Zealand, in this example is almost the reverse. The Wellington Acclimatisation Society was calling out to the

²³⁷ Hopkins, ‘History of Humble-Bees in New Zealand’, p. 8.

²³⁸ Ibid.

²³⁹ McDowall, p.363

²⁴⁰ Wellington, Alexander Turnbull Library, Reports of the Wellington Acclimatisation Society 1884-1929. MSX-6855. Bound Annual Reports.

²⁴¹ Ibid.

reader, presumably a member of the Society but also potentially to any willing party, to collect nests of bumblebees and transport them to Te Ika-a-Māui. There is, at this time in the late nineteenth century, an interplay between ‘public’ and ‘private’ introductions of species. Private individuals, such as Hopkins, and public societies, were at once, in the 1880s vying to introduce bumblebees into Aotearoa New Zealand.

Isaac Hopkins published a bulletin titled *History of the Humble bee in New Zealand: Its Introduction and Results* in 1914. Hopkins notes that the importation of bumblebees to Aotearoa New Zealand had been “undertaken by semi - private institutions and private individuals” and therefore little record of their introduction was lodged in Government archives.²⁴² The objective of introducing the bumble bee, Hopkins states, was for the fertilisation of red clover, although he does note that seeds had indeed been found prior to bumblebee introduction. Besides from perhaps honeybees, which cannot reach the nectar of red clover, Hopkins concludes that no other insect in Aotearoa New Zealand could pollinate red clover in profitable way. While researching for his publication, Hopkins endeavoured to become acquainted with the species of bumblebee currently in Aotearoa New Zealand. He notes however, that those who first imported the bees, were perhaps not so knowledgeable:

Evidently there was no one among those who took a leading part in the introduction of humble-bees in the first instance sufficiently well acquainted with the different species, or of their comparative value for the purpose required, to understand which would be the best to obtain

Soon after their introduction in 1885, there were questions raised regarding exactly which bumblebee species had been imported. To answer these questions, in 1895 the Canterbury Acclimatisation Society sent a sample of species to Miss Ormerod, formerly Entomologist to the Royal Agricultural Society, England. Ormerod examined the species and determined both *Bombus terrestris* and *Bombus subterraneus* present in Aotearoa New Zealand. Further, in response to questions

²⁴² Isaac Hopkins, ‘History of the Humble-bee in New Zealand’, *New Zealand Department of Agriculture, Industries, and Commerce* 2000.46 (1914) p. 3.

from the Acclimatisation Society regarding the best species for red clover pollination, Ormerod replied: “you are now having some hundreds of tons of dressed locally grown seed being annually bought and sold in your market. I do not consider that you could do better than continue as you are doing”.²⁴³

While there was some disagreement amongst European settlers regarding the necessity of bumblebees for clover pollination, correspondents to newspapers in Aotearoa New Zealand in the nineteenth century frequently argued for their introduction. The price of clover seed was a large motivator, and European settlers publicly petitioned Acclimatisation Societies to import the species for agricultural benefit. While private individuals also attempted to import bumblebees, it was the Acclimatisation Societies that were ultimately successful.

Eventually, in 1888, the Wellington Acclimatisation Society had their wishes granted. Their 1888 Annual report states that:

Several nests of Humble Bee were courteously sent up by the Canterbury Acclimatisation Society, and placed on a large clover field in the Wairarapa, where they have hatched out and been seen. Several settlers have also imported these bees from Canterbury, and before long they will no doubt be as numerous in the North Island as they are in the South, and help fertilise our clovers.²⁴⁴

It seems that endeavours to introduce bumblebees were undertaken by both private individuals and the Acclimatisation Societies, resulting in a successful introduction to Te Ika-a-Māui.

The bumblebees wasted no time proliferating in Te Ika-a-Māui, reports from 1890 indicating that the bees introduced in 1888 did indeed survive and establish. The Wellington Acclimatisation Society notes that:

The humble bees imported from Canterbury are spreading very fast, and should in the course of a very few years overrun the North as they already have most of the South Island, and render much of our sterile red clover a fertile seed bearer.²⁴⁵

²⁴³ Hopkins, ‘History of the Humble-bee in New Zealand’, p. 10.

²⁴⁴ Wellington, Alexander Turnbull Library, Wellington Acclimatisation Society: Records. MS-Group-1253. Annual Report of the Wellington Acclimatisation Society for the Year Ending 31st August 1888

²⁴⁵ Wellington, Alexander Turnbull Library, Reports of the Wellington Acclimatisation Society 1884-1929. MSX-6855. Bound Annual Reports.

Shortly after, in 1892, the society notes that the introduction of bees was a success: “In many parts of the South Island where these bees are exceedingly numerous it has been found that red clovers can now be profitably grown on cold clay land hitherto supposed to be incapable of growing it permanently”.²⁴⁶ In the Wellington region, the society happily reports that “the humble bees introduced to this district have increased wonderfully and are spreading widely”.²⁴⁷ Commercially, the Wellington Acclimatisation Society considered the bumblebees to be a success: “it is now worth the farmers’ while to consider how far it will pay to introduce more red clover seed than formerly into the mixture of grasses used for laying down average bush hills in permanent pasture”.²⁴⁸

Many attempted, and failed, to introduce bumblebees to Aotearoa New Zealand in the nineteenth century. The 1885 importation by the Canterbury Acclimatisation Society was eventually successful, answering the call of farmers to address the clover pollinator absence. The dissemination of bumblebees throughout Aotearoa New Zealand in the years following the introduction ultimately made clover a profitable pastoral crop and was a triumph for the Acclimatisation Societies.

Conclusion

The introduction of bumblebees into Aotearoa New Zealand facilitated the completion of the environmental transformation intended by European settlers in the late nineteenth century. Advancements in science and technology compounded this transformation. The work by Darwin on pollination, including his experiments and publications, reached an Aotearoa New Zealand audience in the nineteenth century. European settlers, especially farmers, were keen to see Darwin’s theories tested on the Aotearoa New Zealand landscape. The developments in refrigerated shipping in the 1880s also facilitated the environmental transformation by making grass-based products (wool, meat, dairy) commercially viable exports in an imperial trade market. The capability of grass-based products to have export value hastened the transformation of the landscape from native bush and swamplands to one of pastoral-based agriculture.

²⁴⁶ Ibid.

²⁴⁷ Ibid.

²⁴⁸ Ibid.

This transformation would not have been complete without the introduction of bumblebees. As red clover is a valuable fodder pasture, and Aotearoa New Zealand was bereft of bumblebees prior to introduction, European settlers had to import clover seed from England. With the liberation of bumblebees into the country, courtesy of private individuals and Acclimatisation Societies, red clover began to seed freely, creating a new export market in itself. Quantifying this shift in monetary terms is difficult, the data widely unavailable, and outside the scope of this thesis. However, in the decades succeeding bumblebee introduction, a marked shift can be seen in newspaper advertisements of the import versus export of clover seed.²⁴⁹ After bumblebees proliferated the landscape a significant swell in the number of clover seed sellers based in Aotearoa New Zealand can be seen.

Without an awareness of the logistics of pollination, European colonists would have been ignorant to the reason for the sterility of their clover crop. Aotearoa New Zealand confirmed Darwin's pollination experiments on a country-wide scale, ultimately aiding the transformation of the Aotearoa New Zealand landscape.

Ultimately, the introduction of bumblebees showed a persistence on behalf of European colonists in their efforts to transform the landscape. Relentless endeavour by settlers to create an agricultural paradise consistent of English pasture continues to remain a dominant narrative in Aotearoa New Zealand's export culture. The legacy of colonial landscape transformation echoes from the past, over and over.

²⁴⁹ Prior: 'Grocers', *Grey River Argus*, 13th September 1878, <
<https://paperspast.natlib.govt.nz/newspapers/GRA18780913.2.12.5>> [Accessed 25th August 2022];
'Grass Seed', *Daily Southern Cross*, 8th April 1870, <
<https://paperspast.natlib.govt.nz/newspapers/DSC18700408.2.14>> [Accessed 25th August 2022];
'Clover seed! Clover Seed!', *Wanganui Herald*, 6th February 1880, <
<https://paperspast.natlib.govt.nz/newspapers/WH18800206.2.2.5>> [Accessed 25th August 2022]
After: 'Gold Medal for Seeds', *Southern Cross*, 18th August 1894, <
<https://paperspast.natlib.govt.nz/newspapers/SOCR18940818.2.12.2>> [Accessed 25th August 2022];
'Spring Sowing', *Lyttelton Times*, 1st October 1895, <
<https://paperspast.natlib.govt.nz/newspapers/LT18951001.2.20.1>> [Accessed 25th August 2022];
'Seeds For Spring Sowing', *Ashburton Guardian*, 31st July 1896, <
<https://paperspast.natlib.govt.nz/newspapers/AG18960731.2.17.3>> [Accessed 25th August 2022]

Chapter Three: The Divine and Industrious Hive

Improvement narratives, Christianity and industrial capitalist ideals all sit within each other as a nexus of ideologies that drove European settlers to alter the landscape in Aotearoa New Zealand. These narratives take on many forms in the nineteenth century imagination and bees fit neatly into this intersecting web of ideologies as both a literal biological tool, and an idealistic metaphor. While gender has been discussed in previous sections, the focus has prioritised an examination of traditional gendered roles and spaces in nineteenth century society. However, gender remains a relevant category of analysis when examining the metaphorical interpretations of hive as a mirror for society.

Indeed, notions of an idealised society did not fit onto the landscape the European colonisers and missionaries encountered upon arrival in Aotearoa New Zealand. Eager to reach this Edenic vision, productivist narratives drove a grass-lead transformation, resulting in a large scale and irreversible transformation of the environment. Tempted by propaganda of Aotearoa New Zealand as a fertile paradise, European settler colonists undertook the arduous journey to the Antipodes. Missionaries, wary of immorality corrupting the distant colonies preceded the most pronounced waves of settler migration, many establishing in the early nineteenth century.

However, the Pacific environment, with its specialised island ecosystems, were susceptible to rapid change, accelerated by human interaction with these environments.²⁵⁰ European interaction with Pacific island environments, such as Aotearoa New Zealand, expatiated and intensified environmental change previously unparalleled in the region.²⁵¹ When Europeans arrived in the Pacific, previously unlinked ecosystems now came into contact. Further than this, previously unlinked economies came into contact.²⁵² Therefore, European patterns of existing in Pacific environments shifted from a “hunting and gathering method of resource exploitation”, to one that “featured reorganized production”.²⁵³ As the nineteenth century progressed, the landscape did too “resulting in a vegetation mosaic that

²⁵⁰ J. R. McNeill, ‘Pacific Ecology and British Imperialism 1770-1970’ in *British Imperial Strategies in the Pacific, 1750-1900*, ed. by Jane Samson (London: Routledge, 2003) 349-364 (p. 349)

²⁵¹ McNeill, p. 349.

²⁵² McNeill, p. 353.

²⁵³ McNeill, p. 349.

largely endures to this day”. While, other Pacific island environments were routinely exploited to produce plantation crops, in Aotearoa New Zealand economies based around grassland became the basis of the export market. This grassland economy, revolved around an “image of England’s farm in the antipodes”, providing inspiration and guiding ideology for generations of European settler colonists.²⁵⁴ However, while this model provided a paradigm for transformation, the resulting ecological shift “was to have undesirable implications for this small, geographically isolated country”.²⁵⁵

For settler colonists, bumblebees acted as mechanical agents of transformation; harnessed to speed progress of change—a country wide experiment guided by a growing confidence in scientific knowledge. Indeed, while invasive species undoubtedly “affect both biological and cultural systems”, the introduction of any exotic species arguably has this same potential.²⁵⁶ While the European Age of Exploration in the fifteenth and sixteenth centuries “heralded a biogeographical exchange between Asia, Africa, Oceania and the Americas of unprecedented proportions”, this exchange continued with British Imperial expansion as the empire became concerned with productive colonies.²⁵⁷ Furthermore, there “had been no ‘Magellan Exchange’ of plants, animals and diseases across the Pacific, no analogue to the Columbian exchange in the Atlantic”, the late eighteenth century heralding a Pacific equivalent to what had occurred in the fifteenth century Atlantic world.²⁵⁸ Consequentially, the inflow of exotic species into Aotearoa New Zealand in the nineteenth century entered a landscape that was previously untouched by European exploitation, rapidly impacting the landscape in the space of a century.

Landscape, however, is a “product of culturally specific ways of seeing” according to Brooking and Pawson.²⁵⁹ Therefore, the landscape transformation that followed the inflow of European settler colonists into Aotearoa New Zealand in the nineteenth

²⁵⁴ Holland, p. 15.

²⁵⁵ Ibid.

²⁵⁶ Jeanine M. Pfeiffer and Robert A. Voeks. ‘Biological Invasions and Biocultural Diversity: Linking Ecological and Cultural Systems.’, *Environmental Conservation*, 35. 4 (2008), 281–93 <<http://www.jstor.org/stable/44520358>> [Accessed 30 Jun. 2022] p. 281.

²⁵⁷ Pfeiffer and Voeks, p. 281.

²⁵⁸ Bernard Porter, *Empire Ways: Aspects of British Imperialism*. (London: I.B. Tauris, 2016) p. 351.

²⁵⁹ Tom Brooking and Eric Pawson, ‘Silences of Grass: Retrieving the Role of Pasture Plants in the Development of New Zealand and the British Empire’, p. 419.

century is the consequence of their “environmental attitudes and practices”.²⁶⁰ To analyse these attitudes is to examine what Beattie and Stenhouse describe as “a fascinating historical laboratory in which to explore the interconnections between empire, environment and religion”.²⁶¹ Indeed, the improvement and progress narratives that settlers place upon the Aotearoa New Zealand landscape, “cannot adequately be understood apart from the religious traditions they brought with them”.²⁶²

While bumblebees were literal tools of empire, honeybees guided a cultural transformation. The narratives that surrounding the society of the hive simultaneously of moral and capitalist tenor. Once again, these narratives sit within the matrix of improvement, and religion, but also can be used to analyse gender roles. The hive, governed by its queen-bee, reflective of the overarching monarchy in Britain, the devotion of the bee-masses to their leader a “proper model” for the appropriate relationship between citizens and monarch.²⁶³ This idealised model of citizen behaviour extended further than the leader-masses relationship. The beehive was also viewed as an exemplary model of industrious productivity, incorporated into progress models as an ideal mode of behaviour. This narrative often intersects with religious narratives surrounding bees, which views the beehive as a “divine allegory”.²⁶⁴ The organisation and industry of the hive a moral lesson and pattern for Christian behaviour.

This chapter will examine not only the religious attitudes of European settler colonists towards bees and land, but also their ideals regarding industry and gender. The rise of science in the latter half of the nineteenth century will also be examined as a potential antithesis to the previously dominant religious attitudes. Darwinian thought created the scene for much riotous debate in Europe, and despite actively enacting Darwinian pollination experiments in the entire country, European settlers

²⁶⁰ James Beattie and John Stenhouse, ‘Empire, Environment and Religion: God and the Natural World in Nineteenth-Century New Zealand’, *Environment and History*, 13.4, (2007), 413-446 (p.414)

²⁶¹ Beattie and Stenhouse, p. 418.

²⁶² Beattie and Stenhouse, p. 414.

²⁶³ Eva Crane, *A World History of Beekeeping and Honey Hunting*, p. 592.

²⁶⁴ Dror Wahrman, *The Making of the Modern Self: Identity and Culture in Eighteenth-Century England*, (New Haven: Yale University Press, 2004) p.3

in the Antipodes did not see science and religion as directly opposed like much of Europe did.

Religion: Christian ideologies of landscape and bees

I begin this discussion here with religion as it underpins much of the consequent ideologies. When separating a tight web of intersecting concepts into a comprehensible narrative, one must start somewhere-the natural place is the beginning. In a chronological sense, religious attitudes followed economic drive to exploit the resources of Aotearoa New Zealand. Missionaries feared for the moral status of Māori in Aotearoa New Zealand, viewing the British and American whaling communities in the Pacific as a potential scourge of lawlessness and vice. However, missionary activity in Aotearoa New Zealand predates sustained European effort to transform the landscape. As this transformation is directly relative to the progress and improvement narratives (and religious ideologies), upheld by European settlers, religion will be examined first.

Christian religious ideologies in Aotearoa New Zealand has previously been overlooked or downplayed in historiography in relation the ‘founding’ of New Zealand. The concept of Aotearoa New Zealand as a secular nation in the nineteenth century is, arguably, misguided. The role of Christianity in instructing European settler relationships to the natural world cannot be understood. Beattie and Stenhouse most notably argue that “throughout the nineteenth century many settlers drew on biblical ideas and images as well as scientific and utilitarian considerations in relating to the natural world”.²⁶⁵

Indeed, far from unimportant to the formation of British colonies, the “Protestant tradition was a central element in British empire-building during the nineteenth century”.²⁶⁶ Moreover, in the nineteenth century “British and Irish Protestants (if Anglicans are included in this category)...comprised over 80 per cent of the settler population”.²⁶⁷ Consequentially, early European writing concerning Aotearoa New Zealand reveals that “the association of ‘improved pastoral scenery with virtue and Godliness was the most persistent theme in the written record by the New Zealand

²⁶⁵ Beattie and Stenhouse, p. 414.

²⁶⁶ Tony Ballantyne, *Webs of Empire : Locating New Zealand's Colonial Past*, (Vancouver: UBC Press, 2014.) p. 139.

²⁶⁷ Beattie and Stenhouse, p. 415.

pioneer”.²⁶⁸ Instead of a secular nation, the narratives abounding in Aotearoa New Zealand during the nineteenth century lean quite the opposite way.

Furthermore, notions of ‘improvement’ were considered by European settlers to be enshrined in scripture. Further than believing that colonists had a “God-given duty to improve the land by making it bountiful and productive”, many used ‘dominion theory’.²⁶⁹ As a concept, ‘dominion theory’ originates from the book of Genesis, expressing that dominion over the Earth was given to humans by God. This theory legitimised colonists ‘improving’ the landscape. As European colonists viewed the ‘improvement’ of the landscape as their God-given duty, the clearing of native land, felling of trees, draining of swamps was in essence a holy quest. Beattie and Stenhouse argue that Christian beliefs such as dominion theory lay at the “ideological heart of 'ecological imperialism'”. That is, colonist narratives of “'development', 'progress' and 'improvement' cannot be understood apart from the Christian beliefs and assumptions that framed and sanctioned such concepts”.²⁷⁰

While some downplay the role of Christianity in nineteenth century Aotearoa New Zealand, other theorists, such as Lynn White Jr, argue that Christianity is the key contributing factor to the environmental impact of European imperialism.²⁷¹

Arguably, the Christian beliefs that the majority of migrant colonists to Aotearoa New Zealand held, shaped their attitudes and behaviour towards the landscape they encountered, legitimizing their work to change the environment they arrived in.

Indeed, colonial theorists such as Wakefield championed the use of Christianity to legitimize and inspire colonist migrants to Aotearoa New Zealand. Further, Wakefield echoed ‘dominion theory’ in his writings, stating “And is it not the will of God that the earth should be replenished and subdued, that the desert should give place to the fruitful field”.²⁷² Thereby sanctioning ecological imperialism in the country, feeding ‘progress’ and ‘improvement’ narratives that determined a transformation of the landscape. Far from considering Aotearoa New Zealand to be a secular nation,

²⁶⁸ Tom Brooking and Eric Pawson. *Seeds of Empire: The Environmental Transformation of New Zealand*, (London: Bloomsbury, 2020), p. 32.

²⁶⁹ Beattie and Stenhouse, p. 431.

²⁷⁰ Ibid.

²⁷¹ Beattie and Stenhouse, p.414

²⁷² Wakefield, ‘The British Colonization of New Zealand’, p. 417.

Wakefield believed that “civilization and Christianity, with their attendant trains, should radiate from this country as from a moral sun”.²⁷³

Narratives surrounding Aotearoa New Zealand promised European colonists a land of Eden and continued “to inform settler descriptions of the colony and visions of landscape modification”.²⁷⁴ Biblical descriptions of Aotearoa New Zealand as ‘Edenic’ or a ‘paradise’ were common and used to attract settlers to the shores. Indeed, descriptions of Aotearoa New Zealand as a ‘land of milk and honey’ have their origins in biblical scripture. Used to describe the land of Canaan, promised by God to his people in the books Numbers and Deuteronomy: “If Jehovah delight in us, and he brought us to this land, and he gave it to us; a land which it flowing with milk and honey.”²⁷⁵

This discourse of Aotearoa New Zealand as a representation of the ‘Promised Land’ frequented colonial literature and reinforced Christian concepts such as ‘dominion theory’ as an appropriate and necessary view of the land. Beattie and Stenhouse present an example from the National Agricultural Labourers Union in 1870s England which “urged rural labourers to ‘rush from the old doomed country to such a paradise as New Zealand ... a land of oil, olives and honey; - a land where in thou may’st eat bread without scarceness: thou shalt not lack anything in it’”.²⁷⁶ While a slight variation from ‘milk and honey’, a land of oil, bread, olives and honey, conjures the same biblical message of Aotearoa New Zealand as Canaan- the abundantly productive Promised Land.²⁷⁷

To realise the Christian vision of a land ‘of milk and honey’, European colonists would first need to introduce species to realise this ideal: “acclimatising useful and familiar plants and animals promised to make a good land better”.²⁷⁸ The introduction of exotic species had been occurring since first European engagement with Aotearoa New Zealand in the eighteenth century, a process that was both at times intentional and accidental. The acclimatisation of foreign species to Aotearoa New Zealand gained traction in the mid nineteenth century as visions “of recreating the harmony

²⁷³ Wakefield, ‘The British Colonisation of New Zealand’ p. 417.

²⁷⁴ Beattie and Stenhouse, p. 432.

²⁷⁵ *The Holy Bible Containing the Old and New Testaments* (Hartford, Conn.: American Publishing Company, 1876), XIV Numbers 14.8

²⁷⁶ Beattie and Stenhouse, p. 422.

²⁷⁷ *The Holy Bible*, Deuteronomy 8.8

²⁷⁸ Beattie and Stenhouse, p. 423.

and abundance of the Garden of Eden inspired the more pious acclimatisers”.²⁷⁹ This introduction of new species, plant and animal, worked alongside the deforestation and draining of swamps as a process of ‘improvement’ strategies that “had massive, often unexpected and sometimes disastrous consequences for the landscape and its existing inhabitants”.²⁸⁰

A creature introduced to Aotearoa New Zealand, was of course, the bee. In relation to religious ideology, the honeybee specifically captured Christian imagination as a divine and moral creature. The potential of the hive to reflect an ideal Christian moral society-lived by the teachings of God, hardworking and devoted-is echoed throughout many texts in the long nineteenth century. In this way, European colonists often used the beehive as a central metaphor in discourse surrounding religion, landscape, and themselves.

Undeniably, bees have long been “a source of fascination, investigation, and speculation, the beehive was famously seen by early-modern people as a parable – indeed, a divine allegory – on human society”.²⁸¹ Since Ancient times, the hive and its diligent workers have been a target species for observation as their “complex social structure defied mechanistic interpretations of nature”.²⁸² Allegorical concepts of the hive persisted and developed, coming to have particular salience for those of Christian faith in the late eighteenth and nineteenth centuries.

Indeed, the hive to Christians appeared to be the natural expression of God’s perfect order. The complex mechanics of the hive, enacted without quarrel by a large community “seemed to display a moral character that embodied ideal Christian behaviour in natural circumstances”.²⁸³ Further, the complexity of hive processes and seamless execution of them through the “organization and character of the hive must reveal God’s power and integrity”.²⁸⁴ Moral interpretations of bees drew people to apiculture, who upon observation of the hive, concluded that “the God of Nature has not been deficient in his instructions to the bees”.²⁸⁵

²⁷⁹ Beattie and Stenhouse, p. 423.

²⁸⁰ Beattie and Stenhouse, p. 414.

²⁸¹ Dror, p. 3.

²⁸² Ebert, p. 325.

²⁸³ Ebert, p. 326.

²⁸⁴ Ebert, p. 326.

²⁸⁵ Ebert, p. 325.

Discourse that portrayed bees as taught by God represented the hive as a model teacher for order and morality to humans. Charles Butler, author of *The Feminine Monarchie* in 1623 stated of bees: “Among all the Creatures which our bountiful God hath made for the use and service of man, in respect of great profit with small cost . . . and of their continual labour and comely order, the Bees are most to be admired”.²⁸⁶ Although this text was published well prior to the nineteenth century, it is considered a seminal work, and illustrates the persistence of religious narratives regarding the hive. Indeed, Cotton writing in the mid-nineteenth century repeats this quote in his text, *My Bee Book*, to illustrate the piety of the hive. Cotton also further perpetuates narratives that illuminate the link between bees and their divine teacher, showing the effortless organisation of the hive: “old women have found this out by trying: but the Bees know it without trial, as they were taught it by God”.²⁸⁷

As bees were taught by God, so may they teach humans. Butler considered the moral righteousness of bees “in their labour and order at home and abroad they are so admirable, that they may be a pattern unto men”.²⁸⁸ Cotton extends this concept, stating of honeybees:

They give a lesson to man by following God’s teaching, without asking any questions; and, as I shall soon show, they find the benefit of this child-like mode of action, which I am sorry to say is more followed by Bees than by men. We oftentimes laugh at it, though it is the rule of the Bible.²⁸⁹

In this sense, bees were considered to be a template for religious piety. Cotton urges the reader to “Stop, then, and consider, and admire the perfect obedience of the Bees, and the beauty of their compliance with the commands of their Lord”.²⁹⁰

Evidence of bees association with Christian reverence, for God’s creation and bee’s pious nature, can be found throughout many beekeeping manuals throughout the nineteenth century. Beekeeping itself is elevated to an almost holy experience; as Edward Townley wrote in 1848: “There is no branch of husbandry, the cultivation of which furnishes for our table a more innocent and grateful luxury, than that of the Bee, nor any part of natural history better calculated to raise our contemplation to

²⁸⁶ Charles Butler, *The Feminine Monarchie* (Oxford: Joseph Barnes, 1623)

²⁸⁷ Cotton, *My Bee Book*, p. 273.

²⁸⁸ Butler, n.p

²⁸⁹ Cotton, *My Bee Book*, p. 273.

²⁹⁰ Cotton, *My Bee Book*, p. 348.

that Divine Wisdom which creates and sustains them”.²⁹¹ That is, observing and working with bees is the best natural process through which to observe divine creation. Even talking about bees Townley believed to invoke God, professing “If you speak of a Bee, your conversation will be a sort of demonstration of His power whose hand formed them, for the wisdom of the workman is commonly perceived in that which is of little size”.²⁹²

The honeybee stands out from other insects in this religious reverence. Cotton notes that “all flies go to hell fire except the Bee”.²⁹³ Cotton reasons the distinction between these creatures by stating that “The Lord spake by inspiration unto the Bee saying, Provide three houses in the mountains, and in the trees, and of those materials wherewith men build Hives for thee; then eat of every kind of fruit, and walk in the beaten paths of thy Lord’.²⁹⁴ Consequently, the “mysterious efficiency” by which the hive was organised was interpreted as a manifestation of divine energy, the sum of God’s instruction followed precisely.

In this manner, the beehive was considered to be “a political and moral haven of divine propriety”.²⁹⁵ The beehive became the site for Christian religious ideals as their natural efficiency and community was seen as instruction from God. Their industry a pious representation for humankind.

Imperial Productivist and Improvement Ideals

Although propaganda representing Aotearoa New Zealand as a Garden of Eden attracted Christian migrants, the mythical representation “flourished even among commentators who otherwise eschewed religious language”.²⁹⁶ While ‘dominion theory’ narratives pervaded much of the Christian interpretations of landscape, secular examples bridge the gap between ‘dominion theory’ concepts and narratives driven by economic imperatives fuelling British imperial interests. Beattie and Stenhouse identify historian Keith Thomas as arguing that Christianity is blamed “too much, and capitalism too little, for environmental degradation”.²⁹⁷ Indeed, religious

²⁹¹ Edward Townley, *A Practical Treatise on Humanity to Honey Bees Or Practical Directions for the Management of Honey Bees*, (New York: G. B. Maigne, 1848) p. iiiiv.

²⁹² Townley, p. iiiiv.

²⁹³ Cotton, *My Bee Book*, p. 346.

²⁹⁴ Ibid.

²⁹⁵ Ebert, p. 324.

²⁹⁶ Beattie and Stenhouse, p. 423.

²⁹⁷ Beattie and Stenhouse, p. 416.

dominion discourses can be identified as encouraging major transformation in Aotearoa New Zealand's landscape, but alone does not paint the full picture.

British imperialism can be identified to have “played a modest role in the ecological transformations of the modern Pacific”.²⁹⁸ As the nineteenth century progressed, advances were made in technology and transport, making the journey from Europe to Aotearoa New Zealand shorter and more viable for commercial exploitation.²⁹⁹ Indeed, with the advent of refrigerated shipping in the 1880s, meat and dairy products became a prime export from Aotearoa New Zealand to the British market.

Grass based economies had been growing in Aotearoa New Zealand prior to the 1880s however, increased economic potential hastened the transformation from native bush to pasture. Plants native to Aotearoa New Zealand were not widely seen as economically viable by European colonists and thus were cleared to make way for grass grown with imported seed. In visiting Aotearoa New Zealand in the 1820s, Charles Darwin believed that native plants would not withstand the wave of imported species that would soon surely flow into the country.³⁰⁰

Economies based on grass was not the only vision for the landscape of Aotearoa New Zealand, however. Acclimatisation Societies were inspired by “a vision of New Zealand as a better Britain in which colonists of all classes could hunt game animals and fish for trout and salmon surrounded by the familiar birds and trees of 'Home'”.³⁰¹ This vision would see Aotearoa New Zealand as a leisure ground for wealthy British colonists in eastern colonies. Indeed, the Wellington Acclimatisation Society stated in 1891 that

New Zealand must always be a favourite health-resort for the well-to-do population in tropical portions of the coming Australasian Federation, and should, as its attractions to sportsmen become better known, be a health-giving and economical recruiting ground for the European residents in India, Burmah, Borneo, and other tropical countries of the East.

²⁹⁸ McNeill, p. 361.

²⁹⁹ Ibid.

³⁰⁰ Holland, p. 13.

³⁰¹ Beattie and Stenhouse, p. 423.

While Acclimatisation Societies did indeed import deer and fish with wealthy recreation in mind, it was agricultural based improvement narratives that had gripped the general migrant populous.

The transition from native bush and wetlands to a pastoral based landscape was indeed driven by discourse of ‘progress’ similar to those of ‘dominion theory’. Brooking and Pawson describe the concept of ‘improvement’ as an “ideological, material and technical project” that results in “geographical violence through which space was explored, reconstructed, renamed and controlled”.³⁰² A grass based agricultural model in Aotearoa New Zealand would not only satisfy the “economic imperative of entering into the trade of empire...but also the cultural imperative that John Locke had captured in his theory of improvement”.³⁰³ This theory, formulated by Locke in the seventeenth century, formed the basis for British imperial ‘improvement’ projects-essentially a secular alternative to ‘dominion theory’.

Locke suggests that:

*labour makes the far greatest part of the value of things we enjoy in this world: and the ground which produces the materials is scarce to be reckoned in, as any, or at most, but a very small part of it; so little, that even amongst us, land left wholly to nature, that hath no improvement of pasturage, tillage, or planting called, as indeed it is, waste.*³⁰⁴

The main premise of Locke’s theories of improvement is the concept that things-material, food, land-gain “*value from human industry*”.³⁰⁵ He uses the example of bread, wine and cloth-what Locke views as daily commodities and postulates that these items have more value than acorns, water and leaves. This added value “is wholly *owing to labour and industry*” argues Locke.³⁰⁶ By this logic, when worked upon with the plough, planted and harvested-when labour is applied-the land itself gains value (as well as producing commodities). The transformative concept of labour upon an object-or landscape-lodged European ideology and persisted well beyond Locke’s lifetime.

³⁰² Brooking and Pawson, p. 8.

³⁰³ Brooking and Pawson, p. 8.

³⁰⁴ John Locke, *Two Treatises of Government*, (London: Whitmore and Fern, 1821) p. 223.

³⁰⁵ Locke, p. 222.

³⁰⁶ *Ibid.*

Indeed, Locke's theory suggests little value in land left untouched by intentional interaction, that the greatest value that man can add to the land is to 'improve' it. These improvement narratives persisted throughout the nineteenth century, with Darwin echoing such sentiments on his visit to Aotearoa New Zealand. Brooking and Pawson note Darwin's joy upon visiting Waimate and discovering the missionary gardens planted there, which stood as "an oasis of peace, order and prosperity in a land Darwin generally dismissed as gloomy, unattractive and frightening".³⁰⁷ At Waimate, Darwin recalled as the "evening drew to a close, the domestic sounds, the fields of corn, the distant undulating country with its trees might well have even mistaken for our fatherland: nor was it the triumphant feeling at seeing what Englishmen could effect; but rather the high hopes thus inspired for the future progress of this fine island".³⁰⁸ Darwin depicted what Brooking and Pawson describe as "a typical improver's perspective" in the manner by which he regards the work of the missionaries as an "enchanter's wand" and "high hopes thus inspired for the future progress of this fine island".³⁰⁹

A culture of 'high hopes' is echoed in the work of James Belich, who suggests that early European migrant colonists passion and zeal for "the process of improvement and farm formation" gave them little pause to consider the wider effects of their intensive destruction of native land.³¹⁰ Māori agricultural cultivation had impressed European settlers, and coupled with discourse of Aotearoa New Zealand as a land of fertile abundance, colonists assumed "anything they chose [to plant] would flourish".³¹¹ Indeed, Belich describes 1830s Australasia as having a mood "of 'bold enterprise, unreasoning confidence, and rapid progress'".³¹² Despite general migrant enthusiasm, there were those who were disappointed when the promotional vision did not meet expectations, with a settler in 1887 writing: "I also believed in 'the sunny south as the land of promise, the land of plenty, and the land of hope' but how different were the real facts!".³¹³

³⁰⁷ Brooking and Pawson, p. 15.

³⁰⁸ Charles Darwin, *The Voyage of the Beagle*, (New York: P. F. Collier & Son Company, 1901) p.429

³⁰⁹ Brooking and Pawson, p. 15; Darwin, *The Voyage of the Beagle*, p. 429.

³¹⁰ James Belich, *Replenishing the Earth : The Settler Revolution and the Rise of the Angloworld*, (Oxford: Oxford University Press, 2009), p. 204.

³¹¹ Beattie and Stenhouse, p. 424.

³¹² Belich, p. 267.

³¹³ 'Hopeful', p. ix.

Although some migrants were less than impressed with the reality of Aotearoa New Zealand's environment (less fertile than imagined), improvement projects continued unabashed. This 'improved' environment was heavily based on the introduction of what was commonly known as 'English grasses' and general pasture plants. Ultimately, the "commodity chains" that developed around grass based industry in Aotearoa New Zealand "were both more complex and, internationally, more significant than those of the specialist crops".³¹⁴

While the role of the bumblebee in the transformation of Aotearoa New Zealand's landscape was calculated, honeybees carried an ideological burden. As discussed, Christian religious discourse featured bees and the hive as a representation of the divine; however, as an allegorical symbol, the reach of bees extended further than the spiritual. Indeed, 'improvement' concepts had been adopted by beekeeping literature from seventeenth century agricultural reform, however, these models transformed and persisted throughout the eighteenth and nineteenth century, prompting deeper, more scientific, observation of bees.³¹⁵ Thus, beekeeping became a site of negotiation between considering "the hive as a political and moral haven of divine propriety" and innovation in the world of beekeeping.³¹⁶ However, as will be investigated with Darwin, these two concepts were not mutually exclusive and existed intertwined for centuries.

Furthermore, religion permeated imperial productivist ideals through a Protestant abhorrence of idle behaviour. A "moral objection" to the "danger of relaxation" pervaded protestant ethos. ³¹⁷ Max Weber notes that Protestants considered wasted time "the first and in principle the deadliest of sins".³¹⁸ The minimum requirements for human health were recommended under Protestant work ethic as more than six to eight hours of sleep was considered "moral condemnation".³¹⁹ Scripture upheld this work ethic- "He who will not work shall not eat", and therefore "Unwillingness to work is symptomatic of the lack of grace".³²⁰ Self-indulgence, whether through idleness, slothfulness or other means, was detestable to Protestant work ethic.³²¹ In

³¹⁴ Brooking Pawson, 'Silences of Grass', p. 428.

³¹⁵ Ebert, p. 323.

³¹⁶ Ibid.

³¹⁷ Max Weber, *The Protestant Ethic and the Spirit of Capitalism*. (Routledge, 2001), p. 104.

³¹⁸ Weber, p. 104.

³¹⁹ Weber, p. 104.

³²⁰ Weber, p. 105.

³²¹ Weber, p. 106.

this way, religion penetrated even imperial industry, further pushing a productivist mindset.

While ‘improvement’ ideals pushed for innovation within beekeeping circles, the hive was also used to promote improvement and progress narratives in wider Aotearoa New Zealand society. Depicted as unfailingly hardworking, the bee was seen as a role model for European colonists. In secular examples, the pious bee is often replaced with adjectives such as ‘productive’, ‘polite’, and ‘industrious’. Although these characteristics appear in both cases, morality is a quality that both overtly religious texts and secular instances both highly praise as the desired trait in civil society.

Thus, bees were not only a model for religious values, but secular ones as well. The hive was as a clean and orderly society, governed by a “reigning monarch” as the “natural” standard of societal organisation.³²² European settlers praised morality as a pathway to success and therefore bees were exemplary of “civil citizens”, a parable for the ‘ideal’ citizens of an ‘ideal’ society.³²³ Just as “the unclean, disorderly, and foul-breathed beekeepers incited the bees’ wrath”, so this was also far from the idealised vision of European society-especially one with so much ‘potential’ in an Edenic landscape.³²⁴ Praised for their moderation alongside their cleanliness, bees “did not fall prey to gluttony” and as such were perfect models for colonists seeking abundance in Aotearoa New Zealand.³²⁵

Most notably, their tireless industry was praised by a European society in the throes of industrial capitalism obsessed with ‘improvement’ ideologies. Indeed, a settler suggests “When intelligent farmers are really anxious to make their land flow with milk and honey, they never neglect to have a good number of hive bees distributed about their property, to make all their crops abundantly productive”.³²⁶ This theme of ‘intelligent’ people recognising the bee as an exemplar continues with Edward Townley in 1848 stating that “The industrious Bee has ever been viewed by intelligent naturalists as an interesting species of insects, and the fruits of its industry as among

³²² Ebert, p. 327.

³²³ Jennifer Kain, ‘The Ne’er-do-well: Representing the Dysfunctional Migrant Mind, New Zealand 1850–1910’, *Studies in the Literary Imagination*, 48.1 (2015), 75-92 p. 78; ‘Bee Bucaneers’, *Hawke’s Bay Herald*, 02 March 1881, p.6 <<https://paperspast.natlib.govt.nz/newspapers/HBH18810302.2.17>>

³²⁴ Ebert, p. 326; Kain, p. 78.

³²⁵ Ebert, p. 326.

³²⁶ ‘Hive Bees vs Humble Bees’, *Press*, 10 April 1874, <<https://paperspast.natlib.govt.nz/newspapers/CHP18740410.2.21.2>> [Accessed 18th August 2022]

the choicest productions of nature”.³²⁷ Furthermore, this endless productivity was overtly understood to be an exemplar to men; as such, Cotton wrote: “In their labour and order at home and abroad, they may be a pattern unto men both of the one and the other; for unless they are hindered by weather, weakness or want of stuff to work upon, their labour never ceaseth”.³²⁸

While bees were heavily praised for their tireless industry, many of their qualities were admired by European colonists as archetypes for the society they desired and idealised. Indeed, “The bees, in every age and country, exemplars of wise, well-governed communities, are both making honey while the sun shines”.³²⁹

Between Science and Religion

During the nineteenth century, a mix of seemingly contrasting ideologies abounded. Science and religion were generally considered to be at odds with each other in the mid nineteenth century, especially as many considered Darwin’s theories to directly compete with Christian concepts. While debates between science and religion did occur frequently, and often with intensity, the publication of Darwin’s *The Origin of the Species* was not the trump card for science in a binary debate.

Instead, Stenhouse rejects this overt positivism, that he argues much of Aotearoa New Zealand’s historiography leans into.³³⁰ However, in an Aotearoa New Zealand context, the camps of Darwin/Science and religion were not mutually exclusive positions as a positivistic outlook might paint them to be. Often, science and religion coexisted naturally, Darwin’s theories not only readily accepted into a Christian outlook, but even seen to support them.

Indeed, the scientific argument against religion lies in the assumption that Christians believed in a literal truth of the scriptures: “Presumably, on such views, most Christians still believed that the Earth was only four thousand years old, and had been created in six literal twenty-four hour days”.³³¹ It is the clinging to these

³²⁷ Townley, p. iiiv.

³²⁸ Cotton, *My Bee Book*, p. 6.

³²⁹ ‘Bee Pioneers’. *Evening Post*, 30 April 1934,

<<https://paperspast.natlib.govt.nz/newspapers/EP19340430.2.51>> [Accessed 20th August 2022]

³³⁰ John Stenhouse, ‘The ‘Battle’ between Science and Religion over Evolution in the Nineteenth Century’ (unpublished doctoral thesis, Massey University, 1985)

³³¹ Stenhouse, p. 5.

assumptions that Stenhouse argues, creates the fuel for the narrative of division in the century since the prominence of the debates (arguably still ongoing).³³²

In Aotearoa New Zealand, the debate between religion and science did not rage so fiercely as it did in Europe. Indeed, it did not rage at all, quite the opposite in fact. Rather, “Contrary to the positivist model, almost all the scientists who expressed an opinion on the matter accepted Darwinian evolution but remained religious believers, many of them devout and practicing Christians”.³³³ Furthermore, Christian scientists believed that theories of evolution supported their faith instead of weakening it as God was the “creator and sustainer of nature”.³³⁴

While the majority of migrants to New Zealand were Protestant (“almost ninety per cent”), and Protestant Christians lean heavily on scripture, they cannot be considered “wooden literalists”.³³⁵ Indeed, conceptions of Earth as 4,000 years old had already been discarded by most Christians prior to the popularisation of Darwin’s theories. So, while there were clashes of ideology overseas, “in the Antipodes science and religion were firm friends”.³³⁶ Indeed, Darwin himself had no quarrel with missionaries when he visited Aotearoa New Zealand in the 1830s. Rather, he believed that their influence showed great ‘potential’ for the land.

The thesis of Sujit Sivasundaram’s book, *Nature and the Godly Empire* posits that the missionaries following Captain Cook’s wake in the Pacific “saw themselves as practitioners of science”.³³⁷ Therefore, naturalist and clergyman were often one person, especially in an Aotearoa New Zealand context; only as the nineteenth century progressed did the two professions become distinct. Christian scientists in the early nineteenth century often used science to reinforce their faith, however, a ‘professionalisation’ of science as a discipline into the late nineteenth century saw science become secularised. Notably, God as a “natural creator” began to disappear from scientific texts.³³⁸ Furthermore, the ‘amateur’ naturalist gave way to

³³² Stenhouse, p. 6.

³³³ Stenhouse, p. 7.

³³⁴ Ibid.

³³⁵ Stenhouse, p. 14.

³³⁶ Stenhouse, p. 44.

³³⁷ Sujit Sivasundaram, *Nature and the Godly Empire: Science and Evangelical Mission in the Pacific, 1795-1850*, (Cambridge University Press: UK, 2005) p. 3.

³³⁸ Stenhouse, p. 274.

professionalised scientific disciplines in the later nineteenth century, excluding amateur contribution.

The ‘amateur contribution’ was valuable in the advancement of scientific beekeeping. Ebert notes that the central actors in developing apicultural science were usually “educated professionals, clergymen, artisans, and merchants”, those occupying a middling social stratum.³³⁹ Indeed, clergymen are a particular occupation with a leading role in the apicultural sciences: Charles Butler, author of the *Feminine Monarchie*, seminal scientific beekeeping text, was a clergyman himself.³⁴⁰ For clergymen, nature was free from human sin, and therefore the study of nature was deemed a study of divine. Furthermore, advancements centred mostly around innovation and observation. The killing of bees to harvest honey was a common practice up till the nineteenth century, one which apicultural scientists, particularly those with clerical leanings, were keen to avoid.³⁴¹

The Queen of Hive: Gender and Class

As nineteenth century European narratives surrounding society, industry, and morality can be examined using the lens of bees, so too, can gender. This includes how gender intersects with other narrative ideologies. Indeed, Crane notes that while bees have been used since Ancient times as a parable for human society, “it seems to have been a special characteristic of English writers between 1600 and 1850 to regard the bees’ devotion to the feminine ruler of their colony as a proper model for human devotion to the Queen of their country.³⁴² The concept of using bees as an allegory for devotion to the monarch is seen throughout the seventeenth, eighteenth and nineteenth centuries, becoming commonplace during the rule of Queen Anne (1702-1707). A female ruler perhaps a fitting link between the favourite model of society (hive) and reigning monarch (Queen Anne).³⁴³

While discussions about the sex of bees (and most notably their ruler) went back and forth throughout the seventeenth and eighteenth centuries, Butler in his *Feminine Monarchie* was an early example of a scientific bee text that ‘got it right’. So popular

³³⁹ Ebert, p. 323.

³⁴⁰ Ebert, p. 325.

³⁴¹ Ebert, p. 333.

³⁴² Crane, *The World History of Beekeeping and Honey Hunting*, p. 592.

³⁴³ Ebert, p. 327.

was his work that it persisted throughout the eighteenth century, perpetuating the concept that as bees live “under the government of one Monarch, of whom above all things they a principal care and respect, loving, reverencing and obeying her in all things”, so too evidently should humans.³⁴⁴

There is, seemingly, dual purpose in gender-based narratives surrounding the beehive. The standard for life in Aotearoa New Zealand during the nineteenth century was judged against domestic ideals in England. On one hand the female workers are responsible for the ‘domesticity’ of the hive, texts uphold their ‘cleanliness’, ‘order’, and ‘comely nature’. Indeed, European colonist women were expected to “reinforce and impar femininity, domesticity, and civilisation”, bees acting as a “Mirror to the finest Dames”.³⁴⁵ Notably, women were “key actors” in maintaining gender roles within the global networks in which they were a part of-specifically in this context, the network between England and Aotearoa New Zealand.³⁴⁶ Missionary women are the most obvious actors complicit in the reinforcing of gendered roles-“imposing ideas about appropriate behaviour, dress, and appearance onto indigenous women through church”-however they are not solely complicit.³⁴⁷

Comparatively, a female ruler is portrayed as the idealised vision for community, the industry, morality, and organisation of her subjects a glorified standard for the structure of human society. Such as, for the greatest success of a colony, according to Wakefield, they should “began by nominating to the honourable office of captain or leader of the colony, one of the chief men, if not the chief man of the state, -like the queen-bee leading the workers”.³⁴⁸

These associations between bees and gender norms had been developing since the seventeenth century, becoming solidified in the eighteenth. Ideas of “Amazonian” bees in the eighteenth century mimicked a society in which “warring and governance were wholly female”.³⁴⁹ Understandings of beehives, from the seventeenth century,

³⁴⁴ Butler, n.p

³⁴⁵ Erin Ford Cozens and Erin Cozens, ‘With a Pretty Little Garden at the Back’: Domesticity and the Construction of ‘Civilised’ Colonial Spaces in Nineteenth-Century Aotearoa/New Zealand’ *Journal of World History*, 25. 4 (2014) 515–34. <<http://www.jstor.org/stable/43818463>> [Accessed 28 Jun. 2022] p. 534.

³⁴⁶ Cozens and Cozens, p. 516.

³⁴⁷ Cozens and Cozens, p. 528.

³⁴⁸ Edward Gibbon Wakefield, *A View of the Art of Colonization*, (London: John W. Parker, 1849) p. 109.

³⁴⁹ Dror, p. 3.

were very much anthropomorphised, and these parables between governing women and the beehive was not overlooked. As such, the hive being used as a metaphor for society is revealing of gender roles in the eighteenth and nineteenth centuries.

Ultimately, the gender roles that became established within European settler society in Aotearoa New Zealand hearkened back to those within England. The gendered domestic space of England was viewed as the blueprint from which that within the colony should be based off.³⁵⁰ Missionary women, particularly as wives, had central roles in the importation of British societal and material custom. This extended to concepts of domesticity.

Simultaneously, the nineteenth century colony was still a frontier and therefore class distinctions were permeable.³⁵¹ Aotearoa New Zealand in the late nineteenth century was widely publicized as an egalitarian country, or rather, the closest to achieving this title.³⁵² However, the early nineteenth century saw missionary women attempting to replicate the class structure of Britain, as they also attempted with domestic gender roles.³⁵³ Material culture was the way in which missionary women attempted to cling to British social structure, items such as stays and tea sets treasured pieces in the colonial world, representative of English social custom.³⁵⁴

The domesticity of honeybees in their hive structure was seen as a model for European settler women to emulate. The attempted transference of British social and domestic culture was guided by enduring ideologies surrounding gender and class. Furthermore, concepts that the British monarchy was legitimised by similar structures within the hive were repurposed to extend to other leaders-particularly head of colonies such as Aotearoa New Zealand.

Conclusion

An intersecting web of ideologies underlay and justified much of European colonists' actions in the nineteenth century. The ideologies often constructed the 'perfect'

³⁵⁰ Cozens, p. 517.

³⁵¹ Ibid.

³⁵² Melanie Nolan, 'The Reality and Myth of New Zealand Egalitarianism: Explaining the Pattern of a Labour Historiography at the Edge Of Empires', *Labour History Review*, 72. 2 (2007) 113–34

³⁵³ Angela Middleton, 'Silent Voices, Hidden Lives: Archaeology, Class and Gender in the CMS Missions, Bay of Islands, New Zealand, 1814–1845', *International Journal of Historical Archaeology*, 11. 1 (2007) 1–31

³⁵⁴ Middleton

image-of land, of progress and of society. Notably, religious discourse saturated much of European text in the nineteenth century. Also inherent in European settler texts are ‘improvement’ narratives, pushing for the ‘progress’ of landscape into an economically viable (imperial) product.

Indeed, Beattie and Stenhouse recognise nineteenth century Aotearoa New Zealand as an “a fascinating historical laboratory in which to explore the interconnections between empire, environment and religion”.³⁵⁵ Belich names it a “context of ideological ferment”.³⁵⁶ This nexus of intersecting narratives, discourses and ideologies converged in Aotearoa New Zealand in the nineteenth century.

A casualty of the ideological ‘soup’ that sustained colonists-the native landscape of Aotearoa New Zealand. The transformation from native bush and swamp into “giant farm, sending wool, meat and dairy products to overseas” in the nineteenth century had devastating ecological impacts.³⁵⁷ Unfortunately, in a little over a century the damage was done, with the “formal end of colonialism in the mid- and late twentieth century did not make much difference, at least in environmental matters”.³⁵⁸

While bumblebees were instrumental to the physical alteration of the environment by colonists, honeybees served as anthropomorphised parables for human society. That is, a vision of human society idealised by Europeans. Christian themes featured heavily-the perceived pious nature of the hive denoted evidence of divine teachings, the morality of bees to be emulated. Indeed, bees as teachers, conveyers of the ‘ideal’ behavioural conduct, extended past religious discourse, into secular narratives. These secular ideologies focused heavily on industrial capitalist ideals, drawing on notions of ‘improvement’ popularised by John Locke in the seventeenth century. These ‘improvement’ ideologies emphasised the addition of value to land through labour and therefore honeybees tirelessly industrious nature became a mascot for progress through hard work.

The nature of bees could also be co-opted as allegories for idealised nineteenth century concepts of gender roles. The domestic nature of the worker bees a parable for the idealised housewife. Conversely, comparisons between the social structure of

³⁵⁵ Beattie and Stenhouse, p. 418.

³⁵⁶ Belich, p. 163.

³⁵⁷ Brooking and Pawson, *Silences of Grass*, p. 418.

³⁵⁸ McNeill, p. 349.

the hive and human society legitimised the monarch-particularly female monarchs-as the righteous standard. This discourse was particularly salient during the reign of female monarchs, becoming popularised during the rule of Queen Anne in the early eighteenth century but persisting throughout the nineteenth. As such, bees served as role models for women in all aspects of society, just as they did so for men.

Overall, bees functioned as allegorical standards for societal, religious, and industrial ideals held by Europeans in the nineteenth century. These ideals motivated the transformation in the Aotearoa New Zealand environment and reinforced each other in a tightly woven nexus. As such, “‘Improvement’ was an ideological, material and technical project” enacted onto the environment with lasting consequences.³⁵⁹

Therefore, the transitioning Aotearoa New Zealand landscape, is a cultural project, sanctioned and validated by European ideals to suit their nineteenth century colonial vision for the environment.

³⁵⁹ Brooking and Pawson, *Silences of Grass*, p. 418.

Conclusion: A Land of Bees and Grass

The introduction of bees into Aotearoa New Zealand in the nineteenth century was based on many factors and had wide reaching impacts. Honeybee importations at the hands of private individuals and lobbied as a suitable female hobby contrasted to the organised importation of bumblebees with grandiose pollination goals. The transformation of the landscape at the hands of European colonists was aided by bumblebee introduction. Furthermore, honeybees embodied European ideologies for tireless improvement and piety.

The drive by European colonists to convert the native landscape of Aotearoa New Zealand was motivated by an intersecting nexus of religious, economic, and environmental ideologies. These were combined with nineteenth century conceptions of gender and advancement of scientific understanding, particularly around pollination. These European settler narratives cohesively pushed for a ‘progress’ of the Aotearoa New Zealand landscape into an economically feasible and culturally familiar product.

This grass-based landscape relied on exotic species, imported into Aotearoa New Zealand by European migrant settlers. Not only were the grasses and mammals crucial to the formation of a European pastoral vision of Aotearoa New Zealand, but insects were too. Red clover, one of the fundamental European fodder crops, had no suitable pollinators in Aotearoa New Zealand. As a result, red clover could not seed in Aotearoa New Zealand, and red clover seed had to be imported from overseas. Frustrated at the cost of imported seed, European settlers sought a means to ensure red clover fertility in the late nineteenth century.

Darwin’s theories on pollination in the mid nineteenth century bolstered understandings of the process. Darwin experimented with bees and leguminous plants (of which clover is) and discovered that bees are vital pollinators. These revelations encouraged European settlers, who echoed his experiments as proof that red clover was missing a vital pollinator in Aotearoa New Zealand. The work of Darwin appeared reprinted in newspapers alongside calls to introduce bumblebees.

These appeals were often targeted towards Acclimatisation Societies—groups dedicated to introducing foreign species to Aotearoa New Zealand. Indeed, although several private individuals also attempted to introduce bumblebees, it was the

Canterbury Acclimatisation Society that was ultimately successful after many failed attempts. Furthermore, Acclimatisation Societies were also responsible for the transference of bumblebees from one island of Aotearoa New Zealand to the other.

The operation was a success, in terms of European interests that is. The introduction of the bumblebee facilitated the pastoral transformation of Aotearoa New Zealand's landscape. Bumblebees converted the sterile clover in Aotearoa New Zealand, to a crop capable of producing seed. While the landscape transformation was already in effect prior to the introduction of bumblebees, settler colonists were no longer hindered by importing red clover seed for necessity.

While bumblebees were instrumental to the physical alteration of the environment by colonists, honeybees served as allegorical representations of a 'perfect' community. That is, a vision of human society idealised by Europeans. Christian themes featured heavily, the perceived pious nature of the hive denoted evidence of divine teachings, the morality of bees to be emulated.

This morality extended to secular narratives, revolving mostly on capitalist ideals drawn from Locke's theories on improvement. The tireless nature of honeybees industry seen as a symbol of the value added through labour. The ceaseless productivity of the beehive purported as the ultimate standard for mankind, in the European settler viewpoint. This in turn dictated engagement with the landscape. For the land to be 'productive' in a manner that European settlers desired, they must be like the bee: work tirelessly towards that goal.

Furthermore, the hive social structure, with its Queen bee became a parallel for British society, legitimising the monarchy. As the structure of the hive was viewed to be an idealised imitation for human society, so too did this extend to its class structure. As the leader of the hive is a female (so too are the workers, the only males in the hive are drones intended for mating with the Queen), this discourse was particularly salient during the reign of female monarchs. It became popularised during the rule of Queen Anne in the early eighteenth century but persisting throughout the nineteenth, Wakefield even extending this analogy to colonial leaders. This highlights the persistence of European ideas around hierarchy and class, despite a persistent myth of Aotearoa New Zealand as an egalitarian society.

This thesis has examined the introduction of two different types of bees into Aotearoa New Zealand in the nineteenth century, *Apis mellifera*, the honeybee, and bumblebees. Bumblebees undoubtedly facilitated the environmental transformation of the Aotearoa New Zealand landscape, essentially a biological tool wielded by European settler colonists. Honeybees reinforced societal ideas held by Europeans- religious, moral, and economic. Overall, this thesis highlights the importance of bees to histories of Aotearoa New Zealand, and the power of the small to enact far-reaching change.

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