An Inordinate Disdain for Beetles:

Imagining the Insect in Colonial Aotearoa

A Thesis submitted in partial fulfillment of the requirements for the

Degree of Masters of Arts in English

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I began this thesis knowing very little about the six-legged and being a little bit of an entomophobe. I want to thank all the insects I have encountered for the moments of insight and wonder they generously provided me. I hope this thesis goes some way to opening more eyes than mine to the wonders of the little lives all around us.

Abstract

This thesis examines cultural representations of insects over the last two centuries of European settlement in Aotearoa, with a view to better understanding the contemporary human-insect relationship. The study spans both centuries and disciplines and takes a broad historical view in order to better comprehend the minute details of insect lives and deaths. The role of insects in culture is not a well-studied topic in Aotearoa and the primary texts examined in this thesis are necessarily diverse: they include natural history field guides and illustrations from the nineteenth century, modern museum displays, as well as contemporary print, radio, and news media. Beginning with an exploration of the language used to describe them, I present the idea that insects, despite the vital role they play in almost all earthly systems, are persistently disliked, feared and dismissed by large sections of the population, and I argue that common tropes in visual and textual representations of insects perpetuate and reinforce these negative perceptions. Insects make up a high percentage of the animals on threatened species lists in Aotearoa and yet they continue to be forgotten in wider conversations about conservation and the current biodiversity crisis. By interrogating the cultural representations of insects in colonial Aotearoa, I argue that the lesser status of insects has had serious consequences for their ongoing survival.

INTRODUCTION:

Insectocentrism

'"What sort of insects do you rejoice in, where you come from?' the Gnat inquired.
'I don't rejoice in insects at all,' Alice explained, 'because I'm rather afraid of them—at least the large kinds. But I can tell you the names of some of them.'
'Of course they answer to their names?' the Gnat remarked carelessly.
'I never knew them to do it.'
'What's the use of their having names,' the Gnat said, 'if they won't answer to them?'
'No use to them,' said Alice; 'but it's useful to the people who name them, I suppose.
If not, why do things have names at all?'"

(Carroll 62)

Understanding the ways insects have been interpreted and represented in human culture involves navigating a complicated terrain of life at its most mundane and incomprehensible. Insects are ubiquitous, inhabiting 'nearly every earthly niche' (Klein 1), yet still seem unknowable, even alien; they are dangerous and beautiful, symbols of industry, rebirth[1] and resilience, and of pestilence and plague; they are the much fêted pollinators and the accursed devourers of crops. In Lewis Carroll's *Through the Looking Glass*, Alice (shrunk to the size of a fly) finds herself discussing entomological nomenclature with a courteous gnat. Their

[1] Barrett A. Klein, in 'The Curious Connection Between Insects and Dreams', discusses *Scarabaeus sacer,* the most well-known of the scarab beetles, and its role in Ancient Egyptian culture as a symbol of rebirth (13); see also Gene Kritsky and Ron Cherry's *Insect Mythology* (49–63).

conversation provides us with a curious opportunity to examine the limits of our own epistemologies as they intersect with the insect world. The Gnat's question can seem comical, even bizarre, in its use of the word *rejoice* and its serious, formal tone, unless we consider the world from its perspective—something Carroll invites us to do through the eyes of the diminished Alice. Eschewing the opportunities her new gaze affords her, Alice instead exposes the anthropocentrism at the heart of human understandings of, and interactions with, the natural world.[2] Her gaze (and, by association, ours as readers) places the insect firmly in the category of other, in an ambiguous zone where it is both seen and unseen, categorised but unknown.

Thinking about insects invites us to draw on centuries of myth and storytelling in religion, science, and popular culture, and on bodily encounters with them. While humans actively seek out various species of mammal, often pursuing them in invasive and complicated ways, encounters with insects can be unsolicited and undesirable. They can seem all too eager to engage physiologically: they bite, sting and suck our blood, eat our crops, and populate our food with their offspring. As I write this, a moth is colliding repeatedly with the light of my computer screen, ants are having their way with my sugar jar, and flies are buzzing noisily around my lightbulb. I was raised, as many were, with the disquieting understanding that insects are everywhere, populating and multiplying in the dark. Although they have inhabited Earth far longer than humans,[3] they are pitched as the invaders, as a multitudinous malevolent force that must be controlled and sometimes even quashed lest human civilisation be overrun. They remain the only animal class I can think of to have a slew of killing agents exclusively dedicated to them in name: insecticides.

[2] Timothy Morton discusses the problems inherent in separating humanity from the natural world in *Ecology without Nature: Rethinking Environmental Aesthetics* (2007). He capitalises the word 'nature' to signify the separation he believes is reinforced by the non-capitalised version. I have chosen not to capitalise 'nature' or 'natural' as I believe this reinforces an ethics of separation rather than challenges it.

[3] The earliest insects are believed to have originated 350 million years ago (mya). In contrast, the first hominid ancestors, in the form of primates, are thought to have emerged around five to seven mya (Flannery & Schouten xii-xvi).

Alice's fear—or her entomophobia—is an all too common response and can tell us much about the dominant cultural narratives that have shaped human perceptions of insects over the centuries. Cultural entomologists Erich Hoyt and Ted Schultz suggest that '…perhaps the most prevalent view of insects in human culture […] has been one of revulsion' (50). A number of surveys on Western public opinion of insects corroborate this statement and expose the overwhelmingly negative views humans have of the animal class as a whole (Kellert 1993; Shipley and Bixler 2017; Schlegel and Rupf 2015). While there are examples of insects as revered and beloved cultural objects, there are still more that conform to the anthropocentric notion of their extreme otherness and their emblematic status as pest or invader. Hugh Raffles suggests that one reason we are so simultaneously fascinated and repelled by insects is that '[w]e simply cannot find ourselves in these creatures' (44). Our inability to relate to (or anthropomorphise) insects has made them immune to the sympathetic impulses we employ towards other, perhaps more charismatic, living creatures. Raffles cites Elias Canetti who writes that insects 'are outlaws', and that:

> The destruction of these tiny creatures is the only act of violence which remains unpunished even *within* us. Their blood does not stain our hands, for it does not remind us of our own. We never look into their glazing eyes… They have never—at least not amongst us in the West—had the benefit of our growing, if not very effective, concern for life (in Raffles 121).

Despite this emotional distancing, something about these 'tiny creatures' taps into humanity's deepest fears, and in our often extreme reaction to them, invites the question: 'what other creature has this power over us?' (Raffles 43).

Language

> They wear their skeletons on the outside, bite sideways, smell with antennae, taste with their feet, and breathe through holes in the sides of their bodies. Their eyes are placid, unmoving orbs; when we humans look into them, we experience neither recognition nor empathy. They are the insects.
> (Hoyt & Schultz 1)

How insects are thought about and discussed is perhaps most readily apparent in language. Synonyms for the word 'insect' in *Microsoft Word* include 'bug, pest, creature, fly, beetle, creepy-crawly' (*Microsoft Word* 2020). While fly and beetle are the common names of the insect orders Diptera and Coleoptera, bug, pest and creepy-crawly are indicative of the kinds of negative perceptions that persist in Western culture. Online thesauruses offer a similarly confusing and misrepresentative litany: *Thesaurus.com* lists 'fly', 'beetle', 'pest', 'vermin,' and 'nuisance' as synonyms for 'insect' ('insect', *Thesaurus.com*). *Merriam-Webster* defines an 'insect' as 'a person of no importance or influence' and offers the words 'cipher, dwarf, half-pint, insignificancy, lightweight, morsel, nobody, nonentity, nothing, nullity, number, pip-squeak, pygmy, shrimp, snippersnapper, twerp, whippersnapper, zero, zilch' as synonyms ('insect, *n.1*', *Merriam-Webster*). The *Oxford English Dictionary Online* gives three definitions of 'insect': 'an invertebrate; an animal of the Insecta class; and an insignificant or despicable person' ('Insect, *n.1, n.2, n.3'*, *OED Online*). Reversing the exercise yields similar associations between insects and undesirable 'nonentities': lists of synonyms for 'vermin' and 'pest' often include 'insect' ('vermin, *n. b*', *OED Online*). Not only does language emphasise the scale of the insect in human thought ('insignificancy') but it blurs tiers of classification designed to create distinctions between creatures, jumping from the enormity of the taxonomic class Insecta to the specificity of a family group (fly), and muddling already confused popular

understandings of what an insect is.[4] A number of studies of popular perceptions of insects have shown some confusion as to whether insects are animals (Kellert 1993; Shipley and Bixler 2017): certainly, there are no instances of 'animal' as a synonym for 'insect'. And while an animal may have individuality or sentience implied in the term, a pest or 'nonentity' belongs to an undesirable creepy collective.[5]

The interplay between naming and perception is also evident in the etymologies and uses of the words that describe insects. The use of the word 'bug' to denote 'a little short beast with many feet', to borrow a phrase from Bartholomaeus Anglicus writing in 1230AD, (in Berenbaum 3), dates back to the fifteenth century but its origins are thought to be from the Middle English *bugge.* A *bugge* refers to a ghost or hobgoblin[6]—something difficult to see and vaguely unpleasant which is certainly suggestive of medieval encounters with insects (Berenbaum 3). Wider uses of the term 'bug' position insects as destructive forces rather than vital allies in so many cultural and ecological processes that humans are completely dependent on. The negative connotations of the digital insect infiltrator represent one of the less emotive uses of insect language to demean (Shapiro 376-378). One need only look to the propaganda of twentieth-century genocides for sobering uses of the words 'lice' and 'cockroach' to degrade ethnic and religious human groups.[7] Christopher Hollingsworth explores the use of insect imagery as a persistent force for dehumanizing and reviling human 'others' (262-277).

[4] Two influential studies about human perceptions of insects show persistent confusion over what an insect actually is (Kellert 1993; Shipley & Bixler 2017). This confusion is highlighted in the *OED Online's* first definition of the word 'insect' which states that 'many other arthropods, such as spiders, mites, centipedes, wood-lice, etc., and other invertebrates' are still called insects 'by the uneducated' ('insect, *n.1*')

[5] The list of online dictionaries and thesauruses included in this discussion are varied: some of the works consulted might not be considered suitable for scholarly discussion. Rather than engaging with them as representative of some form of linguistic 'truth', I have included them as an indication of popular understandings of insects.

[6] Other probable connections are with the Scottish *bogill*, meaning 'goblin bugbear,' or the obsolete Welsh *bwg*, meaning 'ghost or goblin' ('bug, *n.1*', *OED Online*).

[7] Examples include the description of Jewish and Tutsi people as cockroaches by Nazi and Hutu propaganda respectively (Raffles 141-161; Kraus 205).

The word for an infant insect—larva—casts additional linguistic shade on the insect class. Raffles notes that the word larva was used in the 1650s to designate a ghost, spectre, or disembodied spirit and had earlier been used for an evil spirit or demon (164). Its zoological sense did not emerge until 1768 when Linnaeus bestowed it on the immature bodies of animals that did not resemble their adult forms (Raffles 164). Insecta, as a classification, is less burdened with moral judgement and more suggestive of morphological features. It entered the English language in 1601 via Philemon Holland's translation of Pliny the Elder's *Historia Naturalis* and was used to describe an animal with a 'notched or divided body', assuming its contemporary zoological usage after 1753 (Berenbaum 3).

Amongst the more telling ways in which humans discuss insects are the collective nouns used to describe—and confine—them. Insects manifest in language as throngs, rabbles, hordes, swarms, plagues—words that swallow the individual and present a single (and nightmarish) identity to the world. Even the term 'insect' reveals the nature of humanity's perception of them: as a taxonomic classification, Insecta includes everything from fire ants to aphids to 60cm long stick insects and parasitic wasps. It includes bees, beetles, fruit flies, blowflies, earwigs, bedbugs, mosquitoes, mayflies, stoneflies, caddisflies, moths, butterflies, grasshoppers, praying mantises, true bugs, wētā, cockroaches, lice. It also includes maggots, caterpillars, glow-worms, and all the other crawling, wriggling larvae that precede the imago—the adult insect at the end of metamorphosis. These group names themselves conceal a multitude of different species and subspecies, so many that it's believed another 4.5 million species are yet to be described on top of the more than 1 million currently recognised (Stork 7519). Entomologist Anne Sverdrup Thygeson believes that for every human being on Earth there are 200 million insects (2019: xvii). And yet somehow, amongst this staggering multiplicity, humans continue to discuss them most often as a group—as insects. Raffles speaks of the 'unreachable diversity contained within the word insects' (42), and Hoyt and Schultz of

the difficulty in covering the 'sweep of being' included in the term (2). In naming them so, we reduce their incredible diversity to something that fits under an umbrella term. It is unsurprising, perhaps, that these linguistic reductions shine through in other human interactions with insects. When humans think of the insect this way, any individual encountered becomes a synecdoche—a part standing in for the whole.

There are several possible reasons for this tendency to collectivise insects. James Hillman suggests that their multiplicity challenges 'cherished human ideas of personal identity and individuality' ('Going Bugs', 3:42). He argues that 'Imagining insects numerically threatens the individualised fantasy of a unique and unitary human being', and that '[t]heir very numbers indicate the insignificance of us as individuals' (ibid). Hillman believes that one way this threat manifests is in the perception of insects as mechanical and 'mindless creatures without the warm blood of feeling' (3:55). Thinking of insects collectively potentially diminishes our ability to empathise with them. As she examines her own relationship to pest control and insecticides, Carolyn Kraus discusses how cockroaches have been the lab animal of choice for many a 'gruesome' science experiment in the United States. They are chosen because they are exempt from animal welfare legislation due to 'insufficient evidence that they are capable of feeling pain' (206). Helen Tiffin argues that the use of insects in scientific experimentation has been predicated on a 'normative classificatory bias' that sees them as simpler, less-complex creatures (81). Insects have become a favoured test subject as 'no serious ethical controversies have arisen regarding in-vivo experiments on insects' (Manev and Dimitrijevic in Tiffin 87). Tiffin investigates a neuroscience textbook from 2013 which states that the ability to feel pain is inseparable from the experience of emotions (Abbracchio and Reggiani in Tiffin 89). Tiffin writes that, according to the textbook's authors, invertebrates lack the 'brain capacity/complexity to both experience emotion and evaluate injury' (89). Recent research has destabilised the idea of the painless, non-sentient insect: Tiffin concludes

by examining the interdisciplinary and ground-breaking research of neurobiologist Andrew Barron and philosopher Colin Klein who, in 2016, suggested that insects have all the hallmarks of conscious beings and are thus very likely to feel pain (in Tiffin 92-94).

One of the more influential studies of human perceptions of invertebrates was conducted by Stephen Kellert in 1993. Kellert's data revealed that negative attitudes to invertebrates were widespread in the United States, particularly amongst farmers and the general population. Amongst these two groups, invertebrates were generally viewed with fear, antipathy, or aversion (851). Kellert's study also exposes a general ignorance of what an insect is: only 23% of survey participants knew that spiders were not insects, a percentage that roughly corresponds to the number of scientists and conservationists surveyed (850).[8] Entomologist May Berenbaum notes that most 'people tend to regard anything with an excess of legs an insect' (8). In Kellert's study, the most infrequently encountered attitudes were affection, ethical concern, and scientific curiosity (850). Jeffrey A. Lockwood, exploring the reasons why humans 'fear, loathe and love' insects, writes that some form of entomophobia is the second most common type of phobia (10). Anxieties about insects as pests and invaders are entrenched and Kellert speculates that the connection between insects, disease and crop damage is one possible reason for ongoing negative perceptions (852). If this is true, the human collectivising tendency does the majority of insects a disservice as a few particularly visible and vehemently disliked species come to discredit the whole. The term insect comes to stand in for a sort of rogue's gallery of creatures whose existence constitutes a physical threat to our own.

In terms of collectivity and numerousness, there is perhaps no better example than beetles. Forming the insect order Coleoptera, beetles have long been considered the most

[8] Kellert surveyed 214 residents of Connecticut, focussing on attitudes towards invertebrates, preference for some invertebrates and not others, assumptions regarding sentience and intelligence, and the demographic characteristics of respondents (848). The group was made up of 145 randomly selected residents, 24 farmers, 20 conservation organisation member and 25 scientists (ibid).

species rich animal group on Earth (New 1). T. R. New states that beetles comprise around one-quarter of all animal species and Arthur V. Evans and Charles L. Bellamy argue that a better moniker for the epoch we live in would be 'the Age of Beetles' (2000). Their abundance alone makes them integral to any understanding of the natural world and environmental processes, as they are vital caretakers of healthy ecosystems. Scientific understanding of beetle numerousness is not a recent revelation: there is the apocryphal tale, dating back more than a century, of British geneticist and evolutionary biologist J. B. S. Haldane replying to a group of theologians who had asked what might be concluded about the Creator from the study of creation. Haldane is said to have answered that if 'he' existed, he had 'an inordinate fondness for beetles' (in Gould 1993: 5). According to Stephen Jay Gould, Haldane was:

> …making a theological point: God is most likely to take trouble over reproducing his own image and his 400,000 attempts at the perfect beetle contrast with his slipshod creation of man. When we meet the Almighty face to face he will resemble a beetle (or a star) and not [the Archbishop of Canterbury] (8).[9]

While Haldane and Gould might, however ironically, side with God in their fondness for beetles, they are hardly a favoured animal for most of the population in the contemporary West.[10] Indeed, I would argue that many in Western societies have an inordinate disdain for beetles and would go to considerable effort to minimise contact with them.

[9] Like many apocryphal quotations, this oft-cited remark of Haldane's is notoriously difficult to trace. Gould does an admirable job of tracing its history and examining the storytelling biases at work in an article he wrote for *Natural History* journal in 1993 (vol.102, Is.1: 4).

[10] There are considerable beetle-loving populations in other parts of the world: for example, the craze for stag beetles in Japan (see Raffles 343-382) and Egypt's long history with the scarab beetle (Kritsky & Cherry 49-63).

Alice and the Gnat in context

Alice's comments do not arise out of a cultural vacuum—she was, of course, shrunken at a particular historical moment. At the time Carroll was writing in the latter half of the nineteenth century, the British Empire had stretched the tips of its avaricious fingers around the globe, colonising, collecting, categorising, and cataloguing. As science expanded throughout the nineteenth century, it also grew in formality and legitimacy. Building on the growing enthusiasm for natural history that had developed in the previous century, the nineteenth century saw the natural sciences ascend to new heights. By the end of the eighteenth century, Carl Linnaeus had developed and formalised a system of nomenclature and Georges Cuvier had proven the theory of species extinction; by the mid-nineteenth century, people like Alfred Russel Wallace and Charles Darwin had radically altered the ways in which the world was perceived and understood by its human inhabitants. While insects are not generally at the centre of historical accounts of these developments, both Cuvier and Darwin took an active interest in entomology: Cuvier's volumes of *Le Règne Animal* (1816) contained lengthy sections on insects[11] and Darwin's shift to focussing on natural history was greatly influenced by his love of beetles (Dodd 106). Adam Dodd describes how Darwin spent so much time collecting beetles as a student that his friend Albert Way drew a cartoon of him riding a beetle and sporting a lepidopterist's net (fig. 0.1; ibid). In this context, the Gnat's presence in Carroll's looking-glass world begins to seem less random and more satirical as he mocks the fixation on taxonomy that characterised imperial science's insect encounters at this time.

[11] The first edition of *Le Règne Animal* (1816) was Cuvier's own work but Pierre André Latrielle, Charles Émile Blanchard, Jean Victor Audouin, and others were responsible for the insect sections in later editions (Cowan 32-64).

Figure 0.1: Way, Albert. *Go it Charlie*. 1832 (in Dodd 106).

Science was not the only ideological or cultural force shaping the opinions of European citizens at the end of the nineteenth century. Biblical language and thinking had considerable influence on new 'discoveries' in the field of entomology—although these were more often phrased in the language of disgust than of divine wonder. Previously designated as God's creations and given to the dominion of 'man' (Genesis 1:26), insects and other nonhuman animals were reframed by emergent scientific thinking outside of rigid biblical narratives, posing gnarly questions for philosophers and theologians that even the most determined theodicist might have struggled to answer. In one instance, insects serve as ideological counterpoints to Christian belief. Raffles cites Gould, who wrote about the 'problem of evil' that parasitic wasps created for Western theologians of the eighteenth and nineteenth centuries. The theologians, Gould details, were unable to reconcile a 'compassionate God' with the 'nightmarish' death the wasps exacted on their prey (Raffles 68-69, citing Gould 1980: 32).

The word ‘evil’ suggests a particular way of judging the natural world born out of the intersection of new scientific observations and Christian morality.[12]

In her encounter with the Gnat, Alice also exudes the same sort of arrogant indifference found in British foreign policy at this time. As the British Empire flexed its muscles, reaching for the Southern ‘antipodes’, many of its exploits were justified, and even propped up, by a thirst for new scientific knowledge and a hunger for specimens. Science as both friend and foe of the natural world has its roots in this period of knowledge gathering and physical expansion. One of the more visible expressions of imperial power and its close relationship with science was the growth of natural history museums, with hundreds opening in Europe and many in the new colonies during the nineteenth century (Coote et al. 323). In European cities, animal specimens were amassed, classified, and stored in museum collections and private cabinets of curiosity. Allegedly kept for scientific contemplation and study, animal bodies became three-dimensional symbols of the extent of colonial power. Far from their countries of origin, specimens took on lives (or afterlives) of their own, morphing into objects, emptied of their previously most defining characteristic—their life (Alberti ed. 2011). As Courtenay Smithers states in a 1988 handbook for insect collectors, ‘It should always be remembered that a “specimen” was once a living, active being, and that each and every part of it once contributed to the life of that being’ (9). Smither’s observation might seem to respect the life of the animal and advocate for its welfare, but she is more concerned that collectors take care not to damage any part of the insect. In the recent history of this country, the irony of the relationship between scientific exploration and the fauna of colonised countries is exemplified in the works of Walter Buller who, in the process of compiling his publication of Aotearoa’s endemic birds, actively contributed to some bird extinctions through hunting (‘Making Sense?’ Ibbotson 27). The lust

[12] The idea of insects being ‘evil’ persists today. For example, Phil Lester has a chapter entitled ‘An Evil Menace?’ in *The Vulgar Wasp: The Story of a Ruthless Invader and Ingenious Predator* (2018: 126).

for specimens is a testament to the drive of nineteenth-century scientific exploration and the often discordant understanding it fostered of life on Earth.

At the intersection of collecting and colonisation are the nonhuman ghosts that haunt the contemporary landscape. With a seemingly unstoppable ability to change everything it comes into contact with, *Homo sapiens* irrevocably transformed Aotearoa.[13] While there are many accounts of—and much debate over—the impact of Polynesian settlement during the preceding centuries, mass European settlement in the latter half of the nineteenth century was devastating, as hunting, introduced predators, and habitat destruction wiped out vast numbers of Aotearoa's unique species.[14] It is now estimated that, since human migration began, Aotearoa's vertebrate species have nearly halved, while there have been 'uncounted losses' of invertebrates (Holdaway par. 8).

Focus of this Research

My own conversation with the Gnat started in 2018 while I was immersed in painting Aotearoa's endangered endemic fauna. I started the project as a personal response to the contemporary biodiversity crisis and an attempt to engage with the nonhuman beings behind the statistics. Believing I would mostly be painting birds and maybe a few reptiles or sea creatures, I was shocked by the reality. Contemporary lists of Aotearoa's threatened fauna are

[13] Contentious notions of de-extinction aside.

[14] For detailed accounts of Māori and European settlement and the effects they had on the landscape and fauna see Geoff Park's *Ngā Uruora: (The Groves of Life) Ecology & History in a New Zealand Landscape* (1995), George Gibbs' *Ghost of Gondwana: The History of Life in New Zealand* (2006), David Young's *Our Islands, Our Selves: A History of Conservation in New Zealand* (2004), and James Belich's *Making Peoples: A History of the New Zealanders: from Polynesian Settlement to the End of the Nineteenth Century* (2007). There are also species specific accounts in Holdaway and Worthy's *The Lost World of the Moa* (2002).

Figure 0.2: Author's painting of the Canterbury knobbled weevil (*Hadramphus tuberculatus*), May 26 2018.

Figure 0.3: Author's painting of the *Notoreas Casanova* moth, May 13 2018.

not dominated by avifauna: they are filled, instead, with the diminutive creatures I had spent my life avoiding or ignoring but that make up the bulk of planetary animal life. Invertebrates, according to the Department of Conservation's Threatened Species Reports,[15] are disappearing in staggering numbers. This is true globally as well as locally. Yet concerns about insect conservation seem muted and their predominance on threatened species lists is certainly not mirrored by their public profile. Why are narratives of the sixth mass extinction so focussed on charismatic megafauna? Why do insects not attract the kind of conservation funding and the groundswell of media attention garnered by other species? What records survive of historical insect extinctions in Aotearoa? What are the cultural and scientific narratives that have nourished this way of thinking about and relating to those on six-legs? These questions consumed me as I painted the tiny hairs on the nationally vulnerable *Notoreas casanova* moth (fig. 0.2) and the bumpy ridges on the back of the critically endangered Canterbury knobbled weevil (*Hadramphus tuberculatus*, fig. 0.3). I wanted to understand why insect narratives and insect lives have been—and still are—so marginalised.

[15] The Department of Conservation (DOC) website contains links to multipage reports detailing the conservation status of different organisms: the insects are organised according to taxonomic order. See, www.doc.govt.nz/about-us/science-publications/conservation-publications/nz-threat-classification-system/.

To investigate the ways in which insects have been interpreted, (mis)represented, (mis)understood, and (un)protected this research will focus on the impacts of coloniser culture over the last two centuries in Aotearoa. The study is situated in the interchanges between insect imaginaries, European colonisation, and scientific understandings from the eighteenth century to today. Representations of native insects by European naturalists in the first decades of contact (from 1769 onwards) are relatively scarce. Insects do appear in the reports of the naturalists aboard Captain James Cook's first two voyages (1768–1771, 1772–1775)—there were the 'ubiquitous' sandflies and a few descriptions of endemic butterflies (Andrews 25; 16 & 40)—but it wasn't until the latter nineteenth century that this country's insects began to receive focussed attention. Although a number of individuals catalogued and described endemic insects throughout the nineteenth century, the work of George Vernon Hudson stands out in its generalist approach and appeal to non-specialist audiences. Hudson's *An Elementary Manual of New Zealand Entomology*, published in 1892, is regarded as the first wide-ranging colonial publication focussed exclusively on Aotearoa's insects. In its textual descriptions of insect biology and morphology, its somewhat clinical approach to its subject matter, as well as the style of its illustrations, the publication represents wider trends in Natural historical approaches to insects. Hudson's studies built on developments in European scientific illustration that had seen insects become increasingly isolated and decontextualized from their ecological contexts. Early European coloniser science, its obsession with taxonomy, and Hudson's *Manual* form the topic of Chapter One.

Moving on from the nineteenth century (but not its tentacular influence), Chapter Two offers a critical reading of the insect displays in four of Aotearoa's contemporary museums. Museums are often one of the principal sites of diverse human/insect encounters in modern society as outside the institution's walls, public interaction with a diverse range of insect fauna can be stymied by the exclusionary structures of modern urban life as well as by general dislike

of insects. Museums function as powerful, multi-sensorial storytellers and the ways in which insects are framed for the public thus becomes an important marker of human/insect relationships. The displays found in the Auckland War Memorial Museum, the Canterbury Museum, the Otago Museum, and the Museum of New Zealand Te Papa Tongarewa highlight shifting relationships between humans and insects. While the colonial roots of Auckland and Canterbury's museums may be obvious in their architecture and curation, the displays of Otago and Te Papa's more contemporary institutions maintain subtler ties to colonial and anthropocentric epistemologies. Insect displays tend to adhere to a set of tropes: they are pinned to white card in taxonomically organised cabinets; colourful, exotic species fill cluttered children's discovery areas in drawers, on walls, and under microscopes, while endemic species are sparingly placed in small cabinets within adult zones; information on ecology, habitat, and conservation can be sparse. Otago's *Tūhura Tropical Forest* live butterfly display raises ethical questions about the role of living insects in museum displays.

Outside of the circumscribed world of the museum, insects inhabit something of a cultural grey area—a wilderness, or microwilderness, of human knowledge and understanding. Often overlooked as subjects of in-depth study (compared to larger endemic fauna), it is likely that many insects vanished without ever coming to the attention of Western eyes. Chapter Three is an investigation of the consequences of negative attitudes to insects in the context of a global crisis in insect biodiversity. Though they symbolise permanence (and, paradoxically, impermanence), extinctions are in many ways undramatic phenomena: they are, by their very nature, silencing. Most often, the last representative of a species slips quietly away, only coming to human attention days, months or years later when its absence is noticed. Understanding the scale and impacts of species loss when so many insects likely have become extinct without our knowledge is a difficult task. There is, for example, only one widely documented historical extinction of an insect in Aotearoa: that of a large flightless ground

beetle from Stephen's Island.[16] This seems remarkable when placed alongside the fact that Aotearoa is home to some 20,000 species of insect, 90% of which are found 'nowhere else' on Earth (Gibbs 2007: par. 1). In 2019 two other species of beetle—the Eyrewell beetle and the Mokohinau stag beetle—were believed to have become extinct. Although their passing was noted by many major media outlets, they disappeared with an alarming lack of fanfare. Through my research I hope to unearth some of the biographies of the extinct endemic insects of Aotearoa through textual and visual re-imaginings of their lives.

To frame this research, I will use the many perspectives offered by the cultural entomological approach. Coined in 1987 by American entomologist Charles L. Hogue (181), the term 'cultural entomology' describes the study of the role of insects in human culture. Though currently a small area of scholarship, contributors to the field come from diverse disciplines, including, by not limited to, biology, anthropology, literary studies, music, fine arts, linguistics, and religious studies. The work of Hugh Raffles in *Insectopedia* (2010), the collected essays in *Insect Poetics* edited by Eric C. Brown (2006), Jean-Marc Drouin's *A Philosophy of the Insect* (2014), and Janice Neri's *The Insect and the Image* (2011) have been particularly influential in my research. Cultural entomology provides a method of engaging with the insect world outside of the distancing mode of Western science. Attempting to break the Cartesian paradigm which posits humanity (or European man) in opposition to nature I draw on the work of Val Plumwood in *Feminism and the Mastery of Nature* (1993) and Timothy Morton in *Ecology Without Nature: Rethinking Environmental Ethics* (2007). As Morton argues, 'ecology without Nature' means getting rid of the very idea of nature as something different from humanity. The insect world 'stops being That Thing Over There that surrounds and sustains us' (Morton 1) and becomes as much an integral—if messy and

[16] Several other extinct insect species potentially exist in museum collections, such as the Canterbury wētā, but they fall into the vast motley category of 'data deficient' species. The current Threatened Species Reports being produced by the DOC, in collaboration with leading national scientists ,contain hundreds of species, mostly invertebrates, that fall into the category of data deficient (see Grainger et al. 2013).

uncomfortable—part of planetary life as humanity. This involves what Donna Haraway calls 'staying with the trouble': an acknowledgement of the entangled present in order to think creatively into a more liveable future (2016). Evidently, human epistemologies need radical renewal, and to ignore the quiet deaths of insects would be to court catastrophe: as 'the lever pullers of the world' (MacNeal in Worrall, par. 2) their demise would very likely be a harbinger of humanity's own downfall.[17]

[17] E. O. Wilson's chronological breakdown of what would happen to the world if insects disappeared in *Creation: An Appeal to Save Life on Earth* shows our desperate dependence on insects with sobering clarity (34-35).

CHAPTER ONE:

Frontier Entomology and the Colonial Gaze

With a microscope you see the surface of things.
It magnifies them but does not show you reality.
It makes things seem higher and wider,
But do not suppose you are seeing the things in themselves.
(Confucian poem from the early nineteenth century, cited in Basalla 13)

When Europeans first began to explore and settle Aotearoa they brought with them pencil, paper, paint and brush to 'capture' the new land and its people and convey their experiences to audiences back home in Europe (Filer 2009). What they also brought, an invisible and often unacknowledged hitchhiker, was a particular way of seeing and understanding the world: what Mary Louise Pratt, in her seminal postcolonial work on travel writing and transculturation, called 'imperial eyes' (1992) and what others have termed the 'colonial gaze'.[18] Like many humans on encountering the new and the unusual, they named and organised this 'unknown' world and placed it into categories informed by the diametric oppositions long disseminated in the Christian tradition and perpetuated by post-Enlightenment Cartesian thinking. These

[18] See Frantz Fanon's *Black Skin, White Masks* (1952); Edward Said's *Orientalism* (1978), and Homi K. Bhabha's *The Location of Culture* (1994) for in-depth explorations of the colonial gaze and its ongoing ramifications.

spectral lenses organised the new colony according to Eurocentric dualisms: they saw civilised and savage, chaos and order, the moral Christian and the heathen other. Alongside judgements on the people and landscapes they encountered, the newcomers also applied the relentless enthusiasm to name and order the world's flora and fauna using the standardised system of scientific nomenclature that had consumed Europe since the eighteenth century.

The science of naming is popularly perceived (or dismissed) as a dispassionate, objective enterprise. Yet, not only is taxonomy a political and social act embodying power-over and possession-of, it is also a generative and rhetorical act, injecting meaning into and passing judgement over the physical world. All scientific gazes are attached to the bodies they look out from: as Donna Haraway argued in the late 1980s, each form of scientific knowledge making, including the naming of a species new to science (or taxonomic classification), is an embodied act.[19] Instead of being distanced from the subjective complications of the human world, Haraway argues, science is itself an expression of culture as the physical processing required to generate scientific knowledge grounds it in the wider mechanics of its milieu. By exposing the human body at work, Haraway unmasks what she calls the 'god trick' (582)—the illusion of disembodied objective vision long promoted by traditional modes of science. Instead, Haraway argues for a form of feminist objectivity grounded in 'situated knowledges': a way of encountering and understanding the world rooted in the body's lived experience which recognises science's unavoidable entanglement in human culture (581). Haraway is not alone in her critique of scientific objectivity: she builds on the work of Thomas Kuhn (1962) and is joined by Bruno Latour (1991; 1999), and Lorraine Daston and Peter Galison (2007). Engaging with science's cultural dimensions reveals the investments hidden behind the 'neutrality' of the taxonomic project.

[19] Haraway's 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective' is the seminal work on this idea of embodied knowledge (1988) but builds on the studies of previous feminist scholars such as Sandra Harding's 'The Science Question in Feminism' (1987).

Daston and Galison argue that objectivity is often understood as the antithesis of subjectivity, something that operates through 'the suppression […] of the self' (36) and is built on 'belief in a bedrock reality independent of human observers' (29). Despite its firm contemporary association with the production of scientific knowledge, this particular understanding of objectivity did not emerge until the 1860s (Daston & Galison 27). Daston and Galison explore the development of objective scientific vision by focussing on the atlases that emerged in the seventeenth century. These were grand (large in size and scope) illustrative works that 'served to train the eye of the novice and calibrate the eye of the old hand,' teaching naturalists 'how to see the essential and overlook the incidental' (26). They make several subtle but key distinctions and divide the development of objectivity into three 'epistemic virtues': truth-to-nature, dominant from the seventeenth century until the mid-nineteenth century; objectivity, which emerged in the mid nineteenth century; and trained judgement, popular from the early twentieth century (19). These 'epistemic virtues' trace a steady shift in the relationship not only between the scientific 'object' and its visual representation but in the human animal that mediates between the two.

Issues of objectivity sit at the core of human/insect interactions. Understanding the power in the term and what it claims to offer is imperative to comprehend the ways in which early colonial science represented Aotearoa's endemic insect fauna. Whether celebratory or derogatory, early scientific texts and images were all enmeshed in the fraught narratives of colonisation with all its attendant social and ecological problems. The way the colonial gaze

fell on and organised the insects of Aotearoa is the focus of this chapter. Understanding taxonomy as a system of organisation derivative of a particular cultural standpoint—and all the subsequent implications of this—compels one to also examine how the human gaze falls on the non-human: how are interactions between humans and insects played out and represented by the processes of science and the science of naming? The history of European insect illustration from the early modern period (c. 1500-1800) onwards provides insight into some of the perceptual biases at work in human-insect entanglements. In Aotearoa, the earliest entomological observations made by Europeans were those of the naturalists aboard Cook's first two voyages (1768-1771, 1772-1775). Notes and journal entries from the on-board naturalists provide some evidence of early perceptions of insects. As insect specimens made their way back to Europe, a small number of studies of Aotearoa's insects began to emerge in the late eighteenth and early nineteenth centuries. But the most dedicated work comes from the amateur entomologists working at the end of the nineteenth century in Aotearoa. George Vernon Hudson's 1892 publication of *An Elementary Manual of NZ Entomology* stands out as the first wide-ranging entomological guide to Aotearoa's endemic insects. Through Hudson's publication, I will explore what happens when a rigid and Eurocentric methodology is applied to a new landscape's fauna. Situating Hudson's work—both textual and visual—in its historical moment is illuminating for contemporary as well as historical insect understandings.

The fantasy of a scrutable world

If the names are unknown knowledge of the things also perishes.
(Linnaeus 1751: 80)

When European naturalists encountered the fauna of Aotearoa they attempted to apply the method of classifying the natural world formalised in the eighteenth century by 'the little oracle' (Kaesuk Yoon 42), Swedish botanist, zoologist and physician Karl von Linné, better known as Carl Linnaeus (1707-1778). Driven by the desire to find a pattern to the natural world and a systematic method that could be used to name all its species, Linnaeus' diminutive but ground-breaking publication of *Systema Naturae* in 1735 sketched out the Latin binomial system still used to name species today.[20] Linnaeus did not reinvent taxonomy: he simplified it, transforming what was previously a chaotic assortment of competing classificatory techniques into a system through which any devoted naturalist could, theoretically, order new 'discoveries' in the natural world. Linnaeus' system, according to him and his devotees, was overarching and could be universally applied to nature. The tenth edition, published in 1758, was arguably the most important and was the first edition to include a detailed classification of insects.

Prior to Linnaean classification, the more detailed a naturalist's observation of a species, the more names they gave it. As well as a number of folk or common names—what historian Keith Thomas describes as 'vivid vernacular names' (81)—a species might have had a scientific name many words long: one species of butterfly, for example, was called *Papilo*

[20] Linnaeus built on the work of scholars such as Gaspard Bauhin who, along with his brother Jean, had introduced some of the nomenclature Linnaeus used in his 1596 publication *Pinax theatre botanici* (Campbell, "Bauhin, Gaspard", *Oxford Dictionary of the Renaissance*).

media alis pronis praefertim interioribus maculis oblongis argenteis perbelle depictis (Berenbaum 4). As education and interest in natural history expanded in step with the empires of Europe, unwieldy scientific names like these became increasingly problematic. Enthusiasm for a more user-friendly, 'universal' system of nomenclature is understandable in this context. The simplification offered by the Linnaean system had its contemporaneous detractors—Georges-Louis Leclerc (1707-1788), the Comte de Buffon, believed that life was 'too rich and varied to be fitted within so rigid a framework' (in Foucault 136) and Genevan naturalist Charles Bonnet (1720–1793) stated that he 'should have a greater esteem for a good treatise on a single insect, than for a whole entomological dictionary: because definitions and divisions are not history' (in Winsor 61). Despite the criticism, Linnaeus' vision for a universal system was ultimately achieved and the bones of the Linnaean system remain today: according to Berenbaum, no scientific names published before Linnaeus' time are valid and all subsequent names must conform to the Linnaean system (4).

Linnaeus himself had a keen sense of the wider importance of his work. As the epigraph to this section suggests, he believed that knowledge of an organism—deep knowledge—was signified by its name. Names were essential, he believed, both in that they were part of an organism's essence, waiting to be unearthed by the taxonomist and in that they were fundamental to understanding—only once named could a thing truly be known. Pratt suggests that Linnaean naturalists 'supplanted' God as the caretaker and namer of the physical world (32), but the rhetoric and actions of Linnaean naturalists did not so much attempt to supplant God as salute divine creation by uncovering the essence (the name) of what God had created. For many, rather than stripping the natural world of its divinity, taxonomic 'excavations' deepened human understanding of divine intention: the Linnaean taxonomist was imagined as a sort of human translator of the wonders of Creation. Taxonomy was imperative and moral

work, they believed, and its perceived connection to divinity helped to bolster the zealotry with which the cataloguing project spread through Europe and her burgeoning empires.

The problematic implications of any way of looking at and understanding the world that purports to be universal are numerous, and scholars have explored these issues from the perspective of both the soft and hard sciences.[21] Anna Tsing discusses the 'falsely imagined universalism' of post-Enlightenment Man: how as Christian influence fell away, Man inherited God's universalism, including his 'singular temporality' (6:47). In the colonial context, Linnaeus' choice of Latin as the 'impartial' language of his system speaks to the widespread belief in the universality of the European perspective and its position as the apotheosis of civilized understandings of the world. Indeed, the idea that a two-part Latin name represents the pinnacle of sophisticated knowledge still persists today: Berenbaum believes that 'by knowing how something is classified, you immediately know something about it' (1). But the assertion that these names are somehow transparent truth-to-nature descriptors ignores the reality that Latin was (as it still is) an elite European language, irrelevant to the majority of the world's population.[22] Furthermore, it was precisely the remoteness and specificity of Latin as a lingua franca that provided eighteenth- and nineteenth-century scientists with the precision and detail needed to form their taxonomic classifications. Because Latin was not used in daily life it could be moulded and adapted to serve a new purpose.

Universality implies some sort of foundational objectivity, but it is not hard to find evidence of taxonomic classification that appears anything but impartial, especially as it

[21] 'Hard' science critiques of Linnaean taxonomy come from contemporary research that suggests that the Linnaean system, with its emphasis on morphological difference, is undermined by current evolutionary theory in which the blurry unfixedness of species distorts attempts to pin life to one rigid iteration. J.R. Gregg explores this issue in 'Taxonomy, Language and Reality' (1950: 419-435).

[22] Latin was the dominant language of scholarship, international (or intercontinental) communication and science well into the nineteenth century and the prestige and authority that its long association with heavyweight religious institutions like the Roman Catholic Church gave to the legitimacy of Latin scientific names should not be underestimated. It was also, importantly, the language in which Law was studied and promulgated.

pertains to insects. By the late eighteenth-century, systems of classification were trying to disentangle themselves from the intense anthropocentrism of previous centuries which had ordered animals according to a confusing array of qualities such as their perceived attractiveness, or their utility to humans (Thomas 77-78;72, 75-76). Reaching back to Plato, Aristotle, Plotinus and Proclus, the Great Chain of Being placed organisms within a hierarchical structure: God (white, male) at the top, minerals at the bottom, and everything else layered in between. By the European Renaissance it was believed that the higher up an organism, the more noble, strong and intelligent it was (Thomas 82): by the eighteenth century, the Chain was still being used by some to mark moral and physical distinctions between 'man' and the 'most despicable Insect' (Addison in Lovejoy 240). Despite Linnaeus' faith in the impartiality of his system, the hierarchical logic of the Chain echoes through his rhetoric. Thomas quotes the evocative names Linnaeus gave to the 'Vegetable Kingdom' which he divided into 'Tribes' and 'Nations', classing grasses as 'plebeians' and funguses as 'vagabonds': 'barbarous, naked, rapacious, voracious' (Linnaeus in Thomas 90). There is a residual and persistent anthropocentrism at the heart of the Linnaean system. By comparing the vegetable kingdom to human social hierarchies, Linnaeus both exulted and denigrated various forms of human and nonhuman life. In his subtle and not-so-subtle judgements on the natural world, Linnaeus was certainly not alone. Although it had become unfashionable to 'regard any animal species as intrinsically ugly' by the late eighteenth and early nineteenth centuries, some naturalists still struggled to suppress their aversion to many insects (Thomas 68). Initially given only a third of one page in the first edition of *Systema Naturae* (1735), insects were subsequently classified by Linnaeus as separate from other animals as he did not believe they had brains (Thygeson 23).

As an imperial tool, natural history was important in asserting intellectual authority in new territories. Science, as Pratt details, was how European elite citizenries related themselves

to other parts of the world at this time (15). Everywhere science was asserting its authority, the publication of specialised, descriptive volumes of work on flora and fauna followed, acting as agents of imperial hegemony (Pratt 29). What Ritvo calls the 'heroic age of scientific classification' (15) was never simply a lofty intellectual venture but was grounded in the practical realities of political systems. In the shadows of this 'heroic' collecting and cataloguing were the indigenous nomenclatures the Linnaean system attempted to supplant and erase. Writing about Māori taxonomy, Jonathan Te Rire argues that the Western taxonomic project reclassified and delegitimised indigenous nomenclature as 'less than' and assigned it to folklore and mythology (59). Te Rire argues that the condescending portrayal of indigenous taxonomies in Aotearoa and in other colonies around the world has undermined the mātauranga (knowledge) that was and is contained within them. According to Te Rire, the distancing ideology promoted by Eurocentric taxonomies has had detrimental effects on humanity's relationship to its environment in Aotearoa (67). Māori taxonomy has a strong emphasis on whakapapa and is based on the connections between beings and the ecosystems in which they live (ibid). In Māori taxonomy, insects were brought by Tāne from the heavens, giving them divine status and a foundational role in the cosmos (70-71). Insects were Te Aitanga Pepeke or Te Aitenaga a Punga—The Insect People, a polymorphous race that included many kinds of small, crawling and flying creatures (Miller 2).[23] Few of these names are used in common parlance in English-speaking Aotearoa. Building on the work of other contemporary Māori scholars, Te Rire argues for a return to experiential based knowledge. Te Rire destabilises the very idea of a universal and objective system of naming and knowledge, arguing that to study Te Ao Māori from an objective point of view is meaningless because it is a necessarily subjective exercise.

[23] David Miller lists many specific Māori names for different arthropods and also lists regional differences in taxonomy in 'The Insect People of the Māori' (1952: 1-61).

Illustrating the other: vision mechanics and the insect in focus

Taxonomy was a visual as much as a textual exercise and classificatory documents were often supported by detailed scientific illustrations. By the nineteenth century, although they may have lifted the prestige, appeal, or accomplishment of a work, scientific images were increasingly seen as secondary to the text they accompanied: they illustrated the words, the words did not illustrate the images. Yet images, perhaps even more than text, are able to substantiate the supremacy of a uniquely scientific perspective: a way of looking at organisms that more closely encapsulates their essence and totality—or so it was believed. European entomological illustrations highlight the shifting understandings, approaches and attitudes humans have had to some of Earth's smaller creatures. Entomological publications began to use images to perform a didactic function, to add authority and clarity to written data, acting as corroborators of essential truth, as if they were windows looking out on nature.[24] Illustration (in this understanding) sits uncomfortably between art and reality as science defines it. Brian J. Ford argues that scientific images perform other, less explicit functions that are not only mechanically descriptive but fundamentally cultural and political. For Ford, scientific illustration survives as a recording of the 'state of human understanding', like a mirror of society's wider interests and beliefs (2), images do not simply 'leaven the load of the words' (4), they highlight the hidden influences, cultural pressures and fashionable constraints that underpin the production of scientific culture at any point in its history. The implication is not

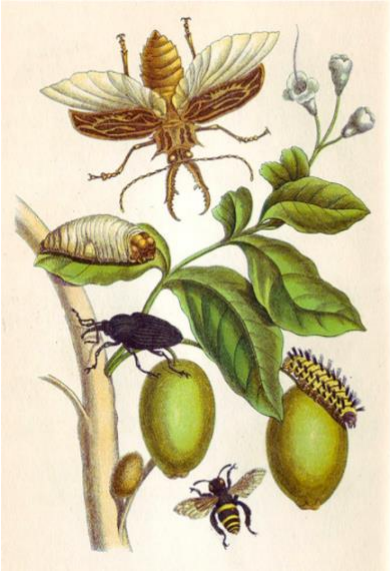
[24] For a fantastic insight into the processes of scientific illustration and the ways in which realism was exulted and stringently—if subjectively—upheld in insect images see Janice Neri's *The Insect and the Image: Visualizing Nature in Early Modern Europe, 1500- 1700* (2011). For a detailed historical account of the idea of objectivity in scientific images since the eighteenth century see Lorraine Daston and Peter Galison's *Objectivity* (2007).

that such images are false or entirely subjective, but that their 'truth' is complicated: they are, as Haraway would contend, the product of situated knowledge.

While humans had observed insects for millennia, it wasn't until the mid 1600s with the development of the modern microscope that European scholars gave focussed and detailed attention to their study.[25] In the early modern period entomology had been cultivated as a respectable pursuit for those with sufficient time, money and inclination. Janice Neri writes that 'In eighteenth-century France, writers of natural history books for elite audiences focused on the study of insects as a point of entry for improving the character of aristocrats through the study of nature' (xiv). Insects were seen as accessible as one could study them in relative comfort, and as such they came to be symbolic of an erudite mind. Unlike larger animals that necessitated travel and skill to track, hunt and preserve, insects were plentiful and varied, were relatively easy to catch, store and display, and could be found without leaving one's grounds. Some of the most celebrated names in entomology emerged between the early modern period and the nineteenth century: of particular note are Joris Hoefnagel (1542-1601), Maria Sibylla Merian (1647-1717), August Johann Rösel von Rosenhof (1705-1759), Johan Christian Fabricius (1745-1808), George Cuvier (1769-1832),[26] and John O. Westwood (1805-1893) (Neri 2011; Engel 2018).[27] With the help of the microscope, important and revolutionary discoveries were made about the lives of insects—including an understanding of the process of metamorphosis (that caterpillars and butterflies were the same animal) and of the gender

[25] Exactly who to credit with inventing the microscope is a contentious issue. Michael S. Engels states that the first optical microscope was invented in Middelburg, in the Dutch province of Zeeland by either Zacharias Janssen (1585–c. 1632) or Cornelis Drebbel (1572–1633) sometime around the year 1599 (19).
[26] Cuvier is remembered for his contribution to the theory of extinction far more than for his contributions to the field of entomology but his entomological study stands out for its contribution to insect classification.
[27] A list of famous entomological works from the early modern period into the nineteenth century is difficult to compile: many scholars whose names survive for their contributions in other fields also produced entomological folios or contributed to understandings of insects. For thorough explorations of historical entomology during this period see Janice Neri (2011) and Michael S. Engel's *Innumerable Insects: The Story of the Most Diverse and Myriad Animals on Earth* (2018).

Figure 1.1: Dürer, Albrecht. *Stag Beetle.* 1505. The J. Paul Getty Museum, Los Angeles: www.getty.edu/art/collection/objects/25/albrecht-durer-stag-beetle-german-1505/.



Figures 1.2 and 1.3: Sibylla Merian, Maria. Plates XLVIII and XXVII from *Metamorphosis Insectorum Surinamensium*. 1705. Copper engraving. *Biodiversity Heritage Library*: www.biodiversitylibrary.org/page/41398755

dynamics of social insects (that worker bees and ants were female and ruled by a queen rather than a king).

As science gained ascendancy and increasing cultural and social power in nineteenth-century Europe and its colonies, the illustrations used to support and represent scientific ideas reflected the increasingly microscopic and mechanistic framework through which science understood the world. This narrowing is visible in both the advancing technologies used to see smaller and smaller organisms, and in the detailed knowledge accumulating about insect lives. What is striking in a broad historical sense about the evolution of the insect image is its increasing isolation from its ecological context. Neri traces the beginnings of this isolation to the early modern period, but insect imagery from this era was still more elaborate and lively than its nineteenth-century counterparts. In earlier images, insects are often poised in different positions: they could be found proud, solitary and shadowed like Albrecht Dürer's 1505 stag beetle (fig. 1.1); terrifyingly large and intricately detailed like the 18 inch pull-out of a flea

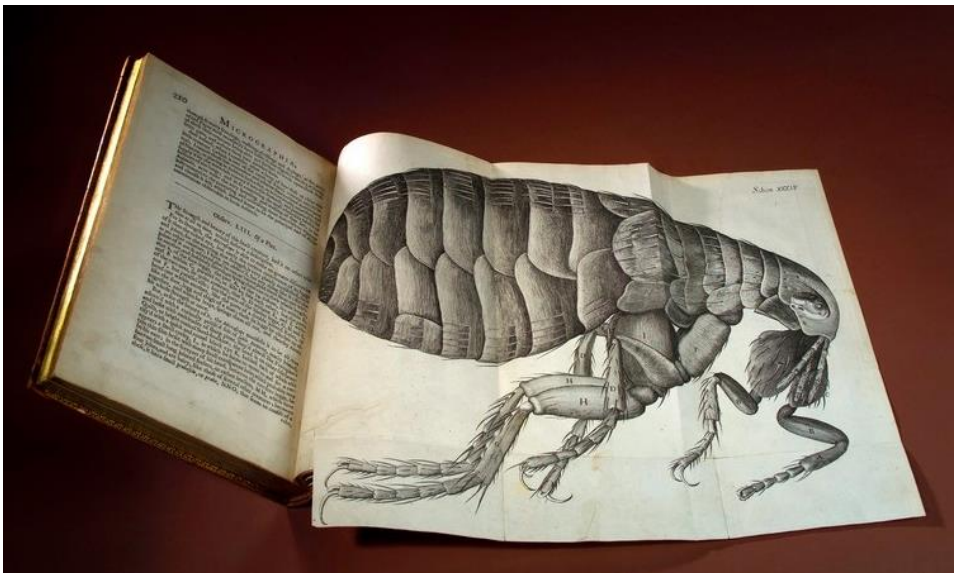


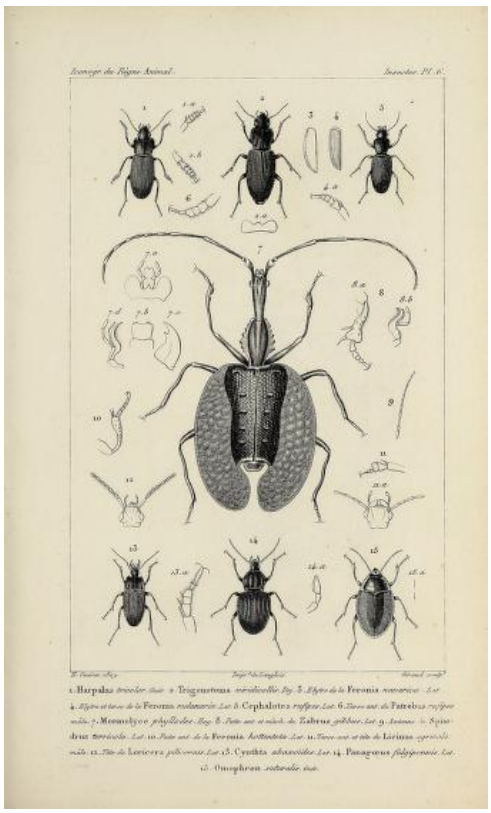
Figure 1.4: Hooke, Robert. Schem. XXIV [engraving of a flea from *Micrographia*]. 1665. Wellcome Collection. Photographer unknown. www.wellcomecollection.org/works/v5yduvwu.

from Robert Hooke's 1665 publication *Micrographia* (fig. 1.4); or awkwardly alighting on luscious foliage as in Maria Sibylla Merian's 1705 engravings (figs. 1.2 & 1.3). According to Neri, Dürer's beetle and Hooke's flea are not only examples of the 'sterilisation' of insect imagery but were partially responsible for establishing this mode of optics, spawning generations of images that adhered to what she calls 'specimen logic': a 'way of understanding the natural world as a succession of isolated objects [that] turns nature into object by decontextualizing […] creatures […] from their habitats, environments, and settings' (xii-xiii). The influence of Dürer's beetle is easy to see in Joris Hoefnagel's 1630 engraving *Diversae insectarum volatilium* (fig. 1.5). Though Hoefnagel's creatures are shadowed and lively, there is the feel of a curiosity cabinet to their arrangement and enumeration inside the delicate border that speaks to the creeping emergence of specimen logic. Specimen logic was not simply a way of thinking but a material term reflecting the catching, storing, and cataloguing of nature in order to better understand it. Dating back to the early seventeenth century, the word 'specimen'

Figure 1.5: Hoefnagel, Joris. Images from *Diversae insectarum volatilium.* 1630. The British Museum, object number PPA261902. www.britishmuseum.org/collection/object/P_2AA-a-67-70.

derives from the Latin 'specere', to look: a specimen, therefore, came to be the means by which a thing is known ('specimen *n.*' *OED Online*).

By the nineteenth century the emphasis on classification as fundamental for deep knowledge of organic life is visible in the increasingly anatomical depictions of insect bodies. Cuvier's illustrations for *Le Règne Animal* provide one example of this (figs. 1.6 and 1.7). Cuvier's images reveal a tension between the inherent beauty and life of the subject and a desire to make its minutia visible. The full-bodied beetles in figures 1.6 and 1.7 are carefully positioned so that their symmetrical bodies do not touch each other: facing the same direction, they are surrounded by shadowy delineations that expose the mechanics behind their chitinous exterior. Almost decorative, the anatomical backgrounds convey a ruthless compartmentalisation of the insect body. Here, knowledge of insect anatomy signifies a deeper understanding of the creature itself. Daston and Galison see the attention to beauty and mechanics as an expression of the 'truth-to-nature' mode of scientific natural history observation dominant during this period. They state that 'Neither artists nor anatomists sensed any tension between the demands of truth and those of beauty; on the contrary, an ugly drawing



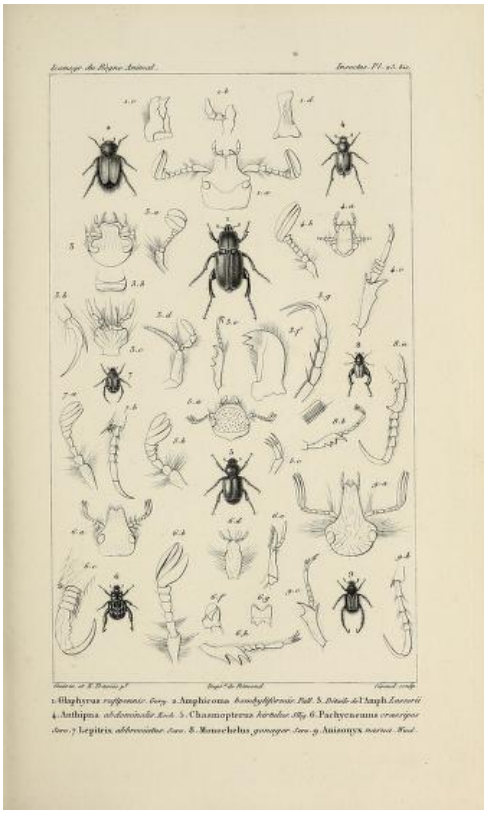


Figure 1.6 and 1.7: Guérin-Méneville, F. É., and Georges Cuvier. Plate 6 and 25 in *Iconographie Du Règne Animal De G. Cuvier. T.2 (1829-1844) [Animaux Invertébrés] [Planches] - Iconographie Du Règne Animal De G. Cuvier*. J. B. Baillière, Jan 1 1970, www.biodiversitylibrary.org/item/88600.

was more than likely a false one' (102). While beautiful and intricate, Cuvier's beetles have none of the life of Hoefnagel or Merrian's insects. In Hoefnagel's riff on Dürer's beetle and the insects surrounding it, the animals (mostly) retain their shadows and, with them, a sense of movement, life and individuality. Cuvier's beetles, pinned to the page in beautiful but rigid symmetry and surrounded by pieces of themselves, highlight the increasing influence of taxonomy on insect iconography.

Early European encounters with Aotearoa's insects

> In such conflict for pre-eminence I know no science that […] has come off worse than Entomology: her champions hitherto have been so few, and their efforts so unavailing, that all her rival sisters have been exalted above her; and I believe there is scarcely any branch of Natural History that has had fewer British admirers
> (Kirby and Spence 1818: 2)

> If the old idea still prevailed that the Evil principle was personified by a fallen deity one might well imagine that the class of insects was his contribution to the life of this planet.
> (Johnston 1897: 366)

Detailed written and visual descriptions of insects by European naturalists in late eighteenth and early nineteenth-century Aotearoa are difficult to find. There are many possible explanations for this absence, ranging from casual indifference to dislike or disinterest. The impact of scale and size may also have influenced both the ability as well as the inclination to observe insects; larger and more charismatic species (like kiwi or tui) likely presented more exciting options for study. Nor are insects always easy to find: many are nocturnal rather than diurnal, are camouflaged in their environment, or move too fast or too slow for easy human perception. The earliest naturalists to visit Aotearoa—those aboard Cook's first two voyages—worked under intense time pressure, often in crowded conditions (Andrews 23-25). Constrained by space and time as well as the sheer abundance of 'uncatalogued' nature they encountered, Cook's naturalists were forced to prioritise the plant and animal species they attended to. How they made these choices generally reflected their personal interests and suffice to say none were entomologists. Their lack of interest in writing about or describing their encounters with insects may have also been a product of wider prejudices against insects

at the time. The entrenched disregard mentioned by Kirby and Spence suggest that dislike of insects was widespread in the late eighteenth and early nineteenth centuries.

While none of the writings of Cook's naturalists go as far as colonial administrator Harry Johnston in their attitudes to insects, they reveal similar underlying attitudes.[28] Linnaeus himself was excited (and subsequently disappointed) by the taxonomic prospects offered by these voyages. The journal of Joseph Banks—naturalist and cartographer aboard Cook's 1769 voyage of the *Endeavour*—remains one of the more detailed accounts of early natural history exploration of Aotearoa. An energetic and independently wealthy English naturalist, Banks was a disciple of Linnaeus' and believed in the deep relevance of the Linnaean project, even calling the Swedish taxonomist 'our Master' (in Ritvo 22). The *Endeavour* held the largest party yet assembled for naval scientific exploration: accompanying Banks was Daniel Solander, Herman Spöring, Sydney Parkinson, Alexander Buchan as well as Banks' four servants (Andrews 7). More interested in botany than entomology, Banks mentions insects only sporadically as objects of scientific observation and more often as pestilential invaders or irritating disrupters of other, more important scientific processes. His first detailed mention of insects was of the lice that inhabited the hair of the local Māori (ibid 10). J. R. H. Andrews, in his comprehensive study of early zoological exploration in Aotearoa, states that 'insects barely feature in Banks's journal', and those he did encounter were said to rival the country's birds in their paucity and dullness—a sentiment that would echo throughout subsequent European accounts (16). Banks and his party seemed to harbour a deep and enduring disdain that was both physical and affective. Not only considered dull and unspectacular, Aotearoa's insect population was also home to namu (the sandfly): in his entry on March 30 1770, Banks wrote that sandflies were 'the curse of any countrey where they abound' (cited in Craig et al. 18).

[28] Johnston's remarks were significantly influenced by his role as colonial administrator in South Africa in 1897. Living in close contact with tsetse flies and mosquitoes, both of which can transmit fatal diseases, certainly accounts for a great deal of the vehemence in his multi-page tirade against insects.

Despite his position as a Linnaean disciple, Banks solidified this disdain by neglecting to properly categorise the insect he found so offensive and unimportant. The two main people-biting species of 'sandfly' in Aotearoa are in reality the black flies *Austrosimulium australense* and *Austrosimulium ungulatum*: Banks was the first to label them 'sand flies' (a name used overseas for a group of moth midges) and the name persists today despite its taxonomic inaccuracy (Craig et al. 18).

Cook's subsequent voyages did not yield many more entomological observations. Banks and Solander were not chosen to accompany Cook's second voyage to Aotearoa in 1772. Instead, father and son, Johann Rheinhold Forster and Johann Georg Adam Forster, as well as Anders Sparrman who joined the expedition in Cape Town, South Africa, took the place of shipboard naturalists. While the ornithological results of this voyage were a considerable improvement on those of the previous one (by this time Linnaeus was deeply disappointed with Banks and Solander for their lack of follow-up publications), insects were largely neglected as, like their predecessors, the Forsters were not passionate entomologists.[29] Georg Forster, responsible for the voyage's natural history illustrations, did not draw or paint any insects and his father commented that 'No countries of the world produce fewer species of insects than those of the South-Sea' (in Andrews 31). Again, the so-called sandfly—what Andrews calls 'that ubiquitous hazard in Fiordland exploration'—was the cause of considerable trouble for the naturalists: '[i]nnumerable and vicious, at times they virtually crippled Forster' (ibid 25). Written documentation in general was sparser than that of the first voyage and the only insects mentioned by the Forsters or Sparrman were the pestilential ones—although a butterfly, a cicada, and possibly a few beetles were collected during the voyage (ibid 31).

[29] Andrews does not go into detail about the reasons for the Forsters' replacement of Banks and Solander but he does go into some detail about the reasons for the latter's failure to publish the results of their voyage—something about which Linnaeus was very aggrieved (18-20).

Despite the lack of written descriptions of insects, the collections that made their way back to England from these two voyages did contain insect specimens. And contrary to the attention they gave insects in their journals, Banks and Solander actually collected more insects than they did any other animal (Andrews 31). Andrews speculates that this might be because their interest in botany brought them into closer contact with insects, but it is as likely due to their comparative ease to catch. The high number in the collections and the shortage of written and visual descriptions suggests that it was more a lack of interest in insects as objects of in-depth study rather than a complete disregard of insect fauna that led to their underrepresentation in early publications. By collecting but not attending to insects, the naturalists consigned them, however inadvertently, to a particular category of nature suggestive of the earlier ideologies of the Great Chain of Being. Their silent presence in these collections seems to mimic the wider human-insect relationship, as if their ubiquity somehow rendered them mundane and uninteresting.

The lack of interest displayed by the shipboard naturalists may also have impacted upon the subsequent treatment of the insect specimens in the London collection. Linnaeus' concern over the care of these collections was, in many respects, justified: avarice and the lure of financial gain saw much of the voyage's collections dispersed to wealthy buyers and museums throughout Britain and Europe (Andrews 39). Accounts of the state of Banks' insect collection are variable and even contradictory. Andrews claims that compared to other taxonomic orders like the molluscs, the insect specimens fared well, in part because their unpopularity meant the collection remained relatively intact.[30] In the years after Banks' return to England, the insects were examined by a number of eager entomologists. Johann Christian Fabricius (another Linnaean apostle) published *Systema Entomologiae* in 1775, which featured several New

[30] Many of the Aotearoan insects collected by Banks are still housed in the British Museum, although some are found in Copenhagen and in the Macleay collection in Australia (Andrews 45).

Zealand insect species. Fabricius was given charge of the collection for a time but despite his best attempts to curate and care for it, the insects were later described by Swedish entomologist Nils Swederus in 1785 as carelessly treated, with legs, antennae and heads missing and all 'covered with dust and ill-arranged' (in Andrews 44). Other notable written classifications and collections of Aotearoan insects were produced by the German entomologist Johann Herbst, whose illustrated monographs on beetles published between 1782 and 1804 included some Aotearoan insects; French entomologist Guillaume Antoine Olivier included New Zealand insects in his multi-volume treatise entitled *Entomologie, ou histoire naturelle des insectes* (1789) and founded a French-based New Zealand entomological society that lasted well into the nineteenth century. New Zealand insects were also referenced by Freidrich Weber (1795) and Carl Schönherr (1806-1817).

Aotearoan insects appeared in these publications in forms that may seem strange today but were standard at the time. Figure 1.8 shows a hand-coloured engraving of a rather slim and harassed-looking tui (labelled here as 'The New Zealand Creeper') from the 1776 publication *New Illustrations of Zoology* by Peter Brown, an English natural history illustrator and associate of Banks. The tui—illustrated from a 'ſtuft ſpecimen in tolerable perſervation, in the poſſeſſion of Marmaduke Tunstall, Efq.' (Brown 18)—is the focus of the image and the accompanying butterfly acts as a sort of disproportionately large decoration filling in an otherwise blank top right corner. The butterfly is not from Aotearoa and was instead found by Brown in proximity to the tui in Tunstall's cabinet. Brown labels it as 'a variety of the Pap. D. F. Enceladus' and has nothing further to say about it (18). Its inclusion here seems more like a matter of convenience than of intention—attempting to lift the image's sense of life and context on the page but in reality muddling and obscuring the ecological reality of two animals depicted.

Figure 1.8: 'The new Zealand Creeper', Hand-coloured engraving (Brown 1776: 6).

Placing species of animal from different geographical regions alongside one another was not uncommon at this time, and can be seen in the work of other natural history illustrators working in the early nineteenth century. Figure 1.9 shows a hand-coloured engraving of four butterflies by Edward Donovan, published in *An Epitome of the Natural History of Insects of New Holland, New Zealand* (1805). The New Zealand red admiral butterfly (*Vanessa gonerilla*, or kahukura; labelled by Donovan as *Papillo gonerilla*) is displayed at the apex of a sort of diamond pattern of butterflies with its wings expanded, and in the middle right at rest on an unspecified plant. The other two butterflies are not from Aotearoa: the bottom species was collected in New South Wales by Banks and the middle left butterfly is of unknown origin. The brief written description accompanying the image focusses on morphological descriptions, contain only the Latin binomials for the butterflies, with some notes regarding the location of the specimen collected and thoughts on its distribution.

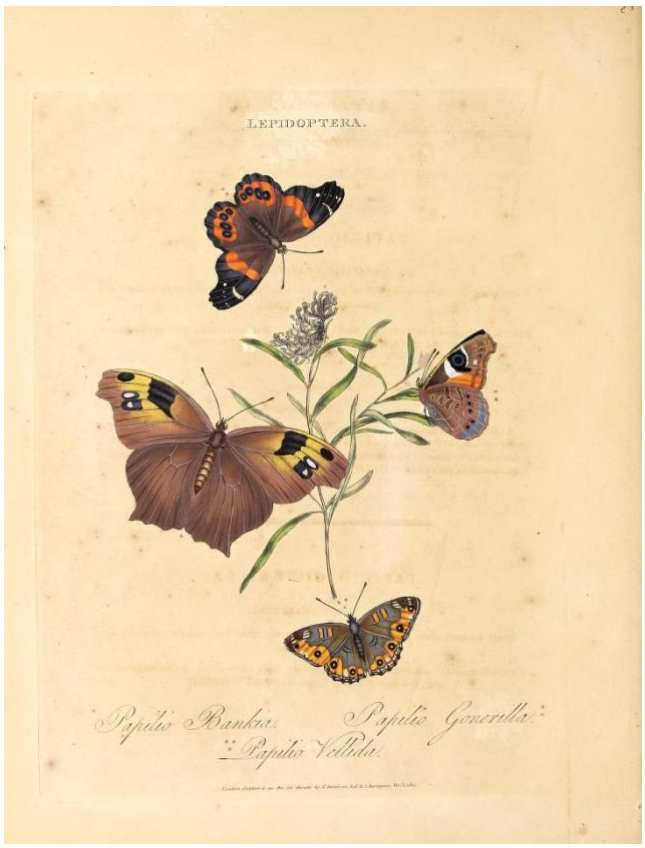


Figure 1.9: Butterflies from *An Epitome of the Natural History of Insects of New Holland, New Zealand* (Donovan 1805: Plate 25).

While Donovan's publication is exclusively dedicated to Australasian insects, in some ways his insects perform a similar function to the anonymous butterfly in Brown's image. Donovan's subjects come from a confusing jumble of geographical locations: most are connected in some way to one of Cook's voyages (most of them drawn from Banks' collection) and their taxonomic names hint at a certain amount of dedicated observation. But it is their movement—not as living beings within their original habitat—but as transposable or relocatable specimens that speaks to their role in the culture and science of the time. Graham Huggan's influential study of postcolonialism and its sinuous connections with capitalism (2001) reveals the ways in which animal difference was commodified in the early stages of empire building. Decontextualised animals like the unknown butterfly from figure 1.8 and the red admirals from figure 1.9 form a two-dimensional, aesthetic backdrop to the processes of

Figure 1.10: Colenso's wētā. Photograph by Peter Quin for the Auckland War Memorial Museum (Early 49-53).

colonisation: in their own way they are both victims of imperial power and tools in the production of its ongoing cultural hegemony. The images simultaneously conjure and erase the animals themselves, forcefully removing them from their ecological context, spotlighting them and then rendering them decorative. Most (if not all) of the Aotearoan insects that made their way into publication in the late eighteenth and early nineteenth centuries were produced from insect specimens held in cabinets in England or Europe, sketched, engraved, and printed in those same countries. Donovan's butterflies are reimagined as part of the exotic other via their framing in an explicitly colonial publication: as Huggan argues, the exotic is achieved via the background labour of such publications, by applying 'a particular mode of aesthetic *perception*—one which renders people, objects, and places strange even as it domesticates

them' (15). This creates what Huggan calls an 'aesthetics of decontextualisation'—a visual isolation that allows for decontextualised meanings and interpretations to flourish (16). There is a quite literal deadening at work here, a reductive flattening of life and animality.

As settlement ramped up towards the middle of the nineteenth century, some keen entomologists began insect collections that remained in Aotearoa. It is believed that the oldest insect specimen to have stayed in the country is that of a giant wētā (labelled *Hemideina gigantea*) currently held in the Auckland War Memorial Museum (fig. 1.10). The wētā is thought to have been captured and bottled in spirits by William Colenso in Paihia in 1838 (Early 49).[31] As well as a zealous missionary and printer, Colenso was also an enthusiastic Natural historian and Aotearoa's first resident European naturalist. Colenso's wētā is notable not only as the first European collected insect specimen to remain in the country but because it represents the beginning of earnest entomological study in Aotearoa's settler community. Today, the specimen cuts a somewhat alarming and gruesome figure: it seems to survive only by the alarming number of entomological pins holding its fragile and desiccated-looking form from fracturing further. With its jointed foreleg positioned as if it is coming out of its head, the wētā reveals some of what it takes to hold an animal body outside of the decaying influence of time. There's a symbolic sort of mishandling at work here, a kind of inability within European scientific culture to understand and fully represent the fauna of an 'unknown' country.

[31] There is some ambiguity remaining about the specimen. Early states that the handwriting on the tag is not believed to be Colenso's but as the specimen came to the museum via the descendent of a close friend of Colenso it is presumed to have been his specimen (49-53). As the first specimen known to European science, this particular giant wētā is the holotype for its species—the example to which all subsequent taxonomic studies must defer.

‘The last of the gentleman amateurs’: [32] George Vernon Hudson’s *An Elementary Manual of New Zealand Entomology*

> It is surprising to my thinking that our asylums are not mainly filled with entomologists driven to dementia by the study of this horrible class; on the contrary, however, by some surprising reversal of effect following cause, the study of insects appears to produce mild spectacled men of regular habits, dull sobriety and calm optimism.
> (Johnston 367)

While many European settlers might have felt sympathetic to the rather extreme views expressed above by colonial administrator Harry Johnston, a small number were enthusiastic about the opportunities a new colony presented for ‘mild spectacled men of regular habits’. Once European settlement began in earnest, a modest number of entomological studies emerged, generally focussed on a specific order of insects like Lepidoptera (butterflies) or Coleoptera (beetles).[33] By the end of the nineteenth century, the study of insects had gained some traction in Aotearoa and one publication seems to have had considerable impact, both at the time and for decades afterwards. A young Post Office clerk and a keen amateur entomologist, Wellington resident George Vernon Hudson (1867–1946; fig. 1.11) was the quintessential Linnaean gentleman naturalist. Fascinated by insects from a young age, Hudson

[32] This phrase was used by Andrews to introduce Walter Buller and George Vernon Hudson as the focus of the final chapter of *The Southern Ark: Zoological Discovery in New Zealand 1769-1900* (1986). The phrase refers to both the quality and character of the men as well as the waning ability of amateurs to influence science as changes in the late nineteenth century began to preclude amateurs from scientific endeavours.
[33] See Thomas Broun’s *Manual of the New Zealand Coleoptera* (1880) which described 1,140 species of beetle and references to the influential collecting work of Edward Meyrick on Lepidoptera (in Hill 530-548).

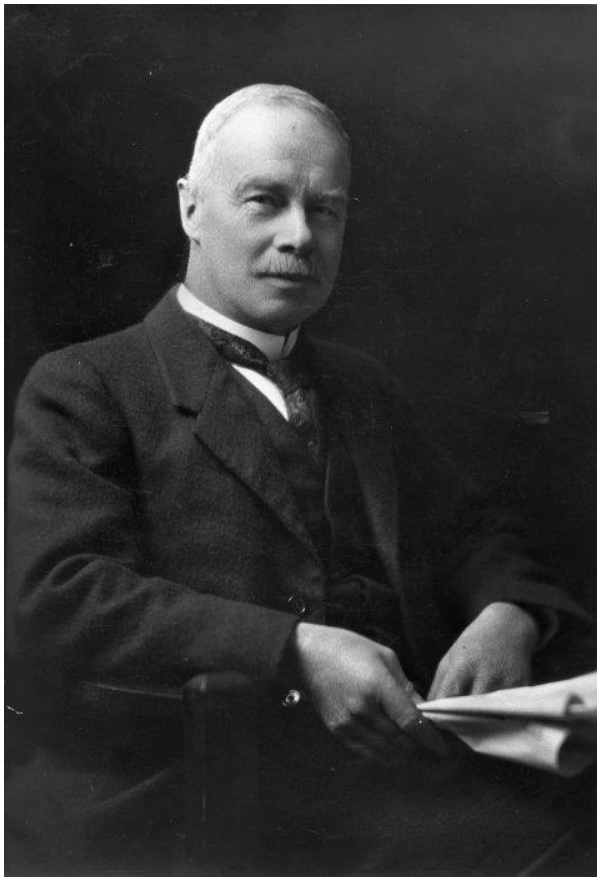


Figure 1.11: George Vernon Hudson, *Evening Post* (1865–2002). Photographic negatives and prints of the *Evening Post* newspaper. Ref: PAColl-6301-20. Alexander Turnball Library, Wellington, New Zealand. /records/23185773.

had built up a sizable collection and written his first paper for the British periodical *The Entomologist* by the age of fourteen. Emigrating from England to Aotearoa in 1881 with his father, Hudson published *An Elementary Manual of New Zealand Entomology* in 1892 at the age of twenty-five. Although he was committed to his new home, Hudson's methods remained distinctly English: despite the technology to print being available in Aotearoa by 1892, he sent *An Elementary Manual* to be published with the Royal Entomological Society of London.[34] The flow of scientific knowledge 'back to the centre' was standard practice at the time, especially as most authors were recent immigrants from Europe. The desire for intellectual esteem and credit saw authors like Hudson send their work to London or an equally prestigious

[34] For a detailed history of the development of printing in Aotearoa and the social and cultural implications of this see Griffith et. al *Book & Print in New Zealand: A Guide to Print Culture in Aotearoa* (1997).

European capital. As the first wide-ranging look at Aotearoa's insects, *An Elementary Manual's* publication in England speaks to the national entanglements of colonial taxonomy and frontier science.

An Elementary Manual stands out in its attempt to make entomology palatable to the non-expert. An amateur himself, Hudson explicitly wanted to popularise the field of entomology: 'The object of the present volume is to give a brief account of the Natural History of the insects inhabiting New Zealand in a form intelligible to the ordinary reader' (1892: i). In this, it seems, he was moderately successful as *An Elementary Manual* (and Hudson's subsequent publications) had lasting influence into the twentieth century.[35] Hudson credits a number of specific entomological studies pertaining to different orders of insects as the source of some of his information. Indeed, referring to what he describes as the elaborate and systematic work of other nineteenth-century entomologists such as Thomas Broun and Edward Meyrick, Hudson is modest about his own achievement, stating that *An Elementary Manual* builds on the work others had done in naming and identifying Aotearoa's insects.[36] Instead of breaking new ground or identifying new species, Hudson's publication endeavours to act as an interlocutor, a translator of the often impenetrable jargon of taxonomic science for the general public. What becomes clear in reading *An Elementary Manual* more than a century after its publication, is just how influenced nineteenth-century entomology was by imperialist scientific epistemologies.

Despite its appearance to a contemporary reader (and its prefacing in this chapter by a discussion on taxonomy), *An Elementary Manual* was not intended to be a taxonomic work

[35] Richard Sharell praised Hudson as a pioneer entomologist, comparing him to the French entomologist Jean-Henri Fabre (208-217). Andrews includes Hudson as the only entomologist profiled in *The Southern Ark* (198–206), saying of his death in 1946 'Thus passed a life unselfishly dedicated to a science' (206). The Hudson collection is now housed in Te Papa Tongarewa and is considered one of the largest insect collections in the country ('G V Hudson Collection').

[36] Much like the publication of authoritative scientific texts, the identification of holotype species was generally done by expert entomologists in Europe who received specimens from the colonies and classified them (Daston 2004).

and instead represents an early attempt at a field guide. What is interesting about Hudson's work is how it negotiates these categories and how it has moved across time. Today, it is neither frontier science nor field guide but collector's item (early editions can sell for hundreds of dollars), offering a snapshot of an earlier perspective on the insect world. In its careful cataloguing of species, its precise language, and the layout of its meticulous illustrations, it embodies many of the ways in which Western science interacted with the fauna of colonised nations. The insects in *An Elementary Manual* are labelled only by their Latin scientific names and are organised according to the seven known orders of insect.[37] The first chapter, entitled 'General Observations,' contains a layperson's guide to insect anatomy—what, in Hudson's words, 'constitutes' an insect (2), followed by a textual outline of the biological stages in an insect's life and an explanation of what distinguishes each of the insect orders. Throughout the introduction, Hudson uses text and image to suggest the morphology of the insect is what defines it: 'An insect is an articulate animal having the body divided into three distinct divisions, […] the head (A), the thorax (B), and the abdomen (C)' (2). His accompanying images (fig 1.12), almost ninety years on from Cuvier's *Le Règne Animal*, show an abiding commitment to a strict taxonomic epistemology. Like an unveiling of the Creator's design brief, the delineations of the 'Body of an insect (Hymenoptera)' in figure 1.12 flatten the insect's vitality until it seems more like a complex diagrammatic puzzle than a representation of a living animal. Hudson's Fig. II isolates the oral and digestive system of the insect in order to display greater detail and, it is presumed, understanding. What the image also reveals is a level of abstraction only really achievable through dissection and the use of a microscope.

[37] At the time Hudson was writing, there were seven known orders of insect: it is now generally accepted that there are at least 30.

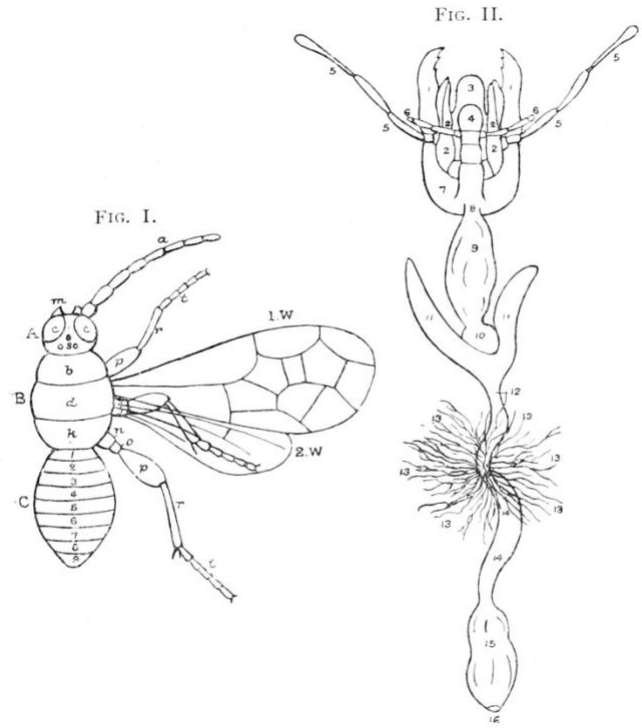


Figure 1.12: Hudson's delineation of insect anatomy (1892: 3).

Behind Hudson's meticulous illustrations are hours of careful observation of living and dead insects. 'Mild spectacled men of regular habits' (Johnston 367) like Hudson were a stark contrast to the violent figures cut by Andreas Reischek and other specimen hunters of nineteenth-century New Zealand.[38] While Reischek and others took guns and knives to hunt larger animals (like birds) and lived the rough, adventurous sort of life necessitated by long periods spent in the bush, the entomologist, according to Hudson, need only open their 'sitting-room windows' at night and the insects would rush in (14)—almost as if they wanted to be caught. Chapter II, 'Collecting Insects', gives readers detailed tips and techniques for specimen collecting—the 'necessary' prerequisite to any microscopic observation (9-18). Other methods listed by Hudson include upending an open umbrella underneath shrubbery and sharply tapping

38 Reischek's book *Yesterdays in Maoriland* reveals a tangled web of colonial racism, capitalism, scientific endeavours, and museums in Aotearoa. His relationship to early museums and the violence behind many animal collections is explored in chapter two.

the plant ‘with a stout walking-stick’, or shaking the dead bodies of birds and other animals onto a sheet of paper to expose the insects lurking in their feathers and fur (10). Some of Hudson’s instructions seem preposterously specific in this regard: ‘When the entomologist reaches his hunting-ground, he will mount his net and place a number of the boxes in his left-hand coat pocket’ (12). Once the insects have been caught and trapped in the boxes, they are to be transferred to the right-hand coat pocket (ibid). Although his methods seem rather passive, Hudson took mild offence to what he called ‘armchair-naturalists’ (in Sharell 214) and believed in the merits of conducting rigorous fieldwork in the ‘backcountry’, going on a number of long collecting trips to isolated locations like the Auckland Islands in order to locate rare or difficult to find species (Gibbs 1996: 1).

Just as the animals of the popular menageries of the Victorians ‘did not thrive’ in captivity, dying from cold, inadequate nutrition and confinement (Kalof 122), insects also do not always flourish in captivity. Hudson was a great believer in studying insects in their native habitat as much as possible, or, failing that, trying to rear captive specimens inside. Sadly, he writes, many insects perish in the attempt to rehouse them (12). Ultimately, these preferences were dictated by scientific rather than ethical concerns and the live insects often end up fulfilling the same purpose as the hunted ones: Hudson believed that rearing insects is ‘by far the most interesting method of acquiring specimens for [one’s] collection’ (15). Live subjects provided more opportunities to observe the different phases of an insect’s life. According to Hudson, ‘[b]eetles should always be brought home alive’ and will survive the homeward journey inside their ‘pill- or chip-boxes’ safely, ‘especially if a wisp of grass or a leaf is put into the box to give them foothold’ (10). There is a touch of gentleness or whimsy to the idea of trying to make a beetle feel at home in a small box that hints at a sentimentality between Hudson and the insects he collects. But the comment is followed, without emotional complication, by the imperative: ‘[b]eetles must always be killed with boiling water’ as this

best preserves the insect's anatomy. The beetles must, according to Hudson, be 'left immersed some hours before setting', which involves stuffing them with cotton wool (10)—doubtless a finicky job for many species.

Hudson advocated killing other kinds of insects by placing them in laurel bottles, a sort of ad hoc device made from a glass bottle containing 'well-bruised *young* laurel shoots' placed in the bottom (12). Once trapped inside the bottle (with the cork replaced) the insects are asphyxiated by the toxins from the plant and die with minimal 'damage' to their anatomy (12). Hudson instructs readers to handle the dead insects delicately and pin them with intense precision to special cork boards (13-18). Despite insisting that specimens be set in a 'natural position' (12), he states that 'The greatest care should be taken to set symmetrically, so that the limbs on the right-hand side of an insect are in the same position as those on the left' (11). Coleoptera, or beetles, 'must be pinned through either the right or left elytron' with the collector taking care to pin on the same side in all 'his' specimens to avoid untidy displays (10). Many of Hudson's instructions use specific entomological terminology, like 'elytron', and would be difficult to follow without sufficient knowledge of insect anatomy. Throughout his many detailed instructions—which include the brand name of specialist products like 'entomological pins' only procurable from London (13)—Hudson's enthusiasm and passion for insects is not marred or complicated by empathy and any remorse he expresses pertains to the potential for lost knowledge rather than lost animal life.

These seemingly self-contradictory structures of feeling—the drive to extinguish life in order to pedestal and comprehend it—reveal an ongoing tension not only within Hudson's *Manual* but in the wider context of European science at the end of the nineteenth century. One of Hudson's role models and contemporaries was the French entomologist Jean-Henri Fabre (1823-1915), whose contributions to entomology are not much remembered in the West today

but who remains 'a household name' in Japan (Raffles 63).[39] A self-educated naturalist and entomologist, Fabre worked as a primary school teacher for much of his life, often infusing his teaching with his passion for entomology. Yet despite being popular as an author, Fabre was ridiculed by some of his peers in the scientific establishment for his sentimental and populist approach to insects—even his fans related to him more as a poet and storyteller than as a scientist (Drouin 45-55). Incensed by this, Fabre attempted to frame the distance between himself and the establishment as a moral rather than intellectual one: 'You rip up the animal and I study it alive; you turn it into an object of horror and pity, whereas I cause it to be loved; […] you pry into death, I pry into life' (in Raffles 56). Fabre was adamantly opposed to what he saw as the clinical taxonomic approach of modern science and preferred to conduct 'biographical' studies of insects, replete with what contemporary entomologist Colin Favret calls Fabre's 'humanistic elegance' (39). One oft-quoted description demonstrates the 'colorful [sic] literary fashion' (Favret 39) with which Fabre described the insects of his backyard: 'forty lovers come to pay their respects to the bride [a newly enclosed peacock moth] born that morning within the mysteries of my study' (*Souvenirs VII*: 341).

On the surface, Fabre's method of entomologising appears to offer a different way of knowing insects that seems gentler or more respectful than that promoted by Hudson. He deliberately positions his 'biographical' studies as an antidote to the dry taxonomic method dominant at the fin de siècle. Fabre employs a narrative style that, in the words of philosopher Jean-Marc Drouin, 'borrows from several literary genres, including adventure novels, fantasies of devouring desire, [and] comedies of manners' (56). Fabre's insects are the protagonists in stories of romance, intrigue, betrayal, drama, and violence. Yet although these tales position

[39] Hugh Raffles, in a chapter entitled 'Evolution', details the ongoing celebrity of Fabre in contemporary Japan where he is 'a stalwart of the school curriculum': there is also a 'Fabre museum' in Tokyo (63-68). Anecdotally, my Japanese housemate was very familiar with Fabre, saying that she remembers some volumes of Fabre's *Souvenir Entomologique* (1879–1907) from her childhood as her brother loved insects as a child (Miyazaki pers. comm. Apr 5 2020).

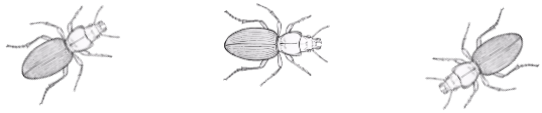
the insect as the central character and elevate its importance through explicit anthropomorphism, Fabre employed the same collecting methodologies and experiments that Hudson describes. His study was filled with carefully set specimens arranged symmetrically in cabinets and laid out in drawers. Rather than foregrounding the death of insect matter-of-factly as Hudson does, Fabre conceals his dissections, killing devices, and entomological pins behind lively 'biographical' narratives.

All the same, the sentimentality expressed by Fabre, his grand narrative style—both ridiculed and admired—demonstrates a kink in the accepted narrative of the shift towards rationalism in the latter half of the nineteenth century. In his exploration of the interplay between wonder and taxonomy, Philip Armstrong discusses the perception that wonder, at this time, was slowly being dissolved by the 'corrosive rationalism' of the Cartesian worldview (2014: 160). Cartesian-influenced taxonomic portrayals of the natural world ostensibly stripped it of its mysterious vitality, reducing organisms to organs and insects to sectional body parts. In Darwinism, this trajectory found expression in a structured, explanatory relationship to the natural world. By the latter nineteenth century, the expression of wonder was an acceptable motivation for scientific enquiry but it was a means to an end, not an end in itself. Armstrong suggests that dominant thinking at the time believed 'the supersession of wonder by reason [was] constitutive of a mature system of right knowledge about the world' (2014: 161). Too much wonder or sentimentality signified a less scrupulous method and a lack of sophistication: the 'forty lovers' of Fabre's tales thus exposed the French entomologist to criticism from the larger, more urbanised scientific establishments in Europe who viewed his writing as fanciful and saw his rejection of evolutionary theory as proof of his place as a poet rather than a scientist (Raffles 54-57).

Hudson has been favourably compared to Fabre as both represented a populist approach to a science that could be doggedly intractable, dense, and itself uncharismatic. Both men were

self-taught amateurs: as Fabre wrote, 'Without masters, without guides, often without books, I have gone forward with one aim always before me: to add a few pages to the history of insects' (1921: 2). Hudson's days were spent working as a Post Office Clerk and he devoted all his free time to entomology. But while Hudson was as passionate as his French contemporary, his work is far less poetic. Perhaps in an attempt to imitate Fabre's style, Hudson does indulge in moments of anthropomorphic whimsy—he described one species of beetle as 'of a most ferocious disposition […] not wanting in maternal affection' (21)—but these tend to be entombed by dry details of reproductive organs, behaviour, and habitat. His later publications—*The Butterflies and Moths of New Zealand* (1928) and *Fragments of New Zealand Entomology* (1950)[40]—continue in the same manner as *An Elementary Manual* with morphological descriptions which are supplemented by colour plates at the end of the book. Manual seems like an apt word for Hudson's work: while sections of his writing might match the narrative vigour of Fabre, the insects are presented like a catalogue, arranged according to their taxonomic order. Hudson actively placed himself in the company of Fabre in his opposition to the 'continual alterations in nomenclature' and the 'multiplication of technical terms'—developments he saw as exemplifying the snobby professionalization of the field, but this is perhaps not readily apparent to a contemporary reader (1950: 170). Although Hudson did not outwardly subscribe to the distancing mode of engagement with nature—'as object, specimen, icon' (Raffles 51), a system obsessed with classification which Fabre believed was 'burying us' (in Raffles 51)—from a contemporary perspective his work seems bound by these systems.

[40] The full title of this publication is much longer: *Fragments of New Zealand Entomology—A Popular Account of all New Zealand Cicadas. The Natural History of the New Zealand Glow-worm. A Second Supplement to the Butterflies and Moths of New Zealand and Notes on Many Other Insects.* The book was published posthumously by Hudson's daughter, Stella Gibbs, with minimal editorial changes as it was considered ready for publication when Hudson died suddenly on April 5th 1946.



The plates that fill the latter half of *An Elementary Manual* were a significant part of what made the publication successful. Perhaps more than the text, Hudson's insect illustrations reveal the ideologies that underpinned colonial science at this time. By the late nineteenth century 'specimen logic' had arguably reached its zenith: unlike Dürer's beetle and Hooke's pull-out flea, Hudson's images lie flat on the page, arranged not in individual space but cheek by jowl (or thorax by antenna) with species from the same taxonomic order. Replete with scale markers to indicate actual size and alphanumeric marks to help readers identify their taxonomic name, Hudson's insects often face the same direction and seem to be given space according to how large and charismatic they are. Most of the insects Hudson depicts may not meet in ecological reality but are brought together on the page for the sake of phylogenetic comparison. The plates perform an extractive function: removed from the ecological environment (be it tree bark, leaf litter, or animal host), the insects are reduced to their place in the gradations of the classified world.

Hudson's images enact a kind of structuralist rearrangement of the living world into relationships only perceptible to the human scientist, stripping the animals of agency. If, as Ford suggests, scientific illustration acts as a mirror of human understanding, then Hudson's images reflect the deep separation inherent in human perceptions of insects at this time. This Cartesian divide acted as an agent of a larger instrumentalism linking scientific enterprises to the ideological and political forces underpinning colonial hegemony. Hudson's images are products of the historical moment in which they were manufactured: isolating, standardising

Figure 1.13: Diptera (Hudson 1892: Plate VII).

Figure 1.14: Hemiptera (Hudson 1892: Plate XX).

and reconstructing nature for human use or observational pleasure. Plumwood defines instrumentalism as objectification, as a way of looking and interacting that centres humanity—or more specifically European 'man'—and places everything else in his orbit (53). In this sense, Hudson's insects are not the protagonists of his publication but are defined by their relationship to him and the European scientific world he negotiates. Hudson's *Manual* represents 'the relationship […] of a superior to a separate inferior order' which in turn reinforces the 'moral dualism' that allows the 'inferior order' to be 'judged by a separate instrumental standard […] or seen as outside morality altogether' (Plumwood 53). It is possible to connect the wider taxonomic project, with its fervent collecting methodology and the sheer number of specimens it created, to the extraction of life from the scientific image. Images of insects, in late nineteenth-century scientific literature, were invariably laid out as singular examples of their

species, arranged perhaps by family group, or similarity with other species, or perhaps to cater to printing requirements. Hudson's insects tell a refracted and distorted narrative. Ecosystems are rich and complex networks of interdependence, yet such images order nature as if alphabetically, placing species that may live in radically different environments and that have evolved separately, side by side—as if their morphological similitude is their most important attribute. The habitat removal, the isolation of the animal from its environment for illustrative purposes, mirrors the habitat loss many insect species experienced as Aotearoa's landscape was transformed by the modern agricultural processes colonisation set in motion (Park 1995; Gibbs 2006). Like all whiteness in the colonies, the blank space surrounding the insects is deceptively loaded.

The removal of the environment from traditional nineteenth-century portrayals of insects is also a by-product of the mechanics involved in their depiction. Perhaps the most important observation on the material circumstances in which insect images were generated is that artists often drew from captured or dead specimens. There were (and still are) enormous constraints on drawing and painting live insects: they are often extremely small and liable to move at speeds difficult for the human eye to follow (Thygeson 22); they are not often still in the proximity of humans nor do they always display the more 'aesthetic' aspects of their physiology (such as their wings); many are nocturnal rather than diurnal, living their lives in rhythms and time-scales almost incomprehensible to human observers. Before the widespread availability of photography or microscopes with photographic functions, artists relied solely on their ability to attend to detail and form and recreate it on the page. In order to create the image, the artist must look at a confined or dead insect and use it to represent the living species, creating an unsentimental mood to its portrayal that mimics the desiccation of the pinned insect. This is 'specimen logic' at its peak: both the image of the insect—an inherently lifeless thing—and the insect on which the image is based, are decontextualized and objectified. In this sense,

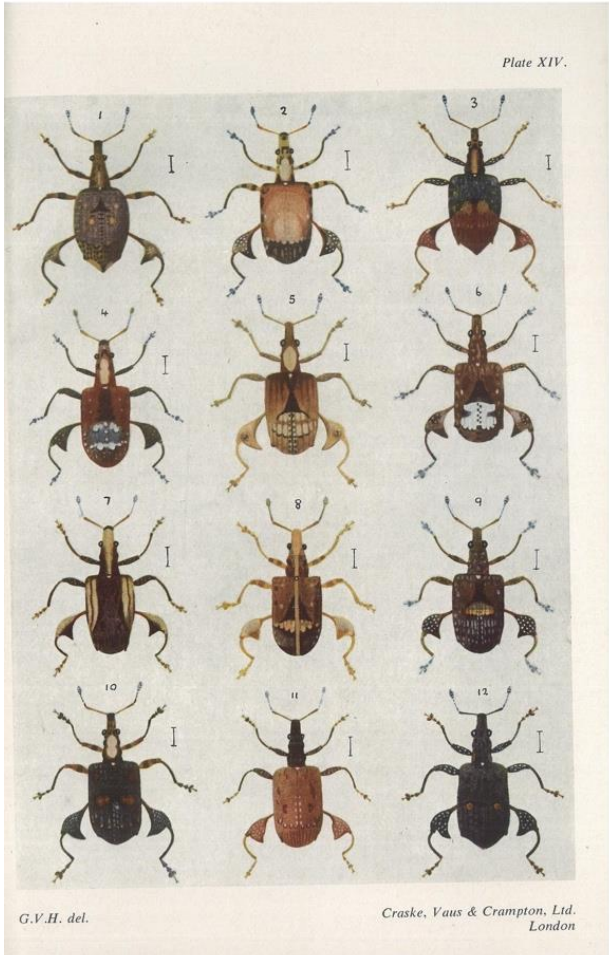


Figure 1.15: Weevils (Hudson 1950: Plate XIV).

Hudson's insects are not depicted outside of their environment at all: in the changing landscape of colonial Aotearoa, their 'context' is industrial capitalism and their ecosystem is an impoverished landscape of increasing sameness. A highly loaded and ecologically fraught moment in Aotearoa's history (albeit in a diminutive form) is frozen on the page: the only things not depicted are the pins fixing the insect in place.

While Hudson's images are somewhat two-dimensional, their texture granular and colour range limited, they are formed by a steady hand and the insect's body is carefully delineated for the non-scientific public. Many scientists were unable to produce their own images and were forced, instead, to hire the services of illustrators, often going to considerable

lengths to train and procure good artists.[41] Able to study, describe, and depict insects, Hudson avoided some of the issues of 'four-eyed-sight' (using the eyes and hands of an artist to depict a subject) that plagued other naturalists (Daston & Galison 84-108). Hudson's insects are meticulously symmetrical, like blueprints for the life they symbolise. In the field guide mentality, the animal's individuality is necessarily absent: one insect (the specimen) stands in for all others of its kind and can be used to identify countless more. Hudson was only 25 when he published *An Elementary Manual*, yet his subsequent illustrations, while more carefully rendered, offer no significant alteration in approach. As the weevils in figure 1.15 show, the insects are symmetrical not only in themselves but in their grid-like relationship to each other: viewed collectively like this they seem more like a pattern for wallpaper than live creatures. The symmetry creates a distance between observer and subject that feeds the notion of insect 'otherness'. As Plumwood points out, this homogenisation is a function of the creation of a 'dominated class' (54). She quotes Albert Memmi, who states that '[t]he colonised is never characterised in an individual manner; he is entitled only to drown in an anonymous collectivity' (in Plumwood 55). The weevils are flattened and decorative, impossibly alike and like clones dressed in different clothing they move even further from the possibilities of human sympathy. The spatial dimensions of Hudson's illustrations are similarly ideological. In dealing with small and multitudinous creatures, he apportions insects an equivalence of space on the page. They sit or lie, leg by wing, *en masse*, evenly spaced, and soothingly (for the entomophobe) two-dimensional.

[41] Daston and Galison detail the lengths some famous natural historians went to in order to minimise the problems of so-called 'four-eyed sight': they discuss in detail the often fraught gender and class dynamic between artist and author (84-104).

Figure 1.16: *Deinacrida megacephala* (Hudson 1892: Plate XVIII).

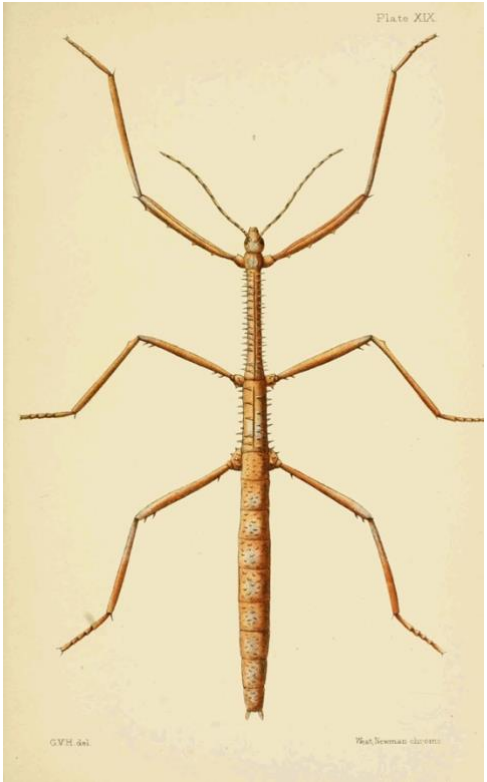


Figure 1.17: *Acanthoderus horridus* (Hudson 1892: XIX).

A few images are striking for different reasons and reveal, however inadvertently, the context and subjectivity of colonial taxonomy. Figures 1.16 and 1.17 show two of Aotearoa's most unique and well-known insects reduced to lifeless symmetry and Latin binomials. The wētā in figure 1.16 and the prickly stick insect in figure 1.17 are not labelled with their Māori names—widely in use at the time—but are referred to only by their Latin name. Unlike most of the insects in *An Elementary Manual*, these two are given an entire page to spread themselves across, an indication perhaps of their great size and thus heightened significance. The wētā is labelled by Hudson as *Deinacrida megacephala* after the taxonomic name given to it by Walter Buller in 1867.[42] *Deinacrida*, loosely translated, means 'terrible grasshopper' or 'demon', from

[42] The species has now been reclassified as *Hemideina crassidens*.

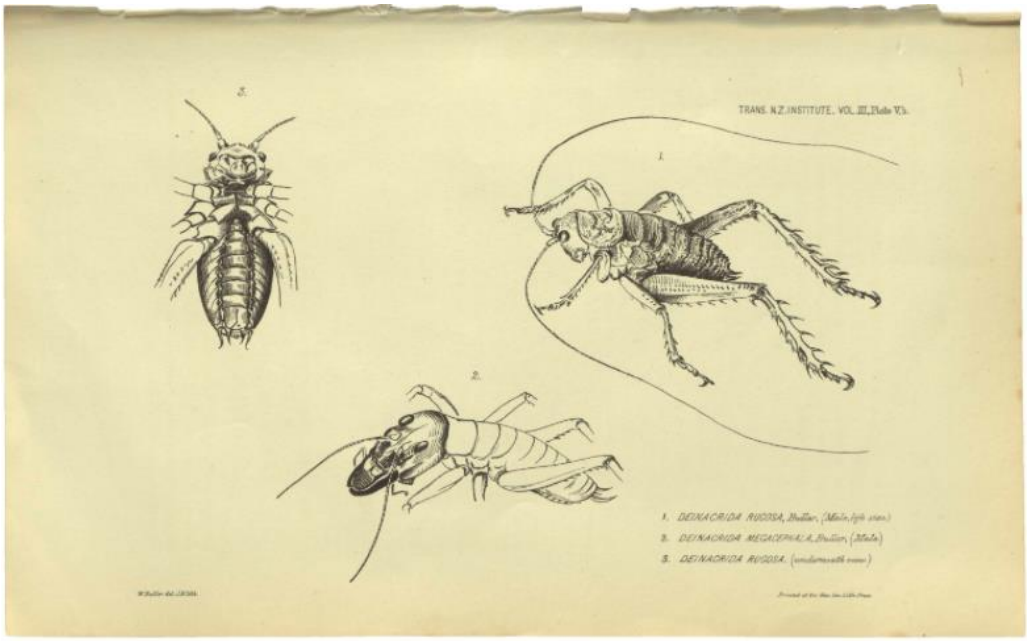


Figure 1.18: Buller's sketches of wētā (1870: 35).

the Greek δεινός/deinos, meaning 'terrible', 'potent', or 'fearfully great' ('δεινός' *A Greek-English Lexicon*) while *megacephala* pertains to its large head which Buller described as 'out of all proportion to the size of the body' (36). In te Ao Māori, wētā were the children of the God Tāne and Punga (the 'God of the Ugly Things') and were so-named because of their frightening and ugly appearance. Buller, in a publication on the genus Dienacrida that appeared in the *Transactions and Proceedings of the Royal Society of New Zealand* (1870),[43] cites the name 'the natives' give to this insect as 'weta' [sic] (35), Hudson never mentions the insect's indigenous name and only uses its Latin binomial. Despite placing these two insects on their own pages—something Hudson only grants to a few species—and despite his wish to popularise entomology, Hudson's use of Latin names erases one of the longest standing human-insect relationships in Aotearoa.

43 This paper was a reprint of an earlier article Buller published in August, 1867 in the *Zoologist*. The chief difference in the latter publication is the addition of another species of wētā.

The bristly stick insect, *Acanthoderus horridus*, (now *Argosarchus horridus*) is another Aotearoan insect demonstrating island gigantism. Its Latin name reflects both its large size and the human perception of that size as horrifying. In Latin, *horridus* translates as 'grim', 'horrible', 'wild', 'frightful', or 'unkempt' (Mahoney, 'horridus' adj.). Figures 1.16 and 1.17 show the insect pinned under the intensity of the Western scientific gaze and everything that implies. In contrast, the sketches that accompanied Buller's 1870 article on several species of wētā (figure 1.18) capture some of the movement and vitality of the insects: figure 2 in Buller's image—the same species of wētā Hudson depicts—almost seems as if it is about to turn and face the viewer. The movement of the insects suggests they might have been alive when depicted—thus constraining Buller's ability to complete a full sketch. Yet somehow, these incomplete sketches seem far more representative of the unique insects than those in Hudson's *Manual.* Compared to Buller's illustrations, Hudson's wētā seems lifeless, pancaked: the divinity in it—the God of the Ugly Things—unrecognisable.

Like Fabre, Hudson was passionate about his subjects. Insects consumed his life and he devoted himself to studying and understanding Aotearoa's many species—endemic and introduced. In his presidential address to the Wellington Philosophical Society delivered on the 19th of June, 1900, Hudson focused on both the enormity and the urgency of the collector's task, hinting also at the burgeoning conservationist ethic emerging in Western societies at the end of the nineteenth century. He states:

> In any country where the insect fauna is incompletely known it may be safely said that the first and most important step to be taken by the naturalist is the formation of good and exhaustive collections of specimens. This is especially the case in New Zealand, where the progress of settlement and the introduction of dominant forms of life are producing the most rapid and far-reaching changes in the original inhabitants, both animal and vegetal. (1990: 383)

There is a complicated sentiment at work in this statement—a Linnaean sort of taxonomic imperative mixed with a kind of urgent and fatalistic solastalgia[44] for Aotearoa's changed ecology. As an active collector, Hudson spent a great deal of time outdoors and witnessed the changes European settlement had wrought on the landscape first hand. The body of his speech is a peculiar mix of laments on the decline and possible extinction of some species of insect, and an emphasis (again and again) on the subsequent need to 'capture' (kill) specimens before they disappear altogether. Hudson appeals to his fellow entomologists, both amateur and professional, to

> … concentrate our efforts on those spots where species are most likely to suffer extinction. These conditions may be said to apply to New Zealand species generally, but more especially, I think, to those species which frequent the native forests, particularly in the North Island. (384)

These statements are fraught not only because they reveal a fractious sort of disconnect between entomologists and conservation ideals—the need to preserve insect species for scientific posterity rather than for their innate worth as beings or as part of a wider ecosystem—but also because of Hudson's own unconcealed derision of the relentless finickity-ness of

[44] Solastalgia is a relatively new concept which was 'developed to give greater meaning and clarity to environmental distress' (Albrecht et al. 95). It can be described as anxiogenic nostalgia for a more harmonious ecological past.

modern taxonomy. Indeed, he was so passionate about this topic he self-published one thousand copies of a pamphlet he wrote on the subject in 1929 and, as the Royal Society of New Zealand refused to publish it, personally distributed it throughout Aotearoa and Britain (1950: 168). In his pamphlet, Hudson calls on entomologists to desist the relentless destabilising of nomenclature by constant revisions by committees—bodies he deemed to be of far less value than individual endeavours (1950: 168-175).

That Hudson saw a distinction between his own efforts and establishment taxonomic processes is revealing. Hudson believed that while amateurs were working 'purely for the advancement of the science' out of altruistic devotion to their subjects, the field was being contaminated by an increasing number of professionals more interested in ambitious careers and motivated by financial gain (1950: 169). The work of these professionals, in Hudson's opinion, was the continual alteration of nomenclature *ad infinitum*, and thus the perpetuation of the perceived inaccessibility of entomology to the wider public. For Hudson, the work of professionals was contaminated with institutionalised biases: 'lack of enthusiasm, brought about by over-study', 'narrowness of outlook', and, amongst other things, 'lack of originality' (1950: 174). For Hudson, persistent changes to names brought entomologists no closer to understanding insects. In an article he contributed to *Entomology Monthly Magazine* in 1935 entitled 'A Stable Nomenclature?', Hudson decries, 'When this work is completed we shall know no more about the insects *themselves* than we do at present. It solely relates to *names* and *literature*' (16). But his critique is specific: he dislikes the shifting nature of a system that should, according to him, be stable and immutable, he does not dislike the system in itself. Hudson followed *An Elementary Manual* with seven other published books as well as more than a hundred other publications: the vast majority of insects in these works are referred to by their taxonomic name only.

Like ecological context and indigenous epistemology, other types of labour were also erased in Hudson's publications. On Te Papa's page for the Hudson collection—which they call 'perhaps the best private insect collection ever made in New Zealand'—the museum states that the work involved in collecting the insects was not only Hudson's but also his wife's and daughter's ('G V Hudson Collection'). Today, the Hudson collection is housed in nine kauri cabinets containing 162 glass-topped wooden drawers and is accessible to the public on request. The specimens are pinned or (for beetles and small insects) glued to a strip of card. The website states that the collection provides invaluable information for contemporary entomologists 'to compare the status of present day fauna with that of a century ago, to ascertain changes due to modification of the environment' (ibid). Were he alive today, I have no doubt that George Vernon Hudson would have been a passionate supporter of this use of his insects.

I have chosen to use Hudson's work as a pivot point for a discussion of the way colonial ideology inserts itself into the 'neutral' discourses of science not because it is an epitome of its kind but precisely because it is not. The value of examining Hudson's work lies in its quietness and loneliness: in its populist, encyclopaedic approach, *An Elementary Manual* stands alone in the field of early entomology in nineteenth-century Aotearoa. And given the enduring unpopularity of insects more generally, Hudson's publications continue to be significant reference points for insect lovers, both amateur and professional. There is something quite striking about a singular volume, and a smallish one at that, attempting to order such a myriad and abundant class of animals and executing this attempt through the narrow lenses of colonial science. Hudson's enduring status as Aotearoa's most significant pioneering entomologist hints at the marginal role insects played in early colonial natural histories—outside of the specialist

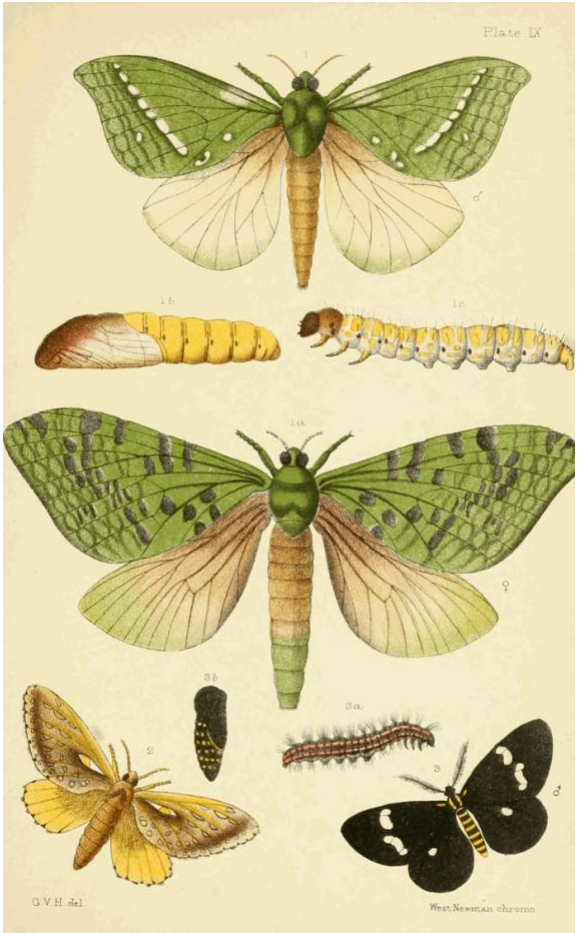


Figure 1.19: Lepidoptera (Hudson 1892: Plate XI).

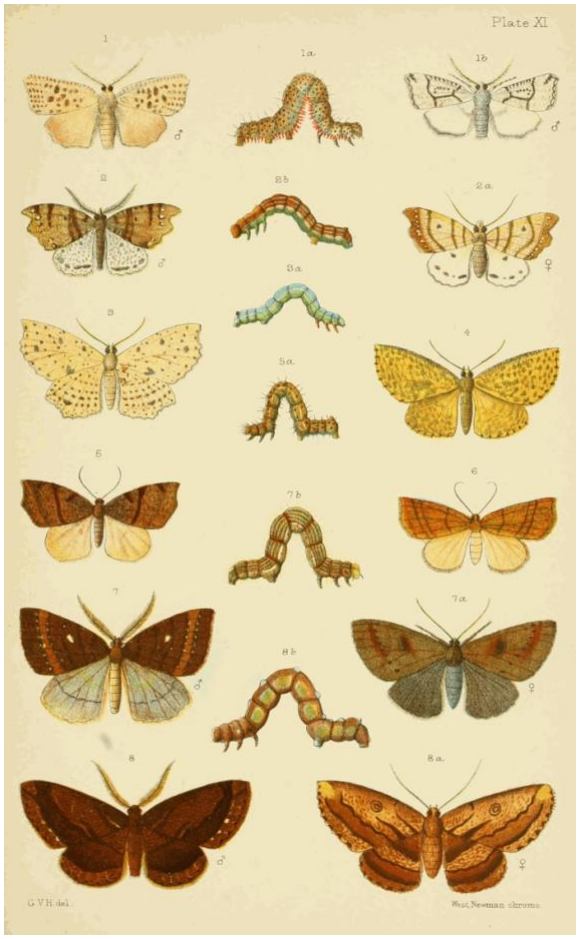


Figure 1.20: Lepidoptera (Hudson 1892: Plate IX).

field of entomology Hudson's name is not nearly as well remembered as Buller's. Perhaps his most enduring legacy has been the passion he seems to have instilled in his children and grandchildren. George Gibbs is Hudson's grandson and also an entomologist: Gibbs is one of the principal publishers of contemporary information and research on Aotearoan insects.

The moths and caterpillars in figures 1.19 and 1.20 offer the possibility of a slightly more nuanced relationship between artist and subject/object and hint at the future role of the Hudson collection. While the moths are static and symmetrical and seem to typify the pinned subject discussed above, the caterpillars almost crawl across the page: they look up, hunch along, and display a range of movements associated with live beings. They are drawn side-on

instead of from above, placing the gaze of the observer on an equal plane. It is possible their movement shows that Hudson was able to rear some in confinement. Unlike their perfect[45] forms (the moths), the caterpillars break free of the relentless symmetry and offer a different way of seeing and knowing the insect, one that seems more in keeping with Hudson's personal sentiments and beliefs.

[45] The word 'perfect' is used to refer to the imago or the completely developed and fully differentiated adult form of an insect.

CHAPTER TWO

Matters of Life & Dea(r)th:

Insects in Aotearoa's Museums

It seems that wherever the white man goes, a part of Nature must die.

(Reischek 63)

Ruthless

Known by the epithet 'graverobber' ('Graverobber' RNZ), the Austrian naturalist and ethnographer Andreas Reischek is widely remembered (and condemned) in contemporary Aotearoa for his infamous theft of four Māori corpses from an urupa near Kawhia in the 1880s. The motivation behind this theft was the same as it was for all the other once-living beings Reischek either stole or shot: to sell them to collectors, either in his native Austria or here in Aotearoa. Reischek was looking to make his fortune in the new southern colony and the rarer and more 'exotic' the item, the higher the price it might fetch. Further financing his expeditions with work as a taxidermist, Reischek pursued native Aotearoan species throughout the mainland and on many offshore islands. Catalogues of his deeds make grim reading in the

midst of the ecological crisis of the twenty-first century: in one instance, for example, he went to considerable effort to locate the last surviving population of hihi (stitchbird) on Little Barrier Island, only to shoot them for specimens ('Graverobber' 9:37–10:15). Without any apparent irony, he wrote of his fears for the hihi's extinction from feral cats and introduced hawks (Reischek 92). Yet, although the profligacy and excess of Reischek's actions might shock contemporary readers, he acted under the auspices of museum directors and in ways that were not at all uncommon in the late nineteenth century. Given the relationship between Reischek's actions and the collections many of his specimens contributed to, his violent and problematic deeds can be seen as emblematic of the formation and growth of Aotearoa's museums in the nineteenth century.

The dissonance between Reischek's actions and some of the more poetic entries into his alleged memoir *Yesterdays in Maoriland*[46]—like the epigraph to this chapter—might seem, at first, incongruous or even bizarre. But nineteenth-century scientific thought was imbued with (and complicated by) this kind of romanticised ecological violence. In a broader sense, the tension between Reischek's sentimentality and the destructive actions it masked is symbolic of the Victorian imagination and its relationship to the natural world. Reading it now, after decades of postcolonial theory and critiques of human attitudes to 'nature', one might interpret his words as repentant or mournful—as stirrings of the burgeoning conservationist ethic that had begun to emerge towards the fin-de-siècle. While it is possible Reischek experienced moments of this sort of penitent conservationism, his poeticisms are better understood as examples of the violent fatalism with which Victorian colonists approached new territories.[47]

[46] Reischek's memoir was published posthumously in German by his son in 1924 and translated into English in 1930. Research librarian Dr Sascha Nolden, interviewed by William Ray for the history podcast series *Black Sheep*, argues that substantial portions of *Yesterdays in Maoriland* were fictionalised by Reischek's son to cater to the increasingly conservationist ethos of the early to mid-twentieth century ('Graverobber', 2:43–3:19).
[47] John M. Mackenzie's *Museums and Empire: Natural History, Human Cultures, and Colonial Identities* (2009) explores specific examples of the violence with which museums obtained objects for their collections as well as the romantic ideologies that underpinned these actions; John Millar's *Empire and the Animal Body: Violence,*

Reischek's statement that '…wherever the white man goes, a part of nature must die' suggests a reluctant feeling of obligation and/or duty to preserve and understand nature by subjugating it for study and display. And it is this morbid kind of compulsion to feed the cataloguing project that provided both moral and financial justification for much of the ecological violence undertaken in the name of nineteenth-century museums and 'progress' more generally. Natural history displays in colonial museums represent one of the more compelling and explicit manifestations of this tension between reverence and violence—between a desire to pay homage to the natural world and the drive to make conquest and power visible.

Though they are the most numerous members of the kingdom Animalia, insects are not often considered casualties of the ruthless early collecting epitomised by Reischek. But, like many collectors, Reischek's violence was not limited to vertebrates. In his memoir, Reischek details the 'magic' of 'innumerable little insects' (glow-worms) as they lit up forest grottos (73); he writes of how the tohunga were afraid of his collections of insects, and how he manipulated this fear to his advantage (66); like Banks, he mentions how many Māori camps were 'overrun' with fleas (84). And there is the apocryphal story of his dog Caesar delicately capturing a butterfly in his mouth and delivering it to Reischek unharmed (Nolden in 'Graverobber' 8:02–8:14). These references, however, are sparse and for the most part insects are everywhere and nowhere in such stories, and were simply too far down the priority list for many early Western naturalists. Aotearoa's insects did not offer the same swift and lucrative opportunities as larger species as they did not furnish museum collections with showy or charismatic specimens. Although their collection was intentional, their exhibition and inclusion in written accounts and exhibitions can seem incidental, like a sidenote to the more exciting

Identity and Ecology in Victorian Adventure Fiction (2012) deals more directly with the impact of nineteenth-century ecological violence on colonial interspecies encounters.

business of extinct and extant megafauna. For Reischek, as for many other early collectors, insects pop up randomly, as afterthoughts, inconveniences or intrusions.

Reischek has found himself in the spotlight in recent years as revisionist historians have brought his duplicitous relations with Māori to light, and he is now widely criticised for his unscrupulous and manipulative behaviour.[48] But the focus on Reischek's tangible skulduggery masks a broader chain of culpability and obscures the roles played by museum boards and directors. Early museums relied on hunters like Reischek to provide them with 'objects' to fill their collections. Much of Reischek's taxidermy, for example, was commissioned by Julius von Haast (1822-1887; fig. 2.2), the German geologist who was the driving force behind the founding of the Canterbury Museum in 1867. While Reischek's name might live on as a kind of contemporary conservationist's nightmare, the bust of von Haast still presides over the foyer of the Canterbury Museum and his name is attached to several species, an arterial route in the lower South Island, a mountain in the Westland region and a (now demolished) building at the University of Canterbury.[49] Unlike Reischek's, von Haast's name is not extensively besmirched and his reputation retains much of the triumphant ring of the pioneer. The difference in social class between the two men is reflected both in the nature of their work and their lasting reputation. The differences in framing are visible in the portraits in figures 2.1 and 2.2: Reischek (fig. 2.1) is posed as a rough male pioneer, touting two guns, a hatchet and an untrimmed beard as if he is about to set off for the hunt. In contrast, von Haast (fig. 2.2) appears erudite, commanding and gentlemanly as he poses for a traditional Victorian portrait with a

[48] His actions in this regard were extremely manipulative and his memoir reveals a depth of cunning and deceit that should not be glossed over. In the case of the infamous grave robbery, Reischek was aware of the tapu (sacred) nature of the site and intentionally manipulated this knowledge to his advantage. Yet Nolden, who has extensively researched Reischek, contests the virulence with which contemporary society villainises Reischek and interviews descendants of the Māori chief who allowed Reischek onto his tribal lands. In Nolden's telling, the descendants of this chief have a more nuanced perspective on Reischek.

[49] Reischek's name is also memorialised (though much less prominently) by a remote backcountry hut in the Rangitata and Raikaia river area in the Canterbury region, as well as a species of parakeet, a glacier and a stream.

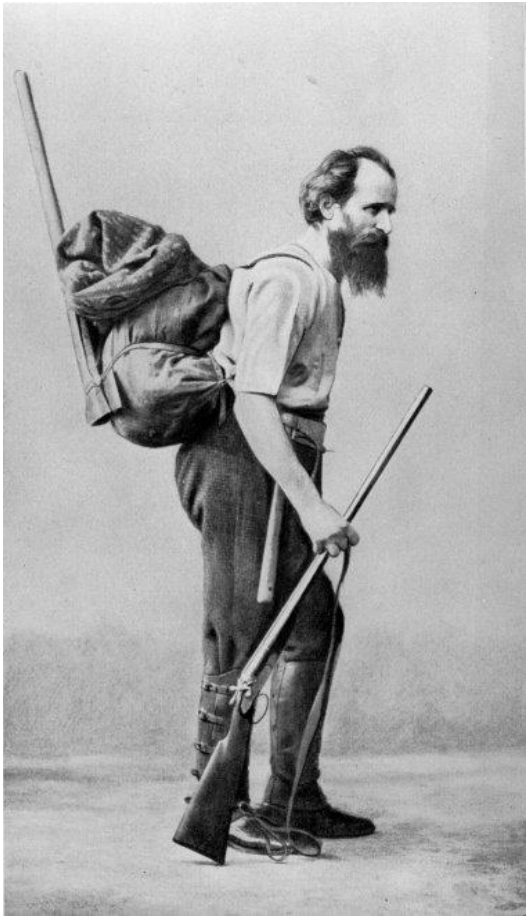


Figure 2.1: Reischek, Andreas. Author photograph (frontispiece) ca. 1870s. *Yesterdays in Maoriland.* Whitcombe & Tombs, 1930. Ref: MNZ-0300-1/4-F. Alexander Turnbull Library, Wellington, New Zealand. /records/23050601.

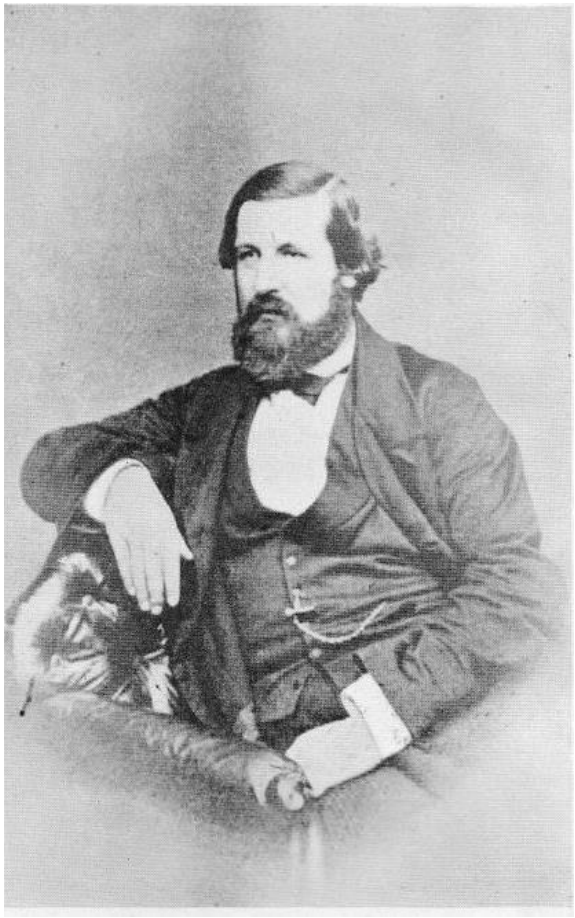
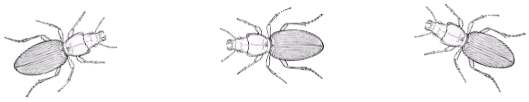


Figure 2.2: von Haast, Julius. Author photograph (frontispiece) ca. 1863. *The Life and Times of Sir Julius von Haast: Explorer. Geologist, Museum Builder*, Wellington, H. F. von Haast, 1948.

neatly trimmed beard and the chain of his pocket watch visible. Ironically, something similar can be observed between human hunter and nonhuman animal. Though Reischek may have largely neglected insects, his now-derided behind-the-scenes physical labour mimics that of many insects themselves: both provided the raw materials that kept museums and ecosystems operating. In the Pākehā colonial museum, Reischek and von Haast—and the ruthless violence or high culture erudition they symbolise—are two sides of the same coin.



Insects have long been footnotes in the story of Aotearoa's colonisation. Understanding their place in Aotearoa's museums thus entails investigating the wider narratives in which insect bodies circulate: it means engaging critically with the history of nonhuman animal displays and disentangling the remaining threads of power and ideology on which museums were established. Positioning insects alongside hihi and other more charismatic endangered or extinct species allows for constructive comparisons on the treatment and framing of different animals. At its core, the museum is an explicitly humanist and anthropocentric project. While steps have been made since the 1980s to redress the human cost of collections (such as the ongoing repatriation of human remains),[50] the human nonhuman dynamic remains silently and potently problematic. An eco-centric reading of the natural history exhibits in four of Aotearoa's major urban centres—Dunedin's Otago Museum, Christchurch's Canterbury Museum, the Auckland War Memorial Museum and Wellington's Te Papa Tongarewa—throws up a particular set of questions regarding the insects in their collections.

With particular emphasis on the endemic insects in their collections, I will examine the ongoing influence of taxonomy and classification on insect displays. Using the natural history exhibits found in the Otago Museum and the Auckland War Memorial Museum, I will explore the question of how distant some contemporary insect displays really are from those of the late nineteenth century.[51] Both of these institutions have organised their permanent nature exhibits

[50] *The New Museology* (1989), edited by Peter Vergo, discusses many of these issues and heralded a major shift in museology—that it has now been more than thirty years since this publication and many of the issues it discusses remain unresolved gives a good indication just how slowly things can change within museological institutions.

[51] For the purposes of keeping the scope of this chapter tightly focussed, I have chosen not to examine the silent load of museum archives in which thousands of insects are stored.

taxonomically, yet both also offer a refreshing divergence from the standard orderly pinned cabinet displays in offshoot sections of their main natural history exhibition halls. In many museums, the largest number of displayed insects are often found in children's areas. I will look at Canterbury Museum's only insect display which is housed in the *Discovery* area—a 'natural history centre for children and inquiring minds of all ages' (*Discovery*, Canterbury Museum), as well as the comparable children's zones in Auckland and Otago. I will investigate the sensory impressions museums cultivate through the emphasis on visual storytelling and examine the ways in which sound, space, and curatorial framing also impact perception and experience. I will then explore the fractious relationship between museums and capital in the live insects of Otago Museum's *Tūhura Tropical Forest*. To conclude, I will examine the new nature exhibit *Te Taiao* in Te Papa Tongarewa which represents the latest iteration of insect curation in the country. *Te Taiao* exemplifies the conservation narratives that increasingly dominate natural history galleries.

Concealing the convulsions of nature: 'taxonomic intoxication' in insect displays

In nineteenth-century Aotearoa museums were part of an institutional demarcation of social and cultural transition: they marked a shift from an existential truth based on religious belief to one founded on 'objective' scientific principles, and they embodied the power and dominance of the new colonial government (Ross 1088). The Auckland War Memorial Museum (fig. 2.3) makes this explicit: with its stark and imposing architecture, imperial Doric columns, and its position atop a hill, it dominates the surrounding landscape. Inside such

Figure 2.3: Your Museum: 90th Commemoration'. Auckland War Memorial Museum. www.aucklandmuseum.com/your-museum/90th-commemoration.

institutions, animal bodies symbolised the extent of colonial power: as 'cathedrals of science and nature', beasts in the museum 'served as signals of an expanding Empire' with important global connections (ibid). The nonhumans on display were often chosen for the stories they could tell or for their perceived beauty, size or strangeness. Perhaps for these reasons, insects were not prized as exhibition pieces and were often absent from the earliest exhibitions in many of Aotearoa's museums. Although this absence may also reflect the interests of early museum directors.[52] The first iteration of the Canterbury Museum in 1870, for example, did hold a modest entomological collection but it did not make the grade for the opening exhibition, passed over by von Haast for larger, more charismatic species (Mackenzie 215). The consistent absence of insects from prominent display in museums established Aotearoan insects as less important and less interesting to the museum visitor.

Colonial museums both denigrated and depended on animal bodies. The *Animal Attic* in the Otago Museum (fig. 2.4) is a particularly explicit example of the persistence of this

[52] Of the directors of Aotearoa's four early museums (Auckland, Wellington, Christchurch and Dunedin) one was a botanist (Thomas Cheeseman in Auckland), all the rest were geologists (McCarthy par. 5).

Figure 2.4: The 'Animal Attic' in Otago Museum (Author's photo Aug 24 2019).

tangled contradiction in the modern era. According to the official webpage for the gallery, the sombre *Attic* (which seems to be, literally, an attic) intentionally plays on the Victorian roots of modern museums with its dramatic lighting, cluttered displays and hardwood cabinetry. The webpage calls the *Attic* 'a museum of museums' and describes it as '…a treasure trove of taxidermy, pinned insects, and pickled and preserved animals […] originally created to demonstrate the Linnaean classification of living things and illustrate Darwin's theory of evolution' (*Animal Attic*, Otago Museum). The idea that a collection of preserved animal bodies could be considered a 'treasure trove' speaks to the overt celebration of the nonhuman violence evident in historical museum practice. By highlighting the wacky Victorian beginnings of museology and the weirder wonders of the animal kingdom, the *Attic* attempts to show visitors just how far museological practice has come since the nineteenth century. Instead, the Victorian predilection for death and the macabre is palpable. The cabinets are filled with faded and decomposing animals gazing out at visitors with glaucomic, misshapen eyes. There are 482 taxidermy specimens, 23 jars of pickled bodies, 59 skulls and skeletons, as well as 1321 pinned specimens, mostly invertebrates (ibid)—although there are very few endemic insect species included in this number. While the title of the gallery might suggest to the visitor

that the *Attic* is a space of animal agency, when I visited several times in 2019 I was reminded instead of the violent history of human collecting and its disquieting relationship to scientific advancement. Rather than humming with the jaunty riff suggested by the website, the gallery struck me as something of an imbroglio, conjuring the cultural associations of madness and horror redolent in the idea of the attic.

Although the rhetoric on the website for the Otago Museum might seek to position the *Attic* as an anachronism in modern museology, the underlying logic behind the arrangement of animal bodies is similar to that evident in many of the more contemporary galleries. Inside many institutions insects are framed by their place in the 'natural order', illustrating what Stephen T. Asma calls the 'taxonomic intoxication' of early natural history museums (77). While Asma highlights the rise of this intoxication in the nineteenth century, taxonomic ideology continues to play out in all four of the museums visited for this research, acting like an invisible net laid over the displays. In an era of ecological crisis this kind of curation is deeply problematic, not least because it visually erases the complexity of ecological relationships and the dynamic multispecies environments in which all animals exist: birds are displayed with birds, mammals with mammals, insects with other insects.

In the Otago Museum this logic is problematically naturalised.[53] Branching off a hall of endemic charismatic megafauna, a modest wall display in the Otago Museum prepares audiences for the ensuing dioramas with an educative illustration of the importance of the Western classification system. Using species from the local environment as examples, 'An Otago Tree of Life' (fig. 2.5) shows how nonhuman animals can be neatly understood through

[53] In Auckland and Otago notable exceptions to this taxonomic isolationism can be found in the indigenous sections where flies have been placed on the dead bodies of birds and fish caught for food (*Southern Lands*, Otago Museum), and kumara moths are displayed alongside the plant they depend on (*Te Ao Tūroa Māori Natural History*, Auckland Museum).

Figure 2.5: 'An Otago Tree of Life' in the (Author's photo Aug 24 2019).

this logic: beginning with the bifurcation of vertebrate and invertebrate animals,[54] each branch of the tree splits off and ends in individual species (as leaves). The diagram omits some tiers of classification like Genus and Order and opts instead for a simplicity that is ideologically beguiling. The metaphorical form of the tree makes Linnaean taxonomy appear innate or 'natural', as if it is a system intrinsic to the world rather than one imposed on it. While the 'Tree' does, in some sense, represent the interconnectedness of all living things, it also acts as something of a deception. Andreas Hejnol discusses how metaphors such as 'trees' have long been a 'double bind', arguing that 'they at once allow us to see and stop up our abilities to notice' (G87). Metaphors like trees, ladders or chains foster hierarchical understandings of life as a progression from the 'so-called simple to the complex' (ibid). This way of thinking, Hejnol argues, has 'limited biologists' queries about lateral relations […] and the lives of seemingly lesser organisms' (ibid). Otago's tree is a reminder that nonhuman nature in the museum is always constructed and manipulated. Although very little in the natural history section of any

54 This separation is misleading as 'invertebrate' (a term denoting animals that do not have vertebral columns) does not actually describe a taxon in a scientific sense but has persisted in lay understandings, in part, because of the simplification it allows.

Figure 2:6: Glass cabinet of endemic insects at the end of the 'Origins' gallery in the Auckland War Memorial Museum (Author's photo Aug 5 2019).

museum shows human forms or products, human eyes and hands are everywhere in their construction.

The taxonomic logic of museums is not always this explicit. More often it takes the form of orderly cabinet displays of particular faunal groups. In all the museums I visited for this research I found the ubiquitous drawers of insects laid out alongside one another and pinned or glued delicately to card. Auckland and Otago both have small stand-alone cabinets of endemic insects as part of their wider natural history sections. Static inside the glass, the insects seem to reify what museology scholar Fiona R. Cameron calls 'representative nature' (19) and what Neri would term 'specimen logic' (xii–xiii): they offer a purportedly authoritative and objective representation of the insect. In figure 2.6, in a stand-alone cabinet at the end of the *Origins* gallery in the Auckland Museum, many of the insects are arranged two by two, female with male, as if they were there on behalf of their species (which they are)

Figure 2.7: Close-up of the cabinet in figure 2.6 (Author's photo Aug 5 2019).

as a kind of museological ark or a biodiversity bank.[55] The female-male displays reiterate the importance of the sexual characteristics of insects, of reproduction, and the predominance of sexual dimorphism—a defining feature of Linnaeus' earliest classificatory methods. With creatures from diverse ecological habitats pinned alongside each other in unrealistic symmetry, the viewer is reminded that what is important, according to the museum, is the morphological appearance of life, its reproductive capacities, and its overall place in the natural order. When I visited in August 2019 I found their symmetry and isolation further compounded by the lack of a key to match the large red numbers beside each specimen (fig. 2.7). Rather than the botched taxidermy Steve Baker discusses in *The Postmodern Animal* (2000), the numbers suggest a

[55] Increasingly, museum archives are being used as biodiversity banks as they often contain rare species no longer easily found in 'the wild' or now protected from collectors by conservation law. Such specimens can be used to access the genetic material of extinct species or to provide better data on extant endangered species (see Jacquet 2015). The idea of the 'ark' has been a key metaphor in museums and Samuel J. M. M. Alberti discusses the implications of the 'ark' on how people relate to individual animals in life and death, inside and outside the museum (2011: 1-16). See also Alberti (2008) for an overview of literature about museum studies and nonhuman animals in natural history collections.

kind of botched taxonomy, where the profound decontextualization of the insects is exacerbated by the inscrutable numbers.

There are many similarities here with the illustrative traditions of nineteenth-century field guides and atlases. The framing of this cabinet erases the ecosystems of which the insects are an inextricable part: in effect, the cabinet 'cleans' the insect of what Jamie Lorimer calls 'the messy substrate of the object world' (912)—the decomposing leaves, rotting logs, or small, damp holes that they might have made their home in. This erasure instead places the animals within an established mode of scientific looking. Rosie Ibbotson discusses the ways in which nineteenth-century natural history illustrations, like those produced by J. G. Kuelemans for Walter Buller's *A History of the Birds of New Zealand* (1872-1873), both contributed to and perpetuated the use of plain or simplistic backgrounds which '[belie] the complex ecological entanglements of species' (2017: 41). She argues that the popularity of this 'bird on a stick' mode of representation rendered animal bodies 'ostensibly devoid of systemic interactions' (ibid). The effects of these erasures are in keeping with traditional notions of the correct way of looking and behaving inside the museum: the simple backgrounds soothe and placate the viewer, manufacturing focal points that elevate the insect to a kind of Limbo of humanity's making: the specimen becomes a symbolic body suspended between animal and object, and between life and death.

While this deception serves a similar function as it does in Hudson's manual, there are several key differences between the insect in a published work and in a museum setting. What Hudson's illustrations are able to elide, the museum is forced to display: written publications can mask the death of the animal behind the glamour of a painted image but museums trade in real physical specimens displayed in three-dimensional space. In figures 2.6 and 2.7, all the materials needed to hold and house the insect and allow it to be studied at leisure—the glass cabinet, the card, the pins, become as much a part of the visual narrative as the insect body

Figure 2.8: Endemic insect cabinet in Otago Museum's 'Nature' gallery (Author's photo Aug 24 2019).

itself. Theoretically, the pins should make it impossible to ignore the death of the insect—their visibility a sharp reminder of the violent materiality of collecting, the collector who patiently set and pinned its body, and thus the life it once had. In some instances, like the weevil in the middle left of figure 2.7, the entomological pin pierces directly through the abdomen of the insect, suspending it above the board and giving it a delicate shadow and the somewhat ghostly impression of swimming or of flight. The shadow of this weevil, perhaps more than the pins, calls attention to the creature's life and the movement that would have characterised it. While it may seem as if insect exoskeletons are identical in death as in life and that they are thus more easily prepared for museum display than, say, those of mammals, there is a surprising amount of work involved in pinning and 'setting' an insect (Smithers 1988; Hudson 1892: 12-14). By and large the dead insect does not naturally fall into perfect symmetry, more likely to have its legs curled under or wings furled.

Figure 2.9: Close-up of the Horrid stick insect (Author's photo Aug 24 2019).

The simplified visual narrative these insects tell undermines the violence that brought them to the museum. Cameron asserts that museums are 'icons of modern humanism and Cartesian rationality', and that, as 'one of modernity's most emblematic and trusted pedagogical institutions', they hold the body of nature apart for human contemplation (16). The weevils, their cohabitants, and the visible and invisible framing they inhabit remind the visitor of the extraordinary efforts museums make to suspend life. But how does an animal body, which once moved through the world, become an object? The isolation of each insect by species and sex, the emphasis on taxonomy, the blank card, the pins—all these things conspire to frame the insects as 'other'—as objects. They impress upon the visitor the difference and distance between themselves and the beings they contemplate. In a wider sense, the very act of placing an insect specimen inside an often imposing building reiterates the power and dominance of the human gaze. Studies into human attitudes to and perceptions of insects confirm that beliefs in the mechanical nature of the animals is widespread, with many seeing their distinctive exoskeletal form as confirmation of a comparable internal hardness or lack of sentience (Kellert 1993; Shipley & Bixler 2017) The insects are suspended out of human reach behind a barrier designed to protect them but that simultaneously supports a sense of

ontological distance between object and observer (Poliquin 1-3; Malamud 5-6). Charles Saumerez Smith writes of how audiences 'hit a boundary of consciousness' when contemplating museum displays (9). Facing visitors behind glass, these insects inhabit humanity's seeming conviction that all biology is a mechanism, an evolutionary just-so story: rather than a reminder of the life sacrificed to the display, the insects are emptied of life and ecology.

In the cabinet of endemic insects in Otago's *Nature* gallery the insects are further diminished by their relational positioning (figs. 2.8 & 2.9). Figure 2.8 shows a detailed painting of a bird habitat in the background with information panels about the Haast eagle. Figure 2.9 shows a close up of the Horrid stick insect inside the cabinet: in the background it is just possible to make out the towering pale skeleton of a moa poised alongside other extinct birds, all easily identified by their labels. Though difficult to make out in this image, the moa skeleton and its entourage of smaller skeletal and taxidermied birds dominate the space. The information panels that accompany the bird cabinet reveal the shift that many museums have made in recent years towards a more explicitly conservationist message. In contrast to the birds, the insect cabinet is layered, visually cluttered and difficult to interpret. On my visits to the Otago gallery I found that it took significant concentration to match the numbers beside the insect to the key on the bottom of the cabinet (though an improvement on Auckland's cabinet). Mirroring the predator/prey relationship of many human/nonhuman interactions in the museum, these insects lie literally and figuratively in the shadow of Aotearoa's more charismatic avian fauna, many of whom would have likely consumed the contents of this little cabinet.

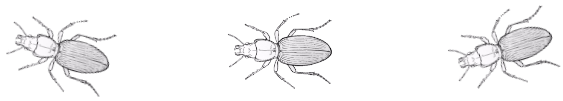
There are clear reasons for the privileging of charismatic species in museum displays like this. While the stuffed skin of a threatened or extinct species of mammal or bird might raise certain emotions in the viewer—such as empathy or sadness—insects do not seem to have nearly as much emotional capital. They remain, as they so often do, somehow outside the

cultural category of animal.[56] The death of the insect can seem immaterial: pinned bodies arranged neatly on trays and tucked into drawers act more like a three-dimensional encyclopaedia than forms of reverence or intense contemplation. Unlike Reischek and the birds he left in his wake, insect bodies are not generally considered problematic, they do not tend to raise difficult emotions or act as reminders of humanity's destructive past (or present). Instead, however unintentionally, they support the idea that what constitutes violence is itself species dependent. And given contemporary society's predilection for pesticides and insecticides, it hardly seems surprising that the word violence is not often used in conjunction with those that go on six legs. As Steve Baker contends, 'Just as not all animal remains that are put on display are seen as specimens, not all dead animals can seem as equally dead' (2014: 290).

Stephen T. Asma suggests that 'recreated animals' like those in museum displays play a decidedly different role from the one they were originally intended for. Asma claims that in the contemporary setting 'they often seem like sad cautionary tales of our exploitative tendencies' (10). Peter Davis states that, under the influence of growing environmental concerns, nature in the museum 'is now recognised as "fragile", something a careless footfall or a greedy capitalist might destroy in an instant' (2). Scholars from museology and Human-Animal Studies have investigated the grim histories of some of the more famous animal specimens acquired by nineteenth-century museums (Asma 2001; Alberti 2011: 1-15), but insects are overlooked in these studies. There is no information in Auckland and Otago's displays to state whether any of the insects are extinct or endangered. There is no grand signage, no extra information on ecology or habitat, nothing to speak to the growing crisis in insect extinction and the 'countless losses' of invertebrates that have likely occurred both in Aotearoa and overseas (Holdaway par. 8; Terzopoulou et al. 1-4). Aotearoa's strong contemporary

[56] Anecdotally, I have had numerous conversations with people since beginning this research who have believed that insects are not animals. The belief that insects are not animals is explored in a number of surveys on perceptions of animals and invertebrates (see Kellert 1993; Baenninger 2000).

concern for ecological conservation is not extended to the contents of these two cabinets. Like any effective narrative, a lot of what leaves an impression on the museum visitor is subtle and not signposted. While looking at the endemic insects inside the glass box in Otago, the visitor can hear a lilting, posh, British-accented male voice explaining the importance of the relics of Aotearoa's ecological past. The authoritative recording plays constantly on a loop, reminding viewers that the cultural heritage of this gallery is Pākehā. The calm and 'reasonable' tone of this disembodied voice reassures visitors that humanity is in control, that extinction is a historical (rather than a future) concern.



There are galleries in both Auckland and Otago that offer a contrasting view to the decontextualizing taxonomy of the two displays discussed in the previous section. At the end of the *Origins* gallery in Auckland Museum visitors can choose to enter the *Weird and Wonderful Children's Gallery* or the *Land* exhibit which, as it is less colourful and more subdued, seems to be targeted at adult visitors. *Land* is designed, according to the official Museum website, as a continuation of the story that *Origins* began: 'Land takes the visitor on a journey from mountain to wetland, revealing the plants, fungi, birds, reptiles and freshwater fish that make this land unique' (*Land*, Auckland Museum). What the webpage omits from this list are the hundreds of insects whose bodies inhabit this small corridor. There are pinned specimens in pull-out drawers underneath the central forest displays (fig 2.10), cave-wētā lining the walls of an off-shoot grotto, and images of the remains of two extinct species of beetle (a species of *Mecodema* from North-West Nelson and the 'Extinct fern weevil' believed

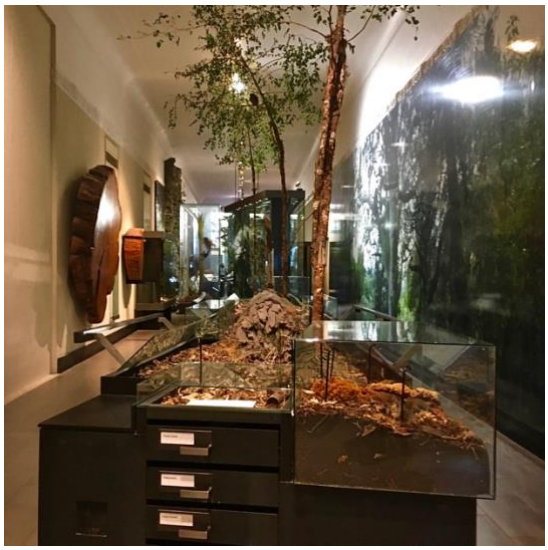


Figure 2.10: The 'Land' Gallery in the Auckland Museum (Author's photo Aug 5 2019).

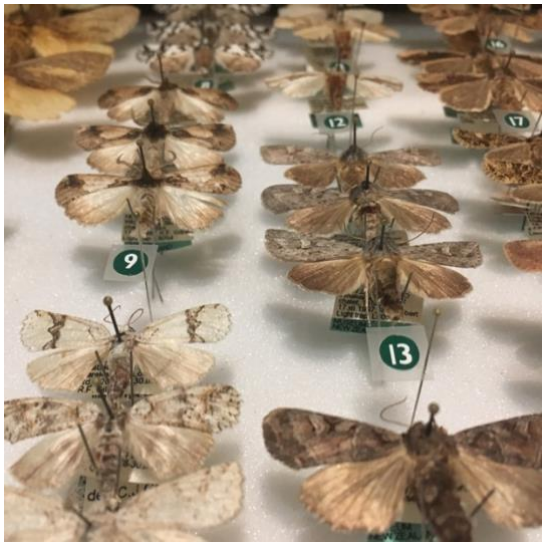


Figure 2.11: Close-up of one of the drawers of 'Forest Insects' visible in fig. 2.10 (Author's photo Aug 5 2019).

to be 1800-years-old from Waitomo cave mud). Their omission from the webpage is rather conspicuous given that there seem to be more insects in *Land* than any other class of animal. Seen from a distance, as in figure 2.10, the gallery seems to be dominated by trees (both 'real' and photographic) but beneath and amongst the foliage are complex dioramas of nonhuman life. There are invertebrates in the soil, birds in the branches, and drawers of pinned insects. *Land* provides the most coherent reconstruction of an insect ecosystem inside the museum. The fact that the animals are difficult to spot is, perhaps, precisely the point: insects are often overlooked because of their smaller size and camouflaged bodies, looking at them takes effort, and understanding them involves seeing not only their bodies but the complexities of the environments they inhabit. In *Land*, insect specimens are featured alongside their predators—birds, reptiles, and other non-insect Arthropods. Here, perhaps, they can be both individuals and parts of a whole system.

Figure 2.12: The Living Forest' diorama in Otago museum (Author's photo Aug 24 2019).

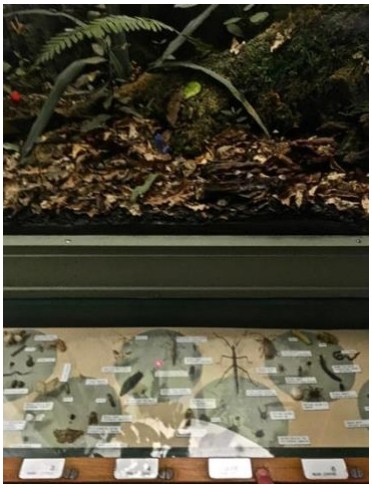


Figure 2.13: Close-up of 'The Living Forest' showing the light up buttons (Author's photo Aug 24 2019).

Otago has a similar—though rather more dilapidated—corridor branching off the main *Nature* exhibition hall. Set into the walls of this narrow space are a number of ecosystem-based dioramas constructed behind glass: although these displays contain a variety of animal life there is a particular emphasis on invertebrates. By focussing on different kinds of ecosystems—fresh water, coastal, forest—the dioramas reveal the 'hidden worlds' beyond the boundaries of normal human perception. Featuring a particularly large number of insect species, 'The Living Forest'—with the subtitle 'the world below—formed from above'—makes the visitor 'work' to see the insects inside the glass. Panels of small buttons invite viewers to illuminate the places in the undergrowth or canopy where invertebrates are camouflaged. Without the little red light it would be difficult to spot many of them, reminding the visitor just how easy it is to overlook, or simply not see, insect life. Unlike the cabinet in the *Nature* hall, 'The Living Forest' was constructed to show the connections and lateral relationships between species—plant, animal and mineral. The dioramas are an explicit reminder that understanding the ecological context a creature exists in is indispensable for a fuller understanding of their lives.

The presence of these multispecies ecological displays seems, at least on the surface, to offer some alternative to the taxonomic model that dominates the other natural history exhibits in Auckland and Otago museums. They show, in part, the shift many institutions have made towards more dynamic and interactive exhibitions. There is a tension here between emerging and residual modes of curation which remains largely unresolved: if Auckland's *Origins* gallery represents the nineteenth-century roots of museum natural history displays, than *Land* is an attempted departure from tradition. And yet the potential of the ecosystemic model is stymied by its wider positioning: rather than 'flowing on' from their more impressive forerunners, the sense of continuity is disrupted by the architectural marginalisation—the feeling that these galleries are corridors moving visitors between more important sections, or offshoot 'cul-de-sacs' from the main events, means that the spaces are dominated by the galleries preceding them rather than standing alone. When I visited both Auckland and Otago Museums several times over the course of 2019 I was left with the impression that the smaller galleries were less appealing. Often, I was the only person viewing the displays and pushing the buttons while other visitors walked past en route to something more 'exciting'.

Framing the object, the audience and the in-between: human-insect sensibilities in age-specific zones

Adults

Museum architecture organises galleries—and thus corrals visitors—not only along taxonomic lines but via subtle and not-so-subtle messages about age, gender, race, and social class. These

messages can be museum-wide, for example where an entire institution is promoted (or rebranded) as populist rather than elitist or traditional, or internal, when galleries within a building are differentiated by style and content to cater for different perceived audiences (Witcomb 13-27). The native flora and fauna exhibits of Auckland and Otago museums described in the previous section are largely tailored towards adult visitors and reflect long-standing curatorial assumptions about how adults best engage with museum content. In these galleries insect bodies are serenely arranged in glass cases in spaces that are often hushed, dimly lit, reverent and sombre—like a cemetery and the inside of a cathedral in one. They demonstrate what museology scholar Janet Marstine calls the museum as 'shrine' (9-11), a space that theorists from Friedrich Nietzsche to Theodor Adorno and Jean Baudrillard believed 'killed objects', and which has frequently been likened to a mausoleum (in Witcomb 8-12).[57] As well as deadening and objectifying the nonhuman body, galleries like Auckland's and Otago's subdue the human body, attempting to dampen or erase its exuberant animality and bring the observer closer to the transcendent, 'objective' spectatorship promoted by the fantasy of disinterested science.[58] There is a strong sense of 'right behaviour', as if the museum is a space where adults can see like a child again with an uninhibited, uncomplicated, 'pure' sort of gaze (Jordanova 24). This distinctly nineteenth-century sensibility allows little agency for the observer or the observed. Despite decades of critique levelled at this antiquated form of curatorial oversight (particularly from postcolonial and feminist critical theory) many museums in Aotearoa maintain strong links to this detached model of adult visitor engagement. Though children are welcome in Auckland and Otago's nature galleries, the mood signals to

[57] Andrea Witcomb lists theorists who have heavily critiqued the museum and see it as an antiquated institution unable to shake off its colonial ideologies (8-12). Witcomb's book *Re-Imagining the Museum: Beyond the Mausoleum* acknowledges the validity of these critiques but offers a more nuanced take of museology in the twenty-first century (2003).

[58] Bruno Latour negotiates, in a more general sense, the difficulties of 'the politics of nature' in his eponymous 2004 book. Although he does not explicitly reference museums, he discusses the difference between the actual practices of science (in which its practitioners comprehend its limitations) and the oft-mythologised public face of science in the modern era.

visitors that these spaces are not intended for the more exploratory and playful energy of childhood.

By placing the majority of their 'objects' behind glass, the Auckland and Otago Nature galleries promote and uphold the idea that visiting a museum is first and foremost a visual experience. This seems especially (and problematically) true in *Origins* where the endemic insects are unlabelled, suggesting, perhaps, that the visitor might be able to uncover the knowledge inherent in the 'object' simply via looking at it (Marstine 2; Jovanovic-Kruspel 406). According to this logic, the institution's role is as an interlocutor through which the Platonic values of beauty and morality can be translated to the elite, erudite viewer (Marstine 9). Via this act of transmission museums are designed, as Ludmilla Jordanova highlights, to elicit 'childish awe at the stupendous variety of natural objects and artefacts, and to offer pleasure as a result' (22). Although most other insects within Auckland Museum's adult-oriented galleries do have functional legends, the numeric guides generally only provide a name without any further information on habitat, ecology, or behaviour. The experience on offer here is, quite literally in this instance, beyond words.

Visual storytelling relies on some degree of separation between object and observer, between the moving, contemplating agent and the fixed immoveable specimen. The 'empty space' created by this distance is reinforced not only by the metal and glass barriers and the rigid symmetry of the insects, but by the perceived 'deadness' of the insect-as-object. The double-death of the insect—its death outside the institution and its placement within the museum—suggests a finality not only to its life but to the meaning of that life, as if the museum were pinning the insect in place both literally and ideologically. Steve Baker calls attention to the insecure and unstable meanings of dead animals inside human spaces (2014: 291). He cites the work of Rachel Poliquin who argues that 'Animals are not fixed entities fully explained by the hierarchies of natural order […] but rather are provocative forces, both ruthlessly physical

and semantically ambiguous' (in Baker 2014: 290: Poliquin 140). Extending the distance between the lively-but-not-too-lively visitor and the dead insect, Auckland and Otago's framing of endemic insects fills this 'emptiness' with ideas of hierarchy and human dominance. Given exhibition space proportionate to their body size—but not their planetary biomass—insect displays in these two museums are rendered visually insignificant for adult contemplation.

Children

Apart from the stored specimens that populate museum archives, the greatest number of insects on display are often found in the designated children's discovery zones, examples of which can be found in Otago, Canterbury, and Auckland museums.[59] Almost everything about these zones is different from the adult galleries: they tend to be brightly coloured, as dynamic and tactile as possible, noisy, and some of them have a cover charge ($2 in Canterbury and $10 in Otago). In order to attract visitors they use hefty doses of what Shearer West calls 'excruciating puns', hyperbole and alliteration to suggest to visitors the gallery is entertaining and exciting rather than stuffy or antiquated (80). Auckland's children's space, for example, is called the *Weird & Wonderful Children's Gallery*, preparing visitors for the 'wackiness' of the biological world with an alliterative title and larger-than-life 'freaky' insect imagery on the walls (fig. 2.14). Canterbury's *Discovery* gallery is lit in neon signage (fig. 2.15) and has a playful set of insect dioramas visible from outside the gallery. These consist of coloured cubes full of plastic insects

[59] *Te Taiao*, the endemic nature gallery which opened in 2019 at Te Papa, is a blended space tailored towards audiences of all ages. This will be discussed in the final section of this chapter.

Figure 2.14: Auckland Museum's *Weird & Wonderful Children's Gallery* (Author's photo Aug 5 2019).

Figure 2.15. Canterbury museum's *Discovery* gallery (Author's photo Jan 29 2020).

arranged in a series of puns based on common euphemisms (figs. 2.16–2.18). Figure 2.16, for example, is entitled 'Bed Wetas' and shows a large number of plastic wētā climbing in and around a tiny bed. Figure 2.17 shows plastic ants crawling out of a pair of underwear under the title 'Ants in your pants'. All of the puns in these colourful cubes are insect-based.

Galleries like Auckland's and Canterbury's have been a popular addition to Aotearoa's larger institutions since the latter half of the twentieth century. After World War II, science galleries aimed at younger audiences emerged globally in response to a range of shifting pedagogical, financial, and ideological factors (Witcomb 353; Barry 98). By and large, museums in Aotearoa have embraced interactive children's galleries as a modernising force. For many institutions, children's galleries are an attempt to provide experiences that are more democratic and 'more entertaining for a younger audience' (Witcomb 129). The pedagogical success of the galleries, however, remains a point of contention: as Witcomb argues, allowing

Figures 2.16, 2.17 & 2.18: The 'excruciating puns' outside *Discovery* (Author's photo Jan 29 2020).

visitors to 'push a button, touch a screen or manipulate an object in order to elicit information' does not necessarily equate to a more democratic, open medium of communication (130). There is some debate as to whether these galleries are designed as babysitting centres for adults wishing to peacefully visit other parts of the museum (the galleries that have a fee to enter also have barriers that could thwart an escaping child) or if they are intended to be introductory spaces providing children with hands-on observational experiences with minimal instruction or information (Nielsen 507–508).

Inside the 'weird and wonderful' children's galleries insects occupy a rote set of storytelling motifs. They are held up as freaky creepy-crawlies which—with the notable exception of butterflies—tend to elicit fascinated gasps from children and more reserved responses from caregivers.[60] They lie in robust scratched-up Perspex cuboids built to survive vigorous microscope usage (figs. 2.21 and 2.22). They inhabit numerous pull-out drawers and are fixed in busier and more cluttered arrangements than their counterparts in the adult nature section. They are part of puzzles and taxonomic games, microscopic projections and larger-than-life replicas. They are symbols of nature's endless weird profusion, representatives of the extent of biodiversity and the interminable strangeness of the natural world. Made tactile and safe by the frames they inhabit, insect bodies can be sold as an experience of discovery,

[60] This is anecdotal and based on the number of hours I spent observing museum visitors in these spaces.

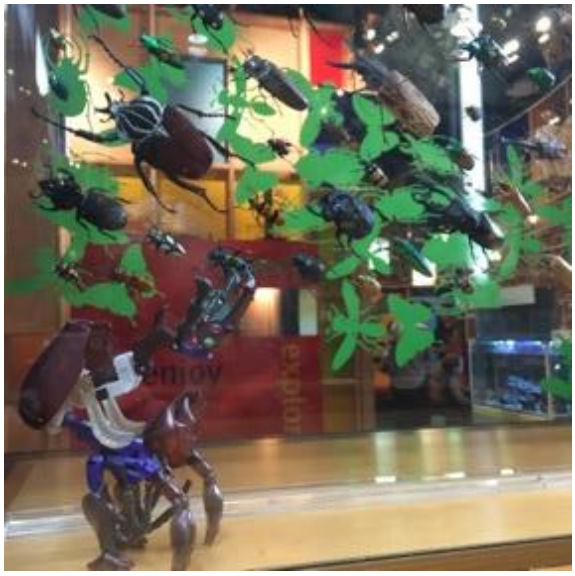


Figure 2.19: Insects inside a Perspex wall in *Discovery* (Author's photo Jan 29 2020).

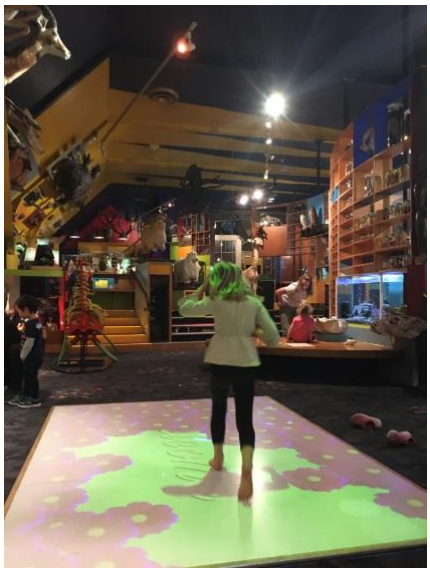


Figure 2.20: The 'Welcome' mat in *Discovery* (Author's photo, with permission, Jan 29 2020).

symbols of spontaneity and energy. Inside the galleries in Auckland, Canterbury and Otago Museums, insects seem to be used as introductory props to elicit interest in natural history. But there is little about these encounters that seems likely to extend a child's understanding or appreciation of the actual lives of insects.

In order to make them palatable, sanitised and approachable, insect bodies are made into educational toys. Figure 2.19 shows an internal dividing wall in *Discovery* made of two sheets of Perspex and filled with a multitude of insects spiralling up as if engaged in an interspecies dance. Vivid green insect decals mimic the insects beneath like lurid shadows, enhancing the effect of the swarm. Below, poised as if standing guard, are two insect-esque plastic toys. The toys lift the arrangement, making it quirky and fun as if it is part of a child's imaginary play rather than a visual arrangement created by an adult. Insects as playthings is an idea introduced right at the beginning of the gallery, where, projected on the floor, is a 'Welcome mat' made up of flowers and butterflies that shift when stepped on. When I visited,

Figure 2.21: Stink Bug in Perspex in Otago Museum's children's area (Author's photo Apr 23 2019).

Figure 2.22: My niece twists the dials on the microscope in *Discovery* (Author's photo, with permission, Jan 29 2019).

this projection was very popular, with toddlers and young children returning to it over and over again.

Discovery balances this playfulness with more serious scientific displays involving interactive microscopes (fig. 2.21). Versions of these microscopes are found in all four of the museums studied for this research: the encased 'objects' available for inspection were predominantly invertebrates. Inside the Perspex cuboids, the insect's life and animality seems to be eroded by its framing and the roughness of their treatment as they are plunged under the microscopes by small hands. Rather than insects native to Aotearoa, the animals inside the cubes are often unwanted 'pest' species who potentially elicit less empathy than an endemic critter might. The Stink bug in figure 2.21, for example, is considered an 'extreme risk' to New Zealand food production (Aotearoa Science Agency, 'NZ on High Alert…') and is labelled with its evocative and negatively loaded common name. Using insect bodies for microscope play can suggest to children that they are somehow less important or more dispensable than other animals, allowing them to be used without complicated twinges of empathy or emotional

distress in the human observer. They provide a cheap and plentiful animal body uncomplicated by ethical concerns. As swatting and stomping too often characterise the human insect encounter outside the museum, insects are offered up in children's galleries as if they were gateway animals or stepping stone organisms en route to more serious zoological study.

The abundance of insects in children's galleries represents an opportunity for children to learn the value of insect life and engage positively with insects from a young age. As if to solidify the idea of the 'insect-loving child' and the entomophobic adult, one four-year-old girl I encountered in Auckland told me she loved insects: as she delightedly pulled out a drawer containing a particularly large and prickly stick insect, her father grimaced and commented on how horrifying the creature was (pers. comm. Aug 5 2019). The same studies that show negative human attitudes to insects in adults also reveal that children, in general, harbour less antipathy and more curiosity towards insects (Kellert 1993; Shipley & Bixler 2017; Schlegel and Rupf 2015). Given their interest in insects, it is plausible that the children's' zones are an attempt to mitigate what Schuttler et al. call the 'extinction of experience' that typifies a modern urban childhood (1-2). Schuttler et al. define the extinction of experience as the 'largescale decline of people's time spent in nature and the diverse experience time in nature entails' (ibid). They go as far as to suggest that this type of experiential extinction represents 'one of the biggest threats to the conservation of biodiversity' currently faced by human societies. In contrast to the allegedly impoverished quotidian, the museum is able to offer children a tactile yet 'safe' interaction with nature in general and with insects in particular. But while 'entomological collections have the potential to divulge the importance of insects to the ecosystem's balance', as Nathália C. G. Ribeiro and Débora de Mello Gonçales Sant'Ana state in their exploration of entomological museum exhibitions and non-formal education (2), whether or not they achieve this is dependant largely on the methods they use to try and engage visitors with the insects on display, and on the other kinds of information they provide to

Figure 2.23: The tarantula approaching the grasshopper in *Discovery* (Author's photo Jan 29 2020).

support the content of the exhibits. In all the museums I visited for this research the main method of communication was visual with minimal audio or textual information: the emphasis was on a fun, dynamic experience not weighted down by words.

As if to highlight the lack of emotional capital insects have, the tarantulas in Canterbury's *Discovery* zone are fed live grasshoppers which they then 'hunt' in front of the viewing public. There are no other live animals on display in the museum, just three species of tarantula and the 'food' which is brought to them by the resident arachnologist—who is also, somewhat ironically, charged with looking after the entomological collections. In figure 2.23 the grasshopper, having just been 'released' into the tarantula's enclosure, perches atop a broken piece of pottery and seems to be looking at the approaching spider. If nothing else, the grasshopper's role in this spectacle reveals once more the status of insects as not-quite animal and not-quite deserving of empathy or sympathy. What this live-feeding event also reveals is

the reality that insect welfare is not specifically covered by animal rights legislation in Aotearoa (Animal Welfare Act 1999).[61] Although I found it difficult to turn my gaze away from the grasshopper, none of the children I was in *Discovery* with (around 10 or so) seemed particularly interested in the spectacle or even seemed to be aware it was happening. It was difficult to ascertain what the child spectator might 'learn' or discover from the encounter between the grasshopper and the tarantula. Perhaps, given the natural historical focus of the rest of the zone, it was meant to further encourage the dispassionate, neutral kind of observational science promoted by museum institutions (MacDonald 6-13). The tarantulas were fed that day at around noon, a time, I imagine, designed to maximise the audience for the meal and perhaps encourage some movement and 'excitement' from the otherwise stationary spiders. The day I visited, a horrified adult was the only witness to this feeding in a children's gallery.

Insect commodities in Otago museum's *Tūhura Tropical Forest*

> How can today's museums compete with television? Viewers are captivated by the action and excitement on the TV screen while museum visitors face only static exhibits in glass cases.
> (Stickler 36)

In many of the larger institutions in Aotearoa, traditional taxonomically-arranged galleries now exist alongside more dynamic exhibitions designed to pull the museum into the 'modern age'. While these newer and more dynamic displays seem, at least in part, like a response to some

[61] There is room for interpretation in the Animal Welfare Act 1999: Clause 2:1:a:vii states that 'animal' can be 'any other member of the animal kingdom which is declared from time to time by the Governor-General, by Order in Council, to be an animal for the purposes of this Act'. However, 'insect', 'insects', or 'invertebrate' are not mentioned anywhere in the Act as at 09 May 2020.

of the criticism of the past few decades, they inhabit murky territory in a late capitalist neoliberal society. In order to make a decisive break or rupture with the fusty nineteenth-century image that has clung to the institution, attempts to modernise museums have gone hand in hand with rebranding exercises that develop and then bolster a public image of the museum as a fun and entertaining destination. Splashy blockbuster exhibits and exciting permanent collections help the museum compete in what Philip Wright calls an era of 'cultural overabundance'—a 'harassed leisure consumption [that crams] as many, preferably concentrated, non-work related experiences as possible into the spare time available' (in West 77). Ramped-up capitalism in the late twentieth century placed new demands on museums: they must now speak the language of business to their sponsors: they need increased foot counts, advertising, and crowd-pleasing exhibits all while sustaining their image as trusted pedagogical public institutions (West 80).

Traditional modes of insect display fit awkwardly into this modern paradigm and for a museum to popularise—or sell—insect encounters the creatures require careful and deliberate framing. Otago Museum has successfully negotiated this and insects have been one of the major drawcards and money-spinners of their permanent collection for more than a decade. To entice the public to pay the entry fee ($10) to visit creatures long deemed uninteresting, unattractive and even disgusting by large swathes of the general population, the insects in *Tūhura Tropical Forest* are carefully curated so their best feet are forward at all times. Opened to the public in 2007, the *Forest* contains several tropical bird species and terrapins, as well as stick insects and tarantula in tanks, but it owes a large part of its success to one sub-order of insects: butterflies. Asked by a journalist why the *Forest* had enduring popular appeal, Dr Anthony Stumbo, Otago Museum Living Environments Officer, said it was the 'beautiful butterflies' that continue to attract people (Gibb, 'Owl Butterflies Magical'). The butterfly has long been an admired member of the insect class: beloved for its gentle dancing flight and

Figure 2.24: A caterpillar of an owl butterfly species raised in *Tūhura* (Author's photo Apr 8 2019).

Figure 2.25: [*Papilio rumanzovia* butterfly from the Philipines in the *Tropical Forest*]. 'First Flight', Otago Museum. https://otagomuseum.nz/whats-on/butterflies-first-flight, accessed Mar 23 2020.

colourful wings, butterflies continue to decorate everything from clothing to skin. Unlike moths (who form the other part of the insect order Lepidoptera), butterflies are portrayed as beautiful and bewitching, feminine and delicate, and are generally considered more charismatic and appealing than their nocturnal equivalents (Schlegel and Rupf 233; Gandy 7).[62] The choice to centre an exhibition on these particular insects is not only deliberate but canny. Not only do they continue to attract large numbers of visitors but as insects their use is not restricted by animal rights legislation that might prohibit the use of larger animals (Animal Welfare Act 1999).

In order to maximise public appeal, *Tūhura* is not just filled with any butterflies but with brightly coloured species from South and Central America and the Philippines (figs. 2.24 and 2.25). Certainly, compared to the 'dull and unspectacular' browns, greys and occasional

[62] There are a number of exceptions to this such as the cabbage white butterfly—as a 'pest' species it 'necessitates' a range of specific products used to minimise the damage it can cause to crops and home gardens. In his study of the cultural representations of moths, Matthew Gandy reveals that there are actually more day-flying species of moth than there are species of butterfly, dismantling the long-standing idea that moths and butterflies are related but opposite and dismantling commonly understood distinctions between the two (7).

greens of many of Aotearoa's endemic Lepidoptera, the exotic butterflies exhibit a diverse range of bold and vivid colours. Most of the species are imported as eggs from Costa Rica and the Philippines then raised indoors on host plants by specially trained staff before being released to wow visitors in the enclosure (Stumbo, pers. comm. Apr 8 2019). The first stages in the insects' lifecycle occur out of sight in back rooms—perhaps because this stage of their development is not as aesthetically pleasing as the adult insect. Because of the short flying life of Lepidoptera it is necessary for the museum to maintain a steady flow of imported eggs in order to keep the display consistent (ibid). The eggs of the Blue Morpho butterfly (*Morpho* genus), for example, are specially raised by butterfly experts in South and Central America and shipped around the world for exhibition in public and personal collections. Members of this genus are also regularly made into framed specimens and sold online.[63] The Blue Morpho's original habitat are the tropical rainforests of these regions and they are among the largest butterflies in the world with a wingspan anywhere between 12.5 and 20cm (Editors, *Encyclopaedia Britannica*). The curated biodiversity of the *Forest* and its artificial ecosystem is only possible with this invisible network of global trade.[64]

Naming the 'forest' *Tūhura*, meaning 'to discover' or 'to explore' in te reo Māori (Moorfield, 'tūhura, *v.*'), might give the impression that the exhibit pertains to Aotearoan fauna: instead, the multi-coloured, six-legged inhabitants sell because of their exotic origins. The museum markets the 'Forest' as an experience visitors are unable to find anywhere else in the country—on the museum's website, it is described as:

[63] Amazon.com, houzz.com, bunderglass.com, and etsy.com are just some of the online stores offering a range of *Morpho* butterflies for sale in frames.

[64] An article in the *Otago Daily Times* on May 22 2020 entitled 'Butterflies are Back on the Wing' chronicles the disruptions in butterfly supply because of the Covid19 pandemic: supply that arrived during Aotearoa's Level 4 lockdown from The Philippines was still, at the time of the article's publication, in quarantine (Gibb).

Figure 2.26: *Tūhura Tropical Forest,* Otago Museum, https://otagomuseum.nz/whats-on-offer/downloads/, accessed Mar 23 2020.

> …the only three-tier live butterfly experience in Australasia! At around 28 degrees and 75% humidity year-round, it's warm and welcoming. Encounter exotic butterflies, giant stick insects, tarantulas, terrapins and other rainforest dwellers—it's a world away but right here in Dunedin (*Tūhura Tropical Forest*, Otago Museum).

The next step up from armchair travel, the website seems to say, is an immersive experience in an exotic location without the long-haul flights and prohibitive costs. The less pleasant aspects of this exoticism have been carefully removed from the environment: there are no dangerous reptiles or mammals, no biting, blood-sucking insects, and no tropical diseases. Tapping into the historical idea of the museum as a site of 'authenticity', the *Forest* purports to offer visitors a genuine encounter with the exotic. The advertising of *Tūhura* suggests that it is a fully functioning ecosystem, just like what one might find in a far-away tropical country. There are

certainly some similarities between overseas travel and visiting *Tūhura*.[65] To enter, visitors must first pass through a transitional zone where, rather than a conveyor belt and x-ray scanning equipment, the museum has a backlit corridor between twin sets of plastic strip curtains and ample signage instructing visitors to check clothes and bags for unwanted insect stowaways. Like biosecurity controls on international borders, these are preventative measures. The *Forest* is filled with exotic species whose escape could be catastrophic for the public image of the museum in an era of fervent reconstructionist conservation.

The cost of maintaining a carefully engineered environment and several full time staff warrants the entry fee. As well as raising and caring for the animals, the staff must keep the temperature and humidity at the right level, the plants healthy and disease-free, unwanted visitors out and exotic species in. Because of the large expense and risk factors, the exhibit needs to attract large audiences to generate enough revenue to recoup costs and make a profit. This might explain why *Tūhura* tends to 'play it safe'. This is a common critique of contemporary blockbuster exhibitions as detractors believe populist framing takes the teeth out of exhibitions (West 80). In 2001 Tim Flannery, then director of the Museum of South Australia, stated that the emergence of the 'super museum'—typified by exciting multimedia display strategies—represented an existential threat to the institution as a place of scholarly research and important artefacts (in Witcomb 1). While some oppose this perspective, arguing that all contemporary exhibits are based on 'serious interdisciplinary research' (Casey cited in Witcomb 15), others adopt a more nuanced perspective arguing that exhibitions like *Tūhura* can make museums more accessible to wider audiences but face a number of challenges in doing so (Witcomb 16). There are class tensions at work between populist and traditionalist exhibitions. The public image of the museum has long been negative amongst many societal

[65] As if to exemplify this point, Changi International Airport in Singapore features '[t]he world's first butterfly garden in an airport', where passengers can 'watch them take flight before you take off'. As well as more than 1000 tropical butterflies, the garden contains 'lush greenery and a 6m grotto waterfall' ('Butterfly Garden', Changi Airport Group).

Figure 2.27: Argentine ants on the body of a butterfly in *Tūhura* (Author's photo Apr 8 2019).

groups and museums have not always been seen as places for fun or relaxation (West 76). While attempting to appeal to a broader audience might be seen as 'dumbing down' for mass consumption, galleries like *Tūhura* have the potential to engage a wider cross-section of society than a traditional cabineted display of pinned specimens. Instead of representing a degradation in the ideology and purpose of the institution, it is arguably the responsibility of museums to aim for this diversity in their visitors.

The sterility of the museum environment has long been an inarguable necessity for the preservation of artefacts and animal remains. And entering 'insect' and 'museum' together into scholarly databases turns up a plethora of articles on the subject of deterring or eradicating unwanted insect pests. Certain species of moth, like the webbing clothes moth *Tineola bisselliella*, have wrought havoc on collections in the past, turning skins to dust and decimating collections of clothing and paper (Querner 111). As well as working hard to deter insects, the temperature of museums, especially archival rooms, must be carefully regulated to keep humidity down. The smallest environmental details are carefully controlled. In this way, the 'environment' of *Tūhura* is no different from other zones in the museum (except that its collection is alive rather than dead). Like archive rooms and specimen cabinets, the imperative

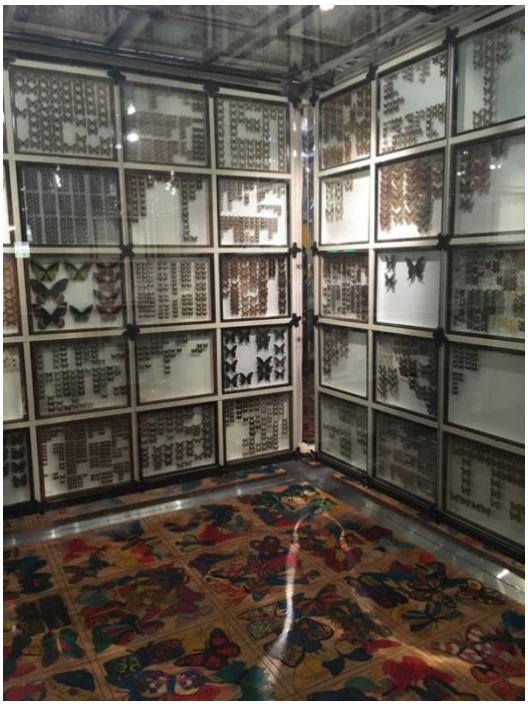


Figure 2.28: The butterfly room in *Discovery* (Author's photo Jan 29 2020)

for strict controls over entry into the *Forest* is partially due to the need to prohibit insect 'pests' from 'intruding' as the high humidity and temperature needed to keep the various tropical species alive also enhances the *Forest's* appeal to uninvited insects.

Inside the enclosure butterflies are not only flying but resting on leaves, squashed on footpaths, and drowned by the power of the waterfall. In a number of cases I watched long lines of ants carrying the bodies away, tiny piece by tiny piece. Stumbo informed me that the undertaker (Argentine) ants were unwanted gate-crashers inside the 'Forest' and were considered 'invasives' (pers. comm. Apr 8 2019). Stumbo was frustrated by the ants' persistence: despite the concerted efforts of the museum staff to seal the enclosure off from the outside world, they continued to find a way in. This seemed ecologically, if not ideologically, disjointed: ants are believed to represent a third of the insect dry-weight in the Amazon rainforest, and, together with termites, are believed to represent a quarter of the dry-weight of all animals, vertebrate and invertebrates (Wilson 50-51). Given the integral role they play in

the non-curated ecosystems the 'Forest' is designed to emulate,[66] the attempt by the museum to actively erase them from an environment purporting to be authentic promotes a fragmented view of how biological systems function and which creatures are important in them. The ants were a reminder of the cycles of death, decay and regeneration that are fundamental to healthy environments. In this way, the abundance of dead butterflies in *Tūhura* was awkward: it was both an entirely natural occurrence and a little jarring in an exhibition meant to be cheerful and 'family-friendly'. The ants disrupted the 'clean', uncomplicated story the museum wanted to tell. But E. O. Wilson suggests the earthly abundance of ants 'is a fateful reflection of what is happening to the rest of life on the planet' (51). He argues that the 'ecological regnancy' of ants makes them 'more likely than other animals to be transported by humans' through international commerce and travel (ibid). Wilson's narrative posits ants as humanity's persistent shadow: *Tūhura's* ant-invaders work efficiently and often out of sight to undermine the authorial vision of the *Forest*.

Tūhura might seem, at first, like the antithesis of the butterfly room in Canterbury museum's *Discovery* gallery (fig. 2.28). The *Forest* hosts live butterflies, and this room is filled—floor, walls and ceiling—with frames of dead specimens arranged like equations or biological abacuses. While the *Forest* continues to attract large numbers of visitors, the butterfly room

[66] In many contemporary definitions of the Anthropocene, the age is defined by the fact that there are no longer any ecosystems on the planet untouched by human activity so the idea of a 'non-curated ecosystem' is somewhat debatable as even those that are zoned and cordoned off as wilderness areas are structured as such through human intervention, often with negative outcomes for indigenous peoples (Ruru 172–179).

seemed dilapidated, outmoded, and remained empty for the several hours of my visit. But the similarities between the two spaces are as striking as their differences. Otago's insects might be alive but they perform the same kind of ideological function as the pinned specimens in this diminutive room. Like the *Forest's* inhabitants, the butterflies here are exotic species, placed in this space to showcase their size, colour and multiplicity: like a beautiful kind of wallpaper designed as a pretty way to visualise biodiversity. There is a weird kind of inversion going on here: in the butterfly room the presence of death is removed from view, the insects are cleanly encased in rigid 'unnatural' symmetry, but in Otago's live display the death of the butterflies is unavoidably present, unable to be sanitised away as the bodies of the insects lie on the pavement and leaves of the *Forest*.

Bugs in the system

> Here we are again, caught somewhere between the reduction
> that makes things fathomable and the generosity that gives them fullness.
> (Raffles 297)

Rather than focussing on conservation in its traditional museological sense, Te Papa Tongarewa's makes environmental conservation a central theme of the *Te Taiao/Nature* gallery, which opened to the public on May 11, 2019. As the most recent iteration of a natural history gallery in the country, *Te Taiao/Nature* seems, at first glance, to demonstrate a decisive shift away from the curatorial tropes discussed in the previous sections, offering, instead, a dynamic and interactive exhibit designed to appeal to all ages. The gallery incorporates Te Ao

Māori throughout: as the Museum website states, 'Mātauranga Māori meets science in these interactive exhibitions about our weird and wonderful wildlife, our shaky land, and the innovative ways we're protecting our natural taonga' (Te Taiao/Nature, *Te Papa Tongarewa*). The by-line for the gallery—'Ko au te taiao, te taiao ko au/I am nature, nature is me'—seeks to include visitors in the natural world and to make them 'the explorers' through the interactive displays (ibid). There are displays about moa and other extinct birds, interactive displays about volcanoes, earthquakes and tsunamis, and information about threatened species of birds. There is a section that informs visitors about invasive species and the damage they have done to endemic fauna, and another that examines the impact intensive agricultural processes like dairy farming have had on water quality. The theme threading through the gallery is connection, between Aotearoa's human and nonhuman inhabitants, plants, land, and water. And with connection, the gallery seems to say, comes responsibility.

Some of the conservationist messaging in *Te Taiao* may be controversially 'political'[67] but it was created in the context of a burgeoning biodiversity crisis. While different sections of the gallery educate visitors on the importance of sustainable freshwater management and the threats facing Aotearoa's endemic birds, *Te Taiao* contains no messaging about insect conservation or the status of Aotearoa's many threatened invertebrates. Indeed, contrary to its bold and progressive stance on environmental conservation, the gallery shows a disappointing lack of creativity in its insect displays. In keeping with the other museums discussed in this chapter, visitors can find microscopes with encased insect edutainment, and pinned specimens in drawers and on walls. On the 'Endemic Wall' (a tall, shallow, glass-fronted cabinet containing 700 'objects' of flora and fauna endemic to Aotearoa) insects are pinned and arranged in traditional symmetrical displays according to their family group or order. Opposite

[67] There was some backlash from the farming community about the exhibition's alleged 'targeting' of the dairy industry and the negative environmental effects of intensive dairy farming on water quality (Taunton, 'Farmers angry at Te Papa over 'disgraceful' water quality display').

the ‘Endemic Wall’ and on the other side of the microscope, is a glass cabinet of moths purportedly identifiable via the digital catalogue in front of the display. The moths are not labelled in the cabinet and the catalogue offers little information besides taxonomic and common name and species location. Unlike the exhibits on birds and ‘invasive pests’, there is little information to educate visitors about the important role insects play in healthy ecosystems, or about the threats they face in contemporary Aotearoa. In the moth cabinet, for example, was a specimen of the *Notoreas casanova*, a Nationally vulnerable species of day-flying moth found only in a small part of Southland and first described in 2010 (Landcare Research 2010). For a gallery aimed at educating and engaging visitors about the conservation of the country’s unique flora and fauna, the absence of storytelling about insects has ominous implications for the protection of insects outside the museum walls. And visitors would certainly not leave with a greater understanding of the large numbers of insects on Aotearoa’s threatened species lists.

In many respects, *Te Taiao* represents the shift in focus many museums are trying to make from institutions that have historically contributed to negative environmental change and colonial structures of power, to entertaining places that attempt to educate visitors about the importance of environmental conservation. The lack of change in the modes of insect display is suggestive of the awkward role the creatures play in museums where they are at once unwanted, destructive invaders and objects of display. Conservation—in a museological sense—is at the heart of what museums strive to achieve, preserving animal bodies and artefacts and extending their ‘natural’ life through carefully controlled environments. Insects play an awkward role in this kind of conservation as they are themselves agents of decomposition. If they find a way in—and they often do—they bring the decay the museum so vigorously fights, making holes in skins and papers, and dust of bodies. As well as being the dead in the museum, they are reminders of death, challenging and destabilising ideas of

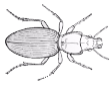
permanence and preservation. Insects (like the ants in *Tūhura*) remind us that all environments have ecologies and that despite humanity's best efforts, some critters simply refuse (or are too small) to obey anthropocentric dictates. Perhaps what is needed, as Cameron attests, is a new ontology, one that highlights the lateral relations and complexity within and across species and ecosystems (Cameron 23; Latour 1991; 1999).

A full account of the role of insects in Aotearoa's museums demands much more than this chapter is able to accomplish. While the display methods discussed do not represent a definitive account of insect representations in Aotearoa's museums, they exemplify some of the more persistent trends and traditions. As one of the predominant sites of elective human-insect encounters in contemporary New Zealand society, the museum has a responsibility, I believe, to contribute positively to insect storytelling—especially in a time of global ecological crisis. Museums can no longer exist in isolation as elite institutes whose cultural value supersedes any responsibility for the wider impact of the ideologies they prop up and promulgate. The longstanding model of placing nonhuman Nature in taxonomic categories within exhibitions deprives insects of establishing their own interweaving and complex relationships with other species and ecologies. The contemporary museum must be able to hold the complexities of the Anthropocene, however uncomfortable, and move away from a God's eye view of the nonhuman world.

CHAPTER THREE

Vanishing Beetles:

Insect Extinction in Aotearoa



What can we say about those beings that pass us by unnoticed, that appear only fleetingly if at all in our lives, that are invisible to the naked eye, or even those whose existence (like so many unremarked species) we are not even aware of? What could it possibly mean for such beings to 'disappear' from the world in the sense of becoming extinct when they don't appear (to be/as) significant?

(Smith in De Vos 23)

Insects occupy a peculiar place in human imagination and perception. Small in size and almost unthinkable in fecundity, the insect typifies a wider human tendency to see nonhuman 'others' en masse, as replicable beings without their own unique identity. The difficulties of thinking about insects—as both too small for empathic attention and too multitudinous for human ideas of individuality—are evident in historical relationships with them and visible in the attentions and inattentions paid to them. For creatures that perform an incredible amount of the caretaking duties of planetary ecosystems and are estimated to represent up to 80% of the world's species (Stork 7519; Berenbaum xi), insects are often physically and intellectually invisible to humans. While studies into nonhuman animals as individual beings have been undertaken with animals as disparate as dogs (Haraway 2007) and octopuses (Christopher Bear 2011), the insect as a

singular creature seems to be a more elusive and fragile concept. Besides the practical complications of their shorter life cycle and smaller size, there is something else, something almost irreconcilably 'other', that has compounded their invisibility in conversations about environmental conservation.[68]

In contemporary Aotearoan society, information about plummeting global insect numbers is complicated by deep-seated cultural narratives about the creatures themselves. Berenbaum diplomatically states that 'The vast majority of people consider it a high priority to minimize the extent of their interaction with the insect world' (xi), but as increasing numbers of insects vanish without so much as a headline, it seems more important than ever to engage with, and disentangle, the human-insect dynamic. Storytelling is as important in scientific narratives as it is in fictional ones: it highlights attitudes and absences, cultural biases and beliefs, and it can set the tone for human perceptions of other species. While New Zealanders have long engaged with the extinction of some of the bigger bird species endemic to Aotearoa, insect extinctions have been, and still are, largely ignored. In order to explain and explore this absence, I will examine the lives and deaths of three species of endemic beetle: one last seen in 1931 and now believed to be extinct, and two that are thought to have become extinct in 2019. In part because of the dearth of primary material on the deaths of these insects, it is necessary to approach their stories sideways, to discuss the contexts and environments, both physical and cultural, they lived and died in, and to look at the ways in which stories about their decline differ to those of endangered or extinct megafauna. The stories of these beetles (or lack of) highlight the ways in which entrenched negative perceptions of insects might have had permanent consequences on their survival.

[68] One exception to this is Rachel Carson's *Silent Spring* (1962) which brought attention to the harmful impacts of industrial-scale pesticide use on insect populations.

Tall-tales of loss in Aotearoa

The winds of the Anthropocene carry ghosts
(Tsing et al. G1)

Understanding humanity's relationship to extinction is a fraught task full of staggering numbers, inconclusive science and what nineteenth-century mathematician John Playfair called 'the 'abyss of time' (73). More than 99% of all species that ever existed on Earth are thought to have become extinct: current estimates put the total number of extinct species at more than five billion (Engel xiii). Yet although it represents something definitive, extinction as a concept has a far more recent and nuanced history than might be imagined. First proposed by Robert Hooke in 1665, extinction was only 'given respectability' in scientific circles in 1796 by Georges Cuvier (Worthy and Holdaway 530). Before Cuvier, animals were not perceived as having a history: they just *were*, ahistorical, outside the temporal and narrative constructions humanity used to understand its own trajectory. As Western societies slowly became aware that the structure of the world around them was changeable, conflicting theories emerged to explain historical extinctions. Cuvier and his pupil Louis Agassiz argued that mass extinctions were the result of sudden and violent catastrophes like floods or volcanic eruptions which decimated plant and animal life (Kolbert 2014: 24-26). This was, perhaps, a comfortable argument for the time as their logic blended establishment theology with emergent science: if all creatures were perfectly formed by God only an event of biblical proportions could be responsible for their complete destruction.[69]

[69] When Hooke first proposed that the fossils he examined under the microscope might be those of creatures who no longer existed, his ideas were treated as heretical by many: by neatly dovetailing established Christian belief into their theory of catastrophism, Cuvier and Agassiz avoided similar treatment (Gill and West 13-16).

In 1859 Darwin argued that extinction was the inevitable result of maladapted species, reframing the causes of extinction as an internal rather than external malfunction (218; 317–318; 345).[70] For Darwin, the vanishing acts of species were part of an entirely 'natural' state of affairs as 'extinction and natural selection […] [went] hand in hand' (172). While prominent members of Europe's scientific community continued to oppose Darwinian theory for decades, the idea of natural selection filtered into the nineteenth-century popular imaginary: ideas of 'survival of the fittest' and of 'good genes' versus 'bad genes' were used to explain and justify social and ecological changes.[71] These were toxic and dangerous ideas to be circulating in an age of imperial expansion. As British colonists encountered a new (to Europe) land and its people, pseudo-Darwinian thinking was co-opted to justify acts of inter and intra-species human violence (Crook 2-7). Empire was constructed via the subjugation of indigenous human cultures and through a purposeful and intensive restructuring of landscapes and their fauna. Indeed, it was widely believed until the latter half of the twentieth century that many endemic fauna were already declining in Aotearoa before the arrival of humans and would have become extinct even without European settlement (Holdaway and Worthy 531-533). In this thinking, extinctions were the inevitable, if unfortunate, cost of 'progress'—if they were noticed at all. Geoff Park notes that although Aotearoa is 'one of the world's youngest and least populated societies we are also one of its most demanding' (74). As forests burned to make way for pasture and new animals were introduced for hunting, aesthetic value, or simply through carelessness, the sights and sounds of Aotearoa's unique fauna became increasingly rare.

Although extinction was largely thought to be a 'natural' phenomenon in the nineteenth century, its acceleration over the last few centuries—and the predicted crescendo in the coming

[70] Crediting Darwin as the sole author of this theory is problematic and erases the contributions made by his grandfather Erasmus Darwin (1731-1802), his contemporary Alfred Russel Wallace (1823–1913), as well as the work of Jean-Baptiste Lamarck (1744–1829).
[71] David Raup's *Extinction: Bad Genes or Bad Luck* (1992) examines some of the ongoing controversy over the mechanics of extinctions.

decades—is not.[72] The current extinction crisis, the sixth mass extinction (sometimes called the Anthropocene extinction), is unprecedented in the long history of life on Earth—Matthew Chrulew and Rik De Vos call it 'one of the starkest and most troubling markers of the so-called Anthropocene' (23). While the five previous mass extinction events are now believed to be the result of atmospheric and geologic disruptions, including asteroid strike, the cause of the current crisis is undisputedly anthropogenic. Chrulew and De Vos explain that anthropogenic extinctions are complicated by an array of complex factors, including different political, economic and racial environments.[73] As more and more species climb threat classification systems from declining to vulnerable, endangered, critical, and finally, extinct,[74] many human societies are coming face to face with the consequences of the ecological violence that has shadowed their development and proliferation. Anna Tsing et al. write that reminders of this destruction walk among us as ghosts, haunting the present landscape (G1-12).

Relationships with species under threat are often heavily mediated: as few people have or have had contact with endangered and extinct species, they are brought to life through images, text, myth and storytelling. The more popular actants in these stories are often charismatic megafauna—creatures whose size or perceived cuteness makes them attractive to more people. Instead of objective truth-tales, extinction stories are often built on what Ursula K. Heise calls 'underlying cultural assumptions' and a cultural rather than scientific ecology (13). Lost or dying species have long been employed in the service of anthropocentric agendas,

[72] The background extinction rate—the average rate at which species have gone extinct outside of mass extinction events—is thought to be around one extinction per 'million species years'. This means that if there were one million species, one would go extinct per year (Goulson 247).
[73] For a contemporary analysis of extinction and its long relationship to cultural and social mores see Heidi C. M. Scott's *Chaos and Cosmos: Literary Roots of Modern Ecology in the British Nineteenth Century* (2014: 1-44); Elizabeth Kolbert's *the Sixth Mass Extinction* (2014); Richard Leakey and Roger Lewin's *The Sixth Extinction: Patterns of Life and the Future of Humankind* (1996).
[74] New Zealand uses a modified version of the IUCN Threat Classification Scheme. The implementation of a modified version in Aotearoa, the 'New Zealand Threat Classification System', addressed the need for a system that better fit the unique challenges of conservation in this country. For more information on the global system see: https://www.iucnredlist.org/resources/threat-classification-scheme; for information on the New Zealand scheme see: https://www.doc.govt.nz/about-us/science-publications/conservation-publications/nz-threat-classification-system/.

and as metaphors and symbols of human power or hopelessness they can be both galvanising and tragic. Unlike wide taxonomic classifications like Phylum, Kingdom and Genus which concern themselves with groups and subgroups, connections and belongings, extinction stories narrow in on a lone species, and speak, ultimately, to an individual animal, emblematised as the last of its kind—like Sudan, the last male white rhinoceros (fig. 3.1). But images of polar bears stranded on ice-caps and extinct white rhinoceroses belie the true scale of this loss as these charismatic megafauna represent the tip of the iceberg, so to speak, of species under threat. As the large and charismatic creatures become exotic icons of the biodiversity crisis, smaller extinctions continue to occur all around us at alarming rates. Entomologist Robert R Dunn, writing in 2005, argued that 'The biodiversity crisis is undeniably an insect biodiversity crisis' (1030): yet 'insect conservation remains the awkward "kid sister" to vertebrate conservation' (1031).

The disconnect between the icons of threatened or extinct species and the creatures who form the bulk of planetary animal life (and who fill endangered species lists around the globe) is exacerbated by the interplay between the perceived charisma of certain nonhuman animals and popular tropes and modes of storytelling about insects. On the cover of the October edition of *National Geographic*, Kenyan ranger Joseph Wachira farewells the last male white rhinoceros, Sudan, who was euthanised in March 2018 (fig. 3.1). It is a powerful and affecting image, in which Wachira's sadness reveals the possibility of bonds of sympathy and care between human and nonhuman. The image is also deeply symbolic—not just of the mass extinction event we crouch at the precipice of, but of the tragic burden it leaves on humanity. Inside the magazine, Elizabeth Kolbert's article on 'vanishing' animals continues the elegiac and tragic tone set up by this image. Kolbert quotes E. O. Wilson who suggests that we should call the current epoch the Eremozoic—the age of loneliness (2019: 48). The sense of isolation is reinforced by the article's striking visual accompaniments of animal portraits arranged on a

Figure 3.1: Vitale, Ami. 'Last of Its Kind'. *National Geographic,* Oct 2019, cover.

black background, many of them looking directly at the reader (fig. 3.2). In these pages it seems as if the animals (and the diversity they represent) are about to be swallowed by darkness.

While the tone of such stories might destabilise some of humanity's entrenched ideas about the inner lives of nonhuman animals (or lack thereof), the drama and sentiment they evoke are often species specific. Given wider human propensities to view insects as 'other' and as groups rather than individuals, stories of insect extinctions are only now creeping into global and local news headlines. Amongst the twenty species profiled in *National Geographic's* three-page spread (partially visible in fig. 3.2) there are only two insects represented. While a moth is shown alone, the group of American burying beetles (*Nicrophorus amercianus*; no. 19) are clustered in a group of four. The critically endangered beetles do not, in fact, live in groups and are most often found either alone or in breeding pairs. Seen from above as they are in this

Figure 3.2: Sartore, Joel. Photographs of Threatened Species in 'Vanishing: What we Lose When Animals Go Extinct', *National Geographic*, Oct 2019, (45).

image, they appear scurrying and social, part of a multitudinous collective. Rather than a lone beetle looking at the camera like the Sumatran Orangutan (no. 20) or the Pacific Walrus (no. 11), the reader is reminded again of the multiplicitous identity of insects, their lack of individuality, their significant insignificancy.

Megafauna are a persistent feature in Aotearoa's 'culture of extinction': the narrative and socio-cultural framework through which nonhuman extinctions take place and are understood in this country. For many years, extinct species in Aotearoa have had the moa for their mascot: a group of nine large, flightless ratites believed to have been hunted to extinction before Pākeha arrival (Worthy and Holdaway 2002; Wolfe 2003; Anderson 2018). James Belich called the moa 'the glamour bird of New Zealand pre-history' (34) and Heise states that flagship species like the moa 'come to act as symbolic shorthands for more encompassing stories about a particular nation's history of modernisation' (13-14). When its bones were discovered by Europeans in 1839, its charismatic bulk was quick to be used for all sorts of 'non-scientific' purposes. Annie Potts et al. note that 'no sooner [were moa] called back from oblivion than they were weighted down with human meanings' (11). One of the most persistent of these meanings was the use of the moa to signify something pre-European that was 'irretrievably lost' (Armstrong 2013: 13), a totem of true New Zealand endemicity (with more implied 'authenticity' than tāngata whenua), and thus a sad shrug at the 'inevitability' of environmental change.

Towards the later part of the twentieth century, growing knowledge of environmental degradation popularised the notion in many settler colonial societies of an idyllic pre-colonial past where indigenous populations lived in harmony with the Natural world (Heise 9). Although many native cultures had developed less harmful ways of interacting with their environments than those promulgated by European coloniser culture, this version of history denies changes that occurred within pre-colonial societies and takes away any sense of agency in their relationship with the environment. It also denies any kind of more complex understanding of the interactions between indigenous human societies and their environments. While European understanding of extinction was still in its infancy at the time of imperial expansion into Aotearoa, recent linguistic analysis of Māori whakataukī (ancestral sayings)

reveals that indigenous populations both understood the possibility of species extinction and had instituted measures to prevent further losses (Wehi et al. 461). Wehi et al. list a range of whakataukī that predate European arrival in which the moa is used as a simile for extinction or complete loss: 'Mate ā-moa' or 'Dead as the moa' dates to around 1500-1650 and employs the stative adjective 'mate' to denote permanence (ibid).

Moa stories are both 'galvanising and problematic' (Heise 14): in contemporary Aotearoa they often act as something of a rallying post for conservation. But having the moa for the mascot of endemic extinctions continues to perpetuate dangerous and toxic mythologies: its demise is neatly packaged as a historical event outside colonial control. European colonisation ushered in a wave of species extinction that hasn't yet ceased. Even as national identity in Aotearoa in the late twentieth- and twenty-first-century was constructed around endemic species and wilderness conservation,[75] environmental degradation has continued apace. Contemporary narratives of species loss and conservation in Aotearoa centre, rather conveniently, around the impacts of 'invasive nonhuman pests,' yet E. O. Wilson points out that introduced species are 'the second ranked cause of extinction in native species, after the destruction of habitat by human activity' (2006: 53). Annie Potts discusses the ways in which so-called 'invasive pest species' like possums are cannily employed as focal points for public frustration, anger, and grief over some of the more damning elements of Aotearoa's industrial farming practices and destructive socio-cultural and economic policies (209-210). There is a corrosive simplicity to this storytelling—its good versus bad binary, invasives versus endemics—that collapses the complex realities of ecosystems into easily consumable storytelling units. And of course, hiding amongst the moa ghosts and the binaries of

[75] The essays that make up *Wild Heart: The Possibility of Wilderness in Aotearoa New Zealand*, edited by Mick Abbott and Richard Reeve, provide an excellent cross-section of contemporary opinions about and relationships to the idea of 'wilderness' (2011).

good=native/bad=invasive, are untold numbers of other animals whose stories are not so amenable to populist distortion and manipulation and are not so easily told.

Historic insect extinctions in Aotearoa: 'the neglected majority'

Autumn cicada –
flat on his back,
chirps his last song.
(Kobayashi Issa, 18th Century Japanese poet, in Appleton par. 16)

Insects were all around, yet we scarcely knew them.
(Raffles on Fabre 51)

As the charismatic figurehead of faunal extinctions in Aotearoa, the moa's great height and girth shadowed the disappearances of myriad smaller creatures. And while the amorphous stories of the moa could be read as parodies of cultural mores or the growth of a fetishistic relationship to particular animals, insect extinctions present a different set of problematic human/nonhuman dynamics. Historical attitudes and approaches to insect extinctions were likely a product of multiple factors, bringing together an incomplete understanding of the mechanics and causes of extinction, practical difficulties in the study of insects, along with some of the negative biases outlined in the introduction of this thesis. It is likely a great number of insects disappeared unnoticed and unrecorded during the first hundred years of European settlement (Holdaway par. 8; Gibbs 2009: 1587). The small number of confirmed insect

extinctions generated no eulogies, no works of art, no fantasies of reunification with a golden past. They did not come to symbolise the grandeur and beauty of a lost world and are not now the subjects of Lazarus conservation efforts.[76] In this sense, historical insect extinctions do not quite fit the patterns of narration that often surround larger lost species. Complicated, innumerable, unfathomable—insects have only recently begun to feature in conservation conversations in a serious way: entomologists and concerned citizens advocating for insect conservation continue to find it difficult to get funding and drum up support in the wider public (Estren 2012; Trewick et al. 2014). Writing more than a century ago, Fabre reminds us that this state of affairs is nothing new: insects weren't absent, we just weren't paying attention to them.

Any discussion of historic (or contemporary) insect extinctions must acknowledge the impossibility of the task. The history of insect extinctions in Aotearoa before the twenty-first century is almost exclusively a story of absence—of information, understanding, and interest. There are intense, sometimes insurmountable, difficulties to understanding past insect extinctions. Gibbs states that knowledge of insect extinctions in Aotearoa is complicated by both a lack of well-preserved Holocene material (unlike the fossils available from endemic vertebrate fauna) as well as a lack of studies (2009: 1587). Insect ghosts are everywhere—it can be assumed they existed in significant numbers but there is very little evidence of this. Assembling data on population distribution and size is one of the most useful tools analysts can use to understand insect extinctions and shed light on the ambiguity of the myriad 'data deficient' species that populate threatened species reports.[77] Instead of facts and figures based on empirical evidence, the science of insect extinctions is necessarily retrospective. Past insect

[76] Torill Kornfelt's *The Re-Origin of Species: A Second Chance for Extinct Animals* (2016) explores some contemporary attempts at de-extinction: she examines projects to bring back the woolly mammoth, the North American passenger pigeon and many more. At the time of the book's publication there were no projects looking at 'resurrecting' extinct insects.

[77] A cursory perusal of any of the DOC's Threatened Species Lists reveals a significant number of data deficient species—especially amongst the less-charismatic and more difficult to study orders of animals like invertebrates and fish. Including data deficient species would significantly increase the total number of endangered species in Aotearoa.

population and species diversity is estimated by contrasting it with that of well-documented animal taxa and reaching a comparative assumption (Dunn 1031; Gibbs 2009: 1587-8).[78] Many, like parasitic insects, are presumed to have gone extinct because of the extinction of their host species—a process known as co-extinction (Stork and Lyal 307). The dearth of information obscures not only the scale of past extinctions but the ways in which insect populations might have shifted over time as habitats and landscapes changed.

As former entomological curator of the American Museum of Natural History Norman Platnick 'bluntly' states, 'speaking of biodiversity is essentially equivalent to speaking of arthropods: [i]n terms of number of species, other animal and plant groups are just a gloss on the arthropod theme' (in Wallace 126). Writing about the current biodiversity crisis, Dunn calls modern insect extinctions the 'neglected majority' (1030), referring not only to the lack of information on insect populations and their historical absence from lists of extinct species globally, but also to the neglect that comes from human indifference. Margaret Stanley bemoans the lack of funding for long-term population studies of insects in Aotearoa: she asks, '[i]f and insect goes extinct in the forest, will anyone know?' (par. 10). For Dunn, the lack of funding for insect studies and conservation is tied up in popular biases against the animals (1035). Data from the International Union for the Conservation of Nature (IUCN) Red List—the predominant global database used to classify extinct and threatened species—identify 62 species of insect as extinct globally compared to 240 mammals and birds (World Conservation Monitoring Centre, Aug 1 1995). However these figures are generally believed to be wildly misrepresentative (Clausnitzer et al. 1).[79] Dunn's estimates put the true number of recent insect

[78] Dunn's calculations are based on comparing the current extinction rates for well-known taxa and then translating that percentage to insects. Dunn argues that if 129 bird extinctions were documented over the last 600 years (1.3% of all bird species) then that same percentage can be used to calculate a roughly equivalent numbers of insect extinctions (IUCN 2002; 1031).
[79] See: Hortal et al. (2015) for an analysis of the difficulties in collating a comprehensive list of global biodiversity.

Figure 3.3: Blanchard, Émile. 'Insectes Coléoptères', Planche 2 [No. 14, *Mecodema sculpturatum,* was collected from Otago]. *Voyage au pole sud et dans l'Océanie sur les corvettes l'Astrolabe et la Zélée : pendant les années 1837-1838-1839-1840.* Paris: Gide d J. Baudy, 1842. www.biodiversitylibrary.org/page/45370938.

extinctions[80] at somewhere around 44,000, a drastically different number (1031). While numerical discrepancies like this are not exclusive to insects, disinterest in and dislike of insects makes them particularly vulnerable to ongoing human misunderstanding and miscomprehension.

On many online databases, including the IUCN, Wikipedia, and the Department of Conservation's Threatened Species reports, one endemic Aotearoan insect is consistently listed as extinct: the flightless ground beetle *Mecodema punctellum*.[81] Little is known about it and very few specimens were ever found or collected. *M. punctellum* has no common name and survives today only in obfuscating taxonomic italics and in dry, thin descriptions of morphology and physiology. While Thomas Broun, the nineteenth-century coleopterist and a

[80] The phrase 'recently extinct animals' is understood to mean any animals that have gone extinct since 1500 C.E. (Fisher and Blomberg 1090-1091).

[81] Other publications with perhaps a more rigorous scientific method dispute this number: in 2012 the *New Zealand Entomologist* (35:2), the country's only dedicated peer-reviewed journal on entomology, listed 4 species of beetle as extinct (Stringer and Hitchmough 91) but this study doesn't seem to have permeated the online databases yet. Outside of these scholarly scientific publications, information on insect extinctions can be contradictory and confusing. However, whatever the source, numbers of confirmed insect extinctions are low and usually single digit.

contemporary of Hudson, was responsible for naming this particular beetle, the genus *Mecodema* was named in 1853 by French naturalist Émile Blanchard in his work compiling and publishing the zoological findings of the Southern voyages of the *Astrolabe* and *Zélée* (1837-1840). The genus was named and described by Blanchard from a specimen collected during these South Sea voyages and published in the 'Tome Quatrième' of the *Voyage au Pole Sud et dans l'Océanie sur les Corvettes l'Astrolabe et la Zélée* (1853: 34-35): the specimen, labelled *Mecodema sculpturatum* from a beetle collected in Otago, was pictured alongside similar-looking beetles from Australia and Tahiti (fig. 3.3). Broun later redescribed *Mecodema* in 1880 and published a detailed account of the morphological characteristics of the genus (7-8).

M. punctellum was described by Broun in 1921 from a specimen found by Mr A. C. O'Connor of Wellington on Takapourewa (Stephen's Island) on the 15th of September 1916: the female beetle was 39mm long and 12mm wide (596–597). Broun opens his description with the kind of taxonomic language amateurs like Hudson found so unappealing: 'Robust, slightly convex, nitid; black, antennae, palpi, and tarsi rufopiceous': in other words, the beetle had a robust, slightly rounded, shiny black body with dull red, segmented antennae and mouth parts (1921: 596). The holotype remains in the archives of Te Papa Tongarewa: there is no photo to accompany its catalogue entry on the museum website and the specimen is not accessible to the public. Although neither Blanchard nor Broun hint at the origin of the Latin binomial, it is likely that 'meco-' (a prefix from Greek) pertains to length ('meco-, *comb. form*' *OED Online*) and '-dema' likely translates from Latin to mean 'variegated'.[82] The species name, *punctellum* (from the Latin *punctum*, to puncture or to mark with points), may refer to particular characteristics of the beetle's shell ('punctum', *Latin-English.com*). The name,

[82] Hours of searching yielded no concrete results for the etymology of -dema as a suffix. *Google Translate* gives 'variegated' as the English translation of -dema, which fits with the French translation of the Latin '-dema' to 'panaché', meaning variegated ('dema', *Google Translate*; 'panaché', *Cambridge Dictionary*).

therefore, seems to offer a shortened version of the beetle's physiological description: it was a long, variegated beetle with indents in its carapace.

M. punctellum was a large, flightless ground beetle endemic to Takapourewa/Stephen's Island and Rangitoto ki te Tonga/D'Urville island—two isolated landmasses at the northernmost tip of the Marlborough Sounds off Te Waipounamu, Aotearoa's South Island. Very few members of this species were ever sighted and it was last seen in 1931 only a decade after it was first described by Broun. Subsequent surveys between 1961–1997 were unsuccessful at locating any beetles—living or deceased—and the beetle has been presumed extinct since 1997 (IUCN 1997). David Seldon, an expert on the *Mecodema* genus and a Research Associate with Landcare Research, claims that the Department of Conservation (DOC), who now control access to Takapourewa, have declined all requests to conduct follow-up surveys for the beetle in recent years (pers. comm. Apr 25 2020). It is Seldon's opinion that the extinction of this beetle is questionable without the information contemporary surveys might yield. Seldon states that there are significant challenges to the data obtained by pitfall trapping—the only method used to date—and that in similar, extant carabid populations, pitfall trapping might only catch one specimen in five years. For Seldon, this is proof that the method is not conclusive enough to corroborate the extinction of a species (ibid).

The beetle now crops up in a few scantly detailed online databases and archives of the Royal Society of New Zealand. Besides the dense taxonomic descriptions of the beetle, Wikipedia remains the most detailed source of information on *M. punctellum*'s life and death. Given that the primary sources for information on the beetle are unchanged, there is no photo to accompany its brief written description which lacks all but the most basic information: size, location, and classification. Its profile page on the IUCN Red List is similarly impoverished: the beetle's name is in big, bold italics at the top, while underneath is a sentence about its habitat—that it 'possibly sheltered under large logs' (McGuinness 2001)—and a bibliography

of seven sources which potentially represent the sum total of all documentation of the beetle. To the non-scientific observer, there is nothing that lifts *M. punctellum* out of the dull mire of the catalogue and into the realm of human sympathy or empathic attention.

M. punctellum's basic profile speaks both to the lack of general interest in insects and to the power of taxonomy to simultaneously conjure and erase. As the only bridge between the beetle and the present moment, the beetle's Latin name has become the small measure of attention holding it in the present: taxonomy both keeps it alive and makes it difficult to think about the beetle as a once-living being. Hortal et al. write that:

> …classifications are abstractions that researchers use to represent the real world and produce scientific knowledge. Thus, knowledge (and ignorance) of nature is fundamentally influenced by the ways in which biological entities are classified and atomized into readily grasped units […] for scientific usage. The ways in which biodiversity is measured should therefore be viewed as a limited subset of the myriad ways that the diversity of life could be classified. (524)

Hortal et al. suggest that the ways in which humans group and organise other beings is an inherently anthropocentric exercise. Potts et al. discuss how the modifiers and names we attach to animals evoke distinctions 'not amongst animals themselves but in how our cultures value and treat them' (2-3). Eric Brown states that 'The act of naming insects—that is, the taxonomy of the insect—creates a problematic disjunction between language and materiality' (xii). In this sense, *M. punctellum's* name becomes a textual manifestation of specimen logic: the Latin binomial exacerbates the distance between human and beetle, and perhaps even perpetuates the ignorance about its life and death. Its scientific name, the only name European science ever gave it, becomes a barrier to deeper engagement. Kaesuk Yoon goes as far as to suggest that taxonomy has helped people become more and more disconnected from other living things, a 'tragedy that has made it possible for species after species to disappear […] without anyone

noticing or much caring' (4). In some ways *M. punctellum*'s present italicised survival reflects the status of taxonomy itself: while still considered an essential part of scientific processes, the science of naming is not the ground-breaking field it was in the eighteenth and nineteenth centuries. Taxonomy is something of a dry and uninteresting relic of a simpler way of engaging with and understanding the scientific world that seems out of step with the crises-laden present and techno-obsessed future.

So what, then, do we know about the life of this beetle? *M. punctellum* was a member of the Carabidae family of beetles, widely believed to be one of the ten most speciose animal families in the world with more than 40,000 species (Kromp 188).[83] Carabid beetles are ground dwelling and, in Aotearoa, they are generally flightless. Like most other species of *Mecodema*, *M. punctellum* would have emerged at night to hunt a variety of other invertebrates like spiders, worms, caterpillars, other carabids, larvae, and even possibly small skinks (Seldon pers. comm. Apr 25 2020). In turn they were possibly food for larger animals such as tuatara. There are sixty species of *Mecodema* in Aotearoa and six subspecies: Ball et al. describe them as 'large-bodied, flightless and very species-rich insect taxon endemic to New Zealand' (84). Carabids in general have often been used as 'indicators of environmental health and of habitat or landscape modification' (Ball et al. 85; Kromp 188). While carabid beetles are known to be adaptable—with some forging new ecological niches in plantation pine forests—habitat destruction has left many extant species clinging on in remnant forests that are themselves akin to islands (Seldon and Buckley 6; Leschen et al. 92-93).

The landscape that *M. punctellum* inhabited speaks to its life and death in the twentieth century: Takapourewa is both a haunted landscape and a remade one.. The island was forcibly taken from the Ngati Koata iwi in 1894 by the colonial government who saw its location in the

[83] To put this figure in context, this means that there are more than six times as many species of carabids than there are species of mammal.

middle of Cook Strait as an ideal location for a lighthouse (Worthy & Holdaway 426-427). The lighthouse was automated in 1989 and the island is now largely uninhabited. Like most Crown land, the island was extensively modified and almost all of the original forests were cleared to make way for agriculture (ibid). Habitat destruction is the most likely cause of *M. punctellum's* extirpation as, like many ground beetles, it needed decaying logs in established forests to make its home. Before the forests were felled, they would have provided a rich understory for the beetle: it likely sheltered under rocks or in logs and nikau fronds during the day, coming out to hunt at night. The canopy species making up the island's forest needed to tolerate intense southerly gales and salt burn: they included ngaio, taupata and kohuhu, with patches of kohekohe, milk tree, mahoe and others with ti kouka and a few nikau poking their heads above the canopy (Ure and Holdaway par. 26). Fallen nikau fronds, kawakawa, poroporo, and ongaonga would have created a dense understorey for the beetle to scuttle about in. Patches of sedge, ferns and tussock occurred in lightly burrowed areas, with mats of creeping ferns such as maidenhair where the ground was too hard to burrow (ibid par. 27). These plants paint a rich picture of the kind of unique ecosystem *M. punctellum* was part of.

Takapourewa is itself an example of the power and politics of naming and the ease of forgetting the small and unassuming. Like the beetle it housed, Takapourewa is a diminutive island cut off from mainland Aotearoa by a broken and restless sea, fierce weather and imposing cliffs. While the character of the island did not save it from extensive destructive modification in the late nineteenth century, its isolation has made it a bastion of modern conservation. Now home to revivalist conservation efforts, the island is a dizzying landscape of forgetting and remembering—attempting to reconcile the past with the promise of a conciliatory future. The island became a designated refuge for a raft of endangered species in 1966 such as the tuatara (native to the island), the Hamilton's frog, and the Ngaio weevil. Ironically, as the population of tuatara thrive on the island, many invertebrate populations

continue to decline, some critically, perhaps as they provide an easy food source for the reptiles (Gibbs cited in Young 230). Graeme Ure and Richard Holdaway believe that the pre-colonial landmass might have been the single most important island ecosystem in the country. For Ure and Holdaway, 'the whole fabric was torn apart' by the colonial government and 'Stephen's Island can now never be more than a husk, beautiful but flawed' (par. 18-19). Tsing et al. write that 'The winds of the Anthropocene carry ghosts—the vestiges and signs of past ways of life still charged in the present' (G1). *M. punctellum*, and the island it lived on, are very much ghosts of the Anthropocene.

As one of the most speciose animal orders on Earth, beetles seem like the most tenable candidates for a kind of revisionist history of insect extinction. Although I am wary of using *M. punctellum* as a metaphor, it has populated this thesis from the outset in the form of the diminutive black and white beetle outlines that give pause to paragraphs and breaks to sections. Having the beetle present in the text is a reminder not only of my initial motivation for the research but of the urgency of such studies. The outline's two-dimensional, linear form reflects the simplistic ways in which humans have often thought about and understood insects, while also mimicking the information available about this beetle and insect extinctions in general. Like so many species of insect, we have only the barest (exo)skeleton of information about *M. punctellum's* life and death. In order to create the outline, I used taxonomic information about the genus *Mecodema* alongside images of other Aotearoan carabids. The changing positioning

Figure 3.4: Author's illustration of *M. punctellum*, Apr 5 2020.

of the beetles serves as a reminder of the insect's own agency and way of moving through the world.

While the symmetry and simplicity of the outline can represent the state of historical knowledge about the beetle, the watercolour illustration in figure 3.4 offers a more personal, individual experience of *M. punctellum*. In this image I have tried to create a 'face to face' encounter with the beetle and situate it within a reconstructed, imagined version of its ecosystem. Given that it is not a scientific illustration and is a product of mixing taxonomic data with information about the ecology of Takapourewa, it is also a reminder of the often fantastical (and false) representations of extinct species and the limits of historical knowledge. Distorting the normal scale of human encounters by making the insect larger (the image is A3) challenges the viewer to imagine being the beetle and living life crawling through the forest floor. The image is an attempt to foreground the lateral relations between species—both flora

and fauna—and highlight the dynamic environments all insects (and, indeed, all creatures) inhabit.

The painting of *M. punctellum* attempts to challenge the anthropocentrism at the heart of human perceptions and experiences of insects. Berenbaum makes a similar point about the anthropocentrism in humanity's view of the world by examining the relationship between pollinators and flowers. While humankind may feel this is one area where kinship with insects is shared in mutual appreciation of the beauty of the flower, we are, she points out, 'eavesdroppers on this conversation; the colors [sic] and shapes are signals from the plant to the insect partner' (6). Raffles makes a similar point, reminding us that insects too are visual agents. Using two photos of the same daisy—one seen from a human perspective and one from that of a bee—Raffles gets to the heart of the issue of relying too heavily on vision alone as objective truth:

> …the natural world's indifference should make us wary of assuming too quickly that flowers that draw our eye are similarly seductive to a pollinator. Such hidden truths make visible one important fact about vision (our own and that of other beings): it is property not only of the viewer and the object but also the relationship between them (304).

Raffles reminds us that human perceptions on the worth and attractiveness of a creature bear little to no relation to the world that creature inhabits. Though perhaps disliked by many, beetles like *M. punctellum* would have moved through and negotiated the world in ways that are imperceptible to the human observer. The likely extinction of *M. punctellum* signifies the lost not just of lives and biodiversity but of a unique way of living in and experiencing the world.

Unsung, unseen, uncharismatic: understanding the 'insectapocalypse'

Next the ghastly ticking of a death-watch beetle in the wall at the bed's head made
Tom shudder— it meant that somebody's days were numbered.
(Twain 143)

While Tom Sawyer might shudder at the 'ghastly ticking' of a death-watch beetle in the wall—named in medieval times because it was only audible during the silence of a 'death-watch'[84]—nowadays it is beetles themselves whose days are numbered. Brooke Jarvis' exposé in *The New York Times* in late November 2018—'The Insect Apocalypse is Here'—brought international attention to the global crisis in insect decline and coined the oft-repeated moniker 'the insectapocalypse'. Rachel Carson had exposed the harmful effects of widespread pesticide and insecticide use more than fifty years earlier in *Silent Spring* (1962), and concerned entomologists had been decrying the decline in insect numbers for decades, but Jarvis' story sparked renewed international attention to the issue.[85] If readers needed confirmation of the consequences of insect die-off they need only glance at the image accompanying the article (fig. 3.6). In this image, the head of a bee is exploding into a mushroom cloud, drawing parallels between nuclear disasters and the crisis in insect decline. More recent articles discuss 'windshield phenomenon', or 'The Splatometer' as a recent *Guardian* article called it (Carrington, 'Car 'splatometer' tests'), as a simple, relatable barometer of the extent of insect decline. Figure 3.5 shows a bug-splattered windscreen in 1998 and a driver who is either horrified or disgusted (or both): twenty years later the same driver looks happily out of a clear

84 According to Dave Goulson, in medieval Europe the death-watch beetle was believed to be the Devil 'impatiently drumming his fingers as he waited for his chance to snatch the soul when it departed from the body' (110).
85 See 'Plummeting Insect Numbers "Threaten Collapse of Nature"' (Carrington, Feb 10 2019) and 'Global Insect Decline may see "plague of pests"' (McGrath, Feb 11 2019).

Figure 3.5: Author unknown. Posted on https://imgur.com/gallery/ud5FWjv, Jan 6 2019.

Figure 3.6: Dorfman, Matt. Photo Illustration for 'The Insect Apocalypse is Here: What Does it Mean for the Rest of Life on Earth?' *The New York Times Magazine*, Nov 27 2018. www.nytimes.com/2018/11/27/magazine/insect-apocalypse.html.

windscreen. The cartoon is an odd way to highlight the crisis in insect death as it positions dead insects as a sign of a healthy ecosystem and clear windscreens as alarming. Like this cartoon, many stories of the insectapocalypse ask readers or viewers to reconsider their attitudes to insects. One headline made this explicit with the heading: 'Insectaggedon: New Zealanders have "two weeks of life" after insect apocalypse' (Palmer Feb 12 2019).

In 2020, the catastrophic consequences of global insect die-off have become conversation topics for more than just entomologists. Despite the dramatic headlines, and despite the implications of this crisis (and by all accounts they are dire), public mood about the insectapocalypse, at least in Aotearoa, struggles to reach the pitch sometimes achieved by other ecological issues. Some global news outlets have even begun to call it the 'unnoticed apocalypse' (Hunt *CNN* Nov 14 2019). One possibility is that concern over insect decline

suffers from entrenched negative perceptions of the diminutive animals: discussions tend not to focus on an individual animal or species but on the class as a whole; stories hinge not on the inherent value of insects but on their usefulness to humans as pollinators or caretakers, directing readers to consider the impacts on their own lives rather than the lives of the insects. While there are many examples of recent children's publications that aim to educate and inform readers about the value of insects and their crucial role in healthy ecosystems,[86] material directed at educating or changing adult perceptions is limited.

One of the major problems that continues to thwart understanding of insect extinctions is a lack of quality information from long-running datasets—especially from biodiversity 'hotspots' like the equatorial rainforests. Historically, entomological studies have focussed more on an insect's behaviour and physiology than on the difficult work of counting and monitoring population size over time. Vojtech Novotny, an entomologist from the Czech Republic, believes one of the main issues is that 'ecologists and entomologists typically do not count insects' (in Hance par. 22). For Novotny, one of the principal barriers in trying to understand the current crisis is that there is still an enormous dearth of empirical information on insect populations, despite technological advancements in the methodologies used to create data (ibid). Without hard numbers it is difficult to communicate the severity of the situation and lobby, for example, for industry change in pesticide and insecticide use—one of the main perceived drivers of plummeting numbers (Sánchez-Bayo and Wyckhuys 8). Indeed, criticism of the 'insectapocalypse story' tends to focus on the fact it was extrapolated from just two studies: one from Germany (Hallmann et al. 2017), and the other from Puerto Rico (Lister and Garcia 2018). While there is now more information to corroborate the claims about insect decline, there is still not enough evidence to convince some detractors of the severity of the

[86] Recent children's books such as Ned Barraud's *New Zealand's Backyard Beasts* (2018), Catherine Barr and Anne Wilson's *Invisible Nature: A Secret World Beyond Our Senses* (2020), and Maria Gill's *On the Brink: New Zealand's Most Endangered Species* (2019) exemplify this trend.

crisis. Some scientists object to the dramatism that words like 'apocalypse' and 'collapse' bring to the issue (Saunders et al. 80). Saunders et al. argue that the apocalypse narrative promoted by mainstream media damages scientific integrity by being too simplistic and erasing the complexities of the issue, and could have detrimental effects on insect conservation by making the problem seem insurmountably large (ibid).

Apart from the lack of literally counting insects, is the fact that, for many, insects simply 'do not count', as Novotny puts it. Perceptions of insects as unlovable and uncharismatic have stymied efforts at insect conservation by limiting the funding available and the people interested in participating. Understanding what charisma is—who has it and why—is imperative to understanding the cultural status of insects. Like human charisma, nonhuman charisma seems like a subjective assignation, one that appears relational but in reality combines a complex range of biological, physiological and cultural factors. Jamie Lorimer believes all creatures have some mix of 'ecological, aesthetic, and corporeal charisma' (911). According to Lorimer, charisma is not accorded collectively but on an individual basis (919). He cites Kay Milton who argues that 'people need to individualise nonhumans before they can come to care for them' (in Lorimer 919). This individualisation in turn bestows the emotional effect of 'personhood' on the nonhuman animal and allows for the individual to be 'used' by conservation organisations to give their target organism a 'face' (ibid). This calls to mind the white rhinoceros Sudan and the way in which narratives about the decline of the species as a whole focussed on the life and death of an individual animal. Given Western humanity's propensity to view insects as a collective, the individuation of an insect in order to 'see' and care for it becomes that much more difficult.

The etymology of the word charisma—a gift of grace—captures the specific, enchanting character of a charismatic being, the ethereal quality of the trait. But charisma has been shown to be less ethereal and more biologically driven. Mark J. Estren, in an article

subtitled ‘Seeking Respect for the Non-Cute’, argues that ‘the animals to whom we feel the greatest attraction are those who we deem, because of their morphology, to be the cutest’ (6). Morphological cuteness creates the ‘neoteny barrier’—an anthropomorphic bias towards mammals with larger heads, big eyes and an unsteady gait as these qualities can mimic peoples responses to human babies (Estren 6; Herzog 40; Gould 1980). Hal Herzog argues that insects have ‘[t]oo many legs’ and ‘disgusting habits’ to be seen through the neotenic barrier. Instead, their radical alterity performs what Lorimer calls a ‘feral charisma that is in stark contrast to anthropomorphic cuddly charisma’ (920). Instead of boosting the popularity or awareness of a species, ‘feral charisma’ often achieves the opposite, surrounding a creature with negative accolades: as Eric Greene states, ‘[i]t’s easier to empathise with the dog than with the flea’ (84).

Being widely perceived as uncharismatic has had significant consequences for the conservation of endangered insects in Aotearoa. It is likely that Aotearoa lost two beetles to extinction in 2019: the Eyrewell beetle (*Holcaspis brevicula;* fig 3.7) and the Mokohinau Stag beetle (*Geodorcus ithaginis;* fig. 3.8 & 3.9).[87] While the deaths of these two beetles were discussed publicly on television and in print, they did not generate the kind of media attention that other conservation stories might—like, for example, a bad breeding year in Aotearoa’s hyper-managed kākāpō population. Anecdotally, I continue to have numerous conversations about the extinctions of these beetles with people who have never previously heard of them and are shocked to think a native fauna went extinct without coming to their attention. However, recent press on the ‘insectapocalypse’ has brought the current crisis in insect decline to a wider audience: this slow shift in attitudes and public concern is visible by comparing the

[87] Extinctions are notoriously difficult to evaluate and there are multiple instances where animals were ‘rediscovered’ many years after they were presumed extinct. Examples from Aotearoa include the takahē, the Chatham Islands taiko, the New Zealand storm petrel, and, most pertinently for this research, the Canterbury Knobbled Weevil (Fountain et al. 737; Platt 2015).

Figure 3.7: Rhode, Brigit/Landcare Research—Manaaki Whenua CC BY 4.0. [Photograph of the Eyrewell Beetle] in 'Hello Cows, Bye-bye Rare Beetle', *Newsroom*, Feb 13 2019: updated Mar 6 2020. www.newsroom.co.nz/2019/02/13/440614/hello-cows-bye-bye-rare-beetle.

dearth of information on *M. punctellum* with the media on the Eyrewell and Mokohinau Stag beetle.

The Eyrewell beetle was proclaimed by some media outlets to be extinct in February 2019. Like *M. punctellum*, it was a flightless, ground-dwelling carabid whose extinction is connected to habitat destruction.[88] And, like *M. punctellum*, very few Eyrewell beetles were ever actually found. It lived in rotting logs and forest undergrowth in an isolated patch of exotic pines in the Eyrewell region of North Canterbury. There are a number of theories as to how an endemic carabid beetle came to make its home in an introduced environment. One theory is that the beetles switched habitats, shifting from the kānuka and mānuka shrubland covering the region before European takeover, to the Monterey Pine (*Pinus radiata*) planted by the Crown for forestry between 1928 and 1932 (Tipa 32). Others believe the beetle might have been transplanted there along with the pines (ibid). The land was returned to Ngāi Tahu in 2000 as

[88] The prevalence of carabid beetles in threatened species reports in Aotearoa and the extinction of both *M. punctellum* and the Eyrewell beetle reveals the particular vulnerabilities of the carabid family group. In Aotearoa, their flightlessness, restricted habitats, small size and nocturnal habits have made them especially vulnerable to extinction (Ball et al. 84, 91).

part of the Ngāi Tahu Settlement Act of 1998 at which time most of the 6764-hectare Eyrewell forest remained in plantation. Since 2010 the land has been slowly converted into dairy and meat production and the plantation forests cleared to open up land for grazing (ibid).

The extinction of the flightless carabid is hotly contested and by no means certain—although no beetles have been found since 2005. The large tract of land which contains the Eyrewell Forest is managed by Ngāi Tahu Farming: Chief Executive Andrew Priest states that they take 'the importance of protecting an endangered species of ground beetle seriously' (in Tipa 33). In 2013 the company partnered with Lincoln University to discuss the restoration of native habitats on the land. Writing for *Te Karaka* (the quarterly magazine of Ngāi Tahu), Rob Tipa states that, together with Lincoln University, the iwi has conducted more than 30,000 trapping days since 2013 (33).[89] Dr Rebecca Dollery, who studies restoration ecology specific to this region, believes negative media about the beetle has taken attention away from the positive changes occurring on the site. Dollery stated, 'We're trying to do our best to restore an area that was an exotic pine plantation into something which is native that benefits a whole host of species, not just an elusive beetle' (Tipa 32). According to Priest, the company has one of the most progressive stances on environmental and ecological harm minimisation in the country and is the only farming business to have signed the Climate Change Coalition, committing to reducing their greenhouse gas emissions by 29% by 2030 (ibid). Complicating the matter are vagaries about the beetle itself. Lincoln University entomologist Mike Bowie finds the habitat of the beetle confusing: there are remnant stands of native kānuka near to the Eyrewell forest but no Eyrewell beetles have ever been found there (in Tipa 33). Bowie would like to see DNA work done to analyse the specimens of the beetle and confirm that it is indeed

[89] While this number seems large, it represents the number of people involved in the surveys—their trapping hours are added together to generate this figure.

a separate species (ibid). Tipa's article leaves the reader uncertain about the fate of the beetle and uncertain as to whether anything could have been done to save it (if indeed it is extinct).

Articles on the beetle in the mainstream media have not been flattering about the role played by Ngāi Tahu Farming. Farah Hancock, writing for *Newsroom*, wrote a piece called, 'Hello cows, bye-bye rare beetle' (Feb 13 2019) which claimed that the Department of Conservation had spent eight years trying to get the corporation to preserve some patches of forest to save the beetle from extinction (par. 17-20). According to Hancock, DOC had repeatedly tried to contact Ngāi Tahu farming between 2005-2013 about the creation of a reserve for the beetle to no avail. Jesse Mulligan, reporting for *The Project*, filed a similarly toned report under the heading 'We just lost another species to extinction—it must be the last' (June 19 2019). Mulligan offers an impassioned, simplified version of the story, stating, 'It's not our job to tell iwi what to do with their land. But if any private business wipes out an entire species in the course of making a profit then we shouldn't be scared to go public about it' (par. 12). Some tāngata whenua have highlighted how this narrative conveniently erases the vastly more significant impact of European settlement on the Canterbury plains, as vast tracts of native forest were cleared to make way for 'productive' plantations (Tipa 32). These plantations were logged several times in the ensuing decades before the land was given back to Ngāi Tahu and, as Tipa states, there are questions as to whether or not the beetle had already become extinct before the conversion to diary (ibid). Ultimately, however, the beetle's extirpation caused little stir in the wider public and Mulligan's report offered the only response to the loss of the beetle that was more emotive than scientific. The three media items discussed here represent the extent of public discussion about its extinction and there have been no follow-up publications.

The possible extinction of the Mokohinau Stag beetle made the front page of the September/October issue of *New Zealand Geographic* in 2019 (fig. 3.8). The article

Figure 3.8: George, Novak. [Mokohinau Stag Beetle]. *New Zealand Geographic*, vol. 159, Sept/Oct 2019, cover.

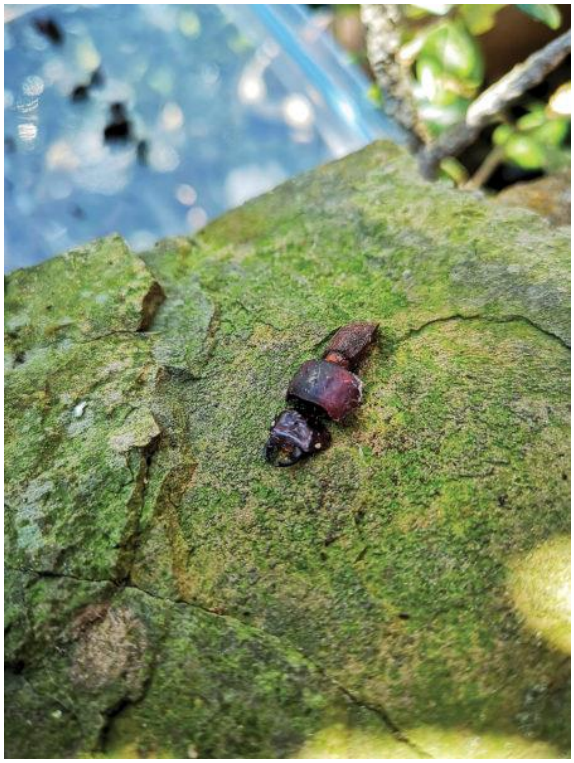


Figure 3.9: Brooking, Benjamin. [The remains of a Mokohinau Stag beetle] in 'What Happened on Stack H?' *New Zealand Geographic*, vol. 159, Sept/Oct 2019, 89.

accompanying the cover, under the ambiguous heading 'What Happened on Stack H?', takes a more cautious, investigative approach to the beetle's potential fate than those addressing the Eyrewell beetle. Mike Dickison, the article's author, an entomologist and a former natural history museum curator, states that '[i]t takes 50 years without a sighting to declare something extinct' and he is thus reluctant to state definitively whether or not the beetle has vanished (93). According to Dickison, '…invertebrates are tricky cases' as the official extinction criteria 'can't cope with insects' because they can remain undetected for decades only to 'pop up again' (ibid). The causes of the probable extinction of this particular species are similar to those that wiped out the two beetles discussed previously: it is believed that geographical isolation led to small, fragmented populations that became increasingly vulnerable to a range of threats. The size of Stack H is one of the more notable factors Dickison singles out as contributing to the beetle's likely demise. Not big enough to be considered an island, Stack H is a rocky outcrop

100kms northeast of Auckland that is only accessible by a nine hour boat trip from the Coromandel Peninsula: it is less than an acre and its diminutive landscape is protected by 30-metre cliffs. As Dickison claims, 'a tiny habitat is ridiculously vulnerable: a drought, a fire, a single rat escaping from a moored boat, and it's all over' (92). Only a handful of beetles were ever found: exhaustive surveys in 2019 found only an empty exoskeleton resting on a piece of mossy stone (fig. 3.9).

Dickison's article in *New Zealand Geographic* draws public attention not only to the crisis in insect extinctions but the difficulties entomologists and conservationists face in funding invertebrate conservation. We can contrast Sudan's emotive farewell with the cover of *New Zealand Geographic* featuring the Mokohinau Stag beetle. Published in the same month as the *National Geographic* article (October 2019), the differences between the images are striking: unlike Sudan, the beetle is alone, unnamed, and laid out on a stark white background in a manner no different, really, to that of the insects in Hudson's *Manual*. Perhaps most significantly, there is no human element to its depiction, nothing to suggest its loss was felt by humanity. It is a stark, almost brutal image that seems to evoke both the physical isolation of the beetle, and the loneliness of efforts at beetle conservation. As Rebekah White commented in an editorial addressing the article:

> If beetles are on the front line of the global extinction crisis, then entomologists are on the front line of budget cuts. Halting plans to save invertebrates results in the least public outcry, especially if no one knows they're there in the first place (6).

White stated that 'some people at the Department of Conservation did not want us to tell you about the Mokohinau Stag beetle', going on to say that the status of this beetle goes 'beyond critical' (6). As White argues, 'You deserve to know that the cost of conservation budget cuts is paid in beetles. That species are blinking out around us, unknown, unpublicized' (ibid). Her

language calls to mind the black background of the *National Geographic* article, as if these species were points of light in a universe slowly getting darker.

'…the flying centre of the world'

> …if we could communicate with the mosquito, then we would learn that it floats through the air with the same self-importance, feeling within itself the flying centre of the world.
> (Nietzsche 1873)

In as much as charisma might be an innate human response to morphological features, it is also, it seems, more tenuous and malleable than that. In his investigation of the ways in which nonhuman charisma is constructed, Jamie Lorimer states that nonhuman charisma has the capacity to subvert what he calls the normative 'scientific epistemology configured around a modern subject-object dualism' (911). In other words, it creates openings for a different kind of relationship between human and nonhuman animals. Lorimer opens his study with two vignettes that capture this potential. In the first story we are transported to a 'dark and windy night' in the Hebrides where, 'thigh deep in flag irises' the author and his companion listen for the call of the corn crake (*Crex crex*)—a bird whose population's recovery has provided a moral and financial boost for biodiversity conservation in the United Kingdom (Lorimer 911; Goulson 189; 235). The second takes place on a summer's evening in the company of the author's scientist friend Helen. Here Lorimer is poised in a Sussex garden watching the emergence of stag beetles (*Lucanus cervus*) from their five-year saproxylic larval stage as they swarm over a dead log:

> Cumbersome, buzzing, and alien they launch themselves into the gloom. Helen is ecstatic; I am transfixed; her neighbour shudders and backs away. Exploring the ecology of the beetle, Helen gets in amongst the swarm, following the beetles, mapping their behaviour, and trapping some for later observation […] As she works she speaks to the beetles, soothing them as they scuttle around the jam jar. Her neighbour goes indoors, revulsed (911).

The scientist in this portrait clearly sees her subjects as charismatic, she soothes them and handles them with loving ease; the scholar—interested in an intellectual sense by what is occurring—is transfixed; the neighbour—uninterested in the life-cycle of the stag beetle and perhaps seeing it as a reminder of an undesirable swathe of beings—exits the scene in revulsion. In their three responses we get a glimpse of the potential for a kind of human metamorphosis—as if revulsion, fascination and ecstasy were stages in human empathic responses to creatures they do not (yet) understand or have had limited exposure to. Whether or not this is Lorimer's intention, the vignette exposes the subjective way in which humans relate to other creatures and the mediated nature of their responses. Through Helen we can see the transformative powers of intimate knowledge on an individual's physical, emotional and intellectual experience of insects. In this instance at least, knowledge, interest and empathy are closely related.

Within the same narratives ascribing insects to the category of other and lumping them together as an impenetrable superorganism are moments of empathic encounters between human and insect. Though the magnified flea of Hooke's *Micrographia* calls the viewer's attention to the alien armour of its form, it is also possible to glimpse a respect in the detailed attention the author has for his subject. Representation of this kind requires a kind of intimacy with an animal that can have transformative powers over human perception. Having spent so much time delineating every aspect of its tiny form, Hooke remarked: 'The strength and beauty

of this small creature, had it no other relation at all to man, would deserve a description' (210). He notes the flea's powerful jumping mechanism: 'These six legges he clitches up altogether, and when he leaps, springs them all out, and thereby exerts his whole strength at once' (ibid). The flea seems to have sparked a similar fascination and wonder in some viewers at the time of its publication. Brian J. Ford details how most surviving copies of the 1665 publication no longer contain the image of the flea as these have been carefully cut out by admirers, presumably to be framed (2). Samuel Pepys, a seventeenth-century politician and diarist, was transfixed by Hooke's studies, calling *Micrographia* 'the most ingenious book that I ever read in my life', and staying up until 2am reading it (Jan 1 1665).

In his exploration of wonder and its structured relationship to animals, Armstrong asks 'what kind of thing is wonder in the first place?' (156). To answer this question, he explores the writings of Renaissance philosopher Francesco Patrizi who suggested that wonder, as a faculty of the mind, 'mediates between the capacity to think and the capacity to feel' (in Armstrong 2014: 156: citing Greenblatt 79). Perhaps by its very nature, the concept of wonder resists rigid definitions: it is experiential, circumstantial, and thus a fundamentally individual experience. The very word itself evokes a feeling of questioning curiosity and imaginative creativity. Armstrong concludes by arguing that:

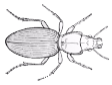
> Not moving too quickly to convert wonder into certainty—being prepared, rather, to experience the suspension between feeling and thought, between the known and the unknown—allows the wonderer to notice the limits to pre-existing thought and knowledge. In this respect, it seems to me that wonder offers the kind of disposition that has great potential to contribute to the urgent task of recalibrating our species' relation to others (169).

The contemporary crisis in insect extinctions certainly demands a different kind of attention and approach than those of the previous centuries. 'Recalibrating' humanity's relation to insects seems to be one of the more urgent tasks of the twenty-first century.

In contemporary Aotearoan society, wonder is often induced by what Heise calls 'the cultural filtering of science into images and texts' (13). When science is the engine of wonder, then it must also take responsibility for the role it plays in cultural productions and understandings of nonhuman others. Inculcating this kind of wonder involves dismantling some of the unhelpful divides that have kept scientific works from expressive displays of empathy or emotion for the past couple of centuries, allowing different kinds of narratives to surface. It is a question of paying attention, of 'counting' insects—both literally and figuratively, and renegotiating the traditional boundaries between beings and disciplines. This involves, in part, an acknowledgement that as much as some might feel a gaping ontological distance between humanity and insects, we are deeply and critically dependant on them. Stephen Loo and Undene Sellbach write of the 'big and small edges of sentience' insects evoke, and remind humanity that 'we are ecologically entangled in ways we often only dimly perceive and are impacting the environment and other species in damaging ways we frequently ignore' (80). What is lost when a species of beetle—or any other being—goes extinct is a way of being in the world. These creatures inhabit microwildernesses of dense and complex interrelation: plants, insects, vertebrates and other invertebrates, fungi, weather, geology combine to create rich worlds of life outside of the human scale—there is much to find wonder in. Paying attention to beetles, disappeared, disappearing, or present, provides opportunities for exploring the edges of sentience and empathy, and of imagination and perception. In the face of the potentially catastrophic scale of insect decline, this is both a necessary and an urgent task.

CODA

Metamorphosis



Many representations of insects in Aotearoa fall short of communicating the complexity not only of the lives and deaths of insects themselves but of the biodiversity crisis currently facing the planet. Although there are examples that promote an ethics of care and respect between humans and insects, such as children's stories, adult-oriented representations tend to frame the insect as less significant than other nonhuman animals. Rosie Ibbotson argues that the Anthropocene 'is facilitated in part by a crisis of representation' ('De-extinction' 16), speculating that the 'macro and micro' manifestations of this 'might be impossible fully to overcome' ('De-extinction' 16). As it pertains to insects, this crisis has been nourished by ways of thinking about animals as 'embodiments of nature' and 'as part of a biologically given order of things' (Potts et al. 4). Pushing past what divides humans and insects, creating new ways of thinking about and interacting with the six-legged might be a difficult task, but it is an important one. In Aotearoa, there are some indications that public attitudes to insects may be slowly shifting.

Changing the Conversation: 'Critter of the Week'

'What sort of insects do you rejoice in […]? the Gnat inquired.'
(Carroll 65)

In Aotearoa one recent cultural text has elevated the public profile of insects and tried to shift the conversation about uncharismatic creatures more generally. Nicola Toki and Jesse Mulligan's Friday afternoon show on Radio New Zealand (RNZ), 'Critter of the Week', affectionately known as 'Critter' by its hosts (Toki, pers. comm Feb 2 2020), has amassed a considerable following in the five years it has been on air and continues to attract new listeners (ibid). While 'Critter' does not exclusively focus on insects, they make up a substantial portion of the creatures covered to date.[90] 'Critter' has been running since 2015 and was started, according to Toki, in response to an interview she did with Mulligan about the crisis in bird funding earlier that same year (ibid). Towards the end of that interview, feeling that she wasn't getting her message across, Toki appealed for the need to look beyond the charismatic megafauna that so often receive the spotlight in Aotearoa. Recalling that moment, Toki said, 'the guts of it is this, everyone wants to sponsor a kākāpō or a kiwi or a tuatara, nobody cares about Smeagol the gravel maggot' (ibid). In the first episode of the show, which aired on October 2nd 2015, Mulligan introduced the program by arguing, 'Just because a bug is ugly, doesn't mean we shouldn't save it, right?' ('Critter' Oct 2 2015: 00:25). He goes on to state, '[t]here are lots of unsung and uncharismatic creatures that need a light shone on their particular plight' (ibid: 00:35). Mulligan claims he did not love insects or other invertebrates before beginning the weekly segment but he has since become a passionate advocate for Aotearoa's

[90] RNZ's website contains an archive of past episodes: www.rnz.co.nz/national/programmes/afternoons/collections/critter-of-the-week

‘unattractive’ species (Toki, pers. comm. Feb 12 2020). This is evident in his impassioned response to the possible extinction of the Eyrewell beetle and the enthusiasm he continues to bring to ‘Critter’ each week.

The show itself follows a predictable script. Mulligan welcomes Toki and they chat informally before he asks her to introduce this week’s critter. Their enthusiasm is infectious and the pair are able to discuss creatures as diverse as gravel maggots, robust grasshoppers, and brachypterous (flightless) moths with equal passion. The conversation focuses on the unique qualities of the creature and its role in the ecosystem as well as its current conservation status—whether or not it is a threatened species. Normally, Toki paints a wide picture of the critter’s life using information from scientific sources: this includes details such as habitat, breeding, geographical location, and any behavioural quirks. Sometimes the species is little known and little studied, like the gravel maggot *Smeagolidae*, or it might be an iconic species like the wētāpunga or pūriri moth. Although there is a strong focus on insects (or, more accurately, arthropods), past episodes have also included lizards, birds, and plants: the criteria for inclusion is less about the number of legs a creature has and more about how unknown or how ‘uncharismatic’ it is. There is an explicit intention to ‘Critter’: to communicate and publicise Aotearoa’s lesser-known species in order to bolster their conservation. The audio is supplemented by photos posted on the RNZ Facebook page and the ‘Critter’ page of RNZ’s website.

The success of the show has seen it branch out in a number of different directions. Responding to the enthusiasm of loyal listeners, Mulligan and Toki have hosted a variety of competitions such as the ‘Critter of the Week Bake-off’ in 2018 (fig. 4.1), ‘Knit-a-Critter’ competition (fig. 4.2) in 2019, and the recent ‘Lego Critter’ competition in 2020. These competitions are emblematic of the quirky and fun tone of the program and support the show’s mission to promote uncharismatic critters by providing educational and fun methods of

Figure 4.1: Guthrie, Ruth. *Mokohinau Islands' Stag Beetle Chocolate Cake.* 'Critter of the Week Bake-Off: the Contenders!', Oct 19 2018. www.rnz.co.nz/national/programmes/afternoons/audio/2018667592/critter-of-the-week-bake-off-the-contenders.

Figure 4.2: Kearvell, Claire. *Giant Wētā*. 'Announcing the winners of Knit-a-Critter 2019', Oct 21 2019. www.rnz.co.nz/national/programmes/afternoons/audio/2018718650/announcing-the-winners-of-knit-a-critter-2019.

engagement. Although the focus can be serious, Toki and Mulligan work hard to keep the show as light and palatable as possible. In keeping with this, they end each discussion by assessing the creature's 'attractiveness' and giving it a rating between 1 and 10 (1 being very ugly and 10 being very attractive). This segment of the show has always seemed somewhat antithetical to the wider intentions of 'Critter', as rather than highlighting the creature's inherent worth as a being, listeners are instead drawn (back) into a hierarchical assessment of its appearance.

Over the past five years, 'Critter' has elevated the lives of Aotearoa's less charismatic and oft-forgotten smaller fauna and, albeit briefly, shone a spotlight on them. Unlike the pinned and isolated insects of older field guides and museum displays, 'Critter's' insects come to life on air, offering listeners a glimpse into some of life's 'unfathomable secrets' (Fabre 1912: 34). Toki states they are currently working on publishing data that will help show the extent to which the radio programme has influenced listeners' attitudes to insects and other uncharismatic creatures (pers. comm. Feb 12 2020). Even without the statistics available to show listener numbers, 'Critter's' success has undoubtedly played a positive role in public perceptions of insects in Aotearoa. If nothing else, it has increased general awareness of the presence of endemic species other than the birds for which the country is often known, and

contributed to a growing understanding of the threatened status of many of Aotearoa's insects. It is important to note, however, that 'Critter' does not represent some sort of 'gold standard' in insect representations. While it has a broad reach and public appeal, it rarely dives deeper than morphological and habitat descriptions and often falls shy of advocating for more conservation funding for the critters discussed. As an employee and one of the more public faces of DOC, Toki must be careful not to be too critical of the Department's current conservation efforts. Compared to his opinion piece about the Eyrewell Beetle, Mulligan is restrained on the show, often assigning a much lower attractiveness score than Toki. Despite this, 'Critter' often feels like a lone voice advocating for insects in an environment that often ignores them.

There remains only one specially designated insect conservation reserve in Aotearoa. In 2018 the Department of Conservation erected a predator-proof fence around a 200 metre long section of gravel road in the Mackenzie Basin in order to protect a remnant population of the critically endangered Robust grasshopper (*Brachapsis robustus*: fig 4.3). The fence is thought to be one of the first predator-proof fence erected to safeguard a single species in the world (Ridden par. 1) and its success in bolstering the Robust grasshopper population is being closely monitored to see if the model could be duplicated elsewhere. The grasshopper's status as the first Aotearoan insect to receive dedicated and specific conservation measures is in part due to the passion of entomologist Tara Murray and her team. Murray's fondness for the grasshopper is visible in figure 4.3 where she frames a single insect looking at the camera: the image speaks to the deep and enduring connections that come from long periods of time spent interacting with an insect. In an interview on RNZ, Murray fondly called the grasshopper the 'kākāpō of the insect world' because it is large and flightless and a bit 'smelly' (00:42). Epitomising the strange and jumbled environments that characterise the Anthropocene, the

Figure 4.3: The Robust Grasshopper, photograph by Tara Murray (in Ridden 2019).

grasshoppers are believed to have been transported to this particular section of road during its construction decades earlier when large quantities of stones and gravel were shifted from a nearby riverbed (Murray 4:35). In August 2019, Murray stated there were only five adult females and a similar number of males inside the reserve: she is hopeful the population will increase (ibid 5:00). While the grasshopper reserve does not offer complete protection from predation by bird species in the area and does not mitigate the significant impacts of farming in the district on the populations outside the fence (Mitchell par. 8), it is hoped it will go some way to securing this species from extinction. The construction of this reserve offers some hope that similar measures might be taken to protect other insect species in decline throughout the country.

If the popularity of ‘Critter of the Week’ and the construction of the country’s first insect conservation reserve seem to herald a shift in popular attitudes, the outlook still seems bleak for many of the country’s threatened insect species. Without a wider shift in perception and the possibility that this might signal an increase in conservation initiatives, it is likely more critters will got the way of the Eyrewell and Mokohinau Stag beetles. As if to presage this possibility, the Gnat becomes increasingly introverted and melancholic during its encounter with Alice:

> Then came another of those melancholy little sighs, and this time the poor Gnat really seemed to have sighed itself away, for, when Alice looked up, there was nothing whatever to be seen on the twig, and, as she was getting quite chilly with sitting still so long, she got up and walked on. (Carroll 65)

Perhaps in its persistent exhalations humanity’s blinkered perception of the insect world can be seen reflected (or refracted) in the eyes of the frustrated fly. Or perhaps, from the perspective of the twenty-first century, these sighs can be heard as the last breath of members of a vanishing class. Like Alice, we might look up suddenly, having finally started a new kind of conversation with the creatures with whom we share so much space, only to find they’ve silently disappeared.

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