Ngaru Whenua: Diffracting Indigenous Practices, Quantum Theory, Electronic Art and the Anthropocene

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Abstract

This practice-led PhD thesis presents the Ngaru Whenua Diffractive Method in an exploration of Indigenous Practices, Quantum Theory, Electronic Art and the Anthropocene. It proposes an evolution of diffractive method into multi-cultural discussion, after Donna Haraway (1997) and Karen Barad (2007). The approach is deeply rooted in Moana awareness of whakapapa (genealogy), creative wayfinding and a diffractive method that protects the mana and integrity of authors' words on all sides of cultural debates.

Ngaru Whenua wave patterns are known by oceanic navigators. Called "diffractive" in the West, they apply to light, water and sound. Acknowledging precedence of diffraction in Indigenous awareness, this research explores Indigenous Practices founded in traditional Moana navigational practices (Kawaharada, 1992) and whakapapa. The diffractive wave patterning found in the wave-particle duality of light is a subject that vexed Quantum Theorists – as Barad (2007) writes extensively about. In diffracting Indigenous Practices and Quantum Theory, the writing of Samoan authors on the Vā, including Albert Wendt (1996), Albert Refiti (2014) and Lana Lopesi (2021) are put into exchange with the writing of Barad (2007) using direct quotations used rather than paraphrasing. The contention is that this is necessary when engaging in multi-cultural, multi-disciplinary decolonised discourse, an essential core of Ngaru Whenua Diffractive Method.

Given the oceanic basis of the Ngaru Whenua discussion, the author's oceanic whakapapa to Tahiti and Hitiaurevareva (Pitcairn Island) and the consequences for creative practice are outlined, introducing the key theme of wayfinding as creative practice. Resolving to a personal level, the issues of whakapapa and Moana diaspora provided important guides to a visual vocabulary that is then taken into diverse media and contexts. Consequences for creative practice are further reflected on in a diffraction of Electronic Art and the Anthropocene. Projects resulting from wayfinding include a curated one-person and extended family exhibition exploring the critical Moana notion of an interconnected universe, a five-year window commission for the Govett-Brewster Art Gallery, the creation of *Arawhiti Āniwaniwa Rainbow Bridges* and *Black Holes* digital imagery, and Anthropocene explorations. The project's epitome comes with the placement of a laser etched Kōhatu on the sacred navigator site of Taputapuātea Marae on Ra'iātea, and the return to Aotearoa with a Kōhatu, necessitating the acknowledgment of Tapu and Noa, Sacred and Mundane. Together the creative work practices Indigenous ecological connection as an essential and ecologising counter to the Anthropocene.

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no materials previously published or written by another person (except where explicitly defined in acknowledgments), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Maata Wharehoka has been an important influence in my life and provided a strong and clear hand on pronunciation, and on engaging in Polynesian themes for living. Some of our collaboration formed the basis for reflecting on how electronic art might fit into the global issues of the day. Te Huirangi Waikerepuru and Te Matahiapo Indigenous Research Organisation played, and continue to play, an influence upon my mahi (work), with lessons from Te Huirangi extending to this day and contained in this thesis.

Of whanau, it is important to acknowledge Meralda Warren, who re-established ahu (tapa) making on Hitiaurevareva (Pitcairn) in 2007. Pauline Reynolds has completed decades of research into the Tahitian wahine (women) of HMAV *Bounty* and their ahu, with many publications on the subject that have provided key waypoints in my creative journey. Sue Pearson contributed an image to the museum exhibition and was a great debater of points. My mother Irene "Weetie" Clothier, father Ron Clothier, grandmother Aunt Lil of Cascades, and Tūpuna (ancestors) from the 1830s all appeared in the museum show, and their energies inspired and accompanied me at all times. So too did my brother Gary Clothier, sister Chris Stephens, and brother Rocky Clothier.

The environment outside my studio, with its lively bird visitors, extensive trees, and stunning light, provided a place to engage with the Anthropocene and submit myself to natural energies in the time of the pandemic isolation. This has been an extraordinary resource, reaching at night up to the moon and stars.

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This document is prepared for double sided printing, consequently, additional pages have been inserted so that Chapters start on a new, odd numbered page.

Glossary of Terms

Ngaru Whenua: This refers to a wave (ngaru) pattern made by a current passing an island (whenua) which splits in two around the island and overlaps downstream, creating a distinctive wave pattern and a line of foamy water in the sea.

Diffraction: The Ngaru Whenua pattern known by traditional navigators is called "diffraction" by Western Scientists and writers in the Humanities.

Ngaru Whenua Diffractive Method: This thesis proposes an evolution of the diffractive method initiated by Donna Haraway (1997) and extended into a multi-disciplinary discussion by Karen Barad (2007). The evolution moves the diffractive method into a multi-cultural discussion. Based on traditional navigator awareness of wave patterning in the ocean, the Ngaru Whenua Diffractive Method consists of citing full sentences of authors across cultural borders rather than paraphrasing, utilising a notion of knowledge as dimensional, citing precedence in Indigenous awareness, and considering the local and broader community.

Indigenous Practices: "Practices" are used here as a broader term than "knowledge" or "awareness," as an emphasis is placed on how knowledge and awareness in Indigenous societies map out *in practice* rather than simply forming constituents of a theoretical model. Also underlined is an associated ethical dimension. "Indigenous Practices" encompasses ontological, epistemological, spiritual, customary and contemporary approaches to living, art-making, material practices, and in the case of this thesis specifically includes life practice, creativity, digital artefacts and curation.

West: This thesis uses the common term West to reference the Western European Cultural Hemisphere, which shares an alphabet and extends from Russia to the United Kingdom, and with Colonisation, out to North and South America, Australia, New Zealand and Te Moana Nui a Kiwa (Pacific Ocean). The term Western Science refers to a post-Enlightenment set of positivist, rationalist values and approaches to reality. The West is not intended as a binary with the East, particularly as this research originates in the so-called "Global South," rather West is used as a shorthand for particular Euro-American ideological processes, particularly those commencing with the rise of Capitalism and Cartesian Duality following the Renaissance.

Polynesian and Moana peoples: The Polynesian triangle is a Western cartographical notion imposed on an open ocean that has no natural boundaries. In current discourse among Polynesians, the term Moana is frequently used to self-describe the region of origin. Consequently, Moana peoples is used in the thesis.

Moana (Ocean) Dimension: Also proposed is the notion of knowledge as dimensional, rather than knowledge acquisition being a linear process based on deductive reasoning. Dimensional knowledge involves looking from multiple sides and perspectives. "Moana" refers to the ocean, and the Moana Dimension consists of local knowledge and intergenerational knowledge, both of which are key to Moana awareness.

Rā (Interconnectivity) Dimension: Rā is widely used by Moana peoples as a reference to the Sun**.** The Rā Dimension measures the degree of interconnectivity of an idea. Interconnectivity is a major theme across Te Moana Nui a Kiwa (the Pacific Ocean) and in contemporary academia in several disciplines.

Tangata (People) Dimension: Tangata Dimension measures the extent of an idea in terms of its spread across cultures. Extent is the key measure, rather than finding single solutions to issues.

Aotearoa: This is the Māori name for New Zealand and is in common usage. In general, with Moana terms, words do not have a singular meaning but rather are multifaceted and depend for their meaning on context. "Aotearoa" is a term that can be expressed in its constituent parts: "Aotea" for example can refer to an island or a traditional waka (canoe). This needs to be borne in mind throughout the text when Māori terms are referred to in English.

Te Moana Nui a Kiwa: This is the Moana and Māori term for the Pacific Ocean (Moana people refer to Kiva). A literal translation gives "The Great Ocean of Kiwa." Kiwa (or Kiva) was an important navigator. An older name for the ocean is Te Moana Nui o Tangaroa, referring to the Atua or Energy of Sea Life (as translated by Dr Te Huirangi Waikerepuru).

Whakapapa: This is often translated as genealogy, which it is. However, in Moana terms, whakapapa is greatly extended and involves relationships to buildings, plants, rocks, and birds – these facets are stored in the oral tradition of a person's whakapapa. In addition, all things can have whakapapa, so whales, plants, and buildings for example can have their own whakapapa. The trees used to make a canoe have whakapapa.

Hitiaurevareva: This is the traditional Tahitian name for Pitcairn Island.

Kōhatu: This term is used to describe a wide range of rocks, with particular emphasis here on laser etched and painted river stones, to be located across Te Moana Nui a Kiwa.

Waka, va'a: "Waka" is Māori for canoe and "va'a" is the Tahitian term.

Mana: In this thesis "mana" is often used in the sense of prestige or integrity: for example, maintaining the mana of Indigenous writers' words on a subject by using block quotations that cite them in complete paragraphs. There is also a metaphysical side to mana, though the emphasis here is not on that usage.

Ahu: The Tahitian term for tapa, a cloth made from the inner bark of trees and widely produced in Polynesia.

Dr Te Huirangi Eruera Waikerepuru (1929–2020): It can be difficult for Western academics to understand the importance of key Indigenous figures. Te Huirangi Eruera Waikerepuru, now passed, is a major figure in national and international Indigenous affairs who spearheaded the campaign to have Māori language legally acknowledged as a second language.

Wayfinding: This is a term used by traditional navigators to describe their practice. This involves the nightly activity of navigating from one star to the next as they rise, traverse, and descend in the sky. The fuller sense of wayfinding involves greater considerations – nurturing the community on board the waka *and* the community on shore, for example, while honouring ancestors. Creative wayfinding is used here to identify a practice that acknowledges these approaches. Creative wayfinding does not involve sailing in the open sea, but rather navigating life and creativity; hence it is not the majestic enterprise of traditional navigators, but the humbler enterprise of living each day, traversing from one point to another and literally finding the way, with a particular emphasis on doing things that might not be done usually in life and the studio.

Te Pō: This is a reference to "nothing" and is referred to in regard to the *Black Hole* works discussed in Chapter Six, and also the ceremony around the placement of a Kōhatu on Taputapuātea Marae, Ra'iātea. An important concept among Moana peoples, it refers to a world of dark, often contrasted to Te Ao Marama (the World of Light). There is a Karakia that refers to twelve kinds of Te Pō which at appropriate times Te Huirangi Eruera Waikerepuru would refer to.

Introduction

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Introduction

This thesis is the story of a journey through the Polynesian or Moana diaspora, with the primary aim of locating a personal context with which to proceed in the contemporary era, alongside the attendant issues of climate crisis and species exploitation. A contextual review of knowledge across cultural borders in this project is predicated on traditional Moana navigational wayfinding and whakapapa. Whakapapa is often translated as genealogy or ancestry, and as we will later see, the concept is much wider among Moana peoples.

Prior to this project, I had discovered that my whakapapa (ancestry) can be traced back eight generations to Hitiaurevareva (Pitcairn Island) in 1790, and within this project I found I have whakapapa a further thirty-three generations on Tahiti, something I am still reconciling myself to. My eighth-generation ancestors were makers of ahu or tapa cloth, and I trace my creative lineage to this generation of wahine (women). I am Māhū – on Tahiti, this refers to someone who both acknowledges and expresses masculine and feminine aspects of themselves, a middle gender. I did not grow up on the island of my ancestry, but in Ōtautahi (Christchurch, New Zealand), and have a daughter Kohana, who has a presence in this document.

Before this thesis project, I was involved in national and international exhibiting, curating and publications, largely within Western conventions and utilising Electronic Art for projects (see Chapter Five). Previous research in the form of the Master of Arts (Hons) *Hybrid Cultures, Nonlinearity and Creative Practice*, focussed on cultural hybridity and nonlinearity in engaging with science and my hybrid cultural background. A major curatorial and residential project has been the co-founding of Solar Circuit Aotearoa New Zealand (SCANZ – every two years from 2006 to 2018). SCANZ was founded on themes of Environmental Response and Connection/Disconnection. As time passed, interaction with Indigenous Māori increased and deepened, while the environmental crisis has multiplied to the point of counting deaths from the impact of storms and fires worldwide. Clearly, the impact of Western multinational business practice and governance is resulting in significant events that impact people of all nations, often the least privileged.

The prospect that an active engagement with "Indigenous Practices" might provide some form of solution, or at least a way out of the crisis, was suggested by Yuk Hui (2017) who wrote that it is important to consider how Indigenous Practices might enter into dialogue with technology

and Western metaphysics. Such a dialogue could contribute to resolving global issues such as the climate emergency. This paraphrase maintains the general thrust of the original text.[1]
With Hui's words as a guide, several issues immediately arise. Bringing Indigenous Practices into dialogue with Western Metaphysics raises concern, due to the damaging impact of Western colonisation on Indigenous Peoples.[2] The following information may be distressing to some readers; however, laying out the situation plainly is important, as it provides motivation for decolonising academia. Andrew Crowe (2018, p. 230) records the following loss of Indigenous populations since European contact: "Tahiti 93%; Hawai'ian Islands 83%; Zealand 60%."[3] These are profound numbers and staggering losses, and they indicate the extent of the deleterious impact of colonisation on Moana and Māori peoples. These statistics are a driver of this project and underline the importance of bringing knowledge bases together in a decolonised framework, of which my thesis approach "Ngaru Whenua Diffractive Method" is an attempt.

Ngaru Whenua is a Kaiwhakatere (navigator) term for a type of wave produced downstream from an island. It is argued here that such wave patterning would have been known by Kaiwhakatere prior to the rapid settlement of Eastern Polynesia in 1190–1290 CE (Wilmshurst et al., 2011), as prevailing currents often come from the east.[4] This date, 1190, is important in providing a concise era for holding an understanding of an interconnected universe. Ngaru Whenua wave patterns can be drawn directly into dialogue with Quantum Theory, where this wave patterning is called diffraction. Diffractive wave patterns are found in light (wave-particle duality), sound and water. The subject and understanding of diffraction has been further extended into a method of multidisciplinary analysis and critique by Donna Haraway (1997) and Karen Barad (2007).

Important contributions stem from Indigenous perspectives. Following Zoe Todd (2016), the first of these is a statement of intent to cite Indigenous Practices (Reynolds & Wheeler, 2022; Wilson, 2008; Wilson-Hokowhitu, 2019) first wherever reasonable ground for precedence to the West can be located, which is strictly followed. A second contribution is to cross-reference Moana philosophy with DNA (Deoxyribonucleic acid) (Ioannidis et al., 2020) and radiocarbon dating records, to ascertain when aspects of Māori and Moana worldviews were in place. As such,

[1] This is the original text text (Yuk 2017, p 20): "The major question for us is in what way indigenous ontology might enter into dialogue with Western technology and metaphysics and thereby transform the current trend of global technologies."
[2] Metaphysics is traditionally associated with Philosophy, examining concepts such as knowing, time and being. In current writing into Quantum Theory exemplified by Barad (2007), knowing (epistemology), the characteristics of spacetime, and an entanglement with ethics are all core concepts under discussion. Hence, this conception of Metaphysics is used here.
[3] Crowe (2018) also writes that while there was some doubt about early assessments of population numbers, current archaeological records align.
[4] Here this term is used to indicate traditional non-instrument Moana and Māori navigators.

1190–1290 (the period of the settlement of Eastern Polynesia) provides a firm date for when the notion of Interconnection (Waikerepuru, 2011) was with Moana peoples. This is seven hundred and ninety years before similar concepts entered Western academic discourse (Deleuze & Guattari, 1987; O'Sullivan, 2001).

A third contribution is to provide a basis for bringing Indigenous Practices into dialogue with Western Science outside of a solely Western knowledge framework, applying a diffractive method to intercultural dialogue, and basing a discussion of Indigenous Practices on a notion of "Knowledge as Dimensional." This enables the unlocking of Indigenous Practices for the reader, without necessarily requiring the dissemination of sacred knowledge itself.

Following Smith (2012), a colonial bias in Western academic method is acknowledged, before using a Ngaru Whenua Diffractive Method to diffract the Sāmoan concept of *Vā* and Quantum Theory. Ngaru Whenua method maintains the mana of Sāmoan voices and Barad (2007) on Quantum Theory, by using block quotes and directly aligning text using quotations rather than author-composed paraphrasing. Paraphrasing in English can distort the meaning of terms used by Sāmoan authors. Importantly in diffractive wave patterning in the ocean and Quantum Science, the waveforms do not merge into one but keep their integrity.

Chapter Five considers the ways in which a Ngaru Whenua Diffractive Method might provide a counter-Anthropocene model for making art and culture utilising technology at this time of complex ecological dislocation. Hui (2017) argues that science and technology have been complicit in bringing about the current environmental issues facing humanity, as the Industrial Revolution removed the "meta" from "metaphysics," thereby releasing ethical practices from being considered when engaging with the environment and Indigenous peoples. Writers such as J. W. Moore (2017) place the schism of ethics and physics as a consequence of Cartesian Duality, and dissolving Cartesian Duality as fundamental is supported by Quantum Theory.[5] Davis and Todd (2017) unite an Indigenous perspective with Western author Moore in placing the start of the Anthropocene epoch with the "Capitalocene." What discursive structures are required when bringing Indigenous Practices into dialogue with Western Science? Do Moana and Māori notions of relationality provide a way forward out of the Cartesian chasm? Can a deeper look into the issues surrounding the Anthropocene provide a context for ethical electronic art production?

[5] Cartesian Duality is so called to distinguish it from other forms of Dualism in philosophy. See Bristow, 2017. In regard to Descartes, it specifically refers to the distinction between subject and object.

Following a wayfinding creative practice, a single final solution to these issues is not sought, but rather a suite of islands in an ocean of knowledge is offered, through which individuals and groups can wayfind solutions relevant to their lives and locations. Some of the islands in this ocean are documented in this text, while detailed and close up views can be found at the project website.

1.1 Ngaru Whenua Diffraction, Precedence and Subject-Object

This thesis directly engages with several critical elements: the relational practices of Indigenous and Moana peoples, Western Science in the form of Quantum and Chaos Theory, art mediated by electronic media, and the central issue of the day – human-forced climate change. In a relational space, relationality is non-dualistic. This is to say, reality is not understood as external to the individual or group; rather individuals, groups and reality are entangled in multiple ways. Therefore, Indigenous Practices are predicated on being located within a dimensional web that spans Wā (Te Reo Māori, Māori language) or Vā (Sāmoan): both space and time. To look across from one cultural group to another while maintaining the mana of each is referred to here as Ngaru Whenua, acknowledging the precedence in Moana peoples' understandings of ocean currents some six hundred years before the same patterns being found by Western science, where they are called "diffractive." This was initially applied in science to water, sound, and light, and subsequently from science to the humanities.

As this understanding of wave patterning precedes the development of a physics of waves in the West, the Reo Māori phrase "Ngaru Whenua" is used to acknowledge the term's origin in Moana navigation.[6] *Ngaru* is a term used for local wind waves, its use extending from Aotearoa New Zealand to Hawai'i and the Marquesas. *Whenua* refers to land, in this case also defining the waves as not caused by wind or current, but by land. While my whakapapa (genealogy in the Moana sense) extends to several islands in Te Moana Nui a Kiwa (Pacific Ocean) I am standing on the whenua of Aotearoa and will use Māori terms here, in part to honour my association with Kaumatua (Elders), and which will be discussed further regarding Dr Te Huirangi Eruera Waikerepuru (Taranaki Whānui, Ngā Puhi) and Maata Wharehoka (Ngati Tahinga, Ngati Apakura, Ngati Kuia).

Precedence emerges as a critical trajectory of this thesis. More precisely, this means acknowledging precedence in Moana understanding where it can be established that the same notion was discussed later in the West. This follows Métis woman Zoe Todd's (2016) experience of hearing Bruno Latour speak about the sentient environment while failing to acknowledge this

[6] See Crowe (2018, p. 88).

notion has existed in Indigenous thought for millennia. Reflecting on this has led to taking a stance, such that wherever I found that Indigenous and Moana practices preceded the equivalent Western understanding, then I acknowledge this first, before giving the Western context. This is not a conventional approach currently, and nearly all academic publishing forces the adoption of a Western context, even for Indigenous writers.

Recognising precedence is entirely suitable for a project that aims to apply Ngaru Whenua practices to diffract Indigenous Practices and Quantum Theory, for example. In terms of Indigenous Practices, the keynote speaker for *SCANZ 2011: Eco sapiens* was Te Huirangi Waikerepuru, an internationally and nationally renowned proponent of Indigenous rights, spoke about the multiple meanings of Wai, which often is translated as "Water." Dr Waikerepuru translated Wai as also meaning "flow," a more philosophical and poetic interpretation. He spoke of Wai o Tapu (sacred water); Ika Tangata (fish people); and Ara (the waters of birth). He talked about clouds gathering in the sky, raining in the mountains, and then flowing down the Awa (river) to the sea. Here it evaporates and is breathed in, intermingling with Ha, the breath. From there, the evaporation gathers to form clouds and the whole cycle commences again. You may have noticed that is a multi-definition context which is basically the Western hydrological cycle, but with one critical difference: the human is embedded in the scenario. This distinction is crucial to understanding the core difference between Moana and Western understandings of reality, which it turns out are critical to understanding the way out of the climate crisis.

Regarding Quantum Theory and Science as will be shown later, Quantum theorists in the 20th century constructed an argument for the dissolution of the subject-object distinction as fundamental to reality. This has been extended in quantum science experiments such as those performed on CERN's (The European Organization for Nuclear Research) Large Hadron Collider, where the scientist establishes pre-experiment parameters such as the type and speed of particle collisions; these must be taken into account in the experiment equations. Then from a large data set, interesting collisions are selected: "data selection criteria are to be applied to collision events so as to select interesting events" (Karaca, 2018, p. 5437). As such, the experimenter is intimately involved in the experiment and subsequent interpretation, so that they cannot be separated from the experiment. Barad (2007) has much to say about this entangled condition, discussed in Chapter Four.

Consequently, in this relational space, "I", rather than being excluded for the sake of objectivity, is understood as integrated into relationality. While this is conventional in several contexts, in the context of this work, it is based in both Moana cosmology and Quantum Science. Henceforth, "I" will appear within this entangled web of practice, and that means "you" the reader are likewise entangled here; together, "we" shall undertake this journey. This is founded in both

Moana worldview and Quantum Theory. The subject-object distinction will be discussed with some surprising consequences in Chapter Four "Ngaru Whenua: Diffracting Indigenous Practices and Quantum Theory."

This relational practice explains the use of "Indigenous Practices" in the title, rather than "Indigenous Knowledge" or "Indigenous Awareness." The concepts of "knowledge" and "awareness" have often, up to the 21st century, been largely based on Western assumptions, within which Cartesian Duality (i.e. the subject-object distinction) is embedded. Of primary importance is that Moana cosmology is the inherited result of intergenerational knowledge-transfer, which has been reinforced through practical application across generations. As such, the practical application of Moana cosmology is crucial, critical and characteristic. The term "Indigenous Practices" refers to the active application and renewal through experience that is central to Indigenous and Moana philosophy and living. Thus, thought and action are united in a transformative praxis.

1.2 Engaging Indigenous Practices

Indigenous Practices are introduced in Chapter Two, where the contribution from Todd (2016) is discussed further. While many in the West feel positively towards Indigenous cultures, the means by which reality is understood, the energy flows that exist within and between all things, and the way understandings of these flows are articulated in daily life and cosmology are less well understood. While anecdotally there has been a significant upswing in Indigenous academics publishing work, by and large this has not resulted in an improvement of Western academic intuition around Indigenous matters and energies, perhaps due to lack of exposure over time. In addition, the strong bias toward evidence-based assumptions often excludes a consideration of oral heritage. One of the primary aims of this work is to place oral histories as confirmed by evidence in the hands of academics; in particular, cross-referenced to the DNA record as recently as 2020 (Ioannidis et al., 2020). The goal here is to provide Western academics with firm and citeable timing, as the phrase "for thousands of years" lacks sufficient precision to be cited strongly and conclusively.

Simply locating information in a matrix of cosmology, DNA and radiocarbon dating will not be sufficient to elucidate Moana peoples' comprehension of Ke Ao (Hawai'ian), or Te Ao (Māori), the world around us. This is mainly due to the complete difference in framing and articulation between Indigeneity and the West. In addition, there has been a substantial and nearly overwhelming momentum towards Western academic frameworks, which has largely functioned to silence the Indigenous voice, not by design, but by the exclusion of Indigenous

forms of knowledge transmission such as oral heritage and a failure to recognise the mana of particular voices.

In academic writing, as Linda Tuhiwai Smith (2012) wrote, "the academic centre of knowledge is either in Britain, the United States or Western Europe … which actually exclude me" p. 37. There have been several ways to attempt to do something about the problem of Western dominance in academia. Promulgation of Moana notions has resulted in substantial academic research around the Sāmoan notion of Vā (Lopesi, 2021; Refiti, 2014; Wendt, 1996). Shawn Wilson (2008) influentially wrote of providing an Indigenous Research Methodology in his book *Research as Ceremony*. A Moana context for research is provided in terms of Hawai'ian Mo'okū'auhau (whakapapa or genealogy) as a framework for academic research method by Wilson-Hokowhitu (2019). Reynolds and Wheeler's (2022) Tahitian orientated research method 'For Mā'oli by Mā'oli' repositions the notion of author. All of this work is directed towards Indigenous authors, particularly in their relevant cultural context. These examples echo Tuhiwai Smith's ground-breaking recognition of Indigenous voices in the second half of *Decolonising methodologies* (2012).

The work of these authors has been an excellent and empowering step for Indigenous and Moana and Māori authors worldwide. Unfortunately, it is not proving fruitful in terms of Western academics citing this research in their papers. It can be speculated that this may be due to a lack of familiarity with and intuition around Indigenous and Moana frameworks. Another factor might be that Western academics are discussing different issues, and where issues might be similar, the discussion is often within Western frameworks.

In order to bring Indigenous Practices into dialogue with technology and Western sciences, while avoiding Western bias in a decolonised framework, I am proposing three *Knowledge Dimensions*, which function to explicate the processes of knowledge construction and articulation while not transmitting sacred knowledge itself. These dimensions – Moana (Ocean) Dimension, Rā (Interconnectivity) Dimension, and Tangata (People) Dimension – are woven to form a cultural bridge and constitute an active expression of Ngaru Whenua Diffraction. Considering knowledge as having dimensionality assists in discussing the relationality of Moana *Ao* (worldview), as it escapes a notion of knowledge that is bounded by deductive reasoning. Deductive reasoning is part of the picture, but does not adequately capture Moana cosmological awareness. *Knowledge as Dimensional* recognises that knowledge is not simply a linear process and that it can be multifaceted and viewed in a variety of ways as if it had a shape, hence is dimensional. Knowledge as Dimensional is also critical to bringing Indigenous Practices into dialogue with Quantum Theory, as it decolonises the notion of knowledge as held in the West. The Western notion has privileged the West and excluded Indigenous contexts.

1.3 Cultural Diversity

Some readers may have noticed that Māori, Hawai'ian and Sāmoan terms are being used, but with more emphasis on Reo Māori. We are indeed sailing in the choppy waters of a multicultural ocean diaspora, where Ngaru Whenua sometimes bifurcates into three or more woven plaits. "Chapter Three: Before the Beginning" provides an entry point into the dynamic cultural spacetime within which I am located, and surveys precedent artworks in a nonlinear history. I am a forty-first generation descendant of tapa-makers from the islands of Hitiaurevareva (Pitcairn Island) and Tahiti, part of the Society Islands group. [7] We call tapa "ahu," following the Tahitian language spoken throughout the Society Islands. My Tūpuna settled on Hitiaurevareva in 1790 (Reynolds, 2008), along with the mutineers of HMAV *Bounty*. The society that developed subsequently outgrew the island and in 1856 the entire community moved to Norfolk Island after the abandoned penal colony was gifted to them by Queen Victoria (Clarke, 1986).

There are two complexities in this cultural background. The first is the impact of two hundred years of colonisation, Christianity, commercialism, and patriarchy, which directly attempted to quash the expression of Moana identity. Tapa making (on Sāmoa it is called "siapo;" on Hawai'i, "kapa;" in Aotearoa, "aute") for example, was banned by church authorities. This has led to revitalising traditional practices such as ahu making on Hitiaurevareva by Meralda Warren in 2007 (Reynolds, 2008, p. 52), and annual Heiva games on Norfolk Island. The second complexity is that it was not my honour to grow up on an island of my descent. Instead, I grew up in Ōtautahi (Christchurch) New Zealand, as my parents who had met on Norfolk Island moved to the city of my father's parents. My mother holds full descent from Hitiaurevareva, while my father's ancestry goes back to the Shetland Islands and Northern Europe. As you will see in Chapter Three, these cultural complexities are common throughout Te Moana Nui a Kiwa, with many artists needing to negotiate these difficult waters, taking steps to secure identity in a foreign land under the conditions of diaspora (Refiti, 2014). The Polynesian diaspora has had a significant impact on many Moana artists, including myself.

The inclusion of Māori, Sāmoan, and Hawai'ian terms in this research relates to the current condition of my thinking and feeling around my identity. While I identify as of Hitiaurevareva-Norf'lk[8] culture in terms of family and have whakapapa to Tahiti, I have become strongly influenced while living in Aotearoa New Zealand by ten years of project activity under the

[7] The discovery of my whakapapa extending this far only recently occurred (in 2023), however, based on Orsmond and Smith (1893, p. 30) I may have whangaunga (common ancestor) linkages to Hawai'i in the distant past, and several to Māori iwi (tribes) in the far past.
[8] This is a local term for Norfolk Island.

guidance of Te Huirangi Waikerepuru. In a core period, we completed four international projects, two in Ngāmotu New Plymouth, one in Istanbul, and one in Albuquerque, and at this time we became friends (as Maata Wharehoka of Parihaka commented [2022, personal communication]). Te Huirangi Waikerepuru was renowned nationally and internationally and is credited with the legal acknowledgment of Reo Māori as an official language of Aotearoa New Zealand. This led to the establishment of Māori Radio and Māori Television. Consequently, Reo Māori is acknowledged here, by frequent reference and quotation. It does need to be said that I am not Māori.

The use of Sāmoan terms particularly relates to the recent impact of the Vā Moana group led by Dr Albert Refiti, as this PhD project has unfolded. From this source, material has emerged around Indigenous Research Methodologies (Wilson, 2008) and an important engagement in the relationality of the Vā, a Sāmoan concept ideally suited to a project diffracting Indigenous Practices and Quantum Theory. This has extended the girth of my Moana awareness and also my approach to creating works that engage with ancestors, and the practices associated with such important connections.

I will simply be honest with you now and say that there has been a part of me that craved the very stuff I missed by not growing up in the islands of my home: the everyday detail in the weaving of Moana understandings in daily life. It has to do with those things that glue an awareness of wider cosmology with the everyday. It has been my great fortune to have come into the world of Hawai'ian teacher Kawaihululani, who has gifted me exactly what I sought and for which I am deeply indebted and eternally grateful. This then, is what is behind the reference to Hawai'ian terms and concepts in this thesis, and which more recently has become aligned to my whakapapa. This speculative approach to my whakapapa (genealogy) found its greatest expression on Hitiaurevareva and Ra'iātea, as will be discussed in Chapter Six.

The section on precedent artworks rounds out the sense of "before the beginning," as the works alluded to were all experienced before the start of this research project. The span of time from which precedents are drawn ranges from fifteen thousand years ago to the 21st century, presented in the historically nonlinear, temporal order of when they came into my life.

1.4 Applying Ngaru Whenua Diffractive Method to Cross-Cultural Dialogue

Chapter Four is titled "Ngaru Whenua: Diffracting Indigenous Practices and Quantum Theory." "Indigenous Practices" in this chapter initially refers to traditional navigation practices, founded in modern times in Majel (Marshall) Islands navigation, because it was Majel Islander Mau

Piailug who restored traditional navigation practices on Hawai'i through his collaboration with Nainoa Thomson (Harden, 1999), and subsequently in Aotearoa New Zealand with Sir Hekenukumai Busby (Mills & Sullivan, 2022); these three are credited with the restoration of traditional practices throughout Te Moana Nui a Kiwa. While navigators utilise an extraordinary range of sensory inputs in navigating, one critical sign is a crossing over of currents downstream from the flow, indicating an island ahead (Spennemann, 1998). Such currents can be seen during the day and felt at night by the Kaiwhakatere (navigator) lying on the hull of the waka. This wave pattern must have been known by traditional navigators before the spread of settlement to East Polynesia that occurred from 1190 to 1290 according to the radiocarbon dating record (Wilmshurst et al., 2011), as the prevailing waves under normal conditions came from the east. Such knowledge would have been transmitted across generations, along with the knowledge of the motu (islands) of Te Moana Nui a Kiwa, at annual Kaiwhakatere gatherings on Taputapuātea Marae on Ra'iātea until the 1400s, according to the Hokulea Archive (Kawaharada, 1992).

As will be shown, this Ngaru Whenua pattern is known in the West as diffraction, which was found experimentally in 1803 by Thomas Young (1807), and subsequently revealed in experiments leading to the wave-particle duality of light, an aspect of Quantum Theory that perplexed theorists for most of the 20th century. Experiments could be set up that established light as a wave, while other experiments established light as a particle. The deep question that was so perplexing was: Why does the action of the experimenter make a difference? In an objective world, the human hand should not be part of the equation. It turns out to be true that the experimenter cannot be seen to stand outside the setting-up of the equipment, which formed the argument for dissolving Cartesian Duality as central to reality. Diffraction was also used as an alternative form of critique in the humanities and philosophy of science by Haraway (1997):

> [D]iffraction can be a metaphor for another kind of critical consciousness . . . one committed to making a difference and not to repeating the Sacred Image of the Same . . . diffraction is a narrative, graphic, psychological, spiritual, and political technology for making consequential meanings. (p. 273)

Haraway developed her diffractive method as a feminist way to escape the rigidly patriarchal structures of critique "at the end of a rather painful Christian millennium" (cited in Barad 2007, p. 71). She used her awareness of science "to diffract the rays of technoscience so that we get more promising interference patterns on the recording film of our lives and bodies" (Haraway, as cited in Barad 2007, p. 71). This was associated with her writing on the cyborg, resulting in applying diffractive wave patterning to cross-disciplinary analysis.

Subsequently, Barad (2007) writes of diffraction as "an apt metaphor for describing the methodological approach that I use of reading insights through one another in attending to and responding to the details and specificities of relations of difference and how they matter" (p. 71). Haraway's tone of cross-disciplinary analysis is at the core of the diffractive technique applied by Barad. Her aim was "to provide a transdisciplinary approach that remains rigorously attentive to important details of specialised arguments within a given field, in order to foster constructive engagements across (and a reworking of) disciplinary boundaries" (Barad, 2007, p. 25).

My intention here is to apply Ngaru Whenua practice – a diffractive methodology – to cross-cultural discourse. In a decolonised framework, the subject of diffraction would be traced to Majel Islands navigators (before the settlement of Eastern Polynesia, c. 1190), then on to Thomas Young (1803), and thence to Haraway (1980–90s) and Barad (2007). This places knowledge in the hands and minds of those who should rightly be acknowledged.

To apply Ngaru Whenua practice to Quantum Theory is to diffract across two cultures and two practices while maintaining the important and distinct aspects of each; they do not blur to become a grey mass of one. The method by which the mana or integrity of Moana Practices is maintained, while responding to the important details and specificities of Quantum Theory, is to utilise block quotes throughout. Summarising text in a way that reads well in English – when the original text is written in differing cultural and knowledge contexts – can produce distortions in meaning. It is important in locating a decolonised framework to bring Indigenous Practices and Quantum Theory into dialogue, so respect for each side of the dialogue is maintained to the utmost. It is noted that since colonisation, there has been an enormous imbalance of power between Indigenous Peoples and those of the West.

The term "Quantum Theory," as opposed to "Quantum Science," is used throughout because most of the theoretical groundwork was completed in the 20th century, commencing 70 years before scientists had the experimental equipment to test their *Gedanken* (German for thought experiments, Barad, 2007, p. 100). In addition, Quantum Theory and Science are significantly detailed but not complete – for example, Quantum Science and gravity are not unified in terms of wide agreement, with several solutions offered, including gravitons and entanglement, as Bose et al. (2017) write:

> Understanding gravity in the framework of quantum mechanics is one of the great challenges in modern physics. However, the lack of empirical evidence has led to a debate on whether gravity is a quantum entity. Here, we introduce an idea for such a

> test based on the principle that two objects cannot be entangled without a quantum mediator. (p. 1)

This challenge means some components of Quantum Theory are speculative, though in part based on the mathematics of multiple dimensions (see Frieberger, 2010). Bose et al. (2017) go on to argue that the quantum mediator is gravity itself. Quantum Theory and Quantum Science open the door to considering further Western Science such as Chaos Theory (Gleick, 1988; Mandelbrot, 1977). This is no mere collage of the sciences, as both Quantum Science and Chaos Theory utilise the square root of minus one, the former in the process of re-normalisation, and the latter in mapping the Mandelbrot set on the complex plane (Clothier, 2021). Chaos Theory is loosely a study of flow, and understanding the dynamics of currents and flow is central to traditional Moana navigation methods, and is revealed in visual culture in the form of kōwhaiwhai. This will be briefly discussed in Chapter Four and extended further in "Chapter Six: Creative Practices," with a collaborative project to create a computer model of flow. Te Huirangi Waikerepuru also placed an emphasis on flow, as explained above.

1.5 Making Electronic Art in the Epoch of the Anthropocene

In "Chapter Five: Electronic Art and the Anthropocene," a direct look at the consequences for creative practice is diffracted with contentions around the climate change debate. of Electronic Art has been the main creative trajectory in my practice since 2000. In 2002, for my MA thesis, I developed and utilised a notion of an integrated or interconnected system. This is an overlapping suite of subsystems, that together form an interconnected artwork.

In simple terms, "Electronic Art" in this thesis refers to creative practices that have a programmable circuit board embedded within creative tools, such as the computer on which this document is written. The basis and consequences of this definition are discussed in the chapter, followed by a reflective response and statements about how Anthropocene issues impacted my Creative Practices. In essence, as the project progressed, a strong emphasis on electronics was replaced by a greater balance between the electronic and the natural.

The term "Anthropocene" refers to geologists' contention that as plutonium isotopes from nuclear test fallout are embedded in sediments in Lake Crawford, Canada (Ellis, 2023), the human impact on the geological record is such that a new geological epoch is warranted.[9] The Anthropocene also refers to the human relationship with the environment: in particular, the

[9] The attempt to formalise this term as a geological epoch was not successful, with the naming not progressing, although the process has been contested (Witzer, 2024).

deleterious nature of that relationship, the result of which is climate change and the climate crisis. Contentions around the Anthropocene debate result in a necessity to incorporate a response to species interaction – the Chthulucene, as Haraway (2016) proposed. Assertions around the Capitalocene as given by Heather Davis and Todd (2017), Jason W. Moore (2017) and others, also need to be taken into account, particularly due to the primary concern of engaging Indigenous and Tahitian matrilineal-based heritage explored here.

1.6 Consequences and Outcomes in Creative Practice

Chapter Six is a distillation and documentation of the Creative Practices that drove the project forward, culminating in the permanent placement of an etched Kōhatu (river stone) on Taputapuātea Marae Ra'iātea on 5th October, 2023, and then a return to Aotearoa New Zealand with a Kōhatu from Taputapuātea, as the ultimate expression of this practice-led research (Figures 84–94). This creative project involved developing a whakapapa (genealogical) orientated visual vocabulary and led to a one person and whanau (extended family) exhibition at Aotea Utanganui Patea Museum, a five-year installation of an *Arawhiti Āniwaniwa (Rainbow Bridge)* work at The Govett-Brewster Art Gallery, a series of patterned works titled *Black Holes*, and the creation of laser etched Kōhatu (stones). This latter work was a response to a deep intuition that became enfolded in whakapapa, and which, in terms of the Anthropocene, used natural materials at hand that were present in the environment. A consideration of multiple generations was embedded into this creative practice. In addition, images as koha or gifts were created. The vocabulary of signs and symbols that were developed through this process could be utilised in many types of production and presentation. It may be helpful to those from diverse backgrounds to see how this maps out visually, so extensive documentation and a website are provided.

It is within the embodiment of the artworks that Ngaru Whenua contemporary practice most emerges. In the diverse works discussed, the distant past is seen through from the present; whales and humans overlap while maintaining their identities; the ocean is woven into a symbol of my identity; and cultural artifacts from islands five thousand kilometres apart are entangled through waves of whakapapa and time. This involved presenting whakapapa images and cultural works by whanau (family), rocks, plants, and references to diverse species.

1.7 Messages Across the Cultural Border

The final chapter, "Waves in an Ocean of Ideas," is an attempt to provide potential solutions to the complex issues of the Anthropocene, and one that acknowledges Moana precedence in regard to relationship to the environment. To do this, we return to the orientation in the ocean,

where the current of nature is woven against the current of humanity, and a solution is sought within the Ngaru Whenua pattern generated. This involves referencing Dame Anne Salmond (2018) citing the words of His Highness Tui Tupua Tamasese Ta'isi Efi. To provide a beginning to this discussion, I offer a Hawai'ian Kahuna navigation chant given to me by my *Kumu* (Teacher), Kawaihululani:

Island come, island go
Ocean come, ocean go
Star come, star go
Life come, life go
I sail, I fly
Centre of the Universe

This chant will unfold at several important points in the thesis: when discussing cultural arrangement in Māori society, in the section concerning Ngāi Tāmanuhiri or Rongowhakaata waka hoe in 1769[10] (Gibbs et al., 2018) and fluid dynamics, when discussing navigation in Chapter Four prior to section 4.2, "Ngaru Whenua: Diffracting Sāmoan Vā and Quantum Theory," and in the final chapter. For now, you are encouraged to reflect on the sense of scaling in the chant, observing that the progression from island, to ocean, to star, and on to life itself involves an increase in scale. Scaling is of crucial importance, as we shall see.

The other aspect the refrain highlights is the sense of wayfinding; not the magisterial sense of traditional navigators, but in the humble sense of treating every day as a discovery, being open to taking divergent paths based on exploring inner and outer worlds. This might be called "creative wayfinding." While acknowledging that artistic wayfinding is not the extraordinary venture that is traditional navigation by Kaiwhakatere, this approach is founded in some of the comments made by Nainoa Thomson and Mau Piailug that there is a sense of a journey within as well as the more well-known navigation through te taiao (the environment): "There's a whole other journey that goes on, and that's internal" as Nainoa Thomson said (cited in Harden, 1999, p. 217). This will be discussed further in Chapter Three, in the discussion prior to utilising the Ngaru Whenua Diffractive method to look through the Sāmoan notion of Vā to Quantum Theory and back again. Wayfinding in the sense intended became crucial to the entire project, as the corpus of visual and written practices occurred during the COVID-19 pandemic, from 2020 to

[10] Based on visual evidence and oral record, Tanith Wirihana Te Waitohioterangi who is both Ngāi Tāmanuhiri and Rongowhakaata (and Te Aitanga-a-Mahaki, Rongomaiwāhine, Ngāti Oneone) as part of an internship with Office of the Prime Minister's Chief Science Advisor, made a case for the origin of the hoe to be Rongowhakaata (see Te Waitohioterangi, n.d.).

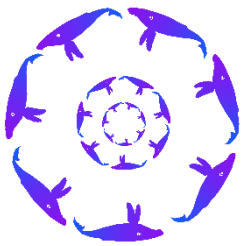
2022. Travel to parts of the country – significantly to Tāmaki Makaurau (Auckland) – was halted at times. I once drove hundreds of miles to avoid Waikato as much as possible, as directed by the government. Relying on access to resources, meeting supervisors and associated people in person, and having personal conversations was not possible. Of eight planned visits to the university campus between 2020 and 2021, only two occurred, so I had to wayfind through the research and practice process at a time when the usual means were not available. The patterns of knowledge acquisition were disrupted: simple activities such as going to a library to research, or meeting and discussing freely with colleagues to explore ideas were sometimes forbidden, and at other times constrained to online resources.

During lockdown, the park of my back yard became my environment, and I had to draw on resources from unexpected locations. The space outside my studio – a hybrid of native and introduced plants with around forty trees, many over six metres tall – became my direct contact with nature during lockdown. The birds became sirens of sorts, not the migratory birds passing traditional navigators above the ocean, but the land-dwelling birds of our native and hybrid bush.

1.8 Summary

This then is Te Moana (the ocean) and Motu (islands) through which I embarked on a wayfinding journey. Smith (2012) revealed endemic anti-Indigenous biases in Western academic methods, with Wilson (2008), Wilson-Hokowhitu (2019), and Reynolds and Wheeler (2022) locating academic methods in whakapapa (genealogy). Crowe (2018) pointed to the deleterious impacts of colonisation and Todd (2016) provided important context around acknowledging Indigenous precedence. Precedence in the knowledge of wave action among Kaiwhakatere (navigators) can be located in Ngaru Whenua (Island Waves), which were later found in water, sound, and light, and called diffractive in Western Science. This opens a door to the subject of the wave-particle duality of light, a cornerstone of Quantum Theory (Barad 2007).

The subject-object distinction on which much Western knowledge accumulation is based is problematic: both Davis and Todd (2017) and Moore (2014) place the commencement of the Anthropocene within the era of the rise of capitalism, and Cartesian duality as the basis for understanding reality. Importantly, these writers straddle the Indigenous–Western cultural boundary. From this point, it then became possible to diffract Moana oral heritage with the radiocarbon dating record and DNA analysis to locate the era in which there was precedence in understanding of an interconnected universe. It was necessary to propose the decolonised notion of Knowledge as Dimensional to achieve this. Next, we move to look more closely at Indigenous Practices.



Chapter Two. Indigenous Practices

2.1 Use of Terms

2.2 Interconnection and Precedence in Moana Practices

2.3 Indigenous Research Methodology

2.4 So Whose Problem is Decolonisation?

2.5 Knowledge as a Dimensional

2.5.1 Moana (Ocean) Dimension

2.5.2 Rā (Interconnectivity) Dimension

2.5.3 Tangata (People) Dimension

2.6 Summary

Chapter Two: Indigenous Practices

This chapter sets out to provide two things of primary importance to contemporary practices and knowledge. Firstly, the aim is to provide people educated within the Western system and knowledge frameworks with a window into Indigenous and Moana understandings of the world. At the same time, the intention is to provide a referenceable period around which aspects of Indigenous philosophy, such as the notion of everything in the universe being interconnected, can be cited firmly. This is targeted at providing information without using the generic statement, "this has been with Indigenous peoples for thousands of years." While this is true, it is too broad for many academic purposes. The strategy used is to cross-reference to radiocarbon dating. As we shall see, this leads to a startling proposition: that Moana peoples held this notion of interconnection around 790 years before post-structuralist French philosophers Deleuze and Guattari (1987) referred to similar ideas.

The group of people educated under Western knowledge frameworks and inside Western education systems is very diverse. There will be people of Indigenous descent and fluent in their culture, those who are Indigenous but know little of their heritage and are trying to learn more, Western people who are interested in trying to accumulate knowledge around Indigenous matters, and those from the West who know very little or nothing about Indigenous matters. In a sense I am trying to reach a broad range of those who know little of their own heritage, those who are interested in accumulating knowledge, and those in the West who know very little. The group of people educated in Western academia and fluent in their own Indigenous culture are those cited on Indigenous matters here. I am grateful to these people, and I rely on them to provide expertise that is outside my own cultural heritage – Cree, Hawai'ian, Sāmoan, and as a descendant of the diaspora of Moana peoples – leading to the dynamics discussed in Chapter Three.

Referencing experts from multiple cultures explains the use of block quotes rather than paraphrasing words written in different cultural contexts. Paraphrasing Indigenous writing in a way that makes sense in English can distort the meaning of the words without the intention to do so. As given in regard to Barad's (2007) method of diffraction in Chapter One, the aim is to maintain the important details of each side of discipline borders for Barad, and here, are related to cultural boundaries. It is indeed important to maintain the mana or integrity of words and thoughts by Indigenous writers, which is a powerful argument to use full quotations and even block quotes rather than paraphrasing or summarising.

The second aim of this chapter is to elucidate the process of knowledge transmission in a way that is informative to audiences but does not require the transmission of sacred knowledge itself. This will occur through the positing of three knowledge dimensions.[11] The first is the Moana (Ocean) Dimension, and has two parts: a) Local Knowledge, which is essential to both survival and cosmology; and b) Intergenerational Knowledge. The discussion on Intergenerational Knowledge leads to a second startling proposition: that intergenerational knowledge can be seen as a form of peer review.

The second is the Rā (Interconnectivity) Dimension, a measurement of the degree of interconnection of notions, and the third is the Tangata (People) Dimension – the degree to which knowledge might be shared across cultures. In Chapter Four, when diffracting Indigenous Practices and Quantum Theory, the relevance of the Tangata (People) Dimension as an evaluative tool proves powerful in linking beliefs across the cultural border, while maintaining the important and essential aspects of each. This dimension functions to make an important contribution to knowledge, as we shall see – relating to the broad agreement across several cultural and Western discipline boundaries on the dissolution of the subject-object distinction as fundamental to reality. It will be revealed that this thinking extends from Tibet to Moana peoples, while being found in Quantum Theory and writing in the Humanities on the Capitalocene.

2.1 Use of Terms

Before we can visit these points, there is work to do in preparing the ground to discuss the items mentioned. This includes clarifying the terms to be used throughout, and then acknowledging where the basis for the assertion of precedence in Indigenous thought arose.

Several terms are used that require some clarification. Firstly, when the term "Indigenous" is used here, this will be taken as an instance in which a practice is shared between Indigenous Māori and Moana Peoples. It must be said that it is only the more encompassing aspects that are shared: for example, viewing water as sacred or seeing the environment as an entangled whole constituted of diverse energies and existences, without the conventional boundaries of Western ontologies. Details will differ between Indigenous groups as their particular cosmologies often refer, respond to, and express locality, in terms of how cosmology might unfold in reality. In this

[11] This is different from Bloom's taxonomy where four linear hierarchical types of knowledge provide a taxonomy to assist educators. "Knowledge dimension" here refers to a capacity to view knowledge from multiple sides as if it were a shape with numerous facets, that could be looked at from multiple viewpoints.

way, the nations of Indigenous Peoples share overarching beliefs but remain distinct in the articulation of these beliefs through localised assimilation of the wider context.

Similarly, *within* Moana and Māori groups, localised assimilation of shared beliefs articulates each nation-state's view while holding to core shared beliefs and values. The way an iwi (tribe) articulates identity is not the same for all iwi, for example not all iwi align to a traditional waka. This sharing while maintaining a distinct identity, can be seen in the way the term for "person" is expressed across Te Moana Nui a Kiwa. On Hawai'i the term is Kānaka Maholi (Wilson-Hokowhitu, 2019); on Tahiti, the term is Ma'oli (Reynolds and Wheeler, 2022); while in Aotearoa New Zealand it is Māori. Trace elements in the terms are appreciable, but in each place they are customised to become localised and distinct.

The term "Polynesia" has often been applied to the region under discussion. However, the Polynesian triangle is a cartographic imposition made by Western map-makers. It is a senseless term in a way, as no boundary is formed in the sea in the way European countries might be bounded by seashores and geographical features such as mountain ranges. Nonetheless, the term Polynesia has become widely used, by both Polynesians and Western peoples.

More recently there have been moves to promote the term "Moana" for use in describing the people of Polynesia (Lopesi, 2021). Moana refers to the sea and is linked to Te Moana Nui a Kiwa, the great ocean of Kiwa, as Māori call the Pacific Ocean. The use of Moana decolonises both Polynesia and the Pacific Ocean as terms for the region and people. As Moana relates to my whakapapa, it is widely used here. Also, as a decolonised position is taken here, Polynesian is substituted with "Māori" and "Moana" tangata or peoples (except in quotations or referring to texts that use the term Polynesia).

To provide a sense of Māori and Moana culture, we can use the scaling principle outlined in the first chapter by the navigation chant. To give the example of Māori: hapū consist of family groups; iwi or tribes are made of a number of hapū and localised to place; each iwi will have its own distinct heritage, language, cosmology and practices; then there are bonds felt among diverse tribes, which is a common-sense definition of Māori. Within this schema, there is abundant variation. Not all iwi describe themselves as being oriented to a waka (canoe). The Parihaka Papakainga (pa or village) consists of people with diverse tribal affiliations. During the colonial period, Parihaka was sacked by an armed Constabulary and the iwi there dispersed around Te Ika a Maui (North Island of New Zealand) with some incarcerated in Te Wai Pounamu (South Island). Consequently, there are many Te Atiawa both in Taranaki and

Whanganui-a-tara (Wellington). This variation is extended by the general practice in society of people leaving the region of their birth and settling elsewhere, often drawn by employment. Having scoped out the use of terms, it is now time to turn to the issues involved in diffracting Indigenous Practices and Western Science. This requires an adequate strategy to combat the extraordinary imbalance of power between Western academia and Indigenous knowledge. Decolonising academia is essential to this thesis, to academia in general, and to the global future, which is entangled in the problematics of human-forced climate change. Before discussing specific Indigenous-based academic approaches, it is necessary to outline a way forward, which involves a discussion around decolonising academia.

My first encounter with acknowledging precedence in Indigenous knowledge came in reading a 2016 paper by Métis woman Zoe Todd: *An Indigenous Feminist's Take on the Ontological Turn: 'Ontology' is Just Another Word for Colonialism*. Todd (2016) refers to herself as an "Indigenous feminist (Red River Métis, Otipemisiwak) woman from amiskwaciwâskahikan (Edmonton, Alberta, Canada)" (p. 4). She first aligns the Inuit multifaceted notion of Sila with Bruno Latour's (2015) use of "Gaia." Todd (2016) writes of Sila as environment, breath, and wisdom, before going on to explain:

> The infinitesimal bit of the concept of Sila that I can claim to understand is that it is bound with life, with climate, with knowing, and with the very existence of being(s). And, in some respects, it sounds an awful lot like the idea of Gaia to my Métis ears. p. 5

Todd (2016) then makes the point that "It is reasonable to assume that Inuit concepts of climate will be referenced in international fora regarding the topic of climate-as-commons" (p. 5), giving the example of Sheila Watt-Cloutier being publicly nominated alongside Al Gore for the 2007 Nobel Peace Prize, then dropped at a later stage, as well as narrated documentaries by Rosemari Kuptana in 2000, who also presented on Indigenous perspectives on climate change at COP-2 (Conference of the Parties) in 1996. The International Work Group for Indigenous Affairs was formed in 1968, and as Todd (2016) points out "played and play an integral role in bringing the topic of climate change to the international stage" (p. 5).

In simple terms, for a conscientious academic, all it takes to locate Indigenous perspectives is the act of searching for reference points. Essentially, this does not happen, in large part due to the aforementioned bias in Western academia toward Western frameworks of reference. Todd waited at a talk by Latour for some form of acknowledgment of Indigenous philosophies to occur, but it did not happen. She writes of this lack of acknowledgment as due "to the European Academy's continued, collective reticence to address its own racist and colonial roots, and debt

to Indigenous thinkers in a meaningful and structural way" (2016, p. 10). This certainly is one part of the problem.

The other part of the problem relates to academic practice being based mostly on conventions that are all Western in nature, with the history of Western thought on any subject usually the main and sole authoritative source for context. In peer review, reviewers often seek to ensure and endorse this context. Writing in *Decolonising Methodologies*, Tuhiwai Smith (2012) noted that "Under colonialism, indigenous peoples have struggled against a Western view of history and yet been complicit with that view" (p. 34). As an expression of this complex engagement, in my own MA thesis of 2002, while making reference to Māori and Moana notions of interconnection, the argument trailed to French post-structural philosophers Deleuze and Guattari (1987).

I return to this shortly, and for now simply need to highlight Todd's point about the lack of acknowledgment of Indigenous philosophies in debates around the Anthropocene and Climate Change. After reading her paper I made an instant decision and mentally cast a stick into the ground with a statement that now guides all my academic practice: *where I can find precedence of thinking in Indigenous Practice, then I will cite it first before giving the Western context.* The consequence of this stance is that it is now clear that the history of knowledge needs to be rewritten.

2.2 Interconnection and Precedence in Moana Practices

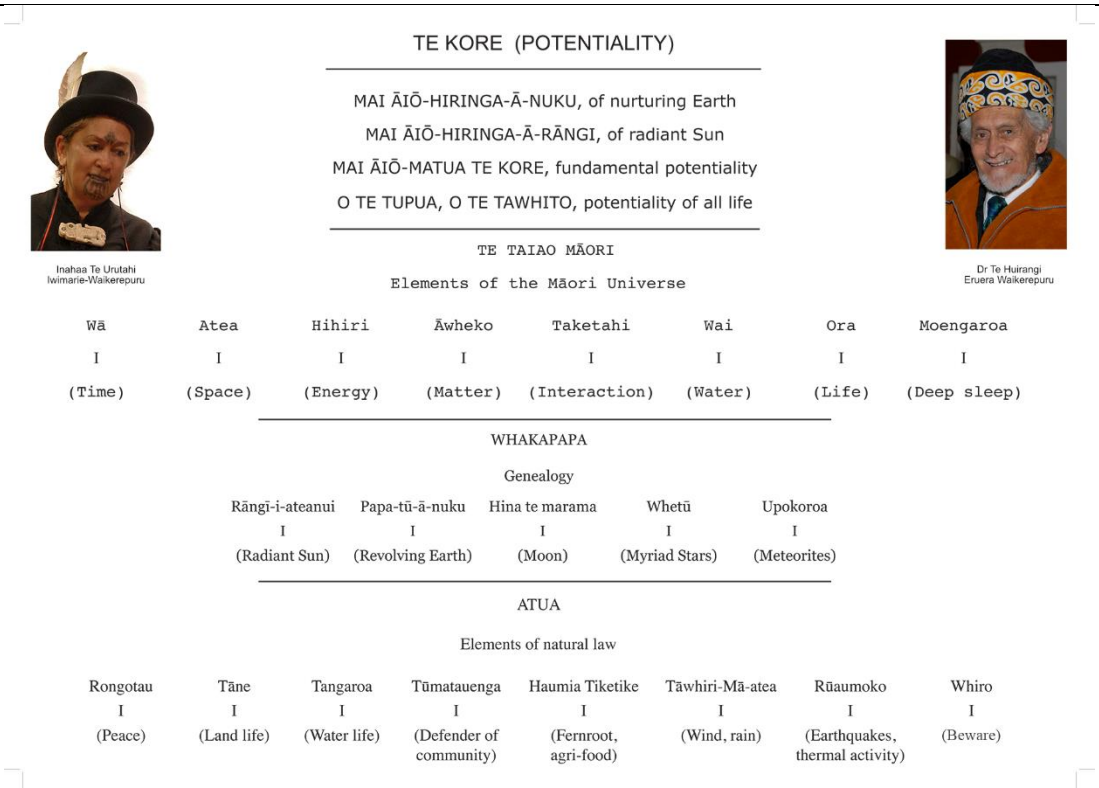
One of the difficulties of citing oral traditions is the general lack of time specificity. For example, the statement "Indigenous peoples have had the notion of an interconnected universe for millennia" is too broad to be cited powerfully in academic writing. However, there are several strategies by which time specificity can be achieved. Cross-co-relating knowledge by whakapapa or tribal genealogy would be one way, which provides rough estimates of timing.

The approach that I am suggesting here is to take a multi-disciplinary stance and cross-reference Indigenous philosophies against radiocarbon dating and DNA records. This places assertions within an evidence-based framework. An important consideration is that Indigenous thinking is left intact, and not distorted by making it fit within a Western framework. That is very important.

To begin with the notion of interconnection in Māori and Moana thinking, I will first clarify what is meant. Figure 1 following shows several layers. At the base are the Atua, which Te Huirangi

Figure 1

Te Hihiri o Te Taiao (Chart of Natural Universal Energies), 2011



Note. The chart produced by Dr Te Huirangi Eruera Waikerepuru for the occasion of *Te Kore Rongo Hungaora* exhibition as part of *Uncontainable Second Nature* in Istanbul in 2011 at ISEA the International Symposium on Electronic Art. *Te Kore* refers to Potential, and *Hungaora* "the group of people who seek balance in nature" according to Waikerepuru [2011, personal communication]. This exhibition also included a painted Kōhatu by Harete Tito, and the stone was selected with appropriate ceremony. Source: Waikerepuru, H. (2011). *Te Hihiri o Te Taiao*. http://www.intercreate.org/huirangi-waikerepuru/

Waikerepuru (2011) calls "Elements of Natural Law." These range from Peace to Defender of Community, to Wind, Rain and Earthquakes. The level above refers to Whakapapa (Genealogy) and details the sense in which many Māori refer to being descendent from the stars – Sun, Moon, Earth, Meteorites and Myriad stars. This statement holds under scientific critique. For example, one process that generates helium from hydrogen in collapsing suns results in the Carbon Nitrogen Oxygen chain reaction, and another place these three elements are found is in the chemical backbone of DNA, which is inherently within all of us. More on this later.

The next level up in Figure 1 refers to Te Taiao Māori (Elements of the Māori Universe) and includes Time, Space, Matter, Interaction, Water, and Life. The layer above that refers to four senses of Te Kore (Potentiality) and fundamental forces. When all of the layers are taken together, a picture of the interconnected world of Māori as exemplified in pre-colonial cosmology, and the life and work of Te Huirangi Waikerepuru is revealed. Note for example, that an Element such as Wai (Water or Flow, as he would say in English) is placed high up the

chart as an Element of the Universe. This means that rain, for some Māori, provides direct access to higher levels of meaning. Indeed, it is in the way the various levels interact that the interconnected component is revealed. When energy interacts with the revolving earth, Rūaumoko (earthquakes and thermal activity) can result. This is an interaction that occurs across multiple layers in the chart. This kind of philosophy is part of, and extended by, Mātauranga Māori, a term that describes Māori knowledge.

Māori environmental scientist Dan Hikuroa (2016) wrote of Mātauranga Māori that it:

> is the term most commonly used to describe Māori knowledge (Mead 2003), incorporating "the body of knowledge originating from Māori ancestors, including Māori world view and perspectives, Māori creativity and cultural practices" (Māori Dictionary 2003), "the knowledge, comprehension, or understanding of everything visible and invisible existing in the universe, including present-day, historic, local and traditional knowledge; systems of knowledge transfer and storage; and Māori goals, aspirations and issues" (Landcare Research, 1996) and "the unique Māori way of viewing the world, encompassing both traditional knowledge and culture" (Waitangi Tribunal, 2011). The worldview of a culture determines what they perceive reality to be: what is regarded as actual, probable, possible or impossible (Marsden, 2003). (pp. 1-2)

The notion of interconnection is clear in the references to: "everything visible and invisible existing in the universe, including present-day, historic, local and traditional knowledge; systems of knowledge transfer and storage; and Māori goals, aspirations and issues" and what is "actual, probable, possible or impossible" (Hikuroa, 2016, p. 2). This is a multidimensional worldview connecting past, present, and future.

The means by which something might become actual, probable, or possible for Te Huirangi Waikerepuru (2011) relates to Te Kore, which he translates as "Potentiality." He gives four types of Potentiality in Figure 1 above (*Te Hihiri o Te Taiao [Chart of Natural Universal Energies]*), aspects of which consist of human and non-human forms. It is important to note that the notion of an interconnected universe is common to Moana cultures including Māori, Hawai'ian, Tongan, Sāmoan, and Niuean – that is, the family of cultures here referred to as "Moana and Māori." It therefore becomes reasonable to consider at what stage such a worldview was known.

A strong argument for a timeframe that the notion of an interconnected universe was with Moana and Māori lies in the settlement of islands of eastern regions (Hawai'i to the north, Aotearoa to the south, and out to Rapa Nui in the east, including those in between), which

Figure 2

Chronometric range of calibrated radiocarbon dates for East Polynesian islands

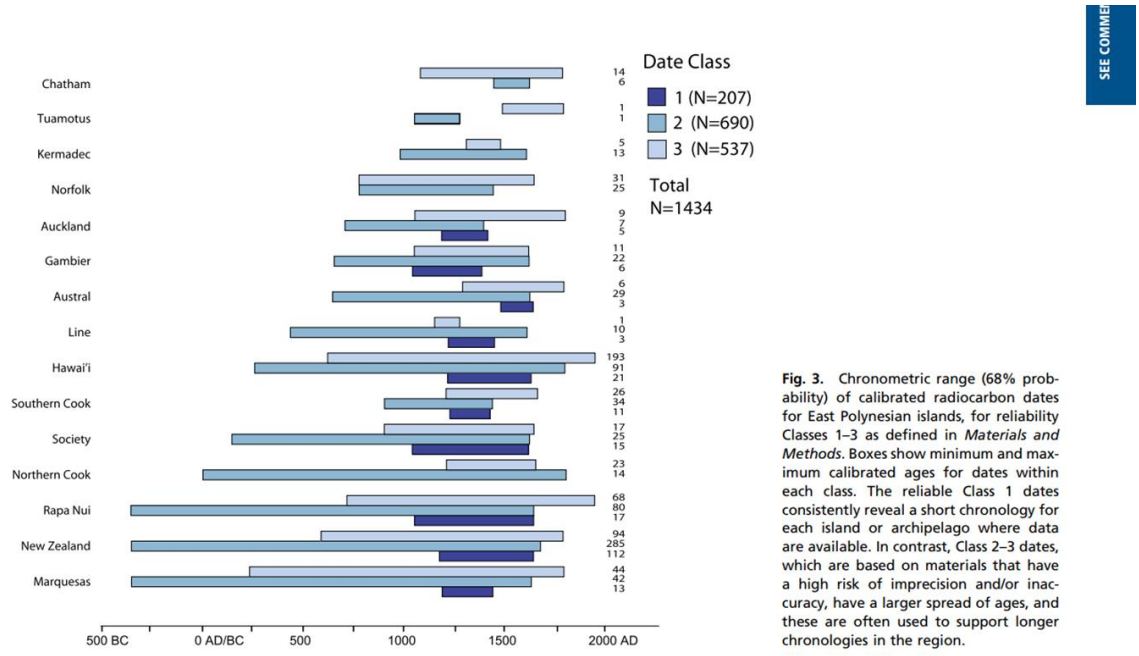


Fig. 3. Chronometric range (68% probability) of calibrated radiocarbon dates for East Polynesian islands, for reliability Classes 1–3 as defined in *Materials and Methods*. Boxes show minimum and maximum calibrated ages for dates within each class. The reliable Class 1 dates consistently reveal a short chronology for each island or archipelago where data are available. In contrast, Class 2–3 dates, which are based on materials that have a high risk of imprecision and/or inaccuracy, have a larger spread of ages, and these are often used to support longer chronologies in the region.

Note. Class 1 samples indicated in dark blue have the highest level of accuracy and are the basis for the assertion of rapid colonisation of Eastern Polynesia. Adapted from: Wilmshurst et al. (2011). High-precision radiocarbon dating shows recent and rapid initial human colonisation of East Polynesia. In *Proceedings of the National Academy of Sciences*, *108*(5), pp. 1815–1820.

occurred in a rapid expansion between (at the latest) 1190 and 1290 according to class 1 radiocarbon dating: "dispersal continued in one major pulse to all remaining islands A.D. ~1190–1290" (Wilmshurst et al., 2011, p. 1815), see Figure 2. This refers to settlement, rather than discovery. Discovery is a lengthy process, as first the currents have to be understood, likely taking between two centuries and a thousand years, given the massive expanse of Te Moana Nui a Kiwa (Pacific Ocean).

In Moana and Māori terms, Class 1 data is very rich – the sample would be selected at marae atea sites which traditionally had a large flattened area, usually stone-covered in Moana islands, as a place where rites and ceremonies were held. There would be evidence of multiple dwellings, middens of discarded food items such as the shells of fish, fire sites often in the ground and discernible by charcoal deposits and rings of stones, evidence of containers used for food, objects and artefacts such as the remains of canoes, evidence of plantings and cultivation, and tools and materials to enable the tasks that utilised these resources. Associated with this confirmation of cultural occupation are short-lived plants and terrestrial birds' eggshells – samples of these were

Table 1

Table of commonly used terms in Moana cultures

Row	Hawai'i	Tahiti	Māori	English
A	Ka Pō/Ke Ao	Te Pō/Te Ao	Te Pō/Te Ao	Dark/Light
B	Kahuna	Tahuna or Tahu'a	Tohunga	Priest
C	Makali'i	Matari'i	Matariki	Pleiades
E	Honua	Fenua	Whenua	Land
F	Ali'i	Ari'i	Ariki	Chief
G	Kapu	Tapu	Tapu	Sacred

Note. Adapted from several sources. Source of Hawai'ian: University of Hawai'i at Hilo Ke Kulanui o Hawai'i ma Hilo. (n.d.). *Wehewehe Wikiwiki Hawaiian language dictionaries.* hilo.hawaii.edu/wehe. Source for Tahitian, Tihoti (personal communication, 2023) – see Section 6.4.6 Victoria University of Wellington. (2016). *Maori-Polynesian comparative dictionary*. https://nzetc.victoria.ac.nz/tm/scholarly/tei-TreMaor.html. Source of Māori: Te Aka Māori Dictionary. (n.d.). https://maoridictionary.co.nz. Chart CC4.0 BY-NC-ND.

dated for Class 1. Following Figure x, the discussion turns to utilising this evidence for locating a time when Moana and Māori held interconnection as a worldview.

An indication of the Rā (Interconnectivity) Dimension regarding island nations in Eastern Polynesia lies in the important terms and concepts shared among Māori and Moana cultures (Table 1). Table 1 reveals linguistic similarities between Moana and Māori cultures, even where there has been a great separation of distance and of associated local knowledge-based refinements of cosmology. Te Pō and Te Ao can be understood as Night and Day or Light and Dark respectively in Māori. In Hawai'ian, these are Ka Po and Ke Ao. The similarities occur in Rows A to G with Row A having the greatest similarity and Row B having the greatest variation. Even where there is variation, the similarities are marked and form the basis for the assertion of cultural and cosmological cohesion prior to the rapid settlement of Eastern Polynesia seen in Figure 1.

The Reo Māori term for male or husband is tane, according to Te Aka (2003–2023), an online authoritative Māori dictionary; in Hawai'ian this is kāne as given by the University of Hawai'i at Hilo (2019).[12] So, while there are similarities, there are differences that delineate distinct cultures. The terms Whakapapa in Reo Māori and Mo`okū`auhau in Hawai'ian appear to have fewer similarities, although both refer to a form of genealogy that is broader than the Western concept. The Hawai'ian form is discussed later in this chapter, in Section 2.4. Genealogy in traditional culture is not solely based on DNA. Whakapapa can involve people, stories, events, objects and spaces, as well as natural and supernatural forces. The similarities are fundamental and shared, and diversification is based on locality, making cultures specific and distinct.

In the suite of islands discussed as having the notion of an interconnected universe embedded in beliefs, it can now be reasonably asserted that the concept existed within the culture before the spread east, which is to say, it can be asserted that a notion of interconnection was with Moana peoples prior to 1190 *at least.* This is 797 years before the discussion of similar concepts in 20th century Western academia when, in 1987, Deleuze and Guattari published *A Thousand Plateaus* in French. It needs to be acknowledged that most likely, the notion of interconnection was actually with the Moana peoples much earlier. However, this date provides academic certainty.

Deleuze and Guattari wrote extensively on their concept of *rhizome* in *A Thousand Plateaus (1987)*, the book for which they are most well-known, although they did write extensively on a large range of concepts. A rhizome is taken to have the qualities of connection where "any point… can be connected to anything other" (p. 7), or Interconnectivity. Other qualities include heterogeneity (composed of unrelated or diverse parts), multiplicity (plurality), rupture (any point can be disconnected but the rhizome lives in its other parts and may grow along new lines), cartography and decalcomania. The latter two are taken to refer to open and connective "maps" rather than "tracing." A map is "open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted to any kind of mounting, reworked by any individual, group or social formation" (p. 12), which is suggestive of dimensional knowledge. They went on to write that the traits of a rhizome are "not necessarily linked to traits of the same nature" (p. 21). This philosophical space is a long way from the duality of the subject-object distinction that characterises much of the Western worldview (more on this later). The concept of rhizome they articulate is fundamentally relational, and we shall soon see that relationality is central to an Indigenous worldview. As such, there is a strong rationale for asserting that the Moana and Māori notions were in place 790 years prior to

[12] When capitalised, the term can refer to Gods.

discussion in the West, a discussion exemplified in the work of Deleuze and Guattari. This timing, as we just saw, is based on radiocarbon dating of the settlement of Eastern Polynesia. In a discussion of Deleuze and Guattari (1987) and others, O'Sullivan (2001) writes of moving beyond subjectivity with "practices that *imaginatively* and *pragmatically* switch the register," writing of an art that "opens us up to the non-human universe that we are part of" (p. 128), which, as we saw earlier, has been a part of Moana worldview for at least eight hundred years, if not longer.

An art that offered "an affirmative actualisation of the virtual" (O'Sullivan, 2001) that "precisely actualises invisible universes; or at least opens up a portal onto these other virtual worlds," situating art on the border "between the actual and virtual," which gives an "ethical imperative" (p. 129) could effectively describe the encapsulation of knowledge in Moana cultural practices. In relation to "aesthetics and affects, this function might be summed up as the making visible of the invisible, of the making perceptible of the imperceptible" (2001, p. 130). He seeks art "precisely involved actuating the possibilities of life" (2001, p. 130) echoing one of the four states of Te Kore given by Te Huirangi Waikerepuru (2011): "O Te Tupua O Te Tawhito (Potentiality of All Life)."

Deleuze and Guattari (1987) have been widely cited in a number of Western academic disciplines, including philosophy (Callinicos, 1985), history (Bell & Colebrook, 2009), science (Bazzul & Kayumova, 2016), art history (van Tuinen & Zepke, 2017) and post-colonial discussion (Huggan, 1989). The time has come when recognition of precedence among Indigenous Practices are acknowledged as a strong way for all to engage in a decolonised academia.

While the configuration associating an Indigenous cosmology with Western research in the contemporary field of radiocarbon dating has a degree of innovation, there are multiple entry points into a discussion around Indigenous research methodologies. These have arisen as a result of the problem of Western dominance in academia. Research has often involved the Indigenous as objects of research, wherein Western researchers test their theories rather than asking Indigenous people for their views. Tuhiwai Smith (2012) wrote of research being conducted "under the gaze of Western Imperialism and Western science" (p. 41). Where views have been sought in an interview, if the statements are not cited in the appropriate context, an incorrect view of Indigenous assertions can be implied. Tuhiwai Smith (2012) cites Patricia Grace, saying about Western authors "they may be writing about us but are writing things which are untrue" (p. 36) Western academics writing the appropriate context is highly problematic and can tend toward using a summary of pre-judged positions. This is not necessarily with pernicious intent but rather is a result of a lack of knowledge. What seems logical in the West and the English language may well not hold up for Indigenous.

2.3 Indigenous Research Methodology

An important figure in the development of Indigenous research methodology is Shawn Wilson, an Opaskwayak Cree, whose influential text *Research Is Ceremony: Indigenous Research Methods* (2008) sets out to discuss an Indigenous based research paradigm. "Stories go in circles. They don't go in straight lines" he writes on page 6 of the Foreword and Conclusion, citing Terry Tafoya. "Research by and for Indigenous peoples is a ceremony that brings relations together" (p. 8); this emphasis on *by* and *for* Indigenous is shared worldwide by Indigenous academics, as we shall soon see. Building on the theme of relationships, Wilson (2008) used two fonts in the text, one for writing of a more academic thrust, and the second when addressing his three sons Julius, Max, and Falco. In Indigenous paradigms, relationships are important, and for some Indigenous peoples, whakapapa or genealogy begins with the generation of their children. Certainly, this worldview is one inclusive of future generations. Wilson presented these relationships in the first letter to his sons where he also gives his parents' genealogy, leading to him and his siblings, and to subsequently meeting his sons' mother.

Relationality is critical to Wilson (2008): "this relational way of being was at the heart of what it means to be Indigenous" (p. 80) he writes, and "relationships do not merely shape reality, they *are* reality" (p. 7). He goes on to say, "an idea cannot be taken out of this relational context and still maintain its shape" (p. 8). Relationality, and acknowledging relationships, is central to Wilson's Indigenous research methodology: "The ontology and epistemology are based upon a process of relationships that form a mutual reality. The axiology and methodology are based upon maintaining accountability to these relationships" (Wilson, 2008, pp. 70–71).

Within the academic framework that Shawn Wilson wanted to use to establish an Indigenous research method (his book utilises research from his PhD), this is a compelling encapsulation of Indigenous, Moana and Māori worldviews, in a form that is amenable firstly to Indigenous, and then to Western academics. Existing in a dynamic web of interconnections precisely captures Māori and Moana practices. Recognising and honouring these interconnections is the fundamental purpose of many Māori and Moana rituals. Wilson is in essence saying that relationality and acknowledging relationality form the central orientation of his method; ontology and epistemology can be seen as equivalent to relationality, and acknowledging relationships corresponds to axiology and methodology.

Axiology is a direct reference to trajectories of practice, and underlines the sense in which the term "Indigenous Practices" is used here. It arises from the understanding that Indigenous do

not just have beliefs, but that these beliefs are mapped out in reality by practices over multiple generations. Relationality is a major part of the Sāmoan concept of Vā. As Albert Wendt (1996, p. 1) wrote:

> Important to the Sāmoan view of reality is the concept of Va or Wa in Māori and Japanese. Va is the space between, the betweenness, not empty space, not space that separates but space that relates, that holds separate entities and things together in the Unity-that-is-All, the space that is context, giving meaning to things. The meanings change as the relationships/the contexts change. (We knew a little about semiotics before Saussure came along!) A well-known Sāmoan expression is "a teu le va." Cherish/nurse/care for the va, the relationships. This is crucial in communal cultures that value group, unity, more than individualism: who perceive the individual person/creature/thing in terms of group, in terms of va, relationships.

Refiti (2014) directly referred to the relationality of Vā as an organising principle:

> In its traditional Sāmoan setting, Vā is the organising principle in which things are given their place and relations are forged between people, as well as between people and objects, and space and territory.... it works as a principle of interdependence – a unidirectional relationship between matai and dependents, in which one is meaningless without the other.[13] (p. 18)

Lilomaiava-Doktor, cited in Refiti (2014) indicates the expansiveness of the relational concept: "Vā is a way of thinking about self, identity, and place. Implicating webs of social networks, institutions, and cultural ideologies, Vā has spiritual, cultural, economic, political, and social implications for thinking about place, legitimacy, and belonging." p. 17

Introducing the writing of Karlo Mila-Schaaf, Melanie Anae and I'uogafa Tuagalu, Refiti (2014) reveals a dynamic sense of articulation in practice within contemporary Aotearoa New Zealand:

> Where teu le va becomes interesting in the New Zealand context is when it is used to mediate community values that are no longer connected to nu'u (the village) in Sāmoa. We can then observe a new dynamism within a democratically shared space of inclusiveness, to counter the Western notion of the individual self. (p. 18)

[13] The variation in the use of macrons, relates to whether they are used in the original text or not. Macron use has changed over time. The term "Matai" refers to chiefs or leaders.

The notion of countering the individual self will be further mapped out in the following chapter when examining the subject-object distinction, as there are many ways to counter the dominant Western notion of self, in both Indigenous and Western contexts. However, being disconnected from a village and working within a new dynamism not on home soil is also discussed in Chapter Three, as it pertains to the revitalisation of my Moana awareness, especially as this project proceeded.

The Sāmoan concept of Vā folds and unfolds in multiple ways across society and the universe. Emily Parr (2020,) writes of engaging with ancestral stories, citing Hinekura Smith and 'Ema Wolfgramm-Foliaki's 2019 conference paper, *Igniting the Vā: Vā-Kā Methodology in a Māori Pasifika Research Fellowship* referring to ancestral journeys as "revoyaging of ancient relationships"(Smith and Wolfgramm-Foliaki, cited in Parr, 2020 p. 18). Following the voyaging theme, Lana Lopesi (2021) writes "Connecting the Sāmoan notion of *vā* to the word *Moana*, I contend that the *Moana Cosmopolitan* is not bound by restrictive notions of home but rather occupies a social world of *Vā Moana* based on relational concepts of vā" p. 83. This point on relationality will be explored further in Chapter Three when applying Ngaru Whenua practices that is diffraction to the Indigenous-Western knowledge boundary.

Re-structuring the academic venture to account for an Indigenous context is amply provided by promulgating research by Māori and Moana authors on topics relevant to the Sāmoan context of Vā. One of the solutions to cultural bias in academia put forward by Tuhiwai Smith when writing of Kaupapa Māori research, she refers to finding:

> space to convince Māori people of the value of research for Māori: second, to convince the various, fragmented but powerful research communities of the need for greater Māori involvement in research; and third, to develop approaches and ways of research that take into account, without being limited by, the legacies of previous research, and the parameters of both previous and current approaches. (Tuhiwai Smith, 2102, p. 185)

This challenge is taken up by Reynolds and Wheeler (2022, pp. 24–25) who write of *Mā'ohi Nui* – citing Turo Ra'apoto from 1988, which is the term they settled on for the region known as French Polynesia. They acknowledge in a footnote that there is contention among Mā'ohi about naming. It must be said that the notion of a single voice to speak for the peoples of any region in Te Moana Nui a Kiwa is an illusion, in large part, as commented previously, because all knowledge and subsequent expression is localised to place. What is important here is the claiming of space on Mā'ohi terms. Echoing Wilson (2008), they write "We argue that the development of Indigenous methodologies, featuring Mā'ohi ontologies and epistemologies, are essential to the

integrity of ongoing scholarship about or in this area of the Pacific" (Reynolds & Wheeler, 2022, pp. 1–2).

They go on to be declare their context, in a section titled "Positionality: 'O vai 'oe? (who are you?)." The phrase "'O vai 'oe?" is defined in the following way:

> 'O vai 'oe asks: what waters (vai) do you flow from, who are your people, what is your genealogy, who is your clan, where are you from, what land are you responsible for, which is your mountain, your lagoon pass, and your marae? If a researcher conducts research in Mā'ohi Nui, this is the first vital step. (Reynolds & Wheeler, 2022, p. 6)

The content and emphasis on vai (or "wai" in Reo Māori) is precisely the same emphasis widely and often placed by Te Huirangi Waikerepuru on the phrase 'Ko wai au?' in Reo Māori, which asks the same kinds of questions (2011, personal communication).

Reynolds and Wheeler (2020) write of a point of methodological departure they found in *Pacific Research Guidelines and Protocols,* an undated pamphlet published by Massey University (n.d.), which emphasised "respect, reciprocity, a holistic approach to research, and prioritising the common good" (p 7.). They then split into first person mode as Vehia Wheeler and Pauline Reynolds, with each describing their research method in turn while they also work in different fields of research. Vehia writes:

> I conduct research in Mā'ohi Nui by building relationships with local communities and by conducting oral history interviews with community members. My research values are inspired by my family upbringing and have been passed down from generation to generation from my ancestors to myself, either explicitly or implicitly. (Reynolds & Wheeler 2022, p. 8)

She goes on to connect to her whakapapa and emphasise reciprocity aspects widely held throughout Moana and Māori cultures.

> I have learned from my elders, family and community members, that the value of hōro'a mai, hōro'a atu (everything that is given will be received, everything that is received will then be given) is an extremely important aspect of our culture. This value reminds us that all things operate within a reciprocal relationship. (Reynolds & Wheeler, 2022, p. 8)

Reciprocity is a cornerstone and foundation of engaging with Indigenous peoples in many situations such as cultural meetings, research, and social gatherings, with gifting an important consideration. Gifting does not only relate to objects but also to giving energy – a form of koha on marae is to help with the dishes. Pauline writes of her method:

> When researching people who lived in the past, it is imperative to at least make an attempt to understand how they saw the world … Some examples of traditional activities that might be helpful include the composition and performance of dance, music, ʻōrero (oratory), and racing va'a (outrigger canoes). Perhaps the most useful of these traditional activities are those that are community-based and that were once all-pervasive, such as the preparation of food (Wheeler & Reynolds, 2022, p. 8–9)

Referring to people who lived in the past is an important and, for many, integral part of lived experience for Moana and Māori peoples. Edited by Wilson-Hokowhitu, the subtitle of the book, *The Past Before Us: Mo'okū'auhau as Methodology* uses the Hawai'ian term for whakapapa or genealogy as a framework for method. The Kanaka Maoli (Native Hawai'ian) worldview, much like the Tahitian and Māori views given above are multi-layered "extending beyond the human realm to include the earth, sky, ocean, riverways, plants, animals, stars, moon, and creation in its entirety" (Wilson-Hokowhitu, 2019, p. 1). Moʻokūʻauhau, whakapapa, or genealogy, is not solely a human characteristic in the Moana and Māori view, plants and mountains also have their own whakapapa independent of humans.

Hawai'ian words can be broken down into their constituents by a process that exposes multiplicity in meaning rather than singularities in meaning. While mo'o refers to a series, Marie Alohalani Brown (2019) (writing in the foreword of the above text) aligns this to geckos and skinks, which have a knobbly backbone and can regrow their tails, an apt "simile for genealogical continuity" (pp. vii-ix). Inspirationally, she continues to say that mo'o can also refer to skin or stripes that stand out, in the way for example,

> a mountain range (mo'o) stands out against the lighter sky; the uppermost part of canoe, the gunwale (mo'o) stands out against the ocean; the narrow path (mo'o) stands out against the vegetation; as do the raised surface … [of] walkways (mo'o) between wet taro patches … a grandchild or great-grandchild (mo'o) … offspring of an animal (mo'o) … a smaller piece of bark cloth (mo'o) that will be joined to a larger piece … a smaller land division (mo'o) within a larger land division … Lastly, mo'o is short for *mo'olelo* (series of words or speech), which comprises English genres such as history, legend, and narrative. (Brown, 2019, pp. viii-ix)

Extending the meaning of mo'okū'auhau, the author ku'ualoha ho'omanawanui cites from an earlier work, picking up on the series or sequence meaning of mo'o, adding that "kū has myriad meanings, including to stand, resemble, reveal, transform and rule the land, while one definition of 'auhau' references leg bones… one way of understanding mo'okū'auhau is the succession of generations standing on the bones of ancestors" (2019, p. 55).

Mo'okū'auhau as methodology is then mapped across multiple disciplines. In social research methodology, Kū Kahakalu presents Hawai'ian foundations that are outside existing qualitative and quantitative research methods, to empower Indigenous researchers to embark on similar journeys. Kalei Nu'uhiwa (2019), who studies atmosphere from a Hawai'ian perspective, writes about a "methodology that systematically organises the accumulated knowledge obtained through generations of observations and interactions in the natural world … [which] affords the researcher the ability to thoroughly investigate any subject of Hawai'ian epistemologies from multiple perspectives" (p. 6).

Historian David A. Chang writes from within a complex web of Hawai'ian diaspora, Indigenous peoples, decolonisation, trans-nationalism, gender, and sexuality. He states, "Because mo'okū'auhau reveals the diasporic kinship networks that connect individuals across territorial boundaries, it has the power to give the lie to notions of the atomised individual and the coherent and bounded settler nation-state" (2019, p. 97). These words have important resonances in this study, particularly in Chapters Three and Four.

Located close to the heart of this project is the chapter by Nālani Wilson-Hokowhitu, which is orientated and extrapolated from lived experience sailing aboard the Hōkūlea'a, arguably one of the most important vessels in 20th and 21st century traditional Moana and Māori navigation. Built by Herb Kane based on research by Ben Finney and sailor Tommy Holmes, the Waʻa Kaulua (double hulled ocean-going vessel) was navigated by Nainoa Thomson in a ground (or moana) breaking journey from Hawai'i to Tahiti at a time when most Western commentators thought Moana and Māori peoples were not capable of deliberate voyaging and lacked the instruments to do so. Thanks to Majel Island traditional navigator Mau Piailug who taught Nainoa Thomson the way, an emphatic start to the revival of traditional navigation was made through this voyage in 1976. Wilson-Hokowhitu (2019) writes of exploring whakapapa where "we find that we are all a part of the beginnings of existence and that our relations extend far beyond our indigeneity and our human bonds to the Earth, Sky, Stars, Sun, Moon, Wind, Water, Trees, Ocean, Rocks and into all and everything" (p. 121). These words are a perfect echo of *Te Hihiri o Te Taiao,* the chart of natural universal energies compiled by Te Huirangi Waikerepuru.

Table 2

Population losses after colonisation by Motu (Island)

Row	Moana Motu (Island)	Population Loss After Colonisation
A	Easter Island [Rapa Nui]	95%+
B	Marquesas	95%
C	Rapa Iti	94%
D	Tahiti	93%
E	Rurutu	90%
F	Tabuai	90%
G	Hawai'ian Islands	83%
H	Tongareva	76%
I	Rarotonga	70%
J	New Zealand [Aotearoa]	60%

Note. Adapted from: Crowe, A. (2018, p. 230). *Pathway of the birds.* Bateman.

It is my hope that this survey of academic writing by Indigenous authors will have assisted you in gaining a better understanding of Indigenous Practices and the multi-layered world in which Moana and Māori peoples dwell. I now turn to a different but related question, which is the vexing issue of decolonising academic methods in the West. This is an important step, as while Indigenous academics have established their own approaches, the enormous momentum of the Western academic sphere remains largely untouched, although there is hope in the coming generations.

2.4 So Whose Problem is Decolonisation?

As we chart a way forward to a decolonised academia we need to redress the impacts of colonialism, the church, capitalism, and patriarchal values on Indigenous Moana and Māori peoples. In Table 2 Crowe (2018, p. 230) records the loss of Indigenous populations since European contact, a range from annihilation to decimation (see Table 2). These awful losses are confirmed by current archaeological records, according to Crowe. As stated in the Introduction, this information is a driver towards decolonisation.

Tuhiwai Smith (2012) observed that "'research' is inextricably linked to European imperialism and colonialism" (p. 1). In scoping Indigenous research methodologies founded in specific cultural contexts, an important advance for Indigenous authors has been that of decolonisation approaches. Institutions in Aotearoa New Zealand are beginning to undertake initiatives around this process. Let me tell you a story that really belongs in the next chapter but is an apt illustration of one of the boundaries inside Western academic practice.

In Chapter Six I write of collaborating with a fluid dynamicist at the University of Auckland, Dr Michael MacDonald. We worked to make a computer model of flow. Dr MacDonald validated this computer model as an important aspect of fluid dynamics projects. This validation ensures the model is representing real flow, rather than the assumptions of the modeller. We commenced our discussion based on Figure 3.

When the fluid dynamicist looked at the three waka hoe (canoe paddle) decoration, he recognised self-similarity and recursion across scales. These two are core elements of Chaos Theory. Self-similarity in Figure 3 is apparent in the visual similarity of forms, and evident in all three canoe paddles; when this repeats across scales of size, we see recursion across scales, which is quite marked in the outer two paddles. The form of scaling is geometric rather than fractal, but nonetheless the relevancy is striking. "Self-similarity is symmetry across scale," wrote James Gleick (1988, p. 103), going on to say, "Mandelbrot's price charts and river charts displayed self-similarity, because not only did they produce detail at finer and finer scales, they also produced detail with certain constant dimensions."[14] There is an interconnection to recursion across scales, as Gleick pointed out; self-similarity "implies recursion, pattern inside pattern" (p. 103). For contemporary audiences familiar with video and animations of the Mandelbrot set,

[14] In locating the common factor to Julia sets, Benoit Mandelbrot developed the notion of fractal dimension and scaling, work memorialised in the naming of the Mandelbrot set.

Figure 3

Left: Ngāi Tāmanuhiri or Rongowhakaata hoe (waka paddles, 3 of 14 traded by Cook in 1769). Right: flow modelling image creating a von Kármán vortex street

Note. Combined image by the artist-writer. Source left: Gibbs et al. (2018). Hoe Whakairo: Painted paddles from New Zealand. In L. Carreau, A. Clark, A. Jelinek, E. Lilje, & N. Thomas (Eds.). *Pacific Presences – Volume 2, Oceanic Art and European Museums*. Sidestone Press.
Source right: Derkson, A. (2019, p. 5). *Numerical simulation of a forced and freely-vibrating cylinder at supercritical Reynolds numbers*. https://www.researchgate.net/publication/333751600

what is being seen is a combination of self-similarity and recursion across scales, to extraordinary levels of magnification. On this point of scaling phenomena, we can return to the Kahuna navigation chant from Chapter One. Islands, oceans, stars, life and the universe are encapsulated in a near poetic form, one that is revealing of life experience in Moana worlds.

Although I did not ask Dr MacDonald to do so, he changed specific introductory lectures and handouts to acknowledge awareness of these forms of patterning in water by Māori and Moana peoples. The first step in decolonising Western academic practice involves acknowledging *Indigenous precedence.* Therefore, the history of knowledge needs to be rewritten, and so too does the history of Chaos Theory.

There are several problems for Western academics in this area. First, there is a strong bias toward Western context that counteracts this effort, and second, as part of a highly internationalised market, it is common for academics to live and carry out their work in places other than where they were born, having succeeded in attaining a position at a tertiary institution that could be in any country. What that means is simply that a knowledge base of how Indigenous peoples practice living, is absent. Third, a result of that lack of knowledge means that intuition around

the subject is missing. Before I proceed to combat these problems directly, it is important to understand that decolonisation is *both* an Indigenous *and* a Western problem.

Let us take a short look into one of the most horrific, deliberate, and immoral acts of any thinking people: the systematic testing of nuclear weapons on Pacific Islands, some of which were obliterated. For many island dwellers, there have been ongoing health issues as a direct impact of this practice. This occurred in the second half of the 20th century and three of the cultural powerhouses of the Western Cultural hemisphere took part: the United States, the United Kingdom, and France.

To protest these actions, many people took to the streets in demonstrations, while others made a flotilla of small vessels in an attempt to disrupt and halt the testing. There were also artists who created protest artworks. *From Scratch* is an Aotearoa New Zealand experimental music performance group. Their work "Pacific 3-2-1-Zero" was composed and performed by Phil Dadson, Don McGlashan and Wayne Laird in 1981. Dadson recently spoke about and played a film of the work.[15] He was asked about the lack of Moana and Māori people in the group and he responded that "nuclear testing is a Western problem not a Polynesian one." This is a salient point, I argue that the same applies to decolonisation. Colonisation was validated by papal decree and imposed on Indigenous peoples. As the Native Voices (n.d.) website points out, in 1493:

> Pope Alexander VI issues a papal bull or decree, *Inter Caetera*, in which he authorizes Spain and Portugal to colonize the Americas and its Native peoples as subjects. The decree asserts the rights of Spain and Portugal to colonize, convert, and enslave. It also justifies the enslavement of Africans. (p. 1)

Consequently, the rectification of colonial impacts will involve the empowerment of Indigenous peoples in their cultural context – this is already occurring. There will also have to be an active application of changes to knowledge and processes within the Western academic hemisphere. As Tuhiwai Smith (2012) argues compellingly, "the methodologies and methods of research, the theories that inform them, the questions they generate and the writing styles they employ all become significant acts which need to be considered carefully and critically before being applied" (p. 41).

Having scoped the Indigenous worldview across several Moana and Māori cultures and

[15] This film was shown at the Govett-Brewster Art Gallery Len Lye Centre 11 February 2023.

established two significant points where there is clear precedence in Indigenous thinking of ideas that were discussed centuries later in the West, we are now in a position to further explicate an Indigenous worldview. To do this, I would like to introduce the idea of seeing Knowledge as Dimensional, rather than linear. There is an implication in the West that all knowledge acquisition is of the type that Newton observed, of apples falling directly downward from trees, from which he deduced the existence of gravity – one thing following the other. This deductive reasoning, however, is only one type of knowledge.

The dimensionality of knowledge arose for me in contemplating *relationality* in Moana and Māori terms and reading about the ten dimensions of String Theory as a component of research. The thing about Knowledge as Dimensional, is that it can be looked at from multiple sides, above and below, ("maps" in the sense of Deleuze and Guattari [1987]) and these alternating views can illuminate in much the same way as the interconnected world view of Moana and Māori peoples alluded to when discussing the chart by Te Huirangi Waikerepuru (2011). Knowledge as dimensional also allows for energistic conceptions of the acquisition and enactment of knowledge. It also follows from the multi-definitions of Moana and Māori words as seen when discussing the Hawai'ian term, Mo'okū'auhau (genealogy).

Knowledge dimensions are not a theory of knowledge. They are a tool that allows the movement of knowledge across cultural boundaries in a decolonised framework. This is important due to past imbalances in cross-cultural discussions and interactions.

Here we go then.

2.5 Knowledge as Dimensional

If knowledge has dimension, then it has a shape and an energy. It can be looked at from multiple sides, from above, below, behind, and in front, and it can go forward or backward. This is a relational way of viewing the universe, just as Wilson highlighted the importance of relationality to Indigenous Practices. We saw this faceted understanding in the way Marie Alohalani Brown (2019) talked of mo'o as standing out – as mountain ranges, canoes, paths between crops, bark cloth, land, and words. It was there when Refiti (2014, p. 17) wrote of Vā as having "spiritual, cultural, economic, political, and social implications." Dimensional shape and energy is explicit in *Te Hihiri o Te Taiao (*Chart of Natural Universal Energies) by Te Huirangi Waikerepuru, (2011). It has multiple layers and potential interactions. Knowledge as Dimensional constitutes a means by which Indigenous Practices can be brought into dialogue

with Western Science in a decolonised framework. In this way, a multifacted cross-cultural discussion can occur.

There are strong mathematical reasons to think of our universe being composed of ten dimensions. This is a matter of Quantum Mathematics. At present, Superstring Theory is the most compelling theory of quantum activity. Uncomfortably for some in the West, a direct consequence of Superstring Theory is a ten-dimensional universe. Writing at phys.org, a respected online physics communication resource, Matt Williams (2014) observes that

> dimensions are simply the different facets of what we perceive to be reality. We are immediately aware of the three dimensions that surround us on a daily basis – those that define the length, width, and depth of all objects in our universes (the x, y, and z axes, respectively).
>
> Beyond these three visible dimensions, scientists believe that there may be many more. In fact, the theoretical framework of Superstring Theory posits that the universe exists in ten different dimensions. These different aspects are what govern the universe, the fundamental forces of nature, and all the elementary particles contained within. (p. 1)

Consequently, we have not one but two reasons for considering dimensionality as relevant whereby Indigenous and Western contexts can support it.[16] This thread of Indigenous *and* Western will be continued, and Knowledge as Dimensional assists in understanding how things truly operate within Indigenous societies. To explain this, Moan Dimension is extrapolated further.

2.5.1 Moana (Ocean) Dimension

Moana is a term widely used for the sea among Moana and Māori peoples, though there are other names for differing contexts. For island-dwelling peoples, the sea is a significant force in everyday life and cosmology. The Moana (Ocean) Dimension has two components: a) Local Knowledge – the source of food (i.e. survival), cosmology, and place-based stories (see Harden, 1999) and b) Intergenerational Knowledge – knowledge that is shared and then transmitted down generations.

[16] While wide agreement is not yet in place, confirmation of Superstring Theory by modelling the big bang or birth of the Universe on a supercomputer provides further evidence to support this theory. See Yirka, 2011.

Local knowledge is important, as it involves such matters as the best place to grow foods or where to source weaving supplies. On Hawai'i, a Kahuna can be a person with expertise for growing taro. If you grow taro, you garden according to the lunar calendar, so the act of gardening in a local place is tied to cosmology through the door of lunar and stelar astronomy. People who hold local knowledge can tell you of the events that occurred in a location, and talk about how, according to oral heritage, land has been used. Holders of local knowledge are highly respected.

The second part of the Moana (Ocean) Dimension relates to Intergenerational Knowledge. One of the main reasons for introducing Intergenerational Knowledge to Western audiences is that there is very little understanding in the West of how this operates. Generations tend to supplant knowledge in the West, so (for example) Newton's version of the universe was supplanted by later generations, particularly by the ramifications of Quantum Science. Intergenerational Knowledge might also be seen as a form of peer review, and I am now going to lay out the basis for making that assertion.

The way to do this is to ask a very simple question: how does a navigator find an island if they do not know it is there? Clearly, in the history of the Pacific, there was a time when islands to the east were not known and were uninhabited. So, how did navigators find the islands? There are multiple ways. Birds returning to their island late in the afternoon is one good sign. A bird that suddenly flies very high will be trying to get a fix on the island it seeks. Some navigators kept birds as pets, which were referred to as "the eyes of the navigator." Andrew Crowe (2018, p. 144) wrote of the six million oceanic birds that converge on the Kermadecs in Spring, and the 20 million sooty shearwaters (tītī) that converge on Aotearoa New Zealand. "By early November thousands of tāiko (black petrel, Procelleria parkinsoni) … are returning to New Zealand from waters off Panama and Central America" (Crow, 2018, p. 147). The tītī annually ranges from the Kermadecs to Hitiaurevareva and South America, and nests in Aotearoa. Some nesting birds fly to the Chatham Islands daily for foraging. Others fly to the sub-Antarctic Auckland Islands, again daily foraging for food. Between April and November, tītī forage in the northern Pacific with foraging zones that include Japan, Siberia, Alaska, and the west coast of Turtle Island (the United States).

Another good clue for a navigator is the things that are drifting in the ocean. Coconuts float and, if tasted, the sourness can assist in understanding how long it had been in the water and, by extension, roughly how far away its island of origin might be. Kōwhai is a tree with a bright yellow flower; there is one right outside my studio. Crowe (2018) writes that the "seeds of Kōwhai (Saphora species) … and fragments of bladder weed (Carpophyllum species) … are

carried northeast from New Zealand on currents … Such a find on the Kermadecs is likely to have triggered an interest in the prevailing currents that brought them there" (p. 145).

Other clues from the environment include islands with high peaks interrupting cloud flow, and the intense blue of lagoons reflected on the underside of clouds, according to the Hokulea archive (Kawaharada, 1992). In darkness, there is a tell-tale sign in the currents swirling around an island. Discussed in more detail in Chapter Four, the essence is that when a current meets an island some parts are reflected, while some are split in two, traversing each side of the island and then joining back up. In a distinctive patch of choppy water, this joining up can be felt by the navigator lying on the hull of the canoe. Such flows would be generated around the motu off Ngāmotu New Plymouth (where I write this) and Motuopao near Cape Maria van Diemen at the northern tip of Aotearoa.

Once an island was discovered, the navigator added it to their internal mind-body map of the ocean (Harden, 1999, p. 218). Up to five hundred years ago, navigators gathered annually on Ra'iātea (Kawaharada, 1992). At such gatherings, knowledge would have been exchanged. Once other navigators confirmed the existence of an island by travelling there, the knowledge would then go down through the generations. This confirmation is core to asserting that intergenerational knowledge can be seen as a form of peer review. The intergenerationality of island knowledge is crucial, as for Aotearoa New Zealand there was a two-hundred-year gap between the voyage of Kupe in 950 CE (Ngati Hei, 2023) and subsequent journeying by Toi in 1150 according to Te Ara: The encyclopaedia of New Zealand (McLintock, 1966). This means knowledge of islands held within a single generation is not very useful, and therefore intergenerational knowledge becomes *necessary*. The Moana (Ocean) Dimension is important, but The next proposed dimension refers to interconnection. It is called the Rā (Interconnectivity) Dimension.

2.5.2 Rā (Interconnectivity) Dimension

We have seen in this chapter that the notion of interconnectivity to all things is foundational in Moana and Māori knowledge. While *Rā* is a short form of a term used for sun or sky, here the Rā (Interconnectivity) Dimension refers to the degree of interconnectivity of an idea across species and dimensions, including human and nonhuman entities, animate and inanimate. This is a space where the way an idea can be mapped across spheres of knowledge can be accounted for. A good example of this is mo'okū'auhau in which, parts of the word could be mapped across terrain, transportation, and horticulture. Interconnection is key to Indigenous, Māori and Moana concepts of the Universe according to Dan Hikuroa (2016, pp. 1-2) and, as evident in the chart by

Waikerepuru (2011), is mediated by energy flows across all facets of the Universe. Rā is a form of reference to the sun, here used to denote interconnection.

Interestingly, a number of Western academic disciplines have put forward versions of an interconnected world including: Quantum Theory (Barad, 2007), Chaos Theory (Gleick, 1988), Post-Structuralism (Deleuze & Guattari, 1987), and Business Studies (Palmer & Parker, 2001). Due to the separation of disciplines, these perspectives have by and large not been shared. Philosophers conventionally do not go to business studies conferences or publish in business journals. This also occurs in adjacent sciences areas such as Quantum Science and Chaos Theory where it is not understood widely, but both disciplines make use of a number called *i*, the square root of minus one. In Quantum Science this is used to collapse infinities into manageable quantities, and in Chaos Theory it is used to map the Mandelbrot Set on the complex plane (Clothier, 2021, pp. 115-116).

One virtue of the Rā (Interconnectivity) Dimension how is the acknowledgment of cross-cultural parallels. It also improves the credibility of Moana, Māori and Indigenous worldviews, while providing a framework for assessing interconnected ideas. This potentially could be important in resolving issues related to climate change and the Anthropocene. Having briefly scoped Moana and Rā (Interconnectivity) Dimensions, the third I am proposing concerns people – the Tangata (People) Dimension.

2.5.3 Tangata (People) Dimension

The Tangata (People) Dimension measures the degree to which knowledge is held in common across cultural boundaries. It is the simple formulation that if knowledge is shared among a number of cultures or subcultures, it carries more weight than if held by just one. As such, it is not a guarantee of certainty, but an acknowledgment of extent. For example, if there is a story in the oral tradition of one Moana or Māori culture then it is likely to be a form of local knowledge. If, however, four Moana and Māori cultures all had the same story, that carries more weight. Similarly, if a belief is held in the West only, then that piece of knowledge is contained within the West, but if that piece of knowledge was shared with Moana and Māori cultures, and with Asian cultures, then that idea holds greater credence due to being shared across cultural borders.

These Dimensions will be tracked through the consequent discussions in the subsequent content of this thesis. As we see in Chapter Four, there is indeed a concept that meets the criteria of being held across Moana, Māori, Western, and Asian cultures, regarding contentions around the subject-object distinction.

2.6 Summary

This chapter has fused the cosmological insights of Moana and Māori leaders such as Waikerepuru, traditional Moana navigational insights, work by Indigenous scholars Wilson (2008), Todd (2016, 2017), Hokowhitu-Wilson (2019), Refiti (2014), Wendt (1996) and Hikuroa (2016), and the sciences in the form of radiocarbon dating (Wilmshurst et al., 2011). The radiocarbon dating record provides a referenceable framework for asserting the era where the notion of Interconnection was shared among Moana peoples. When this is further aligned with recognising precedence, one trajectory leading toward a decolonised academia has been attained.

To prepare to bring Indigenous Practices into dialogue with Western metaphysics, the notion of Knowledge as Dimensional was proposed. This allowed for a discussion of Indigenous Practices outside the confines of Western knowledge structures, entangled as they are with colonial values and approaches. This is a second trajectory toward a decolonised academia. It is not the only strategy, but one of several potential trajectories. Escaping a colonised academia is important to all research in the current era, regardless of cultural affiliation.

The constellations, currents and landmarks of Chapter One have now been fleshed out by aspects of an ancient and lived cosmology, drawing upon traditional navigation practices, the scholarly works of authors from many cultures, and trajectories of science. All of this context is carried forward toward creative practice, with the aim that creative works will carry their markers of identity, although the means for doing this is yet to be determined. In Chapter Three the flesh is given living form through whakapapa relaties that extend back to Tūpuna (ancestors) and forward to future generations.

Chapter Three. Before the Beginning

3.1 Moana Diaspora and Reforming Identity

3.2 Wayfinding Stories

3.2.1 Women, Children and the Community of HMAV *Bounty* on Hitiaurevareva

3.2.2 Visual Culture Today

3.2.3 Growing up in Ōtautahi (Christchurch)

3.2.4 Precedent Art Works in a Nonlinear History

3.2.5 Acknowledging Indigenous: Building Cultural Bridges

3.3 Summary: The Ocean of Life and the Meaning of Whakapapa

Figure 4

Artefacts from Hitiaurevareva in the Auckland War Memorial Museum collection

Figure 9 (above). Stone point/awls. Auckand War Memorial Museum 28968.2, 28326.4, 30155.

Figure 10 (right). Side hafted adze. Auckland War Memorial Museum 28359.

Note. Source: Furey, L. & Ash, E. (2020). Tāmaki Paenga Hira Auckland War Memorial Museum. *"Old Stones for Cash."The Acquisition History of the Pitcairn Stone Tool Collection in Auckland Museum* (Records of the Auckland Museum 55:1–18). https://www.aucklandmuseum.com/discover/research/publications/records/vol55/pitcairn DOI: https://dx.doi.org/10.32912/ram.2020.55.1. Auckland Museum has 20,000 artefacts from Hitiaurevareva.

This chapter lays out the background to the situation of arriving at a confluence of culture, knowledge, research and art. A series of taonga (heritage artefacts) from Hitiaurevareva (Pitcairn) informed the development of my curatorial and creative practice are revealed in Chapter Six, following a wayfound path. As the chapter title indicates, events before the PhD project are considered and go back as far as my whakapapa allows. Through the narratives contained in these artefacts, I discuss important Tūpuna (ancestors) from whom I am descended on Hitiaurevareva (Pitcairn Island), and later Norfolk Island and offer a family history. This chapter also provides a contextual review of Indigenous Practices: from historical paintings and engravings, to material culture; carved and woven contemporary artefacts along with visual artworks, sculptures and reliefs that have informed my artistic milieu.

Figure 5

Scoria Human Figure from Hitiaurevareva

Note. Tuhura Otago Museum Collection. (2023). *Human Figure Pitcairn Isl D.37.64 Fels Fund*. Photo by Kohana Clothier.

I am woven mind-bodily into stories of the ocean, birds, whales and negotiating Te Moana Nui a Kiwa. This weaving becomes explicit in this chapter, in preparation for the subsequent chapter, which introduces my artwork resulting from Ngaru Whenua practice. Here are traced the tracks in the ocean of my past: my whakapapa (genealogy). Much of this chapter involves

Hitiaurevareva (Pitcairn). I had been proceeding on the understanding that my whakapapa was to fifteen generations and to times when artefacts such as those in Figure 4 were in use. Recently it has been revealed that my whakapapa extends at least to forty generations.[17] Hitiaurevareva has three marae sites; the oldest radiocarbon dated to 950 CE (Molle & Hermann, 2018, p. 72), a timing which coincides with the full extent of my whakapapa.

For those educated in Western systems who may not know succinctly, the notion of genealogy for Māori and Moana peoples is much wider than simply DNA. A person's whakapapa (genealogy) can include stories and objects as well as people. As Refiti (2014) wrote:

> Pacific societies generally treat people and objects (including buildings and spaces) as on a par with each other, since both represent the human and the nonhuman. Objects carry aspects of the person, and the person carries part of the object in return. (p. 15)

People and objects are not only on a par; everything can have a whakapapa. When it comes time in Chapter Six to talk about the artworks arising from this project, I will refer to laser-etched stones. One of the stones is bound using muka, a way of preparing harakeke (flax) that produces, among other things, strong fibres for creating cord. The muka that they were bound with also has its own whakapapa – the plant used is a grandchild or even great-grandchild of plants spread and grown by Diggeress Te Kanawa, a weaver of the highest order. So plants have whakapapa, and obviously birds and whales do too. We have already seen that buildings and objects can have whakapapa as well. It is this wide sense of whakapapa (genealogy) I refer to.

Also reviewed in this chapter are works of art in a nonlinear history, which contain traces of what would become foci in later projects and creative practice, particularly in regard to engaging environment, species, Indigenous, and the technical matter of low-relief carving. These begin in the formative years of my late teens. The nonlinear sequence arises due to the presentation of the precedent artworks in the order in which they entered my life – at a time I was negotiating creativity and culture in a way I would subsequently write of here, as creative wayfinding.

3.1 Moana Diaspora and Reforming Identity

As remarked in Chapter One, I did not have the good fortune to grow up on the islands of my whakapapa. I am part of the Moana diaspora that has impacted people from many islands across Te Moana Nui a Kiwa, particularly those whose families moved to Aotearoa and other countries outside the region. Being part of the diaspora has had a significant impact on many Moana

[17] I am still assimilating this at the time of writing.

peoples, and at the same time can be problematic for those wanting to embrace their Moana heritage. As Refiti (2014) wrote:

> Identity as a diasporic project amounts to the reformation and reconstruction process that takes place in a new location. To enable a new identity to be formed in a new location, cultural knowledge is important because it is the thing that travels. Cultural knowledge encompasses rituals, cultural traditions of exchange, religion or faith that usually involve sacred relics or objects, which need to be given place to grow and flourish. (pp. 15–16)

The necessity to form a new identity in a new location is something that many creatives with whakapapa to a Moana island have had to face. For a single, succinct paper, Graham Whimp (2009) assembled several interviews, supplemented by articles and papers of previous interviews; these told the stories of Moana artists working with the complexity of living in another culture. Whimp (p. 10) writes of Fatu Feu'u being an artist based in New Zealand, and at the same time maintaining close links with his Sāmoan village. Consequently, the ties of identity are fixed to two locations. Reflective of this dynamic, Feu'u is then quoted as saying that while culture is a backbone, it "can be recreated and shaped to the demands of our society" (p. 10). Citing Feu'u from an interview with Panoho, Whimp highlights that Feu'u seeks to: "modernise Polynesian/Pacific art/Sāmoan art because I believe if it's not done then the artform will die." Culture and creativity are constantly moving, composed of tradition and innovation. While these artists' words speak of a dynamic, Whimp cites John Pule from an article by Jim Vivieaere, which beautifully captures the tension between remote whakapapa and living in New Zealand:

> Intellectually and emotionally I relate to both New Zealand and Niue but I don't feel too comfortable in either. I feel an outsider and am often treated like one in Eurocentric New Zealand and called a "goagoa fia palagi" in Niue, which means "a dumb wannabe whiteman." I slip between acceptable stereotypes in both places because traditional categories cannot organize my identity. I am nearly everybody's "other." (p. 13)

This point about being not one or the other, yet maintaining a creative practice, is underlined where Whimp (2009) quotes Michel Tuffery:

> You know there's some of us who do live in cities but we've adapted in a different way and taken on different attitudes and then you've got the ones who were born in the Islands and they've got their own attitudes… Sometimes they actually clash. (p. 13)

While Tuffery is mostly based in Aotearoa, the relevance of ocean awareness persists. Whimp then cites from an article by Tim Walker, who wrote of Tuffery's work being: "a navigation through and between the oceans of each culture and society, discovering as he does, that it's all one ocean" (Walker, cited in Whimp, 2009, p. 14).

As global culture has moved into the 21st century, cultural hybridity has become the hallmark of cultures worldwide due to the intermixing of cultural influences and the meeting of diverse cultural groups in cities. Sāmoan New Zealander Niki Hastings-McFall is quoted by Whimp from an article by Pereira, where she talks about not completely belonging being counterbalanced: "the positive side is that you can take that and take that, and mix them up and do something else, that's the really good thing" (Hasting-McFall, cited in Whimp, 2009, p. 15).

In simple terms, this doctoral project, my art-making practice, and my life presently is a reformation and reconstruction process in a new location. Fortunately, as Refiti has pointed out, cultural knowledge does travel. This essential practice of reformation and reconstruction will continue. My eighth generation ancestor Mauatua recalled meeting Captain James Cook on Tahiti. There is a note in the third volume of *A voyage to the Pacific Ocean, Vol. III* by Captain James King (Mayer, n.d., p. 1) that "Cook sailed for Matavai Bay, where he met Tu, his father Teu, his mother Tetupaia, his brothers Ariipaea and Vaetua, and his sisters Ariipaea-vahine, Tetua-te-ahamai, and Auo."

The ancient art of traditional healing is one where the practitioner can become recognised as Tohunga (Priest or expert) in the same way as Tupaia was navigator and Priest (see Section 4.1.1 following). That my Tupuna was there as a young girl intimates that she was seen to have special abilities and therefore included in the entourage, with the possibility she was being trained in these arts. Cook suffered from rheumatism, leading to him declining an invitation to attend a ceremony. "Tetupaia and a number of women came out to the *Resolution,* where they massaged Cook's body until the bones cracked, greatly relieving his suffering" noted King (as cited in Salmond, 2009, p. 439). This was repeated later at night and the following day on land. It seems on at least one occasion the young Mauatua attended as part of the entourage of Tetupaia, as according to Rosalind Young (1894, pp. 93-94) Mauatua spoke of the "cure by means of the native remedy" which involved "a preparation of a'pi plant (arum gigantum)… and Mauatua declared that the dreadful remedy worked."

Tū and his whanau were also known to the Tahitians and sailors of HMAV *Bounty*. King (as cited in Mayer, n.d.), who sailed with Cook on his third voyage also wrote:

> Although various explorers had refused to get involved in tribal conflicts, the mutineers from the *Bounty* offered their services as mercenaries and furnished arms to the family which became the Pōmare Dynasty. The chief Tū knew how to use their presence in the harbours favoured by sailors to his advantage. As a result of his alliance with the mutineers, he succeeded in considerably increasing his supremacy over the island of Tahiti. (p. 1)

The stories of Mauatua taking part in the healing of Cook, and Tū increasing his supremacy through connection with the *Bounty*, is one sense of what is meant by being woven into stories of oceans, birds and navigation. These three together constitute important resources for open ocean navigators with or without instruments. Contained in the Robson and Teira report about Taputapuātea Marae Aotearoa, is a Rarotongan story where migrating birds on a long and arduous journey would land on a waka if they saw one – one story preserved orally is that Kupe flew on the back of a bird to Aotearoa.[18] Here again, we can revisit the Hawai'ian Kahuna navigator chant given in Chapter One and the words "I sail, I fly."

As well as engaging whakapapa, part of my recent growth and flourishing has involved assimilating the influence of Kawaihulululani, which has added a Hawai'ian dimension of significant importance to me.[19] It has filled my daily life, which is what I sought. This was a journey that did not involve speculating on the sources of influence and identity and then moving forward based on rational expectations. It was the internal and external journey of the wayfinder, following Ngaru Whenua and looking through from one time to another, and one place to another.

[18] The most widely given story is that Kupe followed Te Wheke – an octopus. Sir Hekenukumai Busby (in Mills & Sullivan 2022) expressed one of his views being that this is a reference to the currents around Aotearoa, which spin in opposite directions in some places. Busby also referred to the motivation for the journey being love.

[19] Kawaihulululani is the origin of the navigator chant given in Chapter One.

3.2 Wayfinding Stories

Figure 6
Landing in Bounty Bay, Pitcairn Island, December 1825

Note. Painted by Fredrick William Beechey of HMS Blossom. Beechey, Frederick William (Capt), 1796–1856. *Landing in Bounty Bay, Pitcairn Island*, December 1825. Ref: A-118-009. Alexander Turnbull Library, Wellington, New Zealand. /records/22618814

In simple terms, and taking a cue from research into traditional navigation, in life I have become a wayfinder, finding my way through the morass of whakapapa, creativity, life, intuition, and knowledge. This sense of wayfinder is looser than the Wayfinders who are Kaiwhakatere on board waka/vaka/ships, and is used here in the sense of a journey through life. In my journey I had a target and a trajectory – to assimilate the whakapapa and knowledge revealed to me – but was not able to determine a precise path. So I set sail in life, looking out for islands in the ocean of my psyche. I searched for the archipelagos upon which I could pin my creative practice and orientation to the universe. What follows now is the research and stories that resonated. While my whakapapa extends to forty generations, there is one place that stands bold and relates to eighth-generation Tūpuna (ancestors), who settled on an island illustrated in a romantic haze in Figure 6, by the Captain of a ship that went there in 1825.

3.2.1 Women, Children & the Community of HMAV *Bounty* on Hitiaurevareva

Hitiaurevareva is a landmark in the ocean of my whakapapa, as it is the island my eighth generation Tūpuna – tapa makers and mariners – settled in January 1790; and the ship on which they arrived – HMAV *Bounty* – is one of the more notable objects in my whakapapa. The "Mutiny on the *Bounty*" saga based on the story of Master's Mate Fletcher Christian leading a mutiny against Lieutenant William Bligh, has been the subject of five feature films and numerous books. It captured the imagination as a romanticised story, as can be seen in the many depictions in fiction, film, and paintings (see Figure 6). Sadly, though, typically expressive of patriarchal values, the women have been written out of the story, and made almost completely invisible. The story of the Mutiny on the *Bounty* was the story of Fletcher Christian, and the story of the period following was that of John Adams. These stories are biased in terms of being Western and male-oriented, excluding the Tahitian and female people who were also central to the story. It is not my aim to take issue with these historical accounts, but to participate in the process of restoring gender balance through applying a matrilineal lens.

As it happened, after settling Hitiaurevareva in 1790 a race war played out. Citing Townsend, Young (2016) writes, "Through dissensions and massacres, there remained, in 1800, only one Englishman, Adams, the Tahitian females, and 19 children" (p. 3) It is one of the great conceits of patriarchal racism that one man living with ten Tahitian women and nineteen children would result in an English society. That has been the *story*. However, the components of something quite different are in plain sight.

Hitiaurevareva with inhabitants (it previously was thought to be uninhabited), was first happened upon in 1808 with Captain Folger of the whaling vessel *Topaz* entering into his log "I discovered a boat paddling towards me. It was a Tahitian style canoe containing three young men 'dark as natives' and almost naked" (cited in Clarke, 1986, p. 92). It is said (Reynolds, 2008, p. 4) that Tararo of Ra'iātea, who was on board the *Bounty*, had knowledge of the location of Hitiaurevareva. Meralda Warren, who re-established ahu or tapa making on the island in 2007, referred to Tararo as "a navigator" (personal communication, 2023). This would explain how three young men came to be seated in a *Tahitian style canoe.* Navigators are sometimes also waka (canoe) makers, and need to make sea-worthy vessels, which requires a high level of knowledge and skill. As it is unlikely the craft would have been taken on board the *Bounty*, it can be speculated that it was made on Hitiaurevareva, a sign of Tahitian or Ra'iātean influence on the early culture. That they were "dark as natives" was self-evident, and "almost naked" is most likely a reference to wearing a traditional maro or loin cloth. Captain Sir Thomas Staines of HMS Briton travelling with the frigate *Targus* commanded by Captain Philip Pipon, happened upon

Hitiaurevareva in 1814 with Thursday October Christian, then twenty-five years old, coming on board HMS Briton and clearly wearing the maro, as seen in the illustration in Figure 7.

One of the issues for my culture is the dominance of the male gaze on the history of *Bounty* events, to the point that the women and the Tahitian heritage and culture have largely been excluded from historical and fictional accounts (such as books and feature films). Accessing the world of the women and registering Tahitian impacts on the early culture of Hitiaurevareva is important to this project as I see my creative inheritance as stemming from tapa or ahu makers Vahineatua and Mauatua. Figures 7 to 11 trace Tahitian clothing similarities. The style of feather headdress Thursday October is wearing (Figure 7) is clearly Tahitian, is still worn today, and is of a type purchasable online (see Figure 8).

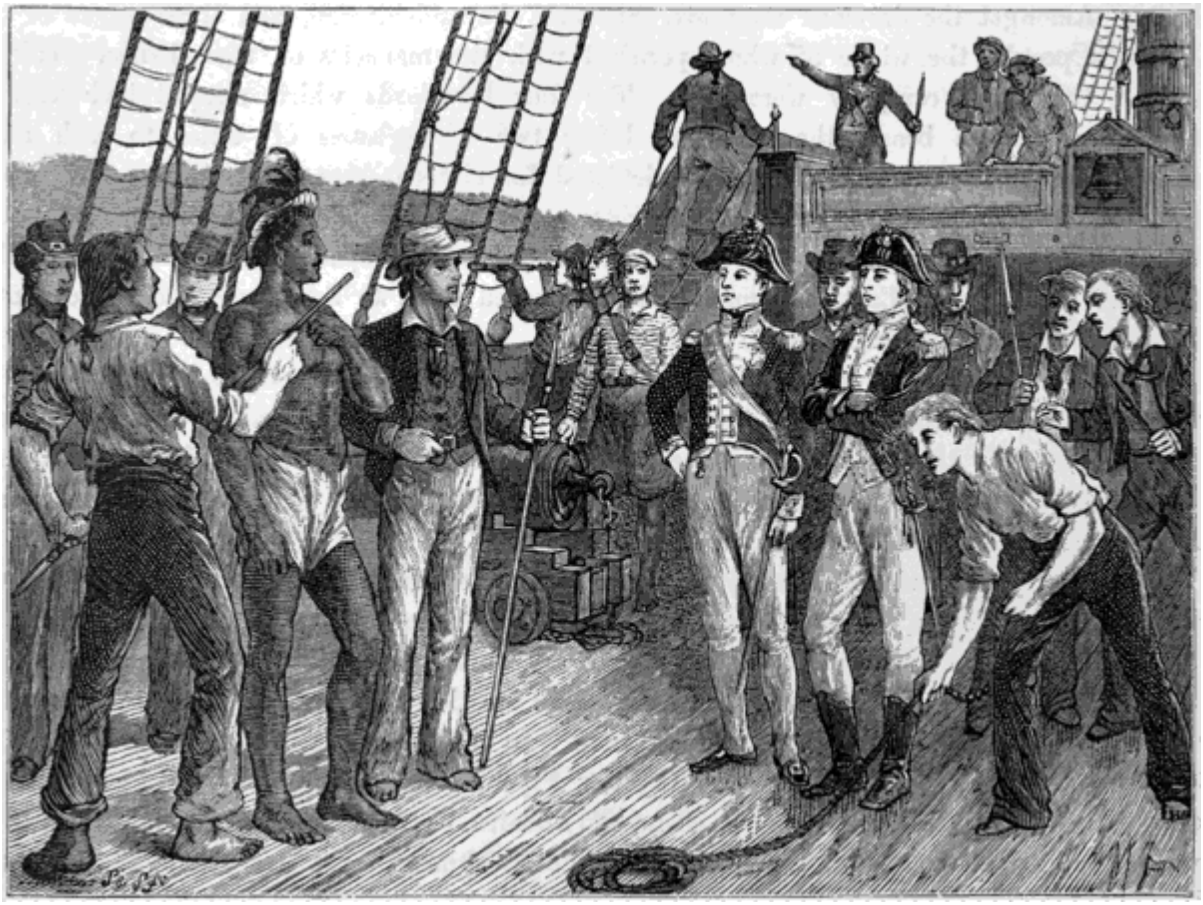
It is also clear from Figure 9, that until at least the 1830s, Moana-type dress was worn by Hitiaurevareva islanders. Both Hannah Adams and George Young depicted above are my Tūpuna. The similarity in clothing can be seen in Figure 10, from the Pitt River Museum Collection, which shows a restored Tahitian tiputa, or poncho-like garment.

The tiputa in Figure 11 following, is authenticated as originating on Hitiaurevareva, as Reynolds (2014–2015) states: "While the *Bounty* women and their daughters used traditional techniques from their homeland, the Pitcairn tiputa show great innovation to the point that they are easily recognisable in collections today due to their originality" (pp. 229–230). Of these innovations, Reynolds notes, "An interesting feature of all of these assembled and decorated cloths is the bands of zigzagged strips, which are designed to fall over the shoulders, presumably giving strength to the poncho" (p. 228). The tiputa below is held in the collection of the Museum of Five Continents in Munich; Reynolds also writes of "eleven confirmed decorated Pitcairn cloths" (p. 230) worldwide, five of which had holes cut through for wearing. The significance of the zigzag strips and the strengthening of the shoulders is that these elements can be used to determine that the tiputa came from Hitiaurevareva and nowhere else. They therefore are defining characteristics, and the use of triangles in my creative works in Chapter Six is a direct result.

While being clothed in Tahitian-style garments utilising the skills of ahu makers, all genders on Hitiaurevareva were "using body fragrances made from the oils of tropical flowers" (Pipon, as cited in Clarke, 1986, p. 98); wearing flowers and feathers in the hair was also common to Tahitian society, as can be seen in Figure 12. The practice of all genders wearing flowers continued during the lifetime of Rosalind Amelia Young (1853 to 1924). In her book *Story of Pitcairn Island: By a native daughter*, she wrote of the "'flower tree' (morinda citrifolia)… Children,

Figure 7

Thursday October Christian dressed in the maro aboard the HMS Briton 1814



Note. Thursday October Christian is my Tupuna. Wikimedia Commons (2015). *HMS Briton at Pitcairn Island*. https://en.m.wikipedia.org/wiki/File: HMS_Briton_at_Pitcairn_Island.png

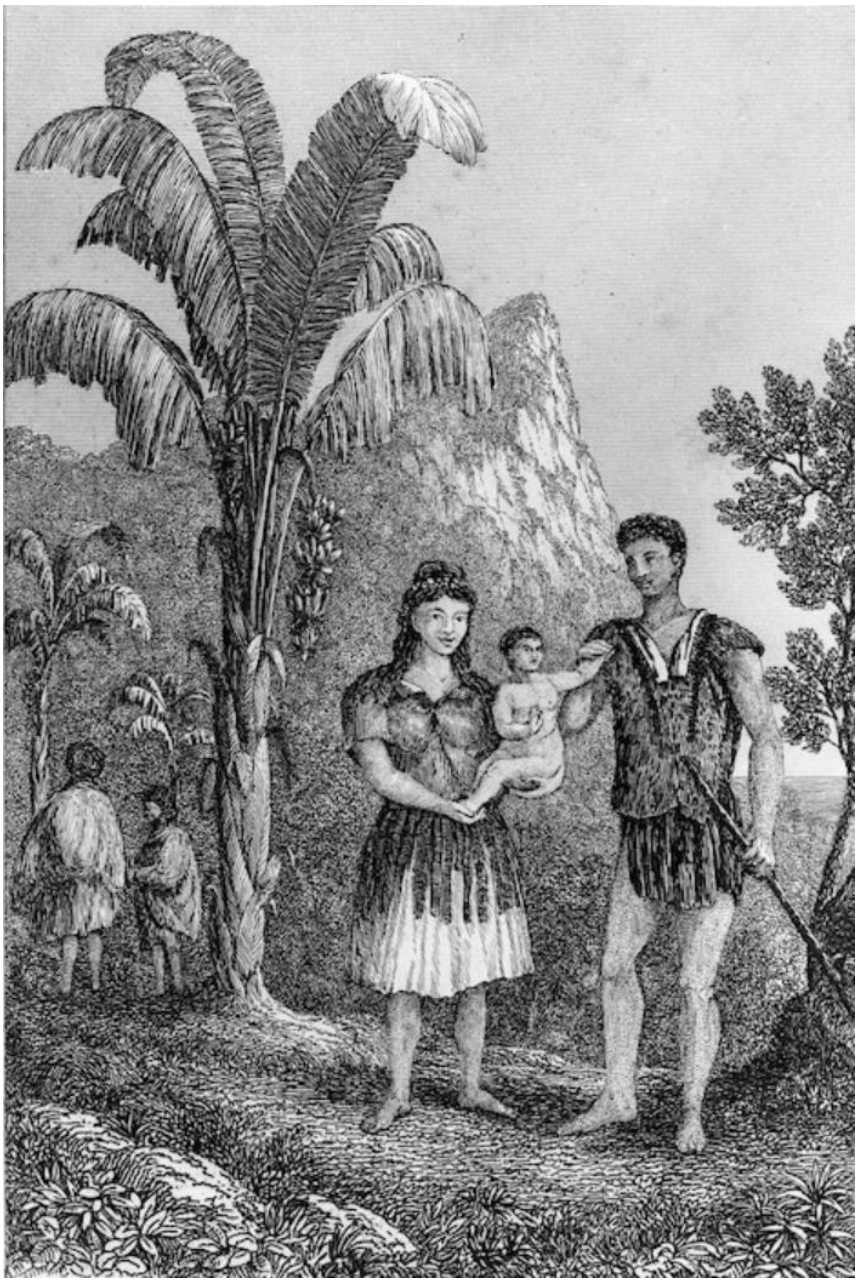
Figure 8

Tapa cloth taumi (chest garment) and Tahitian style feather headdress

Note. No longer available online. Island Mana Designs. (n.d.) Tapa cloth taumi (chest garment) and Tahitian style feather headdress. https://www.pinterest.nz/pin/341921796683500948/

Figure 9

George Young and his wife (Hannah Adams) of Pitcairn's Island



Note. Both George Young and Hannah Young are my Tūpuna. Batty, R. (ca 1825). *George Young & his wife (Hannah Adams) of Pitcairn's Island*. Drawn and etched by Lieut. Col. Batty. From sketches by Lieut. Smith of H. M. S. Blossom. London, John Murray, 1831. Ref: B-097-001. Alexander Turnbull Library, Wellington, New Zealand. /records/23075999

boys as well as girls, find a never-ceasing pleasure in stringing the flowers into garlands, which they wear around their hats" (Young, 1894, p. 51). These are all signs of the impact of Tahitian culture on the founding generations of Hitiaurevareva. The picture attained is that the influence of the Tahitian women was strong, particularly up to the 1830's.

Figure 10

Restored Tahitian tiputa in the Pitt River Museum Collection

Note. Pitt River Object Collections. (2015). *Conservation of a 19th Century Tahitian "Poncho."* https://pittrivers-object.blogspot.com/2015/06/conservation-of-19th-century-tahitian.html

Figure 11

Pitcairn tiputa

Note. ©Marietta Weidner. Weidner, M. (2014). *A Pitcairn Tiputa in the Five Continents Museum*. In Reynolds, P. (2014-15) *Journal Funf Kontinente*, 1, pp 223-231.

Figure 12

Drawing of a Young Man

Note. This type of thigh and torso tattoo was ordinarily reserved for nobles. Note the flowers in his hair. Unknown artist. (n.d.) *Drawing of a young man.* In Clarke, P. (1986, p. 42). *Hell and paradise: The Norfolk Bounty Pitcairn saga*. Viking.

In this *Drawing of a young man* (Figure 12) we see a male wearing a garland of flowers, with circular tattoo forms on his thighs. The circular forms directly influenced my creative practice, with several circular arrangements seen in Chapter Six.

Figure 13

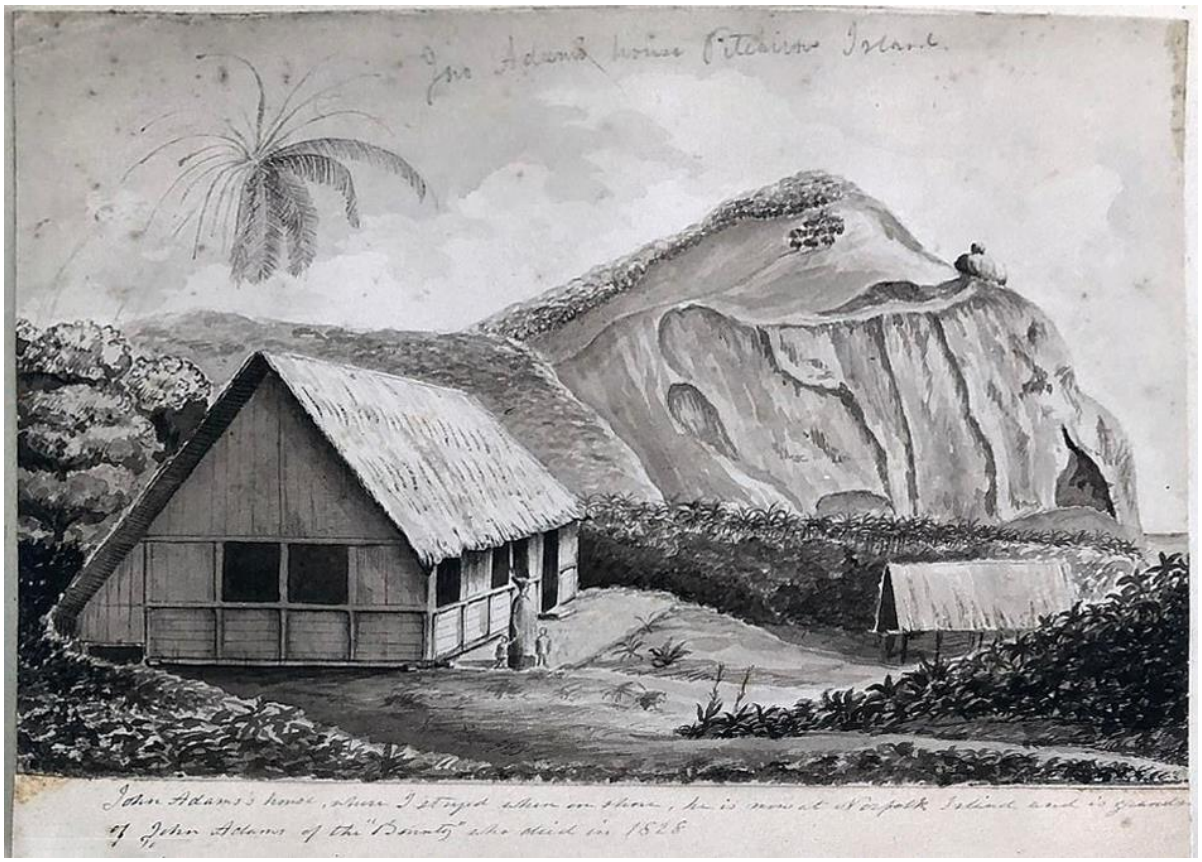
View of Pitcairn Island ca.1830s

Note. From left: John Adams, Tinafornea, George Young, Mauatua, and Hannah Young née Adams with child ca.1830; I am related to all except for Tinafornea. Danvin, V. F. & Lejeune, E. (ca 1836). *Archipel Pomoton*. Intaglio engraving. Online purchase 2021, collection of the artist-writer

Regarding architecture, Figure 13 was produced in 1838 based on sketches made in 1825 by the crew of HMS Blossom, and shows from left to right, John Adams, Tinafornea, George Young, Mauatua, Hannah Young (née Adams) with child – all are my Tūpuna except Tinafornea. The double storied whare or building is the school house and the only double storied one on the island, based on images from this era. There are several outhouses connected to homes, and Pipon (cited in Clarke, 1986) commented that "attached to each house were hog and fowl pens, a bake-house and a 'cloth manufactury'"(p. 95), the latter of which was used to boil down the inner bark of aute and ulu trees to make ahu. The family group is gathered around an umu (earth oven) where a pig is being cooked. Subsequently, I have made an umu at home and use it for cooking and heating earth pigments on fine weather days.

Figure 14

Watercolour by Rear Admiral Marcus Lowther ca. 1853



Note. Lowther, M. (ca 1842–1853). *Scraps*. Publisher unknown, collection of pen and ink sketches and watercolours. https://www.dailymail.co.uk/news/article-8392531/Rear-Admiral-Marcus-Lowther-Sketches.html

Also telling in architectural terms is the reference made by Rosalind Amelia Young (1894) to: "paafata, [a wooden floor erected on four posts…]" (p. 41). As the title and captions to images on pages 123 and 138 of her book indicate, the islanders saw themselves as "natives" rather than "English." The building to the right in Figure 14 appears to be a paafata, a food storage house akin to the pataka of Māori, which traditionally are taller, but serve the same function.

It is apparent from all this that until 1814 at least, Tahitian-style waka were being used to go out to visiting ships. Hitiaurevareva people wore ahu or tapa clothing at least until 1825, closely following Tahitian styles and made by their mothers, with the aforementioned innovations in the zig zag strengthening strips. All genders wore flowers in their hair and anointed themselves with sweet smelling oils. The layout of dwellings was such that each had a place to commence the making of the tapa process, and Moana style storehouses for food were in use until the 1850s. These are all cultural aspects of a Moana community.

While John Adams was the acknowledged community leader, the threat of removal as a mutineer in 1814 had the result that "the Tahitian women pleaded strongly that he be allowed to remain, and clinging to John Adams, weeping while they pleaded, the humane captain … resolved not to disturb them" (Young 1894, p. 42). In addition, the complexities of Tahitian society allowed for male leaders who were endorsed by women. As Neil Gunson (1964) wrote:

> The uninformed historical view has been to assume that certain male lineages were superior in rank to other male lineages; but a careful study of succession to titles and rank in pre-Christian Tahiti appears to show that the highest titles in the Society Islands were not necessarily assumed by right of patrilineal descent. Rather, it would seem, the right to the more sacred titles was transmitted by first-born women of several lineages. (p. 53)

Gunson (1964) further wrote, "It would seem reasonable to assume that a royal chief of senior patrilineal descent would be forced to yield pre-eminence to a junior chief of the same lineage who was of superior status through his mother" (p. 55). This is of relevance here as at least three of the Tahitian women of the *Bounty* – Vahineatua, Mauatua and Toofaiti – were of noble rank. The use of "atua" in their names identifies them as of the royal class, and "Toofaiti" refers to the staff of a chief (they are all my Tūpuna). In addition, ahu or tapa making was the reserve of the ruling classes and was not ordinarily made by commoners. Tahitian society, it needs to be remembered, was matrilineal.

These traces of Moana culture provide substantial grounds for understanding the entwining – one sense of Ngaru Whenua – of cultural influences that occurred on Hitiaurevareva. Layered beneath the community were two centuries of the impact of the Church, racism, and sexism – which could be summarised as Colonialism – that all but quashed the Moana culture from the people. Traces remained, from which the current descendants are resurrecting Moana practices such as ahu making, Heiva games, Tahitian dancing, and making cultural artefacts. Most Hitiaurevareva descendants (around one thousand) live today on Norfolk Island, as the community outgrew Hitiaurevareva and in 1856, Queen Victoria gifted Norfolk Island to them. Those that live on Hitiaurevareva (in 2023, just thirty six) consist of descendants of families that returned and some who have settled there.

3.2.2 Visual Culture Today

Figure 15

Pandanus kete

Note. Warren, D. (2021). *Kete* [Pandanus and dyes]. Acquired from Pitkern Island Artisan Gallery 2021, collection of the artist-writer.

Regarding visual culture today on Hitiaurevareva, there are types of weaving that are predominantly Moana culture in origin, which can be seen in this small kete (basket) by Daphne Warren.

Figure 16

Pandanus fan

Note. Hermans, L. (2016). *Pandanus fan* [Pandanus, dyes and hand stitching]. Acquired from the artisan 2016, collection of the artist-writer.

Figure 16 introduces some of the unique elements of visual culture made on Hitiaurevareva since the early settlement period post the 1850s. It is woven in pandanus by Leona Hermans, based on a fan shape common throughout Moana cultures. Pandanus was also used for traditional sail making (Crowe, 2018, p. 82).

The flower forms are quite distinctive, the ones on the left are appliqué with painted leaves, as is the rose on the right. The rose form, as will be seen in Chapter Six, is incorporated into the visual vocabulary I assembled as a result of research and reflection in this project. The story being told here is not meant to imply Moana culture dominated, but rather that it was a partner in the creation of Hitiaurevareva culture and the subsequent development of visual culture.

Figure 17

Shark in tau wood

Note. When I asked the maker how the shark teeth were obtained, he replied the creative process began with "catch the shark" (personal communication 2023). Christian, R. (2021). *Shark* [Tau wood] (Henderson Island) and shark teeth. Acquired from Pitkern Island Artisan Gallery 2021, collection of the artist-writer.

Another form of visual culture that is popular with islanders and shared throughout Moana Nui, is of sea creatures, and myriads of them are produced in several media. Figure 17 shows a carved shark that has inlaid eyes and real shark teeth. I have several objects carved with tau wood, which is harvested from the nearby, uninhabited Henderson Island, something I did not know until I visited the island in September 2023. Henderson was once the source for trade in highly prized red feathers (Molle & Hermann, 2018).

Figure 18

Hand holding a vase in tau wood

Note. Christian, B. (2021). *Hand holding a vase* [Tau wood] (Henderson Island). Acquired from Pitkern Island Artisan Gallery 2021, collection of the artist-writer.

Figure 18 is of the type of a hand holding a vase, a style taught to the islanders by an Austrian sailor, Eduard Loeffler, who died on the island in 1925 (Ford, n.d.). It has since become distinctive of Hitiaurevareva.

Figure 19

Bird's head walking cane in tau, miro and banana palm

Note. Brown Family, (2021). *Birds head walking cane* [Tau, miro and banana palm]. Acquired from Pitkern Island Artisan Gallery 2021, collection of the artist-writer.

A walking cane with a bird's head is similarly a traditional European form, and has been adopted by those on Hitiaurevareva, having been made for several generations (Figure 19). When I asked what species of bird this might be, the response from Bren Christian was "it's just our island birds" (2021, personal communication). I am reminded of the millions of birds flying across Te Moana Nui, and in particular, the tītī (sooty shearwater or muttonbird) which flies from the Kermadecs to Hitiaurevareva and nests in Aotearoa. When displayed in homes, these walking canes are placed horizontally, which is also the custom among Māori.

3.2.3 Growing up in Ōtautahi (Christchurch)

As alluded to above, my whakapapa extends back fifteen generations to the islands of Ra'iātea, Huahine, and Tahiti.[20] Eight generations ago, some of my Tūpuna settled on Hitiaurevareva with the remnants of the crew of HMAV *Bounty*. Six generations ago, the entire community of Hitiaurevareva moved to Norfolk Island, which had been gifted to them by Queen Victoria. My mother Irene and four generations back, remained on Norfolk Island, and then near the end of World War Two, my father Ron was stationed on Norfolk with the Royal New Zealand Air Force. He was a Morse key operator and therefore worked shifts, which meant he was not required to perform the bane of the serviceman's life, the marching parade practised to synchronicity.

One breezy summer's day at Emily Bay beach, my mother swam into my father, and the rest as they say, is history. My eldest brother Gary was born on Fiji in 1951 (my father having been transferred there), my sister Christine (named after her maternal grandmother) in Christchurch in 1953, then I was born in 1959. As Moana and Māori whakapapa extends forward to the future; my daughter Kohana was born in 2002. Her full name is Kohana Weetie Takako Clothier. "Weetie" was my mother's nickname on Norfolk; Takako was Kohana's maternal grandmother. My Auntie Alma gave me the nickname "Pasha" (short for passionate) which I carry to this day.

Growing up in Ōtautahi in the 1960s was not an ideal time for cultural diversity. Māori faced outright racism on a daily basis. The speaking of the languages of tangata whenua and Moana tangata was not encouraged beyond the family. It was outlawed by social enforcement in schools (Higgins & Keane, 2013). The dominant cultural mode was the idea that all New Zealanders would become a monoculture of rugby and cricket playing people, who lived in neat houses in rows with manicured lawns and English cars in the garage – a "quarter acre, half gallon, Pavlova paradise" as the common homily went.[21]

Among all this, I did have a wonderful childhood. I was very close to my mother and grew up in the company of my younger brother, Alan, whom everyone called "Rocky,"as that was the name Alma gave to him. He was fourteen months younger, so we were in practical terms like twins. As a child of eight I helped my mother doing dusting and vacuuming. By the age of ten I was cooking one night a week for the family, and by eleven, I had learnt to cook spaghetti bolognese,

[20] It has recently come to my attention that I can trace my whakapapa to forty generations, something I am still assimilating as this document is being written.
[21] This phrase was the title of a book and referred to the size of properties on which houses were placed, beer, and Pavlova, a dessert named after the Russian dancer, and claimed by both Aotearoa and Australia.

which meant a panoply of meals was within my reach.[22] In an interesting nod to the situation of John Adams and the first generation on Hitiaurevareva – where there was an acknowledged male head of the community that was effectively run by the women – while my father enjoyed the superior placement of men in 1960s New Zealand society, my mother ran the family home and made most of the decisions involving house and family. It was interesting to observe and feel. Ōtautahi was my birthplace, it was where I grew up and as a child started on a journey with creativity and art. The following section reviews the formative period beginning in my late teens and early twenties, which on reflection would emerge later in my practice as key orientation foci.

3.2.4 Precedent Art Works in a Nonlinear History

Section 3.2 has charted my wayfound journey through whakapapa to Hitiaurevareva today, along with growing up in Ōtautahi. Together with Todd's prompting to locate precedents as outlined in Chapters One and Two, a context is provided to review precedents in my experiences. This relates to environmental practices, ideas of interconnection, low relief, connection to species and engaging Indigenous Practices. These aspects all reappear in "Chapter Six: Creative Practices."

In indicating precedent artworks, it is customary to write about them from the point of view of the audience and art object. The art object is seen as having discrete properties that can be discerned by the viewer. This is simply a restatement of the subject-object distinction, in the context of art and culture. For the reasons I will give in Chapter Four, this distinction cannot be observed here if I intend to maintain consistency. Consequently, I intend to discuss the following works from the point of view of relationality in the Moana and Māori sense.

As a note for clarification, this approach is different from *Relational Aesthetics*, a term used by curator Nicolas Bourriaud in the 1990s to describe an "art based on, or inspired by, human relations and their social context" (Tate Gallery, 2023, p. 1). The main difference is that relationality in the sense that I have described it, operates within Moana and Māori contexts, and extends to more than human relations, tracing backward into deep time and forward into the future.[23] The consequences of this revised temporal approach will be seen in the rapid switching of millennia between precedent art works.

[22] These are classic signs of being māhū, which is my identity. Māhū are an accepted third gender and this term is used on Tahiti and Hawai'i; in Samoa it is fa'afa'fine which translates as "in the manner of a woman" (Schmidt, 2011).

[23] The future part of the project relates to planned activities on Hawai'i and the Cook Islands, directly involving etched kōhatu; it is also an extension of the Aotea Utanganui Patea Museum show being planned for Puke Ariki in 2026. The 2026 exhibition will utilise the same curatorial trajectories as the *Interconnecting: pasha @ patea* show.

I am proposing to discuss the relationship I have with the art works that follow, and apply the context of the Rā (Interconnectivity) Dimension, which measures the degree of Interconnection I have to the works. Considering the dimensionality of the audience's relationship to an art work unleashes a diverse and culturally poignant reading, which may be useful to an art world often mired in Western assumptions. It is a method that is culturally aware and culturally appropriate, as it opens relationships to acknowledgment and discussion.

In another variation of convention, as we proceed through the following artworks, they will come to you in the order I experienced them, not in a timeline based on their year of production. This is a nonlinear timeline. Works that have a central impact on this doctoral project were sought: interactions with the environment, dissolution of the subjective, engaging with species; light (and hence in Moana and Māori terms, dark); and low-relief carving. All are visual precedents. When discussing the works that follow, dimensional thinking will be applied, widening the analysis.

Figure 20

Tilted planes

Note. Griffiths, S. (1981). *Tilted planes* [Inclined planes of grass]. *Australia New Zealand Art Exchange (ANZART) 1981*. Photo by the artist, used with permission.

In terms of engaging with the environment, Stuart Griffiths in 1981 at ANZART made a work *Tilted planes* where he tilted two planes of grassed earth in one of the Ōtautahi Christchurch Arts Centre quadrangles.[24] Griffiths' work was directly a reference to the tectonic plates of the alpine fault line of Te Wai Pounamu (South Island), a range of mountains extending six hundred and fifty kilometres. The impact was subtle and closer to the fault lines that become visible after earthquakes, astonishingly prescient of the devastating earthquakes of 2010 and 2011. Griffiths would become a lifelong friend. From the small beginning of a single ANZART, the consequences would be dimensional in terms of becoming entangled in my life: uniting past, present, and the future as we shall shortly see.

One quite remarkable ANZART work was an early piece by Shona Rapira Davies that directly addressed Tane (trees, forest, land life). The scale was wonderful as can be seen in Figure 21; I had not experienced such a work prior so this conversation about being outside and in the environment was something embedded in my formative years.

[24] "ANZART" stands for Australia New Zealand Art, and the main organiser was Ian Hunter. I was a student of Hunter, which is how I became entangled in ANZART.

Figure 21

ANZART installation

Note. Rapira Davies, S. (1981). *ANZART installation*, Christchurch, 1981. Photo: Robert and Barbara Stewart Library and Archives, Christchurch Art Gallery Te Puna o Waiwhetū. Permission for use granted.

At ANZART, I assisted Jacek Grzlecki with an installation, and was also in his performance. I was placed in a wheeled structure, spread-eagled in the same way as the outstretched hands and feet of Da Vinci's *Vitruvian Man* of 1490. This structure, with me in it, was then wheeled from Cathedral Square in Ōtautahi Christchurch to the Arts Centre, about three blocks. In the main hall the structure with me inside was placed in a larger construction where I could be rotated, which happened during the performance. This may seem somewhat off-song; however, in terms of dimensionality, I wound up going to the last free structured art school in Australasia, where Jacek Grzlecki was a tutor. This experience of meeting him became important for several reasons, not least because at the art school I met artist Anne Pincus, who became my first major partner. Decades later I would co-initiate SCANZ, picking up on the theme of artists gathering for residencies and exploring work in contexts outside of galleries and museums. The first SCANZ did not *require* outputs; however, the artists worked night and day in an open, collaborative environment.

Figure 22

Ginevra de' Benci

Note. Da Vinci, L. (c1474–1480). *Ginevra de' Benci* [Painting]. Collection National Gallery of Ar Washington D.C. https://en.wikipedia.org/wiki/File:Leonardo_da_Vinci_-_Ginevra_de%27_Benci_-_Google_Art_Project.jpg

Figure 22, *Ginevra de' Benci* by Leonardo da Vinci, occupies a central place in sculpting my creative context. In terms of this project, da Vinci is central to the notion of interconnectedness. In a well-known statement, he integrates hair and water: "Observe the motion of the surface of water, which resembles the behaviour of hair" (Hayward Gallery, 1989, p. 124). He considered water to be "the vital humour of this arid earth" (p. 107), and studied turbulence in storms (p. 109), water (p. 128), deluges (p. 131) and the heart (p. 121), aligning this with the behaviour of hair. Turbulence is core fluid dynamics, returning us to the subject of Ngaru Whenua and the painted waka hoe of Figure 3.

Figure 23

Bison licking insect bite. ca.13,000 BCE

Note. Bison licking insect bite. (15,000–13,000 BC). [Relief caring on antler]. National Museum of Prehistory Les Eyzies-de-Tayac-Sireuil, France.. GNU Free Documentation License.

After seeing *Ginevra de'Benci,* the whole expanse of art heritage was opened up in me. After touring through Los Angeles, Chicago, and New York, and exploring the collections of the Metropolitan Museum I returned to Aotearoa. Back at home, I bought in 1984 a second-hand book, *Man and Animal* prompted by the Assyrian works I had seen. This book contained imagery from seventeen thousand years ago up to the 20th century and included the image in Figure 23, which for some reason etched itself into my mind. The extensive depth of human-produced works that intersect this project is here acknowledged: the territory of engraving in low relief, incorporating animals and plants into visual culture, and engaging with the environment spans thousands of years. I see my thesis research into etched Kōhatu (Figures 88–104) as located within this tradition.

Figure 24

Self portrait with other fish

Note. Niolca Jackson (1986). *Self portrait with other fish*. Papier mâché over wood support painted wit acrylic and then varnished. Te Papa Tongarewa The Museum of New Zealand. https://collections.tepapa.govt.nz/object/37094

Nicola Jackson exhibited at The Gallery Akaroa at the time I was Director, and was creating work directly engaging with species. In terms of relationality, Jackson is the partner of Griffiths (see Figure 20) and they have become my lifelong friends, although I was never living in the same city or town as them. The connection to species is made strongly evident in the title of her work (Figure 24) and emerges in my practice in the use of live plants, with bird and whale imagery discussed in Chapter Six.

Figure 25

Tekoteko (detail)

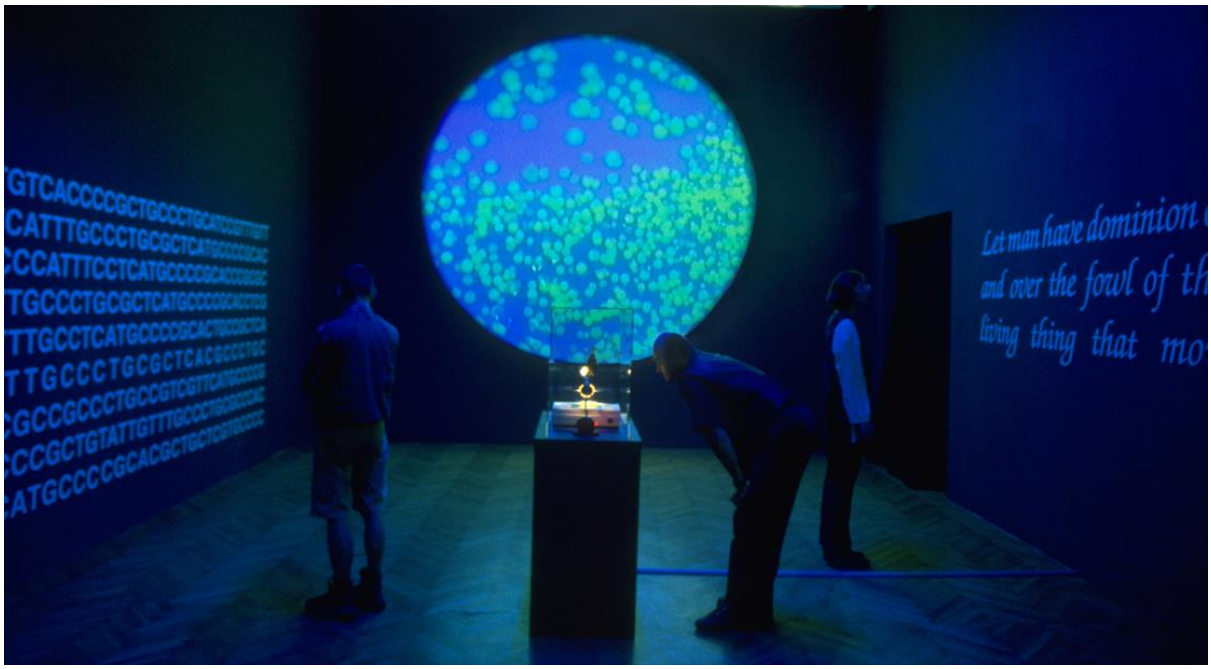
Note. *Simon Rogers (Ngati Porou)* (1985) *Tekoteko.* In stating this work was a tekoteko, Rogers was referring to times past when guardians would be placed in the bush as protectors, both to ward off antagonists and take care of the location. Rogers also innovated on tradition by not carving in the round, based on the qualities of the particular piece of wood used. Photo by the artist-writer.

This tekoteko (Figure 25) is a traditional form, which I was honoured to swap with the carver Simon Rogers for a painting. After carving the work from a piece of old totara, Rogers left it in the near extinguished embers of a fire and then put it in a local river so the forces of nature could act upon it. This process aged it and in so doing, I felt that Rogers had communicated with Tūpuna. The gloves are used for gardening; environmentally inclined artists must sometimes navigate the boundary between art and life in the garden.

Rogers also exhibited at the Gallery Akaroa. This was not an accident, as he lived locally and I met him initially at the marae at The Kaik, near Akaroa where he lived. As Director between 1990 and 1993, I instituted a policy of twenty-five percent Indigenous content in the exhibition schedule, and learnt to give a basic greeting in Reo Māori with which I commenced all openings, Māori and Western.

Figure 26

Genesis



Note. Kac, E. (1988–1989). *Genesis*. Mixed media installation. https://www.ekac.org/genphoto.html

In an expression of interconnection, religion, and art science, Eduardo Kac (1988-1989) translated a passage from Genesis in the Christian Bible, into Morse code, then the Morse code into DNA base pairs.[25] The base pairs formed a synthetic gene which was cloned into plasmids and then transformed into bacteria. These bacteria use photosynthesis to grow, and the amount of light over the petri dish at the centre of the installation could be changed by the online audience, who could switch a light over the bacteria on and off. This changes the structure of the bacteria, and hence its DNA profile, which can be traced back to modifying the Morse Code and hence the passage of the Bible.

This work cuts an elegant swathe through religion, science, nature, and telecommunications. The strategy of using several overlapping sub-systems is something I could recognise from reading into nonlinear systems, and which I applied to my Master's thesis exhibition in 2002. In particular, this strategy sits behind the curatorial approach to the selection of works for the Aotea Utanganui Patea Museum show, and is broadened out to enable Moana and whakapapa awareness in current projects.

[25] Thanks to curator Greg Burke, I saw *Genesis* in 2003 at the Govett-Brewster Art Gallery.

When I set out on this project, the recent past of project activity with Te Huirangi Waikerepuru and Te Matahiapo Indigenous Research Organisation was uppermost in mind when considering engaging Indigenous, and matters of the environment, in relation to art works. Then when I went to seek precedents in my current practice, it was at first unusual to find so many applicable works in a rich past, and then it was extraordinary to feel this extend back to late teenage years and forward to SCANZ and recent projects. Artists engaging in the environment in an ethical practice, and working in the way Griffiths and Davies had to dissolve traditional ideas of subjectivity, were part of my past. The interconnectivity embedded in da Vinci's oeuvre and Kac's work would be found in Moana and Māori cosmology, while connection to Tūpuna (ancestors) was evident in the works by Davies and Rogers. Connection to species is apparent in Jackson's painting, and the subtle engraving in the surface of Kōhatu (stone) in my work had a precedence in a fifteen-thousand year-old carving in bone. All these were things experienced in other contexts, previous to this project. The seeds had been planted.

3.2.5 Acknowledging Indigenous: Building Cultural Bridges

This chapter has conveyed the ocean of my whakapapa, complete with islands, sailing vessels, birds, and ocean currents mixing: Ngaru Whenua. It is an ocean composed of place and time, going back to 1777 and Tetupaia with her entourage including Mauatua. These energies have been flowing within me as I went about the business of teaching, research, art making, and associated network building through event initiation and development. As well as my research into the Indigenous Practices of contemporary crafts in Hitiaurevareva, and my own whakapapa and ancestral history, my creative research evolved from my experience in gathering together digital artists at the convergence of environmental art and electronic art in Aotearoa.

While undertaking my Master's degree at Auckland University of Technology, I read of an event to be hosted in Tasmania, Australia. It would be called "Solar Circuit" and follow the outline of the event known as "Polar Circuit," which took place in Lapland, close to the Arctic Circle. Soon after this, I became deeply involved as a facilitator in a sister event – Solar Circuit Aotearoa New Zealand (SCANZ) that ran from 2006 to 2018. The location of Solar Circuit (2002) was deliberately rural, as the aim was to engage with the environment. The event was an artist residency, where the participants shared meals together and were accommodated in the same facility rather than dispersed across a city. The other connecting factor was that, perhaps counter intuitively, the event revolved around electronic art practice. Many of the people who practise electronic art – coding, software, hand building electronic components, and multimedia installations – are also concerned about the environment. This point is tested in "Chapter Five: Diffracting electronic art and the Anthropocene." Solar Circuit Tasmania took place in January

Figure 27

SCANZ 2006 participants following the powhiri at Ōwae

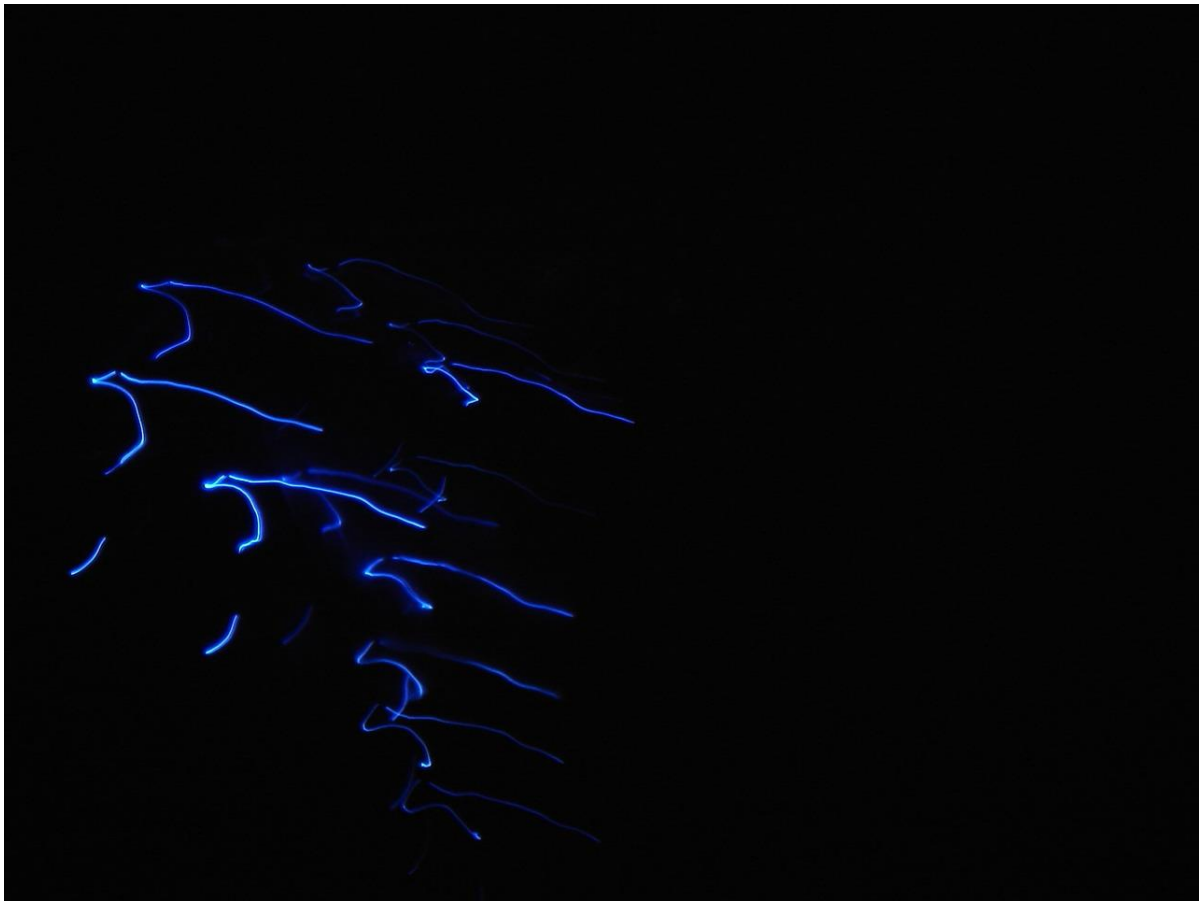
Note. Te Huirangi Waikerepuru stands at the back on the right, with white hair and a goatee. People from Aotearoa, Canada, Australia, the USA, the Netherlands and Germany attended. Note the kōwhaiwhai facing board painted decoration, which will be discussed in Chapter Six. Brennan, S. (2006). *SCANZ2006 participants following the powhiri at Ōwae*. Digital photograph. Permission granted for use.

2002, in part on the wildlife sanctuary of Maria Island. There I met Nina Czegledy, who would become a lifelong friend and collaborator.

A year later I was moving to take up a teaching position at the Western Institute of Technology at Taranaki (WITT), located in a rural region of the West Coast of Te Ika a Maui (the North Island of New Zealand), and home to Aotearoa's leading contemporary art gallery, the Govett-Brewster. It started to occur to me that Taranaki, being rural, would potentially be a very good location for an artist residency styled on the Solar Circuit. On the Aotearoa Digital Artist list, I asked if anyone was interested in organising a residency; Trudy Lane, who recently returned from the Walker Art Centre in the USA (United States of America), put her hand up, and would

Figure 28

Documentation of Night Kite project, Number 14



Note. Gregory, K. (2006). *Documentation of Night Kite project, number 14*. LED's, circuit board, plastic and string. Photo by the artist. Permission granted for use.

also become a lifelong friend.[26] Together with Adam Hyde, a New Zealand artist who founded the student radio network in Aotearoa and was then working from Amsterdam, Nina, Trudy, and I gave birth to Solar Circuit Aotearoa New Zealand (SCANZ).[27] It would soon become the leading art and technology event in Aotearoa.

The themes for the first SCANZ in 2006 were "Connection/Disconnection" (a reference to the work of Deleuze and Guattari) and "Environmental Response." This was relatively early in terms of concern for the environment, and it has been extraordinary to observe this theme grow

[26] An e-mail based discussion list for artists, curators, critics, and educators, focused on the intersection between art and technology in New Zealand and further afield (https://ada.net.nz/about/about-aotearoa-digital-arts/).

[27] The event was funded by Creative New Zealand Toi Aotearoa, the Govett-Brewster Art Gallery, the Western Institute of Technology at Taranaki (WITT), the Goethe Institute, the Royal Netherlands Embassy, TSB Trust, the Moving Image Centre and TheMost 92.3FM.

into the major environmental crisis and threat to humanity that exists today. Since we were meeting to discuss the environment, we all felt it essential to engage with Indigenous peoples.[28]

Consequently, I contacted the Head of Māori Studies at WITT, Tengaruru Wineera, when the project was in the planning stages, and this eventuated in Dr Te Huirangi Waikerepuru leading the powhiri (formal welcoming) at the historic marae of Ōwae (Figure 32, after the powhiri). This is the main home of Te Ati Awa in Taranaki. [29] The Powhiri was an important ushering in of the project in Taranaki, which would continue every two years until 2018, when it was halted by the COVID-19 pandemic.

Such was the awareness and openness of Te Huirangi Waikerepuru, that he visited the residency twice and took an active interest in the artists' projects. He was particularly taken with the project of the Canadian artist Ken Gregory. Gregory researched Matariki, which has since become a national holiday in Aotearoa celebrating the Māori New Year, and held at shifting celestial dates in the middle of the year. The Canadian artist (in a plaid shirt on the left in sunglasses, in Figure 27) read that kites were made and flown, and his idea was to build a kite that could transmit the call of the Huia, a bird made extinct due to a fashion in the United Kingdom for wearing their feathers.

Gregory had to abandon these plans due to the high winds at the time of year, and the payload required to transmit audio. He instead created an LED (light emitting diode) kite that flew at night. What impressed Te Huirangi was that when he saw the images documenting the kite (see Figure 28), he felt that Gregory had gone right back to the original meaning of Matariki, the rise of the stars known as Subaru in Japan, and Pleiades in the West.

So began a chain of events, where a cultural bridge was formed and became the context for engaging Indigenous Groups. There were SCANZ events in 2009, 2011, 2013, 2015, 2016, and 2018, Te Huirangi Waikerepuru attended them all except for 2018. There was a period of three years when Huirangi and I worked together on five international projects, two in Taranaki, one in Istanbul, one in Rio de Janeiro and the other in Albuquerque. As Ahorangi (which Te Aka

[28] As mentioned previously part of my previous experience in galleries was being Director of The Gallery Akaroa, where I instituted a policy of twenty five percent Māori content in the exhibition schedule, and also opened exhibitions with a short sentence of Reo Māori spoken.

[29] This is one of two main iwi in Taranaki, the other is Taranaki.

[30] I am very grateful to Mereiwa Broughton (Te Atiawa, Ngāti Maru, Ngātiawa), Inahaa Te Urutahi Waikerepuru (Taranaki Tūkau, Tāngahoe, Tuhourangi, Ngāti Whakaue, Ngā Puhi), Kura Puke (Te Atiawa Nui Tonu), and Tengaruru Wineera (Ngāti Ruanui, Ngā Ruahinerangi, Taranaki Tūkau, Ngāti Toa) for many years of excellent support and nourishment of Intercreate projects. We would not have been able to do the projects we aimed for without them.

gives as "professor, teacher of high standing") of Te Matahiapo Indigenous Research Organisation, Waikerepuru also became very much an ideological leader for the Intercreate Trust.[30] His emphasis on wai as water and more philosophically as flow, resulted in six Intercreate projects with water as part of their main themes. His championing of Indigenous led Intercreate to actively engage in seeking Indigenous involvement in projects, and cultural bridging was an important platform. At this time we became firm friends, and I discovered that when listening to him talk about Te Taiao, I was able to translate this into Quantum Theory and Chaos Theory as he spoke.[31] He really enjoyed these sessions on his couch and it is my great honour that he accepted me for who I was.

Thinking of wave particle duality, the profound consequences for Quantum Theory, and the dissolution of the subject-object distinction as fundamental to reality, in one of our conversations I asked Huirangi if there was anything in Māori cosmology where something at one time could be solid and located in a specific place, and at another time dispersed or spread out in space. "Oh, you're going back to basics there," he said. The next thing he said surprised me. "It's a rock. It sits in the river and doesn't move. But when the rains come down and the river floods, the stone is carried over the banks of the river and into the fields" (2013, personal communication).

In this conversation, I came to understand that Moana and Māori cosmology is fundamentally grounded in the environment to the point of attaining a great depth of understanding about the cosmos. Just as Nainoa Thomson pointed out when speaking of navigating, this involves intuition and journeying within, to attain the point of interconnected coherence: "that tests you to do things you can't do in normal life. Much of navigation is this internal journey" (Harden, 1999, p. 217). Seeing everything in a potentially transformational state in which a thing can change and become another form was also in the words Huirangi spoke. A mountain can be a very solid thing if you trip on a rock and bump your knee. At other times, it can also be a felt energy. The energy of a mountain can inspire people to environmental action, and I can feel the energy of a mountain even when I cannot see the one that dominates this region – Mt Taranaki.[32]

[30] I am very grateful to Mereiwa Broughton (Te Atiawa, Ngāti Maru, Ngātiawa), Inahaa Te Urutahi Waikerepuru (Taranaki Tūkau, Tāngahoe, Tuhourangi, Ngāti Whakaue, Ngā Puhi), Kura Puke (Te Atiawa Nui Tonu), and Tengaruru Wineera (Ngāti Ruanui, Ngā Ruahinerangi, Taranaki Tūkau, Ngāti Toa) for many years of excellent support and nourishment of Intercreate projects. We would not have been able to do the projects we aimed for without them.
The Intercreate Trust was established to facilitate projects involving art, science, technology, and cultural bridging (see intercreate.org)
[31] Taiao can mean Universe, or when not capitalised, the environment.
[32] Western scientific notation for the exchange of energy and matter is recorded in Einstein's $e = mc^2$

3.3 Summary: The Ocean of Life and the Meaning of Whakapapa

These then, are islands in the ocean of my life: whakapapa to Tahiti and Hitiaurevareva, growing up in Ōtautahi, and early experiences in the world of culture and art. Together, they form the wayfinding stories through which I sought to find a way deep into my Moana essence. The whakapapa components entail a "reformation and reconstruction process that takes place in a new location," as Albert Refiti wrote (2014, p. 15–16). This was a process of discovery, as my whakapapa and my upbringing were separated by five thousand kilometres of ocean, and several generations of ancestors. This is not simply an intellectual matter, but concerns my worldview. One of the most important contributions Sāmoan academic Dr Refiti made to me, and something wholeheartedly supported by my Hawai'ian teacher Kawaihulilani, was to make acknowledgments that recognised the process of engaging with Tūpuna (ancestors). This involves considering the forces of Tapu and Noa when presenting artworks connected to whakapapa and Tūpuna. Tapu and Noa[33] are concepts shared among Moana peoples and Māori. This occurred for many of the works discussed in "Chapter Six: Creative Practices:" at the blessing for *Kāhili* at the Govett-Brewster Len Lye Centre where the ritual process was led by Wharehoka Wano, and at *Interconnecting: pasha @ patea* where tangata whenua ushered in the exhibition, with Noa being restored with a cup of tea and finger food. Acknowledging Tapu and Noa became particularly important when preparations were being made for the Taputapuātea Marae visit to place the Kōhatu. Under the leadership of the Tohunga (Priest) Tihoti, the process was conducted according to tradition, at a location under the elements of nature and secured by sacred acknowledgment of universal energies. A sense of the sacred is involved in the first of three definitions of Tapu as given by Te Aka (2003–2023).[34] Te Aka also goes on to explain a sense of Tapu relevant to Tūpuna:

> Intrinsic, or primary, tapu are those things which are tapu in themselves. The extensions of tapu are the restrictions resulting from contact with something that is intrinsically tapu. This can be removed with water, or food and karakia (p. 1)

The process of removal with food and water renders the formerly sacred space Noa. The ceremony at the blessing of *Kāhili* commenced with karakia and concluded with the offering of kawakawa tea and kai moana (seafood). In recognition of the role of Kawaihulilani, the karakia commenced with a whakatauki in Hawai'ian, followed by the Kahuna navigation chant given in Chapter One. I then recited the Karakia which starts "Ko Rangi, Ko Papa" a traditional karakia

[33] Tapu and Noa are similar to the distinction between sacred and mundane; however the terms are applied in differing contexts, with changes in meaning.
[34] This is a highly regarded online dictionary of Māori language compiled by researchers for the purpose of improving awareness and practice of Reo Māori.

that Te Huirangi Waikerepuru customised to Taranaki; it speaks, among other things, of an interconnected world – it is translated in full on page 209 below. These three utterings were also given at the opening of my speaking at Taputapuātea, after which I introduced myself and my reason for being there to Tūpuna, as directed by the Tohunga (Priest).

Diffracted against this recognition of central Indigenous Practices in the form of recognising Tapu and Noa, the nonlinear journey through precedent works involved a journey through millennia to modernity and back. Engaging Indigenous and the environment in relation to artworks traversed back to early experiences in my art and cultural experience. I had walked a path where artists engaged ethically in the environment, and in so doing, dissolved traditional ideas of subjectivity. I found the interconnectivity of Moana and Māori cosmology had parallels in da Vinci's oeuvre, and that connection to Tūpuna was evident in works from the 1980s. That same decade also saw a connection to diverse species, and two decades later, plants combined with technology was part of my art-world creative experience. Having wayfound a creative practice that stretches back millennia, now it is time to Ngaru Whenua Diffract Indigenous Practices and Quantum Theory.

Chapter Four. Ngaru Whenua: Diffracting Indigenous Practices and Quantum Theory

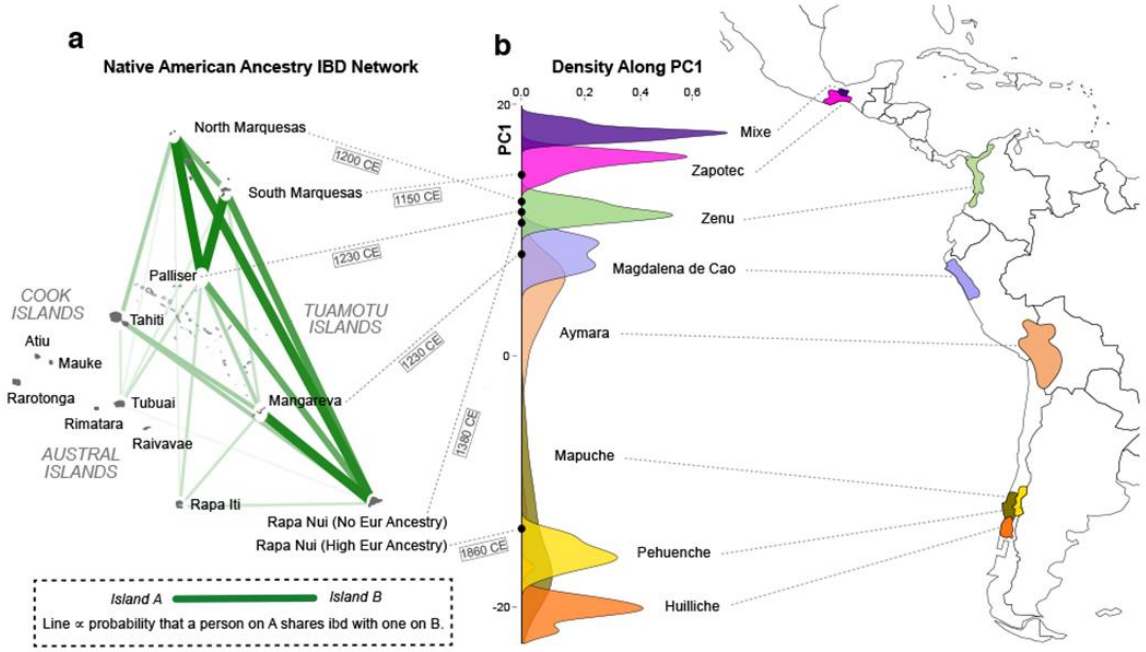
Chapter Four. Ngaru Whenua – Diffracting Indigenous Practices and Quantum Theory

Having introduced the main subjects of the thesis, given a view on Indigenous Practices, and scoped relevant projects prior to the PhD journey, I now turn to Diffracting Indigenous Practices and Quantum Theory. I will first introduce Moana and Māori navigation embedded as that is in my whakapapa, then use a Ngaru Whenua method of diffraction to explore knowledge across the Indigenous-Western border, in a way that maintains the mana or integrity of the important details of each knowledge base. Discussion of traditional Moana and Māori navigation practices is followed by a discussion of diffraction, as there is an important connection here in the recognition of wave patterning.

We then look into diffracting Indigenous Practices and Quantum Theory. Quantum Theory investigates wave-particle duality in light, is orientated historically in the wave patterns of water, and raises important questions about Cartesian Duality (Descartes, 1641, p. xii), with Barad (2007, p. 83) arguing for the dissolution of the subject-object distinction. The majesty of the navigational practice in extending a cultural footprint across the expanse of Te Moana Nui a Kiwa is revealed in both oral traditions, and now in contemporary science through DNA analysis, radiocarbon dating and in Quantum Theory, in terms of wave pattern recognition.

As an artist-writer reading into Quantum Theory, I needed to resolve my cross-disciplinary position, particularly for the coming chapters. Early on in my reading (i.e. in the 1990s), I adopted the practice of summarising the agreed aspects of Quantum Theory, which functioned to give me a solid grounding in the parts of the theory as agreed widely. The most outstanding position where there is wide agreement is in the dissolution of the subject-object distinction as fundamental to reality, or that at least the notion of the distinction being fundamental is not consistent with Quantum Theory. One of the reasons for citing so much from Barad on this, is the position she occupies on the world stage, her impact on diverse fields and new materialism, and because large parts of her text fall within aspects agreed by a range of Quantum theorists. The discussion around the subject-object distinction is critical, because associated with this contention from Quantum theorists, is a range of topics that form a basis for what I have called the Ngaru Whenua Diffraction of the Sāmoan concept of Vā and Quantum Theory. The Vā has been written about extensively by Moana academics, and here is combined with important background related to Majel Islands navigation, the traditional Kaiwhakatere association with the sacred island of Ra'iātea, and the Majel Islands-Hawaii-Aotearoa restoration of the traditional navigation from the 1980s to the present.

Figure 29
Origin and spread of early Native American ancestry in Polynesia,



Note. Thirty one academics from multiple disciplines worked on a comparative DNA project resulting in direct evidence of DNA admixing between people of the Marquesas and those of current day Guatemala in 1150 CE – see the Zapotec people and South Marquesas connection indicated in bright pink. Source: Ioannidis et al. (2020). Native American gene flow into Polynesia predating Easter Island settlement. *Nature*, 583, 572–577. https://doi.org/10.1038/s41586-020-2487-2

What is perhaps revelational in this, is that any form of relationship *whatsoever* between Indigenous Practices and Quantum Theory could be located. It has taken a propositional technique – Ngaru Whenua – vested as it is in ocean metaphors, an acknowledgment of precedence in Moana and Māori thinking where this is relevant, and a determination to encapsulate the current state of affairs around Quantum Theory and science, to get there. This has reversed the usual emphasis placed on Western framework as primary and dominant with Indigenous framework as subordinate and inferior. This is the core of the contention of utilising a decolonised framework for analysis. We begin with traditional navigational practices. Sir Thomas Davis (1952), who later became Prime Minister of the Cook Islands, was interviewed by *TIME* magazine about his open sea voyage with his family from the Cooks to South America. The article describes Davis recalling oral traditions:

> A Polynesian expedition under Chief Maui Marumamao, says the legend, sailed east from Easter Island and came to "a land with ridges like a comb." The Peruvian coast is

Table 3

Table of DNA intermixing between peoples of Moana islands and South America

Year	Moana Motu (Island)	Central and South America
1150	South Marquesas	Guatemala
1200	North Marquesas	Colombia
1230	Palliser Island (Tuamotu group)	Colombia
1230	Mangareva	Peru
1380	Rapa Nui	Colombia

Note. Adapted from: Ioannidis et al., 2020. Native American gene flow into Polynesia predating Easter Island settlement. *Nature*, 583, 572–577. https://doi.org/10.1038/s41586-020-2487-2

> like that, with steep, barren ridges running down to the sea. There the Polynesians built a temple, but they did not stay long because they did not find what they needed: fertile land near the sea. This description also matches Peru, for most of the Peruvian coast is bone-dry desert. (pp. 1–2)

In a similar way to weaving or cross-referencing Moana and Māori cosmology and radiocarbon dating to establish a date for when the notion of interconnection was with Moana and Māori peoples, we can now diffract oral tradition and the DNA record, to establish the correctness and timing of oral traditions around reaching South America. Ioannidis et al. (2020) provided the diagram in Figure 29 on which Table 3 is based.

In simple terms, Figure 29 and Table 3 confirm several Moana oral traditions of reaching South America and, as can be seen in the DNA evidence, genetic admixing first occurred in 1150 CE. It is almost certain that arrival in South America occurred much earlier – at minimum two centuries perhaps – as it would have been necessary to learn to navigate the difficult currents rising north from Antarctica before planned voyaging across this part of the ocean could occur.

In addition, after the first discovery, there would have needed to be motivation to journey the long distance, and this would need to happen several times before genetic admixing could occur with the result of offspring. This study was promulgated in 2020 – relatively recently for such information to be confirmed – and part of the reason for the delay is that previous studies only included DNA from Rapa Nui, Easter Island. As recently as 2018, Western scientists were uncertain whether Moana peoples reached South America or not. This matter has now been resolved, both for Moana people who knew it by oral tradition, and also now for Western scientists.

The 1100–1200s was a very significant century for Moana and Māori voyaging. In one century, Eastern Polynesia from Hawai'i to Aotearoa New Zealand to Rapa Nui and the islands in-between were settled. In the same century, there was DNA admixing with the native people of Central America. Toi followed Kupe's path to Aotearoa New Zealand in 1150, as we saw in Chapter Two. A sudden expansionary period occurred in little more than one hundred years.

So how did they do it, and why is this vital to the thesis? Now is the time to look more closely at what traditional navigation practices actually involve. Traditional Moana and Māori navigation is not simply the task of getting from one place to another. It is an expression of an interconnected worldview, the view introduced in Chapter Two. Consequently, the sun, stars, moon, planets and seasons; species including birds, fish and plants; the behaviour of insects and shellfish; the rocking of the boat when it arrives at places where currents meet; currents of small, medium and large scales; clouds and the colour of clouds; the colour of lagoons reflected on the underside of clouds; storms and being becalmed; islands and volcanoes; the speed of the waka; prevailing currents and their shadow; prevailing winds and interactive energies; all are involved in the navigators' consideration.[35]

The actions and understanding of the traditional Moana and Māori navigator are critical, because in the open sea the lives of all on board are in their hands. The navigator constructs a dynamic mind map: "It's about recognising and understanding your natural environment in its totality, purely out of a need to survive" as Hawai'ian master navigator Nainoa Thomson commented (Harden, 1999, p. 218). These navigators are exemplified by those from the Majel (or Marshall) Islands, who do not take any chart they may have when they voyage. "Stick charts were not taken on voyages but were memorised before embarking" according to Marshallese Manit (n.d., p. 1), a website with content from the islanders themselves (Manit as the site stated, means Culture). [36]

[35] According to Crowe (2018, p. 91), the reflected lagoon colour can be seen from 70 km away.
[36] Unfortunately the site has been taken down, however, it has been replaced with a newsletter.

Also memorised are ocean currents at different times of the year and under differing conditions, such as El Niño and La Nina. It is apparent that Māori navigators understood the weather well enough that they could distinguish between these conditions. The climate of the time of the settlement of Aotearoa New Zealand has been modelled and according to modellers at Macquarie University and Australian National University (Goodwin et al., 2014),

> the intensification and poleward expansion of the Pacific subtropical anticyclone culminating in A.D. 1140–1260 opened an anomalous climate window for off-wind sailing routes to New Zealand from the Southern Austral Islands, the Southern Cook Islands, and Tonga/Fiji Islands. (p. 14716)

They further went on to state that "El Niño events may have assisted voyaging, [which] is reflected in the actual and simulated operation of experimental East Polynesian sailing canoes" (p. 14716). The window 1140–1260 CE does indeed overlap with the radiocarbon dating record for the settlement of Eastern Polynesia.

Patterns in the weather, along with migratory bird and whale routes are also memorised. Migratory birds are now known to depart almost to the day of the previous year, according to Adrian Reigen (2021, personal communication), an Ornithologist tracking Kuaka (migratory Godwits) from the Pūkorokoro Miranda Shorebird Centre in the Coromandel to China, Russia and Alaska. As well as the annual flight paths of tens of millions of birds that Crowe (2018) wrote of, which were cited in Chapter Two, the direction of migratory birds is useful information to a navigator. If a migratory bird is flying in the wrong direction, that is a sign a storm is ahead. In addition, any information about the place of departure and place of arrival are also considered. Along with seeds and types of seaweed, if a coconut is found floating in the sea, the bitterness or otherwise of the milk can give an approximation of the distance the coconut is from the island where it originated. The salinity of seawater changes with latitude, as does its temperature, and the smell of islands are further signs that can be interpreted by the navigator. [37] Weather changes at sea from wild storms to being becalmed, and this can bring considerable problems. As Thompson elucidated:

> When you go into the doldrums, that area near the equator called the max cloud line, it's the cloudiest place on Earth. You are blind as a navigator – you can't see heavenly bodies … The ocean reflects the sky … on a black night, the ocean is black. You cannot

[37] See Crowe, 2018, pp. 88–89.

> even see the canoe, let alone see the stars, see the moon or even the ocean waves. You're blind. (Thompson, cited in Harden, 1999, p. 220)

Nainoa Thomson is credited with re-establishing traditional Hawai'ian navigation methods starting in 1976. This was based on the teachings of Mau Piailug from the island of Satawal in the Federation of Micronesian States. Mau Piailug (as cited by Thomson in Harden, 1999) also said "Don't look with your eyes. Let that go. Look inside to find the answers" (p. 218). Nainoa Thomson, who had balanced a lack of childhood navigation experience with learning the science of weather and currents, commented that his response was to "step from the science to art" (Harden 1999, p. 220). Mau Piailug is credited by Nainoa Thompson with reviving voyaging "not just in Hawai'i, but in all the Pacific" (Harden, 1999, p. 217). Mau Piailug, Nainoa Thomson and Sir Hekenukumai Busby were together responsible for traditional voyaging spreading across Te Moana Nui a Kiwa. The point of the internal journey in association with the external journey, has provided an important guide to this project, my creative practices, and life. I was tested to do things I didn't do in normal life: the journey to Ra'iātea discussed in Chapter Six.

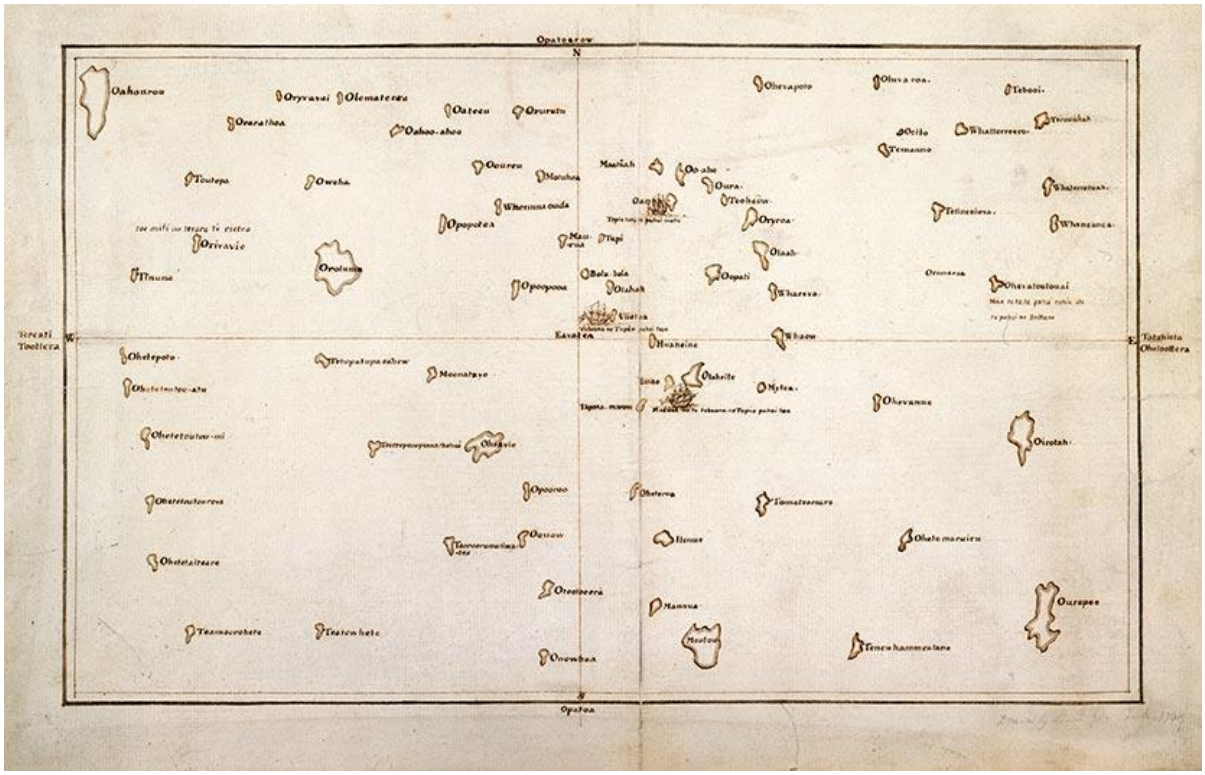
Some of the navigation knowledge is intergenerational, a part of the Moana knowledge dimension, so is multigenerational and collaborative knowledge, confirmed over centuries as we have seen. Such knowledge has been passed down generations, and can be mapped in the process of whakawhanaungatanga (a process of recognising interconnected relational familial lines), which involves Tūpuna. Given the expansive and interconnected aspect of the navigator's knowledge base, some navigators are recognised as Tohunga Kaiwhakatere (Priest, Navigator).

4.1.1 Tupaia: Tohunga Kaiwhakatere Mahi Toi (Priest, Navigator, Artist)

Given the responsibilities and enormous range of information – external and internal – taken into account by navigators and the fact that Moana and Māori navigation knowledge incorporates the stars and cosmology, navigation is therefore of the highest order, and involves an integrated understanding of nature. Tupaia was a Priest, Artist and Tohunga Kaiwhakatere born on Ra'iātea, and was well known for accompanying Cook to Aotearoa New Zealand in 1769, where he found he could speak directly with Māori; as seen in Chapter Two (Table 1) essentially, they were speaking the same language, with different inflections and sometimes different terms. Tupaia was also "known for his knowledge on genealogy and spirituality" (Zaki, 2018, p. 1)

Figure 30

Tupaia's Chart, August 1769 – February 1770



Note. Tupaia, 1769-1770 *Navigational Chart*. Source: Druett, J. (2017). Tupaia. In *Dictionary of New Zealand biography, Te Ara: The encyclopedia of New Zealand*.

which along with being trained in celestial navigation, as Druett (2017) writes, meant he was

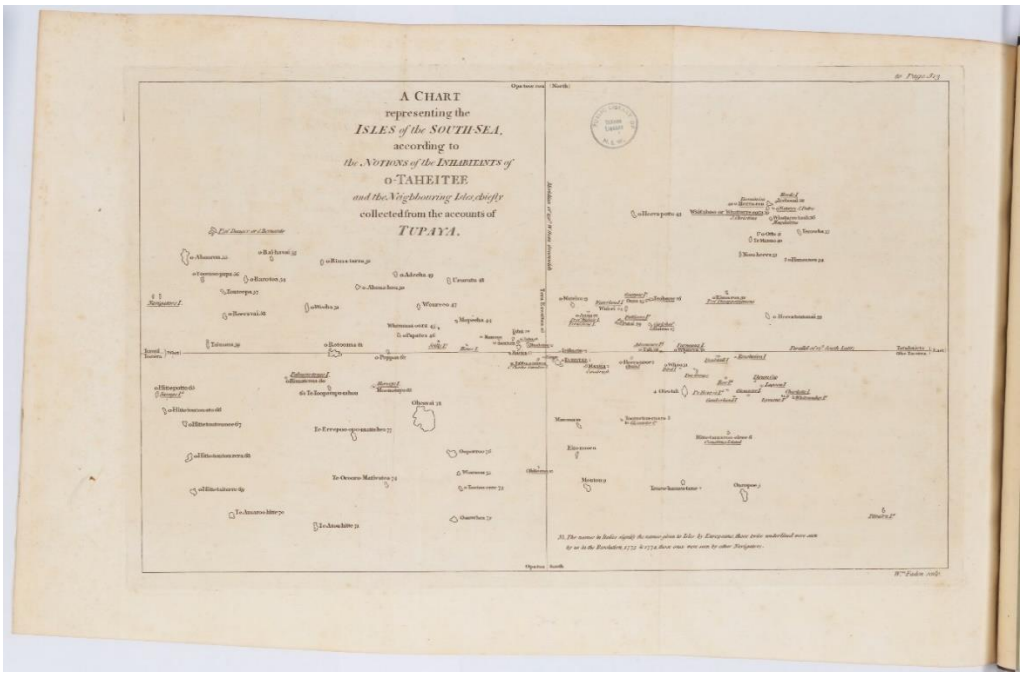
> one of the select few taught at the greatest marae in all Polynesia, Taputapuātea at Opoa, on Raiatea's southern coast. After consecration as a tahua, or priest, with star navigation as his specialty, he moved on to a three-year cadetship with the arioi society.[38] (p. 1)

This places Tupaia at the epitome of Moana knowledge. As an example of the extent of knowledge held in the mind-body memory by Kaiwhakatere, the map Tupaia produced for Cook (Figure 30) is revealing. Tupaia had an extensive knowledge of the South Pacific, which would have included knowledge that was handed down through the earlier navigator meetings on Ra'iātea. He produced the map (Figure 30), which was later reworked to provide numbers for the sequence in which Cook visited the islands (Figure 31), though neither was understood by the West until the 21st century. Two Potsdam University researchers, Lars Eckstein

[38] A secret society in Tahiti.

Figure 31

Tupaia's map reworked to number the islands in the order Cook visited them, 1788



Note. The reworked version includes Hitiaurevareva/Pitcairn. Source: Forster, J.R. (2024). *A chart representing the Isles of the South Sea*, 1788, Collection, State Library of New South Wales. https://www.sl.nsw.gov.au/collection-items/chart-representing-isles-south-sea

and Anja Schwarz over six years of research, finally worked out the map (Zaki, 2018). Simply, the islands radiate from the central point of the middle, which follows the Moana and Māori understanding that a *waka* (canoe) is static, and the aim is to bring the island over the horizon (Harvey, 2018, p. 1).

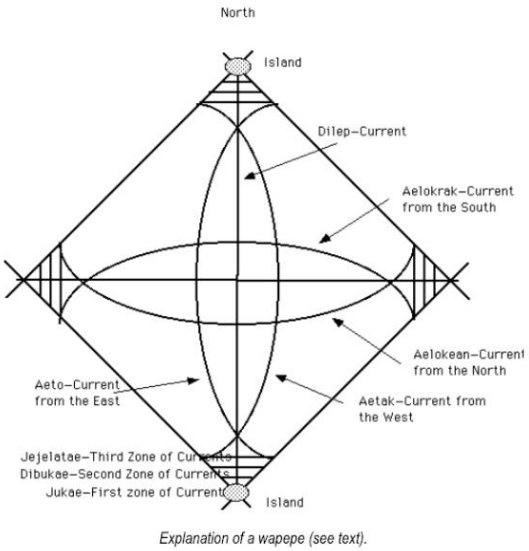
4.1.2 Moana Currents – Diffractive Practices

Having introduced Moana and Māori navigation, it is now time to turn to look into Indigenous Diffractive Practices, as exemplified by Majel Islands navigators. The image in Figure 32 is called "Wapepe" or "Mattang," and is used for teaching about currents around islands. If a theoretical journey from the island at the bottom of the diagram is undertaken then detecting whether the current from the east or the one from the west is strongest needs to occur first. That way the navigator can take account of the current when setting direction.

As the waka leaves the island, the Jukae first zone is passed through, and at this stage the departed island can be seen. The Dibukae zone is then traversed and by the time the Jejelatae

Figure 32

Diagram of a Marshall Islands Wapepe/Mattang teaching chart



Note. Source: Spennemann, D. (Ed.). (1998). *Essays on the Marshallese past (2nd ed.)*. Charles Sturt University. http://marshall.csu.edu.au/Marshalls/html/essays/es-tmc-2.html

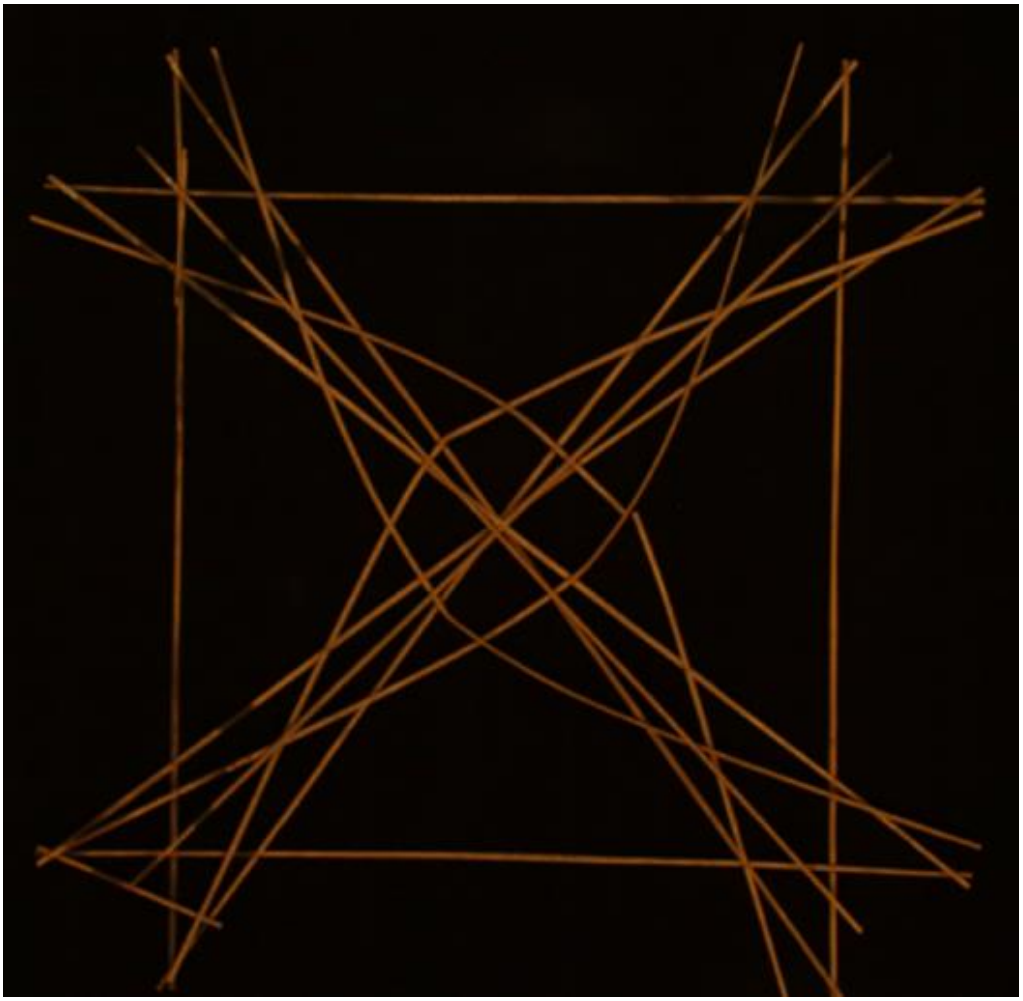
zone is reached, the island is no longer in view. The navigator follows the Dilep (idealised in the diagram below), which is a line postulated between the departed and targeted island. This enables sailing between two islands 100 km apart, with only observation of currents to guide (Harvey, 2018, p. 1).[39]

As the Marshallese Manit (n.d.) site states, where the current from the *aeto* (east) meets that from the *aetak* (west), the waka will roll back and forth from front to back, with more emphasis on the back. This is known as *limaajnono* (choppy seas). As the waka continues toward the target island, the point where the *aelokean* (current from the north) is reached involves calmer waters and the waka rolling from side to side. Then the *elokrak* (south current) is encountered. After crossing again over the meeting of the aeto and aetak currents, the waka again rocks back and forth from front to back. This meeting of currents is another form of Ngaru Whenua. Those on board know the island is closer, but it may not be visible. Eventually the waka comes to the Jejelatae zone of the target island, with the island beginning to appear in the Dibukae zone and becoming visible in the Jukae zone. To underline the sense in which observation is not purely visual, Marshallese

[39] I am very grateful to Associate Professor Amanda Yates, for giving me the reference to the paper by Harvey discussing Marshall Island navigation techniques modelled on computer. From this small beginning, this project unfolded into a position where traditional navigation became an important topic and central to the thesis: Ngaru Whenua.

Figure 33

Marshall Islands Mattang stick chart



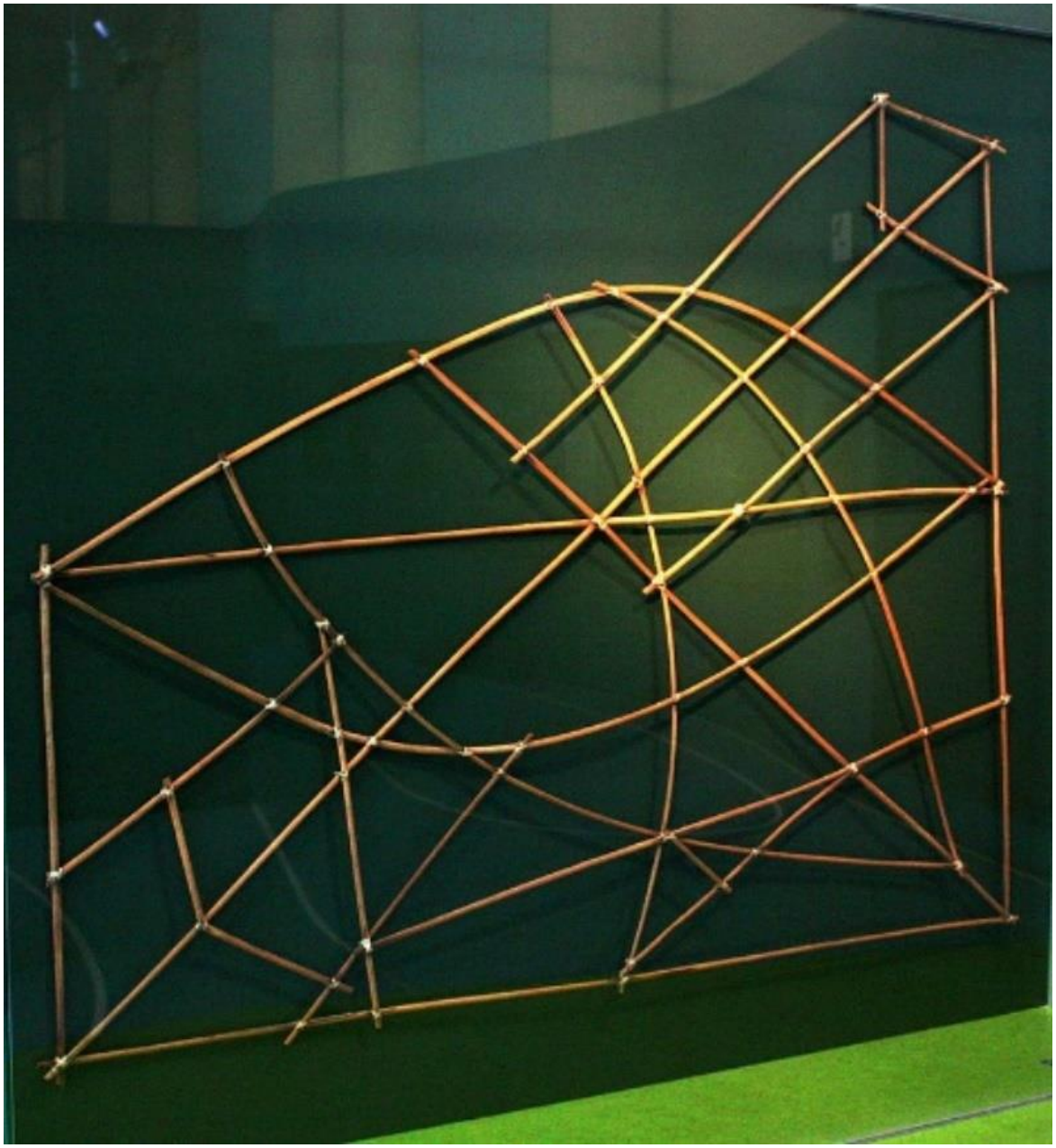
Note. Wapepe are teaching aids and said to have originated before seeing European charts. Source: Smithsonian Institute. (2020). *Navigating the Waters with Micronesian Stick Charts*. https://ocean.si.edu/human-connections/history-cultures/navigating-waters-micronesian-stick-charts

Manit (n.d.) stated: "Many Marshallese sailors could lie in the bottom of a canoe and sail by the feel of the waves and currents" (p. 1).

Following are three kinds of charts (Figures 33, 34, and 35), with different scales. The first is a different type of Wapepe so is a tool for teaching on shore. Figure 34 is called "Meddo" and maps the currents around several islands (Überseemuseum Bremen, n.d.). Figure 35 is a Rebbelib and shows chains of islands, represented by small shells. The use of charts at differing levels of scales is also followed in Western navigation, where charts closer to port have greater detail, indicating obstacles not visible in larger scale maps.

Figure 34

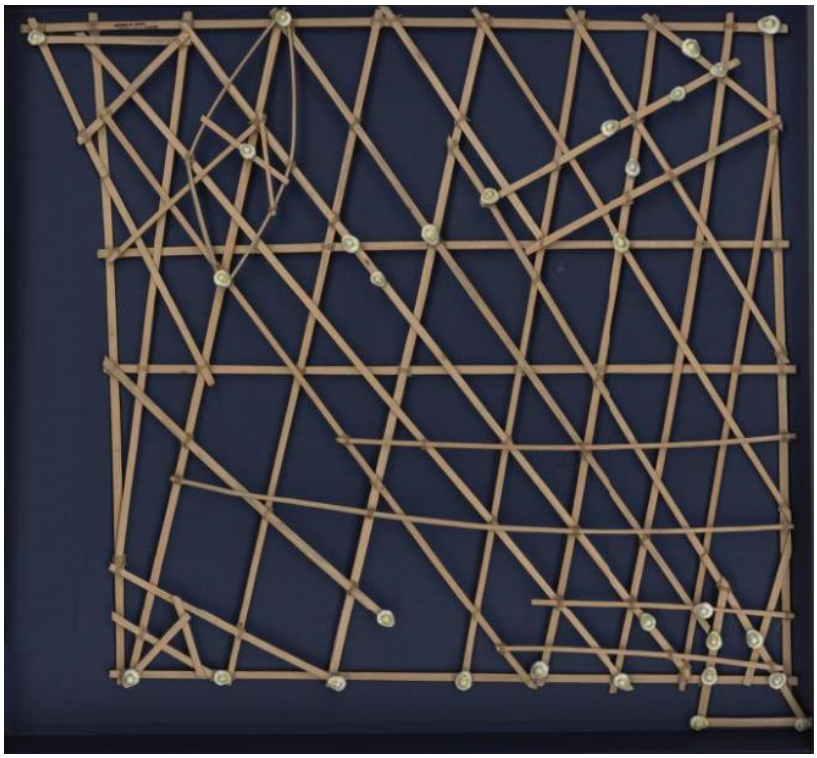
Marshall Islands Meddo chart



Note. A Meddo chart describes main currents around several islands and are said to be post-European contact. Source: Überseemeum Bremen. (2009). Meddo stick chart. https://commons.wikimedia.org/wiki/File:Überseemuseum_Bremen_2009_063a.jpg

Figure 35

Marshal Islands Rebbelib chart

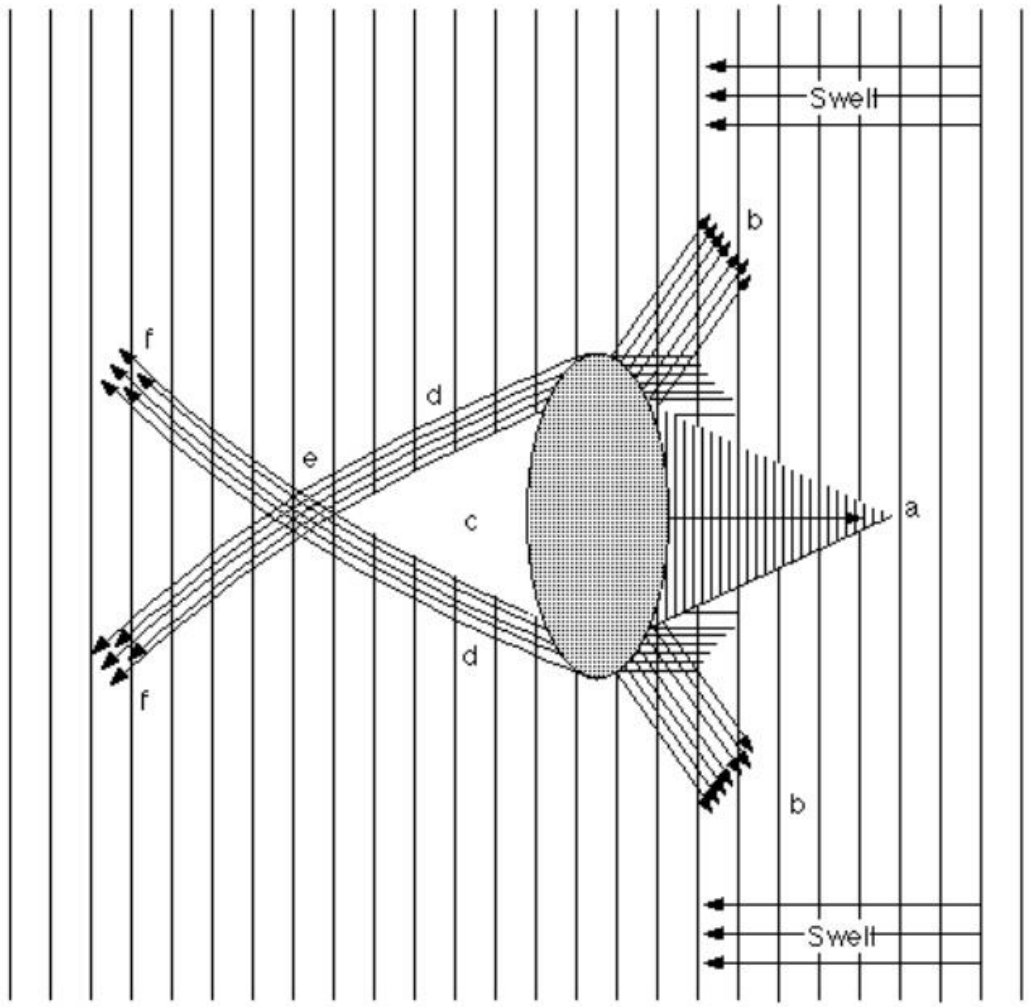


Note. A Rebbelib chart maps ocean swells and waves around strings of islands and the style is also understood to be post-European contact. Source: Library of Congress. (1920). *Marshall Islands stick chart, Rebbelib type*. https://www.loc.gov/resource/g9461p.ct003132/?r=-0.576,-0.054,2.152,1.031,0

It should be noted that according to the Marshallese Manit website, traditional navigators stated that the Meddo and Rebbelib charts were only made after seeing European charts, and hence cannot be considered traditional.

Figure 36

Diagram of current flow around an island



Note. Source: Spennemann, D. (Ed.). (1998). *Essays on the Marshallese past (2nd ed.)*. Charles Sturt University. http://marshall.csu.edu.au/Marshalls/html/essays/es-tmc-2.html

Figure 36 by Dirk Spennemann (1998) a leading researcher into Micronesia, explains wave patterns around an island, where the prevailing current is from the right or west. Water is reflected (a), deflected (b), and at (d) split in two. Where the split currents meet (e), the waves are diffracted and create an interference pattern: "This area is defined by waves coming from two directions and colliding, creating a foamy line on the ocean" according to Spennemann (1998, p. 1) (see Figure 11).

Figure 36 shows Ngaru Whenua patterns created by an island, indicated by point (e). According to Crowe (2018), observance solely of the texture of the ocean permits traditional navigators to locate islands in the dark from a distance of 55 km.

Figure 37

Ngaru Whenua wave patterns formed after an ocean current passes an island and reconnects downstream

Note. An island creates the distinctive Ngaru Whenua wave pattern known as diffraction in the West. Source: Crowe (2018, p. 88). *Pathway of the birds.* Bateman. Photo by Wing-Chi Poon CC BY SA 3.0, WC.

Two of the greatest Moana navigators of the 20th century, Mau Piailug and Nainoa Thomson both attest to navigation also being an internal journey. In this journey, knowledge, intuition and experience merge to guide the navigator across vast tracks of open ocean. A taonga (treasure) of both Tahiti and Aotearoa New Zealand, Tupaia was also an artist, and Nainoa Thomson refers to stepping from science to art, providing an alignment between creative practices, science and Ngaru Whenua. This is a central trajectory providing a ground for creative wayfinding on which my practice and approach evolved.

It was at this point that I could locate a connective tissue between the majestic traditional navigation process and the much humbler project of creating artworks from the material under review. The notion of wayfinding became central to not just creative practice, but my entire life. Wayfinding in life is not as easy as it sounds. Although no-one's life is at stake, it takes a really careful sensitivity to the space being occupied, species, and te taiao (the environment) to get right. This flows over into all parts of living and became for me a central axis from which I

changed behavioural patterns and expelled extraneous thought patterns, replacing them with a reverence for nature, a respect for traditional knowledge, and a desire to go deeper.

Just as the book by Crowe came to me by wayfinding my way to an unexpected meeting, when I travelled on to Kawaihululani (my mentor and kumu, or teacher) after visiting the Pūkorokoro Seabird Centre, she gave me the book by Harden containing the interview of Nainoa Thomson and his comments about navigation and Mau Piailug, which acknowledged that Piailug "revived voyaging, not just in Hawai'i but in all the Pacific" (Harden, 1999, p. 217). Kawaihululani also explained that she does not just go out on the ocean in waka, but that her Kahuna, Kahu Abraham Kaua'i taught cosmology to her using navigation metaphors. This is the source of the navigation chant given in Chapter One:

Island come, island go
Ocean come, ocean go
Life come, life go
I sail, I fly
Centre of the Universe

4.2 Ngaru Whenua and Diffraction in the West

4.2.1 Introduction to Diffraction

From the Kahuna navigation chant and the centre of the universe to a paradigm shift in Western understanding of the physics of the universe, I now turn to the subject of diffraction. I would now like to lay out for you, the subject of diffraction as it has been referred to in the West. We shall see that the subject wandered from science and into feminist theory through the writing of Haraway (1997), and then was broadened by Barad (2007) writing in the field of Quantum Theory, applying a diffractive method across to feminist studies. For Barad it was important to retain the important details of each discipline, and here the discussion turns through diffraction in Western science to diffractive wave patterns that were known by Moana navigators, and which can be seen in Figure 36 and 37. The diffractive wave patterns indicated by Spennemann are then placed side by side with a Western science image by Young. This establishes each side is referring to the same phenomena. The behaviour of light waves as given in a well-known diagram (Figure 39), provides the basis for applying Ngaru Whenua method in diffracting the Sāmoan notion of Vā with Quantum Theory as given by Barad.

One of the most problematic aspects of Quantum Theory relates to the dissolution of the subject-object distinction. Some time is spent on this, and Barad wrote extensively about it. The

discussion moves through to states of superposition, an important aspect of contemporary Quantum Science and Theory. Recent experiments provide further evidence of superpositioning, which is a condition of *relationality* that provides problems for analysis in Western academia predicated on the assumption of Cartesian Duality. Superpositioning is shown to be experimentally established, and my discussion adheres to two principles, citing material that has wide agreement throughout 20th century Quantum Theory, rather than attempting to resolve the Measurement Problem (Rae 1986, p. 53), which refers to the breakdown of the subject-object distinction by questioning measurement in quantum experiments and the role of the observer. The second principle I adhere to is to consider recent experimental evidence, which often confounds theorists.

This section sketches some fairly complex pieces of Science, which foregrounds diffracting the notion of Vā with Quantum Theory. My contention is that discussing the behaviour of *waves of knowledge* in terms of whether they might add or cancel (following the science diagram in Figure 39) provides a decolonised method to bring each side of the cultural boundary into a discussion. Importantly, the discussion can occur without requiring Indigenous knowledge to be located within a Western framework. The reason for giving so much time to discussing Quantum Science is that Ngaru Whenua Diffractive patterns were known by Moana navigators at least six hundred years before the topic was discussed in Western Science. Therefore, it is entirely relevant to be discussing this in a framework that is not by necessity Western.

It is at that point, that we will have arrived at a means by which "Indigenous Practices might enter into dialogue with technology and Western metaphysics," the research prompt driving this project given in my revision of Hui (2017, p. 20) and discussed in the Introduction on page 2. Finding a way to dismantle the colonial imposition of conventional academic research method also required providing fresh insights into knowledge, with the proposition of Knowledge as Dimensional bearing fruit. I do not see my notion of Knowledge as Dimensional is a statement about knowledge itself. Rather, it is a tool for unpacking knowledge that is not bound by Western convention. Knowledge as dimensional is not offered as *the* solution, but as one solution, with others possible. A discussion of Tangata (People) and Rā (Interconnectivity) Dimensions then follows, which assesses how widely the subject-object distinction as illusory is held (that is how it registers in Tangata or People Dimension). This is followed by a short review of Rā (Interconnectivity) Dimension, which measures the interconnectedness of world views.

4.2.2 Diffraction in the West

Diffraction is most well known in Western Science as a property of the wave-particle duality of light first proposed by De Broglie in 1924 (Nobel Prize Outreach, 2023) and followed through by

Einstein and Infeld (1938) and Feynman (1962) with Barad following Haraway in developing a method of critique, "reading insights through one another" (Barad, 2007, p. 71).

In the scientific context, diffraction describes the spreading of light as a result of encountering an obstacle. The light waves bend around the obstacle and spread as the light wave propagates through spacetime. Diffraction is a property of forms of energy that involve waves, so also applies to water, sound and electromagnetic fields (light is a subsection of electromagnetic energy). Importantly the character of overlapping waves is maintained such that two distinct waves can be seen to overlap rather than forming an amorphous singularity.

Barad developed the diffractive methodology to "provide a transdisciplinary approach that remains rigorously attentive to important details of specialised arguments within a given field, in an effort to foster constructive engagements across (and a reworking of) disciplinary boundaries" (2007, p. 25). It is fair to say that my intention here is to extend this diffractive methodology across cultural boundaries. Paying rigorous attention to important details in referring to Indigenous Practices, is interpreted as maintaining the *mana* or integrity of the words of the Indigenous authors.

Diffraction as a methodology was discussed by Haraway in 1997:

> My invented category of semantics, *diffractions,* takes advantage of the optical metaphors and instruments that are so common in Western philosophy and science. Reflexivity has been much recommended as a critical practice, but my suspicion is that reflexivity, like reflection, only displaces the same elsewhere. (p. 16)

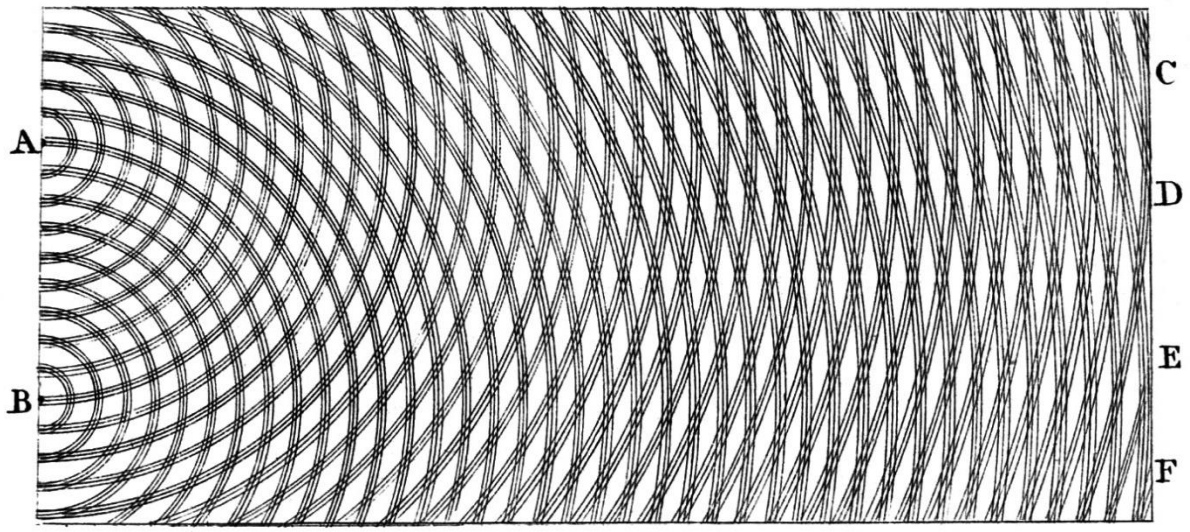
Summarising Haraway's contribution, van der Tuin wrote (2014): "She added the method to the toolbox of semiotics ('syntax', 'semantics' and 'pragmatics') in order to affirm how 'interference patterns can make a difference in how meanings are made and lived'" (p. 10).

This liberated inquiry from the chains of duality in a clear feminist context:

> A diffractive reading of bodies no longer renders them as successfully administered by patriarchy, where the powerful male figure is a mental origin that oppresses woman

Figure 38

Thomas Young's 1803 drawing of diffractive wave patterns



Note. Points A and B are where pencils were placed, interrupting the flow and generating diffractive patterns downstream.
Young, Thomas, 1803, Source: Wikimedia Commons (2016). *Young diffraction.png*. https://commons.wikimedia.org/wiki/File:Young_Diffraction.png. Public domain.

> through sexist imagery and puts her up as a physical origin that gives birth to and arouses men. (van der Tuin, 2014, p. 7)

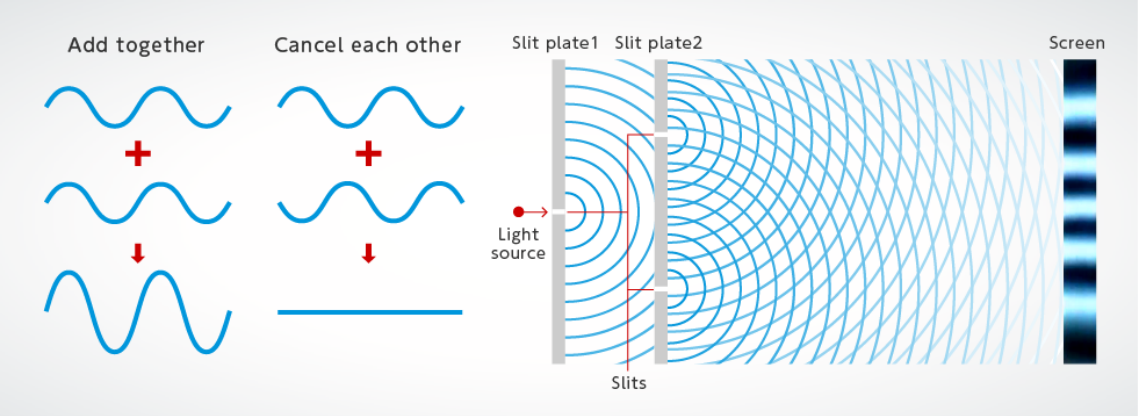
Along with van der Tuin, my aim is for a diffractive reading no longer administered by colonial patriarchy. We now turn to focus on the scientific context for diffraction, to provide a basis for moving closer to diffracting the Vā and Quantum Theory.

Thomas Young in 1803, reported to the Royal Society on interference patterns in water waves, creating the drawing depicted in Figure 38. This was at a time when the question of whether light was wave or particle had not been resolved, and in 1807, Young (p. 614) went on to propose that light is a wave. In a 1905 paper, Einstein (p. 136) proposed that light consisted of packets of data he called "quanta" with a specific wavelength, giving the quantum of Quantum Theory its name.

Figure 39 shows the interference pattern formed in the two-slit experiment of Quantum Science. The right side of the image reveals the same pattern as that drawn by Young depicting waves in water, and which expresses the crossing over of currents downstream from an island in the context of traditional navigation. In Figure 39, the waveforms on the left are an explanation that wave

Figure 39

Diagram of the double slit experiment in quantum science



Note. Source: Hamamatsu Photonics K.K. (n.d.). *The wave-particle duality of photons.* https://photonterrace.net/en/photon/duality/

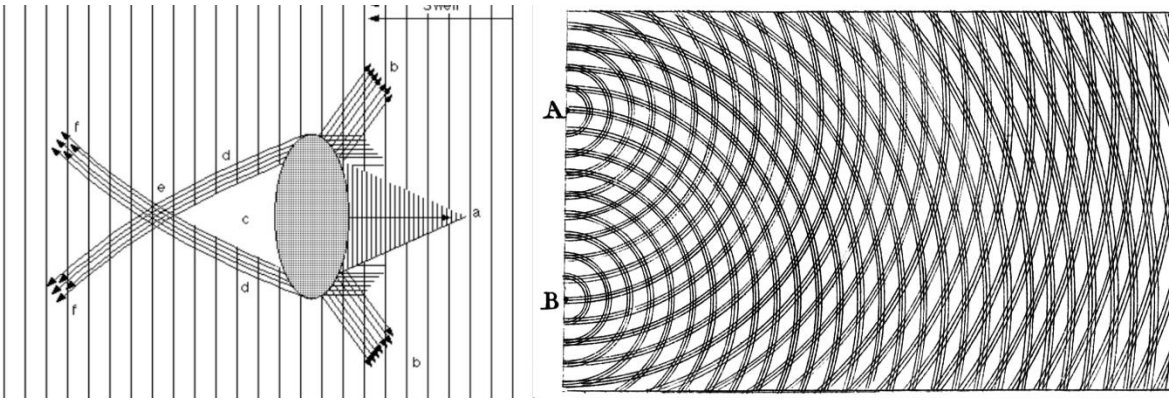
peaks when added together create higher peaks, while two troughs combine to make lower troughs. A peak and a trough combine or cancel to make flat waves. This will be highlighted when diffracting Indigenous Practices with Quantum Theory, as discussing wave patterns is central to Ngaru Whenua Diffractive Method.

The place in the middle of the diagram indicated by "light source" graphically shows light entering a single slit. There is both single slit diffraction and double slit diffraction in science. Single slit diffraction involves the light waves bending around the gateway provided by the slit, and expanding and getting weaker as the wave propagates through spacetime. This happens in the four dimensional spacetime we call daily reality – sound also diffracts around tree trunks in the forest, and around posts holding lights and speakers at rock concerts.

In the double slit experiment diagram above, the light then passes through a panel with two slits or gateways. This results in the waves interacting, forming peaks, troughs, and flat areas. This forms an interference pattern which is indicated by the crossing over of the waves. This interference pattern cannot be seen by the human eye, however, the pattern can be inferred from what physicists record, which is the subsequent light falling onto a photographic plate, indicated by the bands of dark and light on the very right side of the diagram.

Figure 40

Combination of images by Spennemann and Young



Note. Combination of images by the artist-writer. Wave patterning is also explored in Chapter 6.3, where a computer model of flow is discussed on page 140. Source left: Marshalls Digital Micronesia. (1998). *Principles of wave pattern navigation.* https://micronesia.csu.edu.au/Marshalls/html/essays/es-tmc-2.html
Source right: Wikimedia Commons (2016). *Young diffraction.png.* https://commons.wikimedia.org/wiki/File:Young_Diffraction.png

Young's image above in Figure 38 was a landmark in many ways, as it was precedent to later Quantum Science experiments, and as such occupies a central place in the development of Quantum Theory. Let us now use a technique of Ngaru Whenua – to look through one to another, assisted by placement side by side in this instance – to more directly enable a view from one to the other across the cultural boundary. This approach is developed more fully in discussing my creative practice in Chapter Six and is a principle in diffracting the Vā and Quantum Theory.

We can see clearly in Figure 40 that while the prevailing direction of the flow of water is opposite, essentially the images make reference to the crossing over of currents after being disrupted. In the Spennemann image, this is on the left at point e; this is caused by an island, and in the Young image on the right, by pencils at points A and B interrupting the flow of water. In Spennemann's image, the lines are straightened to reflect the style of Marshall Island stick charts. As we saw from the image of the canoe paddles earlier, Moana and Māori navigators and crew were quite aware of the curvature of flows in water. The curvature of flows are recorded in the image by Young above. Importantly they refer to the same aspect of currents crossing over – Ngaru Whenua in the primary sense as given here – called diffraction in the West. This is the central locative point providing an argument for precedence in understanding of Ngaru Wave patterns by Moana and Māori navigators. The prevailing current in the Marshall Islands is from east to west and the technique of navigating by sensing the waves was known to traditional

navigators. The north and south points of the island provide two points of interruption to the current in Spennemann's diagram, just as the pencils at points A and B do in Young's image. We can also apply the Ngaru Whenua practice of cross-referencing Moana and Māori knowledge with radiocarbon dating, and reasonably assert that the knowledge of this wave patterning would have been known by traditional navigators before the settlement of Eastern Polynesia in 1190-1290 CE, where prior to ca.1190 the prevailing South Equatorial Current would be in the same direction as that of Spennemann's drawing. That means such knowledge was with Moana and Māori peoples six hundred and thirteen years before publication by Young. Along with recursion across scales and self-similarity (Aldous, 1994), another instance of precedence in Indigenous Practice is located. Moana cultures are ocean-dwelling and it is clear that a sophisticated sense of flows and currents exists for Moana peoples, and has been transmitted across generations.

Although I have largely focused on diffraction patterns in water due to the connection to navigation, light diffraction is a cornerstone of Quantum Theory (see Barad, 2007, pp. 71–93) and Quantum Science: two-slit diffraction proved the wave-particle duality of light. This vexed Quantum theorists considerably. Some experiments established that light was a particle, while other experiments provided evidence light was a wave: "separate experiments have confirmed the equally counterintuitive result that *light* manifests as *particle* behaviour under certain circumstances and wave behaviour under other circumstances" (Barad, 2007, p. 83). The key question that arose was: why should the actions of the experimenter make a difference? If science was truly objective, the actions of the viewer – the subject – should not make a difference. As Barad goes on to say, this requires [her italics] "*a crucial rethinking of much of Western epistemology and ontology*" (p. 83).

4.2.3 Quantum Theory and the Subject-Object Distinction

As it happens, Quantum Theory and Science do evaporate the subject-object distinction as essential to reality. The idea of the subject and object arises directly from the seventeenth-century philosophy of Rene Descartes with the subject-object distinction becoming widely referred to as Cartesian Duality. This refers to the idea the subject (person) and object (looked at) are a duality at the centre of reality. The foundation for the duality was Descartes' famous *cogito ergo sum* from 1637: "I think therefore I am." (Descartes, 1641, p. xii).

Descartes was primarily concerned with developing a metaphysical theory of mind, whereas the distinction based on a mind perceiving an external reality went on to become foundational to the Enlightenment project. "Mind" for Descartes is what thinks, in contrast to "matter," which is spatially extended. "René Descartes' rationalist system of philosophy is one of the pillars on which Enlightenment thought rests" according to Bristow (2017, p. 1). This aspect is important to

the discussion Hui makes in regard to the separation of meta from physics, laying a foundation for the scientific and technological exploitation of people and resources.

In terms of Quantum Science, the very equations of the experiments *must* take into account the actions of the experimenter. They determine the type, speed and angular momentum of the particles involved in collisions in experiments conducted on CERN's Large Hadron Collider, for example. As Allister Rae (1986) writes of all quantum experiments:

> There are effectively three different levels of operation in a quantum measurement. The first consists of the way the measuring apparatus is set up … The second level of the statistical result that is obtained after a large number of measurements have been made … and the third is the result actually obtained in a particular, individual measurement. (p. 52)

4.2.4 Barad and Quantum Theory

Barad orientates her discussions into several complexes of Quantum Theory. Weiner Heisenberg articulated his Principle of Uncertainty in 1927 (Barad, 2007, p. 116), in which the position and momentum of elementary quanta cannot be measured simultaneously; Neils Bohr referred to this as Complementarity. Einstein, Podolsky, and Rosen (Barad, 2007, p. 269) proposed what has become known as the EPR (Einstein-Podolsky-Rosen) paradox, in which they argued that it is not possible to have both local action and a complete quantum description expressed as a wave function. They argued that if two particles were to interact then separate, the position of the first could be measured and then the position of the second could be determined by calculation. This would violate the principle that no signal can exceed the speed of light. Therefore, Quantum Theory as a wave function must be incomplete (Barad, 2007, pp. 292–296).

However, the same thought experiments are now evidence for superposition and communication faster than the speed of light. In 1964, John S. Bell proposed what became known as Bell's Theorem, in essence providing a proof that localised ideas of connection cannot explain quantum phenomena. The connection is therefore non-local, an assertion that is extremely important and confirmed experimentally: "no theory that preserves locality can ever be consistent with [quantum] experiment" (Rae, 1986, p. 47). This is a very significant point, as non-local connections mean Cartesian Duality and Newtonian mechanics have broken down (Barad, 2007, p. 292).

Here is what Barad (2007) had to say about Bell's theorem [her italics]:

> *There is empirical evidence for the existence of a different metaphysics than the one underlying Newtonian mechanics (one famous example of a local determinate-property theory)*. This is no mere philosophical prejudice but an empirical fact – and this point in itself is already a stunning result. (pp. 291–292)

Barad (2007) then went on to say [her italics] "*either the very idea that individual objects possess discrete attributes is wrong, or interactions among objects are nonlocal, or both"*(p. 292). In Section 4.3 of this chapter, this point will be revisited with some surprising consequences.

Barad moved through the various discussions held by Quantum theorists in the 20th century and arrived at an astonishing point: according to the highest order of thinking in Quantum Theory, the notion that individual objects possess discrete attributes that pertain to the nature of that object is not supported. It is relevant here to ask: what explains "things" and "reality," and the relationships between them? Referring back to the diffractive interference patterns, Barad writes of superpositioned states of particles (2007, pp. 265–269). We have seen above that diffractive patterns occur in waves; however, this can also occur when light is slowed down to one particle at a time (light is both wave and particle). The result of slowing light down is an interference pattern, and Barad states [her italics]: "Indeed this is a general feature of quantum mechanics: *an interference pattern is the mark of a superposition*" (p. 269).

Writing about superposition Barad (2007) [again, her italics] writes that it does "*not* represent mixtures of particles with determinate properties. Rather, *superpositions represent ontological indeterminate states* – states with no determinate fact of the matter concerning the property in question" (p. 265). In order to resolve how it is that superpositioned states interact, the notion of entanglement is given. Erwin Schrödringer in 1935 used this term, referring to "the entangled knowledge one has" (as cited in Barad, 2007, p. 284). An entanglement "is a generalisation of a superposition to the case of more than one particle" (p. 270). Consequently, when two or more particles intra-act, they attain a state of entanglement. She writes that: "phenomena are the ontological entanglement of objects and agencies of observation" (p. 309), and elsewhere she refers to herself as engaging "*in the practice of science while addressing entangled questions about the nature of scientific practice*" (p. 248), extending the notion of entanglement wider than simply the experimenter and the experiment.

Barad (2007) was wanting to position the arguments to support her notion of agential cut, which rests on Neils Bohrs' work: "the specific material arrangement (not the will of the experimenter) enacts a cut between the 'object of observation' and the 'measuring device' such that the boundaries and properties in question become determinate" she writes on page 263. The idea is that the agential cut resolves whether light is measured as either wave or particle. However, at least two separate research teams have measured simultaneous states of wave and particle (see Man et al., 2017; Shadbolt et al., 2012), while another has measured multiple states of entanglement as we shall soon see, all of which does not support the notion of agential cut.

Last year, "the first-ever experimental observation of entanglement between dissimilar particles" occurred, according to physicist James Brandenburg (Brookhaven National Laboratory, 2023, p. 1).[40] Brandenburg quotes collaborator Zhangbu Xu, "We measure two outgoing particles and clearly their charges are different – they are different particles – but we see interference patterns that indicate these particles are entangled, or in sync with one another, even though they are distinguishable particles" (p. 1).

As such, the processes involved in these experiments do not involve the material arrangement impacting the states of the particles. Barad's (2007) earlier statement regarding "ontologically indeterminate states" (p. 265) holds, but not the attempt to endorse the notion of agential cut. Entanglement is important to the development of quantum computing, which requires quanta in entangled states. Recently New Scientist reported that: "A crystal of 10^16 atoms has been placed in a superposition of two quantum states" (Crane, 2023, p. 1) which is very large scale in quantum terms, large enough to be regarded as "macroscopic" and certainly useful to quantum computing.

While recent experiments have not worked in favour of Barad's strong emphasis on Bohr's agential cut, nonetheless much of her writing remains intact and relevant. She wrote that "the latest scientific research, strongly signatures a fundamental inseparability of epistemological, ontological, and ethical considerations" (Barad, 2007, pp. 25–26). That there is a connective tissue between how we know a thing, the status of existence of that thing, and ethics, has a positioning in indigenous sensibility. Cree scholar Shawn Wilson (2008) refers extensively to ontology and epistemology in his discussion of indigenous methodology and the interconnected nature of being and knowing. Both Wilson and Barad talk about the relevance of stepping across discipline boundaries, with an attached ethical framework.

[40] This laboratory has been awarded seven Nobel Prizes.

Barad (2007) writes that: "since individually determinate entities do not exist, measurements do not entail an interaction between separate entities; rather, determinate entities emerge from their *intra-action*" (p. 128) [author's italics]. Matter, she states, "is a dynamic intra-active becoming that never sits still – an ongoing reconfiguring that exceeds any linear conception of dynamics in which cause follows effect end on end ... 'environments' and 'bodies' are interactively co-constituted" (p. 170). This interactive co-constitution is performative, aligning with Butler (1990) and the notion of phenomena as used by Barad.

Having introduced aspects of Quantum Theory, it is important for me to point out to you that the above materials focus on what is agreed by a large number of groups of theorists. In much the same way as no one Moana culture can speak for all Moana cultures, there is no one specific source of Quantum Theory that can speak on behalf of all. There are multiple research facilities with a focus on a specific area, which results in numerous voices on numerous aspects of the theory, each competing with the other in the West.

As remarked earlier, my aim here is not to provide a solution to the Measurement Problem mentioned earlier, but rather to foreground the Ngaru Whenua Diffraction of the Vā and Quantum Theory. It has been important to provide a decolonised framework to this discussion, which is founded in the practices of traditional Moana and Māori navigation revealed to have been precedent to Western Science understanding of diffractive patterns, by some six hundred years.

4.2.5 Ngaru Whenua: Diffracting Sāmoan Vā and Quantum Theory

The moment has now come to diffract the Sāmoan concept of Vā with what Barad has written on Quantum Theory. At the Vā Moana conference of 2021 Ioane Ioane made a comment in his panel presentation about "the quantum physics of Vā" (Ioane et al., 2021). This prompted reflection and further research, which culminated in this section of the thesis. Under the conditions of Ngaru Whenua practice, the aim is to maintain the mana or prestige of the Sāmoan concepts in the form of a chart (see Table 4), and maintain the essence and important details of Quantum Theory as given by Barad.[41] Diffracting the Vā against Barad's writing is done for the purpose of simplicity and clarity. The subject of Moana notions of reality is vast and complex – similarly, the entire field of Quantum Theory.

[41] As it happens, all the quotes used in the chart were given in italics in Barad's text, which was her way of placing emphasis.

Table 4

Ngaru whenua diffraction of Sāmoan Vā with Quantum Theory

Row	Sāmoan Vā	Quantum Theory
A	"The meanings change as the relationships/the contexts change." (Wendt, 1996, p. 1)	"a dynamic intra-active becoming that never sits still – an ongoing reconfiguring." (Barad, 2007, p. 170)
B	"Vā is the organising principle in which things are given their place and relations are forged between people, as well as between people and objects, and space and territory." (Refiti, 2014, p. 18)	"the practice of science while addressing entangled questions about the nature of scientific practice." (Barad, 2007, p. 248)
C	"Vā has spiritual, cultural, economic, political, and social implications for thinking about place, legitimacy, and belonging." (Lilomaiava-Doktor, as cited in Refiti, 2014, p. 17)	The "latest scientific research, strongly signatures a fundamental inseparability of epistemological, ontological, and ethical considerations." (Barad, 2007, pp. 25-26)
D	"vā is a sense of space that becomes active when people and things are connected together in reciprocal obligations." (Lopesi, 2021, p. 85)	"the ontological entanglement of objects and agencies of observation." (Barad, 2007, p. 309)

Consider then, the entries on Row A of the table. The writers are not expressing identical ideas; each comes from their specific context. It could be said that Wendt's emphasis on change matches the sense of ongoing reconfiguring in Barad's words. In terms of wave analysis and weaving the knowledge waves, it could be said that these two *add* together, constituting a wave with a higher peak. Two peaks in the ocean of ideas add to make a higher peak.

On Row B of the table, Refiti talks about relations between people, objects, space and territory. Barad writes of doing science while addressing entangled questions. So, there is a sense of a spreading outwards in both statements; however, the peaks are not as strong, and do not add up to so much as a ripple on the surface of the ideological ocean.

Row C of the table represents two peaks of considerable size. Lilomaiava-Doktor's words on the spiritual, cultural, economic and political have a strong correlation with Barad's inseparability of epistemological, ontological and ethical considerations. In this case, the peaks could be seen as adding to the point of making a wave.

In D, where Lopesi writes of people and things being connected, Barad talks of the entanglement of objects and agencies of observation. Here we have a similar instance as that in row A: two peaks together adding to make a larger peak.

The method of placing Samoan authors and a "Western" author side by side in chart form may be an unusual method for an artist; however, as with the placement of Spenneman's diagram beside Young's drawing (see Figure 40), seeing across the cultural divide is facilitated. As remarked about wave action earlier in this chapter (see page 102), diffracting waves maintain their integrity and do not form an amorphous singularity. This is preserved culturally in using the chart format.

If the question is asked as to whether the four rows of words of writers on the Vā, and the four rows of Barad's words actually capture the core of what the writers were saying, then that evaluation is left to the many people who will have read the words by the authors under discussion. For my part, I tried hard not to cherry-pick, but to encapsulate words as the authors might want to have it. This is all part of a sincere exercise to decolonise Western academia, and hopefully it provides points of consideration for Western academics that are revealing and interesting. Note that there is no attempt to resolve the discussion to a single provable truth. This is not about determining who is right, but how these knowledge bases might interact with a decolonised lens, while preserving the integrity of each side. Consequently, under the regime I am proposing, the aim is not to resolve the "truth" to a singularity, but instead acknowledge that there are multiple truths and parallels between diverse cultural paradigms.

Having demonstrated the Ngaru Whenua Diffraction of the Vā and Quantum Theory, unanticipated consequences would soon emerge. This is in accord with a wayfinding approach, a part of Ngaru Whenua Diffraction Pukethat guided my creative practice. Drawing on the Knowledge Dimensions is fruitful to discussion.

4.3 Wayfinding, Tangata and Rā (Interconnectivity) Dimensions

4.3.1 Wayfinding

On one of my wayfinding visits to Kawaihulululani, I visited Artist and Curator Desna Whānga-Schollum (Rongomaiwahine, Pāhauwera, Kahungunu. Ngāi Tahu Matawhaiti, Te Aitanga-a-Whaanga) and in the course of the conversation she gave a suite of materials pertinent to Chapter Seven, particularly in regard to Māori approaches to the environment. What made this a "wayfound" experience is that when I arrived, I had no idea she had prepared materials appropriate to this research project, and that she was actively distributing them.[42] This was the journey in which I had to drive hundreds of miles out of my way to avoid Auckland and Waikato due to the COVID-19 pandemic. When I arrived to Kawaihulululani, I mentioned the research I was doing on the subject-object distinction. She said I should watch a documentary called *The Dakini code: Lotus-born master and the event horizon* (Lo & Brahm, 2021).

Somewhat extraordinarily, I would find that the words "I consume concepts of duality as my diet," (see "Eight Manifestations,"2022, and Government of Sikkim, India, n.d.) are traceable to the 8th–9th century Buddhist Master Pasambhava, or Lotus Born Master, who also said "I belong to the caste of non-duality of the sphere of awareness" (p. 1). Pasambhava was an historical figure within Tibetan Buddhism, and held a position that was against duality in the form of the subject-object distinction.[43] Note also, that the work of people from two cultural hemispheres agree: Western Science and Tibetan Buddhism.

Given that the subject-object distinction cannot be fundamental to reality in the sense of being consistent with Quantum Theory, what replaces this distinction? Here the attention drawn by Shawn Wilson (2008) and cited earlier is pertinent: "this relational way of being was at the heart of what it means to be Indigenous" he wrote (p. 80) along with "relationships do not merely shape reality, they are reality" (p. 7). He goes on to say that "An idea cannot be taken out of this relational context and still maintain its shape"[44] (p. 8).

In Sāmoan terms, the relational character of the Vā is made explicit in the words of Albert Refiti (2008):

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[42] The basis for our meeting related to a shared interest in the Intercreate Trust.
[43] In an article fact-checked by the editors of Encyclopaedia Britannica, they state Pasambhava was a "legendary Indian Buddhist mystic who introduced Tantric Buddhism to Tibet and who is credited with establishing the first Buddhist monastery there" (Britannica, 2018, p. 1).
[44] Relational ontology is mentioned by Barad and remarked on by several commentators including Pritchard and Prophet (2015, p. 7), who write "By attending to diffractive patterns of difference we focus on what the differences are, how they matter, and for what and for whom," then cite Barad referring to the "relational nature of difference (Barad, 2007)."

> This "knowing/placing who you are" involves the understanding that your body, your being is woven flesh, a gene-archaeological matter made of ancestors/land/community/family. Therefore your body does not necessarily belong to you as an individual. Because you are woven from the flesh of the dead, your body belong[s] to the ancestors, to your fanua the place of birth, and to the community that shaped and cared for you. (p. 99)

4.3.2 Tangata (People) and Rā (Interconnectivity) Dimensions

On reflection, we now have three world cultural groups – Asian in the form of Tibetan Buddhism, Moana in the sense of Vā, and Western academia in the sense of Quantum Theory and Science, all appearing to have close parallels in their sense of the relational nature of the universe.

Using the simple formulation of the Tangata (People) Dimension as knowledge shared by cultures, we now have considerable weight behind the assertion around Indigenous, Moana and Māori beliefs that *relationality* is fundamental to reality, and the subject-object distinction is not. Along with Quantum Theory, three cultural flows of knowledge are woven together, making a fresh pattern in an ocean of awareness, where the important details and integrity of each source are preserved.

The Rā (Interconnectivity) Dimension measures the degree of Interconnectedness of ideas. Lilomaiava-Doktor connected the spiritual, cultural, economic and political, and Barad's inseparability of epistemological, ontological, and ethical considerations both register high in Rā (Interconnectivity) Dimension, as I call it in this thesis. Here we have Western science mirroring the Moana and Māori orientation in interconnection, with each knowledge base founded on different premises.

4.4 Summary

The fundamental aim of this project has been to bring Indigenous Practices into dialogue with Western metaphysics, here in the form of Quantum Theory, for the purposes of charting a methodology in my creative practice. The progression has been to first establish precedence of the wave pattern known to traditional Moana and Māori navigators as Ngaru Whenua. A Ngaru Whenua Diffractive method allowed for discussion to occur within a decolonised framework, which is absent of the biases of Western academic conventions and knowledge frameworks.

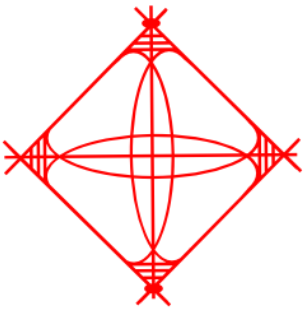
Consequently, the Ngaru Whenua method, which is founded in traditional navigation practices, does indeed inform the "current trends of global issues" (Hui, 2017, p. 20).

A decolonised border required careful attention to maintaining the mana of the words written by Wendt (1996), Refiti (2014), Lilomaiava-Doktor (cited in Refiti, 2014), and Lopesi (2021), and the use of quotes from Barad (2007) – being carefully attentive to the important details contained in her writing. Maintaining the mana or integrity of each cultural group is essential to providing a decolonised framework when bringing cultures into dialogue. Under the conditions of Ngaru Whenua, the diffractive method is extended into a multi-cultural discussion.

The results of so doing are striking, with statements about Vā by four Sāmoan authors diffracted against Quantum Theory as given by an important Western author. The question was then asked: whether statements on each side of the cultural boundary added together or cancelled each other out, with the contention that the core expressions cited would add together to make larger waves. They are "in-sync" while maintaining discrete identities, which is an extraordinary finding given the past interactions between Indigenous and the West.

This has led to considering the degree to which aspects of knowledge can be considered to be shared across cultures. Following a suggestion from Kawaihulululani, the sharing consists of a multicultural viewpoint across Moana and Māori, Asian, and Western knowledge bases, and a high level of Tangata (People) Dimension that measures the extent ideas are shared across cultural borders. I suggest that this is a remarkable situation and one that is well suited to contemporary thinking around humanity's current relationship with the environment.

Importantly, the statements cited that formed the basis for the Ngaru Whenua Diffractive method are core to concepts of Vā and Quantum Theory. These are not peripheral, but rather are central to the contentions being made by the authors. This holds significance as the thesis has moved through my cultural background and whakapapa in the previous chapter, and will go on to diffracting Electronic Art and the Anthropocene in Chapter Five, through to Creative Practices in Chapter Six. The consequences for Creative Practice involve utilising a relational, whakapapa approach, and seeing across cultures certainly, but also across time and species.



Chapter Five. Electronic Art and the Anthropocene

Chapter Five. Electronic Art and the Anthropocene

In earlier chapters, I scoped Indigenous approaches to research after Tuhiwai Smith (2012), Wilson (2008), Wilson-Hokowhitu (2019), and Reynolds and Wheeler (2022), and I outlined a decolonised framework to discuss knowledge across and through cultural boundaries, which involved engaging in the decolonised notion of Knowledge as Dimensional thinking. After wayfinding through the relationality entailed within whakapapa (genealogy), the basis of all previous chapters provided a platform with which to diffract the Sāmoan concept of Vā with Quantum Theory. It is now time to turn to considering the impact of the Anthropocene on Electronic Art practice.

The problematics of utilising Electronic Art in the Anthropocentric era will be foregrounded by a review of authors on the topic of the Anthropocene, with particular reference to Davis and Todd (2017), Haraway (2016), and Moore (2017). We then move to a review of my previous electronic artworks, raising contentions around materials, resource usage and carbon footprint. The primary issue here as we shall soon see is that writers such Hui (2017) argue that science and technology are part of the problem due to the separation of "meta" from "physics" in the Enlightenment period, compounded by the Industrial Revolution. All of which flow through to my creative practices, as will be discussed in Chapter Six.

The Anthropocene, writes Haraway (2016) "seems to have been coined in the early 1980s by ecologist Eugene Stoermer (d. 2012), an expert in freshwater diatoms" (p. 4). She then writes of Paul Crutzen joining with Stoermer in 2000 and that they set out to:[45]

> propose that human activities had been of such a kind and magnitude as to merit the use of a new geological term for a new epoch … Anthropogenic changes signalled by the mid-eighteenth-century steam engine and the planet-changing exploding use of coal were evident in the airs, waters, and rocks. (Haraway, 2016, p. 4)

Hui writes of nature and technology becoming detached during the Industrial Revolution, and seeks instead to "re-affirm the relation between cosmology, morality and technology which has disappeared in the technological system called the Anthropocene" (pp. 17–18). Coinciding with the period immediately after the emergence of Descartes' "cogito ergo sum" (1637, p. xii), which separated subject and object, and towards the end of the eighteenth century, the rupture between nature and technology became such that technical objects became "artificial" objects – artificial in

[45] Crutzen is a Nobel prize winning chemist.

the sense that they have nothing to do with nature (Simondon, as cited in Hui, 2017, p. 13). Hui writes that this period corresponds to what Simondon states as: "a dramatic and passionate notion of progress, becoming rape of nature, conquest of the world and caption of energies" (2017, p. 13). Escaping this rape and conquest is an essential driver of the ethics of this project. Embedded within this industrial era is the colonial period, with its destructive impacts on Indigenous Peoples worldwide. It is easy to see why Barad (2007, p. 71) might cite Haraway in talking about "a rather painful Christian millennium," which has also acted upon women in a significantly deleterious way.

5.1 Anthropocene, Chthulucene and Capitalocene

There are problems in the naming and discourse of the Anthropocene. Haraway proposes the term "Chthulucene," which "is made up of ongoing multispecies stories and practices of becoming-with" (2016, p. 11) and does not place humans centrally. In discussing the "tentacular" she highlights (pp. 2–3) that invertebrates are 97% of animal biodiversity – making humans a privileged few. This is what Haraway has to say about the discourse of Anthropocene:

> I am aligned with feminist environmentalist Eileen Crist when she writes against the managerial, technocratic, market-and-profit besotted, modernising, and human exceptionalist business-as-usual commitments of so much Anthropocene discourse. This discourse is not simply wrong-headed and wrong-hearted in itself; it also saps our capacity for imagining and caring for other worlds, both those that exist precariously now (including those called wilderness, for all the contaminated history of that term in racist settler colonialism) and those we need to bring into being in alliance with other critters, for still possible recuperating pasts, presents, and futures. (Haraway, 2016, p. 8)

Davis and Todd (2017) also point to philosophical issues that swirl around the Anthropocene and must be addressed along with the central issue of environmental practices. They write that the Anthropocene "continues a logic of the universal which is structured to sever the relations between mind, body, and land" (2017, p. 761). Underlining the forces of this severance, they cite Lewis and Maslin in stating that: "in 1492 there were between 54 to 61 million peoples in the Americas, and by 1650 there were 6 million." They point out that "the drop in carbon dioxide levels that can be found in the geologic layer that correspond to the genocide of the peoples of the Americas and the subsequent re-growth of forests and other plants" forms a geological argument for the timing of the Anthropocene (Davis & Todd, 2017, p. 766).

Wendy Arons (2023) also remarks that "the term 'Anthropocene' is both misleading and obfuscatory, and as an analytic framework it has a serious blind spot when it comes to understanding the conflicts stemming from the uneven distribution"[46] (p. 36). She goes on to say:

> The notion of the "Anthropocene" also has the drawback that it can be readily aligned with the discourse of individualism; that is, its universalising of responsibility for changes to the earth's climate also, paradoxically, plays into campaigns that suggest that solutions lie in (collectivised) individual actions, such as recycling, using energy-efficient light bulbs, or adopting a plant-based diet (p. 36).

This point deserves closer attention. The argument Arons (2023) makes is that the framework of the Anthropocene aligns to a discourse of individualism, and plays into a history of decision making that reflects "the interests of patriarchal, colonialist, and white supremacist power" (p. 36). She points out that "the word, *anthropos*, implies that humanity as a whole is responsible for the changes wrought by human" (p. 35) whereas clearly "women, indigenous people, and people of color" are "victims rather than perpetrators of ecological violence against the Earth" (p. 35).

Davis and Todd argue (2017) "that the Anthropocene as the extension and enactment of colonial logic systematically erases difference, by way of genocide and forced integration" (p. 769). Entailed in the erasure is "a severing of relations between humans and the soil, between plants and animals, between minerals and our bones" (p. 770). Echoing the situation in Aotearoa in the colonial era, they write that: "The damming of rivers, clear-cutting of forests, and importation of plants and animals remade the worlds of North America into the vision of a displaced Europe, fundamentally altering the climate and ecosystems" (p. 771). They go on to say: "the forced displacement that many tribal communities suffered involved adaptation to entirely new environments, to new climates, new ecosystems, new plants and animals" and that "In this light the Anthropocene, and the uneven impacts on the global poor, can be understood not just as an unfortunate coincidence or accident, but rather as a deliberate extension of colonial logic." They conclude that "This necessarily means re-evaluating not just our energy use, but our modes of governance, ongoing racial injustice, and our understandings of ourselves as human" (p. 776).

Jason W. Moore (2017) argues for a similar timing, starting the Anthropocene clock "with the English and Dutch agricultural revolutions, with Columbus and the conquest of the Americas, with the first signs of an epochal transition in landscape transformation after 1450" (2017, p. 3). Aligned to Davis and Todd (2017), and Arons (2023), Moore writes that in this period, "Most

[46] Arons cites authors "Demos, Timothy LeCain, Nicholas Mirzoeff, and Jason W. Moore in advocating that, instead, we should be talking about the 'Capitalocene'" (2023, p. 36).

women, most peoples of color, and virtually all Amerindian peoples were excluded from full, often even partial membership in Humanity" (p. 7).

Of note at this juncture is that the writing of Indigenous authors (Davis and Todd [2017] draw on a substantial number of Indigenous authors) and Western writers in Ngaru Whenua Diffractive terms, form a taller wave. In wave diffraction, as seen in Figure 14, two wave peaks add together to form a larger wave. So, here we have the words of Davis and Todd (2017) as one flow in the current of ideas, and the words of Moore (2017) as another flow, with the two being additive under the conditions of diffraction. There is wide agreement that the issues of the Anthropocene are aligned to capitalism, Colonialism, and Racism, in dominant Western trajectories, leading to the climate crisis with deleterious impacts on Indigenous peoples and women in particular.

5.2 Capitalocene and Cartesian Duality

Moore (2017) interrogates the philosophical premises of the severance Davis and Todd (2017) spoke of, stating that: "the Anthropos as the driver of these consequences – stem from a philosophical position that we may call Cartesian dualism. As with Descartes, the separation of humans from the rest of nature appears as self-evident reality" (p. 10). Cartesian Duality, he writes,

> imposed ontological status on entities (substances) as opposed to relationships (that is to say energy, matter, people, ideas and so on became things) … [citing Watts] encouraged either/or rather than both/and logics – Nature and Society rather than societies-in-nature … it favored the "idea of a purposive control over nature through applied science," giving rise to a rationality of world conquest and domination [citing Glacken 1967 and Altvater 2016] … privileging the visual as the principal means of knowing the world [following Jay 1993 and Cosgrove 2008] … through a disembodied gaze situated above space and time. (Moore, 2017, p. 12)

In the Indigenous worldview, relationality is important, as Wilson (2008) wrote. We have already seen that the dissolution of the subject-object distinction as fundamental to reality is contended in Quantum Theory (Barad, 2017). This positioning is brought forward in this project. Bringing together Cartesian Duality and the impact on Indigenous, Moore (2017) states:

> the problem of Cartesian dualism goes well beyond philosophy. It is not only philosophically but practically violent. It is central to a way of organising nature –

> ontologically (what is?) and epistemologically (how do we know?) – that took shape between the fifteenth and eighteenth centuries: the origins of the Capitalocene. (p. 13)

Moore recognises that it is not the naming of Anthropocene or Capitalocene that matters, and writes (2014) "let us not quibble too much over naming, so long as we do name, identify, and explain the non-arbitrary, quasi-reproducible, and incessantly globalising patterns of power, wealth, and re/production over the *longue durée*"[47] (p. 38). The term "Anthropocene" has captured the attention of a wide range of groups, such that the practicality of arguing for the name of the geological epoch as "Capitalocene" or "Chthulucene" may be impacted. It is the recognition of the forces associated with capitalism that is important, and which is necessary for escaping the "discourse of individualism" as Arons (2023) writes. The deleterious impacts on Indigenous peoples, the appalling loss of life of Moana peoples reported here in Chapter Two and the double impact on women and multiple generations are not the result of industrialisation alone, but are the outcomes of a way of thinking about the world that separated humans from the environment, each other and species.

As was seen in Chapter Four, the dissolution of Cartesian Duality as fundamental to reality is part of an Indigenous worldview that sees the world from the understanding of relationality; Quantum Theory also constitutes an argument against Cartesian Duality, and Tibetan Buddhism from the eighth century argues similarly. In terms of Tangata (People) Dimension, which is a measure of the extent or reach of an idea, we can now add an argument from the humanities, both Indigenous *and* Western. The argument from the Western humanities places Cartesian Duality as central to the mindset that has put us into the geological epoch of the Anthropocene, and we must keep in mind the entangled issues of capitalism, racism, gender, and species characterised by the Capitalocene and Chthulucene. Indeed, Moore (2017) remarks that "How to ford the Cartesian Divide, in practical ways, is the great question" (p. 40).

In Chapter Four when it came time to Ngaru Whenua diffract the Sāmoan concept of Vā against Quantum Theory, Refiti, citing Lilomaiava-Doktor (2014, p. 17) writes that "Vā has spiritual, cultural, economic, political, and social implications for thinking about place, legitimacy, and belonging," while Barad writes (2007, pp. 25–26) that the "latest scientific research, strongly signatures a fundamental inseparability of epistemological, ontological, and ethical considerations." On a similar theme, Moore (2017) writes:

[47] Moore's (2014) paper has been cited 6,077 times according to Researchgate; in comparison, one of Barad's papers has been cited 10,000 times.

> Seeing human organisations as part of nature leads us to explore manifold socio-ecological connections that make us specifically human – just not "exceptional." These are connections of agro-ecology, of disease, of climate, of hydrology, of the micro-biome, of non-human animals. Can we really discern what makes us human, for instance, abstracted from our relations with dogs, pigs, fish, and cows? (p. 6)

There is a sense here in Ngaru Whenua terms, where these ideas are adding up to make larger waves across the ocean of humanity. The contention to engage more thoroughly with species from fish to plants led the creative project toward engaging with whale and migratory bird imagery and utilising living plants in museum exhibitions, with relations to Kōhatu (river stones) and whakapapa broadening the sense of interconnection.

5.3 This Means Me, and Most Likely Means You Too

The contentions around Capitalocene and Chthulucene embrace the deleterious impacts of commercialisation (i.e. resource extraction and monetisation through trade) on Indigenous, women and people of colour. A "multi-species politics of emancipation," to paraphrase Moore (2017), will require the deconstruction of the profit purpose as the sole guide for development, along with a changed relationship to species and the environment on the part of people living in places where privileged wealth has accumulated in densely populated cities. "Privileged wealth" here is taken to mean those people who own or rent their homes and have a job to cover mortgage or rent, probably own a car, and certainly use multiple media and devices to connect to the Internet. This means me, and most likely it means you too. Having a job to cover rent may not sound like a privilege, but compared to those people disadvantaged by modernisation, it certainly is. This places responsibility at the source: the profit purpose and the people who benefit.

Changing our relationship to species and the environment is not as difficult as it may sound. If we regard *relationality* as central to our awareness, and utilise the insight of Knowledge as Dimensional, we can look at the issue from many sides, from above and below, and see what might be deflected and what might be absorbed. It is an emancipation process as Moore (2017) argues, rather than a set of restrictions. You and I can draw on a suite of potentials that are suitable to our situations. Following is a list of activities that many are already doing: cutting down on flying, using public transport, buying electric vehicles rather than petrol, growing

plants, eating less red meat[48], driving the car less, walking, cycling, recycling, reusing, repairing, connecting to the stars and planets such as at the solstices and equinoxes, noticing the weather, the cycles of the moon, examining resource use and targeting recyclables, supporting organisations that do good work for disadvantaged people, birds, fish, and animals, honouring your privilege by being thankful, giving things to people, volunteering for a cause, understanding we are connected to the environment whether we want to be or not, getting involved in your ancestry (whakapapa) and making a place that is better for future generations.[49] Doing any number of these things will reframe your relationship to species and the environment. There is an important alignment here to Indigenous Practices, and aligning with species has become a trajectory of this project, as we shall soon see. As actions take place in life, the ability to see our multidimensional relationship to the environment slowly emerges. These actions, as stated, need to take place alongside the deconstruction of the profit motive for development and a substantial reduction of carbon emissions.

5.4 Electronic Art and the Anthropocene

It is time now to turn the discussion to the Anthropocene and Electronic Art, to see how all of these contentions might manifest in Creative Practices. Prior to doing this, I need to provide a clear understanding of what I mean by "Electronic Art." This is an encompassing term for a range of creative practices: sound art, audio art, video art, new media, net art, digital imaging, digital photography, robotics, and installations, to name a few. What connects this diverse range is the use of a programmable circuit board (PCB). The PCB is not exclusive to art, obviously, so this so-called definition is not a form of "definition by means of production" in the Marxist sense. It is a definition that permits multiple outcomes and does not aim to drive an exclusive boundary between art and society. PCBs are now relatively ubiquitous in the privileged West and Asia, and are found in laptops, mobile phones, heaters, fridges, televisions, printers, vinyl cutters, industrial equipment, cameras, speakers, bicycles and cars – and this is not an exhaustive list.

Importantly, electronic media are capable of the transformation of energy from virtual to real. Because digital media rests on binary code and this code is stored in the DC (direct current) of microprocessors, it is possible to convert visuals to audio, and vice versa. Indeed, I worked with

[48] Voting for politicians who express strong climate policies (77%) was the first choice of action for surveyed Intergovernmental Panel on Climate Change scientists, with reducing flying and changing driving habits to lower emissions (56%) and eating less meat had been adopted by 60% of respondents. 380 of 843 responded to the survey. See The Guardian, 2024.
[49] As part of creative practice, I allowed the use of acrylic sheet media, as it is recyclable; in the future I intend also using cellophane, which is also biodegradable and compostable.

a collaborative team in the past to connect live tree voltage data to our project website, so that live environmental data triggered audio files to play in an installation at an arbitrarily far distance away.[50] It would be possible to extend this by having a light come on when the audio reached a certain loudness. This transformation of energy is much closer to a Moana and Māori worldview in contrast to the view afforded by Cartesian Duality, which is not adequate to explain such transformations within a restricted context of observer and observed, privileging vision as the source of knowledge. This is relevant given the multiple strands of this project, engaging as it does with Indigenous Practices, and will be followed through in the next chapter.

Electronic Art sits in a problematic relationship with the issues of the Anthropocene, Chthulucene and Capitalocene. As we have seen above, science and technology were implicated in the severing of "meta" and "physics," as Hui (2017) puts it, and in bringing on the Capitalocene as Moore (2017) indicates. It is important that these contentions are embraced in Creative Practices. As Randerson and Yates (2016) point out, citing Huhana Smith's combination of social-cultural-ecological (which also corresponds to Row C of the Ngaru Whenua Diffraction of Sāmoan Vā with Quantum Theory on page 115), "all of our actions occur within, or in borders between, socio-cultural-ecological discourses whether we acknowledge it or not, including the domain of contemporary art and design" (p. 1). This is not some technical point. It is upon artists and creatives to allow considerations around the human relationship to environment to directly impact their Creative Practices.

As Creative Practices sit inside the conditions of living, these too are considered in an interconnected world. My decision to make fewer international flights impacts my carbon footprint in greater ways than making any media-based decision. It would be pointless in the practical sense to impose a set of rules around appropriate environmental practices; however, what *must* happen is that each step of the creative process requires consideration and reflection in light of the issues of the Anthropocene, Capitalocene, and Chthulucene.

The world of art, design, and culture, cannot escape being located within the Capitalocene, even if it wanted to. It is not possible to escape our relationship with the environment, and the great schism between nature and humans has arisen due to a failure to acknowledge our embedded relationship. The data around climate change can be seen as a representation of nature speaking to us, with the message that things are seriously wrong. How, though, might Electronic Art fit within these contentions? In this instance, the diffraction will be discursive rather than using a

[50] The team included Julian Priest, Andrew Hornblow, and Adrian Soundy, Māori musician Darren Ward, and Navajo-Dineh musician, Andrew Thomas. For one exhibition, the tree was in Aotearoa and the sounds heard in Albuquerque.

chart. I will begin by discussing three previous artworks, to see how contentions around the Anthropocene impacted my decision-making processes going forward.

5.4.1 Previous Electronic Artworks

To clarify how the above might impact the Electronic Arts, I will introduce three works, and discuss how reflection upon them impacted the stance and practices of creating the works discussed in Chapter Six. I will describe three works – *The District of Leistavia, Haiku Robots* and *The Park Speaks.*

Conceptually, these projects are predicated on notions of interconnected systems, referred to in some disciplines as integrated systems or complexity, which were explored in my Masters of Art and Design project *HC : N : CP Hybrid Cultures, Nonlinearity and Creative Practice.* In it I proposed the use of an integrated system composed of overlapping subsystems.

Clustering media allows for an exploration of ideas and processes not limited by my own capabilities. Essentially, I could dream ideas, and locate collaborators to fill any knowledge or skills gap. What I found was that if people liked the idea, they would work together on bringing it to fruition. A system of overlapping subsystems can be applied to any type of project, including the SCANZ residencies, which in each iteration was composed of a differing theme, different artists and different locations.

Utilising this form of structure permitted a wide range of potential discussions. The goal of art rather than being to make beautiful images, might be to critique culture and language, and reframe our relationship with trees. Those were the goals for the three projects to be discussed.

5.4.2 *The District of Leistavia*

Selected for ISEA2004 and presented in Tallinn, Estonia, this project used online survey forms to record participant responses to a questionnaire, which were then used to create the Constitution of an online artist micronation called *The District of Leistavia.* "Leistavia" is a portmanteau of "leis" (a flower garland worn around the neck) and "stavia" (a suffix for towns in the Estonian region), reflective of hybridity. This "micronation" was a hybrid of my cultural background to Hitiaurevareva (seen here in Chapter Three), and that of Estonia, which had recently written its own Constitution after breaking away from the Russian bloc in 1991. Hitiaurevareva had its *Laws of Pitcairn*, written in 1838 which, among other things, gave all over the age of fifteen the vote, and did not exclude women. The constitution of Leistavia questions were formed by an amalgam

of the two sets of laws, with the optional responses to the questions being provided by research into each culture.

Presented in the installation was a website and a moving image sequence of pictures of Leistavia displayed on a computer monitor, the use of vinyl graphics in the form of the Leistavian crest, and an old wooden ladder (a disused relic from a local hospital located by the father of my local collaborator Kylli Mariste, a dance and media artist). I also created five-metre leis for the installation.

In terms of what could be carried forward to this current project, the use of a local item was something reinforced in discussion with Maata Wharehoka at Parihaka. She placed great importance on using materials from the local environment, which led to me creating works in Taranaki utilising Kōhatu from local rivers and to explorations of using local earth pigments, which are discussed in Chapter Six. As it happens, I have experimented with kawakawa leaves, stems and branches, dried weeds, and dried tree roots from my backyard as well.

A second element carried forward was the use of vinyl graphics. However, by research I found out that adhesive PVC is one of the most environmentally unfriendly products, with largely non-recyclable waste and short-term usage. I have since determined that the use of this product is only permitted (by me) when the use extends for longer periods, and if short that it will express the imagery but not the background of visuals. Care must also be taken with disposal as vinyl breaks down into microplastics, so I intend in the future to contractually require the discarded material to be placed in glass containers before disposal to landfill. This approach makes it possible for a three-month museum exhibition, or as it turned out, the five-year window installation at the Govett-Brewster Len Lye Centre. Another strategy to counter environmental concerns was utilising the same imagery – laser cut into stone for external works, and stencilled onto stone in interior works (see Figures 99 and 100). Using acrylic sheet would be permitted as acrylic is recyclable. I now turn to an artwork from 2009, as reflecting on it has led to consequences for the use of monitors and data projectors.

5.4.3 *Haiku Robots*

Commissioned by Puke Ariki Museum in Ngāmotu New Plymouth in 2009, *Haiku Robots* was an interrogation of the idea that language might be the result of emergence from within interconnected systems rather than a top-down imposition made by humans as the alpha species. Collaborators included Daryl Eggar, Julian Priest and Andrew Hornblow.

The small-scale interconnected system consisted of two autonomous robotic cars inside an area marked out by eight cylinders, plus a project computer. One system was the robotic cars; a second was the electronic fence; and the third system was the project computer and customised phone software by Julian Priest, which converted numbers into words.

The robots were very basic: they could go straight ahead, reverse, turn left or turn right. If they detected an infrared pulse, they stopped. Each robot had an infrared LED that could both send and receive infrared pulses. This prevented them from colliding with each other. The electronic fence was marked out by eight pillars. Each pillar had a ring of infrared LEDs at the base, set to send only. If a robotic car comes close to a pillar, it detects the electronic fence and stops. If the LED pulse signal is strong enough, the number associated with that pillar is sent to the project computer. If the signal is weak, the robot just backs up and either turns left or right.

The reason for the eight pillars, each with their own assigned number, can be found in your mobile phone touchpad. 2 = ABC, 3 = DEF, 4 = GHI and so on. Consequently, over time, a string of numbers is sent to the project computer via radio. The customised open-source phone software then converts the string of numbers into letters. Letter by letter, words are created, generating word lists live and dynamically. The output was then checked for islands of coherence in the list of emergent terms. Based on the words being strictly in the order of emergence, we received "red is my ace bird" which at least has a correct sentence *structure*; the vaguely philosophical "god hugs yes fern," a somewhat poetic "cry owl so scare yeah;" and the stupefying, perhaps humorous, "no hash blimp end fly our joys oxide ha" as outputs.

Environmentally, the robots were battery-powered, which at least draws less current than gridded power. The electronic components made by Andrew Hornblow utilised breadboards, which are reusable circuit devices. The carbon footprint of the electronics is relatively low.

However, between each of the pillars is a display panel, eight in total. These do not serve any physical purpose in terms of restraining the robots. They are decorative in this sense and, what is more, simply repeat the output of the single computer. This is to say the electricity draw in displaying the text output exceeds necessity by a magnitude of eight. This strategy would not be permissible going forward, based on the research-based practice of this project.

At the same time, I determined that it would no longer be permissible for me to use data projectors displaying a computer image that runs for the entire daily period the gallery or museum is open to the public. The basic strategy of these reflections is to *mitigate* against carbon footprint and environmental consequences. If a data projector is essential to a project, I would

now motion-activate the projector so that it only displayed when the audience were actually in the room. Having commenced this environmentally informed discussion with a linguistic project, the next work utilising a small-scale interconnected system moved to environmental data sensors and spoken word.

5.4.4 *The Park Speaks*

Utilising the notion of interconnection as a context for artworks formed a critical part of *Haiku Robots* – I entered the landscape of interconnection through the doors of Quantum Theory and Chaos Theory, which was something Te Huirangi Waikerepuru and I discussed, as remarked earlier in this thesis. In 2010, I conceived of *The Park Speaks* as a small-scale interconnected system, exhibited in Puke Ariki. With collaborators Julian Priest, Andrew Hornblow and Adrian Soundy, we created an environmentally connected artwork whereby live environmental data values determined which of one hundred and eighty audio files would play at any given time, in the installation in Puke Ariki Museum. The aim was to draw the attention of the audience to the invisible energies constantly flowing in nature.

The audio files heard were spoken digital sentences, hence the park speaking. One data source was a people counter, and the aligned sentences referred to various states of numbers walking past the counter from "I'm feeling alone" when numbers are low, to "lots of children and families in the park today" when numbers were high. UV (Ultra Violet) values resulted in sentences expressing varying states of sunlight and dark. Temperature values had similar correlated expressions. *The Park Speaks* utilised the transformational capacity of digital data, where UV data values for example, can be converted into audio or LED display, among many possibilities. Light is a subject also explored in audio-video works where I scan science data images and convert the data to audio. I then compose a soundtrack, which is used to generate video animation.

The system that this project enabled, in combination with a tree voltage measurer invented by Andrew Hornblow, would be utilised in multiple artworks. At Puke Ariki in 2009, a computer desktop two-projectors wide was the primary visual display. By 2011 in Albuquerque, this was simply an audio feed, dramatically reducing carbon footprint.

The use of live environmental data sensors permitted via the internet meant that the location of the sensors could be arbitrarily far away from the installation. It was initially thought that for this project data sensors could be placed on Hitiaurevareva, Tahiti, Norfolk Island, Ngāmotu and Tāmaki Makaurau Auckland. The data could control audio and LED display in an exhibition. However, this potential was dramatically halted by the COVID-19 pandemic. Different ways to

reference whakapapa would be needed, along with a reduced carbon footprint in production of the artwork.

5.5 Further Reflections for the Project

This section aims to supplement the considerations above with a suite of approaches to executing the creative works of Chapter Six. Firstly, there are convolutions in determining practical ways forward. For example, whether an electrical vehicle has a lower carbon footprint than a petrol one depends on the power supply for the plant in which the vehicles are manufactured. In artistic terms, if I was to travel to Te Wai Pounamu for research on a project, then return to Ngāmotu to produce imagery on local Kōhatu using plant-based paints and local earth pigments (see Figures 99 and 100), the carbon footprint of the project would be higher than if I made a video and displayed it on a monitor, with the audience presence triggering the monitor to display. Therefore, the strategy I am proposing is to allow sustainability and Anthropocene issues to impact all parts of the creative process. As it happens, this includes considering food intake, which is vital to creative production. It also involves the use of vehicles to procure supplies, and we can see here an interconnected world in operation. Therefore, it is upon us to consider sustainability issues in all parts of our lives.

As well as the daily aspects of living, a renovation of intellectual and cultural life is needed. In regard to the subject-object distinction, Wilson (2008) emphasises that a "relational way of being was at the heart of what it means to be Indigenous" (p. 80 of this text), also stating: "relationships do not merely shape reality, they *are* reality" (p. 7 of this text). Consequently, there is a message from Indigenous: acknowledging relationality is one means of dissolving the object-subject distinction. This approach aligns with Quantum Theory, Tibetan Buddhism, and writing on the Anthropocene, hence it has a wide footprint in terms of Tangata (People) Dimension, which measures the extent of an idea (rather than necessarily its correctness). Engaging with whakapapa was a major way to access relationality.

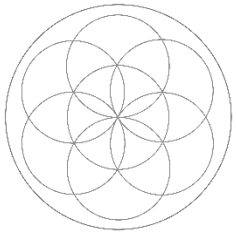
Relationality is here interpreted as engaging with whakapapa-orientated imagery (see Figures 43, 44 and 56–90 in Chapter Six, and the project website). This also involved curating works by my whanau (extended family) into the exhibition *Interconnecting: pasha @ patea* at the Aotea Utanganui Patea Museum (see figures 50–66). As the project engaged with Tūpuna, it was necessary to embrace the concepts of Tapu and Noa (sacred and mundane, approximately) following a prompt from Refiti (2022, personal communication), co-founder of the Vā Moana Research Cluster at Auckland University of Technology (AUT). A third trajectory was to see the artwork as located within a relational space that extended back in time, is located in the now,

and extends to the future. Whakapapa involves a combination of genealogy and kinship – including relations to buildings, ships, waka, plants, and species.

Recognising socio-ecological connections as central to creative practice meant that when the Kōhatu of Figures 83–98 were selected, I uttered whakatauki (sayings) and karakia (prayers) and left a gift for nature at the site on the Waiwhakaiho River where the stones were gathered. The socio-ecological connections around *Kāhili* (Figures 72–77) were acknowledged as part of the blessing of works, through the utterance of whakatauki, karakia, and the Kahuna navigation chant given in Chapter One. The blessing ceremony was concluded, and the Tapu (Sacred) state returned to Noa (Mundane) by the consumption of kawakawa tea and eating kai moana (sea food) – the audience are therefore integral in the blessing process, rather than simply being observers.

5.6 Summary

Opening a discussion of the Anthropocene led to considering the issues of the Chthulucene and Capitalocene, which led directly to subject matter common to both indigenous *and* Western writers. While "Anthropocene" remains the term of the day currently, the issues raised by Davis and Todd (2017), Haraway (2016), Arons (2023), and Moore (2017) must be taken into account. This is because they provide a much clearer awareness of the fundamental forces at play in creating the situation in which humanity now finds itself. Part of the resolution involves reframing our relationship to species and environment, while part involves dismantling perpetuating colonial infrastructures, the profit motive in development, and significantly reducing carbon emissions. Cartesian Duality reappeared in the discussion prompted by Moore, and the Tangata (People) Dimension was extended to include the Indigenous and Western Humanities: in Ngaru Whenua Diffraction context, together these knowledge waves combine to form a larger wave. The interconnectedness of Moore's propositions around the Capitalocene returned us to the Ngaru Whenua Diffraction of the Vā against Quantum Theory. Providing a diffraction of Electronic Art and the Anthropocene resulted in a series of trajectories being prompted, where examples from my Creative Practices were given as instances of approach and consequence. In essence, a balance between electronics and nature is the considered *mitigating* strategy, with a process utilising resources in the environment seen as exemplary. In the Introduction, the question was asked whether a Ngaru Whenua approach could provide a counter-Anthropocene model for making art and culture. It was found that the Moana and Māori notion of relationality provides a means to "ford the Cartesian divide" as Moore sought (2017, p. 40). A pathway in creative practice was located by creative wayfinding, which we now turn to.



Chapter Six. Creative Practices

Chapter Six. Creative Practices

There is a sense in which creative experimentation is the experience of not knowing what you are doing and trying to find it out by exploration. This for me became entwined with wayfinding. Engaging with whakapapa was shifting me, along with the recognition of Tapu and Noa as relevant to a practice that referenced Tūpuna (ancestors). In this way, I began in the mundane and followed a process of wayfinding to a sense of sacred. This chapter reviews the creative process and outcomes, beginning with wayfinding, before moving on to documentation of the submitted works.

My embrace of whakapapa and wayfinding is discussed, and I describe collating a visual vocabulary and targeting the location of etched Kōhatu (stones) on three navigator sites across Te Moana Nui a Kiwa. This includes the site of Taputapuātea Marae in Aotearoa New Zealand, which was used as a navigator site until the fifteenth century (Foster, 2014), and named by the discoverer of Aotearoa, Kupe in 950 CE, as the site reminded him of his home Taputapuātea Marae on Ra'iātea according to Ngati Hei (Robson & Teira, 2011, p. 7).

6.1 Wayfinding and Creative Practice

This chapter now works through the processes of creative practice in a wayfound journey, beginning with a list of works that are submitted as part of the thesis. This includes works that were curated in to *Interconnecting: pasha @ patea* at Aotea Utanganui Patea Museum, some of which were featured in Chapter Three when discussing contemporary visual culture on Hitiaurevareva.

As mentioned at the end of Chapter Five, an early speculation was to place data sensors on Hitiaurevareva, Tahiti, Norfolk Island, Ngāmotu New Plymouth and Tāmaki Makaurau Auckland. The live data generated could be expressed as LED light or audio. There was an undesirable extensive carbon footprint to implementing this scheme, and practically, the COVID-19 lockdowns closed borders. So, I was left to wayfind through the situation.

To get specific about the process of wayfinding, Jack Thatcher tells a story of Mau Piailug describing wayfinding in the following way:

> Well, he grabbed his bottle of whiskey and put it on the ground and went, "This one Hawai'i," and he took the bottle of beer I had and went, "This one Tahiti." And everyone sort of sits up and starts watching, and he goes "First I sail to Sarapool

> [Corvis] this way" and he started walking off on an angle away from the direct line down to the bottle, "I sail to Sarapool until I am half way, then I turn to Murn [Vega], and then I sail until I am half way, then I turn to Wuliwulifasmughet [North Star] until I am close, and then I make straight." (As cited in Evans, 2021, pp. 175–176)

Note that while the destination is known, the progression is from midpoint to midpoint, and the timing of arrival at that point cannot be known – windspeed and current direction are big factors, while position involves assessing boat speed and current intensity. Avoiding storms and being becalmed can change the mid point journey dramtacially. Wayfinding in the open ocean does not allow for precise timing on when a mid point or end might be reached.

While I was not navigating in a waka (canoe) in the ocean, the sea of life in which I lived consisted of stars such as Quantum Theory and the Anthropocene, and islands such as Tūpuna (ancestors), Ngaru Whenua Diffractive patterns and Electronic Art.

6.2 Overview of Submitted Works

This section introduces the works submitted and documented in the thesis and website, followed by the commencement of the wayfinding pathway through past, present and future.

Table 5
Works, materials and collaborators

Date	Title	Location	Materials	Collaborators	Figure(s)
2021	*A computer model of flow*	Digital	Fluid dynamics modelling software	Dr Michael MacDonald	Figure 43
2022	*Interconnecting : pasha @ patea*	Aotea Utanganui Patea Museum	Vinyl creative works, whakapapa images, works by whanau from Hitiaurevarev, plants, historical objects, etched and moulded acrylic, fossils, stones and visual references to	Daphne Warren Leona Hermanns Randy Christian Bren Christian Brown Family Kohana Clothier Harete Tito Unknown makers	Figure 15 Figure 16 Figure 17 Figure 18 Figure 19 Figure 57 Figure 57 Figure 57

Date	Title	Location	Materials	Collaborators	Figure(s)
			several animal species	Jay Warren Sue Pearson	Figure 59 Figure 63
2022	*Kāhili*	Govett-Brewster Len Lye Centre	Ink on transparent vinyl (window installation)		Figures 67–70
2022 - 2023	*Arawhiti Āniwaniwa Rainbow Bridges*	Studio	Digital print		Figures 71–72
2023	*Inter-generationality*	Govett-Brewster Len Lye Centre	Workshop and talk	Ellie Field (GBAG LLC coordinator)	Figures 73–74
2022 – 2023	*Black Holes*	Studio, AUT	Digital print		Figures 75–78
2022 – 2023	*Kōhatu Ra'iātea*	Taputapuātea Marae, Ra'iātea	Etched and bound Kōhatu	Susana Lei'ataua (Kava ceremony), Kim Kahu (weaving); Tihoti (Tohunga); Lucas & Jean-Rene (Haka); Vetea, Vaiete, Osden & Oro Maltby (conch shell audio); Teuarangi, Eliska, Devi & Martjin (conch shell audio and offerings)	Figures 79–90

Date	Title	Location	Materials	Collaborators	Figure(s)
2023	*Kōhatu Hawai'i*	Kapukapuatea Hawai'i (future placement)	Etched and bound Kōhatu	Kawaihululani	Figures 91–95
2022 – 2023	*Kōhatu mauri*	Studio	Etched and bound Kōhatu with Kereru, Toroa (albatross) & mallard raukura (feathers)	Tree MacLeod	Figures 96–98
2023 – 2024	*Anthropocene Experiments*	Studio	Upcycled coffee sack, Parihaka biochar pigment in cellulose-based paint Kōhatu, Parihaka biochar and umu prepared on Taranaki whenua in cellulose-based paints		Figure 99 Figure 100
2022 – 2023	*Images for gifting*	Tairua; Aotea (Great Barrier Island); Ōtautahi (Christchurch); USA.	Digital print	Amiria Raumati	Figures 75–78 (*Black Holes* were also gifted); Figures 101–103
2023 – 2024	*Digital archive*	https://pashaclothier.com/phd			Figures 109–143

Engaging with kōwhaiwhai (see Figures 41–45 on pages 139–144) led to the development of a visual vocabulary for this project and future works, followed by several series. *Interconnecting: pasha @ patea,* a one-person with whanau (family) exhibition at Aotea Utanganui Patea Museum in 2022, drew together many of the strands of current practice: engaging with the environment, with species and with whakapapa.

The development of *Arawhiti Āniwaniwa (Rainbow Bridges)* included a five-year installation at the Govett-Brewster Len Lye Centre with a blessing process that included ritual and ceremony around works that directly referred to Tūpuna (ancestors). The *Black Holes* were the evolution of considering Te Pō, one image of which won second place in an AUT Matariki Art Award.[51] Four etched Kōhatu (stones) were created, which would evolve into a major project placing an etched Kōhatu on Taputapuātea Marae in Ra'iātea, and returning with a Kōhatu. This is part of a plan to place etched Kōhatu on Taputapuātea Aotearoa, on Kapukapuatea Hawai'i, on Taputapuātea Ra'iātea, and on Hitiaurevareva: an area spanning thousands of kilometres of Te Moana Nui a Kiwa that traverses around 90% of what was formerly referred to as the Polynesian triangle (see Appendix 2). The approach taken to the Kōhatu follows Indigenous Practices where interconnection to Te Taiao (universe) and Tūpuna (ancestors) is acknowledged. The encapsulation of these forces and the recognition given to Tapu and Noa form a trajectory that is counter to the Anthropocene, an important question driving this project. Locating an ethical framework around electronic art production was a key question.

The four Kōhatu are significant in reformulating the framework of my creative practice, given where research and discovery have taken me. When it came time to select the Kōhatu, a kaupapa (protocol) was followed in terms of uttering whakatauki and karakia (sayings and incantation), including the Kahuna navigation chant given in Chapter One. A gift was also given to te taiao, the environment, and rituals concluded with drinking kawakawa tea and eating kai moana (seafood). This represents a considerable shift in praxis, as it is one engaging with Indigenous Practices in the *process* rather than collaborating under the guidance of Indigenous, evident in SCANZ and international exhibition projects, as discussed in Chapter Three. The approach to the Kōhatu will be discussed further in the final chapter, as exemplary of a new approach to creativity and culture diffracted through a Ngaru Whenua approach.

[51] Matariki is a celebration of the Māori New Year

Creative practice, along with what creative practice means in the context of the environment today, evolved through experience and spacetime. An important step was *Interconnecting: pasha @ patea* – a curatorial project as much as a creative one and a project that clearly acknowledged the Moana and Māori notion of an interconnected universe. There were cultural artefacts made by whanau (extended family); whakapapa images from the 1830s and more recent generations; multiple species such as birds, sea life and plants, which were referred to imagistically; along with rocks touched by plants, fish and humans; all of which sat alongside contemporary vinyl graphics.

The *Arawhiti Āniwaniwa* (*Rainbow Bridges)* were developed simultaneously and were prompted by my Hawai'ian mentor Kawaihululani as gifts from Moana peoples to those in the West. The works deliberately set out to be inclusive of generations and are bridges from Moana culture to Western that do not require logic or rationality to be understood; they can simply be *seen*, reinforcing the intuitive sense. Imagery runs from floor to ceiling, giving children of all ages something to see. Considering intergenerationality resulted in deliberate expansion of the creative project into Family Art workshops and talks with seniors. Thinking outside of the profit motive is part of resolving issues of the Anthropocene and I now also carry images as gifts for people I might meet.

The *Black Holes* were an important counterpart to the *Arawhiti Āniwaniwa* in addressing Te Pō (the Dark, Night, Nothing), and multi-dimensionality, in the form of patterns and emptiness. The discussion here now turns to kōwhaiwhai, an exemplary instance of patterning and emptiness.

6.3 Kōwhaiwhai and a Computer Model of Flow

As I journeyed through creative practice and process, I received an email response to an image I posted online, here reproduced as Figure 3. It showed the kōwhaiwhai decoration on three waka hoe (canoe paddles), along with an image of a von Kármán vortex street, the latter produced in a fluid dynamics experiment. The email was from Dr Michael MacDonald of the University of Auckland, a fluid dynamicist interested in collaborating on a validated computer model to investigate the connection between kōwhaiwhai and fluid dynamics.

What follows is an introduction to kōwhaiwhai, a "painted scroll ornamentation – commonly used on meeting house rafters" according to Te Aka (2003-2023, p. 1). As we have seen in Chapter Two, kōwhaiwhai originated as waka hoe decoration. The patterns revealed an understanding of the core fluid dynamics and Chaos Theory principles of recursion across scales

Figure 41

Kōwhaiwhai

Note. Author, ca. 1886, paint on paper, Object in the collection of Te Papa Tongarewa, The Museum of New Zealand. https://collections.tepapa.govt.nz/object/1444295

and self-similarity. Additional mathematical components of kōwhaiwhai will be discussed shortly.

Figure 41 shows a range of repeated elements of kōwhaiwhai, in particular items A – pitau (fern shoot), and L – Koru (spiral) which are central to kōwhaiwhai design; along with kape (items O and P) and the negative spaces of several forms (D, E, L, M). It must be said though, that the negative spaces apply to all of the forms depicted, meaning there is a unity of positive and negative space in kōwhaiwhai. The provenance of Figure 41, the author, and its purpose are unknown. The colours are similar to drawings made by Herbert Williams (see Figure 42) for Augustus Hamilton's *The art workmanship of the Māori race* published from 1896 to 1901, however

Figure 42

Designs of Ornamentation on Māori Rafters Nos. 28, 29, 30

Note. Source: Williams, H., ca.1895. *Designs of ornamentation on Māori rafters* Alexander Turnbull Library. Ref: E-331-f-028/030. Alexander Turnbull Library, Wellington, New Zealand.

clearly a different hand has made Figure 41. What is also quite clear is the attempt to identify and provide a kind of vocabulary of kōwhaiwhai elements named items A to P.[52]

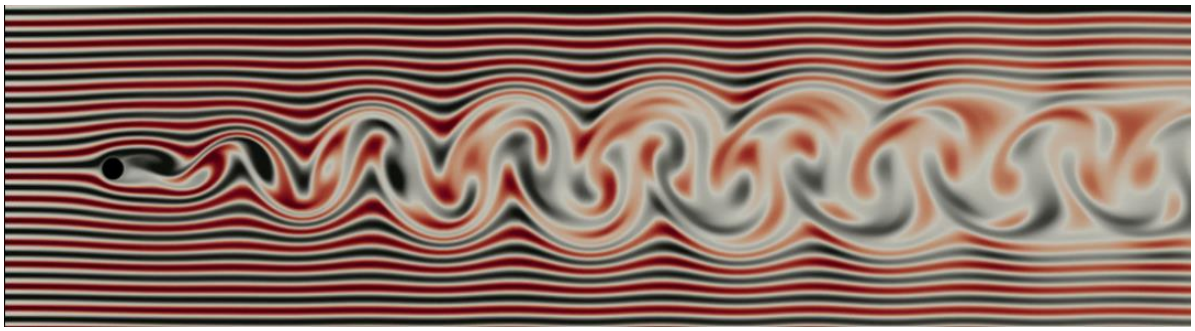
The lower kōwhaiwhai pattern of Figure 42 is called *Ngaru* and is said to be based on the wake created by a waka moving through te moana (the sea). It is important to recognise these words by Robert Janke (2015):

> … kōwhaiwhai was genealogically encoded within the cosmology of the house to provide a visual endorsement of the interconnectedness of Māori and the Natural world. Consequently, many of the names associated with kōwhaiwhai include plant and marine references.

[52] As it happens, as a first year Philosophy, Religious Studies and Psychology student at the University of Canterbury, I poured over Hamilton's publications and still have photocopies of pages from them. I also received a commission to create kōwhaiwhai backdrops for the Māori band *Te Aroha* led by George Kahi.

Figure 43

Frame from a Computer Model of Flow



Note. Clothier, P. & MacDonald, M. (2021). Frame from the computer model by MacDonald and the artist-writer. Customised fluid dynamics software.

> It is generally accepted that the names applied to kōwhaiwhai patterns, while culturally significant, are conceptually rather than perceptually grounded. That is, the relationship between the pattern and its natural referent is related to the cultural significance of the name rather than any visual correlation between the pattern and its natural referent. P. 6

Following the large-scale semi-permanent settlement of Aotearoa New Zealand 1190–1290 CE, kōwhaiwhai transformed to become rafter decorations in Whare Nui (meeting houses), echoing the movement of Lapita pottery patterns onto rafter binding following the settlement of Sāmoa, according to Refiti (2014, p. 210). Kōwhaiwhai designs are made by subjecting a range of visual elements to mathematical sequences of shearing and reflection. Essentially via mathematical operations performed on specific elements, the entire cosmos of kōwhaiwhai patterns were generated.

An extraordinary number of different kōwhaiwhai patterns are created by performing seven types of mathematical rearrangement. According to the Te Kete Ipurangi New Zealand Maths website (n.d.), these are:

> reflection in a vertical axis; rotation of 180 degrees; translation; glide reflection (translation followed by reflection); rotation of 180 degrees followed by reflection in a vertical axis; reflection in a horizontal axis followed by reflection in a vertical axis; and reflection in a horizontal axis.

Figure 44

Koru and Pitau in the Clouds

Note. Photo by Kevin Griggs. Permission granted for use.

Figure 43 is a frame from the computer model made in collaboration with MacDonald. A comparison of forms C, D, E and F of Figure 41 reveals striking similarities. Fluid dynamicists refer to rows of pitau as Kelvin-Helmholz cloud formation (see Figure 45).

The pitau and koru in cloud formations can be seen in Figure 44, while a strong repetition of three pitau is seen in Figure 45. What the photographs reveal are the patterns that are part of fluid dynamics, and these patterns are also found in kōwhaiwhai. Fluid dynamics, broadly, researches states of turbulence and has produced models of the weather, experiments into von Kármán vortex streets (such as that seen on the right of Figure 3), studies of dripping taps, blood flow in the placenta and experiments in using contained wind twisters as a source of energy. The connective point is fluids moving from one state to another, of which clouds are an exemplary instance. Weather is precisely the movement of air currents over sea currents. In the view of Te Huirangi Waikerepuru as was seen in Chapter One, humans are embedded in the hydrological cycle, an intuition that has strong resonance for the Anthropocene which actually endorses this view of nature.

Figure 45

Photograph of Clouds over Mt Taranaki

Note. Taranaki turbulence forming Kelvin-Helmholz patterning. Photo by Scott Valintine. Permission granted for use.

MacDonald presented the model and the validation equations, and I presented the discussion points to the *Fluids in New Zealand 2022* conference where it was accepted that the comprehension of fluid dynamics principles by Māori was real. In addition, the understanding of key principles was acknowledged as precedent (i.e. the 1769 trade between Ngāi Tāmanuhiri and/or Rongowhakaata iwi [tribe] and Cook) to the elucidation of these same principles by Western Science in the 20th century. This forms a strong basis for asserting precedence in fluid dynamics awareness in Indigenous Practices.

From this consideration of kōwhaiwhai, patterns, and fluid dynamics, it struck me that what I needed was a vocabulary of my own. So I began looking into the visual culture of Hitiaurevareva, beginning with the objects and artefacts seen in Chapter Three. These provided leitmotifs of visual culture. Searching for, locating and resolving imagery for the visual vocabulary followed the path of wayfinding my way through culture, whakapapa, art, science, dimensionality and the Anthropocene.

6.4 Next Generations

As we approach the final phase of art-making in this research, I would like to acknowledge the work of several artists, and also a brief encounter, that have aided my thinking about the process of developing a visual vocabulary that operates across several media. In many ways, these are all part of the wayfinding that drove the project. As we approach the visual vocabulary for this project, one based on whakapapa and what occurred "before the beginning" I was aware that the vocabulary would be independent of media.

I had previously attained a position where the utilisation of electronic media predicated on the programmable circuit board allowed for the transformation of data to sound and on to video. This video can be experienced online, via a mobile phone, in a cinema, or in an installation. A tree in the Southern Hemisphere can be connected to the internet such that its live data output can dictate the audio heard in a gallery in the Northern Hemisphere. The imagery of the vocabulary could be laser-etched onto Kōhatu, acrylic sheet, mirror, expressed in vinyl and adhered to a range of internal and external surfaces. The design could be implemented in wood, stencilled onto coffee sacks, and adhered to pandanus.

This positioning of "changing register" is not something developed in isolation. I saw it in the work of Wairere Pene. Her mahi (work) extends from working with painted imagery on wood and canvas, fired uku (clay), to running rites-of-passage workshops at wānanga (places of learning), commissions for the digital design of printed material for iwi, leading rangatahi (youth) through murals while introducing participants to Rongoa (traditional healing), including introducing rangatahi (youth) to the healing properties of kawakawa. While this may appear to be simply a creative practice with diversified income strands, that misses the point that the central orientation is within Te Ao Māori (The Māori World) and is expressed in diversity within and beyond art and design.

Needing to travel to the UK for family reasons, Louisa Chase used the context to explore traditional local materials such as Woad, and self portraits of body in landscape as part of research into sustainable approaches to making art. Her work pushed me away from purely electronic art, and into considering the environmental impact of electronic art practices. Combined with the words of Maata Wharehoka around using materials available in the local environment, the two led me toward finding and selecting Kōhatu (river stones) for use in creative projects.

In terms of relationality and dimensionality, the work of Wairere Pene and Louisa Chase came to me through teaching on online for The Learning Connexion (www.tlc.ac.nz), an art school based in Lower Hutt. As many educators are aware, the students in their final year who are most likely to persist and find success are those students who have already commenced their post-education journey while still enrolled. This applies to Pene and Chase.

A sense of dimensionality can be found in wayfinding and the way content is looked at from multiple angles. In wayfinding terms, on the bus from Auckland Airport to central Auckland, I met Stacey, who lived on Waiheke and was a Tohunga (expert) of tuna (eel). I found this out through our conversation as he could catch tuna wherever he was, so his knowledge was more than local. He asked me what I was doing and as I was then designing the *Puanga* (the New Year Star in Taranaki) poster for the Parihaka Puanga Kai Rau festival, he gave me a beautiful side of fresh smoked eel. Following this I determined to carry gifts with me, as I had nothing to gift to him.

This is something I also found in the exhibition of works *He Wheke He Whai* by Arapeta Hākura and Ashleigh Taupaki at the Audio Foundation in Central Auckland from July 12th to August 12th, 2023. Their mahi was an exploration of estuarine bodies of water in the Hauraki region. Hākura awakens connections to waka (canoe) navigation through mauri (essential core, life force) in terms of vibration and karanga (calling). This was expressed through video installation and included a box of Pongaaihu (traditional nose flutes) which people were invited to take with them. Here then was a confirmation of gifting practice. Taupaki also exhibited video, and on the floor were many small Kōhatu arranged in patterns reminiscent of river beds. This exhibition crisscrossed my research into traditional navigation, working with Kōhatu and evolving a practice of gifting. Notably, the Kōhatu here were not large but small. It is the energy that is the central thing.

The approaches given above are signposts for the future in terms of allowing issues of the environment to impinge directly on creative practice. They allow for diversity while being orientated in whakapapa (genealogy) and te taiao (the physical environment). Resources from te taiao are used in a balance with electronic media: the electronic does not dominate. Extending beyond categories and permitting diversity is the reason the works in this thesis are not solely classified by size, material and media. When locating the *Kōhatu Ra'iātea* (Figures 79–90), the Tohunga (Priest) Tihoti would summon Te Pō (The Nothing) and Tūpuna (Ancestors), locating processes and associated works outside of simply art and design. The online digital archive, as an expression of culture upon art and design practices, includes references to material; but here

in this written thesis resides the purer state of dissolving category as a means to understanding works of art and culture. It is one means of escape from the subject-object distinction.

6.5 A Visual Vocabulary Responding to Moana Diaspora

As mentioned in Chapter Three when discussing whakapapa, like many Moana artists, I am impacted by diaspora, in terms of not living on the island of my ancestors. This section explains the process of generating a visual vocabulary that would be utilised across several works: *Rainbow Bridges* (2021–2023), *Black Holes* (2022–2023) and *Etched Kōhatu* (2022–2023), also seen on the website. Utilising the transformative aspect of electronic art allowed for multiple forms of expression of the same vocabulary. Hitiaurevareva is endowed with a rich visual culture formed of distinct influences from Moana culture and Western, creating a diffractive patterning where, for example, a rose stem appears on a fan shape found in Moana culture. When looking further into the visual culture of Hitiaurevareva, four women are prominent – Meralda Warren, Pauline Reynolds, Sue Pearson and Jean Clarkson, who collectively refer to themselves as The Ahu Sistas, formed in 2006 after earlier research by Clarkson into Hitiaurevareva ahu.

Ahu or tapa (bark cloth) making had been banned by the Church on Hitiaurevareva in the 1800s. There was an attempt to restart making in the 1930s and then in 2007 Meralda Warren re-established Ahu on Hitiaurevareva. The Ahu Sistas have since exhibited on Norf'lk,[53] Tahiti and Aotearoa, where their primary media has involved ahu. Pauline Reynolds has devoted decades of research into the women of Hitiaurevareva, documenting museums worldwide that include ahu in their collections. All four utilise multiple media in addition to printmaking and painting on ahu: Warren is also a singer-songwriter, poet and video maker; Reynolds is a writer and with Pearson recently exhibited in Whakatane Museum works that included installation, an evocative digital video, and audio; while Clarkson is also an award-winning costume designer.

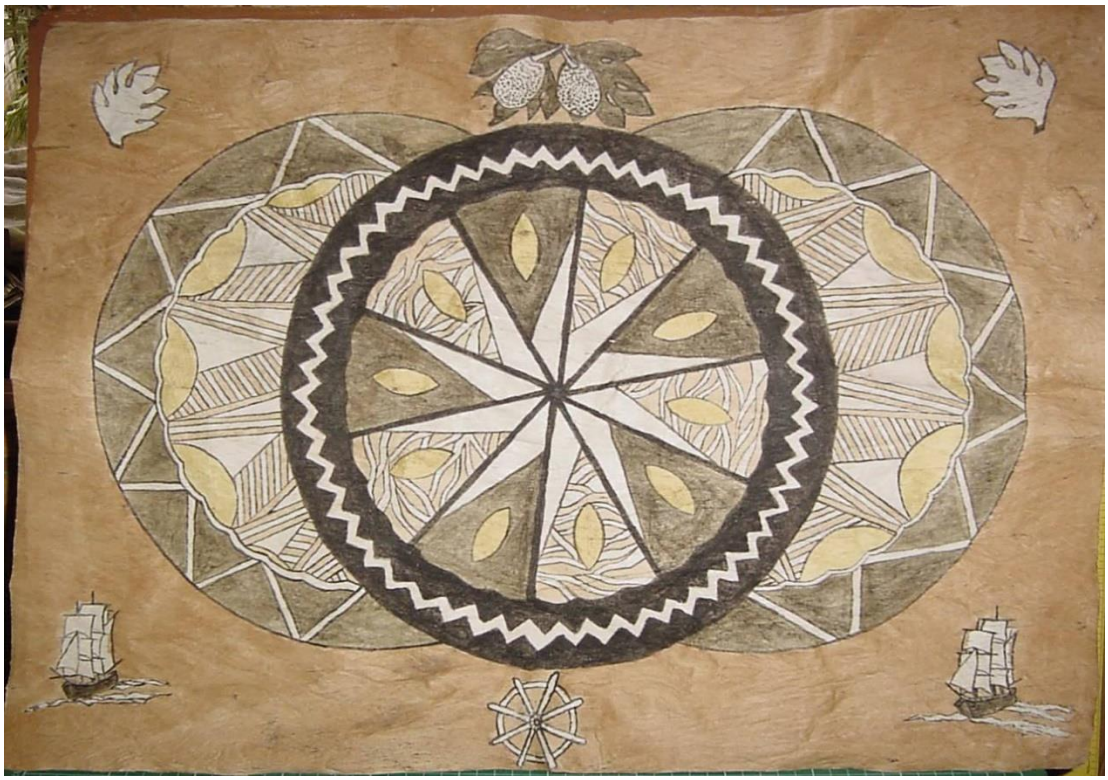
In Figure 46 by Warren, there are clear references to heritage in the ulu (breadfruit) plant which is both a source for making ahu and the reason for the voyage of HMAV *Bounty* – to collect ulu seedlings on Tahiti and transport them to the West Indies to be used as food for slaves.[54] The connection to ulu and ahu is a direct reference to Tūpuna (ancestors) from Tahiti, Huahine and Ra'iātea.Engaging with my whakapapa led me to an unexpected location: the pre-*Bounty* period, which shifted my focus to the thirty-three generations of Tūpuna prior to the prominent eighth generation who settled Hitiaurevareva. In addition, I grew up in Ōtautahi Aotearoa New

[53] As mentioned in the introduction, this is the local term for Norfolk.

[54] Given the *Bounty* venture failed in the task, a second ship was dispatched. However, when the ulu arrived in the West Indies, slaves refused to eat it.

Figure 46

Painted Ahu



Note. Warren, Meralda, (2015). *Painted Ahu* [Natural dyes on handmade ahu (tapa)]. Source: https://www.maimitihaven.com. No longer available online. Permission

Zealand, not on any of the islands of my whakapapa. Within me lay the deep waters of whakapapa and a recent engagement with navigation, dimensional thinking and the Ngaru Whenua Diffractive Method, allowing one cultural knowledge base to be looked at through another while maintaining the integrity of each. How would all of this be brought to bear on creative practice?

Taking a leaf from Meralda Warren's work and acknowledging this here, I set out to generate a visual vocabulary that could be utilised in a range of ways: multiple materials from recyclable acrylic and vinyl to digital prints, shells, pandanus and stone; and at scales that ranged from laser-etched millimetres to three metres high and larger. This would be a visual language that reflected the current condition of my awareness, running back eight generations of Tūpuna, and subsequently to forty generations. This was whakapapa involving Tūpuna, and following a prompt from Refiti I accepted that Tapu and Noa needed to be taken into account and that the journey was approaching sacred territory.

Figure 47

Four Elements of a Visual Vocabulary

Note. By the artist-writer.

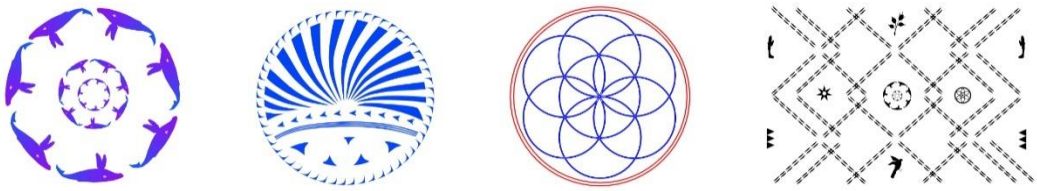
Figure 47 shows four components of the vocabulary, and I should say that considerably more was experimented with than what is revealed here. The source of the triangle motifs on the left lies in the tiputa shown in Figure 11 – a visual element distinctive to Hitiaurevareva ahu. As it happens, I already had such a pattern as digital files. I had used this design previously as part of a collaboration with Maata Wharehoka, B. J. Hetet and John Christini for a Pou (pole or marker post) outside Te Niho o Te Atiawa, one of three Whare Nui (meeting house) at the historic Parihaka Papakainga. This row of triangles pattern is known to Māori as "Te Niho," the teeth, while on Sāmoa it refers to the thorny edges of the pandanus leaf (Liu, 2023), which is also culturally significant in Micronesia (Lebehn, 2021). The Te Niho pou developed in this previous project is solar powered and has five buttons; when each button was pressed, the voice of Wharehoka was heard giving her heritage of the Whare.

The image of the rose branch middle left in Figure 47 identifies more recent visual culture on Hitiaurevareva. It is part of the adaptation of visual culture where new elements were assimilated, and can be seen on several cultural products including the pandanus fan in Figure 16 by Leona Hermans. This fan weaves traditional Moana style with elements that are clearly of European origin, and in this sense can be seen as a form of interlocking – a creative example of Ngaru Whenua in practice. The rose image, which is often found on fans made on Hitiaurevareva, and the bird in the image above are present in Figure 75 below, a *Black Hole* work. They can also be found in the *Arawhiti Āniwaniwa Rainbow Bridge* works.

Birds are important in traditional navigation, and I have been relating to birds for decades. I learnt the flight paths of the kererū in the bush by collecting feathers. These mostly come loose when landing and taking off, so once particular trees are found, paths through the bush can be known and returned to. The image of the red bird derives from an Egyptian panel from 1350BCE, in

Figure 48

Three Visual Elements and an Experiment



Note. By the artist-writer.

the British Museum (n.d.). I drew it several decades ago and recently incorporated it into the vocabulary I was developing. The turtle is ubiquitous in Moana art, along with many forms of sea life.

Figure 48 provides a further four samples of imagery. The image at left is based on repeating a humpback whale image. I refer to it as a "rose of whales," because to be honest I once was meditating and asked for some guidance on imagery for this project, and what came back was "make a rose of whales." An anatomically correct science image of a humpback whale was traced, rather than a more stylised design which is common. Although not easy to see in the small scale of the image above, the knobs on the whales' fins are preserved – which is to say the integrity of the details of the whale has been maintained, which is a key trajectory of Ngaru Whenua method. In the middle left of Figure 48 is a Tahitian tā moko pattern, a tattoo that according to some stories, was worn by a Tūpuna. The "rose of whales" image and the Tahitian moko can be found in *Kāhili, 2022* (Figure 67) and in *Black Holes – Energy Lines* (Figure 76).

Middle right above is the form known as "the seed of life." It is several thousand years old and can be used to generate "the flower of life;" we shall soon see that the flower of life was exhibited as part of the installation *Interconnecting: pasha @ patea* (the 2022 Aotea Utanganui Patea Museum exhibition). On the right of Figure 48 is an inverted *Black Hole* experiment.

Figure 49

Waka and Species in the Visual Vocabulary

Note. By the artist-writer.

It turns out that whales are interrelated in my whakapapa. Hitiaurevareva ahu (tapa) makers of the 1800s were innovators in using whalebone as tapa beaters, which are not known on Tahiti. The largest feeding ground for humpback whales in Te Moana Nui a Kiwa stretches from the Kermadecs to Valparaiso in South America. This feeding ground touches on Hitiaurevareva, and a pod of whales calve there in September. I would witness a mother and calf on my third day on the island. Completing this picture of whales, in the 1800s there were extensive visits of whaling vessels to Hitiaurevareva, and it was a whaling vessel that first came upon the island with inhabitants, in 1808.

After the islanders of Hitiaurevareva moved *en masse* to Norf'lk Island, several men took up whaling as a source of income. There was also a whaling station, now disassembled, directly under the site of my grandmother's house at Cascades on Norf'lk Island, and it is said she greeted the men on their return. Her house was known locally as Hotel Randa (Hotel Veranda) as she received many visitors, offering renowned manaakitanga (hospitality). Such stories speak to multiple connections to and around whales. When I visited the island in 2006 for *Bounty Day* (150th celebration), as a procession of whanau started walking towards the cemetery, I turned and saw a humpback whale blow a plume of water, just off the reef of the beach where my parents met.

Figure 49 indicates further elements of the visual vocabulary – the aute leaf from which ahu or tapa is made is at left, with cut triangles embedded; a double hulled Tahitian va'a motu (island waka or canoe) is left middle. The migratory golden plover is a bird seen throughout Te Moana Nui a Kiwa and here (middle right) has the rose form of Hitiaurevareva stamped into it. In a nod

to insects that provide clues about food sources, an eaten leaf of kawakawa is on the right – a plant used for medicinal purposes in Rongoa (traditional healing) and from which tea can be made.

Experimentation, research and development are essential but eventually it is necessary to map out the identified issues, queries and speculations in a full-scale project. Some of the experimentation will evolve to works beyond this thesis, as the project is on a continuum extending from pre-thesis to post-thesis, led by wayfinding.

As an example of wayfinding process, while driving from Ngāmotu New Plymouth to Whanganui-a-tara Wellington following a wayfinding intuition received several times, I stopped in at Aotea Utanganui Patea Museum and met Curator Bronwyn Wattrus and Luana Paamu (Kaiārahi Whare Tongarewa/Museum Team Leader). In wayfinding you cannot be sure what the precise path or outcome timing might be. An initial conversation eventuated in a one-person and whanau exhibition in the museum's temporary exhibition space.

6.6 Catalogue of Works

Documentation of the main creative project elements now follows. This includes the *Interconnecting: pasha @ patea* museum exhibition in October 2022: the *Arawhiti Āniwaniwa* (*Rainbow Bridges*), which includes *Kāhili* installed in the Govett-Brewster Len Lye Centre in November 2022; *Black Holes*(2022-2023); and the *Etched Kōhatu* series, which resulted in placing *Kōhatu Ra'iātea* on Taputapuātea Marae, Ra'iātea on October 5th 2023, details can be seen on the website. This section includes expansions of creative practice such as giving intergenerational workshops and talks, Anthropocene experiments, and images for gifting.

6.6.1 Curating Ngaru Whenua: a Museum Exhibition

The very first figure in this PhD is *Te Hihiri o Te Taiao* which Te Huirangi Waikerepuru translated as Chart of Natural Universal Energies. It was his view, and often expressed, that the Atua were not necessarily Gods in the traditional form, but rather expressed energies. Tangaroa is not translated as "God of the Sea," but instead, "Sea Life." The *relationality* that Shawn Wilson (2008) spoke of – "this relational way of being was at the heart of what it means to be Indigenous" (p. 80) – is exemplified in the Sāmoan notion of Vā, which I feel is fundamentally an association of energies. This view is also taken about my whakapapa, the visual culture of Hitiaurevareva, my upbringing in Ōtautahi Christchurch, the research, the writing, the creation of works, and the

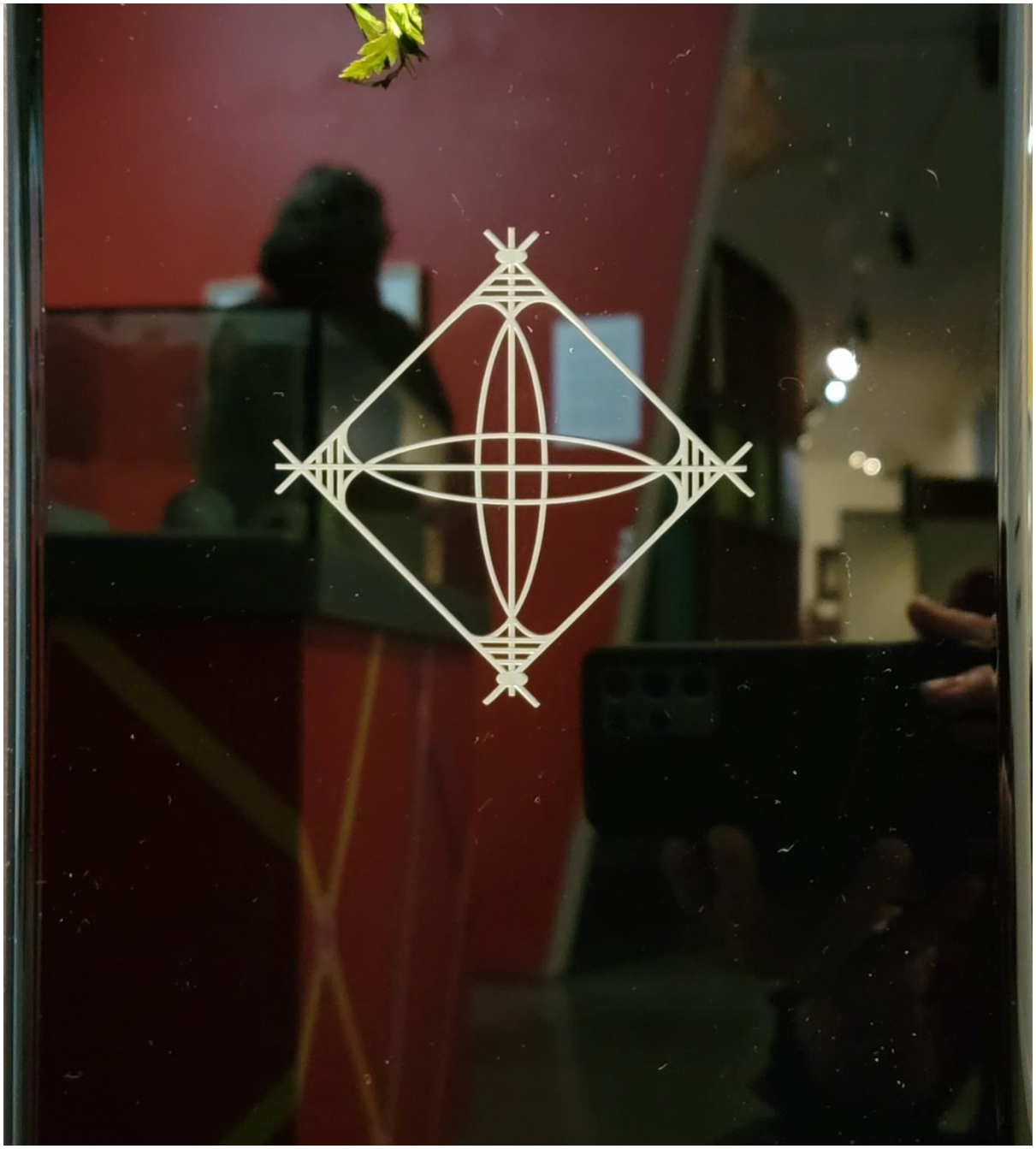
wayfinding. Informed by previous work in the area of interconnected systems or complexity, an overlapping set of sub-systems was behind the coneption.

Ngaru Whenua is the method by which I looked and felt my way through. I thought of the distant past being seen through from the present, and the future being seen through the present to the distant past. Whales and humans could overlap while maintaining their separate identities, applicable to all species from plants to birds. Plants, sea life and humans left their marks on stones, dating to two million years ago in the instance of the fossil crab impression according to the Institute of Geological and Nuclear Sciences (2023). An energistic understanding allowed for the waves of the ocean to be woven into a symbol of my identity. Hitiaurevareva and Norf'lk are islands five thousand kilometres apart but entangled through waves of whakapapa and time. This was the ocean of Ngaru Whenua which I traversed by wayfinding.

As a result of the above considerations, in the *Interconnecting: pasha @ patea* show there were recent vinyl creative works, whakapapa images, works by whanau from Hitiaurevareva, plants, etched and moulded acrylic, stones and visual references to several species. In the documentation written for viewers of the exhibition, it was written that "in this project, you are welcome to walk among the artefacts and dream about the ways in which the objects are interrelated, regardless of whether they are human-made or natural." This tone is taken here as well; I do not intend to explain the contents so much as indicate the flows that run through the exhibition, and some of the information that might be hard to know based solely on looking at an image. Please note that the photographic documentation of the exhibition includes visual reflections, for example some of my creative works are reflected in whakapapa images (see Figure 60). Looking through one to the other in this way, in a Ngaru Whenua environment, is suitable. Figures 50 to 78 have captions but not accompanying text, forming the waters of a visual essay that is open to scrutiny and interpretation.

Figure 50

Wapepe and Fern



Note. Etched and moulded acrylic with fern. The imagery is based on Figure 8, a Majel or Marshall Island navigational learning tool that is used to teach about currents around islands, and the need to traverse the correct side of prevailing currents. Clothier, P. (2022). Etched and shaped acrylic with fern. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 51

Documentation of the Aotea Utanganui Patea Museum Exhibition A

Note. The exhibition diffracted museological practices with contemporary creativity. Clothier, P. (2022). Multimedia and installation. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museu Patea, 2022. Digital photograph by the artist-writer.

Figure 52

Documentation of the Aotea Utanganui Patea Museum Exhibition B

Note. Spanning geological specimens, furniture, crockery, 19th century prints, sea fauna, references to species, cultural artefacts and contemporary creative practices, the exhibition held interconnection at its core. Clothier, P. (2022). Multimedia and installation. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 53

Documentation of the Aotea Utanganui Patea Museum Exhibition C

Note. Vinyl graphics permit the viewing of the wall through the imagery, one sense of diffraction as James Charlton of Auckland University of Technology (AUT) pointed out. Clothier, P. (2022). Multimedia and installation. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Pate 2022. Digital photograph by the artist-writer.

Figure 54

Documentation of the Aotea Utanganui Patea Museum Exhibition D

Note. Reverse view from the back wall. The tall pou was prominent. Clothier, P. (2022). Multimedia and installation. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 55

Documentation of the Aotea Utanganui Patea Museum Exhibition E

Note. The patterning of the display cabinet base I referred to as "interconnection pattern" and would emerge in later works in the form of *waka horua* (double hulled canoe) tracks. Clothier, P. (2022). Multimedia and installation. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 56

Documentation of the Aotea Utanganui Patea Museum Exhibition F

Note. The Georgian writing bureau at left is of the period of the *Bounty* sailing. Its footing detail matches furniture removed from the ship prior to its being burnt in *Bounty* Bay, to avoid discovery. Clothier, P. (2022). Multimedia and installation. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

6.6.2 Distant Past to Ever Present: Whakapapa

Figure 57

Geological and Cultural Specimens

Note. Geological specimens included fossils, a plant impression, perhaps a weight for a traditional eel trap or fishing net, a kōhatu in the shape of a grinding implement and volcanic rock from Taranaki *maunga* (mountain). Collection of the artist-writer. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 58

Four Lapita Pottery Fragments, Fossil, Hitiaurevareva Obsidian and Painted Kōhatu

Note. The crab impression centre top; at left are four Lapita fragments ca.3000 years old, collected with permission. Middle centre is obsidian from Hitiaurevareva. At top right is a painted kōhatu by Harete Tito, while bottom right is a kōhatu painted by my daughter Kohana when she was a child. Fish touched the rocks and humans touched the rocks. Collection of the artist-writer. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 59

HMAV Bounty*, Hitiaurevareva and My Father's WWII Artefacts*

Note. Display cabinet containing Hitiaurevareva artefacts including a *Bounty* by Jay Warren, kete (basket) by Daphne Warren, fan by Leona Hermanns, hand holding a vase by Bren Christian; my father's WWII service medal, photograph, and morse key with its box; Hitiaurevareva shark by Randy Christian, limestone from Norfolk Island, with sea life in the form of coral and shell. Collection of the artist-writer. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 60

Authenticated Prints of Hitiaurevareva From the 1830s

Note. – *Bounty Bay* on left, *John Adams* middle upper, *Hannah Young (Adam's daughter)* and child lower middle, and at right (see Figure 13) a family group – all my Tūpuna. Several artworks and part of me are reflected into the documentation. Collection of the artist-writer. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022.

Figure 61

Christine Rose "Aunt Lil" Quintal, My Grandmother

Note. She spent most of her life on Norfolk Island. When we visited in 1970, she was still using a coal range for cooking. The smell of smoke had permeated the wood, a smell I can still recall. As mentioned in the main text, her house was directly above the Whaling Station at Cascades. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Collection of the artist-writer.

Figure 62

My Parent's Wedding Photo in 1948

Note. Taken in Tāmaki Makaurau Auckland. The barely visible coloured reflection is the Flower of Life on the opposite wall, created in 2022. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Collection of the artist-writer.

Figure 63

Bird and Flowers by Sue Pearson

Note. Woodcut print on cotton rag paper. Pearson is whānau and also makes and uses ahu in prints and installations. Reflected in her work is the Tahitian sunrise moko as a large vinyl image on the opposite wall, said by some to have been worn by Tūpuna Fletcher Christian. Overlapping waves course through time and creativity. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Collection of the artist-writer.

Figure 64

Pou

Note. Clothier, P. (2022). *Pou* [Laser etched and shaped acrylic pou]. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 65

Diffraction of Exhibition and Museums Collection

Note. The "Flower of Life" image can be seen here on the black wall. This documentation of the exhibition also shows the adjacent museum display, in a sense diffracting the permanent display with the contemporary installation in the temporary exhibition space. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

Figure 66

Kawakawa, Aute Leaves and Bird

Note. The Bird is placed low so that children of all sizes could experience the imagery. The circular form is composed of aute leaves from which tapa can be made. Kawakawa is also a medicinal plant. Clothier, P. (2022). Shaped and laser etched acrylic. In *Interconnecting: pasha@patea*, Aotea Untanganui Patea Museum, Patea, 2022. Digital photograph by the artist-writer.

6.6.3 *Arawhiti Āniwaniwa (Rainbow Bridges)*

Figure 67

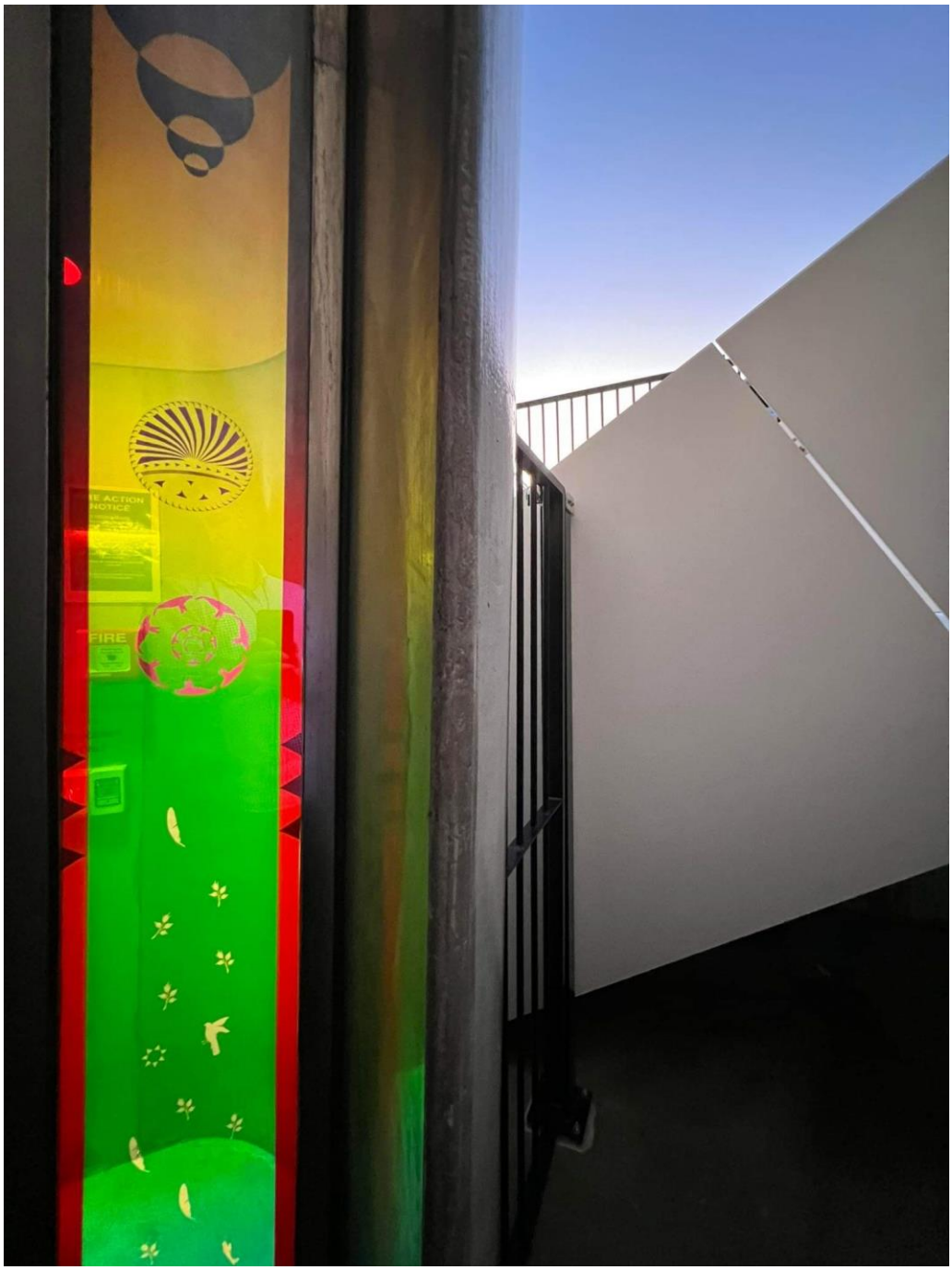
Kāhili, 2022 Install View

Note. The installed work in the Govett-Brewster Len Lye Centre. Clothier, P. (2022). Transparent vinyl. Five-year installation, Govett-Brewster Art Gallery Len Lye Centre 2022–2027. Digital photograph by the artist-writer.

Rainbow Bridges are intended to bridge Moana culture to Western culture without recourse to logic and rationality and be accessible to all ages and genders – this was prompted by Kawaihulululani. Developing the intuitive resource is important to nourishing the human connection to environment.

Figure 68

View of Kāhili From Exterior A

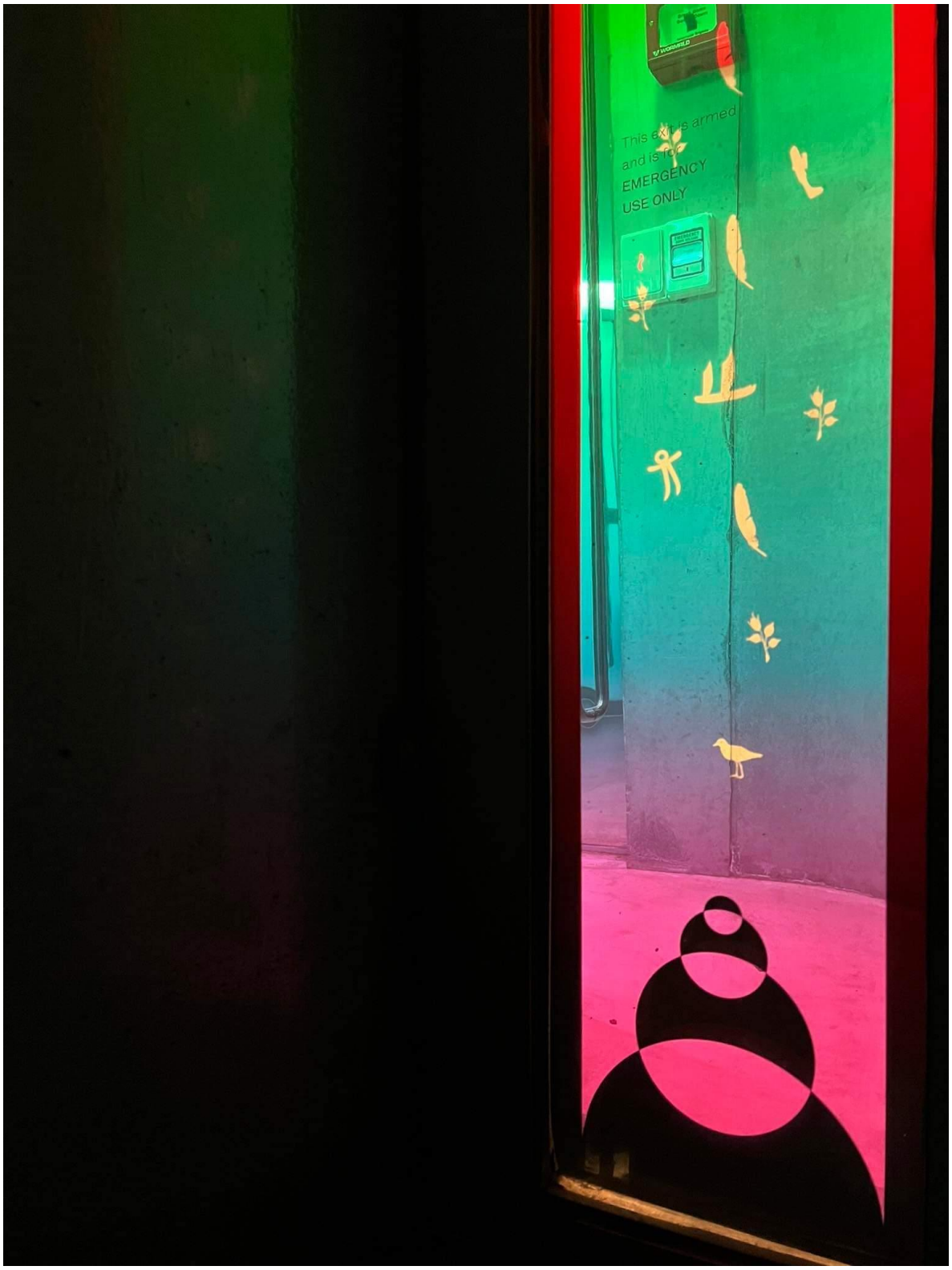


Note. Five-year installation, Govett-Brewster Art Gallery Len Lye Centre 2022–2027. Digital photograph by Shannon Novak, who arranged for my window to be installed in tandem with one of his own.

As the imagery directly referenced Tūpuna, I requested that I acknowledge Tapu and Noa as part of the blessing of the work. This was granted. I also provided kai moana (sea food) and kawakawa tea as a contribution to eating and drinking, which restores Noa.

Figure 69

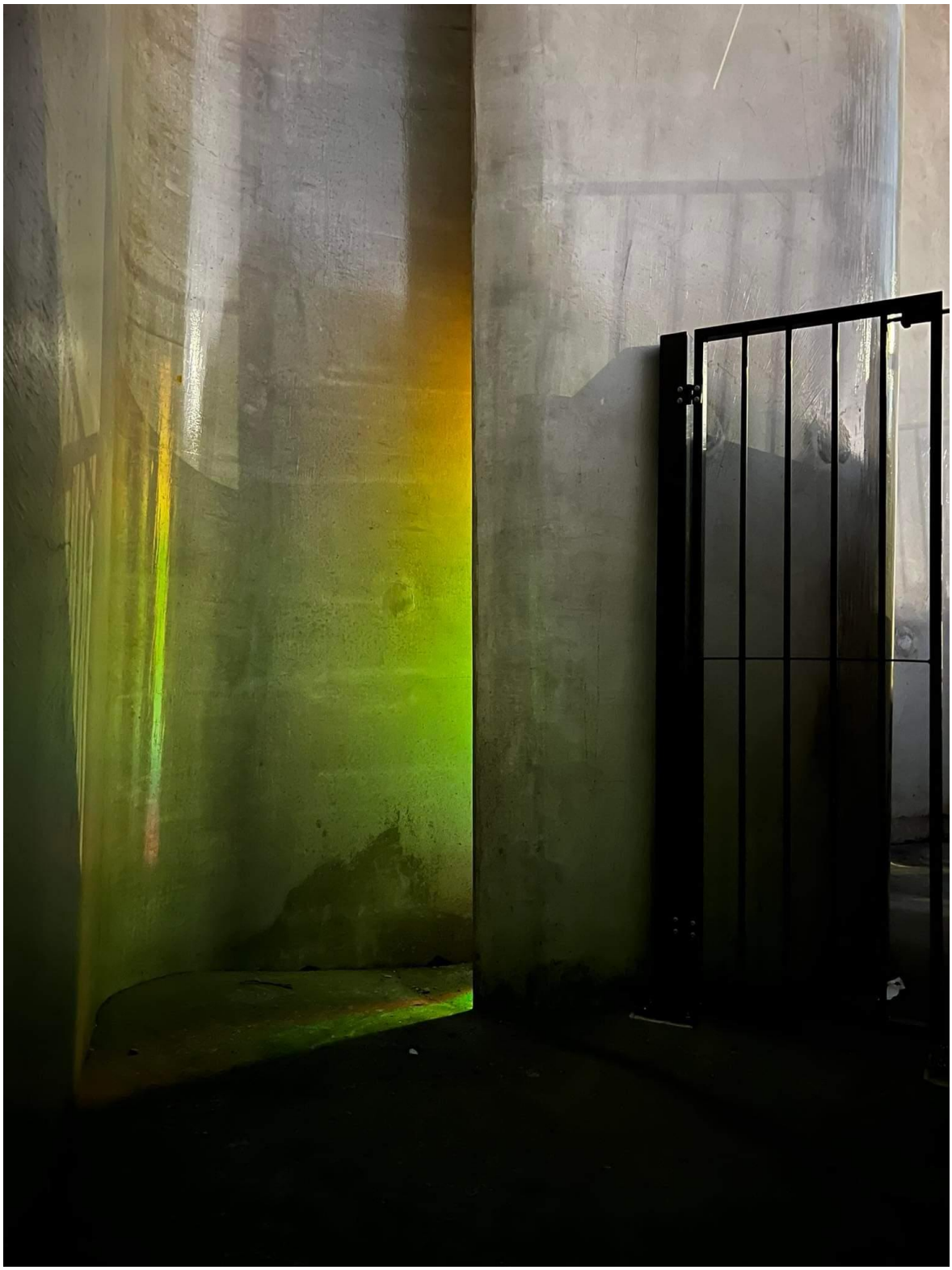
View of Kāhili From Exterior B



Note. Imagery is placed all the way up from the bottom, acknowledging children. Five-year installation, Govett-Brewster Art Gallery Len Lye Centre 2022–2027. Digital photograph by Shannon Novak.

Figure 70

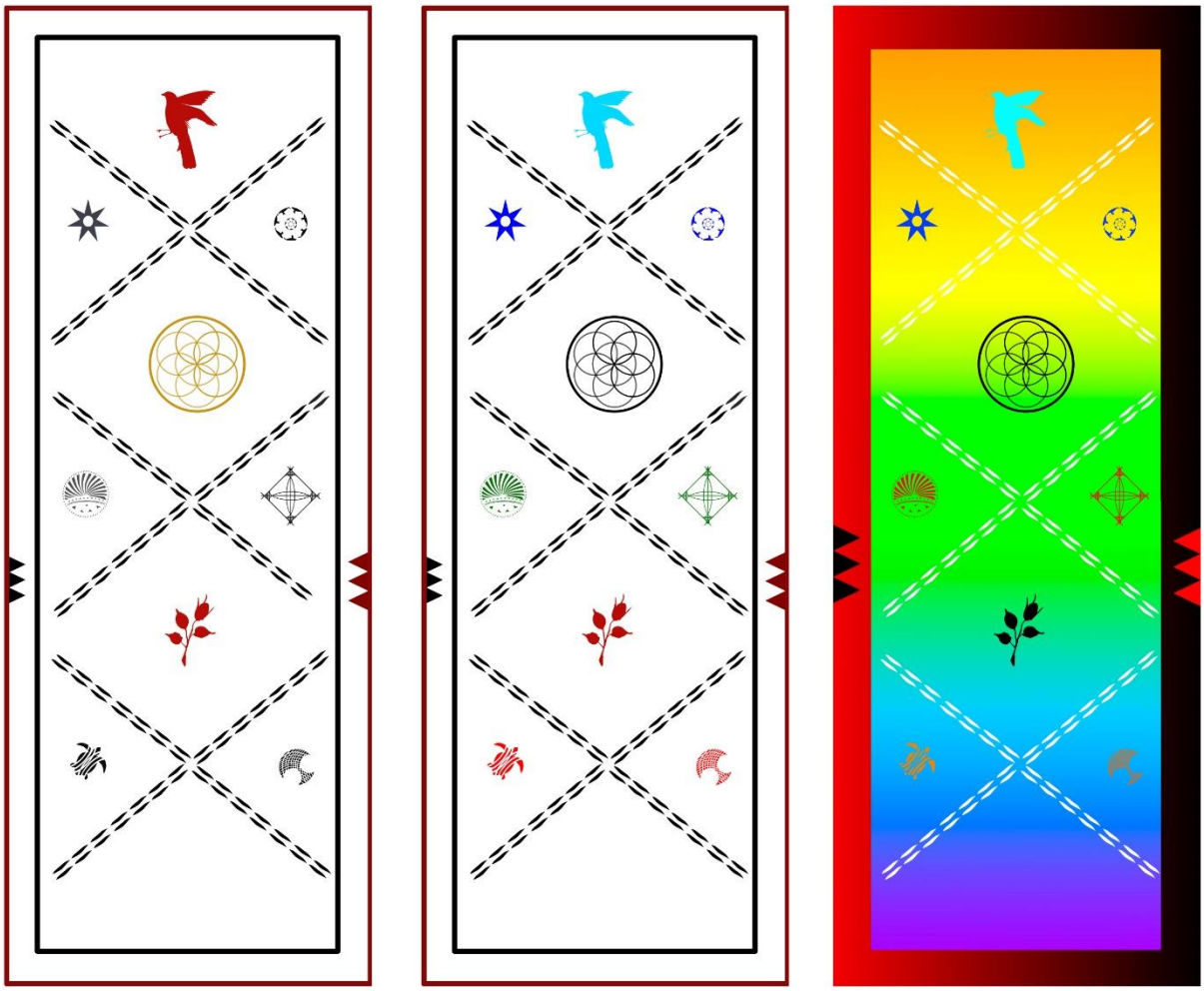
View of Kāhili From Exterior C



Note. Ngaru Whenua as patterns of light and rainbow identity. Five-year installation, Govett-Brewster Art Gallery Len Lye Centre 2022–2027. Digital photograph by Shannon Novak.

Figure 71

Digital Ahu (Tapa) Development

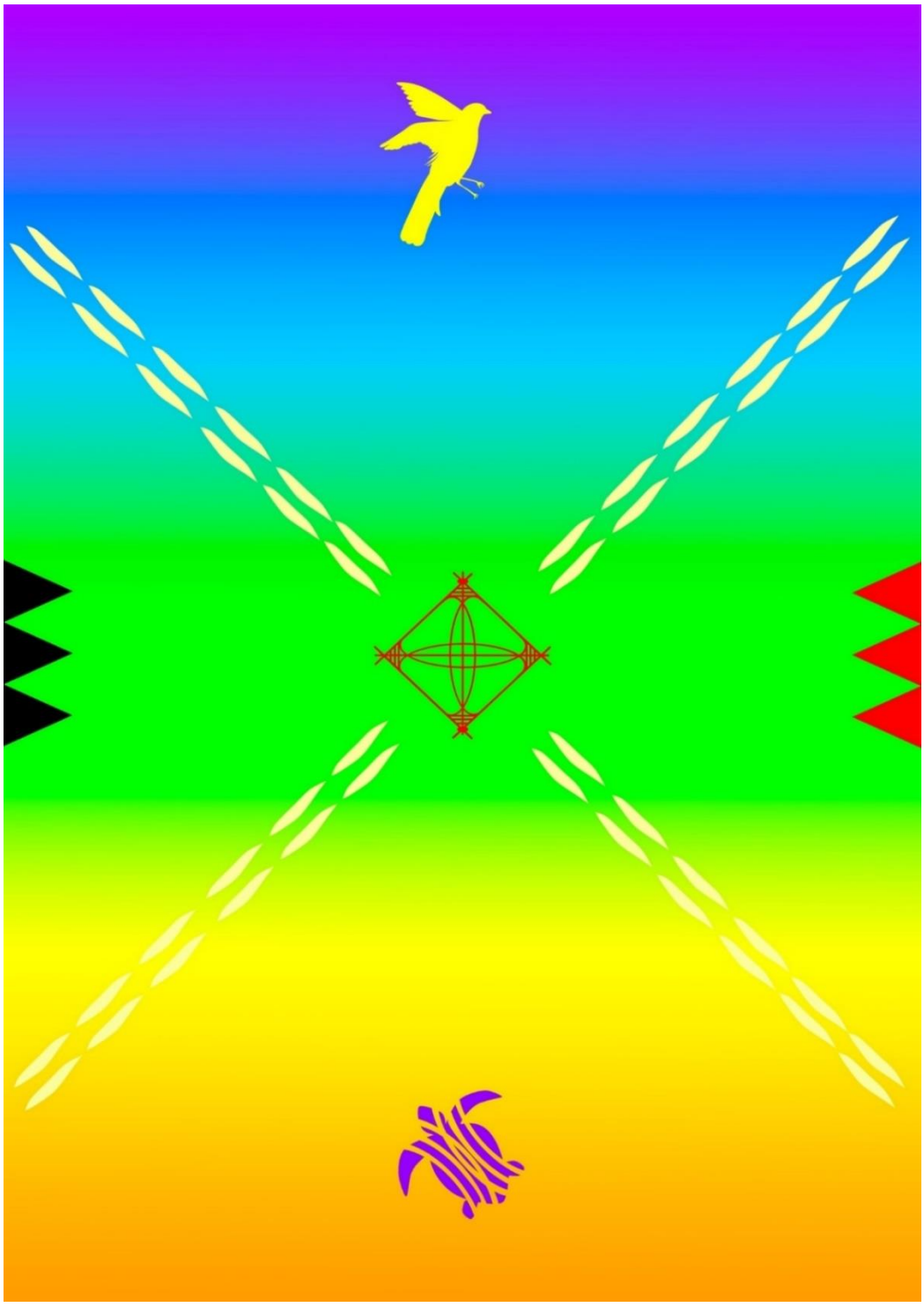


Note. The *Arawhiti Āniwaniwa (Rainbow Bridges)* are not immediately recognisable as of Moana origin, mainly due to the use of high-key colours, although these colours are seen in Pasifika objects such as plastic kete, shirts and mats available in markets. Digital file by the artist-writer.

The spectrum of light that constitutes the colours of the rainbow, follows from an interest in light in earlier works. *The Park Speaks* discussed in Section 5.4.4 and several subsequent works that utilised live environmental data to website, to audio in the installation, all incorporated measurement of light. *Light Seen and Unseen* of 2018–2019 was one of a series of works where scientific data images were scanned and converted to audio, the soundtrack creating an animated video-audio work generated by the algorithms of Adobe After Effects software. The end frames of *Light Seen and Unseen* have the same characteristic rainbow spectra.

Figure 72

Arawhiti Āniwaniwa (*Rainbow Bridge) Digital Ahu Variant*



Note. Digital file by the artist-writer.

The pairs of marks I refer to as *waka horua* (double hulled canoe) tracks. They are also founded in rows of markings made on the tiputa seen in Figure 11 on page 58, connecting to whakapapa. The markings would also emerge in the *Black Holes* (Figures 75 – 78 following).

6.6.4 Intergenerationality

Figure 73

Rainbow Bridges Family Art Workshop, Govett-Brewster Art Gallery

Note. A child participant peering through a prism at a Rainbow Bridges Family Art workshop at the Govett-Brewster Art Gallery Len Lye Centre (GBAG-LLC). Looking through the prism places rainbow spectra at points where there is a change in light contrast, such as around lights or even where black meets white in images. Engaging with all generations is an important trajectory; there will be one each year for the five-year term of the window installation. Digital photograph by the artist-writer.

Figure 74

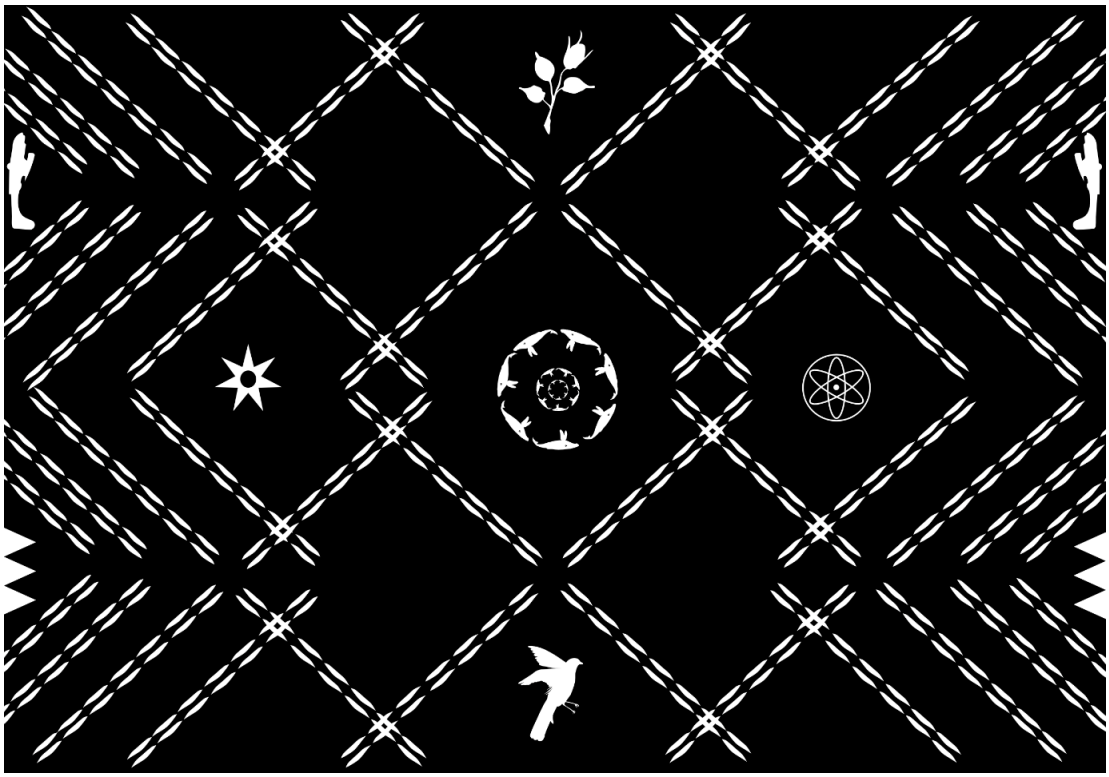
Talk to Matua (Seniors Group), Govett-Brewster Art Gallery

Note. The GBAG-LLC has a lively and interested Matua group who meet regularly for talks. On 21st July 2023 I gave a talk exploring Moana oral heritage recently confirmed by DNA evidence, and new insights into society and navigation practices. A series of talks are planned. Photograph by Ellie Field, Education Officer, Govett-Brewster Art Gallery Len Lye Centre. Permission for use granted.

6.6.5 Black Holes

Figure 75

Black Holes – Visual Emptiness

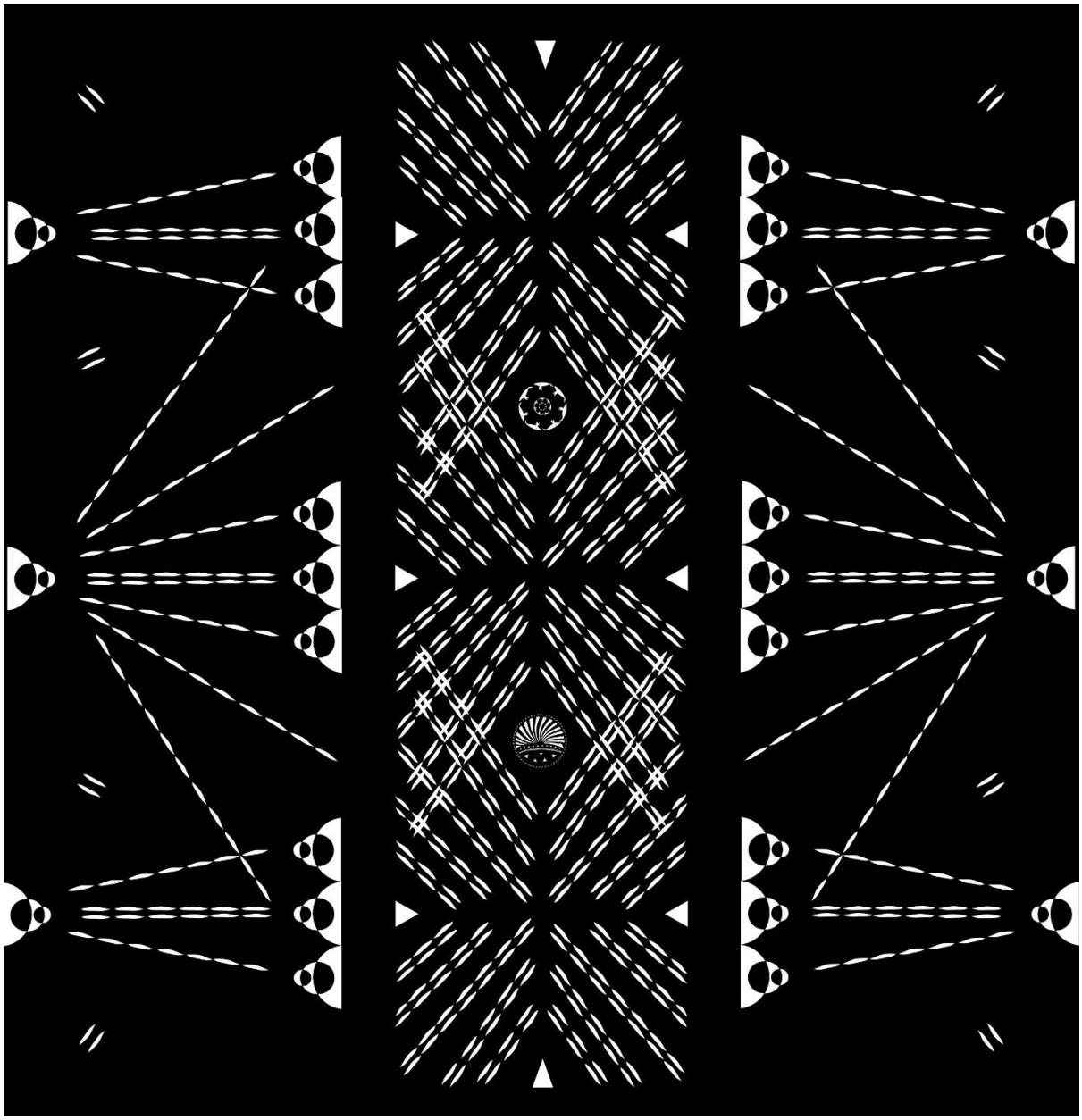


Note. The image contains two senses of black hole – perceptual visual emptiness and enclosed negative space – within a field of darkness. The images upper left and right are of Catalina aircraft, a form of flying boat in which my parents were transported across Te Moana: "I sail, I fly" goes the refrain given in Chapter One, here diffracted against whakapapa. Digital file by the artist-writer.

In tangata whenua cosmology, there are multiple conditions of Pō or Nothing – one Karakia (incantation) gives twelve states of Pō, and the chart given by Te Huirangi Waikerepuru (Figure 1) reveals four states of Te Kore or Potentiality. The *Black Holes* emerged as part of visual experimentation and an awareness of Nothing. They utilise the capacity of perception to form negative spaces, by carefully placed indicative marks. This permits a variety of 'black holes' from the middle of the seven pointed star above, to the 'horizontal lines' spanning the image which are not the result of any visual element, but rather strung together by the nature of perception. Clearly *Black Holes* are creatively related to their existence in the universe as dense areas of space where light cannot escape. This is combined with a sense of dark energy, which makes up most of the universe according to the National Aeronautics and Space Administration (NASA, 2023):

Figure 76

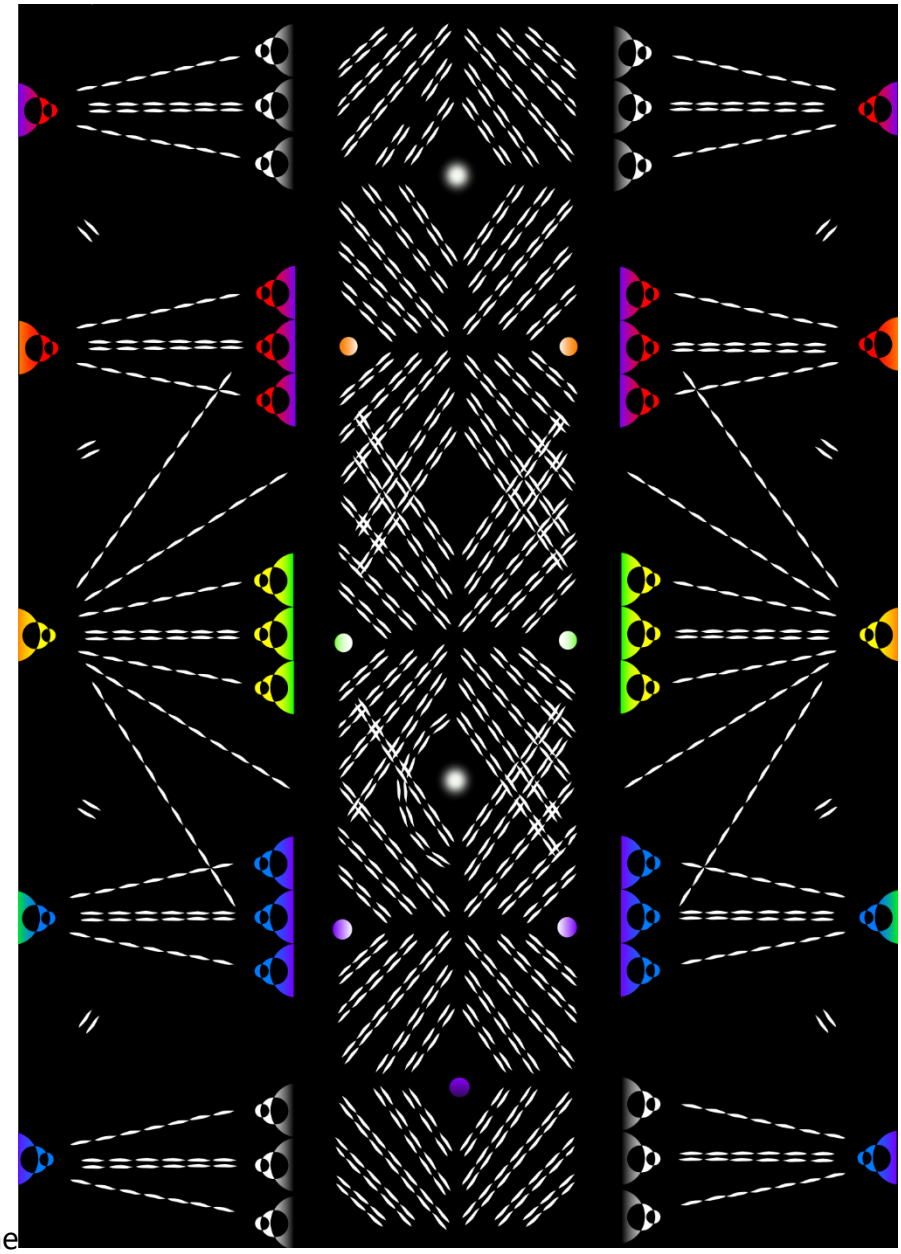
Black Holes – Energy Lines



Note. The series developed along the path of giving greater prominence to the energy lines. Because the imagery is composed of hundreds of smaller sections, it would be possible to create one metre by one metre vinyl graphics, and achieve a height of, for example six metres. This one had whakapapa imagery diffracted against what is essentially Te Pō. Digital file by the artist-writer.

Figure 77

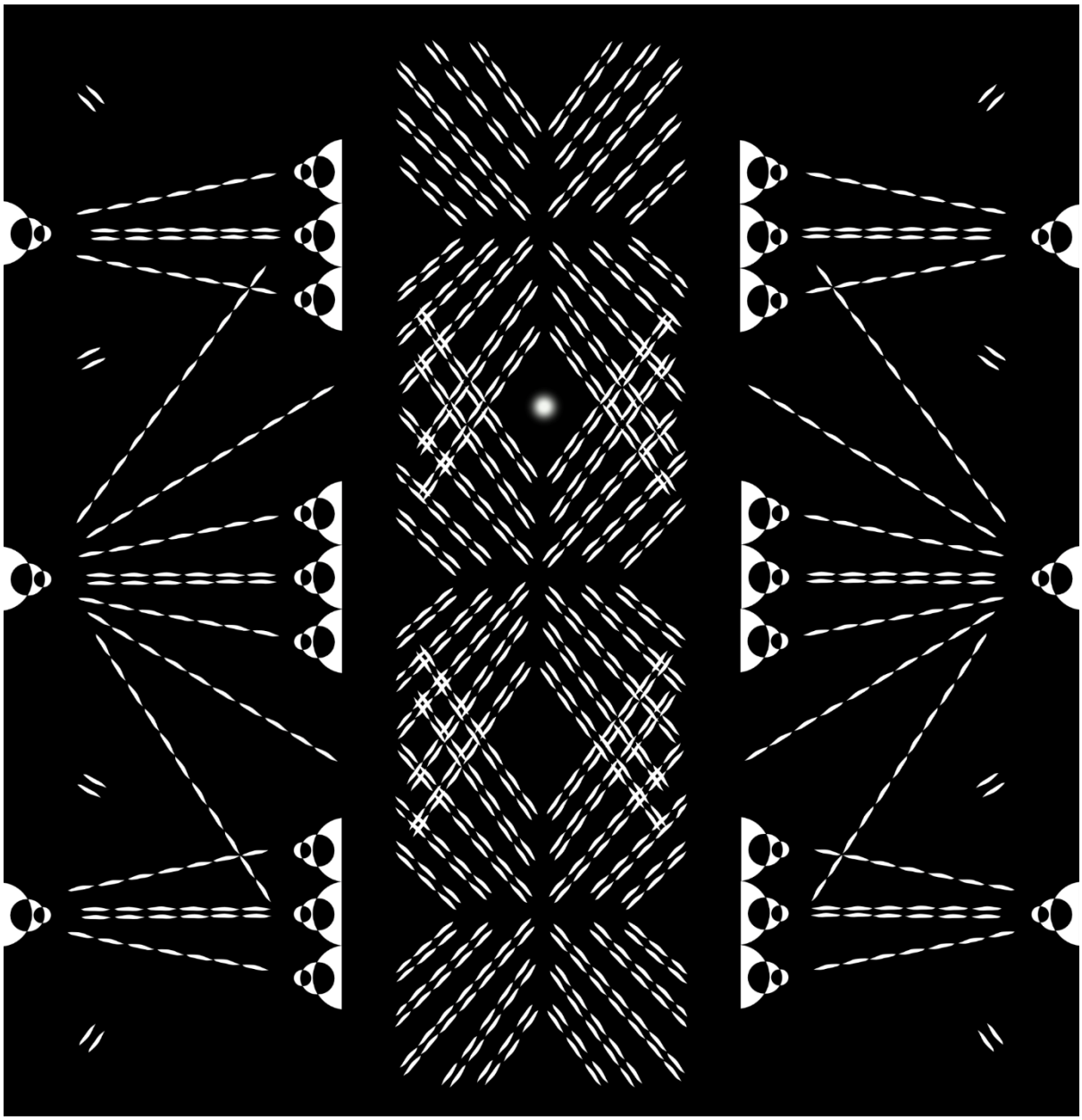
Matariki, 2023



Note. Digital print. This work was specifically made for Matariki and features the nine stars of Māori cosmology rather than the seven of Pleiades or Subaru. This image won second prize in the AUT Matariki Award. Digital file by the artist-writer.

Figure 78

Puanga, 2023



Note. Digital print. The rising of Puanga is celebrated on the new year at Parihaka; I am on the Trust committee for Parihaka Puanga Kai Rau events. Digital file by the artist-writer.

6.6.6 Etched Kōhatu and Placement on Taputapuātea Ra'iātea

Figure 79

Kava ceremony, LAKA Tāmaki Makaurau, Saturday 2nd September 2023

Note. Kava ceremony led by Grand Master Pakilau Manese Lau (centre left) and Therese Mangos (left). Given the full extent of the journey, the event organised by Susana Lei'ataua of LAKA was appropriate and an honour to receive. Digital photograph by the artist-writer.

While Ngaru Whenua Diffractive method was an important context to the curatorial process of the *Interconnecting: pasha @ patea* museum exhibition, the process of creative wayfinding is exemplified in the permanent placement on Taputapuātea Marae, Ra'iātea of the *Ra'iātea Kōhatu*. The entire process had specific waypoints: a Kava ceremony in Tamaki Makaurau Auckland; a stay on Ra'iātea that permitted familiarising myself with place and purpose; the return to Ra'iātea on my birthday; the placement, accompanied by eleven people including haka performers and pu or conch shell blowers; and the selecting and uplift of a Kōhatu for return to Aotearoa New Zealand. The only aspect I specifically arranged prior was to meet with the Tohunga Tihoti on Ra'iātea; the rest "fell into place" in a succession of wayfound moments.

The four etched Kōhatu can be understood as emblematic of the transitional process undertaken during the four years of the project, under which the contemporary issues of the Anthropocene were allowed to impact creative process directly. Considering an artwork within an interconnected ecosystem directly led to considering the energies of the inputs, the production process itself and the consequent outcomes in terms of the overall process. This resulted in a search for local resources that could be utilised rather than creating new works entirely. That

Figure 80

View of marae at Marae Taputapuātea, Ra'iātea

Note. The main *Marae Taputapuātea* is at centre. *Marae Haurivi* is upper centre – this is the investiture marae for the Tamatoa lineage of paramount Ariki. The small marae on the beach front to the right of *Haurivi* is *Ōpū-teina*, the Kaiwhakatere navigator marae. To the right of *Ōpū-teina* across a small stream are several copse of trees: the furthest upper right copse of trees (not the single tree at the shoreline) is the site of the marae where the *Ra'iātea* Kōhatu was placed. Digital photograph by the artist-writer.

approach aligned with what Maata Wharehoka (see page 129) related regarding Indigenous approaches to locality and resources: utilise what is in the local environment.

Utilising Kōhatu spoke backwards in terms of engaging with ancient approaches to making items within visual culture, and forwards in terms of utilising the electronic art process of laser etching designs. There is a sense, therefore, in which the relational aspects of the Vā impacted the project as time extended from the distant past to the current day. When the imagery on the stones is taken into account there is a relationship once again to ancient times: to species on the *Kōhatu Ra'iātea* with its humpback whale design; and to cultural identity and whakapapa in the form of moko or tattau in the the Tahitian sunrise pattern of *Hawai'i* to be placed on Kapukapuatea marae.

Here we can experience the Ngaru Whenua practice of overlapping wave patterns as we see across from the past to the present; from ancient North African visual culture (the Kōhatu for Taputapuātea Marae Aotearoa has the "Seed of Life" image etched on it) through to Moana culture; and from Indigenous Creative Practice through to contemporary Western approaches.

Figure 81

Marae Tau-ʻaitū or Hititai

Note. This marae is the location that Rāhui (prohibition of certain practices) are expressed. Digital photograph by the artist-writer.

As part of the process of selecting the rocks from the Waiwhakaiho awa (river), recognition was given to due process in Indigenous and Moana practices through the expression of whakatauki, a chant and karakia. This involved utilising three languages: Hawai'ian, Reo Māori and English – symbolic of the reconstruction of identity that has needed to take place for me. Note that Electronic Art Practice has not been abandoned completely, but here exists in a balance akin to Ngaru Whenua looking through one to the other.

What did change utterly is the container of the artwork, in other words the preparation process of the works, the realm of who experienced them and where. Rather than being placed in the separated confines of an art world gallery, the Kōhatu works were instead embedded within Indigenous Cultural Practices, acknowledging sacred process. Integrating a process of relationality led to the complete abandonment of the subject-object distinction as fundamental to Creative Practices.

Figure 82

Marae Ōpū-teina, Kaiwhakatere (navigator) marae

Note. Marae Ōpū-teina, located right on the shoreline, is the marae from which navigators would depart. To the right of the palm tree is the place where waka (canoes) were brought up on shore for repairs and maintenance. Taputapuātea Marae on Ra'iātea, is regarded by some as the most sacred site in Te Moana Nui a Kiwa. It has maintained its mana or integrity to the current day. Digital photograph by the artist-writer.

Figure 83

Kōhatu Ra'iātea

Note. This is the Rose of Whales pattern etched into Kōhatu and bound by Kim Kahu. The kōhatu were selected from the Waiwhakaiho Awa (River) with appropriate karakia (prayer, incantation, chant). Clothier, P. & Kahu, K. (2022-2023). *Kōhatu Ra'iātea* [Kōhatu (river stone), laser etching, harakeke and kereru feathers]. Digital photograph by the artist-writer.

Figure 84

Kōhatu Ra'iātea Detail A

Note. The Kōhatu is bound with muka that has whakapapa, as it is from harakeke (a type of flax) distributed by renowned weaver Diggeress Te Kanawa. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Ra'iātea* [Kōhatu, laser etching, harakeke and kereru feathers]. Digital photograph by the artist-writer.

The Kaupapa (protocols, processes) around the placement of the Kōhatu at Taputapuātea Marae were remarkable. In essence, it is important to take great care when entering the realms of Tapu and Noa. That is because the energies involved are immense and there is a duty of care to all present. The way to enter and leave involves certain actions and the use of voice or sound, to first invoke and then close off to the Sacred.

The ritual was led by Tihoti, a Tohunga (Priest) based on Taha'a, an island within the same reef as Ra'iātea. He instructed me to remove the binding, as he felt the Kōhatu would be stolen.

Figure 85

Kōhatu Ra'iātea Detail B

Note. Laser light etched the Kōhatu, revealing the inner grain of the stone. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Ra'iātea* [Kōhatu, laser etching, harakeke and kereru feathers]. Digital photograph by the artist-writer.

Taking into account the talents and abilities of those present, he formed an extraordinary ritual. We began in silence near the marae he led us to (there are at least eight separate marae at the site, all with different purposes).

In attendance were two teenagers from the Marquesas – Lucas and Jean-Rene from Fatu Hiva who gave me an incredibly powerful haka. Then three people – Eliska, Osden and Tihoti – sounded the pu or conch shell as I walked to the small marae (together, we were twelve people).

Figure 86

Kōhatu Ra'iātea Detail C

Note. Open weaving is a second means of preserving the character and integrity of the Kōhatu. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Ra'iātea* [Kōhatu, laser etching, harakeke and kereru feathers]. Digital photograph by the artist-writer.

I had asked my hosts Vetea and Vaiete to attend with their children Osden and Oro – Osden, who is perhaps seven years old, blew the shell very well. Ti hoti opened up the space of Tūpuna and Te Pō, and also used a long *puoro* (nose flute). Teuarangi who is from Ra'iātea, and friends Eliska, Devi and Martjin (all of European origin) placed offerings on the marae: leaves of auti from which leis are made, and hibiscus flowers. The day prior in a meeting to discuss protocols, Tihoti had asked that I introduce myself to Tūpuna and say why I was there. I opened with the Hawai'ian whakatauki given here in the final chapter, then the Kahuna navigation chant in English (given in Chapter One), then the Karakia contextualised by Te Huirangi Waikerepuru to

Figure 87

Kōhatu Ra'iātea Detail D

Note. A view of the underside. Customary display techniques in Western galleries for such objects often do not account for all sides to be viewed. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Ra'iātea*. [Kōhatu, laser etching, harakeke and kereru feathers]. Digital photograph by the artist-writer.

Taranaki (which he handed out freely in Reo and English, and is given in the final chapter) and the whakatauki (saying) "Te tōrino haere, whakamua, whakamuri" (At the same time the spiral is going forward, it is returning) given to me by Wairere Pene.

Figure 88

Kōhatu Ra'iātea Ewe (Placenta, Afterbirth)

Note. The Tohunga Tihoti told me to remove the binding for the *Kōhatu Ra'iātea* as otherwise it would be taken. I later realised that I had the ewe or placenta of the Kōhatu, which will be buried close to its site of origin. Clothier, P. & Kahu, K. (2022-2023). *Kōhatu Ra'iātea Ewe* [Harakeke and kereru feathers]. Digital photograph by the artist-writer.

First I acknowledged the sacred and beautiful place of Marae Taputapuātea and then the Kaitiaki and Tohunga that had maintained the Mana of the Marae for a thousand years. I introduced myself in Reo as an 8th generation descendant of tapa makers from Huahine and Tahiti, as an artist-writer, and gave my three names – Paku'iku'i (given to me from Kumu), Pasha, and Pasha Mahuto'a Clothier. I spoke of the Kaiwhakatere (navigators) who had walked these shores – Sir Hekenukumai-nga-iwi Busby, Nainoa Thomson, Mau Piailug, Kupe and Turi, and pointed to the landscape connected to Hiro when I mentioned his name.

Then it was the purpose, which is part of placing Kōhatu on Hitiaurevareva, Taputapuātea Ra'iātea, Hawai'i, and Aotearoa. As I was touching the untouchable and sensing the invisible, I

Figure 89

The site of the awa where the Kōhatu was selected for return to Aotearoa

Note. The awa closest to Marae Taputapuātea, where the Kōhatu for return to Aotearoa was selected. Tihoti stated (personal communication, 2023) that this is the traditional site for selecting kōhatu from Taputapuātea. Digital photograph by the artist-writer.

talked of carrying these energies on my Rainbow Bridge journey which would take me far from these shores, and mean I would be touching and sensing energies not of this place, as I took part working alongside many others in raising consciousness in the West, my next great journey.

Tihoti had instructed that I placed the Kōhatu firmly, so I held it aloft with both hands then planted it on the marae. I sang a short waiata and then Tihoti closed off the ritual. Two Otaha, or Frigate Birds, flew around the space of the marae. We walked in silence until we crossed a small stream, then everyone embraced and hugged while still bathed in the energy. It was sacred and beautiful, the penultimate moment of the project and the encapsulation of all the embedded practices and approaches that had occurred prior. The Tohunga had requested no photos or video of the ritual, and for all to be as natural as possible.

Afterwards, we went to a local awa (river), which Tihoti said was where Kōhatu that were to be taken to sites throughout Te Moana Nui were selected. So after placing a Kōhatu on Taputapuātea, Tihoti opened a space for me to select a Kōhatu to bring back with me: in certain contexts, this is the highest honour that can be awarded to a person from Te Moana Nui.

Figure 90

The Kōhatu selected for return to Aotearoa

Note. The Kōhatu for return to Aotearoa, which is larger than the three Kōhatu for placement on Taputapuātea sites – it is 15cm wide by 19cm high and weighs 6kgs (the others are smaller – *Hawai'i* is 16cm wide by 13cm high and weighs 3kgs). The image above has been blurred deliberately, as the identity of the Kōhatu has not been fully resolved at the time of writing. Digital file by the artist-writer.

The Kōhatu project in its full context and processes is put forward as an exemplary instance of counter-Anthropocene strategy in a process that also collapses the subject-object distinction into a relation of reciprocity. This reciprocity is expressed in the ritual processes associated with all projects that engage Tūpuna, and in the project framework.

Figure 91

Kōhatu Hawai'i

Note. This is the Tahitian sunrise moko pattern etched on to Kōhatu and bound by Kim Kahu. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Hawai'i* [Kōhatu, laser etching and harakeke]. Digital photograph by the artist-writer.

This Kōhatu will be placed on Kapukapuatea Marae, Hawai'i at some time in the future. The third Kōhatu for Taputapuātea Aotearoa was buried on February 9th 2024.

Figure 92

Kōhatu Hawai'i Detail A

Note. The colour of the etched stone depends on the stone itself, and varies. The Kōhatu were all collected on the banks of the Waiwhakaiho with appropriate whakatauki (sayings), the navigation chant given in the beginning and a traditional karakia edited by Te Huirangi Waikerepuru to be suitable to Taranaki. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Hawai'i*. [Kōhatu, laser etching and harakeke]. Digital photograph by the artist-writer.

Figure 93

Kōhatu Hawai'i Detail B

Note. The idea of binding of the Kōhatu was a strategy wayfound by intuition, and one I am grateful was respected. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Hawai'i*. [Kōhatu, laser etching and harakeke]. Digital photograph by the artist-writer.

Figure 94

Kōhatu Hawai'i Detail C

Note. This aspect can only be seen when the Kōhatu is turned, reflecting a form of knowledge acquisition that is dimensional. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Hawai'i*. [Kōhatu, laser etching and harakeke]. Digital photograph by the artist-writer.

Figure 95

Kōhatu Hawai'i Detail D

Note. Looked at from underneath reveals a completely different view, allowing the natural Kōhatu to speak. Clothier, P. & Kahu, K. (2022–2023). *Kōhatu Hawai'i*. [Kōhatu, laser etching and harakeke]. Digital photograph by the artist-writer.

Figure 96

Kōhatu Mauri

Note. This Kōhatu has become my Mauri stone. The binding is an unfinished structure made by weaver Tree MacLeod before she passed. It has been preserved by poet Patsy Turner – both are long-term friends. In terms of relationality and dimensionality, Tree made a flower headband for my marriage to Mari. The binding used here forms the base structure of a flower headband, this is also part of my Moana culture in which flower headbands are still worn. Dimensionally, this is a range of living and dead, with direct access to species in the use of raukura (feathers). This Kōhatu is large, and weighs nine kilograms. Clothier, P. & MacLeod, T. (2016-2023). *Kōhatu Mauri* [Kōhatu, laser etching, binding with Kereru, Toroa (Albatross) and Mallard feathers]. Digital photograph by the artist-writer.

Figure 97

Kōhatu Mauri Detail A

Note. Between the two upper right Tohorā is a small va'a motu – a twin sail, doubl-hulled, Tahitian island-hopping canoe. Barely visible at upper left is a small Catalina aircraft, the type in which my parents flew across Te Moana Nui a Kiwa in the early years of their marriage. My father had a lifelong affection for the Catalina, and one is parked at Ngāmotu New Plymouth airport. Clothier, P. & MacLeod, T. (2016–2023). *Kōhatu Mauri* [Kōhatu, laser etching, binding with Kereru, Toroa (Albatross) and Mallard feathers]. Digital photograph by the artist-writer.

The Kereru feathers used in this work are from my collection from twenty years of finding. In 2023 I found a recently deceased Toroa (Albatross) in suburban Ngāmotu; and the Rakiraki (Mallard Duck) on a recent trip to see Patsy Turner. I found the Toroa and Rakiraki after birds alerted me – a Tui and a Kārearea (Falcon) respectively.

Figure 98

Kōhatu Mauri Detail B

Note. The underside of the Kōhatu has a red Otaha (Frigate Bird), made in the studio using red pigment in a plant-based medium. Two Otaha visited the Marae where the Kōhatu was placed on Taputapuātea Ra'iātea, at the end of the ritual. Clothier, P. & MacLeod, T. (2016–2023). *Kōhatu Mauri* [Kōhatu, laser etching, binding with Kereru, Toroa (Albatross) and Mallard feathers]. Digital photograph by the artist-writer.

6.6.7 Anthropocene Experiments

Figure 99

Anthropocene Experiment A

Note. The black circles were painted during the workshop by Monique Jansen (2022) part of *Te Waituhi ā Nuku: Drawing Ecologies*, a collaborative team led by Huhana Smith. This was part of the *Te AU: Liquid Constituencies* exhibition at the Govett-Brewster Len Lye Centre, which opened on December 2nd 2022, at the same time as *Kāhili* was blessed [Upcycled coffee bean sack, Parihaka biochar pigment, archival pigments in cellulose-based paints]. By the artist-writer.

The Anthropocene Experiments were prompted by considering resource usage, environmental impacts, and the relationality discussed in Chapter Five. A workshop led by Monique Jansen (2022) involved painting on upcycled used coffee sacks, using biochar made at a Parihaka workshop as the source of black pigment for making cellulose-based black paint seen above. A key factor of these works has been articulating the imagery and not covering the entire

Figure 100

Anthropocene Experiment B

Note. The materials used were Kōhatu (river stone), Parihaka biochar pigment, Taranaki umu-fired earth pigment, in cellulose-based paints. By the artist-writer.

background with plant-based paints, similar to the imagery laser-etched on to Kōhatu described in Section 6.6.6. Figure 100 uses some of the same biochar, mixed in the studio with the same paint medium for the black star. Heated-earth red pigment locally sourced was used for the Otaha (frigate bird) based image above.

To make the heated pigment, I constructed an umu (earth oven) following advice from Aotea Kaumatua Ken Fortzer (2023, personal communication) to select river stones on the full moon. I cooked chicken thighs sitting in paua shells, then burnt the yellowish earth pigment in other paua shells before dowsing the fire to create biochar. The resultant charcoal is used for pigment or dug into the garden, thereby sequestering the carbon. In some ways, this process responds to the challenges laid down in "Section 6.4: Next Generations," and I persist with the practice of using local pigments and cellulose-based paints for interior Kōhatu works, which also aligns with lessons from Maata Wharehoka about using local materials and counter-Anthropocene approaches.

6.6.8 Images for Gifting

Figure 101

The Fingers of Mahuika, 2021

Note. By the artist-writer. Included in gifted images are Figure 25, Tekoteko detail and Figures 77 and 78 *Matariki* and *Puanga*. Although gifting images is common artistic practice for friends and family, it is highlighted here due to the intentionality of incorporating non-financial strategies into creative activity, and to reciprocate in the Moana and Māori sense by carrying koha. Digital photograph by the artist-writer.

The notion of gifting art is not new. Artists such as Ralph Hotere (1931–2013) were well known for giving works to studio visitors if he sensed the visitor has a special connection to the work. Gifting prints and drawings applies across the cultural border, something Western artists do. What is perhaps different here, is that the notion of gifting is contained within the trajectory reconciling the project with the Anthropocene.

Figure 102

Taranaki, 2023

Note. These cloud forms have similarities to flow patterns seen in fluid dynamics. Digital photograph by the artist-writer.

Figure 103

Light over Back Beach, 2020

Note. Note the scale provided by the sole surfer. Digital photograph by the artist-writer.

6.7 Summary

In this chapter we have journeyed through a wayfinding experience, using the insights attained by a Ngaru Whenua Diffractive Method informed by whakapapa. We saw whakapapa diffracted with whales; Kōhatu (including geological specimens) with vinyl images; images of Tūpuna with reflections; and plants diffracted with works of culture by whanau on Hitiaurevareva.

There is a sense that the journey through which I have navigated began in times past, when a Kōhatu from the sacred site of Taputapuātea on Ra'iātea would be taken to sites around Te Moana Nui a Kiwa to commence a new marae in the chosen location. This is a journey that continues into the future with my daughter Kohana, a journey in which I found myself located in a web of spacetime, an ocean of the mind-body, and on Te Whenua o Tūpuna (land of ancestors). The consequences of all of that came before emerged in the creation and curation of works. That included *Arawhiti Āniwaniwa (Rainbow Bridges)* and *Black Holes*, a one-person and whanau presentation at Aotea Utanganui Patea Museum, the project website and a five-year commission at the Govett-Brewster Art Gallery. The penultimate expression of the impact of Indigenous Practice on creativity was an activity that involved the selection and placement of an etched Kōhatu on the sacred site of Marae Taputapuātea on Ra'iātea, followed by the gathering of a Kōhatu for the return home.

Chapter Seven. Finale: Waves in an Ocean of Ideas

7.1 Islands in the Diffracted Ocean

7.2 Summary

Finale Waves in an Ocean of Ideas

Ngaru Whenua Diffractive Method involved asking questions on diverse topics: do these waves of knowledge add or cancel? To achieve the pitch and roll of the ocean, additive waves combine to make higher waves or subtract to make deeper troughs. If a wave and a trough meet, they cancel (see Figure 39) and we sit in calm waters, running the risk of being becalmed.

Wave action also served to provide a basis for acknowledging precedence in Moana and Māori knowledge, as seen in navigation practice (see Figures 30–32) and waka hoe (canoe paddle) decoration (Figure 3). It allowed for the diffraction of Indigenous knowledge (Lopesi, 2021; Refiti, 2014; Wendt, 1996) against Quantum Theory (Barad, 2007), based on recognising diffractive patterning in water. Ngaru Whenua Diffractive Method seeded the development of the notion of Knowledge as dimensional, which in turn unleashed Indigenous knowledge from the strictures of colonial and racist Western academic traditions, allowing for a renewed expression of Intergenerational Knowledge as a form of peer review, importantly within in a decolonised framework.

Knowledge in the diffracted ocean gave rise to locating important junctures across cultural borders. This interconnectivity was measured in the Tangata (People) Dimension where Indigenous Practices of relationality (Wendt, 1996; Wilson, 2008) – as central to Moana and Māori awareness – formed waves with Quantum Theory (see Figure 38; Barad, 2007); waves that were constituted of diffraction and the dissolution of the subject–object distinction. Another important wave pattern was formed in the Anthropocene discussion (Davis and Todd, 2017), where countering capitalism, Cartesian duality (Moore, 2014), and relation to species (Haraway, 2016) were viewed as significant. Evidently there are major currents of world thinking, unexpectedly visible across multiple diffracted cultural borders.

There is a sense in which the *Interconnecting: pasha @ patea* exhibition represents an ocean of Ngaru Whenua Diffractive practices, with the dynamism of containment in a space allowing multiple diffractions to occur. Here spacetime collapsed through twenty-first century creativity to two million year-old fossil impressions. The Moana and Māori notion of an interconnected universe (see Figure 1; Hikuroa, 2016) resulted in a multi-dimensional approach to curating. Gone were creative expressions by a singular artist. Species were living in the form of plants, represented in imagery – etched into stone and acrylic, and instantiated in the form of coral and shells. Whakapapa (genealogy) based imagery of tā moko was diffracted against the walls of the museum on the right side of the black wall seen in Figure 53, a literal "seeing through one to the other." Whakapapa was folded through time, with a Hitiaurevareva obsidian sample (a material

that played an important role in Moana trade between 950 CE and 1400 CE) that could be viewed at the same time as my parent's wedding photo.

The importance of relationality to Moana and Māori awareness was given impetus by the dissolution of the subject-object distinction as a function of Indigenous Practices in the Quantum Theory and Anthropocene discussions. In place of the singular artist were objects made by whanau on Hitiaurevareva and Norfolk Island, by my daughter and – following a line of Kōhatu impression – by Māori artist Harete Tito. There were objects my father touched as part of active service in World War Two diffracted against sea shells and corals formed by nature: a community of practice not bound by traditional Western notions of authorship, discipline or category, instead expressing interconnection in a connective web.

The greatest collective impact of wayfinding through Indigenous Practices, Electronic Art and the Anthropocene was felt in the production process of the etched and bound Kōhatu (see Figures 83–98). The Kōhatu were selected in a process acknowledging Indigenous Practices, where thanks are given to te taiao (the environment) for receiving the gifts of stone, with whakatauki (sayings), chants and karakia (prayer) uttered in acknowledgment of the living forces of the environment and Te Taiao (Universe). The Kōhatu were located on the banks of the Waiwhakaiho Awa (river), one of eight main rivers flowing from Taranaki Maunga (Mountain) which all have iwi or hapū (tribal or sub-tribal) associations. The careful actions taken in selecting them honoured Tūpuna (ancestors) and traditions that are pre-colonial in origin, hence are decolonised practices.

The aim of diffracting the Kōhatu process against Electronic Art was not to expel electronics from the creative process but to locate a potential balance between the two: a diffraction of calm. While core electronic components have international sources, Kōhatu were selected for creative activity as it is a material available in the local environment. The etching process involves another form of technology, while the binding returned to the use of local materials and approaches. While the notion of binding was wayfound and hence not the result of speculated rationality, the raranga (weaving) by Kim Kahu revealed an aspect of Knowledge as Dimensional through the articulation of unseen sides: it is necessary to hold and turn the Kōhatu on multiple viewpoints in order to experience the whole. This is seen on the website and in documentation in this text.

These ethical approaches were also given expression in considering *Kāhili* (see Figures 67–70). The singularity of the art work as an instance of creative practice was dissolved into a broader framework where the type of imagery reinforces intuitive actions as exemplified in creative

wayfinding. Just as the subject-object distinction reinforces objectivity rather than relationality, so too does it provide an armature for the kind of relationality that has seen the rape of the environment and women as part of the imposition of capitalist, colonial and patriarchal values on Indigenous Peoples. This is the nexus of issues expressed by and shared across the cultural boundary of Indigenous writers and those in the West when discussing the Anthropocene. It led to utilising visual expression that could be appreciated outside a necessary engagement with rationality; acting intergenerationally through the placement of imagery at all heights, ensuring children have something to see and engage with, and taking part in Family Art workshops and seniors' talks – not as extensions to the art work, but as part of the suite of central motivations in producing the work.

Such was the ocean of creative wayfinding, where waves bounced among troughs, peaks and calm, producing a diversity of creative trajectories that celebrated the interconnection of all things in the Universe through a web of activities. In every ocean there are islands – landforms that interrupt clouds, provide a firmament for habitation, a place to repair and maintain the waka, and a respite from the buoyancy of an ocean that ranges from becalmed to storms of enormous magnitude, made more frequent in the Anthropocene. Following are some of the islands in the diffractive ocean.

7.1 Islands in the Diffracted Ocean

One island is the contention to restore sacred connection to species, including more than human species. Dame Anne Salmond (2018) citing His Highness Tui Tupua Tamasese Ta'isi Efi, head of state of Sāmoa, wrote of needing:

> to adopt a perspective based on *va tapuia*— "sacred relations between humans, animals, cosmos and the gods." He suggested we might think about climate change from the vantage-point of other life forms—a dog, perhaps, the ocean, the stars, trees, a bird or a fish; and explore Pacific worlds patterned by existential interlocks between people and other beings. (p. 155)

In arguing for a tentacular approach based on soft fleshy octopus tentacles, Haraway (2016) goes some way in terms of promoting relation to species. On the one hand she stops short of sacred connection, and on the other, the reference to an octopus as part of a connective tissue of ideas – Te Wheke (The Octopus) as an interconnective model – would be instantly recognisable to Moana and Māori peoples. In the final analysis, re-establishing sacred connections binds anti-

Anthropocene trajectories into a whole, and this sense of wholeness is likely the reservoir that provides the greatest solace and nourishment to humans, more than humans and the environment.

A second island in the diffracted ocean relates to engaging with whakapapa (genealogy) and relationality. Acknowledging our relationality (Hikuroa, 2016; Wendt, 1996; Wilson, 2008) to all things in the universe and engaging in reciprocal relations where the exchange is beneficial to both sides, is extremely important in calming the swells of the Anthropocene. Accepting relationality also contributes to dissolving the subject-object distinction (Barad, 2007; Moore, 2014), freeing humanity to re-engage ethically with the environment, species, and all living things absent of resource-exploitation as the relationship premise. The insight of Knowledge as Dimensional assists by proposing new ways to understand the universe, one unencumbered by past notions of dominance and superiority – including new ways of regarding species. It enables a view of life where everything is interconnected, as if strands of a web joined humans to plants, fish, rocks, rivers, and eventually to the universe. These strands can also be seen as the lines of energy embedded in *Te Hihiri o Te Taiao (Chart of Universal Natural Energies* (Figure 1).

A third island involves understanding interconnection. Interconnection to all things is part of Indigenous Practices, an insight that holds diverse consequences. It will be necessary for artists to understand their interconnected entanglement to the environment and the Anthropocene, and allow all parts of their creative practices to be reviewed from an Anthropocene perspective. Understanding the interconnection of all things releases us from a subject-object framework for understanding life, to one where we become partners in a better future for coming generations: kaitiaki (custodians or guardians) rather than exploiters.

7.2 Summary

We have taken an exploratory, multiple-academic-discipline journey into Indigenous Practices, Quantum Theory, Electronic Art and the Anthropocene; these subjects impact a range of approaches to creating, thinking and researching. On the journey, unexpected Ngaru Whenua wave combinations were found – waves of knowledge that did not cancel but instead could be understood as adding together to make knowledge waves of varying heights and depths. Propelled by the knowledge of Kaiwhakatere (traditional navigators) and utilising an awareness of Knowledge as Dimensional, we have approached the site of bringing Indigenous Practices into dialogue with Western Science in a decolonised framework. As such, this thesis contributes to a range of messages for humanity going forward: connecting with species, whakapapa (genealogy), relationality (including dissolving the subject–object distinction) and

interconnection. The necessity of revising the subject-object distinction as fundamental to reality has a wide Tangata (People) Dimension as now Indigenous writers, Tibetan Buddhists, Quantum theorists and Anthropocene discussants are coinciding around this.

This thesis aims to make it clear regarding the Anthropocene, that fundamental things must change: the first of these is acknowledging Indigenous precedence to the West where relevant, and revising our understanding of the sophistication of Indigenous, Moana and Māori peoples. The second fundamental change is to have the evidence enter widely into academic discourse in order to strengthen the arguments for these positions. This requires incorporating the evidence and precedence into lectures, talks and handouts, and eventually getting the material into classrooms so that people grow up with this knowledge. A third fundamental change is to see knowledge as more than rational deduction – it can be that in part, but for fullness, Knowledge as Dimensional is important, as it was one key to unlocking a decolonised approach inside academic frameworks. A fourth fundamental change is to collapse colonial infrastructures and end the profit motive as the sole determinant of investment: we need to invest in better futures. This must be accompanied by a significant reduction in carbon emissions, something on which very little progress has been made by governments and multinationals, but which we can all participate in.

The way in which you the reader allow these contentions to impact you is up to you to negotiate, to wayfind *your* way through what we know needs to be done, the new evidence for the assertions made here, and a renewed sense of knowledge to carry forward. The journey and process of this project has completely renovated my life and creativity, and placed me on the side of holding a sacred connection to Te Taiao the Universe, with a strong ethical urge to bring about a better place for all, particularly future generations. From the Kaiwhakatere, I have learnt to wayfind in life, something that will never leave me, just as my Tūpuna (ancestors) and daughter will never leave me. By way of concluding remarks, I would like to hand over the authorship and express the three whakatauki (sayings), chant and karakia (prayers) that have been heard chanted in the studio, in daily life, when selecting the Kōhatu, when placing the *Ra'iātea* Kōhatu on Taputapuātea Marae, and in the blessing ceremony for the *Arawhiti Āniwaniwa* (*Rainbow Bridge*) window.

A po ka Lani

A po ka Po

A po ke Ao

[They span across the sky

The Night

The Day][55]

[55] Translation by Kawaihulululani.

Island come, island go
Ocean come, ocean go
Star come, star go
Life come, life go
I sail, I fly
Centre of the Universe

Ko Rangi

Ko Papa

Ka puta ko Rongo

Ko Tane Mahuta

Ko Tangaroa

Ko Tumataenga

Ko Haumietiketike

Ko Tawhiri-Matea

Tokona te Rangi ki Runga

Ko Papa ki Raro

Ka puta te ira tangata ki te Whaiao

Ki Te Ao Marama

Tihe Mauri Ora

[The sky

The earth

The element of sound, senses, peace

Forest

Sea

Defender of community

Bees, moss, vines, wild food

Wind

To separate the sky above

The earth below

Give birth to humankind in the universe

The world of enlightenment, The breath of life][56]

[56] Translation by Te Huirangi Eruera Waikerepuru.

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Appendices

Appendix 1 Previous Electronic Artworks

Following are images from *The District of Leistavia, Haiku Robots*, and *The Parks Speaks* referred to in Chapter Five.

Figure 104
District of Leistavia Crest

Note. District of Leistavia Crest (2004). In *ISEA2004:Tallinn & Helsinki*. Tallinn Art Hall Gallery, Estonia. Vinyl graphic by the artist-writer.

Figure 105
Haiku Robots installation view

Note. The live word list output reads “day prow sled lip. eyed slid ad.” Further information is at https://ianclothier.com/haikurobots. Haiku Robots, 2009. In *Taranaki culture: Fresh out of the box*, Puke Ariki. Photograph by Bryan James.

Figure 106
The Park Speaks data point locations in Pukekura Park

Note. Photos by the artist-writer. The temperature sensor is at left, the people counter at centre (a beam is broken so there is a corresponding unit not in shot) and the UV measurer at right.

Figure 107
The Park Speaks video installation in Puke Ariki Museum

Note. Above is a frame from one of the videos played in the installation, which shows a 360 degree shot of the lake at the centre of the park. An automated voice provided spoken phrases related to the data received. The installation included ambient park sounds, and several moving image videos were displayed as one desktop spanning two projectors. Screen image from the video by the artist-writer.

Appendix 2 Map of the Project Area

Figure 108
Map of the project area

Appendix 3 Overlapping subsystems (Complexity) as a model for artworks

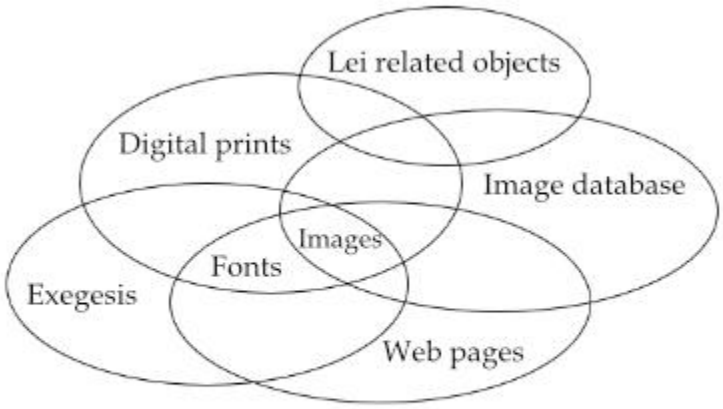
Figure 109

Media structure of an exhibition of framed paintings

Note. The singularity of tradiotnal media is apparent, and constrasts to the Figure below.

Figure 110

Diagram of the media project of HC : N : CP



Note. The clustering of media, and partial mirroring is evident in the above diagram. Centrally located is 'Images,' reflected in 'Image database,' 'Digital prints' and on 'Web pages.' 'Lei related objects' (e.g. an armchair covered in leis) intersect the 'Image database' and 'Digital prints' in the exhibition. This type of model for an artwork or any type of project for that matter, would be referred to as a model of complexity, a context for interdisciplinary practices in contemporary universities.

Appendix 4 Collaboration Forms for Significant Collaborations

Co-Production Declaration For a Format Three PhD

The Candidate

Name of the PhD candidate: Pasha Clothier

Role in the co-production of the Candidate: Customising fluid dynamics software

The Co-produced Work

Please specify the artistic component of this thesis that has involved co-production or creative collaboration and the title and public presentation details of the co-produced work.

Title: *A computer model of flow*

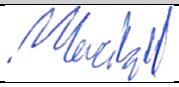
Date of production: 2022-2023

The Co-producers

Name	Nature of Contribution and how you would like it attributed (ie sound recordist)	Name of Organisation
Michael MacDonald	Set up and ran a fluid dynamics simulation of a von Kàrmàn vortex street, with coloured smoke to generate a fluid kowhaiwhai pattern. Presented this work alongside Pasha at the Fluids in New Zealand (FiNZ 2022) workshop and the Balance-Unbalance International Conference (2022). In this work, Pasha was responsible for conceptualisation, investigation and interpretation. Michael did the software, validation and visualisation.	University of Auckland

Certification of Co-producers

The undersigned hereby certify that the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the collaborators.

Name	Signature	Date
Michael MacDonald		06/02/2024

Co-Production Declaration For a Format Three PhD

The Candidate

Name of the PhD candidate: Pasha Clothier

Role in the co-production of the Candidate: Raranga

The Co-produced Work

Please specify the artistic component of this thesis that has involved co-production or creative collaboration and the title and public presentation details of the co-produced work.

Title: *Kōhatu Ra'iātea, Kōhatu Hawai'i, Kōhatu Aotearoa*

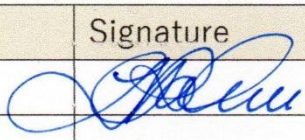
Date of production: 2022-2023

The Co-producers

Name	Nature of Contribution and how you would like it attributed (ie sound recordist)	Name of Organisation
Kim Kahu	Tieing in the spiritual aspect of Raranga Ki te whenua through the art of weaving	N/A.

Certification of Co-producers

The undersigned hereby certify that the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the collaborators.

Name	Signature	Date
Kim Kahu		27-02-2024