Technē and Indigenous Exosomatic Memory: Heidegger, Stiegler, and Cutting the Gordian Knot of Modernity

Ruth Irwin and Te Haumoana White

1 Worlding as Technology

Heidegger describes 'thrown-ness' as the already existent world into which we are thrown (1927/1962). People learn to navigate the world they are thrown into because of the way others casually use tools. The table is not used as a raft, but rather an upright object that holds other objects aloft. These corporeal interactions often require no language and yet they form the basis for shared cultural understanding and values. The ordinary, adept creation and use of objects, tools, and craft was called *technē* in Ancient Greek. Language, and the names for communal interpretation of things and events, evolve over generations in tandem with these shared, phenomenological, understandings of the world we are thrown into.

Our bodies interact with technologies, accentuating some senses above others. Heidegger noticed that sight is privileged in *modern* technologies, through the telescope, the microscope, the camera, the screen. We can magnify sight and sound to an amazing extent, making it possible to perceive subatomic particles in particle accelerators, to view the universe unhindered by the atmosphere through telescopes like Hubble, and visit the ocean depths in submarines that cope with enormous pressure. These technologies have expanded our understanding of the universe, reaching into arenas that humanity has never perceived before.

Heidegger argues that technologies shape, and are shaped by, perception and experience. *Technē* shapes the way we understand the world we are thrown into, even as they expand the frontiers of knowledge as never before. As technology changes our depth of knowledge about some things, it also flattens and obscures the

R. Irwin (✉)
RMIT University, Melbourne, Australia

T. H. White
Poutama iwi, Mokau, Aotearoa, New Zealand

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vibrancy and meaningfulness of older, more originary relationships with our phenomenological experience of the external milieu. The fluid cold ocean currents and deep ocean pressure do not impact our breathing (increasing anxiety) or inadvertently carry our body far from an original dive point, when we are viewing the ocean floor on a remote camera screen. Technology changes the phenomenological experience from immediate, multisensory and multi-dimensional to two dimensional images and datafication.

As new technologies reveal new ways of knowing, Heidegger argues that older understanding of knowledge becomes 'forgotten' (1935/1973). The determinism of the scientific mechanics of the universe tends to silence other forms of understanding the world and deepens the alienation between modern humanity and other species, geologies, and strata in the ecological surroundings.

Heidegger (1977) argues that modern *technē* enframes the way that people think. He calls this the technological *Gestell,* or enframing of thought. Modern *technē* is fundamentally different from earlier kinds of cultural technology. Heidegger's work on the enframing of thought, or the *Gestell*, is vitally important to understand why we are so trapped in the progressive ordering/entropy of the Anthropocene. In 1956 Heidegger wrote *The Question Concerning Technology* where he argues that the 'essence' of modern technology has changed significantly from earlier culture (Heidegger 1977). In modernity, the essence of technology 'is nothing technological'.

Earlier cultures had allowed the pace of seasonal change, the natural fall of the river, or the rate of domesticated animals procreation to dictate the rate of production and consumption. These parameters shaped culture and population. In modern times, something profoundly new emerged, which changed the pace of production from one set by seasonal flows, to one set by consumer demand. Heidegger argues that when this transition occurred, *everything* began to be understood as potential reserve, waiting for consumer demand. A river was no longer a water channel, but potential electricity generation. Mountains are reserves of timber, copper, zinc, gold, and other precious metals. People are 'human resources' waiting to be called into the machinery of consumer production. The outcome of this shift in mindset has been a deep alienation of people from the pace and needs of their locale.

Ecological damage goes unrecorded, and if it is noticed, it has been difficult to get newspapers and other media, or major corporations and governments, to register the problems sufficiently to regulate them. The cost-benefit exercise has dominated the discourse of modernity and ecological concerns were an externality to those calculations until very recently. However, other than during the first Covid-19 global shutdown in March – July 2020, there has been no reduction in greenhouse gas emissions.

2 The Anthropocene and the Entropocene

The Anthropocene is a new geological era, that is marked by a new geological strata of micro-plastics which can be found as a layer in the highest mountains, the furthest reaches of the polar circles, and the deepest ocean trenches. The atmospheric changes caused by greenhouse gas emissions, the resource exhaustion and pollution, and the largest extinction event since the dinosaurs died out millions of years ago, all mark this new epoch, dubbed by the Royal Society, as the Anthropocene. No part of the planet, and no human culture, whether they are involved in consumer culture or not, are exempt.

The Anthropocene can be seen as a type of entropy. Entropy is a 'law of nature' that emerged from chemistry, where if two molecules are allowed to mix, they will intersperse until the heat of all the atoms are evenly distributed throughout the available space.

Modernity is characterised by the ordering of order, or the reorganising of raw materials into technological artefacts that are then distributed worldwide by global marketing, production, assembly, shipping and consumption. Much of this accelerated 'development' was powered by cheap and abundant fossil fuels. Soddy (1926) and Georgescu-Roegen (1971) describe this acceleration of raw materials into widely distributed production, and then waste, as an accelerating economy of entropy. Economic growth is entropy by another name.

Alienation and technological acceleration are at the centre of the Anthropocene. Over a hundred years of pouring carbon dioxide into the atmosphere has increased the greenhouse gas effect. Other human-made chemicals, along with the immense damage to biodiversity when mining the raw materials out of the earth, and the failure to consider waste during the design or manufacture of consumer goods, have created widespread destruction of ecological niches all over the planet. The complete disregard for sustainable logging, and industrial agricultural practices based on nitrates and toxic pesticides has decimated soils, forests, and wildlife habitat. While small, localised improvements have been created (UN Decade of Biodiversity) on the whole, extinction and pollution is accelerating (Ripple et al. 2020; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services 2019). The Anthropocene can be understood as the rapid disintegration of planetary ecology into cascades of entropy and disorder. As Stiegler puts it, the Anthropocene is more accurately described as the Entropocene (2018).

This is a type of 'progress' gone devastatingly wrong. But rather than remain caught in the enframing of modernity, Stiegler suggests we need to seek a negative entropy, or negentropy as an antidote, or pharmakon to reverse the worst impacts of the accelerating Anthropocene.

In response to the dystopian eschatology of the entropic Anthropocene, Stiegler coined the term, the Neganthropocene. Negative entropy is not a well worked out concept, but the idea is similar to photosynthesis, which takes the entropic light of the sun's radiance and converts it from heat into photosynthesis. This reverses the tendency towards a general heat equilibrium of the universe and converts that energy

into nutrients for the plant. Stiegler hopes that just as toxins in small doses can have pharmaceutical health benefits, there might be ways of taking broad entropic frameworks such as the acceleration of technology and repurposing it, in small doses, towards a neganthropy. But thus far, the ideal of neganthropy has not fundamentally shifted the modern enframing of thought elucidated by Heidegger, which continues to dominate the modern way of understanding everything. Most communities are subsumed in the modern enframing of thought, and certainly all people, all species, and the hydro and atmospheres are impacted by the Anthropocene.

3 Exosomatic Memory

In a remote village, in the most remote island nation on the planet, Te Haumoana waves his hand towards a steep ridge of straggly trees that scatter up the steep ridge, across the road. 'Those are the Tainui trees.' The grove of ordinary looking bushes glimmer in the westerly evening sun. 'They came here on the Tainui canoe.' 'What??' For Ruth, this was startling. How could those bushes arrive a thousand years ago on the Polynesian voyaging ancestral canoe, the *Tainui*?

This deceptively simple discussion took place in December 2019, when Ruth was in New Zealand and stayed with Te Haumoana for an extensive interview on Māori philosophy and politics (Irwin and White 2019). Our conversation, and this written collaboration, is one between Māori and Pakeha because Te Haumoana is Rangitira of the Poutama tribe, and grandson of the famous 'renegade', Te Oro, and Ruth is sixth generation settler of Irish descent. Ruth's Irwin's family have silenced their complicity in the land wars, which ravaged Te Haumoana's tribe in the 1860s, but no doubt Irwin ancestors participated in these outrages, somewhat further north, in the Waikato.

From Ruth's perspective, my own indigenous Celtic origins are held mistily, perhaps mystically, but really I mean through a fog of half-forgotten gestures and sayings, and a fierce post Christian, and entirely irrational, internalised family antagonism to 'alternative' knowledge, especially meditation, herbalism, or anything that might once have been associated with witchcraft. This active obliteration of our Pagan Celtic roots has in part thrown me back on my Kiwi heritage, growing up with Māori community, the stories, games, language lessons, visits to Marae, and as my interest has developed, I feel incredibly grateful to have gained so much insight through the generosity and wisdom of *mātauranga* Māori; the Māori way of knowing.

For Te Haumoana, this conversation is part of sharing and propagating a better relation with ecology, to disrupt the alienation and antagonism of modern genocides against people and places. His active resistance to new road building through Mt. Messenger, through the courts, social media, and in protests are further examples of leadership, *kaitiakitanga* (caretaking) and public educative engagement.

The story accepted by early European historians was that Māori arrived in New Zealand in the Great Fleet, of seven great ocean voyaging canoes, of which the

Tainui was one. Most tribes trace their genealogy, or *whakapapa*, back to one of these seven canoes, although some tribes claim earlier antecedents, including Poutama, and when Ruth was living in Fiji, locals laughed about continuous visits to New Zealand 'to go raiding'. On its first exploratory voyage, the *Tainui* stopped at various points along the west of the North Island; Kawhia, Raglan, Mokau, as it explored down the coast for good places to settle. Mokau is where Te Haumoana lives, and it is a very old settlement which is proud to host the enormous anchor stone of the *Tainui* canoe, now safely ensconced in a concrete plinth so it cannot be stolen by marauding European museums.

Te Haumoana explained that the enormous, ornately carved prow of the canoe, and the running boards, are all bound onto the dugout hull with vines or *muka* (cf. Johns et al. 2014), were coming loose after their long ocean journey. Somebody pulled the twine out to replace it, and it struck where it was put in the ground, establishing the first grove of Tainui trees (Te Haumoana White, personal communication, December 2019).

Mnemonic devices like the Tainui trees saturate the landscape. Everywhere Te Haumoana and Ruth go are similar stories; the slow growing nikau palms, which Ruth had always thought were endemic, are particularly tall and old in the valley behind Mokau village. Te Haumoana tells the story of how they came here with the earliest Polynesian settlers, and they mean 'no coconut'; *ni* is coconut and *kau* is no. Presumably this palm was important for thatching houses and other uses. It makes sense that these plants also arrived with Polynesians, because New Zealand has no other palm trees. The landscape is full of narrative, creating a living worldscape of meaning.

The Tainui trees tie the locals to the technology of the great ocean going, voyaging canoes. They tie people to a world understood as an ocean full of islands, with the skill of steering the fastest boats in the world via the stars, ocean currents, knowledge of birds, driftwood, cloud formation, and other natural events, which 'point' the canoes towards land, even when it is invisible over the horizon (Lewis 1972; Irwin 2008). Natural events are a rich tapestry of indicators through which the world is knowable. The *technē* of nature constitutes the 'always-already' world which pre-exists each individual (Heidegger 1927/1962).

Techniques of memory are entwined with environment and epistemology. The stand of Tainui trees recalls the origin story for the tribe, where ancestors travelled from Ha'awai'iki, and the trees tie the locals to their ocean and landscape, culture, history and knowledge of the ecological context. Another name for the Tainui trees is Kumarahou, and it is an important medicinal plant. Somewhat astonishingly, Te Haumoana later told Ruth that when he looked up its Latin name on the Internet, he discovered that *Pomaderris apetala* is not from Polynesia, but actually originates in Australia. These trees add to hints of recurring Polynesian visits to the ancient Aboriginal 'grandparents' of indigenous peoples (Susan Moylan-Coombs, personal communication, 2020).

4 The Phases of Exosomatic Memory

Memory is crucial to the generation of thinking and identity. Episodic memory is normally associated with the individual. Following Alfred Lotka, Leroi-Gourhan, Heidegger and Derrida, Stiegler expands memory from the individual to examine how communities and societies leverage memory as cultural transindividuation. Instead of immediate experience or one-on-one knowledge transfer, exosomatic memory duplicates knowers across the eco-social milieu and anyone already initiated into the worldscape of semiotic meaning can explain this to a new learner.

This takes the emphasis off individual memory and thus individual education. Instead of educational testing aimed at the individual accreditation and vocational added value (Marshall 1996, 1998), exosomatic memory is a systems approach. The narrative level of comprehension is attached to technological objects and methods of communication. It is both the content of meaning and the systemic substructure that the content attaches to. Subjects and 'objects' are always in relationship.

In the literature, exosomatic memory is traced back to the earliest artefacts, or 'signals' that externalise knowledge into the materiality of things. These artefacts, including adzes, arrows and cave paintings, allow ideas to pass across generations, partly through immediate experience and practice, but also through phenomenological, affective apprehension of the artwork or technology (Leroi-Gourhan 1945). Interpretation of the written word, or the artwork, is not static but is generative, as it proliferates and evolves in interpretation (Derrida 1978).

De Saussure's early work on structural linguistics is an important contributor to this debate. De Saussure argued that there is a big difference between the fluidity and double checking of 'parole' or speech, and the (mis)interpretive power of reading the written word (1916/1966). There is a 'black box' of interpretation between the intention of the writer and the way the reader comprehends it. Whereas, while there are often failures of communication in speech, it is easier to attend and correct these misreadings, in an organic, embodied, almost self-correcting way with the immediacy of sending and receiving of speech and gesture.

In the wide-ranging discussion about 'the Death of the Author' Barthes (1977), Derrida (1978), and Foucault (1998) carefully delineate how the 'representation' of meaning resides in a dynamic system. At once meaning emerges from multiple sources; in the underlying grammar, the author's milieu of ideas circulating when the author set down their ideas, as much as the author's intent, and also in the physical context and deportment, and active, historically contextualised agency of reading. The text has a life of its own, changing in interpretation as words fill with new nuances, and the concerns of the day contextualise how the text is read in unfolding ways. Barthes argued that writing cannot be attributed to the creative genius of a sole author, but instead is a communal practice of dialogue where interpretation of ideas emerge along with new understandings of historic discourse, and where some meaning falls into forgotten crevices as the modern world abandons all sorts of elements of the past.

The literature tends to assume a 'progressive' periodisation of exosomatic memory; starting with stone age tools, artwork, upright bipedalness, gesture, faciality and language (Leroi-Gourhan 1945). Stiegler calls this a cinematography of exosomatic transindividuation. The second phase comes with writing, where ideas are 'represented' through art and script. The printing press increased the range of this representational phase. The 'simulacra' (Baudrillard 1983) of the Internet is the third phase. Stiegler argues that cybernetics introduces a new, passive approach to the screen, defined more by donating attention span than to critically thinking. Following Mark Poster (1993), James Marshall traces three distinct phases of exosomatic epistemology.

> First there is face to face and orally mediated exchange; second there are written exchanges mediated by print; and finally, electronically mediated exchanges … Meaning, in the first stage of meaning, is characterized by symbolic correspondences; in the second stage, by representation; and in the third stage, by simulation. (Marshall 1996: 273)

Stiegler characterises the grammartisation of different visual and written technologies as a periodised exosomatic memory, that enables learning to transcend the immediacy of experience and take place by subsequent generations. Following Leroi-Gourhan (1945), Stiegler cites cave paintings as a 'cinematic' example of ideas transferring from one to another without direct conversation being necessary. This enables modern humans to presume they enter the same conversation.

Leroi-Gourhan was fascinated with the evolution of thinking that could be found in the ancient surviving artefacts of Palaeolithic *homo sapiens*, and in the interconnection of bodily comportment, technology, and environmental milieu. Leroi-Gourhan argues that memory, language, and epistemology emerge with the evolution of *homo sapiens* into upright bipedals. This brought the face into view, allowing gesture and speaking to become more visible, and freed the hands for complex grasping. With faciality and hand facility, he argues, the cortex could evolve, and technology and language begins to emerge. Like a lot of other anthropologists and philosophers since Aristotle, Leroi-Gourhan assigns the ability to create and use technology and language as the species-being of humanity.

The 'grammatisation' that Stiegler develops to conceive of the 'arche-cinematic' pictographs of the Palaeolithic cave paintings, through to the video messaging of contemporary smart-phones, emerges from these important debates over semantics, representation, and meaning, and at the same time, to the embodied way we occupy the 'always-already' 'thrown' world (Heidegger 1927/1962). Daniel Ross refers to this in his excellent introduction to Stiegler's book *The Neganthropocene* (2018), where Stiegler

> refers to the broader analytical process by which temporal and perceptual flows of all kinds are rendered discrete and reproducible through being spatialized. Through this extension, he is able to push the origin of the grammatization process backwards in time to the 'arche-cinematic' reproductions of Upper Palaeolithic cave painting, and to extend this process forwards, not just to the grammatization of visual and auditory perception that occurred with radio and cinema, but, prior to that, to the grammatization of the manual gestures of the worker or the craftsman that are spatialized in being programmed into the machinery of the industrial revolution, and finally to what is unfolding right now: the grammatization of

> ‘everything’ made possible by the inscription of binary code into central processing units composed of silicon. (Ross 2018: 20)

Derrida’s argument is that distinctive shifts occur in epistemology and the constitution of the self, in the transition between the oral tradition, the technology of writing, and the ‘informatics’ of networked computing technology. With writing the responsibility for memorising became increasingly located in the archive.These distinct shifts in technologies of the self and their changes in exosomatic relation also changes the nature of knowledge and the way people think and ‘speak’ (or write/ paint/ video/ blog/ vlog/ game). The Internet has produced new conundrums about access, veracity, and amplifying algorithms that interlocutors have never needed to deal with before. Jim Marshall makes an important point about the ‘evolution’ of the way language constitutes the self, especially in the age of the Internet.

> Both the authority that accompanied oral communication — that of who the speaker is — and the authority of written communication — where the notions of truth, evidence, and of being an authority are important — became tenuous. If unwanted communication cannot be controlled then traditional notions of being in authority become very tenuous. Of course, a ‘solution’ to this is to control emitters and emittees so that they are passive senders and receivers. (Marshall 1996: 271)

Very importantly, instead of conceiving of these different modes of exosomatic memory as progressive, Marshall argues they do not replace each other in the typical characterisation of an evolution. Marshall argues they co-exist. This is exactly what occurs with the Tainui trees.

5 Heidegger and the Modern Enframing of Thought

Heidegger’s important concept of the technological horizon of thought, that shapes the way modern people subsume all ways of knowing to the machinery of consumerism, is an important lens to appreciate Leroi-Gourhan, Derrida, and Stiegler’s exteriorisation of memory in the techniques of cinematography and writing. Heidegger noticed that the modern era is dominated by the narrative of consumerism which ‘challenges forth’ our ways of knowing, the natural environment, culture, art, and our internal techniques of the self. Everything becomes understood as resources to be potentially exploited by the demands of consumerism. Everything is in ‘standing reserve’ – even land, domesticated animals, rivers, water, forests, wildlife, atmosphere and the ocean, molecules, quantum subatomic particles, genes, the moon, and solar system – as the demands of consumer capitalism learns to exploit wider arenas, colouring how human understanding extends into new frontiers.

Heidegger (1977) argues that the process of storage has the paradoxical impact of freeing local communities from the constraints of natural disaster, or threat to production, and at the same time, alienates our communities from their local environment, so that people no longer have awareness of seasonal flows of abundance, or the impact of pollution, because they are locked up in their busy consumer worlds.

This alienation from nature, and definition of all aspects of the world as a potential resource in the machinery of consumerism, characterises modernity in all its forms.

According to Heidegger, Leroi-Gourhan, Derrida, and Stiegler, technology operates as both the parameters that shape thought and a catalyst for exosomatic memory. Yet this focus on technology as though it must always be artificial, 'artefact', rather than naturally occurring sets up presumptions that exclude the indigenous way of incorporating the natural environment into knowledge and epistemology as an exosomatic device. By doing so, these philosophers remain stuck in the western enframing of thought where humanity are reified above other species, and our modes of behaviour, organisation, and redistribution are excluded from environmental consequences.

Our conversation about the Tainui trees elucidates how exosomatic memory is an age-old paradigm, that predates and exceeds technological techniques. Remembering techniques of oral memory helps to recontextualise the technological artefact as one technē amongst others. This destabilises the alienation embedded in modern epistemology as determined by the enframing of consumerism (Heidegger 1977). The ancient techniques of memory and narrative open up deeper modes of integration with ecology and care, without the necessity of abandoning contemporary technologies to meet a romanticised pastoralism.

The technological enframing of thought that characterises the Anthropocene is undermined in other ways too. It is built on an alienation of rational humanity over and above animals and the natural world. But increasingly these distinctions are disintegrating, as science and technology demonstrates how intricately interconnected everything is. Artificial Intelligence, and the grammartisation of 'everything' through the inscription of binary or quantum code on silicon and other materials is extending the concept of intelligence too, from an anthropocentric focus towards the idea that intelligence can be distributed in networks, or bodies, in wider ways of understanding the evolution of thinking, reproduction, and evolution than ever before (Tegmark 2017).

Conforming to the Enlightenment assumption of elevating humanity above other species for our apparent superiority in wielding tools, Leroi-Gourhan, with Stiegler following, argue that *homo sapiens'* exteriorisation of knowledge into art and technology is the moment in which we became distinctly 'human'. Other animals – crows, kea, chimpanzees, octopus – and others, also use tools but this is ignored. The unusually long childhood of human children is also often attributed to the need for wider, transgenerational modes of memory and learning, that exceeds the experience and experimentation of the individual in favour of broader exosomatic cultural narratives and epistemology.

Despite Leroi-Gourhan's ideas remaining within the anthropocentric conception of human superiority, his are important, and have been very influential and raised the relationship between embodiment and epistemology (upright bipedalism, faciality, the tool grasping hand), technology, and a more respectful approach to Palaeolithic peoples. He understood technology as constituting the conceptual apparatus of human cultures, as a screen, or 'curtain of objects' that intervene between the environmental 'exterior milieu' and the cultural 'interior milieu' of the

ethnic group. The technologies create conceptual 'tendencies' that impose a 'membrane' or lens that constitutes the way they access understanding of their exterior milieu. Leroi-Gourhan's important books influenced Derrida's books *Of Grammatology* (1974), and Deleuze and Guattari's discussion of faciality and the milieu in *Anti-Oedipus* (2004) and *A Thousand Plateaus: Capitalism and Schizophrenia* (1999).

6 Passivity and Accelerating Informatics

Derrida (1978) developed the exosomatic memory in relation to writing. Literate people no longer have to remember everything, and the repository of memory is delegated to the written word. Stiegler updates this to the smart-phone and the iPad, where the contemporary attention span is getting shorter and shorter, and the Internet as a simulacra of lived experience, and the repository of immediately accessible information is increasingly relied upon. The extensive memorisation practices of ancient peoples are becoming lost.

Celtic bards, for example, knew long sagas that took days to recite, and the genealogical knowledge keepers in traditional Polynesian cultures could trace genealogies back 30 or more generations. As memorisation is disrupted, the worldscape of mnemetic techniques begins to be forgotten. There are many examples of this. Celtic understanding of the landscape can still be found in Ireland where each field has an old Gaelic name, which describes events that have occurred there. But many of these named fields have been cleared of their stone walls and turned into large industrial agricultural production. Māori have a 'script' of meaning attached to the woven mats and wall screens called *tukutuku*, and carvings, and tattooing or *moko* are all brimming with meaning that inscribes identity and genealogy for others to understand. But many people in contemporary Aotearoa/New Zealand have no recognition of the chevroned flounder pattern, or the association of the spiralling *koro* with the fern and network of kin relations called *whakapapa*.

Knowledge holders cannot refer to the external milieu as abundant in symbolism and meaning if nobody else in the community understands it. Modern Māori creatively engage with these shifting normative resonances and the alienation of urbanisation by extending the worlding of *tikanga*, or lore, through the exosomatic techniques of the book or the webpage instead relying only on the shared cultural and technological meaning imbued in trees and geological features (Nikora et al. 2021). A diversity of mnemonic techniques reinforce each other.

Likewise, the cinematography of late Palaeolithic rock art can only be partially understood when the absence of 'worlding' that makes the cave paintings resonate with other elements of reality is missing. How do modern humans understand the 20,000-year-old image of a mammoth? We have no association with taste, or the communal hunt, or their trumpet calls. We have no recollection of the totem. The modern interpretation of this visual cinematography throws up new interpretations unavailable to the ancient world, but it also only gives a limited window into the

somatic worlding that once took place there. This is acknowledged in his later work by Leroi-Gourhan (1993) who distances himself from earlier interpretive projections.

But these changes in exosomatic *technē* have many ramifications. In the Pacific, there was a different economy of knowledge, where access to understanding certain technologies and protocols is protected and held by particular families or chosen disciples. Knowledge of art making, weaving, carving, boat building, navigation, star maps, botany, performance, song, speech making, oratory and argument, and genealogical lineage, all build mechanisms of value and regimes of status outside of consumerism. The entire economy of protected knowledge, its value, and who has access to it, is affected by universal education and the open access model of the Internet.

7 The Acceleration of Technology

Stiegler updates the argument of exosomatic writing to encompass the rapidly accelerating late capitalist information technology, which he argues is now faster than the synapses in the human brain. With an inverse interpretation of Elon Musk and Max Tegmark's (2017) excitable faith in the progress of Artificial Intelligence, Stiegler's AI resonates with a dystopian deterioration of the ordering of human modes of working and thinking.

Stiegler argues that the acceleration of technology, through the speed of its network capacity – an argument exacerbated by the further acceleration looming in quantum computing – have overtaken the capacity of the human brain to keep up. Consequently, the human mind is increasingly passive and receptive rather than active and creative. AI leads research searches along pathways that are informed by postcode, country, gender, and prior searches. AI creates 'bubbles' where like-minded people reconfirm each other's ideas and assumptions, and alternative opinions are filtered out. The lack of exposure to alternative viewpoints mean that people are unaware, and increasingly intolerant of divergent interests and opinions. By living in a cyber 'bubble' people participate less in their wider community, with less understanding of the impacts of policies or economic functions on different class, gender, sexuality, disability, or ethnic groups in their own communities. Diversity is operating but people are less aware of it. Democratic agonism (Arendt 1959) is less skilfully negotiated because people are increasingly passive, apathetic, and isolated in their self-confirming screen simulacra of culture.

AI has been manipulated by wealthy donors and thinktanks such as Cambridge Analytica (Cadwalladre and Graham-Harrison 2018), to spread and deepen reactionary climate denialism and helped Boris Johnson and Donald Trump's election campaigns. Alienation is exacerbated when people limit their opinions to those they 'discover' on the Internet instead of paying attention to the world around them. Arguably, this prolonged the dominance of climate denialism in the political sphere, until 2018–2020 when the enormous forest fires in the USA, Siberia, Continental

Europe, Australia, and the Amazon wrenched ordinary people out of their myopia. It took the deaths of over three billion animals in Australia alone – to bring carbon dioxide emissions into the public policy arena.

8 Accelerating Cybernetics

Stiegler regards accelerated cybernetics as encouraging increasingly passive receptivity to stories and concepts, rather than active noetic thinking (2018). The alienation described by Marx on the land clearances, has accelerated with the personal computer, and networked society. Covid-19 has pushed people out of the office towards 'working from home' so that immediate corridor conversations are further reduced, and nearly all interactions are facilitated through smart devices. The daily regulation of time through sunlight hours was relegated to clock time, and this has been reconsidered yet again, as global corporations 'never sleep' with fully functional offices in different time zones around the world. The clocking off at 5.00 pm has dissolved to shifts that align with work in foreign time zones. People are at once, more alienated from their local ecology, and more knowledgeable about global affairs.

Local living knowledge gets displaced (not surpassed), Heidegger argues, by modern *technē*, which obscures older ways of knowing. The subtleties of a wind change, an ocean current, or the type of range a sea bird has from land, are lost when people are reliant on global satellite navigation technology, and maps of shipping lanes and weather reports. Localised, specific, cultural knowledge is increasingly overcoded, regular, normative, and subsequently less alive to evolutionary change. It has become statistically normative, ossified, and dogmatic at exactly the moment that humanity assumes the modern mantle of technological mastery. Normative overcoding includes human beings, who were understood as rational utility maximisers by Hayek (1960), Novick (1974) and other neoliberal theorists, regardless of gender, age, ethnicity, or culture. Neoliberal discourse dominated public policy in almost all nations since the 1980s.

Cyberspace has taken that normative idealisation of the rational individual, and obscured further physical, historical embodiment in real-time. The dispersal of the self in cyberspace where place and cultural history can be invented or circumvented is in some ways the ultimate alienation.

> In the Age of Information, and in relation to identity, the new self will be decentered and dispersed, as in post-structuralist theory, without spatio-temporal and bodily constraints. But, furthermore, the physical body has nothing to do with identity in electronic communication. It is almost as though the self has become invisible. (Marshall 1996: 272)

Yet at the same time, the dispersed self, without body or historic specificity is always an illusion. Not only do bodies reflect the passivity of long hours sitting but people behave in peculiar ways in cyberspace. The illusion of invisibility alters the quality of human interaction.

9 The Proletarianization of Epistemology

Stiegler pivots from the important recognition of truth in the Anthropocene as the 'forgetting of Being' expounded by Heidegger, in his book *What is Metaphysics* (1935/1973). By diving into the linguistic semantics of Leroi-Gourhan, Simondon, Foucault, and Derrida, Stiegler takes the idea of the person 'thrown' into an 'always-already' world (Heidegger 1962: 65) in a new direction. Technologies like writing, and smart cybernetics enable the exosomatics of memory. Creative talents such as music, narrative, and scientific exploration take place through the expression of these technological artefacts – both in content and form. The ideas expand from the immediate sphere into a globalised network, where storage could take place anywhere, making it possible to pass on information through technologies, to future generations. By tracking exosomatic memory through its evolution from cave paintings (Leroi-Gourhan 1945) to the Ancient Greeks, Marx and then Heidegger's critique of modernity, Stiegler is able to critique cybernetics and AI at the levels of noetic thinking and technologies of the self, work and redistribution, and the dystopian progress of the Anthropocene.

The alienation of labour from the farms they had lived on for thousands of years not only dislocated the population; it reduced their rich knowledge of the landscape and eventually replaced it with the monotonous and reductive labour of production line factories. Workers became increasingly competent at one small monotonous element of the overall assembly of the product. This replaced active thinking and knowing with a proletarianization of labour and noetics. While this reductive mode of working has characterised factory labour for a long time, there is now a middle-class creep, as proletarianization enters all sorts of professions through robotics and mass computing power of Artificial Intelligence. Ross explains how the semantics of exosomatic technologies are encroaching ever further on our internal psyche and modes of thinking,

> now, in the twenty-first century, it is rational and conceptual knowledge that finds itself increasingly absorbed into an ever more powerful computational apparatus: the successive epochs of grammatization have thus ultimately led to the progressive extension of the proletarianization described by Socrates and Marx to all areas of understanding and finally reason (Ross in Stiegler 2018: 21).

The ultimate completion of proletarianization, Stiegler writes, is when the American Treasurer, Alan Greenspan explained he had no idea how the stock market works because it is run via algorithms.The future of knowledge has implications for the future of work and vice versa. The evolution of technology, from stone age digging sticks to the metal shovel, and then the diesel-powered digger, transformed the nature of work and the nature of phenomenological experience. Robotics and AI are beginning to also make middle class labour redundant or proletarianized. The stock market, legislation, legal contracts, quantitative research and multiple other professions are becoming automated. The unique creativity of knowledge in these fields are becoming increasingly uniform. What's more, machine learning obscures the reasons for particular results emerging, so the parameters of tasks codified into

the algorithms transforms and narrows as the machine learns to predict statistically likely correlates.

This has had devastating consequences in some fields, such as welfare provision, where algorithms have taken over case workers and people have had their entitlement to welfare checks denied or lower-class school students having their predicted grades lowered (Coyle 2021). Machine learning exacerbates the 'bubble' where specific groups, defined through gender, age, postcode, and shopping preferences, are mutually reinforcing, and other specific groups similarly defined, are excluded because historic bias is recompounded, and expectations reconfirmed. Women are less likely to be exposed to adverts for financial advice, for example.

Stiegler argues that the acceleration of AI and robotics will make labour as a form of exchange increasingly redundant. This raises important questions, because labour as the standard of exchange value has dominated economics since the large-scale land clearances made it impossible for people to generate subsistence living from their land. The alienation of people from their territories forced labour to become the primary value of exchange (Marx 1887). Education has been built upon the vocational legitimacy of accreditation, so that employers are assured of certain accredited skillsets. But as the men who apprenticed themselves to the ship building industry in the 1970s or those with computer credentials from the 1980s already know, skill sets become rapidly redundant with the speed of technological change.

For many decades, lifelong learning has set out upskilling redundant labourers, but Stiegler's point is that the scale of redundancy in many middle and upper management roles will be so large that far too few jobs will be left for employment to be a meaningful product of exchange. The implications are the need for new forms of valuation. Tie this to the rapid phasing out of fossil fuels, to be replaced with renewable electricity, hydrogen or other forms of energy, and an aging global population, and the nature of work is changing rapidly.

> The question of the Anthropocene, which, therefore, has the structure of a promise, emerges at the moment when, on the other hand, full and general automation is being set in place as one outcome of the industry of reticular digital traces. This reticulation industry must be thought as the chance for a new epoch of work, where the epoch of employment will be brought to an end, and where this will occur through a 'transvaluation' of value, wherein, as Marx put it: 'labour time ceases and must cease to be [the] measure [of work or labour], and hence exchange value [must cease to be the measure] of use value'. In this situation, the value of value becomes neganthropy (Ross in Stiegler 2018: 45–46).

In 2015, Ruth Irwin argued that the UN population statistics artificially increased the birth rate (which has been falling steadily for decades) to pump up the continuous growth of the global population (UN Population Statistics 2019). This is essential for consumer and GDP growth, and especially for the continuation of growth in property prices (Irwin 2015). We argue that peak population is nearly upon us – probably as early as the 2090s – which will stall and start shrinking the housing market by the end of the century. The entire premise of economic growth, which is fundamentally based on interest rates on capital that injects extra money into the system without tying it to work or any other form of productivity stalls without it (Soddy 1926). Growing population has kept property buoyant and as this stagnates,

the fundamental requirement for economic growth also crumples. Thus, the need for material consumption – and commensurate CO_2 emissions (Hickel 2016) – for the sake of 'growth' will also begin to deflate (Irwin forthcoming 2022). This reorganisation of priorities for patterns of economic redistribution offers us a brilliant opportunity to reconsider economics altogether, with ecology and interspecies wellbeing at its centre.

Accelerating technology, combined with peak and then shrinking population requires a transvaluation of values. The greenhouse gas inventory is in the process of setting in place new tracking requirements – called scopes 1, 2, and 3 – to track emissions at all stages of the production, use, and waste cycle. The call is for a circular economy, which inhibits global production and yet facilitate more responsible global distribution. The circular economy applies surveillance measures to make the conditions for better design and production, and an end to built-in obsolescence.

These changes are joined by a seismic shift in philosophy and politics, as the era of postcolonialism finally takes real hold. Up until now, racist assumptions of universal truth, have prioritised western modern values and practiced cultural genocide of humans and other species, both physically and figuratively in most 'developed' nations (Braidotti 2009, 2013). However, as these claims to universality are unpicked, and 'other' cultures take up the mantle of epistemology once more, the impasse of the technological *Gestell* so well described by Heidegger can finally dissolve.

10 The Indigenous *Epistêmê*

Te Haumoana's alertness to the Tainui trees is an important illustration of how authentic, integrated knowledge, affection, care, and attachment to the land stands in contrast to the alienation of western modes of epistemology and economics. In the context of growing climate emissions, consumerism and economic growth, these ancient modes of onto-epistemological cohesion and attachment are increasingly vital to restore. Ecology as an exosomatic *technē* is absent from western literature, even when the analysis of memory and epistemology seeks its earliest iterations in Palaeolithic societies.

We argue this failure of comprehension emerges from the assumption of separation of nature from culture that shapes western epistemology since Descartes' sceptical liberation of the rational mind in *The Meditations* (1641/1980). Exosomatic memory is an important shift away from the privileged position of the rational individual, and it helps to show how cultural artefacts produce communally held understanding of the way the world works, and these shared nodes of epistemology enable memory to become transgenerational rather than limited to the learning and experience of one short-lived individual.

The epistemological enframing of thought by modernity has been so all-encompassing that such important thinkers as Heidegger, Leroi-Gourhan, and Stiegler were all attempting to break out of it albeit with very limited success. They

each prioritised *technē* as the locale of exosomatic memory. But there are broader ways of conceiving of *technē* and of exosomatic memory. Heidegger began thinking about technology as the always-already world into which each person is thrown (1927/1961). Like Leroi-Gourhan (1945), Heidegger's early work was on the way the tool and the body co-create each other, the opposable thumb and fingers of the hand combining with the hammer collectively constituting the 'self'.

Before the need for speech, the thrown world constitutes meaning. The flow of ideas and technologies of the self, along with a momentum of transition and change, are shaped by the always-already technological milieu. Leroi-Gourhan argued that the versatility of the hand, the upright gait of early bipedal humans, and the 'faciality' of expressive language enabled humanity to develop the pre-frontal cortex and extensively develop creative technological progress. Bipedal faciality and technology co-evolved.

Stiegler too, accepted Heidegger's (1927/1962) and Leroi-Gourhan's (1945) focus on technology at the exclusion of the ecological milieu. Older by far than stone axes, or the representation of the artist's depiction on a rock face are the exosomatic associations of mother earth herself.

Te Haumoana's narrative of the Tainui trees show us how plants, animals, and geological features serve as important exosomatic signifiers, that constitute the 'always-already' world as much as technological artefacts like a chair or a table. Many of these 'items' are so ubiquitous that we 'forget' to notice them (Heidegger 1935/1973). When we were young, climate discussion was limited to a small group of scientists. By the ordinary population, climate was completely taken for granted. As the fish in the sea do not 'notice' the water they swim in, modern humanity failed to notice the ecological milieu because we had successfully assumed it was an ongoing cornucopia, that allowed modern society to prioritise consumerism and individual labour as signifiers of status and economic value.

As a valuable contrast, for indigenous peoples, nature does not contrast against culture, nature is *technē*. Technology items are predated by *technē*/nature in the service of transgenerational memorisation. Major mountains, the river, certain species, particular old trees, they all make up the 'world' of signification, with layers of technological meaning including medicine, food, shelter, and spirituality. In contrast with modernity, which has been alienated from this type of knowledge, these natural phenomena create the taxonomy of meaning that makes sense of the world.

Unlike thinkers in the West who attribute higher status to human beings, as a generalisation, indigenous people recognise the faciality, languages and *technē* of other species. There are many examples of symbiotic relationships, such as an African honey eater that calls humans to follow them (sometimes for 20 miles) so that the person will find and break open a honey hive, allowing the human's access to valuable honey, and the birds to pick over the opened-up beehive. The human is the tool the bird wields to open the hive. Māori were the vector of transport for the Tainui trees to immigrate from Australia. Species intersect in all kinds of ways, and the privileging of humanity as the only agents was an immature and narcissistic

assumption of superiority from which indigenous epistemology can ingeniously disengage.

Recognising the agency of ecology does not result in an abandonment of modern technology. Technology is rather reconceived as facilitated by a variety of species, whom all modify their habitats to some extent. Accepting the indigenous orientation of exosomatic memory enables modernity to slice through the Gordian knot of technological enframing and its ensuing alienation of culture from nature. As Mark Poster (1993) and Jim Marshall (1996) point out, all three modes of exosomatic memory operate *at once*.

New technologies are rapidly evolving, and the speed of the Internet will accelerate even further once quantum processing is cracked. The pre-frontal cortex is finding it hard to keep up with the rapid change in technological innovation, as it no doubt had difficulty at the beginning of metallurgy and the invention of the first printing press. New technologies, in our case robotics and AI, transform the process of exosomatic memory and with it, creativity, and critical thinking. But computing is also creating interest in the way information can be inserted into the 'substrate' of various materials (Tegmark 2017), breaking the boundaries of 'life' from animals to inorganic self-organising features such as a solar system. Information systems are creating synergies with new biological science on the way that trees and mushrooms 'talk' and that animals and insects elicit certain toxic responses from trees as they resist being overgrazed. Big data is being employed to record and recognise the speech patterns and words of several species of whale, of chaffinches and meercats, to name a few. Language, like tool use, can no longer be merely associated with the human.

The intersectionality of all elements of the ecological milieu is increasingly apparent in a wide range of discipline areas. Emissions Scopes 1, 2, and 3 introduce entropy into existing practices of economy and surveillance. But new forms of entropic accountability do not shift deepset values. The transvaluation of values requires firm boundaries, and a sacred Yes to life itself (Nietzsche 1982). Indigenous people all over the world have been struggling to be heard, to overcome the colonial universalism of Enlightened modernity, and to bring ecology back into the forefront of consciousness.

Artificial artefacts created a 'screen' as Leroi-Gourhan put it, between subjective apprehension of the wider world. This remained within the Idealistic interpretive 'black box' analysed so well by Descartes in 1641. Indigenous cultures embrace the exosomatic memory and meaningfulness of unadulterated natural events and items, incorporating tools into a wider natural technological milieu. The web of kin relations forms the basis of worlding, that inserts humanity as one species amongst a plethora of agents, organic and inorganic. This shift in ethos and orientation is subtle, and it does not exclude sophisticated tool use.

An *attunement* with the ecological environment characterises indigenous culture. As the westerly sun shines on the hill above Te Haumoana's house, the Tainui trees quiver in the heat. Resonating with meaning; the great ancestral canoe, the ocean full of islands, with Australia, with medicine, the Tainui trees *sing*. Alive, alert, each leaf strives upwards. Clean, salty, oxygenated air circulates the hills.

Branches delicately whisper as the earth's breath eddies, lazily rising to meet the hovering clouds that tangle with the mountain ridge. The dusty flowers spread a subtle pollen on the air. Chlorophyll glows. The plants exude aliveness, and an upward striving for light. Twigs and leaves adjust, momentarily dancing in the sweltering sunlight, a generalised alertness, spreadeagled, glorious.

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