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Situating knowledges of *Araucaria cunninghamii* (hoop pine) problematises how aestheticised environmental relations obscure architecture's full entanglements in colonial and ecological injustices.

Resituating timber imaginaries: Learning from *Araucaria cunninghamii* (hoop pine)

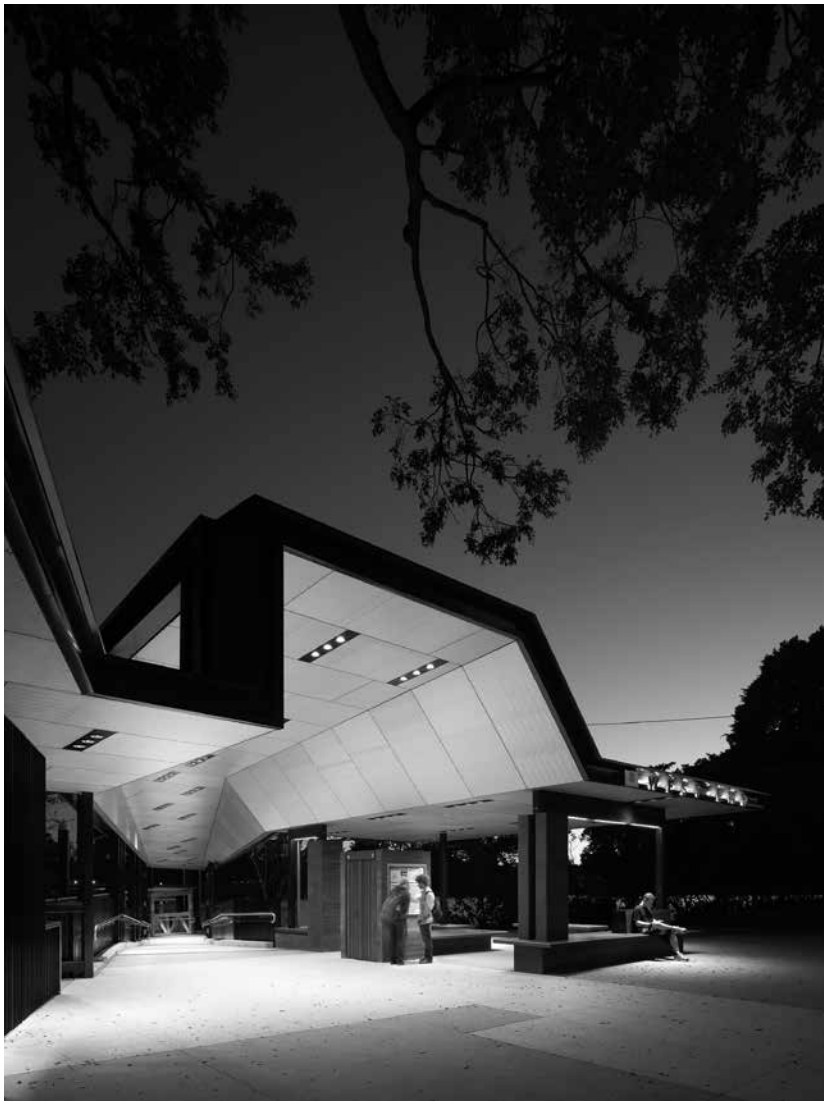
Anna Tweeddale

Timber, forests, and plantations are increasingly positioned as critical to global visions of architectural futures, both materially and discursively. *Materially* this plays out through an intensified focus on timber construction technologies, as the rapid roll out of engineered mass timber (CLT and GLT) offers a heroic opportunity to shift construction away from carbon-intensive systems like concrete and steel. These global timber imaginaries are permeated with a distinctly European / North American materiality of blonde timbers enjoyed in temperate climes. Indeed, mass engineered timber technology and standards have been developed using timber species endemic to these cooler regions. A rapid rise can be observed in publications about timber, including both technocratic (how to build/specify/detail more sustainably/efficiently/beautifully/innovatively with timber) as well as an emerging renarration of architecture and design's disciplinary relationship to forests entirely.[1] *Discursively* these new timber futures play out through an explosion in both professional and societal attention to both forests and timber, including many aesthetic and moral assertions.[2] Aestheticisation of the 'biophilic' well-being effects of building and living with biomaterials, of which exposed timber is often used as illustrative, is also exemplary. Underneath all lies an often-uncritical assumption that these imagined timber futures are inherently reparative. Through a situated case study, this paper troubles assumptions that such desituated knowledge of timber and its material and discursive production can guide architecture and construction towards the repair of, and reparation for, the conditions causing planetary crisis.

The timber from *Araucaria cunninghamii* (hoop pine), an endemic softwood timber species of Southeast Queensland and northern New South Wales, provides a distinctive material texture and ambience to the internationally recognised 'subtropical imaginary' of contemporary Southeast Queensland architecture, and Australian architecture more broadly, as a kind of material marker of place *[1]*.[3] This region's architecture culture embodies a deeply held environmental consciousness, expressed through lightweight structures, minimal use of 'raw' materials (often timber framed, with touches of concrete and steel, frequent use of timber claddings and plywood), passive thermal design and ventilation for the humid climate and a simultaneously functional and aesthetic enjoyment of blurring indoor/outdoor inhabitation, particularly in bush/forested sites but also in urban situations. Before these modern versions, the 'Queenslander' house typology, described materially by its 'timber and tin,' was already readily identifiable: the honey-coloured hoop pine floors of these houses are now highly sought after as recycled timbers *[2]*. Made and used locally, hoop pine is an extremely versatile timber cut from a tall straight tree to produce sawn timber for general construction and as well as high-grade joinery and furniture. Plywood is produced locally from the soft, easy to lathe logs, with the species' smooth grain and lack of knots easily achieving A-grade veneers. With 96% of global hoop pine produced in PEFC-certified 'sustainable' plantations and milled locally in Southeast Queensland, this timber ticks all sustainability boxes. To the contemporary architect, this timber recently trade marked as *Australian araucaria*™ appears as close to an ideal material for specification as possible.[4]

It is understandable to desire a simple, black-and-white heuristic to follow, or neutral and objective processes to verify and ensure that one's efforts are oriented towards good, ethical, or ideally, reparative outcomes. Amid scholars who have unpacked problems of objectivity in Western technoscience through close analysis of how scientific knowledge is produced and verified, Donna Haraway argues instead for 'situated knowledges' as a way of creating a purposely non-neutral technoscience that is 'for' certain practices (that enable living) and 'against other practices (that promote death). Critical to this concept is the understanding that there is no one, universal, 'objective' knowledge of the physical world. Rather, objectivity must be pieced together through many partial perspectives, some of which may be incommensurable with one another. The problem, she clarified is '[…] how to have *simultaneously* an account of radical historical contingency for all

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1 Hoop pine plywood ceilings become a material marker of place, synonymous with the river as a public space at ferry terminals that provide urban mobility along the Brisbane River (Maiwar), 2010.

2 'Timber and tin' Queenslander house in Harris Street, Windsor, Brisbane, c. 1905.



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knowledge claims and knowing subjects, a critical practice for recognizing our own "semiotic technologies" for making meanings, *and* a no-nonsense commitment to faithful accounts of a "real" world, one that can be partially shared and that is friendly to Earthwide projects of finite freedom, adequate material abundance, modest meaning in suffering, and limited happiness.'[5] Rapid growth in available materials, material products, and the proliferating variations these take, has created material selection as a 'problem', or key competency, for the contemporary architect. It is imperative that architecture also recognises its own, disciplinary 'semiotic technologies' and ensure that our 'knowledge claims' and positions as 'knowing subjects' – our imaginaries, aesthetics, and decisions – are grounded in 'radical historical contingency'. This paper outlines a scope and agenda for an ongoing project for following hoop pine as an illustrative, deep-dive case study for how we might start to produce 'situated knowledges' of timber. In following a plant/material/product, this approach shares methodological approaches with other studies, yet the particulars of this timber ensure its specificity.[6] That the tree's entanglement with Western scientific enquiry and industrialised construction practices is very recent (exactly two hundred years) and that its limited geographical extents were and still are easily graspable, make this timber useful to understand how desituation can occur even without the extreme material and geographical flows usually drawn upon.

Imperial extractivisms

Classifying Araucariaceae

Even before a single tree was felled, a critical process of desituation began to occur when the Araucariaceae family of plants encountered European languages and the knowledge structures of Western science, such as the Linnaean taxonomy, through imperial projects and collections. Endemic only across the southern hemisphere, Araucariaceae are ancient conifers that grow across modern-day Australia, Aotearoa (New Zealand), Papua, Indonesia, Malaysia, several Pacific Island nations (exceptional species diversity in Kanaky/New Caledonia), as well as Chile, Brazil, and Argentina, mostly in rainforests. The etymology of Araucariaceae comes from 'Arauco', said to mean 'chalky water' in the language of the Mapuche/ peoples of modern-day Chile.[7] Classifying endemic languages like plants in 1950, John Mason classified Mapudungun and others as 'Araucarian' languages, reusing the name previously used to refer to these First Peoples by the Spanish colonists.[8] 'Araucaria' is therefore a colonially appropriated name applied to lands and languages that are contested, and now also refers to a province, city, and commune, and timber company in Chile.[9] European invaders also commonly named newly encountered trees by their similarity to familiar trees and their useful timbers: along with hoop pine, bunya pine, and kauri pine (*Araucariaceae*), we see this continually repeated in common name examples including white beech, (*Lamiaceae*) southern beech (*Nothofagaceae*), southern silky oak (*Grevilleoideae)*, cypress pine (sub-family of *Cupressaceae* found only in Oceania), Queensland red cedar (*Meliaceae*), all of which are distinct species from their northern counterparts.

Discursively these Araucarian forests and their constituent species are invoked by Western scientists with awe, as the Araucariaceae are traced back over 200 million years to the Gondwana supercontinent, when the continents of the southern hemisphere were connected. In a didactic summary globalising plant and animal geographies, David J. de Laubenfels positions Araucaria as one of the 'important genera' of the Antarctic flora '[…] the most unusual of any comparable flora in the world' and a collection of species that are found both sides of the Pacific. Araucaria inhabit both the Western division (Tasmania, Aotearoa/New Zealand, Kanaky/New Caledonia, Queensland and New Guinea) and the South American region (Brazil, Argentina, and Chile).[10] Cumulative scientific analysis of Araucariaceae over a few centuries has significantly informed contemporary Western scientific understandings of how planetary geological and ecological configurations came to be.[11] Categorisation of Araucariaceae perhaps reached a zenith with the Araucariaceae Symposium that took place in Aotearoa (New Zealand) in 2002, a one-off gathering of international dendrologists that resulted in publications of a substantial proceeding.[12] Less than a decade beforehand in 1994, a new-to-Western-science genus of Araucariaceae, *Wollemia*[13] *nobilis,* were 'found' in rainforest about 150km North-West of Sydney. Emblematic of discursive flourishes, Wollemia is often described as a 'living fossil'. Where early scientific knowledge of exotic-to-the-European-observer plants were produced through drawings and specimen collection, by the time *Wollemia nobilis* was analysed, its position in the taxa was established with genetic testing. As keynote to open the Araucariaceae Symposium, de Laubenfels's proposed changes to the then-established taxonomy of the Araucaria genera is in response to the changing data. Illustrated here, as many scholars have attested, Western science's narrations of environmental and planetary histories need to be understood as embedded and produced within ever changing technoscientific practices, technologies of knowing, and even the rise and fall of entire disciplines.

Demystifying 'abundance'

To non-Indigenous people, Gondwana produces a narrative of continuity through massive changes in planetary geologies, geographies, and ecosystems over hundreds of millions of years. First Peoples here explain the origins of this process differently, including their own active stewardship since time immemorial. The continent now called Australia has been continuously inhabited for at least 60,000 years, by many language, cultural, and kinship groups. These diverse First Peoples share a deeply relational ontological co-existence with their situated environments that is now collectively expressed in the preferred English-language term 'Country', and an

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obligation to care for that Country. Hoop pine has therefore also been known, named, cared for, and received care from the peoples of the many language and kinship groups that shared these Lands including: Gooreng Gooreng, Gubbi Gubbi/ Kabi Kabi, Wakka Wakka, Yuggera, Bundjalung, Badtjala, and probably Barunggam and Nagarabal, as well as First Peoples of current-day Atherton Tablelands in Far North Queensland.[14] Kombumerri (Yugambeh) and Wakka Wakka woman, and Adjunct Associate Professor of Political Science, Mary Graham describes the 'Law of Obligation' to Country as 'attending to and maintaining the custodial stewardship, ethical obligations of looking after Lands, waters and the well-being, cultural, physical and spiritual being and values of all Peoples within our boundaries who have lived in this Country for millennia, continue to, and now, live here and practice stewardship obligation to care for all Lands and Peoples.'[15]

Local species of Araucariaceae were also deeply embedded within technology, knowledge, culture, and trade before encountering European technoscience. The resin of hoop pine is recorded as being used and traded as an effective adhesive for tool making, as is the case for many trees of the Araucariaceae.[16] *Agathis robusta* (Queensland kauri pine) and *Araucaria bidwilli* (bunya pine) are endemic to a roughly similar extent geographically to *Araucaria cunninghamii* (hoop pine). First Peoples from across modern-day Australia would travel long distances to Bunya Country to gather for the Bunya Festival, feasting on their large nuts as well as for ceremony and trade. European romanticism of this festival, which has recently been revived, spared the Bunya from as extensive logging as other species and led to its proliferation as ornamental planting.[17] A similar festival is hosted by Pehuenche/Mapuche peoples around the nuts of the *Araucaria araucano* (monkey puzzle), and most Araucariaceae produce edible nuts.[18] Recent scientific work provides evidence that Araucaria forests were extensively cultivated by First Peoples across Southern Brazil as were bunya pine in Southern Queensland and Northeastern New South Wales.[19] Araucaria trees provide shelter, food, important materials, and symbiotic living for many other species; grow in relation to the geology and soils they have grown with; their distinctive silhouettes outline the skies; and they are relationally significant to waters that filter and flow into rivers and form clouds and rain. The abundance that greeted European invaders in the early nineteenth century was therefore far from an untouched wilderness, rather produced by sophisticated and resilient socio-ecological relations and biocultural practices.

Industrialising commodification

Extraction and commodification of the abundant mature timber was a key imperative in the selection of Moreton Bay as site of a new penal colony north of Sydney, ultimately established in 1825. Evidence of sustained attention to potential exploitable resources, particularly but not limited to timber, pervades the ships logs of imperial exploratory voyages. The extractive potential of the tree that came to be named interchangeably hoop pine, colonial pine, Queensland pine, Brisbane pine, Dorrigo pine, and Richmond River pine made a striking impression on Captain John Oxley and Alan Cunningham (King's collector to the Royal Gardens at Kew), when they took the first European ship up Maiwar (Brisbane River) on reconnaissance in 1824. In Oxley's words, 'Among others a magnificent species of pine was in great abundance' and '[…] the timber abundant, and fit for all the purposes of domestic use or exportation, while the pine-trees, if they should prove of good quality, were of a scantling sufficient for the topmasts of large ships.'[20] Mappings reproduced from these early logbooks document the endemic vegetation and its extents as observed and trace the first local sampling of Hoop pine to 21 September 1824 at a site now called Pine Mountain.[21] As *Araucaria cunninghamii*, hoop pine is therefore named for both an ongoing colonial encounter in Chile, as discussed earlier, and a prominent colonial figure, Alan Cunningham, who connected the taxonomic similarities with Araucaria species that he'd encountered on prior expeditions in Brazil.

Timber from hoop pine became the first export commodity shipped to England from the new colony. In following material geographies of early colonial cross-Tasman timber trades, Stuart King and Andrew Leach have already illustrated how 'mercantilism' was always more central to the colonial project than popular histories reflect.[22] Coinciding with the already well-underway Industrial Revolution in Europe, extraction and commodification of hoop pine and other raw materials from Southeast Queensland ecosystems were industrialised and scaled as quickly as was practicable. By 1853, within thirty years of Oxley and Cunningham's reconnaissance voyage, a steam-powered sawmill had been established on the banks of the Brisbane River by entrepreneurial industrialist William Pettigrew to process and export timber extracted from the forests. This mill's production was also integral to the development of the 'timber and tin' *Queenslander* architectural typology.[23] Within another twenty years, Pettigrew had expanded productions 200 km to the north, constructing the first private steam railway at Tin Can Bay to haul sawlogs to nearby mills and export docks and by 1891 he had built his sixth sawmill.

Across this period an unusual pattern of development followed the commodification of raw production of all kinds, often beginning with timber extraction. Instead of the usual radial configuration of transportation, centred on an emerging city or port, infrastructure such as roads and railways, were built in east–west linear corridors running directly from inland to the coast at regular intervals where commodities could be processed and shipped directly from basic docks.[24] This industrialisation should not be simplistically interpreted as a one-way importation of advanced technologies from, what should perhaps now be inverted as, the new world (Europe) to the old world (60,000-plus years of inhabitation). In a report for the Department of Environment in 1998, John Kerr connects how forestry exploration fuelled rapid

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innovations in sawmill technologies across the colonised world in the nineteenth century: 'With so many large virgin forests awaiting exploitation, timber became a cheap and abundant building material. The demand stimulated great advances in sawmilling technology.' *[3]*[25] Large-scale industrialisation also co-existed with small-scale, 'pioneer' extraction as can be seen in the phases of industrialisation loosely classified through transportation systems: 'Waterways and Coastal Routes (19th century)', 'Private Tramways (1870s–1950s)', 'Timber Chutes (19th century)', 'Railways (1890s–1920s), 'Bullock Tracks (19th century until 1950s)', 'Road and Truck Transport (1900s to present)', 'Forestry Roads Systems (1940s to present).'[26]

This invasion and terraforming of ecological systems that extraction was a key part of, did not go uncontested nor unresisted: accounts of extensive frontier wars between First Peoples and European invaders throughout this period and region are revealing a particularly brutal regime of death and dispossession in early Queensland that is too slowly making its way into colonist histories. As often the first wave of extractive activity, analysing the specific role that early timber exploitation and the development of related industrial infrastructure played in these wars has yet to be systematically investigated *[4]*.[27] The rapid settlement, and transformation of this region's apparently 'natural' abundance into commodified and industrial production, provides a textbook case of what has been called 'primitive accumulation' or 'accumulation by dispossession.'[28] The establishment of the newly separate colonial administration of Queensland in 1859, subsequently facilitated processes of state-sponsored industrial modernisation.



3 Man standing next to a hoop pine tree holding an axe. Hoop pine, a softwood of outstanding quality. This has been the most important species in the timber economy of the State. (Original description supplied with photograph.)



4 Loggers standing next to a felled hoop pine at Gallangowan, Queensland, c. 1925. (Original description supplied with photograph.)

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Sustaining supply

Modernising forests

In *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed*, James C. Scott uses the example of scientific forestry to illustrate the modern states' desires to centralise organisation of populations and resources through scientific and objective knowledge, regulation, as well as construction of infrastructure to reduce material and legal uncertainties faced by industry.[29] Collated environmental histories document how rampant extraction from logging and clearing for agriculture threatened to eradicate valued timber species in the vast forested areas of newly formed Queensland as early as 1875, within fifty years of European invasion, causing concerns for industry and authorities.[30] From 1880, timber reserves began to be established by the colonial government of Queensland. Colonial governments were often constituted from representatives of the burgeoning industries, including timber production, as can be seen in the case of William Pettigrew, mill owner introduced earlier, who was appointed to the Council Legislature in 1877, or R.M. Hyne, founder of modern-day Hyne Timber, in 1889.[31] It was industrialists such as Pettigrew and Hyne that advocated for, and legislated, state management of Queensland's forests and timbers under the terminology of 'conservation.' This advocacy occurs in a context in which the colonial government was able to leverage broad reaching, colonial powers. As Warwick Frost accounts: 'In November 1906, the Queensland parliament debated and passed the State Forests and National Parks Act, the first legislation in the world to establish set procedures for the creation of national parks. This allowed the Secretary for Public Lands to declare state forests and national parks by ministerial regulation rather than through individual ad hoc legislation enacted by parliament (the method previously used elsewhere to create national parks).'[32] Subsequently in 1912, an Australian League of Forests, with chapters in each state, was established to advocate for modernised and regulated forestry nationally.

Scientific methods of research further underpinned the early modernisation of forestry practices in Queensland with experimentation into regrowing and plantation cultivation of local timbers began in 1878, initially with low success.[33] A Forest Products Bureau was established in 1918 alongside appointment of E.H.F. Swain, 'a fierce opponent of



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5 Timber workers on ladders pruning hoop pine trees. These trees are pruned to produce high quality veneer and joinery quality timber. (Original description supplied with photograph.)

6 Machine peeling hoop pine logs for plywood and veneers. (Original description supplied with photograph.)

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rainforest clearing', as Chair of the Provisional Forestry Board (1918–24).[34] Swain oversaw the successful establishment of timber plantations, particularly hoop pine and authored *Notes on the Silviculture of Hoop Pine*.[35] Swain also instigated experimentation with acclimatisation of exotic pine from similar climates (*Pinus caribaea*, Caribbean pine and *Pinus elliottii*, slash pine) *[5]*.[36] Forester, academic, and historian John Dargavel has argued that Queensland forestry had been at the forefront of research into sustainably managing highly diverse tropical forests until 'the research stopped when most of the Queensland rainforests were transferred to conservation reserves.'[37] Industrial processing gained sophistication alongside forestry and, as a smooth timber of consistent grain that is soft and pliable for lathing, Hoop Pine was soon pivotal in the emergent local plywood industry *[6]*. Pine stands out as a rare example where cultivation of an endemic softwood was deemed economically viable, thus guaranteeing regular supply and supporting a modernised Australian timber industry.[38] By the Australian Pavilion at the British Empire Exhibition in 1924, where Australian timbers including hoop pine were exhibited, understandings of how to commodify, market, and produce these timbers for export has gained considerable maturity.

An imperial precursor to contemporary global timber imaginaries can be seen in The Empire Forestry Association, founded in 1921, which shared forestry experimentation, knowledge, and skills across the Commonwealth through the Empire Forestry Journal (1922–45) and Empire Forestry Conferences (1920–35).[39] Forestry modernisation experiments with the endemic species of present-day Queensland under Swain, alongside situated experimentation in India, Canada, and South Africa, were of great importance to this broader Empire Forestry project. Swain's sociotechnical imaginary, unconventional for the time, were of a forested modernity for Australia (if not globally) where silviculture overtook agriculture's dominance and slowly replaced mineral-based economies. Barton and Bennett argue that E.H.F. Swain, who alongside his forestry administration produced extensive writings and journals, needs to be systematically studied to better understand how his unconventional 'vision of forest modernity' developed in and with Queensland and New South Wales forests, and what their impacts were both locally and globally. Further research is already underway to understand how Swain informs the historical complexity of politics, economics, culture, and aesthetics behind the contemporary shift towards forested futures in Australia, and relationships with architecture and construction. At the 1928 Empire Forestry Conference, held in Australia, Swain, presented to commonwealth foresters his 'universal index to wood' that indexed three hundred timber species using schedules of characteristics.[40] Like the Linnaean taxonomy for plants, it must be determined how contemporary taxonomies of wood and wood products also came into being through technologies of knowing the associated modernisation of forest practices and colonial governance and how these have since been entrenched into architect's everyday through standardisation of building materials.

Encountering the plantationocene

A common 'founding narrative' of sustainable development and the concept of 'sustainability' is the co-production of timber plantations with German scientific forestry in the 1800s,[41] yet Swain argued against the simplistic assumptions that Queensland forestry developments were simple applications of Continental forestry practices. Timber plantations in colonised places also did not arise in a political economy, nor an ecosystem, like those in Central Europe. They were co-produced –geographically, economically, and politically – alongside some of the largest industrialised sugar and agricultural plantations of the late nineteenth and twentieth centuries.[42] Haraway and Tsing coined the term 'plantationocene' to articulate a specific set of practices including coerced labour relations through which the plantation model positions species (human and other) in a restrictive framework that intensifies extraction and excludes other ways of being in relation. Proposing that the plantation was the conceptual model for the factory, Haraway and Tsing seek to account for ways in which extractive logics of capitalism also developed within 'situated' technoscience practices in specific geographies, ecologies, and sociopolitical regimes. Hoop pine timber plantations were established on the exact sites and soils where the tree grew to maturity with First Nations Peoples, formed, and continue to exist in 'processes that break generations, that radically simplify ecologies, that drastically force labor in a mass way that creates a kind of global transformation and global wealth that is in and of itself genocidal and extinctionist.'[43]

The plantationocene acknowledges that planetary scale change directly results from the industrial-scale simplification of ecological and human systems intrinsic to colonial extraction and subsequent industries. The history behind hoop pine plantations is a direct example of how the socio-ecological apocalypse that Western societies now fear from unfolding climate crisis has already been experienced by First Nations Peoples and their Lands in the violent incorporation of their life worlds into capitalist logics. In addition to mass dispossession and displacement of First Nations Peoples, the colonial apparatus of industry and government in Queensland has regularly employed coerced and restricted labour in agriculture and forestry. This began quite obviously with convict and Aboriginal labour and skills, extended through practice such as 'black-birding' (slave labour kidnapped from Pacific Islands such as Vanuatu, mostly to work on sugar plantations), cheap labour from Asia (China, Japan, and India), relief workers funded by government during the Great Depression, POWs captured in North Africa (Second World War), then refugee and immigrant labour (post-Second World War), and continues to this day in temporary visas for agricultural workers and backpackers *[7, 8]*.[44] Such practices therefore remain embedded in plantations that grow over many decades in the same sites, soils, and planting extents, even as ownership

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7 Exotic pine plantation established by relief labour in 1932. The marked tree has been selected for seed collection purposes. (Original description supplied with photograph.)

8 Displaced persons temporary camp for forestry workers. 446 displaced persons were employed during the year to 1950, and 48 permanent barracks constructed. (Original description supplied with photograph.)



model and governance structures change. Substantial historical work needs to be done to critically unpack historical, potentially problematic, labour relations of timber plantation practices. Uncomfortably, plantations of hoop pine must therefore be understood as both ecology-simplifying and extractive infrastructures and, a mechanism to conserve timber supplies and prevent rampant logging of old growth timbers. In 2010 the Queensland State Government financialised the plantations, rewriting the states forestry laws and selling the rights of extraction and responsibilities for ongoing management of the 100-year-old state-produced and -managed plantation resources to an international corporation on a 99-year lease, effectively until the year 2109.[45] While the timber production and supply chains are still very local – hoop pine is grown, milled, and turned into plywood and other products for distribution within its endemic geographies – it is now through financialised investment mechanisms and global carbon markets that hoop pine has been truly globalised.

Normalising *extraction*

Environmentalism and 'cultural accounting'

While modern forestry therefore grew from a close alignment between the state, researchers, and industry, through legislated forest conservation, and infrastructure supporting sustained supply of timber, these activities also co-produced forest-based leisure and tourism, aesthetic/cultural relations to 'nature' and productive landscapes, as well as contemporary environmentalist movements. The development of State Forests (in many cases dominantly consisting of timber production) and National Parks (conservational reserves valued for their integrity) have both become substantial social and leisure infrastructure. State forests with lesser environmental protections, including many hoop pine timber plantations, are mostly publicly accessible for tourism, hiking, birdwatching, camping, fishing, and many other recreational activities. The close relationships many Australians have with these forest activities, and their contribution to rest and well-being, fosters a sense of personal, societal and aesthetic connection. In *Empire Forestry and the Origins of Environmentalism*, Gregory Barton also argues that the forestry practices and experiments of the British Empire were a crucible for the emergence of both modern forestry and environmentalism worldwide.[46] So-called 'forest wars', highly visible and sensationalised skirmishes between environmental activists and logging enterprises, have played an important role in development of an Australian environmentalist politics.[47] Though environmental concerns with forest destruction were recorded from as early as the 1860s,[48] Dargarvel argues that instigations of the forest wars were a response to clearing of old-growth forests to increase the national stock of pine plantations in the 1960s, later morphing as response to emerging waves of threat, particularly to old-growth forests.[49]

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In the settler-colonial context, both environmentalism and cultural heritage accounting can be problematic for reparative justice, preferencing protections for 'nature' and 'culture', as legislated under Western law, over Land Rights and in conflict with protections for the of First Nations Peoples unceded connections to Lands and obligations to care for Country.[50] The difference between Native Title and Land Rights, and how these conditions have been historically and socially produced, relates to how the 'culture wars' presents First Nations connections to Lands as predominantly 'cultural' and positions it alongside appreciation of extractive landscapes and industrial heritage.[51] Beginning with the Mabo decision in 1992, the legal and material implications of these definitions in Australia's system of law have often been put to the test in Queensland. The Australian Heritage Commission Act of 1975 already imbricated so-called 'natural' environments, European history and settlements, as well as Aboriginal and Torres Strait Islander 'cultural heritage' as seen in the definition of the National Estate: 'For the purposes of this Act, the national estate consists of those places, being components of the natural environment of Australia or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community.' The definition is particularly relevant in understanding how settler-colonial relations of forests with aesthetic appreciation, recreation, and well-being become elevated alongside millennia of caring for Country. Professor Aileen Moreton-Robinson, academic and Goenpul woman of the Quandamooka people from Minjerribah (Stradbroke Island), has named ongoing possessive orientations that developed through modern-day Australia's colonisation, as evident both materially and discursively in these ongoing politics, 'the white possessive.' [52]

Australian forests and timber production landscapes have therefore been instrumental in the so-called 'culture wars', in which questions of Australia's national identity, cultural inclusiveness, and the colonial state's legitimacy were contested alongside a new wave of economic modernisation.[53] In 1998, the federal government established processes to negotiate Regional Forestry Agreements with the state governments. These 'cultural accounting' processes took place within the context of federalising economic development with forests being an early focus: part of the process was production of detailed Comprehensive Regional Assessments, performed largely by state government, of heritage and value of the 'national estate' as related to forestry regions. This CRA/RFA process resulted in the publication of a series of highly detailed reports of the biogeographic region of Southeast Queensland as explored through different lenses: 'People and Trees', 'National Estate and Historic Values', 'Travel Routes, Forest Towns and Settlements', 'Sawmills and Tramways', 'National Estate: Social Values', 'Integration of National Estate Aesthetic Value Studies', and 'Management Guidelines' (the latter relates to management of Aboriginal and Torres Strait Islander Heritage). While taking account of societal associations to places and histories, such cataloguing of settler-colonial and industrial heritage also normalises the degraded conditions of landscapes under colonial governance and capitalist production.

Slow(ed) extinctions

In a continuation of these disputed practices into the twenty-first century, climate change and biodiversity crisis, what counts as endangered for the Araucaria forests of Eastern Australia, and who gets to produce the accounts, remains contentious. In 2022, the Sixth IPCC report *Climate Change 2022: Mitigation of Climate Change*, included explicit reference to 'colonialism' as a key driver of climate change and biodiversity loss as well as the disproportionate vulnerability for many peoples to its effects.[54] Of the forty-one living Araucariaceae species across the Southern Hemisphere, the vast majority are now listed by the IUCN Red List as ranging from Vulnerable to Critically Endangered, with many of those still in decline.[55] Listed as 'Least Concern', with hoop pine,[56] bunya pine and Queensland kauri pine, the species found in modern-day Australia, along with *Araucaria columnaris* in New Caledonia / Kanaky (Cook's pine), as the only exceptions.[57] That Araucariaceae is not classed as endangered in modern-day Australia can be explained in part by the existence of the plantations of hoop pine, conservation of extant stands in the UNESCO Gondwana Rainforests of Australia World Heritage Area, National Parks and State Forests, along with extensive ornamental and urban plantings. Yet in liberal concepts of extinction/endangerment, the survival of individuals is often privileged over any consideration for the relational conditions within which a species exists, or if that existence counts as persistence or thriving.

Celebrated for surviving since the Jurassic, so-called sustainable forestry – built by the colonial state and now managed as a financial investment – has merely slowed the potential extinctions introduced to the relational world of *Araucaria cunninghamii* by two hundred years of imperial capitalism and the resulting climate crisis. A year after the plantations were sold off to private interests in 2010, the Forests of Eastern Australia were added as the 35th Biodiversity hotspot, with 2,100 endemic vascular plants and over 77% of the original habitat lost.[58] 'To make the grade as a Global Biodiversity Hotspot, a region must first have more than 1,500 endemic vascular plants (that is, plants found there and nowhere else on Earth). Second, more than 70% of its original (pristine) native vegetation must have been lost or significantly degraded.'[59] Under Queensland's own biodiversity monitoring, seven ecosystems with *Araucaria cunninghamii* are listed as 'Endangered', seven ecosystems as 'Of Concern', and five ecosystems as 'No Concern At Present.'[60] The Australian government also listed Lowland Rainforests of Subtropical Australia, to which Araucaria forests belong, as critically endangered in 2011. The IUCN has not yet completed regional

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9 *Araucaria cunninghamii* (hoop pine) plantation, Imbil State Forest, 2020.

assessments under the Red List of Ecosystems dashboard. Though logging for timber is regulated, eastern Australia remains a globally identified 'deforestation hotspot' due to land clearing, the only developed nation on this list.[61] Even where protected these forests now face escalating risk from climate change effects including bushfires, loss of habitat integrity, and the inability to move, adapt or acclimatise. Even wet 'Gondwana' rainforests, not associated with bushfires, burned during Australia's 'black summer' of 2019–20. In July 2024, Kabi Kabi Traditional Owners were awarded 'non-exclusive native title rights' over an extensively urbanised region of Southeast Queensland. The tile determination area includes a substantial portion of Queensland's hoop pine and exotic pine plantations as well as many of the places outlined in the CRA/RFA cultural accounting for Southeast Queensland *[9]*.[62] It is to be seen how revitalisation of custodial practices of care for Country and financialised plantation management may begin to mutually inform one another.

Resituating architectural imaginaries

Carbon and Country

In contemporary Australia, 'Carbon' and 'Country' might readily describe two epistemic virtues of architectural practice that directly inform how architects are expected to know and relate with materials such as timber. These reflect the recent introduction of new professional competencies: one around 'Environmental Sustainability, Life Cycle Assessment and Whole Life Carbon' and a second called 'Understanding Country', that were added to core requirements for architects under the updated 2021 NSCA (National Standard of Competency for Architects), which regulates architectural registration and accreditation of educational programmes in Australia.[63] 'Carbon' is used here as shorthand for the rapidly growing suite of new technocratic practices intended to 'account' for carbon, whether it is the embodied energy of the materials used in construction, or the lifetime carbon produced in occupied buildings. These include Lifecycle Analysis (LCA), Carbon Accounting, and a multitude of modelling tools and certification schemes (for both materials/products and buildings). 'Country', the term having been introduced earlier in the paper, is used here as shorthand for the requirement for (the mostly non-Indigenous) architects of Australia to acquire knowledge and skills in appropriate and respectful engagement with First Nations Peoples, their knowledge and practices, as well as addressing the kinds of relations with Country that architectural artefacts both embody and enable. Material selection, raised earlier as a locus where architecture's 'semiotic technologies' are being challenged, is also where the complexity of these tensions between 'Carbon' and 'Country' become apparent, as evident in the definition of PC45 (Professional Competency 45). 'At the point of registration – a candidate will […] be able to nominate and integrate quality and performance standards with regard to selected materials, finishes, fittings, components and systems, considering the impact on Country and the environment, and the whole life carbon impact of the project. This includes integrating life cycle assessments and other expertise and advice from consultants.'[64]

Following hoop pine in this paper raises attention to what is at stake for architects between these two very different ways of knowing and being in relation to materials, such as timber, and their production. The technologies of knowing that make up 'Carbon' are inherently desituated and actively strip away other kinds of relations in the drive to produce 'objective and quantitative' data that would once and for all enable perfect decisions. An artefact of this desituated thinking is that in LCA/LCI tables and other carbon accounting data available, 'softwood'

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and 'plantation pine' are referred to interchangeably, irrespective of whether the timber is from endemic species such as hoop pine (*Araucaria cunninghamii*) and cypress pine (*Callitris australis*), or from exotic species such as radiata pine *(Pinus radiata*), Caribbean pine (*Pinus caribaea*) or southern pine (*Pinus taeda*). This constitutes a doubling down on the desituating logics of Western technoscience and how it produces a false commensurability in construction materials. Collectively, these technologies of knowing embody an assumption that the most ethical thing architects can do is focus on limiting carbon emissions, and that the only thing preventing perfect material decisions is data. In the case of hoop pine this means celebrating the existence of modern plantation timber production logics for its lower embodied carbon in comparison with other possible materials and/or timber produced by logging of old growth forests without accounting for how those plantations came to exist. Even while paying extremely granular attention to certain aspects of material production, 'Carbon' tends to erase any necessity of engaging more directly with real socio-ecological conditions of production, especially as produced historically. While new competencies also require architects to build capacity in understanding First Nations ways of knowing and being with the world, the application of this competency in architectural projects often shares a predication on starting with deep attention to where we are now and looking into the future from the present-day condition.

Recognising 'semiotic technologies'

This paper has already addressed how, in the absence of more meaningful relations to material production, aestheticisation becomes the only form of relation available. Both the imaginaries that accompany architectural artefacts and the production landscapes that make these artefacts materially possible, therefore need to be interrogated for their 'semiotic technologies', or how meaning is actively produced. Bregje van Veelen and others propose that: '[…] mass timber's emergent sociotechnical imaginary embodies a distinctive kind of futuring work, a form of "nostalgic futurism" which conjoins – not always comfortably – distinctive drives which we term technofuturist and nostalgic-reparative' identifying how these imaginaries are produced within aesthetic imagery of architecture.[65] The techno-futurist orientation is easily grasped as a continuation of narratives that separated traditional or vernacular meanings and entanglements from construction materiality as a deeply entrenched aspect of universal modernism and that align with 'Western conventional moments labelled past, present, and future.'[66] In a detailed exploration into 'the basis of a moral engagement with the past in the present' in the context of settler-colonial Australia, Deborah Bird Rose clearly articulates the risk of indulging in reparative imaginaries on the basis of desituated knowledges when she states: 'A seemingly commonsensical orientation towards the future, in a society built upon destruction, enables regimes of violence to continue their work while claiming the moral ground of making a better future.'[67]

For the architect in modern-day Australia, 'nostalgic-reparative' imaginaries of timber architecture, which the authors describe as 'significant if selective appeals back to wood materials' more traditional premodern and preindustrial associations',[68] perhaps operate within the 'touch the ground lightly' construction made globally famous by Pritzker Prize-winner Glen Murcutt, who also chose hoop pine as the interior to most of the houses for which he is renowned.[69] Yet this environmental sensibility owes its tectonic heritage as much to the to the industrialised logics of international modernist architecture as to the construction practices of early colonial extractive vernaculars including Queensland's 'timber and tin'. This nostalgic reparative is therefore dependent on continuation of problematic relations to Country: modernised systems of material production, such as plantations of hoop pine, and proprietary relationships to the colonised landscape to which it opens. In this context, we might also revisit more critically how the recent rebranding of Australian araucaria ™ from hoop pine, as it is known throughout industry, weaves a discursive web that claims ancient Gondwana continuity, and aestheticises both the timber architectural relations and the plantation landscapes they produce without any reference to First Nations Peoples.[70]

Situating architectural imaginaries of timber requires the reconnection of desituated knowledges, revitalisation of ancient knowledges, and critical reflexivity with respect to the positioning and blind spots of architectural perspectives and 'semiotic technologies'. Situated imaginaries need to be underpinned by sustained and granular historical and intersectional inquiry into aesthetics, construction practices, labour relations, as well how material and discursive practices of architecture and construction emerge and develop *in situ*. Spending some time with the inherent incommensurability of carbon accounting and caring for Country presented a useful place to begin. For Australia, this will also include acknowledging impacts of knowledge sharing and economic trade with, and historical appropriation of, traditional ecological knowledge and industrial histories of First Nations Peoples.[71] This case study of hoop pine complicates architectural relationships to timber and Country as it takes an important first step in reconstructing thicker, situated knowledges – by following one timber tree with limited geographical extents yet deep entanglements. There is significant work yet to be done in this ongoing project if doing the work of producing 'no-nonsense commitment to faithful accounts of a "real" world, one that can be partially shared and that is friendly to Earthwide projects of finite freedom, adequate material abundance, modest meaning in suffering, and limited happiness' is to result in tangible, materially reparative imaginaries of practices with hoop pine.

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Notes

1. See: Lindsey Wikstrom, *Designing the Forest and Other Mass Timber Futures* (Abingdon: Taylor and Francis Group, 2023); and D. Handel, *Designed Forests, A Cultural History*, 1st edn (London: Routledge, 2024) <doi:10.4324/9781003473411>.
2. Hanna Sophie Mast, 'Conflicting Sociotechnical Imaginaries of the Future Built Environment: An Analysis of Current Discourses on Timber Construction in France and Germany,' GAIA – *Ecological Perspectives for Science and Society*, 31:3 (2022), 151–7 <doi:10.14512/gaia.31.3.5>.
3. See *Place Makers: Contemporary Queensland Architects*, ed. by Miranda Wallace and Sarah Stutchbury (Queensland Art Gallery, 2008); *Sweat: The Subtropical Imaginary*, ed. by Andrew McNamara (London: Institute of Modern Art, 2011).
4. See details of trademark at Australian Trade Mark Search, 'Trade Mark 2406900,' Australian Government, IP Australia (2024) <https://search.ipaustralia.gov.au/trademarks/search/view/2406900?q=araucaria> [accessed 25 July 2024].
5. Donna Haraway, 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,' *Feminist Studies*, 14:3 (1988), 575–99.
6. This approach sits alongside others, each attending to how materials are materially and discursively produced by, with, and for capitalist markets. See: Mimi Sheller, *Aluminum Dreams: The Making of Light Modernity*, 1st edn (Cambridge, MA: MIT Press, 2014); Jane Hutton, *Reciprocal Landscapes: Stories of Material Movements*, 1st edn (London: Routledge, 2019), and Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton, NJ: Princeton Architectural Press, 2015).
7. Arauco was initially used to designate a province of Chile, from which the genus 'Araucaria' was named and 'Araucarians' became commonly used to describe the languages and Peoples of this territory, including the Mapuche. See: Willem F.H. Adelaar and Pieter C. Muysken, 'The Araucarian Sphere,' in *The Languages of The Andes*, Cambridge Language Surveys Series, 1st edn (Cambridge: Cambridge University Press, 2004), pp. 502–49; Mirko Vidakovic, *Conifers: Morphology and Variation*, trans. from Croatian by Maja Soljan (Croatia: Graficki Zavod Hrvatske, 1991) and 'Araucanian,' Merriam-Webster.com Dictionary, Merriam-Webster, available online: <https://www.merriam-webster.com/dictionary/Araucanian> [accessed 23 June 2025].
8. In such as mapping of languages akin to natural categorisations, Mason includes the 'Pewenche' (Pehuenche) language, which derives from Pewen/Pehuen, the name the Pehuenche people call the nuts of Araucaria Araucana (araucaria pine). John Alden Mason, 'The Languages of South America,' in *Handbook of South American Indians*, ed. by Julian Steward, Bureau of American Ethnology Bulletin, 143 (Washington, DC: Smithsonian Institution, 1950), pp. vi, 157–317.
9. ARAUCO, 'ARAUCO | Sustainable Forest Products – Pulp, Panels, Lumber,' Arauco Medio Oriente <https://arauco.com/mo/> [accessed 19 November 2024].
10. David J. de Laubenfels, *A Geography of Plants and Animals*, The Brown Foundartios of Geography Series (Dubuque, IA: William C. Brown Company Publishers, 1970), p. 47.
11. Peter Kershaw and Barbara Wagstaff, 'The Southern Conifer Family Araucariaceae: History, Status, and Value for Paleoenvironmental Reconstruction,' *Annual Review of Ecology and Systematics*, 32:1 (2001), 397–414 <doi:10.1146/annurev.ecolsys.32.081501.114059>.
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14. This list has been produced from the authors understanding-to-date of endemic hoop pine extents as cross-referenced to mapping of Indigenous groups produced by the Australian Institute of Aboriginal and Torres Strait Islander Studies, 'Map of Indigenous Australia (1996),' *AIATSIS* (Australian Institute of Aboriginal and Torres Strait Islander Studies, 2024) <https://aiatsis.gov.au/explore/map-indigenous-australia> [accessed 19 November 2024]. The map has limitation as understood from the explainer from the map's creator: 'This map attempts to represent the language, social or nation groups of Aboriginal Australia. It shows only the general locations of larger groupings of people which may include clans, dialects or individual languages in a group. It used published resources from the eighteenth century–1994 and is not intended to be exact, nor the boundaries fixed. It is not suitable for native title or other land claims.'
15. Anne Poelina and others, *Declaration of Peace for Indigenous Australians and Nature: A Legal Pluralist Approach to First Laws and Earth Laws* (London: Springer Singapore Pte. Limited, 2024), p. 33.
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32. Frost, *An Environmental History of Australian Rainforests*, p. 192.
33. Ibid., p. 157.
34. The Forest Products Bureau was the beginning of a significant focus on state-sponsored forestry research in the region. See: David Gough, 'Early Forestry and 100 Years of Timber Research in Queensland', *Australian Forest History Society Newsletter*, No. 75, June 2018, pp. 3–11.
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Competing interests

The author declares none.

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