An exegesis submitted in fulfilment of the requirements for the degree of Master of Design by Project

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Declaration

This Thesis/Dissertation/Research Project entitled

Horological Furniture:
An investigation into temporal form

is submitted in partial fulfilment for the requirements for the Unitec degree of

Master of Design by Research

I confirm that:

• This Thesis/Dissertation/Research Project represents my own work;

• The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.

• Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Simon Gamble
October 27th 2011
Horological Furniture:
An investigation into temporal form

Research Question: How can temporality be used to develop new strategies for the design of furniture?

This exegesis documents the journey through my Masters of Design project Horological Furniture.

An artefact's temporal form is defined by changes manifest through use over time. In this project I have crafted furniture while considering the role of time as a design dimension. Normally we privilege the new; however with furniture, the temporal form is often one of devaluation and decay.

My making has been guided by a Heuristic approach. I have employed a 'research through design methodology' of testing ideas through a cyclic process of observation, making and reflection.

This text is divided into two distinct phases; the first is an exploration of immediacy and the second of longevity. These explorations parallel the horological modes of clock and calendar.

Abstract

Through research, direct observation, experimentation, making and use I have identified the potential for artefacts to operate in one of two temporal forms, specifically damage or diary. Damage and diary act as metaphors for the analogies of clocks and calendars.

This project has affected the manner in which I perceive use, wear, and damage of artefacts. Damage or Diary will now be used as a schema to critique my ongoing practice and as a crucial tool to influence my making.
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Tick tock, tick tick, pip pip.

Time is everywhere. We look to our wrists, our phones, our ovens, to the corner of a screen or little boxes beside our beds for temporal markers. In many ways, our world is dictated by the clock. We have required timepieces for navigation, the regulation of prayer, economic development and technological advancement.

A hundred years ago, and for four hundred before that, clocks were totally mechanical, requiring cogs, springs and pendulum. Currently the majority of timepiece's tempos are regulated by the oscillations of an electrified slither of quartz; no moving parts, just visual change and change again. There are of course different manners of reading and recording time. The Deep Time1 of Cosmology and Geology, the biological tempo of circadian rhythms, the tide and seasons, the millennia, centuries, decades, years, months, days, hours, minutes, seconds, or nanoseconds. While we are used to looking at clocks to define timeframes, other objects, ones without spinning hands or digital displays, can also act as temporal markers. Technology impacts not only what we use to tell the time but also how we work, dwell, and access information. In contemporary western culture we have become acutely impatient with technology. The instantaneous ubiquity of information on demand via the internet evokes frustration with its absence, but anger if we have to wait for dial-up speeds. Deceleration, in regard to technology, it seems is a dirty word.

I am a designer maker, that is I make the objects that I design. I use this term to differentiate my practice from industrial design which inevitably, in the production stage, separates the designer and the designed. As a kinaesthetic (tactile) learner, ‘making’ is a source of unending pleasure. The process of design, crafting and the haptic feedback from materials are all intrinsic to my practice. As a result, I am less interested in mass produced objects and more interested in bespoke, crafted artefacts. This is not to suggest I am a technophobe. I have an abiding interest in technology and the tools of industrial production. It is simply that the tools and technology of consumer production are, for me, infinitely more interesting than the products they produce.

Throughout my life, I have had an affinity for the damaged. This was possibly due to the limited number of new things in my family home. Toys, clothes, bicycles and other ephemera were passed down or salvaged from skips and inorganic collections. Cleaned, restored or repainted, pre-owned objects were an ever-present element of my upbringing. The fact that these artefacts had a life before making their way into my sphere was never a concern, but rather fostered a sense of appreciation. This ongoing interest in the second hand has tempered my ability as a maker. Some artefacts simply need a little attention. A great deal of my ability to construct comes from my tinkering that has gone alongside fixing. With this, comes the knowledge of how things were made and how they work. Effectively, I practiced reverse engineering for years before ever learning the term.

My practice has, at times, borrowed directly from the past, sourcing materials from charity shops and using nostalgia as a tool. My Crown Lynn Toki (fig.1) are an example of this. Re-worked from cracked and chipped Crown Lynn tableware, the success of these pieces is generated through a shared cultural experience; dinner at Nana’s. By taking the discarded and unloved remnants of a revered part of New Zealand’s ceramic production history as my raw material and re-crafting it, I am tapping into that history. “These were the plates we had as children” or “I remember that pattern from my grandparents” are common statements associated with these pieces. While I have up-cycled and crafted my own contemporary interpretation of the toki, I accept that my toki’s success is based on the work of others. Without Tom Clarke and his employees at Crown Lynn, I simply would have no raw materials to work with.
Objects consigned to second hand stores are only partway through their life cycle. They may be fine as they are, repaired, or repainted and, after use, may find their way to the tip. But this midpoint of being worn (in and out) is largely ignored by the designers and makers of domestic objects. It is not surprising that it is impossible to design an object mapping all of its possible scenarios from conception to conclusion, from cradle to grave\textsuperscript{2}. As a result, the predominant foci are towards these points, not the life between.

This project is my exploration into the possibility, as a designer, to have some influence beyond the periphery, giving consumers and my products something other than a trip to the tip to look forward to. During this project I have produced two tables, \textit{Break and Side}, three rocking chairs, \textit{Fabric, Poplar and Polyplast}, and three benches, \textit{Piix1, Piix 2 And Piix 5}, alongside a variety of test pieces.

This project sits between the spheres of material culture, Horology and user experience; within those spheres I have further divided the project parameters into cultural experiences as they relate to time and domestic artefacts. This document is a record of my process; my successes and failures.

I have used a ‘research through design’\textsuperscript{3} methodology to explore ideas through making, reflection and development. This is a heuristic design process. In its most basic form, a heuristic methodology is one of trial and error, of action, reflection then reaction.

My making process, with all its development, tests and trials, exploration and assessment, is inherently suited to this approach. My work usually unfolds from a simple observation that is tested. The results are then mocked up either in the real or virtual, altered, developed and assessed, before being presented.

In this project the final pieces of furniture have been placed in Long Black Café (a café at Unitec) for finishing. The café was chosen as a site of intensive use in an attempt to compress the timeframe and hasten the development of damage. This decision was both successful and counterproductive, as is described later.

Throughout this project, there have been a number of unexpected outcomes. This is to be accepted, as a heuristic approach relies heavily on intuition and educated guesswork. The expectation that I might get it wrong or that the answer is \textit{no that didn’t work} is an integral part of this methodology and my learning.


fig. 2
Wear and Exchange

Wear is the inevitable consequence of use. All objects are in a constant state of flux, moving from pre-existence to post-existence. It is the perception of this flux that we register as time. Clocks do not measure time, but this flux, or at least its recognisable changes within space. Time requires space and entropy marks its passing. Otherwise, a moment and millennia would be indistinguishable. The precise representation of wear on a surface is an expression of its position in space and use through time. This implies that considerations around time in the design of objects could be used to create artefacts capable of displaying their ‘life’ through the unique marks manifest on their surface. Just as we respect the qualities in individuals that take a lifetime to achieve, so too could we appreciate or value surfaces for their individual qualities.

“Once one took the paint off the blue blanket chest, and sanded it down, and sharpened its edges, it would be difficult to tell it from a thousand reproductions. The nice proportions would still be there, but much of what gave the chest its beauty lay in the evidence of its travels through the years. Once that evidence had vanished, its history would disappear.”

While other related fields, notably architecture and jewellery, have exploited the possibility of surface and structural changes through time, the opportunity of utilising this potential has been largely ignored within the field of furniture design. Notable exceptions are items in the ‘do series’ by Droog, which were both finished and unfinished. Each piece required active engagement, sometimes quite destructive in nature, to individualise the work. A sledge hammer, for example, is supplied with Marijn van der Pol’s ‘do hit’ (2000) (fig.3.) In contrast, there are a variety of jewellers that utilise the potential for change, including 22 Design Studio’s concrete and stainless steel rings (2007) (fig.5) or Ilse-Marie Eri’s gold and silver wedding bands (1999). These works have decorative surfaces designed to soften through repetitious use. In the field of architecture, the Australian Centre for Contemporary Art (Melbourne) designed by architects Wood Marsh (2002) and RTA Studio’s Iron Bank (Auckland) (2008) (fig.4) utilise a special high carbon steel called Corten. Corten is designed to oxidise and rust to create a protective coat. This patina develops and changes over time depending on atmospheric conditions. While these are both contemporary buildings utilising the same external cladding, the process of weathering is not new.

“Weathering is often associated with a romantic appreciation of the appearance of buildings that have aged: their mellowed brickwork, moss covered stone, and seasoned timber.”

These works exemplify an understanding of the changes a material will undergo over time. These changes are then employed as part of the completion of the design.

fig. 5
Rock,
22 Design Studio,
2007
The Preformative Object

“A Japanese tea bowl – Chawan – acquires its beauty through having been used over the years; when the enamel’s glaze has faded and the colour of tea stains its pores and cracked lacquer; when its uneven surfaces have been rubbed smooth through the repeated use of the tea whisk.”

In 2003 Dutch designer Maarten Baas broached the subjects of change and time with his Smoke series (fig.9, 10, 11). This series consisted of a collection of burnt furniture presented by Dutch label Moooi. Baas comments:

“People tend to hold on to what they have, without wanting things to change. Time is regarded as a tedious factor and not an extra dimension. We don’t often see any value in the process of change. Damage has to be repaired to maintain the original concept: symmetrical, shiny and tight.”

But Baas’ break with convention still regards the designer as author, instigating and directing the flame, dictating when the work is finished and then finishing by polyurethaning the remnants to retard any further decay. Such a consideration of surface becomes just another veneer, a mere visual condiment; fire is faster than repair and more visceral than paint. The continued degradation of the object is rejected and time once again becomes a foe to rile against. By comparison the do break \(^{10}\) (fig.8) ceramic tableware produced by Peter van der Jagt and Frank Tjepkema’s for Droog (2000)\(^ {11}\) is more aligned to Baas’s rationale than Baas’ own work. do break and the later series Shock Proof (fig.6,7) are polyurethane lined ceramic vases, that work from the position that all ceramics are eventually broken. Their ‘decoration’ is derived from breaking the outer ceramic shell. The vases retain their primary function as a usable vessel by preserving their intact, inner polyurethane core. This work requires the engagement of the consumer to activate the transformation, permitting the artefact to alter through time and use. do break accepts the role of the user as co-creator. This work also recognises the relationship between material properties, and the affect of time on those materials. The changes that take place are considered inevitable, but not derogatory. Unlike Baas’s polyurethane refinishing, the vases can be re-broken again and again and time is truly not considered a foe.

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9 Ibid
Examples from
Smoke,
Maarten Baas,
2003
Diagram of Project Parameters

fig. 12
Non-Verbal Communication

Chronemics

My initial survey into the use of time as a design tool highlighted the difficulty in marrying intent and delivery when considering time. I queried how other fields value and assess the use of time. My first avenue of literary exploration was into Chronemics, a branch of communication theory. Specifically, it deals with non-verbal communication related to time. In a Chronemic sense, the way we structure, value and react to time can be loosely grouped into two cultural norms; either monochronic or polychronic time. The temporal behaviour between these cultural norms varies on almost every level, from the analysis of time, timing and tempo. These views extend into the considerations of the past and future and an individual's relationship to it. For example, New Zealand Maori see themselves at the end of a long line with their ancestors standing before them; in contrast New Zealand Europeans (Pakeha) see their ancestors as standing behind. Both these approaches bear an influence in my making. Respect for both tradition and technology requires the ability to look through time in both directions and appreciate the view.

Monochronic Time and Industrial Production

Monochronic time is objective and driven by the clock. Monochronic cultures view time as linear and absolute. Time is a substance that can be segmented, arranged and managed.

“Monochronic people work sequentially, adhere tightly to plans and schedules, and are accustomed to short term relationships”.

The relationships discussed are interpersonal but Edward and Mildred Hall’s comment hints towards a sense of ubiquitous disposability. In Monochronic cultures time is divisible by increasingly small increments but holds little value other than that of increasing speed. The concept of delayed gratification, or projects which may take more than one lifetime to complete become abstract(s). Speed and acceleration become the valued aspects of time. The sooner one task is finished, the sooner the next can begin. This leads to a lowering of quality, as care is replaced with expediency. Monochronic cultures are industrial or post-industrial. It is industrialisation and the organisation of labour that necessitate the precise measurements of time. Horology, the discipline of measuring time and making of chronometers (accurate clocks) is a Monochronic cultural obsession. As the west’s preoccupation with speed accelerates, the time which we allow objects to gain meaning decreases. This exchange of time with speed is based on capitalism’s obligation to profit; time is, after all, money. Capitalism requires the exchange of time for money. We buy possessions with our time; money is simply Capitalism’s agreed medium of exchange.

“When transactions become easier they also tend to become less meaningful and less exciting.”

In a consumerist society, the specific objects of exchange become immaterial. German philosopher Karl Jaspers stated:

“When (the ideal type) has been realised, attachment to specific exemplar indeed has no relevance anymore; one only loves the form not the specific object.”

Herein lies one of the more pressing problems embedded in an industrially produced object’s value. Traditionally, the aim of producing objects en masse is to strive for similarity, similarity that denies evidence of the hand or machine that made them. The intent is homogeneity and uniformity. Value is given to this uniformity but not to variation. This autocracy of treatment theoretically allows for uniformity of manufacture, quality control and ease of shipping. This sameness removes any hierarchy of objects within a mass produced set: all similar in size, form, material, all in the same box, sold in a multinational store and as ubiquitous as the mono-block chair. The dirty little secret of mass production is that there is an awful lot of hand work going on. Most mass production is still
heavily labour intensive, the direct evidence of human endeavour is simply unvalued, denied and concealed. The evidence of the hand is hidden underneath, inside, or under layers of finish. My concern with the denial of the hand in production is that it inevitably privileges a state of non-use. The pristine artefact in its box, unused and purportedly untouched, sterile, is in the best state it will ever be. As soon as the plastic wrap is pulled away and skin meets surface, the artefact is on an inevitable slide toward the tip. Once the imaginary line of warranty repair has passed, the object is living on borrowed time.

**Polychronic Time and Craft Production**

“In almost every respect, polychronic systems are the antithesis of monochronic systems. Polychronic time is characterized by the simultaneous occurrence of many things and by a great involvement with people.”

Polychronic cultures view time as subjective and are less focused on the accounting of time. Polychronic time systems are ones in which time is less clock-oriented, scheduling is more fluid and multitasking is the norm. Time is seen as circular and actions are governed more by natural rhythmic cycles. Telling the time may be based on the position of the sun, moon or stars, the tide or some other natural phenomenon. In Polychronic cultures, the method of production is often as layered with meaning as the finished artefact. This meaning is difficult to quantify into monetary value, especially when more than one participant is involved. The manufacturing process follows convention based on a shared experience, and there is an understanding that increases in speed at some point result in a loss (of quality, integrity, and meaning). This loss is also difficult to quantify. In the past few years, the term ‘craft’ has had something of a renaissance, in part brought about through the resurgence in western handicrafts marketed through websites like Etsy.com. Beyond the cutesy nostalgia of much ‘craft’, there is an appreciation of doing a job well for its own sake and a deeper level of cognitive engagement. Craft production revels in the maker’s ‘hand’, though as Fo Wilson explains, the term should not simply be taken purely literally:

“Even though we talk about hand-made in opposition to machine-made, we use the word hand not in its strict sense of ‘made with our hands’, as much as a signifier of embodiment. The crafts draw on our haptic or visceral experiences as much (or even more than) our rational mind - both for the maker and for the audience. The ‘hand’ stands in for the rest of the body.”

Craft has no allusions to either the amount of labour required in the crafting of object(s) or the role the maker’s mark plays in value of objects. A well crafted object will reveal not only individuality but, somewhat oxymoronically, uniformity. To produce similar objects is difficult and uniformity is valued for its mastery of process and material. A well crafted set of hand thrown cups, for example, will be conspicuously similar. This ability to replicate uniformity is time intensive; 10,000 hours is an oft quoted maxim for the time required for the mastery of a skill. This sets up a disturbing possibility for the life of well-crafted objects. The time spent honing a skill is recouped in the cost of an object once mastery has been achieved. This means a well crafted object may be too expensive to buy, use, or possibly even touch.

Monochronic, Polychronic Cultures and Digital Craft

There are cultures which can exist with a combined comprehension of time: Hawaii is one. As an American state, it is bound by western cultural values and as such Monochronic time applies. However, its geological position in the Pacific subjects it to ‘Island Time’ or Polychronic ‘Hawaiian time’. If an appointment is made for two PM, for example, the statement is suffixed with either ‘American’ or ‘Hawaiian’ time to differentiate between two PM exactly or sometime in the afternoon. New Zealand is another colonised corner of the Pacific triangle and accommodates the concept of ‘Island Time’. This slippage and overlap in temporal observation can only occur in the boundaries between two cultural norms. It is paralleled in production through the processes of mass customisation and digital craft. Digital craft is the incorporation of digital production technology Computer Aided Design, digital manufacturing Computer Numeric Cutting, laser sintering and cutting, 3D printing and craft sensibilities which privilege the qualities of considered making. Digitally controlled cutting machinery holds potential for crafting unique objects, as it allows for outputs from the virtual to the physical world and there is slippage and overlap here too. Digitally controlled cutting is becoming more and more commonplace in manufacture and its use has started to slip into Western craft practices. In viewing Polychronic craft as mired in nostalgia, and Monochronic industrial production as acceleration obsessed, the contradiction presented by digital craft, positions artefacts in the present. This opens the possibility of producing objects, time-stamped to the present (through production technology) while allowing the object to age, and the body (both maker and user) to remain critical in this process.

21 Ibid. 348.
22 ‘Island time’ is the colloquial term for Polychronic time. It is used by Monochronic cultures to explain a more relaxed attitude toward time on islands in the Pacific.
Damage Objects

The Disposable Body and Newness

The immortal, eternal and static live outside time. For example, furniture viewed as a signifier, in a show home or museum is dead to its original function. There are differences in the roles of objects in institutional or domestic contexts. The object becomes one for view as opposed to use. Objects for view become markers of societal status trapped in the perpetual present. This inert existence is of little experiential meaning. Furniture that is mortal and is used, that lives and dies, is in the flux of existence moving through states of being. The use of an object damages and degrades it. It becomes weathered and worn. This wearing down is full of experiential meaning and can imbue the object with an emotional value. Regardless of our cultural norms regarding the understanding of time, the perception of time is experiential. The ‘experience of time as absolute’ and ‘time as absolute’ are different. It is well accepted that clock time appears to drag or remain constant when we are bored and races past when we are excited. This observation is borne out by Henri Bergson. Perhaps Bergson’s most famous demonstration of the succession lived time is that of watching sugar dissolve in a glass of water.

“If I want to mix a glass of sugar and water, I must, willy nilly, wait until the sugar melts. This little fact is big with meaning. For here the time I have to wait is not the mathematical time, which would apply equally well to the entire history of the material world even if that history were spread out instantaneously in space. It coincides with my impatience, that is to say with a certain proportion of my own duration, which I cannot protract or contract as I like. It is no longer something thought, it is something lived. It is no longer a relation it is an absolute.”

Here Bergson is differentiating the objective (Monochronic) and subjective (Polychronic) time. For Bergson, the experience is the manner in which time is measured. This is the mode in which the objects produced in this project function as clocks. Bergson’s impatience with sugar is allogoric and relates to all uncontrollable temporal experiences. As has already been mentioned current transactions around impatience often centre around the digital technologies and an inability to decelerate. While intellectualization of the experience of time is a uniquely human experience, the experience itself and the articulation of that experience is universal. All matter moves from a state of pre-existence to post-existence; the space between being an expression of the existence.

“That’s a nice car you have there some one might say to us, and we reply modestly, ‘Yes but its second-hand you know’ But we would not give that modest reply if someone said ‘that’s a nice Rembrandt you have there, nor could we give it if the car in question was a ‘vintage’ car: a Bugatti, say.”

Objects and people maintain different timeframes. A well-maintained table, designed for longevity and its environment, made from appropriate materials will easily outlast the 122 years of the longest confirmed human lifespan. Most bodies (or tables) never last that long. Bodies travel a predictable timeline from conception to death. As we age, we generally move through fairly predictable life phases. While nothing is certain, a hip replacement is more likely at seventy than seven. Furniture also has a definitive inception and conclusion, but a far more unpredictable interstitial timeline. Previously in my practice, my influence on an artefact has been confined predominantly to the anterior. Choices around purpose, form, fabrication and materials affect the possible longevity of an artefact, because once completed, the regard for the work is passed to the purchaser. Their value systems will affect longevity far beyond my formal design concerns.

Unvalued objects are disposed of in a variety of ways and at an alarming rate.

"the United Kingdom alone condemns a massive 1.25 million tonnes of waste to landfill per year; waste consisting of fully functioning toasters, refrigerators, mobile phones..."26.

In 'Rubbish Theory' (1979) Michael Thompson argues for a dichotomy of artefacts. Objects are either 'Transient', meaning they have limited lifespan and decline in value as they age; or 'Durable'; these are items have potentially infinite lifespan and increase in value. All objects start their lives in a transient state and only transform to a durable state after passing through a transitional third state; 'Rubbish'.

"A transient object, decreasing in value with time and use eventually sinks into rubbish – a timeless and valueless limbo. In an ideal world, it would then disappear into a small cloud of dust but often this does not happen, and it lingers on unnoticed and unloved, until perhaps one day it is discovered by some creative and upwardly mobile individual and successfully transferred into the durable category."27

For the most part, items fail to survive the rubbish stage of their lifespan. They are recycled, buried in landfill, or burnt once their perceived value reaches zero. Rubbish is, after all, rubbish. To become durable, an item requires an investment of time and money to restore and renew it and time to pass to allow it to become fashionable again. The durable item can be either a restoration or a reinterpretation of the original. The influences of most designers sit at the periphery of their design's lifespan. This is not unsurprising, considering that most artefacts are designed to attract attention, not maintain it.28

The fight against perceivable degradation caused by the passage of time has many fronts, from face cream to architectural cladding, but its tenets are the same; slow down the process, repair the damage and cover the cracks. Deny the fact that ruination will prevail regardless. Entropy is slowly degrading everything. Bodies heal as best they can but they are in a constant state of decline. Artefacts do not self-repair; scratches are permanent scars. A bruise on a wooden surface can be as unsightly as a black eye. In the past, we have ignored or repaired these imperfections in our possessions. Acceptance of our throwaway society has coincided with an increase in cosmetic surgery. A facelift will furnish a new appearance; IKEA will rejuvenate the sitting room. Collectively, society understands that artefacts act as avatars and we (in the west) are preoccupied with youth. The newness of an object creates the illusion of a newness of self. It may be our preoccupation with the perfection of our appearance that is driving our disposable culture.

"As products become more like living things, the body is increasingly approached as a consumer product."29

"Human beings, using objects to survive and conquer, rely on the world of things, merging their own identities with the objects they use."30

The ability of artefacts to act as proxies is one of the suppositions that motivate Marx’s ‘Fetishism of Commodities’ in ‘Das Kapital’ (1867). Following this theme are both Thorsten Veblen ‘The Theory of the Leisure Class’ (1899), and more recently Alain de Botton in ‘Status Anxiety’ (2004), have written about the relationships between people and things. They claim that personal identity is articulated by what is owned. Sending the correct signals pertaining to ones status, depends on the possession of the correct commodities. The practice of displaying wealth and prestige through artefacts is thousands of years old. However, in capitalist societies the values placed on objects and the interpretations of those values are predominantly linked to financial value. Insurance exemplifies this; however emotionally significant (valuable) ‘priceless’ or ‘irreplaceable’ an artefact may be, by insuring it, it becomes chattel. As artefacts degrade in appearance, they also degrade in value. Their ability to communicate is not diminished, though we may be unhappy with the artefact’s commentary, suggesting that we are outdated, out of touch, ill informed, or simply poor.

30 Ibid. 32.
The Furniture

Furniture requires the interaction of the corporal to animate and activate. There is an exchange; the body gives life to the artefact, the artefact records that life. While the active wear may be infinitesimally small, this is no small exchange. The gentle wearing, through use, of wooden objects to produce a natural sheen (a patina of accumulated oils) has long been coveted in antique timber furniture for its decorative and tactile qualities. Its removal commonly lowers the object’s tactile and monetary value. Increasingly, western furniture is produced without the ability to age. Veneer surfaces are becoming less than skin deep (in some cases they are simply printed on31). This allows for little experiential transfer before objects become ‘worn out’. Starting with the dichotomy presented within Chronemics and incorporating elements of Bergson’s temporal experience, I produced two tables, Break (fig.16) and Side (fig.22).

Break

Break is a Polychronic piece. It is a solid timber table fashioned from Fijian Kauri (Eucalyptus marginata). The entire table was intentionally left unfinished, because bare timber is porous and readily accepts and accrues marks. The soft golden colour of the timber also easily stains. Break’s legs and rails were covered with 3500 saw cuts (fig.18). These cuts allowed the audience to alter these parts by chipping the remaining timber away revealing the underlying form (fig.20). I had hoped that the audience would, by participating in the ‘finishing’, come to add value to the table. This process of appreciation through activation was modelled from the Droog ‘do’ series.

Kerfs (cuts in timber) were cut perpendicular to the timber grain. This process is used in the workshop to remove timber from lap or halving joints before gluing. In this procedure, parallel crosscut kerfs are made halfway through the timber at regular intervals (this timber to be removed is considered short grain), a chisel (or similar tool) is inserted and twisted between kerfs. This snaps the timber between kerfs at approximately the depth of the cut. After experimenting with a variety of different distances, the final cuts were made at 4mm intervals. The distance between the kerfs was crucial for ease of activation, as it was intended that the timber between kerfs could be removed without a tool. If the cuts were placed too far apart, the timber was difficult to break away, too close together, and the timber would break during construction. This distance is specific to both the timber qualities and the depth of cut.

By varying the depth of the kerfs, it is possible to outline a form within a block of wood. During the construction of this piece, I discovered Gareth Neal’s Anne console table32 (fig.17). This work utilises the same technique to produce cabriole legs within an American walnut block leg. Neal’s work also deals with time but the intent is to illustrate stylistic changes. The kerfs’ distance and timber choice mean any breakage would be unintentional.

31 An example of this printing can be found at: <http://youtu.be/Z3sIDQ1HCA>, or The Wrong Woods furniture series, which is a collaboration between designer Sebastian Wrong and artist Richard Woods for Established & Sons, 2006. <http://www.dwell.com/articles/wrong-woods.html#ixzz1htN9zXvU>
Break was installed in the Unitec cafe ‘Long Black’. The rationale was to open the work up to the public and monitor its use and record its finishing. Initially, it was unused as a table and customers would routinely watch, but not utilise it. This was followed by use without activation, as various people began sitting at the table. The notion of deconstructing a table as we sit at it is uncommon. It required an explanation of intent to explain the fragility was intentional and that damage was not only inevitable but also invited. When this was made explicit, the act of deconstruction was, at the onset, viewed by non-participants as shocking. This was followed by complacency when it became apparent that there were no repercussions for this somewhat violent action.

It became obvious that for some, the destruction and construction of finish in the table was little more than a large version of a stress toy. Users routinely kicked or flicked large swathes off the legs and rails (fig. 19). As such, the object’s appeal sat not with a fostering of appreciation for the changes taking place across its surfaces, but with its novelty value.
Side

The Side table was my attempt at a monochronic temporal object. Side’s exterior was produced from computer cut, laminate-coated MDF and laser cut acrylic sheet. The materials were chosen for their inability to improve with age. While the laminate veneers provide protection for the MDF beneath, the edges are prone to chipping and it is difficult to produce a moisture proof seal, MDF expands and ‘fluffs’ when wet. The high gloss finish of the acrylic was specifically chosen to limit the potential for touch without damage. Gloss surfaces are more prone to showing signs of damage, as light reflects at different angles off dents and scratches from the main body. Dirt and dust create areas of low reflectivity. The high gloss, glass-like surface acrylic is, in reality, relatively soft and scratches easily.

Set into the centre of the top is a red LED counter which displays the number of times the surface has been touched. The red LED display was chosen for the aesthetic connection to the red LED display of early digital alarm clocks. This movement between the electronic and the physical is representative of my practice as a whole. The circuit I used counts when the circuit is open not closed. This means the system counts when the subject breaks the circuit (by removing their hand for example), not when they close the circuit by touching the table. The circuit counts a loss, not a gain. However, many people misinterpreted the proximity sensor for a simpler pressure switch. This meant they tried to activate the tabletop by pressing heavily upon it, however the sensor is activated by capacitance, and weight has no bearing on its function. This piece is aesthetically less imposing than the Break table and as such it is unsurprising that it commanded less attention. The little attention that it did attract seemed to garner less intense and prolonged interaction, commonly after few taps of the top to watch the numbers move up, the object was disregarded. People preferred to kick Break.

Few objects are designed to gracefully wear. It was probably inevitable that the furniture would fail on some level. Exceptions such as the breaking-in of car engines to improve their performance are of little help, as this is done to lessen the probability of mechanical failure, not to foster a bond between drivers and engine specifically, and is not witnessed in the public domain but beneath the bonnet or in the workshop. At this point in the project, I realised that, when viewed from a Polychronic perspective, any object can act as a clock. An apple decaying in a fruit bowl, or the bulb burning out in a lamp, both work as clocks. As damage affects all objects, and time is recorded by measuring change, then any table that is used is already a Polychronic clock. Side is not a chronometer; rather it examines different ways that time impacts on the apprehension of, and engagement with, the object. It is changed and activated by use, possibly in a more dynamic fashion than in standard static objects. However, the speed of change does not qualify the table as being more clock-like than a lamp or an apple. Side is technologically complex, but it counts according to the subjective nature of its environment and interactions, not in an objective manner. While there is no universal time, the localised time of Monochronic cultures still values regularity, and though the table counts precisely, it does so irregularly. It is a Polychronic clock with a Monochronic face. As the table has no backup electrical system, by interrupting the power supply, the counter resets to zero. Resetting the time frame effectively negates the small amounts of damage the digital system is intended to record.

The Break table was ultimately more successful than the Side table. It was primed for being both an interactive experience and a site of exchange. Confusion over the purpose of Break, however, led to it being abused and eventually one of the legs was broken off completely, requiring repair. Ultimately, the placement of the work may have negated its ability to be fully appreciated. The communal nature of the site increases the amount of use, compressing both wear and time compared to a domestic setting. It also failed to foster that sense of personal appreciation that an owned, and valued item in the home might garner.
Good Damage

It is understandable that damage is commonly viewed as a negative. If our possessions are extensions of ourselves, the exhibition of damage is a reminder of our aging and, by extension, our mortality. There are clearly differing degrees of damage. In the third chapter of *Being and Time*, Heidegger addresses damage. Heidegger establishes three categories that identify how we relate to objects. The first, and primary mode of experiencing entities in the world is through intentionality or ‘skilful coping’. When this mode is in play, we experience entities as ‘ready to hand’. Heidegger’s example of a hammer is experienced as ‘ready to hand’ when it is used to hammer in a nail. In this mode we are not explicitly aware of the hammer. We use it without consideration. The hammer is not our focus; instead we are focused on the task of hammering in nails.

This mode of skilful coping is at times interrupted, if the hammer breaks or we have difficulty hammering in a nail for example. When this happens, we move from ready to hand to unready to hand. In this second mode, we experience the hammer, nails or timber as frustrating in some way, hitting a knot in the wood, for example. In the mode of ‘unready to hand’, we must focus on the task:

“Unreadiness-to-hand is a ‘deficient mode’ of readiness-to-hand. We are still using the piece of hardware to complete a task, but our experience of the situation has changed. We can no longer “see through” the tool to focus on the task; instead, we must explicitly attend to the unready-to-hand object that the tool has turned into.”

Present at hand is Heidegger’s third mode. In this mode, we engage with the hammer not as a tool but a collection of physical properties, weight, form and colour. The hammer becomes an object of philosophical (design) consideration.

Heidegger sees ready to hand as the primary mode of experience in two ways: firstly, the majority of worldly experience is in this mode; secondly, the other modes are derivative. A hammer’s being is predominantly a tool to use, and only considered when it is broken or we are contemplating its materiality.

Heidegger outlines three states of ‘unreadiness to hand’: ‘conspicuous’, damaged or broken, ‘obtrusive’, missing a required part, or ‘obstinate’, when the object is a hindrance to pursuing another task. I believe however, that these states should not, be seen as negative. It is the objects damage which brings its Being to a perceptible state. The ‘conspicuous’ state could be designed into part of an object to allow a fuller experience. When an object breaks, our continuity with that object is arrested and the relationship between people and things is changed.

“The partially irrelevant physical properties of the hammer are more salient when the hammer is broken than when it is functioning.”

The problem of course is that this salient moment is also irksome. It seems that the moment most primed for the appreciation of an artefact is also the moment it is least likely to be appreciated.

Yet the moment when we are truly aware of an object, when it fully demonstrates its Being, is gravely important in the object’s life. This is when we decide to repair or replace. This is the point when an emotional historical connection between object and owner is also at its most visible.

34 This contemplation is similar to Plato’s punishment of insentient objects (chairs should be cast out of the city walls if they fail to hold weight, and inflict harm in doing so.) The object is only contemplated when it is damaged.
Cataloguing

One of the objectives of my proposal was to record and create a catalogue of various ‘abused’ materials (fig. 23). The purpose of this catalogue was to expose patterns that had appeared over time. The aim was to determine patterns of damage that could be used to develop desirable and repeatable patterns of wear. These observations give some measure of the types of prospective damage that may occur and where it is likely to happen. To achieve this, I photographed a wide variety of marred surfaces and structural damage. I was not particularly concerned with the field from which the surfaces were derived. Architectural, industrial, and biological structures were all applicable. Stone, hide or skin, metal, timber and plastics were all recorded. These surfaces were analysed and organised to create a lexicon of damage. I defined the categories according to the type of injury the material had sustained. I initially categorised them according to surface treatments, for example, painted surfaces. The issue with this focus is the variety of ways paint will react, according to the type or quality of paint, the number of layers, the undercoat, the primer, the prep work, the environment or the drying time, all of which are unknown.

These photographic observations were effective to a point. The information embedded within the images extrapolates a cause that for the most part can only
be imagined. I could guess a cause for the damage but controlling or influencing the action is based on being able to affect the outcome not simply recording the effect. It became apparent that to connect cause and consequence would require a more extensive material exploration. This observation did lead to the construction of a diagram of damage (fig.25) to serve as a starting point for exploring the types of damage that may occur to objects and how this affects material structure. A stain, for example, is simply a pigment that is absorbed into a porous surface; this is an additive process. However minute the difference, there is more matter in a stained surface than an unstained one. Similarly, when materials fracture or tear their surface area increases along with the volume of occupied space. This is markedly different from scratching or cutting, which removes substance from a material.

Dirt and Stains

“There is no such thing as absolute dirt; dirt exists in the eye of the beholder.”

There are aspects beyond the physical in this diagram (fig 25). The axes point toward damage with varying physiological and psychological implications. Stains, for example, are an interesting aspect for consideration beyond the intentional use of dyes; stains are an unintentional accretion of dirt. British anthropologist Mary Douglas points out in Purity and Danger (1966) that dirt is a social construct, attributed to disorder.

“Dirt offends against order. Eliminating it is not a negative movement, but a positive effort to organise the environment.”

Applying order, regulation and control are hallmarks of mankind’s domination over nature. This is more evident in industrialised cultures where the distance between the natural and the everyday are greater. An effect of this distance is clearly visible in the Chronemic readings of time explained earlier.

Cleaning is an assertion of ownership. By removing the physical residue of others we are psychologically stamping ‘MINE!’ on an object. Designer Bethan Laura Wood subverts these assertions in her Stain (fig.24) series. Her range of teacups reveals images through use. Tannins in the tea stain the unglazed surfaces of the porcelain cup darker with each successive use. This technique is also employed by the Czech collaboration Whitefruits in their Smiler tea service. This method effectively communicates the relationships between use and time. It also highlights the role of individual ownership contrasted against that of the communal. It is unlikely that these artefacts would be desirable to others in their used state. It may be an engaging experience to gradually watch a pattern reveal in your favourite cup. It is another altogether to be served a pre-stained cup in your local café.

37 Ibid.
Diagram of Physical Damage

fig. 25
Experience design

We, as consumers, may be indifferent, surprised, shocked or disappointed with the actual experience of using an object. The amount of ‘value’ added to (or removed) from an object through its use is completely subjective. It is impossible to design the emotive response to an experience or predetermine the value given to any phenomenon. Though designers have no true control over their audience’s experiential response, they affect the design of objects, and therefore direct the priming of objects with the prospect of experience. Cut one centimetre off the leg of a chair and it is primed for a wobbly experience, though the value placed on that experience is subjective and open to conjecture.

In *Glimmer*, Warren Berger discusses the attributes required in designing a compelling experience. He describes the ‘Doblin Compelling Experience Framework’ as the five phases of consumer experience: attraction, entry, engagement, exit and extension;

“there must be a progression that starts with drawing people in, then proceeds to deep engagement (characterised by a sense of losing track of time) and finally concludes in a manner that is distinctive.”

The Doblin Framework also quantifies levels of intensity. The most significant to this project is ‘immersive’, meaning you lose yourself in the experience and time foreshortens. While noteworthy, the Doblin map considers experiences as commodities that are ’brandable’ and privileges intense experiences. The immersive experience is based on the intensity of an event, not on a meditative state. So we will not check our watch while riding a rollercoaster. If we are constantly bombarded with intense experiences, they become impossible to differentiate and simply cause confusion or anxiety. This has been expressed in a number of works: Umberto Eco’s *Travels in Hyper-Reality*, Alvin Toffler’s *Future Shock*, Pamela M Lee’s *Chronophobia: On time in the Art of the 1960’s* et al. Obviously, the opposite can also be true. I have lost track of time sanding timber, the experience is immersive and meditative and, in the end, deeply rewarding. Architect Jaakko van’t Spijker describes two opposite experience design modes as:

“closed and open specificity (open=undefined; closed=highly defined). Out of these two positions, the first pretends to deliver unique experiences, whereas the second actually does.”

In this manner, the experiences are either closed to personal interpretation or open to it. As such, our ride on a rollercoaster is intense and has closed specificity (the roller coaster travels a predetermined path), as opposed to riding a bicycle, which has open specificity (the rider chooses the route), and by this virtue may choose relaxing or intense experience. The furniture produced in this project fits into all of these categories.

The pleasurable experience that can be garnered from the act of repairing an object has, for the most part, been removed from our daily existence. The term ‘no user-serviceable parts’ has become a fixture on (modern) electronic devices. This phrase creates more distance between us and our possessions by making them unknowable. Though the term is not associated with furniture due to the general lack of electrical technology embedded in most domestic furnishings, the prospect of a quality home repair is as unlikely for a digital camera as it is for a sofa.

<table>
<thead>
<tr>
<th>EXPERIENCE</th>
<th>Open specificity</th>
<th>Closed specificity</th>
</tr>
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<tbody>
<tr>
<td>Intense</td>
<td>Break table</td>
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<tr>
<td>Meditative</td>
<td>Two Person Rocker</td>
<td>Poplar Rocker</td>
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<td></td>
<td>Piix 1, Piix 2, Piix 5</td>
<td>Polyplast Rocker</td>
</tr>
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| Fabric Rocker |

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38 Doblin Inc is the Chicago based design and innovation consultancy which produced this experience map.
Rockers and Rails

At this point in the project I began developing forms, specifically rocking chairs. The rocking chair was chosen for a variety of reasons. It is a dynamic site; in use, it encourages movement while remaining in a fixed location within a space. It encourages active interaction. The motion of rocking is relaxing and reduces physical agitation. These physiological effects affect our perception of time. The more anxious we are, the slower time appears to pass. In most chairs, sitting is actually secondary and subordinate to performing a primary task. We sit to rest our legs and remain stationary while concentrating on a task. The variety of leg heights, seat and back angles available, arrange the body to facilitate a position appropriate to the task. Unlike most seating, rocking chairs are difficult to repurpose. A dining chair might be a surrogate office chair, but it is hard to write from a rocking chair. Rocking chairs are associated with the boundaries of our lifetimes. Babies held by nursing mothers and the elderly are the common frequenters of rocking chairs.

The rockers of a rocking chair are the paired curved sections on the base of the chair that allow the rocking motion. Rockers are also known as blades or runners. For ease of comprehension in this document, I have used the term runners to describe the part, and rocker to define the entire chair.

The first rocking chairs appeared in Europe in the 18th century. Originally, these were simply preexisting chairs with runners added. My first rocking chair (fig.27) was equally as improvised; a simple steel tube and plywood ex-school chair, commandeered from my dining room. Runners were fashioned from a similar gauge of steel tube. The entire piece was welded together in half an hour.

It rocked terribly.

This was due to the curvature of the runners, which positioned the centre of gravity well behind the rear legs. Conventional rear chair legs slope away from the rear of the seat. This positions the centre of gravity forward and makes it difficult to fall backwards, even while leaning backward. Sitting in my improvised rocker did the opposite. The centre of gravity dragged the head, arms and torso, approximately 70% of average body weight, backward. This was disconcerting, not particularly soothing, and made it difficult to reposition the centre of gravity to rock forward. I removed the runners and remade them with less curvature and a greater length protruding behind the rear legs. By replacing the original pair of runners with pairs of different radii allowed for changes to the rocking motion. Too tight a radius resulted in a pivoting action. Too shallow and the rocking required substantial effort to move. The exact equation appears to

$$ R = \pi A $$

Where $A$ equals the chair front leg length measured from floor to seat. This is effectively the length of the tibia of the sitter.

fig.27
Fabric Rocker

The process then moved into the digital realm. For the last nine or ten years, I have digitally modelled my designs. This process allows for a rapid ideation and representation of form and material. The specific proportions for the Fabric rocker (fig. 32) were constructed around a 600mm cube. The rocker’s exact size was tailored so that its centre of gravity would align the chair arms horizontally when not in use. This was an aesthetic decision based on a visual evaluation of the prototypes. The intention was to construct a rocking frame to house the seat and back. These areas are obviously the main points of contact between the sitter and chair. The seat and back protrude slightly from the frame. The position of the seat and back and their associated angles relative to each other and the frame, position the sitter in a way that allows the runners to finish directly in line with the back legs. The runners have no ‘stops’; theoretically you could rock back far enough to tip backwards completely. In reality the amount of travel required to reach the tipping position makes physical ‘stops’ redundant.

The process of refinement moved between the virtual and physical worlds. Amendments were made to the digital model (fig. 28) in relation to feedback from the test pieces, and vice versa. The end result of this process was my Fabric rocker. Constructed from a powder coated square section steel frame with a solid American cherry (*Prunus serotina*) seat and back.

The seat of this chair was then upholstered with 35 layers of fabric (fig. 31). I chose ten varieties of fabric that were randomly layered to produce a stack thirty-five layers thick and 50mm high, twice the thickness of the steel frame.

Each layer of fabric is sacrificial in a manner similar to breakable segments of Break. As the top layer wears away, a pristine layer is exposed beneath. The destruction of each surface reveals a new surface and recreates the artefact. This act of wanton destruction and reinvention is played out on a daily basis in the form of graffiti and its removal. The adjacent image (fig. 29) is of peeling layers of paint on a train station seat. The colourful layers are the markers of graffiti, the off-white layers being the council’s version of a constructive contribution. This topographical layering of history is one of the ubiquitous effects of the passage...
of time and is articulated in a range of scales and is both additive and reductive. The geological term for this addition of layers is accretion, the reductive mode being erosion. The layers of fabric on the rocker are intended to erode, consistently moving in and out of Heidegger’s ‘conspicuous’ mode.

The time taken to wear through upholstery fabric would make it unlikely for the subsequent layers to be exposed before the completion of the project. One front corner was intentionally worn through to expose the subsequent layers and illustrate the construction (fig.30). The edge (boundary) was obviously damaged, and as such had moved from ‘ready to hand’ to ‘present at hand’. However the damage was superficial, as such the chair was not in a ‘conspicuous’ state. As with the earlier pieces, the final work was placed in the Long Black café. When the chair was presented in with its damaged corner the intentionality of damage was obvious and as such may have be seen as decoration, moving the perceived state to ‘ready to hand’ for all but me.
Two-Person Rocker

Further readings around Chronemics had piqued my interest in the possibility of incorporating other aspects of non-verbal communication in the project. I then made a Two-Person rocker (fig.33). The rocker is a powder coated steel frame bench with three runners and a timber slat seat. By sitting in a rocking chair with another person, a level of non-verbal communication and collaboration was required to synchronise the rocking motion. The Dutch horologist Christiaan Huygens observed in 1665 that two pendulum clocks placed on the same wall tended to synchronise\(^{45}\). This was due to mechanical coupling. A similar effect is also apparent in individuals\(^{46}\) and is borne out by a number of psychological experiments.\(^{47}\) These experiments took place on two individual rocking chairs and showed that individual’s rocking would synchronise even when they weren’t explicitly instructed to. I had hoped that the shared experience of rocking might foster an appreciation for the object. However it was utilised as both a bench and a low table. Its intended use remained ambiguous to the café clientèle. My materials and form choices did little to add specifically to the scope of this project and this path of exploration was abandoned.

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Wear Testing

I began material testing utilising a random orbital sanding machine to simulate the attrition of erosion (fig. 34). The test samples were a range of upholstery fabrics. I replaced the sandpaper on this machine with fabric in an attempt to simulate the interaction between clothing and upholstered furniture. The mechanised wearing of surfaces is an industrial process often used to approximate the lifespan of a particular surface finish, material or product but is seldom utilised for crafted or bespoke objects. The samples were photographed at 15min intervals; initially there were very little obvious signs of wear.

Over time, however, the cumulative affects modified the surfaces (fig. 35-38). Initially, the material became glossy, then became threadbare and eventually ruptured and tore. While this is hardly a revelation, this process gave a foundation to look for shifts or patterns in the subsequent experiments. I made incremental changes to the surfaces and substrates, to see if I could speed up or slow down the affect of wear. I recorded these changes and repeated the process of abrasion. In one series of experiments, I stacked woollen fabric atop corduroy. The pattern of wear on the wool exposed the corduroy stripes before the surface actually ruptured. This lead to a series which explored the placement of seams and stitching as a boundary between two pieces of fabric and the aesthetic effects obtained.

The results, for the most part, matched those hypothesized, namely the gradual wearing of a surface to expose the substrate. One of the unconsidered outcomes was, however, far more intriguing. The samples wore from the extremities toward the centre. While this is a rather obvious observation, it marked a shift in process. Edges; the boundary of planes and transition from one to another facilitate the action of wearing. They catch and grab and as they chip and soften they expose the transformation of a surface. Edges create opportunity for wear to manifest. When a surface transitions, in a linear manner, from one plane into another, the resulting thin ridge is more prone to damage. This is the process of erosion. In the case of the Fabric rocker, the surfaces primed for damage are the runners, the arms, the seat and the back.

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48 An explanation of this process can be found at <http://www.weartesting.com>
fig. 35
Woollen fabric and corduroy
On MDF substrate
Fabric covered sander
15min intervals
fig. 36
Woollen fabric and two perpendicular layers of corduroy
On MDF substrate
Fabric covered sander
15min intervals
fig. 37
Flocked upholstery fabric and woollen fabric
On MDF substrate
Fabric covered sander
15min intervals

fig. 38
Flocked upholstery fabric and woollen fabric
On MDF substrate
Fabric covered sander
15min intervals
Digital Abstraction

To produce three dimensional structures with an abundance of edges, I looked to the digitised constructions produced by three dimensional scans (fig.40-44). Three dimensional scanners analyze physical objects to produce a point cloud of samples. The point cloud is an arrangement of Voxels, or pixels, plotted with three dimensional coordinates. This point-cloud extrapolates a geometric surface structure. The reconstruction of this data can be viewed as a virtual model. Contact scanning systems use a physical probe to touch the object and record the position X, Y and height Z. These coordinates are extremely accurate though the fidelity of the final scan is attributed not only to the accuracy of the points in the cloud, but also the number of points within the cloud.

Distortion is present in three dimensional scans and a fast low resolution scan will produce a blocky and large faceted virtual rendition of the real. Conventionally, all care is taken to avoid outputting these types of faceted surfaces. In the past, I have attempted to minimise this effect by smoothing the model digitally, limiting the amount of magnification between the virtual and outputted objects or hand finishing.

At this point in the project, I saw the effect of this faceted structure on the surfaces as desirable. I also noted a correlation between the homogenous grid system of Voxels, and the warp and weft of fabric. By scanning the woollen and linen upholstery fabric left over from the initial rocker, I mapped various surface topographies. As the magnification increases differentiations between materials blur and become abstract. The scans simply become faceted surfaces full of mountains and valleys. I find it impossible to look at the surfaces and not imagine geographic features, a lifetime of low res video game graphics has conditioned me to guiding characters through this style of landscape.

The digital scan files were then run through a process of virtual modelling to simulate wear. Just as mountains erode and valleys fill and become plains, the faceted surfaces acted in a similar manner. Selected surfaces were then reproduced by outputting the files through a Roland CNC mill (fig.45) to produce the back and seat of the Poplar and Polyplast rockers. The back and seat were singled out as the most high-frequency site of physical contact between user and object. The seat and back of the second and third rockers were produced from progressively harder materials. CNC milling is a reductive process, meaning a block of material is placed onto the milling bed then tools remove the material required to produce the desired form. Other digital technologies (3D Printing) could be used to build forms by putting down thin films of material in a layering process similar to the geological process of accretion. Ross Stevens parallels this with the biological process of growth. In his Industrial design Masters thesis ‘Worn out or Worn In’ (2006) he shows a number of wear test examples, including rapid prototype samples.
As has been already explained, the limited number of possibilities embedded within a mechanised process limit variances available. Industry, while denying the hand, also attempts to limit its introduction. It costs every time an employee physically touches a product and this engagement may introduce instability into the closed loop of production. This desire for uniformity influences material selection. It can be easily forgotten that each piece of timber is unique. Over the years, a great deal of timber has passed through my hands. It has taken Heidegger’s ‘obstinate’ state in the form of cups, bows, shakes, knots or other defects to remind me of the individuality of each piece. Renny Ramakers suggests that one of the reasons materials like timber and leather ‘improve’ with age is the fact that they were once alive and aging and consequently bring this temporal quality with them. In contrast heavily processed organic materials lose this ability. MDF, a material liberally employed in mass produced furniture, while technically a timber-based product, has its natural variances processed out. I saw the introduction of variables into my production model as an opportunity to introduce the ‘hand’ and therefore an aspect of craft to the production cycle. To achieve this, I cut sections of the abstracted fabric topographies into solid timber. I waited until the CNC mill had finished its cutting and then simply repositioned the timber. Had I done this in a precise manner.

Piix 1, Piix 2, Piix 5

fig. 46

manner, the result would have been a repeating pattern. By being imprecise in my repositioning, the milling bit would at times cut through thin air, at the next it would be cutting into fresh timber and at other times the cuts would intersect with preceding topographies, creating new forms and contours. On top of this, I modified the scale of the point clouds as I went, so that some of the topographies were made of thousands of Voxels while others numbered in tens. The resulting surfaces, while built of precise cuts, are unrepeatable.50

There are a number of physical scales relating to properties of hardness in materials. The Janka hardness test is commonly used to test timber species’ ability to resist wear.51 For the Piix series of work, I laminated planks of Jarrah (Eucalyptus marginata) (Janka scale 191052) and Fijian Kauri (Eucalyptus marginata) (Janka Scale 61053). The Jarrah is a rich red timber that contrasts with the honey colour of the Fijian Kauri.

The laminated block was cut with the CNC. As the tool moved from one timber to the other, there were dramatic visual changes. These changes were also borne out in the individual timber types’ ability to wear (Janka rating) which in turn was affected the amplitudes and angles of the facets.

50 Architect and industrial designer Greg Lynn uses a similar system of iterative but unique forms based on teratology and symmetry breaking to produce non-modular repetitive forms. This is exemplified in his Form coffee set for Alessi 2003.
51 The Janka test is used to measure timber’s resistance to wear. To test a timber sample a steel ball is pushed into the timber sample and the amount of pressure required is recorded, normally in pound force.
53 Ibid
The CNC cut timber sections were use to construct three bench seats Piix 1 (fig.46), Piix 2 (fig.48), and Piix 5 (fig.47). The numbers at the end refer to both the number of overlapped topographical paths, and the overall length of the bench.\textsuperscript{54}

These works were shown in the window gallery of Objectspace in 2010. The works were installed on plinths constructed from square steel tube or represented in tape on the walls and floor. This was intentionally visually disruptive, with the plinths being both two and three dimensional. The use of plinths is problematic when displaying furniture as it makes the furniture ‘obstinate’ (it becomes unusable). The intent was to present the works and plinths as a scattered array of Voxels. This meant the viewer could move through a landscape populated by the virtual made real.

A very light layer of beeswax was used to seal the timber. This was the first time a ‘finish’ had been used on the timber aspects of this project and was the result of the staining that had taken place on the Poplar rocker. Wax was chosen as it does not chip or peel and is easily reapplied (repaired). The timber sections were then attached to powder coated steel frames. These benches can, like the Two-Person rocker, be seen as open specificity, in that their intended function is not explicit in their appearance. This ambiguity of function allows for a variety of uses, but in this case it decreased the potential for use in the café setting. Customers seemed unsure of how to physically engage with the objects. The benches are not uncomfortable to sit on, the difficulty is around the perception of comfort. The faceted surfaces of the bench don’t portray a conventional picture of comfort. The static nature of the benches and the choice of materials make any visible manifestation of change exceptionally slow.

\textsuperscript{54} Piix 1 has a single path and is the smallest bench, there are no overlapped paths. Piix 2 is twice as long as Piix 1 and has two overlapping paths. Piix 5 is five times longer than Piix 1 and has five overlapping paths.
Poplar and Polyplast

Unlike the Side and Break tables or the Piix benches, the Fabric rocker was almost instantly utilised. It was frequented by staff and students as they waited for coffee or was dragged over to a table and used (peculiarly) as a dining chair. The simplicity of form and plainness of implied function made the use of the chair explicit in a manner that differed from the previous works. Watching the café clientèle sit in the chair, it became obvious that I would have to make a variety of sizes. For the Fabric rocker I had used my own body as a universal measure, the runner’s arc being proportioned to my calf length. This meant that I observed shorter subjects sitting, either forward or with their knee on the seat and their calves protruding forward in an uncomfortable looking manner. I produced a medium and small scale chair. The previous cataloguing of wear and material exploration informed the decision to utilise different materials in the production of the chair seat and backs. The faceted surfaces produced through the input-output cycle exhibit different types of wear, dependant on the material attributes. Hard materials tend to chip and round, where softer ones flex and stain.
For the medium sized chair *Poplar* (*fig.50,51*), I chose White Italian Poplar (*Populus balsamifera*) for its low Janka rating (300). I used Poplar plywood for its stability and I had appreciated the visual effect of timber grain present in my early samples. The seat of this chair has been stained blue-black through customer use. This is pigment transfer from denim jeans and dark clothing, dirt and spills. This accretion has also been accompanied by erosion, the peaks and ridgelines of the seat have rounded and smoothed, dulling the surface in both colour and definition.

For the smallest chair, *Polyplast* (*fig.52*), polypropylene fibre reinforced cement was used for the seat and back. Initially designed to reinforce and earthquake proof brick structures, this cement uses polypropylene fibres instead of an aggregate. This allows the cement to crack without breaking apart. The lack of large aggregate allowed for a very smooth cast surface. The cast surface feels smooth to the touch while its crystalline makeup makes it microscopically abrasive. In this chair the high points have, in contrast to the poplar chair, been burnished by use. The physical properties of the cement allows for an exchange of wear, the sitter’s clothes wear away too.

Obviously the *Poplar* and *Polyplast* Rockers work in a different manner to either the *Break* table or the *Fabric Rocker*. Neither have any sacrificial properties. They also differ from the *Plix* series by allowing a visible exchange to manifest over a shorter time frame. The focus of the exploration has steadily moved from immediacy towards longevity, from clocks to calendars. I had hoped that this slowing of process through durability would open the possibility for relationships to develop. This may be possible with the Rockers as their patina increases, but is unlikely once again to fit within the time frame of this project. An observable outcome was the relationships which developed between customers and the chairs based on proportions. Some customers had favourites based on the size of the chairs. This is akin to Goldilocks and the Three Bears... too big, too small, just right. The active decision of having a favourite implies the construction of a relationship between a person and a specific chair. The scale variances in the chairs were key to fostering this.
fig. 52
fig. 53
Paint
On CNC cut Plywood substrate
Sandpaper
15min intervals

fig. 54
Polyplast cement
Wear testing
Fabric covered sander
15min intervals
Conclusion

Horology has two distinct modes, chronometers and calendars. Chronometers articulate time on the micro scale, while calendars deal with time on a macro level. These fields are addressed in this project as the focus moves from ephemeral toward enduring objects.

My act of viewing faceted digital surfaces as topographies had lead toward the consideration of longevity. Topographies and geological considerations of time sit between the experience of time as Phenomenological and the abstract idea of Cosmological time. In orders of magnitude, a lifetime is far shorter than an ice age or period or eon. Even these in their turn are minute when considering Cosmological time frames. The consideration of geological time predisposes itself toward the slow. As my focus has changed from micro to macro, I have moved from the analogy of clocks and calendars, to the metaphor of damage and diary.

I view the Break and Side tables as working like clocks as their temporal form is one of damage. They deal with a sense of immediacy that cannot be sustained over the long term. The Rockers and Pix Furniture can be viewed as calendars, as they diarise longer developmental time frames. From the view of experience design, these objects are moving from intense to meditative and closed specificity to open specificity.

The intention of this project was to open up and invigorate my practice. While the project had no preconceived outcomes, I have to concede there was a great deal of underestimation on my part as to the breadth of scale implicit within this project. There is a tendency to want to find a positive answer to a research question, a conclusion that justifies both the time and effort invested in a project. This undermines the true learning that can come from failure. Many of my assumptions have been proven wrong and more questions and potential areas of exploration have been opened than closed. I had begun this project thinking that I could use time like a layer of paint, which would stick uniformly to my work. I have discovered it is more like quicksilver; flowing and pooling in some areas and not others, generally resisting the touch. Designing with time comes down to a question of intent, observation and a heuristic approach.

I freely admit that, while concluding this Masters, this project is far from finished. I am not entirely sure that it ever will be. Many aspects have only briefly been touched upon, others not at all. This exegesis is another boundary between academia and applied craft practice and a horological object in itself (clock or calendar). Luck, the quality of my making, and millions of unforeseen and unforeseeable events will determine the life of the objects that I make. Any designed intervention that takes place is inevitably a contrived experience if it is repeatable (closed specificity) and unknowable if it is not (open specificity). Experiences which are exciting are unsustainable, while meditative ones may be imperceptible and dull.

During the timeline of this project, both the Poplar Rocker and the Break table were damaged in unexpected ways. In both these cases, the artefacts were quickly disregarded by their audience. This suggests that my assumptions regarding the way use fosters affection could be wrong, or this could also be a context issue given the public interactive and informal nature of the environments they were exhibited within.

All objects can act as temporal measures. They age and develop in ways that we can choose to appreciate or not. They do so based on cultural and personal attitudes toward both material attributes and qualities of production.

This project has helped me to classify and assess the various potentials for an object’s temporal form. As such, this project has profoundly changed the way in which I view my making and given me a new set of criteria to assess and critique objects.

All objects can be seen as either clocks or calendars, their temporal form is one of either damage or diary. Our assessment of them in a state of ‘un-readiness to hand’ is what determines their mode. (An undesired, but undamaged object, may be seen in an ‘obstinate’ state). Objects which develop marks or wear quickly have a temporal form that presents itself as damage. Those that take longer to develop can be seen as diaries. While time may tick on regardless, both of these
modes require the corporal to activate and develop. It is through transactions with the body that objects gain a life of their own. Though individual materials vary greatly, those which have been alive, either literally (timber, leather) or metaphorically (up-cycled, reused) bring this temporal nature with them, and are likely to be able to act as diaries.

Our experience of any object is crucial in determining our attitude towards that object. Experiences that are personalised in some way are more effective in fostering relationships; this can be as subtle as sitting in the right sized chair. Qualities of the experience or interaction can be tailored toward either an assessment of damage or diary. The more intense the experience, the more likely the artefact’s temporal form will appear as one of damage. Sacrificial surfaces can be used to lengthen the experience time frame. This will extend Heidegger’s ‘conspicuous moment’, but ultimately the experience is unsustainable. This was exemplified with the Break table, the experience becomes contrived or the surfaces wear away.

Finishes like paint, lacquer or wax may act as a sacrificial surface, but an appreciation of the specific object must be gained via experience before the repair state is reached or the object may be considered damaged and therefore disposable.

If an object is to move its temporal form from damaged to diary, then it must first become rubbish. The boundary between useful and rubbish being the attitude towards the state of ‘unreadiness to hand’. Once rubbish, the artefact may be resurrected through a nostalgic desire; but this also assumes that it is repairable, if it is to function with its original purpose. Artefacts operating in a damaged state are irreparable while in this state, the considerate act of repair moves the object into a diary state, moving it from ‘transient’ through ‘rubbish’ to a ‘durable’ mode55. Diary objects are able to be repaired. The consideration of maintenance moves their state from ‘transient’ to ‘durable’ without becoming rubbish.

Diary objects may be viewed as damaged if they are unable to withstand the rigour of their existence. This may be accidental or through poor crafting. Special consideration should be placed on physical boundaries; either the edges or transition between materials as this is the area most likely to exhibit wear. Internal corners are associated with accretion, external ones with erosion. There is a tendency towards erosive wear on harder materials and accretion on softer ones.

The production and material technology used to manufacture any artefact can timestamp an object as much as any aesthetic concerns. Using contemporary technologies, regardless of their philosophical underpinnings effectively sets the clock at 0:00, the present. When begins now. This is also true of embedded technology. Older production technologies are more commonly associated with diary objects. This is through both a sense of nostalgia and the materials used in production.

There is no oracle for the life of an artefact; the life of things is as unpredictable as that of individuals. While the life of an individual object may be unforeseeable, the knowledge gained throughout this project has opened my eyes to the potential of producing objects whose aesthetics extend beyond the physical forms and into the temporal form. As a maker this means that form follows not only function (utility), or fiction (narrative) but also friction (use).

Appendix 1

List of Images

Unless otherwise stated, all images by Simon Gamble

Page 2  fig.1  Crown Lynn Toki, this is an example of the up cycling and repurposing of damaged Crown Lynn ceramics that I have produced since 2006.

Page 3  fig.2  Silver-plated spoons. Maker unknown. These spoons exhibit wear and use. The surfaces have oxidised and tarnished, the silver-plating has been removed in some places, exposing the substrate beneath.

Page 6  fig.3  do hit Chair. Stainless steel, and steel and timber sledge hammer by Marijn van der Poll 2000. <http://www.droog.com/store/furniture/do-hit-chair/#slide0> This chair is an example of the use of the consumer as co-author of the final design. The work requires engagement on a number of levels, as well a little bravery on the part of the consumer (you brought it, now break it).


Page 7  fig.5  Rock. Stainless steel and concrete by 22 Design Studio, 2007. This is an example of jewellery which requires consumer engagement to co-author the final design. There are many other examples, as jewellery requires the corporal to activate and animate.


Page 8  fig.8  do break. Ceramic and polyurethane vases by Peter van der Jagt and Frank Tjepkema 2000.< http://www.tjep.com/works/products/do-break> This work was produced as part of the do series for Droog. There is an understanding of the inevitable built into the design. The designers’ influence moves beyond the point of sale through time and use.


Page 11  fig.12  Diagram of Project parameters.

Page 13  fig.13  The Shepherd Gate Clock built by Charles Shepherd Junior 1852. This is a 24 hour slave clock on the external wall of the Royal Greenwich Observatory.

Page 14  fig.14  The Prime Meridian, Royal Greenwich Observatory.

Page 17  fig.15  Rubbish couch. This couch was part of the detritus abandoned beside Great North Road as part of the Auckland City Council 2009 Inorganic rubbish collection program for disposal of household rubbish. This represents part of the 1.4 million tons of household rubbish produced annually in Auckland.
Page 18 fig.16  Break table. Fijian Kauri, 2008. This image shows the complete table as it was installed in Long Black Cafè.


Page 20 fig.18  Jig for cutting the legs of the Break table. There were a number of different jigs used in the production of this piece.

Page 21 fig.19  Break table in use as a stress toy.

Page 22 fig.20  Break table leg detail.

Page 23 fig.21  Break table after six weeks use.

Page 24 fig.22  Side table. Formica covered MDF, Acrylic, LEDs, touch sensor and control circuitry in Snowwhite Gallery, Unitec.

Page 26 fig.23  Catalogue Images from top left.
Wooden cupboard door with stains, Auckland.
Wooden door with peeling varnish, Auckland.
Cracked concrete and dripping water, Auckland.
Exposed cobbles under asphalt, London.
Stone step entrance to church, Paris.
Wooden carved furniture detail showing weathered timber, part of the Egyptian collection at The Louvre, Paris.
Weathered stone Lion, London.
Damaged chair, part of the Auckland City Council Inorganic Collection, Auckland.

Page 26 fig.23  Silver swarf and filings in my bench apron, Auckland.
Swing doors, Auckland.
Acid rain damaged column, Bern.
Differences in wear between mortar and stonework, Dijon.
Damaged protruding edge on stonework, Florence.
Weathered statue, Dijon.
Bomb damaged Stone, London.
Cart and trolley damaged column, Auckland.
Rusting painted metal (unprimed?) Auckland.
Rust forming around bailing wire connection, Auckland.
Exposed stonework and damaged render, Venice.
Damaged car, Auckland.
Medieval graffito, Dijon.
Stone owl on the side of Notre Dame (Dijon). This owl is touched by locals and tourists for luck. This is the third owl since the building of the cathedral between 1280 - 1325.
Roadworks, London.
Damaged steel grate guard (truck damage?), Auckland.
Railway track, the contact surface is polished and clean while all other surfaces remain rusty, Auckland.
Exposed brickwork, Venice.
Damaged stonework in doorway, Florence.
Notice carved into the stonework of a court building, Dijon.
Worn stone steps, Dijon.
Damaged mortar, Florence.
Exposed stone brickwork, Dijon.
Unused and graffited steel plate outside the Louvre, Paris.
Repaired stonework, Bern.
Damaged corner, Paris.
Weathered emblem, Dijon.
Antiqued door, Auckland.
Graffiti on the Duoma Santa Maria de Fiore, Florence.

Page 27 fig.24 Stain. Porcelain, by Bethan Laura Wood 2007 <http://www.woodlondon.co.uk/>

Page 28 fig.25 Diagram of Physical Damage, showing Additive and Reductive Processes.

Page 29 fig.26 Experience Intency and Open/Closed Specificity table, positioning the furniture produced for this project.

Page 31 fig.27 Prototype rocking chair improvised from an old school chair and scrap steel pipe.

Page 32 fig.28 Solidworks render of Fabric Rocker the Solidworks model is used a generative tool to produce renderings, engineering drawings, a bill of materials, as well as three dimensional visualisations.

Page 32 fig.29 Peeling paint on a wall at the Mount Albert Train Station. The coloured layers are from graffiti, the cream and white layers the council’s attempt to beautify.

Page 33 fig.30 Corner detail of Fabric Rocker showing the layers of fabric which make up the cushion.

Page 34 fig.31 Images showing the Fabric Rocker cushion as the fabric in layered before the edge is abraded.

Page 35 fig.32 Fabric Rocker. Powder coated steel, American Cherry, fabric, stainless steel screws.

Page 36 fig.33 Two-Person Rocker. Powder coated steel, Poplar plywood, stainless steel screws.

Page 37 fig.34 Detail of wear testing.

Page 38-41 fig.35 Wear testing series: Woollen fabric over two layers of corduroy each image taken at 15 minute intervals.

Page 40-43 fig.36 Wear testing series: Woollen fabric over one layer of corduroy each image taken at 15 minute intervals.

Page 42-45 fig.37 Wear testing series: Woollen fabric over one layer of flocked linen over wollen fabric each image taken at 15 minute intervals.

Page 44-45 fig.38 Wear testing series: Woollen fabric over one layer of flocked linen each image taken at 15 minute intervals.

Page 46 fig.39 Detail CNC cut plywood.

Page 47 fig.40-44 Three dimensional scan of fingertip showing fingerprint followed by a number of zooms, abstracting the information.

Page 47 fig.45 Roland CNC Mill cutting digitally generated facets into Plywood.

Page 48 fig.46 Piix1, Fijian Kauri, Jarrah, powder coated steel.

Page 49 fig.47 Piix5, Fijian Kauri, Jarrah, powder coated steel.

Page 50 fig.48 Piix2, Fijian Kauri, Jarrah, powder coated steel.

Page 51 fig.49 Detail CNC cut plywood.

Page 52 fig.50 Poplar Rocker, White Italian Poplar plywood, powder coated steel, stainless steel screws.
Page 53 fig.51  Poplar Rocker, in production.

Page 54 fig.52  Polyplast Rocker, Polypropylene reinforced concrete, powder coated steel, stainless steel screws.

Page 56-57 fig.5  Series of painted CNC-cut timber being sanded at 15 minute intervals.

Page 56-57 fig.54  Wear testing series: Polyplast cement with fabric covered sander at 15 minute intervals.
Appendix 2

Reading list


