Life, Death and Time:
The Life Cycles of Buildings

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Abstract

This thesis document attempts to explore the idea of decay with regards to buildings: decay in the negative form- the premature demise and death of buildings, the run down nature of certain sites and the unwanted demolition of unadaptable buildings. I also wanted to look at decay in the positive form: mans love affair with ruins, the build up of human patina on a building overtime, uncovering stories and events within its walls. All buildings are capable of such positive decay, which can also be attributed to weathering, however few get the chance to survive this long. In thinking about this, how do we build to last?

Looking at infrastructures and they’re nature of survival and durability, I thought about Limerick City and its infrastructural spaces that have with stood the test of time. During construction of the city, Limerick was built a level higher than the original ground plane to allow for the River Shannon to flood underneath without harming the buildings. Thus, a series of culverts, basements and coal bunkers create a secondary subterranean landscape beneath the streets. In thinking about this, I questioned solely building up, and if the entire groundscape is to be constructed, why not take advantage of the spaces that could be uncovered beneath. Thus creating an excavation of subtraction and addition.
Introduction

Time is a human concept, constructed to measure the degree of entropy, the gradual decline into disorder, or the lack of order and predictability in the universe. It is not a tangible entity but something that we comprehend experientially. Time separates that which has happened and that which has yet to occur, that is, it differentiates between past memory and future unpredictability. That which we know about time is categorised into a sub grouping called history: the record of past events that allow us as humanity, for example, with regard to history of countries or regions, to create our own identities.

Units of time are constructed on predictable cycles: days are derived from revolutions of the Earth, years from orbits around the sun. Such cycles have been occurring continuously long before the concept of time was conceived: astronomical, seasonal, geological, agricultural, biological, right down to social and economic, as everything on Earth is and always has been subject to change. For the most part, these cycles revolve around the same general principles; birth, growth, decline, death, in a constant sequence. All phases are needed for progression; change is needed for continuation.

Everything around us, both natural and synthetic, is subject to time and thus to maintain the natural order of the environment, should ideally be susceptible to some form of decline and decay. It could be said that from the moment something is created or ‘born’ it begins its process of decay. We can only grow older. Materials and substances that do not have a natural ability to decay are not subject to change and so will become outdated and discarded sooner rather than later. With regards to buildings, how is the inevitable process of decay accounted for? In reality, very few buildings actually reach their projected lifespan. The expiration of use generally occurs long before the physical deterioration of buildings, resulting in wasteful abandonment or unjustifiable demolition of structures. The rate at which this constant cycle of building followed by abandonment and/or demolition occurs is damaging and unsustainable in a world where materials and space are finite resources.

The decay of buildings can be seen as a unique and multifaceted process, as varied as the structures and their environments. Not necessarily a negative stage, the attributes of decay can be seen as positive additions to a building if they do not lead to its premature demise. There are different driving forces of decay, generated from specific contexts. Unless the contextual reason for decline is overcome, the decay quickly spreads to include other forms. For example, physical decay is often the last stage in the ‘death’ of a building, while it is rarely the catalyst. Detrimental decay occurs as a result of the deterioration of function, locale, economy, materiality, inadaptability or a combination of these.
From a construction stance, the building has reached its completion. From a broader point of view, it is just beginning its life. Being as yet untouched by human occupancy, it is merely a carefully organised assemblage of materials that try to define certain spaces. The character of the building is undetermined, to be defined and redefined over time by the inhabitants and the uses they will allocate to these spaces. The building is a blank canvas, all it can offer is a vague memory of the future, the potential it holds for the occupier and what it can absorb from them.

Cutting into and rising from the ground, the exterior walls are an intertwining of historical and contemporary materials. Some of the brickwork has been restored, mingling elements from previous uses of the site with new additions. The newly fabricated walls stand fresh and clean, their edges sharp and precise.

Copper gleams darkly in the light, promising to grow old gracefully, to absorb and endure time. The cogs and wheels wait in anticipation, their jumble of polished and matt finishes reflect the light to different degrees onto the rough and textured surrounding surfaces. The steps jut out sharply, their clearly defined edges challenging the inhabitant to ascend.

Inside, a smell of newness and construction hangs in the air. All surfaces are equal. No signs of inhabitation, everything is pure and unmarked, expectant. At this point the spaces are full of possibilities. They belong to no one and are nothing more than their material make up.
Decay of function is possibly the most common and detrimental form. When the function of a building expires, tenants no longer have the same use for the space. The lifespan of a building whose function is unadaptable to change becomes stunted, rendering it useless for human occupation and therefore, resulting in inevitable abandonment.

For example, when the Swedish Wine and Spirit authorities relocated in 2000 from their original position in Liljeholmen, Stockholm, they left behind five 150m deep, 20m high caverns tunneled deep into a 30m tall rocky cliff face. With no natural light or ventilation filtering through, the caverns were so specifically designed for the storage and bottling of alcohol that city architects struggle to find a new use for them, more beneficial to the space constrained capital city, other than car parking. These unique spaces have since remained vacant.

Buildings which are designed so specifically to their program are prematurely putting a time limit on their life span. Dutch architect Herman Hertzberger agrees that in designing too rigidly to the program, the building will possess an 'all too specific quality'.

The adaptability or more appropriately worded, 'changeability' of a building is crucial for its long term survival. It is not exactly the physical flexibility that is in question, because permanence and durability of materials are also necessary for long-standing sustainability; it is the ability of the building to offer multiple uses without the need for expensive renovations of structure. "Changeability is subject to change" because everything is subject to time. Designing for the present conditions is to design statically, or to design for the past. By the time the building will be complete, the original designs will be serving a past condition.

To withstand the test of time we must design with time in mind. In order to do this we must design to sustain. The most widely known definition of ‘sustainable development’ comes from the Brundland Commission of 1987, which defines the term as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
Designing for flexible functioning, building for durability and permanence: this is what complies as a sustainable building.

Whereas buildings that are built solely for a specific function expire when the function becomes outdated, adaptable buildings can change function and become a commodity again. Buildings that are designed for future ease of modification are able to withstand the demise of their original function and continue to be useful spaces. Delfrect Park Office complex for ABT-Damen in Delft was designed by Hubert-Jan Henket to transform its use over time. Comprised of a system of integrated steel and concrete beams, they are easily demountable for future modification of layout. Michael Braungart, founder of Environmental Protection Encouragement Agency based in Hamburg, Germany, discusses adaptable buildings in *Cradle to Cradle*, those which are used and reused time and time again to house varying functions, although often this was never intended to be the case. He mentions the Lower Manhattan neighbourhoods of Soho and Tribeca, which continue to be adapted and reused in different ways, due to their design which today would be considered inefficient: high ceilings, large windows and thick walls. The same can be said of the canal houses of Amsterdam or potentially the Georgian houses in Limerick City which possess the same design qualities. Dutch architect Maccreanor, of the architectural firm Maccreanor Lavington, points out that “we are all familiar that those buildings changed from large single-family houses, to apartments, offices, workshops, hotels, clubs, art galleries, etc. with an astounding ease.” This is due to their adaptable spaces resulting from high ceilings, abundance of light and thick walls which provide thermal insulation.

These houses that are easily adaptable without intending to be can often be compared to what American writer, Stewart Brand categorises as ‘low road buildings’. That is those buildings which are uncared for, in low rent areas but hold the possibility of change. He describes them as “discarded buildings, fairly free of concern from landlord or authorities.” Shabby but spacious, what these structures have in common, according to Brand, is that any change is likely to be an improvement. This leaves an unsupervised, non-precious space open to creativity. In these areas there are no “turf battles because the turf isn’t worth fighting for.” Such buildings are catalysts for reinvention: artists move into low rent, low road buildings where there are few limitations. There is room for them to be creative with their spaces and diversity blossoms. The area becomes fashionable and trendy and the rents rise. The original tenants can no longer afford the rent and so move to the next cheap, run down area, and so the cycle restarts. Jane Jacob recognises that only established franchises or companies can afford to finance new buildings. Local industries, entrepreneurs and family run businesses move into older existing spaces. She notes that “well-subsidized opera and art museums often go into new buildings. But the unformalized feeders of the art- studios, galleries, stores for musical instruments and art supplies, backrooms where the low earning power of a seat and table can absorb uneconomic discussions-these go into old buildings…”

Most famously known for his design of the Pompidou Centre in Paris, architect Richard Rodgers admits that he is in pursuit of a new form of architecture, unconstrained from the classical buildings that are “perfect and finite upon completion.” He states that “We are looking for an architecture rather like some music and poetry..."
which can actually be changed by the users, an architecture of improvisation. Hertzberger reinforces this belief of adaptable buildings being sustainable buildings. He stresses that architects should not over design to a specific function but should enable the users to become involved in the design of their own spaces. It is exactly this concept which made Quinta Monroy Housing in Iquique, Chile such a success. Constructed in 2004, Chilean architecture firm, Elemental, designed the minimum structure necessary for the residents to move in. There was so much potential space left over, the residents were given the opportunity to have their own input in the making of their homes. This lead to a personalised and varied project, changing over time with the needs and financial abilities of the residents, that proved to be hugely successful, going on to win the Curry Stone Design Prize in 2010. This scheme follows Hertzbergers awareness that the role of the architect is not to provide complete solutions but to provide a spatial framework that, over time, will be completed by the users.

Fig. 7, 8
Photographs of project, before and after residents have moved in.

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As the brick-work begins to lose its brightness and the walls begin to mellow with time, melting into their surroundings, the building begins to create its own history. Through events, stories and experiences, the patina of human life begins to build up in the spaces; etching itself upon the walls, the floors, the fixtures, creating unseen connections between the building and the community, that although include, and to some extent depend on the physical materiality, also surpass it into something else. A familiarity is developed; a feeling of nostalgia, the product of the combination of physicality, materiality, spatiality and use/inhabitation that forms the building. As people inhabit the structure, spaces become defined and the rooms find themselves with specific functions. Furniture is brought in and out accordingly, and people claim the spaces, personalising, making it their own.

The copper begins to dull empathetically, oxidising gradually to verdigris. The cogs and wheels turn confidently with experience, their polished faces becoming tarnished and smeared with grease from an epoch of production and servicing. It begins to adopt the stains of time. The tarnish lends an antique look, giving the robust system an unexpectedly delicate quality.

The interior is altered, although not only physically. Spaces are no longer equal as the inhabitants have established a hierarchy of rooms: which ones are used most often, which ones are communal and which ones exclusive, which are for services and which are for storage.
Decay of Locale

An absence of function may occur as a result of the decay of the immediate physical context or locality. Deterioration of the context can mean that there is no longer a need for the function to exist. Limerick City center could be discussed as an example of this. Due to the large numbers of people attracted to large shopping centers located on the outskirts of the city, such as The Crescent in Dooradoyle, there is a populous deterioration in the city center. Fewer and fewer people visit the city center for retail motives. Before such suburban shopping centers came into being, the city center was the commercial hub, the vast majority of lots designated for retail. The decline of locale, along with economical decay brought about by the recession, inevitably resulted in shops and businesses closing down.

Shutters pulled down over store fronts, vacant spaces and boarded up windows add to the sense of decay on the main streets, creating an unpleasant atmosphere, and thus, a downward spiral. The decline of a locale has a direct effect on the actual components, in this case, the buildings. If attachment or worth is not given to an area, then the buildings are also stripped of these values. “The longer a building lasts, the more it becomes part of the identity of the city and of the community. In time buildings acquire a collective urban value.” 17 If emotions are invested in a building then personal interest will keep the building alive through use, upkeep and care. These emotions do not occur overnight but develop over a long period of time, so that in times of economic downturn, inhabitants still care for the buildings. In certain parts of Limerick city, William Street in particular, emotions were never instilled in these main street shops which have often had a fast turnover: this year a clothes shop, next year a discount store. Temporary signage covering the facades at street level seems to distance the building further from the public, representing it solely as a commercial entity. In certain buildings ownership has never surpassed profit making motivations and so attachments to the spaces were never formed.

17 Van Raeth. “Cultural Durability” In Time-Based Architecture. p. 115.
Economic decay is extremely applicable in Ireland in recent years, following the financial downturn. During the Celtic Tiger of the 1990s, a building boom erupted and housing estates were built in excess by ambitious developers, as quickly as possible, with the main motivation being their personal financial return. Subsequently, following the collapse of the economic high after 2008, many of these housing estates are lying vacant and unused, both due to the fact that banks and developers ran out of money to complete the construction, and the lack of national cash flow for potential buyers to purchase them. While people wait on long lists to acquire social housing, there are thousands of new, vacant homes littered across the country. Due to a huge lack of amenities that were never built for these estates, they are rendered useless for social housing. They are ghost estates lying vacant, decaying without ever being used, scarring the Irish landscape. It is not a case of their function expiring but due to economic decay, they cannot be finished or occupied. A study carried out by NIRSA in January 2010 found that there was over 300,000 unoccupied new homes in Ireland, spread over 621 ghost estates. Additionally, many of the estates are in areas where the number of homes built greatly exceeds the number required, and which are too far from major employment centers; Leitrim, for example, has a housing surplus of 401%.

Economical decay of a region is reflected in the buildings of that time. During the period between 1945 and 1990 most of Eastern Europe was under the control of the USSR. All buildings were state owned, and so tenants had no stake in them. As a result of this, inhabitants were not motivated to invest in their homes. They were never altered, personalised or maintained in any way and so fell gradually into a state of monotonous disrepair. Brand comments that in these countries “…culture and the economy were paralysed for decades.” This was evident in the buildings. Urban designer Anne Vernez Moudon discusses the advantages of small lots over state owned or large scale real estate projects, “Small lots will support resilience because they allow many people to attend directly to their needs by designing, building and maintaining their own environment.” Properties owned by various people will generate different decisions, and this will ensure a rich and varied environment rather than tedious monotony.
Unadaptive systems can also lead to the premature decay of function, in that the building systems become outdated and do not meet the present building standards and regulations. St. Göran Gymnasium in Stockholm designed by Léonie Geisendorf, who practiced under Le Corbusier, was opened in 1960 as a domestic school for girls. In 1971 its use changed effortlessly to a secondary school. It was sold in 2011 to a state owned company, Svenska Bosföder, to be renovated into student housing, which is at present in urgent demand in the city. The layout and structure of the 15,000 m² modernist building can easily adapt to accommodate this function. However it does not comply with ventilation standards. The ventilation system is designed as part of the structure and the cost of renovation would be the same, if not more expensive, than demolition and construction of an entirely new building. The city does not want to demolish St. Göran Gymnasium due to its architectural value but because it does not meet with present safety standards, it cannot be used. Occupying a prime site in the city center, and offering notable architectural qualities to the city of Stockholm, it presently stands vacant, unable to adapt to current regulations due to inflexibility of services.

In *How Buildings Learn: What Happens After They’re Built*, Brand discusses the detrimental effects combining building systems can have on the building’s survival. He breaks down buildings into their basic components, which consist of site, structure, skin, services, space and stuff (furniture). These components serve different systems that react to time at varying rates. Brand explains that to combine them leads to the slow systems inhibiting the flow of the quicker ones, and the quicker ones tearing up the slower ones with their constant state of flux. An adaptive building has to allow slippage between the differently paced systems... Embedding the systems together may look efficient at first, but over time it is the opposite, and destructive as well. In the case of St. Göran Gymnasium this statement is completely accurate. While it is has not yet fallen to physical decay (decay as opposed to weathering) because it is considered culturally valuable, and therefore its upkeep is maintained, in reality it is merely a cultural object rather than a functional building.
Physical Decay

Void of people and function, neglected due to emotional indifference, an abandoned building can fall quickly into a state of disrepair. Not being maintained, the building is allowed to be reclaimed by nature, and thus, develops progeria, a hyper state of premature physical decay. The materiality, its physical make-up, obviously plays a lead role in the life expectancy of a building. With regards to sustainability, buildings or structures that are easily assembled, dismantled and moved are not actually sustainable designs, for the simple fact that they have no future. They are temporary and certainly not durable in the long term. When thinking of durability through time, heavy, robust, resilient materials come to mind: stone, brick, concrete, steel, materials that have a natural quality and a natural aging process.

In tying in with the interest of decay and materiality, a material study was conducted in a desecrated cemetery in Limerick City center to further inform these thesis ideas. In looking at the site through the filter of materiality and disregarding function, the weight and thickness of the stone slabs were examined, the manner in which they were cut, the way they were assembled and placed on the ground, the weathering of the stone. Cracked, peeling, fractured, crumbling, fissured, pockmarked by moss and lichen, the aging process of the various families of stone was diverse and evident. The breaking down of these physical elements by the natural elements: sun, rain, wind, snow, frost, etching the material with a story of time. The varying textures and colours added to this feeling of a story or a history: where did the stone originally come from, where was it cut and crafted. A graveyard was an ideal location to conduct this study, as most graves are dated and so can be compared. Other static factors included orientation: which sides received the sun, which were exposed to the wind, the difference between the bases, left unprotected against the ground, and the higher parts of the slab.

When giving priority to materiality, function became questioned. The lifespan of stone, seemingly eternal when considered against that which it represented; a person’s life and identity captured in something as permanent as a slab of stone. The contrast between the fleetingness of human life and the permanence of the weathering stone, that which we have chosen to mark our existence with, highlights the fragility of life and the durability of material. What we design and construct should effortlessly outlive us.

Physical decay an inevitable product of time and rather than being perceived as a negative and unwanted process, should be considered natural and a thing of beauty: the interaction and subsequent transformation of materials as a direct result of their surroundings. This form of decay is more commonly referred to as weathering. Similarly wear and tear as a consequence of use is not necessarily a negative form of decay but instead can be viewed as a building up of character. The stratification of time imprinted on a building is not
something undesirable but the telling of a story, of memories and events that have occurred here. This offers us a certain kind of familiarity that we can relate to as humans. It is these ‘imperfections’, along with the human nature of construction, the signs of craft, that we relate to; the human details that read like chapters of a book. In his essay “The Sustainable City is the Adaptable City”, Dutch architect Maccreanor, of the architectural firm Maccreanor Lavington, states that “Such deviations allow a sense of rawness to be retained in the midst of rigidly controlled environments, a personalisation that in turn creates a recognisable identity.”25 They give a human quality to an otherwise inanimate object.

The natural patina creating a sort of timeline on the materials: the wooden façades gradual transformation from brown to silver, the shiny copper gutters oxidising to a matt green, the slow weathering of the stone and the moss staining the cracks in the mortar. We respond to the evidences of time while also creating our own timelines. The patina deposited by people, the lived-in-ness; scratches on the floorboards underneath the kitchen table, the wearing of the wood around the key hole, the discolouration of the marble around the hearth. These can be read like pages of a story that tell the life within buildings over time. “The house was never finished; it grew along us and we grew within it.”26 In Zumthor’s opinion architectural richness results from materials absorbing the traces of human life.27 In order for this deposit to occur, there must be a considerable sustainability to time. Brand agrees with this theory, claiming that it is “Age plus adaptively is what makes a building come to be loved. The building learns from its occupants, and they learn from it.”28

25 Maccreanor “The Sustainable City is the Adaptable City” In Time-Based Architecture. 103.
Photographs taken in graveyard study, exploring the materiality and weathering of stone.
When building for a specific program, should we design for function? In contradiction to the Modernist approach, 'form follows function', when designing for durability, function should not dictate the design of a building. Designing strictly for a specific function limits a building, both in its use and also to a specific time when the prescribed function is relative. Hertzberger recommends that designers need to "be aware that the program is only a temporary thing that may even have lost its validity by the time the project is in place." He acknowledges that the brief must be fulfilled, that a building should service the use for which it was made, but it should also offer more possibilities. When taking time into account, the world is in a constant state of flux and what may be relevant today may not be tomorrow. Thus we must design with the possibilities of change, we must design for time.

Functionalism is outdated and often executed inhuman and communist ideas in architecture. We are all individual. The greatest designs allow for change and freedom for the user. Architecture is not merely art; it is primarily for the person and should be designed accordingly. Star architects can also have negative influences on buildings. Frank Lloyd Wright for example, was notorious for the over designing of his buildings, "down to the screw heads all being aligned horizontally to match his prairie line- that they cannot be changed." He treated his buildings as an art form primarily, and a place to reside secondarily. It is said that to live in one of his homes is to be the curator of a Frank Lloyd Wright museum; "They are not living homes but petrified art."

When designing for a program designers should not design specifically for the requirements but should allow for potential future use(s) of the building. Van Reeth comments that "Buildings designed for a myriad of possibilities will be as it were broken up by time in order to serve new tasks." He advises that we should design for 'unpredictable events'. Durable buildings are buildings that allow space to change. "A building is not complete upon its completion, at that point a durable building just starts to live, it merely begins its career as a construction." Hertzberger writes, "The point... is to arrive at an architecture that, when the users decide to put it to different uses than those originally envisaged by the architect, does not get upset and consequently lose its identity...

Instead of constructing over-designed, finite buildings that are unadaptable and unsustainable, the architect should allow for change. Brand highlights the fact that "final solution buildings obsolete and have to be torn down because they were too over specified to their original purpose to adapt easily to anything else."

The functionalist city placed a huge emphasis on zoning. Activities were not intended to mix, so that there would be no interference or distractions from the task at hand. In "The Sustainable City is the Adaptable City", Maccreanor...
discusses the unsustainability of zoning and the dead time periods it creates. "Empty business districts in the evening and empty housing estates during the day." He accuses zoning of contributing to traffic jams and rush hour. "The city of adaptable buildings is a city of life/work in the broadest sense. It is a more fully inhabited place." A more balanced mix of use, or more lenient and flexible zoning laws, would generate busy, vibrant areas that support a mix of activities and life all the time.
Demolition Vs. Preservation

In Sweden approximately 90% of building construction in the next ten years will be reconfiguration of existing buildings. It is recognised that demolition is not a sustainable approach, "it is not durable." Alteration of built structures is a more sustainable approach; that is why we must design buildings for change of use. It is once again worth stating that a sustainable building consists of designing for flexible functions and building for durability and permanence. Van Reeth believes "that we should design the load-bearing structure and also the skin of the building so that it need not be necessary to demolish them for the next 400 years." Which raises the question, how long do we design for? Do we consider time at all?

Historically, Western culture has built to last, with historical buildings surpassing more recent constructions in their timeless qualities. "Durability involves added value, achieved by the factor of time." Van Reeth explains that the longer a building lasts, "the greater chance that users and inhabitants will become attached to the building and to the environment." This leads to the consideration of historical buildings whose function is most definitely expired. Castles for example have no role in present day life. They are not flexible in function and yet we place great value on this genre of buildings. Physically they exuberate durability, but their permanence is also a limitation to changeability.

If the function is dead then doesn’t it concede that the building is also dead? These historical buildings are a contradiction to the forms of decay. The subject of preservation arises; the preservation of historically notable buildings that we consider a part of our culture, and yet, are of no service functionally to the city. This is actually the case with most preserved buildings. To preserve means there will be no change and the form will be kept as it is. This could be considered inhibiting to the production of new functions or lease of life. While preservation means that something will be protected, does this render the building dead because we can’t use it? If we were to preserve a city, there would be no room for the city to expand and grow. A city that is frozen in time leaves no opportunity for development. Change is needed for a city to progress. Prohibiting change is similar to denying the persistence of time. Just as in USSR controlled parts of Eastern Europe in the latter half of the 1900s, preservation could be seen as freezing cultural growth. Large areas of Venice, for example, are controlled by strict preservation regulations. With the younger generation of inhabitants leaving at a steady rate, Venice runs the risk of becoming a ‘living museum’.

Cultural durability is expressed as “something which does not change but nevertheless summarises the passing of time.” Buildings that possess a quality of familiarity appeal to the user, buildings that hold a promise of future possibilities, an openness to interpretation. It is these buildings that evoke a sense of déjà vu or nostalgia which
are able to endure architectural fashion fads. "It is this enduring presence that invites a powerful engagement with the building, an endearing quality that seduces people into adapting themselves to it." If we hold feelings of cultural or personal value for a building, it seems that its function, or lack thereof, may not matter. However, this is because the building has already overcome the challenge of time; we have been given generations of time to develop attachments to the building.

"Architecture should design intelligent ruins." This quote is seductive, in that from the moment the first building blocks are put in place, the materiality of a building is subject to physical deterioration. It is becoming a ruin. Eero Saarinen said of his TWA airport terminal when it was halfway through construction, "If anything happened and they had to stop work right now and just leave it in this state, I think it would make a beautiful ruin..." It is this timeless quality, playing on man’s attraction to familiarity, age and ruin that is needed, along with adaptable functioning and durable physicality.
The smoke and pollution of the city mingled with the elements, drumming against the crumbling brick facade, washing away the built-up scree of weathered particles, in a chemically acidic solution. Patches of moss cling to the jagged surface. Weeds poke from cracks in the disintegrating mortar, their roots stretching out of sight, twisting and binding, finding chinks and fissures deep within the wall, weakening the strati of hand-laid brick-mortar-brick-mortar.

Water drips from serrated edges, the former matt finish choked by clumps of flaking green, attacking like a mould, slowly consuming the entirety. The patina gives way to corrosion, as the former metal substance flakes away. The cogs and wheels have remained stagnant for years, no longer needed as they are replaced by new technologies. Their compounds altered by air and moisture become something different and new. In a flurry of earthy colours, a palette of browns, reds, oranges and yellows, the process of erosion changes the once strong steel into a new element, disintegrating with exposure.

This colourful display of decay is not unlike the bloom of colour gently emerging from the dark water, to paint the grey limestone from the bottom up. It does not discriminate, coating the rough, grainy surface of the stone and everything else in its path in a slimy film of brilliant emerald.
The materiality of a building is essential to creating the sense of familiarity or timelessness that relates to human emotions. Alvaro Siza comments on the difference in material assembly between the Netherlands and Portugal. In the Netherlands, material possibilities are numerous, limited only by budget. "So many choices exist that there is little chance for building up experience with any one of them..." Mass production of material parts has caused a shift in the relationship between architect and builder. In his book, *On Weathering: The Life of Buildings in Time*, David Leatherbarrow comments that years of experience, knowledge and craft possessed by the builder is largely overlooked in new building techniques, in the form of an architecture that is entirely prescribed by the architect. Lack of experience and precedent in materials is a risk that can often lead to negative situations such as unforeseen physical decay due to weathering. In contrast to this, Siza comments that a lack of material choices in Portugal leads to a deeper knowledge and understanding of a material, "more experience with the material can be gained". This allows for greater versatility of the material, allowing its limits to be pushed and tested.

In the design of buildings, great thought should be placed on the selection of materials, especially when thinking of time. Which materials will age well, allowing the building to grow old gracefully? The weathering of materials should not be seen as a negative aspect but can be thought of as a trait of beauty; the story and history of the building becoming evident over time. The aging process can give the building character and a relatable familiarity. Durability of materials should be taken into account, how will they look 50, 100, 200 years from now? How will they be experienced as a ruin?

Certain materials have the ability to absorb time more so than others. Natural materials such as wood, stone, and brick age better than synthetic materials such as plastics and poly-composites. This is because they are already ‘aged’ before they are put into production for building materials. They are natural and so have natural responses to weathering and time. This makes them almost timeless, certainly with regards to fashion. They embody a sense of time and evoke a response within us, a sense of security or familiarity. Synthetic materials, in contrast, do not have a natural life span. Most plastics do not decompose. There is no factor of decay, no graceful aging process. Its appearance degenerates over time, fading in the sunlight or breaking apart, but does not possess the ability to embody time and decay naturally, giving back to the Earth. It merely appears dirty or dated, reflecting a previous fashion.
Exceptions to the Rule

Structures that are not functionally adaptable yet possess an admirable ability to withstand the test of time more so than any other constructions are infrastructural projects. Infrastructure rarely outgrows its original function because it is so valuable to the functioning of society. Generally the only reason it is terminated is that it has come to the end of its physical lifespan, and needs to be replaced; the function rarely changes or expires. Often taken for granted, cities would not be able to function without infrastructure: bridges, roads, ports, airports, cemeteries, hospitals. They are the structures that feature and support our everyday lives. These are components that are required for a city to function and so will not be demolished without being immediately replaced. The removal of a bridge or hospital from a city would have a much more detrimental effect than the removal of a city retail block. Infrastructure is immensely valuable to a city and dictates how that city operates. It does not suffer fashion because it has a timeless role that is cared for in a particular way. Generally it outlasts many generations of human use, and is built to last. Even if the function does eventually expire, the infrastructure itself can remain, as a part of the historical backbone of the city.
In the natural world, death and decay possess only positive connotations: the promise of rebirth and new beginnings. They are no more or less than phases of a life cycle, as important as birth and growth, which must occur to provide beneficial nutrients for the cycle to continue. Change is an essential part of such cycles. Everything natural must be adaptable, adjusting and evolving, aging as necessary with the passage of time.

In our built and manufactured world, all that which has been constructed by man is also subject to life cycles, including death and decline. However unlike in the natural world, two forms of these exist: the positive and the negative. The positive occurs naturally over time; the aging and weathering of the materials, the ‘lived-in-ness’ and familiarity we develop for such buildings. The positive form of decay is something with is inevitable, and can add character, beauty and variation to structures and locales. The negative form of death and decay occurs in the premature demise of buildings; that is the decline of function, due to decay of locale, economy, culture, unadaptable systems or inflexible reuse. It results not so much from physical decay as from physical restriction, preventing reuse and change of function. Physical limitations that resist time strangle a buildings ability to be reinterpreted functionally. To resist change is to resist time, and time continues, indifferent to any futile efforts otherwise.

If we were to design with time in mind, there need not to be negative forms of death and decay; if we design buildings to be adaptable, not only for today’s function but for many other possible uses. The notion of time and decay should be incorporated into the design stage from the start, primarily for the fact that the building will inevitably experience this, but also because allowing for change can extend the buildings life span significantly. Buildings should not be torn down before their physical structure even gets a chance to absorb the advantages that time can inscribe upon it, but to avoid premature death and demolition, they should be designed accordingly. They should adapt and evolve with the slippage of time, to be reinterpreted when circumstance demands. A sustainable building should therefore be durable in materiality, susceptible to a graceful decay or aging process, while being both flexible and adaptable functionally, allowing for easy and multiple changes of use. They have to possess the ability to be reinterpreted. The only other option in building to withstand the test of time is infrastructure.
The steps are now smooth and glassy, reflective of the many pairs of feet that have trod up and down their surfaces. Finishing in blunt curves, all sharp edges have been chiseled away by the years. Although the entrance appears softer and less defined physically, the prominence of durability and time it now exudes makes it even more striking.

The interior spaces exhibit the signs of time of a different kind. Unaffected for the most part by the exterior climate conditions, the patina of time can still be read. The trails of human inhabitation can be seen underfoot, etched onto the flooring as surfaces around the entrances and doors, below the stairs, around the hearth, are smoother and shinier than the rest, having been worn down through excessive use. Scratches and scuff marks tell tales of previous occupants, both animate and inanimate, that once inhabited these spaces.

The deep recesses that hold the glass panes are paler than they once were, having been faded from years of sun exposure they manipulate the light to appear even brighter. The original glass panels are not all present, some having been replaced over the years, the mishmash of old and new building techniques imperfect, but adding to the character of the space. Discolouration on the walls and floors tell stories of previous picture hangings and furniture locations. The past is evidently contained within the spaces. It clings to and alters the physical sphere, mingling the abstractness of time and the concreteness of materiality.

Inevitably, the original use dwindled over time to the eventual closure of the building. The furniture was removed and the spaces were returned to their former canvas of possibilities, only this time they possessed a time instilled character, a history. It is the ease and ability that these possibilities can be imagined within the spaces that enables a swift change of use. A new and totally independent function can occupy these walls due to the flexibility of the spaces. A variety of uses can be pictured inside the structure, accomplished with a few minor additions or subtractions. The building is no longer solely a memory of the future, but also a strong link to the past. Its design is of a different period but its presence fits within the current context because that is where it resides in the memory of the community.
Introduction to Site

The site for this thesis project is located in Limerick City. At a main point of intersection, Sarsfield Bridge brings traffic and pedestrians into the heart of the city from across the river, forming one of the main gateways into Limerick City. An area where infrastructures meet and intertwine, the bridge creates a crossing over the river, and also creates an underpass beneath, where the street level is a whole story below. Here an under used road runs the length of the quay to Arthurs Quay Park, an unsuccessful public space overlooking the water, and eventually joins up to the main thoroughfare at Arthur’s Quay Shopping Centre to the north.

Built in the 1800s, Sarsfield Bridge consists of a Limestone structure joining a wrought iron swivel bridge. While no longer in use as a swivel bridge, it is still operational and the wheels and parts are still intact. Beneath the swivel bridge are the lock gates that allow boats to pass from the Abbey River which flows into the site, to the Shannon River, which is at a lower water level. A weir separates these rivers on the northwestern edge of the site.

Where the bridge meets land, the main road becomes Sarsfield Street which continues on to William Street, one of the major retail strips of the city. Beneath the roads, Georgian basements, coal bunkers and sewage culverts run perpendicular to the street. Situated on a flood plane, when Limerick City was constructed it was raised a level higher than the original ground plane, to allow for the river to rise without causing damage to the buildings. The subterranean layers of the city act as a sponge, taking in water to accommodate the River Shannon.

This site is a highly constructed landscape, from the subterranean layers beneath the constructed groundscape, to the quay walls that attempt to apply limitations on the River Shannon, to the lock gates and the weir that enable the water levels to be manipulated. Cross overs of levels and different infrastructures highlight man’s successful attempts to control that which we normally consider natural: water and land.

An abandoned building creates the gateway to Limerick City at this point. Formally a large retail location, it has remained vacant for some time. The gateway to Limerick City stands as a marker of decay in its negative form, greeting visitors and residents to the city. It is this site, extending towards the river, including the lock gates, Sarsfield Bridge, the main street and Arthur Quay Park that will be a testing grounds for this thesis.
Photographs taken on site exploring materiality and weathering.
Photographs taken on site considering infrastructure and its ability to endure time.
Fig. 13
Hand drawn study of Sarsfield Swivel Bridge.
The interest lies in the mechanics and operations of the bridge, as an infrastructural piece. Despite one of its original functions expiring, it has surpassed the test of time and remains intact and operational.
Fig. 14
Hand drawn study of Sauchie Bridge Gate.
The interest lies in the mechanics and workings of
the gate. The way in which they are opened and closed,
controlling the flow and level of the river water.
Context

Fig. 17

The site as it is now, surrounded on all sides by roads, cut off from the quayside and Arthur’s Quay Park.
Fig. 15: Perspective attempting to highlight some of the intersecting elements and layers on the site, looking towards the city.

Fig. 16: Section through Sandfield Bridge and the existing building, showing change of levels.
Proposed plan at street level. Dark shadows show the depth of the ground cuts and the spaces uncovered beneath.
An array of maps shows a series of levels excavated within the site.

Pure water tanks, 25m below street level, using the natural bedrock as the foundation.

Sediment tanks, coagulant basins, slow sand filters, Ultra Violet light treatment, 21m below street level.

Sediment tanks, flocculation chambers, main swimming pool, 17m below street level.

Aeration tanks, hot and cold water storage for laundry use, urban beach, 14m below street level.

Coarse filtration, fine filtration, children’s pool, urban beach, main laundry space, 8m below street level.

Air drying platform, gallery view from street, public showers and changing areas, bus stop, street level.

Urban beach, public changing rooms, mechanical drying and drying cloths, 2m below street level.
I wanted to make a piece of infrastructure that operated outside of its own spaces while also offering spaces to the city, public areas and uses. In looking at the water system for the city, the nearest reservoir is in Castletroy, and the cost of transporting water is expensive, requires constant maintenance and a large percentage is lost along the way. The projected increase in demand for potable water will be increased by at least 30% in the coming 10 years. Currently rainwater runoff is sent along with sewage to be treated the same way, which is unnecessary. The site is on a low lying area, an ideal location for catching urban run off. Therefore I decided to create an urban rain and river water treatment plant for the production of potable water in the city. Thus began the primary structure, consisting of the water cleaning process, sediment tanks, coagulant basins, fine and coarse filters and a rooscape that consists of 30 meters high water towers and rain water cisterns, 30 meers being the minimum height required to allow the water to be gravity fed into the catchment areas taps. A turbine placed in the river pumps the water into the towers.

The secondary use of this project is a series of urban spaces, an extension of Arthur’s Quay Park which is currently underused, consisting of an urban beach, public toilets, showers, a laundry, swimming and bathing pools, changing rooms and drinking fountains. These water functions come together to create somewhat of an antiseptic park for the residents of Limerick City. The water treatment plant runs on a sloping west to east axis that allows for the drops required to filter the water. The laundry runs on a south to north axis, drawing the users into a subterranean world without the claustrophobic feeling usually associated with the underground.
This project stems from an interest in the positive and negative aspects decay can have on buildings over time. The positive being the natural weathering of materials, the human patina and buildup deposited on a building by its users and uses, and the negative being the premature demise of a building before its physical lifespan has expired. In thinking how to make a building last unto ruin, I thought about infrastructure and how it often outlasts buildings and even its own primary use: the Roman aqueducts, Sarsfield swivel bridge, the Georgian underground culverts.

I was looking at the constructed and layered nature of Limerick, the original groundscape having been raised an entire story during the construction of the city, to allow for the river to flow underneath in times of flood. This raised ground plane, the constructed nature of the quay walls and shore line, the bridges, the lock gates and the weir that allows the Abbey River to drop into the Shannon, all speak of the power and control man has over things that are usually considered natural, in this case, water and land.

I wanted to make a building that operated outside of its own spaces while also offering spaces to the city, public areas and uses. In looking at the water system for the city, the nearest reservoir is in Castletroy, and the cost of transporting water is expensive, requires constant maintenance and a large percentage is lost along the way. The site is on a low lying area, an ideal location for catching urban run off. Therefore I decided to create an urban rain and river water treatment plant for the production of potable water. Thus began the primary structure, consisting of the water cleaning process, sediment tanks, coagulant basins, fine and coarse filters and a roofscape that consists of 30 meters high water towers and rain water cisterns, 30 meters being the minimum height required to allow the water to be gravity fed into the catchment areas taps.

The secondary use of this project is a series of urban spaces, an extension of Arthur’s Quay Park, consisting of an urban beach, public toilets, showers, a laundry, swimming and bathing pools, changing rooms and drinking fountains. The water treatment plant runs on a sloping west to east axis that allows for the drops required to filter the water. The laundry runs on a south to north axis, drawing the users into a subterranean world without the claustrophobic feeling usually associated with the underground.
Fig. 20

Working drawing showing the pipe arrangements at an engineering level for one particular section. The pipes are labeled with their diameter and the maximum length of the runs are marked, and the public spaces marked clearly.
Fig. 21
Night time view of the water towers from the Franciscan Church on Henry Street.

Fig. 22
View upwards from underneath the roof scape created by the water towers and rain water catchment.
Fig. 24
View from the main swimming pool, looking towards the mining lifts. The rainwater storage tanks can be seen on the left and the gallery access from the street to the right.

Fig. 25
View from outside the changing areas, looking towards the children’s pool, the outdoor showers and the mining lifts. Beyond is the main laundry spaces and the drying area.
Fig. 25
View from inside the main laundry space towards the street.
Bibliography


