CHAPTER 7: THE CHART: A BLUEPRINT FOR TIME

If one must describe duration as an instant of time in space, then Duration would be an interpenetration of instants, where each instant is heavy with its entire past and big with its entire future. Bergson (Levinas, 130)

The cemetery on Shuter’s Hill is a time sequenced portfolio of materials of different individual durations. The overall duration of the materials portfolio is determined by the trustees of the cemetery who have a vision for the cemetery that includes perpetuating the function beyond the constraints of space. There are 13 elements in this portfolio that make up the essential character of the landscape.

The seven organic elements that mark the seasons and biological time are the meadows, the willows, the beeches, the apple orchard, the plantings and burials in the maze, the ginkgos and the tulip poplars. The three man-made elements are the walls, the well, and the laundry. Finally, there are the three memory elements that capture a period of time and provide a bridge between the past and the future. Ancestral memory in the cemetery is provided by two elements, the ghost of Fort Ellsworth and the names of the dead. Living memory is provided by three generations of a family, which translates into 80 years and coincides with the duration of the entire cemetery. (see Appendix C to view 280 years of the chart and Appendix D to view the steady state chart)

Fig 7.1 Elements that make up the chart
ORGANIC ELEMENTS:

The Meadows: Every two years one of the meadows is tilled under and reseeded with flowers that will provide color and groundcover throughout much of the growing season. Mourners walk along the mulched path and scatter the ashes of their loved ones amongst the bleeding hearts, larkspur, love in the mist, poppies, columbines, asters and black-eyed susans. After two years, the meadow is closed off and the second meadow is available for the scattering of ashes. Two years later, the first meadow is tilled under, fertilized and reseeded. A new and different path is laid out and the cycle continues, with one scatter meadow alternating every two years with the other. Duration is short and the steady state is reached after two years.

![Fig 7.2 The meadow over 100 years time](image)

Spiral of Willows: Forty young willows are planted at the same time around the well. In the first year, four consecutive willows are cut and four new young willows are planted. In the second year, moving counterclockwise, the next four willows are cut and new ones planted. This continues until 10 years have gone by and all the original willows have been replaced. The steady state for the willows is reached in 10 years and the cycle then repeats itself. In the 11th year, the four willows that are cut will be around 10 years old (age at planting time plus 10 years), and from hence on, that will be the age of all the willows that are cut. No willow will be allowed to exceed 10 years, for in this cemetery, the willows represent the early stages of grief. The visitor will, at all times, see 40 trees ascending from age one to 10 around the well. The exact age and position of the individual trees will vary according to which year within the 10 year cycle one visits the cemetery. The ages and location of the willows in the spring of year 25 are different from that of the autumn in the year 150 and from the winter in the year 213. However, the location and ages of the willows in the summer of the year 70 is identical to that of the autumn in the year 150. Both of these years fall in the 10th year of the cycle.

![Fig 7.3 The willows over 100 years time](image)
The Beeches represent sudden death due to their tendency to topple over suddenly in a windstorm. The root system of the beeches is shallow and their canopy is large and heavy, so when they reach old age, they can fall over at any time and create damage. Beech trees also grow fast, so that by age 50 the tree resembles a venerable old tree. In the first year, two beeches are planted one in each planting bed on the terrace. In the 50th year, one tree is cut down and a sucker from the roots of that tree is allowed to remain. At this point the beeches have reached their steady state, since the design intent demands the continued existence of two beech trees at all times. One tree must always be between one and 50 years of age and the other between 50 and 100 years of age. After the first 50 years, there will be a 50 year old and a one year old tree on the terrace. After another 50 years, the 100 year old tree will be cut down and a sucker left to grow in its place. The other 50 year old tree will continue to grow to 100. If one of the trees dies, a new young tree is planted, and, so to stay on course, it is cut down whenever the original was supposed to have been cut down, regardless of its age. Thus, there is at all times, at least one beech tree that is a minimum of 50 years old and is large enough to embrace the terrace with its canopy.

The Orchard located outside the walls of the cemetery represents a fruitful life and consists of 110 trees. In the first year all 110 young apple saplings are planted at once. Five years later, every 11th tree is cut down, counting from the north nearest the entrance gate and winding left to right. Thus, in the fifth year, the 11th, 22nd, 33rd, 44th, 55th, 66th, 77th, 88th, 99th and 110th trees are cut down and new young ones are planted in their place. Then five years beyond that, in the 10th year, the first, 12th, 23rd, 34th,.....100th tree are cut down and replaced. The steady state is reached after 55 years, when the last of the trees first planted are cut down and the cycle begins anew. Now in the steady state, the trees that are cut down are always 55 years old, so the young chase the old and no tree ever reaches more than 55 years of age. The cemetery ends up having an orchard with trees of 11 different ages from newly planted to 55 years old. Duration is constant. The wood from the trees is used for the pyres in the brass basins at the entrance of the cemetery as well as for the construction of small boxes that contain the ashes that will be interred in the maze.
The Maze is the heart of the cemetery, and most clearly represents the renewal of time. The spiral paths divide the maze into four quadrants, each accounting for 20 years of time. A quarter of the maze is available for burials at any one time. Ashes contained in a plain, small wooden box can be interred at any location in the quadrant that is open. A quadrant will hold a maximum of 20,000 burials in a 20 year period, so no more than 1000 burials are permitted per year. There is no limit set for the well and the scatter meadow. During this 20 year period, small ornamental tree saplings are planted in the middle of the burial bed, periwinkle is planted for groundcover and small bulbs are dug in as well. Family members of the deceased may bring their own bulbs to plant at the time of burial and may offer a small tree if space is available. The trustees will have a list of bulbs and trees that reflect the current trend in planting and are appropriate for the space. The maze is the only place in the cemetery where the nature of the plantings changes with the times. Once the quadrant is full and 20 years have elapsed, the second quadrant, moving counterclockwise, is made available for burials for another 20 years. After 60 years, when the fourth quadrant opens up for burials, the trees of the first quadrant are slowly cut down and left on the burial bed to decay naturally. In addition, any brush generated by maintenance in the cemetery is added to this quadrant. The increased brush creates new soil and shelter for birds and small animals. After 80 years, the earth in the first quadrant is made ready for another 20,000 burials and enough time will have elapsed by then to dim the pain of those who might still remember. The boxes made of untreated wood, containing the ashes, will have long since disintegrated and returned to the earth.

The steady state is reached in 80 years, when the cycle begins anew. After 80 years, the maze will consist of four quadrants in different stages, young, mature, old and felled. Burials take place in the young stage, plantings grow in peace in the mature stage, they age in the old stage and decay in the felled stage. If one knows the year of death, anyone can look in the Duration Chart in the row titled “Maze” and determine in which quadrant someone was buried, or, anticipate which quadrant will become available at the time of some person’s death. The circle with plantings is placed above the maze in the plan and rotates one quadrant, counterclockwise, every 20 years.
The Ginkgos are living fossils that existed as long as 270 million years ago and normally represent longevity. The ginkgos in this design represent unnatural death, something that occurs in war. They are arranged in two groves of ten rows apiece. The twenty rows of trees are planted in the first year and then 10 years later, the first row on both sides is cut down and new, young ginkgos are planted. Ten years later, the second rows on both sides are cut down and so on, until 100 hundred years have elapsed and all the rows have been cut down once and replanted. Once the steady state has been achieved, the row of trees that is decimated every 10 years will be mostly 100-year old trees. If a tree should die in the interim it will be replaced with a young tree and then cut down with its companions regardless of age. The design intent is to have two opposing groves of trees where every row represents a different decade of age, from newly planted to 100 years of age. These 10 different decades will be represented at all times, but not in the same row.

The Tulip Poplars are cloned from the Tulip Poplar originally planted by George Washington at Mount Vernon on the Potomac. In the first year, five tulip poplars are planted in a loose arrangement south of the building. These long-lived trees will frame the bottom of the Masonic Temple from anywhere in the site. After 40 years, the trustees cut down the tree they deem to be the weakest and plant a new one close by. Every 40 years another tree is cut down and a new one planted. The steady state is reached when all the original trees have been cut down. That can occur at 200 years at the earliest. Given the longevity of these trees, it is not unrealistic to assume that a tree in this grove could reach a very old age of several hundred years and be healthier than a much younger tree. However, a healthy and extremely old tree may be deemed “weakest” and cut if the trustees determine that the tree will not survive another 40 years without support. There are many possible scenarios, such as the youngest tree is always cut, because it fails to thrive is the shadow of the older trees. At some point, however, a very old tree will be considered weaker than even an unhealthy young tree. Here, these trees represent lingering death.
INORGANIC ELEMENTS:

The Granite Walls reach the steady state the moment the first burial takes place and the first name is inscribed on the granite. The walls are the structures that make up the bones of the cemetery. Not only is the granite a material of long duration, but the material itself absorbs the events that recur over time within the cemetery. This perception that the walls have witnessed so much over time gives them a greater value every year. Any wear and tear that requires maintenance over time, is more than offset by the increased weighting placed on the granite as it acquires its own landscape the patina of age. The granite walls are ever-changing and their surfaces “imply a past that is caught up in the present and anticipates the future” (Mostafavi and Leatherbarrow, 64).

The Well is also constructed of granite and like all the walls that make up the cemetery it acquires additional weighting with age as well. The ashes of the thousands of people scattered into the water gives the well a sacred quality that increases with time. The steady state is achieved after the first four seasons of the year have elapsed.

The Laundry that existed in the 18th century is evoked by the white marble pool that is situated directly over the foundations of the old laundry house. The water in the pool symbolizes an activity that occurred in that exact space over 200 years ago. The pool is immediately in the steady state, for it is merely a newly constructed indicator of a time long gone.
MEMORY ELEMENTS:

**Fort Ellsworth** reminds us of a time endured by our ancestors. Ancestral memory includes the genetic and cellular memory of all living things, but is specifically defined here as the physical reminder of an event or person long gone. The ancestral memory of the cemetery site is reinforced every spring by the emergence of the outline in the grass of Fort Ellsworth. This event is an echo of a time that no living person today experienced, but we are reminded every spring that it did occur. Though duration in the financial sense is only forward looking, the same concept can be applied when looking back in time. The weighted value applied to an event in the past will be subjective and depend on the age and values of the individual. For example, a young person may not place as much value on this natural signal from the past as an older Civil War history buff. The trustees of the cemetery value this event and have left the site free for the past to emerge every spring. The steady state has been evident for over 140 years and has persisted despite all the changes to the site since then. Recalling the past enriches the experience of the present.

The names etched into the granite wall are also a physical reminder of people who once were alive and whose remains ended up within these walls. These names exposed to the elements, may persist for years before time wears them down and they fade beyond recognition. The steady state is reached when the entire interior side of the outer wall (top 12 inches) and both sides of the inner wall (excluding seating) are fully engraved with names. If the space allotted for a name and dates is eight by one and one half inches and, on average, five names are added every day, it will take 155 years to fill the inside of the outer wall, 51 years for the inside of the interior wall and 65 years for the outside of the interior wall to fill up with names. The trustees are guaranteed space on the wall for over 250 years. By then, time in the form of weathering, will have likely erased the early names etched in the granite, freeing up new space for ever more inscriptions. The people who cared for those names will be long gone, but every new name adds to the open-ended sequence that ties the past to the future through the present and contributes to our ancestral memory. Given the limitations of space, it is not possible to provide a permanent, tactile ‘souvenir’ of every person buried in the cemetery. The Internet (electronic medium) makes it possible to record (see and hear) every life that is being lived today and will be lived in the future. Space is limited and time is endless, and the dilemma for the trustees is how to leave a physical and material remnant of every period of time in a constrained space.

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**Fig 7.14 Fort Ellsworth over 100 years time**

**Fig 7.15 Names on the wall over 100 years time**
Living Memory: First and foremost, is my assumption of 80 years for living memory, combined over three generations. I presume every generation will live to 90 years of age, with reliable memory lasting from age five to age 85. On the chart, every 10 year period of life is a block of color, with a light green for the first 10 years of life to a dark purple for the ninth decade. A line brackets the time of living memory. A five year old child will remember burials of relatives and visits to the cemetery and those memories will be passed on to at least two subsequent generations, who will build onto those relayed memories with memories of their own visits to the site. This time frame is important, because it determines the length of time that must go by, before the burial beds can be reused. The steady state, defined here, as the time of one complete cycle for this element, is reached in 80 years. In the design of this cemetery, the steady state is the duration of the trustees.
PORTFOLIO OF ELEMENTS:

To maintain a specific constant duration, a financial manager must rebalance the portfolio every day. A landscape architect creates a static design and walks away, even though landscape is dynamic and the materials that make up the design are constantly changing. Though a landscape architect cannot realistically stay on site to maintain the design, he can create a blueprint for the future that unambiguously specifies the intention of the design over time, as well as allow for the calculation of future maintenance costs. In the case of the cemetery, the mandate is to create a landscape of constant and long duration, thus I have included a chart that clearly states the intent of the design and the means for achieving that intent over a very long period of time.

The chart is a simulation of a dynamic process that can be used to envisage an outcome at any future point in time. It is the rebalancing tool for the trustees who wish to perpetuate the function as well as the spirit of their cemetery and it is a communication tool for the designer who is entrusted with creating this design. Time as seen in the chart is divided into measurable and divisible time periods, yet the design is in motion. We can view the chart as a musical score and run our eyes up and down and along time to read the harmonic and lasting nature of the design. The philosopher, Henri Bergson tells us that real duration is time perceived as indivisible and that it resides in the “uninterrupted humming of life’s depths” (Bergson, The Creative Mind, 148).

The plans in Appendix E, F, G and H show the cemetery 25, 70, 150 and 213 years after the initial construction. From the chart, one can reconstruct the design for any given year, by following down the column of elements. Once the steady state has been achieved, the sum of the duration of every element in a column is the same for every year. The sums all add up to the same constant number.

Though the landscape materials are in motion, the essence of the design experienced by the viewer remains the same year after year. A visitor returning after 30 years may subliminally perceive the changes and shifts in the landscape, but his consciousness will recognize a familiar pattern. The memory of a previous visit primes him with a pattern. On his return visit, he will recall and interpret the pattern as the same, regardless of the changes. This is something like remembering that the result of a sum is 24 and discarding all the different possible combination of numbers that can make up that sum.

A cemetery designed for constant duration gathers all the notions of time in one place. The concepts of time with a beginning and no end, time as linear and flowing, time as a loop repeating itself over and over, time as always in the present and time as a subjective flow can all be found in this design.

Fig 7.17 Chart
CHAPTER 8: CONCLUSION

Time is the substance from which I am made.
Time is a river which carries me along, but I am the river;
It is a tiger that devours me, but I am the tiger;
It is a fire that consumes me, but I am the fire.
Jorge Luis Borges (Scientific American, 10)

To design for perpetuity is to design with constant duration in mind.

This thesis explores time in the landscape with the design of an urban cemetery constrained by finite borders, which incorporates the inevitable material changes of all things. I adapted the concept of constant duration from finance to create a landscape that is perpetual. The design of a cemetery with a long constant duration assures the continual life of the cemetery. The design perpetuates both the function of burying the dead and the essential experience of the landscape.

The chart that accompanies the plan takes into account the dynamic changes in the landscape and communicates the intentions of the designer over time. A constructed landscape that is not rebalanced may ultimately resemble installation art left out too long. It is vital to rebalance the portfolio of materials to preserve a dynamic landscape for perpetuity.

The constant duration approach, outlined in this thesis may be applied to future landscape designs. While the design of this thesis was of long duration, the concept of constant duration can be applied to any landscape and to any time frame. Nonetheless, this concept is particularly well-suited for long duration landscape designs, such as cemeteries and memorials. The constant duration approach to landscape has important implications for preservation, restoration and conservation, since such designs will have already accounted for time in the landscape.