NECROPOLIS

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Master Thesis Spring 2022
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ABSTRACT

Sweden is one of the most secularized societies in the world and many swedes go through their entire lives without the involvement of religion, but that is not true for their death. The purpose of this master's thesis is twofold: to propose a design for a truly secularized burial site, that celebrates death in a meaningful way without religion, where religion is welcome but not the norm, and secondly to find a typology for the burial ground that fits the urban landscape and do not occupy unnecessarily vast areas of land, useful for other types of urban expansion.

Through dialogs with *Sveriges Kyrkogård och Krematorie förening*, manufacturers of cremator ovens and filter equipment, as well as reference projects, a room program was constructed. From this a connection diagram was established that in conjunction with the room program became the necessary toolbox in working with the separate flows and functions of the facility. On top of this separate focus studies were performed to further enhance and detail the design.

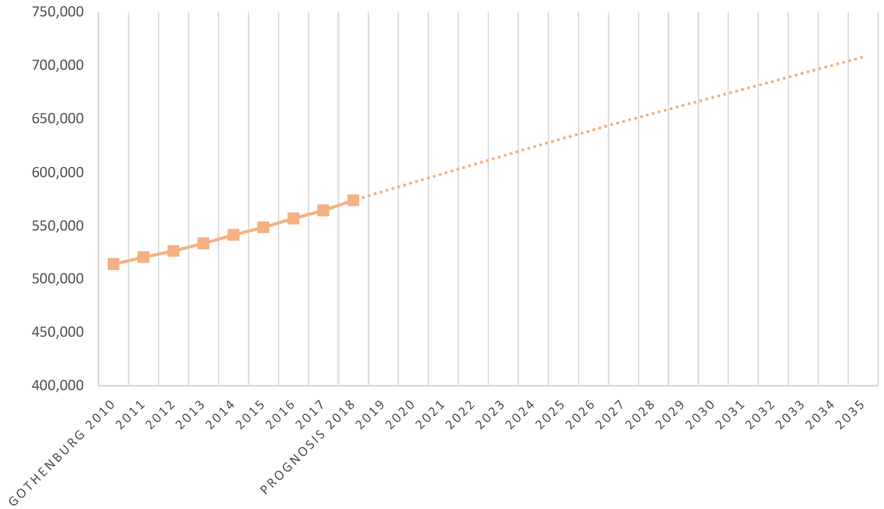
Through historical and reference studies of architecture relating to death, primarily the thoughts of Étienne-Louis Boullée, his theory of *architecture parlante* and what he fittingly describes as the 'Poetry of Architecture' (Boullée, E. 1953), as well as crematories of Italy, Germany, Scandinavia, and France, a visual language is distilled that has the dignity and stature to manifest a memorial for our loved ones. The design of the necropolis is imbued with the symbolism and an architectural language that is associate with death while not making the religious connections.

The building should communicate both civic authority as well as emotional resolution (Worpole 2016). The atmosphere of these grave settings is of paramount importance, it should not through mediocrity sit at odds with the emotional range of the funeral service or while visiting a dearly departed. Atmosphere is investigated through the nine qualities of atmosphere proposed by Peter Zumthor (2006) in his book Atmospheres.

Keywords: Columbarium, Crematorium, Funeral, Mausoleum, Necropolis

CONTENT

POPULATION



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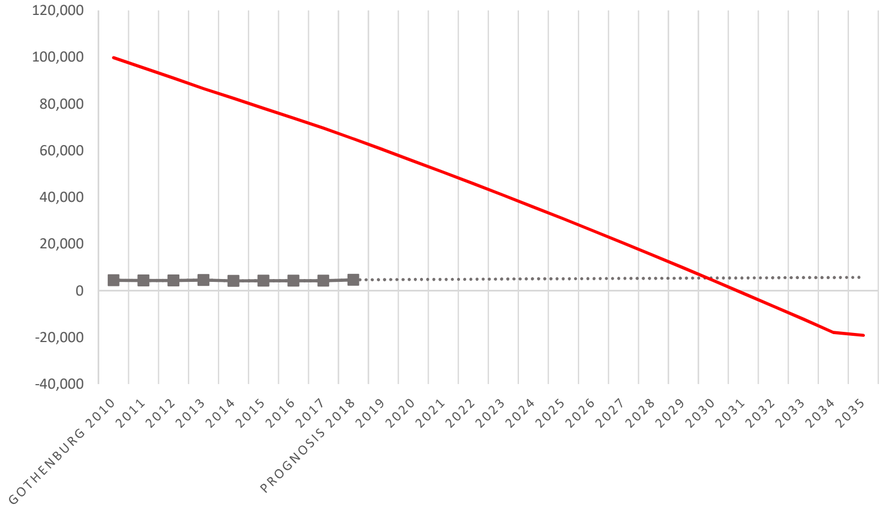


WHAT?

Background

According to the World Values Survey ("WVS Database", 2022), Sweden is one of the most secular countries in the world. The church was separated from the state in the year 2000 with one exception, the Swedish church is commissioned by the Swedish state to perform funerary services and provide burial sites (The Church of Sweden Employers' Association, 2020). This is a unique arrangement that sets Sweden apart from most European nations; historically, overcrowding of churchyards resulted in very unhygienic living conditions within the rapidly expanding towns and cities of Europe. The rich and powerful where given the privilege to be buried within the churches, and this sparked a demand for similar treatment from the lesser classes. The situation got even more strained when Willem the Stadhouder came to reign in Britain alongside Mary and brought with him the Netherlandish customs where churches functioned like enormous public mausolea (Curl, 2002). During the 18th century the growth of the Swedish population was so great that the capacity of the old churchyard's was stretched to their limits, bodies were not decomposing quickly enough (Grönwall, 2017). Overcrowded graveyards led to decaying matter getting into the water supply and causing epidemics, so charnel houses where erected and old bones where disinterred to make room for new burials (Curl, 2002), but the situations required more drastic measures, and during the 19th century, radical and secularising impulses lead to the establishment of the grand cemetery Père-Lachaise in Paris (Heathcote, 1999). Père-Lachaise quickly became the model for a new era of private and public funded cemeteries like Mount Jerome in Dublin, Glasgow Necropolis, Kensal Green and the other six cemeteries of the 'Magnificent Seven' in London (Curl, 2002).

The interesting shift that happened here is that during this time, the responsibility of caring and housing our dead shifted from the clergy to the public and private sector in most European countries, but not in Sweden. For the most part, the involvement of religious authorities tends to be marginal, with the exeption of Denmark and Sweden, where the Church authorities have maintained a degree of control (Rugg, 2000). In Sweden, the state has placed the responsibility for securing burial sites and performing cremations on the parishes and groups of parishes of the Church of Sweden, e.g., *Göteborgs begravningssamfällighet*, with the exception of the municipalities of Stockholm and Tranås. The entity that is responsible for funerals, cremations, and burials is called the burial authority. (The Church of Sweden Employers' Association, 2020).

While not strictly a monopoly, it has often been described as such and at the moment there are no obvious alternatives. You can opt for a civic funeral service, but you will most likely be buried in consecrated ground, on property own by the Church of Sweden (Grönwall, 2017). You can choose between being buried or cremated, if you are cremated you can apply for a permit to have your ashes spread beyond the designated burial grounds, e.g., the ocean, but it must be a place not to close to settlements. The parishes are required by law to provide a sufficient number of graves, and also burial spaces for other beliefs and views of life in a respectful manner, as well as alternative accommodations for faith-neutral funerals, cremations, and burial activities (The Church of Sweden Employers' Association, 2020). But these venues seldom match the architectonical qualities that the church offers and is far less suited for such an important occasion as a funeral. Therefore I find it imperative that we reevaluate this arrangement.

Since the beginning of the 21st century, there has been a steady decline in the number of funerals adhering to the Church of Sweden's funeral order (Helgesson Kjellin, Sandberg, & Sjöberg, 2021). Helgesson Kjellin et al. (2021) reasons that the decrease is probably due to the fact that younger generations are not socialized into the traditions of the Swedish Church at the same extent as previous generation, drawing a parallel towards the similar decline in baptism, confirmation, and weddings. I would argue that the number of funerals that follow the Church of Sweden's funeral order, 65% of all funerals in Sweden in 2020 (Helgesson Kjellin et al, 2021), is high compared to their number of members, roughly 54% of the entire population, especially since only 86% of their own members opt for funerals that follow the Church of Sweden's funeral order (Helgesson Kjellin et al, 2021). I believe that this is probably due to the fact that they have settled in what you in nudge theory would call the default choice, as well as their almost self-mutilating tendencies in being too accommodating in an attempt to stay current, exemplified by Helgesson Kjellin et al. (2021) when they argue that the grief makes people more susceptible to the way they are treated, and if the clergy is not accommodating enough, it could alienate people to such an extent that they will leave the Church for good, therefore the clergy should rather accommodate the wishes of the bereaved than stand by their own tenets.

There is an apparent decline in the number of people who chooses a funeral that follow the Church of Sweden's funeral order, and this is especially noticeable in Göteborg, and particularly Stockholm where only 54% choosed to have funerals that follow the Church of Sweden's funeral order. This is partly because there are more people per capita here that are not members of the Church of Sweden compared to the rest of the country, but it is still a significant difference even when this is accounted for according to Helgesson Kjellin et al (2021). A recurring reflection is that most of the people who are members of the Church of Sweden is probably not believers, and just members purely out of habit. Another theory is that more and more people view the funeral as a private occasion, and the fact that the Church of Sweden insist on the funeral being a public funeral mass might be another alienating factor (Helgesson Kjellin et al, 2021).

So, the question is if it is feasible that they should be responsible for such an important societal function? As a Christian faith society, the Church of Sweden's main objectives is to spread the gospel, hold divine services, diaconia, and missions. As the appointed burial authority, they are in a unique position compared to other faith societies, and although they are required to provide this service faith neutral, this dual nature sometimes leads to ambiguity and meshing of these two rolls (Helgesson Kjellin, 2021). *Sveriges kykogård- och Krematorieförbund* (2017) are generally happy with the arrangement, in a do not fix what is not broken kind of mentality, but they do present some critique. To begin with they point out that since the start of the 21st century, the Church of Sweden has lost about 1,3% of their members annually, and if this trend persists, their main source of income will soon come from being tasked to provide burial services. *Sveriges kykogård- och Krematorieförbund* (2017) also points out that there have been some troubling developments, where they experience that the Church of Sweden have successively increased their confessional pressure, even though there should be a clear divide between their role as a faith society and that of state appointed burial authority.

([Monumentale di Milano ingresso al Tempio Crematorio], 2015)

WHAT?

I would argue that there is a dissonance between the values that we chose to live by, seeing that Sweden stands out as one of the most secular nations in the world, and the alternatives presented to us regarding our final resting place and that this should be reason enough to explore our alternatives, but there are other problematic aspects to. We have reached a point where the urban population of the world is greater than the rural, and cities like London, New York, and Hong Kong are rapidly running out of burial space (Eggener, 2018). This is a phenomenon directly related to the growth of cities, and when cross referencing statistics from *Göteborgs Stad*, *Sveriges Kyrkogårds- och Krematorieförbund*, and *Göteborgs Kyrkogårdsförvaltning* it becomes apparent that there will be a acute shortage of graves in Gothenburg if the population growth continue as predicted and no new burial grounds are established. Gothenburg has had a deficit of burial space for the past 40 years. Because of the accumulated deficit in combination with population growth, there is now an urgent need for at least 30 hectares of new burial space within the next 20 years, plots that need to be at least 10 hectares each and easily accessible (K. Evenseth, personal communication, January 3, 2022).

In Sweden, if a person is a registered citizen within a burial authority's administrative district at the time of their death, that burial authority must provide a grave, or equivalent, in a public cemetery for 25 years at no cost to the estate of the deceased, after 25 years the estate can choose to keep the grave in exchange for a fee, or it can be returned to the burial authority (The Church of Sweden Employers' Association, 2020). Because of this there is an influx of graves every year that is returned to the burial authority. But, in Sweden, by law, *griftefriden* inhibits the reuse of graves to a certain extent. Specifically, that each grave is usually only reusable up to three times, since the new interment must be shallower than the previous one, effectively stacking three graves on top of each other (M. Hammarberg, personal communication, January 31, 2022). This unfortunately means that all graves in Gothenburg will at some point become unusable, and it becomes increasingly hard to calculate how many graves *Göteborgs begravningssamfällighet* have at their disposal. But if we disregard that a grave can only be reused 3 times and hypothesis that every grave was empty by the year 2010, we can see that with the predicted increase in population and with the amounts of deaths in relation to the population growth there will be a shortage of graves by the year 2035. Therefore, a solution to this problem is highly necessary.

The obvious problem with cemeteries is that they permanently occupy vast amounts of useful greenspace that could otherwise be used for either recreational parks or urban densification. Less obvious is that traditional burial consumes materials like metals, stone, and concrete, while also posing a risk that it can contaminate the soil and groundwater (Eggener, 2018). The rapid shift in the distribution of our population towards older ages puts us in a challenging spot regarding the scale of death infrastructure (Murray 2016) and while more than 60% of open space in the London Borough of Newham is cemetery land (Worpole, 2016) the need to find a more space efficient typology becomes apparent. But as mentioned earlier, this is not the first time that the bulk of all the dead and the living have been on a collision course; by the 1870s most of the earlier problems regarding disposal of the dead had been dealt with (Curl, 2002). Death had by then been forced into exile, and by the end of 1785, processions of wagons had been crossing the cobbled streets of Paris by night for 17 months, relocating the 6 million corpses that had hitherto occupied *Cimetière des Saints-Innocents* (Valentijn, Verhoeven, & Tol, 2018).

But already by the end of the 19th century, the new hygienic cemeteries that were located outside the cities where gradually filling up, and for many it became apparent that even these grand acres of death would someday be full, and become a cause of great difficulty (Curl, 2002). But Victorians had grown distant to soft values and become experts in hard facts and efficiency, and a functional line of thought was introduced in the debate. It was argued that the corpses could be broken down and used as fertilizer, used in research, artificially and speedily decomposed, used as fodder for animals or even humans, mixed with water and treated as sewage, frozen, or burned (Curl, 2002). In the end, cremation was the favoured option, but it was not the Europeans of the 19th century that invented cremation, the ceremonial burning of corpses is older that human history and most likely were a common occurrence in Europe and the Near East during the early Stone Age, spreading across northern Europe during the late Stone Age, with the oldest traces of cremation in Europe found in Sweden from about 7000 BCE (Valentijn et al, 2018). But the customs of cremation were considered pagan by the early Christians of the Roman Catholic Church, and this perception of cremation as something foul and pagan held strong well into the 19th century. But the world of the 19th century was a world in change, and the discovery of the New World in the 16th and 17th centuries had broadened the cultural horizon, and some inspired scientists rediscovered cremation, which was common practice in large parts of Asia (Valentijn et al, 2018).

The earliest crematoriums of Europe were much simpler buildings than their contemporary counterparts, but in a sense, they were more genuine, since the farewell took place in the crematorium itself. This is primarily because the pioneers where abandoning the ecclesiastical services since the church was opposed to cremation, and they needed a venue for the farewell (Valentijn et al, 2018). But, what is important to consider about crematoriums is that they were basically developed in conjunction with the invention of the cremator oven, and mainly constructed to shelter one or multiple ovens, all other functions have been subject to extensive debate since its inception (Valentijn et al, 2018). Cremation accounts for over 80% of all funerals in Sweden, and because it is a modern phenomenon, and a movement that historically was secular, functional, hygienic, and even anti-clerical (Curl, 2002), architects have tried abandoning the religious architectural traditions while struggling to develop a new stylistic language for these secular but grave settings, which are required to communicate both civic authority as well as emotional resolution (Worpole, 2016). It is apparent that crematoriums play an increasingly important role in our society, but they vary greatly in function, where we on one hand have almost complete funeral homes, and on the other hand have almost purely technical disposal facility like the ones we see in the Scandinavian countries (Valentijn et al, 2018).

It saddens me as a Scandinavian that we have managed to produce some of the most exquisite pieces of contemporary funerary architecture in the world, obviously we understand the important position funerary architecture holds in or society, when we seldom give any thought towards the important position the ceremony and send-off holds in the grief process, and how important and curative a clear and definitive conclusion can be when the only thing left to do is accept and move forward. To rectify this was one of my primary objectives when I wrote this thesis, and if there is anything that I hope that you the reader carries with you when you stop reading is the knowledge that the ceremony, and its conclusion, need to hold a pivotal part in future crematoriums.

WHAT?

Context

In all honesty the spaces that we create for our dead is actually meant for the living, they are intended to be places of social cohesion and should feel reliably solid when we ourselves are breaking apart. Therefore, even if my intentions are to avoid any religious branding there will be cultural aspects to consider. Death is a process for both the dying and those left behind, and the spaces intended for it should offer solace and consolation, it should feel like an important space worthy of our loved ones and offer the unique feeling of purpose and continuity (Murray, 2016). And we need these spaces in the heart of our cities because we want to remember and stand in the silent presence of our loved ones.

Therefore, this master's thesis is set in a central urban context located on top of *Medicinareberget*. Notable pieces of architecture to especially consider in the vicinity is *Skansen Kronan*, *Annedalskyrkan*, and *Göteborgs naturhistoriska museum*. The site offers many advantages that are key for this thesis, first and foremost it is centrally located while still unrestrained by any apparent architectural influences, this allows for a greater freedom regarding placement, expression, and major and minor axis. It will allow the project to be a solitary piece of monumental architecture without compromise, creating the opportunity for an unrestrained proposal and focus all efforts on the task of creating evocative spaces by working with the interior, scale, light and shadows, materiality, details, and atmosphere, with great liberty in room sequences, orientation, and spatiality.

A site visit was carried out to better understand the site. Notes were taken during the visit regarding possible pathways, rocky outcrops, and vistas. Multiple vistas were noted, especially towards the west with a view overlooking *Slottsskogen* and *Annedalskyrkan*, and also towards the north, with a great view overlooking *Linnéstaden* and *skansken kronan*, seeing all the way to *Hisingen*. *Linnéplatsen* is the primary hub for public transport in the vicinity, and during the visit a path was mapped that established a connection between the site and *Linnéplatsen*. South of the site, only 3 minutes by car, is *Sahlgrenska Universitetssjukhuset*, and right next door is *Rättsmedicinalverket*; the Swedish government agency that is responsible for forensic chemistry, forensic genetics, and forensic medicine. This is very desirable since *Sahlgrenska* is the biggest hospital in the vicinity and many of the deceased will come from either here or *Rättsmedicinalverket*. There is also a need for a venue to cremate body parts that are removed during surgery, since they cannot be disposed of in any other way. If the crematorium could accommodate this need, it might be possible to have the ovens burning throughout the night; if you can have an oven burn a continuous period of 60 hours per a week rather than to re-ignite it every day, you can save up to 50% of fuel usage (Valentijn et al, 2018).

There were two rows of 60 construction barracks, stacked in two levels, that was used as student housing in the southern end of the site. Since these were temporary structures, they were disregarded when moving forward with the project. There was also a parking garage in three levels just east of the site. This garage was not well used, and it is situated below the main plateau of the site, with the top deck almost level to the main plateau. A walkway was proposed, linking the top deck of the garage with the main plateau to allow easy access for wheelchair users. Wheelchair users are also able to enter the site via the south entrance, but since the site is located on top of a hill, most wheelchair users will most likely arrive by car or taxi.

Thesis

This master's thesis is parts research-by-design on how to design an urban, secularized cemetery and crematorium, and parts research-on-design through analysis of case studies regarding how death has been approached in architecture from a historic perspective, as well as in contemporary projects. I believe that the aesthetics of this project will be of paramount importance and I think Boullée said it best when he said:

'Yes, I believe that our buildings, above all our public buildings, should be in some sense poems. The images they offer our senses should arouse in us sentiments corresponding to the purpose for which these buildings are intended' (Boullée, 1953)

I believe that through previous experiences, we have a preconceived notion of what this type of settings entails, and stepping away from that format will cause a conflict between our experiences of the space and the situation, leading me to the conclude that atmosphere is extremely important in this kind of setting. To verify this hypothesis, extensive research into the social sciences regarding funerals and the grief-process was conducted.

But the notion of atmosphere raises some interesting questions: What gives a building its atmosphere? And what kind of atmosphere should this building exude? To answer the first question I am relying primarily on the theories of Peter Zumthor and his book, aptly called *Atmospheres*. Secondly, I will investigate what I define as the architectural language of western funerary architecture, referencing the rich history of western funerary architecture.

But setting is not everything, the sequence of events is just as important, acknowledging the importance of the ceremony and how it ties directly into the design. Approaching the design from the ceremonial point of view not only addresses functional questions like, do the rooms work with or against the intended program, but it also engages the human perspective, raising further questions like: Is the atmosphere of the room appropriate? What is it like entering/occupying/exiting a room? What is the appropriate sequence of rooms?

Ultimately, I will answer the following questions:

• Is this typology viable, even preferable?

• What is an appropriate atmosphere for a secular building, that supports mourning and remembrance?

• What could/should a secular building for the dead look like?

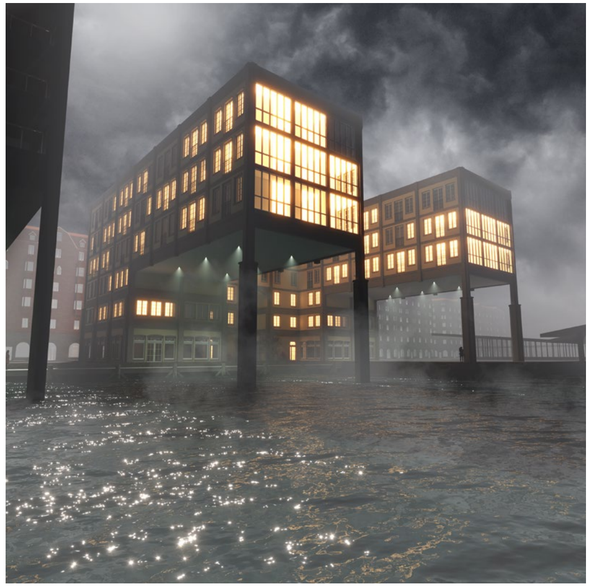
• What functions should a secular building for the dead accommodate?

To guide this focus I will try to answer the following questions along the way:

• Is there a common spatial, material and/or mood that is historically representative for funerary architecture?

• What do people want their loved ones' final resting place to look like?

• How should you work with the ceremony in this type of project.



WHY?

Aim & Purpose

Firstly, I do not think that the arrangement we have today is beneficial; outsourcing a very important societal function onto a shrinking faith community that soon, most likely, will garner more revenue from their role as burial authority than from their actual work is a mistake in my opinion. Both because they obviously are settling in a much more marginalized position in our society, but also because we mistreat other faith communities by playing favourites. Secondly, I believe that most Scandinavian crematories have missed an opportunity and disregarded a very important function when the ceremony was left out of the design brief. This is probably due to the fact that Sweden and Demark have appointed our former state churches as burial authorities of our respective nations, and they of course prefer to keep using their churches. Thirdly, I also wanted to strengthen the position that death have in our society, believing that the displacement to peripheral cemeteries that happened during the 18th century created an unfavourable distance between the living and the dead. Now, most of those cemeteries lies within the city borders due to urban expansion, but I do not want us to keep repeating the same mistakes as we are approaching a point in time when we yet again must decide where to lay our dead to rest. I also wanted to point out the opportunity we have in finding alternative typologies since over 80% of us gets cremated, and the traditional cemetery lay claim on very large landmasses. Lastly I wanted to rectify the almost factory like aesthetic that plagues our contemporary funeral architecture designs; Modernism might work for the architecture of the living, but when it comes to the architecture of the dead, we often find solace in the familiar embodiment of tradition and revert back to a more conservative aesthetic language (Heathcote, 1999).

Delimitations

This master's thesis does not aim to propose a replacement to graveyards as we know them but rather explore and elaborate on our options and showcase an alternative. I will not delve too deep into the rules and regulations regarding the handling and final disposition of human remains, if my proposal is not coherent with current regulations is beside the point and scope of this master's thesis. Also, parts of the project will be left at more of a conceptual stage, because it is not feasible to undertake both a major landscaping and architectural undertaking during one semester. Therefore, the columbarium will not be as refined as the crematorium.

Me

The thought of having a Christian burial and ending up in consecrated ground has never felt appealing to me. I have never identified myself as a religious person and, morbid as it might seem, have many times pondered about my own eternal resting place, and been sorely disappointed in how few options there are, and how little those options resonate with me. I am not a religious person, I do not subscribe to the idea of a soul, I have a strong inclination towards the sciences, but that does not mean that I do not want to show reverence towards the departed. For me, the burial site is not a place where the dead linger, but rather a place that helps the living remember. And the funeral is a respectful goodbye, as well as an important part of the grief process. During my studies, I have had a keen interest regarding the expression, usage, and experience of rooms, of sequentiality and in some sense ceremony. I believe that these are paramount in good architecture, and something that this master's thesis will need a great deal of.

Reading Instructions

The thesis is broken down into multiple parts, and I tried to write it so every part would be able to stands on its own, so you do not need to read the entire manuscript if you are just interested in specific parts. Although, this means that there will be some repetition, since the same topic might recur in another part of the thesis, where it is expanded on or discussed in relation to something else.

Under the headings *What?*, *Why?*, and *How?*, I give a brief introduction to the topic, the context, the thesis, and my aim with this thesis. I also introduce myself and my education as well as define the delimitations, or boundaries that I set. Under the headings *Room Program*, and *Studies*, I will expand upon the knowledge that I collected during this process, in regards to the function, arrangement, and detailing. Knowledge that I later rely on when transforming theoretical knowledge into practical implications and lines on paper. The heading *Design* is self-explanatory, here I give an in-depth rundown of the project in its entirety. Under the heading *Theory*, I will expand upon the theoretical framework that I hitherto only hinted at, as well as summarize my conclusions. Under the final heading *References*, I will give full disclosure of my references, as one should always do.

Education

Master of Architecture
Chalmers University of Technology
Gothenburg, Sweden
2017-2022

Autumn, 2018

AUT164 - Future visions for healthcare, housing and work 1: Residential healthcare - housing for seniors.

ARK641 - Master's thesis preparation course 2 (Material Turn).

ARK636 - Master's thesis preparation course 1.

Spring, 2018

ARK137 - Future visions for healthcare, housing and work 2: Housing inventions

ARK442 - Design and communication tools

ARK590 - History, theory and method 1

Autumn, 2017

ARK263 - Future visions for healthcare, housing and work 3: Healthcare architecture

ARK650 - Sustainable development and the design professionsBachelor 2014-2017

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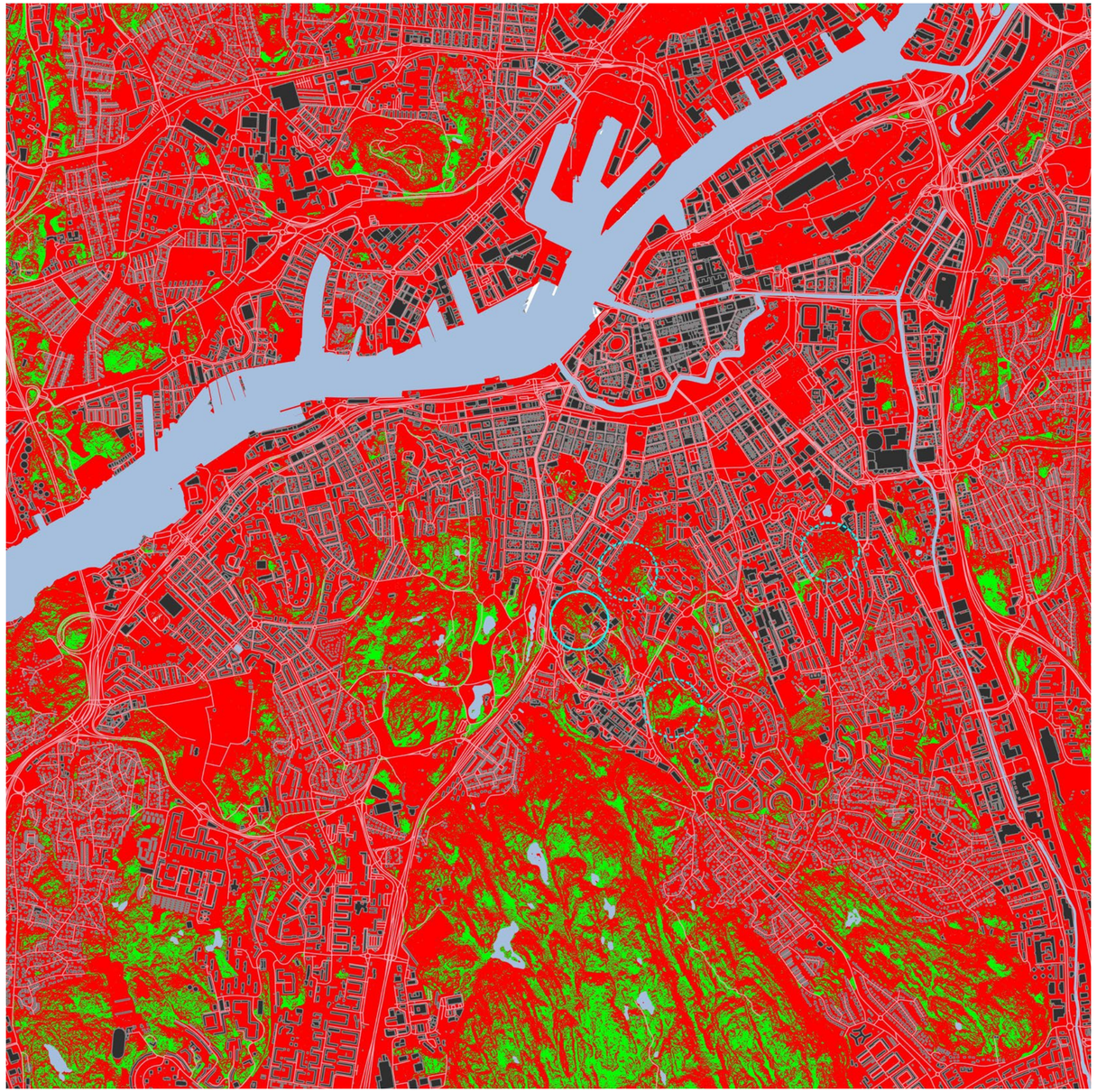


HOW?

Method

To identify potential sites, a DTM, Digital Terrain Model, that is produced using lidar data from a point grid with a resolution of >1 point/m² was acquired from *Lantmäteriverket*. The DTM is supplied as a raster heightmap, generated from points classified as ground and with a resolution of 1 m/pixel. Using QGIS, a slope map and an aspect map were calculated from the DTM; the slope calculation calculates the per pixel slope in relation to the eight surrounding pixels, while the aspect calculations give each pixel a numeric value based on the directions of the slope face, where 180 is south. A raster calculation was performed using the slope map and aspect map to identify areas in Gothenburg where the slope was either less than 5% or the slope was less than 30% and not facing north. A land use map was also converted into raster format and used to exclude areas that were identified as already in use by other functions. This produced a binary raster map that shows where the calculations returned true or false. From this, potential sites were identified and qualitatively assessed to find a good match. The main criteria of the qualitative assessment were size, centrality, and accessibility via public transport.

A Sunlight hours analysis was performed with Ladybug tools using Rhinoceros 3D and Grasshopper. The time period was set to measure the average sunlight hours over an entire year. The analysis confirms that the entire site receives ample amounts of sunlight, including the north facing slope since it is not steep enough to shadow itself, though placing structures here would potentially have a negative impact on the microclimate.

An annual daylight simulation was also performed on parts of the interior using Ladybug tools, Honeybee, Rhinoceros 3D, and Grasshopper. The time period was set to measure the average useful daylight illuminance over an entire year. The data was collected in percent, and showed the percentage of time the interior was illuminated above a threshold value of 300 lux.

A simple script was constructed in Grasshopper, that calculates the slope of a curve. This was used to sketch paths across the topography to find an accessible route from *Linnéplatsen*, making sure it didn't have a rise above 8%. To make this possible, large amounts of earth had to be excavated. Therefore a cut and fill analysis was performed, and measures where taken to achieve an acceptable mass balance.

Parallel to site analysis, historical and reference studies of architecture relating to death was conducted. The thoughts of Étienne-Louis Boullée was especially considered, primarily his theory of *architecture parlante* and what he fittingly describes as the 'Poetry of Architecture' (Boullée, 1953), as well as contemporary European crematories from Italy, Germany, Scandinavia, and France. From this, the layers of religion and sacral symbolism was peeled of in an attempt to distill an architectural language that was both evocative and representative of the monumentality and dignity that is deserving to manifest a memorial for our loved ones. My wish was to transcend the mere visuals and stimulate other senses like sound and touch, creating a deep understanding of the importance of materiality, surface and space. To help me with this I employed the thoughts of Peter Zumthor, collected from his book Atmospheres.

My research on the grief process, and the connection between healthy grief and a fulfilling ceremony, has made me think about how the atmosphere of the building works in tandem with the ceremony in creating a desirable experience. How the building was experienced therefore transcended being a question of mere taste and became one of the primary functions of the complex. So, by engaging the human perspective, I used the context of the ceremony to addresses functional questions like, does the rooms work with or against the intended program? Raising further questions like: Is the atmosphere of the room appropriate? What is it like entering/occupying/exiting a room? What is the appropriate sequence of rooms? Working with the ceremony as my modus operandi.

Through dialogs with *Sveriges Kyrkogård och Krematorie förening*, manufacturers of cremator ovens and filter equipment, as well as reference projects, a room program was delineated. From this a connection diagram was established that in conjunction with the room program became the necessary toolbox to begin working on the separate flows and functions of the facility. On top of this separate focus studies were performed to further enhance and detail the design.

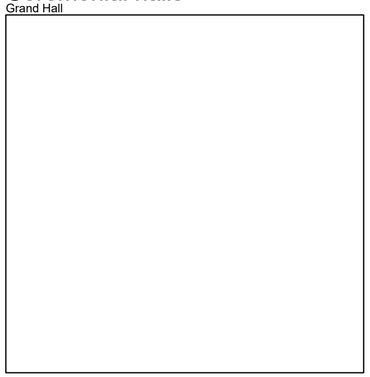
One of the focus studies was aimed at trying to understand the layout of the ceremonial halls and how different arrangements of seating would impact the ceremony. I investigated the difference between the classic theatre arrangement, which is the most common, and two other arrangements that I choose to define as the parliament seating arrangement and the centred seating arrangement. I also further investigated how these three could be combined into hybrid seating arrangement, and if those synthesized arrangements could alleviate some of the problems associated with their component arrangements.

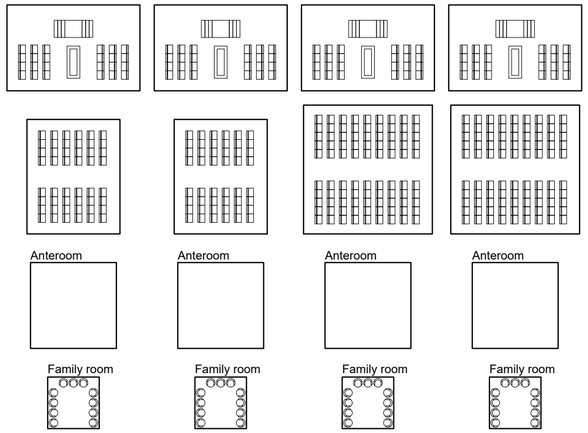
Another focus study I did was aimed at understanding what affective responses the layout of individual niches in the columbarium would garner, and what the critical parameters were. And in my third focus study, I wanted to investigate how the circle and the square could interact, since my research on funerary architecture underlined how important symmetry and geometrical formality has been to the success to the mortuary tradition.

When designing funerary architecture, you quickly realize that a large part of the building is dictated by the ceremonial sequence. So, I began by mentally trying to organise the rituals and the ceremonies, creating spaces that support them. Based on the knowledge I had acquired through my research, I sketched a progression though the building, schematically connecting the rooms in the right order. I then looked at how the progression would impact the experience, reasoning that arriving at pivotal parts of the ceremony would coincide with entering and exiting certain rooms, looking at how the physical and emotional experience could work in tandem. I played with the ideas of enclosure and spaciousness and how one state can elevate the experience of the other. I studied the relationship between scale, verticality, proportions, and how it impacts the occupant relationship with the building. I looked at how I could work with the natural lighting, both for emotional effects as well as a means to steer the occupant in the right direction.

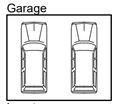
Ceremonial halls

Grand Hall

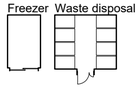




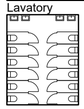
Garage



Freezer Waste disposal



Lavatory



Wreaths & flowers sale

Staff

Staff room

Washing room

Lavatory

Changing room

Rest room

Administration

Meeting room

Manager

Office

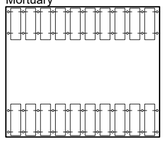
Officiant

Archive

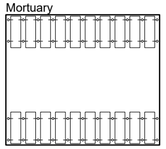
Lavatory

Mortuary

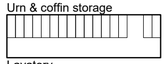
Mortuary



Mortuary



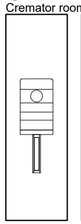
Urn & coffin storage



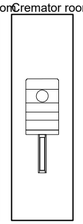
Lavatory

Crematorium

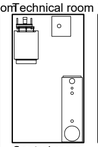
Cremator room



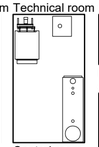
Cremator room



Technical room



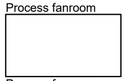
Technical room



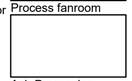
Oil tank

Diesel generator

Process fanroom



Process fanroom

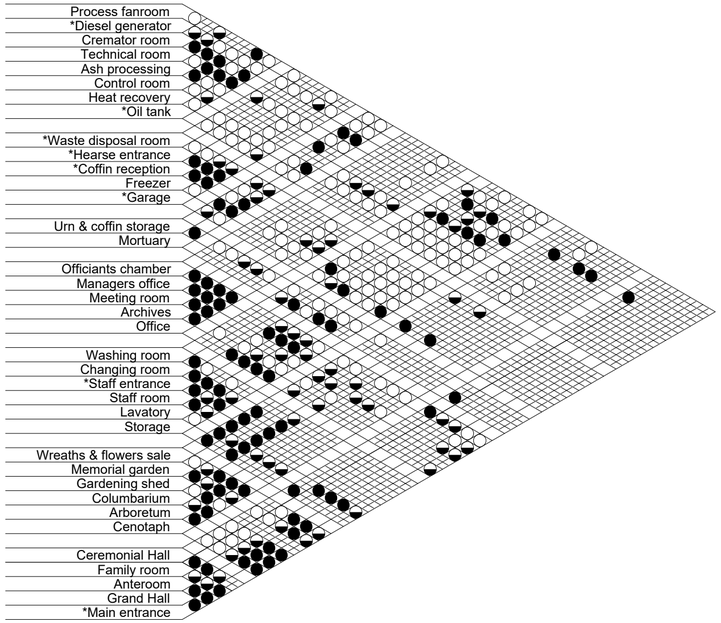


Control room

Control room

Lavatory

Ash Processing



● Necessary ◒ Desirable ○ Inconsequential ⤫ Undesirable

Scale 1:300

ROOM PROGRAM

Calculations

An approximation of a suitable number of graves where set to 40,000, this is quite a high number since it is almost 1.5 times the size of the currently largest graveyard in Gothenburg, and almost 40% of the total amount of graves available to *Göteborgs begravningssamfällighet*, but since one of the goals of the project was to test the typology, it was decided that a major impact on the local burial landscape was desirable. From here it was possible to estimate the number of ceremonies per day; reasoning that if 40% of all graves in Gothenburg would be located at this cemetery, that means that at least 40% of all funerals would take place here, and 40% of the estimated average of funerals per year between the years 2025 and 2070 is 3,116 divided by 250 workdays per year is just over 12 ceremonies per day.

A cremator cremates a normal sized person in about 75-90 minutes. According to *Sveriges kyrkogårds- och krematorieförbund* (Den framtida krematorieverksamheten, 2017), one cremator oven can cremate about 1,350 remains per year, if we assume that the technicians work 8-hour workdays with no overtime, regular service of the ovens are performed, and some leeway regarding unforeseen downtime is accounted for. Most cremators are either single sided, meaning they are raked and charged from the front, or double sided, raked from the back and charged from the front. A cremator technician needs 4.5 meters on the raking side, and about 6 meters on the charging side for the foldable charging bier. So, the **cremator room** needs to be at least 14 meters long and 5 meters wide. Every cremation uses about 20 l of oil, and it is appropriate to have a buffer that would lasts at least 3 months, so an **oil tank** with an 15,000 l capacity is necessary. An industrial sized **diesel generator** is also necessary in the event of a power failure since the cremation needs to run its course; each oven needs about 35 kW, so a diesel generator of about 100 ekW is sufficient.

The flue gases need to be filtered so no particles or harmful substances will spread to the surrounding area. Before this the flue gas needs to be cooled, this is done via a flue gas cooler that works like a heat exchanger and is connected to the district heating system. It is usually estimated that it is possible to regain about 230-250 kWh of energy per cremation that can then be used to heat the facilities while the excess is distributed to the surrounding area via the district heating system. The flue gas cooler is also connected to a dust filter that in its turn is connected to an active carbon filter that connects to the chimney. The flue gas cooler is also connected to the chimney via a bypass valve in case of failure in the filtration system. All of this needs to fit into a **technical room** of roughly 9 meters by 6 meters. A **process fan room** is necessary for the flue gas filters to work properly. This needs to be about 35 square meters per oven. Since the fans produce a bit of noise, it is preferable if they have their own separate room.

A **control room** is necessary from where the ovens can be monitored. Each oven needs a separate computer with two monitors. It is also appropriate that this room has the dual function of functioning as the crematorium technician's office space. The ash needs to be processed after the cremation; bone fragments need to be ground up and any metal pieces, e.g. from prosthetics, needs to be removed, this is done in the **ash processing room**. In the ash processing room, there should be room for a cremulator, a processing station, and an ash pan cooler, so the room should be at least 3 meters by 2.4 meters.

The deceased usually arrives several days beforehand. When the hospital or police have finished processing the body, the deceased need somewhere to go, so often they arrive up to 3 weeks before the ceremony. A **morgue** with a capacity of roughly 180 shelves is therefor necessary. A **coffin reception** that is connected to the drop off zone where the hearses unloads the coffin containing the deceased is also a must. Here we will need a trolley for moving the coffin as well as a computer terminal to log the arrival. In the event that a body has decomposed more than desirable, it is vital to have a **freezer** that will stop further decomposition and reduce the odor. A **urn and coffin storage** where replacement coffins, as well as empty and occupied urns can be stored is also necessary.

According to Helgesson Kjellin et al. (2021), the average funeral in Gothenburg is attended by 42 mourners. Therefore, this is the minimum number of seats in any **ceremonial hall**, but it should also be noted that there is no upper limit, and the number of mourners vary greatly depending on culture and ethnicity, and is susceptible to changes over time. A **Family room**, where the deceased's closest relatives can commune before the ceremony is a nice gesture and should be accommodated for if possible. A shop that sells **wreaths and flowers** is not a necessity per say, but it is fairly common that larger cemeteries accommodates one, and because of its location, it would be preferable to make space for such.

But the building will not function on its own, it needs staff, and the staff needs staffrooms. We can estimate that we will need about 2 crematorium technicians and one crematorium manager to operate the ovens. We will also need rooms for 4 officiants, 4 funeral attendants, 3 groundkeepers, and 1 diener. Since the work in a crematorium and morgue can get quite dirty, we will need **changing rooms** with showers, as well as a **washroom** for work-clothes. We will also need a suitable **lunchroom** and a **rest room** for the staff, since working with bereaved families can get quite emotionally draining. They will also need **office spaces**, **meeting rooms**, and **archives**.

Flows & Connections

There are two main flows through the building; the deceased and the mourners. It is of the utmost importance that these only coincide in specific locations, that are carefully arranged. The deceased follow a route that is strictly regulated to ensure that absolutely everyone end up where they are supposed to. The mourners move through the building freely, but according to the sequence and progression of the farewell ceremony. It is quite a staged experience that must consider the significance of the atmosphere as a catalyst in the grief process and as an instrument to instill the right frame of mind. Mostly the mourner will be lead through the building within the context of the ceremony, but at branching points it is important that they do not happen to enter the wrong space, putting them in a state of embarrassment.

To better understand the program, a diagram charting desirable, and undesirable, connections between rooms/functions were established. The diagram contains 4 degrees of connection; necessary, desirable, inconsequential, and undesirable. Rooms and functions were grouped by similarity and patterns started emerging, showing how different clusters of rooms and functions either attracted or repelled each other, laying a good foundation for future spatial organizing.

STUDIES

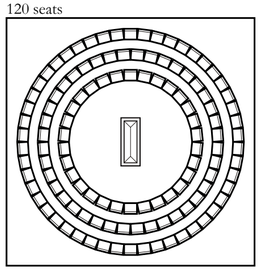
Site Analysis

A site visit was carried out to better understand the site. During the visit notes were taken regarding possible pathways, rocky outcrops, and vistas. Multiple vistas were noted, especially towards the west with views overlooking *Slottsskogen* and *Annedalskyrkan*, and towards the north, with a great view overlooking *Linnéstaden* and *skansken kronan*, seeing all the way to *Hisingen*. The main plateau of the site is easily traversable with slopes ranging from 0% - 20% rise. The western slope towards Dag Hammarskjöldsleden is quite steep with slopes ranging between 15% - >100% rise, while the northern slope is only moderately sloping with slopes from 5% - 40% rise.

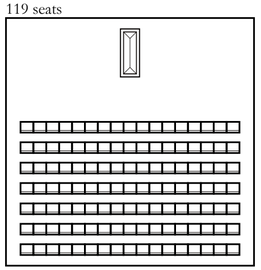
Linnéplatsen is the primary hub for public transport in the vicinity, and during the visit a path was mapped that establishes a connection between the site and *Linnéplatsen* with an average rise of 15%. Though, it will not allow access for wheelchair users, it is easily traversed by the average pedestrian. South of the site, only 3 minutes by car, is *Sahlgrenska Universitetssjukhuset*, and right next to the parking garage is *Rättsmedicinalverket*; the Swedish government agency that is responsible for forensic chemistry, forensic genetics, and forensic medicine. This is very desirable since *Sahlgrenska* is the biggest hospital in the vicinity and many of the deceased will come from either here or *Rättsmedicinalverket*. There is also a need for a venue to cremate body parts that are removed during surgery, since they cannot be disposed of in any other way. If the crematorium could accommodate this need, it might be possible to have the ovens burning throughout the night; if you can have an oven burn a continuous period of 60 hours per a week rather than to re-ignite it every day, you can save up to 50% of the fuel (Valentijn et al, 2018).

There were two rows of 60 construction barracks, stacked in two levels, that was used as student housing in the southern end of the site. Since these were temporary facilities, they were disregarded when moving forward with the project. There was a parking garage in three levels just east of the site. This garage was not well used, and it is situated below the main plateau of the site, with the top deck almost level to the main plateau. A walkway was proposed, linking the top deck of the garage with the main plateau to allow easy access for wheelchair users. Wheelchair users are also able to enter the site via the south entrance, but since the site is located on top of a hill, most wheelchair users would most likely arrive by car or taxi.

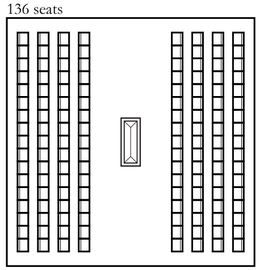
Centred
120 seats



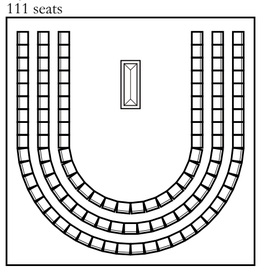
Theater
119 seats



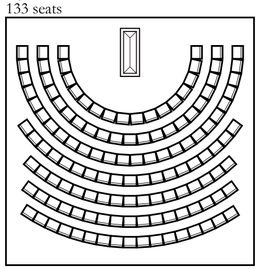
Parlament
136 seats



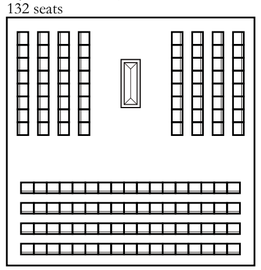
Hybrid Centred/Parlament
111 seats



Hybrid Theater/Centred
133 seats



Hybrid Parlament/Theater
132 seats



Study of Ceremonial Halls 1:200

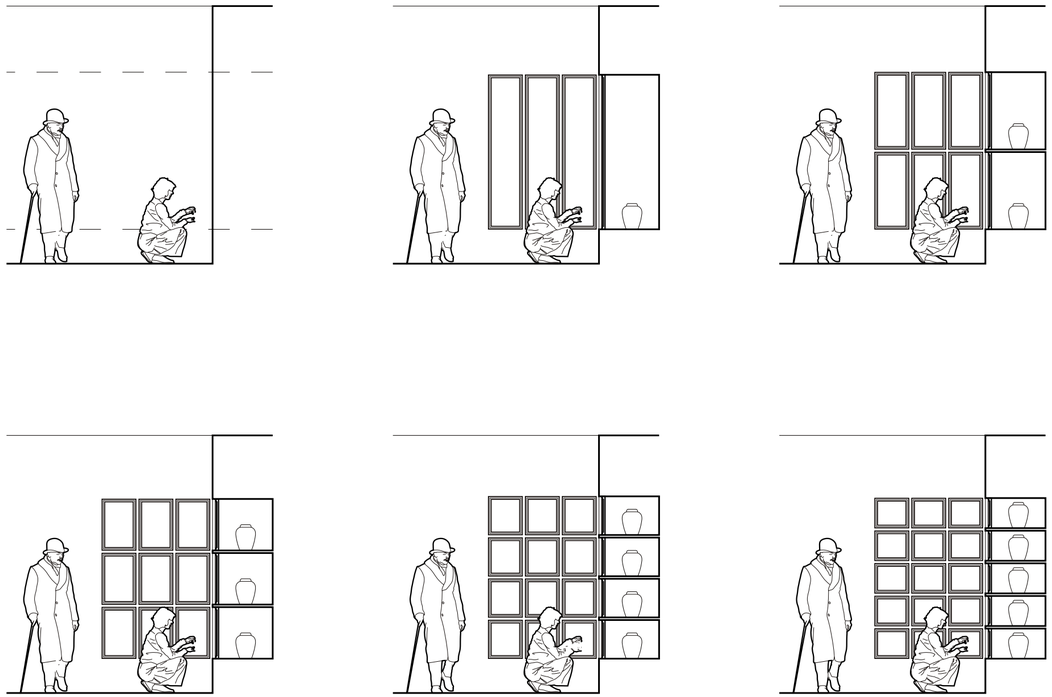
STUDIES

Study of Ceremonial Halls

Holloway, Adamson, Argyrou, Draper, & Mariau (2013) explains that funerals exist primarily because of the enduring individual and social need to formalise loss and manage the transition from life to death. A funeral service is a complex composition of social practices that relies on implicit knowledge, bound to bodily performances and appropriate artefacts (Knopke, 2019). Funerals rely on the active participation of mourners, and the ritual demands their physical involvement. This usually entails familiar acts and artefacts such as condoling, carrying the coffin or urn, and the funeral oration (Knope, 2019).

Studies show that the act of collective mourning allows the bereaved to better cope with the sorrow through an intensification of emotions. The grief builds civic bonds within the grief-community that aid the bereaved in their personal loss and creates an expectation of civic participation, further fuelling the grief process and facilitating a fulfilling experience (Wasserman, 1998). The death of a loved one often creates a deep sense of loss within the family. Sharing this misfortune establishes a social context where not only the kin become intimately involved and bring their feelings into the group. And even though this process is individual and unique, the grief-community brings individuals into the collective realm, creating a communal sense of loss, spurring feelings of belonging and kinship (Wasserman, 1998). As architects we cannot influence the course of the funeral directly, but we can study the room in which it unfolds and give it its best point of departure.

Most ceremonial halls have their seating in a classic theatre arrangement. This arrangement feels familiar to most of us, and people can easily follow the ceremony as it unfolds in the front. But it establishes a certain degree of isolation and can create a sense of observing rather than active participation. This can be somewhat alleviated by employing the parliament arrangement, where emotional interchange is established between the two groups, that then should drive a stronger sense of participation. But this seating arrangement literary divides the mourners in two camps, creating a divide that is not desirable. My conclusion is that the centred arrangement is the best option. In the centred arrangement all mourners are treated like equals, it generates a strong sense of community, and it focuses the funeral inwards and onto the deceased. It would have been preferable to only have a single row of seats, but this would not yield a feasible ratio between number of seats in relation to the size of the room, so employing multiple rows was a decent compromise.



Study of Columbarium 1:50

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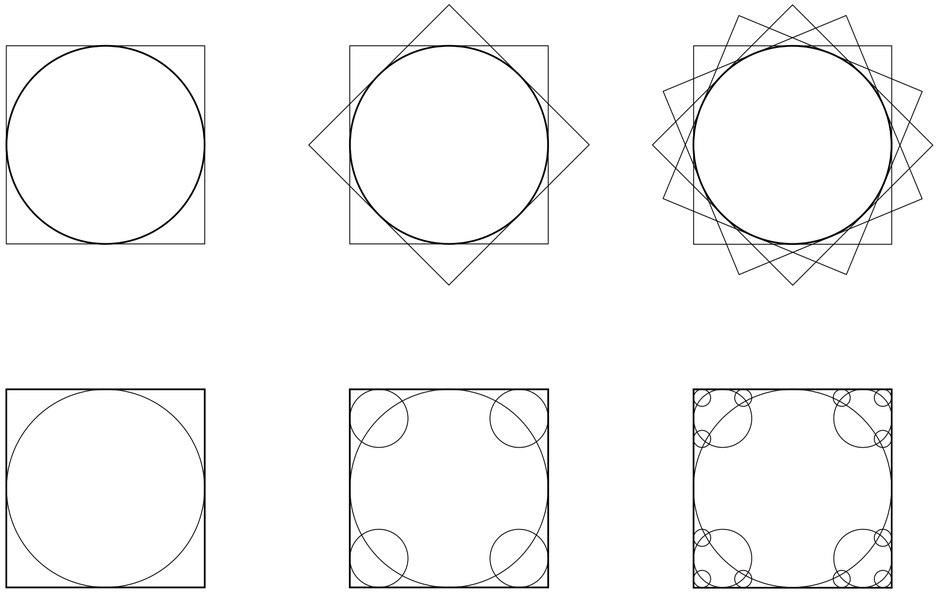
STUDIES

Study of Columbarium

A columbarium is a structure that is used for the storage of cremains, in a reverential and respectful manner. It is usually open to the public and visited by bereaved friends and family in the same manner as a regular grave would be. A columbarium consists of multiple niches, called *loculi*, where the funerary urns are stored. Each niche is considered as a separate grave and provides space for one or more urns. Niches in a columbarium belongs to a category of graves with limited burial rights, meaning that the burial right holder has a restricted right when it comes to decisions regarding appearance and nature of the grave memorial and other aspects of the decoration and arrangement of the grave. On the other hand, they are exempt from the responsibilities regarding maintenance and care that comes with a full burial right (The Church of Sweden Employers' Association, 2020).

It is important that the columbarium is recognised as a meaningful and dignified public space if it is to become part of the city. That starts with the single unit; the niche. First it´s important to consider the vertical placement and its effect; On one hand, if it´s placed to low it will come into contact with the ground, and it will be perceived as dirty and undignified. On the other hand, if it is placed to high it will feel distant and out of reach for displays of affection and care. Therefor I have concluded that an appropriate span is between 40 centimeters above the ground to 240 centimeters high.

Within this span multiple niches was stacked, and different configurations where evaluated, ranging from a single niche to five. My conclusion was that having just a single niche take up the entire vertical span is the most dignified option, it is very similar to the image of a regular grave, just vertical instead of horizontal, but it´s unfortunately not justifiable from an economic perspective. Therefor we need to stack niches in levels to make it economically feasible, and my conclusion was that it does not matter if you stack two, three, or even four niches, you will basically have the same effect. But when the front panel starts to lie horizontally rather than stand vertically, it feels cramped, so five levels is to much. Therefor I concluded that having four levels of niches is the most feasible option.



Study of Geometrical Morphing

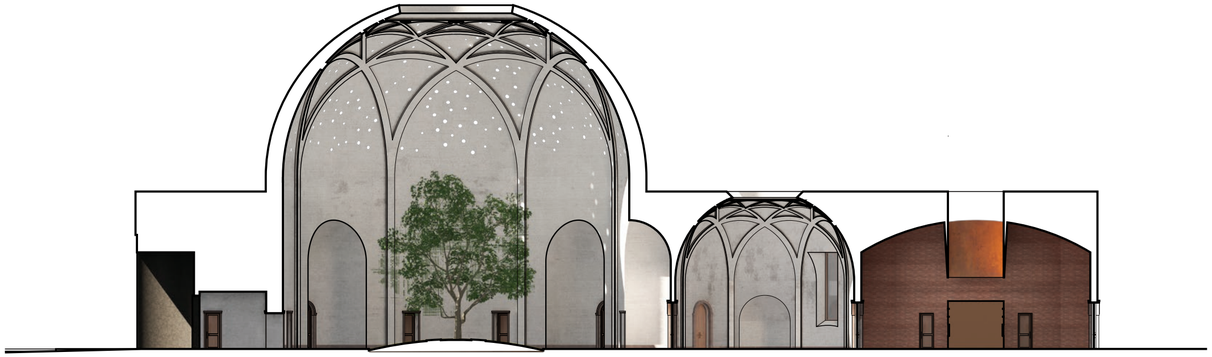
STUDIES

Study of Geometrical Morphing

A recurring theme that you come across while studying the historical high points of funerary architecture is the use of symmetry and geometrical arrangements when designing memorials, tombs, mausolea, and cemeteries. This is not just true for the Western European tradition, where we find the Gothic chantry-chapels, Italian ossuaries, and1 British war-memorials, but is also true for Japanese memorials and Islamic funerary architecture, as well as prehistoric tombs. People have throughout time, and regardless of cultural, manifested a sense of formality and dignity by employing formal, symmetrical, and geometrical arrangements. It is an essential part of funerary architecture, and helps the architecture in achieving that sense of completeness, balance, and stillness that is afforded the best in funerary architecture (Curl, 2002)

What I would define as the two pinnacles of funerary architecture especially used symmetry and geometrical arrangements as a way to instil repose and dignity, and those two are the ancient Egyptian mortuary chapels and the brain children of Étienne-Louis Boullée. Both present a solemnity and gloom that is very appropriate, as well as a massiveness and monumentality that suggest a structures that will last for eternity, providing a vessel for the deceased as he or she also becomes immortalised in a sense. Boullée's style especially can strike you as quite modern in its simplicity and functionalism, but remote in its emphasis on regularity and symmetry (Curl, 2002).

Therefore, symmetry and geometry became important parts of my toolbox in my pursuit of an appropriate architectural language and mood. I had already decided that I wanted a dome atop of a square base, so I wanted to investigate how the circle and the square could interact. I found that you could fill a square space in a fractal pattern by drawing a circle that touched all four sides of the square, and then adding new circles like apses until you have filled enough of the rectangle. I also found that by rotating a square around its own centre, you will gradually create a circular space in the centre.



Study of Space, Sequense, and Light 1:300

-2 0 2 5 10 20

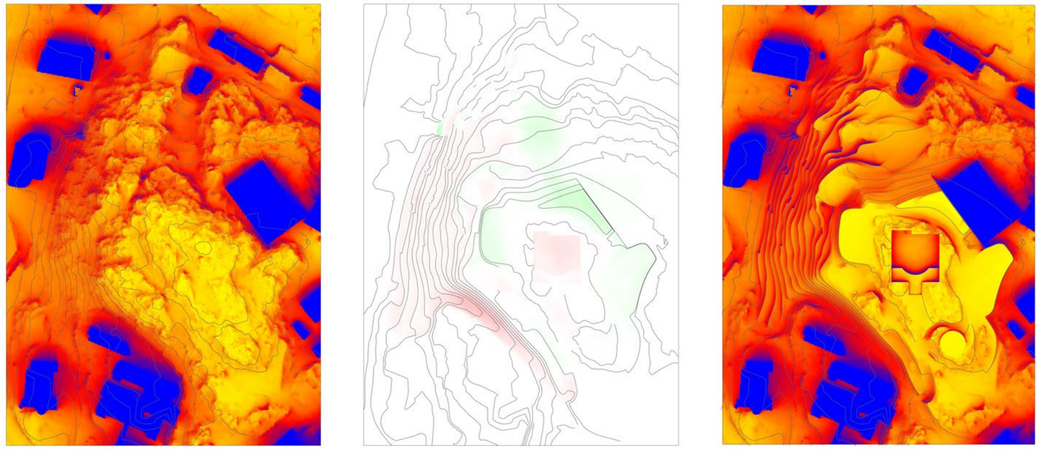
STUDIES

Study of Space, Sequence and Light

It quickly became obvious for me that a large volume better encompassed what I wanted to achieve, and it also became apparent that the scale of things surrounding the occupant was important for setting the right mood. Therefore, all the doors have a slightly larger scale than usual, they are 2.5 meters instead of the usual 2 meters. This makes quite a difference for the occupant, as it makes them feel smaller than usual, but it also makes them perceive the building as big and solid, while it also felt more proportional to the scale and verticality of the rotunda. The entrances to ceremonial halls are even larger with a height of 3.25 meters, but still larger is the main entrance with a hight of 3.7 meters.

Entering the building, I wanted the encounter with the rotunda to be a jaw dropping experience. This is mostly achieved by scale and lighting, but to further enhance this experience I made the corridor connecting the entrance with the rotunda the darkest and narrowest passage along the ceremonial route. This creates a sense of enclosure that later explodes into this otherworldly space that is the rotunda. The building moves you forward on its own since one room leads to the next. But the rotunda is a branching point, and since it would have been undesirable to enter any other space than the ceremonial halls, all other doors were pushed deep into the wall, removing them from the occupant's perception, enveloping them in darkness.

I first opened an 8 meter in diameter oculus in the dome and did an annual daylight analysis of rotunda to confirm that I had enough light coming in. I then perforated the dome with additional tubes of optical fibres. I was inspired by Boulleé's Cenotaph for Newton and wanted to create something reminiscent of a starlit sky, or like the scattered light that filters through the crown of a tree. The ceremonial halls got a similar treatment as the rotunda, but with an oculus of only 4.5 meters in diameter. I also added windows to the ceremonial halls, but they are placed at a height of 2 meters, only allowing for a view of the sky, because I did not want the occupants to be distracted, or even aware of the outside world, I want them to be contained within that moment for as long as it lasts. The oven room is the darkest room. Here all the light is focused through a lantern above the cremator oven, flooding it with light while obscuring insignificant parts or the room in darkness. The only thing that matters in this room is the occupants encounter with the oven, and that is why the rooms only natural light source is pinpointing it.



Direct Sun Hours & Mass Balance 1:4000

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STUDIES

Sunlight Analysis & Mass Balance

For the cemetery to truly become part of the city, it has to attract visitors, and for this to happen it has to offer a pleasant microclimate. Apart from the obvious reasons to visit the cemetery, big public cemeteries tend to attract dark tourism; tourism focused on exploring locations associated with tragedy and death, not because of morbid fancies, but rather to learn about a place's history. But, non the less, even grieving relatives prefer to mourn in a comfortable climate. To ensure that this was the case, a sunlight hours analysis was performed with Ladybug tools using Rhinoceros 3D and Grasshopper. The time period was set to measure the average sunlight hours over an entire year. Since slope and aspect had already been part of the initial raster calculation when choosing the site, I knew that the microclimate would be somewhat favourable. The analysis confirmed that the entire site receives ample amounts of sunlight, including the north facing slope since it is not steep enough to shadow itself, though placing structures here would potentially have a negative impact on the microclimate.

Using this information, I decided to locate the columbarium on the west facing slope. Here it would receive ample amounts of sunlight during the afternoon and evening, as well as present a beautiful view overlooking *Slottsskogen* and *Annedalskyrkan*. To make this possible, the terrain had to be divided into plateaus, so large amounts of earth had to be excavated. Therefore, a cut and fill analysis were performed, and measures were taken to achieve an acceptable mass balance.

Most of the excavated earth comes from the excavation of the columbarium, and some from the foundation of the crematorium. In total, 48,489 cubic meters of earth was excavated, and 44,085 of those was used on site, leaving only 4,403 cubic meters that had to be deposited elsewhere. Most of the displaced earth was used to create two plateaus on opposite sides of the crematorium where Bio Urns ® could be planted, and allowed to grow into trees, before the family would collect them. The rest was used to level out the northern slope, making it possible to establish a path between the site and *Linnéplatsen* that had a rise below 8%.

DESIGN

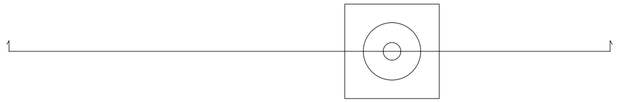
Siteplan

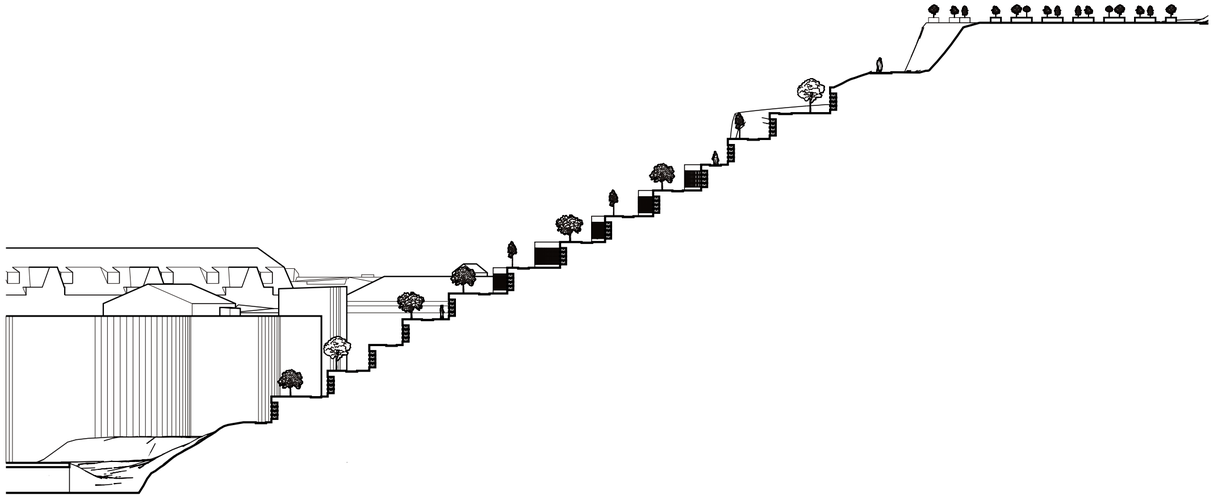
This site offers something unique that no other spot in Gothenburg offers; It is a large site of 55,000 square meters that is centrally located and unexploited, it is in close vicinity to both *Sahlgrenska Universitetssjukhuset* and *Rättsmedicinalverket*, and it is in close proximity to a large public transport hub, *Linnéplatsen*. Apart from that it offers a beautiful, very Gothenburgesque, setting on top of a hilltop with rocky outcrops and beautiful vistas overlooking both *Linnéstaden* and *Slottsskogen*. But, for the site to work, it had to be easily accessible from the central parts of the city. To make this possible I had to create a path that snaked up the northern slope. So I made a simple script that allowed me to calculate the slope of a nurbs curve in real time, allowing me to trace a winding path with a rise below 8%, connecting the site with *Linnéplatsen*. I also used this tool to create an accessible path that connects the southern parts of the site with *Annedalskyrkan* and *Dag Hammarskjöldsleden*, as well as making sure that all parts of the columbarium was accessible by wheelchair.

The path that connects to *Linnéplatsen* is divided into a succession of paths and plazas. The plazas become destinations along the winding path up the mountain and offers a space to both rest and contemplate. Each of the plazas would contain a memorial garden were ashes are spread, a so called *askgravlund*, and artwork that would set each of them apart. But, they would still be similar enough that you would read them as a continuum and part of a narrative that starts at the base of the mountain and ends with the last plaza that is located inside of the building.

As I mentioned on the previous page, a sunlight hours analysis was performed on the site, and I decided to locate the columbarium on the west facing slope. To make this possible, the terrain had to be divided into plateaus, so large amounts of earth had to be excavated. When trying to work out what the columbarium should look like, I looked at terraced vineyards and the Montjuic columbarium in Barcelona, Spain, for inspiration.

To create the plateaus, large amounts of earth had to be excavated. Most of the displaced earth was used to create two plateaus on opposite sides of the crematorium where Bio Urns ® could be planted, and allowed to grow into trees, before the family would collect them. The rest was used to level out the northern slope and to create a path between the site and the top deck of the parking garage. I definitely believe that there is much more that could be done with the columbarium, but I had to manage my time, so the columbarium had to become more proof of concept than a fully fleshed out plan.





Sektion W-E 1:500

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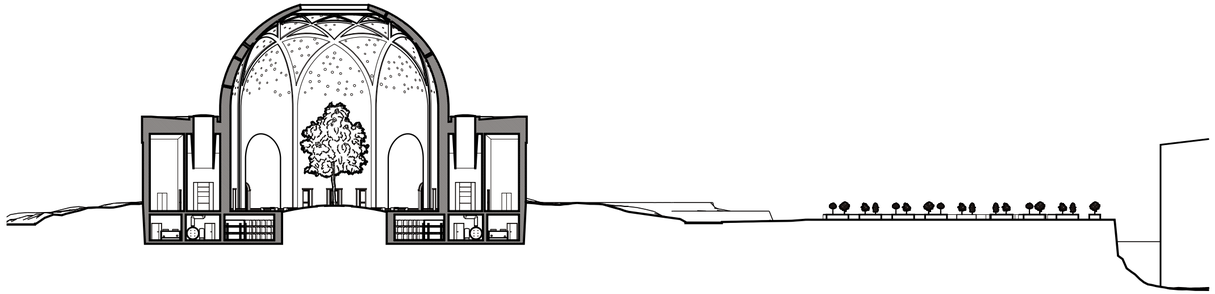
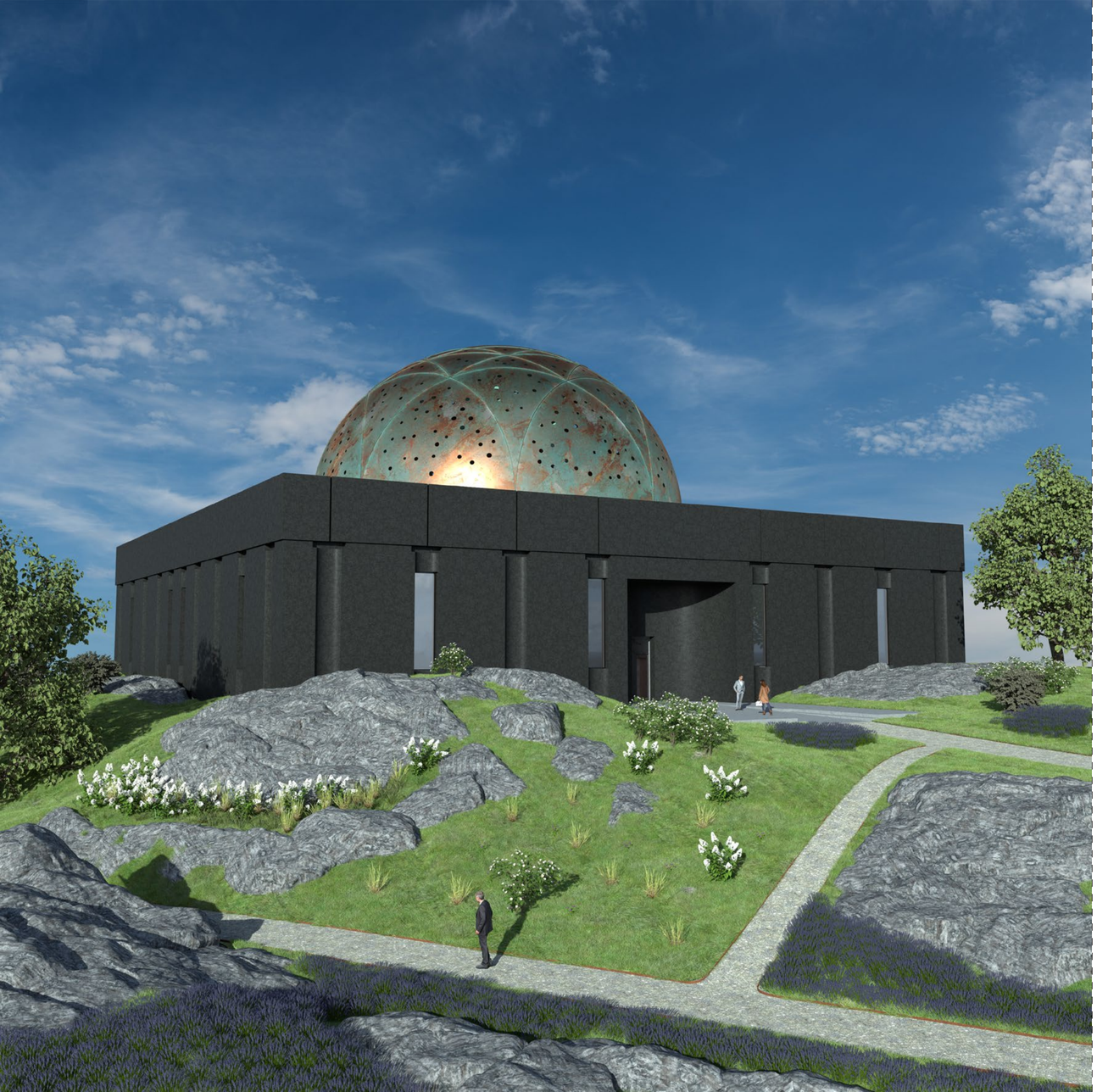
DESIGN





DESIGN

Perspective of Building

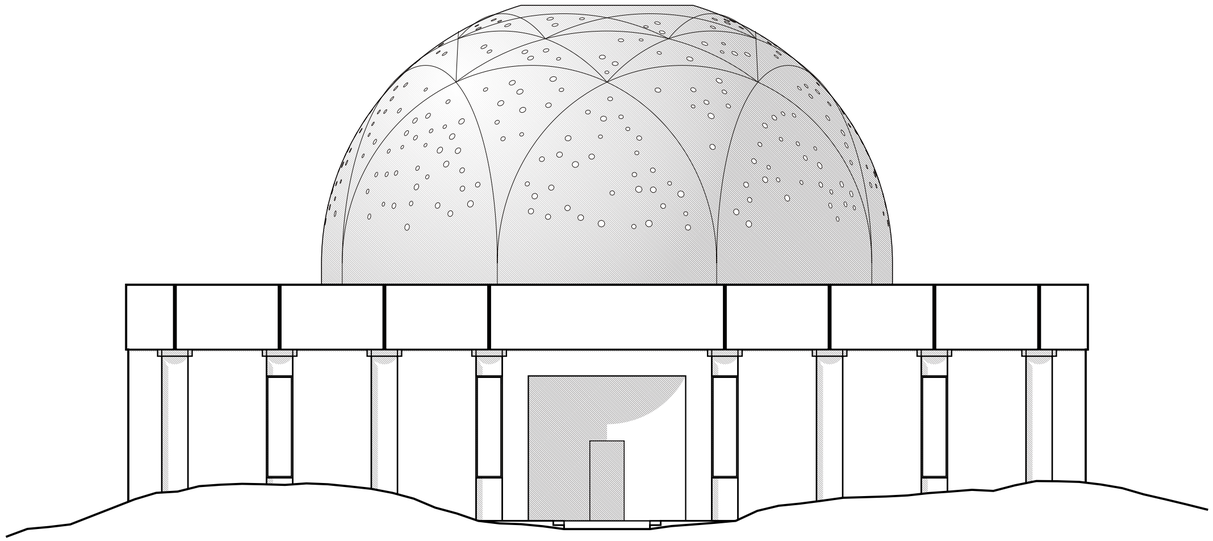
Elevated above the surrounding city, on the peak of *Medicinareberget*, a monumental building towers and stretches towards the sky. Almost like a temple in a Greek acropolis, and clearly visible from *Linnéplatsen* and *Slottsskogen*, it reminds us that death is always present and a part of life; remember those who went before us, do the best with the time that was given, and cherish your loved ones.

Inspired by the designs of Étienne-Louis Boullée and his thoughts on *architecture parlante*, I set out to create a temple of death. I wanted the building to read as awe-inspiring, balanced, dignified, formal, grand, immovable, impervious, monumental, solemn, solid, venerable, and worthy. I also wanted the building to exude social cohesion and feel reliably solid when we ourselves are falling apart. Death is a process for both the dying and those left behind, and the spaces intended for it should offer solace and consolation, it should feel like an important space worthy of our loved ones and offer the unique feeling of purpose and continuity.

My research into funeral architecture showed me that modernism often struggles when trying to grasp the subject of death; Heathcote (1999) argues that modernism might work for the architecture of the living, but when it comes to the architecture of the dead, we often find solace in the familiar embodiment of tradition and revert back to a more conservative aesthetic language.

I wanted it to be recognisably classic in its proportions and design, but still interpret as a contemporary piece of architecture. It uses symmetry, balance, and geometrical formality to instil a sense of repose and dignity. It is striped of most ornamentation, but not to such an extent that it fells minimalistic; the process became a balancing act between being too sterile and too baroque. Death has often prompted an architecture that is stripped bare of ornaments, were only that which is necessary remains; post, lintel, and roof. And what I created might aptly be described as distorted classicism, where the expected vertical members are replaced by concave echoes, carrying the entablature on the void of nothing.

It is a monumental building with monumental proportions; with a footprint of 2000 square meters, and a height of 24 meters, clad in black granite and crowned with a copper dome that is 26.6 meters in diameter, it is a colossal structure that suggests a durability and permanence that spans well beyond our own lifetime. Its placement in the terrain, were it sits partially submerged, further emphasizing the enormous burden the building exerts on its surrounding, both figuratively and literary.



Elevation from South 1:200

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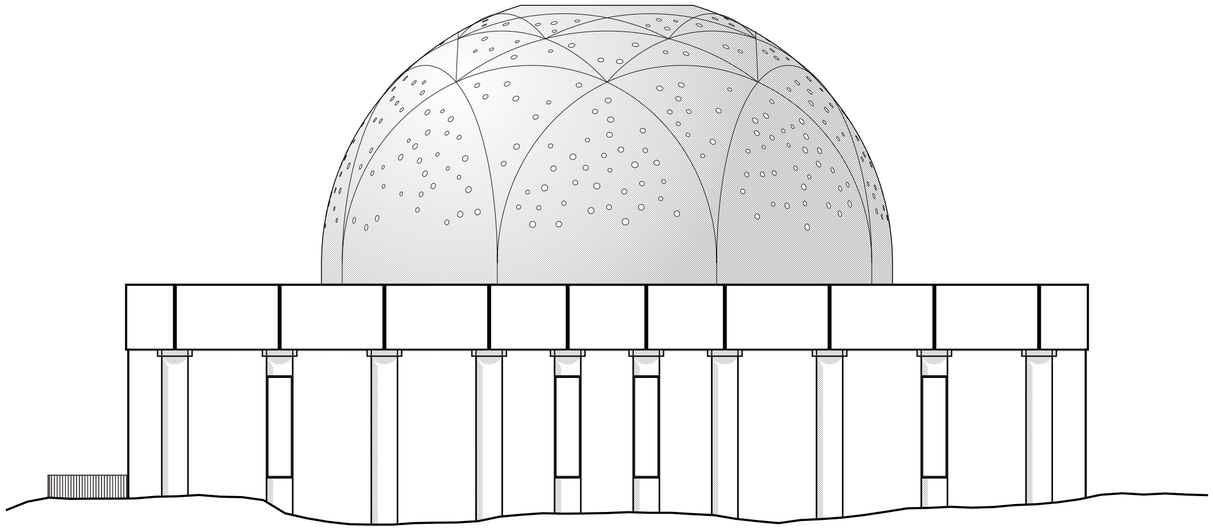

Elevation from West 1:200

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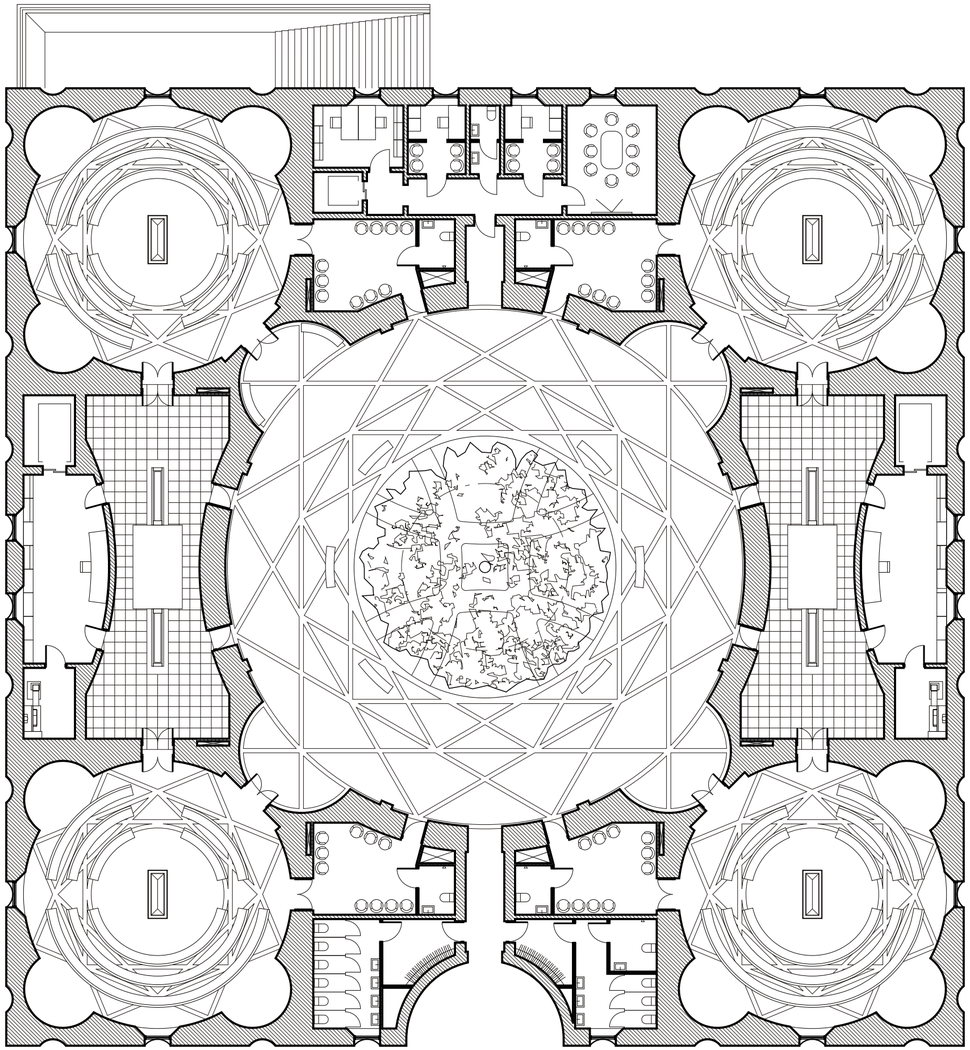

Entrance Plan 1:200

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DESIGN

Entrance plan

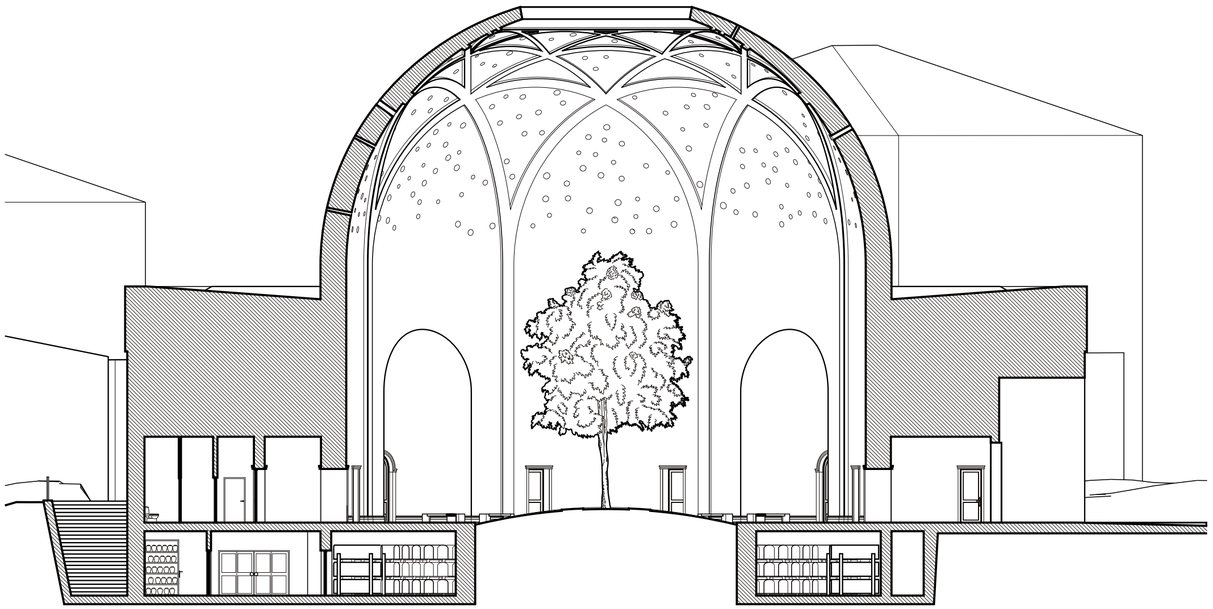
There are two main flows through the building; the deceased and the mourners. It is of the utmost importance that these only coincide in specific locations, that are carefully arranged. The mourners move through the building freely, but according to the sequence and progression of the farewell ceremony. It is quite a staged experience that must consider the significance of the atmosphere as a catalyst in the grief process and as an instrument to instill the right frame of mind.

As the bereaved enter the building, they go through a passage with toilets and cloakrooms on both side before they enter the rotunda. The rotunda is a branching point where they wait for the ceremony to commence. If they are next of kin, they may also choose to wait in the adjoining family room for added privacy. The bereaved then enters the designated ceremonial hall, either via the rotunda or the adjoining family room. As the ceremony concludes, they may choose between exiting the building via the rotunda directly or follow the deceased into the oven room and witness the committal before they exit the building. The cremation process takes about 75-90 minutes, so the next of kin may choose between waiting for the process to finish, so they can follow the cremains as they are moved to their spot in the columbarium, come back at a later time, or let the staff handle it on their own.

Aside from the public spaces, there are also some staff areas on the entrance floor. Next to the oven rooms we find control rooms from where the crematorium technicians monitor the operation of the ovens, as well as an ash processing rooms, where the cremains are prepared before going into the urn. This includes cooling down the cremains, removing everything metal, and grinding down any recognizable bone fragments.

Along the northern façade, in the middle section, we find offices and a meeting room, as well as an elevator that connects to the basement. This part of the building is not open to the public and is used by the staff to hold meetings, administrate the daily affairs of the crematorium and its staff, and receive those in need of consultation regarding their own or a loved one's funeral.

Also worth mentioning is that even though the rotunda is enveloped by the building, it is still technically an outdoor space, with insulation in the supporting wall, and floor heating to make it comfortable, relatively dry, and traversable regardless of season. The floor is heated with residual heat from the cremator ovens



Section N-S 1:200

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DESIGN

Section N-S

One of the most striking features of this design is the grand condolence hall that I have chosen to call the rotunda. Since this is designed for a northern country, artificial lighting was necessary to consider. This lighting is predominantly located underneath the majestic beech tree, shining upwards and illuminating the dome from below. But, during the parts of the year when there is ample sunlight, I wanted to rely on as much natural light as possible. Therefor I performed an annual daylight simulation using Honneybee, Ladybug, Grasshopper, and Rhinoceros 3D. I constructed a Honneybee model using Rhinoceros 3D volumes and Grasshopper, and used Ladybug to calculate the amount of time that the sun would illuminate the interior above a threshold value of 300 lux. I found that with an 8 meter in diameter oculus, the interior would receive over 300 lux of sunlight 60% of the time.

Another striking feature of the design are the pilasters that shoot out and flow along the curvature of the dome. The pilasters are simply a projection of the geometrical configuration of the floor tiles, but it creates a décor that is both evocative and dramatic, that feels both balanced and intricate. The pilasters give both life and boundary to a surface that would otherwise feel boundless and undefined, but they also enforce balance and stillness, and creates a dialog between the wall and the floor. The reason why the rotunda can be both dramatic and tranquil at the same time is because its symmetrical, and therefore predictable. According to Curl (2002), symmetry and the use of powerful geometries have been part of the architectural language of death ever since humans started erecting tombs and mausolea in the prehistoric and classical era. It is the serenity and sense of repose that arises when inhabiting a geometrically strict and symmetrical space, the balance and stillness of such funerary architecture that contribute to the perfection and the monumentality of such designs.

Clearly visible in this section is the magnificent beech tree that inhabits the centre of the rotunda. Beech trees are known for their shade tolerance, that they can grow in full shade and thrive in dense forests. The reasons why there is a tree on display in the rotunda are numerous: Trees are often used as symbols to represent life and growth in mythologies, it also holds specific significance within this project because of the arboretum. Also, research have shown that people find it soothing to look at plants and nature, and lastly it promotes this narrative of being in ‘another world’, cause when do you ever see a 10 meter tree inside a building.

DESIGN

Perspective of Rotunda

I defined three key encounters that the occupant would have as the ceremony moved them through the building, the first of those encounters would be with the rotunda. I wanted the encounter with the rotunda to be a jaw dropping experience. This is partially achieved by scale and lighting, but to further enhance this experience I made the corridor connecting the entrance with the rotunda the darkest and narrowest passage along the ceremonial route. This creates a sense of enclosure that later explodes into this otherworldly space that is the rotunda. But to only accredit the otherworldly experience of the rotunda as an effect of its imposing scale would be overlooking all the effort that went into creating a cohesive visual poetic language and the symbolisms that offer solace and consolation, and turns it into this important space that is worthy of our loved ones and offer a unique feeling of purpose and continuity.

I wanted the symbolism to be non-religious and numerous, so that whoever needed could find their own personal meaning. The perforated dome could be interpreted as a starlit night sky and the oculus as the moon, and you would leave the daylight behind as you enter this space that exists in perpetual night. Another interpretation could be that the pilasters represent trees, and the perforated dome is the scattered light that filters through when sunlight hits the tree canopy. In this interpretation the oculus would represent the sun, and instead you would enter a space that exists in perpetual light. The point is that regardless of whether you interpret the rotunda as a space in perpetual nighttime, perpetual daytime, or neither, it is a space that is interpreted as distinctly different compared to the regular world, a world that you can enter or exit as you please.

Another aspect of the rotunda to consider is that it is the only branching point, and since it would have been undesirable to enter any other space than the ceremonial halls, all other doors were pushed deep into the wall, removing them from the occupant's perception, enveloping them in darkness.

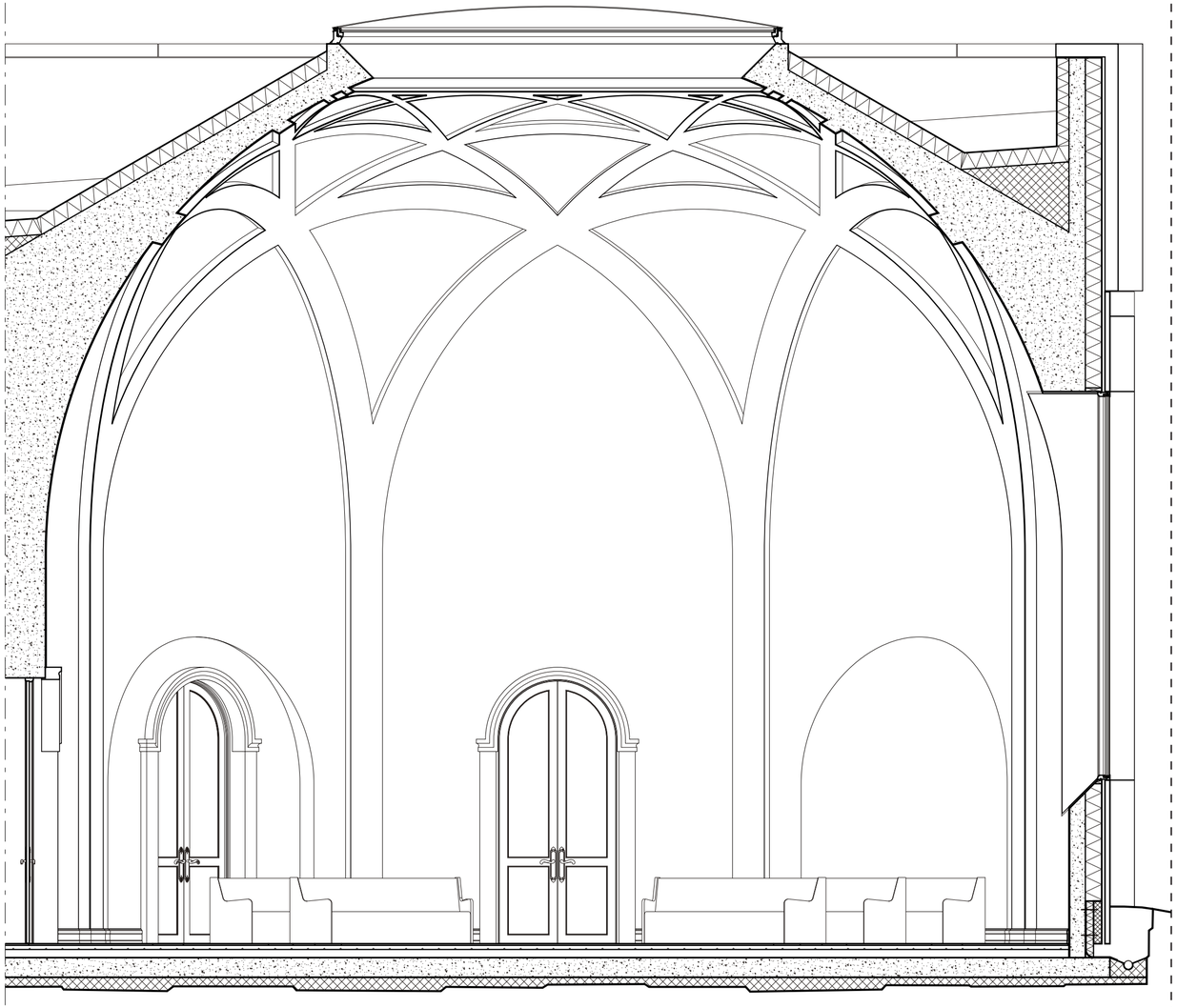
DESIGN

Perspective of Ceremonial Hall

The second encounter that the occupant would have as the ceremony moved them through the building would be with the ceremonial hall and the deceased. The ceremonial halls are very reminiscent of the rotunda, but on a much smaller scale. They are still quite monumental in their verticality, with a dome of 12.5 meters in diameter, and an oculus of 4.5 meters in diameter that is 10.6 meters above the floor. But, with a room that is only 12.5 meters across, you get a much more intimate space compared to the vastness of the rotunda, and it is this dual nature of being both monumental and intimate at the same time that makes the ceremonial halls exceedingly successful.

The ceremonial halls only serve one purpose, to be an appropriate container for the ceremony, this is achieved in a two ways. Firstly, the ceremonial halls achieve a very desirable atmosphere by relying on an archaic expression of monumentality that is somewhat reminiscent of gothic architecture, but actually moves you even further back to the tholos tomb of Mycenae, or even Maeshowe, a remarkable chambered cairn tomb from the neolithic era. Many of the greatest works of funerary architecture rely on that return to the archetypal form. I imagine this is because it is comforting when the design stands firmly rooted in history; it suggests a durability and permanence that spans well beyond our own lifetime.

Secondly, both the floor pattern and the shape of the room plays an intricate part of directing the ceremony inwards. Just like the rotunda, the ceremonial hall is a circular space that fills a square through the use of apses. The flooring is the opposite, a square, rotated around its centre to envelop a circle. The symmetrical and circular nature of the space is ideal for the purposes of rituals; the circle holds a lot of symbolic meaning, e.g. the circle of life and the passage of time. It represents all things limitless like the idea of eternity, and things that has no beginning or end. But, while the circle has no beginning or end, one thing that it does have is a centre, and the centre of a circle is its most potent position, a position in total balance and tranquillity. This means that placing the departed in the centre of a circular space not only places them at the focal point of the entire room, but it also positions the bereaved in an orbit around the deceased. I believe this to be the ideal seating arrangement for any funeral ceremony as it treats the bereaved as equals, it generates a strong sense of community, and it focuses the funeral inwards and onto the deceased.



Section of Ceremonial Hall 1:50

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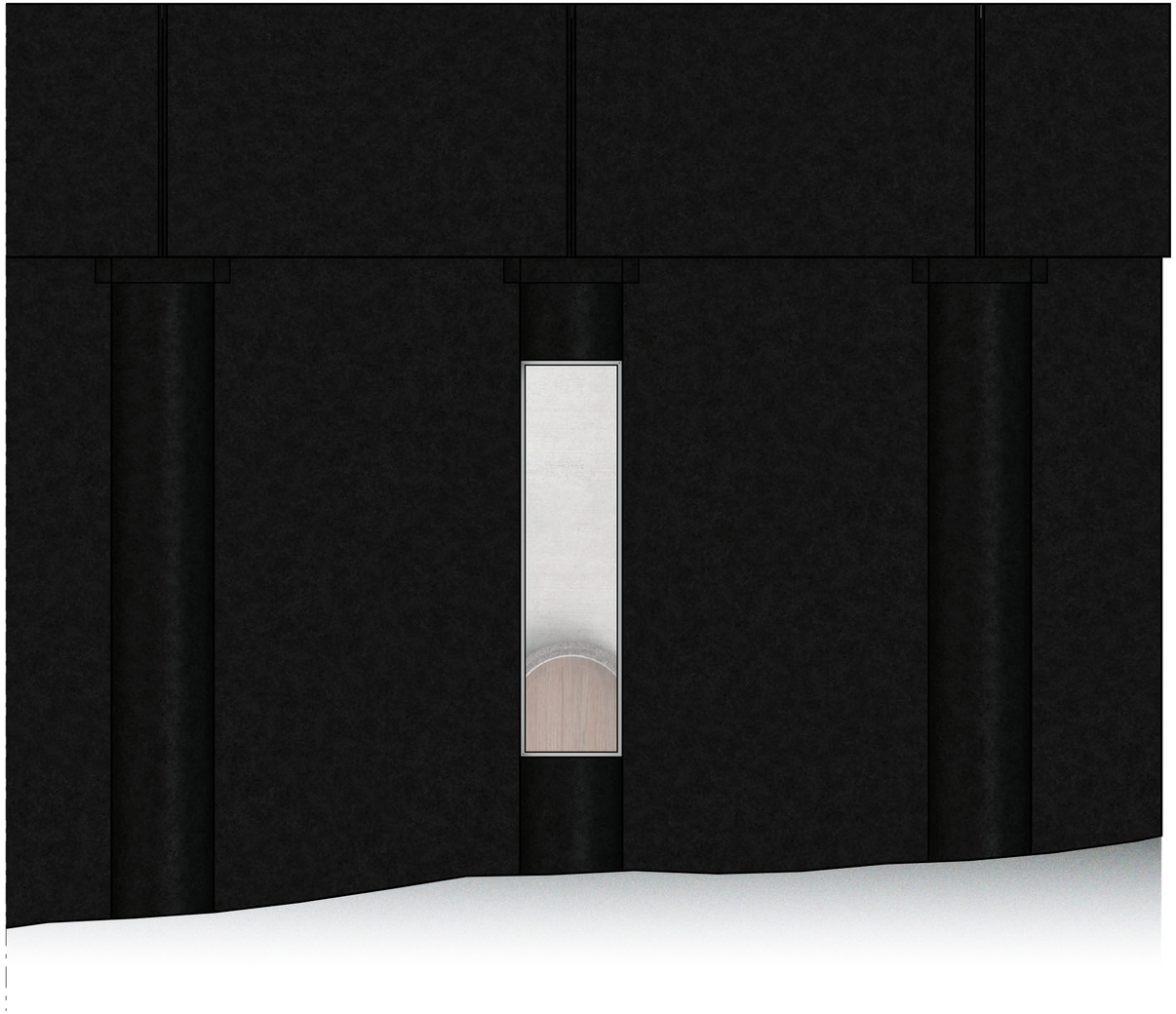


Elevation of Ceremonial Hall 1:50

-1 0 1 2 5

DESIGN

Perspective of Oven Room

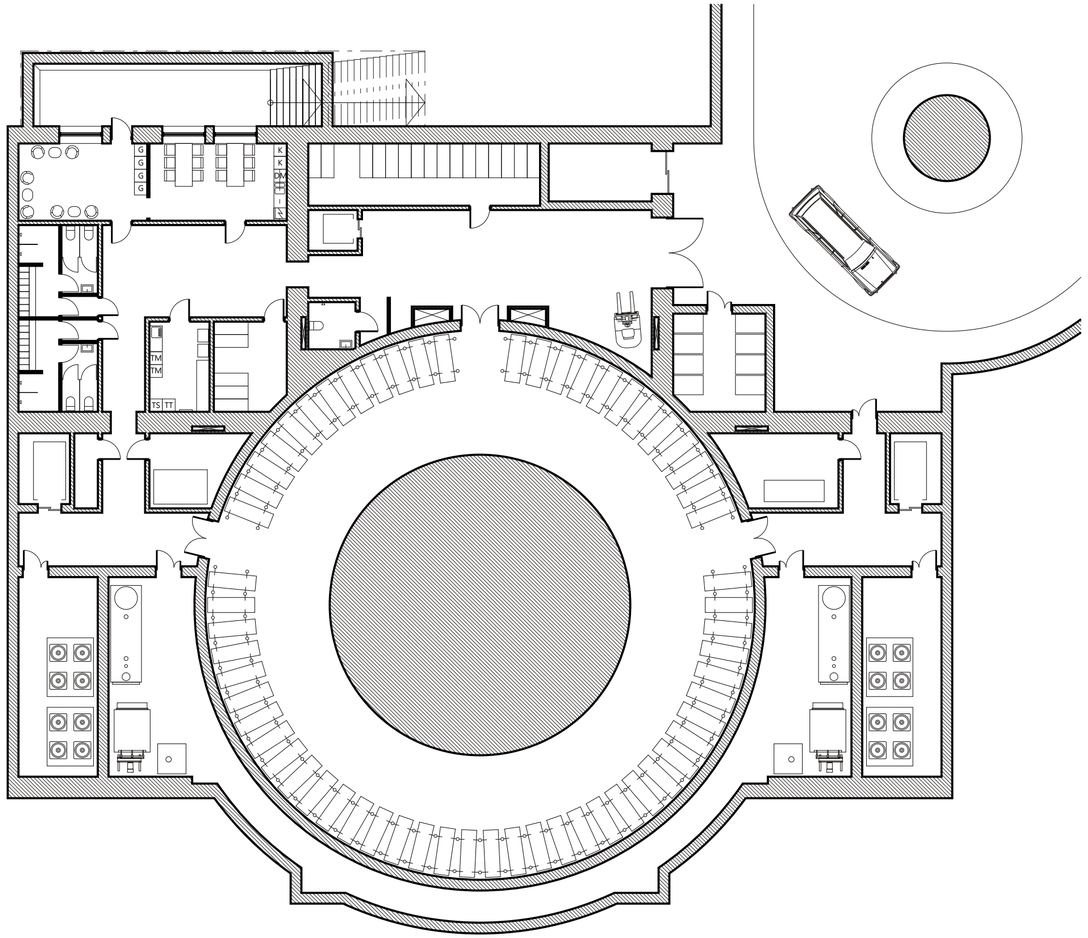
The third and final encounter that the occupant would have as the ceremony moved them through the building is with the cremator and the oven room. When designing the oven room, there were only one thing in my mind; to set the stage and make the meeting with the cremator oven as impactful and evocative as possible.

The oven room is probably the room that I had the clearest image of even before I started to design it. I wanted the material pallet to be very restricted, avoiding any unnecessary cluttering, and warm, almost burning. In the centre of the room, between the dynamic turmoil of convex walls, stands an oven made from burnished copper, freestanding in space, like a stately tomb monument. The entire room speaks of its grandeur and deforms around its presence, almost like its enormous weight is altering the gravity, pulling the walls towards it, and pulling us into the room.

Above the oven sits a square lantern that penetrates the roof and floods the oven with light from above. The lantern is clad in the same burnished copper as the oven and relates to it in size and proportion. They together create a unit that becomes both vessel and portal to the afterlife. It is a shining beacon that should resonate with just about everyone, regardless of religion, and impart an image of how the body does not disappear into the darkness, but rather into the light.

The room is perfectly symmetrical in two axes to create a strong sense of balance and integrity. Everything in the room shares a cohesive architectural language, e.g. the doorframes are also clad in the same burnished copper as the oven and the lantern, and penetrating the brick wall in the same manner as the lantern, establishing a unified architectural language that envelops the entire room. All for the single purpose of containing the occupant within that important moment.

Since the oven room is shared by two ceremonial halls I had to think outside of the box. I needed an oven that was chargeable from both sides. Sadly, there is no such oven readily available on the market. But, through communications with manufacturers, I was assured that such an oven would be possible to manufacture.



Basement Plan 1:200

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DESIGN

Basement plan

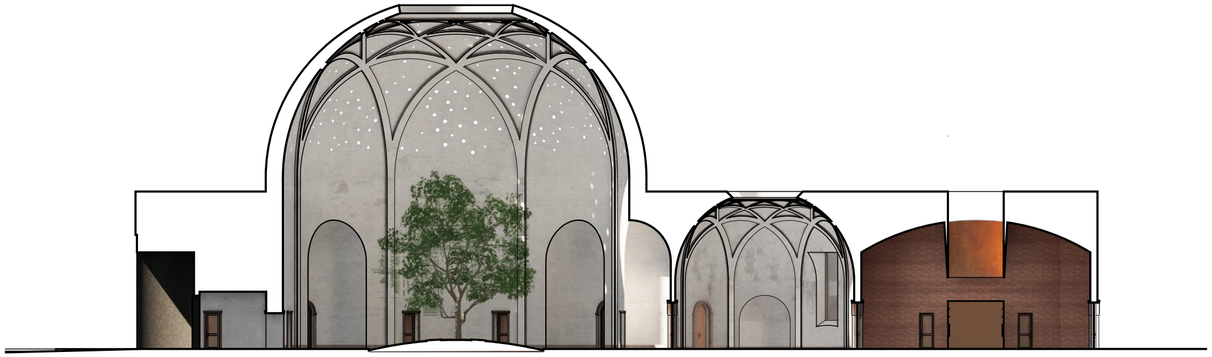
Unlike the entrance floor where the primary objective is to provide the visitors with a meaningful experience, the basement of the complex is all about efficiency and control. This floor is not open to the public and is a strictly regulated area that ensure that absolutely every deceased person end up where they are supposed to.

The deceased arrives via a tunnel that connects to the parking garage. As they arrive, they are unloaded, logged, and placed in either the morgue or the freezer, depending on what state they are in. They usually arrive up to 3 weeks before the ceremony, so a big morgue with 180 shelves have been proposed in the circular room beneath the rotunda, a solution that was both beneficial due to its central location and because the walls were already thick enough to accommodate the extra insulation.

Also in the vicinity of the coffin reception is a urn and coffin storage where replacement coffins, as well as empty and occupied urns can be stored. There is also an elevator that connects to the staff area of the entrance floor as well as an accessible toilet.

On opposite sides of the morgue, we find technical rooms that houses the flue gas filters and process fans. We also find rooms for an industrial sized diesel generator, of 100 ekW, as well as a room for the oil tank, with a capacity of 15,000 l, which ensures a stable reliable operation of the cremator ovens. There is also elevators on both side of the building that is used when transporting the deceased from the morgue to the ceremonial halls.

But the building will not function on its own, it needs staff, and the staff needs staffrooms. The staff entrance is located in the northwestern corner of the complex. The staff entrance connects to a staffroom that in turn connects to the staff kitchen. Exiting the staffroom, you entre a corridor that connects to two changing rooms with lockers and showers, a washroom for work-clothes, and an archive, were important documents concerning the daily operations and funerary wishes can be stored.



Study of Space, Sequense, and Light 1:300

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THEORY

Atmosphere

Peter Zumthor (2006) propose that atmosphere is perceived through our emotional sensibility, and it happens instantaneous when we experience space much like the first impression of a person. Atmosphere refers to the sensorial qualities of space, specifically those that stimulate emotional responses. Zumthor (2006) proposes nine qualities to consider that he works upon to generate atmosphere in his designs, and I have tried to implement these to make educated decisions in regard to my own project. Not all the qualities where relevant for this project, so I will focus on the ones that were and describe how I worked with them.

Material Compatibility - How combining material can create something that is greater than the sum of its parts, and the endless potential in processing materials (Zumthor, 2006). Even though I wanted the project to feel cohesive, I believed that the oven room should stand apart from the rest. If your have the same dish over and over you will soon lose your appetite towards it, and I believe that there are three important moments in the spatial sequence of this project; when you enter the rotunda, when you enter the ceremonial hall, and when you enter the oven room. I believe that it is preferable if the rotunda and ceremonial hall share the same DNA, because an echo of that grandeur will live on beyond the transition of spaces, elevating the ceremonial hall even further than it could on its own. But the oven room represents the end of the ceremony, its culmination, and it should be emphasized. Here the room ties into itself and uses a very strict design scheme. All the exits of the oven room is surrounded by burnished copper, including the oven. The red tint from the copper is picked up in the brick walls and floor tiles, and the dynamic geometry becomes even stronger because the bricks make the curvature easy to read.

The Sound of Space - How interaction with material generates sound, and geometry can either amplify or diminish it (Zumthor, 2006). I wanted the rotunda to have a similar soundscape to that of a cathedral, since I believe that is what we expect from this type of setting. This was achieved naturally because of its size, shape, and material palette.

The Temperature of Space - The temperature of the space and how certain materials almost extract the warmth from our bodies (Zumthor, 2006). Here I wanted to create something paradoxical; I wanted to use stone, concrete, bricks, and burnished copper, but those are all perceived as quite cooled materials, and I wanted something warm, that felt comforting, like an embrace. So, I used the residual heat from the cremator ovens to heat the building via a UFH system that also heats part of the wall. Even the rotunda is heated, but this is to help keep the ground snow and ice free during winter, since this is actually an outdoor space.

Between Composure and Seduction – How movement through space is directed by the architecture (Zumthor, 2006). This quality is very important in this type of building that attempts to create ceremonial sequence, and for the most part, the building moves you forward on its own since one room leads to the next. But the rotunda is a branching point, and since it would have been undesirable to either enter any other space than the ceremonial rooms, all other doors where pushed deep into the wall, removing them from the occupant's perception, enveloping them in darkness.

Tension Between Exterior and Interior – The incredible sense of place, an unbelievable feeling of concentration when we suddenly become aware of being enclosed (Zumthor, 2006). I wanted the encounter with the rotunda to be a jaw dropping experience. This is mostly achieved by scale and lighting, but to further enhance this experience I made the corridor connecting the entrance with the rotunda darkest and narrower passage along the ceremonial route through the building. This creates a sense of enclosure that later explodes into this otherworldly space of the rotunda.

Levels of Intimacy - Size, dimension, and scale, the buildings mass in contrast with the human body. The view that a human scale has to be more or less the same as us is over simplifying it (Zumthor, 2006). My work with this quality has been quite extensive. I believe that it is important for this kind of building to be perceived as monumental, otherworldly, and with a certain dignity and grandeur. I started my process quite early by comparing the effects of having on large volume compared to multiple smaller ones. I did this by collecting adjectives that would describe these volumes, and then comparing what option most resonated with what I was trying to achieve. The adjectives I found for multiple smaller volumes were: Familiar, human, intimate, informal, ethereal, and personal. The adjectives I found for single large volume was: Monumental, worthy, dignified, solemn, authoritarian, impervious, formal, grand, immovable, solid, awe-inspiring. It quickly became obvious for me that a large volume better encompassed what I wanted to achieve, and it also became apparent that the scale of things surrounding the occupant was important for setting the right mood. Therefore, all the doors have a slightly larger scale than usual, they are 2.5 meters instead of the usual 2 meters. This makes quite a difference for the occupant, as it makes them feel smaller than usual, but it also makes them perceive the building as big and solid, while it also felt more proportional to the grand scale and verticality of the rotunda. The entrances to ceremonial halls are even larger with a height of 3.25 meters, but still larger is the main entrance with a hight of 3.7 meters.

The Light on Things – Envision the building as a pure mass of shadows that is hollowed out by the light. Recognize the superiority of daylight versus artificial light (Zumthor, 2006). This is exactly what I did. I first opened an 8 meter in diameter oculus in the dome and did an annual daylight analysis of rotunda to confirm that I had enough light coming in. I then perforated the dome with additional tubes of optical fibres. I was inspired by Boullee's Cenotaph for Newton, I wanted to create something reminiscent of a starlit sky, or like the scattered light that filters through when sunlight shines through the crown of a tree. The ceremonial halls got a similar treatment as the rotunda, but with an oculus of only 4.5 meters in diameter. I also added windows to the ceremonial halls, but they are placed at a height of 2 meters, only allowing for a view of the sky, because I did not want the occupants to be distracted, or even aware of the outside world, I want them to be contained within that moment for as long as it lasts. The oven room is the darkest room. Here all the light is focused through a lantern above the cremator oven, flooding it with light while obscuring insignificant parts or the room in darkness. The only thing that matters in this room is the occupants encounter with the oven, and that is why the rooms only natural light source is pinpointing it.

Et in Arcadia ego by Giovanni Francesco Barbieri (Barbieri, 1618)

Et in Arcadia ego by Nicolas Poussin (Poussin, 1628)

THEORY

Et in Arcadia ego

Et in Arcadia ego translates to 'Even in Arcadia, there am I'. The usual interpretation is that 'I' refers to Death, and 'Arcadia' describes a utopia, meaning that no matter what, death will always be present, regardless of how prosperous our society becomes. But our society have grown distant to death, and the modern attitudes towards its finality reflect man's deepest fears and existential angst (Heathcote, 1999). I believe that this attitude only makes us more fearful and less capable of dealing with the emotional turmoil once we are forced to face our own or a loved one's, inevitable, mortality. Curl (2002) said 'If one is truly alive one is strongly aware of death and its inevitability, its nearness, its powerful presence', but we as a society have hidden away death in the hospitals for the greater part of the 20th century (Davidsson Bremborg, & Dahlgren, 2011), reflecting the efficient and hygienic, almost machine like, modernist mindset, where you start and end your life in a hospital. Heathcote (1999) argue that our cities lost a layer of history and consciousness when death was exiled under a banner of hygiene, subjecting us to a real reduction in the relationship between the cities of the living and the cities of the dead.

But how did it come to be like this? Curl (2002) notes that funerary architecture has previously held an important position in all civilizations as a means to canalize and formalize loss, reflecting not only the religious, but also the social, and artistic tendencies of those cultures. In the classical Greek world, the emotional aspects of the funeral were satisfied within the essentially ritualistic ceremony. They appear to have had an attitude to death that satisfied basic emotional and aesthetic problems, while in rare perfection, celebrating the fact of death in architecture and art. During the Middle Ages when the Black Death struck northern Europe, death was not hidden away but rather the transience of life became emphasized in the funerary art. Effigies and Weepers had long since adorned tombs and sarcophagi with the intention of honouring and reminding us of the deceased. But in a Europe that was ravaged not only by famine and war, but also plague and disease, deaths constant presence manifested in the *transi* type of *gisant*, a type of effigy meant to reference the realities of death, reminding us of life's fleeting nature and how bodies become compost and food for worms. *Transi de René de Chalon*, the effigy that I have chosen to adorn the cover of this thesis, is such a *gisant* type of *memento mori*, adorning the final resting place of René of Chalon, Prince of Orange, depicting his body as it would be three years after his death.

To understand how we would become a society that shy away from death we need to go back to the early days of Christianity, to a time when it was practiced within the catacombs in secrecy. According to Curl (2002), when Christian worship later moved above ground and churches were built on top of the catacombs, or near the places where martyrs had died, fragments of bones, often those of martyrs and saints, where brought from the catacombs and placed within the altars. The strong connection between Christianity and death had a great impact on the course of this young religion in two major ways. Firstly, since churches were built in close proximity to the burial sites, control of cemeteries passed to the church, and they inherited the guardianship off the dead. This had a major impact on Christianity since a considerable part of the income of clergy derived from fees charged for interment. Secondly, since the relics of martyrs and saints were stored within the church, it became popular amongst the more prominent citizens to secure a final resting place within the sanctity of the church.

But lesser classes were still buried in common grave pits, and as the segregation between classes began shrinking, a demand for similar treatment was called for. This was even further intensified when Willem the Stadhouder brought the customs of Holland with him, where churches functioned like enormous public mausolea, when he came to reign over Britain (Curl, 2002). When the ideal of the individual gained traction during the reformation, the concept of the individualised and personal memorial became an important outlet for displaying affluence and artistic finnes in Norhten Europe (Curl, 2002). This led to a piling up of sculptures and familiar architectural motifs within the churches that were more often than not shallow, ostentatious, and even vulgar. This did not stop until the Church Law of 1686 was passed in Sweden, a law that prohibited the erection of tombs that would interfere with worship. But people still wanted to commemorate themselves, so they started producing beautifully composed mural tablets, that coincided with Netherlandish custom that now had become common place in Britain. Many of them were in the form of floor-slabs, but we also find a lot of mural wall monuments during the 17th century, often in the form of aedicules, with an arched niche containing praying effigies (Curl, 2002).

During the 18th century the growth of the Swedish population was so great that the capacity of the old churchyard's was stretched to their limits, bodies were not decomposing quickly enough (Grönwall, 2017). Overcrowded graveyards led to decaying matter getting into the water supply and causing epidemics, so charnel houses where erected and old bones where disinterred and moved to make room for new burials (Curl 2002). But the situations required more drastic measures, and during the 19th century, radical and secularising impulses lead to the establishment of the grand cemetery Père-Lachaise in Paris (Heathcote, 1999). Père-Lachaise quickly became the model for a new era of private and public funded cemeteries like Mount Jerome in Dublin, Glasgow Necropolis, Kensal Green and the other six cemeteries of the 'Magnificent Seven' in London (Curl, 2002). By the 1870s most of the earlier problems regarding the disposal of the dead had been dealt with (Curl, 2002). Death had by then been forced into exile, by the end of 1785, processions of wagons had been crossing the cobbled streets of Paris by night for 17 months, relocating the 6 million corpses that had hitherto occupied *Cimetière des Saints-Innocents* (Valentijn et al, 2018).

Interestingly, parallel to this displacement of burial space, a newly sentimentalized funerary culture was evolving that placed the visit to the tomb at the centre (Rugg, 1998). So even though initially, cemeteries were viewed as something just functional, and constructed simply to serve the purpose of disposal, by the beginning of the 19th century they became places where grief could be expressed in an emerging culture that enthusiastically submitted to any stimulus in the search for an emotional quiver and melancholic sentiment (Rugg, 1998). But cemeteries in the periphery of our cities are not as accessible, and today we can see that the relation between the dead and the living has had a great recession, and a layer of history has been removed from the urban fabric, resulting in an increasing reluctance to address death as the inevitable consequence of life (Heathcote, 1999). But already by the end of the 19th century, the new hygienic cemeteries that were located outside the cities where gradually filling up, and for many it became apparent that even these grand acres of death would someday be full, and become a cause of great difficulty (Curl, 2002).

Crematorium Östrakyrkogården Gothenburg (Holmquist, 1890)

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But Victorians had grown distant to soft values and become experts in hard facts and efficiency, and a functional line of thought was introduced in the debate. It was argued that the corpses could be broken down and used as fertilizer, used in research, artificially and speedily decomposed, used as fodder for animals or even humans, mixed with water and treated as sewage, frozen, or burned (Curl, 2002). But it was not the Europeans of the 19th century that invented cremations, the ceremonial burning of corpses is older that human history and most likely were a common occurrence in Europe and the Near East during the early Stone Age, spreading across northern Europe during the late Stone Age, with he oldest traces of cremation in Europe found in Sweden from about 7000 BCE (Valentijn et al, 2018). Around 1000 BCE cremation was an integral and respectable part of Grecian funerals, and was the prevalent way of disposition by the time of Homer in 800 BCE, and later adopted by the Romans during 600 BCE. But the customs of cremation were considered pagan by the early Christians of the Roman Catholic Church, and by the 5th century cremation was abandoned as a result of Constantine's Christianization of the Roman Empire, and in the year 789 Charlemagne imposed the death penalty for the performing of cremations (Valentijn et al, 2018).

This perception of cremation being something foul and pagan held strong well into the 19th century, where the predominantly Christian Europeans considered cremation an unchristian custom. But the world of the 19th century was a world in change, and the discovery of the New World in the 16th and 17th centuries had broadened the cultural horizon, and some inspired scientists rediscovered cremation, which was common practice in large parts of Asia (Valentijn et al, 2018). Though many people considered the overseas cultures inferior, Sir Thomas Browne's Hydriotaphia, or Urne burial have attracted devotees since the 17th century (Curl 2002). But on the 22nd of January 1876, the well-known silk industrialist Alberto Keller was the first person to be cremated in modern Europe. He was cremated in Milan, in a crematorium that he himself financed and later donated to the city of Milan (Valentijn et al, 2018). The earliest crematoriums of Europe were much simpler buildings than their contemporary counterparts, but in a sense, they were more genuine, since the farewell took place in the crematorium itself. This is obviously because the pioneers where abandoning the ecclesiastical services since the church was opposed to cremation, and they needed a venue for the farewell. But already by this time, two different crematorium concepts were in development, differentiating between whether the actual cremation was a natural part of the farewell or not. Mainly this was driven by the placement of the oven, whether it was placed in the basement, and a lift was used to lower the coffin into the oven, or if the coffin was committed horizontally into an oven on the same level, allowing the visitors to watch the committal (Valentijn et al, 2018).

The cremation movement was historically secular, functional, hygienic, and even anti-clerical (Curl 2002), architects have tried abandoning the religious architectural traditions while struggling to develop a new stylistic language for these secular but grave settings, which are required to communicate both civic authority as well as emotional resolution (Worpole 2016). It is apparent that crematoriums play an increasingly important role in our society, and even though they vary greatly in function, were we on one hand have almost complete funeral homes, and on the other hand have almost purely technical disposal facility like the ones we see in the Scandinavian countries (Valentijn et al, 2018), it is also apparent that this does not translate to a compromised and neglected architecture. Curl (2002) give prominence to Ove Hidmark's Lilla Aska crematorium for example, and Valentijn et al (2018) expresses their astonishment when they first visited Ringsted crematorium in Denmark and learned that it is hardly visited by any relatives. Often the undertaker transports the deceased to the crematorium after the final farewell has taken place, and very few relatives collect the ashes themselves. When Valentijn et al (2018) asked Tom Olsen, the manager of Fælleskrematoriet in Ringsted, 'why?' he answerd 'The building exists because it matters... Crematoria are dignified buildings with an important function; we may not build them for the eyes of the public by definition, but they must be respectful places for the accommodation of our dead and the operations surrounding death. This also requires a high-quality cultural product'. And this holds true for many crematoriums in Scandinavia; some have ceremonial rooms, but more often they only have small farewell spaces called *anhörigrum*, where the closest family can take a final farewell, but is not suited for a ceremony. More often than not the family never visits the crematorium, because they have already said their goodbye at the funeral that was held elsewhere. But many of these crematoria are produced to such a high standard that they could ritualize the final farewell and the committal at the crematorium (Valentijn et al, 2018).

But there has been quite a lot of criticism regarding the more contemporary crematories, Curl (2002) believes this to be mostly due to lack of dignity and ceremonial grace, claiming that the uncomfortable design of many British crematoria, plagued by attempts to spruce them up to make them more lively by using pastel colors, plastic seats, and light woods, making them staggeringly banal, is due to misplaced sentiment, and a suffocating attempt to pretend that everything is not what it seems. Many find that crematoriums have suffered from a to functional and industrial character, arguing that there has been no suitable liturgy to apply, leaving the ceremony without an emotionally acceptable conclusion (Valentijn et al, 2018). There have been attempts to superimpose religious imagery on top of cremation ceremonies, like the Siemens Apparatus, in an attempt to extend the liturgy of a Christian inhumation (Curl 2002). But long before the religions we know today, people have been disposing of our dead with ceremonial grace, involving a framework where deep emotional expressions are satisfied. And there never was a liturgical requirement to begin with since there was no rite in modern times for cremation in a European tradition (Curl 2002). What we need is a return to the essential, to understand the significance of seeing a body buried in the earth or at sea, or in the case of cremation, seeing the act of committal to the flames, and understand the emotional response to such an act, and how it becomes part of life, enriching, and teaching (Curl 2002).

One of Sweden's first crematoriums was erected 1889 in Östrakyrkogården, Gothenburg, designed by Hans Hedlund. Similar to the one previously mentioned in Milan, there were not any intermediate chambers. The coffin was placed directly in the furnace while the mourners were present (Curl 2002). Ever since *Svenska Eldbegangelseföreningen* started advocating for cremation, Sweden has grown into a country that has really embraced cremation, now accounting for 80% of all funerals and predicted to increase even further. Scandinavia, and Sweden in particular, has distinguished herself in the design of beautiful woodland cemeteries, and stunning and modern crematorium architecture. I now believe that it is time to stop viewing our crematoria's as just disposal facilities, and looking backwards while moving forward, towards crematoria designs that encompasses and answers to the death of a loved one in its entirety.

([Photograph of Floral Arrangement], 2020)

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Secularity & Ceremony

Holloway et al (2013) explains that funerals exist primarily because of the enduring individual and social need to formalise loss and manage the transition from life to death. A funeral service is a complex composition of social practices that relies on implicit knowledge, bound to routine bodily performances and artefact usage (Knopke, 2019). Funerals rely on the active participation of mourners, and the ritual demands their physical involvement. This usually entails familiar acts and artefacts such as condoling, carrying the coffin or urn, and the funeral oration (Knope, 2019). Since the Palaeolithic era, and among all cultures, we find evidence of that basic human need to remember and memorialise the dead. The ceremonial structure might differ but have often included acts of bodily performances, feasting, chanting, and praying, creating potent multi-sensory memories that can be repeated or referenced in later memorialising practice with the purpose of forming continuing bonds between the living and the dead (Inall & Lillie, 2019).

As our society has prospered, we have grown into a culture of individuals. This is evident in the trend of post-mortem personalisation that has been growing since the 1980s. Funerals are marketed as 'authentic', 'individualistic' and 'creative', and as something fundamentally different from the religiously induced funerals of the past (Schafer, 2012). This trend is a reaction to an experience of meaninglessness that many mourners feel regarding the Christian liturgy, and the impersonal way in which many religious funerals has been conducted (Holloway et al, 2013). Some have argued that the abandonment of Christian liturgy has left mourners unable to express or manage their grief and describe the subsequent funeral as spiritually barren. But most scholars disagree, and instead argue that we have found a new relationship to death in our post-secular society, where there is still a strong commitment to find meaning in death, but the trend of individualisation has refocused it towards personal meaning-making rather than meaning-taking that stem from traditions and liturgy (Holloway, 2019). The idea of the personalised funeral is that it assists in establishing meaningful memories that help preserve the identity of the deceased (Schafer, 2012), for in the end, that is all we are left with.

Helgesson Kjellin et al (2021) explains that our culture has now reached a post-secular state, where secular and religious ideas co-exist in a person without causing friction. This is especially evident during funerals, where you often see secular ceremonies incorporating Christian liturgy and symbolism out of tradition. Helgesson Kjellin et al (2021) argue that Christian liturgy and symbolism is still meaningful for most people within the funeral context, reasoning that the choice of a civic funeral does not automatically translate into wanting a ceremony devoid of any spiritual elements, but rather to acquiring a greater degree of freedom, often using a religious ceremony as a template, and then excluding the parts that do not resonate with them personally. I believe that the inclusion of religious elements has very little to do with any actual religious belief and is included out of tradition or rather a sense of correctness, because religion becomes meaningless and superficial if you do not fully believe, e.g., if you do not believe in the virgin mother and the virgin birth of Jesus, everything else with Christianity becomes meaningless. Holloway et al (2013) studied 46 funerals in northern England in a qualitative study where they observed both the funeral and the preceding arrangement meetings, as well as conducted semi-structured interviews with bereaved families and funeral professionals. They found that there seldom was an adherence to any formal religious belief system, but rather the evidence suggested that a refitting of religious traditions and symbols to attain personal meaning-making was the usual way of arranging a funeral. Holloway et al (2013) noted that there was a remarkable similarity between the 46 funerals that they studied, irrespective of belief system or degree of informality, were the funeral oration always functioned as the centre piece, and a eulogy that celebrated the life of the deceased was included. Ritualistic behaviours were part of every studied funeral, and where categorised in three categories: 'rituals belonging to a religious service; ritual employed because 'traditional'; and emerging patterns of behaviour which take on the characteristics of a ritual.' (Holloway et al, 2013). For the most part, ritualistic behaviours belonging to different categories coexisted without any friction, e.g. funerals with no formal religious belief for the most part that included prayers because 'traditional', and because the deceased would have liked it. That the deceased would have 'liked it' is a very common guiding principle when planning modern funeral, and something that most families put a lot of emphasis on when determining if the event had been a success (Holloway et al, 2013).

Instead of a religious interpretation of death, a contemporary funeral often focusses on the deceased's life, and the relationships we had with them in order to manage the transition to a new relationship with the deceased. Families spend a lot of time and care to 'get it right', characterising the short period between death and the funeral as quite intense, where choices must be made, and a lot of planning and preparation must be done. This is also unfamiliar ground for many, so the funeral director often plays a significant role in guiding them through the process (Holloway et al, 2013). Schafer (2012) noted that funeral directors expressed concern regarding the lack of guidance when people choose to have a civic funeral, and therefore moved into fill that gap, recognising the importance of a meaningful and personalised funeral services. Studies show a strong correlation between personalised funerals, emotional expression, and healthy grief, where the funeral is described as an outlet for 'natural emotions' and an opportunity for the bereaved to lower their emotional guard (Schafer, 2012).

Many view the funeral as the last act of reverence towards the deceased, but it is also used as a catalyst within the grief process, where the bereaved feel acknowledged and become enveloped in the comfort of the grief-community (Helgesson Kjellin et al, 2021). With the help of the funeral and the grief-community, the bereaved take that first step toward adjusting to their loss, and even thou grief is individual and unique, the need to emotionally express the sorrow is a universal need (Schafer, 2012). What is worth to remember when talking about funerals is that they are regarded as unrepeatable events, and lack of meaning has been found to contribute significantly to mourners' distress (Holloway et al, 2013). So funeral professionals often describe the perfection of the moment that must infuse the funeral to support the bereaved in the crisis that results from the loss of a loved one, and central to this is the atmosphere of the memorial service (Knopke, 2019). Even though many strive for individualism within the funeral service, what has become apparent is the limits of individual originality and creativity. Schafer (2012) argue that rhetorically funeral directors emphasise the freedom of choice when marketing civic funerals, but that 'freedom of choice' is subject to judgment and limited to what the funeral director distinguishes as appropriate funeral behaviour, advocating concepts of 'healthy grief'. This might seem a little demeaning, but for many thou, the ideal of a personalised funeral that felt meaningful was an unattainable goal according to Schafer (2012).

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I believe that the problem lies in the paralysis of the blank page. The time between death and the funeral is not very long, in Sweden it has to happen within a month, and then it is better to work within a strict boundary of creative limitations and under the guidance of a funeral professional. Therefore, this paradoxical discourse has emerged amongst funeral director, where they emphasise individuality, autonomy, and creativity, but it gets diluted by this psychological discourse focused on healthy grief resolution (Schafer, 2012). So, the truth of the matter is that, while 'individuality' is the common buzzword in advertisement for funeral directors, a critical examination of the person-artefact-network shows that the composition is almost always very limited and standardised (Knopke, 2019). This is mostly because funeral directors rely on their own aesthetic taste, either because décor depend on what artefacts they already have at hand, e.g., décor they previously deemed appropriate that is limited due to storage and economics, or because they propose floral arrangements, coffins, and urns that they themselves like.

But there is more freedom when choosing floral arrangements, coffins, and urns, or when choosing what music to play and what the funeral oration should include. But even amongst these we find restrictions and standardisation; floral arrangements are dependent on the florist preference and the current season, and the urns and coffins are mostly picked from existing models (Knopke, 2019). Even when it comes to the choice of music the funeral professionals have their preferred repertoire of secular and religious funeral songs (Knopke, 2019), and live music is encouraged and seen as the more suitable alternative (Davidsson Bremborg & Dahlgren, 2011). Even the funeral oration is largely schematised and comprised of the celebrant's repertoire of finely crafted sentence fragments. Adding a portrait of the deceased to the person-artefact-network might be the only truly unique artefact in that network, but even these are affected by norms and conventions (Knopke, 2019). Helgesson Kjellin et al (2021) explains that a good balance between being rooted in tradition and freedom of choice is perceived by many bereaved as crucial for attaining a meaningful funeral service. While striving for something original and individual, we are also longing for that sense of community when we are struggling (Venbrux, Peelen, & Altena, 2009).

Gradually, within this framework of standardised and normative funeral traits the wishes of the bereaved form the person-artefact-network under the guidance of the funeral professionals. It is through this interplay between standardisation and individualisation that the person-artefact-network of the funeral service takes shape, and thus also the constituent atmosphere that in turn establishes how the collective mourning becomes emotionally and aesthetically clear (Knopke, 2019). This works, because most of the time the bereaved feel accommodated for and helped by the competent and knowing funeral professional, and it alleviates the burden of creating something memorable and meaningful out of nothing. So, the funeral professionals intervene in the shaping of the atmosphere of the funeral in a habitual way, colouring it by their own aesthetic palette. But the atmosphere of the funeral is not just generated through what is said and what artefacts are present, it also builds on the corporeality of all present actors. The presence of the bereaved, the deceased, and the celebrant are unsurprisingly included in the performance of the ritual, and thus their actions, reactions, and appearances are also influencing factors for the spatial affectivity (Knopke, 2019). Therefore, not only do people take offence if you are not properly dressed for the occasion, but the sombre colours and formal clothing of all participants helps in establishing the right atmosphere.

In a sense, funerals can be understood as stages where a performance, aimed at creating emotional responses and evoking sensations and feelings in relation to the ritual that is unfolding, is taking place (Knopke, 2019). Celebrants are very much aware of this and use it to great extent when setting the right mood. Holloway et al (2013) noted how celebrants and funeral professionals would routinely change their tempo and speech patterns. They would move quickly when the preparations needed to get done, but as soon as they came into contact with the bereaved, they would change pace, and adopt a much more dignified and formal body language. This also influenced their speech patterns and behaviours, moving from mundane to formal when the professional within them kicked in, and all of this can be understood as acting to evoke certain sensations and feelings necessary for the ritual to become meaningful, and the architecture is highly relevant to this.

I believe that if we look at what the funerals professionals are trying to achieve, we get a decent idea of what the room should represent, what affective fields the spaces should amplify. Primarily I believe it should feel tranquil and dignified, with a slow tempo. It should encapsulate you within that moment and hold you there for as long as it lasts, for it does not last long, and when it is over, the memories are all that you have left. It should feel formal and important, and maybe just a tad bit imposing, and what I mean with that is probably best described by what one funeral orator told Knopke (2019) during an interview, in relation to the oration, that it is aimed to 'sensitise for this hour, for this moment – because it is only a short moment – and to sensitise for the perception of what is happening there', and when your enveloped in this slightly imposing spaces, you become alert, you become sensitised, and through this you become more receptive and emotionally expressive. Some people wear their heart on their sleeve, and it is easy for them to have an emotional release, but for others it is much harder, and you have to pry the emotional response out of them, and it is for them, to allow them full closure, that this becomes important.

But there are also some functional aspects that should be addressed. Davidsson Bremborg & Dahlgren (2011) mapped the Swedish people's attitude towards funerals and its inherent components, and they found that almost all participants felt that you should be allowed to choose their own music. Even funeral professionals view this as something that should be encouraged, so you could say that there is a mutual consensus. But religious celebrants were for obvious reasons against music that was deemed immoral or anti-religious, and even secular celebrants would deem some music as unsuitable to some extent. Most funeral professionals also found live music to be more favourable. So, when designing ceremonial spaces, it is a good idea to think about acoustics, and where musicians would be situated, since music in one form or another will be an important part of the person-artifact-network. They also found that during funerals that ended with inhumation, eight out of ten participants wanted to attend the actual burial, but when it comes to cremations, in 76% of all cases only the closest family were involved during the burial of the urn, which often takes place some time after the funeral ceremony. For me, these numbers say that people want to be part of the comital, but transition between ceremony and comital is not as fluent when it comes to cremations, since most funerals that end in cremation are not celebrated within the crematorium. And it is such a strong act and there is such an emotional resolve that is achieved through ending the ceremony with the comital, that I find it paramount that we try to allow for this to happen when we design funeral spaces.

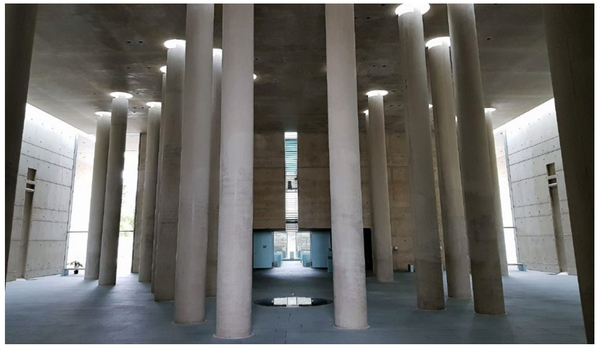
Søndermark crematorium (Gonon, n.d. a)

Mariebjerg crematorium (Gonon, n.d. b)

Malmö crematorium (Olsson, n.d.)

Woodland Crematorium (Vågen, 2012)

Baumschulenweg crematorium



Baumschulenweg condolence hall (Wolfgang, 2021)

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Architecture & Death

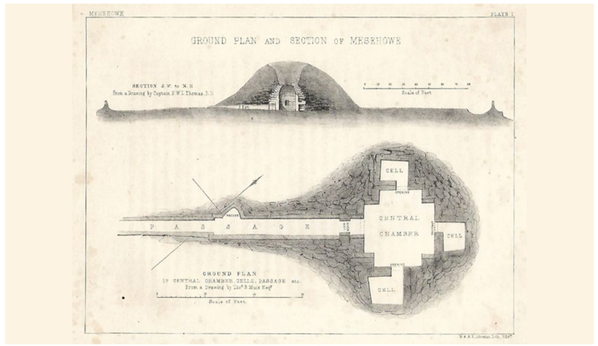
When studying funeral architecture, one thing becomes abundantly clear; in all cultures and throughout history, architecture has been an important way to canalize and formalise loss, as well as a means to preserve the memory and in a sense immortalize the ones who went before us (Curl, 2002). It is an idealised architecture that often tries to envision the next world, while expressing people's angst and existential terror regarding their finite existence (Heathcote, 1999). The places that we purpose for these final farewells reflect the position death has in our society (Valentijn et al, 2018). But Heathcoat (2018) argues that by the end of the 20th century, only a handful of architects were truly contemplating the depth of these questions and producing work that interpret and reinterpret these archaic expressions. The grandeurs that have been achieved historically within the field of funerary architecture is undeniable, which makes it even more depressing when contemplating the rows upon rows of uninspired tombstones that constitute the bulk of the modern memoryscape; as curl (2002) explains that many of the memorials we often erect today have contributed to a new terror regarding death.

But Curl (2002) also recognizes a few interesting contributions during the last four decades, many of them with Scandinavian origin, like *Lilla Aska* Crematorium by Ove Hidemark; 'beautifully sited and composed, and has a dignity that puts most British crematoria to shame', as well as Erik Bryggman's crematorium in Turku, the crematoria in Søndermark and Mariebjerg by Fritz Sclegel, Helsingborgs crematorium by Ragnar Östberg, Malmö crematorium by Sigurd Lewerentz, and the *Woodland Cemetery* and the *Woodland Crematorium* by Gunnar Asplund. One of the reasons why the *Woodland Cemetery* and particularly the *Woodland Crematorium* is held in such high esteem is because it is upheld by architects on both sides of the modernist movement; both as an example of modern architecture on a human scale, as well as a meaningful utilization of the familiar classical archetypes without reverting to an overtly classical language (Curl, 2002). Death has often prompted an architecture that is stripped bare of ornaments, were only that which is necessary remains; post, lintel, and roof, e.g., the *Woodland Crematorium* thrives on that return to the elemental, to the archetypal form (Heathcote, 1999). In the greatest works of funeral architecture there is no room for the trivial, but rather it is an architectural language that impart serenity and repose through the use of symmetry, balance, and geometrical formality (Curl, 2002). Modernism might work for the architecture of the living, but when it comes to the architecture of the dead, we often find solace in the familiar embodiment of tradition and revert back to a more conservative aesthetic language (Heathcote, 1999), and it is clear according to Heatcote (1999) and Curl (2002) that contemporary architecture often struggles when approaching the subject of death, while the few architects who have truly engaged the subject have produced some of the most important buildings of the era.

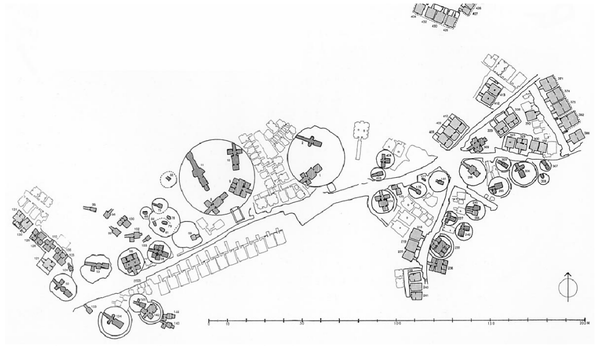
These buildings, as well as the memoryscapes that often surrounds them, are immensely important on multiple levels. According to Wasserman (1998) they can be viewed as places that enrich the community and lets us engage with the history of the city; Père-Lachaise is a prime example of this, how a city and a cemetery becomes interdependent, where not only relatives gather to mourn and remember, but it also becomes a destination for dark tourism (Heathcote, 1999); tourism focused on exploring locations associated with tragedy and death, not because of morbid fancies, but rather to learn about a places history. The memoryscape and the building becomes mnemonic devices within the city, that preserve its history, letting us remember and placing us within this continuum we call culture. Wasserman (1998) explains that cultural artefacts, purposed for the act of memorialisation, has been found as far back as we have found any artefacts. Their function is integral to our culture and civilisation, and they allow us to approach death even though it frightens us. These artefacts are often at the centre of rituals, and the rituals becomes a method of collapsing history, bringing the past into the present and grounding us in our culture (Wasserman, 1998). The memoryscape then serves as the venue where the spatial manifestation of those rituals takes place, both binding those memories to the memoryscape, and becoming a place to return to when we want to recall those memories. Valentijn et al (2018) explains that it heals us and helps us move forward when we are able to associate the deceased with a physical, spatial place, and maintain a stable connection with the deceased. Memorials lets us stabilize and fixate that memory and alleviate the finality that comes with losing someone by perpetuating the memory of that individual (Wasserman, 1998). The memory of a person can attach to either the entire memoryscape or a specific grave, but regardless, the connection between place and person emerges during the interment, during the transition from corporeal to social remains, and I believe that this connection becomes stronger if the complex is able to contain the entire act of parting rather than just parts of it.

But for healthy grief to manifest, it is essential that it does not fester in the minds of the bereaved, but rather is something they can process when they feel the need or leave behind when life must go on. I believe architecture can make all the difference here; from traveling to a place to how we experience the architecture, it all becomes part of the ambience and has a lot of influence on our experience of the send-off. A good example of this is the crematorium at Baumschulenweg by Schultes Frank Architekten, where a great deal of effort and attention has gone into providing visitors of the crematorium with a meaningful experience. It becomes this carefully staged, almost theatrical, world. The bereaved start their procession towards the Baumschulenweg crematorium via a gatehouse and find themselves on the central square. The square is only 25 meters wide, but 120 meters long, with the monumental crematorium at the opposite end. Visitors move across the square, manoeuvring through a grid of equidistant planted trees, moving up the grand stairs that are sunk into the building, entering the monumental and imposing condolence hall. Measuring 900 square meters and inspired by Egyptian temple architecture, the condolence hall is meant to balance the transient and the eternal, placing the visitor within a forest of irregularly placed concrete columns that pierce the roof and floods the room with light.

Visitors are separated from the technical parts of the complex and only move between the condolence hall and auditoriums, allowing them to stay within that almost sacral realm without having to face the technical parts of the send-off (Valentijn et al, 2018). I believe that what makes a memorial successful is that theatrical staging and strong sense of entering 'another world', and to achieve this we need to look at both the location and the architecture; how the architecture embeds in the surrounding and what we experience while progressing towards our destination, as well as how we relate to the architecture; what it tells us and how it makes us feel. Wasserman (1998) explains that when a place becomes a mnemonic device, it is pertinent that the place serves as a container, as a reserved region; the memoryscape should exist within the city, but as its own entity, as a separate world.

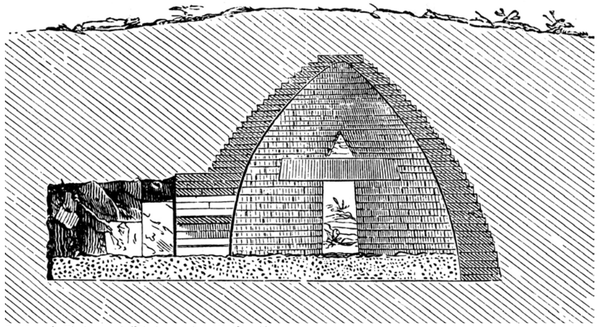


Floorplan and section of Maeshowe ([Maeshowe plan & section], n.d.)



Siteplan of an Etruscan tumuli ([Etruscan tumuli plan], n.d.)

Etching of Kungshögarna in Uppsala ([Kungshögarna in Uppsala], n.d.)



Section of a Tholos tomb ([Tholos tomb section], n.d.)

Etching representing the Mausoleum of Halicarnassus ([Mausoleum of Halicarnassus], 1572)

Stone memorial at the Treblinka memorial (Grycuk, 2013)

THEORY

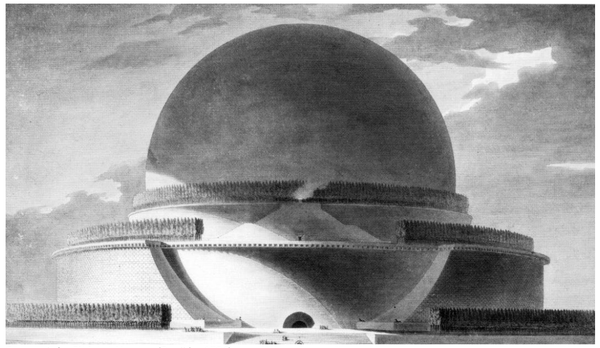
Studying the findings of Valentijn et al (2018) it becomes apparent that there are three branching theories that influence the design brief of crematoriums in Europe; either they are thought of as technical disposal factories, religious spaces, or theatre stages. Comparing such an important space to a theatre stage might not be the most flattering comparison, but it does resonate a lot with our understanding of the inherent structure of the farewell ceremony, and how the act is often described within the social sciences (Holloway, 2013; Knopke, 2019). Funerals are generally thought of as unrepeatable events and the only ritual that has survived in the modern age, it is a significant event that families invest a lot of effort into to 'get it right' (Holloway et al, 2013), and central to this is the atmosphere of the memorial service (Knopke, 2019). Grieving relatives can experience immense feelings of shame and guilt if the ceremony is thought of as unsuccessful, so to foster healthy grief, it all comes down to how the bereaved experience the send-off. The fear of failing to hold a 'proper' memorial service is often fuelling relatives through days of preparations and rehearsing, where multiple 'actors' gather to play out their parts, carefully crafting this scripted experience, and setting the 'stage' for a fitting send-off (Holloway et al, 2013). Therefore, the aesthetics is not just a question of décor, but a big part of the buildings primary function. But it is hard, maybe even impossible, within the scope of this thesis, to objectively define what an architectural language of death should look like, but it is possible to describe its characteristics. I started by reading the works of Curl (2002) and Heathcote (1999) to anchor myself within the history of funerary architecture.

According to Curl (2002), one of the most important factors and recurring themes within the design of funerary architecture, regardless of whether we look at individual tombs and mausolea or entire cemeteries and memorials, is the use of powerful geometries and symmetry for evocative effects. Symmetry and the use of powerful geometries have been part of the architectural language of death ever since humans started erecting tombs and mausolea in the prehistoric and classical era, later influencing Gothic chantry-chapels and Italian ossuaries, and not restricted to design of Western European origin, but also common amongst Islamic tombs and funerary gardens, as well as Japanese memorials. For example, the formal and symmetrical arrangement of Maeshowe, or the symmetrical disposition of tomb-chambers around the central chambers and corridors of the huge tumuli that where erected in Po valley and Campania, 400 BCE. It is the serenity and sense of repose that arises when inhabiting a geometrically strict and symmetrical space, the balance and stillness of such funerary architecture that contribute to the perfection and the monumentality of the design (Curl, 2002).

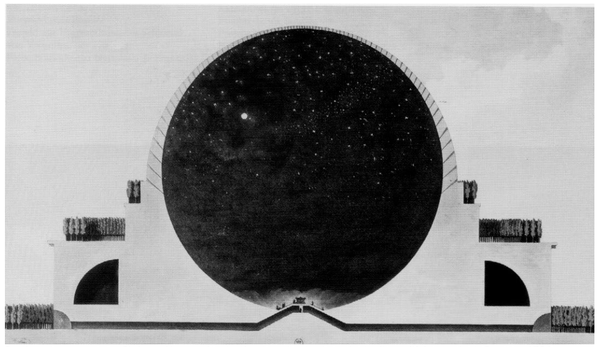
As previously mentioned, many of the great works of funerary architecture rely on a return to the archetypal form, an archaic expression of monumentality. I imagine this is because it is comforting when it stands firmly rooted in history; it suggests a durability and permanence that spans well beyond our own lifetime. Probably the most archaic expressions of all, and one that is traceable in so many of history's greatest works of funerary architecture, is the simple mound in the woods (Heathcote, 1999). A grave is created by digging a pit, displacing a portion of the soil during the inhumation that then forms the mound, and by growing that mound beyond what is considered the human scale, monumentality is achieved, e.g. *Kungahögarna* in Uppsala; three monumental tumuli found on *Uppsalaåsen* in *Gamla Uppsala*. The Tumuli has a diameter of 55-70 meters and are about 7-11 meters high, a monumental height that is further enhanced since the surrounding area has been artificially flattened. Other examples are the Maeshowe and the Etruscan tumuli that was previously mentioned, and the tholoi tombs of Mycenae; dry stone structures consisting of a circular chamber with a corbelled roof known as the tholos, buried beneath a mound, and entered via a long corridor called the dromos (Curl, 2002). Among these works of funerary architecture, we also find the cairns, commemorative and funeral oriented piles of stacked stones, found all over the world, that has been used as memorials and burial monuments since time immemorial. You might also argue that even the pyramids, or even the great mausoleum of Halicarnassus, are just refined interpretations of that archaic expression. I would go as far as to argue that all domed buildings associated with mortuary activities is a descendant of the burial mound. Since the late Stone Age there has been a widespread domical funerary tradition, where domical chambers were constructed to shelter the dead, further evolving into the domes of monumental structures like the Taj Mahal, mostly because there were few other ways to build large open spaces, but probably also because of heritage.

When discussing expression, you also need to address materiality. The cairns, the pyramids, and the mausoleum of Halicarnassu are all stone structures, but so is also many burial mounds as they contain vaulted and corbeled stone structures. Stone is an exceedingly common material for funerary architecture, and one of the most essential memorial forms. They are commonly seen all over the world, sometimes used as individual artifacts, e.g. runestones and tombstones, but also used to demarcate the burial grounds, or used as building blocks (Wasserman, 1998). Sometime the stonework is rougher, e.g. the roughhewn stones found in Japanese Shinto cemeteries (Wasserman, 1998), and sometimes it is more delicate and deliberate, e.g. during the Middle Ages in England, when dark limestone was quarried on the Isle of Purbeck and shipped to the mainland and carved into tombs, or between the mid-14th century and the 16th century when most of England was using alabaster from Derbyshire and Staffordshire, not only for use in funerary architecture, but also to carve exquisite effigies (Curl, 2002). Stone is a potent symbol for death; many memorials use stones to symbolically depict and honour victims of war and catastrophes, e.g. the Treblinka memorial.

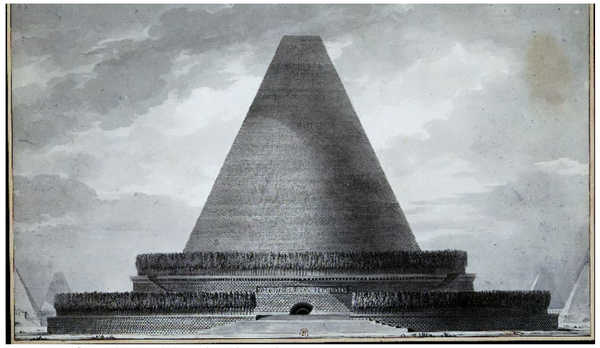
Stones material properties make it possible to expand even further on its symbolic capacity; stone is often thought of as a dead material. From a scientific point of view this is because stone is made up of a solid mass or aggregate of minerals or mineraloid matter, compared to wood that is made up of cells like other living things. But stone is also perceived as dead from a figurative perspective; stone has a much higher thermal conductivity compared to wood, so it is perceived as cold when you touch it, 'stone cold'. Also, it has a much lower thermal expansion coefficient compared to wood, so there is not nearly as much movement in a stone structure as there is in a wooden structure, making it feel less alive. But it is also because wood has an intelligible lifespan; wood changes its colour over time, and will be subject to deterioration either through climate, mould, fungi, or insects. Stone on the other hand does not deteriorate as apparently, allowing it to represent a permanence that contrast beautifully to the impermanence of life, becoming the ideal vessel when trying to immortalize the memory of someone important, especially when the blocks become massive enough to also be perceived as immovable, e.g. the massiveness, solemnity, and gloom that the Egyptian pyramids exude speaks of a buildings that will literary last for millennia, and figuratively stand until the end of times, admirably suited for their purpose as funeral monuments (Curl, 2002).



Cenotaph for Sir Isaac Newton (Boullée, 1784)



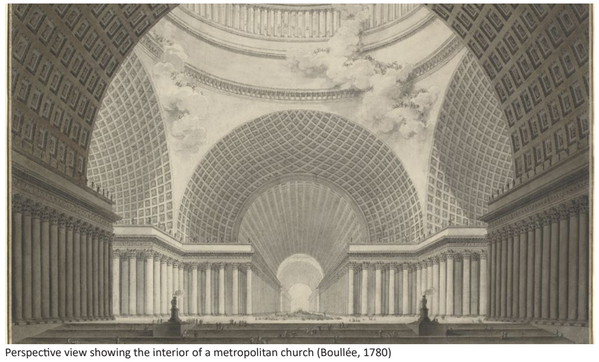
Section of cenotaph for Sir Isaac Newton illustrating the effects of daylight with artificial starlight (Boullée, 1784)



An Egyptian influenced cenotaph design (Boullée, 1786)

Elevation of l'Opéra de Paris (Boullée, 1781)

Perspective view showing the interior of Bibliothèque nationale (Boullée, 1785)



Perspective view showing the interior of a metropolitan church (Boullée, 1780)

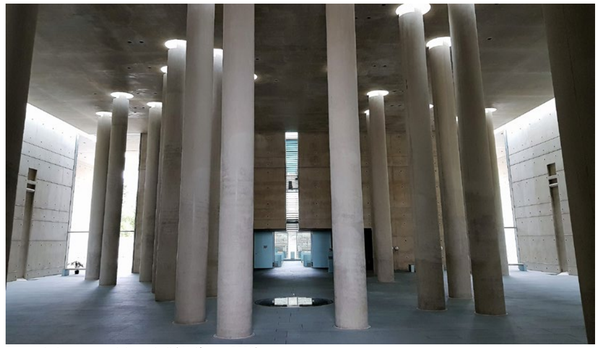
THEORY

Having finished my historical research, I felt well versed in the traditions and history of funerary architecture and ready to dive into the assignment. I began to mentally sketch a design brief by brainstorming a list of adjectives that I would like to have associated with the design that I was trying to envision. Those adjectives were: awe-inspiring, balanced, dignified, formal, grand, immovable, impervious, monumental, solemn, solid, venerable, and worthy. Contemplating this list, I quickly realised that the only reasonable way forward, in realising my design, was to settle on a single monumental building, made out of a massive building material like concrete, stone, or brick. I wanted it to be recognisably classic in its proportions and design, but still interpret as a contemporary piece of architecture. It should use symmetry, balance, and geometrical formality to instil a sense of repose and dignity. It should be striped of most ornamentation, but not to such an extent that it fells minimalistic. It was extremely important that the bereaved would associate with the building and find the rooms appealing and dignified. It was a balancing act between being too sterile and too baroque. So far, we have discussed what desirable qualities the building should have, but when designing any piece of architecture, it is equally important to consider its functions. I have already concluded that having the building evoke the right feelings and providing the right atmosphere is one of the primary functions of the complex, but an equally important function is how it coordinates around the ceremony. When designing funerary architecture, you are mentally trying to organise the rituals and the ceremonies, and creating spaces that support them. Based on the knowledge I had acquired through my research, I sketched a progression though the building; starting with the arrival at the building, entering the condolence hall, meeting the funeral attendant, occupying the condolence hall, entering the anteroom, meeting the other bereaved, occupying the anteroom, entering the ceremonial hall, meeting the deceased, meeting the officiant, occupying the ceremonial hall, forming a procession towards the cremator, relinquishing the deceased to the flames, leaving the ceremonial hall, and exiting the building. The idea of a building started to form at this stage. I envisioned a single, large, monumental structure, with a grand dome covering a magnificent condolence hall, with ceremonial halls like satellites, orbiting the condolence hall, and rooms for the furnaces connecting to both the ceremonial halls and the condolence hall. But I needed a reference to help guide my design, and without a doubt, I turned to Étinne-Louise Boullée for my inspiration. He has undoubtedly created some of the most exciting schemes for monuments, cemeteries, cenotaphs, and buildings, that celebrate death, and is one of the pinnacles of funerary architecture.

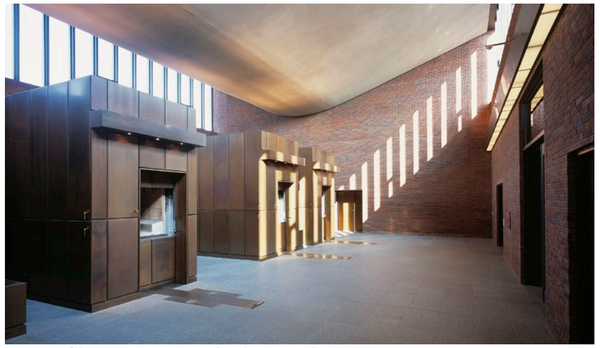
Étinne-Louise Boullée; a visionary French neoclassical architect who lived between 1728-1799. He has greatly influenced many contemporary architects even though his designs, that to this day titillates our imagination and speaks of an otherworldly grandeur and monumentality, with a few exceptions, was destined to never amount to anything that was tangible. But instead became a source of inspiration and a model for monumental architecture, and have impacted the field of architecture ever since (Heathcote, 1999). In order to understand the architectural style of Boullée, we first need to know a little about his aspirations; Boullée dreamed of becoming a painter but was introduced to the field of architecture through his father, who held a position as an architect in the *Bâtiments du Roi*, A division that were responsible for building works at the King's residences. But Boullée never let go of his artistic ambitions and managed to achieve a splendid synthesis by letting his desire to paint develop into an architectural style that heavily relied on the novel effects of light and shadow (Boullée, 1953).

When comparing Boullée with his predecessors Boffrand and Blondel, what his painters' skills contributed becomes very clear; Boffrand and Blondel were very concerned with the static elements of buildings, but the play of light and shadow that is so apparent in Boullée's drawings are missing, as are the use of colours that Boullée used to bring out the most important structural and emotional aspects, never just for the sake of it (Boullée, 1953). But Boullée, like all of us, stood on the shoulders of giants, and borrows from Vitruvius the concept of regularity and symmetry as equivalent to proportion. He regarded symmetry as one of the basic factors of aesthetic balance and beauty, as can be seen in his renderings on the left hand side. Boullée grew out of the rococo tradition and shed the ideas of exuberant use of ornamentation and instead gravitated towards bolder and simpler forms, in which the unadorned wall or cupola dominated. His architecture belonged to what would later come to be called Neoclassicism, a reaction against the slavish copying of antiquity that dominated the Rococo, lending great freedom and eclectic abandonment in the use of Antique forms and motifs, and emphasizing the aesthetic quality found in the unadorned wall, as something that spoke of dignity and the sorrow of death (Curl, 2002). Boullée deeply admired the simplest stereometrics forms and his style was clear, precise, and without embellishments. He believed that the sphere was the perfect volume, and that it conveys feelings of immensity and infinity. It is this love towards the unadorned and the use of powerful geometries that strikes the modern observer as familiar in its simplicity and functionalism, yet heavily classical due to its emphasis on regularity and symmetry (Boullée, 1953).

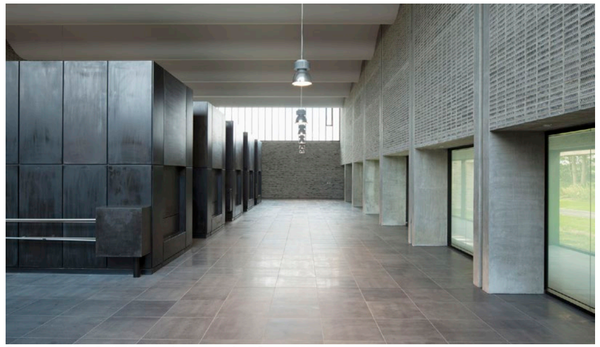
Étinne-Louise Boullée, together with other pre-revolutionary Frenchmen like Jean-Jacques Lequeu and Claude Nicolas Ledoux, developed a school of thought that believed that architecture should reflect its purpose called *Architecture parlante*, or 'speaking architecture'. The theory strives to visually accentuate a buildings purpose and function through its formal appearance, a theory that I find exceedingly effective for funerary architecture. Boullée designed his funerary architecture like temples of death, intended to chill the heart, relying heavily on ancient Egyptian motifs, often placing his buildings partially submerged to further emphasis the enormous burden the building exerts on its surrounding, both figuratively and literary (Boullée, 1953; Curl, 2002; Heathcote, 1999). He also developed theories regarding how the huge blank wall underlined the devastating terror and finality of death, and relied on his painters' skills to compose intricate plays of shadows, producing a distorted classicism, where the expected vertical members were replaced by vertical openings, and the 'burden of grief is born upon the blackness of empty space' (Heathcote, 1999). Boullée detested the influence of Greek classicism, but admired the grandeur of Roman architecture (Boullée, 1953), and often included cypress trees and sculptures, explaining the nature of the building, to reference the imperial monuments of Rome. He insisted that funerary architecture should be designed to withstand the ravages of time, and according to Curl (2002) said that 'if we make abstraction of all the beauty of art, it would be impossible not to appreciate in such a construction the mournful effect of the architecture'. Boullée is mostly recognised for his many cenotaph designs, especially his cenotaph for Sir Isaac Newton, but he also produced designs for cemeteries. Boullée's cemeteries often consisted of a centrally located main monument, perfectly symmetrical arrangements, and an enclosure that consisted of charnel-houses and chapels for funeral services. He incorporated elements like 'funerary triumphal arches', obelisks, enormous pyramids, and gigantic Neoclassical sarcophagi, that in themselves became buildings, e.g Tombeau des Spartiates (Curl, 2002).



Baumschulenweg condolence hall (Wolfgang, 2021)



Oven room of the Bispebjerg crematorium (Friis & Moltke, n.d.)



Oven room of the Fælleskrematoriet crematorium (Berg, n.d.)

Crematorium in the Père Lachaise cemetery ([Père Lachaise crematorium], 2009)

Smaller ceremoniel hall at the Skogsljus crematorium (Liffner, n.d.)

Columbarium in Tempio di Cremazione (Bascetta, 2018)

THEORY

Baumschulenweg

The Baumschulenweg crematorium in Berlin, Germany, by Schultes Frank Architekten, is probably the most famous crematorium in Europe, and for my project it became a great source of inspiration because it is the reference project that best embodies the concept of transporting the occupant to 'another world'. Though it did not inspire me with its modernist aesthetics, sublime as it might be, it was the emphasis on having a bespoke poetic visual language that resonated the most with my own thoughts on funerary architecture. Axel Schultes have supposedly said that the idea was 'to create a place that balances the transient and the eternal, to interpret the gravity and allow alleviation' (Valentijn et al, 2018), and it is this abundance of attention directed towards providing the bereaved with a meaningful experience, that make the Baumschulenweg crematorium exceedingly successful; From witnessing the monumental exterior after having passed through the gatehouse, to experiencing the jaw dropping condolence hall with its abundance of poetic symbolism that makes you reminisce of ancient Egyptian mortuary temples, and the fact that visitors experience nothing at all of what is going on in the technical 'back of the house'.

Bispebjerg

The Bispebjerg crematorium in Copenhagen, Denmark, by Friis & Moltke A/S, is a wonderful piece of architecture, a minimalistic sculpture in an urban oasis. But, as a crematorium, it pretty much operates in the opposite way of what I believe we should be doing. The Bispebjerg crematorium functions like a technical disposal factory; the corpse is shuttled here either before or after the funeral service, depending on if the final farewell will be conducted over an urn or a casket. There is no connection between the ceremony and the cremation, apart from the very small numbers of mourners that sometimes choose to hold a secondary farewell and subsequently watch the committal of the coffin from the witness room or, under supervision, from the oven room itself. But one thing that the Bispebjerg crematorium does exceedingly well is the detailing and dignity that has been afforded the sparsely visited oven room; it is dynamic with its curved ceiling that compresses the entire room around the four freestanding cremator ovens, bathed in an abundance of natural light and clad in burnished cooper, a material that is also used on other details in the room, and interacts splendidly with the brick walls.

Fælleskrematoriet

Fælleskrematoriet is a crematorium in Ringsted, Denmark, by Henning Larsen. Just like the aforementioned Bispebjerg crematorium, Fælleskrematoriet would most aptly be described as a technical disposal factory, as is usual amongst the Scandinavian countries. But, even though it is sparsely visited, and does not include any ceremonial halls, the detailing is immaculate and the entire building is held to the highest of architectural standards. The atmosphere is immensely sombre and dignified, and the few visitors the crematorium receives can follow the coffin as it is being relinquished to the flames, alas from the other side of a glass wall. The material palette is tastefully restricted to only include grey brick walls, granite flooring, some exposed concrete, and black accents. In the 12 meters high oven room stands five cremator ovens, clad in black steel, freestanding and basked in natural light, 'like stately tomb monuments' (Valentijn et al, 2018).

Père-Lachaise

The Père-Lachaise crematorium in Paris, France, is one of the earliest crematories in Europe and undoubtedly the most impressive. Inaugurated 1889 after designs by Jean-Camille Formigé, the Père-Lachaise crematorium is a true temple to death in a neo-Byzantine style with a symmetrical square floorplan, a dome, three apses, and surrounded by a columbarium that demarcate the boundary between the crematorium and the enormous Père-Lachaise cemetery. Aside from the obvious similarities, a square base that is crowned with a dome, what truly inspired me is the position that the Père-Lachais cemetery holds in both the heart of Paris and the Parisians. The crematorium serves as both a ceremonial venue and a crematorium, and all the necessary technical additions are virtually invisible to the public. According to Valentijn et al (2018) the project leader of ceremonies and rituals, Jean-Paul Rocle, supposedly told them that 'Relatives sometimes find it hard to make the connection between the deceased and the remains, the body and the urn with ashes. We try to help them turn the urn into a significant symbol of the deceased, for example by allowing them to watch the committal.'

Skogsljus

The Skogsljus crematorium in Gävle, Sweden, by ELLT arkitektkontor, stands out amongst Scandinavian crematories because it also accommodates two ceremonial halls. The two ceremonial halls each have their own 'wing' with separate entrances, waiting rooms, and courtyards. What also sticks out with the Skogsljus crematorium is the seating arrangement of the ceremonial halls; instead of the classic theatre arrangement, the smaller ceremonial hall employs a single row centred arrangement while the larger sport a hybrid parliament/theatre seating. What is nice here is that not only does the crematorium embrace the entire send-off, but the ceremony is also focused inwards and onto the deceased, containing the bereaved within that moment for as long as it lasts. Sadly, even though the bereaved gather at the crematorium to hold the ceremony, there is no way for the family to witness the comital since the cremator oven is located in the basement, the family just leaves the dearly departed behind as they exit the ceremonial hall. Nevertheless, this is my favourite of all Scandinavian crematories, and it is a beautiful piece of architecture, with immaculate detailing, and awarded the Kasper Salin Award on behalf of the Swedish Association of Architects.

Tempio di Cremazione

The Tempio di Cremazione crematorium in Parma, Italy, by Zermani Associati Studio di Architettura is a stunningly beautiful piece of architecture, and a true temple of death as its name implies. Just like the Baumschulenweg crematorium, Tempio di Cremazione is highly evocative and relies on a poetic visual language when creating its carefully staged experience. The floor plan of the crematorium recalls ancient Greek temples and is symmetrical on two axes, primarily consisting of a ceremonial hall and an oven room that is separated by a 'room of light'; a room that marks the transition from corporeal to ethereal. The entire design of the crematorium is based around this idea of a transition from one state to the other, and the 'room of light' ensures a safe travel as the departed moves towards the light and does not slip into the darkness; a symbolism that is well thought through and should reasonably well resonate with almost anyone.

(Beksinski, 1972)

THEORY

Conclusion

Is this typology viable, even preferable? - I believe that the answer to this question is a resounding yes. It does not solve all the problems; many faith communities do not accept cremation. But, with the vast majority being in favour of cremation, a large quantity of those should be able to be accommodated for in columbarium's, alleviating the pressure on other cemeteries in the city, and drastically reducing the amount of land that *Göteborgs Kyrkogårdsförvaltning* wants to lay claim on. *Göteborgs Kyrkogårdsförvaltning* have said that they will need 30 hectares of new burial space within the next 20 years, and that those plots need to be at least 10 hectares each and easily accessible (K. Evenseth, personal communication, January 3, 2022). Unfortunately, I did not reach my original goal of 40,000 graves. I only managed to procure 25,000 graves. But I believe that this could have been solved had I only managed to allocate more time towards solving the problem. I'm sure I would have managed if I had looked towards the possibility of placing freestanding structures, like shelves or mausolea's, in the memoryscape. Alas, my time was limited, and the undertaking was massive. Non the less, if I compare what I actually managed to achieve to other cemeteries in Gothenburg, like Västra kyrkogården or Östra kykogården, my projects managed to allocate almost 7 times as many graves per square meter, and I did so on land that would never even have been considered had I stuck to the classical model. Also, I do not think that the arrangement we have today is beneficial; outsourcing a very important societal function onto a shrinking faith community that soon, most likely, will garner more revenue from their role as burial authority than from their actual work is a mistake in my opinion. Both because they obviously are settling in a much more marginalized position in our society, but also because we mistreat other faith communities by playing favourites.

What is an appropriate atmosphere for a secular building, that supports mourning and remembrance? - The answer to this question can never be anything other than subjective. But I do think that we can at least give an educated answer if we look at the important position the ceremony holds in the grief-process. As architects we cannot influence the course of the funeral directly, but we can study the room in which it unfolds and give it its best point of departure. Peter Zumthor (2006) propose that atmosphere is perceived through our emotional sensibility, and it happens instantaneous when we experience space much like the first impression of a person. Studies show that the act of collective mourning allows the bereaved to better cope with the sorrow through an intensification of emotions. The grief builds civic bonds within the grief-community that aid the bereaved in their personal loss and creates an expectation of civic participation, further fuelling the grief process and facilitating a fulfilling experience (Wasserman, 1998). But for healthy grief to manifest, it is essential that it does not fester in the minds of the bereaved, but rather is something they can process when they feel the need or leave behind when life must go on. I believe architecture can make all the difference here; from traveling to a place to how we experience the architecture, it all becomes part of the ambience and has a lot of influence on our experience of the send-off. In a sense, funerals can be understood as stages where a performance, aimed at creating emotional responses and evoking sensations and feelings in relation to the ritual that is unfolding, is taking place (Knopke, 2019). Therefore we should look at funeral architecture as carefully staged experiences aimed at transporting the bereaved into 'another world'. It should create and atmosphere that is tranquil, sombre, and serene. It should sensitise but not create friction with the experience.

What could/should a secular building for the dead look like? - Just like the previous question, this one is impossible to answer objectively. But, I believe that through previous experiences, we have a preconceived notion of what this type of settings entails, and stepping away from that format will cause friction between our experiences of the architecture and the situation, leading me to conclude that the trend of almost factorylike aesthetics is probably not the way forward. My research into funeral architecture showed me that modernism often struggles when trying to grasp the subject of death; Heathcote (1999) argues that modernism might work for the architecture of the living, but when it comes to the architecture of the dead, we often find solace in the familiar embodiment of tradition and revert back to a more conservative aesthetic language. One of the reasons why the *Woodland Crematorium* is so highly regarded is because it is upheld by architects on both sides of the modernist movement; both as an example of modern architecture on a human scale, as well as a meaningful utilization of the familiar classical archetypes without reverting to an overtly classical language (Curl, 2002). Many of the greatest works of funerary architecture rely on that return to the archetypal form. I imagine this is because it is comforting when the design stands firmly rooted in history; it suggests a durability and permanence that spans well beyond our own lifetime. I wanted my design to be recognisably classic in its proportions and design, but still interpret as a contemporary piece of architecture, using symmetry and geometrical formality to instil a sense of repose and dignity. It should be striped of most ornamentation, but not to such an extent that it reads as minimalistic. It was important that the bereaved could relate to the building and find the rooms appealing and dignified. It was a balancing act between being too sterile and too baroque.

What functions should a secular building for the dead accommodate? - When studying funeral architecture, one thing becomes abundantly clear; in all cultures and throughout history, architecture has been an important way to canalize and formalise loss, as well as a means to preserve the memory and in a sense immortalize the ones who went before us (Curl, 2002). Funerals are generally thought of as unrepeatable events and the only ritual that has survived in the modern age, it is a significant event that families invest a lot of time and effort into to 'get it right' (Holloway et al, 2013), regardless if they are religious or not. Many view the funeral as the last act of reverence towards the deceased, but it is also used as a catalyst within the grief process, where the bereaved feel acknowledged and become enveloped in the comfort of the grief-community (Helgesson Kjellin et al, 2021). Valentijn et al (2018) explains that it heals us and helps us move forward when we are able to associate the deceased with a physical, spatial place, and maintain a stable connection with the deceased. Memorials lets us stabilize and fixate that memory and alleviate the finality that comes with losing someone by perpetuating the memory of that individual (Wasserman, 1998). When it comes to crematoriums, I believe that it has been a dreadful mistake to separate the ceremony and the cremation by holding them at different venues, which is all too often the case amongst Scandinavian crematoriums. Scandinavia, and Sweden in particular, has distinguished herself in the design of beautiful woodland cemeteries, and stunning and modern crematorium architecture. I now believe that it is time to stop viewing our crematoria's as just functional disposal facilities, and instead look backwards while moving forward, towards crematoria designs that encompasses and answers to the death of a loved one in its entirety.

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