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Enhancing Sensory Environments of Crematoria

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ENHANCING SENSORY ENVIRONMENTS OF CREMATORIA
- THROUGH CONNECTIONS TO NATURE -

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How can technology today enhance or amplify the social interactions of people in crematoria through the simulation of nature?

Crematoria typically, are religious and neutral spaces appropriate to those who want to participate. One of the most significant aspects of crematoria is location. Most crematorium complexes today are located next to either a noisy motorway or in an industrial park. The reasoning behind this is usually to make sure it is not open to the public for viewing unless they want to be a part of it. Usually the crematoria end up in an open landscape, but have walls that would screen this in order to maintain some kind of privacy. Another important aspect of the location of crematoria is that it needs to be by a water body - where part of the ritual involves dispersing the remains in the water.

Why situate these crematoria in remote locations? The crematoria is there to be experienced by those who want to be a part of the process – in order for this to happen the crematoria should be made accessible. By locating the crematoria in a location which can be easily available to anyone the opportunities to have a new or different experience open up.

In order to make this experience celebratory in honor of those who have deceased my proposal is to bring the landscape into the crematoria rather than placing the crematoria in remote locations. Similar to crematoria designed in the past – the simulation of nature being a part of the architecture will play a major role in the project. This proposal involves integrating the ideas and processes of an active architecture (one that engages the occupant through sensory technologies) with the ideologies and theories of a passive architecture (one that uses typical means of achieving the simulation of nature in the space).

By unifying the advancement of sensory technologies with a passive architecture the location and experience of crematoria can be improved immediately - the space automatically evolves from being a space that limits the amount of time you can spend there versus one that can made available for an extended period of time.
Cremations date to at least 20,000 years ago in the archaeological record with the Mungo Lady, the remains of a partly cremated body found at Mungo Lake, Australia. Throughout history there have been alternative death rituals which emphasize a specific method of disposing of the deceased - burial, cremation, and exposure.

It is evident in the Middle Eastern and European archaeological records that burials and cremations have taken place in the Neolithic period. Each individual culture had its own preferences and restrictions.

For example in ancient Egypt, a complex transformation of soul theology, which forbids cremation, and this custom was adopted widely among many other Semitic peoples (cultures that speak Arabic or Hebrew).

In the case of the Babylonians, the dead were embalmed. Early Persians practiced cremation, but this eventually was prohibited during the Zoroastrian Period.

Phoenicians practiced both cremation and burial. From the Osipolitic civilization in 3000 BC until the Silla/Myanmar era in 1100–1900 BC. Greeks practiced burial, while cremation began around the 12th century BC. Romans, cremation was considered the more archaic rite, while the most honored citizens were most typically cremated—especially upper classes and members of imperial families. Christianity frowned upon cremation, both influenced by the tenets of Judaism, and in an attempt to abstain from Greek/Roman pagan rituals.

Christian conversion among the AngloSaxons or Early English during the seventh century, when inhumation of the corpse became general.

In Europe, there are traces of cremation dating to the Early Bronze Age (ca. 2020 BC) in the Pannonian Plain and along the middle Danube. The custom becomes dominant throughout Bronze Age Europe with the urn field culture (from ca. 1300 BC). In the Iron Age, cremation becomes again more common, but cremation persisted in the Villanovan culture and elsewhere. Homer’s account of Patroclus’ burial describes cremation with subsequent burial in a tumulus similar to Urnfield burial, generally regarded as the earliest described practice of cremation. It is most likely an anachronism, as during Mycenaean times burial was generally preferred, and cremation may have been reserved for common use in cremation in the period in which the Iliad was written. Critical of the custom of cremation, Homer describes in the Iliad the corpse of Patroclus left on the pyre for days, then burned. The ashes were then placed in a clay urn and buried, and this practice became common among the Greeks.

Cremation and inhumation had been practiced depending on the era, and area. Roman cremation and inhumation generally only associated with military honors.

Christianity frowned upon cremation, and this custom was adopted widely among many other Semitic peoples (cultures that speak Arabic or Hebrew).

The practice of cremation had practically disappeared by the 5th century, from Europe. In early Roman Britain, cremation was typical however, it was diminished by the 4th century. Ritual cremation and inhumation during the migration era, when sacrificial animals were sometimes included with the human bodies on the pyre, and the deceased were dressed in costume and with ornaments for the burning. This was also very widespread among the Germanic peoples of the northern continental lands from which the AngloSaxon migrants are supposed to have been derived, during the same period. These ashes were usually deposited in a vessel of clay or bronze in an urn or cemetery.

The custom again died out with the Christian conversion among the AngloSaxons or Early English during the seventh century, when inhumation of the corpse became general.

In the Middle Ages, throughout parts of Europe, cremation was forbidden by law and was even punishable by death. Cremation was sometimes used by authorities as punishment for heretics, and this did not only include burning at the stake. For example, the bodies of John Wycliff were burned after his death and cremation, with the ashes thrown in a river, as a specific part of his legal process intended to deny their use as a location for any sort of memorial. In Japan, however, erection of a memorial building for many executed war criminals, who were also cremated, was allowed for their remains.

The first crematoria in Europe were built in 1878 in Woking, England and Gotha, Germany. The first cremation in Britain took place on 26 March 1886 at Woking. Cremation was declared as legal in England and Wales when Dr. William Price was prosecuted for cremating his wife's body. The practice was permitted after the passing of the Cremation Act of 1902 (the Act did not extend to Ireland), which imposed procedural requirements before a cremation could occur and restricted the practice to authorized places. Crematorium Stuttgart 1906 Ruppmann cremation system Some of the various Protestant churches came to accept cremation, sometimes used by authorities as part of punishment for atheists, and this did not only include burning at the stake. For example, the ashes of John Wycliff were thrown into a river, explicitly as a posthumous punishment for his denial of the Roman Catholic teachings. Mass cremations were often performed out of necessity, when there was a fear of contagious disease, which was typical after major battles. Reburial cremation continued into modern times. For example, after World War II, the bodies of the 12 men convicted of crimes against humanity at the Nuremberg Trials were cremated and their ashes disposed of at a sacred location as a specific part of a legal process intended to deny their use as a location for any sort of memorial. In Japan, however, cremation is permitted for the cremation of the dead and is allowed for their remains.

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Cremation remained common, but not universal, in both Ancient Greece and Ancient Rome. According to Cicero, in Rome, inhumation was considered the more archaic rite, while the most honored citizens were most typically cremated—especially upper classes and members of imperial families. Christianity frowned upon cremation, both influenced by the tenets of Judaism, and in an attempt to abstain from Greek/Roman pagan rituals.

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3 \ CULTURES
Traditionally, the body is washed by family members and close friends. Many Hindus believe that death and life are connected, and thus, when a person dies, the body should be washed in the same way as if they were alive. During this time, the family of the deceased will stay at home and receive visitors, though mourning rituals may differ depending on the community. A photograph of the deceased may be prominently displayed, and a garland of flowers may be placed on the photograph. Throughout the mourning period, the family will observe various rituals that help the deceased transition to the next phase of their existence.

Historically, Hindu cremations take place on the Ganges River in India. The family builds a pyre and places the body on the pyre. The karta will circle the body three times, walking counter-clockwise so that the body stays on his left, and sprinkling holy water on the pyre. Then the karta will set the pyre on fire and those gathered will stay until the body is entirely burned. For Hindus living outside of India, there are companies that will arrange for the shipment of the body to India and hold a traditional cremation with a proxy karta.

In the United States, only crematories may cremate bodies. However, most crematories will allow for ceremonies before the cremation and will allow for services to be present at the cremation itself. This is in line with the Hindu tradition of paying homage to the deceased before they are cremated. The cremation ceremony is the beginning of the mourning period, which lasts for 13 days. During this time, the family of the deceased will stay at home and receive visitors, though mourning rituals may differ depending on the community. A photograph of the deceased may be prominently displayed, and a garland of flowers may be placed on the photograph. Throughout the mourning period, the family may choose to observe various rituals to assist the soul of the deceased in their transition to the next phase of existence.

One year after the death, the family will observe a memorial event called “sraddha,” which pays homage to the deceased. The karta will invite Brahmins, members of the highest caste, to the home and provide them with an elaborate meal, treating them as he would his own parents.

In Hinduism, the soul is believed to be immortal and is said to be immortal. The goal for many Hindus is to become free from desire, thereby escaping samsara and attaining moksha, the transcendent state of salvation. Once moksha is attained, the soul will be absorbed into Brahman, the divine force and ultimate reality.

Generally, Hindus believe that life and death are part of the concept of samsara - rebirth. The ultimate goal for many Hindus is to become free from desire, thereby escaping samsara and attaining moksha, the transcendent state of salvation. Once moksha is attained, the soul will be absorbed into Brahman, the divine force and ultimate reality.

When a Hindu is approaching death - a priest and the family gather with the dying person and chant mantras or play recordings of mantras being chanted. When death seems imminent, the body should be placed in the dying person's mouth if this is not possible before death, then these actions should take place immediately after the death.

As soon as death occurs, the family will gather to offer the body to the soul. The body should be left to face south, and the head should be placed in the north. The body should be placed on a grass mat on the floor. A small amount of water from the Ganges River should be placed in the dying person's mouth. If this is not possible before death, then these actions should take place immediately after the death.

Preparations for the funeral begin immediately. The funeral should be as simple as possible - typically, no presents or donations for the funeral. The body should remain at home for 48 hours after death.

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In the United States, only crematories may cremate bodies. However, most crematories will allow for ceremonies before the cremation and will allow for services to be present at the cremation itself. Thus, most of the rituals may still be observed. The body should be brought into the crematorium first, ideally with the feet facing south. Those gathered may pray, and then the karta will perform the ritual of circling the body. At this point, the body is ready for cremation, and should be placed into the incinerator feet-first. When the body has been fully cremated, those gathered will return home.

Upon returning home, all family members will bathe and change into fresh clothes. Then the family will gather for a meal. A priest may visit the family at home and purify the house with incense.

The day after the cremation, the karta will return to the crematory and collect the ashes. Traditionally, the ashes should be immersed in the Ganges River, though more and more other rivers are becoming acceptable substitutes. For Hindus living outside of India, there are companies that will arrange for the shipment of the cremated remains to India and will submerge the ashes in the Ganges.

The family of the deceased will observe a memorial event called “sraddha,” which pays homage to the deceased. The karta will invite Brahmins, members of the highest caste, to the home and provide them with an elaborate meal, treating them as he would his own parents.
In Switzerland, when one dies, they are cremated instead of burying them. Switzerland has one of the highest cremation rates in the world, reporting a cremation rate of 90.75% in 2008 (compared to the USA at ~42%). Cremated remains are usually put in smaller sizes and therefore can be shared amongst the surviving relatives.

In a Swiss cremation, the coffin is placed on a tray in the crematorium. The family witnesses the body being slid into the cremation chamber. Cremation times vary depending on the size of the body. The family leaves and returns once the cremation is complete. At the appropriate time, they return go back and pick the bones out of the ashes and put them into a urn using large chopsticks/metal tools (sometimes two members of the family move a bone at the same time). This is the only time in Japan when it is proper to have two people hold the same item at the same time with chopsticks.

In 20% of cremation cases — ashes are scattered in the open — this is no longer a problem for the environment because these days, the ashes are very fine.

"Society evolves notably by its migrants," notes Julie Montandon, a religious sociologist from the intercantonal Centre for Information on Beliefs in Geneva. And it is the movement of migrants which ensures different beliefs in the community are in constant evolution and new funeral rituals regularly appear.

Previously banned religious rites in Switzerland have now received authorization:
- Hindus are now allowed to throw ashes into the River Reuss
- Cities like Bern & Zurich also allow this

In Japan, when one dies, they are cremated instead of burying them. Japan has one of the highest cremation rates in the world, reporting a cremation rate of 99.85% in 2008 (compared to the USA at ~40%). Cremated remains usually end up in smaller sizes and therefore can be shared amongst the surviving relatives.

In a Japanese cremation, the coffin is placed on a tray in the crematorium. The family witnesses the body being slid into the cremation chamber. A chamber or crypt underneath for the ashes. The body is placed in the crematorium, usually the family leaves and returns once the cremation is complete. At the appropriate time, they go back and pick the bones out of the ashes and put them into an urn using large chopsticks/metal tools (sometimes two members of the family move a bone at the same time).

At any other time if two people want to hold anything with chopsticks simultaneously, it will remind people of the funeral of a close relative causing everyone pain. To ensure comfort for the deceased, the family leaves and returns once the cremation is complete. At the appropriate time, the relatives go back and pick the bones out of the ashes and put them into an urn using large chopsticks/metal tools. Sometimes the ashes are divided between many urns; some ashes may go to a family grave, a temple or a company grave. Many companies have their own graves in the largest graveyard in Japan, ZOJO-NOIN, typically for former employees and their relatives. Some company features feature grave stones that are related to the company. The Coffee Company, UCC, has a grave stone in the shape of a coffee cup.

A typical Japanese grave is usually a family grave consisting of a stone monument with a place for flowers, a place for incense, water in front of the monument, and a chamber or crypt underneath for the ashes. The family leaves and returns once the cremation is complete. At the appropriate time, the relatives go back and pick the bones out of the ashes and put them into an urn using large chopsticks/metal tools (sometimes two members of the family move a bone at the same time).

The names of the family members are sometimes carved all at once on one side of the topmost stone, and the names of those still living are colored red. The red is then removed when that person dies. The reason for this is largely economical with it being cheaper to have the names all carved on at the same time, however this practice is less frequent these days.
4 \ PRECEDENTS
-LOCATIONS-
The image illustrates the locations of:
- the crematoria locations (worldwide)
- passive precedents
- active precedents
- cultural research locations
- current sites that are being researched for potential locations of the crematorium.

The precedents have been chosen from a variety of different locations on the map in order to discover different backgrounds and experiences that take place in those areas.
4 \ PRECEDENTS
- LOCATIONS, CULTURAL RESEARCH SITES, SITE RESEARCH -
The image illustrates the locations of:
- the crematoria locations (worldwide)
- passive precedents
- active precedents
- cultural research locations
- current sites that are being researched for potential locations of the crematorium.

Through this map, it is clear that there are clusters in certain continents of where the crematoria are located.

Specifically, North America and Asia have the largest number of crematoria.

The precedent studied throughout this process have been picked from various different countries in order to get a wide range of knowledge of rituals, customs, and backgrounds on crematoria.
The San Cataldo Cemetery located in Modena, Italy is different to most of the crematoria I have been looking at in the research projects. The simulation of nature is much lower than that of the others however, the San Cataldo cemetery’s intention was to create this kind of atmosphere. Although there is some simulation of nature it is limited which was an intention of the Architect. The simulation of nature is visible in the San Cataldo cemetery however; the analysis shows that this simulation is limited in comparison to other crematoria.

- San Cataldo is simulating nature (water, light, centralized space) through NON-REPRESENTATIONAL methods therefore being a PHENOMENOLOGICAL simulation of nature.
- Design to be an ossuary (a chest/building/well) which will serve as the final resting place of the skeletal remains.
- Competition project entered as “The Blue of the sky” - represented a mockingly distant feature (metaphorical).

Simulation of Nature: PHENOMENOLOGICAL
Created through a sense of emptiness - and feeling of being alone - emphasis of the departed being gone.
Within each of the spaces of the San Cataldo cemetery the aim was to create a feeling of emptiness and loss. As each image shows this sensation is created by the very plain, large, monumental building in a wide open space. The idea behind this project was mocking the “distant future” which is why Rossi’s competition submission was called “the Illus of the Sky” - something that is impossible when one has deceased.
In the Krematorium Baumschulenweg the simulation of nature is evident especially through the use of materiality in order to enhance light and also through the essence of water. The centralized space and the observation spaces are all also contributing to the overall simulation of nature. Through the comparison of the Krematorium Baumschulenweg and the Dendera Temple in Egypt you can a lot of similarities in the overall layout of the spaces.

- Baumschulenweg Krematorium is literally simulating nature (water, light, centralized space) this is therefore REPRESENTATIONAL + LITERAL. Through the visual aspect it looks like Baumschulenweg is addressing the life-death relationship as a means to ease visitors through the process through the REPRESENTATIONAL simulation of nature and it could be argued that this is therefore PHENOMENOLOGICAL (this is being achieved through the deep spiritual experience - enhanced by the quality of light/centralized space/water etc. It is also considered a MULTI-CULTURAL crematorium.

Simulation of Nature / REPRESENTATIONAL, simulating nature through a "forest like" layout of the central atrium space.
The similarities in the spatial organization between the Dendera Temple in Egypt and the Krematorium Baumschulenweg are obvious in the images shown below and to the right - the centralized water body is placed in the large atrium of the Krematorium Baumschulenweg and comparably there is a centralized atrium in the Dendera Temple.
Both the Krematorium Baumschulenweg and the Dendera Temple have large apertures and crevices to let natural light into the space - this is one of the major design criteria that simulate nature in these religious spaces.
Simulation of Nature: LITERAL
Open air space + Dynamic Quality of Light (courtyard space)
Simulation of Nature: LITERAL
Open air space + Dynamic Quality of Light
(courtyard space)
All the "services" for are located in the basement level of the Krematorium Baumschulenweg. These services include storage space, and spaces for where the cremation actually takes place as well as the preparation for the body in order for it to be cremated. Typically, this type of space would not be open to the public but maybe accessible for the family for those who choose to be a part of the process.
Although the crematoria in Lithuania is unlike the monumental crematoria we see in other countries the principles and elements which were taken into consideration during the design process remain similar. Some of these are the relationship to nature, the easing of people in, the dynamic quality of light. Some of these qualities however, are not applied (again) here such as the centralized gathering space. Once again this is not a requirement of crematoria. The crematorium in Lithuania is a small intimate space unlike the other monumental crematoria we have seen however, the simulation of nature is enhanced by its location and the influence of Japanese court-yards.

-Crematorium Kedainiai is literally simulating nature (water, light, centralized space) this is therefore REPRESENTATIONAL + LITERAL + CULTURAL but is also simultaneously representing a PHENOMENOLOGICAL simulation of nature (this is being achieved through the deep spiritual experience - enhanced by the quality of light, centralized space, water etc).
Simulation of Nature: REPRESENTATIONAL + PHENOMENOLOGICAL - Open air space + Dynamic Quality of Light (courtyard space)

Simulation of Nature: LITERAL - Open air space + Dynamic Quality of Light (courtyard space)
Each crematorium is organized in a different way to accommodate the local culture, city and context it is located within. Most crematoria are split into spaces for specific ritual that takes place - typically there are spaces for relatives, spaces for staff and spaces for cremations. The emphasis in the vestfold crematorium is higher in the simulation of nature rather than the centralized space as that is not one of its prime requirements. Through the simulation of nature there is the development of other criteria which become important in the crematoria such as the observation space, easing people in and the dynamic quality of light. The Vestfold Crematorium enhances the simulation of nature through materiality and the cultural landscape that it is located within.

VESTFOLD Crematorium - Pushak, Sandefjord, Norway, 2010

Simulation of Nature: LITERAL Dynamic quality of light
Simulation of Nature: REPRESENTATIONAL
Dynamic quality of light
LITERAL & Water body
Simulation of Nature: PHENOMENOLOGICAL
atmospheric quality of daylight

- Vestfold Crematorium again is a REPRESENTATIONAL + CULTURAL simulation where the PHENOMENOLOGICAL is achieved through this simulation.
This particular crematorium is located in Tamil Nadu, India where the entirety of the program is located outdoors - most of the simulation of nature us achieved merely through the literal fact that the site is located outdoors (within nature). However, despite being located outdoors the crematorium lacks many of the other design criteria - there is not one specific centralized space, the essence of water is not on the site itself therefore it is most likely located elsewhere. Although the centralized space is not a requirement of cultures and religions it would be an important factor in terms of achieving the perfect simulation of nature through a balanced natural environment. The crematorium in India is a large open, almost monumental space. This is typical of most cremation sites in India - where the majority of rituals and ceremonies take place in the privacy of ones home. However, the actual cremation process is done at a cremation ground.

- The Crematorium charity trust is a completed outdoor space with designated areas for gathering/cremation (all other rituals are carried out in other locations)
- LITERAL + CULTURAL
- This crematorium once again is a literal simulation of nature (natural light/aperatures/water feature)
- PHENOMENOLOGICAL
Typically, religious facilities (cremation grounds) in India are public, outdoor events that take place. It is known for the family to have individual ceremonies for specific rituals at home or at a temple.
6 \ PRECEDENTS - ACTIVE
The Hylozoic series is an example of simulating nature through sensory technologies in order to amplify this simulation. The simulation is one that if integrated into the crematoria. The integration can amplify the entire design criteria. Not only will the crematoria have the three primary spaces but also the sensory technology which will enhance the simulation of nature and together these elements can completely change the experience one has in crematoria along with elongate the amount of time one is allowed to spend there (typically a 6-8 hour affair).

- All sensory/responsive architecture is primarily REPRESENTATIONAL, however, much like the passive precedents - it can use the REPRESENTATIONAL factor in order to achieve the PHENOMENOLOGICAL.
- Most of the REPRESENTATIONAL aspects of design are visual - some of these are audible [sound of water, sound of movement].

Simulation of Nature: [REPRESENTATIONAL] dynamic quality of light

Simulation of Nature: [PHENOMENOLOGICAL] creates a sense of phenomena/magical environment for occupants
- The Convective Museum in Poland - uses a high temperature of 22 degrees Celsius and a low of 16 degrees Celsius derived from the requirements of a museum program. The two poles are placed in a diametrically opposed fashion so that the higher pole is cold and the lower pole is warm. Therefore they create an atmospheric quality within the museum through a multitude of temperatures.

- The Convective Museum in Poland - purely REPRESENTATIONAL + LITERAL in that it uses two temperatures to create a specific atmospheric quality which then generates a dynamic quality of light.

Simulation of Nature: REPRESENTATIONAL atmospheric qualities are created through temperature change.

Simulation of Nature: LITERAL - the literal quality is generated through the dynamic quality of light.
The Stratus Project, although just a research project is also one that is potentially quite high in the simulation of nature. Being a type of responsive architecture it could be intensified when integrated with a passive architecture. These active (responsive) architecture projects can be superimposed and integrated into passive architecture projects in order to achieve the most effective experience one can have in the crematoria. The simulation of nature is almost as inherent in the sensory precedents as it is in passive projects which shows how much more these simulations can be made visible in responsive architecture such as the stratus project. One of the aims of this project aside from creating a specific atmospheric quality was to develop a conversation between the occupants and the installation - this was to be achieved through temperature, materiality and a continuous informational exchange.

The Stratus Project is REPRESENTATIONAL, but in order to achieve the PHENOMENOLOGICAL, it borrows from the primary aspect of this type of architecture - the primary aspect being the dynamic quality of light. Another simulation of nature achieved in the Stratus Project is the LITERAL. This simulation of nature is achieved through the thermal qualities that are being played out in the installation.
The Prairie House is a project that uses a tensegrity system in addition to a new cladding system in order to improve the environmental performative levels through a new aesthetic. The goal is to reduce the impact of heat on the hot days and reduce the amount of heat required on cold days.

Simulation of Nature: LITERAL Created through the dynamic quality of light in the entire site. The reflection of the Sun does seem to achieve some kind of PHENOMENOLOGICAL qualities as well.

The Prairie house in Chicago, IL (by ORAMBRA - The Office for Robotic Architectural Media & The Bureau for Responsive Architecture) again uses REPRESENTATIONAL + LITERAL techniques in order to create the phenomenal lighting effect - this is dependent of the natural daylight that hits these surfaces.
NEW YORK SAND AND STONE, BROOKLYN NAVY YARD, PIER J, BROOKLYN, NY

The map to the left indicates one of the two potential sites I am exploring. The first choice of locations is New York, NY because it has some potential in terms of ornamentation.

Currently, the majority of crematoria in New York available to a wide range of cultures have most of the main ceremonies and rituals in house whereas the actual cremation process would take place elsewhere, or vice versa. The location of the funeral homes that carry out these processes are typically located within the city block in a dense neighborhood. Although, this would mean that the funeral homes are accessible - this does not meet the requirements of all the different cultures in New York City.

Being one of the most diverse cities in the world - these facilities should be made in order to host all cremations from different cultures in the world. The funeral home for example does not have a water body - most cultures disperse ashes after the cremation in water.

The location in the Brooklyn Navy Yards - has an immediate relationship to nature as it is located adjacent to a water body. This site is also easily accessible by the subway and therefore makes it out of the city limits (respecting other religions and the codes that need to be applied by).
The map to the left indicates one of the two potential sites I am exploring. The second choice of locations is Toronto, Ontario because it has some potential in terms of crematoria.

Currently, the most culturally diverse city in the world is Toronto. Toronto has several funeral homes that carry out the cremation process but once again the majority of crematoria in Toronto regardless of being available to a wide range of cultures have most of the main ceremonies and rituals in house whereas the actual cremation process would take place elsewhere, or vice versa.

As the most culturally diverse city in the world - these facilities should be made in order to host all cremations from all cultures in the world. The funeral home for example does not have a water body - most cultures disperse ashes after the cremation in water.

The location in the Birch Cliff Quarry, in Toronto, Ontario - has an immediate connection to nature as it is located adjacent to a water body. The site was a former quarry site and may be potentially abandoned therefore making it a large open space adjacent to a water body and consequently being a good site for the new crematorium.
Toronto, with a population of 2,793,500 people (5.5 million in the GTA - Greater Toronto Area) is heralded as one of the most multicultural cities in the world and is ranked as the safest large metropolitan area in North America by Places Rated Almanac. Over 140 languages and dialects are spoken here, and just over 30 per cent of Toronto residents speak a language other than English or French at home.

- In 2006, the City of Toronto was home to 8 percent of Canada's population, 30 percent of all recent immigrants and 20 percent of all immigrants.
- Between 2001 and 2006, Canada received 1,109,980 international immigrants. The City of Toronto welcomed about one quarter of all immigrants (267,855) to Canada during this period of about 55,000 annually.
- Half of Toronto's population (1,237,720) was born outside of Canada, up from 48 percent in 1996.
- In 2006, half of all immigrants to the City of Toronto have lived in Canada for less than 15 years.
- In 2006, more than half of all immigrants living in the City were age 25 and over; 7 percent were pre-school age 5 and under; 16 percent were school age 6 to 14; and 22 percent were youth 15 to 24.
- In 2006 the City of Toronto had 45 percent of the GTA's population in 2006, and was home to:
  - The top five visible minority groups in Toronto were:
    - South Asian at 298,372 or 12.0 percent of our population.
    - Chinese at 283,075 or 11.4 percent.
    - Black at 208,555 or 8.4 percent.
    - Filipino at 102,555 or 4.1 percent.
    - Latin American at 64,860 or 2.6 percent.

New York is defined by its diverse ethnicity and is well known as a cultural metropolis. It is the largest city in the United States with a population of 8.4 million, this is defined by a long history of international immigration.

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    - Latin American at 64,860 or 2.6 percent.
The diagram shows that if the simulation of nature is to be at its highest, there would have to be a combination of 6 aspects to achieve this:

- **Representational aspect** - one that is illustrating nature through other means
- **Phenomenological aspect** - creating an atmosphere through metaphorical imagery
- **Cultural aspect** - of or relating to several/specific cultural practices
- **Literal aspect** - place in a natural environment
- **Passive architecture** - one that does not comprise of sensory technologies to simulate nature in artificial ways
- **Active architecture** - one that does comprise of sensory technologies to simulate nature in artificial ways
NEW YORK
- Bodies are buried in established cemeteries
- Ashes cannot be scattered anywhere - permission is required or it has to be a private property of the family
- Cremation + rituals take place in two different spaces (rituals are typically outsourced)
- Some cemeteries or funeral homes provide gardens for scattering ashes
- Cremation ashes are harmless, there is no public health risk involved in scattering ashes. Use common sense and refrain from scattering ashes in places where they would be obvious to others
- You may scatter ashes in your own garden if you choose to do so

- The federal Clean Water Act requires that cremated remains be scattered at least three nautical miles from land
- If the container will not easily decompose, you must dispose of it separately
- The EPA does not permit scattering at beaches or in wading pools by the sea

SWITZERLAND
- Ashes can be scattered anywhere
- Ashes can also be scattered in the River Reuss (as of 2012)
- Scattering ashes in the open, or burying the urn in the soil or even compressing the ashes into a diamond - is typical of Swiss funerals
- Scattered ashes are from the family request and not allowed even in countries that allow a large amount of freedom to funeral and loved ones following a death and also have the highest cremation rates of 80%

- In 20% of cremation cases - ashes are scattered in the open - this is no longer a problem for the environment because these days - the ashes are very fine.
- Previously banned religious rites in Switzerland have now received authorization:
- Hindus are now allowed to throw ashes into the River Reuss
- Cities like Bern & Zurich also allow this

- Ashes can be scattered in the River Ganges
- Generally, Hindus believe that life and death are part of the concept of samsara - rebirth
- When a Hindu is approaching death - a priest and the family gather with the dying person and chant mantras or play recordings of mantras being chanted.
- When death seems imminent, the body should, if possible be transferred to a grass mat on the floor.
- When death has occurred those gathered will assist burning the body, as it is seen an engine.
- The funeral should take place as soon as possible.
- The body is washed by family members and close friends.
- For the ritual washing, the deceased's head should be facing southward. A lighted oil lamp as well as a picture of the deceased's favorite deity should be kept by the deceased's head.
- The body may also be washed in purified water. While the body is being washed, those washing should recite mantras. Once the body is sufficiently cleaned, the big toes should be tied together, the hands should be placed palm-to-palm in a position of prayer, and the body should be shrouded in a plain white sheet. If the person who died was a married woman who died before her husband, she should be dressed in red.
- Generally, a brief wake is held before the cremation.

CREMATION RITUAL & LAW COMPARISON: NEW YORK, SWITZERLAND, INDIA, JAPAN

NEW YORK
- The family (all members) must watch the coffin be placed into the furnace
- Once the cremation has taken place the ashes are separated from the bone (a typical ritual after the body has been cremated)
- Ashes are split into several urns (if the family requests) and then distributed throughout the family
- Cremated remains usually and equally in smaller places and therefore can be shared amongst the surviving relatives.
- Gravesites have names engraved prior to people being deceased. Names of those deceased / alive are differentiated by color (white/red)
- At any other time if two people were to hold anything with chopsticks simultaneously it will remind people of the funeral of a close relative causing everyone pain.
- To ensure comfort for the deceased the bones of the feet are placed first and the bones of the head placed last.
- Sometimes the ashes are divided between many urns some ashes may go into a family grave, a temple or a company grave.
- Many companies have their own graves in the largest graveyard in Japan

INDIA
- Ashes are scattered in the River Ganges
- Generally, Hindus believe that life and death are part of the concept of samsara - rebirth
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- Generally, a brief wake is held before the cremation.

JAPAN
- The family (all members) must watch the coffin be placed into the furnace
- (Traditionally) the deceased has taken place the ashes are separated from the bone (a typical ritual after the body has been cremated)
- Ashes are split into several urns (if the family requests) and then distributed throughout the family
- Cremated remains usually and equally in smaller places and therefore can be shared amongst the surviving relatives.
- Gravesites have names engraved prior to people being deceased. Names of those deceased / alive are differentiated by color (white/red)
- At any other time if two people were to hold anything with chopsticks simultaneously it will remind people of the funeral of a close relative causing everyone pain.
- To ensure comfort for the deceased the bones of the feet are placed first and the bones of the head placed last.
- Sometimes the ashes are divided between many urns some ashes may go into a family grave, a temple or a company grave.
- Many companies have their own graves in the largest graveyard in Japan
- Some company businesses feature gravestones that are related to the company the Coffee Company UCC - has a gravestone in the shape of a coffee cup.
- A typical Japanese grave is usually a family grave consisting of a stone monument with a place for flowers, a place for incense, water in front of the monument, and a chamfer or crypt underneath for the ashes. You'll often see sprigs of Japanese star anise in the vases. At the bottom is a sealed chamber for the ashes which are held in ceramic pots. The front of the stone pillar generally states what family the grave belongs to.
- Some cemeteries or funeral homes provide gardens for scattering ashes
- Cremation ashes are harmless, there is no public health risk involved in scattering ashes. Use common sense and refrain from scattering ashes in places where they would be obvious to other.
- The federal Clean Water Act requires that cremated remains be scattered at least three nautical miles from land.
- Ashes can be scattered anywhere
- Ashes can also be scattered in the River Reuss (as of 2012)
- Scattering ashes in the open, or burying the urn in a nest or even compressing the ashes into a diamond is typical of Swiss funerals.
- Switzerland and the Czech Republic are two among European countries that allow a large amount of freedom to families and loved ones following a death and also have the highest cremation rate of 80%.
- In 20% of cremation cases - ashes are scattered in the open - this is no longer a problem for the environment because these days - the ashes are very fine.
- Ashes are scattered in the River Ganges
- When a Hindu is approaching death - a priest and the family gather with the dying person and chant mantras or play recordings of mantras being chanted.
- When death seems imminent, the body should, if possible be transferred to a grass mat on the floor.
- When death has occurred those gathered will avoid touching the body, as it is seen as impure.
- The funeral should take place as soon as possible.
- The body is washed by family members and close friends.
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9 \ DIAGRAMS
- INITIAL EXPLORATION OF DESIGN CRITERIA-
There are three primary spaces that need to be considered in the crematorium. The space for cremation, the space for relatives and gathering, and the space for staff.

My proposal is integrating these spaces and simulating the entire crematorium to nature (green spaces / a water body / daylight).

The diagram above is showing that if we can integrate the three primary spaces in crematoria with sensory technologies, the most effective experience is created for those who visit crematoria. It becomes a lasting and memorable experience.

Through the analysis of crematoria, my understanding is that, some have an emphasis on centralized spaces whereas others don’t consider this as a requirement. The diagrams above show how the three primary spaces in crematoria can be organized in a number of ways depending on the final form of the building.

In addition to the other design criteria explored bringing in the simulation of nature is an important aspect in the proposal. If the crematorium is located within city limits these qualities may need to be emulated that of crematoria that are typically outside of city limits. In order to amplify this simulation of nature, my proposal is to bring the nature in to the building.
Through the integration of these three spaces (cremation areas, gathering and staff areas) in combination with sensory technologies and whether REPRESENTATIONAL, PHENOMENOLOGICAL, CULTURAL, or LITERAL aspects the maximum simulation of nature can be achieved. Through the integration of PASSIVE and ACTIVE architecture this would be even more enhanced and in addition to this - a secondary program of a hotel would compliment the entire space and what it is trying to achieve.

The three required spaces regardless of their orientation should be integrated in order to achieve the maximum simulation of nature. By integrating these three spaces the crematorium will be accessible to all cultures. Certain spaces may be shared by two cultures and therefore they may be integrated in order to accommodate all of both of the cultures associated with that space.

This approach will also avoid unnecessary repetition of spaces.
Usually, cremations and the rituals to follow and planning an entire funeral when one has deceased takes 3-5 days, sometimes longer. In some cultures these rituals include a wake or dinner afterwards whether the family gather and mourn.

In order for this to be a completely accessible crematorium a possible additional program would be a hotel to help this process be easier.

Typically, crematoria are located on the outskirts of a city and therefore members of the family have to travel a long distance to attend this funeral.

Having a hotel as the additional program would be the solution to most families worries about where to stay and whether the wake would have to be organized in a different location.

Although the main program of the project is the sensory crematorium the hotel would be an addition to this as a way to solve this issue.


"Crematorium Consultant - Google Maps." Crematorium Consultant - Google Maps. http://www.google.com/maps/place/Crematorium+Consultant/@40.677642,-74.012734,17z/data=!3m1!4b1!4m2!3m1!1s0x0:0x31f0f3801c9523d1 [accessed May 2, 2014].

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"the strata project (not the strata project)." http://www.nmr.no/research/research.htm [accessed May 2, 2014].