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I would like to dedicate this thesis to my parents, for giving me the opportunity to pursue a post professional degree.
I would like to thank my critics, Professor Imre Halasz, Professor Stanford Anderson, Professor Dimitris Antonakakis, and Professor Mark Jarzombek for their guidance and patience throughout the semester.

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In our changing times many of our necessities have geared us to search for new spaces that can accommodate them. This thesis attempts to devise the use and expansion of a distinguished 18th Century building dominating a small island, Isla del Rey, in the deep sea port, Port de Maó, of Menorca.

The task allows for the exploration of a specific type of intervention, which transforms both the isolated object of the historical building and the landscape of the site into a mutually dependent organization within the island and beyond.

This design process considers the morphology of this extension (rather than addition) as an open system, so eloquently described in H. Wölflin’s Principle of Art History. He proposes a distinction where ‘architecture ceases to be what it was in the Renaissance, an art of articulation and composition of the building […] but yields to an agglomeration of parts without true independence […]’. The decisive point is that the building and site enter into a compulsory relationship, that one cannot be conceived without the other […], the style of an open form everywhere points beyond itself and purposely looks limitless’.

The thesis regards this type of continuity as the focus of its design intent and hopes to give a new meaning emerging from the matrices of the context: expressing growth through a family of forms without the need for mimesis in the selection of architecture elements.

The program which is proposed as part of the exploration, is a Marine Biology Center. The Center’s program includes residential quarters in the historical structure, and the research and reference facilities in the proposed extension. There is also a provision for boat facilities and gallery for public display of the Center’s advancements.
The stone, rolling down the mountain side, can assume quite different motions according to the gradient of the slope, the hardness and softness of the ground, etc. but all these possibilities are subject to one and same law of gravity. So, in human psychology, there are certain developments which can be regarded as subject to natural law in the same ways as physical growth. They can undergo the most manifold variations, they can be totally or partially checked, but, once the rolling has started, the operation of certain laws may be observed throughout.

—Heinrich Wölflin
The thesis intends to explore, through a physical design, an ongoing transformation of a place rich in history and tradition, in order to fulfill one of our modern requirements. The evolution of the design wants to avoid 'demolish and replace' methods or restoration and mimicry as pastiche, which merely reproduces a past. The design objective achieves an approach in which this evolution takes place through the extension of the existing systems, rather than through other methods such as insertion or addition.

In order to initiate the transformation of Isla del Rey, one first needs to understand its physical continuities, qualities and its historic, social and cultural context. The new infrastructure has to grow out of the existing, rather than from an arbitrary invention. The new elements have to act as an ever expandable system, rather than to exist for themselves. As coherent, functioning extensions of the built and natural environment of the island, a full understanding of the existing organism needs to become explicit before the exploration and philosophical elements take shape as a specific intervention— a natural transformation of the place.
This transformation of the Isla del Rey, takes place at may different levels. After understanding the physical and metaphysical context of the site, a new articulation of the interspaces, territories, containments and activities is introduced. This articulation is the product as the system is expanded to accommodate the proposed Center for Marine Biology at Isla del Rey.

As the Isla del Rey enters this process of transformation, a new use is given to the island as a whole. The old quarantine military hospital building, with its heavy masonry construction, continues to serve a similar purpose as its former use, with some modifications. The hospital becomes one of the major influence from where the proposed extensions take many of its inspirations. Soon, a relation between the old and the new emerges at all levels throughout the entire island.

The two built elements, new and old, are considered to be interdependent, thus creating a tension. This tension keeps the whole complex alive, with its ever changing relationships of material, surfaces, uses and spaces. The boundary between existing and proposed, although discernible, becomes blurred at many instances, creating a dynamic continuity throughout. Instead of producing a singular correlation of the built form with the terrain, the relationship between the two becomes an interactive experience. As the thesis progresses this continuity takes on further levels of refinement.
As a vehicle for the exploration of the extension of the system, this thesis has chosen a competition on the *Isla del Rey*, on the Sound of Maó, Menorca, Spain. This design and development competition sponsored by the Adjuntament de Maó and the University of Barcelona, in 1993, called for a positive solution to the degrading state of the *Isla del Rey*. The requirements for the competition were to preserve most of the existing structures on the island, giving them a sound use and extending the possibilities of the island through the inclusion of new structures and activities. It was also recommended that such activities, not only would take advantage of the location, surroundings and inhabitants, but also expose the potentiality of the city of Maó worldwide. The competition was eventually abandoned.

The thesis has used the general philosophy of the competition to pursue its explorations.
Before immersing ourselves in the explorations which concern us for this thesis, one needs to backtrack in order to understand the relevance of the Isla del Rey in relation to the rest of the Mediterranean Sea. The Isla del Rey is located in the Sound of Maó, in the southwestern end of the Menorca. The Island of Menorca, which is one of the components of the Balearic Islands, is centrally located in the northeastern portion of the Mediterranean Sea, between Spain and Italy; and France and Algeirs.
The Sound of Maó is famous among maritimers of all times for its safe waters in times of tempest. It is the largest natural harbor in the eastern Mediterranean. It is one kilometer wide by five long. With a minimum depth of 30 feet, it allows passenger steamers reach the city of Maó, located at the very end. During the British presence in Menorca during the eighteenth century, the town of Villacarlos was established as a military settlement. Several other military structures were built or upgraded because of the advantages of the sound as a strategic location in the Mediterranean.
As mentioned earlier, the city of Maó is located at the very end of the sound. The city is perched on a high cliff which defines the edges of the coastline. It is only at one point at which one can descend to a second strata of the city located at water level. The descent to the lower level is by way of a baroque system of streets and pedestrian ways which have enhanced an already existing natural carving of the cliff. At the lower platform of the city, one can only find structures and spaces which are directly related to the activities of the sea and commerce. On the other hand, above, the city of Maó boasts the same luxuries as any commerce center of its time.
Defense structures

Because of strategic location in the Mediterranean Sea, and natural qualities of the sound, there is a very strong military influence in the area. Early on, in the second century before Christ, the Phoenicians had already set up a post for their military and commercial activities. At the entrance of the sound there are four defense towers controlling the narrow passage into the harbor. Nearby, several fortifications were also built at different times in history to enhance the security in times of war. Throughout the interior of the sound, various structures were built to service the needs of the military. One of these structures is the Military Hospital at Isla del Rey, the site for this thesis.
The site chosen for the exploration of the thesis is an island on the Sound of Maó, known as 'Isla del Rey.' The 'Island of the King,' as its name translates, is located halfway between the end where the city of Maó is located and the mouth of the sound. The 41,167 square meter island can be accessed by water to one of its two wharfs, or jetties: one on the northern side and the other on the southern side.

The island has been the site for many historical accounts. It has been under Spanish rule since 1287, when the Spanish king Alfonso III, conquered Menorca from the Muslims. In preparation for the war after a severe storm, he landed on the island in order to rest his weakened troops before the attack; hence its name, Island of the King.

During the 18th century, when Menorca was momentarily under the British Crown, a military hospital was built for service to the British Navy. Later, in the 19th century, the island was recovered by the Spanish Crown, and lent to the French and United States governments as temporary military bases for their foreign interventions. The United States used the island as a base for the U.S. Navy Seventh Fleet, on patrol in the Mediterranean Sea.

On the island there are also remains of a paleo-Christian basilica dating back to the sixth century. The forms in the mosaics of the church have been linked to the ruins of Carthage of 418 AD.

Source: Ajuntament de Maó, Competition pamphlets.
Quarantine Hospital

Built by the British, and abandoned since 1963, the military hospital structure, designed as a half courtyard, was able to accommodate 140 beds for the sick and another so for the medical personnel. Four water reservoirs in the basements of the buildings stored sufficient water for the hospital's full operation. In spite of having undergone several modifications and alterations, the structure remains in its original form.
The courtyard is surrounded by a series of arches which act as buttresses for the two level building. The rooms on the lower level have preserved their original barrel vault ceilings. One can also find several secondary structures and a lighthouse throughout the island.

Top to bottom:
view of the courtyard;
original ground floor plan.
It was soon realized the necessity to carefully analyze and explore the main structure in the island: the Quarantine Hospital. Built during the British dominion of Menorca, the hospital follows strongly the laws of baroque design. At the same time the construction process is very much rooted in the traditions of Menorca, with its typical thin shell Catalan vaults. As analyzed, the highly geometric design process carefully dictates the existence of each of the building’s elements. A series of squares, circles and what is most interesting, corresponding arcs and parallel diagonals, are inscribed in the design. A very clear proportioning system can be extracted from the hospital's architecture.
Analysis continues

The analysis evolved further through which the hospital building was dissected into its different components. Through this analysis, the several relationships and rhythms of hierarchies of elements were discovered.

Dissecting the hospital into its components.
This second part of the analysis was then transformed into a physical model in which the different elements and rhythms discovered were exposed. The circulation movements were abstracted into planes, from which the relationships of bays and spaces were extruded. The result is a linear model which will have a strong influence in the final production of this thesis.
Discovering an order

The island as a whole is soon to be discarded as being too small. In other words, the analysis and project soon realizes that it must take much of it influences from a larger domain than just the island itself. The whole sound of Maó, with its traditions and history begins to express its importance in the project. The city of Maó and its attitude towards the cliffs it is on, the everpresent defensive structures throughout the sound are not taken as symbols, but rather as the relationship of man made structures towards the natural environment. An everpresent order which has its consequences of the Isla del Rey, slowly emerges as all the components of the environment surface. It is on this discovered order in which this thesis bases much of its foundations and strategies.

*Analysis of the sound of Maó*
New horizons

One of the discovered relationships which belongs to the order mentioned earlier is the interconnection of the Isla del Rey's Quarantine Hospital, and its camposanto on the north coast line. It was at this cemetery where the deceased patients of the hospital found the glory and salvation. Due to the precarious state of the medicine available for the treatment of infectious diseases, passing away was not an uncommon thought. One always died with the belief of transposing to a better life. This horizon of hope and prosperity is where the new programmed activities for today's Isla del Rey are aiming at.
New activities on the island

One of the key elements in the exploration of this thesis is an appropriate program. The activities on Isla del Rey have traditionally been in search for innovations. In 1778, when the hospital was established, the search for innovations was focused towards humankind. The human body, then, was a series of enigmas which slowly were emerging to the realm of knowledge. Exploring the internal organs of the human body was a relatively new science which astonished those who investigated it.

Today, at the verge of the twenty-first century, the human body no longer the enigma it used to be. Our voracious need for searching the unknown have brought us to the underwater world. Our knowledge of the seas of our planet, is only the tip of an iceberg waiting to be explored. Many of the problems humankind faces today may find its solution in the deepness of the Seas. It is a body of knowledge waiting to be deciphered.

As the two government sponsored design competitions suggested, the program for the 'Isla del Rey' is a research facility. Due to its central location on the western part of the Mediterranean sea, and along with the strong fishing traditions of the inhabitants of Menorca, the center will concentrate its activities in marine biology research.

The marine biology research center will also provide living quarters in order to allow for ongoing research. The 'Isla del Rey', because of its unique location will have the possibility of becoming a micro-city. A micro-city that will support housing, research and other facilities, all self contained by the perimeter of the island itself.
Early strategies

The approach this thesis has taken is to extend a discovered system, both physically and conceptually. Using the camposanto of the hospital as a direction for hope and glory of the future, and counterbalancing the axis of the hospital, a plane is set up to become the backbone of the proposed research center. Thus, tension is created between the two structures. As in a euphausiid, a type of marine crustacean, there is a well-defined exterior shell which protects the delicate internal organs.
As one navigates around the island the dichotomy between inside and outside, and, old and new becomes an ever-changing experience. At no two points is the tension created equal to any other.
The plane becomes a datum of where the terrain is recorded on, and serves as the spine through which the circulation and utilities flow. The research labs are then attached to this inhabited wall.

Early sketches of the relationship of the elements to the wall.
Proposed extensions

At different points the wall is fragmented to allow for interaction with other influences and directionalities present in the island. These interactions transform the project into an open system which can be continuously extended. The wall is not seen as a barrier between the built and natural forms, but rather as a form of enhancing the spaces which exist. Through the tension created between the existing hospital and the new proposed research facility, the spaces take a new meaning which in turn, relate back to each other.
Approach

As one approaches the island by boat, the datum wall becomes a bold facade which guards the delicate jewels it contains in the inside. As the approach becomes imminent, the strength of the wall diminishes to correspond with the incoming human figures. The entrance to the complex becomes one of the points at which the wall fragments. At the arrival to the jetty, one is confronted with a fortress like gateway which is carefully incised into the terrain. A gateway that is reminiscent of the past defense history of the sound and the island. This gateway marks the threshold between the outside world and the new Isla del Rey, a domain of research and innovation.
Once one has surpassed the gateway, a series of winding passageways and stairs recalls those encountered on the descent to the harbor from Maó.
At the culmination of the ascent, a series of terraces and outdoor spaces continue the procession throughout the complex. One flows from one space to the next as the built form interacts with the natural terrain, achieving a tranquil continuity. At the end of the sequence of spaces, is the grand terrace from which one can actively absorb the whole complex.
The grand terrace becomes the transition space of interaction. It is the space where many of the sporadic activities of the day converge. As the day progresses, the terrace metamorphoses through the various activities it sponsors. From a solitary space of contemplation and meditation at dawn, a place for active leisure during the day to a space of gathering or spontaneous entertainment at sun down and later. For the scientists and assistants who reside on the island, the grand terrace becomes an escape from their otherwise monastic daily schedule.
Through the extension of the existing system on the island, this thesis is also exploring the space created by the dichotomy between the old structures and the new proposed intervention. The tension created is not only physical, but also philosophical. It is assumed that the hospital is rehabilitated to take a very similar role as it once was built for. Before, it used to house humans before the passed away to a better life, now it houses humans as they learn from the Seas the immense knowledge it has to offer. The learning of this knowledge, on the other hand, takes place in a different setting. Far away from the heavy dark construction of the hospital, the laboratory facilities are inspired in the clarity and sunlight of the seas. They become spaces of air and light, apt to generate the best environment for absorbing the information which is offered. The work setting, therefore aims to the future, separated from any of the banalities of the daily life. Each researcher becomes a monk of his own religion, where he find himself immersed in his own experiment, somewhat oblivious of his surrounding. As he goes from sleep to work and back to sleep he may choose a different itinerary every time, thus creating a personal world of his own. Every night he goes back to his cell to rest and every morning he comes back to his laboratory to restart the machine of knowledge. Through the separation of the two main activities of the day, research and sleep, by a series of decisions, but still remaining in a single complex, the tensions between the existing and the extended are strengthened.
From the grand terrace, one can contemplate the row of research laboratory facilities docked onto the spine of the project. At one end it is connected with the circulation passageways and library building. As the spine reaches the other extreme, it slowly metamorphoses into a vessel interphase, which awaits the oncoming data from the deepness of the seas. The space between the laboratories and the hospital building becomes an extension of the built environment into the natural terrain. Here, humankind is invited to participate with Nature.
Bridging between work and sleep is a passageway which emerges from the terrain and transforms into a building to culminate at an outdoor court at the convergence to the chosen directions of the complex. The natural tendency of the terrain is allowed to flow under the passageway as one crosses from home to the office.
Intersecting directions

Here, one reaches the pinnacle of the project where the intersection of the different alignments of the open system allow one to take several decisions of what the activity of the moment will consist of: the books or the labs. The carefully defined space becomes a secondary place of gathering, especially at midday, when the inhabitants wish to be outdoors but protected from the harsh Balearic sun by the hung canvases.

The library and administration building is conceived as a transitional element between the heavy masonry baroque hospital and the light construction research facilities. At this point, one is also able to experience the strength of the datum wall as it is re-encountered for the first time since the arrival to the island. The wall clearly defines the outermost edge of the domain created by the hospital and its extensions.
Research modules

The research laboratories, key elements of the Marine Biology Center, are located along the spine wall. Each lab is conceived as a shell which is transformed by the specific necessities of the experiment it houses. In this way, the view of the laboratories from the old hospital becomes an active facade in continual metamorphosis as the experiments progress and renew.
Each shell has a service ramp accessed from the spine, on the ground floor and, a visitors gallery on the second level. At the third level of the triple height space, overhangs the office of the scientist in charge of the experiment. To the side of each individual laboratory shell is a service module which provides the space with the required hookup of utilities. This strategy permits to procure a very flexible research space which adapts to the specific needs of the experiment in progress. Light, space and air can all be regulated to fulfill the required needs. The arrangement also offers the possibility to unite temporarily several laboratory units to create a larger research space.

The general needs of the facility as a whole are served by the laboratory support module at the beginning of the research row. In this module are the necessary services, such as the growing algae room, the electron microscope room and assistant offices.
Access to Isla del Rey is not restricted to the research personnel. In fact, the circulation throughout the facility is conceived so that visitors can pursue their own interests without disturbing the Island inhabitants. As a visitor, one can contemplate the temporary displays of the Center's findings, use the library for possible inquiries or attend a seminar at the lecture hall. One can also amble throughout the island and admire the remains of a paleo-Christian basilica dating back to the sixth century.
1. residences
2. lecture hall
3. exhibitions, library, administration
4. laboratory support
5. Laboratory
6. vessel docking area
7. paleo-Christian basilica remains
Closing comments

The Marine Biology Center at Isla del Rey, has been the vehicle for exploring the extension of a found system. Through extension, rather than addition, the thesis has aspired not only to create a continuity between the existing forms, both built and natural, but also in the conceptual realm; where a dichotomy between past and present and, sleep and work produce a dynamic interaction of being. The exploration has not limited itself to the circumference of the island, but rather has expanded its bounds to encompass the metaphysical elements of the sound of Maó. Such exploration has proposed an intervention at Isla del Rey which has just began to exist and needs to further evolve throughout a lifetime.
Credits

Unless otherwise noted images are by the author.
page 15.
  right. Ajuntament de Maó
  plan. Ajuntament de Maó

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  right. Estop Fotografía. number 19/300

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page 21.
  top. Edicions Imatges, Maó.

page 23.
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Selected bibliography


