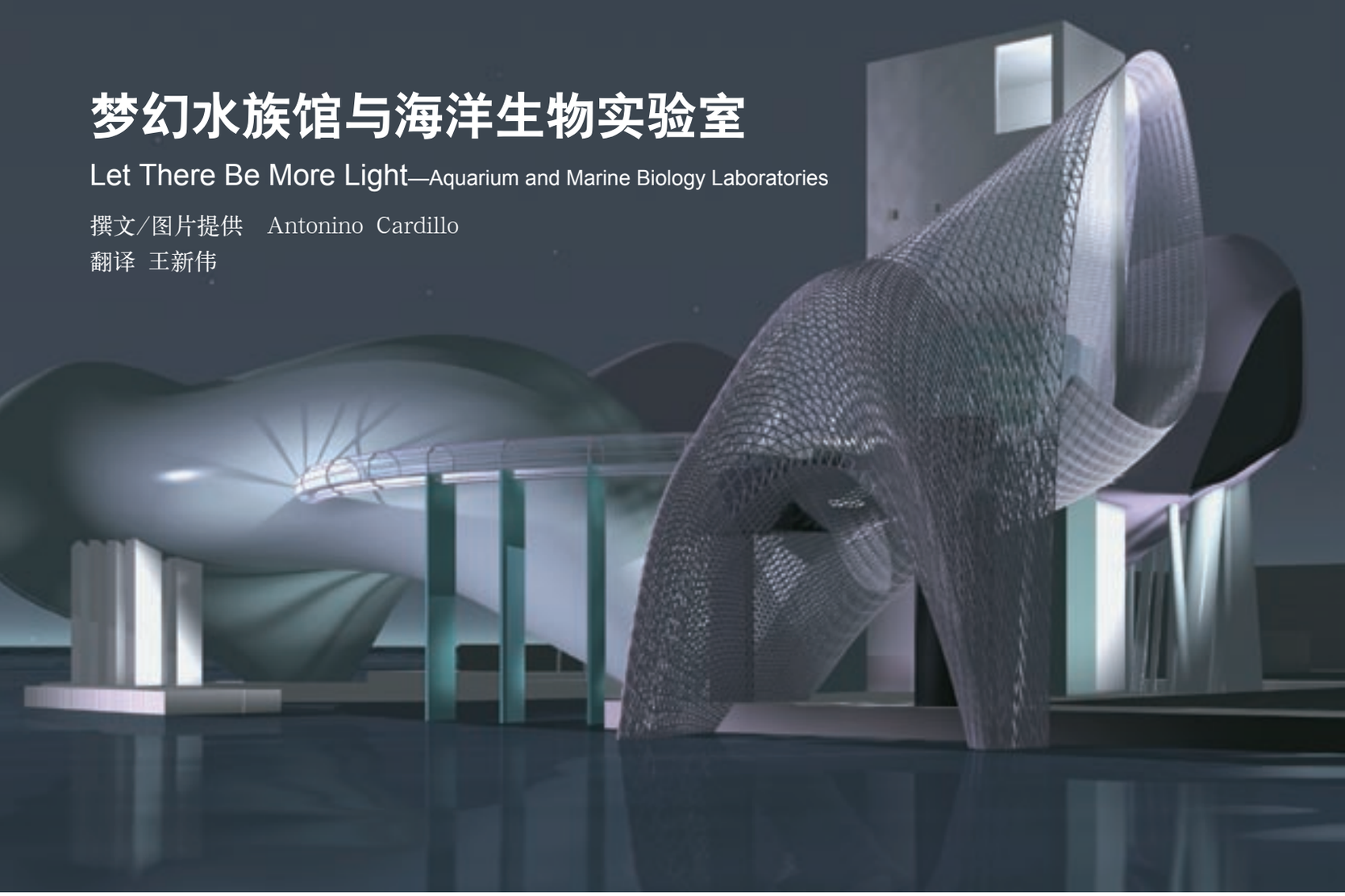

梦幻水族馆与海洋生物实验室

Let There Be More Light—Aquarium and Marine Biology Laboratories

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翻译　王新伟

内部构造与功能

水族馆是一座为鱼类建造的家园。如果这座家园很适合它的海洋居民的话，那么它就是一件杰出的建筑作品。从小型鱼船的角度来看，水族馆是悬浮在水面的、模拟洞穴的建筑，它在体量和形状等方面都与自然的栖息地很相似。

为了尽可能地对水域生态系统做到严谨和尊重，游客可以通过一个管状密封走廊来参观体验水族馆。管状走廊直径 200m，长 800m，从明亮宽敞的大厅一直延伸到梦幻般的神秘水中洞穴，成为了贯穿这个建筑群的步行通道。这套游客参观系统保留了传统的单池单通道的分级体系，将不同种类与区域的海洋生物群细分和归类。此外，为了能够使海洋生态系统与水族馆所处位置的外部环境协调一致，在馆内的中部、高出地中海海面约 20m 的位置设置了玻璃墙悬浮走廊，使游人在观赏海底生物的同时，能尽享远处岛屿与夕阳余晖交融的开阔视野。

这幅作品蕴涵的理念源于建筑师巴克敏斯特 · 福勒于 1967 年为蒙特利尔博览会建造的“美国帐篷”——一座网架结构的开放式建筑。福勒的理想结构被这座伸展于白塔（海洋生物局）与大海之间的神秘网状建筑替代了。这个金属杆状系统构架的精简结构像一枚坚硬的贝壳，将空间凹凸有致地封闭起来。

通道

通过这条通道人们可以了解建筑的结构和风格。为了重建这个项目，设计力争通过三维空间内的分支循环通路来推动它为人所用、为人所知的进程。从路边或海面上望去，映入眼帘的是轮廓柔和的印加地岛和渐渐淡出背景的落日余晖，很难辨别清楚地形与距离的地理关系。这幢建筑还是观测海洋风景的三维立体瞭望台。休息室位于海面上方 20m 处，外部的玻璃结构将其包围起来，精简了内部的洞穴结构，与这片风景天衣无缝地融为一体。通常来说，建筑物内的步道以及规划的空间是由墙壁来决定的，比如，在很多水族馆内，池间的空间决定了游览路线的地理方位；而传统建筑内的步道形状是与这部分空间协调一致的，这项工程就是试着用结构将这两部分实体相分离。各楼层并没有与环境的空间界限协调一致，这些空间的界限或者成为各楼层的墙壁，或者成为了玻璃表面。在这里，地面、天花板、墙壁的界限已经变得非常模糊了。水池的玻璃墙起自地面，由市区广场演变而来的神奇的挂毯透明地悬在空中。向东北方眺望这个城市，由一系列陡然向上、瞬息万变的明亮玻璃墙主宰着人们的视线；从西南方向遥望印加地岛，会为一直向下伸展的波状起伏的外壳而心生感动。覆盖外部的罩棚与矩形的地板镶嵌在一起，构成了墙壁。这样不成比例的状态并不多见，刻意而为，借此表明一种不断变换的悬浮状态，而其他部分在内部旋转，飘忽游离，捉摸不定。

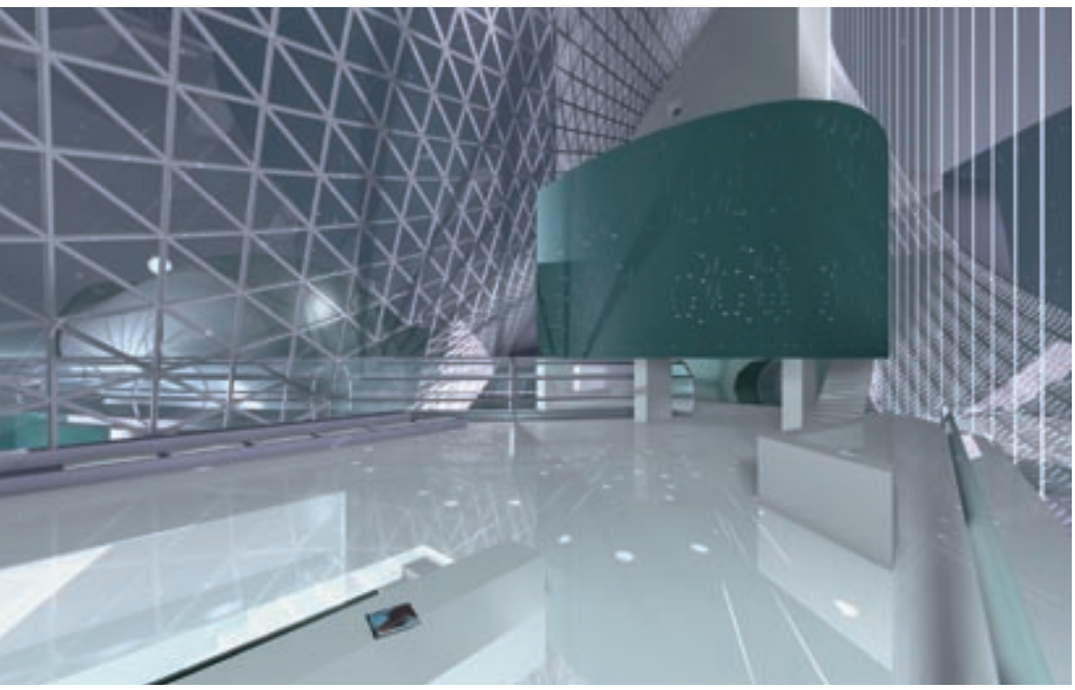
Contents and function

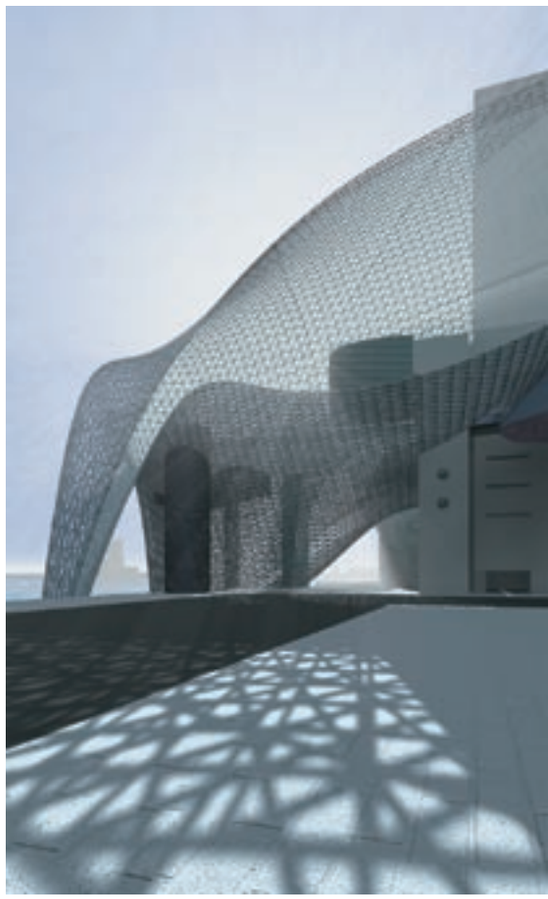
An aquarium is fundamentally a house for fish. If the house cares for its marine inhabitants it will probably also be a good piece of architecture. Such a presupposition is realised in the idea of building tanks, analogous in dimension and shape to the natural habitat, thus becoming pretexts for the elaboration of fluid cavities, modelled by means of curves and NURBS surfaces, a mathematical representation that accurately defines solids and surfaces with free or organic shape. Suspended on the water, denouncing their form to external space, they are moulded, cave-like, for the benefit of the little fishermen's boats.

Aiming to be as discreet and respectful as possible to aquatic ecosystems, the visitor experiences the aquarium through a tubular pressurised gallery developing along a circumference. With a diameter of 200 metres and an extension of 800 metres, this creates a continuous walk which crosses the architectural complex from the light and ample Foyer to the fleeting and mysterious aquatic cavities. This system of visitor experience reverses the conventional hierarchy of single tanks and paths, the result of a vision of biological life rigidly subdivided by classes and sectors. Therefore the fishes' aquaria consist of two thirds of the building and man's experience is reduced to a single circular path, relatively small in proportion to the other parts. With the intention of sparking a synergy between experience within marine ecosystems and the outside world where the aquarium is sited, moreover, in the pauses between the principal tanks, the glass walls of the gallery suspended over the Mediterranean at a height of about 20 metres, give ample and luminous views over the archipelago of islets that fade away into the sunset until they condense on the three crusts of the Egadi islands on the horizon.

In the circular path beginning and end coincide and so find their "raison d'etre" on the ground floor of the Foyer. Rising 20 metres over the sea, rational and irrational entities are revealed in a closed dialectic.

The concept which subtends the composition can be seen as deriving from the American Pavilion by Buckminster Fuller built for the 1967 Montréal Expo: a collection of open buildings enclosed in a geodesic grid structure. It is diverse in its method of shaping and recounting space and therefore in language. Here Fuller's platonic structure is substituted for an indefinable veil extending between the White Tower of the Department of Marine Biology and the sea. Condensed formally and structurally by a system of metal shafts looking like a rigid shell, it envelops the space in an extension of concaves and convexes. Inside there is an almost neoplastic dance of elementary objects. Their presence in the space does not imply a hierarchy, but an invisible network of resonances which make up the architecture. Some of them find their raison d'etre in recalling the functions of the Foyer: reception, lounge, galleries, shuttle lifts and

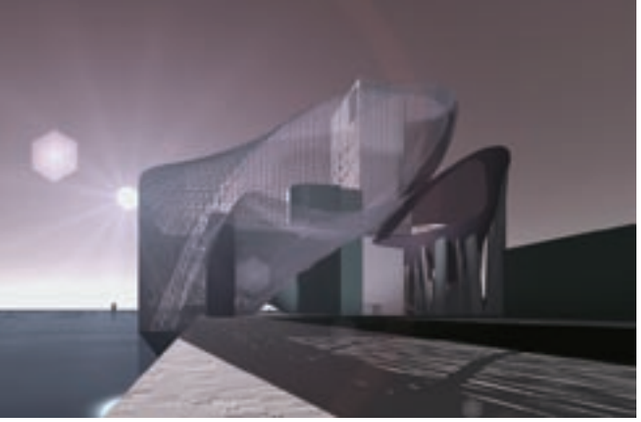


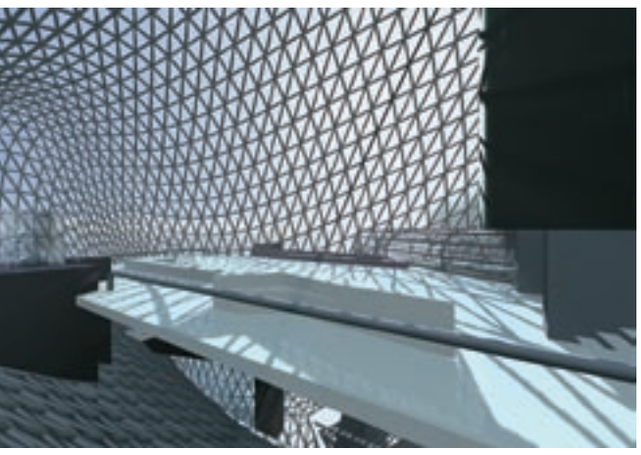


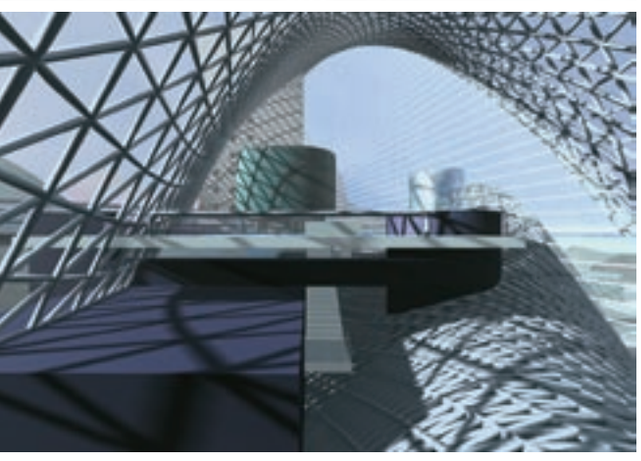
stairs. Others, like in a vertical village, are true buildings within the building which, in strict succession, present themselves vertiginously on the platform of the Foyer. A recurving surface of green tunnelling envelops the interior of the Cafeteria and Bookshop, extended on two levels and accessible by a small staircase from the Foyer. Lastly, the spaces assigned to scientific study inside the White Tower integrate both entertainment and research.

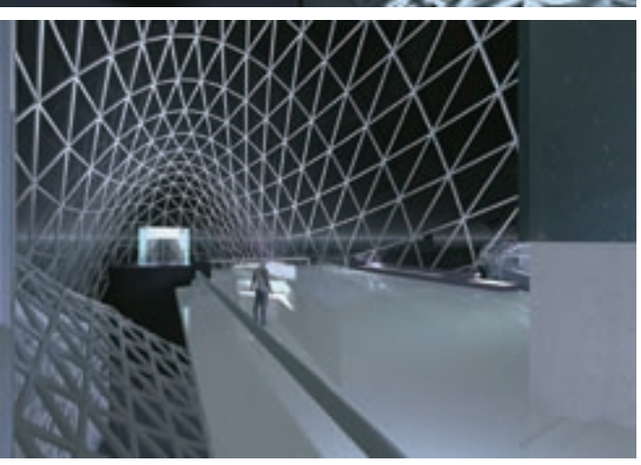
Pathways

It is through these paths that we can understand the structure of the building and the reason for the architectonic language. In aiming to regenerate the site, the design tries to spark, through a branching circulation in the three-dimensional space, a process of appropriation and knowledge. In the normal view from the road or from the sea, the small group of rocks to the west of the door, the salt reservoirs and the soft shapes of the Egadi islands in the background are seen as a series of low profiles, parallel and in receding serried perspective towards the sunset. It is difficult to discern the geometric relationships of the shape of the land and its distances. Thus the building forms a three-dimensional observatory of the marine landscape. For this reason the Foyer extends





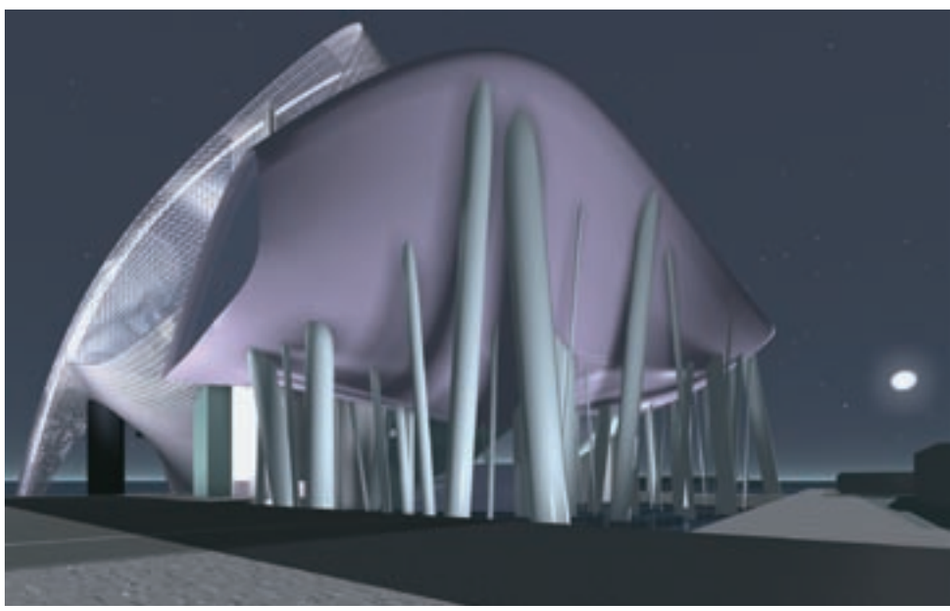


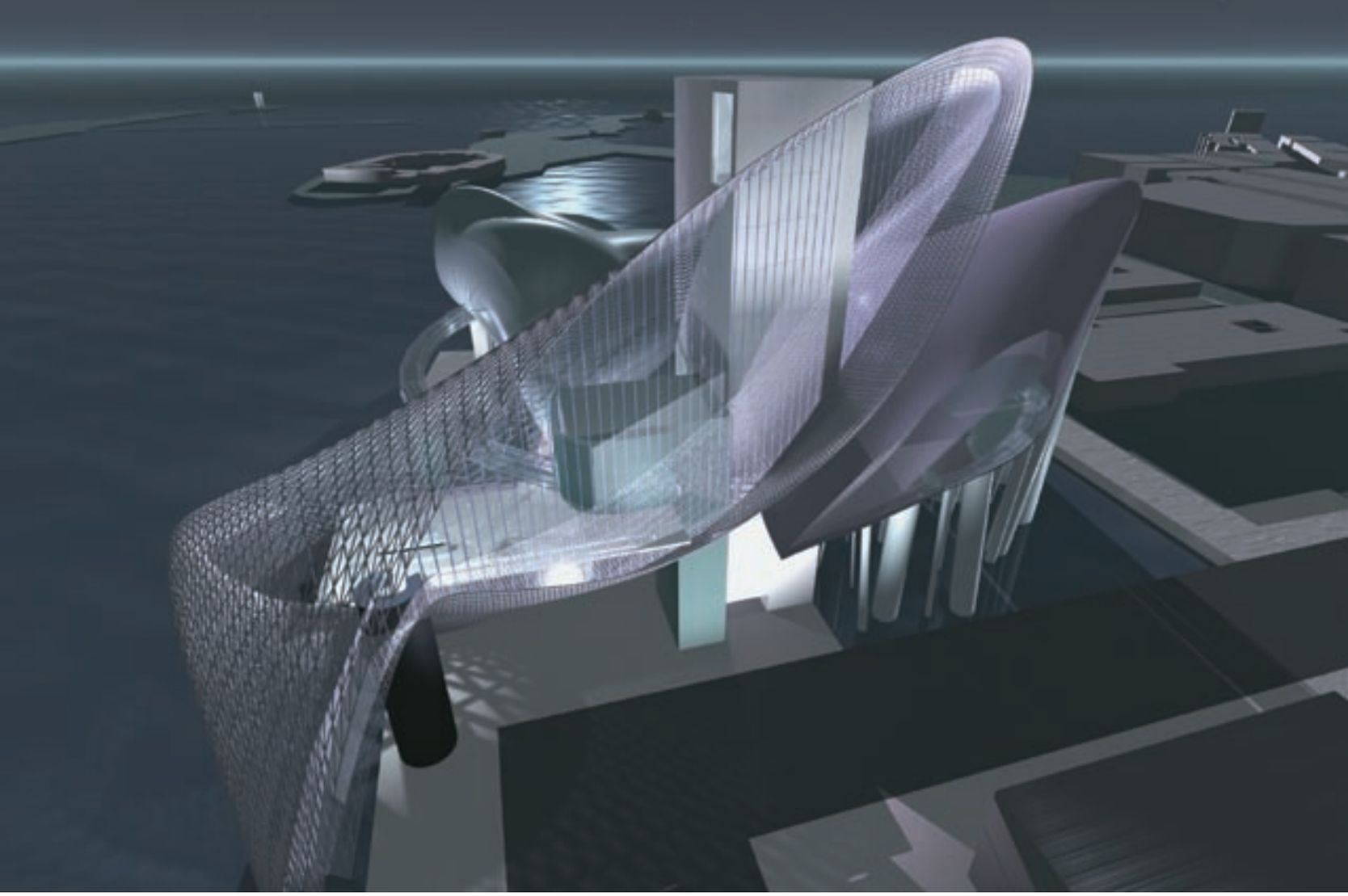


20 metres over the surface of the sea, inside a glass creation which, enveloping it, condenses the internal cavities without making a rift in the landscape.
Usually, in buildings, the shape of the walkways and thus the spaces is determined by walls. In many aquaria, for example, the exhibition route is the geometric result of the space between the tanks. In traditional building the shape of the walkway coincides with that of the space. This project experiments with the deconstruction and the independence of these two entities. The floors do not coincide with the spatial limits of the surroundings, be they walls or glass surfaces. In the Foyer the fluid and aerodynamic shape of the glass shell has at its heart a rectangular platform. Here, the terms “floor”, “ceiling” and “walls” are thrown into disarray. The perimeter glass surface develops within the slabs of the floor, transfigured from urban piazza to magic carpet apparently suspended in mid air. The only meeting points between the two entities are at the opposite corners of the rectangle: triangles of floor jut out from the glass shell, defining two galleries, one looking north-east towards the city, dominated by the vertiginous and vibrant glass walls articulated by a steep series of uprights; the other looking south-west towards the Egadi islands, touched by the descending undulation of the shell outside. These are the only two segments of contact, in which the external mantle, intersecting with the rectangular floor, becomes a wall. But the event is very brief and is deliberately disproportionate to the zones of non-contact, which suggest a state of fluctuating suspension. Only in these small areas is it possible to “touch” the glass shell. The rest rotates inside, in space, elusive.

Structure and Technology

The structural problems arising from the free shapes of the aquaria are analogous with those of fuel tanks suspended on bases built around their perimeter. The structural walls encircle the liquid content creating an enveloping continuity. In the same way as veined floors, they are constructed with a double row of slabs joined by right-angle uprights. The distance between the two rows varies in proportion to the amount of bending to be absorbed, determined, in the central area of the tanks, by the enormous loads created by the water. Such a dimension limits the internal arm of the pair capable of absorbing the tensions caused by the arc in the outer and inner rows. Two cables make up the system: the one above compressed by the weight load and the mass of the liquid; the other at the bottom compressed by the weight of atmospheric agents. This last, furthermore, absorbs even the residual states of traction transmitted by the adjoining lower cable, balancing the opposing states of tension.
Lastly the high White Tower of the Department is constructed on 14 connected floors with a thick perimeter wall of reinforced concrete, dotted with small square windows.





Because they are sparsely scattered the structural power of the perimeter wall is not reduced, so, behaving statically like a giant pillar of hollow rectangular section, it is capable of absorbing the loads and abnormal pressures of the tanks and of the glass covering of the Foyer on the walling. On the ground floor, the Reception is built in a double-height space illuminated from the west by a narrow gap in the wall. Above there are three floors for technical and office use, adjoining those of the Green Tower. From the Foyer level, the triple height of the Cafeteria cuts through the intermediary floors, in an internal space widening organically in the green office cavity on the platform. A trio of pillars alternates in the subsequent floors relieving the loads across the adjacent reinforced platforms that contribute to freeing the cafeteria and the succeeding laboratory floors from obstacles in the centre. Lastly the attic floor, as previously mentioned, contains a vast conference hall.

Outside, in the street, the low horizontal entrance, dug out of the cornerstone of the White Tower, looks onto a small piazza moulded by the two juxtaposed towers and by the jutting Pink's Cave. LD

位　　置：意大利 特拉帕尼港 埃林娜女王大街
设计公司：Antonino Cardillo architect
设计时间：2002 年 1 月～3 月
面　　积：2035 m^2（第一层），9500 m^2（顶棚）
楼　　层：16 层（白塔）
水族箱的容积：43.375 m^3 + 51.735 m^3

Location: viale Regina Elena, Trapani Harbour, Italy
Designer and producer: Antonino Cardillo architect
Design dates: January ~ March 2002
Surfaces: 2.035 m^2 (first floor) / 9.500 m^2 (cover)
Storey: 16 (white tower)
Volume tanks: 43.375 m^3 + 51.735 m^3