

Dichotomy

Architecture generating machine

The research is located between the natural and the artificial, moving from one to the other. It generates a system of opposites, private public, work life, natural environment, artificial environment. My hypothesis works with the idea of the limit between the natural and the artificial. Studying a natural context, I extract formal and organizational logics to hybridize artificial conditions. The work aims at the construction of an architectural system that changes the way we live. The life of the future points to a dense community that demands open and natural spaces. The construction of natural spaces and microclimates inherits logic and behaviors from the context studied.

Dichotomy proposes the construction of an architectural hybrid model. The research builds a work methodology based on systems of variables. From a natural context, ranges of maximum and minimum values are defined to regulate the capabilities of the model.

The first thing to do is to choose the natural context. This research works with Misiones, province of Argentina. Located on the border between Brazil and Paraguay. It is a mountainous area built by peaks and valleys and crossed by multiple rivers. These natural conditions shape a constantly changing territory, which adapts according to climatic and artificial conditions, mutating and updating its organization.

The first system of variables that is generated in the investigation is the topography system. From the ground, a network of cells is built that adapts to the slopes. This network is transformed depending on the slope of the terrain and its location in height. Defines larger cells associated with valleys and smaller cells associated with peaks. By means of an algorithm the values can vary and regulate the sizes of the cells. In this way we can produce hundreds of possible artificial grounds. The algorithm works with 5 concatenated and dependent variables.

The topographic network is evaluated and analyzed. The variety of cell shapes and sizes is then cataloged and isolated. This results into a catalog of geometries and dimensions that are ordered from largest to smallest and are classified into three large groups. Work, hybrid and housing. The combination of these groups gives new subgroups and new forms emerge.

Once the range of the network is established, it is transformed into a three-dimensional system. The second system of variables defines the thickness and porosity of the topographic network. The algorithm parameters regulate the difference

between the height of each cell and its porosity. This system can vary the terrain by equalizing the heights of all the cells, generating a vertical connection between the parts. You can also increase the different heights between peaks and valleys and generate higher slopes.

Then the parameters are adjusted and the 3D model is analyzed. Different cell groupings are isolated and studied separately, identifying trends and shapes. They are tested on the different slopes of the terrain and the relationships between the parties are optimized.

So far these systems of variables are connected and interdependent. A clear and systematic research methodology was established, based on the construction of algorithms and parameters. This architectural mechanism can be tested on any terrain.

Now we enter the testing stage of the machine. It is tested in different situations, both natural and artificial. 3 work scales are defined. House scale, building scale and city scale. The system is implemented at these scales and in different conditions and contexts.

The household scale is implemented in 3 different climates. Mountain, beach and Antarctica. Each home is conformed by the union of multiple modules that are updated according to the climate. The number of modules is variable depending on the size of the house. The modules are subdivided into slabs that vary in height, thus defining the specific spaces of the house. The slabs are connected by circulation systems that connect the different modules to each other and generate complex routes. Thus the spaces are differentiated and mixed. In this way, classic programs are hybridized and new forms of life emerge. The relationship between the public and the private is blurred. The dichotomy between social areas and areas of intimate use is put in tension. Depending on the context of each house, the circulation, slab, wall, window and ventilation systems are adjusted and adapted. The amount of natural and artificial spaces is defined according to the climate. The module configuration is adapted to the topography.

The building scale is put to the test in a dense city (New York) and in an extreme natural context (the desert).

The building in the city is located on the limits of one block, growing in height and building a system of fills and voids. The building builds courtyards, parks, atriums and squares, which are both public and private. It seeks to eliminate the boundary between the public and the private. Build a natural environment in an artificial context. The modules adapt to the empty space of the city. There are three types of modules. Housing module, office module and hybrid module. These three modules fill the empty space alternately. There is always a connection between these three types of modules. Each module is subdivided into tiles according to the program. The union

between the slabs of the different modules generates continuities at different levels of the building. This building is both natural and artificial. It is both a city and a jungle. It is both public and private. It proposes a way of life in the open and shared, where work and housing are one, where we live in nature and are aware of its impact.

The building in the desert is isolated in the middle of nowhere. It adapts and builds its own context. Define your own ecosystem and react to the desert. It is built like a large umbrella that captures the sun's rays and converts them into energy. Through huge pools it captures rainwater and stores it. The rain system inside the building is artificial and is regulated by waterfalls that fall from the pools. The modules are grouped as in the city building. The relationship of full and empty is reversed generating a much larger empty space and stalactites of programs that fall from the ceiling. At ground level, parks and artificial lakes occur. On the upper level a greenhouse is generated that produces food for the inhabitants. It is a self-sufficient ecosystem. Once again, the public and private space mix and the boundary between home and work is blurred. This building is a machine for producing life in harsh environments. Unlike the city building that produces life in saturated environments.

The city scale is put to the test in the original study context. In Misiones, a jungle terrain of mountains, valleys and rivers. This scale is the most directly related to the topographic network, since the modules are located in the place of the original cells. The modules adapt to the terrain and constantly change in scale. Public and private programs are mixed. The circulation is articulated by tubes, rivers, streets, walkways and mountains. It is a great system of movement and permanence. On the scale that most relates nature to the artificial, to the point of doing only one thing. A natural city.