HONORABLE MENTION

Project Title:
LAND_AND_SEE

Faculty Sponsor:
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IMPLANTATION
The situation of the campus was decided by three criteria. The first are the STRONG WEST WINDS on the site. On the one hand the building should be naturally protected from them on the other hand they are used for the natural ventilation of the building. The second criterion is the VIEW over the ocean and the bay which are the fields of activities of the marine research center. The third and last criterion is the connection of the land and the sea in form of a campus which is situated in-between the two. This gives the final DIRECTION OF THE BUILDING. This connection of land and sea brings up the name of the building LAND_AND_SEE, at the same time an homage to the historical importance of the site, the Columbus' landing.

Besides those was also considered the implantation at existing routes, lest additional routes destroy the national resort.
- Accessibility/Transportation.
  To protect the national historic site all the exhaust-bringing vehicles are banned from it. They are parked at a big parking-site in 1500ft distance. Stored bicycles are used to access the campus. The only exception are the vehicles for the delivery, which can enter the building directly.

The whole campus is divided into four parts, each shelters a different function - research, public, private, technic.
Those four parts are connected by a path located on the south side of the building. It offers multiple perceptions changing during the passage of the whole campus (internal-external connection, private-public spaces).

SUSTAINABLE RESOLUTION
The sustainable concept of the campus is based on the three forces of nature: WATER, WIND, and SUN. Those three natural forces are converted to POTABLE AND SERVICE WATER, VENTILATION and ENERGY.
- Water Treatment and Recovery
  Rain-water: All the rain is collected, filtered and stored. It is used for the irrigation of the surrounding of the campus to grow new plants as well as for the service water of the whole campus.
  Sea-water: Underneath the laboratories is located a big sea-water tank. This water is used for the wet-laboratories and is desalinated (reverse osmosis method) for the potable-water supply of the campus.
  The energy required for the production is provided by the parabolic mirrors.
- Ventilation/Cooling: The outside coating protects the room boxes from the strong sun radiation and helps to cool down the inside. Its aerodynamic form offers the possibility to use the strong west winds to supply the laboratories with fresh air by a double skin system. Firstly the strength of the winds is tamed by horizontal wooden lamellae in the external cover of the building and then it is brought into the building via air-filters in the glass façade.
- Energy Generation: Throughout the whole campus the roofs are covered with parabolic mirrors to convert the heat of the sun into energy – a technic much more effective than solar panels. The power produced with this technic is sufficient for the energy supply of the whole campus, but also for the desalinisation of the seawater.

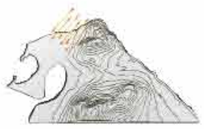
LAND_AND_SEE

SITE PLAN

Sustainable Lab Competition 2012

Strong west winds

View



Direction of the building

Implantation

The situation of the building was decided by three criteria.
The first are the STRONG WEST WINDS on the site. On the one hand the building should be naturally protected from them on the other hand they are used for the natural ventilation of the building.
The second criterion is the VIEW over the ocean and the bay which are the fields of activities of the marine research center.
The third and last criterion is the connection of the land and the sea with a campus which is situated in-between the two. This gives the final DIRECTION OF THE BUILDING.
This connection of land and sea brings up the name of the building LAND_AND_SEE, which is at the same time an homage to the historical importance of the site, the Columbus' landing.

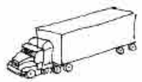
Energy Generation:

All the energy is produced by sun-power with parabolic mirrors installed on the roof of each box.
The power produced with this technic is sufficient for the energy supply of the whole campus, but also for the desalinisation of the seawater.

Water Treatment and Recovery:

Rain-water:
All the rain is collected, filtered and stored.
It is used for the irrigation of the surroundings of the campus to grow new plants as well as for the service water of the whole campus.

Sea-water:
Underneath the laboratories is located a big sea-water tank. This water is used for the wet-laboratories and is desalinated for the potable-water supply of the campus.

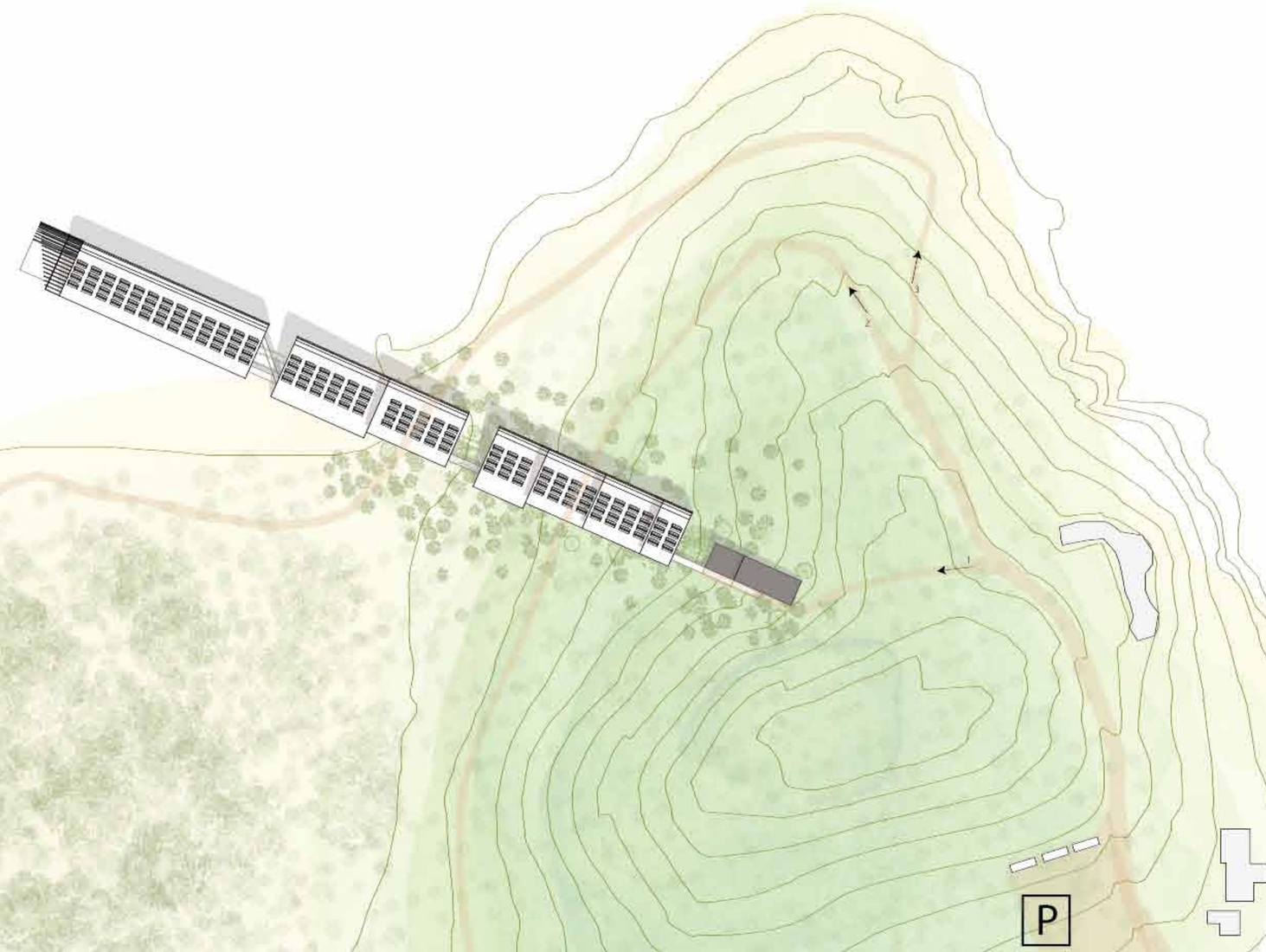


Transportation:

The only vehicles allowed to enter the site, are those for delivery.
All the goods are brought to the entrance hall and from there by man power or by boat spread to the other parts of the campus.

Accessibility:

For the access of the campus are only used already existing routes.
About 1500ft away from the campus is located a big parking-site. All the vehicles are parked there and the campus is reached by public bicycles stored on this parking-site. There are three different routes: 1. technic, 2. living, 3. public and working.



LAND_AND_SEE

research

public

private

technic

The whole campus is devided into four parts, each shelters a different function.

The research part: The laboratories and all its supplying spaces are located on the sea to have a direct connection with the water. The façade is mostly closed by wooden lamellae. In direction to the ocean it ends with a big pier.

The public part: This part is a connection between the working and the living part of the campus. It is located in-between the sea and the land. The big glass façade shows the public function.

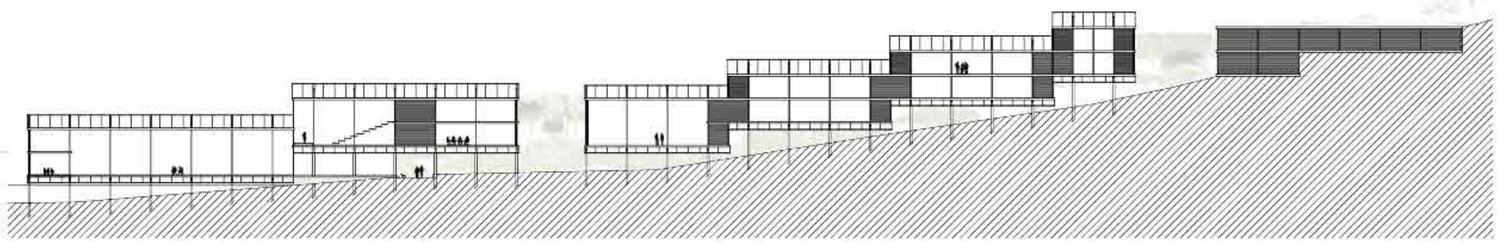
The private part: The attachment of the apartments to the slope of the hill forms smaller private spaces, like a little village.

The technical part: It is placed in the end of the building and is hidden in the nature by its simple façade and form.

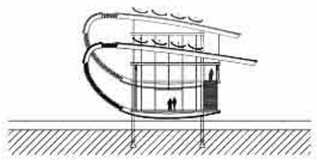
public entrance

dining space

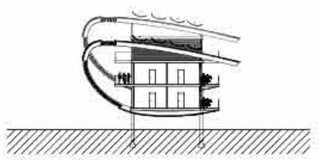
continued at sustainable laboratory



longitudinal section



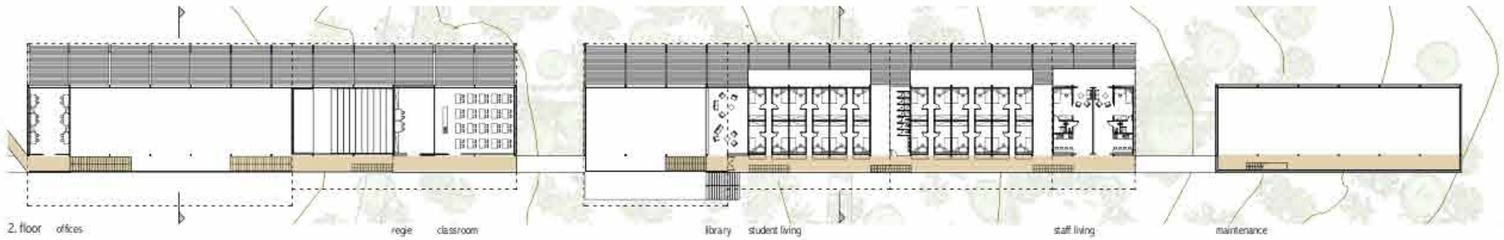
section exhibition

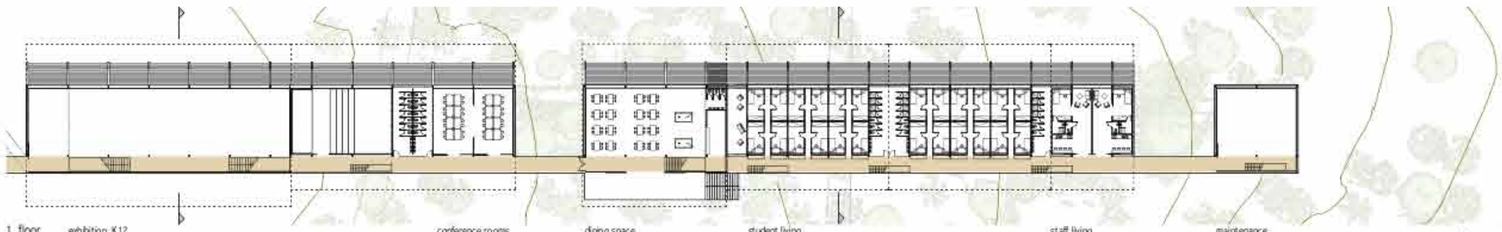


section student living

The path

It connects the four different parts of the campus. During the passage from the laboratory to the maintenance the path offers multiple perceptions. It is directly connected to the sea in the research spaces. Then, at the public spaces, like the exhibition or the dining space it is located inside, divided from the grand halls via a sequence of columns. Reaching the classroom area, the path is outside and offers space for conversations. In front of the private spaces, like the student and staff accommodations, little gardens separate the public path from the living areas.





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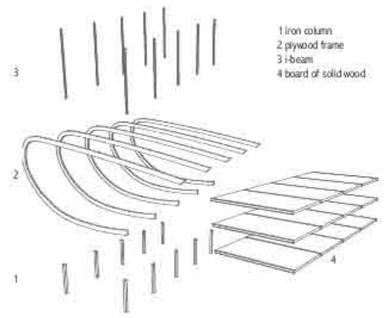
LAND_AND_SEE

Laboratory

Sustainable Lab Competition 2012

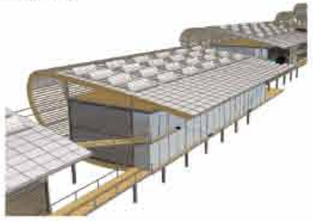
simplicity | openness | flexibility | water contact | site view | aerodynamic



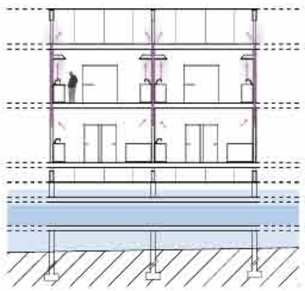
Construction:

The whole construction is based on columns made of iron, which raise the building from the protected site. The following components are plywood frames, I-beams and floors of solid wood, produced on the island. Aluminum plates are used as cover of the building, this provides the aerodynamic form. The façades are made of glass and partly coated with wooden lamellae.

Basic construction

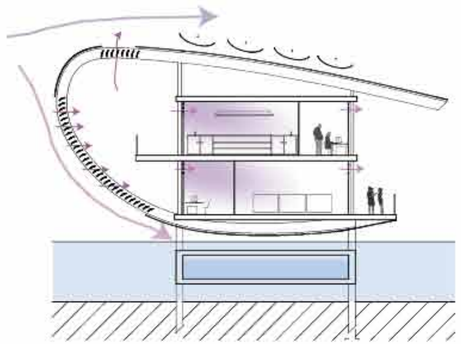


Cover materials



Air suction:

The polluted air from the laboratories is firstly filtered by an exhaust hood above the working desks and then brought to the outside through tubes in the separating walls.



Ventilation:

The strong west winds are used to supply the laboratories with fresh air by a double skin system. The strength of the winds is tamed by horizontal wooden lamellae in the external cover of the building. Afterwards it is brought into the building via air-filters in the glass façade.

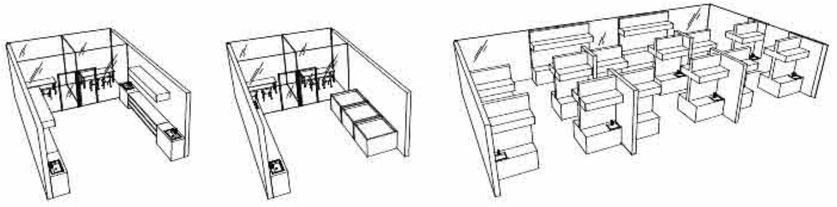
south-elevation

longitudinal section

Flexibility:

The floor plan of the laboratory is very flexible, because the ventilation and water supply is placed in the separating walls. This is shown with three different ways to furnish the laboratories:

1. Dry laboratory
2. Wet laboratory
4. Teaching laboratory



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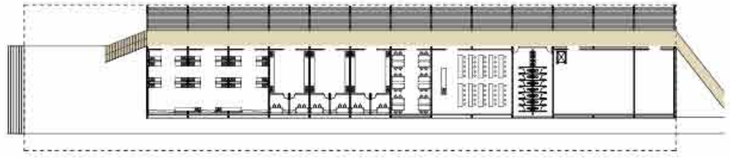

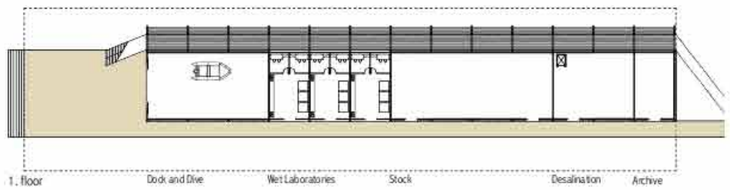

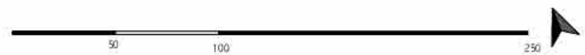

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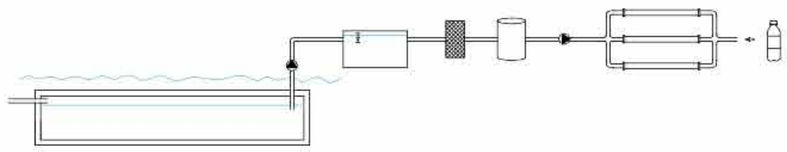
SUSTAINABLE RESOLUTION

The sustainable concept of the whole campus is based on the three forces of nature: WATER, WIND, SUN. → Those three natural forces are converted to POTABLE AND SERVICE WATER, VENTILATION and ENERGY.

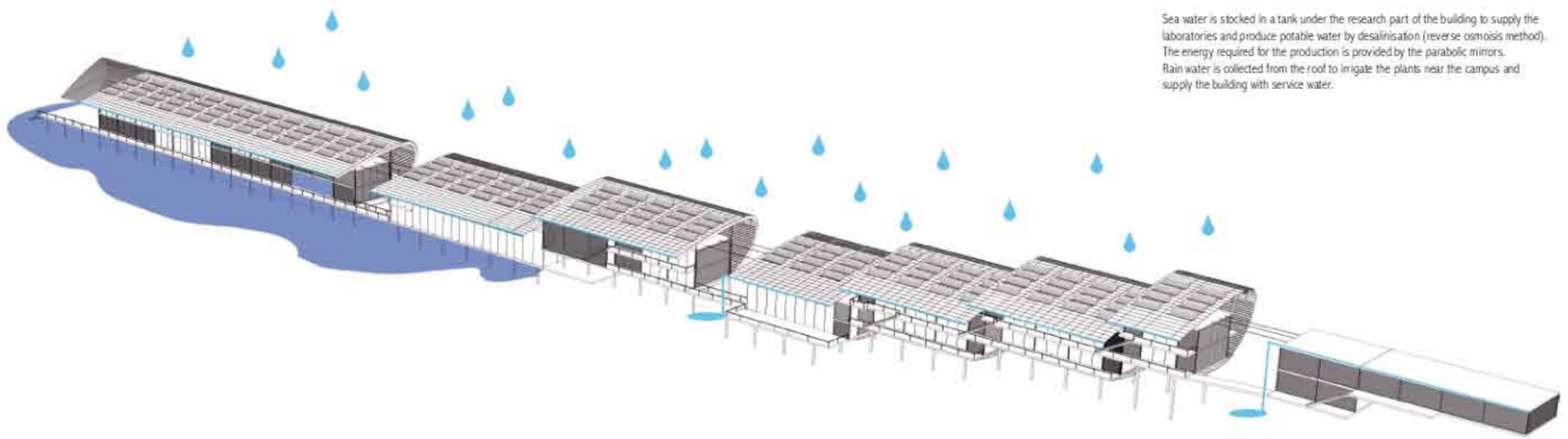
WATER

Desalinisation of the seawater

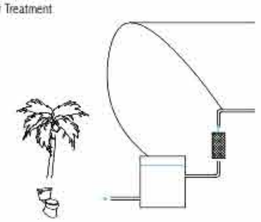


1. Sea water tank located under the laboratories
2. Decantation tank
3. Pre-filtration
4. Pre-loading pomp
5. Reverse osmosis membrane

Sea water is stocked in a tank under the research part of the building to supply the laboratories and produce potable water by desalinisation (reverse osmoisis method). The energy required for the production is provided by the parabolic mirrors.
Rain water is collected from the roof to irrigate the plants near the campus and supply the building with service water.



Rainwater Treatment



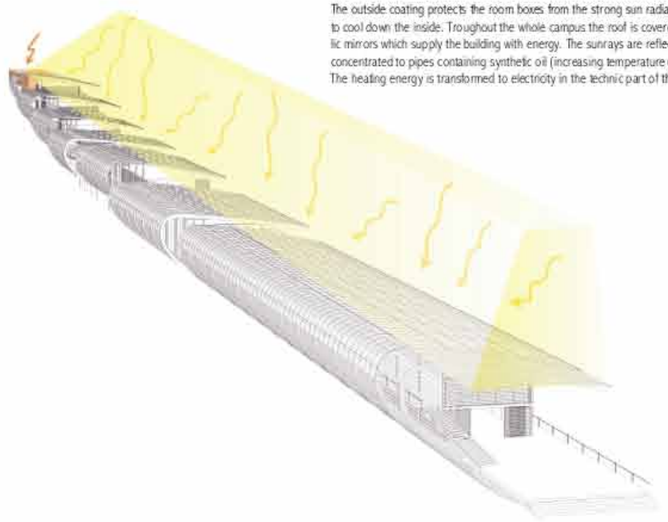
2. Water tank
1. Filter

Site improvement

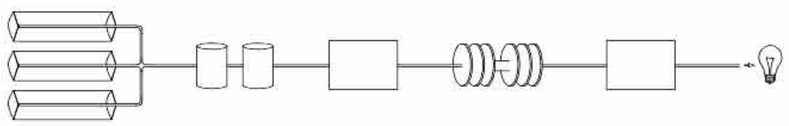
after 1 year
after 3 years
after 5 years

SUN

The outside coating protects the room boxes from the strong sun radiation and helps to cool down the inside. Troughout the whole campus the roof is covered with parabolic mirrors which supply the building with energy. The sunrays are reflected and concentrated to pipes containing synthetic oil (increasing temperature until 600°C). The heating energy is transformed to electricity in the technic part of the campus.



Energy Production



1. Parabolic mirrors with synthetic oil
2. Heat storage in salt tanks
3. Steam producer
4. Turbine
5. Generator

WIND

The aerodynamic form of the coating harms the strong west winds to protect the campus. Tamed by the louvers of the double skin, the wind supplies the inside with fresh air.
It enters trough filters in the façade, ventilates the rooms and gets out at the south façade of the building.