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# From a Reservoir Building to the Main Library of the Universitat Pompeu Fabra

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ABSTRACT

The lecture deals with the challenge of converting a reservoir building dating from the nineteenth century into the main library of the Universitat Pompeu Fabra, and of maintaining an equilibrium between the functional requirements of a modern university library and the architectural and historical features of the building. [Fig.1]

## THE UNIVERSITAT POMPEU FABRA

The Universitat Pompeu Fabra (UPF) was established as a state-funded university by an Act of the Catalan parliament on the 12th of June 1990. It is a young institution and its facilities are still in development.

The UPF chose to adopt an urban campus model. The university as a centre of learning has to offer teachers and students an environment that does not stop at the walls of the university buildings. It has, of necessity, to find an expanded presence in its setting that only the city, as the site of most human activities, can offer. The city itself also benefits from the presence of a community as vital and changing as that of the university.

The main site of the University is in the Ciutadella district of Barcelona. It is strategically located in the heart of Barcelona, between the old town of Barcelona and the new sector built in 1992 for the Olympic Games.

The siting of the University in the historic centre of Barcelona has meant a major transformation of the area in many ways.

Two old barracks, which occupy two city blocks in the Cerdà Eixample, were rebuilt and refurbished to accommodate the academic functions of the

University, and the magnificent Dipòsit de les Aigües building was fitted out to house the Main Library.

## THE LIBRARY OF THE UNIVERSITAT POMPEU FABRA

From the outset, the UPF has been conscious that the Library had to play a leading role in carrying out the mission of the University. The Library represents the core of the University, and occupies a privileged central location because it is needed to accomplish all its functions.

To decide on the type of Library required it was necessary to take into account the dispersal of the University buildings over a number of city-centre sites.

The UPF Library currently has, in addition to the Main Library, three branch libraries (Rambla, França and Mar) in the buildings where teaching takes place, with all of these providing the same services.

This geographical dispersion has not, however, prevented the creation of a single catalogue and a common circulation system. This means that the computer system allows users to request, pick up and return documents at any Library site. Therefore, they don't need to go from one Library site to another.

*The UPF Library data*

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|---|---|
| Opening hours | The library opens from 8.00 am to 1.30 am from Monday to Friday with no interruption. And on Saturdays, Sundays and bank holidays it is opened from 10.00 am to 9.00 pm. It only closes 5 days a year. |
| Users | 14,549 |
| Surface area | 7,850 m² |
| User places | 1,473 |
| Collection | 308,711 monographs<br>8,505 serials |

## THE MAIN LIBRARY OF THE UPF

The Main Library of the UPF takes up two interconnected buildings: the space of the Jaume I building and the emblematic Dipòsit de les Aigües building.

The first stage of the Main Library was in September 1996: it occupies the basement of the Jaume I building.

And the second stage was in July 1999: there was the extension of the Jaume I building with the incorporation of the Dipòsit de les Aigües building.

## THE DIPÒSIT DE LES AIGÜES BUILDING

The Dipòsit de les Aigües was designed in 1874 by the architect Josep Fontserè, as a reservoir building to store water for the nearby the Parc de la Ciutadella.

The Parc de la Ciutadella is the largest green space in Barcelona. In one corner a kidney-shaped lake and a baroque cascade provide an ornamental counterpoint to the landscaped gardens. These large-scale aquatic features were served by this reservoir building.

Fontserè, who employed industrial techniques in the construction, designed a structure with walls a metre thick, which supported arches four metres wide. In keeping with tradition, he perforated the walls in order to reduce the quantity of building materials and labour required. These openings run the height of the walls and are crowned with arches, causing the partitions in the walls to look rather like a series of independent pillars. The building is similar to that found in large Roman reservoirs, being practically identical to that of the impressive Piscina Mirabile in Bocoli, near Naples.

There is, however, one important difference between the two buildings: the water for the Piscina Mirabile was stored below the arches and thus the structure had to sustain only its own weight. However, Fontserè designed the arches of the Dipòsit de les Aigües to hold 10,000 tons of water at a height of 17.5 metres above the level of the floor.

With regard to its external appearance, this is a square building, with four identical façades and a turret on each of the four corners. The raised water tank itself is situated in the very centre of the building. And yet we come up against an omnipresent ambiguity when we consider the interior space of the

great hall: the plan suggests the bi-directional arrangement of the pillars in a hypostyle hall, while the perception of the real interior is of a succession of very well communicated longitudinal spaces.

As a curiosity, one of the assistants who helped Fontserè with the structural calculations was a young student whose name was Antoni Gaudí, who later became famous for building the Sagrada Família, which „has become a symbol of the city itself".

In 1988, Barcelona City Council commissioned the architectural recuperation of the building which interior had been used for a variety of other functions — exhibition space, city asylum, archive of the Criminal Court hospital, film studio — before its latest conversion for use as a library. The intervention consisted in stripping away all of the later elements in order to lay bare the original brickwork structure. It was decided to respect the original ceilings of the first bay, composed of the spaces adjoining the windows and separated by buttresses, and the second bay, which forms a spacious circulation route around the perimeter. [Fig. 2]

The original Dipòsit de les Aigües reservoir had a depth of 4.25 m and contained up to 3 m of water. This has now been replaced by a sheet of water which is level with the perimeter circulation route, with a depth of 1 m. Beneath this is an accessible space with a height of 3.4 m, divided by the extensively perforated partitions which support the sheet of water.

Although the volume of water has been reduced, the exterior image is still that of a building topped by an artificial lake on which people can go rowing above the city of Barcelona. At the same time, the interior space beneath the sheet of water makes it possible to detect and fix possible leaks without these damaging the hall.

In order to ensure the quality of the water, a system of pumps has been designed to filter the entire volume of the new sheet of water, thus maintaining hygiene without the use of chemical treatments. [Fig. 3]

*Conversion of the building to house the Main Library*

The desire to harmonize the form and function of the building required a close understanding between those responsible for the conversion work and

those who were to be responsible for running the library. Thus from the outset, this co-ordination been carried out by a Campus Project Office.

The Campus Project Office was set up to co-ordinate the building strategy of the UPF, and included architects, lawyers and experts on urban planning.

In 1992, the Library and the Project Office conducted a joint feasibility study into the siting of the Main Library of the UPF in the Dipòsit de les Aigües, which served to demonstrate viability of the proposed scheme.

The University commissioned the architects Lluís Clotet and Ignasi Paricio, who had previously been involved in work on the building, to produce an outline project.

A Technical Commission was the set up to define the project and monitor its subsequent execution. Library staff have participated in the project at a technical level at every stage.

The information provided by the Library underlined the need to conserve the basement of the Jaume I building, in order to provide more space, and to make the latter more functional. Using this as starting point, the main reading room of the UPF Main Library has been located in the Dipòsit de les Aigües building, thus creating a large area for study and research uses.

*Conversion to house the reading room of the Main Library*

The siting of the reading room posed various problems in terms of the disproportion between the volume of the room and the available floor space.

The solution adopted was the construction of a mezzanine floor, 2.8 metres above the existing floor level, covering the entire area except for a large central island. This new mezzanine floor provides a considerable increase in the available floor area and receives abundant natural light from the high windows.

The spaces created by the mezzanine floor are notable for their variety of heights: low spaces above the mezzanine floor, medium to high spaces above the middle of the mezzanine, and very high spaces in the central part of the lower floor. The siting of this mezzanine floor has not affected any of the main lines of the building or open spaces.

In 1999, a part of the large reading room in the Dipòsit de les Aigües building was opened to the public:

The first phase of the conversion, commenced on the 21st of July 1999, focused on the transverse volume containing the three lateral bays closest to the Jaume I building: some 3,500 square metres, equivalent to a third of the total surface area.

Also, in this first phase an underpass was constructed, running just beneath the street, to communicate the Dipòsit with the Jaume I building: this linking space, nine metres across, also includes a reading room.

*Entrance to the Library*

At present, the entrance to the Main Library of the UPF is situated in the Jaume I building. This is the only entrance to and exit from the Library, with security control. All users entering the Library pass through this access.

The spacious entrance area contains a circulation and bibliographic information desk and the OPACs for rapid consultation by users on foot. Further inside, there are the computers for consulting the services offered by the Library and the resources available.

Close to the desk, there is the reference collection, the Reserve Room which includes the documents recommended by faculty in their classes and other Library sections. It also accommodates rooms for group working, the users' training room, internal technical services and the Management of the Library.

The passage which connects the Jaume I Library and the Dipòsit de les Aigües building contains a study room and a rest area.

The characteristics of the entrance circuit, combined with the bibliographic collection contained in the Jaume I building, and the proximity to the classrooms, mean that this space is most directly geared to the needs of undergraduate students.

In this way, these facilities in the Jaume I building serve as a filter for the Dipòsit de les Aigües space, which is more specifically oriented towards individual study and research.

*Interior of the Dipòsit de les Aigües*

It was decided that the number of shelves should be limited in the interests of a better orientation of the users and a fuller appreciation of this singular space. The reading room features a combination of reading tables and book shelves, which serves to optimize lighting conditions and ensure a satisfactory division of the space.

Inside the building, 3,600 linear metres of shelving and 142 places for users have been installed without any violation of the existing fabric. It accommodates special collections.

*Main reading room*

The ground floor is devoted to library shelves, given that the natural light here is poor on account of the height of the walls. On the tables located near the desk are the computers to consult the Library catalogue and the other resources available.

On the first and second floor the tables are located along the sides next to the windows, with the bookshelves concentrated in the centre. The space between the buttresses on the ground floor provides rooms for group working. On the first and second floor, the space between the pierced walls provides a large number of small areas where readers can work individually.

On each floor the spaces between the buttresses closest to the stairs on the corner accommodate the sanitary services. Adjacent to these are the vertical installation spaces and the lifts.

*Construction and fitting out of the Library*

The Library has been conceived on the basis of a modular system. The structure has been conserved intact , with the intervention focusing on the partitioning of the space, the furniture and installations.

*Lighting*
In order to bring natural light into the central part of the interior space, the architects introduced a skylight which crosses the vaults of the roof and, in the reservoir, projects up from the surface of the artificial lake like a kind of

island. Beneath these skylights the architects placed an inverted pyramid composed of four triangular mirrors.

These mirrors allow visitors on the ground floor to see the reflection of the water in the interior of the reservoir several metres above their heads, and the context in which the building stands, while visitors to the artificial lake see the reflection of the enormous void which opens up beneath the three metres of water, thus establishing a relationship between the interior and the mass of water. [Fig. 4]

The light is a basic factor in the quality of the atmosphere, of primary significance in establishing links with the exterior and permitting the identification of the surroundings.

The artificial lighting is incorporated into the furniture: on the shelves and on the tables, to do no damage to the building. The general ambient lighting is provided by halogen spots directed at the ceiling. [Fig. 5]

*Flooring*
The flooring of the reading room is a modular paving designed to allow the movement of all the installations. The floor slab is of concrete. The pieces of the flooring are finished with fitted carpet and are perforated to accommodate the emergency lighting.

*Installations*
One of the most important limitations on a building of this type is the impossibility of utilizing the ceilings or the interior space for service ducting. In view of this, one of the advantages of the mezzanine is the possibility of concentrating all of the ducting and cables in this new ceiling.

The flooring can be taken up to access all of the installations, including the air ducting system. It consists of a suspended floor of concrete slabs laid on metal supports.

The shelves, as fixed fittings, serve to support the fire hoses – thus leaving the fabric of the building intact.

*Furniture*

The concrete floor slab of the mezzanine is virtually a furniture element inserted in the existing structure, between the walls of the original building, with a series of vertical elements anchored to the pillars to support its lightweight structure.

In the voids of these walls there are architectural fittings of woodwork, extremely simple in their design, which provide construction solutions to geometrical and functional problems. These are set into the metre-thick walls, but are not movable.

For instance, the „bench" designed to take advantage of the space between the stacks, when this is not a circulation space, to accommodate two small tables. [Fig. 6]

## THE MAIN LIBRARY OF THE UPF IN THE FUTURE

When the Dipòsit de les Aigües building is fully operational it will initially have some 9,000 linear metres of shelving, which will hold approximately 350,000 volumes, and 600 reading places, including some twelve study rooms (of 14 square metres each) for postgraduate students, plus some ten study rooms for 4 to 6 people.

But, if we sum the reservoir building with the Jaume I space, the Main Library of the UPF will have, approximately, 15,000 linear metres of shelving, which will hold 600,000 volumes, and 1,400 user places.

## CONCLUSIONS

What emerges from this project is how surprisingly ideal a building with a structure which seems at first sight absolutely alien to the needs of a library has proved to be, and how the distribution of the walls and the distance between these has turned out to be truly optimum. The four metres that separate them perfectly accommodate a reading desk and the space required by the readers to move between the shelves mounted on the walls. If this space had been even half a metre narrower, the present layout would have been impossible.

The Dipòsit de les Aigües building is a space inscribed within the larger space of the General Library, combines two elements: that of modernity and that of the quality of the space.

The element of modernity reflects the commitment to providing an effective and efficient response to the needs of the university community, while the element of spatial quality is the result of a skilful adaptation of the spaces to their new uses. As it has been said, the spacious reading room in the Dipòsit de les Aigües is an aid to concentration and encourages a less massive use thanks to its smaller work spaces. Its interior induces a sense of tranquility and silence rather like a monastic space, while the Jaume I facilities are designed for a fairly intensive circulation and movement of users.

Finnally, we would like to stress the representative value for the UPF of installing the Library in the most emblematic of the University's buildings; a building that is, on account of its singularity, well known to the whole city of Barcelona. The Library acts as a bridge between the University and the city.

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Figure 1

Figure 2

Figure 3

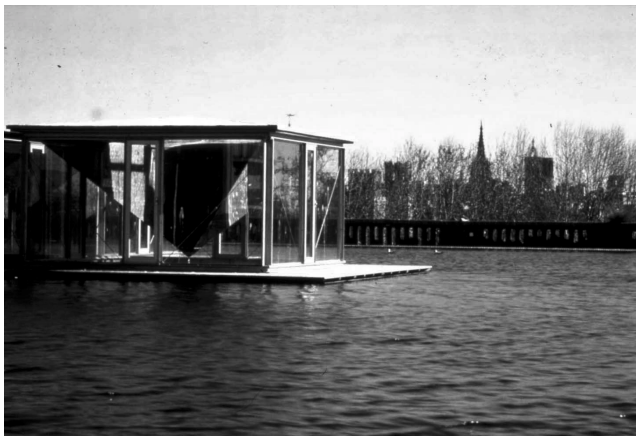

Figure 4

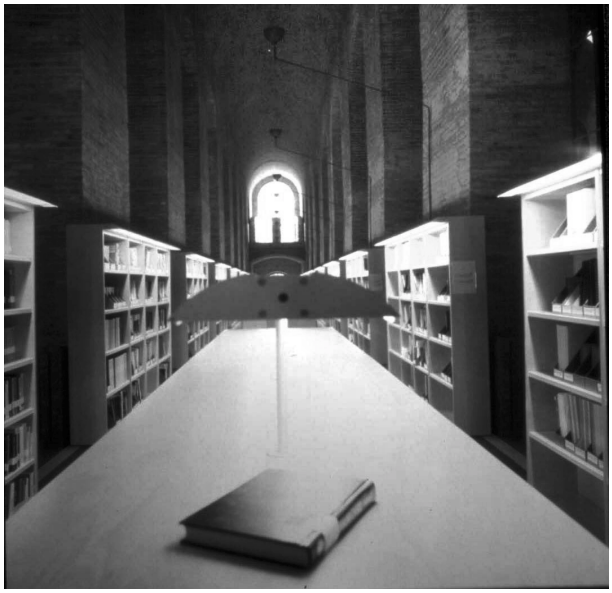

Figure 5

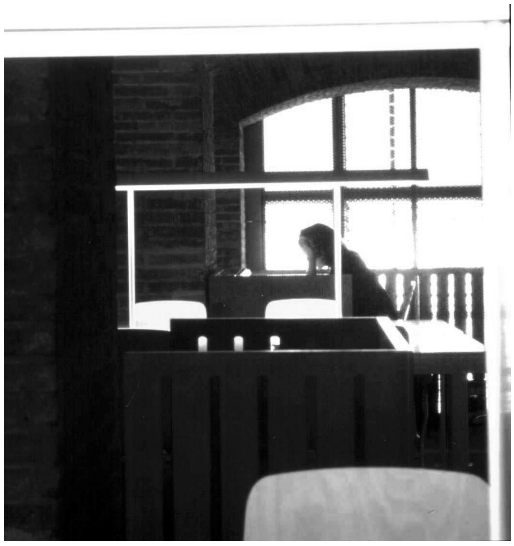

Figure 6