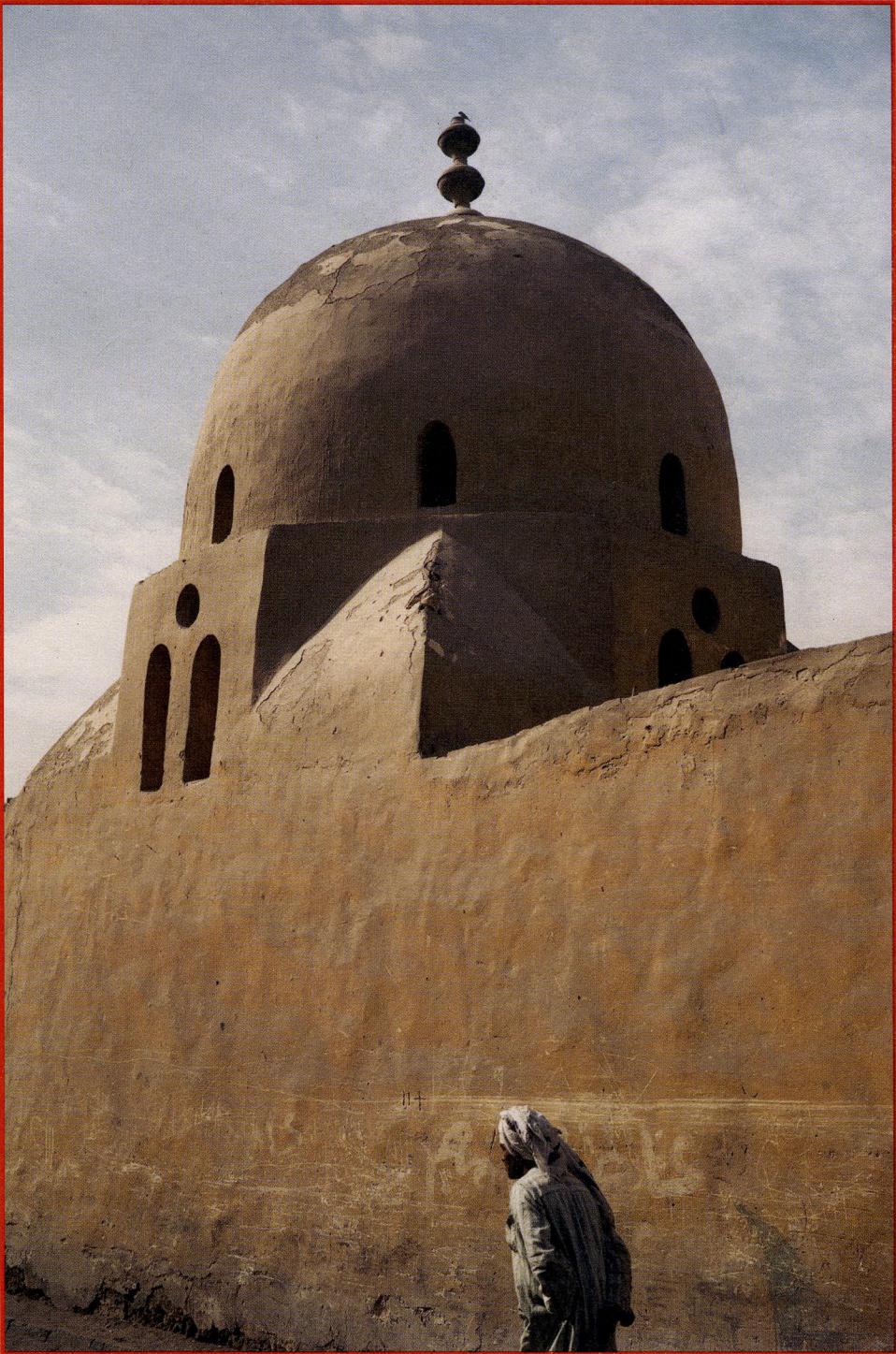


THE MASSACHUSETTS REVIEW



EGYPT

# MR

## The Massachusetts Review *WINTER 2001-2002*

A QUARTERLY OF LITERATURE THE ARTS AND PUBLIC AFFAIRS

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*Christoph Kapeller*

## The Architecture of the New Library of Alexandria

UPON VISITING THE RAMPARTS of the medieval castle of Qait Bey, which was built on the remaining foundations of the ancient lighthouse of Alexandria, one of the seven wonders of the ancient world, nobody will miss the magnificent view of the oval-shaped Eastern Harbor and the city skyline.

The buildings surrounding the harbor form a solid wall of almost uniform height, thus creating a very strong feeling of space and containment. The Eastern Harbor bay, nowadays used for fishing and sports, has revealed numerous submerged archeological finds dating from the Ptolemeic Period, and provides one of the strongest spatial experiences in the city.

Directly across from the castle, at the opposite side of the bay, the skyline opens to give way to a huge cylindrical shape set back from the actual bay. One doubts whether this gray oval disk, which is divided into a series of smaller modular elements, has stood there from antiquity, or has “just arrived.” The new library of Alexandria, viewed from the castle, feels familiar and alien, ancient and contemporary, glittering and shining like a polished mirror in the morning, gray and huge like Moby-Dick in the afternoon light—a timeless structure.

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*Library seen from Qait Bey*



### *The Massachusetts Review*

The creation of a building that conveys this sense of timelessness was one of the main objectives five young architects set out to achieve, when we gathered in Los Angeles in May 1989 to prepare our entry for the international architectural competition. Two of us had previously been associated under the Norwegian firm of Snohetta, whose name was used for the competition and became the name of our company, two had previously formed ties by studying and working together in Graz, Austria, and the five members comprised three nationalities; Norwegian, Austrian, and American. This variety of experience and cultural background, as well as the familiarity of the team members, allowed us to draw from a multitude of images and inspirations for the design of the building. Our design was awarded the First Prize among 526 participants. Now, 12 years later, the library building is nearing its completion and the thoughts and ideas created during the competition period are put to a test.

It was clear from the beginning of the design process that the new library—called Bibliotheca Alexandrina to recall its classical predecessor—had to be a contemporary building that would defy the styles and fashions of architectural design. Instead, the shapes derive from geometric, historic, and functional criteria set out by the nature of the project, the user's program, the site, and of what is known of the ancient library.

The design attempts to create a universal shape generating a building rooted in the ancient past and reaching out into the future. It describes the re-birth of one of the greatest knowledge and learning centers of ancient history.

In order to withstand architectural fashion statements and to convey the feeling of a timeless structure, the design of the new library of Alexandria had to be accessible on many levels. Some should be able to see the symbolic content and the images, while others would see shapes, spaces and light. Lastly, the library can be understood as a pure functional building, fulfilling all the requirements of a modern research library and satisfying the users needs and comfort.

The following portrays some of the levels of ideas and inspirations that led to the final shape and organization of the building.

## *The Architecture of the New Library of Alexandria*

### **THE URBAN SETTING**

The site of the new library lies at the foot of the peninsula Silsileh, directly across from the Mamluk fortress of Qait Bey. This provides views of the Eastern Harbor, the skyline of the old city on one side of the peninsula, and the view of the Mediterranean Sea on the other.

The existing conference center with its main entrance towards the site created one of the major challenges for the design. The building's general appearance needed to be enhanced and a dialogue needed to be found between the conference center and the new library.

The new library opens the skyline of the Corniche by creating a raised public entrance plaza. This plaza leads the visitor to the entrances of library and conference center, and connects the University campus with library and seashore promenade. This connection is further enhanced by a footbridge which starts at the University and helps students to reach the library over the heavily traveled Port Said Street.

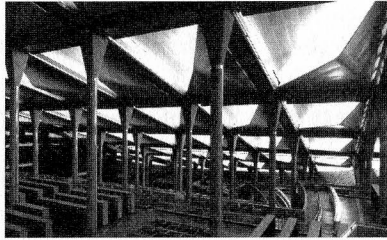
The public elevated plaza at the Corniche side carries a grove of twelve olive trees and acts as a civic gesture, as an invitation to the people of Alexandria to visit and use the facility.

### **THE LIBRARY'S COMPONENTS**

The entire facility consists of three main structures: an already existing conference center, the new library and a small planetarium and science museum.

The Conference Center houses four main halls, one for 1300 seats, three others of 300 seats each. Additional exhibition areas within the center are being added, together with offices and small meeting rooms. This will create a fully functional conference facility whose aim is to provide a counterpart to the research library by establishing the opportunity to research, study, and debate within one project.

The library consists of several related functions: the library proper with its reading room, book storage, audio-visual and music departments, book-handling facilities etc., an international school for information studies, a library for young people, cafeteria,



*Planetarium*

bookshop, lobby, auditorium, several small museum and exhibition spaces and the administration area.

The science museum and planetarium form a small separate unit, standing prominently on the entrance plaza. The planetarium, which accommo-

dates seats for about a hundred spectators, is a complete sphere, black with lit metal strips and suspended on two trusses. Beneath the suspended ball sits the science museum. This space is covered by an inverted glass pyramid, which provides views of the planetarium sphere suspended above. The science museum will be furnished with exhibits describing the scientific achievements and inventions of the philosophers working at the ancient library.

#### **SYMBOLS, IMAGES AND INSPIRATION:**

##### **THE CIRCLE AT THE BEGINNING**

According to legend, the ancient library of Alexandria whose exact location, appearance and ultimate fate are not known, contained the writing and knowledge of the entire world of its time. Flavius Josephus wrote the following about the library:

Demetrius of Phalerum, who was in charge of the king's library, was anxious to collect, if he could, all the books in the inhabited world, and if he heard of, or saw, any book worthy of study, he would buy it; and so endeavored the wishes of the king, for he was very much devoted to the art of book-collecting.

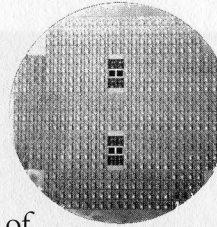
This is the most widely known myth of the ancient library, and we decided to express it in the language of form and architecture. The idea of oneness, containment, and all-encompassing knowledge is physically portrayed in the geometric form of the circle. The universe of the book and knowledge is metaphorically described by a universal geometry, without beginning or end, a continuous shape—the circle. Throughout the design of the building, circles and volumes derived from circles have been an important source of the project's geometry.



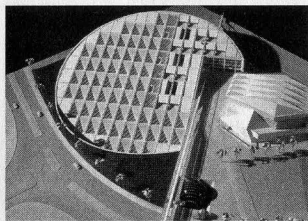
## *The Architecture of the New Library of Alexandria*

### **THE IMAGE OF THE MICROCHIP**

The image of a microchip, circular in its perimeter shape, and modular in the organization of its surface, was the image for the design of the roof disk.



The microchip generates the basic geometry of the building and forms a high-tech skin, metaphorically recalling the element of information transfer of an active institution and physically providing a filter for environmental influences. The image of the microchip symbolizes the library's active role within the technology of the new century.

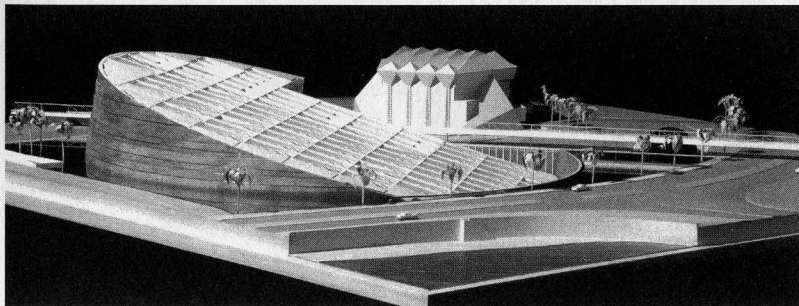


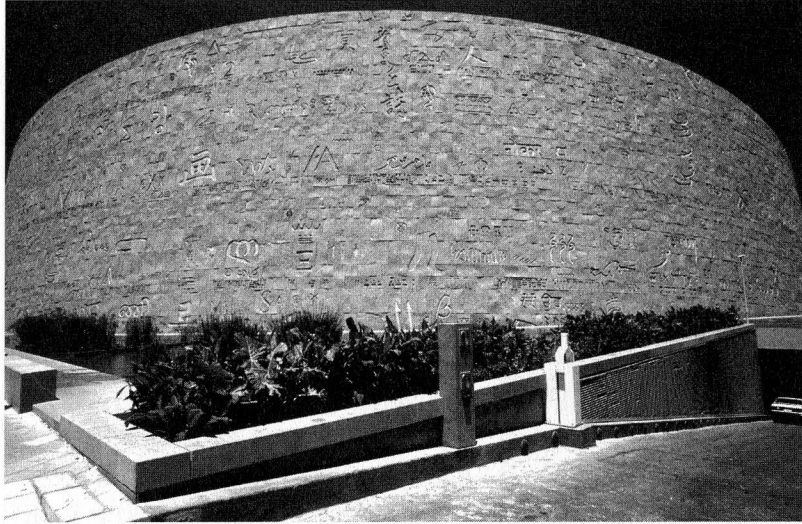
*Model shot of the library roof*

### **A BUILDING ARISES**

Once the roof element was established, the circular roof disk was tilted along one of its chords, so that the smaller element of the disk was placed below ground level, while the larger portion rose from the ground to form the actual elevation of the building. The roof stands out to the northwest, overlooking the Eastern Harbor and the Mediterranean Sea. The tilt of the roof disk symbolizes a frozen moment of the rising motion of the new Library of Alexandria. Metaphorically, the expanse of the roof from 10 meters below grade to 32 meters above, describes the institution's foundations in history—below ground level, its crossing of the present, described

*Model*





*External granite wall*

as the ground level, and finally its reaching out into the future—32 meters above grade.

#### **THE CONNECTION TO THE PAST**

Surrounding the tilted disk and shaping the cylindrical building form, the external granite wall connects the roof to the ground. The wall is entirely clad with cleft granite panels hewn and carved with a continuous relief of signs and letters of languages from all over the world. This archaic element connects the building to the ancient tradition of Egyptian relief arts while describing the smallest elements of human writing, the letter. The letters and signs, which are found inside the library in the organized form of books, are taken out of context here and are displayed in a pure artistic manner as a circular carpet of modern calligraphy.

#### **THE GEOMETRY**

Eratosthenes of Cyrene, one of the chief librarians of the ancient library of Alexandria, became famous for his calculation of the circumference of the earth. In an equally bold and simple move, he measured the angle of the sun at exactly the same time

### *The Architecture of the New Library of Alexandria*

at two different cities, with known distance from each other. He thus could define the arc between the two cities, and with it, the circumference of the whole. In addition, Euclid is said to have spent some time at the ancient library and Archimedes had either been there, or at least corresponded with the library's scholars.

Knowing, that at least three of the leading minds of ancient discoveries of geometric relationships had close contacts with the ancient library of Alexandria, it was clear to us that the new building had to follow a simple and convincing geometric concept.

Book shelves are spaced at a distance of 1200mm in book storage areas and 1600mm in the open access reading room. Two common multiples of these two figures were determined at 9.6 meters and 14.4 meters, respectively. These two figures then formed the structural module for the building as they would allow shelves to be arranged with maximum flexibility.

The height from one floor to the other is assumed at 4.15 meters to allow ample space for services. Floors had to meet beams at equal intervals, so the angle of the roof is determined as the result of 14.4 meters and 4.15 meters, with 16.08 degrees.

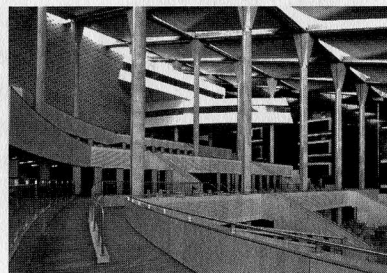
It was further determined that both, floor plans and roof plan, had to be true circles, while the resulting building volume was an elliptical cylinder. It is obvious that when an elliptical cylinder is cut at a particular angle, the resulting geometric figure is a circle, just as any oblique cut of a circular cylinder creates an elliptical figure.

Finally, the building shape is defined by these conditions, as follows: The building volume is the one elliptical cylinder, which provides circular sections at 8.04 degrees from the normal section of the cylinder.

#### **THE READING ROOM**

Following the great tradition of 19th century libraries, the new library of Alexandria houses a gigantic reading room, the largest in the world. Forming a

*Reading room*

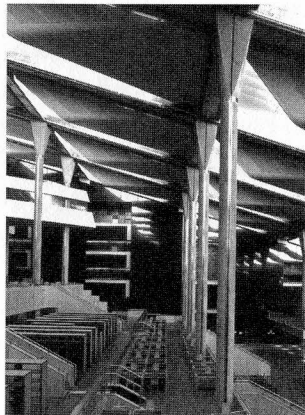


## *The Massachusetts Review*

semi-circular amphitheater that covers half of the building's footprint, the reading room provides space for 2000 readers and numerous open access reference shelves. Contrary to most of the traditional reading rooms, a completely different concept of shelving and book storage was created in order to avoid the inevitable problems of expansion and flexibility that come with a circular space.

The reading room, whose dimension is 160 meters in one direction and 80 meters in the other, is laid out in accordance with the geometry of the roof module and is organized on seven main platforms. The room's height varies between three meters, at the bottom, and sixteen meters, at the top. Readers' desks occupy the terrace edges to benefit from the best lighting conditions and views across the space, while open access shelves are spread out on the rest of the platform. Beneath the next higher platform, a row of seminar rooms and carrels separates the reading room from the stacks, the closed book storage areas. The stepped reading room, therefore, allows for maximum flexibility, for future department changes and for extremely short distances between readers and book storage areas. The main access to the semi-circular room is on the middle platform, creating equal numbers of platforms above and below the entrance terrace. A main stair connects all terraces and a series of smaller connecting

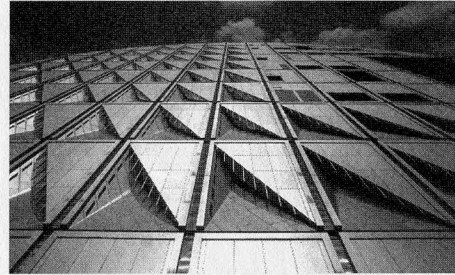
*Reading room*



stairs provide additional convenience for the readers. Every reading space is made accessible for the disabled. Elevators are located in a linear "spine" element and serve each main platform, while ramps are strategically located to serve the secondary reader platforms. The interplay of geometries, namely the modular system of the roof and bookshelves, and the circular system of the perimeter walls, create a multitude of niches and nooks in the giant room. This, together with the arrangement of the terraces, provides

## *The Architecture of the New Library of Alexandria*

intimacy and privacy within the large space and will allow every reader to find his “favorite” reading spot. This eliminates the “train station” atmosphere of many other large spaces and provides an feeling of intimacy within the huge space.

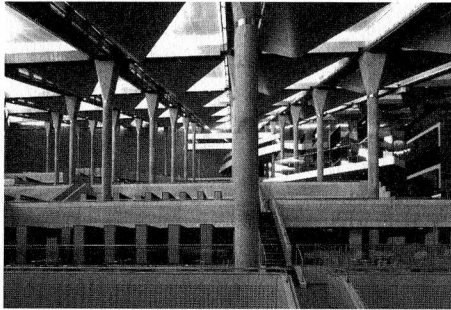


*View of roof skylight*

### **NATURAL LIGHT**

Fifty-six large skylights, one at each roof module, cast natural light into the library’s giant reading room. Each skylight is placed at the diagonal of one of the roof modules. In order to allow a maximum of daylight to enter the reading room, while avoiding the direct sunlight to enter, each roof module is formed as a sculptural metal element containing a large vertical skylight. The roof is oriented in a manner that directs the diagonal skylights to the north to keep the direct sunlight out. Additional external curved sunshades at the level of the roof, block morning and evening sun during the time of the summer solstice. The light is reflected into the skylight from the lower, curved portion of the roof module onto the internal ceiling. From there, a double reflected, homogenous, soft glow illuminates the reading room during daylight hours. The minimum lighting level of natural light at the reading desks is determined at 250 to 300 lux. Therefore, the natural lighting, while being enhanced by desk lights during low external lighting levels, is quite sufficient during most of the day. In addition, small colored glass elements are placed along the vertical roof beams. These skylights cause colored patches of light to move along the reading room floor, in accordance with the time of the day and the season. They add to the richness of the space, and provide additional contact to the outside, as well as the sense of time for the reader.

Twenty-seven perimeter modules contain a continuous skylight along the outer wall of the reading room. Direct ingress of sunlight is accepted here, and the skylights primarily light up the perimeter wall.



*Reading room*

The administration and research areas are lit by two large glazed curtain walling elements along the cut edges of the building volume. In addition, there are two deep light-wells, bringing natural light into the lower portions of the administration areas, and a number of office and public balconies cut into the roof structure.

The artificial illumination of the large reading room is achieved by up-lights whose direction mimics the incoming daylight and whose color temperature is carefully adjusted to blend pleasantly with the daylight.

Materials and shapes are chosen to enhance the flow of light. The gigantic concrete columns are visually separated by metal rings and plates designed to shine in the reflected roof light. The concrete capitals are adorned with small ribs to assume texture in the light.

#### **ACOUSTICS**

Another major challenge of designing a large reading room such as the one for the new library is the avoidance of a noisy environment. While this is foremost a question of the readers' discipline, the architectural layout and design of finish surfaces could either further good acoustic performance of the room, or not. The new library of Alexandria has a multitude of seminar rooms, study carrels and group study rooms. This will allow visitors who wish to discuss certain issues in the library, to do that in one of these rooms.

In addition, the acoustic consultant provided a three dimensional computer simulation of the sound propagation within the room. Though this model, we determined the most suitable and effective location for the sound absorbing material. The ceiling, the edge of the platform balustrades, and the surrounding perimeter wall were the areas determined to be most effective.

### *The Architecture of the New Library of Alexandria*

In fact the acoustic performance of the room is excellent, even without the presence of books and people, which will further improve it.

#### **FIRE PROTECTION**

One of the big controversies between architects and librarians has always been the use of water for fire fighting within a library building. Rumor has it that the ancient library was destroyed by fire and the books were burned, a fact that makes the fire fighting system of the new library an especially sensitive issue.

Librarians claim that water has destroyed more books than fire ever has; they would rather see books burn than be drowned in water. Architects and engineers reply that water—especially an automatic sprinkler system—is by far the most efficient and safest way of fighting a fire and of saving human lives. After long discussions, we reached a compromise with the librarians. In the reading room and the regular book storage areas, a double knock sprinkler system would be used. This means that there will not be any water inside the sprinkler pipes unless a special alarm is given by a smoke detector. The advantage of this system is that the accidental knocking off of a sprinkler head will not create a flood in the library, while the efficiency of the total system will not be compromised during a fire.

Manuscripts and rare book vaults are equipped with a gas extinguishing system, while the offices and public non-sensitive zones are furnished with a traditional sprinkler system.

Finally, the main concern of the large reading room is to provide safe exit facilities for the 2000 readers in the event of a fire. It is common knowledge that most people are killed by smoke in the event of a fire. Keeping this in mind, our fire consultant created a three dimensional model simulation of smoke spread in the large reading room. The results of the simulation model called for the introduction of two smoke curtains that divide the room into three zones. In the event of a fire, the smoke rises and will be kept within the zone of the fire. This way, safe exit passage for the visitors is provided within the two other zones of the reading room.

### *The Massachusetts Review*

THE SETTING WITHIN the skyline of the Alexandria, the symbols, ideas and inspiration, the tranquility of the external wall, the play of sunlight on the circular building shape, the change of appearance of the roof during the course of the day and finally, the huge expanse of the reading room. All this, together with integrity of function, comfort, practicality and the facilities for a modern state of the art library, form the multitude of access levels, which are needed to create a successful building.

Architecture that defies the fashion of the times must provide all this and more; it must describe the unwritten nature of a place. For a building to be successful, it must fulfill peoples' desire of integrity of use and form. The more openness and interpretations it allows, the more successful it will be.

The ideas created during the competition design in 1989 have been built in real materials, most of them strengthened and enhanced during the realization of the building. The timelessness the building conveys, stems from the richness of levels of understanding and the multitude of interpretations.

It is now up to the users and their organization to fill the library with content and ideas. Attempts in this direction have already been made, a legal framework was created, a dynamic director was appointed and an international board of trustees was established.

I sincerely hope that the new library of Alexandria will create a life of its own and act as a catalyst for further developments and projects within the old center of Alexandria. These new developments could help to put Alexandria back on the map, where it belongs, as one of the most interesting cities in northern Africa, a capital of active engagement into the future, not merely the "capital of memory" of an uncertain past.