

بسم الله الرحمن الرحيم

مؤتمر الأزهر الهندسي الدولي الثالث عشر

**AL-AZHAR ENGINEERING
THIRTEENTH INTERNATIONAL CONFERENCE**

December 23-25, 2014



Ref.: A 25

Date: 07-04-2014

**PAPER TITLE: THE HISTORICAL EVOLUTION OF MUSEUM
ARCHITECTURE**

Author(S): Dr. Y. M. MANSSOUR, H. M. EL-DALY, N. K. MORSI

Dear Author(s)

I have the pleasure to inform you that your paper has been accepted for oral presentation during Al-Azhar Engineering Thirteenth International Conference. The paper will also be published in a special issue of Journal of Al Azhar University Engineering Sector, JAUES

Thank you for your interest in AEIC 2014 and I look forward to seeing you in Cairo.

Sincerely,

Prof. Dr. Abd El-Wahed Gabr
General Secretary
Al Azhar Engineering Thirteenth International Conference
Faculty of Engineering, Al Azhar University
Nasr City 11371
Cairo - Egypt

Tel. + (202) 24029873 / 22601702
Cellular + (2012) 22153943
Fax. + (202) 22601706



Chairman

Prof. A. H. Wahdan

Co-Chairman

Prof. M. H. Kabb

General Secretary

Prof. Abd El-Wahed Gabr

THE HISTORICAL EVOLUTION OF MUSEUMS ARCHITECTURE

Y. M. MANSSOUR, H. M. EL-DALY, N. K. MORSI

ABSTRACT

When the architecture is the art of designing a space for certain purposes; the architectural design of the museum is the ability to create a special and inspiring envelop, which provides its visitors with different experiences, according to its cultural message. It became the main place for preserving artworks, inventions, and human achievements. The architectural design of museums has passed through many stages from the onset of the concept of creating a space to preserve artifacts, until it became now the main cultural and educational beacon for communities, which made it from the most important building types. It was developed over centuries until it became a separate building with special architectural characteristics. This paper discusses the evolution of the museum architecture from the B. C till now, in order to study its evolving circumstances, which had managed its design concept and the new design technologies, which is affecting its design nowadays.

Keywords: Museum, Architecture, Virtual museums.

INTRODUCTION

According to the ancient Greek civilization and mythology, which was based on believing in the existing of gods, the word "Muse" refers to "The God of inspiration" or "The protector of Arts", and the word "Mouseion" refers to "The seat of Muse" [1]. During the Roman era, the word Muse was referring to "The places of meditation and philosophical discussions" [2]. The word Museum was first used in the 15th century in Europe for describing Lorenzo de' Medici's works in Florence. By the 17th century, it was used to describe the European artists work like Ole Worm. In England, the art collection catalogue of John Tradescant in Lambeth was titled Musaeum Tradescantianum, which was published in 1656. The property collection of Tradescant was moved to Elias Ashmole, and then he transferred it to a new building in Oxford University, which was built especially to host this collection upon Ashmole request and named the Ashmolean Museum. After that, the museum was opened to the public in 1683, accordingly, the Ashmolean museum was considered the first old museum built on the museum concept as nowadays and also the first university museum [3]. The museum was moved to another building in the university, and the old building became a science museum. Subsequently, a paradigm shift has occurred in the concept of museum, during the 19th and 20th century because of the revolutions took place around the world, in addition to the world wars. A new generation of museums has been emphasized after this time, by the architectural pioneers. Accordingly, the design of a museum building has become a great challenge for any architect, which reflects the ideology of this era, and remarked as a progress for any school of architecture. At this time, museums are the places for preserving history, appreciating the artistic icons, and recording the human science invents. The visitors of museums now are from every place, different cultures, different ages, and coming for different purposes. According to ICOM, the museum is "A *non-profit, permanent institution in the*

service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment” [4].

In this paper, the evolution of the museum concept from the ancient times to the 21st century will be discussed. Through this study, the main ideologies for museums in each era will be highlighted, passing through the emergence of museum concept and the changes happened due to the changes of world culture from high to public culture and how it could be affected by the new digital design technologies.

1. Museum of Ancient time (B. C).

The idea of establishing a museum or expressing it backs to the B.C time. The museum was an important feature in the ancient schools and libraries. During the rule of the Pharaoh Akhenaten (1335-1353 B.C) a big library was built upon his request in Tal El Amarna region, it was full of antiques and precious collections [5]. Some cloned pieces of old precious pieces with the same materials was found in Larsa in Mesopotamia (Iraq now), back to the second millennium B.C, these pieces have been used for educational purposes, other parts of Babylonian city had been discovered by Sir Leonard Woolley, these parts show how the kings Nebuchadnezzar and Nabonidus were caring about collections while they were ruling Babylonian. Sir Leonard Woolley also found a collection of old pieces and a tablet back to the 21st century B.C in a room found in an old school located near his area of discoveries, this tablet was explaining the life during the 21st century B.C, and also tells a story about Ennigaldi-Nanna, Nabonidus’ daughter and a priestess who operated this school, which preserved some items in their small educational museum [6].

In Asia, especially China, the emperor Shang Dynasty who ruled the yellow river valley area (old China) during the 3rd millennium B.C (1122-1766) was interested in making collections. Also, did the emperors Shih Huang-Ti and Near Sian, and their tombs had witnessed on their care of collecting precious and rare pieces, which were guarded by a group of terracotta warriors and horses, as in (Fig.1), and displayed after that in The Museum of Ch’in figures. The art in China was not only sculptures or paintings, but also included glass, metal works, and poetry. An academy for handwriting and drawing was built at this time by one of the Hun emperor Wu-Ti (87-140B.C), and the last Hun emperor Hsien-Ti, who built a gallery for his ministers’ portrait.



Fig. 1 Terracotta warriors and horses [7].

2. Museums of Medieval from the 5th to the 15th century.

The spread of Christianity during the medieval times in Europe emphasized new changes in the religious ideology and culture of this era, which gave the church a great importance to princes and diplomats. The art collections were mainly preserved in princes's palaces or in the church safes. Collections had a great importance for economical purposes, as it had been used for funding arms during the war. Also, the cloned pieces of these collections have been used for trading, which was including some treasures of the emperor Charlemagne, who ruled the Romanian empire (800-814), and the king of Franks (768-800), who had a number of palaces in Nijmegen and Anglham, which had been contained many treasures, columns, golden and silver lights, and bronze doors, after that it had been divided between the church and princes.

Because of the waterways connecting between Europe with the other countries, and harbors like Lombardy and Tuscany on the Mediterranean Sea; a continuous communication between these countries and the church in Rome, in addition, trade traffic around the world depending on selling collection has been made. The collections were moving between owners from different countries. Most of the shoppers were bishops like Henry of Blois (the bishop of Winchester), who bought some ancient statues during his journey to Rome in 1151, and delivered them to England. The conveyance of antiques was very common in Europe during this period, which became more obvious after conveying the famous bronze horses from Constantinople to St Mark's Basilica in Venice during the Crusades in the 13th century, these horses called after that *The Triumphal Quadriga* or *Horses of St Mark's* [3], as in (Fig. 2).



Fig. 2 The Triumphal Quadriga [8].

3. Museums of Renaissance from the 15th to the 17th century.

The princes's, nobles's, and merchants's passion of collecting classical antiques has increased more than before the Renaissance period (1400-1650), and spread all over the European countries. The start was by the king of Hungary Matthias I, who put the Romanian antiques that have been collected in Szombathely castle, and the paintings in Buda. Also, did Maximilian I of Austria, who preserved the paintings he had collected in his palace in Vienna. In the "Green vaults" of the Dresden palace of Augustus of Saxony samples for scientific materials and pieces of art were found inside. In addition, some collections belong to nobles from central Europe were found, including some collections of the Holy Roman emperor Rudolf II in Prague, others to the Duke of Bavaria Albert V [3].

In France, the passion of making collections had started during the ruling period of Frances II (1515-1547), and Henry II (1547-1559) following their father, then the king Louis XIV (1682-1789) who made a collection containing more than 1500 painting for artists from Italy and Paris, some of these pieces have been transferred to the grand gallery of Louver to present to public during occasions, and the other collections have been preserved in Versailles palace.

In Spain, the Holy Romanian emperor Charles V was keen on making his own collection, which is now presented in the Prado museum in Madrid. Other items presenting the Italian artworks were added to the Spanish royal collection by the Italian king Philip IV [5].

In England, King Charles I (1625-1649) was fond of collection since he was the Prince of Wales; he gathered many art pieces across Europe, and paintings of the famous artists at that time like Antony Van, as in (Fig. 3), Leonardo Da Vinci, Raphael, and Peter Paul.



Fig. 3 Paintings for Charles I of England, paint by Antony Van [9].

4. Museums of the late 17th century.

At the end of the 17th century, the royal and noble's passion of collection has been increased, they were keeping these collections in what so-called “Cabinet of Antiques”, which had been contained many paintings, antiques and some pieces of natural history [10].

After that, all of these palaces had turned into museums, as it had been contained valuable antiques, and treasures. The Louver museum was one of those palaces, it was built in the 12th century, during Philip II ruling time, and in 1682, it had been turned from the Louver palace to a museum by Louis XIV to present his royal collection, and moved to live in Versailles palace.

Most of Florence, Vienna, and the Vatican collections have been transferred to other museums, known now as the most important museums around the world. These collections were presented to the cultivated class only, as a part of luxury, for promoting spirits, sublimity the sense of beauty, appreciating the artistic value, and emancipating thoughts from the church domination [3].

5. Museums of the 18th century.

The 18th century is considered the onset of the public museums in Europe. The high class's power had been diminished, and the church domination, the public interest of arts and culture became higher, especially after the Industrial revolution in this century, in addition to the new developments in science, technology, and arts. Museums were still for aristocratic class only, but it has been opened a few days for public to visit. New museums had appeared during the period in Europe, the Vatican collection was presented for public in museums like the Capitoline Museum in 1734, as in (Fig. 4), and the Pio-Clementino Museum in 1772, its collection had been contained many of the antique works of the Renaissance era.

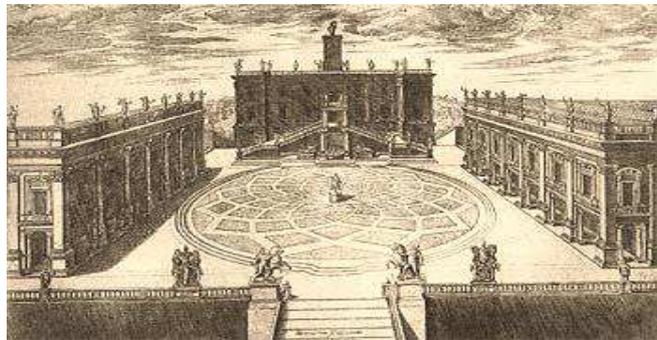


Fig. 4 Michelangelo's design for Capitoline Hill, now home to the Capitoline Museums 1568 [11].

After discovering the Americas, the revival of the trade traffic in northwestern Europe, and the industrial progress, new museums had been built in Europe, including the British museum in London 1759, as in (Fig. 5), and the Louvre Museum in Paris 1793, as in (Fig. 6). The presented collection in the British museum at this time was collected by Sir Hans Sloane - an Irish physician and a collector - his collection had been contained specimens, natural history pieces from Jamaica, ethnographic, numismatic, and art materials. Sloane's collection was about 100,000 pieces, which made it the main core of the museum [12]. Other collections had been added to the British museum by Sir Robert Cotton and Robert Harley - 1st earl of Oxford - which had been contained manuscripts mainly.



Fig. 5 The Entrance to the British Museum in London, England [13]. **Fig. 6** The Louvre Palace [14].

In Spain, the idea of public museums has been evolved during the kings Charles the Third and the 4th ruling time, and the French occupation of Joseph Bonaparte –Napoleon Bonaparte’s brother- who was collecting antiques and artworks from palaces and museums to put it in Prado museum, in Madrid, but the museum opened in the 19th century, during the ruling time of King Ferdinand 7th [5].

After discovering the Americas, and converting it to the English colonies; the Americans started to imitate the European life and their interest in the art, so they built the Charleston museum in 1773 in South Carolina, which is known as the oldest American museum on record, the museum was presenting the natural history at this time [3], now it is presenting the full history about the civil war, ancient world, and the Lowcountry history, as in (Fig. 7).



(a) Historic Textiles Gallery



(b) Natural History



(c) Civil War – City Under Siege

Fig. 7 The Charleston Museum, permanent exhibits [15].

During the American civil war, all the war incidents had been incorporated by portraits painted by the artist Charles Wilson Bill, he had a significant role in the American museum movement, by transferring part of his house into a small museum in 1787, which contained mainly his art works, some pieces of natural history, and a full record for his collections. When the museum became full, it was moved to the Philosophy hall –The Independence Hall now – in the State building, the house stayed as a museum until it had been closed in 1827 for economic reasons. In 1814, a new museum has been built in Baltimore by Rembrandt Bill – Charles Wilson Bill's son – which was the first museum to be designed, and build for exhibiting artifacts after the Ashmolean Museum [5].

In India, the onset of Calcutta Museum the same as the Central museum of Indonesian Culture. Calcutta Museum collection in 1784 was mainly from the Asiatic Society of Bengal's collection, as for the Indonesian museum the Batavia Society of Arts and Science's collection was the base for it in 1778 [3].

The architectural style of museums at that time was looking like the previously noble's palaces and public buildings, as a result of turning most of these palaces into museums, and the domination of the Neo-Classic architectural style in Europe for half a century, in addition to the domination of Renaissance period building style. In the 18th century, museum building architecture was as follows [16]:

- The museum was with the cross shape plan, with a dome in the center surrounded by exhibition halls covered by vaults.
- They used solid elevations in case of using top lighting. The main elevation was full of column, natural forms, with big entrance.
- The light source was always from the natural light by top lighting, so they used the clear story lights, and large numbers and areas of windows in the elevations to get the maximum advantage of the natural light.
- Exhibits were mainly from natural history pieces, books, antiques, monuments, and manuscripts. The traditional way of exhibition had been used with a simple record for each piece.

6. Museums of the 19th century.

After the French revolution in 1789, the ideology of the society has been changed, and provided the public and the middle classes with more social rights, which affected the governing ideologies and all the social life in Europe.

After the French campaign on Egypt and Damascus in 1798, which spends three years there, it was returned to France with some Egyptian artifacts that gave more importance to the museum idea, and as a result; new museums have been opened and more palaces have been turned into museums [6].

In the United States, many museums had been opened, including the American natural history museum, the Metropolitan museum in Philadelphia, as in (Fig. 8), the central museum in Chicago, and the natural history museum in Newberg, Philadelphia, which opened for public in 1850, and became George Washington's base during the American Revolution in 1782 and 1783.



Fig. 8 The Metropolitan Museum elevation, and the great hall [17].

In South America, new national museums had been built, such as the Argentine museum of natural science in Buenos Aires in 1812, the Brazil's national museum in Rio De Janeiro that had been opened to the public in 1818, and the national museum of natural history in Santiago, Chile 1830.

In South Africa, the zoological collection of Sir Smith Andrew, which had been found in Cape Town in 1825 was the main collection in the Zoological Museum. In Australia, a new museum had been opened in Sydney, which had been founded in 1827, as in (Fig. 9). In Egypt, the Egyptian museum in Cairo, or The Museum of Egyptian Antiques. The museums had been established in 1835, near Ezbekeyah Garden, later it had been moved to another building in Boulaq; because the building had been full with antiques, and there is no place for new pieces. The new museum building location was beside the Nile Riverbank, but the antiques had been moved again to a museum in Giza after the damages happened because of the flood of the Nile River. The antiques had been moved for the last time in 1902 to the museum located in Tahrir square, as in (Fig. 10). The Egyptian museum contains most of Pharaonic artifacts, which had been discovered. New museums found their way during the 19th century and opened in many countries, including Ukraine, Copenhagen, Denmark, France, United Kingdom, and Germany [3].

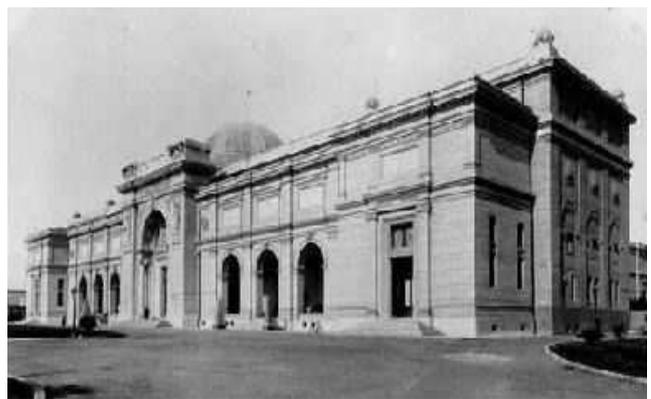


Fig. 9 The Australian Museum, Sydney [18]. **Fig. 10** The Egyptian museum, Cairo, in 1896 [19].

7. Museums of the 20th century to present.

Since the beginning of the 20th century, a new generation of museums had emerged. Many factors affected the establishment of museums at that time, started by the World Wars I, as a result, new museums had been established, especially in Germany to glorify the war men, the important characters of the country, and of course the Nazis figures.

After the Three Russian revolutions, new museums had been established to glorify these revolutions, such as The Winter Palace at Petrograd (St. Petersburg), see figure (1.15), which contains some collection related to the revolutions. A different type of museums had been emphasized named “The Memorial Museums”, which preserved the personal stuff of the famous characters in this period, from these museums was The Central Museum in 1924.



Fig. 11 The Winter Palace, St. Petersburg, Russia [20].

After the Second World War, many ruins resulted from the war, especially in Europe. Most of the European countries used this ruins during its reconstruction, and this ruin had placed in the museums to be preserved after the war [5]. The museums before this period were suffering from the domination of politics and government men, as in the Chinese museums, and Eastern Europe, but after the war everything had been changed, democracy had been extended all over the world, consequently; museums became an independent society [5].

The rise of new architecture pioneers and schools, with new visions for the architecture of this century, like Le Corbusier, Mies Van Der Rohe, Frank Lloyd Wright, and others, each architecture school had adopted a different ideology (form or function), which had a deep effect on the design concepts of museums to be different from the past. The new school’s leaders were searching for what makes their work a landmark in the architectural history, so they started with the museum’s buildings, for its leading educational and cultural role [6]. Le Corbusier and Frank Lloyd Wright had a significant contribution in the museum design. The Museum of unlimited Growth in 1939, Sanskar Kendra museum in 1956, Ahmedabad, India, The National Museum of Western Art in 1957, Tokyo, designed Le Corbusier, as in (Fig. 12), and The Guggenheim museum in 1943, for Frank Lloyd Wright, as in (Fig. 13).



Fig. 12 The Museum of unlimited Growth in 1939 [21].



Fig. 13 The Guggenheim Museum, Manhattan, New York City [22].

As a result of the scientific and technological progress, new types of museums had appeared, London Science museum in 1857, which moved to another building in 1919, and the Deutsches Museum in 1925, in Munich [3], as in (Fig. 14) & (Fig. 15).



Fig. 14 London's science museum [23].



Fig. 15 the Deutsches Museum [24].

At this time, museums have become very common, and it's visitor from different countries, cultures, ages, which give museums a great cultural, educational, touristic, and entertainment statue. Museums typology became varied, science and technology, anthropology and ethnology, archaeology, arts, and natural history.

The differences between museum visitors and their motivations, new functional spaces had been imposed, in addition to the main spaces of the museum, which differ according to the museum topology, consequently; the functional program of museums changed and have to include new functional spaces such as:

- Preservation and restoration rooms: labs, and workshops.
- Educational and cultural spaces: library, lecture halls, showrooms, and conference hall.
- Entertainment spaces: restaurants, cafeterias, and stores for gifts and souvenirs.

According to the changes happened to society during the 19th and 20th century, an economical problem had appeared with the Russian state of museum, after the collapse of the Soviet Union, museums had its own budget, sooner it became very hard for the government to save money for developing museums, so they began to make the museums fund itself after the public donations had fallen [3]. As a result of that, these new spaces such as restaurants, shops, and cafeterias became the main funding source for museums not just for entertaining visitors, and the income from such activities will be used for enlarging the museum collections by buying new original items, or for building new museums.

8. Museums of the 21st century.

During the 21st century, many museums took their place all over the world; because of the paradigm shift occurred in the digital design technology, which is the result of the interference between science branches, the design ideology for the museum architecture has been developed rapidly. This shift offered the architects new solutions for their problems between designing an imaginary form, and the building functional needs, accordingly the field of architecture design became more advanced, as they moved to use this technology in the design stages. This new technology included new ways of presenting artifacts, lighting techniques, monitoring, controlling, and virtual visits for the museums. The new design technologies presented in few types containing optimized, parametric and algorithmic design, as in (Fig. 16). A new generation of architects has adopted this new trend of architectural design by digital tools, which affected the museum design during the 21st century, including Frank Gehry (who designed the Guggenheim Bilbao Museum, which was modeled with CATIA, the computer modeling system in order to develop and coordinate building systems by mapping its curved surfaces), Zaha Hadid, Daniel Libeskind, Jean Nouvel, and other, as in (Fig. 17), (Fig. 18), (Fig. 19) & (Fig. 20). The new trends and technology used in the design stages changed the design ideology along century.

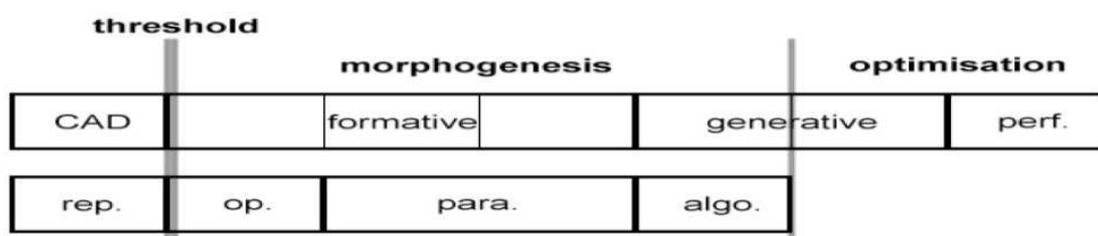


Fig. 16 Towards a conceptual framework - comparison of Turing-based model with Oxman's classification [25].



Fig. 17 Guggenheim Bilbao Museum, Spain, by Frank Gehry [26].



Fig. 18 Denver Museum of Modern Art, USA, by Daniel Libeskind [27].

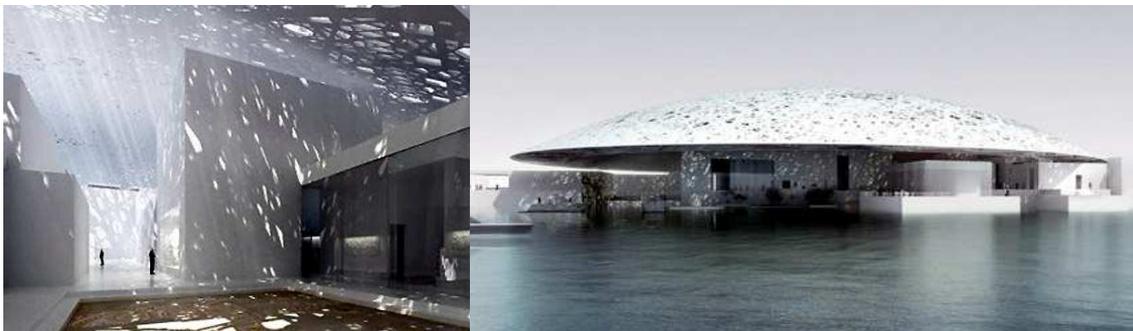


Fig. 19 Classical Museum on Saadiyat Island museum, New Louvre Dubai by Jean Nouvel [28].



Fig. 20 Grand Egyptian Museum, Egypt, designed by Heneghan Peng's company [29].

The new millennium technology in museums is the virtual museums, which became preferable for whom cannot visit museums, and more common. This new service will definitely affect the architectural design of the upcoming museum spaces, not only for the real visitors, but also for the virtual visitors. The control of movement inside the museum became easier to be solved after the new solutions presented by the digital technologies, but the virtual movement, it is still in such a need for other ways to be developed [30].

CONCLUSION

This paper was mainly discussing the emergence of museums, it is derived from the word Muse, which means "The protector of arts", until it became the main space for preserving the human achievement.

A brief history of the museums evolution starting from the ancient times (B.C) as a part of schools and libraries. Then, the museums of the Medieval times in Europe, which was a part of the noble's palaces or a part of the church possessions. After that, the increase of the noble's passion of classical collections during the Renaissance period. By the time, some palaces were transferred into museums in the late 17th century. In the 18th century, it was the beginning of the public museums, and the study of the architecture of museums, which was looking like palaces at the first and turned to the Neo-classical architecture.

In the 19th century, it was the start of spreading the museum culture all over the world. During the 20th century, new factors, including the World Wars, revolutions, architecture pioneers had emphasized new types of museums and some changes in the museums cultural and educational role. Due to the paradigm shift of digital design technology in the 21st century, which affected the architect's perspective of the upcoming museum designs, and the new technology of visiting museums virtually.

REFERENCES

- [1] Online Etymology Dictionary,
www.etymonline.com/index.php?term=muse&allowed_in_frame=0.
- [2] H.H, B.C, "The New Encyclopedia, Macropaedia", Chicago, 1983, volume12, P (656-659).
- [3] Lewis.G, "The History of Museums", Encyclopedia Britannica.
- [4] ICOM, International Council of Museums, 21st General conference in Vienna, Austria, 2007.
- [5] عاصم، أيمن", إدراك الفكر التصميمي للإتجاهات المعاصرة فى عمارة المتاحف", رسالة ماجستير، كلية الهندسة، جامعة عين شمس، 2007
- [6] Abd El Rehem, M. M, "Museums and Architecture", M.Sc, Faculty of Engineering, Cairo University, 2005.
- [7] Ibid, Lewis.G.
- [8] www.ancient.eu.com/news/4814/
- [9] Ibid, عاصم، أيمن.
- [10] Impey. O.R., MacGregor. A., "The origins of museums: the cabinet of curiosities in sixteenth and seventeenth century Europe", House of Stratus, London, 2001.
- [11] Morgan, C. H. "The Life of Michelangelo", Reynal and Company, New York, 1966, P (209–211).
- [12] Anon "Sir Hans Sloane (1660-1753) founder of the British Museum", Journal of the American Medical Association, 1969.
- [13] www.britishmuseum.org/visiting.aspx

- [14] www.louvre.fr/
- [15] www.charlestonmuseum.org/exhibits-permanent
- [16] صلاح الدين، خالد، " عمارة المتاحف"، رسالة ماجستير، كلية الفنون الجميلة، جامعة حلوان، 199
- [17] www.metmuseum.org/visit
- [18] en.wikipedia.org/wiki/Australian_Museum
- [19] www.sca-egypt.org/eng/MUS_Egyptian_Museum.htm
- [20] www.saint-petersburg.com/museums/hermitage-museum/
- [21] Kaynar. I., "Visibility, movement paths and preferences in open plan museum", University of Michigan, USA.
- [22] www.guggenheim.org/new-york/about/guggenheim-images
- [23] http://en.wikipedia.org/wiki/London_Science_Museum
- [24] www.deutsches-museum.de/en/information/museum-courtyard/
- [25] Kotnik, T., "Algorithmic Extension of Architecture", Swiss Federal Institute of Technology, Zurich, October 2006, P (17-89).
- [26] www.guggenheim.org/bilbao
- [27] www.arcspace.com/architects/Libeskind/denver2/denver2.html
- [28] www.designbuild-network.com/projects/louvre-abu-dhabi/louvre-abu-dhabi4.html
- [29] www.hparc.com/work/the-grand-egyptian-museum/
- [30] راشد ، هيثم فاروق ، " دور الواقع الافتراضى فى تصميم المتاحف"، رسالة ماجستير، كلية الهندسة جامعة القاهرة، أكتوبر 2004