

**THE REPUBLIC OF TURKEY**

**BAHÇEŞEHİR UNIVERSITY**

**A SEARCH ON ARCHITECTURAL  
FEATURES  
OF  
NATURAL HISTORY MUSEUMS**

**Master Thesis**

**LAWAL YUSUF**

**İSTANBUL, 2016**



**THE REPUBLIC OF TURKEY**

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**GRADUATE SCHOOL OF NATURAL AND**

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**Supervisor: Assoc. Prof. İrem Maro Kırış**

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Istanbul, 2016

Lawal Yusuf

## **ABSTRACT**

### **A SEARCH ON ARCHITECTURAL FEATURES OF NATURAL HISTORY MUSEUMS**

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Museums are dynamic institutions that have evolved for centuries; they serve as intersection between the past and present. The thesis reviews the transformation of museum architecture from the 16<sup>th</sup> to the 21<sup>st</sup> century with focus on natural history museum buildings. It explores the changing meaning of museum from the traditional to contemporary along the way.

In many countries in the world especially European countries and America, museums of natural history have been constructed for centuries to preserve natural collections and educate the public- not much have been contributed regarding the literature of natural history museum architecture compared to other museum types. Some notable architects had studied and produced theoretical works about Art Museums such as “Museum of Infinite Growth” by Le Corbusier in 1921 and “Museum for Small City” by Ludwig Mies Van de Rohe in 1942. However, the natural history museum architecture has not been considered as an issue.

The study aims to review the history of general museum architecture and concentrate on some notable examples of natural history museum buildings around the world such as the London Natural History Museum, Smithsonian Natural History Museum, Washington DC, American Natural History Museum in New York etc. and analyze various meanings of museums in general along with certain historical occasions that influenced the architectural and societal features of natural history museum buildings.

Reviewing the reason for the categorization of museums according to specialization that took place in the historical course of the museum architecture are also subjects of the study. Some museum buildings are briefly highlighted to spot the transformation in time, functions and collections of the various museums. The shift of collections from stuffed and inanimate exhibits to more interactive and sometimes live displays and new spaces related to these activities are being noted.

The thesis study had been formed on the basis of the historical route of natural history museums, which includes the beginning of the collection of natural objects, the preservation and later the exhibition in natural history museum buildings.

The overall study concludes that the transformation in natural history museum architecture is partially in parallel with the contemporary architectural trends, design methods and building technologies. The thesis demonstrates that part of the architecture of contemporary natural history museums is directed towards organic philosophy through the case studies.

**Keywords:** Natural History, Science Centers, Architectural Features, Natural History Museums, Transformation.

## ÖZET

### DOĞA TARİHİ MÜZELERİNİN MİMARİ ÖZELLİKLERİ ÜZERİNE BİR ARAŞTIRMA

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Müzeler yüzyıllar boyunca değişen dinamik kurumlardır; geçmiş ve şimdiki zaman arasında bir kesişme alanında yer alırlar. Tez, gelenekselden moderne müzenin geçirdiği işlevsel ve anlamsal değişimi dikkate alarak 16. yüzyıldan 21. yüzyıla kadar müze mimarlığındaki değişimi değerlendirirken, doğa tarihi müze binalarına odaklanıyor. Dünyada birçok ülkede, özellikle Avrupa ülkeleri ve Amerika'da, doğa tarihi koleksiyonlarını korumak ve eğitim öğretim adına yüzyıllar boyu doğa tarihi müzeleri inşa edilmiştir. Diğer müze türlerine nazaran, doğa tarihi müzeleri ile ilgili mimarlık literatürü, pek katkıda bulunulmamış bir alan olarak kalmıştır. Kimi bilinen mimarlar sanat müzeleri hakkında teorik çalışmalar ortaya koymuştur; 1921 tarihli Le Corbusier tasarımı "Sonsuz Müze / Sınırsız büyümeye açık müze" ve 1942 tarihli Ludwig Mies Van der Rohe tasarımı "Küçük bir Şehir için Müze" gibi. Fakat doğa tarihi müzelerinin mimarisi böyle bir ölçekte ele alınmamıştır. Çalışma, doğa tarihi müzelerinin mimarlığına, seçilmiş örnekler üzerinde biçimlenen bütünlüklü bir yaklaşımı amaçlar; genel müze mimarisinin tarihine kısaca değinirken, müze mimarlığının gelişiminde etkili olan belirli tarihi olgular eşliğinde Londra Doğa Tarihi Müzesi, Smithsonian Doğa Tarihi Müzesi, Washington DC ve New York'taki Amerikan Doğa Tarihi müzeleri vb. gibi dünya genelinde bilinen bazı doğa tarihi müzeleri üzerinde durur. Müze mimarlığının tarihi rotasında yer alan türlere göre kategorileşme, doğa tarihi müze mimarlığının biçimlenmesinde etkin olan bileşenler olarak fiziksel ve sosyal faktörler çalışmanın konuları arasındadır. Çeşitli müzelerin işlev ve koleksiyonlarında



değişiklikleri açığa çıkarmak adına bazı müze yapıları kısaca vurgulanmıştır. Doğa tarihi koleksiyonlarında içeriğin cansız sergi nesnelere, ziyaretçi ile daha etkin iletişimin sağlanmasını mümkün kılan nesne ve yöntemlere değiştiği, canlı gösterimlerin, simülasyonların ve ilgili mekanların bu müzelerin kapsamına katıldığı gözlenmiştir. Bu tez çalışması, doğa nesnelere koleksiyonculuğunun başlangıcını, koleksiyonların korunmasını ve daha sonra doğa tarihi müze yapılarında sergilenmesini içeren doğa tarihi müzelerinin oluşum ve tarihsel rotası üzerinde yönelmiştir. Genel olarak çalışma, doğa tarihi müze mimarlığının özelliklerinin, gelişim ve değişimin kısmen, dönemlerinin mimarlık akımlarına, tasarım ve yapı teknolojisi alanlarında gelişen trendlere paralel olduğu sonucuna varır. Tez, çağdaş doğa tarihi müzelerinin mimarisinin bir kısmının organik felsefeye doğru yönlendiğini de örneklerle gösterir.

**Anahtar Kelimeler:** Doğa Tarihi, Doğa Tarihi Müzeleri, Bilim Merkezleri, Mimari Özellikler, Değişim

## CONTENTS

<b>FIGURES .....</b>	<b>VII</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
<b>1.1 SCOPE AND LIMITATION .....</b>	<b>4</b>
<b>1.2 METHODOLOGY.....</b>	<b>5</b>
<b>1.3 MOTIVATION .....</b>	<b>5</b>
<b>1.4 REUNDERSTANDING THE MUSEUM.....</b>	<b>5</b>
<b>1.4.1 Etymology Of The Word ‘Museum’ .....</b>	<b>6</b>
<b>1.4.2 Definitions Of ‘Museum’ By Scholars.....</b>	<b>7</b>
<b>2 MUSEUM OVERVIEW .....</b>	<b>10</b>
<b>2.1 SOCIETAL FUNCTIONS AND MEANINGS OF MUSEUM .....</b>	<b>10</b>
<b>2.2 SIGNIFICANT EVENTS IN THE HISTORICAL DEVELOPMENT OF MUSEUM ARCHITECTURE .....</b>	<b>12</b>
<b>2.2.1 Early Museum Designs .....</b>	<b>19</b>
<b>2.3 EVOLUTION OF THE CONCEPT OF “IDEAL MUSEUM” .....</b>	<b>27</b>
<b>2.4 MUSEUM TYPES ACCORDING TO SPECIALIZATION .....</b>	<b>36</b>
<b>3 NATURAL HISTORY MUSEUMS .....</b>	<b>38</b>
<b>3.1 EMERGENCE OF NATURAL HISTORY COLLECTIONS .....</b>	<b>38</b>
<b>3.2 EARLY NATURAL HISTORY MUSEUM BUILDINGS.....</b>	<b>39</b>
<b>3.3 EXHIBITION METHODS IN NATURAL HISTORY MUSEUMS .....</b>	<b>43</b>
<b>4 EMERGING TRENDS IN NATURAL HISTORY MUSEUM ARCHITECTURE.....</b>	<b>47</b>
<b>4.1 COMPARATIVE ANALYSIS TABLE.....</b>	<b>57</b>
<b>5 FINDINGS AND CONCLUSIONS .....</b>	<b>61</b>
<b>REFERENCES .....</b>	<b>65</b>

## FIGURES

Figure 1.1: 41 Spring Gardens.....	3
Figure 1.2: Prudential Assurance Office .....	3
Figure 1.3: National Museum (Malaysia) .....	4
Figure 1.4: Temple of Hephaestus.....	6
Figure 1.5: Ole Worm's cabinet .....	7
Figure 2.1: Solomon R. Guggenheim Museum.....	12
Figure 2.2 Munich, Residenz, Antiquarium by Strada .....	14
Figure 2.3 E.-L. Boullée, museum design, 1783 .....	17
Figure 2.4: L. -F Trouard design for gallery, 1753.....	18
Figure 2.5: Guy de Gisors design of a museum, 1778-79.....	19
Figure 2.6: Leonhard Christoph's Ideal museum plan, 1704 .....	20
Figure 2.7- East Front 1679-1683.....	21
Figure 2.8- North front of the Old Ashmolean Building .....	22
Figure 2.9: Old Ashmolean Museum ground floor plan.....	22
Figure 2.10: Oxford University of Natural History .....	23
Figure 2.11: Spatial layout of Oxford University Natural History Museum .....	24
Figure 2.12: Oxford Natural History Museum central courtyard .....	24
Figure 2.13: Berlin, Altes Museum, 1823-30, by K.F. Schinkel.....	25
Figure 2.14: Central rotunda of Altes Museum.....	26
Figure 2.15: Statues of Castor, Dioscuri and Polux on Altes Museum .....	26
Figure 2.16: Durand's Museum floorplan and section, 1803 .....	28
Figure 2.17: Model of infinite Growth Museum by Le Corbusier .....	30
Figure 2.18: National Museum of Western Art, Tokyo, 1959 .....	31
Figure 2.19: Ramp at the central space of the Tokyo Museum.....	32
Figure 2.20: Similarities between Le Corbusier's concept and Frank Lloyd Wright's Guggenheim Museum, New York.....	32
Figure 2.21: Museum for a Small City Project, Plan by L. Mies van der Rohe 1941-43 .....	33
Figure 2.22: Mies Van Der Rohe's Museum for a Small City Project .....	34
Figure 2.23: Marcel Duchamp, box-en-valise, 1936-1968 .....	35

Figure 3.1: Breakdown of collection syntax at the British museum in Montagu house.....	41
Figure 3.2: A rough architectural plan drawn by Richard Owen in 1859 and final architectural plan by Alfred Waterhouse.....	42
Figure 3.3: A diorama in the Museum of Natural History in Milan.....	43
Figure 3.4: ANHM space show known as Hayden Planetarium.....	45
Figure 3.5: Hall of African Peoples, American Natural History Museum.....	46
Figure 4.1: Natural History Museum of Utah.....	48
Figure 4.2: Facade cladding of Utah NHM.....	48
Figure 4.3: Natural History Museum Utah by Ennead Architects.....	49
Figure 4.4: 3 section natural nautilus shell.....	50
Figure 4.5: Shanghai Natural History Museum.....	50
Figure 4.6: Shanghai NHM green wall.....	51
Figure 4.7: Shanghai NHM cellular wall.....	51
Figure 4.8 Shanghai NHM water garden.....	52
Figure 4.9: Section revealing "connections" throughout Richard Gilder Center.....	53
Figure 4.10: The Gilder Center Central Exhibition Hall.....	53
Figure 4.11: Diagram of Natural History Museum, Denmark.....	55
Figure 4.12: Model view of NHM Copenhagen from the botanical garden.....	56
Figure 4.13 Views from the interior of Danish NHM.....	56

## 1. INTRODUCTION

In the famous Australian indigenous myths known as 'Dreamtime,' people, animals, and plants are the three spirits that created the earth. The connection between human beings and the natural world is maintained through poetry, songs, paintings, and stories. This connection gives the dream site an imaginary mental structure. The imaginary mental structure can be unnoticed in denser regions where buildings and residences determine/dominate the space; this shows the effect of material culture, so solid, in abundance and apparently useful that it can overpower the invisible mental structure that gives meaning to space and its use (Markus, 1993). The myth serves as a metaphor, which highlights the intimate link between people and nature, and also, the way buildings are instrumental in defining space and giving it meaning.

Human beings are curious about nature; the world's evolution is related with human beings' inquisitiveness, which is the catalyst of the learning process and interest to gain knowledge or information. Human beings mental betrothal with nature indeed precedes matured civilizations. Therefore, it can be assumed in early civilizations, man collected objects from nature out of curiosity during periods that predate documentation of history. It is probable that this was done to have a better understanding of life and in an attempt to understand humanity's origin. Natural history collection has gone through a long period of evolution, from the time the collection was for personal interest or individuals' satisfaction of curiosity, to a time when the collection is for the enlightenment of the public. Such collections are now housed and displayed in public institutional buildings known as natural history museums in different regions.

Museums are experienced in the present but still they act as an intersection between the present and the past, this is because their basic purpose is to preserve artifacts from the past in order to enlighten the future generations. Museums are institutions prone to change- sometimes the changes may be slow, but regardless, they are always evolving. Nowadays, there is such a broad range of museum types according to background, philosophies and different services they render to the community, this occurred as a result of increase in specialization and technological advancement. According to George E. Hein (1932- present), a professor with several publications about museums, museum

types in our century include Art Museums, History Museums (Historic houses), Science and Technology, Zoo, Natural History, Science Centers, Outdoor, Maritime, Music etc. housing different functions. As an institution, the museum, itself, has come over a long phase of evolution to become the one that we know today, still, it serves the fundamental purposes, which are education, observation, learning, questioning and scientific research (Günay 2012).

The need for Museum Architecture in general has been increasing over the centuries, from the time they were simple buildings such as Ashmolean Museum in Oxford (1683), The Museum of Natural History La Specola in Florence and the old British Museum in Bloomsbury, London to the 20<sup>th</sup> and 21<sup>st</sup> century monumental museum buildings as in Frank Lloyd Wright's Guggenheim Museum (1959), Frank Gehry's Guggenheim Museum in Bilbao (1997) and they are being responsible for the preservation of collections and making them accessible to the audience. Therefore, architecture is pivotal to a functional museum as expressed by Arthur Erickson, the architect of the museum of Anthropology in Vancouver, Canada, architecture is more than one problem for a museum since it is accountable in making it expressive in terms of social and physical environment and most importantly for its structure (Herreman 1989).

Attempt to review and examine the natural history museum buildings' architectural transformation is beneficial to the NHMs as institutions and the profession as a field. The effort is not solely to state the museums architectural status at a particular time, but to raise questions and awareness on issues that need to be addressed in the field.

There are many museums all over the world in different forms, building styles and from different periods, it is important to note that there are certain factors that influence the design and appearances of these museums. Some of these factors may include; the architect, location, time of design and construction, initial purpose of the building, availability of building materials and technical know-how.

The most important factor might be considered as the period in which the museum building was designed and constructed due to the architectural tendencies, technical know-how and available technology in the period. Preference of architects' architectural style might be influential in some cases, for example, the architect of the British Natural History Museum, Alfred Waterhouse had preferred the French renaissance style as can

be seen in some of his buildings such as the Prudential Assurance Office (1888-1889) and 41 Spring Gardens (1890).

**Figure 1.1: 41 Spring Gardens**



Source: [www.geograph.org.uk](http://www.geograph.org.uk) [Accessed 10 Mar. 2016]

**Figure 1.2: Prudential Assurance Office**



Source: [www.britainfromabove.org.uk](http://www.britainfromabove.org.uk) [Accessed 10 Mar. 2016]

Geographical location plays an important role, most regions have their traditional architectural style; as a result, buildings in a region are likely to be in the regional style

regardless of their functions. An example that supports this is the National Museum of Malaysia dated to 1963, which adopted the Rumah Gadang, the Minangbakau indigenous architecture, Minangbakau is an ethnic group largely found in regions of Indonesia and Malaysia.

**Figure 1.3: National Museum (Malaysia)**



Source: [www.thestar.com](http://www.thestar.com) [Accessed 10 Apr. 2016]

## **1.1 SCOPE AND LIMITATION**

This research is going to be conducted by studying and analyzing the architectural features of natural history museums from the construction period of the early known NHM buildings to the present time and what changes were made regarding the architectural characteristics of this museum type. The study will review the historical course of museums in general and natural history museums with regard to concept of museology and museum buildings. Randomly selected examples of natural history museum buildings based on chronology from various geographical regions will be analyzed to be able to know, easily comprehend, and highlight some notable changes in natural history museum architectural features based on the examples.

This research is however limited to some examples of natural history museums from the 17<sup>th</sup> century to the 21<sup>st</sup> century. The results of the study will be based on the examined case studies.



## **1.2 METHODOLOGY**

Basically, this study will be a preliminary research whereas the research will aid in acquiring a re-understanding of underlying reasons, motivations and opinions of various scholars regarding museums. The research approaches that will be used for analysis include;

- a. Review of relevant existing literature regarding museum and its historical course by referring to publications of scholars (Nikolaus Pevsner, George E. Hein etc.), Journal articles, architectural interviews, seminar reports and museum guidebooks.
- b. Qualitative review of some museum and natural history museum buildings including early built, recently built and proposals or under construction designs.
- c. Analytical and comparative study of some natural history museum buildings from 17<sup>th</sup> to 21<sup>st</sup> century with regard to some independent variables such as; period of construction, building architectural style, building materials used on façade, structural system etc.

## **1.3 MOTIVATION**

The study is motivated towards the desire to examine the architectural properties of natural history museum buildings, these museums are instrumental in people's understanding of life itself, they involve the research and formation of statements that make elements of life and life styles comprehensible by describing the relevant operations, structures and circumstances of various species, such as diet, reproduction, and social grouping (Panyal, 2007). The desire is to attempt pointing out areas needed for addressing in terms of architectural (building appearance and space quality) and societal ingredients of such museums for better study, preservation and exhibition as well as museum architecture that invites visitors to explore and learn.

## **1.4 REUNDERSTANDING THE MUSEUM**

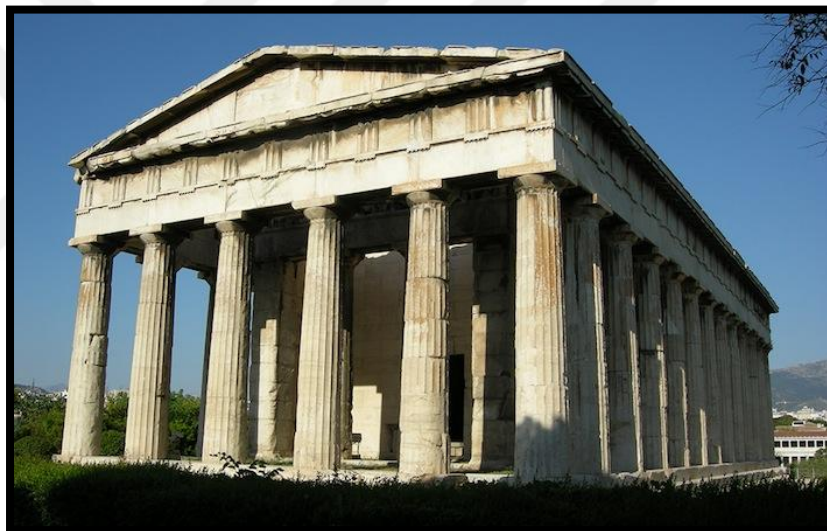
This section focuses on the concept of museum in general, starts with the origin of the word goes on to definitions and various meanings in the society. From the beginning of museum's existence, people are often confused when it comes to the functions of the museum and this is because museums are flexible organizations that respond to the society's trends at every point in time. For instance science and technology museums

had been founded as a result of technological evolution. It is essential to refer to various definitions in order to fully understand the concept of museum due to its dynamic nature. To achieve this, the study started with the historical background of the emergence of the concept of museum and museum buildings.

#### 1.4.1 Etymology Of The Word ‘Museum’

The word ‘museum’ originated from a Greek word mouseion, which means the place where the goddesses, sometimes referred to as muses lived at a point in time (Latham and Simmons 2014). These muses were goddesses who served as a source of inspiration. According to the Greek myth the word “muse” is derived from the word ‘men’ meaning creativity, thought and wisdom (source of inspiration).

**Figure 1.4: Temple of Hephaestus.**



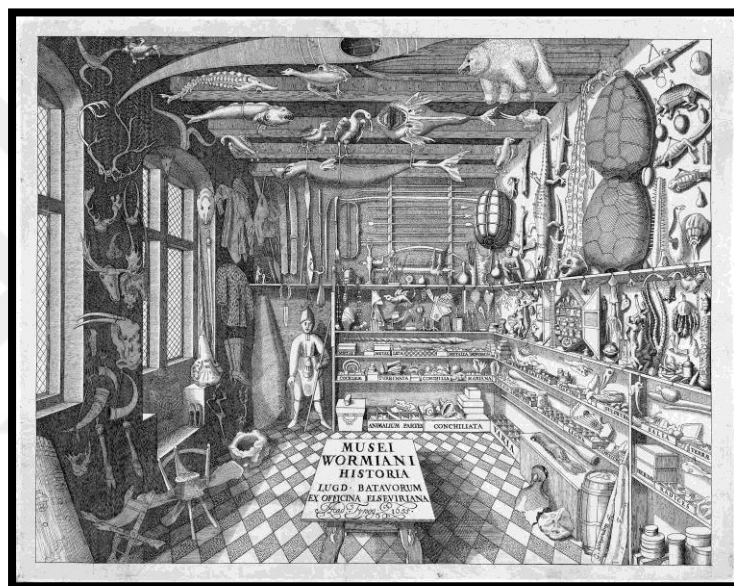
Source: [www.greece.greekreporter.com](http://www.greece.greekreporter.com) [Accessed 15 Mar. 2016]

During the 3<sup>rd</sup> century, the temple of muses (mouseion) which was founded by the Egyptian ruler Ptolemy Soter (367 BC- 283 BC) in Alexandria, was more like a university than a museum in the modern sense because it was only open to professors or lecturers and their students. The only similarity it has with the modern museums is the association of objects with learning (Latham and Simmons 2014).

The word museum was later used again in the 15<sup>th</sup> century to refer to the Medici family collections in Florence, Italy, even though the word was used to represent the concept of inclusiveness rather than that of a building (Lewis, 2006). The first time the word was published in an English book was in 1615 by George Sandys (1578-1644), an English

traveller, colonist and poet, he discussed about the disintegration of the temple of muses in Alexandria (Latham and Simmons 2014). Since after the 1600s, the word museum has been used to address organizations that collected and exhibited objects or collections of curiosities. For instance the collections of Ole Worm (1588-1654), who was a Danish physician and an antiquary, John Trandescent collections that were referred to as Musaeum Trandescantianum in a publication in 1656 and the Elias Ashmole collections which were housed in a building later known as Ashmolean Museum.

**Figure 1.5: Ole Worm's cabinet**



Source: [www.zymoglyphic.org](http://www.zymoglyphic.org) [Accessed 16 Mar. 2016]

As mentioned earlier in the Medici family collections, the word “museum” was used to refer to collections of curiosities not the building that housed them in particular. It is during the 19<sup>th</sup> and 20<sup>th</sup> century that the use of the word also referred to building accommodating cultural material which is open to the public (Lewis, 2015).

#### **1.4.2 Definitions Of ‘Museum’ By Scholars**

It is almost impossible to find a single definition that covers all aspects of museum both meaning and typology wise due to its complex nature. It will be discussed in later chapters that there are many types of museums based on specialization and features. Museum image has slightly changed over time from the time they were private collections of individuals to the time they became dwellings that store artifacts. Lastly

became building housing institution open to public for display, as will be reflected in some definitions cited below. One of the most relatable definitions to date is that of ICOM<sup>1</sup> which defined it at their meeting in 1955 as a “non profit-making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment.” (ICOM, 1955)

To relate to other definitions by scholars might give clues about the understanding differences of the museum concept. Most of the definitions are concurrent except that they may be different aspects due to the compound nature of museum as mentioned earlier. For example, Douglas Allan, who was a director at the Royal Scottish Museum, defined it as “a building that house collections of objects for inspection, study and enjoyment”. Many people would agree with the definition in general except the part that he confined the museum to a single building (Edward and Mary 2008). Despite the number of definitions of a museum, ‘collection’ is often mentioned because ‘collection’ is the fundamental of most museums; therefore a definition may be questioned when such is omitted. Below are further definitions of museum:

“The technical term for collection of objects of art, of monuments of antiquity or of specimens of natural history, mineralogy, and generally what were known as “rarities and curiosities” (Murray 1904).

“An institution for the preservation of those objects which best illustrate the phenomena of nature and the works of man, and the utilization of these for the increase in knowledge and for the culture and enlightenment of the people” (Burcaw 1997).

The definition of museum seems to go in parallel with the evolution of the societies. It can be observed that the museum as a term has been used to label a variety of possessions through time. As mentioned earlier the major paradox of museum definition is the high probability of finding a contradiction as soon as one of its definitions is comprehended. For instance, many definitions confine the museum to a building as in the case of Douglas Allan whereas building-less museums such as open-air museums exist. In some cases, collections of art or culture are mentioned in

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<sup>1</sup> International Council of Museums

definitions. While science Centers may be referred as museums, they don't possess such collections. Botanical Gardens, Zoos and aquariums might be considered as museums while it is apparent that most of their collections are composed of living entities. Most definitions hardly incorporate living organisms. Therefore, the best approach to relate to the museum concept would be to stay current with the definitions due to the rapid level of innovations and evolving trends.

ICOM as one of the most reliable Museum international community made a slight modification to their previous definition, which was adopted in their 22nd General Assembly that was held Vienna 2007;

“A 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 purpose of education, study and enjoyment.” (ICOM 2007)

Another recent definition is that of Mark Walhimer in his recently published book ‘Museum 101’. He defined the museum as “an organization in service to society, open to the public, that acquires, researches, exhibits, and interprets objects and ideas for the purpose of education, study, and enjoyment.” (Walhimer 2015).

Most of the definitions reflect the image of museum at the time, for instance, Murray (1904) referred to it as houses that store artifacts but did not mention anything about displaying them to the public while the latter definitions put an emphasis on museums being open to the public. Based on the above-cited definitions, it can be said that Museums in the 21<sup>st</sup> century in general, are centers which are aimed at educating the society informally by acquiring, studying, storing and exhibiting a wide variety of objects (living and non-living) to the public in an environment or building that integrates learning and leisure.

## 2 MUSEUM OVERVIEW

In order to have a better understanding of the museum concept, this chapter will concentrate on the importance and meanings of museum in the society, museum in history, starting from the beginning of art collecting to when the need to display them to the public arose along with some key figures. The chapter aims to give insight on what museum represents in the society, early museum architecture and spatial layouts.

### 2.1 SOCIETAL FUNCTIONS AND MEANINGS OF MUSEUM

People visited museums starting with when they became public for many reasons but the common goal is often to go and learn (Edward and Mary 2008). Museums have various roles and meanings in the society. The role is sometimes linked to the educative aspect of the museum, interpretation and preservation of culture (Hein, 1998). Despite the educational role of museum is venerable, it is prone to changes due to the shifts in the meaning of education and its significance within museums and the profession (Hein, 1998). Hein (1998) further notes that the addition in the definition of the late 20<sup>th</sup> century is that learning is considered as the physical engagement of the learner with the environment. This definition has given more importance to experience in the learning process. Therefore, this makes the museum essential to the learning process if the focus is shifted from written words to physical interaction with objects, since museums' primary focus is on active engagement with objects.

Museums have some similarities with schools as both are aimed at educating people. Museums are institutions that provide “informal” education while schools provide “formal” education with consideration to certain rules regarding attendance, periods of classes, formal curriculum and requirement for students to graduate. Museums in most scenarios offer “informal” education; rules regarding attendance are usually not included, there is no fixed curriculum with hierarchical progression to higher levels, and in most cases museums do not award mastery certificates at the end of a visit.

In addition to their educational role, some museums are involved with cultural interpretation in order to reflect an updated re-understanding of local and national history. This can be noted in the inclusion of a slave trade exhibition in Liverpool Museum, which is linked to the evolution of the city. Addition of slave accommodations including slave trade auction simulation in Colonial Williamsburg in

Virginia is another instance culture is reinterpreted by museums for modern re-examination.

Similar to the museum role in interpretation of culture, they are active in the preservation of culture in many countries especially regions with vanishing cultures. This is achieved through going to remote regions of a country and collecting locally produced objects and artifacts of the area for preservation. Therefore, museums aim to preserve culture by active collection of cultural production especially regions with disappearing ways of life due to factors as urban renewal programs and preserving these items to prevent them from destruction over time (Groy, 1995).

Despite the increase in societal functions of museums, they still serve the basic role of collecting, preserving, researching and displaying to the public. The educational process is required and conceded. The museums are concerned with the contents to be displayed and meanings attributed to them. The work of museum education makes the interpretation of the exhibits more comprehensible for the visitors.

Just as museums have taken educational roles in various geographical regions, they have also gained additional meanings in the contemporary period, as stated by the Architect of the Jewish Museum in Berlin, Daniel Libeskind, in an interview with Pulse. He said that museums have obtained a new meaning, they are more than design alone but rather the origin of ideas that are being exhibited within and many people have come to notice that as well. Since most museums are intended to be centers of attraction to the locals, they should also be aimed at provoking awareness of the past, giving the people a sense of history (Libeskind 2013). Museums provide a sense of closure and make complicated issues comprehensible for the society through various exhibition settings.

In the contemporary period, there is more to museum than just its basic role, museums are now considered as places that trigger ideas. The center of attention is not intended on the exhibits alone but also the building itself, the building should be in a place to respond to development by providing captivating spatial features, which can provoke curiosity and make visitors wonder. The museum buildings are not considered as buildings that serve as just containers for the exhibits. In examples of modern and postmodern architecture, it is possible to observe slight shift of interest from museum contents to the museum building, people visit some museums for their architecture not

solely for their contents due to the contemporary approach of museums to serve also as monuments. Two of such example among many others are Frank Lloyd Wright's Guggenheim Museum in New York and Daniel Libeskind's Jewish Museum in Berlin.

**Figure 2.1: Solomon R. Guggenheim Museum**



Source: <http://www.aviewoncities.com/nyc/guggenheim> [Accessed 21 Mar. 2016]

In the design of New York Guggenheim Museum, the architect gave less regard to the surrounding environment, which resulted in this striking structure. Frank Lloyd Wright, the architect of the building, was an American architect who used nature as a source of inspiration for most of his designs and Guggenheim Museum is not an exception. Due to its distinctive form, the building continues to draw attention even in a city such as New York filled with landmarks (Ermengem, 2016).

Museums have gone through a phase of transformation both in terms of expression and their image in the society. The educational role of museum is increasing in importance, which is central in adjusting the role of the museum. Museums can be instrumental in defining and spreading the culture of a nation through the various means of objects collection and enlightenment process as mentioned above. Museum buildings in the contemporary period have a role to play in making their contents meaningful to the visitors. In some cases the attention is shifting from the contents of the buildings to their architecture.

## **2.2 SIGNIFICANT EVENTS IN THE HISTORICAL DEVELOPMENT OF MUSEUM ARCHITECTURE**

Art collection began with the period of Italian renaissance, Italian renaissance marks the period of change from medieval to modern era in terms of literature, architecture and



classical art, which began in Italy and later spread throughout the world around 14<sup>th</sup> century till 16<sup>th</sup> century. The collection activity started with elite people interested in collecting objects from the past and a whole category of art objects that are in form of furniture of private residences such as miniature bronzes and paintings. Some art collections consisted of objects such as paintings with historical value and some valuable items such as bronzes. Artists, humanists and most significantly aristocrats were the pioneers of collecting; they collected particles of marble, small things and displayed them on their courtyards. Some of the important Italian pioneers are Ghiberti who was an art collector, Alfonso of Aragon and Casimo Medici who were prince and leader respectively (Pevsner, 1976).

Pevsner records that the word '*museum*' was already used in 1565 to address collection and there were constructed buildings for the sole purpose of accommodating collections of statues. Most of the buildings were either long galleries or rooms planned centrally (Pevsner 1976). However, there were other terms closely related to the word museum, most of them from sixteenth century, an example is the word '*gallery*' that was discussed in the previous paragraph as a synonym of the word museum, and was also used to refer to a place exhibiting works of painting and statuary. It can be derived that '*museum*' and '*gallery*' were used for naming similar spaces. The word '*cabinet*' was used to refer to collection of curiosities, the two words are applicable both in English and French languages. The case was slightly different in German language since the words '*kabinett*' or '*kammer*' were used. In some cases two words could be combined in order to make it precise as in the example, "wunderkammer" meaning cabinet of curiosities (Thompson, 1994).

There were several galleries built within 15<sup>th</sup> and 16<sup>th</sup> centuries to house statuaries some of which included Degli Antichi Gallery in Sabbionetta, Italy designed by Vincenzo Scamozzi (1548-1616), an Italian architect and writer. Among the other galleries of the period was the sculpture gallery of Thomas Howard (1586-1646), 21<sup>st</sup> Earl of a town in London called Arundel, followed by the most aspiring of all the galleries, Antiquarium. Built in Munich for Albrecht V (1528-1579), Duke of Bavaria, state in southeastern Germany, it was built within 1569-1571, the gallery was named '*Antiquarium*'. It was a 66 meters long gallery which was later transformed to hall of festivities by Duke Wilhelm V, Albrecht V's successor, during 1581 to 1600 (Pevsner 1976).

**Figure 2.2 Munich, Residenz, Antiquarium by Strada**



Source: <http://www.residenz-muenchen.de/englisch/museum/> [Accessed 10 Mar. 2016]

Prior to focusing on some early museum buildings in history, it is essential to note the meaning and effect of Renaissance on museum architecture.

Renaissance period started with the influence of certain factors that came to play in the 12<sup>th</sup> century; these factors are social, political and intellectual forces, these forces served as catalyst for interest in learning about the ancient world, ancient Greek and Rome. The interest is to learn more about their art, architecture and literature and to know their values. Among all regions, there is no other place that the transition was more common than in Venice, this is due to its maritime dominance in relations to other regions bordering the Mediterranean during that period. According to Thompson the transition started when the Venetians joined the fourth crusade. Among the battle trophies brought back to Venice were a lot of Greek antiquaries. After centuries of the Byzantine art dominance, it started to diminish as a result of Constantinople's Latin occupation (Thompson, 1994).

By 13<sup>th</sup> century number of collections were already being gathered by some of the elite families in Florence, among these was that collected by Cosimo (1389-1484) of the Medici family, the family line continued to add to the collection even after his death. At a point in time, during the reign of Lorenzo the Magnificent, Cosimo's grandson (1449-1492), the Medici collections included Byzantine icons, paintings, sculptures, books which are all of high value, some of these collections were ransacked on three different occasions after Lorenzo's death until his successor, Cosimo I (1519-1574) decided to

rearrange the collections and made some additions to them. Some of the additions include collection of specimens of natural history as well as artifacts. Later on palaces were built and some were extended by the Medici's to accommodate these collections. The conversion of the Uffizi first floor to a portrait gallery by Francesco I (1541-1587) in 1582 is an example for such building activity (Thompson, 1994).

Pevsner (1976) also notes that the Medici collections continued to grow until Anna Maria Lodovica, the last of the Medici family gave the collections to the city of Florence in 1743 according to her will, the collections were later put for display to the public years after her death. Apart from the Medici collection, there were other collections as well compiled by the other ruling families during the 15<sup>th</sup> century that were also available for display to the public, little payment maybe required on some occasions prior to viewing the collections (Pevsner, 1976).

The establishment of natural history collections was a result of the renaissance enthusiasm for experimentation and observation. In the 16<sup>th</sup> century, the activity of natural objects collection was common in Italy. There were around 250 recorded collections that belonged to various individuals. These include that of Luca Ghini (1490-1556), Felix Potter (1536-1614), Aldrovandi (1522-1605) etc. (Thompson, 1994). Neoclassicism is somehow a return to the Classical Orders of Greek and Roman Antiquity on an advanced level, yet with the maintenance of all the building propels and new materials of the advanced period that is the 18<sup>th</sup> century. It was set apart by massive scale structures, strengthened or finished by sections of Doric, Ionic or Corinthian columns, overcame by amplified Renaissance-style arches. Here and there columns were duplicated and stacked, to make an impression of tallness as in the case of Altes Museum by Schinkel, while the exteriors were enriched with a blend of corridors, rotundas and porticoes.

Neoclassical Crusade or Neoclassicism as it is otherwise referred to was a movement in terms of visual arts, literature, music and architecture that was inspired by ancient Greece and Roman cultures. The movement started in Rome around 18<sup>th</sup> century and later spread to other parts of Europe, mostly by European art students who took part in The Grand Tour. The tour was a traditional trip around Europe organized for the privileged European male students and some sponsored students for the purpose of exploring artistic and intellectual works of European countries (Matthew, 2016). These

European students used to return home from Italy with newly found ideas of the Greco-Roman ideals (David and Johnson, 2006). Despite all the fields influenced by the movement, Neoclassicism had the strongest impact in fields of architecture, sculpture and decorative arts.

The term Neoclassicism was made more comprehensive by Johann Joachim Winckelmann (1717-1768), German archaeologist and historian who was instrumental in shaping the crusade in the field of architecture and visual arts through his writings. In his books *Thoughts on the Limitation of Greek Works in Painting and Sculpture* (1750) and *The History of Ancient Art* (1764), he comprehensively explained the development, spread and differences between Ancient Roman and Greek art within some defined periods. Furthermore, Winckelmann discussed about some of the features that include simplicity, splendor and lastly he emphasized that the imitation of the ancient styles had to be “great” (Honour, 1968).

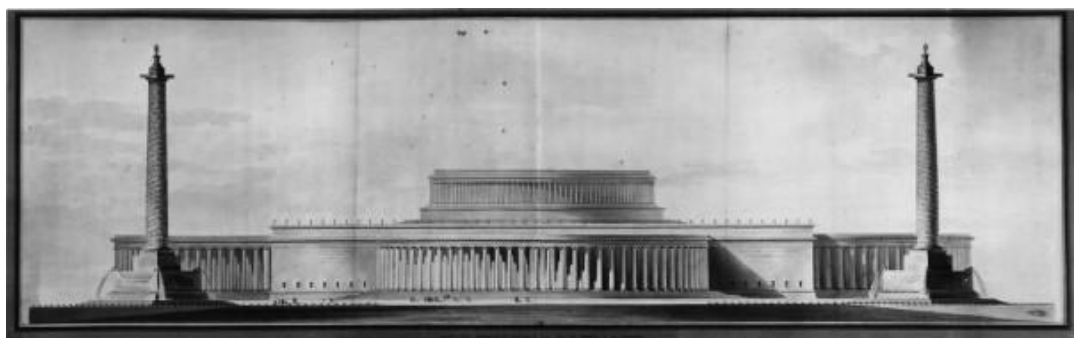
In summary, Neoclassical Architecture emerged in mid 18<sup>th</sup> century. The style evolved from the ancient style of Greeks and Romans such as Andrea Palladio (1508-1580), an Italian architect influenced by architecture of classical antiquity and mostly by Vitruvius’ principles one of which is the connection between structure of the human body and that of a building. The style was first adopted in England then France; in England, Sir William Hamilton, a Scottish diplomat, antiquarian and an archaeologist, was the first to embark on it, The Grand Tour played a major part in introducing it to England as well. Likewise in France, the students that went on the Grand Tour in Rome brought back fresh Greco-Roman ideals; other influential factors are the books of Johann Winckelmann (Honour, 1968).

The Prix de Rome is a major factor in the history of all museum types because it assigned the design of museums on several occasions that resulted in some innovative museum designs. The era of the contest had been a critical period in the academic life of students of architecture, painting and sculpture departments. It was a yearly contest that was organized from 1720 to 1790 by Academie Royale d’Architecture (Royal Academy of Architecture) in France. The main goal was education. Jean Baptiste Colbert (1619-1683) who was a French politician and minister of finance founded the academy in 1671 and was suppressed later in 1783. The concept of the competition is in place since the establishment of the academy (Jacques, 2002).

In the initial years of the competition, students were asked to design part of a building, later on; the assignments became more complicated as the tasks given to them were to make big-scale designs with detailed drawings. For instance in 1744, they were asked to design a public library and in 1748, the assignment was to design a commerce exchange, the yearly assignments were mostly related to the current architectural activities of the time. The academy was not meant for all architects because there were architects that participated but didn't succeed who had successful careers and gained fame afterwards. Among many are Louis Etienne Boullée (1728-1799) and Claude-Nicolas Ledoux (1736-1806) (Jacques, 2002).

A significant figure that appeared at a crucial period in the history of every building type is Étienne-Louis Boullée (1728-1799), the French architect famous for his designs of conceptual monuments. Being born in Paris, he was trained by the French architect Jacques-Francaise Blondel. Boullée, at a very young age, taught at Ecole Nationale des Ponts et Chaussees in Paris during 1778 to 1788 where he systematized most of his ideas on the utilization of geometrical forms in architecture (Palmer, 2011: 42). Most of Boullée's designs with classical features were unrealized due to their large-scales. He was considered more of a theoretical architect. Boullée's designs were uncirculated during his lifespan, but were widely distributed after his death and became very influential in the following two centuries in the evolution of monumental architecture. Boullée was part of the Grand Prix contest in the year 1783, and the theme was to design a museum, even though he did not emerge the winner, regarding style, Boullée's design surpassed the Grand Prix as he gave more consideration to form over function of the museum.

**Figure 2.3 E.-L Boullée, museum design, 1783**

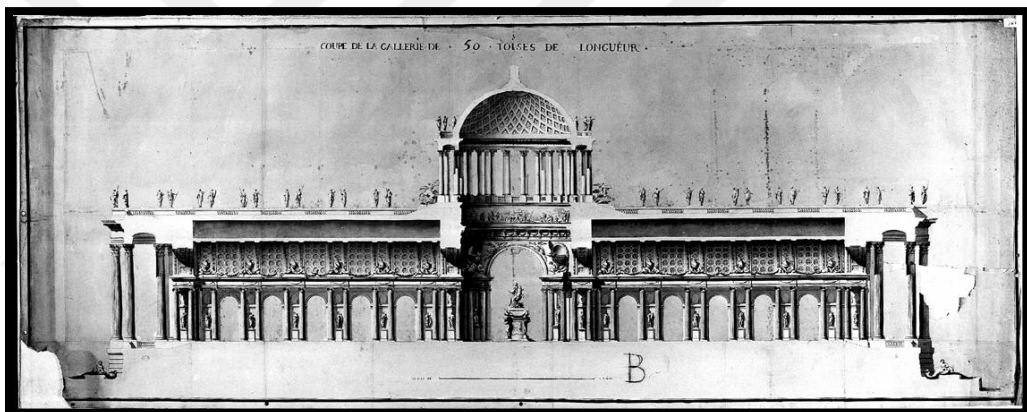


Source: <http://act.art.queensu.ca/details.php?i=4192> [Accessed 5 Apr. 2016]

The museum was in the form of a square shape with Greek set in, a rotunda at the intersection and massive porticoes in the form of semicircles in the middle of every part of the four squares. It was intended to be the four arms and four ranges of the outer square; he designed the domes in such a way that they were elevated from the ground and totally exposed. On the elevation, it looks like a drum with columns around it (Pevsner 1976: 119).

Throughout the span of the Grand Prix contest, the largest numbers of assignments were either related to educational, scientific or conventional buildings such as libraries, museums, military buildings. This resulted in many outstanding designs in the various fields, which set the tone to how individual buildings were to be designed in later generations.

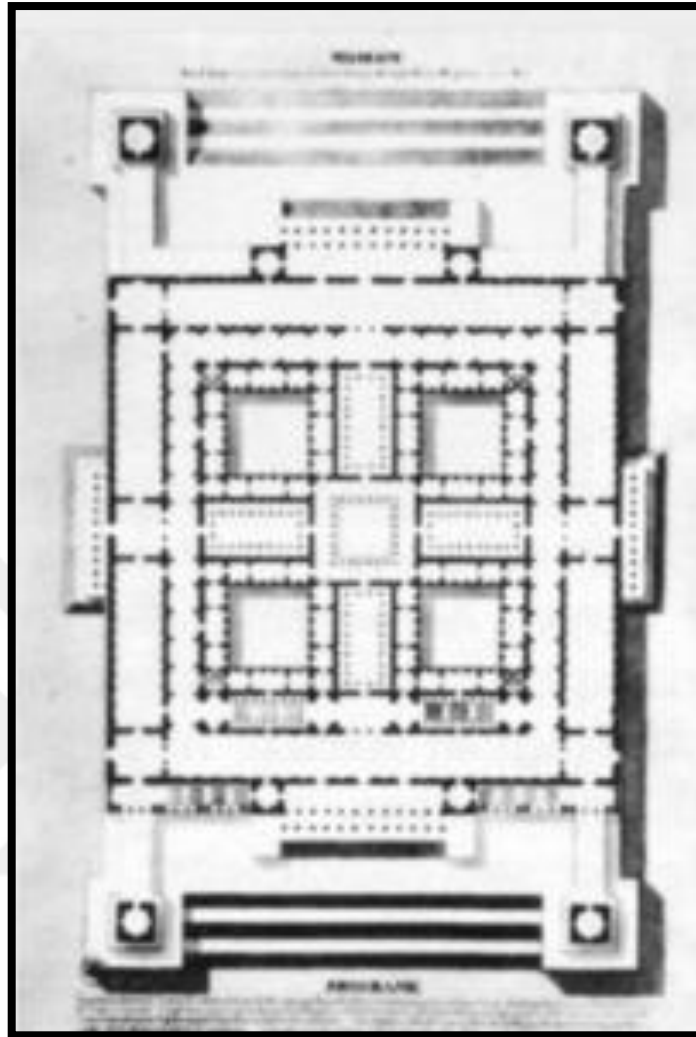
**Figure 2.4: L. -F Trouard design for gallery, 1753**



Source: <http://www.ensba.fr/ow2/catzarts/images/Pra042-11354.JPG> [Accessed 3 April. 2016]

One of the early examples is Louis-Francois Trouard's gallery in 1753, the gallery of a central rotunda, vaults of galleries on both sides of the rotunda and rows of pilasters. Another important museum design is that of Guy de Gisors, winner of 1778-79 at the age of sixteen. His design is a large square-shaped building with four courtyards that are divided into two wings forming a cross, with columns in the required spaces.

**Figure 2.5: Guy de Gisors design of a museum, 1778-79**



*Source:* (Pevsner, 1976: 118)

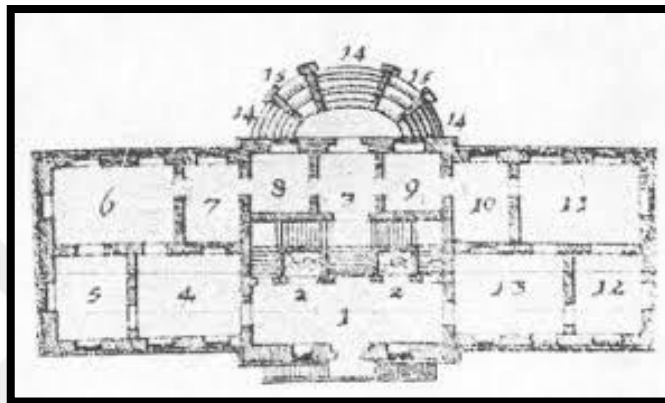
Even after the Grand Prix, the drawings of the competition were used as guides, in order to make them widely accessible to the public, the academy decided to make copies of the originals and published them starting from the year 1758 (Jacques, 2002).

### **2.2.1 Early Museum Designs**

Museum space was introduced as a result of lack of order in classification of cabinets due to the rapid growth of collections. In addition to paintings and statuary; the collections included natural history objects, minerals, corals and freaks. These new additions brought about propensity for separation of the item types, which led to specialization as well (Pevsner, 1976). Despite the separation, collections were still housed in the same buildings, the positive effort made to change this was the

publication of a typical museum plan model in 1704 by Leonhard Christoph Sturm (1669-1719), a German writer, architectural theorist and builder. In the plan, Sturm categorized the collections into groups placing each group in separate rooms, in the arrangement, he decided to issue a single room on the upper floor for paintings, statuary and drawings. The rest of the rooms were shared among the remaining collections (Pevsner 1976).

**Figure 2.6: Leonhard Christoph's Ideal museum plan, 1704**



*Source: (Pevsner 1976: 114)*

The above figure is the ground floor of Sturm's plan showing the various functions of a museum's rooms. According to his design, rooms 4 to 8 are for Antiquities, while 9 to 12 are the rooms for Treasures which may include gold, precious stones, jewelries coral etc.

Before Sturm's 'ideal museum' plan, Ashmolean Museum (1683) in Oxford, United Kingdom had already been erected which is regarded as one of the earliest known purpose-built museums. According to Walhimer it is also regarded as the first natural history museum (Walhimer, 2015). The building was erected as result of gift of collection of curiosities to the University of Oxford by Elias Ashmole (1617-1692), famous English antiquarian and politician. Most of the collections' content were given to him by the son of the original collector, John Tradescant. The building is known to have been designed by Sir Christopher Wren alongside Dr. R. T. Gunther (Elmes, 1823).

The museum was built around 1679-1683, consisted of two-storeys with one basement floor, also, a fine example of Renaissance Style of the 17<sup>th</sup> century. The main building is in the form of a rectangle with two fronts, one to the north and the other to the east. The



first front, which is the east façade, has triangular point pilasters along with entablatures preceded over the front of the first floor façade level and beneath the plain balustrade. Coupled Corinthian sections supporting entablatures with decoration of shells flank the focal entry. The first floor consists of a focal window that has architrave, transom, mullion that are bound by pilasters with cut stones of blooms, shells etc., the façade of the east front is well ornamented.

**Figure 2.7- East Front 1679-1683**



*Source:* <http://www.british-history.ac.uk> [Accessed 10 Mar. 2016]

On the other hand, the façade of the north front is divided into five major vertical divisions along with some horizontal features surmounting the façade. The main entrance was a door converted to a window consisting of an architrave, supports, and ornamental brackets along with an enhanced entablature.

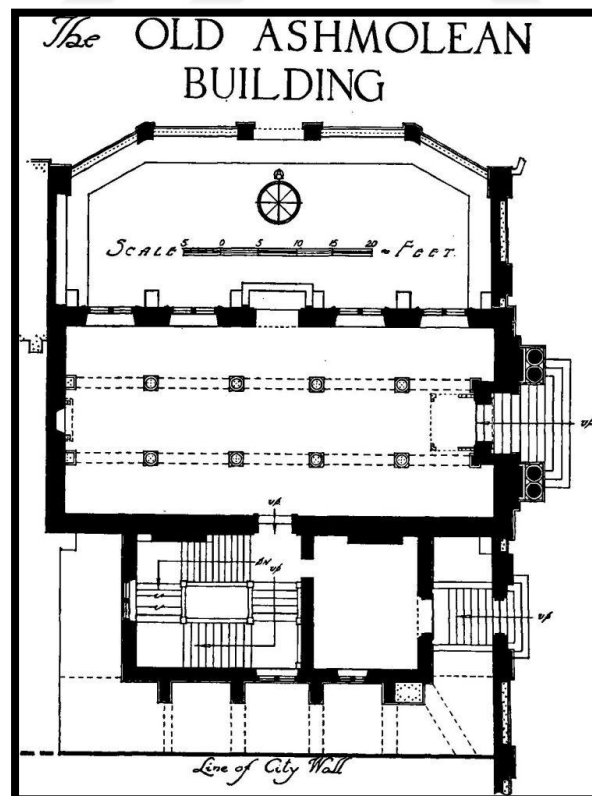
**Figure 2.8- North front of the Old Ashmolean Building**



Source: <http://www.british-history.ac.uk> [Accessed 10 Mar. 2016]

At the basement, there is a tunnel vault made of stone in shape of half an ellipse, which groined over the upper transverse part of the windows. The vertical circulation system, being the staircase, is made up of crafted balusters, formed strings and handrail with square support columns (Royal Commission on Historical Monuments, 1939).

**Figure 2.9: Old Ashmolean Museum ground floor plan**

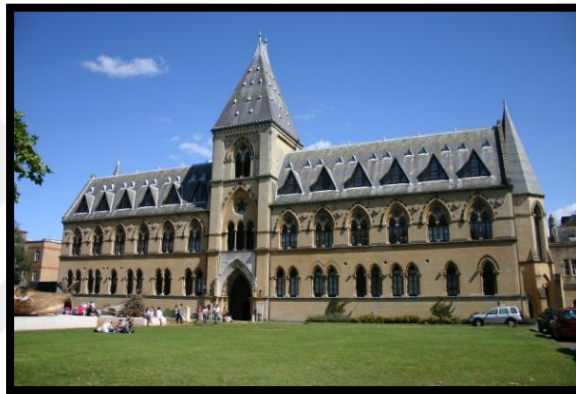


Source: <http://www.british-history.ac.uk> [Accessed 10 Mar. 2016]

Regarding spatial arrangement, the building consists of ten rooms distributed on the three floors; three of the rooms are relatively larger and open to the public. The first floor was the museum space while the main floor consisted of natural history school. Research laboratories, library and a storage room were situated in the basement floor (Royal Commission on Historical Monuments, 1939).

The collection of curiosities were housed in the museum until the 18<sup>th</sup> century when the university created a new museum of natural history, currently known as Oxford University of Natural History, this resulted in the natural history collection of the museum being transferred to the newly opened museum. (University of Oxford, 2012).

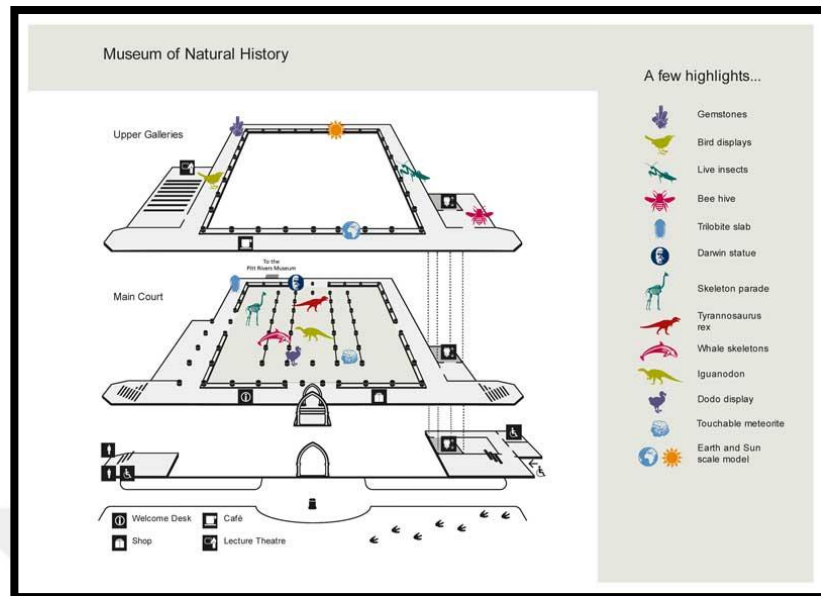
**Figure 2.10: Oxford University of Natural History**



*Source:* campusoxford.com [Accessed 10 Apr. 2016]

The Oxford University of Natural History is a natural history museum established by the University of Oxford in 1850. The museum is a Neo-gothic building that was built in 1861 and designed by Thomas Newenham Deane. A central courtyard with glazed roof and iron pillars as structural support characterizes the building. The iron pillars divide the space into three lanes where most of the collections are arranged and displayed (see Figure 2.12).

**Figure 2.11: Spatial layout of Oxford University Natural History Museum**



Source: [www.oxfordaspiremuseums.org](http://www.oxfordaspiremuseums.org) [Accessed 10 Apr. 2016]

**Figure 2.12: Oxford Natural History Museum central courtyard**



Source: [www.campusoxford.com](http://www.campusoxford.com) [Accessed 10 Apr. 2016]

Followed by the Renaissance and Neo-gothic buildings is a neoclassical example that stands out significantly in history of architecture. Schinkel's Altes Museum in Berlin.

**Figure 2.13: Berlin, Altes Museum, 1823-30, by K.F. Schinkel**



*Source: www.architectsjournal.co.uk [Accessed 10 Apr. 2016]*

Karl Friedrich Schinkel (1781-1841). He was born in a place near Poland called Brandenburg and studied architecture in Berlin with Friedrich Gilly and his father, David Gilly who both worked on Neoclassicism.

The Altes museum in Berlin, built around 1825-1828, is characterized by an open row of columns in Ionic order at front façade, a central rotunda and steps that invite people to the building. The row of columns are set in front of the façade wall which gives a perception of distinction between the columns and the wall behind them. The inner rooms obtain daylight via a number of small courtyards and the tall windows on the exterior walls (Palmer 2011, 205). When the building was being criticized on the use of the central rotunda on the ground floor for exhibiting artworks, Schinkel defended it by stating he employed the central rotunda in order to give the building “a dignified central point”, he further stated that the space makes the visitors feel welcomed and provides a conducive atmosphere that helps them comprehend the contents of the building in other words the exhibits (Voogt, 2005).

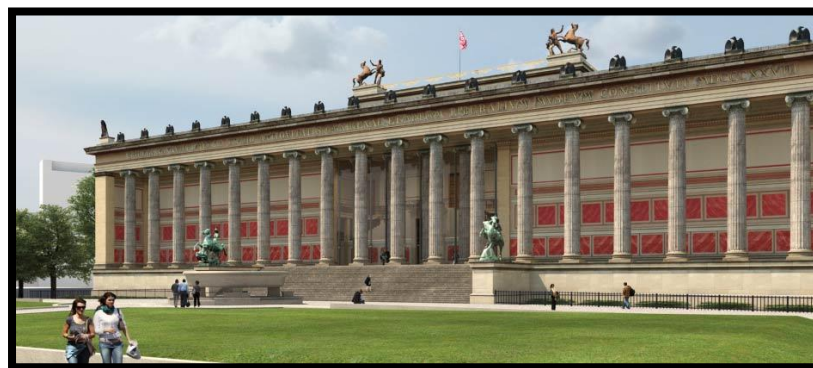
**Figure 2.14: Central rotunda of Altes Museum**



*Source:* [www.smb.museum](http://www.smb.museum) [Accessed 25 Mar. 2016]

The museum also serves as a monument due to its unique form in its physical context combined with the museums' representational character. The architect wanted the museum to be a landmark of the nation's achievement of the past. On his explanation on the reason he gave the museum monumental features, Schinkel stated that "Nations decline and fall because every human power exhausts itself, but they live on in the monuments of art and science, which eternally retain their effectiveness." He continued, "They provide us a touchstone for the cultures of past and present" Schinkel showed the monumentality in the museum by adding some astonishing ornamentations including the statues of Castor, Dioscuri and Polux placed close to the rotunda on the exterior of the building, regarded as helpers of mankind according to the classical myths, according to the architect they'll provide defense and lifeline (Wetzel, 1996).

**Figure 2.15: Statues of Castor, Dioscuri and Polux on Altes Museum**



*Source:* <https://www.museumsinsel-berlin.de/en/buildings> [Accessed 10 Apr. 2016]

### 2.3 EVOLUTION OF THE CONCEPT OF “IDEAL MUSEUM”

The concept of “ideal museum” is far from achieved since it refers to an institution in perfect form, which doesn’t exist in reality. The focus is always on the museum and its contents, not the site. This makes it a basic concept of Utopia; Utopia as described by Michel Foucault is a site with no context, which shows the society or institution in perfect form that does not exist in reality. The absence of the site makes the museum or society open for criticism, improvement and people can reflect on it more (Foucault, 1986).

The word ‘ideal’ implies a perfect model. ‘Ideal museum’ is an expression that emerged to suggest ways in which the proper museum should be. There have been several utopian concepts at different stages through out the museum development dating back to 1704 when Christoph Leonhard Sturm proposed the first design of an ideal museum (Pevsner,1976). Until the end of 18<sup>th</sup> century, collections were mostly accommodated in palaces and courtyards of the elites. What brought about the rise of interest of the expression was the palaces’ inability to preserve the collections due to their insufficient conditions, secondly, they were unable to protect the collections from damage, most especially fire outbreaks because they were considered as part of the decorations of those residences (Sheehan, 2000).

It can be said that architecture is one of the factors responsible for making museum buildings the public institutions they are today, because it is associated with a functional museum building. The first ideal museum was that of Sturm as discussed in the previous parts of this study, the obvious features in the design as explained by Pevsner (1976), are as follows;

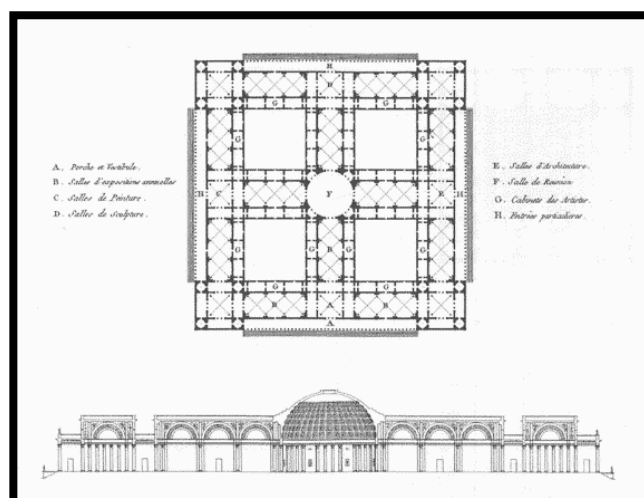
- a) Scientific organization: In the building, Sturm categorized the objects scientifically in separate numbered rooms not as residential ornaments as they were considered by the elites.
- b) Special independent building: The plan clearly illustrated that the building is independent thus separating it from the palaces, residences or other building types ( Figure 2.6).
- c) A utopic whole without context: The plan did not illustrate whether the public can access the building, as there is no site plan (Pevsner, 1976).

By 19<sup>th</sup> century, there were several models on how a museum should be, most of which are the products of the Grand Prix de Rome. The notable plans include that of Francois Jacques Delannoy who won the Grand Prix contest in 1779. The other influential plan was that of Boullée from the previous portion of the study.

The difference between Sturm's ideal museum and that of Boullée is that Sturm focused more on the contents of the building while Boullée, focused on the architectural features of such building type. The major edge Boullée's ideal museum has over that of Sturm is the shift of focus from the royal bodies i.e. the kings to the public, which is the person, standing in the middle of a monumental building. This means the focus of his design is not just on the perception of the elites, but also the public. Paula Young Lee notes that these ideal museum plans can be related to museums becoming public institutions as we know them today, not because of the establishment of Louvre in 1793 (Lee, 1998), because it is widely regarded as one of the initiations of museums as public buildings.

Another architect that was influential in the expression of an ideal museum in the 18<sup>th</sup> century was Jean –Nicolas-Louis Durand (1760-1834), an important French author, teacher and architect, Durand's design is the combination of all designs of the 18<sup>th</sup> century, it entails all the features of his predecessors designs such as; the building is in form of a square and divided by a cross with arms of equal length, with four courtyards for more lighting. In his design, Durand used multiple entrances to make all parts of the building easily within reach due to its large scale, at the middle of the cross; he placed a rotunda that has a very visible dome from the exterior (Durand, 1817).

**Figure 2.16: Durand's Museum floorplan and section, 1803**



Source: <http://jelaipa.free.fr/blog/index>. [Accessed 5 May. 2016]



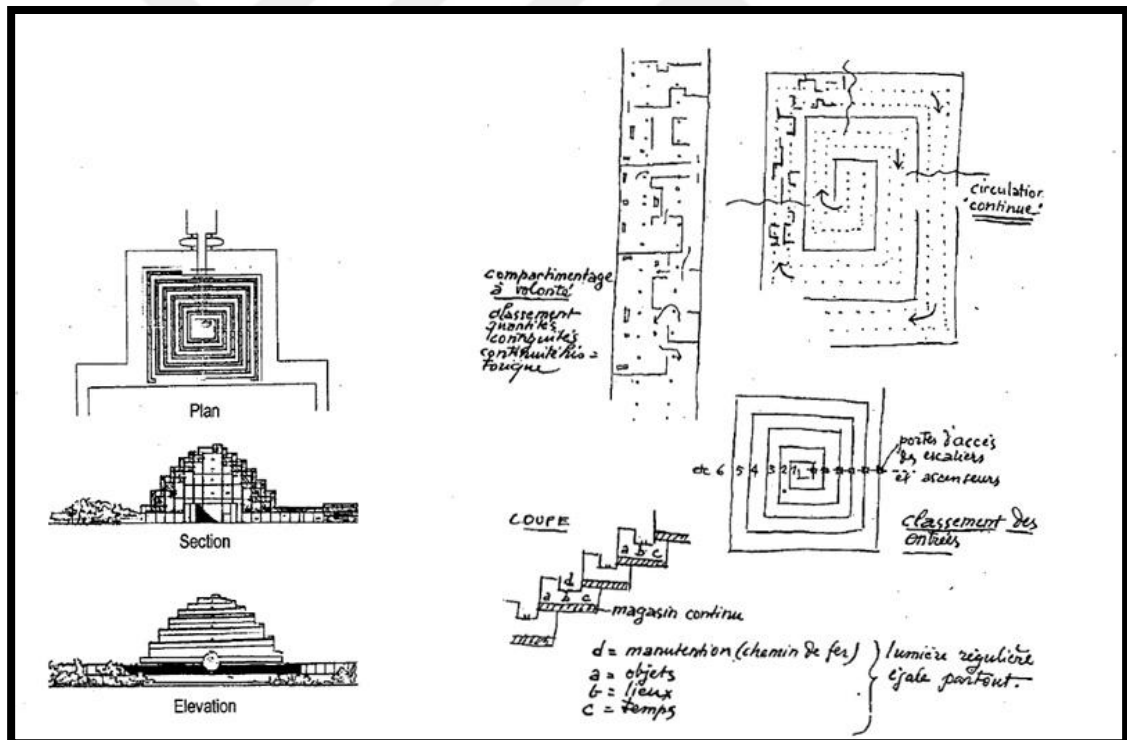
The ideal museum design concept continued to Altes Museum in 1830 and prior to it in 1817, the Dulwich Picture Gallery in London evolve following some early 19th-century museum constructions such as Schinkel's. The ideal museum of this period also followed similar principles with those of Sturm and Durand, the shift of attention from the elite culture and the goal of design novelty. The ideal museum concepts of the 19th century were based on improving the preceding models. Some major models that reflect such development include that of Gottfried Semper (1803-1879), German architect and architecture professor who designed "Ideales Museum" in 1852. In this project, Semper designed a museum where the collections were arranged according to their materials, which helped categorize the museum into sections in an attempt to make the museum comprehensive. The museum was categorized into four sections; the section of carpentry, fabrics, ceramic arts and masonry (Semper, 1852). The boundary of each section is made of the material in which that section involves to easily direct the visitors. Semper's design had been criticized in terms of excessive façade decoration, which leads to a shift of attention from the building contents to the architecture of the building. Some of the critics were Alfred Lichtwark (1852-1914) who was a German museum curator and art historian and Adolf Loos (1870-1933), Austrian architect and theorist of modern architecture. He discussed the issue of ornamentation in art and architecture in his *Ornament and Crime* in 1910 that was published in the following years (Lejeune and Sabatino, 2010).

It can be noticed that the ideal museum concept is shifting from a general paradigm towards criticism, reduction or simplification of preceding models, architects or artists tend to criticize or modify the previously rather than propose new models. For instance, Sturm's model was made regardless of museum type or context, it was a general plan with regards to all items being collected at the time and it was designed from the scratch, not as continuation of another model. Followed after Sturm, the Grand Prix de Rome models were innovative as well because there was no such museums with monumental features prior to the contest's era. From the 19th century henceforth, especially the previously discussed Semper's project, alongside Lichtwark's and Loos' criticisms.

In the 20<sup>th</sup> century, architects like Le Corbusier and Ludwig Mies van de Rohe came with their ideal museums. Le Corbusier, Swiss-French architect, designer, painter, urban planner and writer, proposed a solution for art museums that had the problem of accommodating collections with his design for ‘museum of infinite growth’.

‘Museum of Infinite Growth’ is a museum model developed by Le Corbusier and his cousin Pierre Jeanneret in 1921 that was never realized in the western part of the world due to a large amount of criticism. Although traces of the model can be seen in three of Le Corbusier’s museum buildings, the buildings are The National Museum of Western Art in Tokyo (1959), The Government Museum and Art Gallery in India (1957), and lastly, the Sanskar Kendra, Ahmedabbad also in India (1957). Among these, the first is the one that reflects the main concept of the idea the most because the latter had to adapt to the Indian climatic factors (Zeballos, 2011).

**Figure 2.17: Model of infinite Growth Museum by Le Corbusier**



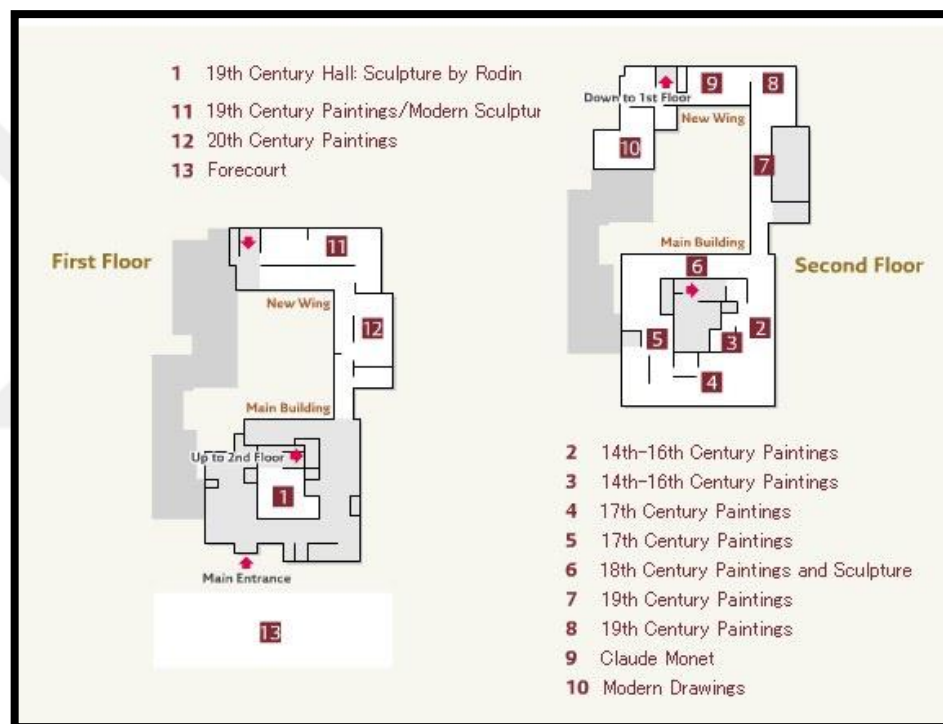
Source: <http://architecturalmoleskine.blogspot.com.tr/2011/10/le-corbusier-museum-of-western-art.html> [Accessed 28 Apr. 2016]

The museum of infinite growth is often characterized by a square shaped spiral (as seen in Figure 2.17), which grows in size based on the project’s dimensional requirements along with consideration of the human structure. Since The National Museum of

Western Art in Tokyo is the museum that is closest to Le Corbusier's Ideal Museum, some of the museum features are going to be highlighted.

The museum is a three level building placed on piers, the façade of the building is windowless, and the flat façade emphasizes the horizontality of the building. The building is made up of two parts, the main part that is square shaped in plan and the administrative section, which is on the northern side of the plan. Both parts have inner courtyards; the courtyard of the main building is a covered space while that of the administrative section is an open garden.

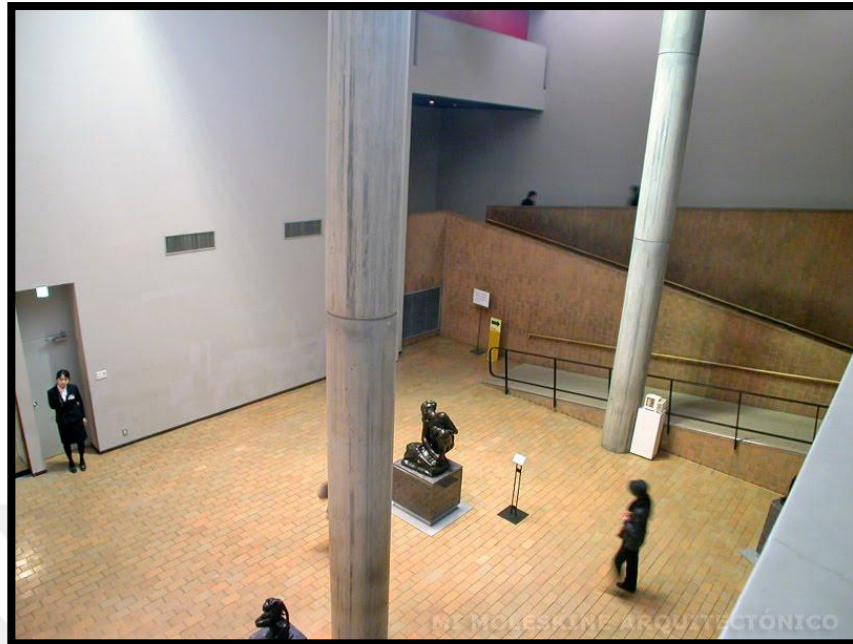
**Figure 2.18: National Museum of Western Art, Tokyo, 1959**



Source: <http://architecturalmoleskine.blogspot.com.tr/> [Accessed 28 Apr. 2016]

The first floor is made up of a grid of columns 6 x 6 meters apart and a skylight illuminating a central inner space which is two floors high, there is an ascension from the central space by a ramp that leads to the galleries on the upper floor which are arranged around the central space. The elevation by the ramp gives the visitor a three-dimensional sensation of the double floor in the central area (Zeballos, 2011).

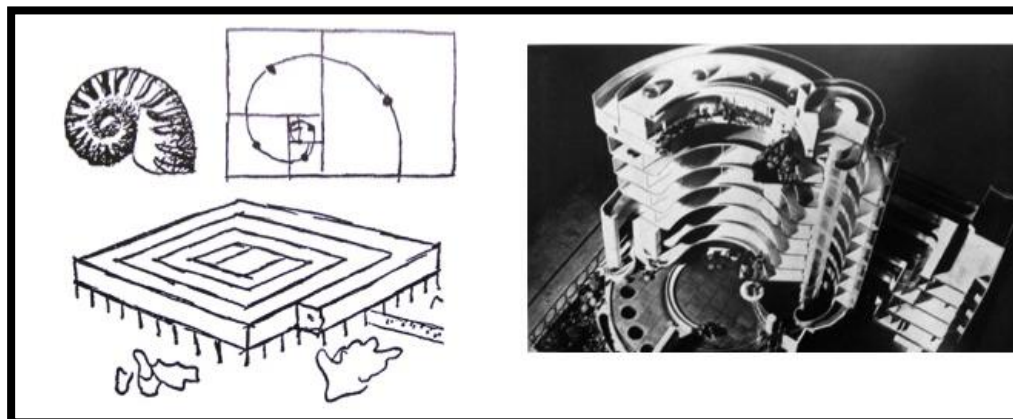
**Figure 2.19: Ramp at the central space of the Tokyo Museum**



*Source:* <http://architecturalmoleskine.blogspot.com.tr> [Accessed 28 Apr. 2016]

The fundamental feature of Le Corbusier's concept is the ever-growing spiral that varies based on museum size which gives the feeling of limitlessness, similar idea was later mimicked by Frank Lloyd Wright in his Guggenheim Museum design in New York (**Error! Reference source not found.**). The museum resembles Le Corbusier's Ideal Museum especially in terms of the central spiral pathway that the model is characterized of.

**Figure 2.20 Similarities between Le Corbusier's concept and Frank Lloyd Wright's Guggenheim Museum**

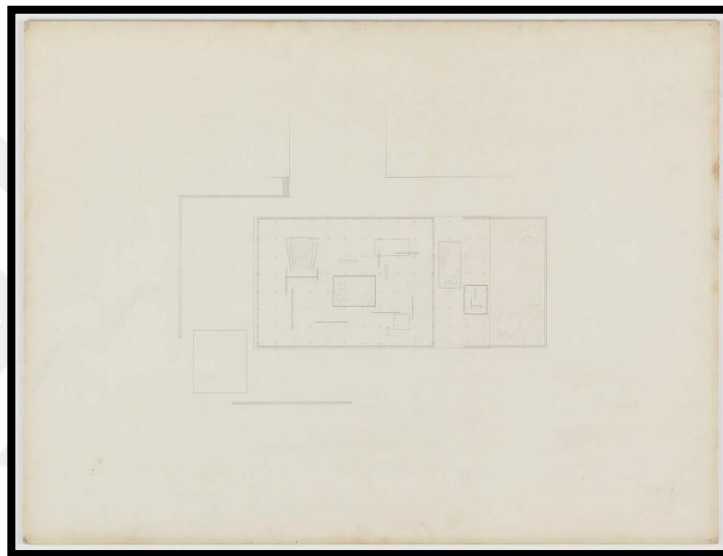


*Source:* [http://arts-plastiques.ac-rouen.fr/grp/architecture\\_musees/architecture\\_xxe/images/09\\_xl.jpg](http://arts-plastiques.ac-rouen.fr/grp/architecture_musees/architecture_xxe/images/09_xl.jpg) [Accessed 29 Apr. 2016]

*Source 2:* <http://archiveofaffinities.tumblr.com/post/31347378832/frank-lloyd-wright-guggenheim-museum-sectional> [Accessed 29 Apr. 2016]

Ludwig Mies van der Rohe, a German-American architect made an attempt to solve the lack of connection between art and architecture with his ‘Museum for Small City’ project in 1942. In this project, the architect explored bringing art and life together through his ideal museum ideas. Mies ‘museum for small city’ are perspective drawings of the interior space and its plan.

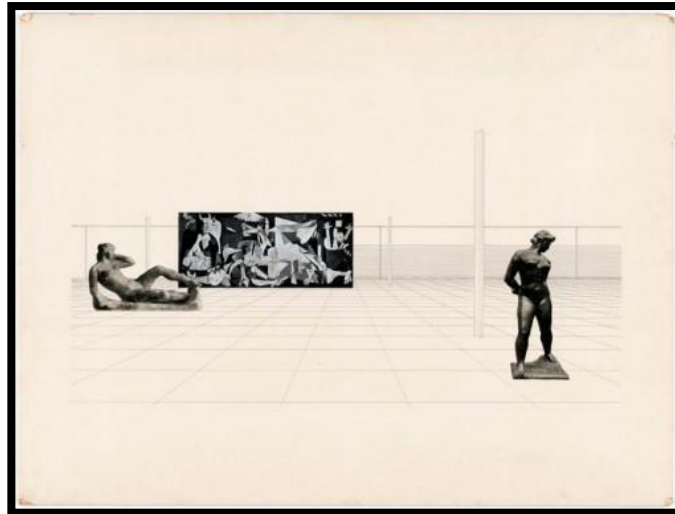
**Figure 2.21: Museum for a Small City Project by L. Mies van der Rohe**



*Source:* <http://www.moma.org/collection/works/> [Accessed 29 Apr. 2016]

On the plan, the architectural elements are barely visible in the drawing leaving the artworks such as paintings and sculptures to hover in open space. According to Mies, these artworks serve as architectural components dividing the whole space in order to achieve rich spatial features (Danforth, 2013).

**Figure 2.22: Mies Van Der Rohe's Museum for a Small City Project**



Source: <http://blog.archpaper.com/tag/louis-kahn/#>. [Accessed 29 Apr. 2016]

The fundamental components of his design are the paintings; they serve as the vertical separations while the sculptures are organized around them and Mies did not put boundaries between the museum and the city, he wanted it to be like a meeting place for the people. Overall, Mies achieved simplicity in his project by reducing it down to only structural elements, the art pieces, and space so that the visitors will enjoy an uninterrupted display of artwork (Danforth, 2013).

As discussed in the earlier paragraph, the architects gave consideration to mainly art museums; therefore, their models can hardly be applicable in some museum types, especially museums dedicated to natural history due to the huge scales of some of the exhibits, for example, fossils of animals such as a whale.

Following Mies' and Le Corbusier's models that emerged early 20th century is that of Brian O'Doherty (1928-present), an artist whose design called the White Cube emerged in mid 20th century in the year 1976. This design is mentioned because it is still being talked about in the museum and art domain, it is also one of the most popular ideal museums of that year. The compelling feature of his design is the willingness to remove anything that will interfere with the displayed art pieces, the concept of the ideal museum is also based on shifting the focus from the container being the building and surrounding, to its contents being the artwork. He is one of the pioneers of using white wall's neutrality as an illusion; according to his discovery, whitewalls have the ability to be perceived as backgrounds of artworks which can make the artworks stand out

(O'Doherty, 1999), unlike the whitewall, other wall colors may interfere with the artworks main features especially the coloring thereby tamper with the visual arts' original character.

By these isolations, O'Doherty aims to integrate some features of other institutional buildings in order to achieve a unique space of beauty. The features are 'formality' as can be observed in courtrooms, followed by 'sanctity' of a church building, according to O'Doherty, these two features are essential to a fully functional museum, a museum should be conventional and sacred (O'Doherty, 1999).

Apart from O'Doherty, there were other artists who have created their ideal museums due to their disagreement with the relationship between the typical museum of the period and their artworks, they felt the museums did not have the ability to display their works the way they were meant to be displayed. In some cases their designs are in form of extensions to their artworks, artists recreate miniature versions of their artworks in mobile and portable mediums to be carried and displayed at anyplace. A typical example is Marcel Duchamp whose design, Box-en-Valise, is in form of a suitcase containing his art pieces that can be displayed anywhere.

**Figure 2.23: Marcel Duchamp, box-en-valise, 1936-1968**



Source: <http://www.museumofmuseum.com/> [Accessed 04 May. 2016]

O'Doherty's ideal concept has been widely referred in the late 20th and early 21st century, however, there is one of the latest examples of ideal museum in 2006 by Calum Storrie, exhibition designer, and an architect, his concept is based on utopian ideas as it is not realized yet, he discussed it his book bearing the same name with his ideal museum concept, the *Delirious Museum*. According to him, the museum should serve as container for the collection of the past as well as a continuation of the surrounding streets in which it is situated this is achieved by eliminating the boundaries between the museum and the surrounding, which is one similarity that his museum and that of Mies share in common (Storrie, 2007).

The field of ideal museum is a broad topic based on chronology; the highlighted designers and design models are some of the influential at their respective periods. It can be noted that the concept changed over time, the similarities that seem to survive the transition is that all the ideal museums are based on utopian ideas and each strives to be innovative, as a result of this, two of Le Corbusier's museums in India did not reflect the features of his ideal museum as the **Error! Reference source not found.**, due to difference in climatic factors.

It can be noted that the 18th and 19th-century ideal museum concepts are compatible with almost all museum types due to the lack of museum separation according to specialization during the period. Most of the 20<sup>th</sup> century "ideal museum" models are for art museums in particular, while the 21<sup>st</sup> century models are still in progress except that of Callum Storie (2006) whose mission is to improve the relationship between the museum and the city.

#### **2.4 MUSEUM TYPES ACCORDING TO SPECIALIZATION**

Museum as an institution has emerged over a long period dating back to 16<sup>th</sup> century (Thompson, 1994). As discussed earlier in this thesis, museums started as private collections of elites they later became open to the public, from then, transferred from private to public buildings. These public buildings were sometimes referred to as 'galleries' around 16<sup>th</sup> century as in the case of Galleria Corsini, Degli Antichi Gallery in Sabbionetta and antiquarium in Berlin while from 17<sup>th</sup> century henceforth the name 'gallery' was replaced by the name 'museum' as we know it today, the only museums sometimes referred to as galleries are the art museums often called art galleries.



The first step to museum separation was the transfer of collections from private residences to public domains due to rapid accumulation in 16<sup>th</sup> century. Since museum's fundamental purpose is to preserve collections such as artifacts, curiosities or visual arts in order to enlighten future generations, the number of collections tends to increase with time due to the increase in artwork production. Artifacts related to significant people such as the Medicis were being placed in the museums in order to remember such people and curiosities were gathered to be studied. As a result of this, palaces or elite residences of the 16<sup>th</sup> century were unable to house the collections due to increase in their number and confusion. Collections were being transferred to other buildings as in the case of the collections of British Museum moving from Montagu House to Alfred Waterhouse's building.

Another attempt to distinguish the collections and make them comprehensive to the spectators was Sturm's proposed ideal museum plan. This is not far from museum separation in terms of specialization because it only distinguished the items but they were still preserved in the same building.

Museums are now classified according to various services they render to the society. There is such a broad range of museum types according to background, philosophies and different services they offer to the community. Some can hardly fall under a single group because they contain collections from different areas of specialization. Below are some museum types According to George E. Hein, a Professor Emeritus at Lesley University and author of the book *Learning in the Museum* (1998):

Art, technology, natural history, science centers, farm, science, children's, maritime, aquaria, outdoor, nature centers, popular culture, zoos, eco-museums, history (and historic houses), music, nature centers, specialized collections, historic sites, etc.

The list of types of museums is far from finished as there are a lot of criteria's in which various museum types can be distinguish. Therefore, it is sometimes preferable to make a general categorization as many museum types fall under sub divisions of other museums for instance, transport museum and industrial museums are subdivisions of science and technology museum while some zoos and aquariums may be considered under natural history museums because they also study animal species and display them to the public. The only difference is the natural history museums cover more than just animals; the exhibits of natural history museums do not necessarily have to be alive.

### **3 NATURAL HISTORY MUSEUMS**

Natural history museums are fundamental in the understanding of life itself, they involve the research and formation of statements that make elements of life and life styles comprehensible by describing the relevant operations, structures and circumstances of various species, such as diet, reproduction, and social grouping. Most definitions include the study of living entities (e.g. biology, including botany and zoology). Other definitions extend the topic to include Paleontology, Ecology or Biochemistry, as well as parts of Geology and Climatology (Panyal, 2007).

Natural History Museums exhibit a wide variety of items ranging from small-scale items such as specimens of plants and some small animals such as insects, to large items such as reconstructed bones of elephant, whale, mammoth or dinosaurs. Due to the variation in scale and other features, the museum building's architectural features should be considered according to such dynamism. More will be highlighted on natural history museums from their rise in history in order to understand their purpose, which will aid in not just understanding what they stand for, but also reflect favorable architectural and display settings for such museum category by referring to some case studies of such museum buildings.

#### **3.1 EMERGENCE OF NATURAL HISTORY COLLECTIONS**

The word 'museum' came from the Greek's and it is certain that they carried out little or no effort regarding the preservation and exhibition of natural objects. A Greek philosopher by the name of Aristotle (384-324 B.C.) is said to have studied some animals and plants around 325 B.C. gathered by Alexander the Great (356-323 B.C.), king of Ancient Greek kingdom of Macedon, no effort was made to preserve the specimens though (Farrington 1915).

The first natural history exhibition known, took place in the Temple of Astarte in Greece sometime before Alexander the Great's era, the objects displayed were gorilla skins that were obtained by a Carthagian (a person from suburb of Tunisia's capital which was dissolved in 146 BC), named Hanno from Africa.

It is important to note that one of the important factors for the existence of museums is a sufficiently civilized and permanent condition of society to preserve artifacts and objects of nature from one generation to the other (Farrington 1915). Farrington further stated

that there are items of art initially objects of nature such as the animal skin, preserved to us from the ancient Egyptian civilization which possess true value in the current era. The fact that the ancient Egyptians were involved in preservation of these items, there is no proof that they undertook the preservation of these items for their generation alone, it is obviously intended for the generations to come (Farrington 1915). This shows that the preservation of objects of nature dates back to the ancient time, inquisitiveness is part of the nature of man, it can be assumed that just the way people of the current generation are curious of learning new things, so were the ancient civilizations.

It is known that the Roman emperors kept collections of statues and work of art, there are few mentions of them preserving so called “natural curiosities” such as human skeletons, crocodiles etc. but no record of interest in preserving and studying such items (Farrington 1915).

As mentioned by Johann Beckmann (1739–1811), a German scientist and scientific writer, one of the main limitations for the collection of natural objects in the ancient time was the people’s lack of mastery of the means of preserving the objects. The means known by the people then were dipping in salt solution, covering with wax and the “Spirit of wine” now known as alcohol (Tallis and Strutt, 2011).

The first Natural History museum is said to have been the Great Institute of Alexandria in Egypt established in the third century B.C. it had botanical and zoological gardens and also a section for the study of sciences which was referred to as the museum, the museum was more of a study place rather than a place for exhibition (Farrington, 1915). Therefore some did not regard it as a museum, rather a library.

Within fourth to the seventeenth century, most of the rarities present at the time were found in religious places; people were drawn to religious places such as churches due to their collections of curiosities that were hardly seen at the time (Farrington, 1915). For example there was a large Tortoise shell present in the Porch of Cathedral of Merseburg in Germany, the Cathedral at Sevilla had a stuffed crocodile, some elephant tusks and Jawbone of a whale found in the Cathedral Arezzo (Casson, 1994: 251).

### **3.2 EARLY NATURAL HISTORY MUSEUM BUILDINGS**

This type of museum buildings emerged in the 16<sup>th</sup> century but prior to the buildings, natural history collection started as a result of interest to preserve curiosities and rare objects acquired from nature, which were gathered by collectors from various parts of

the world. During the early stages of natural history collection, some significant families, for instance, the likes of Medici and Estes at Modena started the collection, and then later dispersed to parts of Europe. The early collectors i.e. the elites, collected for their own interests in the form of accomplishments, it was later developments that brought about collecting for scientific purposes and exhibiting for the public (Evermann, 1918).

Farrington stated that early museums were made of single collections, due to that they were enclosed to spatial lines and miscellaneous in feature, it was later improvements that brought about museums with wider scopes. Example of a museum consisting of more than one collection or wider capacity as referred to by Farrington is the British museum. The museum mainly emerged from two collections; the first is the collections of natural rarities belonging to Robert Hubert (1733-1808), a French painter popular for landscape painting. The second was that of Sir Hans Sloane (1660-1753) who was a popular physician and president of the college of physicians. His collections consist of about 800 varieties of plant species that he brought from his trip to Jamaica around 1687 in search of scientific knowledge. The whole collections were donated to the British nation at the time of his death.

The British Museum came into existence by after the representatives of Sir Hans Sloane gave his collections to the country, the British Parliament decided to accommodate the collection which include books, coins, objects of natural history etc. (Markus, 1993: 197). The initial building founded was the Montagu House, which was built in 1675 for the Duke of Montagu in Bloomsbury. A mathematician named Robert Hook designed it. The building was destroyed by fire around 1686 and later rebuilt as hotel, when opened as a museum in 1759 it housed not just objects of natural history but many other collectibles such as coins, books, pictures, anatomy collections, minerals, sculptures etc. It is characterized by suit of rooms aligned with each other because of lack of room corridors. Because of the mismatch of size between the space objects, space continuity is often broken down (Markus, 1993).

**Figure 3.1: Breakdown of collection syntax at the British museum in Montagu house.**



Source: [http://www.britishmuseum.org/about\\_us/the\\_museums\\_story/](http://www.britishmuseum.org/about_us/the_museums_story/) [Accessed 04 Mar. 2016]

The collections were soon divided and transferred to other museums due to their rapid increase in numbers; medical and anatomical collection was posted to the Hunterian Museums later known as Royal college of Surgeons. In 1855 the zoology department transferred their collections to the British Museum, which made the case in there more severe. It was in 1880 after several years of the scientific group's struggle with the Government that the particular department was transferred to the astonishing Museum of Alfred Waterhouse Natural History museum. (Thomas A. Markus, 1993: 199).

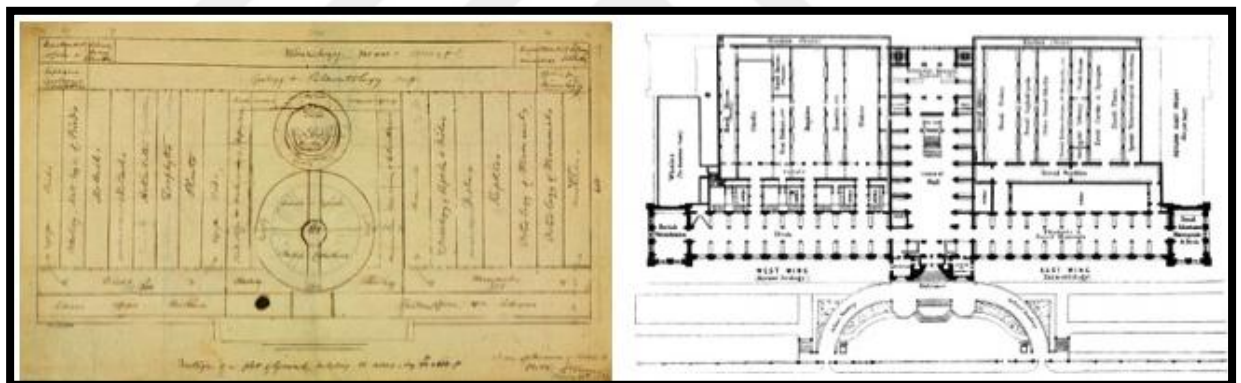
Early natural history museums were designed by the architects while the interior spatial arrangements were determined by special curators due to their knowledge of natural history. They arrange the collections and describe how they want the ground plan to the architects (Yanni, 1999), the architects work with the curators in making the floor plans in order to determine how the exhibits should be displayed as in the case of London

Natural History Museum that was designed by the architect, Alfred Waterhouse and the spatial arrangement alongside the curator, Richard Owen.

Richard Owen, an English biologist, comparative anatomist, paleontologist and also the director of the museum, sketched the plan of the new Museum. He sketched his idea on how the items and spaces were to be classified. According to his sketch the 'index gallery' is to be placed in the central rotunda- this is where the natural history characters of regions, their classes, orders and the animal kingdom are to be highlighted. Behind it he placed a theater room and the logic behind it is that two places of fundamental knowledge are placed in close proximity.

And he placed mammals to one side of two long galleries and birds to the other one, most of his initial ideas survived various changes up to the buildings final plans (Markus, 1993: 197).

**Figure 3.2: A rough architectural plan drawn by Richard Owen in 1859 and final architectural plan by Alfred Waterhouse**



Source: <http://www.nhm.ac.uk> [Accessed 08 Mar. 2016]

Apart from the Ashmolean Museum and British Natural History Museum, some early natural history museums include, The Indian Museum (1875) in Kolkata which is a neoclassical building followed by The American Natural History Museum (1877). The main building's architectural style is Street side Beaux Arts and Parkside Romanesque revival. Later extensions reflected various architectural styles by different architects. The recently discussed permanent building of the British Museum by Alfred Waterhouse widely regarded as Natural History Museum, London (1881), it is a Victorian German Romanesque and Romanesque Revival building characterized by a bilaterally symmetrical plan around a central entrance.

### 3.3 EXHIBITION METHODS IN NATURAL HISTORY MUSEUMS

In early practice during late 19<sup>th</sup> century, Evermann notes that the first approach to educating the public through the exhibition is called Habitat Group; this is the integration of animals or specimens within their natural habitats to the museums (Evermann, 1918), museums achieve this by installing the species natural environment and displaying them in it. Displaying species in classified glazed cases does not pass the necessary information to the audience, but displaying in their original habitat and surrounding can suggest the kind of habitation that particular species can be found in nature (Evermann, 1918). Even though the entire habitat can hardly be recreated due to the availability of materials and setting, the museums complete the habitat by painting the remaining surrounding, which can hardly be differentiated from the real surrounding (**Error! Reference source not found.**). The term used to relate to the three-dimensional replication of habitats or their mini versions is known as “Diorama.”

**Figure 3.3: A diorama in the Museum of Natural History in Milan.**



*Source:* [www.wikipedia.com](http://www.wikipedia.com) [Accessed 10 May. 2016]

The education feature is one of the fundamental features of the modern natural history museums. The visitor/observer has become an inseparable part of museum design, meaning the visitors are needed to complete the museum, without visitors the museums

have no purpose. In an attempt to achieve this, there are various methods developed to pass information or make the visitor comprehend the exhibits not just wander around the museum without full appreciation and understanding of the exhibits around them.

Another approach of enlightenment is through lectures carried out at the museums; the lectures are mainly about the explanation of the museum exhibits to help the visitors understand more through guided tours, headphones or sometimes videos. Lastly is the *loan exhibits*; these are portable exhibits which maybe composed of birds, plants or small mammals that are made by the museums and loaned to be taught in public schools on mutual agreement between the school and the museum, example of a museum engaged in this is the Field Museum in Chicago (Evermann, 1918).

Some of the newly developed exhibition methods adopted by natural history museums in the 20<sup>th</sup> and 21<sup>st</sup> centuries are the 3D and 2D theaters in which the exhibition is in form of documentaries made by the museums to guide the audience visually. An example is the 'space show' in ANHM<sup>2</sup> in New York, in the show; the audience are guided through a journey to space in a theater. This includes simulations of the galaxy using images from telescopes etc.

Apart from the various means of education it can be observed that NHMs<sup>3</sup> are involved with the issue of representation. They represent the identity of their respective geographical regions, local cultural national entities.

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<sup>2</sup> American Natural History Museum

<sup>3</sup> Natural History Museums



**Figure 3.4: ANHM space show known as Hayden Planetarium**



*Source:* www.anhm.org [Accessed 15 Mar. 2016]

The issue of national identity regarding natural history museums role in preserving and interpreting culture of a geographical region had been mentioned in 'societal functions and meanings of museum' (see page 10). Natural History Museums are established to collect, preserve and display objects acquired from nature, in most cases, these objects are from or relating to the museums' geographical regions, their fore people and their culture. There are some museums that are exceptions to this, these institutions exhibit objects not necessarily from their national boundaries. They include in their exhibits, objects relating to life modes of past civilizations; cultures of tribes related with that particular region or other areas that have been colonized by them in order to give insight on the nation's history and origins by referring to cultures that were associated with the geographical region (Yanni, 1999). For example, The Hall of African Peoples is an exhibition in the American Natural History Museum, which contains artifacts and exhibits of the Africans and their culture that were related to the region during colonization period. There is another hall dedicated to the Northwest Coast Indians, the original tribe that occupied the museum's geographic area and are also referred to as the Native Americans.

**Figure 3.5: Hall of African Peoples, American Natural History Museum**



*Source:* [www.amnh.org](http://www.amnh.org) [Accessed 12 May, 2016]

In some cases civilizations/communities (usually non-westerners) who lived in natural environments leading lives close to nature; are considered as subjects of NHMs. Their art or objects of daily life can be exhibited in NHMs and not in Art Museums. According to the anthropologists of the 20<sup>th</sup> century, these civilizations are considered as ‘primitives’; things made by these ‘primitives’ were not considered as art according to the so-called definition. Art was a production of civilization; therefore, in some cases objects made by these “uncivilized” people are therefore placed in natural history museums (Yanni, 1999). Similar approach can be observed in Natural History Museum of New York, Amsterdam, and Washington DC.

Apart from the educational and social aspects of the modern natural history museums, another important factor is the trending architecture of this museum typology as it determines how the recent museum developments, the exhibits and theaters interrelate with the audience. The new architectural trends of the museums will be discussed in the following sub chapter.

## 4 EMERGING TRENDS IN NATURAL HISTORY MUSEUM ARCHITECTURE

Natural history museums have evolved for centuries; during this period of evolution, there have been changes or improvements along the line both in terms of the building's physical characteristics and their social interaction especially regarding various means of societal functions.

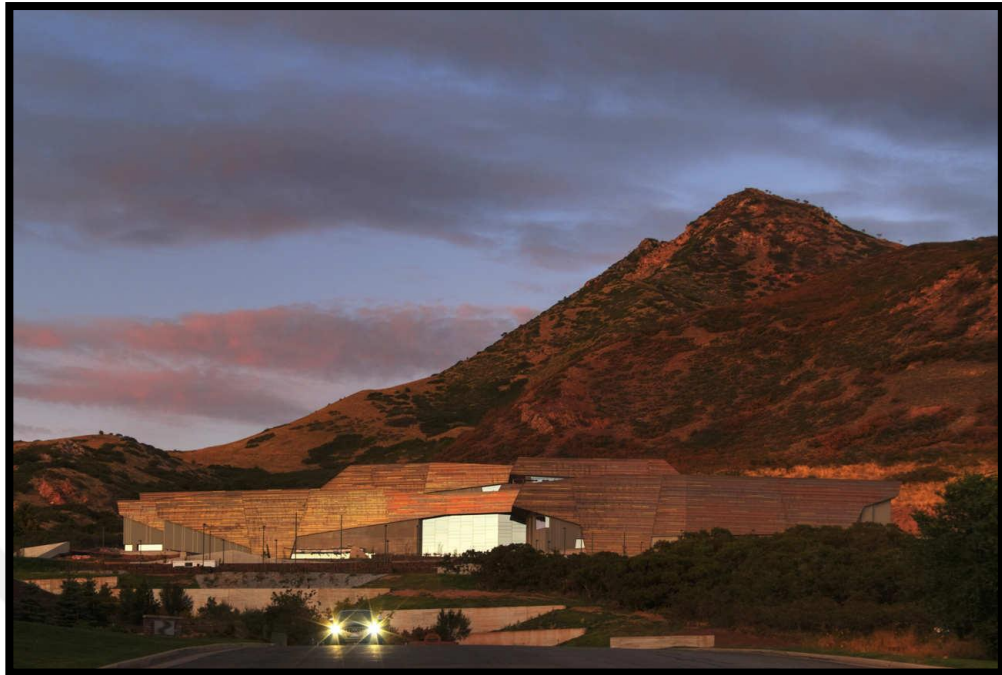
The case studies chosen to support the recent trends in NHM design include the Shanghai NHM<sup>4</sup>, Natural History Museum of Utah and recent proposals, which are extension of ANHM<sup>2</sup> by Jeanne Gang, an American architect and leader of the architectural firm studio Gang located in Chicago and Natural History Museum of Denmark by Kengo Kuma & Associates. The case studies will be examined based on certain factors that include design context/theme, spatial character, circulation, technological features and spaces other than exhibition. The Utah NHM<sup>4</sup> will be the first focus as it is the earliest among the highlighted museums.

The museum was designed by architectural firm called Enneads architects and was completed around 2011 in Salt Lake City in Utah, United States. The design of the building was inspired by the surrounding environment in order to achieve a unique architecture based on setting. The Architect designed the building as an extension to its surrounding by imitating the characteristics of the landscape which are rocks, minerals, soils and vegetation through the use of appropriate building materials as seen in ( Figure 4.1). The adoption of this approach is aimed to blur the differences between the natural environment and the museum building as can be seen in the following illustration (King, 2012).

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<sup>4</sup> Natural History Museum

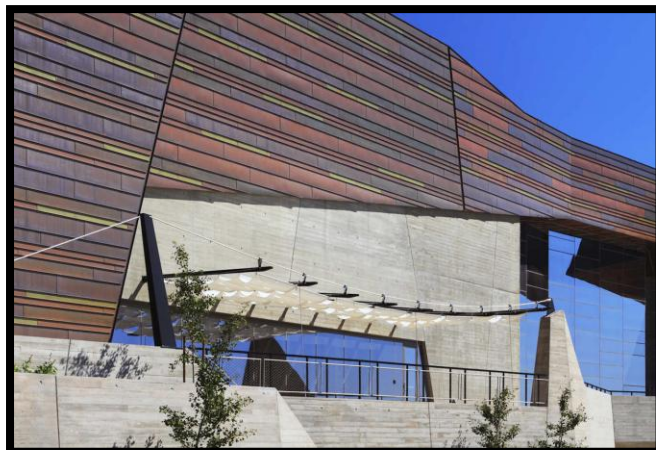
**Figure 4.1: Natural History Museum of Utah**



*Source:* [www.archdaily.com](http://www.archdaily.com) [Accessed 22 Mar. 2016]

The museum's façade material properties are determined according to the context natural elements such as soil, mineral, vegetation and rock; the building is built on top of terraces that are arranged along the contour lines of the landscape with minimum intervention. Selected building materials and the architectural form create an image as if the museum blends with the surrounding nature. Copper panels of the building's façade are arranged on different levels to imitate the variation of the site contours in order to reflect it on the building's façade (King, 2012).

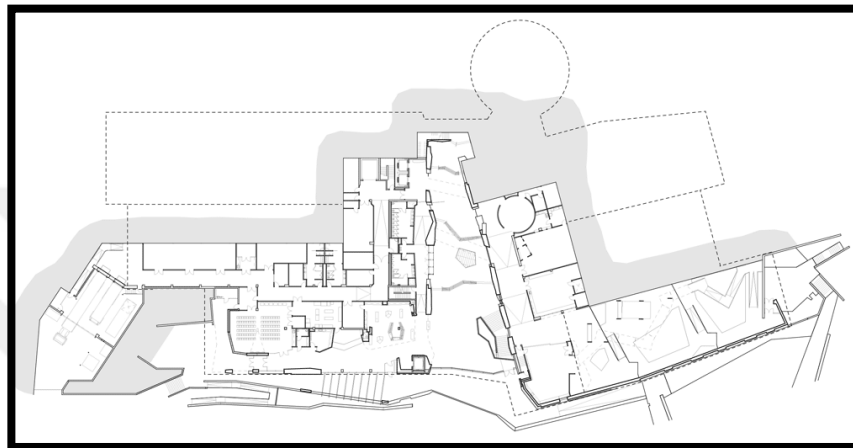
**Figure 4.2: Facade cladding of Utah NHM**



*Source:* <http://www.archdaily.com> [Accessed 22 Mar. 2016]

Regarding spatial features; the museum is divided by a voluminous central space into south and north wings with access to both. There are beams of light illuminating the central space naturally through the skylight. The south consists of the exhibits that interpret the collections of the museum and guide the visitors to explore the museum's natural history.

**Figure 4.3: Natural History Museum Utah by Ennead Architects**



*Source: [dezeen.com/natural-history-museum-of-utah/](http://dezeen.com/natural-history-museum-of-utah/) [Accessed 22 Mar. 2016]*

The north wing is the empirical section of the museum which is based on impartial understanding of nature through scientific research; this consists of the conservation and research laboratories, admin and storage for collection.

The museum uses traditional means of exhibition such as dioramas, models of dinosaurs as well as interactive driven by technology. Vertical circulations in form of stairs and ramps and connecting bridges determine the visitor circulation in the Canyon. The bridges connect various spaces of the museum at different floor levels.

Apart from exhibition spaces, the museum houses spaces such as library, café, store classroom and private birthday party room for children.

Recently completed Shanghai NHM<sup>4</sup> stands for another architectural approach carrying similar 'organic features'; The museum was completed in 2015 by Ralph Johnson, leader of the architectural firm Perkins + Wills. Similar to Utah NHM, the design of the building was inspired by nature. Shanghai NHM took inspiration from cellular structure of plants and animals while the overall form of the building was specifically inspired by a unique geometric form found in the natural world known as nautilus shell (Johnson, 2015).

**Figure 4.4: 3 section natural nautilus shell**



*Source:* [www.shells-of-aquarius.com](http://www.shells-of-aquarius.com) [Accessed 25 Mar. 2016]

**Figure 4.5: Shanghai Natural History Museum**



*Source:* [www.archdaily.com](http://www.archdaily.com) [Accessed 25 Mar. 2016]

There is another wall situated on the eastern part of the building with grass on it which according to the architect, Ralph Johnson, represents earth's vegetation while a stone wall on the northern part of the building represent the movement of earth's tectonic plates in the past that resulted in the current appearance of earth.

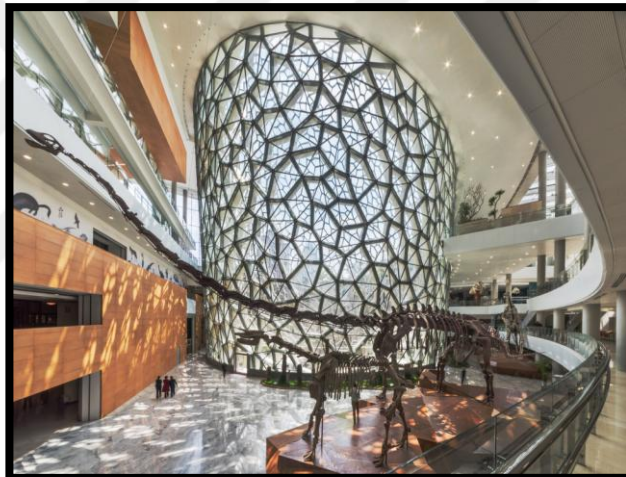
A 3 storey building that has a central curtain wall (cellular wall) with the structural form of living organisms' cell houses the museum. A 30-meter tall hall welcomes audience with enough natural light illuminating the space through the cellular wall.

**Figure 4.6: Shanghai NHM green wall**



Source: [www.archdaily.com](http://www.archdaily.com) [Accessed 25 Mar. 2016]

**Figure 4.7: Shanghai NHM cellular wall**



Source: [www.archdaily.com](http://www.archdaily.com) [Accessed 25 Mar. 2016]

Regarding the spatial arrangement of the building, the overall building is wrapped around a water garden 2 floors below ground level to draw sunlight into lower levels of the building through the cellular curtain wall (Figure 4.8).

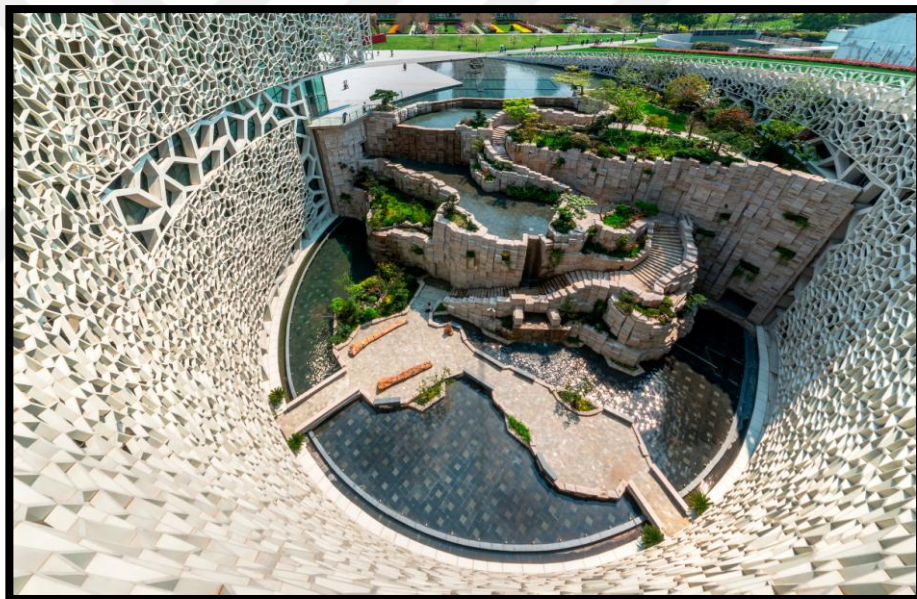
The architect adopted the curved natural form to aid in traffic control; museums in China are usually crowded due to the regions' large population. The primary circulation element is a ramp which directs the crowd through its descend via a chronological journey of the natural world. In the descend, there are over 11,000 specimens starting with some dinosaur fossils followed by extinct vegetation that once thrived on Shanghai soil. Included in the exhibits is the explanation of the natural energy utilization of the

building such as water systems and green climate which in cooling the interior (Tang, 2015).

The building has recent technology features integrated to it; firstly it is a bioclimatic building; it is designed with optimum regard to the surrounding climatic factors in order to provide thermal and visual comfort to the visitors. The building achieved this through the use of intelligent skin installed into it increasing the amount of sunrays to illuminate the building at the same time lessening the amount of sun heat from getting through the building.

The other technological feature is called geothermal system; it controls the temperature of the building by using energy from the earth to warm and cool the building (Johnson, 2015).

**Figure 4.8 Shanghai NHM water garden**



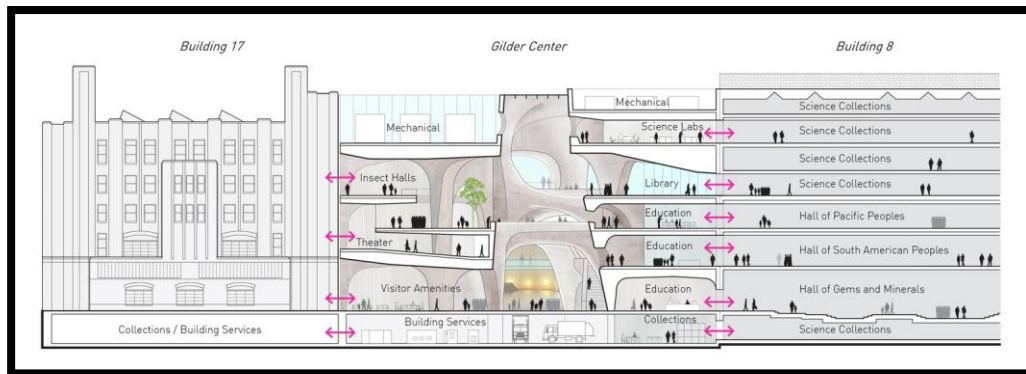
Source: <http://www.wired.com/2015/09/> [Accessed 08 Apr. 2016]

The building consists of an exhibit garden in outdoor space, 4D theater, exhibition spaces, library, café and gift shop.

The other NHM<sup>4</sup> building chosen to support the thesis is the new design proposal of the ANHM<sup>2</sup> extension known as Richard Gilder Center by Jeanne Gang expected to be completed by 2020.



**Figure 4.9: Section revealing "connections" throughout Richard Gilder Center**



Source: [www.archdaily.com](http://www.archdaily.com) [Accessed 27 Mar. 2016]

The extension retains the same 6-story height with the existing museum building, the theme of the building is characterized by a cave-like structure with connective bridges and recessed spaces within the museum. Similar to the previously mentioned museums, the Richard Gilder Center derived inspiration from the nature in form of naturally formed rocks and glacial forms found in the geology.

The space organization is not finalized due to the projects status being in progress. According to the architect, the main exhibition hall is the first place a person will walk into upon entering the building. Similar to the central canyon of NHMU, sunlight entering through a skylight enlightens the hall area and pathways to various activities. The exhibition spaces of the museum will be highlighted by sequence of open and “recessed cavities”.

**Figure 4.10: The Gilder Center Central Exhibition Hall.**



Source: [www.archdaily.com](http://www.archdaily.com) [Accessed 27 Mar. 2016]

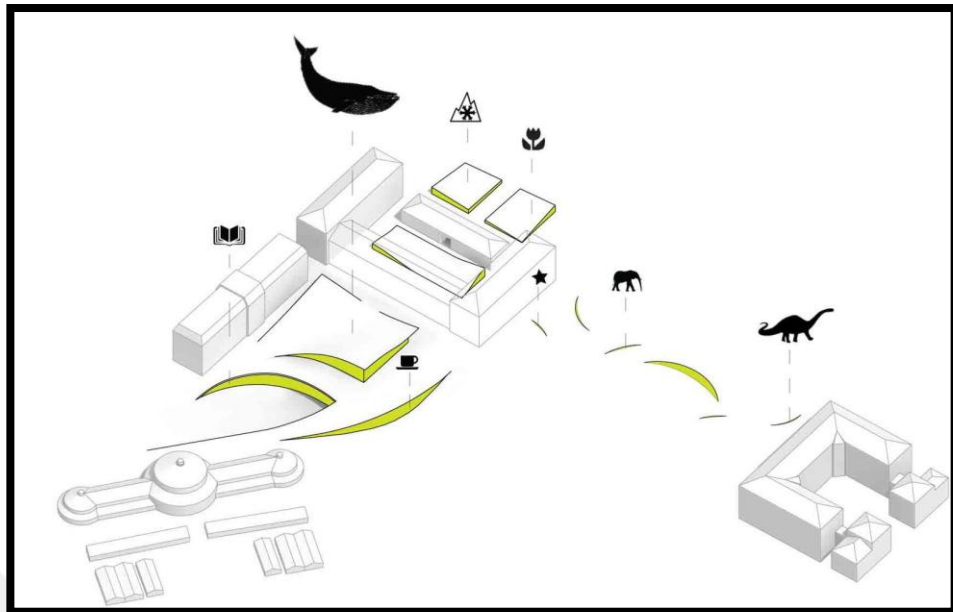
According to Jeanne Gang, the major key to the new extension is improved circulation and museum function in terms of exhibition spaces. This will be achieved by creating over 30 different connections to various activities in the museum extension and to the existing museum building preventing visitors from running to dead-end, instead, they will have a continuous journey with no interruption. The museum's aim is to solve the existing circulation problem using the multistory to provide various movement options for the visitors.

The technological features include an "interpretive wall" for directing the visitors to pathways such as insect hall, library, classrooms and laboratories etc. Secondly, portable technology will be included in the museum which links the place of activity with discovery of visitors via digital journey.

Massive concrete structure houses the exhibition spaces and other facilities such as 3D theaters, libraries, classrooms and laboratories ( Figure 4.10).

The new Danish Natural History Museum proposal by Kengo Kuma and Associates is another design that further reflects the some contemporary features of NHM design. The museum is situated in the city's historic botanical garden. The architect's integrate the museum into the surrounding garden through series of underground spaces in an attempt to make the museum and garden experience inseparable; it is like a garden of natural history. This will aid in creating a unique, and more appealing museum for the public (Furuto, 2012).

**Figure 4.11: Diagram of Natural History Museum, Denmark**



Source: archdaily.com [Accessed 27 Mar. 2016]

In terms of spatial quality, the architects used the garden to create variety of spaces to draw daylight, green areas and views ideal for quiet observation. The spatial organization may be prone to changes because the museum is not yet realized, the placement of the various exhibits according to the present design stage can be seen in the above diagram. Other spaces include library and a café.

The visitor experience starts outside the museum unlike other museum that the experience begins inside the museum buildings. It is designed in a way that a walk in the garden invites the visitors inside the museum through a journey of natural history and vice versa. The museum is integrated to the landscape through series of cuts as seen in the above 3D depiction (Figure 4.11). This gives glimpse of the museum from outside thereby provoking curiosity of the surrounding people, which invites them to explore inside.

**Figure 4.12: Model view of NHM Copenhagen from the botanical garden**



*Source:* archdaily.com [Accessed 28 Mar. 2016]

**Figure 4.13 Views from the interior of Danish NHM**



*Source:* archdaily.com [Accessed 28 Mar. 2016]

The recent changes noted in the contemporary NHMs especially the ones designed in the 21<sup>st</sup> century is that most of them adopt context cautious approach or are built as extensions of their natural surrounding. The museums adopt the organic philosophy as design understanding which is about promoting harmony between the people and nature (Blitz,2015), this will be supported in the following case studies. Prior to that, it is essential to shed light on the organic design approaches.

Organic Architecture is an architectural philosophy, which promotes the relation between the nature and human habitat (Freed, 2014). The philosophy uses design

approaches integral with natural settings to achieve a unified harmony between a building and its site and between nature and architecture in general.

The word “organic” denotes a natural entity but has slight different meaning when used in the architectural context. According to Eric Corey Freed (2007), the phrase “Organic Architecture” was invented by Frank Lloyd Wright (1867-1959) to describe his architectural philosophy. Organic Architecture goes beyond mimicking nature, it is rather, design using natural materials natural principles as guide (Wright and Walker, 1954). Below are some of the guiding principles that need to be taken to consideration in achieving an organic design as proposed by David Pearson in his book “*The Breaking Wave: New Organic Architecture*”:

- Taking design inspiration from nature and making design sustainable.
- Flexibility and adaptability of design.
- Satisfaction of physical and social needs by design.
- Uniqueness of design and growth out of natural setting (Pearson, 2001).

Some notable architects involved with the philosophy include Frank Lloyd Wright, Antoni Gaudi, Vittorio Giorgini, Tadao Ando, Alvar Aalto etc.

#### **4.1 COMPARATIVE ANALYSIS TABLE**

In an attempt to provide a comprehensive historical course of NHM architecture, it is imperative to refer to and analyze some commendable museums of such type from various geographical locations on random selection, to arrive at a more rational result. In this section, the museums will be highlighted based on chronological order, which will help define the changes in building material, layout, façade features and various structural systems adopted on the buildings.

The analysis table is classified into four segments based on centuries of establishment, with 17th and 18th centuries museums combined due to their less number compared to the following centuries. The content of the analysis table include;

- 1) 17<sup>th</sup> and 18<sup>th</sup> century
  - a) British Museum (Montagu House), London
  - b) Ashmolean Museum, Oxford
  - c) National Museum of Natural History, Malta
  - d) Museum of Natural History La Specola, Florence

- 2) 19<sup>th</sup> century
  - a) Academy of Natural science Drexel university, Philadelphia
  - b) Museo di Storia Naturale di Venezia, Venice
  - c) The Indian Museum, Kolkata
  - d) American Museum of Natural History, New York
  - e) London Museum of Natural History.
  - f) Museum für Naturkunde, Berlin
  - g) Oxford University Museum of Natural History
- 3) 20<sup>th</sup> century
  - a) Smithsonian National Museum of Natural History, Washington
  - b) Victoria Memorial Museum Building, Ottawa
  - c) Natural History Museum of Los Angeles County
  - d) The Field Museum, Chicago
  - e) National Museum (Malaysia), Kuala Lumpur
  - f) MTA natural history museum, Ankara
- 4) 21<sup>st</sup> century
  - a) Fukui Prefectural Dinosaur Museum, Katsuyama, Fukui
  - b) The Rose Center for Earth and Space, New York
  - c) California Academy of Sciences
  - d) Darwin Centre, London
  - e) Museum of Natural History, Obafemi Awolowo University, Osun, Nigeria
  - f) Natural History Museum of Utah
  - g) Shanghai Natural History Museum
- 5) Projects in design stage
  - a) New Museum of Natural History<sup>5</sup>, Basel
  - b) Richard Gilder Center <sup>6</sup>, New York.

In the analysis table, incomplete museum building examples in design proposal stage or under construction were included because they give insight about the direction natural history museum design is heading. The table consists of mostly purpose-built NHMs

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<sup>5</sup> Winning design in competition expected to start in 2018

<sup>6</sup> Estimated 2017 prior to the museum's 150<sup>th</sup> anniversary (2020)

buildings and some converted buildings or museums housed in some institutional buildings with other functions.

It can be noted that architecture of three out of the four museums built in the 17th and 18th-century, reflected either Renaissance or Neoclassical features, in accordance with architectural tendency of the period. The buildings are ornamented and are load-bearing structures; they are rigid in form which is resulted from materials used such as brick, stone, marble and limestone depending on the availability in the geographical location. The plan schemes are simple, and the buildings are on average of two-story high. The 19th century is the period purpose-built museum buildings started to be erected to house natural history collections except Ashmolean Museum. In the 19<sup>th</sup> century, Neoclassical and Romanesque revival features characterized the museum buildings architecture especially the museums in the United States and the United Kingdom, had been constructed in concrete frame structure.

One of the transformations that can be noted from the table is the switch from the use of bricks, stones, marbles, etc. as dominant building materials to the use of glass, concrete, and steel, etc. from traditional to contemporary period.

The common spatial feature that the museums from the 17th to the 20th century have is the central entrance space with symmetrical sides and facades constituted by window openings. Contrary to the preceding natural history museums such as NHM London (1881), AMNH New York (1877) and Smithsonian NHM Washington (1910), the 21st-century museums are dynamic in form. It is observed that some non-western countries adopt their various indigenous architecture such as National Natural History Museum, Kuala Lumpur which adopted wood as one of the dominant building materials as it characterized the architectural style of that region known as Rumah Gadang.

Despite the above table consists of some commendable natural history museum examples from various regions based on chronological selection; it can be deduced that out of the 29 museums listed, there are 7 from the United States, 4 from the United Kingdom, 11 from European countries and 7 from other non-western countries. The United States has the highest number of Natural History Museums from the table, there is at least one natural history museum in each of the 50 United States with Academy of Natural Science Drexel University in Philadelphia as one of the earliest (Loviglio, 2012). There are over 30,000 museums regardless of type in the United States according

to Christopher Ingraham, a politics writer on data related subjects; the majority of the museums are small scale. It is known that most of them adopt the theme of history including natural history museums displaying African/non-western heritage linked to the western regions history through colonization. Therefore, some western natural history museums include the African/non-western in their exhibits because they are considered as part of their history.

The number of natural history museums in a region seem to be related with in-depth knowledge of the history of that particular area. The less number of museums of such type non-western regions especially Africa might be related to the lack of information and preserved objects of nature from these regions past compared to the western regions.



## 5 FINDINGS AND CONCLUSIONS

This chapter will be based on the overall results deduced from the study, in an attempt to support the conclusions; the overall study will be summarized to make the concluded results more comprehensive. Following the summary, the findings from the study shall be discussed and highlighted.

Review of evolution of museums and focus on natural history museum buildings revealed that museums are dynamic institutions, in the sense that they go in parallel with the changing trends of the society and architecture as noted in the various definitions of museum by sources. The study indicated that the museum building's image/role has changed over time; from the traditional role of collecting, preserving and displaying collections, into buildings that serve as origins of their exhibits and settings by provoking awareness of the past and giving a sense of history to the visitors.

In this study, some periods instrumental in the museum evolution were highlighted briefly, for instance, Renaissance was the period collection started which serves as a threshold to museology. The Romans and Greek architectural culture had a major role to play in the renaissance period museums physical properties; the period was mainly about emulating the ancient Greek and Romans regarding art, architecture and literature. The neoclassical movement came after Renaissance; it also derived inspiration from ancient Greek and Romans, some early museums of the 17th century were either Renaissance in style or Neoclassical. Grand Prix de Rome is one of the factors that resulted in large-scale monumental museum designs with architects such as Boullée, Trouard and Guy de Gisors as some of its pioneers who all participated in the Grand Prix contest. Overall, the museums of the 17th to 18<sup>th</sup> century were characterized by rectangular shaped plan scheme divided by Greek cross often with courtyards within the inner space and a massive central rotunda visible from the exterior of the building.

In the 19<sup>th</sup> and 20<sup>th</sup> centuries, the transition period of museum designs from the Grand Prix de Rome, Renaissance and Neoclassical museum building designs characterized by classical features to contemporary museum designs as will be mentioned in the following paragraphs. Artists such as Marcel Duchamp criticized the "ideal museum" of the 20th century because they felt the museum buildings had no relation with the exhibits and did not exhibit their art the way they should be. Just as artist have

impression of an “ideal museum” of art concept, so do the curators of natural history museums. In some cases, curators of the 19<sup>th</sup> to 20<sup>th</sup> century describe the plan layout they want to the architects while the architects design the rest of the building in order to achieve museums that display the objects of nature the way they are meant to be for better perception by the visitors, an example is the London Natural History Museum.

Majority believes that natural history museums focus on objects acquired from nature such as specimens, fossils, reconstructed bones of animals, etc. Some natural museums exhibit collections of non-westerners especially the African cultures; these include carved wooden objects such as small statues, attires, traditional musical instruments and other art objects. According to the anthropologists of the 20<sup>th</sup> century, these collections, especially the art objects, do not belong in art museums but natural history museums because art is a sign of civilization and the ‘non-westerns’ are considered as ‘primitives’.

In the overall study, 30 natural history museums were examined established in the duration beginning from 17<sup>th</sup> to 21<sup>st</sup> century. The transformation of natural history museums architectural features deduced from the table and study will be highlighted below.

The 19<sup>th</sup> and 20<sup>th</sup> century NHMs are characterized by massive and monumental architectural forms while the 21<sup>st</sup> century NHMs are relatively reduced in mass. The museums have changed from rigid concrete structures to more flexible and often steel structures, the 18<sup>th</sup> and 19<sup>th</sup> century NHMs are firm structures often characterized by simple geometric forms while some of the 21<sup>st</sup> century NHM are characterized by complex geometric forms.

Natural history museums of the 17<sup>th</sup> and 18<sup>th</sup> century are composed of single collections; therefore they are enclosed to single spatial axis and are miscellaneous in feature. The museums are often characterized by suits of rooms aligned with each other due to lack of corridors. In the 19<sup>th</sup> century, improvements brought about increase of activities, which affected the spatial layouts in turn. Central courtyard for exhibition characterizes some of the natural history museums of this period such as ‘National Museum of Ireland- Natural History’, Oxford University Museum of Natural History, and Museum für Naturkunde in Berlin. It can be noted that some natural history museums started to have complex layouts within 20<sup>th</sup> and 21<sup>st</sup> centuries, which might

also be related to increase of activities in the museums. However, there are spatial feature of the natural history museums that have remained unchanged after the transformation such as the inclusion of the voluminous common space after the entrance where reconstructed bones or models of large animals are displayed. Enhanced circulation is another feature of the 21<sup>st</sup> century natural history museums, the museums provide various options of pathways and means of circulation such as connecting bridges, stairs and ramps to various parts of the buildings. This avoids traffic resulted from large crowd moving on a single or double paths as in the case of the natural history museums of the preceding centuries.

The collections of these museums may also include live species of animals; some early natural history museums exhibited their collections in the replica of their natural habitats to suggest the kind of environment the species can be found in nature, basic glazed cases are not sufficient to pass the necessary information. Another traditional exhibition approach of the early natural history museums is through lectures held at the museums about the explanation of the exhibitions. With the advent of technology, natural history museums of the 21<sup>st</sup> century have newly developed exhibition methods that guide the audience visually in form of documentaries made by the museums which are displayed in their 3D and 2D theaters.

The newly developed exhibition methods have resulted in additional spaces in the contemporary natural history museums, which include auditoriums, 3D, and 4D theaters for the simulations of the natural world. Increase of activities in the 21<sup>st</sup> century natural history museums also brought about addition of spaces, which include spaces for leisure and entertainment, which include game centers for children, cafes and gift shops unlike the traditional natural history museums, which are mainly composed of exhibition spaces, storages and sometimes libraries or study rooms.

The contemporary natural history museums make use of glazed façades making them more transparent as they are parallel with the architectural trends of the period; the central domes are replaced with skylights and the use of glazed façades. For example, skylights from the central hall will illuminate pathways to various activities of the newly proposed extension of ANHM Richard Gilder Center. California Academy of Sciences uses daylight obtained from skylight as a source of illumination.

There is a shift that can be noted in some contemporary museums of the 21st century, they are often designed with optimum regard to their various natural settings, the architectural features are often determined by their natural surrounding as can be seen in NHM Utah and the new NHM in Copenhagen. They also adopt minimal approach regarding their context, they are designed with little or less intervention on the site, and this can be seen in the plan layout of NHM Utah organized according to the contour lines of the landscape. Shanghai and Copenhagen natural history museums are constituted of ramps ascending or descending into the buildings, which makes the building as continuation of the natural surrounding. Adopting of organic philosophy may have resulted in the uniqueness of each natural history museums of the 21<sup>st</sup> century.

Portion of natural history museum architecture is taking a shift towards organic philosophy as reflected in the study; this raises questions that may need further study to be answered. The questions are;

Do living animals need to be exhibited in enclosed artificial setting with the latest level of advancement and various means of exploring the nature through the available technology such as virtual simulations and research approaches? It is almost impossible to provide the best environment to a living creature.

Secondly, what will a futuristic vision of natural history museum exhibitions be like, how would it affect the architecture?

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