

The Concept of the Aesthetic Features in Architectural Structures of the Museums

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Abstract—The focus of this study is to analyze and elaborate the formal factors in the architectural features of the museums. From aesthetic vantage point, this study has scrutinized the formal aesthetic values and identity-related features of the museums. Furthermore, the importance of the museums as the centers of knowledge, science and arts has gradually increased in the last century, whereby they have shifted from an elite standing to the pluralist approach as to address every sections of the community. This study will focus on the museum structures that are designed with the aesthetic apprehension, and presented as the artistic works on the basis of an objective attitude to elaborate the formal aesthetic factors on the formal aesthetics. It is of great importance to increase such studies for getting some concrete results to perceive the recent term aesthetic approaches and improve the forms in line with such approaches. This study elaborates the aesthetic facts solely on the basis of visual dimensions, but ignores the subjective effects to evaluate it in formal, subjective and conceptual aspects. The main material of this study comprises of the descriptive works on the conceptual substructure, and a number of schedules drawn on such concepts, which are applied on the example museum structures. Such works cover many several existing sources such as the design, philosophy, artistic philosophy, shape, form, design elements and principles as well as the museums.

Keywords—Aesthetics, design principles and elements, Gestalt.

I. INTRODUCTION

IN order to define the changes in architectural aesthetic over time, we need to examine the changes of form in this process. The form of the first building examples from caves to the present day has been continuously developed and renewed. Architectural and aesthetic studies have led to different approaches to aesthetic-architectural relations [1]. The form is the final result of the architectural product, taking into account the nature of the form, evaluation, and many related assessments and discussions in architecture are completed based on form and shape [3]. In addition, since it is the main determinant of the beauty of the formal world, the current study examines interpretable formalities and analyzes with an objective view in the form of a system. In order to examine the aesthetic characteristics concerning form and shape, a set of principles and elements is presented [7], [6]. Formal aesthetic includes a large number of factors like formal aesthetic form, rhythm, proportion, color, texture, symmetry, proportion. Therefore, although each work belongs to time, place, and

culture, it is required to determine a series of common values and general criteria for it to be appreciated and evaluated by different world societies [2], [4].

The museum is considered as one of the most exciting places to discover architecture. In addition, the importance of museums as centers of science, knowledge and art has increased noticeably over the last century. It is very important to consider the aesthetics of museums from viewers and users, as well as to connect and draw attention to them, in attempts to make the museums as public and common cores of the society [9]. These architectural investigations are attempts to achieve the best and most beautiful [5].

II. PURPOSE OF THE STUDY

This research was an attempt to investigate the formalities of museums, the conveying of values applied in the form of elements, the characteristics of the elements used in the form and concept of the architectural form. On top, studying the formal factors of aesthetics in the museum, the formal analysis of architecture, the characterization of the museum's construction from an aesthetic point of view and attaching a new perspective on the aesthetic values of other were amongst the other objectives of the present research. The purpose of this research is creating aesthetic discussions within systems due to accepted concepts and the framework of the rules and general principles of aesthetics and Gestalt theory [8]. Moreover, based on the importance of a visual understanding of formal architecture, designing the components of the building has been investigated [10]. Examining how to reflect the principles of design and quality on the samples, changes in aesthetic comprehension, finding current factors of formal aesthetics, and examining and analyzing these factors on selected samples are amongst the other objectives of the study. In other words, this study, with the objective view of aesthetics, examines the formal elements forming museum buildings in context-dependent systems and puts emphasis on common factors responsible for obtaining any security clearances.

III. HISTORY OF THE STUDY

Many sources have been collected and studied under the heading of design principles, design elements, architectural design, visual perception, aesthetics, architectural philosophy, gestalt theory, museums, and so on. The study of resources, theses and articles about the concept and subject of aesthetics, present different perspectives and various methods used to analyze this subject. The used and in line sources and method of this project are as follows:

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In a Ph.D. dissertation Oguz investigates the theoretical sources which are directly or indirectly related to architectural aesthetics and evaluates theoretical information with a philosophical classification [12]. In 1980 Besgan has studied the influence of developing concepts on the architectural aesthetics of the 20th century and the architectural styles of the same period in forms, in his doctoral dissertation [13]. Akca in her Ph.D. dissertation [14] examines the relation between external facets and related semantics through symbolic aesthetics and common sense through various concepts.

IV. METHODOLOGY OF THE STUDY

A. Concerning Studies on Various Sources

In the scope of the research, in accordance with the objective of evaluating and studying the formal aesthetic factors, a systematic system template has been examined on sample museums and finally results are obtained by analyzing the factors. In accordance with the purpose of the study, According to the study objective, selected museums (after 1970) have been analyzed by aesthetic factors in two different tables.

Depending on the criteria, the review is carried out in two main stages. These are as follows: Stage One: in line with design principles and selected design elements, museums are analyzed in design tables in a variety of ways. The second stage: The form review is based on the principles of Gestalt's theory. Examples in the table are visually examined in accordance with the principles of this theory.

B. Creating a Chart to Use in the Review

The designed chart examines sample museums with formal aesthetic factors. These factors have been selected due to principles and design elements based on the ten different sources of aesthetics and architecture derived from the greater emphasis. These authors and their works are as follows:

- 1) Ismail Tunali, "Aesthetics" [15];
- 2) Hulusi Gungor. "Basic Design: For Visual Arts and Architecture." [16];
- 3) Latife Gurer, "Visual perspective" [17];
- 4) Bilgi Denel, "An experiment in design" [18];
- 5) Demir Divanlioglu, "Basic Design: Elements and Principles" [19];
- 6) Burzo Zevi, "Learn to see the architecture" [20];
- 7) Dogan Kuban, "Architectural Concepts" [21];
- 8) Semra Aydinli, "The values of aesthetics in architecture" [22];
- 9) Ayse Sentuter, "Architectural Aesthetics" [23];
- 10) Roberto Masiero, "Aesthetics in Architecture" [24].

First, in Tables I and II, the principles and architectural design elements used are considered regarding the above resources. The positive symbols are related to the researcher emphasizes in their book, and negative symbols means they did not consider them.

TABLE I

ARCHITECTURAL DESIGN PRINCIPLES ACCORDING TO DIFFERENT VIEWS

Architectural	1	2	3	4	5	6	7	8	9	10
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design principles	1	2	3	4	5	6	7	8	9	10
Point	-	-	+	-	+	-	-	-	-	-
Line	+	+	+	-	+	-	-	-	-	-
Space	-	-	+	-	+	-	-	-	-	+
Form_Shape	+	+	+	+	+	-	+	+	+	+
Scale-Proportion	+	+	+	+	+	+	+	+	+	+
Texture	-	+	+	-	+	-	+	-	+	-
Color	+	+	+	+	+	-	-	+	+	+
Materials	-	+	+	-	+	+	-	+	+	-
Direction	-	+	+	-	-	-	-	-	-	-

TABLE II

ARCHITECTURAL DESIGN ELEMENTS ACCORDING TO DIFFERENT VIEWS

Architectural design elements	1	2	3	4	5	6	7	8	9	10
Hierarchy	+	+	+	+	+	-	-	+	-	+
Emphasis	+	+	+	+	+	+	-	+	+	+
Rhythm	+	-	+	+	+	+	+	+	+	+
Repetition	-	+	+	-	+	-	-	+	+	-
Balance	+	+	+	+	+	+	-	+	+	+
Contrast	-	+	+	-	+	+	-	+	+	-
Unity	+	+	+	+	+	+	+	+	+	+
Symmetry	+	+	+	+	+	+	+	+	+	+
Variety	-	-	-	+	+	-	-	-	-	-

According to the results, 10 different factors from the principles and elements of architectural design have been selected. Selected factors are the principles of architectural design: repetition, balance, symmetry, unity and contradiction. Also, the selected elements of architectural design elements are as follows: shape and shape, size, proportion, materials, color and texture.

In the final stage, investigations have been carried out based on gestalt factors and the tables are designed for analyzing the factors of proximity, likeness, completion, continuity, and so on.

V. SAMPLE SELECTION

Contemporary architectural movements in the early 1970's and subsequent changes in modern architecture created various styles after this decade and resulted in the diversity of currents of the generalization approach [25], [26]. The form of museums was released after this period and, according to the importance of the content, the construction of museums was also designed as a work of art intended to please- considering this issue and the importance of choosing museums. For this research, samples have been selected from museums since the 1970s and museums of a contemporary structure. Moreover, the sample selection factor can be expressed as follows [27].

The selection has been done due to the fact that museums are of different styles and belong to prominent architects and given that these buildings reflect the cultural and social values of the place where they are located.

VI. CASE STUDY

A. Kimbell Art Museum, Fort Worth, Texas, ABD, 1972, Louis Kahn


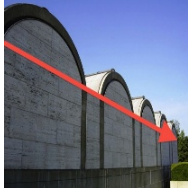


TABLE III

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE KIMBELL ART MUSEUM

Architectural design principles and elements	Description
Repetition	In the view, the arches are of the same size, color, texture, shape and value, and the placement of these arches in one direction has led to the principle of repetition.
Symmetry	Although symmetry is seen in many parts, the facade is asymmetric as a whole.
Balance	five arches empty bezel in the poster has created an asymmetric equilibrium
Unity	There is Residing unity in the building which results from harmony
Contrast	There is a conflict between the full and the empty vaults.
Form-Shape	So it has regular and geometric forms. The museum is composed of repetitive shapes and is made up of a supreme design.
Scale-proportion	The length of the arches is 36.5 meters, their height is 6 meters and a width of 6 meters. The ratio of the elements is 1/2. This building is proportional to its components and to the human scale.
Materials	Concrete materials used in this building are travertine, glass, plastic and metal.
Texture	The natural texture is fabricated and the texture is one-dimensional.
Color	The color of the building is a mixture of dark and light gray.

TABLE IV

GESTALT THEORY ANALYSIS AT THE KIMBALL ART MUSEUM

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

B. High Museum of Art, Atlanta, Georgia, ABD, 1983, Richard Meier

TABLE V

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE HIGH MUSEUM OF ART

Architectural design principles and elements	Description
Repetition	Architectural elements, windows, and white coatings have caused repetition.
Symmetry	The design of this museum is asymmetrical.
Balance	The different volumes on the left and right sides of the original volume are in balance.
Unity	Unity has been created using the geometric order. The unity of existence is constant and stable.
Contrast	There are no contradictions in this building.
Form-Shape	The forms used in this design are geometric and orderly. These forms include: cylinders, cubes, squares and rectangles.
Scale-proportion	The exterior is designed using modules, so the museum is generally in line with the components. It also fits on a human scale.
Materials	The museum's view is made up of concrete and glass coverings.
Texture	Concrete and glass texture is available in this building. This tissue is a relatively hard tissue.
Color	The white color is the main characteristic of this Museum.

TABLE VI

GESTALT THEORY ANALYSIS AT THE HIGH MUSEUM OF ART

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

C. Guggenheim Museum, Bilbao, Spain, 1997, Frank O'Gehry





TABLE VII

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE GUGGENHEIM ART MUSEUM

Architectural design principles and elements	Description
Repetition	Repetition of components and elements is evident in the design of this museum.
Symmetry	The design of this museum is not based on the principle of symmetry and is completely asymmetric.
Balance	This is an asymmetric equilibrium.
Unity	In this design, unity of thought and style can be seen.
Contrast	There is a soft contradiction in the museum's view of the material.
Form-Shape	The museum has many complex forms, unusual and unusual shapes. Forms have no reason and are not subject to any geometric law.
Scale-proportion	The building is at the highest point 50 meters high. It is proportionate to the components of this museum. This proportionality is also seen on a human scale.
Materials	Three different types of materials were used in the museum's view: titanium, limestone and glass.
Texture	The museum has a natural texture of materials. Additionally, it is a hard texture.
Color	The museum is painted in titanium metal, which has a beige color. But the titanium used in the facade is seen in different light colors.

TABLE VIII

GESTALT THEORY ANALYSIS AT THE GUGGENHEIM MUSEUM

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

ABD, 1998, Ricardo ve Victor Legorreta

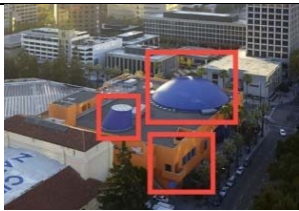

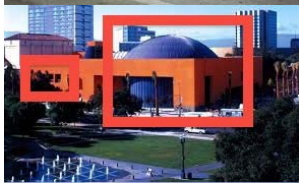

TABLE IX

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE TECH MUSEUM OF INNOVATION

Architectural design principles and elements	Description
Repetition	In the facade of the building, there are repetitions of the penthouses.
Symmetry	Design is asymmetric
Balance	The museum's construction is in asymmetric equilibrium.
Unity	The design of this building has created unity and sustainability.
Contrast	This is a sharp contradiction due to the use of two hot colors.
Form-Shape	Geometric, regular and initial shapes are used and are statically designed. The museum consists of a cylindrical giant tower and a two-story rectangular cube.
Scale-proportion	The height of the cylinder is 14 meters and the cube is a two-story rectangle. It is in perfect fit between the components and the scale with humans.
Materials	Concrete and turquoise tiles are selected as materials.
Texture	Tile and concrete texture used as materials. Therefore, it has an artificial and relatively hard tissue.
Color	The warmest tint of turquoise and orange is used in this building, and the use of these brilliant colors is the most striking feature of this museum.

TABLE X

GESTALT THEORY ANALYSIS AT THE TECH MUSEUM OF INNOVATION

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

D. The Tech Museum of Innovation, Fort Worth, Texas,

E. Milwaukee Art Museum, Wisconsin, Texas, ABD, 2001, Santiago Calatrava





TABLE XI

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE MILWAUKEE ART MUSEUM

Architectural design principles and elements	Description
Repetition	The architectural form of this museum is composed of repeated elements.
Symmetry	The principle of symmetry can be seen and the building is symmetric.
Balance	Since the museum is symmetrical, it has a symmetric equilibrium.
Unity	In this building, a mobile unity is clearly seen.
Contrast	No conflicts have been made in the design of the museum.
Form-Shape	This building is designed as an independent body and is seen using natural and organic shapes. The museum is designed as a bird and the museum also has many elements of the sea.
Scale-proportion	The pedestrian bridge is 85 meters long, the pillar is 60 meters long. It does not fit into the general measurement of the components and the human scale.
Materials	White steel, concrete and glass are used as materials.
Texture	Concrete and steel texture is used and has a fairly hard texture.
Color	Elements, walls, ground and exterior are white. The white color shows the dimension as a bigger exaggeration.

TABLE XII

GESTALT THEORY ANALYSIS AT THE MILWAUKEE ART MUSEUM

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

F. Fort Worth Modern Art Museum, Fort Worth, Texas, ABD, 2002, Tadao Ando


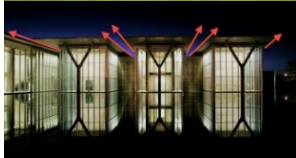


TABLE XIII

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE FORT WORTH MODERN ART MUSEUM

Architectural design principles and elements	Description
Repetition	In the design, repeating glass booths and Y-shaped elements are seen.
Symmetry	Although the elements and forms are symmetrically designed and, in general, the building is asymmetrical.
Balance	The museum's building has an equilibrium asymmetry.
Unity	Using the principle of harmony, unity has been created.
Contrast	In this design, the existence of closed concrete spaces and open glass spaces together contradict each other.
Form-Shape	In this building, simple geometric shapes have been used to create smooth walls and volumes produced by pure modulation. Forms are regular, simple and rectangular cubes.
Scale-proportion	The height of the pavilions is about 40 meters. While the width of the pavilions is 7.3 meters and 12.2 meters, respectively. In terms of overall size, the components of the museum and the scale of the human being are perfectly proportional.
Materials	Concrete, steel, aluminum, glass and granite are materials used in this museum.
Texture	The building has a fairly hard texture and is used for tissue materials.
Color	Museum building is bright gray.

TABLE XIV

GESTALT THEORY ANALYSIS AT THE FORT WORTH MODERN ART MUSEUM

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

G.MAXXI Museum, Roma Flaminio, Italy, 2009, Zaha Hadid

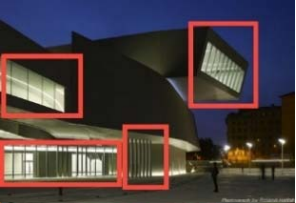



TABLE XV

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE MAXXI MUSEUM

Architectural design principles and elements	Description
Repetition	Some elements of the Museum are repeated.
Symmetry	The construction of the museum is asymmetrical.
Balance	In balance design, this equilibrium is asymmetric.
Unity	Between all components, based on the organization of the original idea and thought, there is a light unity.
Contrast	The principle of conflict between open or glass walls and hard surfaces is seen.
Form-Shape	This project is made up of a set of regular forms and large volumes.
Scale-proportion	The height of the museum is 22.90 meters and the length of the base is 150 meters. This building is proportional to the size and size of the human being.
Materials	The pallet has limited materials: concrete, gray epoxy floor, metal, glass and steel.
Texture	The use of concrete in the facade has a relatively hard texture.
Color	The museum is color-graded gray and visible from the distant distance.

TABLE XVI

GESTALT THEORY ANALYSIS AT THE MAXXI MUSEUM

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

H.Soumaya Museum, Mexico, Mexico, 2011, Fernando Romero





TABLE XVII

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE SOUMAYA MUSEUM

Architectural design principles and elements	Description
Repetition	The museum building consists of 16,000 pieces of hexagonal steel.
Symmetry	The museum building has an asymmetric form.
Balance	Due to the asymmetry of the museum, the building has an equilibrium asymmetry.
Unity	Due to the existing harmony, there is a unity of thought and style.
Contrast	Due to the use of uniforms, colors and materials, the principle of conflict in the building is not seen.
Form-Shape	The museum is designed using organic, symmetrical and complex geometric forms. It also has an irregular and unusual shape.
Scale-proportion	The building, which is 46 meters high, has only one entrance gate, so the elements are inadequate. Also it does not fit a human scale.
Materials	The facade consists of 16,000 pieces of hexagonal mirror steel.
Texture	The fabric is the same as a mirrored steel fabric with a relatively tight texture.
Color	The gray color dominates the museum.

TABLE XVIII

GESTALT THEORY ANALYSIS AT THE SOUMAYA MUSEUM

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

I. Perot Museum of Nature and Science, Dallas, Texas, ABD, 2011, Thom Mayne, Morphosis Architects





TABLE XIX

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE PEROT MUSEUM OF NATURE AND SCIENCE

Architectural design principles and elements	Description
Repetition	The windows and glass used in the input section are in one repeat.
Symmetry	This building has an asymmetric design.
Balance	The museum has an asymmetric equilibrium.
Unity	Through this contradiction, a unity has been achieved.
Contrast	There is a contrast between the transparent cube and the rectangle in terms of color, material, and contrast.
Form-Shape	Regular, geometric and initial forms have been used in the design of this museum. The museum consists of two rectangular cubes.
Size-proportion	Clear cubes are 52 meters high, 46 meters long and 16 meters wide. The components of the building are proportionate to each other, but its proportion is not proportional to human standards.
Materials	Stone panels, concrete, glass and aluminum composites have been used in the construction of this museum.
Texture	A total of 656 concrete panels are used to create synthetic tissue for centuries. In addition, natural stone panels have created a tough texture.
Color	In general, gray is dominant, but there is also blue, brown and green.

TABLE XX

GESTALT THEORY ANALYSIS AT THE PEROT MUSEUM OF NATURE AND SCIENCE

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

J. Museum of Confluences, Lyon, France, 2014, Coop Himmelbu





TABLE XXI

THE STUDY OF THE ARCHITECTURAL DESIGN PRINCIPLES AND ELEMENTS IN THE MUSEUM OF CONFLUENCES

Architectural design principles and elements	Description
Repetition	Repeat does not exist in any of the elements.
Symmetry	This building is asymmetrical and no symmetrical elements are used in the design.
Balance	The equilibrium obtained as a result of free component placement is an asymmetric equilibrium.
Unity	Since all elements are designed in accordance with the idea and understanding of harmony, the museum has a unity in terms of thought and style.
Contrast	Crystal and cloud are two independent structures, which are contradictory in terms of materials and form.
Form-Shape	This building is complex and consists of several sections. It is composed of geometric and irregular symmetric forms. The museum looks like a spacecraft in the middle of the city.
Scale-proportion	It is 44 meters high, 150 meters long and 83 meters wide. It is proportionate to the components of the building, but it is disproportionate to the human scale.
Materials	Concrete, stainless steel and glass are materials of this museum.
Texture	The museum building has a relatively hard artificial texture.
Color	Due to the fact that the facade has been used more than steel, the museum is bright gray.

TABLE XXII

GESTALT THEORY ANALYSIS AT THE MUSEUM OF CONFLUENCES

Gestalt Principles	Visual
Proximity	
Continuation	
Similarity	
Closure	

VII. COMPARISON RESULT

TABLE XXIII
EXAMINATION OF SAMPLES IN TERMS OF ARCHITECTURAL DESIGN
PRINCIPLES AND ELEMENTS

Architectural design principles and elements	Examination
Repetition	Repetition exists in most of the reviewed museums. Considering the results of the surveys and considering the results obtained, the principle of symmetry found in a small number of museums. Buildings are often formed
Symmetry	asymmetrically. In the design of the components of a number of museums there is symmetry, while the entire structure is symmetrical.
Balance	The equilibrium obtained as a result of free component placement is an asymmetric equilibrium.
Unity	The principle of unity exists in all the examples examined.
Contrast	In the study of samples, the conflict law has been used in the design of some museums.
Form-Shape	Regular geometric forms have been used in many of the samples. While irregular forms are less visible looks like a spacecraft in the middle of the city.
Scale-proportion	In most museums, the fit between the components is seen. But most museums do not fit into the human scale.
Materials	Materials used in museums are mostly concrete, stone, glass, steel, and aluminum.
Texture	In samples, natural materials are used. Concrete, glass and steel are the most materials used in samples, so the texture in most museums is relatively hard tissue.
Color	Most museums are gray, white and beige.

VIII. CONCLUSION

In recent years, the active participation of lightweight architects has led to various views on museum design. Consequently, the construction of museums evolved from aesthetic point of view. This led to two different types of attitudes towards the aesthetics of museum design. According to the first view, the form of the museum should only serve content considering this thought, the most important task of the museum architecture is to draw people and visitors attention to the contents of the museum. This way of thinking has affected the form of museums in the field of aesthetics. Therefore, the most appropriate form for museum buildings is described as simple forms and shapes that direct attention to the museum. For example: Louis Kahn's "Kimbell Museum", Richard Meier's "High Art Museum", Tadao Ando's "Fort Worth Modern Art Museum" or Ricardo Legorreta's "Museum of Technological Innovation". In these museums, the principle of symmetry and contradiction is used very mildly and simple, geometric and regular forms are used in the design of these museums. These museums are both proportional to the components and proportionate to the human scale.

The second view began with the design and construction of the Guggenheim Museum in the 1990s; this is a revolutionary period in the design of museums. This building appeared in the formation and understanding of the existing aesthetics of the museums as a new statement. In addition to emphasizing the importance of the museum's content, Gary also mentions the suitability of the museum's form with content and the presentation of the museum's building as an artwork. So the form was released from the performance fence. For instance: Santiago Calatrava's "Milwaukee Art Museum", Zaha Hadid's

"MAXXI Museum", Fernando Romero's "Soumaya Museum", Morphosis's "Perot Nature and Science Museum" or Coop Himmelblau's "Museum of Confluence". Museums that are designed with this view have asymmetrical, irregular and non-geometric forms, and they can be clearly seen in the contradiction.

Often in museums, concrete, steel and glass are used as materials, and are mostly found in white, beige and gray. Briefly, nowadays the buildings of the museums are at their golden age. These buildings are often the result of the reflection of aesthetic thinking and understanding of their architects. Finally, it can be concluded from the studies that finding common aesthetic factors in museum buildings, from the 90s onwards, is more difficult than the past decades.

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