



Classic Car Museum with a Bionic Architecture Attitude

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Abstract

Presence of automotive industry can be an indicator for assessing industrial status of a country, because automotive industry practically enhances the knowledge level in the county and after a while a country equipped with this industry can be enabled in tens of other fields. Featuring by high level of financial power, this industry can increase research and development activities and purchasing technical science from outside and as discussed earlier, this brings about development across other sectors. Existence of museum and car exhibition is one of cultural necessities and considering the activity and influence area, it can be considered as a huge school serving education and expansion of science among all society members. Meanwhile, attention to empirical sciences and human experience in industry age is a factor of formation of museum and fairs. Considering the relevance of this industry, architectures and designers believe that designs inspired from nature can effectively assist in reduction of environmental harms. Bionics, or biometrics or creative bioengineering applies existing biological systems and methods found in nature in engineering and modern technology systems.

Keywords: museum, car, architecture, bionics, nature

Research Question

- Which effects can car museum have on industry and development?
- Which objectives do car museum and its architecture include?
- What are indicator criteria of car museum and bionic architecture for society?

Research hypothesis

- Informal education along with learning serves as a part of experience of classic car museum.



- Learning is not merely accumulating skills in facts in the mind; rather it is a process of becoming and an active interaction with experience.
- Collaboration between museum and engineers serves as complementarity of this institution generated for experience of stable education.

Research objectives

- Presence of domestic and foreign automakers in car museum with propagating information about car.
- Car museum as a base for information exchange about automotive industry
- Holding short time training course in line with automotive industry context for fans of car museum
- Holding scientific and educational festivals and holding temporary fairs for museum collection of artifacts.

Methodology

Methodology of this paper is a combination of library and field methods. It is a case study with descriptive nature which has been carried out by referring to various Latin and Farsi books and articles.

Introduction

Museology expert and theorist of presentation of museums, Rhiannon Mason believes that: “in new museum management, museums bring about a multicultural space that while exhibit various cultures, they interpret cultural differences. Classic car museum and fair can provide such spaces. The spaces exhibit productions of various countries and offer cultural similarities and cultural to visitors and thus it serves as a scientific, cultural and educational place which enhances scientific and academic level of society members and this can be only achieved by support of officials.

From long time ago, architects have inspired from nature. At ancient time, columns of temples and castles have been made by inspiring from palm tree and lotus flower, building designers have drawn on natural forms and proportions for achieving to aesthetic and attractive patterns. Nowadays, some architects are of opinion that inspiring from nature is fruitful more than just apparent beauty. Therefore they replicate the structural rules available in the nature, for example, they draw on natural patterns for life environment air conditioning, producing energy and even



water desalination. Thus, they urge that using natural patterns and designs is not only a high-sounding motto, but also it is a vital and economic issue when it comes to economic and financial concern. Architects and designers believe that nature-inspired designs can effectively contribute in reducing environmental harms (Hagan, S. 2001).

1. Museum

Based on definition of museum by international council of museums (ICOM), museum is a place for collecting, keeping, studying and examining as well as exhibiting cultural artifacts or natural objects for educating, training and valuating to collections (Mohammadi, 2014).

Museum term is originated from French word Musee meaning a place that exhibits ancient and industrial artifacts and other precious objects to use of scientists, researchers and artists and so on. French Museum term is derived from Greek word. Muse is name of a hill in Athena in which a temple is made for Muse (goddess). Today, there are many museums around the world for ancient antiquities, anthropologic, natural and zoological artifacts and this presents their historic heritage. Culture and civilization of any nation can be understood by objects and artifacts collected in their museums. One of ways through which one can know ancient people and their manner of living is through teaching it to students by museum (Mohammadi, 2014).

2-1. Type of Museums

- Art museum
- History museum
- Specialized museum
- Science museum
- Technical and industrial museum
- Single-themed and urban museums

2-2. history of museum

By seeking the lexical etymology of museum, museum researchers and experts have sufficed to Hellenic origin and have defined the history of museum as follows:

Temple of poem and music goddesses placed on a hill in Athena is the first museum which has been mentioned in museums history and Ashmolean museum in Oxford is the first museum which keeps the antiquities of East in itself (Fig. 1). First museum in Asia is Hermitage museum in Leningrad, Russia (Fig. 2). First museum in Iran, Iran National Museum, has been established in 1916 (Fig. 3). In 1746, turning point of museums evolution process has been taken place,



because in this year French writer Lachon Daussen has offered his opinions and beliefs about museum and given rise to movement and accelerating in founding museums. Four years later, in 1750, fist world real museum has been established in Luxemburg (Mohammadi, 2014).



Fig. 1. Ashmolean museum in Oxford, UK.



Fig. 2. Hermitage Museum in Russia



Fig.3. Iran national museum 3-2. Manner of attracting people into museum

3-2. Objectives of Museum

Main Objectives of Museum can be considered as follows:

- 1- Keeping ancestors artifacts and relics and exhibiting and passing them to posterities.
- 2- Assessing and comparing historic, scientific, technical and industrial and at phenomena of now and past.
- 3- Developing and fostering mutual understanding among nations and people.
- 4- Knowing and exhibiting the contribution of nations and people in global culture and civilization.
- 5- Enhancing and improving the knowledge level of students, researchers and other groups.
- 6- Preventing native culture disintegration.

2. Car museum

If we are to define the car museum in brief, it is a place in which classic cars from early available prototypes have been collected and it provides a place to show them to visitors.

In general, museum serves as a place for collecting, studying and exhibiting an object or piece for education, research and recreation. Car museum also has such function, a place which exhibits the procedure of beginning and inception of automotive industry and its advancement and progression steps so far by existing real samples and allows visitors to closely touch the development procedure (Fig. 4).



Fig. 4. Classic car museum of U.S Las Vegas

3-1. reasons and necessity of Car Museum in Iran

Following development of urbanity, amount of car importing has been increase since 1921 in Iran, this trend continued until 1979 revolution, within this time domestic automotive industry has been commenced as well. Importing variety of cars was free, and this caused that there would be a lot of cars with wide variety of old-fashioned car with respect to our time. A lot of these cars are going to be disappeared because their owners don't know their value or they are unable to keep them (in our country many people are owner of such cars however, they are encountered to a lot of problems in maintaining them) (Fig. 5).



Fig.5. decayed classic cars

Today, in such condition that car represents a part of everyday life and living without it is almost impossible, knowing car history and process of evolving is highly interesting. Lack of suitable space in the county with ability of fully showing the trend of car evolution as a complete reference for amateurs is quite obvious.

Currently, the only specialized place for classic car in Iran is Car Spectacle Museum (Tamashagah). This museum is located near Tehran in Karaj special among industrial factories. However, due to inappropriate space and undesirable building of museum, it fails to be a suitable place in this context and it requires designing such space (Fig. 6).



Fig. 6. Undesirable museum of Car Spectacle (Tamashagah) located on Tehran-Karaj road

3. Designing based on bionic architecture

4-1. introduction

Natural forms are evolving for billions of years, among this only some forms are continued to exist in which shapes and forces are in permanent harmony. It seems that studying some cases which include millions of years of evolution and natural selection can set the stage for solving a lot of engineering problems. Egg shell, seed husks, animals' skull, water bubble; seashells are among common samples of shells available in the nature. Meanwhile, seashells are suitable sample of application of shell in the nature with simple mathematic function that can serves as an appropriate pattern for designing museum architecture. Gastropods are a family of seashells which their shell forms are mostly in spiral shape. Twist form of this kind of seashells adapts the

logarithmic spiral or golden spiral. Abalone seashell, in addition to having spiral form in its shell is among rare seashells which its plan can be placed on horizontal plane. This type of seashell has some holes in its edge that they become smaller along spiral length on an algorithmic basis. Overall form of abalone seashell is shown in Fig. 7.

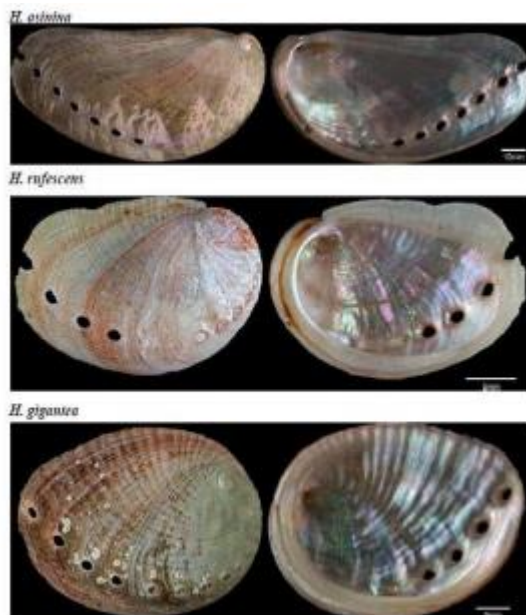


Fig. 7. Overall form of Abalone seashell with shell edge holes

4-2. Bionic Science History

It is long time of centuries that man had close relation with the nature and has inspired from it for producing his needs. Renaissance age genius, Leonardo da Vinci was one of firsts who mixed the biology science and technic to make his flying machine and for solving his time technical problems; he studied the structure of animals and living creatures. Today, five hundred years is passed from Da Vinci, and engineers of various fields undertake similar effort for establishing relation between technical science laws with living world. This relation has found a special situation at beginning of 21st century and evolving new computes and has affected architectural ideas too (Golabchi et al, 2014). A huge body of papers, lectures and theoretic discussion presented over past years proves this. Along with soaring of these discussions, this trend manifests itself in halls of world well-thought-of museums. One of the first cases of using natural creating for innovation in architecture represents in architecture of early second half of 19th century. English experts in 1846 for the first time managed to plant a type of great lotus in Europe which its leafs diameter reached two meters. An English architect, Paxton, by seeing the strength of leafs of the lotus, began to study the plant's round shelving and radial structure. The result of this research was innovating a new structure for glass light ceiling in the architecture

which was presented in London global exhibition crystal castle in 1851 and attracted the attention of critics (Fig. 8). (Golabchi, 2014). Some other examples are collaboration and interdisciplinary study of structure of human leg bone for making a light and low-cost structure in 19th century. In early 20th century (pre-modern era) and early years of modern time we encounter more or less similar efforts, yet they remained rather in theoretic status. The fondness of Le Corbusier to seashells and examining the structure of these animals can be an example in this context.

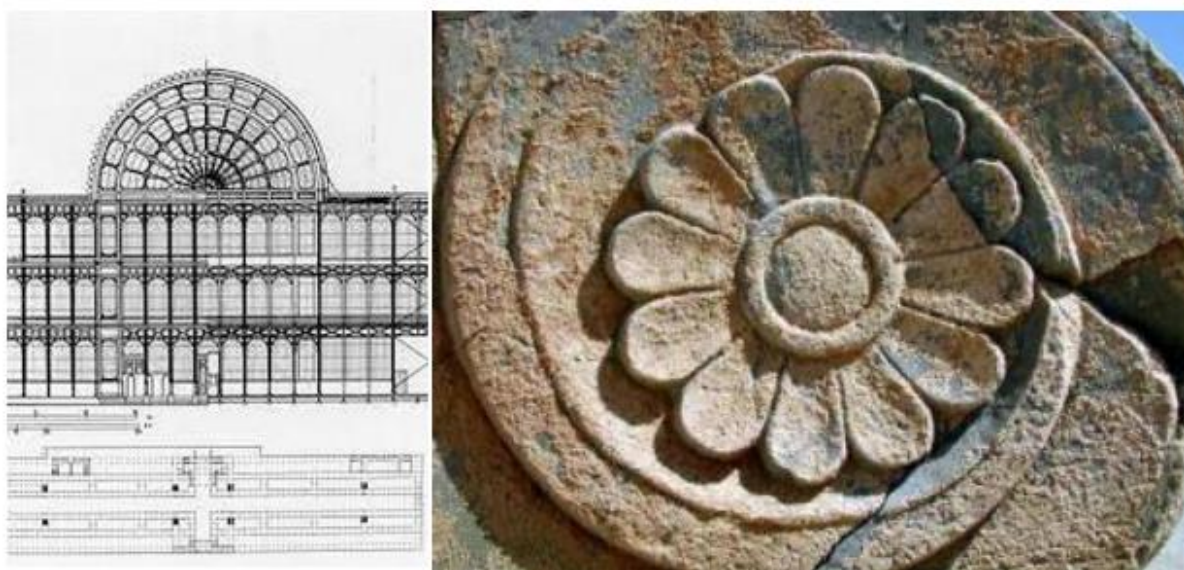


Fig. 8. Inspiration of English architect from lotus flower in designing the ceiling of London crystal castle

4-3. Bionics and nature gift for modern age

As the meaning of adopting nature artificial shapes, bionics was used for the first time by American scientist Jack. E. Steele in 1960. He considers bionics as science of systems which serve as basis of all living systems. At first, bionics examined the machines which have been designed and made based on living systems, however, now bionics is the art of using knowledge of living systems in solving technical problems. Today, wherever technology matters, one thinks about important technological achievements for meeting today and future needs of human. However, if we pay a close attention to path of technology, we can find the origin of some phenomena, for example which nature living pattern was the source of inspiration of any industrial or construction phenomenon. It is many years that researchers are seeking to prove this causality so that thereby they would be able to examine and justify the manner of formation of different systems of life and as the result of these studies, by conflating two terms “biology”

and “technic”, bionics is founded as a knowledge for solving technical problems through biological solutions (Fig, 9) (Golabchi et al, 2014).

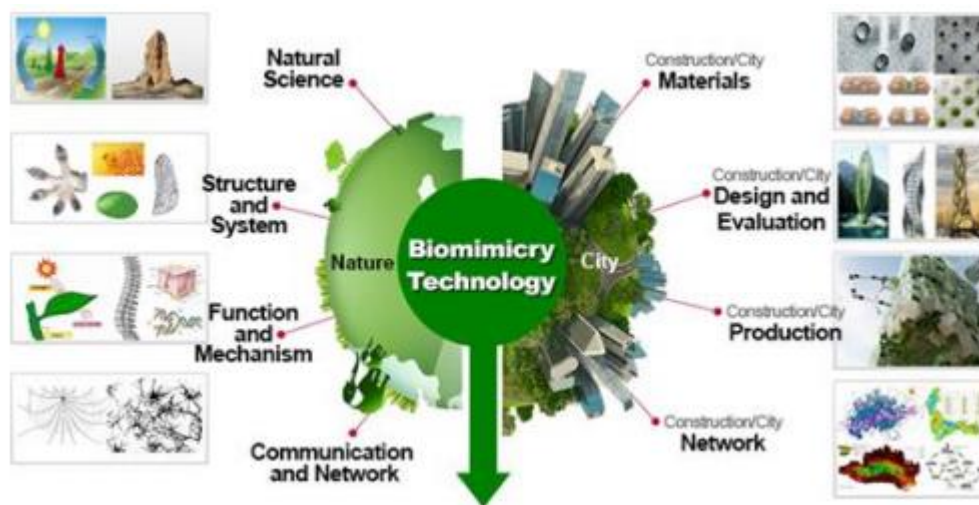


Fig 9. Structure of bionics and its influence on other areas of life

4-4. bionic architecture features

Granting soul to the building is one of efforts of bionic architecture and designers seek to realize this considering the power of structure for breathing (liveliness), by direct and curved lines and gradually inducing the integrity of structure and the cornerstone of bionic architecture is that the building would be able to induce its liveliness. In general, among important factors existing in nature and man uses it for constructing his own buildings are as follows:

- 1- Shell or membrane
- 2- structure
- 3- ornament
- 4- energy

Bionic and naturalist architects have new attitude toward the structure. As in genetic terminology, codes with many forms and special shapes are used to find out the relation between phenomena, here we can draw on computers for simulation of form of living creatures to structures and architecture (Fig. 3).

Architecture can be named as science of artificial life. Organic and bionic concept is the most gift of 20th century. Sullivan, Wright and Le Corbusier all have used this style in their architecture (Senuzian, 2010).



Fig. 3. Proposed steps for bionic architectural design

In general, bionic design is a convergent one, that is, passing from each one of these steps doesn't imply end of the step and in a spiral movement and based on need and procedure of design, and there is return to previous steps.

4-5. design procedure in bionics

In general, design steps based on biodesign and nature is as follows:

- 1- Selecting the living creature (considered phenomenon in the nature)
 - A)Animal) B)plants C) protists, unicellular
- 2- Identifying biological features
 - Living environment: environment conditions, temperature, humidity, pressure and sound
 - Reactions: vital resources, respiratory systems, alimentary materials
 - Physical features: symbiosis conditions, direct and indirect compatibility and incompatibility
 - Systematic relations: aggregate statistics and bio-dispersion, special geographical conditions.
- 2- Identifying architectural features:
 - Internal structure
 - Systematic relations



- Main body of creature: micro components and geometrical proportions, macro components, materials and ratios

In its development, bionic architecture adapts itself with place of building, local common styles, climate condition, building materials and local interpretation of beauty (Hagan, 2001).

4. Identifying regulations and rules of museum spaces based on bionic architecture

Area allocation:

for area allocation in museum, exhibitions and dividing exhibiting components, it is needed to establish a coordination between exhibited pieces, visit circulation o guide axis and information section. There are three different areas, namely public, private and public-private areas that these can be interrelated by inspiring of nature (Bionic architecture). Presence of bionic design component brings about a significant impact on inviting sense.

Movement and access:

movement and access serve as a part of presentation of objects and is an important factor in organizing museum and exhibition space, because theoretically there is no space in the area of presentation of object dedicated to circulation and traffic and no corridor and staircase should hinder this circulation in the region.

Circulation systems: museum and exhibition circulation are in two forms of access concentrated systems and access distributed systems.

- a) Access concentrated systems: in such systems, visitors are directed systematically in a predetermined path. Directive factors can be designed from architectural components with respect to identity and theme of museum. Special weakness of this setup is that the visitor is always subjected to some preliminary influences before reaching to a certain object.
- b) Access distributed systems: in these setups, due to more entries and exit, visitor is not obliged to follow a certain path. Like a pedestrian walking on sidewalk in center of city, he can move within it which can be considered as a certain part of city.

Development: a building can be expanded when its main core brings about consistency in building structure when it is developing and expanding. Thus, adaptability and extendibility are inseparable notions. In other word, integral and consistent extension of museum can be take place along with its functional improvements (Aqajani, 2014).



Administrative organization: administrative organization and setup of museum and exhibition are generally affected by performance hierarchy governing on them and impact of architecture of special spaces that here bionic architecture is considered based on natural design as well as the extent of generality or specialty of their activities (Aqajani, 2014).

Conclusion

When it is decided to build a museum, whether small or large, the fundamental problem to deal with is selecting the place, with various facilities and each one in its turn should be individually studies carefully. Museum should be accessed from any point of city with public transportation vehicles, and as it is possible, one can reach it on foot and it should be located near schools, colleges, universities and libraries as much as possible.

A museum is needed to be planed not only with respect to objectives, quality and type of relics, but also to some economic and social considerations. For example, if in a city only an institute is recognized for cultural purposes (performing theater, lecture, concert, fair, conferences and training courses and so on), it is better that in preliminary estimations of financial resources on which one can rely, one would count on nature of local residents, their tendency to progress based on statistics, share of each group to attract each museum activity. Similarly, nature is a great source of materials, patterns and evolved technics which is connected to the environment in the best manner. These technics and patterns are harmonized on engineering and architectural basis with each other. In addition to optimizing the performance of form, this can bring about diversity and beauty too. Examining each one of natural structures as a case study can teach a new lesson to engineers in how to coordinate the form and structure. Today, the result of these efforts in a modern and scientific manner as bionic architecture seeks to develop this science and approach, yet this effort is achieved to some successes. Many works are created by world famous architects and it is evolving as an idea everyday more.

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