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A biotic balance of objects with nature as an architectural destination: (Marsh houses as case study)

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ABSTRACT

The biotic balance is a special strategy followed by the building, which helps it to stay and interact, and perform vital functions at a constant and natural rate under suitable conditions or the possibility of making them suitable, in the light of the general trend that seeks to preserve nature, as a result of the emergence of concepts of sustainability and green architecture and applied models of polarization outside the environment. Which resulted in buildings that are not compatible with the environment and thus reduced environmental performance of the building, emerged the research problem of "lack of knowledge about the mechanisms of living organisms to achieve a biological balance with the surrounding nature." The main objective of the research was to "build a cognitive perception about the mechanisms by which living organisms create a biological balance with the surrounding environment." Therefore, the main research hypothesis was that there is a similarity between the mechanisms used by living organisms to balance the surrounding nature and the architectural solutions that the architect must follow to achieve the same Harmony with the surrounding nature, "and therefore adopted the methodology of research on two parts: First: the theoretical study, which includes the introduction of concepts and considerations related to the concept of biological balance, and knowledge of the mechanisms used by living organisms and try to apply in the field of architecture, The study concluded that the strategies of living organisms in dealing with the surrounding environment, along with the automatic architecture of marsh homes, is the basis of the main hypothesis and its applicability.

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1. Introduction

The research deals with two main areas: theoretical study and practical study. The research concludes with a set of conclusions and recommendations that represent the theoretical and practical conclusions of the study. The theoretical study deals with the concept of biological balance and how to measure the mechanism of the organism. The biological balance and mechanisms followed by architecture and try to find elements of

similarity between them, to try to build a cognitive perception of those mechanisms and use in the production of architecture in line with the surroundings. The study included the handling of models of marsh houses and the comparison of the construction of the balance of organisms living in the marsh environment, and the use of these mechanisms in the construction of buildings in harmony with any other environment, in

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addition to the presentation of the results and recommendations. Fig. 1 shows the path that will follow the research to achieve the above.

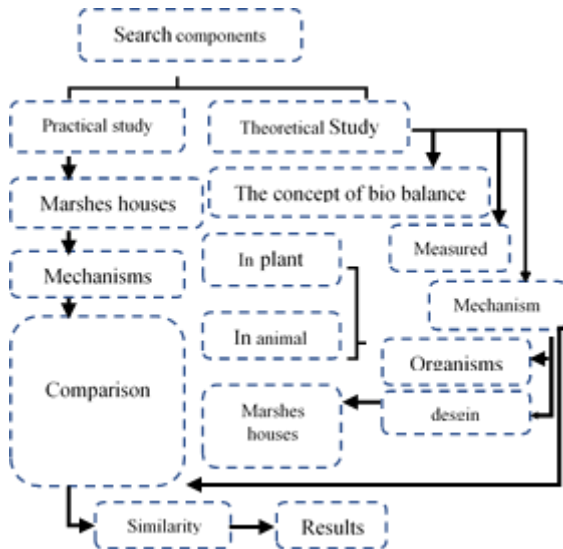


Figure 1. shows the research path (preparation of the researchers)

2. Theoretical Study

2.1. Basic concepts of research

2.1.1. The linguistic and theological concept of biological balance:

When researching the linguistic assets of the terms of the terminology and terminology of the concept of balance, these Astolol contribute to the extraction of synonyms and similarities of language and at the same time contradictions of the balance of balance, so the synonyms of balance are two cases:

- The system: corresponds to the (compatibility - compatibility - homogeneity), ie the situation in which things are placed in relationship with each other.
- The model: corresponds to the (example - type - format) [1], but the meaning of the word vital "practical study of the interaction that determines the distribution and number of objects"[2] ie represents the biological balance study of objects in their environment.



Figure 2. illustrates some of the marsh dwellings in southern Iraq (Source: <https://www.google.com/search?ei>)

2.2. Balance in Architecture:

"The state in which each part of the composition has a fixed problem and the sphere of the fixed, nothing is added or eliminated without the total homogeneity,"[3] as Francis Ching defines the balance as "a homogeneous and relative organization of contradictory parts or elements , Interactive, opposite) within a particular design or situation. "[4]

An equilibrium is the state of harmony between the building and the surrounding environment.

A- Biotic balance: It represents the biological balance of living organisms within their environment, the medium that occurs at the beginning of the relationship or known as the ecosystem[5], which is due to many of the biological processes, which are evidenced by the internal biological medium with the external environment despite the change of climatic factors.

B- Biotic Balance Mechanisms: The concept of biological balance of organisms, we conclude that the ability to survive within the ecosystem requires flexibility during the interaction of the organism with the elements of the ecosystem and its environmental determinants. The environmental determinants of the Lachroho system differ in the distinctive features of each ecosystem. Environmental determinants However, organisms have been able to survive and overcome these environmental determinants and changes by adopting methods that are compatible with their environmental environment and with the diversity of domains as well as the organisms they coexist with. The methods in which organisms achieve balance and harmony Which is due to the multiplicity of the acquisition of each group of organisms characteristics or characteristics are different from another group of beings of the same species living in a different environment these attributes are called adaptations, which is characteristic of an object that enables this organism to live under the conditions of its environment is called adaptation, Special adaptation organisms enable the biological balance with the environmental environment These adaptations in the organic composition of the external form and an internal structure suited to the functions of the object, which is called organic composition complemented by a set of behavior behaviors called behavioral adaptation, those adaptations that all organisms can be called mechanisms T Realize the vital balance.

3. The marshes

Are the lowlands covered by the water both in all the days of the year or in some of them. There is no clear difference between the marshes and marshes, and the people of southern Iraq call the marshes generally on ponds or lowlands that are filled with deep shallow water in southern Iraq and sedimentary plain, Where the reeds, the Golan and the papyrus[6] . The ecosystem of the marshes also includes shallow land that is submerged in water for a period of the year and is formed by the accumulation of rain water above the surface of the earth or as a result of the flow of water over a land surface especially in areas close to groundwater sources and rivers. The sources of marshes are subject to change. Permanent or fixed rate may flourish year-old and other year-old moths so living organisms in the marshes characterized by seasonal.

4. Previous studies

- **The study of Mashhadani, Yahya Dawood, Plants and their environment, 1987[7]** : For example, light affects a number of vital functions of plants with different values and by plant type and different growth stages of plant age. Plants grow in light and others grow. In the shade, between the plants of shade and light called the adaptive ability to live in any amount of lighting with the optical balance of plant. We conclude from the study that the biological balance is meant to adapt to climatic conditions.
- **The study of Awadat, Mohamed Abdo, and others, plant morphology and slice, 1992[8]** : The study indicates that the biological balance is the flexibility and dynamism that gives the plant harmony with the changing environment. This is achieved through changes that affect the two main components of the plant, namely vegetative and root. The balance includes the change in shape and branches at the leg level, And the surface materials of the plant, the smooth surface of the aquatic plants may be rough in the desert plants, due to the control of the number and area of the holes to create a thermal balance with the ocean. We conclude from the study that the biological balance is intended to include the external and internal part and consists of different levels of the parts of the plant.
- **The study of Hamoud, Mohamed Hassan, and others, human biology, 2002[9]** : This study may vary in the animal kingdom to determine the thickness and material of the outer shell of the animal. In dry and warm environments, it is characterized by the thinness of the sweating process, In humid environments it is thick to resist extreme cold. We conclude from the study that the biological balance is a process that depends on the interaction and influence interactively between the animal and the external environment.
- **Study "Chapman" Ecology Principles and Applications 1992[10]** : The study deals with the concept of biological balance as a part of organic life and the group of living relationships that live in the ocean or the environment. The study also shows that the biological balance includes the study of animals and plants and their relation to their environment. It also indicates that the biological balance is the interaction between the living organism and the surrounding environment in mutual relationships through which the organism seeks to continue and develop. This balance is divided into two levels, namely the level of the organism and the surrounding ecosystem, The biological balance is the interaction between the environment and the organism, which ensures the continuity and evolution of the organism.
- **Dickinson Gordon & other study, "Ecosystems: A functional approach" 1998[11]**.The study indicates that the functional bio-balance is a special strategy to cope with the changes and disturbances that occur within the ecosystem, which ensures the continuity and balance of objects during their interaction and performance. The study also points to the mechanisms of balance that arise in living organisms, such as avoidance, resistance and circumvention. The bio balance is part of the principle of adaptation to the environment. The study also discusses the biological balance of climate, which includes interaction with the surrounding climate through the amount of rain and vegetation, temperature and relative humidity. The study also describes the biological balance as the ability of the ecosystem of the organism to vary and vary according to the environment (desert, forests, lakes, etc.). We conclude from the study that the intended balance is the functional balance, while the study did not address the other aspects of the balance of form and behavior and others.

Table 1. shows the focus of previous studies (preparation of the researchers

		Concentration	Mashhadani, Yahya	Awadat,mohamed	Hamoud,mohamed	Chapman	Dickinson Gordon &other
Type of study	architecture						
	Non-architectural	plant	●				
		animal			●	●	●
Interesting study	shape			●		●	
	function		●	●		●	●
	behavior					●	
balance	climate		●	●	●	●	●
	topography						
direction balance	enterir		●	●		●	●
	exterir		●	●	●	●	
Possible value			●	●	●	●	●
balance form	continues		●	●	●	●	●
	evolve					●	

We conclude from the previous studies that the table above shows the aspects of each study that the biological balance in general, and most of the studies were outside the field of architecture, in addition to the biological balance was handled in most studies that leads to survival, not development and survival together, But most of the studies did not address the mechanisms and levels of biological balance and the possibility of using these mechanisms in other areas and within different environments, so it was one of the reasons for the emergence of the research problem.

4.1. :The research problem: Having mentioned in the previous paragraphs the most important studies that dealt with the biological balance and its relationship to the survival and persistence of living organisms, we note our lack of a specialized architectural study, since all the previous studies were outside the field of architecture. We also noted that most studies dealt with any vital balance In general, without explaining its mechanisms and levels, and the possibility of using these mechanisms and methods in other areas and in different environments and by other organisms, and here we mean specifically the human and the field of architecture, and therefore the general problem of research can be identified by (b) the lack of knowledge of mechanisms and methods Biological balance of organisms).

4.2. : Determination of the objectives of the research: After identifying the problem research must identify the main objective of the research is ((understanding and understanding the mechanisms and methods of biological balance of living organisms, and the possibility of using these mechanisms in the formation of an architectural product is consistent with the environment). Which is reached through the secondary objective: to arrive at conclusions about the similarity between the mechanisms of the organism and architectural design, specifically *through*

the handling of marsh houses in southern Iraq and some structural models that tried to simulate those houses.

4.3. *The theoretical framework of the concept of biological balance:*

In this paragraph will identify and analyze a range of architectural studies close to the framework of the research. To solve the research problem as it provides the basic vocabulary through which the different aspects of the research problem are measured. And to prepare the requirements for practical application through the selection of samples of marsh houses or houses were built according to the mechanisms of construction of marsh houses that will be applied to the measure, and identify the vocabulary and variables of measurement and determine methods of measurement and astrology and the construction of hypotheses main and secondary research, and to extract and analyze the results of practical application of research, Then put forward conclusions, and finally put forward the final conclusions.

4.4. *Previous studies on bio-balance:*

- **Dabsen, ysri, "Nature Reserves and Environmental Balance "**, 1999[12]: The study indicates that the biological balance is part of the ecological balance and a condition for its continuity. It is the process by which organisms seek to achieve their balance through the use of the principles of nature. There are many alternatives in organisms to conform to the biological balance is the behavior of the organism that is created according to the surrounding environmental variables. The reproduction of animals and plants is not done through an engineering sequence. The decrease of food and the feeling of increasing its numbers prevents it from multiplying, migrating or redistributing its spread. The study of biological balance is closer to the flexibility of the organism to survive, a process of interaction depends on the impact of the environment and the extent of the object
- **Arafa study, Salah "Environmental balance and the establishment of human settlements "** 2000[13]: The study indicates the biological balance is the interaction of elements of the environment in groups, each group is an environmental range (a living area) has characteristics distinguish it from other neighboring environmental ranges, Environmental elements, such as the prevailing climate, soil components (non-living elements) and the quality of plant and animal life (living elements), where living elements interact through a reciprocal relationship that depends on each other in a part of his life. We conclude from the study that the biological balance is an interactive process with mutual benefits that is similar to coexistence to form a vital society, which interacts with the environment.
- **The study of Bayoumi, Hussein, "The Machine of Nature: Ecology from an Evolutionary Perspective "**, 2000[14]: The study indicates the dynamic balance as the dynamics and the interplay between the systems to cope with environmental changes, which helps continuity. The study also describes the biological balance in the integration between organisms and the surrounding environment. The amount of the biological balance The quality of the properties of the overlapping ecological systems and the topographical and physical barriers that separate the systems, which make them very sensitive to environmental changes. We conclude from this study that a dynamic balance is a dynamic integration process that relies on flexibility in dealing with external variables.
- **Nebel "Enviroment Science" study 2000[15]** : The study indicates the biological balance as a periodic exchange process occurs in two directions, once towards the organism and the other direction of the outer

perimeter, and this cycle includes the transfer of materials and energy, and although each cycle has different characteristics, In the end we find that each of them complement the other, and the process of exchange through the outer envelope, influenced by factors such as climate, which includes temperatures, humidity and rainfall rates, as the study to balance levels, and put those levels within the hierarchy, In the general structure, where the product represents the base and the material The balance will lead to the loss of the relationship between them, where some consumers resort to reduce their preparation for the existence of imbalance in the burner, which is due to the disturbances that occur in the environment of the surrounding. We conclude from the study that the biological balance is a periodic exchange between the organism and the surrounding environment according to levels affect the nature Disorders and external changes.

- **Batton study "Physical Geography" 1974 [16]** : The study indicates that the biological balance is the functional harmony of the organism with the outer environment, the members of the organism acquires a group of features or specifications to suit the changes in the external environment, In contrast to the members of similar functions in the organisms of different environments, where the members adapt to meet the effects of the external environment, so as to achieve consistency between the internal biological medium and the external environmental environment. We conclude from the study that the functional balance of functional is the harmony or suitability or adaptation of the components of the organism Components of the environment.
- **Brown study "The Relation of Evaporation to the Water content of the soil the time of wilting" 1998 [17]**]
The study deals with the biological equilibrium through the term adaptation, which leads to ecological balance. The biological equilibrium is defined by the range of differences in characteristics and characteristics of the organism, acquired as a result of continuous exposure to different environmental conditions for a long period of life cycle, The study indicates that the biological balance leads to formative changes in organisms of the same species, when they grow in two different environments, such as the aquatic environment and the terrestrial environment, where the total root of the nucleus decreases T that grows in the aquatic environment while expanding the ground environment to balance the absorption Alme.nstkhals of the study that the vital balance is adapted to a functional change, followed by a configurable output from the organism affected by the environment surrounding the process.

4.5. Abstract: The main and secondary vocabulary and its possible values, which represent the conceptual frame, were identified. Thus, the research achieved its first objective in constructing a theoretical framework on the biological balance of the living organisms and the effects on architecture, And the vocabulary came as follows

5. Application

In the practical study, the vocabulary of the theoretical framework will be applied to a selected group of samples. For the purpose of the research, the vocabulary of the effect of interaction with the environment on the external appearance and the flexibility of formality to respond to environmental variables will be chosen.

5.1. Test the hypothesis of research: - This research was based on the hypothesis of the main (the existence of a similarity between the mechanisms and strategies of living organisms to balance with nature and architectural solutions that must follow the architecture to achieve the same degree of harmony within the environment itself). The research was

based on the analysis of the detailed explanatory texts, drawings and explanatory diagrams of a number of selected projects. The analysis included several stages:

5.2 : a general description of the project based on the sources and re-analysis of each project according to the specific vocabulary for the measurement and the descriptive charts and illustrations.

5.3 : the specialized description and measurement form contains a detailed explanation of each secondary variable within the specific adaptation vocabulary. The two components (the effect of interaction with the environment on the external appearance, the effect of formal elasticity on response to environmental variables) and the effect of formal elasticity on response to environmental variables In the form (1), which shows how the possible values will be based on the nature of the relationship between each of the two selected members of the measurement and secondary indicators as stated in the form, which was later applied to the selected samples, based on information

Table 2. All the elements of the general theoretical framework. (preparation of the researchers).

themain Singularity	Singularity 1	Singularity 2	Possible values
The mutual influence between the building and the environment	Dimensions and proportions of outer cover		
Effect of building in the environment	Shape, size and area of openings	Form Fonts	
		Colors and texture	
		Softness and roughness in the walls	
		One activity	Use hollow walls
Several activities	Thickness of walls		
The effect of formal Flexibility on responding to environmental variables.	Formalism	harmony	Local materials
			porosity
		Orientation	
	Functional	repulsion	Surface shrinkage and width (mobile interfaces)
			Increase functional efficiency
		Functional inefficiency	External closure and internal openness
Shape and surface area			

obtained from Examples of projects for each of the elected, and in line with the goal of research.

6. Analysis of the results

This section includes the discussion and analysis of the results of the application derived from the variables measurement form on selected projects based on the Exccel program to calculate the percentage of each

variable according to the selected projects. The results related to the individual (the effect of interaction with the environment on the outside) the effect of formal flexibility on responding to environmental variables) to the differences between their indicators and their impact on the biological balance:

Table 3. shows the description and measurement form to measure the variables by determining values ranging from 0-0 (0: not verified, 1: weak, 2: acceptable, 3: good, 4: very good) for the sum of variables. (preparation of the researcher).

key vocabulary	Secondary variables	Possible values for the three samples	First project (P1)	Second project (P2)	Third project (P3)	Total	Total values as a Percentage	
The effect of interaction with the environment on the external form, (A)	Outer shell (A1)	Exploitation of renewable energy sources	2	4	4	10	8%	
		Dimensions, proportions and outer space	4	4	4	12	%10	
		Shape, size and area of openings	3	4	2	9	7%	
		Form Fonts	3	4	2	9	7%	
		Colors and texture	4	4	2	10	8%	
		Softness and roughness in the walls	4	4	3	11	9%	
	Internal medium (A2)	Use hollow walls	4	0	3	7	6%	
		Thickness of walls	4	2	4	10	8%	
	Formal elasticity of response to environmental variables (B)	the shape (B1)	Local materials	4	4	0	8	7%
			porosity ^l	0	4	2	6	5%
			Orientation	3	3	4	10	8%
		Function (B2)	External closure and internal openness	4	2	3	9	7%
Shape and surface area			4	4	4	12	10%	

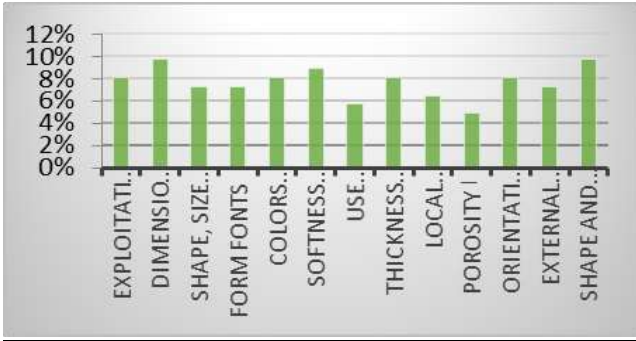


Figure 3. shows the analysis of the results of achieving the biological balance formality through the single (impact of interaction with the environment on the outside)

The ratio of the effect of the individual indicators (the effect of interaction with the environment on the external form) varied in effect on the level of achieving the biological equilibrium. The index of the use of (dimensions and proportions and the area of the outer envelope) achieved the highest percentage of 11% (Thickness of walls) by 8%, while the indicators of (shape, size and area of openings), (lines shape) were 7% Finally, the index (using hollow walls) was 6%, as shown in Figure (2).

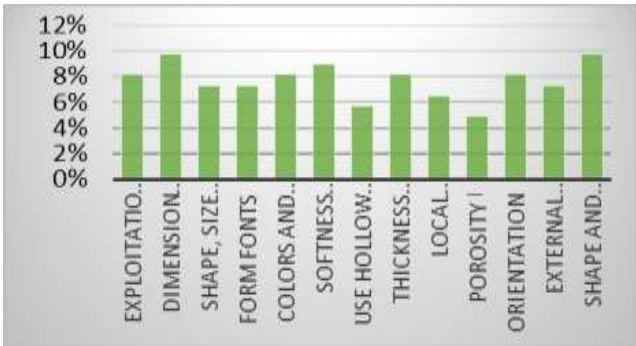


Figure 4. shows the analysis of the results of achieving the biological balance formality through a single (the effect of formal flexibility on the response to environmental variables)

The effect of the individual indicators (the effect of formal elasticity on the response to environmental variables) varied in effect on the level of achieving the formal biological balance. The use index (shape and surface area) reached 9%, while the steering index came at 8% (External closures and internal opening), (domestic materials by 7%), and finally the porosity




Figure .5. shows The ratio of the effect of the individual (the effect of interaction with the environment on the external form) to the physical equilibrium was 63%, while the other effect (37%) was as follows

7. Similar examples

7.1 The first example

1- Ithe project of a residential house / the owner Sheikh Hadeeb Al-Haj Hamoud / Baghdad / 1972 and was referred to as the symbol (P1)



Designer / Rafta Jaderji
Location / Iraq-Baghdad-Ma'amoun
The design idea / inspiration from reeds in the marshes.
Mechanisms used:



Use the local material, which is the clay bricks, the ceiling and the walls.

The balance and the ratio between the open and the closed in the front, where the CSS is superior to the open because of the environment


1-Use the arched ceilings to reduce the amount of heat-absorbing and reduce the wind speed.
2- Increasing the thickness of the wall and the use of bricks without finishing materials, contributes to heat dissipation and insulation efficiency.
3-Provides the color of the brown blocks, integrating with the surrounding environment.

7.2 : The second example

2Name of the project / Host (guest house) / Sayed Sarout / 2017 Reference is made to the symbol (P2).

Designer / Mode
Location / Iraq-City of Architecture / Mowar
Desion idea / Sumerian houses






The use of the local material is only reeds, mainly walls, roofs and windows.

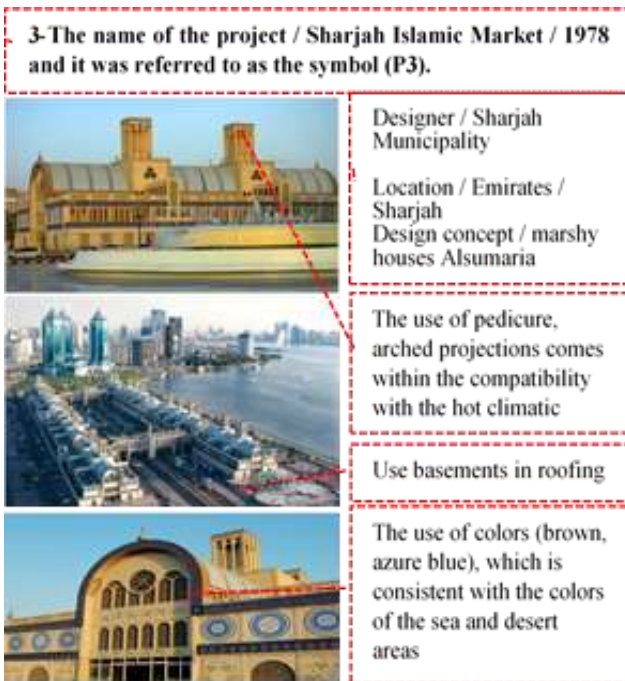
Using the so-called semi-erect structural structure. As well as to the air networks or so-called delights, which is achieved by the ability to host the host.

The distances between the young are encapsulated in the so-called barrier

1-Uses reeds have a poor conductor of heat and cold, so the houses are hot in the winter and cold in the summer
2-the ability of reeds to bend or fold, is used in the formation of arched ceilings, which reduce the flat area exposed to sunlight.

7.3 : The third example



8 :Conclusions:

- Formal biological balance is an interactive process, through which to develop principles that can be applied to architecture, in the framework of an introduction to the nature of the marshes.
- The formal bio-balance contributes to the determination of the distance or space of the organism's environmental environment, which helps architecturally determine the exterior shape of the building and guide it and the relationship of anchors to the surrounding environment.
- Compatibility of strategies and mechanisms of living organisms in the harmonization of the environment with the mechanisms of architectural design, and is done through the following: -

A - dynamic interaction

Is the ability to control the amount of interaction with the environment and change the color of the outer surface from separation to separation and move from one location to another in order to shade gives the object a great deal of compatibility, which can be applied to the architecture. The exterior coating of light colors with the possibility of turning to dark colors at a very low temperature at night, which is available in the characteristics of natural plastics.

B - Isolation between the inside and outside

Marshlands deliberately isolate the biosphere from the inner environment by increasing the thickness of the outer wall and its permeability and containing special materials that have the ability to heat insulation. This is one of the principles of marsh objects to achieve the equilibrium of the biological medium, which can be applied to urbanization, Of materials with thermal insulation capability.

C) External closure and internal openness

Reducing the holes and pores open to the environment and inward orientation, which enables the marsh objects to avoid the sharp changes of the physical medium, which can be applied to the architecture, such as reducing the proportion of openings in the outer shell to avoid the impact of environmental variables inward direction through the interior and interior spaces.

D - Avoid the surface of the earth

- Humans are called to avoid the surface of the earth, which is rapidly affected by the change of the state of the physical medium such as high or very low temperature, so that the marshes escape to the depths of the earth where the observed decline and relative stability to the temperature or resort to the vertical direction away from the impact on the surface of the Earth An application to urbanization, such as resorting to the soles of the earth, a trend that is used instinctively in models of automatic construction and represents one of the modern trends or what is known as the infrastructure.
- A conceptual design can be presented that draws strategies and guidance from the environment.
- proved models of automatic construction (marsh houses), the compatibility of both the mechanisms of objects and architecture in the principles of each.
- consider biological balance as a principle of architectural design principles, no less important than other design principles.

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