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# A Novel and Modern Comprehensive Theory to Create an Anthropocentric Architecture Based on Laws of Chaos (Part IV): Synergy of Information

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### ABSTRACT

If you want to create an architectural system as beautiful as the natural system, you need to try to make it so it contains new information at any second like the flow of a river and never become linear and repetitive. It's necessary that in this system, there always be the chance of news and this is not possible except with the synergy of information of all the factors affecting the system. Anything the architect, as the creator, does in the process of creating the work at every second is creating information. These information should be managed deliberately in line with the goals of the system and comply with all the qualities of chaotic systems. This principle is a general principle applicable before all other principles.

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### 1. Introduction

Management and synergy of information of the architectural system must start early in the process of design with the focus on mental information of the architect and must be applied at any point until the whole project is concluded. At the time of creation, the architect is not merely a creator, but also a nurturer [1–27]. S/he must guide the design group and coordinate with other professionals. His/her mental information, as the third dimension, must take on the role of the guide. Generative information (the mind of the architect) must act as the manager in control. In the process of designing, s/he mobilizes material including physical facilities and tools of designing, and energy and information of the partners and guides them using a strategic system. As the main creator of the work, s/he must act as the supervisor of the group creating and completing the work and systematically lead the people involved in a way that the work of the group becomes something more than forced summation of the works of the individuals [28–43]. Information, in this form, is controls other information itself and performs the task of converting generative information to information in circulation. In the process of executing the design, it is also essential that the designer be involved directly and not just as the architectural supervisor, but as the coordinating supervisor, leads the execution of the project so smoothly and coherently that the design is perfectly embodied [44–64].

In previous discussions, we elaborated on the synergy of the generative information in the mid of the architect with the information in circulation of the environment and the process of its refinement and transformation in order to form the design. However, what level and what kind of information the space and fabric of the work of architecture which bears the responsibility of transmitting the message of the architect

should have? How can we eternalize the circulation of information in space like a strange attractor using merely rock and metal? Here, with emphasis on specifics and amount of the information sent from the space to the mind of the audiences, and the using the synergy of information in circulation in the space and the mental patterns, this issue shall be examined in order to specify the fractal boundaries within which human institution enjoys the space [65–71]. We know the main different between strange attractor and other attractors are that it is never repeated and does not cross itself which means the information in it is infinite. So, the closer we succeed to bring the probability of news or information of the building on different layers to infinite, the more chaotic and unpredictable our work becomes. It's obvious that today, we can't design and provide as much appropriate information on all the different scales of the building as the ancient masterpieces in a short period of time, but resorting to nature and technology and responding to the expectations of the audience are our best shot at producing infinite and desirable information of the mind [72–82]. Continuing our revision of what was explained in chapters Perception and Cognition, we shall elaborate on the matters that ensure the increase in information in the system and provide an opportunity to chaotically manage the information entered into the mind of the audience to form and recognize the pattern [83–93].

### 2. Different Scales

Previously, we explained how a fractal object bears information on different scales of any level and in any proportion to the observer. Magnifying a part of it would reveal a shape similar to the initial shape and this provision of information is constant and infinite. On the one hand, we gain cognition of the different scales due to the self-similarity quality and on the other hand, we gain new information due to the difference in size and the element of randomness. This

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scaling is seen in all the chaotic systems due to characteristics of its strange attractor and its fractal dimension. If we want an architectural building to naturally interact with the environment, it has to bear information for the mind on every scale.

Nikos A. Salingaros is a mathematician who, with the collaboration of Christopher Alexander, has done much research on scaling and different scales from the viewpoint of biological and psychological mathematics which confirms the necessity of information provision on different scales in another way.

Salingaros believed that there is a quality in natural shapes and traditional and indigenous architectures which is called natural scaling hierarchy. That is, there is a constant proportion among the sizes of successive groups in all the components of these forms, as observed in fractal objects. He reached the conclusion that an object with scaling coherence has distinguishable scales which can be sequenced from the biggest perceivable size to the smallest based on that scale and introduced this proportion with the number  $e = 2.7$  which is achieved through the calculation of the proportion of the existent scales in natural forms.

Salingaros considered the reason for the pleasing quality of natural shapes to be this coherence of scaling based on the number 2.7 and claimed that if this quality is also applied in the design of the buildings, despite the asymmetry, would unconsciously trigger perceptual familiarity and pleasure in the mind. He presented a sequence of numbers for division of scales:

$$\{e\} = \{1, 3, 7, 20, 55, 148, 403, 1097, 2981, 8103, \dots\}$$

He stated that if the sequence of proportion of sizes of the components are these numbers, the coherence of scale is produced. For instance, a building 20 meters high must have divisions shrunken to 7 m, 3 m, 30 cm, and 10 cm in the ratio of 2.7. He believed that when traditional and indigenous construction methods and materials are used, the potential hidden in the materials (texture, type of function, and quality) automatically lead to this division roughly speaking. But modern materials with wide coverage capabilities (for surface, volume, and opening) usually mess with this hierarchy and the scaling. In examination of modular systems usually used in designing which are based on integral, the basic dimensions are calculated whose scaling number is the integer 2 or 3 and using them would lead to rigid and segmented divisions.

Salingaros stated that the coherence of scales depends on the scales being close enough together and yet distinguishable enough to be differentiated. Thus, if the ratio is less than 2, we can't distinguish between different scales so there would be no separate hierarchy either. For instance, a scaling hierarchy based on the Golden Ratio  $\Phi = 1.618$  (like the modulators of Le Corbusier) has sub-units very close to each other in size, so, it is more a gradual change between scales than separate different scales. In contrast, if the ratio is too big, like 10, the structures too different in size, would appear so unexpected that perception of continuity between different scales and the link between them would be lost. He claimed that he had reached the appropriate number 2.7 by referring to the fractal patterns existent in mathematics which of course, we know the number is not unfamiliar in mathematics and is the famous Neper's  $e = 2.7$  or the base of natural logarithm.

According to Salingaros, we can gain an order within disorderly structures by applying this coherence of scales which infuse a sense of pleasure with no aesthetic

justification. The coherence of scaling in fact, shows an infinite number of scales, but for practical purposes, he designated a range for these scales. Assumption of  $\frac{1}{4}in = 6mm$  would be proper number for the lowest limit of

this range so that all the numbers of the subsequent scales are measured through it. If  $x_0$  is the smallest amount in this set and  $X = e^{n-1}x_0$  the biggest,  $n$  would be calculated as  $n = 1 + LnX - Lnx_0$

Therefore, a building with the height or width of  $X$  m is required to have distinguishable sub-units in the size on  $n$  to appear coherent. In addition to the number of scales, the proportion of these measures should also conform to the hierarchy of scaling. So, if a building has scales too small or too big, it would appear incoherent. Thus, most buildings with measures between 3 to 50 m must have 8 to 10 separate scales, the smallest of which is assumed to be  $\frac{1}{4}in = 6mm$ .

After that, the scales of the materials are defined. The smallest size perceivable depends on the distance of the observer and the distance of closing on the object to the point of contact (touch) is also possible. Architecture connects with human consciousness through the smallest details regardless of the building having modern or traditional style. The psychological need for details in the smallest scales perceivable is perfectly seen in extensive usage of natural surfaces like wood or stone. Such a surface creates an emotional connection in terms of very fine details. Interestingly, the eye perceives natural structures related to real wood or marble, even if there are limitations for visual perceptions. However, it is not easy to deceive perception using formica even from a distance.

We can strengthen the relationship between the observer and the microscopic structure of the materials. Below the human scale, there is an infinite hierarchy of scales getting smaller and these small scales are as important as the big scales. We establish a strong relationship with the materials which have a scaling hierarchy to the microstructure. Shapes with no specific form or texture, transparent, or strongly reflective cannot form such a relationship with human perception. Materials with loose natural qualities often create surfaces which does not provoke perception. Therefore, modern materials with no natural microstructure can only form emotional connection with the observer through maintaining the scaling hierarchy. In this case, the observer must be able to distinguish the surfaces and divisions more clearly and distinctively than natural materials are used. This can be done by putting the opaque and glossy materials together or by emphasizing further on details and colors.

It appears that Salingaros chose the number 2.7 because the natural logarithm plays such a key role in calculation of the dimensions of chaos (as addressed in the first chapter). However, proper direct use of this number for divisions of the building elevation seems unlikely. Although this achievement is phenomenal that a building with scaling coherence can provide the observer with a complete scope of human scales and provoke a sense of beauty by coherence of information but this object-oriented viewpoint or passing general judgments on it that any beautiful building necessarily follows this division is basically in opposition with the viewpoint of chaos. Because as was explained, chaos considers architecture a system whose information are produced by the synergy of the information of its sub-

systems. So, the conditions of formation and deployment of the building in the context and the position of the observer in relation to it play a key role in the design of different scales which was not considered by Salingeros. The conditions Salingeros dictated might be true in case of a flat surface seen from exactly from the opposite, but in most case, the building is not directly faced and depending on the size of the building, the observer perceives it from different perspectives which thoroughly challenge the 2.7 ratio. In addition, it is necessary that some of the building elements are designed in terms of long distance observation and using details in sections which are never going to be seen in close range is not required. For instance, it is suggested that the building plinth be designed up to the human height with observable details and tangible texture in touching distance and the higher the building goes in terms of height, the density of details be reduced and the sizes of divisions be increased. In areas which are perceivable and can be experienced from different distances, in proportion to that distance, there must be divisions on different scales so that on any distance the relevant information is perceived but there presence of this divisions on the elevation of the building in a narrow alley is either not seen at all or would cause information congestion.

However, in general, it is emphasized that given the conditions and the perceptual level and the culture of the audience, in order to create coherence of information, the architect needs to take into consideration the details of scaling and creative thinking on different scales not only on the elevation of the building but in it the creation of the whole building. A beautiful example of taking notice of the observer on any distance is the design of the domes of the mosques in the past. A turquoise dome decorated with verses of Quran from a far distance is merely a shining jewel specifying the location of the observer relative to the mosque, from a closer distance, we can read the verses but on a much closer range, when we have reached the mosque and the dome cannot be seen on human scale, no delicacy has been deliberated in a way that if we ignore the defined presence of the audience in the building and go on the roof, we can see that the materials are rough and designed on a macro-scale and the smaller divisions cannot be seen.

It is necessary that the architect think about all the aspects of designing and attempt to create information in any section layer by layer. As was discussed before, s/he needs to make decisions and design purposefully not just in the elevation but in creation of sub-sections and interior divisions of the space in a fractal way and through positive feedback and not leave any section out. After selecting the final option for the design by, the architect creates the interior divisions of the buildings, considers the zoning, reaches the smaller divisions, moves from divisions to decoration and from decoration to furniture and appliances and even to the most trivial objects. This live mechanism leads to the unity, diversity and multiplicity in scales. Note that here the goal is not necessarily to create a fractal object but to follow the behavior of the chaotic system in order to create the intended natural work. On different scales of designing, the inherent requirements and conditions in respect to the audience of the work would lead the diversity and complexity of the system the same way it does in natural phenomena and not in identical fractals produced by a computer.

Here, the crucial role of decorations is revealed: architectural decorations, like what was used is the indigenous-historical architecture, is an integral and constant part of the building and must be designed in sync with the

design of the building or at least their future accession be previously taken into consideration so that they don't appear as excessive members and inconsistent with the parent system (the building). Decorations can be born out of other scales using fractal geometry and be considered on different scales. Decorations and details are all that make a building beautiful. It's the decorations and the texture of the materials that render the dimension of the architecture fractional on the last scale of design and carry it beyond the Cartesian three dimensions into the world of chaos. Without details ensuring the unpredictability, there would be no beauty in the world and Iranians realized this to perfection and portrayed it in a place like the Red Palace Granada.

Recognition of the scaling hierarchy and the amount of details is the responsibility of the cognizant architect who can make a decision based on estimation of the conditions of the first stage and the subject of the work having in mind the audience if the building. A point observed in any city possessing the quality of beauty is that the prominent buildings in huge volumes with numerous divisions and details and complex decorations on human scale are zoned in a way that the observer is able to form a pattern and properly perceive the building from the outside and inside of it with enough distance and s/he has enough time and space to perceive and recognize the different scales and promote his/her mental pattern from afar and in close range. These decorations and divisions fade and lighten up in proportion to the importance and size of other buildings in the city to the point that normal residential houses adjacent to narrow alleys might be distinguishable only by their different colors and there might be no complexity and details involved. In cities where human is important, even if the building is constructed as a tower simply functioning for work and residence, it is tried to reduce the dry and soulless presence of the buildings while adjusting the skyline by recessing in proportion to the human scale and the designing of the details down to vision line of the passerby and soften the negative effect of heavy volumes by increasing the expanse of open spaces.

### 3. Coherence of Information

Imagining that information approaches the brain in the form of pulse and codes and the mind process them one by one is wrong. The nature sends its information to the mind during a continuous creation in a live and constant way and this is what the brain expects from the surrounding world and is one of the reasons for the harmony of the mind with the nature and the pleasantness of the natural phenomena compared to machine products. Therefore, we find that in the nature-oriented architecture that chaos suggests, design and creation of the work cannot be left to the computers. Although today, computers and software play a significant role in the production and embodiment of the space, numerical calculations and signs and codes which form separate dimensions and their inadequacy in embodying multi-dimensional phenomena limits their advance beyond the level of being a tool and renders them unfit to create a work with coherent information. The architect must experience his/her work in a live way and control all its potential and actual information personally. To create the intended space, the architect must actually experience similar spaces and observe the normal behavior of people in regards to those spaces. The architect must have a clear visualization of the actual scale of his/her work and be aware of its effect on the perception of the audience. S/he must be able to expand multi-dimensional patterns of different factors in

his/her mind besides visual patterns and create live spaces based on them.

Today, we are so mesmerized by the one-dimensional visual patterns and consider information linear to the point that some suggest using digital screens to show a picture on the walls to replace the window. It is emphasized that these screens might be able to account for the coherence of visual information, but they would never be able to account for the coherence of perceptual information and this is the reason for their unpleasantness. When you, the live mind, look out the window in search of live information, you see a leaf moving by the wind which you can hear and feel. You see the color and shape of the leaves of the trees in all their moments of transformation and this coherent flow is perceived by the brain not just in those few moments you are looking at them but also in the prolonged days and weeks even if you don't look at them and you'll receive psychological pleasure from them. The leaf is right there. You can always go out and touch it. Variable and healthy lights and heat of the sun penetrates the room from beyond the mesmerizing clouds, the wind moves the curtains and makes them dance in the sunlight and maybe, bring with it the smell of dirt or rain, the rain which is so close and can soak you. All this comes from a system which you are a sub-system of, and in whose lap, your imagination and perception have been formed. The mental pattern is naturally the sum of all these coherent and generative information. When you see the most beautiful image on a three-dimensional digital screen, your intelligent mind understands it but due to the pixel and frame nature of its information and the lack of the accompanying information, it doesn't fully enjoy it and your mental pattern would not be improved. The mental pattern formed naturally in the brain is the pattern formed of live and coherent information of different perceptual aspects of the perception of the surrounding smells, sounds, tastes, memories, images and emotions which desires live and meaningful experience to complete and recognize it. Otherwise, people would never have left their houses and instead of traveling and sightseeing, would be content to see those sights on their TVs.

In real life, the mind is in a continuum of information which makes the story of life real for it, just as in order to increase the effects on the audience, a filmmaker needs the auditorium to focus the audience on his/her message, the architect should also emphasize his/her message by selecting the right fancy and clever usage of the characteristics of determinacy and unpredictability. Have you ever thought about the difference between the TV screen and the theater screen? Why do people still go to the movies given all these advanced home theatres? When watching the TV, there are many interfering factors which attract our senses and so, we would never perceive the pleasure we feel while watching a movie in the theatre watching the movie in our room. But what happens in the movie theatre? The big space darkens, the screen is maximized, the sound is broadcasted to the maximum and broadly, the walls are sound-proofed and recently, the third dimension and the smell and motion is also added so that the senses of vision, audition, and olfaction are affected at full force and other senses and thoughts are paralyzed so that the maximum level of connection to the movie is established. Most importantly, it is the shared presence of other people which leads to your approval and reflection and turns watching a movie into a civil experience. On the stage, this impact of human presence is more tangible; the actor is in your presence in real and presents all his/her emotions in full force in the field of your perception and

cognition and captures your mind by creating coherent and generative information.

The architect, like a movie director, should try to emphasize the live human presence in the space and this is not possible without creating coherent and constant information. Information of each section of the space should be coherent and purposeful by observing the designing on different scales. The building, as a united whole and a coherent system, despite being created from variable sub-system, is coherent like a live organism and behaves integrally, although its various spaces, like different members of the body, have different responsibilities. The knowledgeable architect is responsible to design the whole building, from the general form to the rooms and to the details and decoration, in accordance to the characteristics and expectations of the employer so that the information cover the perception of the audience in a coherent manner. To clarify the way coherent information is created, one of the subsets of the architectural space shall be explained: the connective space

In most buildings, the connective space is the remaining part of the design, as if provision of information is intentionally disrupted till the next space is reached! A chaotic system never ignores such an integral part of itself. It is surprising that we always forget the path where we spend most of our life and only think of the destination and if inevitably, the corridors, the steeped spaces and the stairs are placed in the most inferior parts of the building, instead of optimizing and amending this shortage, we fuel this deficit by lack of thinking and designing. Today, connective routes on any scale are left with not identity and with the least amount of information all over the country, city, shopping center, and office and residential buildings. Interior circulation or connections play the role of vital and connective veins in the body of architecture. The routes are sub-systems of architectural system which must be designed with careful consideration and fancy, like the general shape of the building. The mental pattern of connective space is borrowed from giving life to the truth of transition and enjoyment of the path, finding the path, reaching the destination and access. Coherence of information between different spaces of the building is made possible by the path. So, the nature of the information of the path depends on the information of other parts and thus the circulation, as a sub-system of the whole design, becomes flexible and accommodating to it.

Each path, itself, is composed of parts for which there must be measures introduced like hierarchy, openings, intersections, bifurcations, spatial interaction, accesses, pause spaces, motion stimuli like light, sound, etc., change in directions, change in height, imposition of certain perceptual feelings (like shortness, wideness of the path or accessibility to the destination) and etc. in perfect accordance with the facilities and limitations of the building and corridors, stairs, elevators, and slopes should be zoned in a way that their functions remain intact. As we mentioned in previous section, the experience of motion and change in the building is one of the most important strategies for increasing the characteristics of determinacy and unpredictability, hence, the deliberate design of the connective paths holds a special position in the process of designing to experience and see different parts of the building.

Throughout the path, we can support and encourage the audience to move in different ways by producing coherent and diverse information. Rhythm is a factor which induces motion but it shouldn't last too long. It is necessary that from

time to time, it is intercepted by an opposite element so that new information is produced in the brain. In the hierarchy, we can both encourage the observer to move and make the movement purposeful by constant and diverse spatial changes. Intersection is a place where there is the possibility and expectation of news. Here, more than one goal is set, so it is associated with uncertainty and increased unpredictability (innovation of information). Interaction of different spaces with the path adds to the consistency and diversity of information, fluidity, and permeability. Different entrances and accesses indicate acceptance, permission to enter and change in the identity of the location and creation of information.

The number of specified entrances induces the sense of free will in the corridors, visual connection to different parts of the building and the path, as we mentioned in the previous stage, determined the path in addition to providing diversity by producing visual opportunities. The curves, turns and twists and abruptions of the path add to its surprise. Changing the height of the floor makes you aware of the truth of motion and change in the material of the floor which can be coupled with a change in the sound of your feet, induces the sense of presence in the space and a change in location. The pause space provides the preparation for the occurrence of an incident and to see the destination while still crossing the path, gives the person some hope, etc. In each of these cases, the architect can also create vagueness, ambiguity, unpredictability and in summary, new information minute by minute by creating virtual information or non-occurrence of an incident expected by the audience.

The access routes from outside to the inside of historical Iranian houses are among the best examples of creation of information in the path: first, the opening of the path is defined by an elegant gateway which marks the important incident of entrance. Here, there is a pause space that also shelters the passerby with two platforms. Even if you are not a guest of the house, you can rest there under the shelter of the mercy of the host from wind and rain and sunlight for an hour or two and enrich your mind by looking at the designs and *کاربندی* and brickworks of the gateway. Here is an exhibition of arts with meaning which cannot be found in any art gallery nowadays. After entering with a distance that adjusts the height different between the alley and the floor of the house, you'll reach the divide space. The vestibule is a place from which several access routes to the roof, dock, upstairs, guest room or the heart of the house are branched out. It is a space with decorated ceiling and floor and walls and is welcoming, and its lighting difference with the outside space creates psychological comfort and it prepares the guest to enter a palace with different information and qualities by changing the spatial quality. As if the mediating space is a cleanser with the purpose of destroying the redundant outside information and focuses the person on new information, centralization and becoming worldly. The corridor is more or less dark and it makes the mind curious to find the answer at the end of the path by casting a shadow of vagueness and ambiguity. At the end of the path, there is a wide interval of light which gives the path purpose and direction despite its turns and twists. That would be courtyard where you'll find all your answers, where the building is waiting for you with open arms like a beautiful, kind, adorned and lively mother.

#### 4. Diversity of Information

As was mentioned in the definition of information being generative and variable, information must not be reduced from sender to the receptor. Diversity and coherence are two

informative qualities of chaotic systems. Information must be born anew, grow, and continue to change and evolve. The architect must be able to constantly create information like the nature. The mental pattern of the audience of the building forms over time. The more chaotic the space is, the longer information is provided for the mind and completion of the pattern and the longer would the attraction of the space last. The more linear the space is, the sooner this pattern formation is completed and the sooner the mind becomes weary and bored of repeating it.

The pattern that the architect provides the audience with of the architectural system must not lose its informative reserve quickly. It rather should be able to generate information on different perceptual levels by integration of cognition and surprise. Thus, it is necessary that information be accompanied with an appropriate amount of redundancy and parasite, or in other words, to send the intended message, there should be adequate background preparation and contextualization, so that the message is not reduced to its fragile initial structure during transmission to the audience which might render it unperceivable or trivial to many of the audience.

In order for the information of the building to be generative, it is essential that on all the scales, we create information layer by layer proportionate to different perceptual levels. The architecture must be composed like a sonnet or weaved like a Persian carpet or narrated like a story. The information treasury of the true architecture, like Hafez's poems, is discovered over time depending on the perceptual level and the mood of the audience, not suddenly, and is never vulgar or distasteful. The architecture must be created and built little by little. It's necessary that the architect make decisions for not only the general design but for all the sub-systems, components, texture, materials, color, and decorations of the building to create information worthy of human perception on every scale and for any distance. Remember that any building whose real volume is not even slightly different from its one-hundredth mock-ups is not architecture but a statue and its interiors bear no proper answer to the human institution. Fancy finding to design any part of the building and proper application of natural elements, edges and corners, motion and change, vagueness and ambiguity, contradiction and complexity, color and lighting, mirrors, symbols and signs, designs and decorations, materials and furniture lend richness to the architectural space and provides for the completion of the mental pattern from whole to details in long term. The more the knowledge of the architect, the better he will be equipped to provide multi-dimensional, deeper and richer information in the design. Gradually, as the knowledge and experience of the user increase, like a text being decoded, this information would unravel and the audience can complete and promote his/her mental pattern for a long time.

One of the most important solutions to create live information having the characteristics of diversity and coherence is using natural elements in the design. Those who care for children, animals, and plants and nurse them have more dynamic minds and a more lively humanity. The more we distance ourselves from the nature and become trapped in the repetition of the routine machine life, the farther we get from human institution. Always try to encourage people to return to the natural life and their human institution by implementing streams and fountains and allocating places for the birds to nest and feed and to plant flowering and plants.

Also, strongly avoid synthetic and dried flowers in the house and living space which create patterns of deception and death.

### 5. Adjustment of Familiarity and Surprise

The stages of the process of architecture form systematic essentials which are directly connected to the texture of the space of the universe. Human cognition is also founded in relation to the space of the universe, thus, all of the limits and degrees of the architectural space must include cognition. Without it, the conception of humans of their human environment would become unsettled and their individuality would be threatened. Yet, humans need diversity and novelty. When the amount of information is properly adjusted between cognition and surprise, the sense of pleasure would emerge.

In the fourth stage, determinacy (familiarity) and unpredictability (surprise) and the necessity of considering them in the creation of the face of the work was discussed. Here, the necessity of considering the proportion of these two characteristics by relying on the quality of the provision of information at all stages of designing based on the type of message which the architect wants to send through the architectural space is discussed. According to what was discussed in Perception Chapter, to transmit information to the audience, it's necessary that the pattern of design and creation of its places be in a way that it provokes the possibility and prediction of news in the receptor, have novelty of information on several scales and be able to maintain information novelty over time. Therefore, when faced with the building, at first, a general and determined pattern of it is formed in the mind of the audience and then, every time the audience visits the building, this pattern is completed some more. The completion of this pattern should not be fraction by fraction as if the parts of something are being put together, it should rather be holistic and integrated and in connection to the information of the previous mental patterns of the audience so that the mental perception of it generates the sense of pleasure. This means that the designer must provide the audience with facilities (as per the methods mentioned in the fourth stage) so that s/he acquires a determined image of the general form of the building. At the next stage, s/he generally takes in its spatial behaviors and relations, then zones him/herself. Then, s/he learns about the physical divisions and sections and finally, s/he would note the details, texture, and qualities. However, these are not chronological stages but perceptual ones which might take place simultaneously depending on the cognitive level and the mental patterns of the audience.

In cognition of each sub-system and sub-spaces, the process of introduction is the same. Similarly, the observer must discover new information and subtle links while returning to the outside from the inside and again from the whole system to its inside which s/he has missed in his/her initial confrontation with the building due to his/her intentions and focusing on perception of the general form of the design. The same subtle links which the architect succeeded to design via the negative and positive feedback mechanism while creating the work.

As the subsets were created in the process of creating the work in a whole to details move by the mechanism of positive feedback, the audience also forms patterns in his/her mind the same way. S/he sees everything, the wall, the painting on the wall and the drawing on it, all at the same time but his/her brain first forms a mental pattern of the generalities of the collection the details of which shall be completed later on. It's even possible that the information of

the details is stored in the unconscious but don't emerge and reappear later if needed for the recognition of the pattern. Anyhow, at the stage of familiarity of the whole and the surprise within, there is a component that is located on the next scale. We noted before that how much working on the details on different scales can generate coherent information and maintain the pleasing effect. Adjusting the proportion of familiarity and surprise depends wholly on the type of the message of the architect. As mentioned also in the previous stage, whenever the designer decides to impose a certain feeling to the audience in a part or whole of the building, s/he can try increasing or decreasing the amount of any of these two. So, we'll see that unlike those who believe in the originality of the form or seek to create their own style or signature, a talented architect creates every space and place different from the other based on the behavior taking place in the space and based on the conditions of the first stage by learning how to manipulate the characteristics of familiarity and surprise. For instance, the conference room is a place where the focus on the current affairs and discussion requires that the space be designed determined and simple, while the waiting space must be provide the audience with ease and pleasure while waiting through plenty of details and texture. A building intended for theater can be very simple and devoid of details in design because its audience expects a new and theatrical spatial experience every time which is filled with unpredictable moments and this exempts the architects from having to design numerous details and information in the space. However, the everyday working space must enjoy a certain amount of familiarity and surprise so that the staff does not become frustrated and bored with it due to constant contact. In this regard, the details must not be so much that it attracts the conscious curiosity and attentions of the audience and distract them from their work. It should rather stimulate and promote their perceptual level coherently and secretly and to do so, nothing is better than using natural elements and textures.

As true poets are able to compose unique and unprecedented poems using words we all know, as a creative filmmaker like Stanley Kubrick can create works in very different genres, each of which is an immortal innovation in the history of cinema which can, at any time, affect different stratum of people, the true architect is able to create different works by combining familiarity and surprise and attending to the details whose similarity lies in the satisfaction of the audience.

But the definition of good things for the healthy human institution is not so random and variable that we are unable to build a general framework for its recognition. For instance, everyone has the same conception of expensive and luxurious spaces: high ceilings with historical designs, windows opening to gardens, natural and artificial lighting implemented from different directions, fire is the fireplace, ponds filled with gold fishes, floors made of expensive stones with classical designs, rounded stairs with magnificent with designer gold handles, Persian carpets, lush curtains with velvet layers and lots of pleats which might be waving in the wind, wood work, mirror work, stucco, tools, carefully decorated column heads and cornices, hand-made paintings, statues, furniture and objects and the colors red and yellow and gold which are associated with the sun, the symbol of life and power. These spaces are generally described as heavily worked-on and this is in fact, the same description of designing on different scales or designing details. The details of the amount of information over time increase the amount

of folding in the space and the unpredictability and thus, lead it to being fractal. As long as the human remains human, such buildings as Chehel Sotoun and Persepolis and French Palaces would be forever praised and coveted by him and the efforts to change the human taste by resorting to machinery would always fail. Unless, the life is so loaded with the problems and mental preoccupations and the trivia instead its essence and the minds of the citizens is so filled with fears, worries, and internal struggles that there would be no place left in their brain to enjoy the outside environment and that's the gift of industrialized society! In fact, today's society has succeeded in introducing modern architecture as a pleasant space not by innovation in design but by suppressing and subjugating the human institution!

Those designers who always build the volume of the building through heightening the sketch plan, or whose one-hundredth mock-up is no different than their real size product, or who are inclined to use artificial materials with no texture or use gray and black and white instead color in the space, or consider decorations a crime, or always prefer dimly lighted, shot and dark spaces, they are neurotic people who are deprived of creativity and a sense of beauty and while they have no self-confidence to choose the correct fancy, form, light, color, and material, they impose their unpleasant feeling of the universe on the society. Although familiarity and surprise were clearly introduced as the reliable tools of the architects, only and only those who have achieved high levels of cognition as described in the relevant chapter through experience, research or intuition can use this tool.

## **6. Conclusions, Perspectives, Strategies, Useful Suggestions and Future Studies**

The informed architect is able to affect both the conscious and unconscious of the audience. After perception of the face of the building, humans can connect with the architecture and enjoy it when they can gain a meaningful experience of it. Since conveying the meaning is possible through language, the architect needs a shared language to convey it to the audience. This shared language can be defined in three ways on the conscious level: nature, rational incidents, and culture. To connect with the audience on the unconscious level, the message should be sent emphatically to receive the hidden archetypes in these three approaches.

Undoubtedly, the language of nature is familiar for all humans. Those architects who consider challenges of the climate, natural phenomena, gravity, inspiration by natural elements, etc. as their fundamental problem are able to talk to their audience in a shared and universal language and affect the conscious and unconscious of all humans. This language which is received immediately is in fact, the language of icons. In such a work, every form and element of architecture is elaborated and determined with the help of nature and due to belonging to the nature, enjoys its characteristics and thus, enriches the mind. The necessity of paying attention to the climate and context of the design, the information being generative and coherent on all scales, being fractal or self-similar, and benefiting from natural elements is because of this need to connect with this shared language.

Except for the solutions the architect finds in response to the requirements of the nature, any kind of rational relationship which is understandable by the audience also helps the audience to understand the message of the architect. To complete the pattern, the mind reflects on the phenomenon before it using its previous information and asks questions in the search of meaning and determinacy which if answered cleverly and satisfactorily, makes the work beautiful and if

found purposeless and undue, rejects it. This language can be called the language of indices.

The third language, which is superior to the other two and enters the mind into the realm of awareness, is the language of culture. This shared language can be examined on three levels, universal, regional, and local. This language is the product of collective thinking about the world and the extract of the efforts of a nation over centuries. Like the mother tongue which must be celebrated and promoted to not be forgotten and lead to shared understanding and transfer of deep meanings. This language is the language of symbols. Like poetry, architecture is also formed from words, arbitrations and characteristics that help transfer culture behind it. The more familiar the architecture is with this terminology, the richer the work becomes and the more learned is the audience of the work, the deeper and more lasting his/her enjoyment of the architecture would be. This enjoyment is a spiritual happiness which leads to the opening of the inside and awareness and this is the final goal of architecture.

The deep notions of symbols are also transmitted through these three languages, albeit on different levels and even if they are forgotten or damaged in the conscious or semi-conscious, they are still able to affect the unconscious.

In order to transfer the transcendent culture of Iran, traditional Iranian architecture is formed from pattern-forming elements, symbols and signs. Proper usage of these elements or retrieval of those notions in new forms is the most important challenge of modern Iranian architecture. The highest degree of information synergy takes place between the architect, the work and the audience by resorting to multiple notions hidden in ancient architectural elements, symbols, and signs which play a key role in controlling the amount of information and simultaneously creating semantic determinacy and unpredictability on different scales. One of the firm fronts of modern anti-culturists relies on the belief that using symbols, designs and decoration in architecture is *stereotyping*. This claim which has a major influence on the designers is like discarding our mother tongue which is full of words used over the centuries by our ancestors because it is old and repetitive! Basically, the notions are transferred through the shared language. If there is no shared language, even the best notions are futile. Just like Moulana's great poems are worthless to foreigners. Those who claim to be innovative and want to speak their own language fail to understand that as we cannot discard language as the most important collection of cultural signs because changing and removing it would destroy human communication, we can't and shouldn't remove cultural indicators, symbols, designs, and decorations from art and architecture because it would lead the disconnection with the audience and the tongue of architecture would be cut, as is happening today and the architecture is becoming bereft of meaning and message. However, when the words become devoid of notion, i.e. the audience forgets the meaning of the signs, their superficial and purposeless usage on the face of the building can only be useful on visual level. That means, just as carving the image of hieroglyph on a building in imitation of ancient Egypt while not understanding its meaning is merely formal imitation, carving Sassanid or Achaemenid symbols without perceiving their meaning as additional decorations is useless for the cognitive level, although the symbols still affect the unconscious even beyond the control of architect. Anyway, it is essential that the notions and vocabulary are both restored and the shared language is consciously and quickly



disseminated in the society. Today, the works of artists and architects have become devoid of notions and a shared language. What still attracts some people to them is merely the hope and expectation of people to find those notions in these works and trying to interpret it according to their personal mental patterns. If this process of removal continues and people become sure that they cannot find any shared notions in the works of the designers, the few fans of arts would also turn their backs on them.

The cognitive value of the work of art is the amount of its connection with the audience through a language which transmits the notions. Testing the validity of this claim is very easy. To whatever museum or exhibition that you go, you see that the visitors linger a few minutes in front of each work. How much time do you spend to look up and admire a modern skyscraper? Why is it that the number of the admirers and visitors of Leonardo da Vinci's Mona Lisa has not reduced over time? Why do people hang a piece of seven-color tile on their walls like a work of art but not an aluminum panel?! Why is it that the age-old works of Iran, Egypt, India, and Iraq are so valuable and the researchers, scientists and art experts of the world dedicate years of their lives to study them while modern architecture is deliberately blown up and destroyed so that there I nothing left of it?

The psychologist, Young, believed that the house is the symbol of the human himself and that when you dream of a house, in fact, you are watching your inner self. The state of the house in the dream is indicative of the psychological state of the dreamer. Yes, the relation of architecture to the inside of human is just as intense and cognition of the symbols and signs is the only way to discover and optimize this relationship. Undoubtedly, the architect who is the builder of these houses must understand his/herself and the human institution better than anyone else. Our modern architecture has become mute due to the lack of attention to the interaction of human and architecture and thus, failure to nurture ways to establish this relationship and this silence is both in the sense of being inarticulate and in the sense of being confused and undetermined. Using mental patterns most of which can fortunately be mutually perceived or quickly learned can be the best way to get rid of this silence.

As it was mentioned, signs are divided into three categories: icons which are signs based on formal and substantial similarity between the signifier and signified, indices whose signifier and signified are related on a causal base, and symbols whose signifier and signified are related based on arbitration. The classification of different parts of architecture into various sign categories is not possible, because this classification depends rather on how the pattern is formed and recognized in the mind of the audience than on the designer. When the Corinthian capital was designed for the first time, it was an icon. When a sign permeates, as is the case in the spread of styles, it turns into a symbol and like linguistic signs, its arbitration is automatically established. So, as the style became widespread, the capital was introduced as a symbol. Now, when we look at an ancient Greek building where such a capital is implemented, we understand it as an index of or an existential reason for that particular architectural style and when we see it on the face of a post-modern building, again, we consider it a symbol which is placed there arbitrarily. What matters here is that despite our oral awareness of the history of the invention of this capital, when confronted with its replica on a building in Tehran, our mind recognizes it as an icon and builds its mental pattern based on the fake, in a way that from then on,

the original one can also be recognized by comparing it with this mental pattern. Somewhere here, the classification of the sign and even perception of the proper and original application of this architectural element is challenged and this is an issue which should be addressed by the designers when creating a work and sketching. Signs increase the degree of familiarity and surprise at the same time and trigger computation, cogitation, and provoke awareness. The story of their creation and evolution contains infinite information which everyone can enjoy based on their perceptual and cognitive level. Icons are different versions of a familiar truth. Indices might be created very directly and logically. For instance, a form created as a result of a function or a building formed due to the presence of the view facing it. But symbols are formed completely in a variable context from cultural-social factors and their application utterly depends on the local arbitrations and how long they'll survive in the perception of the society. The shape of the ancient Iranian cypress is a symbol of tree meaning life. Carving it on the face of buildings and the story of it getting bent, when it appears in the form of a paisley contains a thousand-years-old myth which singularly converts a simple wall to a sonnet with endless notions. Where is the wise man to read it?!

Symbols, even though containing powerful personal aspects, share their original root universally. The presence of archetypes means that we are previously equipped with the will and preparation and/or potential and hidden agents to face and react to the experiences of this world. The more experience we gather, the more likely it is that these hidden conceptions manifest themselves. Therefore, a ripe environment is one that can provide the possibility of using all the aspects of collective unconscious for the evolution and acquisition of individuality of people (making them aware). Despite what formalists imagine. Form without meaning does not have human value.

Symbols and signs result in determinacy. This determinacy which might occur from the presence of a symbol in the general volume of the building to its appearance in a small part of the decorations of the building generates a sense of cognition, trust, comfort, empathy, consensus and shared perceptions in the observer. Symbols, on their highest level, cause the transition from unconsciousness towards pure consciousness because the audience sees before him/her a true embodiment of unity which underlid his/her unconscious and s/he was not aware of it. On the other hand, these same patterns which contain eternal multiple and profound motions, sue to having infinite interpretations in the semi-conscious and conscious of different nations and people, are themselves, an infinite source of generating information and unpredictability, describing each of which would require an entire book. If you design a building in the form of Swastika (卐), most probably, people would be reminded of the German Nazi, but those who are familiar with Iran's profound culture, would understand its sublime and mystical notions and would enjoy the wealth of this divine symbol, while it would be associated with other notions in the mind of an Hindi or Chinese person. Anyhow, synergy of information of the building and the mental patterns of the audience would lead to the unity, possibility of news and the sense of belonging of the building on every cognitive level between the audience and the work and its creator whose limitation and boundary is unpredictable even for the designer!

Today, the elements of ancient architecture and symbols can be used in architecture in three ways: the most natural



way is proper contextualization or using them in historical context and grounds which is the best way to preserve the cultural continuity and remind and perceive the notions. In this sense, the work must be designed from whole to parts in proportion to the message of the signs. This is a method only preserved to some extent in the construction of religious building. Thus, divine notions and signs related to religious beliefs which are still understandable by the newer generation are somewhat preserved by religion in shrines, mosques and holy places. The context that has kept these elements alive to this day was not using them in the body of the building but more importantly, the repetition and preservation of the beliefs and traditions in the society. The second way is using the elements completely out of the coherent context of the work. Since the differences in modern life have rendered the possibility of the manifestation of ancient notions very limited and expensive. To remember these elements and use them to promote the perceptual level and to affect the unconscious, we can consciously implement them in their original shape, merely as a subject of observation and reflection. Imagine a white marble staircase which circles a sky light in the center of which is a single complete column from Parseh. Humans circulating around this object at different heights provide the possibility to watch and reflect on the details of this single column from different angles. Seeing symbols of cow and milk and sunflower and the stem of a tree, etc. and thinking about how the works were built 2500 years further binds an Iranian to his/her past and activates the mental patterns of pride and compassion and affability. Plaster work or a statue of the tree of life or a wooden frame on a wide, white wall which tell a tale from the *Shahnameh* can also create such an effect. Regardless of whatever has taken place in the design of the current building, the frame creates a world of ancient signs within its bounds. So, as a designer of a building, think about the subjects of the tableaux which are going to be displayed. You are in a position to bring growth, joy, and self-confidence to the future residents of the building by selecting the perfect alternative. But the third way is truly only manageable by a well-aware and powerful mind which can bring about the promotion and survival of the culture. The true artist and creative person is capable of creating new shapes consistent to the current context of the design by creating change and updating the appearance of ancient patterns in a way that its conceptual connection is not interrupted. We need to find a way to display those profound ancient notions in an updated, understandable appearance.

If you find cognition and application of cultural symbols and signs difficult, don't neglect using natural symbols to enrich the space information-wise and connect with the unconscious of the audience. For instance, a hospital is a place which requires a determined design. The architect, due to the necessities, has to design it predictable, devoid of surprise, and even symmetric but all this does not mean that we should open a book of standards of architecture and give its diagrams height and impose the result to the hapless people as a work of architecture! A hospital can be the most lasting work and mental pattern for the audience: flow water, the symbol of life, and give those who have lost the will to live the promise of return to life, tear open the ceiling in places and the ends of the corridors and give them the promise of mercy and opening by letting in the rush of sunlight, create an opening and let ivies and plants in to grant the patients delicacy, pampering and peace, allow singing birds to roam freely due to the concentration of trees in your

design to invoke passion and motion in the patients. The sound of a waterfall reverberating in the space will purify their soul and would sing in their ears the song of return to life. The goldfish in the pond which are the symbols of healing would tell them that they are not going to die of cancer and would once again swim in the cool waters of life. Light and color provide the best opportunity to encourage livelihood. In the hospital, maintaining the livelihood of the staff and helping to recycle the life energy of the patients is as important as the hygiene of the environment. In most parts, instead of green, white and gray, it is better to use yellow-orange and yellow and orange. If the doctors and nurses get into a bad mood due to the monotony of the colors and the gray, they would not only be of no use to the patients, but it would also make them sick and depressed. Since most frequently, the patients are lying down and facing the ceiling, the design of the ceiling in the hospital is particularly important. We can put designs on the ceiling using Gestalt principles which would attract the patient's attention and keep him/her from thinking about his/her pain and sickness. The lights used in the ceiling should be filled with warm, linear and superficial and not blinding. When in pain and suffering, humans become helpless and vulnerable children. If the hospital is designed welcoming and colorful like a daycare center, it would more logical than the currently prevalent buildings which sicken a healthy person and force them to think of death! By introducing controlled information to the hospital, we can greatly divert the attention of the patients from their own sorrow and their dear one's or the pain they are suffering from to the outside and reduce the focus of perception on sickness and death. Symbols provoke the will to be in the patients and their companions and also in the staff and destroy the information about death and nihilism. The next discussion focuses more on how to create useful information and destroy redundant information from the mind of the audience.

The fancy for the memorial undoubtedly must be evoked from the symbols and signs to create maximum communication with the audience. Here, there is no place for creating a volumetric combination and pretention.

In the above alternative, the pattern of the circular movement upwards, tree of life, flower and bird, water, plan in the shape of a cypress is the result of a geometric shape which was invented by Iranian to calculate the square root with triangles one meter wide and the golden poems of Hafez, written on the familiar blue of Persian birds, are patterns which any passerby would reflect on based on his/her mood and otherwise, it would affect his/her unconscious.

In the alternative below, winged lions grown in the Achaemenian plaque are the symbol of celestial lion which carry the source of light. (The sun is in the Leo constellation-so read all the oddities and myths of the fortune of Iran). The symbols of the twelve-leaf flower, morning glory and stone and water are the other things used in this memorial.

If we want to have something to say, we must speak the same language and if we want to regain our respectable identity while maintain our communication with the world, we need to relearn the language of symbols and signs and remind it to the people.

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### Short Biography and Outlook

Architect Sanaz Eftekharzadeh was born in 1975 is an independent researcher and the CEO of Iranian Association of Sustainable Building-City founded in 2014 in Tehran where she can focus on her research interests such as vastu Shastra, sustainability, Chaos, Cognitive science, Transactional Analysis, Semiotics, Persian literature, Aryan culture, archeology, ancient Iranian Mythology and patterns in art and architecture and finds the ways to apply the achievements in practical architecture.



She has got her M.S. of architecture from Shahid Beheshti University/ Architecture and Urban Planning faculty with excellent grade in defense. The subject of her thesis was applying of Chaos theory in architecture, focusing on cognitive science for defining a design methodology entitled: "Towards a Chaotic Architecture".

This theory presents a new definition and then new methodology for creating architecture. It considers architecture a system of distinctive minds of the architect and the audience and the architectural building itself, which is a subset of diverse environment, then chaos, as the agent defining the rules of the mind's function and the nature and the connector of different branches of science and art, has redefined it as the best system for the human's physical / psychological/ cultural needs which can be named anthropocentric architecture. The achievements of the thesis has been developed in 17 years expanding on different scopes of cognitive science and updated outcomes of chaos theory to present the characteristics of the anthropocentric architecture in 7 stages . The book was published in Persian as: "from

chaos of perception to cognition of architecture / a new theory to create an anthropocentric architecture based on laws of chaos" in 2014. In the same year the book has become the finalist of the international award of book of the year of 2014 and awarded as the book of the season in Iran. It also was the winner of the Dr. Mozayani national book award of 2014.

Sanaz Eftekharzadeh has participated at more than 30 national and international conferences and forums, T.V. interviews and academic seminars as the lecturer and architecture theorist and analyst and has presented more than 60 papers and articles in national and international journals.

In 2017 she received the title of "The Architect of the year" of Iran for the best architectural criticisms based on her unique theory. Before that she had been selected as the Best researcher of the year of 2010 by the ministry of habitation, roads and urban development of Iran.

She has been the editor-in-chief of Architecture and Construction Seasonal from 2006 till 2010.