AESTHETIC OF POTENCIALITY. THE EMPTINESS IN THE GENERATIVE ART

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Abstract

Since the birth of mathematical and computer concepts related to fractal geometry, It is possible to set new conceptions of certain art forms that use the irrational geometry for express themselves. Traditional Islamic Art is an eloquent example of this.
Considering this idea and bringing it to the plane of the electronic arts, this essay seeks to establish a reflection on the possibilities of Generative Art - as one of the manifestations of contemporary electronic art - to dialogue with the history of Art and the traditional eastern culture throught the concept of "Metaphysical Emptiness". Consequently, we can argue the develop a new syncretic Art, able to connect both eastern metaphysics and western contemporary mathematics, through the computer platform.

Key words

Metaphysical Emptiness, Syncretism, Fractal Geometry, Generative Art, Islamic Art.

The *Emptiness* previous to image and the *all*

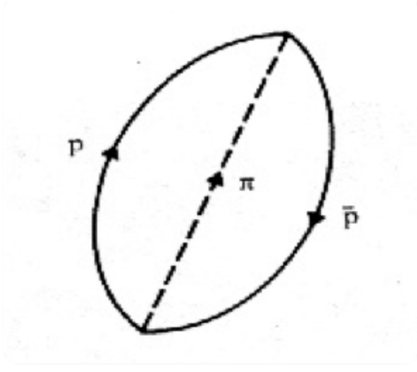
If we enquire into an ontological reflection about the Universe, one of the natural questions that arise is the relative to the origin of the existence; in the materially aspect, divinity or any phenomenon experienced by humans.

If we contextualize this idea in the contemporary western culture, we can perceive the fact that we carry about 7 decades assuming the Big-bang theory as a scientific model for the contemporary worldview (Radovic 2009: 121). This fact transcends the science boundaries, affects to the culture, and determines two paradigms: A kind of dogmatic creationism as Christian religion versus a scientific materialism, which finally derives in an ultra - technification of the society of progress (*op. cit*., 123). Both views are divergent and do not take relationship between them, creating at the same time one of the big paradigms of our era. But these visions are not always found split, there are historical periods in which an empiric view of reality found tied to religion, as an intuitive vision of the natural phenomenon (*Ibid*). In the other hand, in eastern society, we can see other cultural evolution processes. They never separated the philosophy from the experience, understanding the nature as an integral subject beyond the pure materialistic objectivity (Nishida 1995:13). Through this matter, the eastern traditional culture has developed, as one of their conceptual underpinnings the idea of "Emptiness" as the last level of understanding the universe, on any plane; from the material perspective to the living behaviour, influencing various artistic expressions. Some examples of the latter are the Haiku poetry, the Sumi-e Japanese paining and the traditional Chinese or Arab calligraphy. This art forms not only have a deep connection with the daily life but also represents an understanding of the divinity contained in something undetermined; a "Nothing" that is "Everything" at the same time, an "Emptiness" which contains in itself the plenty of things and finally, for the Buddhism, Taoism, Hinduism, Zoroastrianism or Islam, represents the unique true about the reality. An intuited truth, meditated, sensed, really connected with some very refined sensibility (Del Arco Carabias 2004: 2h39).
While here, in the west society, we do not possess this so eloquently perception of the "Emptiness", my interest is to pay attention to certain contemporary art forms, which in some way can be connected with this idea, creating at the same time a cultural syncretism between west and east and promoting a global culture.

On a detailed plane, the concrete connection possibility between the west and east cultures is the aforementioned "Big-Bang theory" in parallel to the "Emptiness" idea. The latter does not need any empirical proof of its existence, is an intuition. However, the western rationalist culture needs to "see" this conception by the scientific method. Technically speaking, the science traces the route of the mathematical and physical proofs, about quantum fields, defined as soaring energy states of subatomic dimensions in determining the conformation of matter as an ephemeral manifestation of certain particles which are finally the artifices of all reality perceived by our senses (Radovic 2009: 64). In this way we can also understand the presence of the physical emptiness in the universe, in the modern era. In contrast, for Nagarjuna, Hindu Buddhist philosopher (3rd c BC.), reality as perceived by a worldly observer, is a veil composed of multiple layers, but for the Brahma or the man reaching a high level of illumination of consciousness, this veils disappears for show the unique reality that is the "Emptiness" (*Ibid* 83); not as a nihilism concept but as an

idea that transcends reason, language, action and the existence itself, without positive or negative qualifications. The emptiness that Nagarjuna declares is a non-existence that when it is not, it is in plenitude. This plenitude can also be found in the contemporary science, specifically, in particle acceleration experiments. About it, I will quote the Kenneth Ford words (*Ibid*. 64):

"In different experiments of particle acceleration, it has been proved that particles can come to existence from the void, spontaneously, and then fade again in the void, without the presence of a nucleon or any other particle of strong interaction. According to the "Field Theory", this kind of events can happen all the time".



In this diagram is represents the process mentioned. Three particles: a proton (p), an antiproton (-p) and a pion (π) are conformed in the void and then they dissapear again in the void (9).

The physical void then, is not a simple "nothing" state, but "potentially it contains all the particles of the world", it means, full energy. We most to keep these ideas clear because, in the next aesthetic analysis of some traditional and modern art forms, both perspectives of "Emptiness" will be fundamental.

The *Nothingness* as an image, express the inexpressible

The *Logos*, the verb or the word, strictly speaking, barely serve for speaking of the universe from the perspective of its origin. The visual representation in most cases, do not help. As much as we try to dig into it, the first problem that emerges is the naive pretension to address the void in our language. But if we want to seriously approach this "Nothingness" from an aesthetic level, we must inquire from the gist of the shape, from the *Eidos*.

By the understanding of the idea of appearance behind something that can connect with its own qualities, the Greek term *Eidos* presents suitable as a starting point.

Every form has a quality of being. An eloquent example of this occurs, for example, in traditional Islamic Art; which through certain geometrical patterns, it has as main purpose not the mimetic illustration but the plastically synthesis of a divine order, defined as the creation of Allah.

The Islamic Art has its original motivation the negation of the icon; but more to determine this art under the frame of iconoclast, is more appropriate to use the word "aniconism". Titus Burkhard (2010) refers to this last term as having a spiritually positive character while iconoclasm only has a negative sense, and precisely my point is not to foster a nihilist tendency but lead to an unifying trend that seeks a possible elevation of the human spirit over a dialectical materialism. However, the prohibition of the image, in the Islam, is limited to the divinity's image; it is located under the Abrahamic monotheism so that the plastic image of divinity is presented as the way that associates the relative to the absolute, the created to the uncreated, subjecting the

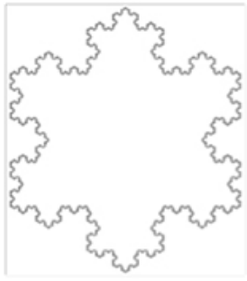
An example of a characteristic Arabesque of traditional Islamic Art.
Al Karaouiyyne mosque in Fez, Morocco.

former to the latter. It is in other words, the negation of the *idol* in the concrete translation of the testimony of Islam. Aniconism is in some ways an extension form of the sacred[1], and this is an idea that is not only limited to symbols but is consistent with the forms that it structure. In this sense it seeks to reflect the divine order of the universe, through synthesizing a main figure as a pattern that expands through geometric links, tissues representing the idea of divinity as a whole composed of parts. They are the classic atauriques or arabesques of Islam. This art form is closely related with certain ancestral cultures in the idea of "Emptiness" or "Nothingness". We can call the latter as *Me* for the Sumerians, *Maat* for the ancient Egipt; the *Asha* of the Iranian Zoroastrian; the *Tao* of Lao-Tsé or the *Sunyata* of Buddha (Radovic 2009:70); and carrying this reflection even farther we can call this Islamic art pieces on an "aesthetic of potentiality" while this forms are deep connected with some nature structures. This is possible if we consider the "Emptiness" quantum theory in relation with the Fractal Geometry.

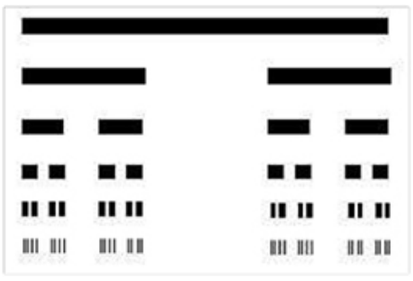
A mathematical image for the *Emptiness*

Out of the religious perspective, all natural phenomenons, for being understood by a western culture man, require to be proven or calculated scientifically, otherwise is a myth. Before the Calculus of Newton or Leibniz in the seventeenth century, were known some functions with great irregularity and discontinuity, but the scientific of that time supposed that was impossible to find in them any natural system, therefore were considered exceptions to the traditional mathematic (*op*. cit.). Then, in the twenty-century, these shapes were called as Fractals. It is not easy to define in simple words this kind of geometry, but for this essay the most relevant are the concepts of *Iteration* and *Self-similarity.*
The Fractal Geometry, unlike classical or Euclidean geometry, allows us to understand patterns of behaviour and natural structures[2]. Each portion of an object or organism in nature has the same characteristics of the whole object or organism. Also we can say that each area of a fractal preserved, statistically, their global characteristics. This is the *Self-similarity* definition. (Mandelbrot 1977:131). In parallel, Iteration refers in simple words, repeat and return to itself a certain number of times (*op.* cit., 133). In the fractal case we iterate formulas and equations through algorithms. Nowadays this geometry is very useful to calculate natural growth patterns or develop behavioural models of natural phenomena.

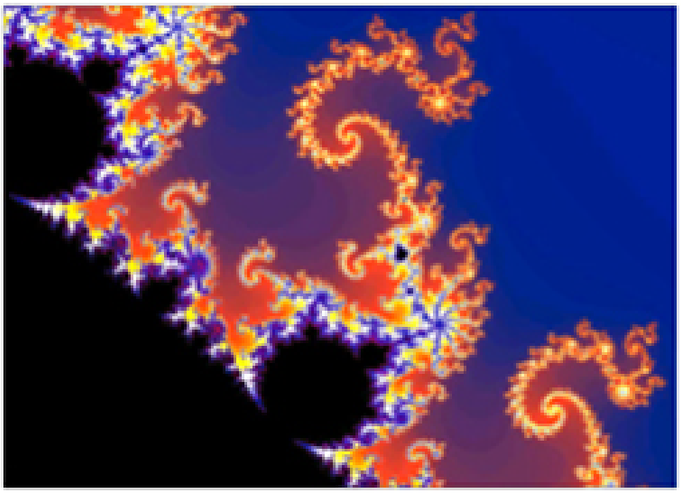
The fine arts were been related to math in many stages of western history. The Renaissance is a good example. However, in last decades the high developed of computer science has offered to the artist and the viewer a new perception on this relation. The "Generative Art" is one of these cases. Operating with computer data or algorithms assisted by software interfaces, the artist can compose without impediments complex geometric structures, which



The Koch curve



The Cantor set



The Mandelbrot set

some cases can be assimilated with the Islamic arabesques; both from the visual perspective as the mathematical matrix that constitutes them. Organizations and artists that mix art and algorithm develop a multi-linear method of research, which is connected with both the intuitive and the logical state of creation. An eloquent example is the self-described "Algorists" (Wilson 2002: 314). This group includes Charles Csuri, Helaman Ferguson, Manfred Mohr, Ken Musgrave, Jean-Pierre Hebert and Roman Verostko. In the work of the last two artists we can appreciate the production of certain shapes that refer directly to medieval manuscripts and Islamic arabesques.

Even more rhetorical is the work of Larry Cuba, computer artist and animator, considered with John Whitney, as one of the fathers of computer animation. One of his emblematic works is "Arabesque"(*Img.6*), an animated short film created in 1975 which uses as aesthetic influence the traditional arabesques, and then he deconstructs the original forms, composing new structures starting from a base idea. Karl Sims is another prominent artist and computer animator who relates his works with the Mandelbrot and Julia fractal sets (*Img.7*) and researches in the automation process of graphic creation through analogue machines (drawing machines). The key point in this works is the creativity of the artist in connection with the free action of the machine, in an autonomous process guided by the author. For Herbert W. Frank other of the pioneer of this art form, this kind of artist are not only interested in the last image, or the product image of their work process; they are also interested in another aspects (Wilson 2002:313), of which I want to emphasize:

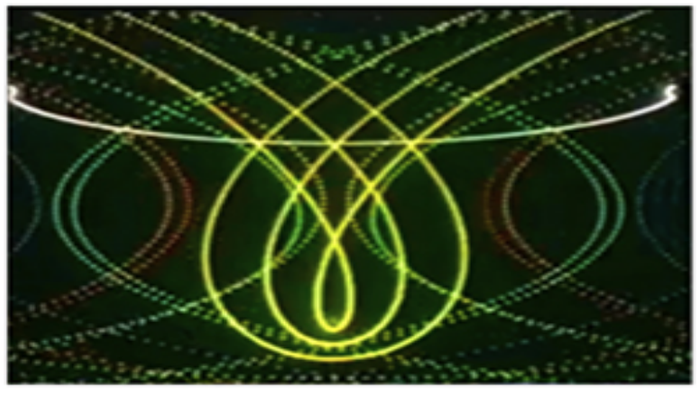
a) A way of working that focused on the creation of abstract generative processes rather than exclusively on the production of a particular image.

b) Enhance the ability of algorithms to create "families" of images through the manipulation of parameters.

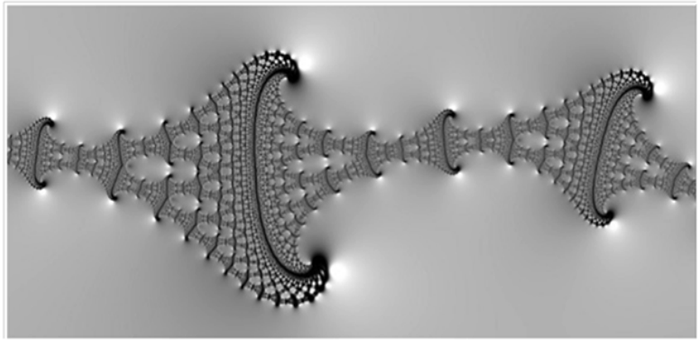
The *Hewlet Packard's Basic Research Institute in Bristol* (BRIM), which has initiated a project in art and mathematics to encourage and promote artists, mathematicians and scientists to work together, articulates their vision statement about this topic:

" Mathematics seeks to describe reality by looking at the logical interrelationships between concepts. Through art, we experience reality in ways not directly accessible to reasoning, but which we find intuitively meaningful.
There are, however, profound commonalties between the two areas. Both try to express funda- mental "truths" about the nature of reality, seeking structure and symmetry within the complex universe in which we find ourselves. As Einstein once said: "Common to both is the devotion to something beyond the personal, removed from the arbitrary." (Ibid).

Starting from this general view of Generative Art, we can observe this closely relationship between visual arts and mathematics, influencing each other, complementing. Image and algorithm are here interdependent.



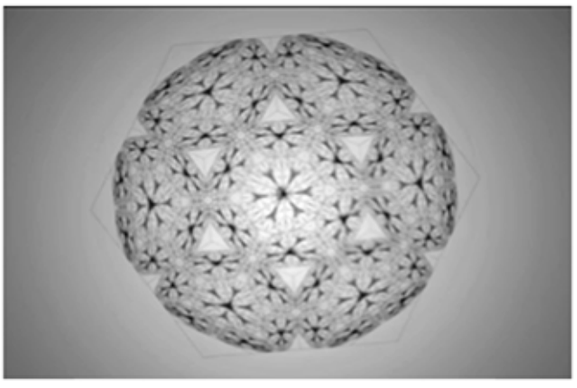
Img. 6: Larry Cuba and John Whitney. *Arabesque*. 1975



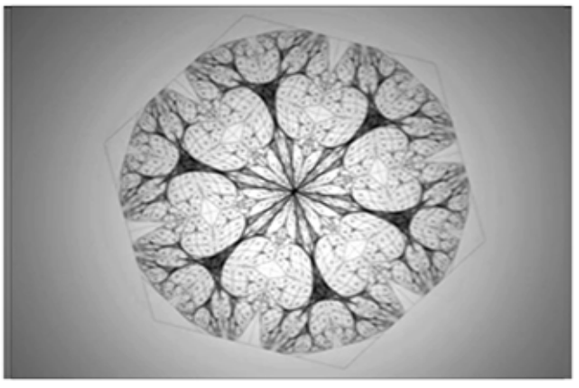
Img. 7: Karl Sims. *Stalk*. An artwork developed with fractal root code from the formula of Julia set.

Aesthetic plenitude, potentiality and syncretism

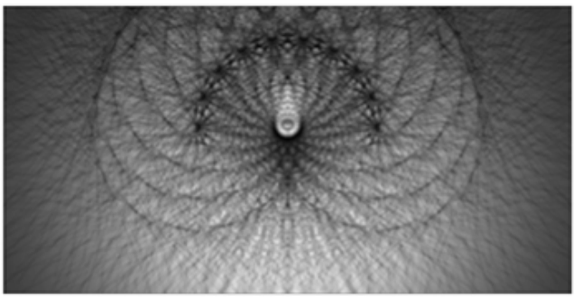
Arriving at our central point, we most to decant all the already referred topics to the analysis of Generative Art and apply to them a new perspective, the "infinity" as a concept. Now, if we link every aforementioned topic, we can also refer to an "unlimited *Eidos*" for the aesthetic and mathematic characteristic of these kind of works; a dynamic *Eidos*, always open to the possibility to vary from its own quality of appearance. In technical words, to develop itself in its own state of *Self-similarity*. As we can see on this art forms, the actual boundaries of the image exist only on external factors to it, which does not belonged to its figure quality. For instance, the physical memory capacity of a computer that hosts that image. The latter determines where it could expand, algorithmically, the figure. The physic



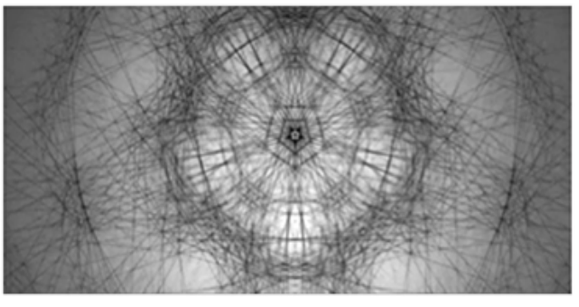
Img. 8



Img. 9

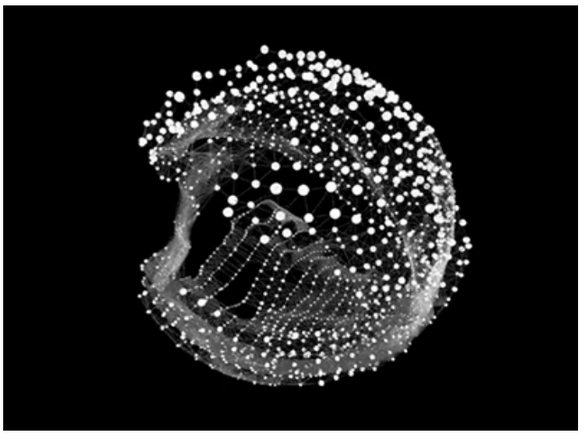


Img. 10



Img. 11

Img. 12



Img. 13

The images above are examples of art pieces denominate as “Generatives”, using softwares like *Processing*, among others. This works are created from algorithm resources.
While you can just review a static image of these figures and pose them as art work, the full potential of them is in their manifestation as video, as an application or in the original software. The latter allows to appreciate their infinity autogeneration.

As example, I recomend to visit the next web adress, with a demo video of the images 1, 2, 3 and 4 (by Reaven Kwok):

http://vimeo.com/43752422#

http://www.techgatherer.com/if-you-like-programming-and-fine-art-you-will-love-raven-kwoks-work-made-with- processing/

About the images 5 and 6 (byMatt Pearson):

http://vimeo.com/9712740 http://zenbullets.com/thumbs.php abandonedart.org

More information in the text Generative Art by Matt Pearson.

memory of a computer is not part of its compositive range (the mathematic dimension) neither its visual range, or plastic dimension.

Another interesting example to observe is that the aesthetic boundary of this kind of images lies also in the amount of time that a viewer decides to provide to the artwork as aesthetic experience. This means that, if an individual experiments the art piece, which is mathematically infinite and it can transform automatically without a final stage, another actual limit of the image is the simple moment when the viewer no longer wants to experience the art piece and breaks the cycle of self-production / iteration / appreciation.

The limit is finally in the relationship spectator- artwork, while the aesthetic experience lasts. So that the only way that image could keep iterating, transforming, manifesting infinitely, is that the spectator could keep interacting with the image, infinitely. As this last thing is impossible in the practice, the art piece is only potentially infinite and its existance in a certain instant – this point is key- is as much the image itself as the original seed that contains all the possible derivative images. This potentiality into the algorithmic seed is concrete, as inexistent at the same time, by its own state. This idea could also be enhanced from the perspective of *Aendoesthetic*, as the artwork as semi-autonomous system and the role of the artist as co-author (Gianetti 2002). Thus, within an Aendoesthetic analysis of Generative Art in fractal code in this kind of manifestations, the concept of potentiality is coherent.

With these revised points is possible to built a broad reflection on a "Aesthetic of potentiality", and we can understand this idea not only as a simple image created on computer code but also as a reflection of a way of creating in the present techno scientific world, and certainly a clear evidence of the contemporary culture state.

The postmodern culture allows the rhizomatic manifestation of various aesthetic tendencies. This defines the globalization. However, apply this topic to the concept of "Emptiness" assist us to consider most specifically the displacement of possible aesthetic ideals in the recent formation of twenty century. This is a coherent projection of plastic possibilities that could represent an integral globalization. In this context is also essential to consider the concept of *Syncretism* in the actual global art proposed by Roy Ascott (2005); In his words, *Syncretism* should not be confused with pure synthesis, where the disparate things merge into a homogeneous whole and therefore lose their individual distinction. Nor is eclecticism, which usually indicates a wavering train of thought. In the syncretic context the extreme differences are respected, but there are aligned in such way that the similarity is found in the difference; the power of each element is the power of everything else, inside the matrix of their differences. This topic allows us to situate the triad spectator-artist-artwork in the contemporary western aesthetic. The latter, by the way, is a very current problematic; Olafur Eliasson (2009) refers to this matter in his theoretical statements and visual experiments: the phenomenon of the visual perception and the key role of the spectator in the creative process of the artwork. He calls it as "compromise". If the artwork is potentially infinite and depends on the interaction with the spectator, we most to bear in mind the "Compromise" concept of Eliasson.

The art as we understand it nowadays, quite some time ceased to depend only on the artist for a finish art piece and then exhibit itself. We are now used to develop ourselves in a work that implicate the spectator and makes them protagonist in the art process, making in real time, influencing each other. The image idea has decanted into multiple shapes. This multiplicity of shapes should be also coherent with a traditional eastern worldview or aesthetic philosophy. The idea of "Emptiness" or "Nothingness" in its plenitude of possibilities, in its "be full of everything", brings to the understanding of an art that confirms itself into this multiple state; that can define most clearly its characteristics as potential characteristics. The algorithmic art or generative art that I have analyzed in this essay can then be presented as a concrete possibility to this eventual aesthetic rollover and even can be related with an ideal out of its cultural frontiers, as is the Islamic Art. In parallel, some industrialized countries from Asia, like Japan, have already assimilated the computer technology in art and have developed a sort of aesthetic that "returns" to western countries, offering new perspectives. The artist Ryoichi Kurokawa is a good example, among others. In this way, the multimedia art is confirmed itself as syncretic in this respect; a global visuality, where is enhanced the constant dialog between dissimilar cultures, bordering between the traditional and the modern.

The relation between western science and eastern philosophy in parallel to an aesthetic of the electronic art should be a subject to pay attention in current times. The spirit of this idea can be appreciated then in the structure of certain multimedia art that is seen as having an Aesthetic of Potentiality, composed of infinites shapes according to a pattern; in the same way that the nature manifest herself in her most pure form; in obedience to a universal pattern.

Notes:

1- Titus Burckham supports this idea in the following words : "... A sacred art is not necessarily made of images, it may even be only the existential externalization, as it were, of a contemplative state and if so, it will not reflect ideas but qualitatively transform the environment, integrating an spiritual balance whose center of gravity is the invisible. "

2- The Euclidean geometry is in mathemathics, a synonimum of a geometry of rigid forms; and in relation with non-integer structures, it is considered as classic. (Vera 1988: 28)

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