

# The Imaginary World: fifth dimension of a quantum and semantic web.

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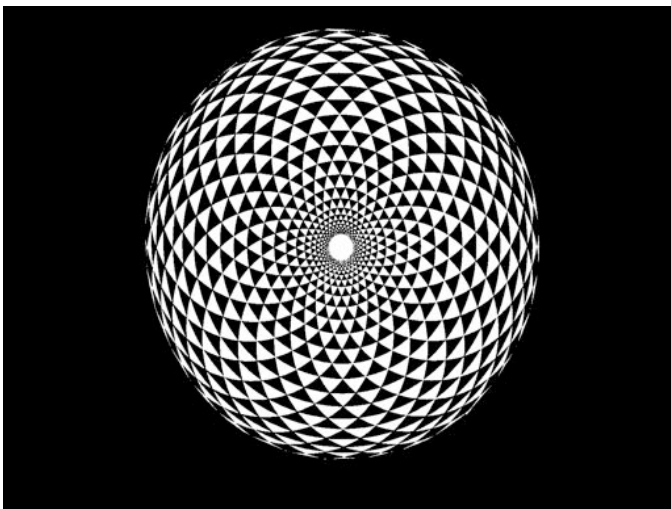
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## I. THE MISSION OF THE WEB



*To be or not to be* was Shakespeare's quandary. Four hundreds and fifteen years later, *To be and not to be* is the solution offered by quantum physics. To understand that paradox, one must have a little bit of imagination.

Before we talk about the imaginary world, considered in quantum physics as the fifth dimension; before we talk about « 'Pataphysics, science of *imaginary solutions* » according to poet Alfred Jarry; and before we talk of my project, entitled *L'Étoile (The Star)*, which resorts to physics, metaphysics, fractals and set theory, let's talk briefly of the inventions and historical events that preceded the coming of the Web, the largest, most immediate and most democratic resource for acquiring knowledge, likely to help us understand why Socrates, inviting humans to know themselves, could say : « *I know that I know nothing.* » With the Web as the largest library in history, such access to universal knowledge will change our world.

Knowing that in the last 20 years, astrophysicists have learned more about the intimate nature of the Universe than in 5

millennia; knowing that in 2015, the D-Wave machine, a powerful quantum calculator developed by Canadians and acquired by NASA and Google, does in one second, or 100 million times faster, what a conventional computer would calculate in 10 000 years; knowing that, according to Seth Lloyd from MIT, who designed a quantum computer, 10 to the 120th power is the number of information bits in the entire Universe; knowing all of this and so many other things, do we not swim here in the imaginary world, between the infinitely small and the infinitely immense? Indeed, we know that we know. But facing the totality of possible knowledge, we feel that with or without the Web, what we know is tiny. The world of yesterday has produced masterpieces without the help of the Web. Can the world of today do without it? Is the Web more humanistic than commercial? Could digitization, having become a cultural reflex, make us lose contact with nature? Finally, could "web mania" alter humans, or is it a springboard to our transcendence?

What is absolutely certain is that, apart from the imaginary world where all possibilities are latent, the Web is the greatest reservoir of information. But it is important, here, to distinguish information and communication. Information is about objects and operates with numbers; it quantifies reality by answering the questions *where? when? how? and how much?* On the other hand, communication qualifies information by giving it a meaning. Every authentic communication is aimed at subjects and persons, and operates with words, colors, sounds, forms, emotions and ideas. Based on relationships and interdependence, communication asks questions: *for whom? with whom? and why?* While information is coldly immanent in the message, communication — as an echo of the intelligence of the heart — interprets it, decodes the intention and transcends it. Thus, it is communication that gives meaning to information. The Web is a tool, a powerful way to build our world-vision and to achieve our dreams.

In fact, the Web, in its worthiest dimension, is the greatest vehicle of a planetary pedagogy, and the immediate echo of the creative imagination of humans. Human values are what gives meaning to the Web. Sharing knowledge in order to

better understand the world around us is a universal human value that encourages the evolution of mankind towards a possible common wisdom where beauty, love and peace could reign on Earth, at last. Do we swim in an imaginary world, in utopia, in the unreal? Was Goethe right when he said that *one must dream the impossible in order to achieve all possibilities*? But what about the new semantic Web?

## II. THE INTENTION BEHIND THE SEMANTIC WEB

According to Tim Berners-Lee, the semantic Web will be *intelligent and "will make the semantic contents of information on the Web interpretable not only by man, but also by machines, which could process knowledge itself through inference and processes similar to a human deductive reasoning"*. Does it mean that machines or artificial intelligence will be able to enter into a dialogue with each other by sharing information, but also with humans — and understand human language, which could not be digitized, because it is full of symbols, metaphors, and analogies? Will *machina sapiens*, containing billions of times more information than *homo sapiens*, make the latter antiquated, outdated, even useless? Frank Herbert, author of the science-fiction novel *Dune*, says: *We could very well become the creation of what we have created*. Furthermore, Ray Kurzweil, director of engineering at Google, foresees that man will take over from nature and that the machine, more intelligent than us, will give us access to immortality. Will man and his robot walk together, hand in hand?

Contrary to Berners-Lee, the inventor of the Web, and Stephen Wolfram, father of Google's new search engines, for whom the dream of a semantic Web oriented towards knowledge seems to become real, Claude Shannon, founder of the information sciences and builder of the very first portable computer in history, considers that one of the basic characteristics of information technology is the exclusion of semantics. Indifferent to the meaning of messages, information theory gives itself only one role: a messenger whose function is to transmit an object. Shannon was the first one, in 1948, who proposed the word *bit*, for *binary digit* with a value of 0 or 1, and its systematic use in order to simplify the transmission of signals inside classical computers.

## III. INTRICATION AND SUPERPOSITION

If a classical computer would take more than 10,000 years to calculate what a quantum computer can calculate in a single second, it's easy to perceive the distance between them on the informational level. In order to give a meaning to its contents, the semantic Web resorts to intrication and superimposition, two phenomena observed in quantum mechanics and in which the quantum state of two objects spatially separated is globally described, without being able to separate one object from the other. But what is this notion of imaginary time that never moves forward like our clocks?

According to the brothers Igor and Grichka Bogdanov, respectively theoretical physicist and mathematician: *"In the fifth dimension, time and space are elastic. Space gets bent and stretched out infinitely, or cancels itself without any transition; time accelerates, then slows down, goes astern, freezes, leaps from one instant to another, backtracks and deforms itself perpetually, going from June 21st 2015 to May 8th 1426. We are only a "probability of presence" in such-and-such place of the Universe. Curved by gravitation, time has plunged into the complex level and becomes purely imaginary."*

Is it not the same when an artist imagines, with words, colors, forms and sounds, a new world where the proportions of things, sensations, feelings, ideas are pushed to the extreme? In other words, the hidden aspect of time, its imaginary aspect, is as true as the other one, its visible face. All that comes from the imagination of a creator can be both true and false. False, because the imaginary world doesn't exist in the concrete experience of reality. True, because the imaginary world exists "elsewhere", rather than in this world, and because it can be decoded and understood through symbols. Vincent van Gogh used to say : *« I paint infinity »*.

In Kantian philosophy, no rational experience in our four-dimensional world is possible outside the frame of space and time. At some point, every thing has to be somewhere. This somewhere is the fifth dimension, where the imaginary vibrates.

*"Time is the changeable image of unchangeable eternity."*

Stated by Plato, about 2,500 years ago, here might be the most perfect definition of the imaginary world. The imaginary world, inhabited by every true creator, transcends time and space, and past, present and future are simultaneous in it. In the beginning of 20th century, Planck defined the smallest temporal unit, as well as the smallest spatial unit, that is: 10 to the negative 33rd power centimeters, which corresponds to the distance traveled by light in 10 to the negative 43rd seconds. Beyond this "Planck wall", we swim in imaginary time and virtuality. Is it possible that real time began with imaginary time? If this is true, it means that intuition precedes reason, that the unreal precedes the real, that the otherworldliness precedes the here-and-now. William Blake extolled the precedence of dream over reality. And poet Alfred de Musset goes further: *Reality is a vision*.

Before the Big Bang, the Universe, the being (real time) and the non-being (imaginary time, unreal) are superimposed and intricated, and simultaneously coexist, both real and imaginary, in balance, perfectly symmetrical, unified in a single zero point of null size. There is only primordial information containing infinity, a purely mathematical being, a cosmological code that will allow the Universe to appear and to begin its exponential expansion. It is somewhat as if the genetic code contains all the information that will allow a living organism to develop from a single cell. My project,

called L'ÉTOILE (The Star), that I will describe later, is made in the image of this concept of evolution of forms from a single point.

#### IV. TO BE OR/AND NOT TO BE

At the end of 17th century, philosopher and mathematician Wilhelm Leibniz asked this fundamental question: *Why does something exist instead of nothing?* In 1601, Shakespeare had asked the question in another way: *To be or not to be*. We should note that in the 20th century and still today, physicists, mathematicians and poets are the ones asking the most important metaphysical questions. In 1990, physicist John Wheeler wrote: *Every being, every particle, every force field, even the space-time continuum, draws its function, its meaning, its entire existence from yes or no responses... for everything in the Universe amounts to information*. According to Seth Lloyd, pioneer of quantum computers, *every single element in the Universe is made of information bits. Not pieces of matter, but fragments of information, zeroes and ones*. In quantum physics, the very essence of reality is not physical, but mathematical. Therefore, physical reality is preceded by mathematical reality. But since I am, above all, a poet with a philosophical education, I have to quote Martin Heidegger: *The poet is the shepherd of being. It is poetic language that makes language possible*.

In classical physics, to be or not to be, a metaphysical question, corresponds to 0 or 1, the two smallest information units, called *bits*. In 2012, physicist David Deutsch, inventor of the new effort called *It from qubit*, said that *the fabric of reality is of a digital rather than material nature*, for in contemporary quantum physics, being and not being correspond to the superimposition and intrication of the states 0 and 1.

For ordinary mortals and for excessive rationalists, declaring that the real question today is “to be and not to be” would certainly dazzle Shakespeare, for between this “or” and this “and”, there is a very new concept of reality. How is it possible to be and not to be? According to physicist Jean E. Charon: *Being is being because it contains all possibilities; and being is non-being because it is only a possibility of becoming...* Do we not swim in the imaginary world, here?

#### V. THE ONE AND THE ALL

The world of imaginary is the world of the creator. I am a creator. A multidisciplinary creator. As a citizen, a human among humans, I am of this world. And as poet Éluard said, in spite of my “lasting desire to last”, every day I feel my finiteness. Yet, my quest for infinity sometimes blinds me and sometimes enlightens me. When I create, I sometimes have this feeling of being one with all, of being, like every human, unique in the whole Universe and in eternity.

My presence in this world manifests itself particularly in the universe of culture, but nature is my main theme. My existence in this world only has a meaning if I have the feeling of participating in its evolution. I evolve by absorbing, every day, information of all kinds, coming from all that I smell, taste, see, hear, touch, feel, all my intuitions and thoughts. Who would I be without all those who have nourished me with their knowledge and their experiences? I am the sum total of my emotional, sensory, rational and psychic points of reference.

As a creator, I am in this world, but not of it. Didn't Rimbaud write: *I am an other?* While I remain myself, as a multidisciplinary artist, I become not only an other, but, apparently, many others: poet, painter, musician, sculptor, actor, moviemaker... I am the superimposition and the intrication of all my “I”. I am singular and plural. Between the man and the artist, which one is more real? And the philosopher in me answers: both. Like light, I have a double nature. According to physicist Niels Bohr, in quantum physics, the duality wave-particle of light and matter is not in contradiction: these two properties are complementary. The typical property of the waves is their ability to combine themselves, to interpenetrate and superimpose themselves. It is the same in the creative process, which entangles and superimposes multiple possibilities. If, as a man, I am a particle full of probabilities, as a creator, I am a wave, a vibration carrying meaning, a vision of another world translating into symbols the one in which I live.

In the universe of creativity, the imaginary world transcends time and space by opening a fifth dimension, *the otherworldly*, which entangles and superimposes all possibilities, thanks to symbols, analogy, metaphor, allegory, synonymy and polysemy. The musical sounds, symbolic and semantic objects born of the imagination of creators traveling between the real and the unreal are the radars and echoes of civilizations.

« *Pataphysics is the science of imaginary solutions* »

This definition of ‘pataphysics by poet Alfred Jarry can be connected with this other one by astrophysicist Michel Cassé : *physical reality is nothing else than the superimposition of imaginary possibilities*.

The integration and superimposition of aesthetical languages allow us to vary the modes of expression, to translate the same emotion, the same idea, in different ways. All the arts call each other or respond to each other, every medium can be inspired by one or many other mediums. In 1857, Baudelaire wrote in his poem entitled *Correspondences*: “*Perfumes, colors and sounds respond to each other*”. Poetry, music, painting and sculpture share correspondences. It is possible to translate in poetry a painting, a sculpture or a piece of music, to set a painting, or a sculpture to music, to paint music or a poem.

If the Universe is the totality of possibilities, the imaginary world contains them. Even if the imaginary world can be perceived as abstract and unreal, it is the figment of the imagination of an individual, of a group or a society, producing pictures, stories or myths more or less detached from what we call "reality". The creator dives into the imaginary world in order to create a world of signs and symbols that inhabit him. Daniel Bounoux says: *Man is descended more from the signs than from the apes: he gets his humanity from a certain symbolic or signifying regime. We live less among things than among a "forest of symbols"*.

Thus, in poetry, the scale is the symbol of justice, and the dove or the olive tree are the symbols of peace. In order to translate a mental abstraction into a concrete image, the poet often resorts to metaphor, a process through which one carries the meaning of a word into another meaning that only fits because of an analogy, a comparison: the light of spirit, the flower of innocence, burning with desire. As the saying goes, a picture is worth a thousand words, but this is both true and false. For a poet, one line can be worth a thousand pictures. Like the following line by Éluard which inspired my Master's thesis in philosophy: *the lasting desire to last*. In order to explain the meaning of this unique line, I had to write almost two hundred pages. And yet, this hasn't emptied nor completely explained the meaning of this phrase, one of the most profound I have read. Since I learned how to write, and I was motivated to seek how and why to write by reading authors like Éluard, I have lived the experience that being a creator is to give birth to a vision of the world's mystery as well as one's own.

## VI. CREATIVITY IS A TREE

In all civilizations and in all eras, men have established a correspondence between the tree and the imagination. The symbol of the tree is the ideal image for representing the creative process. Like the tree, rooted both in the sky and in the earth, imagination joins matter and spirit, dream and reality. Like the tree, imagination is a perpetual source of regeneration. Creativity is a tree. All the branches of art call and respond to one another. All is interconnected, in correspondence with everything. In the tree of imagination, colors sing, forms dance, words sound, and the music of emotions paints itself.

Some creators say that true art must be spontaneous, purely instinctive, even automatic. Others affirm that art must be under the guidance of reason. For me, creativity calls both on the logic of the left brain, rational and analytical, that organizes and stabilizes a necessary order; and on the intuition of the right brain, spontaneous and synthetic, where imagination is in power, disturbing the established order, but reinventing the world. As far as I'm concerned, between the shore of reality and the shore of dream, I am fascinated by the river of life flowing. What I'm interested in is to build a bridge between the two shores of my being: reason and intuition. Which means translating the invisible into the visible, the

unheard into the audible, emptiness into the inexhaustible, and throwing some light on all these mysteries.

The organ of the real is logical reason; the organ of the imaginary world and the dream is intuition. Reason measures. Intuition navigates in the immeasurable and in the emotion of its perception. Reason is looking for bounds. Intuition is like the photon for which time doesn't flow; whatever distance it crosses, it starts and arrives "at the same time". So, for light, there hasn't been a single second since the Big Bang. The process of creation submits spontaneously to the most complete freedom. Then, the work builds itself, one instant at a time, controlled by nothing other than emotion and imagination. This is what I call the *short path*. On the contrary, the *long path* is a predetermined process, a well-considered and calculated plan where freedom of expression is conditioned, controlled and oriented by an idea, a concept, even an architectural plan that imposes a constraint. I call *the middle path* the balance between these two techniques or the combination of the two paths in the same painting. In art, everything is a matter of proportions. Harmony between all the elements of the work comes from a just proportion.

It is not relevant to try proving that one vision is better than the other. We must use the two access modes in order to understand the Universe: reason and intuition. Intuition is a sensation and a feeling of fullness and freedom. The rational vision of the Universe adds, subtracts, divides and multiplies the parts. Intuition is a global vision of the all, and sees the Universe as the totality of all possibilities, as the unity of parts and constant interaction, in a perpetual interconnection. It is the same in quantum physics. According to Leibniz, philosopher and inventor of integral calculus, *everything is connected to everything, and everything is both part and whole*. In order to say that, Leibniz, like so many other current physicists, was undoubtedly inspired by presocratic philosopher Anaxagoras (500 B.C.), whose aphorism *Everything is in everything* was a fair premonition of current theories about the Universe.

According to philosopher George Santayana, *the progress of man includes a poetic phase in which he imagines the world, and a scientific phase in which he experiments with what he has imagined*.

## VII. THE MULTIMEDIA L'ÉTOILE

Since I wanted to take stock of my life, and since I am a man of words, I went silent. Suspended by the rhythm of my breath, I stopped thinking. Vibrating at the frequency of the theta brainwaves, realm of the imaginary world and of creativity, I emptied my mind. Called *sfir* by the Arabs, emptiness corresponds to zero. Emptiness is the latent state of nature, just as matter is its manifest state. Being in emptiness is entering the center of oneself, in the essence of one's own being. Emptying one's mind is being silent, learning not to think, learning to be in fullness. Silence would be the

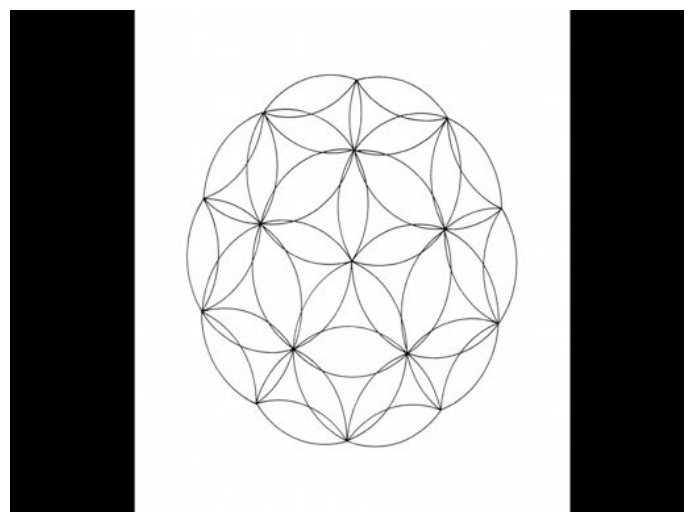
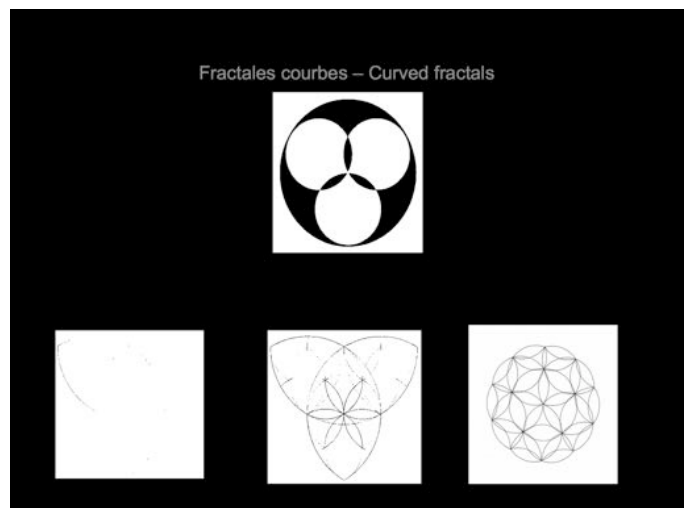
equivalent of the quantum void, the infinite reservoir of the imaginary world that contains, in latency, in hibernation, in virtuality, all the possible poems. According to the physicist Michel Cassé, *quantum emptiness potentially contains all matter... in spite of its apparent absence, emptiness is guessed through its random fluctuations, like the air through the wind; full of virtualities, it contains the totality of possibilities. Emptiness is full of all that is to be born.*

In the silence where emptiness is fullness, I felt the essence of my being. I felt so small in this world and in front of infinity. I wanted to translate into a multidimensional artwork this simultaneous feeling of smallness and greatness. The inspiration came from this thought by Anaxagoras: *All things were together, infinite in multitudes as in smallness; for smallness too was infinite.* The minuscule seed contains all the information necessary to the development of a gigantic tree. It's the same for language. The alphabet contains twenty-six semantic seeds: the letters. The combination practically infinite of these vowels and consonants into words, and the practically infinite assembling of these words in order to make meaningful sentences could reveal the alpha and the omega of all that is animated and inanimate, all the possible stories of all the universe made with matter and spirit.

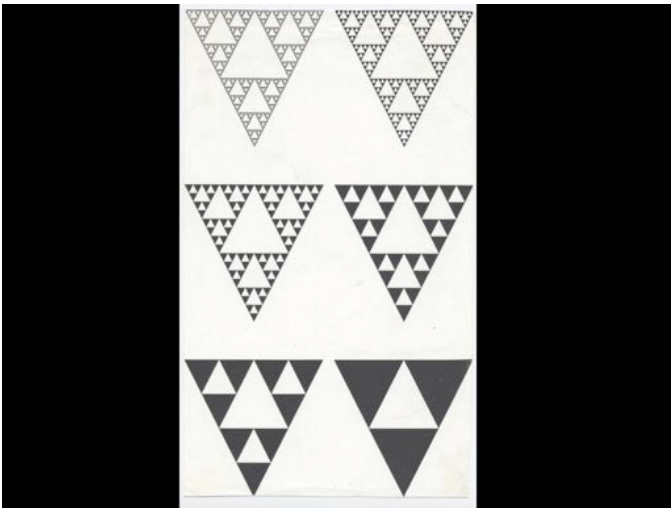
I am currently working on *L'Étoile*, a multimedia installation that integrates painting, sculpture, music and poetry. Born out of a philosophical reflection on the infinitely small and the infinitely large, this project is a meditation on the interrelation between the parts and the whole, reality and imagination, nature and culture. On the other hand, *L'Étoile* is a cosmological poem nourished by the current theories in quantum physics and in astrophysics on the genesis and destiny of the Universe.

The starting point of this project, the flash that lit the star, is the dimensionless point, the spherical image of the infinitely small becoming, through the expansion of its radius, infinitely large. Learning from a book by the Bodganov brothers that Alexander Friedmann, a Russian physicist and mathematician, first introduced the idea of an expanding universe, and that before its expansion, the Universe was so contracted in a mathematical point having a non-existent volume and entropy from which it has expanded its radius ; also learning that this point contained an infinite information, that it could take on all possible states ; learning at last that in imaginary time, this original point expands into infinity, I saw this point as an infinitesimal circle whose radius could enter into expansion.

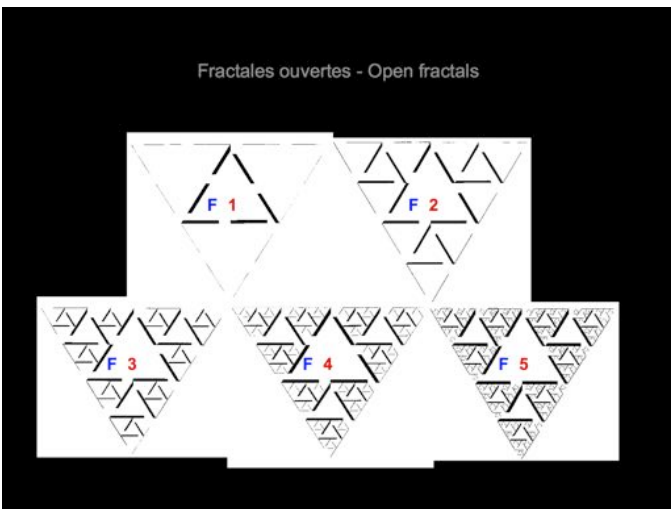
But I was convinced that the sphere is the most beautiful of all geometrical objects when I saw the famous Cantor Set, from George Cantor, creator of set theory and first mathematician of infinity. The set in question is made of a set of spheres, every one of which contains three times the dimension of the one that follows it.



I already know this principle of building that proceeds through iteration or repetition. Imagined by Benoît Mandelbrot, the fractal is a ramified and tree-like geometrical structure that models a complex system. Its characteristic is the property that if a detail of the pattern of the geometrical structure built from an equilateral triangle is magnified, the whole pattern appears. At every step of the magnification, a new triangle is formed, twice as large and containing the previous ones.

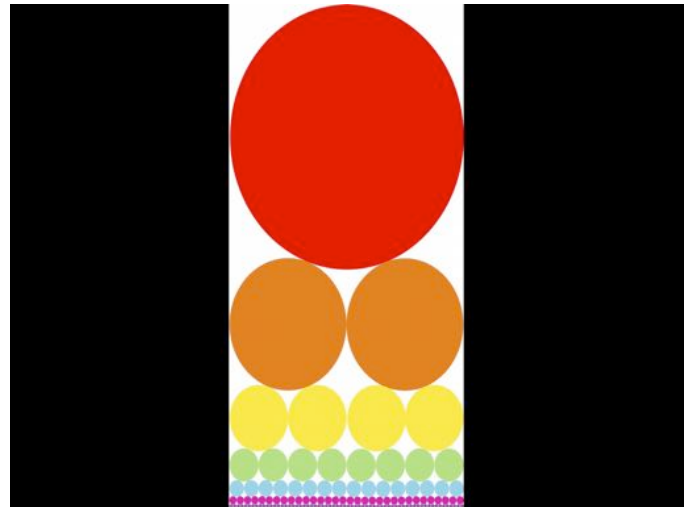


This is why the fractals are mathematical entities where infinity flows ceaselessly alongside the finite, and the part alongside the whole. Many natural systems, complex and information-rich, have adopted this fractal structure, like DNA, memory, brain cells and trees. This is why I adopted fractals for the architecture of my Web site. Thanks to Polish mathematician Waclaw Sierpinski, who designed the geometrical layout, the tree-like structure or the images of successive generations of fractals are easily visible.



But it's when I saw an image of the structure of the chromatic scale that I could apply the concept of fractals to my project. So, the original inspiration is music. Music is time in movement. How can we convert musical time into visual and sculptural space, so that this space becomes a real image of the musical "score"? Creating an equivalence between the temporal value of each of the 12 notes of the tempered scale and its representation in space in the form of 12 circles, I created a convention: the whole note, equivalent to 4 beats, will have its visual equivalent in a 4-inch circle, and so on, until the sixty-fourth note, represented by a point in the shape of a circle measuring one sixteenth of an inch. In the score of L'ÉTOILE, created for 12 musicians, this point that takes the

form of a tiny sphere can be considered as the center or the matrix of the work. Musically, it corresponds to an ostinato pulsation and will take the rhythmical form of a mantra, an echo of the « cantic of quantum ».

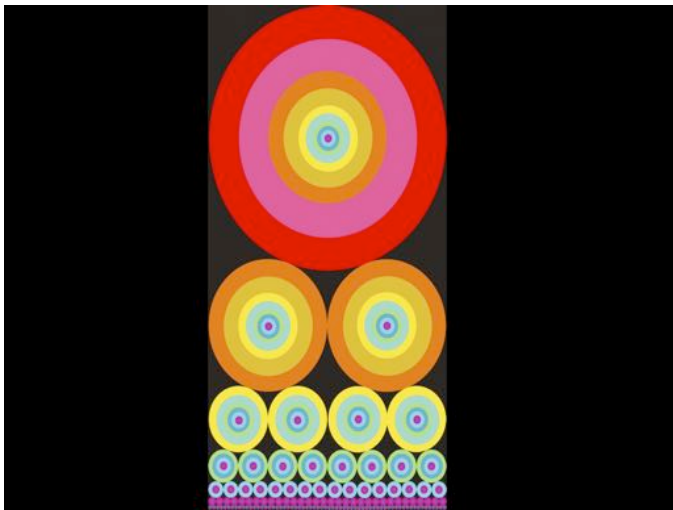
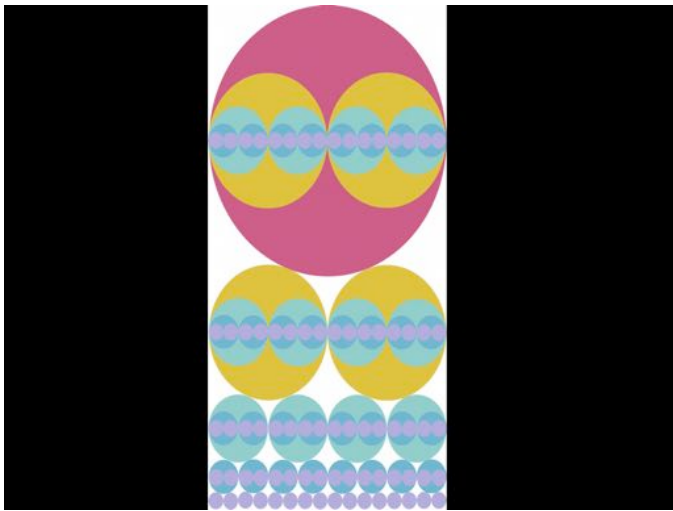
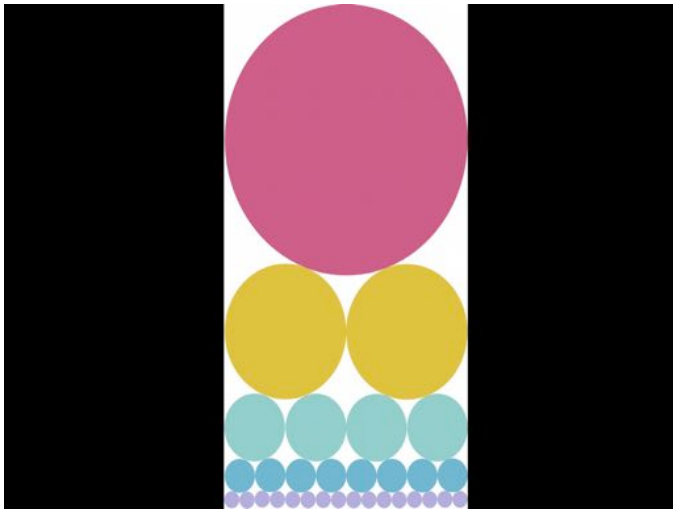


Then, in order to illustrate the luminescence of music, I have allocated to each one of the 12 notes a color corresponding to its wavelength converted into hertz. So, the note G (392 Hz), the fifth and quintessence of music, is symbolized by red. And this red will always be, in the visual work, the color representing the whole note. In order to allow a concrete reading by the musicians, the visual score will be transcribed into real notes on music paper.

In order to distinguish between 5 black keys and 7 white keys of the piano's tempered scale, I have created two distinct sets : binary for the 7 white notes and ternary for the 5 black notes. The binary comprises the whole note (4 beats), the half-note (2 beats), the quarter note (1 beat), the eighth note (half a beat), the sixteenth note (one quarter of a beat), the thirty-second note (one eighth of a beat) and the sixty-fourth note (one sixteenth of a beat). The ternary is composed of the dotted whole note (3 beats), the dotted quarter note (1 and a half beat), the dotted eighth note (three quarters of a beat), the dotted sixteenth note (three eighths of a beat) and the dotted thirty-second note (three sixteenths of a beat).

As for the application of the concept of superimposition, inspired by quantum physics, and the tree-like structure, inspired by the fractals, one sees that the whole note contains or is the equivalent to 2 half-notes, 4 quarter-notes, 8 eighth-notes, 16 sixteenth-notes, 32 thirty-second-notes and 64 sixty-fourth notes. Doubling the dotted thirty-second-note, the smallest value of the ternary, results in a dotted sixteenth-note, and so on and so forth.

In order to give a third dimension to the visual work, sculptures will be built by exponentially multiplying the diameter of the circles (2, 4, 8, 16, 32, 64, etc.), absolutely respecting the proportions established in the score.



multimedia project integrates the semantic superimposition of music, painting, sculpture and poetry. This project is entitled L'ÉTOILE because the shapes created and set in a visual form look like stars.



A cosmological poem, connected with the imaginary time of quantum physics, will express that the smallest element, the point, contains and superimposes all the larger elements that follow it, for, in the artistic and mathematical imagination, it is the infinitely small that contains the infinitely great, and note the reverse.

Imagine a world where love, beauty, peace and liberty make stars shine in the eyes of mankind. Imagine a world where love for life, love for all that lives, is the only real victory. Imagine a planet where the essences of life, water, air, and earth are protected against pollution. Imagine a world where it is good to live happy, together. Imagine it is possible.

*In the sky flower the stars  
On the Earth, the flowers reflect them*

On the other hand, as the field of the imaginary world is located between the infinitely small and the infinitely great, between being and non-being, above and below reality, my