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Addendum 10: Integral Singularity

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Abstract

For some decades now, in the field of information technology and computing, after observing the accelerated progress of technology in recent times, there has been speculation that, shortly, a point of no return will be reached —to which It has been called the technological Singularity— in which the rhythm of change will be dizzying, the acceleration curve will become vertical, and artificial intelligence will far surpass human intelligence. Some even believe that superintelligent machines, as they become the dominant species on the planet, will end up devaluing human beings until they become obsolete organisms and, in the long run, leading humanity to extinction. Our research on the rhythm of evolution and history —which reveals the existence of a very precise spiral-fractal pattern, hidden in the universal process and oriented towards a point of Singularity within a couple of centuries—, far from marginalizing human beings at that peak moment in history, they make him the true protagonist. Therefore, in this Addendum, after summarizing the key points of our research, we will try to answer some of the main questions that are being raised around the Singularity hypothesis: Will the technological Singularity really occur? When could that expected/feared moment take place? Can we truly conceive of a conscious machine? What are the ultimate implications of the Singularity? How can humanity face the process of approaching that peak moment in history?... Perhaps, in the end, we will come to glimpse that reality, our own reality, is more fascinating than we could have ever imagined.

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1. Introduction

The transdisciplinary research that we are developing about the surprising creative dynamics deployed during the history of the universe reveals that the great evolutionary novelties that have emerged throughout the process, far from being simple contingent, fortuitous and unpredictable events, have been emerging from ordered form, according to a very precise spiral, harmonic and fractal pattern. In summary, we can speak of a double divergent-convergent spiral that, starting from the dizzying creativity of the original pole of the Big Bang, gradually slows down until reaching the moment of formation of the solar system and, from there, begins to accelerate again progressively, first through biological evolution on our planet and, later, through human development and the expansion of civilizations, until reaching the current moment, in which the rhythm of emergence of novelties is once again dizzying and everything seems to indicate that we are rapidly approaching a definitive pole of infinite creativity that will take place in a couple of centuries, around the year 2217.

When we began this research, back in 1981, the mere suggestion of the existence of a spiral pattern in the evolutionary process, and its inexorable orientation towards an imminent pole of convergence, was considered pure blasphemy for official science. The only references available at that time were far outside the academic spheres. The most relevant, from the Western perspective, was, without a doubt, the French paleontologist and theologian **Pierre Teilhard de Chardin** (1881-1955), who, observing the increase in complexity and consciousness throughout the evolutionary process —cosmosphere, biosphere, noosphere, pneumosphere—, defended the existence of a final pole of attraction —which he called the Omega Point— in which the full unification of matter and spirit would take place. And, from the Eastern perspective, the clearest exponent of a similar approach was, without a doubt, the Indian poet and philosopher **Aurobindo Ghose** (1872-1950), who, understanding that the origin of the universe was the result of the involution of the Spirit in matter, he proposed that the entire cosmic evolutionary process was nothing more than the return movement of matter —through life and mind— towards the supramental summit, the non-dual nexus of absolute reality and the relative world.

Obviously, all these proposals clashed head-on with many of the central assumptions of conventional science, but, surprisingly, over the last decades they have begun to appear, in the environment of what has been called the "technological Singularity", numerous works that clearly resonate with those "pseudoscientific" approaches about the accelerated and convergent dynamics of evolutionary development.

The term "singularity" is used with different meanings in various fields of science. For example, in mathematics, it can be used to refer to certain functions that present unexpected, extreme or infinite behaviors, or, in relativistic physics, it can refer to the hypothetical initial point of the universe of infinite density that gave rise to the Big Bang, or, of the likewise, it can be used to designate certain "places" in space-time —such as black holes— where fundamental magnitudes, such as curvature, become infinite because very large concentrations of matter and energy, driven by the gravitational force, they end up collapsing until they are reduced to an infinitely small point. In the field of information technology and computing, observing the accelerated progress of technology in recent times, there has been speculation that, shortly, a point of no return will be reached —technological singularity— in which the rhythm of change will be dizzying, the acceleration curve will become vertical and artificial intelligence will far surpass human intelligence, with unpredictable and uncontrollable results for civilization as we know it. Because, just as in black holes —physical singularities— it is not possible to see beyond the event horizon, in the technological singularity we cannot even glimpse what will happen beyond it because it will completely exceed our current cognitive capabilities.

Next, to familiarize ourselves in some way with the topic, we are going to refer to some of the authors who have been key to the development of this idea over the last century. We will limit ourselves only to giving some significant data from the pioneering researchers who, throughout the 20th century, have placed emphasis on the technological aspects of the process, and we will leave for later those others who have studied the topic of evolutionary acceleration —and its final asymptotic instant—from other perspectives.

2. Brief history of the technological singularity

Perhaps the first theorist to speculate on the possibility of an event like the technological singularity was the American historian **Henry B. Adams**, who, in 1904, having noted the rapid development of science and technology throughout the 19th century, proposed the existence of a law of acceleration of progress, defined and constant like any law of mechanics. In 1909, Adams developed this idea further in the essay *The Rule of Phase Applied to History*, in which he proposed a "*physical theory of history*" by applying the law of inverse squares to historical periods, suggesting that the world may now be immersed in an inexorable acceleration towards a "*phase change*" in the relationship between technology and humanity of unimaginable consequences. In this work, Adams

statistically determined the average duration of each new phase of human history and proposed a Religious Phase of 90,000 years, a Mechanical Phase of 300 years, an Electrical Phase of 17 years and an Ethereal Phase of 4 years, which, finally, "*would push Thought to the limit of its possibilities*", suggesting that the asymptote —the singularity of the phase change— could occur at any time between 1921 and 2025.

In any case, it seems that it was the Hungarian mathematician and physicist **John von Neumann** who, in the late 1940s or early 1950s, first used the term "singularity" to describe his vision of a future runaway progression in computational events. Some time later, in 1958, the mathematician Stanislaw Ulam, recounting a conversation with von Neumann, wrote: "*One conversation centered on the ever accelerating progress of technology and changes in the mode of human life, which gives the appearance of approaching some essential singularity in the history of the race beyond which human affairs, as we know them, could not continue.*"

In 1965, British mathematician and computer scientist **Irving J. Good** —author of the book *Speculations Concerning the First Ultraintelligent Machine*— was the first to use the concept "*intelligence explosion*" to suggest that if machines were to slightly surpass human intellect, they could recursively improve their own designs in ways unforeseeable by their designers, leading to a dizzying cascade of self-improvements and a surge in super intelligence —that is, a singularity— . It appears that, years later, Good wrote in an unpublished autobiographical statement that he suspected that an ultra-intelligent machine would lead to human extinction.

It was in this same year of 1965, when the American chemist and entrepreneur **Gordon E. Moore**, co-founder of Intel, published a document in the magazine *Electronics* in which he anticipated that the complexity of integrated semiconductor circuits would double each year with a reduction of commensurable cost. Known as "Moore's law," his prediction has made the proliferation of technology possible throughout the world. Moore updated his prediction in 1975 to note that the number of transistors on a chip doubles every two years and this still holds true today. Many authors have used this "law" to make their predictions regarding the precise moment in which the technological singularity will take place.

The Austrian robotics and artificial intelligence researcher **Hans Moravec** is, perhaps, the pioneer in the study of the acceleration of computational change in the 20th century. In a series of articles published between 1974 and 1979 (and later in his 1988 book *Mind Children*) he generalizes and expands Moore's law on the pattern of exponential growth in the complexity of integrated

semiconductor circuits, to also include technologies from long before the integrated circuit up to future forms of technology. Moravec describes a timeline and scenario in which robots will evolve into a new series of artificial species, starting in 2030-2040. In 1979, Moravec's ideas reached the general public through an article titled *Today's computers, intelligent machines and our future*. In the final part of this essay "*he considers the implications of the emergence of intelligent machines and concludes that they are the final step in a revolution in the nature of life. Classical evolution based on DNA, random mutations and natural selection may be completely replaced by the much faster process of intelligence mediated cultural and technological evolution.*" Analyzing the future evolution of computers and humans, Moravec states that we are rapidly heading towards a post-biological form for all living intelligence and, "*in the long run the sheer physical inability of humans to keep up with these rapidly evolving progeny of our minds will ensure that the ratio of people to machines approaches zero, and that a direct descendant of our culture, but not our genes, inherits the universe.*"

At this point we want to remember that it is in that same decade, following the publication in 1977 of the book *The Dragons of Eden* —Pulitzer Prize in 1978— by the astronomer, cosmologist and scientific popularizer **Carl Sagan**, when the idea of evolutionary acceleration begins to become popular. In this book, Sagan proposes the metaphor of the "Cosmic Calendar" with which he shows that the great evolutionary novelties have been emerging in an increasingly accelerated manner throughout the last six billion years of the history of the universe. The Cosmic Calendar is a method to visualize the chronology of all universal history in which its total duration is equated with an annual calendar. The Big Bang is placed at midnight on cosmic January 1 and the current moment at midnight on December 31. In this calendar, the solar system appears on September 9, life on Earth emerges on the 30th of that month, the first dinosaur on December 25, the first primates on the 30th, the first *Homo sapiens* appear ten minutes before midnight of the last day of the year, and the entire history of humanity occupies only the last 21 seconds.

Returning to our story, we will say that the term singularity, linked specifically to the creation of intelligent machines, did not begin to be used until 1983, when the American mathematician and writer **Vernor S. Vinge** wrote a brief opinion article in the magazine *Omni* in which he said: "*We will soon create intelligences superior to ours. When this happens, human history will have reached a kind of singularity, an intellectual transition as impenetrable as space-time knotted at the center of a black hole, and the world will go far beyond our understanding.*" In 1986, Vinge pressed the idea of the exponential acceleration of technological change in the science fiction novel *Marooned in Realtime*, set in a world of rapidly accelerating progress leading to the emergence of increasingly sophisticated technologies separated

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by increasingly shorter intervals of time, reaching a point beyond human comprehension. Years later, in 1993, Vinge himself wrote another article, titled *The Coming Technological Singularity: How to Survive in the Post-Human Era*, which was very widely disseminated in the Internet and the idea of singularity then began to become very popular. This article contains a statement that has been cited numerous times: "*Within thirty years, we will have the technological means to create superhuman intelligence. Shortly after, the human era will be ended.*" Vinge refined his estimate of the necessary time scales, adding*: "I would be surprised if this event occurs before 2005 or after 2030.*"

[As a mere curiosity, we can point out that it was precisely in this year 1993 when the pioneering article of the present research on the pattern of evolution, that we are still developing in these pages, was published. At the express invitation of Ervin Laszlo, I wrote the text in 1992, with the title *A hypothesis on the rhythm of becoming*, and it came to light in Volume 36 – Number 1 – 1993 of *World Futures: The Journal of General Evolution*, pages 31-56, with three fold-out graphics (9, 12 and 17) at the end of the paper copy. The article was also published online on June 4, 2010: https://www.tandfonline.com/doi/pdf/10.1080/02604027.1993.9972329].

In this same 1990s, numerous authors began to appear with works related to the topic of technological singularity. For example, the American scientist **Marvin L. Minsky** —*Will Robots Inherit the Earth?*, 1994—, the American cultural entrepreneur **John Brockman** —editor of *The Third Culture*, 1995—, the American mathematician and computer scientist **W. Daniel Hillis** —*Close to the singularity*, 1995—, the Australian science fiction and popular science author **Damien Broderick** —*The Spike*, 1997—, the Swedish transhumanist philosopher **Nick Bostrom** —*How long before superintelligence?*, 1997—, British philosopher and futurologist **Max More** —co-founder and president of the *Extropy Institute*—, American strategic designer **Natasha Vita-More** —*Create/Recreate: 3rd Millennial Culture*, 1999—, the American futurist and prospective consultant **John M. Smart** —creator of the *Acceleration Watch* website [from which we have collected a lot of information], since 1999— [we will return to this author soon], but, perhaps, the most important fact for the massive dissemination of all these ideas has been the publication in this decade, by the American inventor and pioneer of artificial intelligence **Ray Kurzweil**, of two fundamental books: *Age of Intelligent Machines*, in 1990, and *Age of Spiritual Machines*, in 1999. In the first of them, Kurzweil examines the philosophical, mathematical and technological roots of artificial intelligence, puts highlights the astonishing growth in computing power in recent decades, and predicts the central role that AI will play in 21st century life. In the second, he broadly

develops these ideas. He outlines his vision for how technology will progress in the coming years and predicts that within a couple of decades there will be machines with human-level intelligence available in affordable computing devices, revolutionizing most aspects of life. He presents his "*law of accelerating returns*" to explain why the computational power of computers is increasing exponentially and why "*key events*" occur more frequently as time passes. Kurzweil begins by noting that the frequency of novel events throughout the universe has been slowing since the Big Bang, while evolution has reached important milestones at an increasing rate. This is not a paradox, because —he writes— entropy (disorder) is increasing globally, but, simultaneously, local foci of increasing order are flourishing. Time speeds up as order increases.

Moore's law —remember— refers only to the growth of complexity in integrated semiconductor circuits. Kurzweil —like Moravec— expands the field of study and, after analyzing the development of technologies prior to that of these integrated circuits, observes that the geometric growth of processing capacity is prior to said paradigm and that, at least, it extends across four other technologies: early 20th century electromechanical equipment, relays, vacuum tubes, and early transistors. So, while he believes Moore's Law on integrated circuits will end around 2020, the law of accelerating returns will require that progress continue to accelerate, and therefore some other technology will be discovered or perfected to continue exponential growth. Kurzweil argues that whenever a technology reaches a certain type of barrier, a new replacement technology will be invented to cross that barrier, ultimately leading to "*technological changes so rapid and profound that they will represent a rupture in the fabric of human history*".

In 2005, Ray Kurzweil published his most renowned work, *The Singularity Is Near: When Humans Transcend Biology*, through which the idea of singularity achieves full popularity in all media. Returning to his law of accelerated returns, he predicts an exponential increase in technologies such as computing, genetics —intersection between information and biology—, nanotechnology —intersection between information and the physical world— or robotics, and affirms that, a once the singularity is reached, machine intelligence will be infinitely more powerful than all human intelligence combined. It predicts that the next step in this inexorable evolutionary process will be the union of human and machine, in which the knowledge and abilities of our brains will be combined with the much greater capacity, speed and potential to share knowledge of our creations. He explains that the rhythm of evolutionary progress is exponential due to positive feedback, in which the results of one stage are used to create the next.

According to Kurzweil, the information processing capacity has been following exponential behavior for a long time before the appearance of the latest technologies. In fact, his hypothesis is that the pattern extends throughout the entire evolutionary process, from the very origin of life —almost four billion years ago— to reaching humans and current technology. Kurzweil summarizes evolution through the ages as progress through six epochs, each of which builds on the previous one. It states that the four epochs that have occurred so far are: **Epoch 1. Physics and Chemistry**: Information in atomic structures, **Epoch 2. Biology**: Information in DNA, **Epoch 3. Brains**: Information in neural patterns, and **Epoch 4. Technology**: Information in hardware and software designs. Kurzweil predicts that the singularity will coincide with the upcoming **Epoch 5. The Fusion of Technology and Human Intelligence**. After the singularity, he says, **Epoch 6. The Universe Awakens** will occur. Kurzweil places the moment of the singularity —a profound and disturbing transformation of human capabilities— in the middle of this century, around the year 2045, because, he claims, the non-biological intelligence created on that date will be a billion times more powerful than all human intelligence today. This circumstance, in principle, does not really seem definitive enough to be considered a true singularity in the cosmological sense in which we are proposing it, and, in fact, Kurzweil himself, in this same book, states that, starting in 2045, *our civilization will expand outward*, eventually converting all the dumb matter and energy we encounter into enormously intelligent (and transcendent) matter and energy. Ray specifies that we can saturate the universe with our intelligence before the end of the 22nd century, and concludes: "*Once we saturate the matter and energy of the universe with intelligence, it will 'awaken', become conscious and supremely intelligent. It's the closest thing to God I can imagine.*" So, according to this, it seems that the true evolutionary summit, the true Singularity that will imbibe the entire universe with its spirit, will not take place in the year 2045, but rather will occur at the end of the 22nd century, when all the energy and intelligence of the universe are experienced in a unified way. Viewing things this way, clear resonances can be found with the conclusions of our research, both in the planned date for the Singularity and in its deep meaning, since, as we have proposed in this article, it will be, precisely, at the beginning of the 23rd century —around the year 2217— when energy and consciousness discover their definitive non-duality. In any case, despite these coincidences, in a moment we are going to propose a possible alternative to Kurzweil's idea that *our civilization will expand outwards, until it embraces the entire universe* —which sounds excessively optimistic and adventurous—, suggesting, exactly, the opposite path, that is, that *our civilization will be oriented inward, until reaching the very bowels of matter and consciousness*, thus transcending the world of dualities in its unified

foundation —beyond space and time— that is generating, moment after moment, the entire universal manifestation.

After this process of gestation of the idea of technological singularity that has taken place throughout the last century, we currently find ourselves with a very extensive debate on numerous questions that humanity is beginning to ask itself in the face of the increasingly evident exponential development of technology and the very foreseeable arrival of an explosive moment of artificial intelligence, when it will *be a billion times more powerful than all human intelligence today*: Will that enigmatic moment truly be reached one day? Is this just a purely theoretical and speculative idea? A simple utopian —or dystopian— approach from imaginative science fiction authors and transhumanist enthusiasts? Among those who take this concept seriously, there is a wide variety of opinions about the probability, how and when the singularity will occur. Some view it as an uncertain event, which may or may not occur. Many consider it an inevitable destiny. Others are actively working to prevent the creation of digital intelligence beyond human oversight. When could that expected/feared moment happen? There are futurists who see it as an almost imminent event. Most predict it could happen in the coming decades —between 2030 and 2080—. Others believe that there are still two or three centuries left. Or even more. In the event that the singularity happens, what would be the implications for human beings? There is also controversy on this point. The most optimistic believe that humans and machines will work together and, by integrating biological and technological elements —nanotechnology, biotechnology, neurotechnology, brain-computer interfaces— the development of our organisms will be promoted and our physical, perceptual and intellectual capabilities will increase. There are even those who venture the possibility of achieving cybernetic immortality by "downloading consciousness" (?) into some imperishable artifact. Optimists also believe that, at a collective level, it will be possible to create a planetary environment of abundance —in which all people will have all their needs met— which will bring us closer to achieving a more just, global and integrated society. Faced with this idyllic panorama, the most pessimistic predict, on the contrary, a future full of uncertainties and threats, given the serious dangers posed by the gradual loss of control of our lives in the face of the growing decision-making power of mechanisms with artificial intelligence. Some believe that superintelligent machines, as they become the dominant species on the planet, will devalue human beings until they become obsolete organisms, which, in the long run, may even lead to the extinction of humanity itself. Noting this disparity in criteria, some authors have predicted that we are inevitably heading towards a "*artilect war*", which will break out before the end of the 21st century, between those who embrace artificial

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intelligence —"*cosmists*"— and those who reject it —"*terrans*"—. Faced with this apocalyptic panorama, it seems more sensible and cautious to approach the path towards singularity with less sectarian positions, which, while guaranteeing responsible control of the situation and respect for shared ethical values, are capable of actively integrating the extensive potentialities objectives of the technological world with the deep subjective capacities of human consciousness. There are ample reasons to think that this scenario is not only possible, but is the natural outcome of the long history of evolutionary development since its origin. Our research points strongly in this direction. Let's check it out.

3. Some key points from our research on the pattern of evolution

We are going to briefly recall some central ideas that have emerged throughout our research, since, we believe, they can serve to clarify, to a large extent, some of the doubts raised about the moment, the manner and the deep meaning of the singularity towards which we are rapidly heading.

At the outset, let's define the general framework. If we want to achieve a truly integral understanding of the singularity event, it is completely necessary to refer to at least three different realms within omni-comprehensive Reality: non-dual absolute reality, potential relative reality, and space-time relative reality. [See Addendum 8]. We have outlined these three areas as follows:

—**Non-dual absolute reality**: Given that all manifested reality appears, inexorably, in the form of interdependent dualities —subject/object, inside/out, origin/end—, we can understand them as polar manifestations of a reality that transcends them and is "prior" to that dualization. Physicists speak of infinite potential energy in the original quantum void, and sages speak of infinite diaphanous consciousness in the final mystical void. Our proposal is that these two voids are the same and only absolute Emptiness, perceived by physicists objectively and by contemplatives subjectively, but which, in itself, is neither objective nor subjective, but rather the unity, the identity or the indifference of both facets simultaneously, in clear syntony with the proposals of dual aspect monism, neutral monism and non-dual traditions of wisdom. This realm has been called *dharmakaya* in Buddhism, *nirguna brahman* in Hinduism, *nameless tao* in Taoism, *godhead* in Christian mysticism, *ein sof* in Jewish Kabbalah...

—**Potential relative reality**: Since non-dual Emptiness completely lacks the slightest separation between subject and object, it cannot perceive itself in any way. Therefore, if it wants to contemplate itself, it has no choice but to unfold itself into an original objective pole —basically of energy— and a final

subjective pole —basically of consciousness—, fully maintaining its empty essence. Between both poles, a very broad spectrum of balances between both polar facets is instantly generated, which runs the entire range from the most basic states —of enormous energy and little consciousness— to the highest —of little energy and enormous consciousness—. The different levels of this unified, entangled, archetypal and potential energy-consciousness spectrum are, precisely, the "*potential levels of stratified stability*" that will be actualized, one after another, along the successive steps of universal evolution. This realm of reality has been called in very different ways depending on the perspective of its approach: "*unus mundus*" (Carl Jung), "*implicated order*" (David Bohm), "*akashic field*" (Ervin Laszlo), "*morphogenetic field*" (Rupert Sheldrake), "*quantumland*" (Ruth Kastner), "*unified spatial memory network*" (Nassim Haramein), "*semi-harmonic EM background field*" (Dirk Meijer) …

—**The space-time relative reality**: The entire spectrum of potential energy-consciousness —the universal wave function— is actualized —collapses— at each point-instant of the universal pixelated manifestation, recursively. In other words, the infinite and eternal Here-Now of the potential realm is projected and identified, moment after moment, in and as each finite and fleeting here-now of the manifested realm, to contemplate itself from that determined perspective, and, immediately, return to its potential foundation. We can speak, thus, of a recursive toroidal dynamic, through which the entirety of the ever-present archetypal spectrum is progressively actualized into the world of space-time forms. [See Addendum 6]. In any case, we must not forget that everything happens in a single and full Here-Now that encompasses in itself, in its entirety, all the illusory distances and durations of the dynamic cosmic hologram. [See Addendum 9].

This recursive dynamic between the self-evident and infinite Void —which is, in fact, the only real protagonist in this whole game of appearances— and all its space-time forms is intrinsically creative, and is facilitated by the unified field of memory that, step by step, it is developing at a fundamental level. All the information collected at any point-instant of the manifested world is immediately introjected into that basic field of collective memory which, in this way, increases, moment by moment, its potential. In this way, any entity, whatever the level of the spectrum in which it operates, has, in the most intimate depth of itself, free access to the entirety of that unified field of information, although, depending on its characteristics specific, connect only with certain facets of that field. Toroidal dynamics has, therefore, a true holographic structure, in the sense that each "part" of itself has information about the "totality", and is, in fact, a particular reflection of that totality.

This integral, fractal, holographic, toroidal and non-dual dynamic of fundamental energy-consciousness greatly facilitates the understanding of the evolutionary process. Through this recursive dynamic that we are proposing, the ever-present and self-evident Emptiness focuses, moment after moment, on the successive levels of the potential spectrum of energy-consciousness, starting with the most basic ones —primarily energy— and ending in the most elevated —primarily consciousness—. In each plane, it actualizes the specific potential of that level, integrating it with the aspects already emerged at previous heights. At each turn, starting from the resources available in the unified field of memory, it projects itself into each specific situation in space-time, perceives that specific situation based on the possibilities of its structure, and immediately introjects that information into the field of collective memory of the foundation. When a specific entity has deployed the full potential of the fractal stratum in which it basically operates and has integrated it with everything that emerged in the preceding stages, having reached a specific level of complexity, it can resonate with the next fractal level of the energy-consciousness spectrum, and, in this way, ascend to a new step on the long ladder of evolution.

Next, we will present the simple harmonic pattern that, according to our research, precisely marks the rhythm at which the successive potential levels of stratified stability present in an entangled way in the fundamental unified field emerge in the spatiotemporal manifestation.

Previously, we believed that it may be interesting to remember here that the original hypothesis of this research arose as a possible solution to the problem posed in paleontology when it was found that the fossil record did not support Darwin's original idea that new species appeared **gradually** by the impulse of natural selection over time. In recent years it has been seen that the gradualist conception of evolution was only responsible for a small part of the evolutionary changes, and that the most profound modifications in biological evolution occurred at certain moments in the history of the groups, very quickly and giving rise to stable species with very few subsequent variations. Neo-Darwinian theory can explain the mechanisms of microevolution —the small changes within a species— but it encounters great difficulties when it tries to account for the origin of new species and, even more so, when faced with the emergence of genera, families or higher taxonomic divisions. Macroevolution —the evolution of these higher-order taxonomic categories— presents differences between divisions that are too marked to have arisen through gradual transformations. In the words of C. H. Waddington: "*one of the fundamental problems of evolutionary theory is to understand how the very obvious discontinuities that we find between the main taxonomic groups: phylum, family, species, etc.*

have arisen." The Darwinian version of a slow, gradual and continuous process has given way to an interpretation characterized by sudden, **jumpy** and discontinuous changes, as S. J. Gould and N. Eldredge have shown with their theory of "punctuated equilibria". [See the section "*The crisis of Darwinism*"].

At the beginning of the twentieth century, physicists encountered a similar problem —albeit in a different area— when they verified how the energy emitted or absorbed by atoms, far from presenting itself as a **continuous** flow according to their predictions, did so in a quantified, **saltatory** way, in very precise packages. For several decades they tried to explain this strange phenomenon by searching for a good mathematical theory of the atom that would generate these quantum numbers in a natural way. The solution came when E. Schrödinger proposed the similarity of the world of electrons with musical harmonics —standing waves—, thus giving rise to the happy "wave function", a fundamental piece of revolutionary quantum physics of surprising precision. [See the section "*A harmonious solution*"].

In line with this, we believe that it may be interesting to remember here that while for the Ionian philosophers the fundamental question was finding the corporeal substance of the world, for the Platonists and Pythagoreans the key was in the patterns and orders. Today's science seems to move, basically, in this second line. The fundamental claim of Pythagoreanism was that numbers constitute the immutable principles underlying the world, the essence of reality. Discovering that the proportions between musical harmonics could be expressed simply and accurately, the Pythagoreans considered that the cosmos itself was a harmonic system of numerical ratios: everything real could be expressed by relationships between numbers. According to them, the numerical order inherent to sounds was in direct relationship with the organization of the universe itself, and, thus, they affirmed that music was nothing more than the expression of the internal relations of the cosmos, and that every material manifestation was the result of concert of universal vibrations.

The new science considers the universe holistically, that is, it perceives nature as an integral whole, as a global movement that is not fragmented or divided. We have seen how the evolutionary dynamics of this unified universe unfold its novelties discontinuously, how the most profound transformations of evolution happen abruptly and suddenly, generating a hierarchy of progressively complex and inclusive levels of organization. We find ourselves, then, with a vibrant unit —the evolutionary universe— that channels its energy flows into a very defined series of levels of stability. Like atoms. Like musical instruments. Both in the world of atomic physics and in the field of music, the secret of its sudden jumps and sound discontinuities was revealed through standing waves

and musical harmonics. Couldn't the same thing happen in the field of evolution? Isn't it very coherent that this unified universe that we are beginning to discover generates similar creative patterns at its different levels of organization? Isn't the idea, then, very suggestive that the sudden evolutionary leaps that have occurred in the history of the universe respond, precisely, to those same stationary waves that turned out to be the key to the explanation of the subatomic and musical worlds? This has been the basic intuition that has given rise to our hypothesis of evolutionary rhythms that we will outline below. [See the section "*Statement of the hypothesis*"].

Jacob Bronowski, in 1970, proposed a theory about a single process that explained hierarchically ordered diversity without reductionism. This theory proposed, as a general cosmological principle, the concept of "*stratified stability of potential levels*" as the key to the evolution of non-equilibrium systems. It basically proposed the existence of certain levels of stability around which energy flows would be grouped and organized, thus allowing successive and sudden ascents towards new strata of progressive complexity. Our hypothesis constitutes a very precise specification within this suggestive approach. Let's see it.

Standing waves are known to anyone who has played a musical instrument. The characteristic of these waves is that they divide the vibrating unit —string, tube or ring— into complete equal sections. A guitar string, for example, since it has fixed ends, cannot vibrate in any way, but has to do so in such a way that its ends remain motionless. This is what limits its possible vibrations and introduces integers. The string can vibrate as a whole (see fig. 1-A), or in two parts (see fig. 1-B), or in three (see fig. 1-C), or in four, or in any other number whole of equal parts, but it cannot vibrate, for example, in three and a half or five and a quarter part. In music theory these successive standing waves are called harmonic sounds. The unlimited series of these harmonics, starting from the "fundamental sound" of the complete original unit, very precisely define the successive notes of the Pythagorean circle (spiral) of fifths, the entire hierarchy of levels of stability of the musical flow.

Taking now, again, the example of a guitar string, let's imagine that it is tuned to the note C —fundamental sound—. If we vibrate half of its length —first harmonic— we will obtain the same original note an octave higher. If we vibrate the third part —**second harmonic**— we will get a **different note**, which in our case will be a G. That is, **with the second harmonic the sound novelty arises**. Taking the new note, in turn, as a fundamental sound, we can repeat the experience as many times as we want, and, thus, we will obtain successive staggered sound novelties with each second harmonic. That is, by vibrating a

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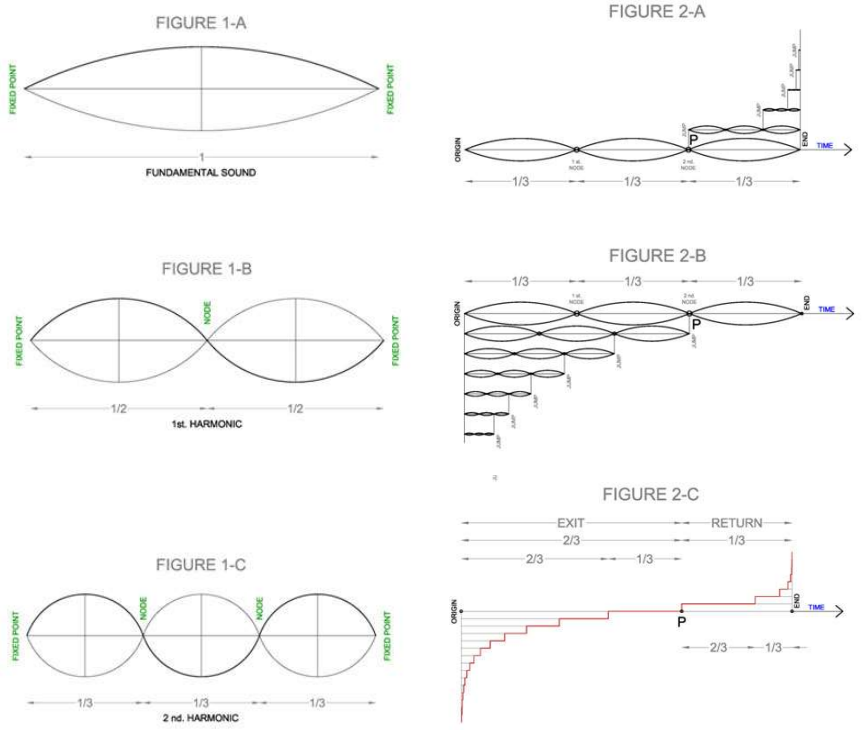
third of the length a creative jump will appear, and with the third of the third another, and with the third of the third of the third another, etc.

This simple fact gives us the key to our hypothesis. The proposal is that simple: considering the temporal totality as a vibrant unit, the successive chained second harmonics, that is, the successive thirds of the duration, will mark the emergence of evolutionary novelties. Or, put another way, the second harmonics will define those "potential levels of stratified stability" through which the creativity of nature is channeled, that is, those rungs of the evolutionary ladder through which the energy flows in its ascending creative process of progressively complex and conscious organisms.

In figs. 2-A, 2-B and 2-C we can graphically observe the global process. Taking the complete temporal trajectory —from the "origin" to the "end"— as the fundamental sound, we have drawn the successive level jumps in both directions: in fig. 2-B the section that goes from the origin to the second node "P" of externalization —what is called the "exit" or "outward" stretch—, and in fig. 2-A the section that goes from that same second node to the end —the "return" or "inward" stretch—. In fig. 2-C we reflect the joint trajectory, the global ladder of evolution.



A moment ago, when outlining the basic characteristics of **potential relative reality**, we said: "*Since non-dual Emptiness completely lacks the slightest separation between subject and object, it cannot perceive itself in any way. Therefore, if it wants to*

contemplate itself, it has no choice but to unfold itself into an original objective pole —basically of energy— and a final subjective pole —basically of consciousness—, fully maintaining its empty essence." When this apparent dualization of non-dual Emptiness occurs, an illusory distance is generated between both poles —between the initial and final singularity, between the object and the subject, between energy and consciousness— with an endless number of intermediate balances between both facets. When this polarization of the Void takes place, automatically, a bidirectional tension is produced between both extremes in its attempt to recover the original non-duality: an ascending and expansive current coming from the initial "**energy**-(consciousness)" pole and a current descending and contractive coming from the final "**consciousness**-(energy)" pole. Both flows traverse, in opposite directions, the entire spectrum of potential levels of stability —standing waves— in which both polar facets are balanced, in different proportions. Instant after instant, these ascending and descending flows resonate with each other at a given level —standing wave— of the energy-consciousness spectrum, thus "collapsing" the entire potential field into a concrete event of the manifested world. (See Addendum 7). The proposal that we are developing is clearly in tune, obviously, with the syntropic theory of the mathematician Luigi Fantappiè. This theory states that the increase in complexity in the evolutionary process is a consequence of advanced waves that emanate from attractors located in the future and that are directed backward in time. It proposes, therefore, moving from a mechanistic and deterministic model of the universe to a new model, entropic-syntropic, in which the expansive forces (entropy) and the cohesive forces (syntropy) work together, so that the unfolding of phenomena is no longer just a function of the initial conditions, but also depends on a final attractor.

In clear resonance with all this, our approach has, in the same way, a great similarity with the Transactional Interpretation of Quantum Mechanics —proposed by John Cramer and inspired by the "absorber theory" of John Wheeler and Richard Feynman—, which describes quantum interactions in terms of a standing wave formed by interference between retarded waves (forward in time) and advanced waves (backward in time). We can summarize this transactional model as follows: The emitter produces a retarded "offer" wave, forward in time, which travels toward the absorber, causing the absorber to produce an advanced "confirm" wave, backward. in time, which travels back to the emitter. The interaction is repeated cyclically until, finally, the transaction is completed with a "handshake" —a standing wave— sealing a two-way contract between the past and the future, and the actual quantum event occurs, the "collapse of the wave function". (See fig. 15). The "pseudo-temporal" sequence of this story is, of course, just a semantic convenience to describe a

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process that is, in truth, instantaneous, since it does not happen in space-time but in the potential underlying unified field that is, as we have said, timeless and non-local.

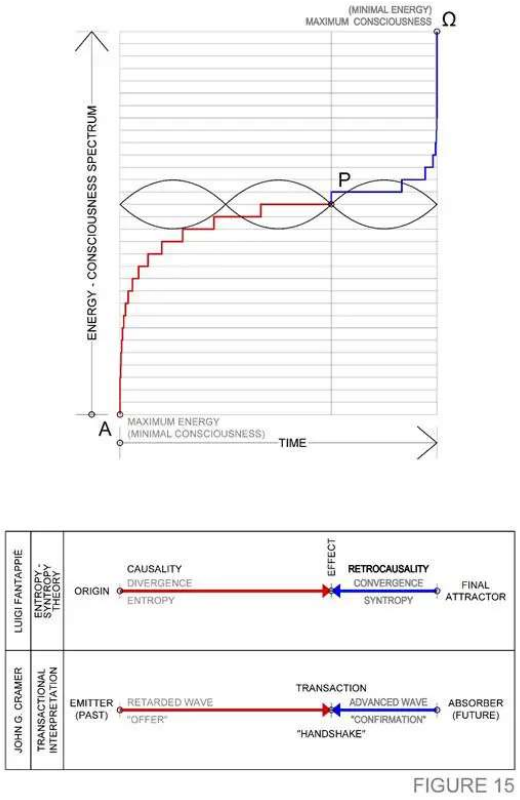

FIGURE 15

We want to highlight here that the "handshake" between the ascending and descending flows can take place at any level of the energy-consciousness spectrum. In fact, at the original moment, the "transaction" occurs at the very base of the spectrum, but, throughout the evolutionary process, the level gradually rises, level after level, as we have explained previously: "*Through this dynamic recursive approach that we are proposing, the ever-present self-evident Emptiness focuses, moment after moment, on the successive levels of the potential spectrum of energy-consciousness, starting with the most basic ones —primarily energy— and ending at the highest levels —primarily consciousness—. In each plane, it actualizes the specific potential of that level, integrating it with the aspects already emerged at previous heights.* (…) *When a specific entity has unfolded the full potential of the stratum in which it basically develops and has integrated it with everything that has emerged in the preceding stages, once it has reached a specific level of complexity, it can resonate with the next "harmonic" of the energy-consciousness spectrum, and thus ascend to a new rung of the long ladder of evolution.*" Ultimately, the entire evolutionary process is nothing more than the attempt to manifest in a gradually way, level after level, the entire spectrum of energy-consciousness and, simultaneously, embrace it in its entirety, from one end to

the other, to reproduce in the world of space-time appearances the non-duality of its potential foundation.

After having outlined in these last paragraphs the basic mechanisms that, according to our proposal, underlie the evolutionary dynamics, we will now briefly recall the data provided in our research that, as we think, seem to confirm the validity of the harmonic hypothesis. To check if, as we have proposed, the successive standing waves that characterize the chained second harmonics truly define the fundamental stages of the evolutionary ladder, it will be enough to fix a couple of points of that plot and, automatically, the entire spectrum of levels of stability will be outlined that evolution will have to ascend, step by step, until reaching the pole of final singularity. We will take, therefore, as fixed points, the moment of the **Big Bang** —just over 13.5 billion years ago— as the original moment —Singularity A— and the moment of formation of our **solar system** —just over 4.5 billion years ago— as a turning point between the "departure" and "return" sections of the global trajectory. Well, as we say, simply with these two pieces of information, the entire spectrum of evolutionary levels is fully defined. Now, we only have to check whether our theoretical plot adjusts, or not, to the data provided by paleontology, anthropology and history. And what we see is that this "periodic table", certainly, marks, one after another, each and every one of the stages in which the successive taxonomic grades of the human phylogeny have been unfolded: **Kingdom: animal** (A- 1), **Phylum: chordate** (A-2), **Class: mammal** (A-3), **Order: primate** (A-4), **Superfamily: hominoid** (A-5), **Family: hominid** (A-6) and **Genus: homo** (A-7). And then the same thing happens with all the maturation phases of our primitive ancestors: **Homo habilis** (A-7), **H. erectus** (B-1), **archaic H. sapiens** (B-2), **H. sapiens** — Neanderthal— (B-3) and **H. sapiens sapiens** —Cromagnon— (B-4). And the same thing happens, once again, with the successive transformations experienced by humanity in its most recent history: **Neolithic** (B-5), **Ancient Age** (B-6), **Middle Ages** (B-7), **Modern Age** (C-1) and the emerging **Postmodern Age** (C-2). Full success! [See the section "*Verification of the hypothesis in the macrocosm*"]. If, as we see, all these stages conform to the predictions of the "periodic table" of rhythms that we have proposed, it is more than likely that our hypothesis can also give us the key to glimpse the successive stages that will unfold in the coming years, in a progressively accelerated process, which will ultimately lead to an instant of infinite creativity —the Singularity Ω — in a couple of centuries. Let us point out here that, if we group these stages into series of seven elements, the result corresponds exactly to the successive links of the so-called "Great Chain of Being" —Matter, Life, Mind, Intellect and Spirit—, which also coincide, basically, with the evolutionary epochs proposed by Kurzweil —Physics and

Chemistry, Biology, Brains, Technology, and Fusion of Technology and Human Intelligence— or with the spheres of Teilhard de Chardin —Cosmosphere, Biosphere, Noosphere, Pneumosphere and Omega Point—.

We invite readers interested in the study of the progressively accelerated unfolding of the basic stages of evolution and history —and their asymptotic final instant— to consult the works of other authors such as, for example, the geologist **André de Cayeux**, the historian **François Meyer**, the electrical engineer **Richard L. Coren**, the paleontologist **Jean Chaline**, the computer scientist **Carter V. Smith**, the mathematician **Paul Hague**, the physicist and futurist **Theodore Modis**, the electrical engineer **Mario Hails**, the systems theorist **Graeme D. Snooks**, inventor **Ray Kurzweil**, astrophysicist **Alexander D. Panov**, social psychologist **Akop P. Nazaretyan**, mathematician and economist **Erhard Glötzl**, physicist and psychologist **Peter Russell**, philosopher **Terence McKenna**, toxicologist **Carl J. Calleman**, physicist **Börje Ekstig**, futurist **John M. Smart**, economist and systems theorist **Pierre Grou**, astrophysicist **Laurent Nottale**, software engineer **Nick Hoggard**, biologist **Miguel García Casas**, philosopher of history **Leonid Grinin**, anthropologist and sociologist **Andrey Korotayev**, the software engineer **David J. LePoire**… [The summarized proposals of some of these authors can be found in Addendums 1, 2 and 5].

Before moving forward, we would like to make two or three clarifications here about the matter we are investigating. Given that the human being currently constitutes the living organism that, on our planet, has unfolded the greatest number of levels of the "complexity-consciousness" scale, to make our verification about the fundamental stages that have been defining the vanguard of the evolutionary process, we have strictly adhered to the basic stages characteristic of human phylogeny. There is nothing anthropocentrism in this, because, as we are proposing, the same underlying structures of the potential spectrum of energy-consciousness that have manifested themselves on our planet through the concrete forms of our phylogeny, we suspect will have done the same in an endless number of planets of the universe through very different forms, although, in good logic, they will have to be resonant and convergent with ours given that we are all fleeting expressions of the same and only unified field of timeless and non-local collective memory.

Another objection that is often raised when observing the surprising confirmation of our predictions about the accelerated pattern in which the evolutionary stages unfold, consists of suggesting that we have been able to rig the result by taking into consideration only culled data that validates our hypothesis. We believe that, in the case at hand, this objection cannot be raised,

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given that, far from selecting isolated facts, we have taken complete series of paleontological, anthropological and historical data, as they appear —in block— in any basic general culture manual. There is still a third objection that is often raised on this topic. It states that it is not true that the rhythm of transformations has been accelerating throughout the evolutionary process, but that it is an error of perspective caused by the greater abundance of data on what has happened in more recent times. To refute this objection, it will be enough to remember, for example, that our ancestors of the Lower Paleolithic, generation after generation, were making the same stone tools for more than a million years, while, on the contrary, in just the last century, the transformations that have occurred in all areas of our lives have been spectacular and dizzying. A simple error in perspective?

Returning to the issue of verifying our hypothesis, we will now expand the check field. Previously, we have raised the holographic nature of our universe. An intriguing feature of holograms is that when the holographic plate is broken, each of the resulting fragments contains the entire original image. Each part contains the whole! Up to this point we have seen how the long trajectory of human phylogeny, from the moment of the Big Bang until today, has been unfolding in the manifested universe practically the entire spectrum of energy-consciousness of the potential foundation following the rhythm foreseen in our evolutionary hypothesis. Let us now check whether, in the same way, human ontogenetic development —a significant "part" of the "whole"— also displays that same spectrum of energy-consciousness in accordance with our predictions. This is not a new idea, given that in very different cultures it has already been proposed that the human organism —the microcosm— is a capsule of the whole —the macrocosm—, an individual concentration of the world, a unit that reflects, like a mirror, the entire universe. According to this approach, the growth or development of human beings is a rapid recapitulation and integration of all levels gradually unfolded in the universal evolutionary process, during its long and slow paleontological development. This is, basically, the main contribution of the German naturalist Ernst Haeckel to the theory of evolution in what he called "the fundamental biogenetic law", with which he defended the parallelism between the development of the individual embryo and the development of the species which belongs: "*ontogenesis, that is, the development of the individual, is a brief and rapid repetition (a recapitulation) of the phylogenesis or evolution of the lineage to which it belongs.*" (See the section "*Regarding phylogenetic-ontogenetic parallelism*").

To now verify our harmonic hypothesis in the field of human ontogeny, we will take a couple of reference points —as we did in the case of phylogeny— to

establish our theoretical framework of rhythms, in such a way that, automatically, the entire spectrum of levels of stability will be outlined that, according to our predictions, will have to be unfolded, one after another, throughout the complete trajectory of a human life until its full realization. Assuming that the human being is tuned to the same temporal pattern of evolutionary cycles that we have analyzed in the phylogenetic process, and knowing that, according to a famous study by **Richard M. Bucke**, the spontaneous emergence of what he called the "cosmic consciousness" takes place around the age of 34, we are going to take the C-4 cycle, which lasts 34.17 years, as the base cycle to verify our hypothesis in the individual development of a fully realized human organism. Starting from this data, we can take as points of fixation of the plot, the moment of generation as the original pole and the moment of realization of the "cosmic consciousness" —34.17 years— as the final pole. In this way, automatically, our theoretical forecast for the complete trajectory of a human life is already defined, both in terms of the rhythm of emergence of the successive stages to be followed, and the specific content of each of them. That is to say, starting from the moment of engendering, each human existence will have to unfold in a progressively slowed manner the "exit" section —or "outward arc"—, oriented towards the inflection point located around the age of 22 —coinciding with the affirmation of the integral thinker **Ken Wilber** that the process of return, or "inward arc", does not usually begin before the age of 21— and, from there, the "return" section will begin, now in a progressively accelerated way, towards the final luminous pole. If this proposal is true, our life would reveal itself as a fascinating and magical dance set to the beat of the music of the universe. Or, in other words, we would be nothing less than a radiant condensed expression of the great cosmic symphony. Let's check, now, if our forecasts adjust to the data offered by embryologists, for the intrauterine phase, and developmental psychologists (synthesized in Ken Wilber's integral list in his latest book *The Religion of Tomorrow*), to the postnatal phase.

Summarizing what we have explained in the section "*Verification of the hypothesis in the microcosm*", we will say that, starting from the single-celled living phase, which in the macrocosm we called A-1, our plot is adjusted, one after another, with all the stages of embryological and psychological development: **Ovogonia, follicular maturation, ovulation, fecundation** (A-1), **Cell division, nervous cord and notochord formation** (A-2), **Limbs and amnion formation**, **reptilian trunk development** (A-3), **Placental constitution, limbic system development** (A-4), **Anthropoid fetus resemblance, neocortex development** (A-5), **Hominid fetus resemblance, birth** (A-6), **Oceanic consciousness —pleromatic—** (A-7), **Physical consciousness —**

uroboric— (B-1), **Sensorimotor mind —archaic—** (B-2), **Imaginal mind —archaic-magical—** (B-3), **Symbolic mind —magical—** (B-4), **Conceptual mind —magical-mythical**— (B- 5), **Concrete rule/role mind —mythical—** (B-6), **Abstract rule/role mind —mythical-rational—** (B-7), **Formal mind —rational—** (C-1), **Pluralistic mind —relativistic**— (C-2), **Lower logical vision —holistic—** (C-3), **Superior logical vision —integral—** (C-4), **Para-mind —transglobal—** (C-5), **Meta-mind —visionary—** (C-6) and **Overmind —transcendental—** or **Final Witness** (C-7). The **Supermind**, as we will later see, transcends and includes the entirety of this spectrum of energy-consciousness from its non-dual foundation. Full success!

We invite readers interested in the study of the unfolding of the successive stages of the psychological development of the human being to consult the works of the most renowned researchers in the different areas of the psyche: **Jean Piaget**, **Michael L. Commons and Francis A. Richards** (child and adult cognitive development), **Jean Gebser** and **Ken Wilber** (worldview development), **Abraham Maslow** (needs development), **Clare W. Graves** and **Jenny Wade** (values development), **Don E. Beck** and **Chris Cowan** (development of spiral dynamics), **Jane Loevinger** and **Susanne Cook-Greuter** (development of self-identity), **Lawrence Kohlberg** (moral development), **James Fowler** (development of stages of faith), and **Robert Kegan** (development of orders of consciousness). Despite investigating various aspects of human psychology, the coincidence between the stages of development proposed by these different authors is truly resounding, and, in the same way, its correspondence with the evolutionary stages unfolded from the appearance of modern man to the day of today —from our B-4 cycle to C-3— it is also practically total. [See Addendum 4].

Once the verifications on the validity of our hypothesis have been successfully carried out, both in human phylogeny and ontogeny —both in the macrocosm and in the microcosm—, we can now also confirm the parallelism between both processes, as clearly observed in figures 7-A and 7-B. It is enough to see how both start from the same original point (pole A of energy) and arrive at the same final point (pole Ω of consciousness), how both unfold the same spectrum of energy-consciousness —as manifested in the great chain of being: matter, life, mind, intellect and spirit— and how the two travel an identical trajectory of unfolding and folding —of exit and return—, guided at all times by the successive chained second harmonics. The only difference between both trajectories lies in the level of the spectrum at which the inflection point between the "outward arc" and the "inward arc" takes place, since in the

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macrocosm it is located on the border between "matter" and "life" —the appearance of organic macromolecules after the formation of the Earth—, and in the microcosm it does so on the border between the "mind" and the "intellect" (or "soul") —the formation of the mature ego—. As we explained above, the "handshake" between ascending (entropic) and descending (syntropic) flows can take place at any level of the energy-consciousness spectrum and, in fact, at the original instant, the "transaction" took place at the very base A of the spectrum and at the final instant it will take place, as we will see, at the summit Ω.

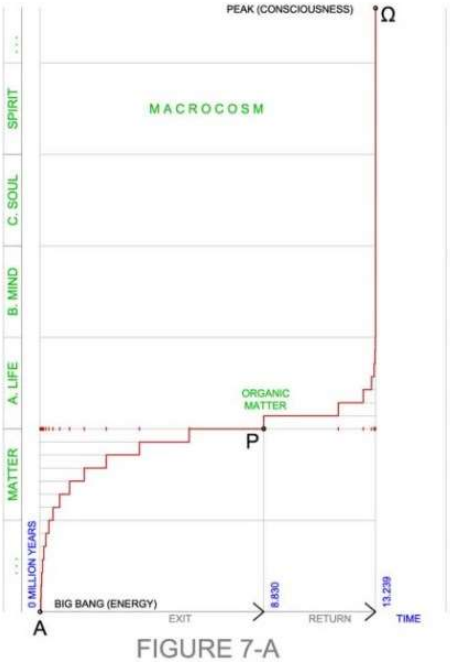

FIGURE 7-A

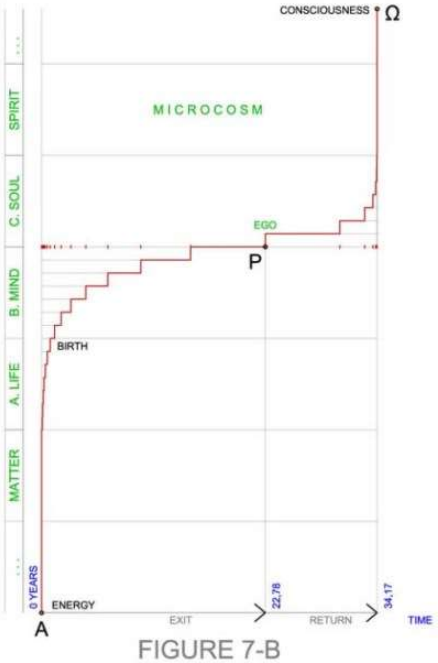

FIGURE 7-B

As we have just seen, in our research we have taken into account both external aspects (objective forms of energy) and internal aspects (subjective forms of consciousness), both individual aspects (ontogenetic) and collective aspects (phylogenetic). At each stage of the evolutionary path, these four aspects —individual/collective, interior/exterior— have been present, since none of them would have been possible without the simultaneous presence of all the others. This approach fully coincides with the idea expressed synthetically in Ken Wilber's famous "four quadrants" graph, in which the entire evolutionary history is summarized in the four facets —individual, collective, exterior and interior— in a simple way, omni-comprehensive and coherent. In this graph [see Addendum 3], the "individual" facets are located in the upper area, the "collective" ones in the lower one, the "external" ones in the right area and the "internal" ones in the left one. So, the upper left quadrant describes the individual-inner process (the conscious self), the upper right quadrant the

individual-outer process (the energetic organism), the lower left quadrant the collective-inner process (the cultural perspective) and the lower right quadrant the collective-external process (the social system). All evolutionary levels unfolded throughout the history of the universe —the entire spectrum of energy-consciousness— are reflected in each of the four quadrants according to their specific facets. This is because each evolutionary leap produces simultaneous transformations in the four areas in a coordinated manner, which gives rise to a specific and recognizable flavor for each historical era. Usually, many researchers not only restrict their field of observation to only one of the quadrants —according to their academic specialty— but also reduce it to a specific facet of it —to a specific line of development— and, in many cases, even they limit it further by focusing exclusively on a certain period of history. In this way, in the end, it is practically impossible to perceive the correspondences, similarities and "the patterns that connect" the enormous plurality of the data. It seems clear, then, that a comprehensive approach to evolutionary dynamics is much more appropriate, not only to demarcate and precisely define each and every one of the steps taken throughout the process and the transition phases between them, but to perceive the complete shape of the resulting staircase.

Let's look at some examples of the series of stages proposed by various researchers from different lines of development, in each of the quadrants, from the appearance of *homo sapiens sapiens* to the present day. We can observe the enormous syntony with all the stages of our hypothesis, all six of them, from B-4 to C-2.

We start with the lower-right quadrant, which encompasses all collective-external processes, that is, successive **social transformations**. Development of **social organizations** [according to **E. Laszlo**]: …nomadic tribes (B-4), neolithic villages (B-5), ancient empires and city-states (B-6), feudal kingdoms (B-7), national states (C-1), supranational units (C-2)… Development of **socio-economic systems** [according to **E. Laszlo**]: …hunter-gatherer societies (B-4), agropastoral (B-5), agricultural (B-6), artisanal/preindustrial (B-7), industrial (C-1), postindustrial (C-2)… **Technological development** [according to **A. de Cayeux**]: …Acheulean lithic industry —technical mode 2— (B -2), Mousterian —technical mode 3— (B-3), Aurignacian —technical mode 4— (B-4), polished stone/mesolithic —technical mode 5— (B-5), age of metals —bronze-iron— (B-6), machine age (C-1), atomic age (C-2)… Development of **modes of production** [according to **K. Marx**]: …savagery (B-4), barbarism (B- 5), slavery (B-6), feudalism (B-7), capitalism (C-1), socialism (C-2)…

We are going to continue with the lower-left quadrant, which encompasses all the collective-inner processes, that is, the successive **cultural transformations**. Development of **worldviews** [according to **J. Gebser** / **K. Wilber**]: …archaic (B-3), magical (B-4), magical-mythical (B-5), mythical (B-6), mythical- rational (B-7), rational (C-1), pluralistic (C-2), integral (C-3)… Development of **value systems** [according to **C. Graves**]: …magical-animistic (B-5), egocentric (B-6), absolutist (B-7), multiple (C-1), relativist (C-2), systemic (C-3)… Development of the "meme-values" of **Spiral Dynamics** [according to **D. Beck** and **C. Cowan**]: …survival —beige— (B-4), kin spirit —purple— (B-5), power gods —red— (B-6), truth force —blue — (B-7), strive drive —orange— (C-1), human bond —green— (C-2), flex flow —yellow— (C-3)…

Let us now continue with the upper-left quadrant, which encompasses all individual-inner processes, that is, the successive **psychological transformations**. **Cognitive** development [according to **J. Piaget** / **M. Commons** / **F. Richards**]: …sensorimotor (B-4), symbolic preoperational (B-5), conceptual preoperational (B-6), concrete operational —rule/role mind— (B-7), formal operational —rational mind— (C-1), pluralistic mind —meta-systemic— (C-2), inferior logical vision —paradigmatic— (C-3)… Development of the **self-identity** [according to **J. Loevinger** / **S. Cook-Greuter**]: … symbiotic (B-4), impulsive (B-5), self-protective (B-6), conformist (B-7), conscientious (C-1), individualistic (C-2), autonomous (C-3)… **Moral** development [according to **L. Kohlberg**]: …premoral (B-4), obedience and punishment (B-5), individualism (B-6), interpersonal agreement (B-7), law and order (C-1), social contract (C-2), universal ethics (C-3)… Development of **orders of consciousness** [according to **R. Kegan**]: …0 - incorporative (B-4), 1st - impulsive (B-5), 2nd - imperial (B-6), 3rd - interpersonal (B-7), 4th institutional (C-1), 4, 5 (C-2), 5th - interindividual (C-3)… Development of **spiritual intelligence** [according to **J. Fowler**]: …undifferentiated (B-4), magical (B-5), mythical-literal (B-6), conventional (B-7), reflective-individual (C-1), conjunctiva (C-2), universalizing community (C-3)…

The transformations in the upper-right quadrant, which encompasses all individual-external processes, were very noticeable during all the stages of phase A —Life— and in the first stages of phase B —Mind—, but, since the appearance of anatomically modern man —Homo sapiens sapiens— transformations have basically taken place only in the structure and functioning of our brains —through the increase in the complexity of synaptic connectivity— but without major apparent changes. Therefore, in this quadrant we will take as references the series of stages of development of the **organisms** in our phylogeny proposed by various researchers of the temporal phase that

spans from the origin of life on our planet to the appearance of homo sapiens. (Also here we can see the enormous syntony of these lists with the stages of our hypothesis, from A-1 to B-3). (Remember Addenda 1, 2 and 5). Let's see, to begin with, the 14 stages of development throughout our phylogeny proposed by **J. Chaline**, **L. Nottale** and **P. Grou** —observe the practical total coincidence of these 14 evolutionary leaps in the fractal tree of life, with the 14 nodes of our series A—: Node 1: Emergence of life - first prokaryotic cells / Node 2: First eukaryotic cells (A-1), Node 1: Multicellularity / Node 2: Exoskeletons (A-2), Node 1: Tetrapodia - first lung tetrapod / Node 2: Homeothermy - first mammal (A-3), Node 1: Viviparity - first marsupials and placentals / Node 2: First primate - prosimian (A-4), Node 1. First anthropoid ancestor - ape / Node 2. Proconsul - great apes (A-5), Node 1: Common ancestor P/G/H / Node 2: Australopithecus (A-6), Node 1: … / Node 2: First Homo (A-7)… Let us see, below, the stages of the evolution of the biosphere after the emergence of life on Earth according to **A. Panov**: prokaryotes / eukaryotes (A-1), vertebrates (A-2), reptiles (A-3) , mammals (A-4), hominoids (A-5), hominids (A-6), Homo habilis (A-7), Homo erectus (B-1), archaic Homo sapiens (B-2), Homo sapiens — Neanderthal— (B-3) Homo sapiens sapiens — Cromagnon— (B-4)… Let us see, next, the proposal of **T. Modis** for this same phase that we are studying: …origin of life (A-1), first life multicellular/Cambrian explosion (A-2), first mammals (A-3), first primates (A-4), first orangutan (A-5), first hominids (A-6), first stone tools (A-7), development of speech (B-1), development of fire (B-2), development of "modern humans" (B-3)… For his part, **D. LePoire** describes the different evolutionary stages from the origin of the life, defined by successive changes in energy flows: …complex cells (A-1), Cambrian (A-2), mammals (A-3), primates (A-4), hominids (A-6), humans (A-7), language (B-1), fire (B-2), eco-adaptation (B-3), modern humans (B-4)…

After verifying the solidity of our hypothesis through this general overview — interior and exterior, individual and collective—, we believe that the rungs of the evolutionary ladder are quite well located, outlined and defined. Next, we are going to try to understand the mechanisms that generate the transitions — the level jumps— between the successive steps. Let us remember that, according to our hypothesis, each level of the evolutionary spectrum is defined by a specific standing wave —with a characteristic fundamental sound— and that the sound novelty arises with the emergence of the second harmonic —in the third third of the original wave— that defines the new level of the spectrum. Each evolutionary stage consists, therefore, of three sections of equal duration: the one that extends from the original fixed point to the first node, the interval between the two nodes and the section that goes from the second node to the

final fixed point. The global process is as follows: in the environment of the original pole, an evolutionary novelty emerges incipiently and slowly tests its capabilities on the way to the first node, at which time a first concrete sketch of the characteristic paradigm of this stage appears, and, from there, its full potential is progressively deployed in the section towards the second node. It is at that moment, just when the stage reaches its full maturity, when it begins to show its intrinsic limitations and, simultaneously, an emerging evolutionary novelty begins to dispute its hegemony. This situation is, precisely, the origin of a new stage, in which, throughout the first section, the previous paradigm enters into decline, while the emerging paradigm begins its deployment, thus repeating the previous process. For those interested in the new sciences of evolution, we will say that these second nodes of each cycle correspond to the moments of "bifurcation" (Mitchell Feigenbaum), of "creative imbalance" (Ilya Prigogine), of "beneficial catastrophes" (René Thom), in which level jumps occur. At these points the "attractors" that define the previous pattern disappear, and those that define the new state appear, "fallen from the sky". The fundamental sound suddenly changes to its second harmonic.

The scheme we have just proposed clearly resembles the classic model of successive logistic curves —nested S-shaped curves— that is frequently used to represent the processes of growth, learning, development or propagation of almost any natural or induced phenomenon by the man. Simply put, when something begins to grow or spread, it first starts very slowly, then accelerates until it reaches a maximum, after which the rate of growth or diffusion slows until it basically tends to zero. Within the studies carried out on the topic at hand, the proposals developed by **T. Modis** or **D. LePoire** are based, precisely, on this model of logistic curves. Similarly, **R. Kurzweil** states that a specific paradigm generates exponential growth until its potential is exhausted. When this happens, he says, a paradigm shift occurs, allowing exponential growth to continue. He thus summarizes the life cycle of a paradigm in three stages: 1. Slow growth, 2. Rapid growth, and 3. Stabilization as the particular paradigm matures.

Starting from our syntony with this idea, a specific characteristic of our hypothesis consists of the proposal that each of the successive evolutionary stages —each of the first-order S-curves— lasts one third of the previous one, so that the global resultant of the complete series of these successive S-curves ends up giving rise to a second-order exponential J-curve, which becomes asymptotic upon reaching the final singularity pole.

In the last paragraphs we have located and defined, from the outside perspective, each of the steps of the evolutionary ladder and the transition

zones between them. Next, we are going to describe that same process from the inside perspective. To do this, at the outset, let us remember the basic outline of our hypothesis. We started from the idea that the non-dual Emptiness —self-evident but invisible—, in order to contemplate itself in and as the manifested world, needed to polarize itself —at least apparently— as object and subject, in the form of an original pole of energy and a final pole of consciousness, which, from the first moment, gave rise to a very wide spectrum of balances between both facets. We also said that this fundamental polarization automatically generated a bidirectional tension between both extremes: an ascending, expansive and entropic current coming from the initial "**energy**-(consciousness)" pole and a descending, contractive and syntropic current coming from the final "**consciousness**-(energy)" pole. Instant after instant, these ascending and descending flows resonate with each other at a given level —standing wave— of the energy-consciousness spectrum, thus "collapsing" the entire potential field of information into a concrete event of the manifested world. This "handshake" between the ascending and descending flows –we explained– can take place at any level of the energy-consciousness spectrum. In fact, at the original moment, the "transaction" occurs at the very base of that spectrum, but, throughout the evolutionary process, the level gradually rises, level after level, until reaching the final moment in which the resonance between both flows takes place at the top of the spectrum.

If we describe the evolutionary process from the inner perspective, we can state that, given that at the original moment the consciousness aspect was fully absorbed by the energy aspect, the entire journey since then has been nothing more than a progressive distancing from that situation of enclosure and darkness, and, consequently, a gradual increase in clarity and lucidity. In summary, during the early stages of development of **matter**, the consciousness facet is absorbed into the energy facet. With the emergence of **life**, the facet of consciousness takes a leap back, separates itself from mere matter, perceives it and, thus, can act on it. With the emergence of the human **mind**, the facet of consciousness once again jumps inward, self-consciousness appears, which separates itself from simple subconscious life and thus increases the capacity for action on the natural world. With the emergence of the rational **intellect**, the facet of consciousness jumps back, once again, allowing us to think about thinking and, in this way, understanding of how things work increases exponentially and, therefore, the ability to intervene on them. This entire process is possible due to the presence, from the very original moment, of pure consciousness –the "**Witness**" that Hindu tradition speaks of— as the final pole of the process. It is worth clarifying, therefore, that this final pole of pure consciousness does not evolve at all —since it remains full and immutable at all

times— but its reflection and identification with the different entities and organisms that develop throughout the process —atoms, molecules, cells, multicellular organisms, vertebrates, mammals, primates, apes, humans...— it does evolve in terms of its capacity to actualize that full consciousness, which allows it to progressively increase the ability of organisms to capture, store, process and respond to information from the environment.

The Hungarian essayist **Arthur Koestler** in his book *The Ghost in the Machine* used the term *holon* to designate any system that was a whole in itself and, at the same time, a part of a greater whole. Pursuant to this terminology, a hierarchy of holons is called a holarchy. According to our approach, two antagonistic holarchies occur simultaneously in the evolutionary universe. A decreasing and entropic holarchy of energies, in which the maximum capacity is found in the original pole A, and a growing and syntropic holarchy of consciousnesses, in which the maximum capacity is found in the final pole Ω. The integral thinker **Ken Wilber**, starting from the idea that the Kosmos is composed of holons, has studied evolution as a holoarchic process —in the growing sense— in which each of the successive emerging holons transcends and includes its predecessors, so that, as the number of levels included increases, step by step, its depth —that is, its consciousness— and its complexity also progressively increases. Wilber has carefully analyzed the transition phases between successive levels of the spectrum, given the importance of these moments for a healthy unfolding of the process. Starting from the initial identification of consciousness with the characteristic structure of a given level, each evolutionary leap will basically consist of a process of initial transcendence and subsequent inclusion —of denial and conservation, of differentiation and integration— with the consequent dangers of fixation or addiction in the transcendence phase and of avoidance or allergy in the inclusion phase. In essence, it is about unfolding the basic potential of each and every one of the successive structures of the evolutionary holarchy, avoiding exclusive identification with any of them and embracing the entire spectrum already covered, until finally reaching the pure Witness —the essence of consciousness of each and every one of the different levels of development— which transcends and includes the entire process.

4. An integral approach to singularity

After having briefly presented some significant aspects of our research on the pattern of evolution from an integral perspective, we believe we are in a position to be able to provide some answers to the major doubts that are beginning to arise in light of the vertiginous acceleration of technological development and the consequent prediction that in the coming decades an asymptotic point will

be reached —a technological singularity— at which *artificial intelligence will be a billion times more powerful than all human intelligence*, radically transforming current civilization and our own understanding of existence.

—Will the Technological Singularity really occur? Will that enigmatic moment ever be reached? Is this just a simple utopian —or dystopian— approach by imaginative science fiction authors and transhumanist enthusiasts?

According to our research, yes, everything seems to indicate that, truly, the evolutionary process is rapidly heading towards a moment of Singularity in the very near future. We have a very different opinion when it comes to describing this summit event, simply, as "technological", because, from our point of view, many other elements will be at play in this event, as we will soon explain, some of which are enormously more significant. This is not just a mere quantitative question related to the computing capacity of some technological devices, no matter how great it may be, because what we are talking about is, nothing less, that the next Singularity Ω is, essentially, the antagonistic pole of Singularity A, that is, of the Big Bang itself. And, let us remember, all the universal dynamics arose, precisely, from that original polarization of the fundamental Emptiness as A and Ω, object and subject, energy and consciousness. As Alan Watts said: "*Current will not begin to flow from the positive end of a wire until the negative terminal has been established.*" That is, the universe of forms would not have emerged from the Void through the original Singularity A, if the final Singularity Ω had not been present, simultaneously, from the beginning of time.

According to our hypothesis, the key to the creative leaps unfolded throughout evolution and history is in the standing waves that are generated, at the same original moment, from the fundamental sound. As we have seen, the cause of these standing waves is that the ends of the vibrating unit are fixed and, therefore, limit the possibilities of oscillation, thus generating the entire quantum spectrum of musical harmonics. It is worth remembering that these harmonics are the potential archetypes that, one after another, are actualized in and as the successive stages of evolution and history. The key to the entire evolutionary process lies, therefore, in these original and final poles. The universe would not have emerged without the simultaneous presence of the singularities A and Ω, exit and entrance to the full and self-evident Void. If the original pole consisted, basically, of an *explosion* in the realm of "energy," the final pole toward which we are rapidly heading will fundamentally consist of an *implosion* in the realm of "consciousness." But, let's look closely, both facets —"energy" and "consciousness"— are not two different realities, but rather polar aspects of the same and only Void, the objective and subjective facets of the

ever-present Self-Evidence. Therefore, from our perspective, the "trick" of evolution and history will be definitively revealed in this next final moment. At that moment, it will become evident that the entire trajectory traveled from Singularity A —Big Bang— to Singularity Ω is occurring in the eternal Now that, in truth, we are. In this way, we will understand that our life has not been a mere fleeting fragment in the middle of an endless process, but, in fact, we have always been that pure and timeless Self-evidence in which all worlds have happened, are happening and will happen. There has been no "before." There will be no "after". There is only Now. And Now. And Now…

—When could the expected/feared moment of the Singularity truly take place? Could it happen during the life cycle of the current generation?

Among those who seriously investigate the idea of the Singularity in its technological meaning, there is a wide variety of opinions about when it will happen. There are some who see it as an almost imminent event, most place it between the years 2030 and 2080, and there are others who believe that there are still two or three centuries, or even more, before the human era comes to an end. As we have said, the Singularity, as it appears in our research, is not reduced to a mere technological issue. So, the moment at which artificial intelligence reaches a certain computing capacity does not truly define the Singularity in the cosmological sense that we are proposing. Kurzweil himself, who places the technological Singularity in 2045, states that from that year on our civilization will expand outwards and we will be able to saturate the universe with our intelligence before the end of the 22nd century. Many futurists —although not all— make their predictions about the moment of the Singularity by observing the pace of progress only from a technological point of view and, exclusively, over the last century. If the framework of the study is expanded, encompassing other perspectives and analyzing longer periods, things are perceived more clearly...

In our research we have verified how the gradual acceleration of the rhythm of the transformations that we perceive in all areas of our environment, far from being a specific and exclusive phenomenon of recent years, has, in fact, been the permanent norm throughout the entire evolutionary process from the very origin of life. The intervals between the successive creative leaps that have marked the entire unfolding of our phylogeny have been shortening, again and again, at a very precise rhythm. In short: all the great news has emerged with the successive second harmonics. The vanguard of the evolutionary wave has been jumping levels, again and again, as it reaches the last third of each stage. Beyond earthquakes, eruptions, meteorites, glaciations, mass extinctions, plagues, floods, world wars, pandemics... Whether we investigate the interior or

exterior, individual or collective facets, we always find the same pattern in the emergence of the novelties. In all quadrants, at all levels, in all lines of development... The full coherence revealed between this plurality of approaches allows us to outline with sufficient precision the location and content of each and every one of the stages of the evolutionary spectrum, as well as its emergency and sunset phases. If this has happened throughout the entire process from the beginning, there is no reason to think that it will stop doing so in times to come. According to our scheme, we are currently going through stage C-2 —which covers from year 1909 to 2114—. Stage C-3 will take place between 2114 and 2183. C-4 will take place between 2183 and 2205. C-5 between 2205 and 2213. C-6 between 2213 and 2215. C-7 between 2215 and 2216. If our calculations are correct, in the following year, in 2217, the Ω Singularity will occur. It will not just be a technological event, but an integral one —interior and exterior, individual and collective— as we are going to propose in a moment.

—What happens when machines reach or surpass human intelligence? Can we conceive of a conscious machine? Could a machine become self-aware?

On many occasions, in the world of artificial intelligence there is talk of the possibility of consciousness in robots or of achieving cybernetic immortality by downloading human consciousness into some everlasting artifact. From the non-dual perspective in which we are framing our research, these approaches seem quite naive. To clarify this point of view, we will now recall some of the central aspects of our proposal that raise great doubts about these naïve expectations.

The only absolute reality of everything and everyone is the same and unique non-dual Void, in which the objective and subjective facets are completely undifferentiated. In other words, the Void is, at the same time, subject and object, that is, invisible but absolutely self-evident. To contemplate itself in some way, that self-evident Emptiness polarizes itself as object and subject, that is, as potential energy and pure consciousness. All **objects** in the universe, ultimately, are constituted exclusively by that **potential energy**, actualized to varying degrees along a very broad spectrum of levels. In the same way, all **subjects** in the universe, ultimately, are constituted exclusively by that **pure consciousness**, actualized in varying degrees along a very broad spectrum of levels. The entirety of this unified spectrum of potential energy-consciousness, which in itself is timeless and spaceless, collapses, moment after moment, in each point-instant of the space-time universe, illusorily identifying itself with an endless number of finite and fleeting forms from the that contemplates itself in

infinite ways, thus originating a creative toroidal game of projections and introjections, which progressively manifests in the holographic universe the infinite potentiality of its Void foundation.

With all this we want to say that consciousness, far from being a product of neuronal interconnections or of technological sophistication, is, in truth, the foundation of all of this. Just as all objects in the universe are but finite forms of the same primordial potential energy, all subjects in the universe are but fleeting identifications of the same primordial pure consciousness —the transpersonal Witness of which Hindu tradition speaks—. As we have seen, the progressive actualization of the unified potential field of fundamental energy-consciousness in space-time takes place through the resonance between the upward and entropic flow from the originating pole of energy and the downward and syntropic flow from the final pole of consciousness, which collapses into a certain standing wave of the spectrum. Starting from the lowest level —of great energy and little consciousness—, the successive collapses of the potential unified field in each point-instant of the space-time universe gradually scale the different levels of the energy-consciousness spectrum, unfolding, in this way, in the world of forms the entire range of stages of our phylogeny, which, one after another, when integrated with those that have previously emerged, give rise to progressively more and more complex and conscious organisms. For example, the human being, at the current moment, integrates in himself all the characteristics —interior and exterior— of the harmonics corresponding to elementary particles, atoms, molecules, cells, chordates, mammals, primates, hominoids, hominids, Homo habilis, H. erectus, archaic H. sapiens, H. sapiens, H. sapiens sapiens, neolithic humans, to those of the ancient age, of the middle ages, of the modern age and of the postmodern age. That is to say, at this precise moment we are recapitulating, in its entirety and simultaneously, the entirety of universal history. It would be enough to eliminate any of those steps —e.g. the molecular one— for the entire rest of the staircase above that level to automatically collapse. So, inevitably, we can only actualize the highest levels of the energy-consciousness spectrum if, previously, we have unfolded in an integrated way the totality of the lower levels, since it is, precisely, the complete presence of the entire evolutionary ladder from the base which allows the interaction between the ascending and descending flows of potential energy-consciousness to resonate with each other, when the time comes, at the highest levels of the spectrum.

Starting from these ideas, if our approach is correct, the answer to the question we have asked —can we conceive of a conscious machine?— is immediate: NO. Robots, or any other mechanical device activated by artificial intelligence

algorithms, can simulate behaviors similar to those of human logical thinking, but without the slightest hint of consciousness. As with a book or a television, they can give us ideas or emotions that they themselves completely lack. All these tools, no matter how sophisticated they appear, are, essentially, mere material objects, with the consciousness of the most basic levels of the evolutionary spectrum. Their structures lack practically all the rungs of the long evolutionary ladder —whose entire presence, as we have seen, is absolutely necessary for the emergence of the highest levels of the energy-consciousness spectrum— and, therefore, they operate in the almost total unconsciousness.

—What are the implications of the Singularity? What is its deep meaning? What is really at stake in this summit event of evolution and history?

The usual answer to this question refers to an exclusively technological version of the singularity, according to which —it is said— within a few decades, artificial intelligence will far surpass human intelligence, thus producing a turning point and no return, from which machines will be able to build better versions of themselves at such a rapid and exponential rhythm that humans will no longer be able to understand or control them. Within this approach, some believe that superintelligent machines, as they become the dominant species on the planet, will devalue human beings until they become obsolete organisms, which, in the long run, could even lead to extinction itself of humanity. Our proposal points completely in another direction. We do not understand singularity in a merely technological sense, but rather we approach the topic from an integral and cosmological perspective. According to the global framework that we are proposing, the original singularity A consisted, basically, of an *explosion of energy*, and, in a complementary way, the final singularity Ω will be, basically, an *implosion of consciousness*. Let's see, below, how this can happen.

The future panorama that, today, is usually proposed by the majority, from a purely technological perspective, revolves around the idea that our postbiological heirs, after the singularity, will embark on the conquest of outer space, until finally, they manage to convert all the silly matter and energy in the universe into enormously intelligent matter and energy. Along these lines, the Russian astrophysicist Nikolai Kardashev proposed, in 1964, a scale to measure the degree of technological evolution of a civilization —and the degree of colonization of space— with three categories: a Type I civilization achieves mastery of resources from its home planet, a Type II dominates the resources of its planetary system, and a Type III dominates the resources of its galaxy. Later, other authors have added two other categories on this scale: a Type IV civilization harnesses the energy of a galactic supercluster, or even the entire

visible universe, and a Type V civilization harnesses the energy of multiple universes. All this sounds quite adventurous and speculative, because if, in truth, the conquest of outer space is the usual destiny of the most developed civilizations that populate the universe —presumably many of them more advanced than ours— how is it that we do not have news from any of them? This is, in essence, the paradox raised in 1950 by the Italian physicist Enrico Fermi that, later, has had important implications in the projects to search for signals from extraterrestrial civilizations (SETI). In summary, "the Fermi paradox" highlights the apparent contradiction between the estimates that affirm that there is a high probability that other intelligent civilizations exist in the observable universe and, on the other hand, the complete absence of evidence of said civilizations.

Perhaps the solution to the Fermi paradox does not consist in assuming that our knowledge or our observations are defective or incomplete, but, rather, in understanding that the path followed by the most developed civilizations, far from heading towards the conquest of outer space, directs its steps exactly in the opposite direction, that is, towards the conquest of inner space. This is precisely the approach carried out by the futurist and prospective consultant **John M. Smart** in his works *The Transcension Hypothesis* and *Evo Devo Universe?* Integrating insights from theoretical physics, information and computing theories, and evolutionary developmental biology (evo-devo), Smart develops a framework that seeks to reconcile the evolutionary and unpredictable characteristics of universal emergence (evo) with universal trends development and potentially statistically predictable (devo), particularly those central to accelerating change —which clearly resonates with our entropic-syntropic proposal—. He says: *"One apparent trend is an ever-increasing spatial and temporal locality of universal complexity development. Another is the apparent hierarchical emergence of increasingly space, time, energy, and matter (STEM) dense and efficient substrates for adaptation and computation. Another is the increasing complexity, interiority, empathy, ethics, and integration of mind. The latter trend has been discussed most notably in the noosphere hypothesis, and its prediction of the increasing interconnectedness, integration, ethics, and consciousness in complex minds."* The *transcension hypothesis* —or *developmental singularity hypothesis*— proposes that a universal process of evolutionary development guides all sufficiently advanced civilizations toward what might be called "inner space", a computationally optimal domain of scales of space, time, energy and matter increasingly dense, productive, miniaturized and efficient, and, finally, towards a black hole-like fate. If the transcension hypothesis is correct, inner space, not outer space, is the final frontier of universal intelligence. The closer we get to engineering on the Planck scale, the greater the densities and efficiencies of our designed objects. One of the most curious

processes of our universe is that it seems to be hierarchically constructing special zones of intelligence that are increasingly compressed, localized and restricted in space, more accelerated in time and with greater densities in energy flows (ergs/sec/gr) and matter. As the special physics of our universe appears to support computing and physical transformation at increasingly denser, more miniaturized levels, and at more efficient scales in STEM, the current acceleration of our civilization toward a black hole-like limit seems likely to continue, which would be the most favorable place in which universal intelligence could achieve the greatest understanding and consciousness. Surprisingly, if current trends continue, a physical limit to computational acceleration should arrive within a few centuries.

Until now, as each particular computing system has become saturated in its capabilities, new ones with increasing miniaturization, power flux density, and efficiency have continually emerged. Recently, I received an email from computer scientist Jason K. Resch in which he states: "*I have been gathering research for a planned article on the limits of technology and where it is going. During that research I projected that based on current technology trends, within approximately two centuries we will reach the fundamental physical limits of the best possible technology. Basically it is following Kurzweil's law of accelerating returns (a generalization of Moore's Law) until we reach Bremermann's limit a limit on computational speed imposed by known laws of physics. Currently we're off from that limit by a factor of about 10^{34}. Or 2^{112}. So it will take another 112 doublings of current computer speed to get there. Over the past century the trend has been fairly consistent of computing technology doubling roughly every 18 - 24 months, so that puts us between 173 and 224 years away from that point.*"

STEM density and computational/metabolism efficiency are growing exponentially, or more rapidly, at the forefront of universal intelligence development. Just as gravity alters space-time around high-mass objects, STEM compression can cause increasing curvature of space-time in the most complex environments and, in the limit, lead to the formation of something similar to a black hole. Black holes, truly, can be a development destination and a standard attractor for all higher intelligence. They can even not only be ideal attractors of advanced complexity, but also act as true "seeds" within a hypothetical chain of successive universes. In this scenario, each universal civilization, as it transitions toward black hole-like intelligence, may be in the process of becoming something analogous to a seed or a spore, that is, a developmental structure that packages its evolutionary history and experience in such a way that it transcends our seemingly finite and potentially dying universe —just as seeds transcend dying biological bodies— waiting for the right conditions to replicate it. In the transcension hypothesis, a potential evolutionary role in the

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reproduction of the universe is assigned to all cultural intelligences that successfully develop in the cosmos. In this sense, it is proposed that the local intelligence of the Earth is on the way to forming a reproductive system analogous to a black hole for the formation of seeds capable of originating a new universe within a recursive multiverse. According to this hypothesis, if local intelligence on our planet continues to develop successfully, it will leave our visible cosmos very soon in universal time.

This transcension hypothesis proposed by John Smart, although based almost exclusively on merely "objective" sciences —theoretical physics, theories of information and computation, and evolutionary developmental biology— we believe that it has suggestive resonances with the conclusions of our comprehensive research. Next, we will try to highlight them.

We have said that the original singularity A consisted, basically, of an *explosion of energy*, and that, in a complementary way, the final singularity Ω will basically consist of an *implosion of consciousness*. This idea is nothing more than the logical conclusion of our entropic-syntropic approach: since –as we said– in the original instant the "handshake" between the ascending and descending flows of energy-consciousness took place at the very base of the spectrum, in which the *consciousness* facet was fully absorbed in the *energy* facet, once the entire evolutionary process had been completed, in which the level of resonance between both flows has been progressively ascending level after level, upon reaching the final moment of the path, the "transaction" between the flows will take place at the very peak of the spectrum, in which the *energy* facet will be fully absorbed into the *consciousness* facet.

According to our approach —let us remember— in the evolutionary universe, two antagonistic holarchies occur simultaneously. A decreasing and entropic holarchy of energies, in which the maximum capacity is found in the original pole A, and a growing and syntropic holarchy of consciousnesses, in which the maximum capacity is found in the final pole Ω. Describing the global trajectory from the "inner" perspective, we have spoken of a holarchic process of consciousness that, starting from its absorption or identification in the original moment with the "external" facet of energy, progressively makes leaps towards "inward", generating successive emerging holons of greater depth, breadth and lucidity, which, one after another, transcend and include all their predecessors. In essence, it is about unfolding the basic potential of each and every one of the successive structures of the nested evolutionary holarchy, avoiding exclusive identification with any of them and embracing the entire spectrum already covered, until finally reaching the pure Witness —the essence of consciousness

of each and every one of the different levels of development— that transcends and includes the entire process.

This holarchic process of consciousness has been described in detail by some authors —such as Sri Aurobindo or Ken Wilber— who have investigated, both experientially and theoretically, the final stages of this path of deepening the inner space. Starting from the pluralistic Mind —relativistic— (C-2), whose structure is currently being unfolded at the forefront of psychological development, the next stages to be followed in the near future will be —using the terminology proposed by Wilber—, the lower logical Vision —holistic— (C-3), the higher logical Vision —integral— (C-4), the Para-mind —transglobal— (C-5), the Meta-mind —visionary— (C-6) and the Over-mind —transcendental— or final Witness (C-7). One of the central characteristics of these last stages of the path is the progressive felt, direct and immediate understanding —not only theoretical— that the world is not exclusively physical, but psychophysical, that is, that the knowing subject and the known object are like the two poles of a magnet, the two ends of a single underlying global field. Upon reaching the highest level of the spectrum of energy-consciousness in the space-time manifested universe —that is, the final pole Ω, the Overmind, the pure observing Self— one has the sensation of being a cordial and loving Witness (subject) that embraces the entirety of the evolutionary Kosmos (object) —from the Big Bang to the final moment— without being identified with any particular aspect of that immense Image of All-That-Is, that emerges in your resplendent field of consciousness. In Wilber's words: "*It is this consciousness and this almost omniscient knowledge that turns the overmind into the last great data processor, the loving knowledge machine that it ultimately is. The state usually associated with the overmind is the causal/Witness (True Self or I Am), which usually rests in pure silence, which is simply dedicated to observing, without judgment, comment or any attribution, the emergence of the world.* (…) *The overmind is I Am plus all the structures that go back to the Big Bang, continuously processing information from any level of existence throughout the entire path of ascent until reaching its own.*" As long as we believe we are a knowing subject alien to known objects, we will continue to move in the world of duality, but, although the unimplicated Witness —the Overmind— is not an exception, it is certainly found in a privileged position, on the very threshold of non-dual reality. The Witness can be interpreted, therefore, simultaneously, as the highest level of the development process, or as the last obstacle that prevents us from discovering our true nature. [We invite readers interested in this point to look at the section *The last Witness* of my work *Non-dual evolution*, whose link can be found at the head of this blog.]

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The *center of gravity of the sense of identity* of the different evolutionary organisms has been moving —deepening—, stratum after stratum, throughout the entire great holarchy of the universe, in an endless game of successive identifications-and-disidentifications with everyone and everything each of the levels of the energy-consciousness spectrum, from the original pole A to the final pole Ω. At this point, when we find ourselves in the position of the Witness, in the perspective of the ultimate subject who contemplates the entire world of objects as an alien reality, at any moment we can be suddenly swept away by the potential unified field of energy-consciousness, which—as we know—is beyond space and time or, rather, is its true non-spatial and timeless foundation. In that realm, we completely transcend all distinctions between subject and object, and instantly discover the definitive truth: there is not, and never has been, a true witness nor attested world, but only a diaphanous, joyful and unified reality that, moment after moment, it manifests itself before itself in infinite ways. We understand, thus, experientially, that our true identity is "prior" to all that dual manifestation that unfolds between the poles of creative energy and pure consciousness, extreme reflections of the unique and ineffable Self. We no longer perceive ourselves, therefore, as mere marginalized spectators contemplating an alien universe, but we discover, without the slightest shadow of a doubt, that our real identity is, in truth, the entire spectacle contemplated.

This realm, which we are calling "potential relative reality" or "unified field of timeless, spaceless energy-consciousness", is what both Aurobindo and Wilber know as the Supermind, the intermediate reality between the primordial Unity —our "absolute non-dual Emptiness"— and the Manifestation —our "relative space-time reality"—, the essential unity between the object and the subject, between knowledge, the knower and the known, which knows all things in the most intimate way imaginable, since not only are they in the consciousness of the one who knows them, but are nothing other than modes of the knower himself. In the words of Aurobindo: "*the supramental Spirit knows all things in itself and as itself*". According to this Indian philosopher, the knowledge of the Supermind is a total knowledge that has a triple vision: *transcendental*, *universal* and *individual*, which means that each *individual reality* is known in its particularity, but always put in relation to the *universal reality* of the which is part, and, in turn, the set of interdependent realities that forms the concrete totality of the manifestation is apprehended and valued as a symbol and expression of the *transcendent Reality*. In the same way, the Supermind simultaneously possesses the vision of the three times: past, present and future. This capacity enjoys not only that extended horizontal vision, but also its character of self-manifestation and symbolic expression of essential Eternity. Time in its unfolding is thus

shown, in a similar way to how Plato proposed it in *Timaeus*, as "*the moving image of Eternity*".

According to Wilber, the Supermind is the union of the entire manifest Kosmos with your completely empty I Am. Transcending and including all the levels of form that have thus far appeared, it is a full and complete wholeness, a genuine Unity, a truly non-dual Unity, a Unity between Emptiness and the entire world of form. There is no sensation of a subject seeing objects, but there is simply an immense open space inside whose interior phenomena emerge, moment after moment, with no one to look, no one to observe and no one to see. Things as they are, emerge and release, suspended from Suchness and internally resonating with each and every structure it encounters. The Supermind therefore takes into account and embraces every individual thing and event in the Kosmos, known and unknown. The only reality there is is the ultimate simplicity of an open, clear and pure space indistinguishable from everything that emerges in it as its resplendent clarity and whose very interiority is felt and radiates as something infinite and open absolutely to everything.

Let us briefly recapitulate what we have stated in these last paragraphs. After the long *process of internalization* in consciousness, throughout the successive levels of the nested holarchy of evolutionary development, the subjective facet of the process reaches the pole of final pure consciousness —the Witness, the Overmind or the *Singularity Ω*—, from which *it embraces the entirety of the evolutionary Kosmos* —from the Big Bang to the final moment— without being identified with any particular aspect of that *immense Image (information) of All-That-Is* that emerges in its resplendent field of consciousness. When the subjective facet reaches this point, to the position of the final Witness, *it implodes* in the potential unified field of energy-consciousness, thus *transcending the universal manifestation* in its spaceless and timeless foundation, into which *it introjects all the information coming from any level of existence processed along the entire path of ascent from the Big Bang to the Witness*. This information introjected into the potential unified field will be the *seed* that will give rise to a new stage in the recursive multiverse, through which non-dual Emptiness tries to contemplate, in an endless number of subject-object perspectives, its eternally invisible face.

Doesn't all this sound quite similar to John Smart's transcension hypothesis, according to which *inner space* —in the physical sense—, not outer space, is the final frontier of universal intelligence? Let us remember the *hierarchical emergence of progressively denser, more productive, miniaturized and efficient space, time, energy and matter (STEM) substrates* for adaptation and computing —increasingly closer to the Planck scale—, *which are oriented towards an intelligence similar to a black hole*, in the *process of becoming something analogous to a seed*, that is, to a developmental

structure *that packages all its evolutionary history and experience* in such a way that *it transcends our space-time universe, waiting for the right conditions to be met to replicate* it within a hypothetical chain of successive universes.

We believe that the resonance between our proposal and the transcension hypothesis is quite evident. Both stories seem to describe the same process from two different perspectives —subjective and objective— that complement and enrich each other. According to the scheme of the four quadrants —which encompasses, as we have said, both interior and exterior perspectives, both individual and collective—, this multiple approach is, precisely, the appropriate way to investigate any aspect of the universe if we want to understand it in all its integrity, since any transformation in any of the quadrants imperatively requires the simultaneous presence of correlative transformations in all the others. All four are mutually implicated by each other, because, in fact, all of them are nothing more than the coordinated expression of a unified reality that underlies and transcends them. (Remember Jung's theory of synchronicity). With all this we want to say that the emergence, precisely now, of objective computational substrates increasingly closer to the Planck scale is not a coincidence, at this moment in history in which the subjective facet of consciousness is approaching its peak of the spectrum —to the Witness— in which it will embrace the totality of the information coming from any level of existence processed along the entire path of ascent from the bowels of the Big Bang until that final moment. As Bernard Enginger (Satprem) explains in his book *Sri Aurobindo or the Adventure of Consciousness*: *The supreme opposition awakens to the supreme identity* (…) *the upper degree of the supermind is not "above", but here below and in everything* (...) *the extreme limit of the past touches the bottom of the future that conceived it* (...) *everything ends in the perfect circle* (...) *the supramental is the same vibration that endlessly composes and recomposes matter and worlds* (...) *it is necessary to enter in the last finite to find the last infinite...*

—How can humanity face the process of approaching the peak moment of the Singularity? How can we prepare for his advent?

If the proposal we are developing points in the right direction, the path towards the Singularity would affect all facets —organic, psychological, cultural and social— of our lives. From the outset, it is worth making it very clear that the human species, far from being condemned to complete obsolescence due to the unstoppable emergence of technological artifacts driven by artificial intelligence, will be the key piece that will allow to unfold, individually and collectively, all the potential capabilities of human beings of the stages of development that still need to be covered until reaching the summit in the Singularity Ω. At the same time, it is important to note that, although human

beings play the fundamental role in this exciting stage of evolution and history, there is not —nor has there ever been— the slightest trace of a truly separate individuality that could take credit of this "feat", for the simple reason that each and every one of the alleged independent selves that we believe ourselves to be are, in truth, nothing more than finite reflections —fleeting identifications— of the same and only final pure consciousness, which constitutes, together with the potential energy of the origin, the fundamental polarity of the universal manifestation. As Erwin Schrödinger said: "*Consciousness is a singular of which the plural is unknown*".

The integral perspective, from which we are approaching this work, greatly clarifies some basic aspects that must be taken into account in order to healthily access the final Singularity. As a general principle, it is important not to forget that each and every one of the steps of the evolutionary process are manifested in the four quadrants, since there are no interiors without exteriors —nor vice versa—, nor are there individuals without collectivities —nor vice versa—. The singularity, therefore, will inevitably happen in these four areas simultaneously. Each of them needs all the others for their own existence. It is not possible, therefore, to propose an exclusively technological singularity by eliminating, for example, human beings from the equation. The technological facet, obviously, will play a key role in the integral journey towards the Singularity, but not as the exclusive protagonist of the process, but as a very important tool to facilitate the unfolding of the intrinsic potential of the successive steps in the four quadrants and in each one of the specific lines of development within each of these quadrants. Another basic lesson that the integral scheme provides refers to the importance of each and every one of the rungs of the evolutionary ladder as fundamental pieces for its harmonious unfolding. Exclusive absorption in any of them produces a distortion of the overall view. Let us remember, for example, the mythical-heroic model of the Ancient Age, the absolutist-conformist model of the Middle Ages, the rational-empirical model of the Modern Age or the relativist-pluralist model of the incipient Postmodern Age. Each of these paradigms has been an important and valuable step in the development of individuals and human collectivities, but none of them has been able to see beyond their limited point of view. Just look at the complete intransigence and mutual incomprehension between, say, an urban gang member, an Islamic radical, a neoliberal capitalist, and an environmental activist. Each one, passionately defending his own narrow relative truth, appears incapable of appreciating and integrating the valuable contributions of the other points of view. The perspective will begin to change with the emergence of the next holistic (C-3), integral (C-4), transglobal (C-5), etc. levels. The successive envelopes of the holarchy of inner development, which will transcend and

integrate all the previous ones, will gradually unfold greater levels of lucidity, depth and consciousness and, at the same time, more integral, loving and ethical perspectives, which will allow them to deal with the situations of increasing complexity that will arise in this final stretch of history.

When the center of gravity of the sense of identity of human beings is located in those higher strata of the energy-consciousness spectrum, we will understand in an experiential way —not just theoretically— that we are not —nor have we ever been— true separate individualities in a foreign world, but mere multiple reflections of the same and only pure consciousness. That is, we will perceive that others are nothing but diverse expressions of myself, and that everything else is nothing but the objective facet of common subjectivity. This radical understanding will automatically eliminate the ego-centered behaviors characteristic of previous levels, which will facilitate the healthy transition along the last stretches towards the Singularity. But, in the meantime, those stages of greater lucidity and inclusivity arrive, to prepare the way, we can make some suggestions about the role that new technologies can play in the deployment of the four quadrants.

In the upper-right quadrant —which refers to the external aspects of individuals— biological and technological research is already being carried out to integrate organic and inorganic materials with a view to expanding our physical, perceptual and intellectual capacities. Let us think, for example, of bionic engineering, gene therapy, nanomedicine, bio-printing of organs, virtual and augmented reality...

In the lower-right quadrant —which refers to the external aspects of communities— a very promising panorama is also presented regarding the great possibilities offered by new technologies with a view to facilitating a real approach towards a global and integrated society, as well as to facilitate universal access to food, healthcare, housing, education and free time for all of humanity. Let's think, for example, about robotics, artificial intelligence, nanotechnology...

In the lower left quadrant —which refers to the internal aspects of communities— the new information and communication technologies have already begun to facilitate connectivity between human beings on a planetary level —let us remember Marshall McLuhan's *global village* or the *noosphere* by Teilhard de Chardin—, which can foster collective consciousness, the unfolding of shared emerging values and truly cosmocentric worldviews, in line with the integral and non-dual proposal that we are developing in these pages.

In the upper left quadrant —which refers to the internal aspects of individuals— new technologies can also facilitate psychological growth toward

integral and transpersonal stages of consciousness and toward motivations of increasing freedom and plenitude. In fact, in the field of spirituality, intelligent machines have already begun to be created capable of generating specific brain wave patterns in human beings —in the upper right quadrant —, correlative to certain meditative and contemplative states of consciousness —in the upper left quadrant— of which the great traditions of wisdom tell us. Perhaps in the near future AI researchers will also be able to create machines that contribute to the development of all the great consciousness structures of the evolutionary spectrum —not just the meditative states— that are absolutely necessary for access to the final Singularity. As Ken Wilber says: "*Bordering on science fiction, we will see things such as the injection into the human brain of billions of nanotransmitters connected to the cloud, forming a neocortex enhanced by intelligent machines and receiving specific instructions from it to accelerate the development of structures and states. We will live in a true heaven on earth for almost any human being, because their brains will be able to connect to a development accelerator that causes complete enlightenment in them.*"

At the moment in which the Singularity is achieved, human beings, individually and collectively, will discover, experientially, that the true Identity of everyone and everything is —and has always been— the same and only pure Consciousness, the aspect subjective fundamental polarity. At that moment, from the level that we have called the Overmind —or the Witness—, all the information coming from any level of existence processed along the path of ascent from the bowels of the Big Bang until that final moment will be fully embraced and will be immediately introjected into the potential unified field of underlying energy-consciousness —in the Supermind— thus completely transcending the universal space-time manifestation. That Supramental Reality, eternally located in an omni-comprehensive Here-Now, is —and has always been—, simultaneously, the only subject and object of all the virtual and fleeting worlds through which it has unfolded, unfolds and will progressively unfold, instant after instant, the infinite potentiality of the self-evident fundamental Emptiness, in its inexhaustible attempt to contemplate its invisible face in and as the world of forms. Because, as stated in the Heart Sutra: "*Emptiness is form, form is Emptiness.*" Now. Now. Now…

(Note: The English version of this Addendum 10 is made using Google translate)

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