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Physical reality and the experience of being and existing

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Abstract

Physical reality is inaccessible to us and we do not know what we are or what reality is. The psyche – the subjective individual psychological experience, composed by a conscious part and by a deeply unconscious part – is the unique experience of being and existing and the only reality we have access to. The origin of the God image is in searching for restraint of the perplexity and of the fear of death, of unknown and of non-existence, and in searching for meaning to the psychic experience perceived as the only reality. The diversity of expressions of God images – either avowedly religious or rational and mathematical formulations – is a function of the culture and takes a psychologically true narrative form. Describing the experienced reality is what we can do.

Descriptors

physics, life, conscience, unconscious, individuation, self, reality.

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Realidade física e a experiência de ser e existir

Resumo

A realidade física nos é inacessível e não sabemos o que somos ou o que é a realidade. A psique – a experiência psicológica individual subjetiva, parte consciente e parte profundamente inconsciente – é a única experiência de ser e existir e a única realidade a que temos acesso. A origem da imagem de Deus está na busca de contenção para a perplexidade e para o medo diante da ideia da morte, do desconhecido e da não-existência, e na busca de significado para a experiência psíquica percebida como realidade única. A diversidade de expressões das imagens de Deus – sejam declaradamente religiosas, sejam em suas formulações racionais e matemáticas – é função da cultura e assume forma narrativa psicologicamente verdadeira. Descrever a realidade experimentada é o que nos é possível.

Descritores

física, vida, consciência, inconsciente, individuação, self, realidade.

Realidad física y la experiencia de ser y existir

Resumen

La realidad física nos es inaccesible y no sabemos lo que somos o lo que la realidad es. La psique - la experiencia psicológica individual subjetiva, parte consciente y parte profundamente inconsciente - es la experiencia única de ser y de existir y la única realidad a la que tenemos acceso. El origen de la imagen de Dios está en la búsqueda de contención para la perplejidad y para el miedo ante la idea de la muerte, ante lo desconocido y ante la no existencia, y en la búsqueda de sentido para la experiencia psíquica percibida como realidad única. La diversidad de las expresiones de las imágenes de Dios - sean abiertamente religiosas, o en sus formulaciones racionales y matemáticas - es una función de la cultura y asume forma narrativa psicológicamente verdadera. Describir la realidad experimentada es lo que nos es posible.

Descriptores

física, vida, conciencia, inconciente, individuación, self, realidad.

Introduction

The development of civilization over the past 30 years has been astounding. An **information revolution** started in the 1970's with the development of personal computers, and exploded at the end of 1980's with the beginning of the Internet, accompanied by profound scientific and technological advances. Since then, human society has experienced major changes in commerce, finance, institutions, politics, culture, art, education, social relationships, demography, ecology, religion, and what it means to be human. The Internet and information technology led to democratization of knowledge and thereby changed the world.

Human language is unique: humans are capable of exchanging and accumulating knowledge with superlative efficiency, which probably gave us an advantage over our closest evolutionary cousins, the now-extinct Neanderthals. Some 6,000 years ago we invented the written language in at least six independent places: Sumer, Egypt, Indus Valley, China, Crete, and later in Mesoamerica. In the 15th Century, Gutenberg invented movable type and started the printing revolution. All these steps led us to the creation of the World Wide Web, and we can say that knowledge is the very basis of civilization.

Astonishing advances in physics and cosmology have been obtained since the end of 19th Century. In 1900, Planck described the basis of quantum mechanics. In 1905, Einstein presented his theory of special relativity and 10 years later, general relativity. In 1929, Hubble observed that the universe is expanding, leading to the development of the Big Bang theory. Computer science permitted the development of powerful machines for observation of macroscopic and microscopic universe. Today, we manipulate subatomic particles, accelerate particles close to the speed of light, observe supernovas, control anti-matter, deal with relativity of time, and hear echoes of the universe when it was only 380,000 years old. We have amplified our understanding of the world and all that we need is a computer and an Internet connection to gain access to this knowledge.

Biotechnological revolution decoded DNA and created the Genome Project. Major advances in pharmacology occurred and extraordinary biomechanical and cybernetic machinery created human-machine interfaces. These advances are giving us longer and healthier lives, along with ethical dilemmas. Bioethics was created to deal with these dilemmas.

Politics are leading to globalization of democracy, and although there still exist several totalitarian regimes around the world, most societies are aware that only with the strengthening of democratic principles and the rationalization of Earth's resources may survive despite ourselves.

World population currently totals approximately 7 billion, each individual one with his or her own dignity. The **principle of human dignity** is a form of moral statement intrinsic to democratic societies where the individual human life is an end in itself.

Kant (1785/2013):

> In the kingdom of ends everything has either value or dignity. Whatever has a value can be replaced by something else that is equivalent; whatever, on the other hand, is above all value, and therefore admits of no equivalent, has a dignity (Section 2, position 744).

Civilization is a unique form of relationship. Its definition is based on anthropological and historical concepts: transition from the hunter-gatherer model to fixed settlements, domestication of plants and animals, foundation of cities, and invention of written language. Although throughout history human life has been little valued, it has gained supreme value alongside with civilization process which is, in itself, a pathway to humanization: Hammurabi's code, slavery's proscription, condemnation of racism since the Universal Declaration of Human Rights, freedom of expression, protections in democratic regimes, establishment of children's, women's and minorities' rights, and the growing perception that poverty must be eradicated are examples of this tendency.

Jung defined psychology as a cultural discipline, stating that it is not possible to analyze a human being without considering his or her cultural and social environment (Zoja, 2005). This approach is very close to the bioethical concept of autonomy, where beneficence, non-maleficence and justice are dependent on each person's understanding of what is acceptable within a cultural context. Therefore, differences in historical, cultural, ethnical and religious background must be considered in the approach of a human person.

These are the main subjects of our era. But we must not forget that we are talking about 30 years within 6,000 years of civilization, 200,000 years of existence of our species, six million years of existence of hominids, 65 million years of mammalian prosperity on Earth, 600 million years since the rise of the big living forms in the Cambrian explosion, 3.5 billion years of life on Earth, 4.5 billion years of existence of Earth itself, five billion years since the formation of Solar System, 11 billion years since the beginning of formation of the Milky Way, 13.7 billion years since the emergence of the universe.

Scientific method

We pose questions about reality: What is the universe? What is life? And what is the psyche? Did the universe have a beginning or is it eternal? What would be there beyond a finite universe? What is energy? What is matter? What is antimatter? What is space-time? What is gravitation? What is the difference between non-living matter and life? How did non-living matter become animated? What is the pathway from genome to phenotypic expression? How do neurons, chemical transmitters and electric signals act as the basis of the psyche? What is consciousness? And what is unconscious?

We cannot answer any of those questions. So, scientifically speaking, we don't know what we are or what reality is. Common sense tells us that these unknown subjects are mysteries or enigmas or even gaps in knowledge: but they are not gaps, they are fundamentals. All knowledge is based on a fundamental unknown.

How then can we answer the questions about reality?

We started to question reality through symbolic thought, and then through oral, plastic and visual narratives during the so-called mind's big bang. The first record of symbolic communication dates from the Upper Paleolithic period, mainly through the rise of sculptures and rock art, but also through the growing sophistication of burial rites, ornaments and weapons (Balter, 2009). Symbolic thought is not exclusive to *Homo sapiens*, as it was also identified in *Homo neanderthalensis* (Zilhão et al., 2010), and is indeed a primate feature (Tomasello, 2000).

Rational thought started to impose itself with the rise of Greek philosophy during the 6th Century BC. But Hawking and Mlodinow (2010, p. 5) say that philosophy is dead because it has not kept pace with the modern developments of modern science. Science is empirical, mathematical and evidence-based. Its main goal is to predict events through identification of repeating patterns. Science is not only causal: etiological explanation is the confirmation of any prediction, but it is not indispensable.

Scientists tend to select problems that may be mathematically treated, excluding phenomena for which mathematical predictions are not possible. The predictive value of any test depends on the constancy of subjacent relations among variables, which do not occur, for example, in physical systems that develop chaos (Lívio, 2011) or feelings. In fact, as a tool to evaluate reality, mathematics is limited, as demonstrated by **Gödel's theorem of incompleteness**, which states that any complete system is necessarily inconsistent: to be consistent, a system must be incomplete, depending on axioms that cannot be proven.

The biological approach depends on statistical tools and its predictability is biased by fragile samples and research designs. And although **evidence-based medicine** was developed in an attempt to diminish these biases, the approach for biological questions is always related only to parts of human economy and only some parts at a time, never embracing the completeness of a single person.

Psychic phenomenon makes even more difficult the application of the scientific paradigm. Although there is an empirical neuroscientific, cognitive and behavioural framework, the ultimate analysis of psychic experience is always from a phenomenological approach. The singularity of the psyche is not understandable by scientific method because the sample is n = 1. Even so, this doesn't mean that the observation-theory-observation paradigm has no value: psychic contents are phenomena and therefore prone to observation despite the difficulties that such observation may represent.

Another fundamental methodological bias is that the observer functions as an interfering agent in an observed phenomenon: this is critical in physical experiments, definitive in biological research, and totally inseparable from the phenomenological approach of a psychic event; there is always the issue of "how" the phenomenon is seen (Colman, 2009). In psychological experience, observer, observation and the object of observation are the only thing and the same thing. Theories are only suggestions of how we may consider things and they are auxiliary methods in producing knowledge; whenever they are transformed into definite explanations they create exaggerations, and we always need several points of view to provide an image of reality (Jung, 1985a, CW 16: 198). Today's scientific truth will be tomorrow's myth, and there is an ever-changing frontier between knowledge and the unknown, which seems to be the only truly predictable aspect of human phenomenon.

The universe

This universe – which is the only one we know – had its start 13.7 billion years ago, emerging from a huge expansion of matter. Since then it continues to expand and cool.

At 10^{-35} seconds after the Big Bang, there was a hot and shapeless soup of quarks, leptons and energy created by cosmic inflation. At 10^{-11} seconds matter overrode antimatter. At 10^{-5} seconds, nucleosynthesis with quarks forming protons and neutrons took place. In five minutes, helium, lithium and heavy hydrogen nucleus appeared. About 380,000 years later, atom formation released cosmic microwave radiation and the **universe was illuminated**. For somewhere between 100 and 300 million years onward, gravity continued to increase density differences over gas filling space, and from small clusters of matter the first stars were formed. From the explosion and destruction of such stars, heavier elements of the periodic table and new stars appeared. From three billion years on galaxy clusters began to be formed with peaks of galaxy and star formation. There exist 100 billion galaxies in the visible universe, each one containing about 100 billion stars with an uncountable number of planets and moons (Turner, 2009).

The universe is expanding itself. Hubble stated that galaxies are becoming more distant and the most distant galaxies are moving away even faster. The observable divergence of the universe permits us to trace the opposite path. The consequence is the Big Bang theory.

Energy, matter, space-time, and gravity had a simultaneous start from an infinite small, dense and hot state: a **singularity** (Steiner, 2006). A singularity is something that is not submitted to mathematical and physical laws, being indefinite and of unexplainable behaviour because of its infinite values. The precursors of everything that does exist were smashed in a mathematical point of dimension that equals zero, and we have conspicuous evidence of what happened in the instant after the Big Bang, but we know nothing about the moment when time was equal to zero.

The Big Bang theory also creates a problem; what was there before the beginning of the universe, because according to the theory there was nothing before it: thus, it is impossible to include the concept of "beyond a finite universe" in the scientific model.

Many scientists reject this idea of singularity, and theories were developed to explain the universe without this concept, almost all based on quantum mechanics; the Big Bang therefore being conceived as a transitional moment between an anterior and the present state of an eternal universe (Veneziano, 2012). According to **cyclic universe theory**, there was an extreme implosion reaching a maximum density point before the expansion (Bojowald, 2008). The **Multiverse theory** hypothesizes that our universe would be just one among innumerable disconnected universes (Ellis, 2011).

The universe is composed of three basic elements: particles **with** mass (fermions), particles **without** mass (bosons), and empty spaces. Particles with mass constitute a minimal part of each atom. We call them matter. Particles without mass are responsible for the interaction of particles with mass. We call them energy. Energy transforms itself into matter through the process of mass acquisition demanded by the Higgs boson and by the Higgs field (Riordan, Tonelli & Wu, 2012).

The standard model of particles describes fundamental particles and forces constituting matter and energy (Moreira, 2009) and it predicts two classes of indivisible elementary particles with mass without an internal structure: **leptons** (electrons, for example), and **quarks**, along with their correspondents, the antiparticles. These are the building blocks of everything. After that, there are **hadrons**, complex particles like protons and neutrons with an internal structure composed by quarks and antiquarks.

The two main modern physical theories are general relativity and quantum mechanics, and they respectively explain macroscopic and subatomic universes very well, but they are not compatible with each other: the most important quest of physics is the search for a unified physical theory (Seife, 2005) called **theory of everything**.

Matter and energy are equivalents. Actually, both matter and energy may behave as a wave or particle, and according to **Heisenberg's uncertainty principle**, it is impossible to simultaneously observe position and velocity of a particle or its corpuscular and wave activity.

There are four **fundamental interactions** mediated by particles without mass: electromagnetism, responsible for every form of light, mediated by **photons**; weak nuclear force, responsible for radioactive decay, mediated by **W and Z bosons**; strong nuclear force, responsible for fixing neutrons and protons inside the atomic nucleus, mediated by **gluons**; and gravitation, mediated by **gravitons**.

The speed of light is the most important constant of the universe, and nothing, inside the universe can move faster than 299,792,458 m/seconds. But we now know that the initial expansion of the universe – known as **cosmic**

inflation – occurred at a speed superior to the speed of light, and so, this constant is valid only inside the universe.

Antimatter was created along with matter in the very first moments after the Big Bang, and initially there was nearly the same amount of matter and antimatter. Given that matter and antimatter particles present opposed charges, they cancel out each other when they meet. At subatomic levels under high energies, there is symmetry between the particle peers of matter and antimatter, but this is not the case at the macroscopic level where there is only antimatter in cosmic rays or in some forms of radioactive decay. Our universe is asymmetric and dominated by matter.

The universe as we see it now would not exist, because everything should be consumed if it was not the unexplainable and minimal excess of matter over antimatter, about one quark amongst each billion of quarks/antiquark peers. We don't know why there was an excess of matter. But nowadays we can manipulate antimatter on our own behalf: for example, one of the most important tools in the fight against cancer is positron (antielectron) emission tomography associated with computed tomography (Beyer et al., 2000).

General relativity states that space and time are inseparable, constituting a quadri-dimensional space-time *continuum*, and absolute time, separated from space, doesn't exist. Space-time is not fixed: it is in a state of permanent change; it is relative and creates curves. It slows down the closer an observer is to speed of light, and depending on the strength of gravitational fields. Only a particle without mass can travel at the speed of light and it doesn't experience the passage of time. The phenomena of de-acceleration of time and of space curvature are routinely calculated to obtain precise results in GPS equipment.

Physical laws are the same for all observers, independent of the observers' reference systems. One may choose any coordinate system and a time axis to map space-time, since different observers with differing motions have time axes that go in different directions. Each point in space-time is defined only by itself and not through its location, since no coordinate system is special. A still observer will experiment only temporal direction. An observer in motion will experiment a mix of space and time.

The question of time is one of the biggest obstacles in the unification of general relativity and quantum physics because time properties required by the quantum state (the complete description of an object) are antagonistic to Einstein's non-absolute time: in quantum mechanics the epic of the universe occurs over time, and general relativity permits the idea of a non-temporal universe.

Other theories search for quantum explanation. The main version of **string theory** predicts 10 dimensions (Baez & Huerta, 2011). **M-theory** (which tries to conciliate the many string theories) predicts 10 spatial dimensions plus time. Some scientists speculate about the possibility of more than one temporal dimension and even dimensions that are neither spatial nor

temporal. The theory of loop quantum gravity is about atoms of space-time, contrary to the idea of continuous space-time.

But if this universe is finite in past time direction, why should it be different in future time direction? The end of universe would be probably related to expansion and dispersion or contraction and collapse (Musser, 2010).

Gravitation was defined by Newton as the natural phenomenon through which physical bodies attract themselves mutually. The orbital relationship of cosmic bodies; a coalescence of matter that formed and continues to form stars, planets, galaxies; the weight and the fall of things; water flow, etc. are all events based on gravitation, the weakest and at the same time the most universal of the four fundamental forces of nature. Actually, everything that does exist is under gravitational effect and simultaneously produces it, including energy, which means that gravitation itself produces gravitation (Novello, 2012). Each one of us produces gravitation. Therefore, gravitation puts everything that exists in a relationship with everything that exists.

According to **general relativity**, gravitation is a consequence of space-time curvature in its relationship with matter, governing inertial movement of things. It predicts a universe that must be expanding or contracting. But relativity cannot describe the quantum structure of space-time. In distances shorter than the **Planck length** order (1.6×10^{-35} metres), particle behaviour is exempt from general relativity and quantum mechanics (Smolin, 2004).

All matter we know – called **baryonic matter** and corresponding to the sum of masses of all known protons and neutrons – represents only 5% of all matter of the universe, and it isn't enough to explain the density and the consequent gravitational stability of the universe: there must be an unknown dark matter responsible for that. **Dark matter** supposedly isn't formed by atoms and doesn't emit or absorb light, i.e. it is invisible. We don't know what dark matter is (Feng & Trodden, 2010) or even if it does really exist.

There also must be an anti-gravitational unknown force called **dark energy**, responsible for the unexpected acceleration rate of expansion of the universe for the last 5 billion years (Riess & Turner, 2004). If this acceleration process had been started earlier, then possibly agglomeration of matter in galaxies and stars may never have happened. Actually, dark energy must be responsible, along with dark matter, for most of the density of the universe, but we don't know what dark energy is or even if it really does exist (Clifton & Pereira, 2009).

Life

According to the **primordial soup theory**, under the extreme conditions of the initial existence of the Earth, the association of liquid water, intense volcanic activity, violent electric atmospheric discharges and impacts of cosmic bodies provoked chemical reactions transforming atoms and basic molecules in more complex molecular groupings (Ehrenfreund et al., 2002). But we don't know the prebiotic composition of Earth and its atmosphere. We suppose that

from carbon, hydrogen, oxygen, nitrogen and sulphur broke out glycoproteins, phospholipids, amino acids and other macromolecules that finally produced ribonucleic and deoxyribonucleic acids (Orgel, 2004).

DNA is the structural basis of life and through it all living beings share the same heritage. It is an organic macromolecular complex in a double helix shape, described by James Watson and Francis Crick in 1953, that contains the genetic determinations for development and functioning of living beings through protein production. It is responsible for hereditary transmission of features.

DNA is the most complex molecule in the universe. Part of DNA contains genetic information, constituting genes; other parts act in regulatory processes of genetic information or have structural function. However, DNA alone can't explain life.

We don't know how RNA and DNA were formed because there is no fossil register and the processes had never been reproduced either through natural observation or in the laboratory. In any event, current theory states that somehow complex molecules of non-animated matter came to be living beings (Zimmer, 2009), but such an idea had never been proven. Recently, Venter's team created a form of **synthetic life**, introducing a synthetic genome inside a bacterium previously emptied of its own DNA: the bacterium started to replicate and to produce new proteins (Pennisi, 2010). But this is not the same as to create life from non-living matter.

The hypothesis that life arrived on Earth via meteorites (**panspermia**) is speculative and doesn't solve the question on how life began. Earth is the only place in the observable universe where life is identified.

Some thinkers use the biological concept of 'emergency' to explain the outbreak of life, meaning a system that exceeds predictions could be done from analysis of its individual components and forces (Balazs & Epstein, 2009). This concept is superimposed onto the "complex system", which has the same meaning in physics, meteorology, economy, etc.

We assume, by definition, that life begins with the cell. It has genetic material destined for perpetuation, a complex metabolism, and a semi-permeable membrane to separate it from outside world. According to this definition, virus and prions are not living beings. But the definition of life is the subject of controversy.

A virus is an encapsulated complex of DNA. It is not considered alive because, although it presents a genome, it doesn't present ribosomes and other organelles responsible for enzymes and energy production needed for the complex cellular metabolism, it is not able to grow or to divide, and it depends on a cell to reproduce and to obtain proteins and metabolic energy: a virus is an exclusive intracellular parasite and outside the cell it is inert (Lwoff, 1954).

A prion is a protein that is not composed by nucleic acids and does not feature a capsule, and therefore it is not considered alive. Even so, it is an infecting agent in mammalian cells, making them produce copies of it (Prusiner, 1984). Prion infections cause bovine spongiform encephalopathy in cattle and Creutzfeldt-Jakob disease in humans.

In 1859, Darwin presented the process of species evolution through natural selection. Evolution of life is compulsory (Benton, 2009). Genetics prove it: although there are many other sources of evidence to reaffirm **evolutionary theory** (Pigliucci, 2009), today a scientific study on species evolution would be improbable without genomic analyses if there is genetic material available. Efforts to compile genetic sequencing of all living beings are at a priority in scientific research (Pennisi, 2009).

The theory of evolution states that all species change by evolving into another species or disappearing in an open and ramified process, that species evolution is an exclusive function of random genetic mutations and the relationship with environment, that species derive from common ancestors in the tree of life, that every species is characterized by population's diversity, and finally, introduces death as a creative force of nature (Bowler, 2009). However, Darwin's theory only deals with evolution of living beings from others, and it doesn't explain the origin of life, although it points out to this kind of origin in convergent manner analogous to the reasoning that leads to Big Bang theory from the expanding universe.

Mechanical interpretation of evolutionary theory asserts that we are not the apex of evolutionary process, as many species already existed prior to our appearance, and very likely many will remain if we disappear. And despite our momentary (and doubtful) dominance over the environment, other species may represent more significant examples of evolutional success. Our capacities and behavior are only phenotypic adaptations of random appearance, with no intentionality, no finality and no particular value in the universe and life evolution. Any a posteriori interpretation that supposes that past act to produce our specific present time and any anthropic notion that physical laws and the fundamental constants of the universe may be a calculated arrangement whose goal is humanity's existence must be rejected (Dawkins 2004, p. 2). Chance – and just chance – drives evolution.

But life modifies environment. Vernadsky (1998) points out that the biosphere acts as a geological force. He adopted the term 'noosphere', meaning the 'thinking layer of matter', indicating that humanity also behaves as a geological phenomenon. Margulis (2013) states that there is intentionality in life as a whole, interfering in its own evolution, resulting from symbiotic relationships among living beings. Maturana and Varela (1987) say that life is autopoietic, which means that life creates itself from interactions that intend to regulate and reproduce itself in an autonomous mode: the only goal of life is to create itself. According to the **Gaia theory** by Lovelock (1995), Earth is a huge living organism: the biosphere is in synergy with physical elements and

is characterized by intentionality and self-regulatory capacity to maintain favorable conditions for its living components.

The question of whether life presents intentionality or is a simple mechanism is crucial and ultimately related to the phenomenon of human free will. Margulis and Sagan (2002, p. 22) establishes a strict separation between life and death and criticizes both animism and mechanicism, arguing that on one hand vitalization of matter ignores the difference between what lives, what is dead and what has never been alive; and on the other hand as mechanisms just react and don't act, mechanicism denies life's intentionality and autonomy and human free will, inferring surreptitiously the idea of a personal designer and leading to a deeply metaphysical perspective.

Phenotype is defined as the complex whole of a living being's characteristics, such as its morphology, physiology, metabolism, development and behaviour, the result of genetic expression influenced by environmental factors. There is a pathway that leads from genomic map to the whole of phenotypic characteristics through codifier and non-codifier DNA, RNA, regulatory proteins, chemical and structural genomic changes and interactions, and epigenetic processes (Goldman, 2009). Sometimes we can directly trace this pathway, like in thalassemia for example, a rare form of anemia. But this is not true for most physiologic and pathologic events. Actually, we don't know how a mere 25,000 human genes produce hundreds of thousands of different proteins (Pennisi, 2005), and ultimately, us.

The psyche

Our ancestors started to stand on two feet. It seems that the head, now elevated to just more than one meter above the savannah floor, was now in an environment a few degrees cooler. Our ancestors started to follow the great cats, eating carcasses after all other carnivores could no longer feed on it: with the help of rock tools they could extract the most caloric part, the bone marrow. They started to cook meat, spending less energy on the digestive process and offering a surplus of blood to the brain. These important events facilitated the growth of the brain.

Our large brain, with its profuse grey matter, functions via neurochemical substances and electric impulses among its main cells, neurons, and its special unions, the synapses. The brain's electrochemical physiology is the structural basis of the psyche. Neuroscience can identify cerebral areas that function as the seat of the superior psychic functions, like thoughts, feelings, memory, etc.; it has discovered cerebral plasticity against deactivation of specific areas with recovery of functions through alternative pathways; and even identifies abnormalities in neural circuits that can eventually be related to mental diseases (Akil et al., 2010). Neuroscientists are capturing electric cerebral impulses and developing brain-machine interfaces capable of cybernetic structures, opening up an unimaginable field of possibilities (Nicolelis, 2011). Even so, we don't know the pathway that brings us from a few chemical substances intermediating electric impulses among neurons to

the complexity of psychic experience (Miller, 2005), and to connect an organ directly with function would eventually lead to the same mistakes made in phrenology and craniology.

We may understand life and the psyche as a single thing: a biopsychic unity. In this sense, even the most basic form of life, i.e. the unicellular organism, may have a kind of psyche since it looks for food and shelter and presents the impulse to perpetuate itself, somehow making choices.

Nowadays, transhumanism supports that consciousness is an epiphenomenon of biology, and as all living beings are transitional and unfinished forms, there is no valid ontological definition of the human being, allowing for the surpassing of the present human status. Therefore, we must attempt not only to prevent, control or cure physical and mental diseases through genetic mapping, cybernetic engineer, nanotechnology, pharmacology, stem cells manipulation, etc. but we may also limitlessly improve human nature, for example, changing undesirable features of personality and deleting painful memories (Han et al., 2009), thereby eliminating emotional suffering, depression, diseases and aging itself, allowing human beings to live for perhaps 150 or 200 years as young people (Couzin, 2005). The top of the transhuman would be, through mind-machine interfaces, retain our consciousness within a machine of perpetual durability.

If one considers the exponential acceleration of knowledge production resulting from the information revolution during the past 30 years, the "technological singularity" would not be improbable; this is the hypothesis that predicts a new, incalculable technological advance in a very short period of time with unpredictable consequences: a scenario close to Huxley's "Brave New World", where introversion, solitude, suffering and aging should be abolished.

Consciousness is the human psychic part characterized by rational and directed thought and verbal language (Jung, 1976a, CW 5: 11), which leads to adaptation, particularly to social environment, reflection about the world, metaphysical yearning, creation of moral codes, production of knowledge, and development of science and technology. Based on scientific and technological advances, we have seen improvement in resources, nourishment, protection against diseases, quality of life and longevity; our knowledge is growing exponentially and there is an increase in tolerance and justice, with better laws and codes derived from ethical principles based on human rights and the dignity of the human person. Unfortunately, these advances do not represent universal justice. Because of technological advances we became more competent predators of ourselves. This fact leads to tribalism, racism, wars, degradation of the Earth's resources, corruption and social injustice; the very development of consciousness causes psychic dissociation, suffering and disease.

There is a difference between conscious and unconscious modes of identifying, organizing and answering the fundamental question, i.e. "what is reality?" Symbolic thought answers it from collective and imagetic perspective,

and consciousness answers it from its center, the "I" (or "ego") in a rational way. Consciousness assumes the position of observer and controller of the world par excellence. Nothing can be conscious without an ego as a reference point, and everything that doesn't relate to ego is unconscious: we may define consciousness as the relationship of psychic facts with the "I". And consciousness differentiates us from the remaining world. But even so, although human consciousness is an event equivalent to the very outbreak of the psyche, life and even the universe – since all of them represent new facts in existence – it doesn't correspond to the whole psyche (Jung, 1979, CW 9/2: 9). We are used calling the part of life beyond consciousness as the "unconscious". But consciousness has the function of adaptive life, which means it controls the world around and within. It is the consciousness' intrinsic nature to see itself as creator and apex of evolution, and consequently it despises the condition of creature or representative. Pride and self-centeredness of culture and civilization are expressions of this process, as well as exaggerated individualism. Consciousness naturally puts the unconscious psyche at a subsidiary level, usually attributing to it a reactive and passive character, eventually connecting the psyche with aversive feelings.

Actually, the entire psyche – conscious and unconscious – shows autonomy and intentionality, and its parts cannot exist normally without the other. The modes of operation of both are ultimately based on the collective unconscious' pre-existing determinants: the archetypes. Indeed, consciousness is born from and has its basis in the unconscious psyche. The very development of consciousness is archetypical and each one of us has an innate project to form it. Hence, we are not only the conscious part of our psyche, and consciousness is not even its center, but a functional part of it that becomes dysfunctional when attempting to see itself as exclusive.

Freud's **theory of the unconscious** revolutionized psychology and civilization: he demonstrated how deeply the unconscious interferes and eventually dominates conscious activity. But under Freud's perspective, unconscious is produced mainly from consciousness. Indeed, there is unconscious content that was once conscious, constituting what Jung called the "personal unconscious". But there is a phylogenetic evolution of psyche as well as life, generating content that had never been accessible to individual consciousness: this phylogenetic unconscious Jung called "collective", because it relates to the impersonal psychic history of each and all human beings.

In fact, we are relatives of microorganisms that probably appeared in the deep ocean darkness and only after some time started living off the Sun's energy. Our eukaryotic cells were initially prokaryotes. Somehow, billions of years ago, some phagocytic bacteria, instead of digesting others, incorporated them as mitochondria and cilia under a process known as endosymbiosis: our lives depend on such blueprint. We share with flatworms from 600 million ago a bilateral morphology and a nervous system, with the first amphibians experiencing life on Earth and breathing oxygen. With all other vertebrates we share a vertebral axis, and with all other mammalians

the experience of nursing our mother's milk. We share with Ardi (*Ardipithecus ramidus*) and Lucy (*Australopithecus afarensis*) a particular perspective of the world derived from bipedalism. All these experiences (and many others) are part of our phylogenetic heritage. Jung's **theory of collective unconscious** states that this is true not only biologically, but psychologically as well (Jung, 1985b, CW 4: 728).

We are not able to measure the size of the unconscious. Although some studies are trying to measure the amount of unconscious electrical activity, supposedly there will always be an indefinite independent unconscious psyche in the development of consciousness. The unconscious psyche reveals itself through images that appear in dreams, fantasies, sights, hallucinations, mythologies and art, but every psychic content – even the most rational – does have a symbolical component, derived from its unknown nature. And fear of the unknown inhabits the unconscious.

God-image

The God-image is highly prevalent and is a psychic content (or a group of contents) responsible for two main functions: to give restraint to the unknown and to serve as supreme value that offers meaning to the psychological experience that we call "reality". It is full of emotion and psychic energy (Jung, 1973, CW 11: 3).

Jung identified in the deep unconscious an impersonal and non-temporal archetype that determines the formation of the God-image (Jung, 1976b, CW 18: 1567): he hypothesises the Self as simultaneously being the center and totality of psychic experience.

We have always dealt with the existence/non-existence dilemma as a God-image prerogative, and every religion has a creation myth, if one interprets this as image giving meaning to existence (von Franz, 2003). It is responsible for and simultaneously transcends time and existence, allowing the images of beyond time and beyond-death (or non-existence) to have meaning.

Such a dilemma of immaterial existence can be detected since the emergence of burial rites during the Upper Paleolithic period, then continuing through the entire catalogue of mythologies until arriving at modern religions. The 11,000-year-old Göbekli Tepe (now Turkey) monuments are temples designed for religious affairs and they were constructed during the Aceramic Neolithic period, preceding ceramic production, metal manipulation and livestock and agriculture, and shows the turning point from hunter-gatherer societies to Neolithic welfare, not only for economic or environmental reasons but also due to the impact of the sphere of the transcendental (Schmidt, 2000).

We can find what probably were the first writings on the quest for immortality in the Mesopotamian Epic of Gilgamesh (Gardner & Maier, 1985). The basis of the religion of Ancient Egypt was its very relationship with after-life (Budge, 1996).

In Jewish-Christian tradition, Yahweh is the only answer to the existence/non-existence dilemma, and creation is the work of a unique god, an eternal creator that existed prior to creation, giving order and justifying the world: God insufflates life. Allah presents the same potency in Islamic tradition.

Vedic tradition presents an unknowable, impersonal and supreme entity: when Brahman opens its eyes (a day of Brahman) existence starts, and when Brahman closes its eyes (a night of Brahman) existence ceases to be. Later, Krishna took responsibility for Brahman (Wilkins, 1785). The Upanishads say that the Atman (the true "I") looks for the encounter with the impersonal Brahman, and along the entire sequence of lives Atman and Brahman are the same, identifying the human being with everything alive and everything that does exist (Tinôco, 1996).

Buddhism denies that there is a creator of everything (Armstrong, 2000). Even so, Nirvana is a God-image as well as the image of Buddha. It was from his experience of aging, suffering, disease and death that Siddhartha Gautama started his journey to be Buddha, a state attainable for every human being (Bancroft, 1997).

The image of an original substance as the beginning, end and permeating all existence appears with pre-Socratic philosophers. Although it was the starting point of rational thought, such an idea still served as a means to deal with the divine sphere (Reale & Antiseri, 2003, p. 19). Many forms of religious and philosophical thought believe that biological life and psyche are separate, claiming an immortal soul restricted, or not, to human beings. Socrates stated that the human being is its own *psyché* or soul: the conscious "I" characterized by reason, i.e. the intellectual and moral personality.

The God-image in transhuman thought is the transhuman being – the mind-machine creature – the work of human genius. There is a clear teleological parallel between soteriological and Nirvana concepts and the transhuman desire to overcome suffering, disease and aging.

Although modern physical theories are based on powerful evidence, they are speculative. Therefore, Big Bang theory, string theory, quantum loop theory, multiverse theory, primordial soup theory, panspermia theory and even the mechanical perspective of evolutionary theory are all cosmogonies, structured on the operational model of rational and mathematical consciousness but even so based on the archetypal strength of deep unconscious, the psychic fundamental of each and every human being (Jung, 1980, CW 9/1: 125). Confrontation between the various scientific empirical and non-empirical theories, philosophical arguments and creation myths are evidence of the simultaneous interdependence and hostility between rational and symbolical thought, but it is seems there is no real difference between myths of creation and scientific theories: none of them reveal ultimate reality and both are developed to provide psychic restraint regarding the fear of the unknown, of death and of the non-existence, and to offer meaning to the existence.

Reality

We are something. According to Jung (1986), this "something" is the psyche:

> We know nothing objective about it, since all the knowledge about the psyche is itself psychic: the soul is the direct experience of being and existing. It is the only direct experience and a "sine qua non condition" of subjective reality of world for itself. Psyche creates symbols which basis is the unconscious archetype, and which apparent image comes from ideas that consciousness acquired (p. 220-221; 1986, OC V: 344).

Neuropsychology confirms the idea that we do not actually see what does exist, but we recreate the world in our own psychic experience (Hood, 2013), generating a peculiar reality. The **holographic principle** hypothesizes that the physical world and us would be composed of a holographic projection of information (Bekenstein, 2003). Hawking and Mlodinow (2010) support the idea of a **model-dependent realism**, in which reality depends on the observer and on the model's accuracy in describing the phenomenon. Nowadays, millions of people spend part of their lives in virtual worlds and complex games, existing as characters on the Internet (Bainbridge, 2007).

Although this does not mean that the universe does not exist but for us, everything that reaches us – consciously or unconsciously – through our body and senses (including the very perception of our own body) and everything that occurs in our internal world is merely psychic experience; and everything that each human being produces or expresses is only the product of the psyche. We simply experience what we are, life and the universe, and each one of us does it within himself or herself in a way we call "psychic": in an internal, subjective, unique, individual and incommunicable way.

The experience of being is incommunicable because every language, including mathematics, is merely an approximation, and is never the inaccessible reality each person experiences as being and existing. Therefore, there is a level of understanding at which there is no difference between language and mythology, and every attempt to communicate creates a description of reality: literary, theological, philosophical, or scientific.

Descriptions of reality are told stories

Under the fundamental laws of physics, the universe evolved from a relatively homogenous soup of quarks and other particles, developing into the diversity of galaxies we see today. Among them, there exists at least one planet where biologically living beings inhabit and evolve with at least one species that experiences a psychic state in which it creates symbols and cosmogonies, technology and science, and raises questions.

We don't know how the universe began, if the universe is finite or infinite, what there was before a finite universe, what matter is, what energy is, what antimatter is, what space-time is, and what gravitation is. We don't know how

non-living matter became animated, what the difference is between living matter and non-living matter, and what the pathway from genome to phenotypic expression is. We don't know how chemical neurotransmitters and cerebral electric signals act as the basis of the psyche, what consciousness is, and what unconscious is. We don't know what we are or what reality is. Each individual experiences the universe, life and himself or herself through individual psychic experience and this is the only possible reality. While searching to contain the unknown, death and non-existence, and the meaning of such experiences, we inevitably produce God-images in all our diversities of expressions; these are exclusively human expressions that invariably result in narratives of reality.

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