SKYWARD

Ethics and Metaphysics of Transhumanism: a proposal

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ABSTRACT

This thesis - of nomothetic nature - advocates in favour of a cosmically expanded humanity, as proposed by transhumanists in the first topic of their *Declaration* published in 1998: *we envision the possibility of (…) overcoming (…) our confinement to planet Earth*. In order to accomplish this purpose, two topics are considered: (1) *ethics*, in which the Hobbesian concept of *summum malum* is surpassed in order to agree with the Hans Jonas's statement: if we can say there is a supreme evil, it is the eventual extinction of the human species. Therefore, in order to avoid the Jonasian *summum malum*, this thesis proposes the biocosmic expansion as an imperative based on zoocentric bioethics; (2) *metaphysics*, in which an exercise of cosmogonic supposition – as proposed by Jonas - is taken into account, and the humankind is seen as a way that the cosmos found to understand itself not in a single scenario but in multiple universes.

Keywords: summum malum; space colonisation; mass extinction; transhumanism; terraforming; many worlds interpretation.

Initial Considerations

Tis true without lying, certain and most true.
That which is below is like that which is above,
And that which is above is like that which is below,
To do the miracles of one only thing (…)[1]

The ontology of humankind is also the ontology of the skies. The ties that bind them together are inextricable to such a degree that changes in one incur in a profound transformation of the other as in a mutual reflection.

This thesis is a development of my master's degree research on ethics from a number of perspectives. Before defending the thesis itself, I find it necessary to present a brief summary of the dissertation that precedes it, so as to shed a light upon my original standpoint and my ultimate outcome.

The dissertation[2] presented at University of São Paulo (Brazil) tries to demonstrate that the paradigm shift in cosmology that occurred between the centuries XVI and XVII contributed significantly to the epistemic transformations described by Michel Foucault (1926-1984) in *Les Mots et Les Choses* (1966). In this book, Foucault poses the question: how did the dramatic epistemic shift occur in the West? As Foucault does not provide any answers, I attempted to propose one, taking the following into account:

The ancient epistemology is underlined by an Aristotelian-Ptolemaic cosmology, which divided the cosmos in two worlds. The *sublunar* one, home of becoming as well as of corruptible matter and the *superlunar* one, characterised by its immutability and eternal elements having neither beginning nor end. Consequently, this architecture of the astrological sky guaranteed the existence of a meaning that, in addition to preceding humankind, also unveiled in the configurations of the celestial sphere. The world, place of becoming, was viewed as the product of a divine will, which would have created everything in a beautiful and flawless manner. The symbolic interpretation of the heavenly positions conveyed the designs of the intelligent creator[3]. To glimpse the starry sky was,

[1] Hermes Trismegistus, ***Emerald Tablet***. Translated from the original in Latin by Isaac Newton.
[2] DODSWORTH-MAGNAVITA, Alexey (2013). *From Sky to Genes*. (Master's Thesis, USP),. Available from: http://www.teses.usp.br/teses/disponiveis/8/8133/tde-29012014-105129/pt-br.php. (2018, October 23)
[3] As contended by Julius Firmicus Maternus (306-307), in *Matheseos Libri VIII.*

therefore, to contemplate aprioristic essences. This link between the heavens and humankind was paramount to form the Christian ethics of resignation and tolerance, predominantly in the first five centuries of Christianity. Even the matters then regarded as monstrous were nonetheless seen as part of the celestial norm.

The aforementioned ethics undergoes a dramatic transformation between the centuries XVI and XVII. As put forward in my master's dissertation, this was due to the cosmological revolution led by Copernicus, Kepler, and above all by Galileo. The celestial bodies - then regarded as "spheres of ether" - were unveiled in all their unexpected becoming and all the banality of the elements composing them: the Moon, with its craters and mountains steeper than terrestrial ones; the planet Jupiter, surrounded by other moons in its orbit. Upon the realisation that the celestial spheres were as irregular and subject to the becoming as our own world was, the macrocosmic harmony of the astrological sky - organised, harmonic, eternal - gave way to a sky without any aprioristic essence: an astrophysical cosmos - imperfect, irregular, threatening.

As our knowledge of astrophysics evolved, there was a change in the sense of *wonder*, the starting point of the whole of philosophy. Our wondrous awe before the stars above us was replaced by a terrifying dread. We were faced with a sky that not only no longer offered the guarantee of eternity, but also loomed with its menacing celestial bolides, gamma ray explosions and other mass extinction phenomena.

It has been this shift of perspective regarding the skies that gave rise to the concept of *abnormal*, a non-existing term in ancient times and hence, non-applicable. The word "normal", however, was used though only in its geometrical sense: a vertical straight line that meets a perpendicular horizontal one, symbol of the divine will (vertical line) that rules over the world of becoming (horizontal line). As pointed out in my master's degree dissertation, the word "anomaly" was used for the first time to refer to irregularities in the position of the planet Mars, once the mathematics of the time did not allow for the precise position of the red planet to be known. The concept of "anomaly" gradually found its way into the field of biology, the field of medicine and finally, by the XIX century, it could also be found in the fields of psychiatry and psychology. There were now abnormal bodies and abnormal beings to be rectified due to the lack of a macrocosmic harmony to

ensure everything was within a norm. Our different understanding of the sky led to a different understanding of humankind. It had gone from a very characteristic ancient Christianity ethic of tolerance that stated: "*This is foreign or weird to me, but given that it is, it can only have come into being out of divine will and therefore it is justifiable by some celestial design*" to an ethic of rectification that is put into works by use of technical knowledge and which states: "*This is foreign or weird to me; what means do I have at my disposal to fix such strangeness?*"

While in my master's dissertation the scope was limited to a description of what had transpired during such process, in the present thesis, I will discuss the contemporary framework of ethics and its possible future outcomes. I intend to illustrate the emergence of yet another transformation in ethics, which equally stems from a change in the way humankind regards the skies. Whereas in antiquity the *astrological sky* is phased out to have the *astrophysical sky* introduced instead, we now bear witness to the introduction of the paradigm of the *astronautic sky*, a shift that has been underway since the second half of the XX century. Moreover, the debate around life is now reconstituted as *astrobiology,* which no longer understands our world as being separate from the remainder of the universe.

In this new relationship with the stars, knowledge and technical power allow human intelligence to redesign the species as *transhumanity*. The *homo sapiens* then gives way to the *homo faber*, whose technique makes possible to invade what were previously the unreachable skies. The human cities have long constituted a *topos* where humans make use of their technology to seek shelter from the inclement elements and to have a circumscribed space to live a happy life. Notwithstanding, such knowledge and technical power also incurred in the unstoppable growth of these former self-contained realms in such a way that there is no territory we cannot occupy. Thus, removed from its sanctity, the skies had their veil lifted to reveal a territory as ordinary as any other, one that also stands as the promise of the continuity of life in other forms and even of a transformation of our current understanding of "life" itself.

All things considered, this thesis is divided into two chapters:

The first chapter encompasses a thorough study of this new ethical system, based on the transhumanist movement, which I define as *biocentric but not*

geocentric, and call the *ethic of desperation*; the second chapter contemplates a metaphysical hypothesis derived from Jonas' cosmogonical suppositions regarding the divine wager, and this supposition serves as a basis for the ethical system this thesis propounds.

Throughout the chapters, I especially and foremost derive my contentions from the work[4] of the German-born Jewish philosopher Hans Jonas (1903-1993), since his legacy holds particular value toward ethics, especially concerning his plead for the extreme emergency of developing a new ethics that may account for transhumanism. As a matter of fact, the ethic of despair here described bears resemblance to the *heuristics of fear* asserted by Jonas. I do highlight, however, that the present work does not portend a perfect alignment with the whole of Jonas's proponents. As I made an effort to demonstrate, there are a number of issues critical to the matter at hand that, had them been known or taken into consideration by Jonas, might have led him to draw different conclusions.

This thesis thus leans on Jonas's works, albeit parting from the philosopher's ideas in some regards, as its interest is to further contribute with some original thought. Which is, incidentally, the ultimate goal of a doctoral thesis: not to echo previously uttered words simply by rephrasing them, but to aim at broadening the already existing perspectives. Thereby allowing future generations to follow suit, feeling at liberty to either extend or refute whatever ideas are put forward here.

[4] Namely *Das Prinzip Verantwortung: Versuch einer ethic für die Technologische Zivilisation* (1979), translated from German to Portuguese by Marijane Lisboa and Luiz Barros Montez, PUC-Rio (2006).

1. THE IMPERATIVE OF BIOCOSMIC EXPANSION – AN ETHICAL PROPOSAL.

1.1. Transhumanists against the Jonasian *summum malum*.

In this thesis, the main proposition is in alignment with the first topic of the *Transhumanist Declaration*[5], which advocates among several points the expansion of consciousness toward the outer space, and the proliferation of life beyond planetary boundaries. According to the topic,

> **(…) We envision the possibility of broadening human potential by overcoming aging,[6] cognitive shortcomings, involuntary suffering, and our confinement to planet Earth (VITA-MORE et al: 2013: pg. 54).**

A post terrestrial humankind (or transhumanity) is here defended as able to deal with the concept of *summum malum*, in accordance to Hans Jonas perspective: the extinction of the whole of the human species is the actual supreme evil to be avoided (JONAS: 2015: pg. 83-88). The Jonasian perspective is significantly expanded in comparison to the Hobbes[7]'s, who in turn defines: *the supreme evil to be avoided is the violent death*[8]*.*

It is possible to contend that the Hobbesian restriction to the *summum malum* regarding an individual's violent death derives from the fact that the concept of "species extinction" was practically non-existent during this philosopher's lifetime. Even the religious version of catastrophism that was in vogue during Hobbes' time – Noah's flood – did not make mention of extinct species, only of individuals - both human and non-human animals - who met their demise in the water and humankind was far from knowing what a dinosaur was. It is therefore understandable that Hobbes had not imagined something worse than the individual violent death.

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[5] The current *Transhumanist Declaration* consists in a series of eight topics. It was originally crafted in 1998 and has been modified by several authors over the years.
[6] Underlined by me.
[7] Thomas Hobbes of Malmesbury (1588-1679), English philosopher.
[8] Free translation from the original in Latin: *Mortem violentam tanquam summum malum studet evitare*. HOBBES. *De Homine*, chap. 11, art. 6.

This thesis argues for the extreme urgency of a new ethic that lays out criteria for actions centred around the goal of avoiding the Jonasian *summum malum*. This ethic is driven by a generous non-reciprocal care, since it goes as far as stating the prevalence of the welfare of future generations before our own. (JONAS: 2015: p. 72-73). If the concerns and solutions presented here sound like science fiction, it is because this thesis considers Jonas's suggestions about the importance of taking fictional speculations seriously. The warnings proposed here may sound strange in current times, but are undoubtedly important in the long run (JONAS: 2015: p. 74).

Despite being in accordance with the Jonasian concept of *summum malum* and in agreement with the assertion that an individual entity's violent death constitutes a *minus malum*, this thesis mainly parts way with Jonas' view pertaining what the philosopher calls "the element of wager in human acting". The argument presented here is that the most probable scenarios should be given precedence over an endless cluster of possible conjectures as a guide for an ethical action. In considering every conceivable risk, one would choose not to take any action before the sheer multitude of possibilities, in contradiction with the fact that the species extinction is the *summum malum,* which presents itself not as a matter of a hypothetical "if", but as a matter of the certain "when", given our restriction to planet Earth.

However, it is understandable that the Jonasian proposition of a heuristic of fear be limited to the risk of destruction led by humans. Let us consider the context: Jonas' mother died in the concentration camps of Auschwitz and he bore witness to the attempt to exterminate the Jewish people; moreover, he also witnessed the cold war and the rise of the nuclear threat. If the Jonasian *summum malum* exceeds the Hobbesian one, it is due to the fact that in Hobbes' time it was inconceivable that a ruler - no matter how insane - could be capable of exterminating an entire ethnic group or a whole group of other species. Nevertheless, while the Hobbesian *summum malum* is seemingly restricted to the philosopher's ignorance of species extinction, the Jonasian version also seems limited to the *uniformitarian paradigm*.

Throughout the XIX century, uniformitarianism – as defended by Lyell[9] - prevailed as the doctrine that explained the terrestrial geological transformations, serving as an alternative to the religious belief in a diluvian catastrophism. Broadly speaking, uniformitarianism postulated that the changes on the planetary surface were the result of gradual processes whose agents were not unusual, such as rain, snow, the erosion caused by the winds and so on. Based on his geological studies, Lyell concluded there was nothing to support the belief in the successive development of animal and vegetable life. Every being that ever was would have existed in every Earth era, and if a few had gone extinct, that would have been the result of slow processes such as lack of food, for instance (LYELL: 1990: pg. 123). In its time, uniformitarianism had deep implications in Darwin's work[10], leading him to the conclusion that extinctions always happened at a very slow pace, even slower than the rise of a new species (DARWIN: 1964: pg. 84). It is true that Darwin contradicted Lyell by pointing to the emergence of new species due to evolution and yet, both agreed that the phenomenon of extinction occurred gradually and related to the lack of resources, some sort of geographical restraints, which consequently led to the number of individuals dwindling. Darwin and Lyell's successors remained in keeping with the uniformitarian idea of slow extinction, even when it came to dinosaurs and other pre-historical animals so that science entered the XX century envisioning only one agent capable of causing sudden extinction: the human type.

It was only in the later 70s of the XX century that humankind was presented with the existence of events of global extinction caused by extraterrestrial forces. This knowledge was obtained in the outskirts of the Italian town of Gubbio in a place known as Gola del Bottaccione thanks to Walter Alvarez[11] noticing how abruptly the species foraminifera seemed to have disappeared considering their fossil presence in the different layers of the rocks. It was Luís Alvarez[12] (Walter's father) who suggested dating the clay in Gubbio and ended up detecting this extraordinary amount of iridium in the samples (ALVAREZ: 2000: pg. 69). It just so happens that iridium is an extremely rare element on the terrestrial surface, albeit

[9] Charles Lyell (1797-1875), Scottish geologist.
[10] Charles Darwin (1809-1882), English naturalist, biologist, and geologist.
[11] Walter Alvarez (born in 1940), American geologist.
[12] Luís Walter Alvarez (1911-1988), American physicist, Nobel prize in Physics (1968).

highly abundant in meteorites. Understanding they had an anomaly in their hands, the Alvarezes decided to analyse the dirt of other geological sites where species seemed o have disappeared suddenly and detected the same abnormal presence of iridium. In June 1980, the Alvarezes's article was published on *Science* under the title *Extraterrestrial Cause for the Cretaceous Tertiary Extinction*. The impact of this publication quickly spread beyond the realms of geology, positively influencing other fields of knowledge such as astrophysics[13], while also facing the fierce resistance of many scientists of the time, as can be confirmed in an article entitled *Miscasting the Dinosaur's Horoscope*[14]. This and other pieces in the media of the time like *Dinosaur Experts Resist Meteor Extinction Idea*[15] clearly show the extent to which science still stood by Lyell's Uniformitarian paradigm. A paradigm that ruled out any sudden change, even when confronted with evidences to the contrary. Let us not forget Lyell himself was perfectly aware of the sudden gap in fossil records. In his *Principles of Geology*, Lyell refers to an abrupt gap between fossil strata found in rocks of the end of the Cretaceous and the beginning of the Paleogene. According to Lyell, it was *impossible and non-philosophical* to suppose that this abrupt rupture truly represented a sudden change to the order of things and that such suppression was most likely due to a fault in the fossil records (LYELL: 1990: p. 328, v. 3). Darwin was also well aware of the sudden change in the fossils in the later part of the Cretaceous and, just like Lyell, he attributed this to a fault in the records, interpretation that can be found throughout his *On The Origin of Species.*

If nowadays science has already surpassed the uniformitarian paradigm and understands Earth's history as a combination of both uniformitarianism and neocatastrophism, still bioethics remains predominantly confined to a concern regarding the dangers of the human technological action, and neglects the fact that extinction is not an anomaly exclusively introduced by human intelligence, rather, it is a component of the erratic course of nature itself. Despite the present thesis being in unison with Jonas' definition for the *summum malum*, our disagreement lies on the procedural recommendations. Jonas is mainly concerned

[13] Inspired by the Alvarez' article, the American astrophysicist Carl Sagan (1934-1996) lead a team to model the effects of a nuclear war and conceived the concept of "nuclear winter" as a result.
[14] *The New York Times*. April 2, 1985.
[15] *The New York Times*. October 29, 1985.

with the dangers of technological action and although he is right in his caution, his concerns are limited by the context of his time. *Das Prinzip Verantwortung* is a 1979 work, published a year before the Alvarezes' article, whose impact took close to a decade to be absorbed by the most part of the scientific community.

As one of the strongest voices to take question with the unbridled technical progress and denounce the threat of disaster that comes with it, Jonas was a pioneer. His reservations in relation to technology are well substantiated by the fact that human action in the past need not be restrained by imaginative projections of possibilities. Whatever procedural blunders our ancestors made did not incur in irreversible consequences and hazard was, at most, brought upon the confines of time-space boundaries. The same cannot be said about our technologically empowered actions, whose oversights imperil not an isolated city but the very existence of humanity. It stands to reason that the possibility of extinction as the result of unrestrained technological development is unlikely scenario amidst the multitude of other possible scenarios and outcomes. However, this scenario belongs in a set whose probabilities could be altered by an ethical pact so as to reduce its likelihood. According to Jonas:

> **This reservation - that only the avoidance of the highest evil and not the pursuit of the highest good justifies, under certain special circumstances, that the interest of "others" is put at risk in its totality, for their own sake – does not offer support to justify the high stakes of technology. For these are not undertaken to preserve what exists or to alleviate what is unbearable, but rather to continually improve what has already been achieved, in other words, for *progress*, which at its most ambitious aims at bringing about an earthly paradise. It and its works stand therefore under the aegis of arrogance rather than of necessity (JONAS: 2015: pg. 85).**

Jonas is not wrong when he perceives technological progress as brimming with vanity more than being driven by necessity. Nevertheless, the scenario where life is wiped out is elevated in category from contingent to apodictic in the absence of such technological advances. Note that Jonas implies in the aforementioned excerpt that the stakes may be worth the risk were "to preserve what exists" (*id est*, humanity and other sentient beings) or "to alleviate what is unbearable" (the Jonasian *summum malum*: the collective extinction) the ultimate aim.

And yet, if the element of technological innovation is removed from the equation, the element of extinction ceases to be a mere possibility. It would then

constitute a certainty. Jonas himself appears to be fully aware of Earth's natural lifespan lapse in his 1988 work[16] when speaking of the end of planet Earth as the result of natural cosmic events: the end of terrestrial revolutions, meteor collisions, death of the Sun, etc. Remarkably, Jonas seems not to apply his defence to an *unconditional duty to exist* (JONAS: 2015: pg. 86), nor does he deem the extinction of the human species unbearable as he refers to such facts of incontrovertible certainty - and that will cause complete annihilation. Here is what he has to say on cosmic disasters:

> **We should not be terrified by this cosmic expiration: in this interval which has been conquered - for us of long duration - characterized by great articulations from the very wide extent, the *chances* lie precisely in what for us, and probably also for a divine observer, constitutes the meaning of all the cosmic adventure (JONAS: 2012: 35).**

Eight years stand between *Das Prinzip Verantwortung* and *Materie, Geist und Schöpfung.* Jonas does not express human extinction as the result of cosmic disasters is something to be feared in any of his works despite the fact that, as previously demonstrated, it belongs to the realm of absolute certainty and not that of mere contingency. At this point, the present thesis departures from Jonas. Even though the Jonasian ethic is not anthropocentric and does confer intrinsic worth not solely to humans, but to life, still it does not conceive the astronautic expansion of existence nor life's astrobiological dimension. Though Jonas does not define his ideas as anthropocentric, they are ecocentric - or *biogeocentric* even - wherein life and planet Earth are inseparable from each other. Jonas on contacting extraterrestrial intelligent entities:

> **This we do know: that with us and in us, in this part of the universe and at this moment of our fateful power, the cause of God tremble in balance. What does it matter to us whether somewhere else it prospers or is endangered, is rescued or squandered? That our signal going out somewhere or other in the universe may not be a death notice- with this we have enough on our hands. Let us concern ourselves with our Earth. Whatever might exist out there, here is where our destiny is decided[17] — and, along with our destiny, that share of the wager of creation which lies in our hands can either be preserved or betrayed. Let us care about it as if we were, in fact, unique in the universe (JONAS: 1996: pg. 197).**

[16] *Materia, Spirito e Creazione*. Morcellana: 2012. Translated from German by Paolo Becchi and Roberto Franzini Tibaldeo.
[17] Excerpt underlined by me.

According to the aforementioned excerpt, Jonas calls us to look after our own world as a precaution *that our signal (...) may not be a death notice*. As for how we can fend off our own extinction, given the fact that life has been so far intertwined with Earth, Jonas offers no perspectives. It is even possible to infer from this text that such extinction is not to be fended off, once, in the words of the philosopher *here is where our destiny is decided*, considering that Earth is not without an end and far from immune to cosmic interference. In establishing humanity's destiny as interwoven with the planet's, one has to passively comply with its indubitable future extinction, which is diametrically opposed to what Jonas himself advocates in stating that *an unconditional duty for mankind to exist, and it must not be confounded with the conditional duty of each and every man to exist* (JONAS: 2015: pg. 86).

If Jonas' perspective on the *summum malum* states it as the extinction of the human species it makes no sense to settle for Earth as our destined residence. Forasmuch as our world has an expiration date regardless of human action, the *summum malum* may only be avoided by means of technological actions that aim at expanding humanity and other life forms beyond their own shape and terrestrial constraints, as contended in this thesis. It is also the burden of this paper to offer *an astronautic dimension to existence*.

Jonas took a huge and necessary step by attracting notice to the relevance of a non-anthropocentric ethic. We must, however, take one more step ahead toward a Copernican revolution of ethics, wherein the Earth is a cradle and worthy of care, but does not constitute centre or final destination and is instead regarded as a starting point. We are far more likely to avoid the *summum malum* by spreading throughout the galaxy and serve our purpose as *distributors of the gift of life*. No other species detains the power and knowledge to accomplish this feat of – to use a Jonasian term - non-reciprocal generosity.

It is thus necessary to extend far beyond Jonas' concerns. It is not only the human technological action that should worry us, but also the unjustified human inaction in light of the scientific knowledge we currently detain. This is an immoral inaction that imperils more than the whole of humankind, but it puts at risk all life on Earth as well.

The expansionist and transhumanist endeavour proposed here is nothing like that of the first space run and its purposes, inasmuch as it worked within the framework of the cold war and was grounded on sentiments of vanity and competition. This proposal is above all about survival, and its first policy should be the creation of a space guard programme in order to protect the planet against cosmic menaces. Although science fiction does not intend to guess the future, there is in it a truth more powerful than reality.

For example: Clarke [18] 's *Rendezvous with Rama* seriously warns us regarding all this. The story begins with a great moral criticism on our tendency to act only when it is too late. Clarke starts by describing some real cosmic events that happened in our recent past. By remembering the meteorite that fell in Tunguska on June 30, 1908, he emphasises how vulnerable we are, given that *Moscow escaped destruction by three hours and four thousand kilometres – a margin invisibly small by the standards of the universe* (CLARKE: 2011: pg. 8). He also remembers the Sikhote-Alin meteorite falling close to Vladivostok in 1947 *with an explosion rivalling that of the newly invented uranium bomb* (CLARKE: 2011: pg. 8). It is quite clear that we are at the mercy of random cosmic events. We do not take serious measures regarding a space guard programme because we have not yet been hit in a way that really hurts us. So in order to demonstrate how random and indifferent the universe is, Clarke offers us a drastic fictional scene in which northern Italy is totally destroyed by thousands of tons of rock and metal falling from the sky. He writes:

> **The cities of Padua and Verona were wiped from the face of the Earth; and the last glories of Venice sank forever beneath the sea as the waters of the Adriatic came thundering landward after the hammer blow from space. Six hundred thousand people died, and the total damage was more than a trillion dollars. But the loss to art, to history, to science – to the whole human race, for the rest of time – was beyond all computation (CLARKE: 2011: pg. 9).**

Thanks to that trauma, mankind reacts by saying there will be no next time, and so the "Project Space Guard" arises. Clarke's warning is quite clear from the very beginning of the book: *Sooner or later, it was bound to happen* (CLARKE: 2011: p. 8). This thesis sustains Clarke is right, therefore is our moral obligation to

[18] Arthur C. Clarke (1917-2008), British scientist and sci-fi author.

act in anticipation against the human extinction. It would be better to act in anticipation than merely reacting.

Although environmental ethics is being taken more and more seriously, it is still quite unusual for philosophers to address themes that go beyond the terrestrial context. The act of visualising the Earth as if it were within a shielded box with no interactions with cosmic space is a common misconception. In fact, people do tend to visualise themselves as living inside a box whose transparency merely allows the entrance and escape of light and heat. Until now, the major cosmic environmental concern regards the problem of space debris orbiting our planet. But the planet Earth is not a closed system. Common knowledge tends to be easily misled by the false idea of planetary stability. As said before, our planet has suffered events that cause global extinction, which were triggered by extraterrestrial factors that caused the extinction of more than 75% of the species. There is no guarantee - and we should not even act as if there were one - that cosmic extinction events will not recur.

Moreover, the very idea of "cosmos", taking the meaning of the Greek term that refers to "order" and "beauty", is somewhat illusory. In so many ways, common knowledge still lives under the idea of an Aristotelian macrocosmic harmony – the comfortable belief in an everlasting world.

1.2. *Trasumanar*: from Dante to Huxley.

Despite its recent ascent as an organised movement in human history, transhumanism and its dearest propositions may be traced back to ideas postulated by ancient thinkers who could be considered proto-transhumanists. In order to understand this movement, it must be clarified that many of its claims[19] are strongly paralleled with ancient mystical mythopoetics.

As a matter of fact, “transhumanism” is a term probably used for the first time by Dante[20] in *La Divina Commedia* in order to express a kind of human transcendence towards God. Since there was not a proper term to express his

[19] Among all claims, the most recurrent ones are: immortality and paranormality; an existence with no suffering (or with less suffering, at least); and the one that interests us in the current thesis: the rising of a “new Earth” (in the sense of optimising and conserving our own world as well as of creating new habitable worlds whether natural or artificial ones.
[20] Durante degli Alighieri (1265-1321), better know as Dante Alighieri, Italian poet.

mystical experience in Heaven, Dante coins the neologism *trasumanar*. In English, an acceptable translation from the Dantesque original could be: *Transhumanising cannot be expressed with words / but let the (previous) example be enough / to those who will experience it by the grace (of God)*[21].

Two centuries after Dante, Pico della Mirandola[22] is considered to be a proto-humanist landmark of the Renaissance (MORE: 2013: pg. 9). In *Oration on the Dignity of Man*, Mirandola reinvents the myth of creation, writing as if the Gods addressed the humans. Notwithstanding the religious/mythological aspects found in the text, it proclaims one of the core transhumanistic ideals, which is that man does not have a ready-made form and is responsible for shaping himself. Mirandola writes:

> **We have given you, oh Adam, no visage proper to yourself, nor any endowment properly your own, in order that whatever place, whatever form, whatever gifts you may, with premeditation, select, these same you may have and possess through your own judgment and decision. The nature of all other creatures is defined and restricted within laws which We have laid down; you, by contrast, impeded by no such restrictions, may, by your own free will, to whose custody We have assigned you, trace for yourself the lineaments of your own nature. I have placed you at the very center of the world, so that from that vantage point you may with greater ease glance round about you on all that the world contains. We have made you a creature neither of heaven nor of earth, neither mortal nor immortal, in order that you may, as the free and proud shaper of your own being, fashion yourself in the form you may prefer. It will be in your power to descend to the lower, brutish forms of life; you will be able, though your own decision, to rise again to the superior orders whose life is divine (MIRANDOLA: 1956: p. 7-8).**

There are other proto-humanist noteworthy names such as Giordano Bruno[23], who intended to create some sort of meditation technique that was supposed to expand intelligence and memory. Also, Tommaso Campanella[24] who advocated in favour of a somewhat mystical eugenics in his work *The City of The Sun*, where he established that marriages determined by favourable astrological prognostications would lead to the development of brighter and stronger human

[21] Dante's original reads: *Trasumanar significa per verba non si poria / però l'essemplo basti a cui esperienza grazia serba*; Paradiso (1).
[22] Giovanni Piccolo della Mirandola (1463-1494), Italian philosopher.
[23] Filippo Bruno (1548-1600), better known as Giordano Bruno, Italian philosopher, and Christian monk.
[24] Giovanni Domenico Campanella, (1568-1639), better known as Tommaso Campanella, was an Italian philosopher, Dominican friar, and astrologer.

beings. Throughout the centuries, alchemists laboured to concoct the elixir of long life and sought other conceivable means to miraculously extend human capabilities.

It is quite clear that what was then sought after by magical means was later made possible by technological ones. Marquis de Condorcet[25] is not to be forgotten here, as he was a critical cornerstone of this departure from magical thinking. He was one of the first illuminist thinkers to suggest an improvement in human nature and circumstances boosted by scientific knowledge with the potential to bring prosperity to the world. According to Condorcet:

> **In fine, may it not be expected that the human race will be meliorated by new discoveries in the sciences and the arts, as an unavoidable consequence, in the means of individual and general prosperity; by farther progress in the principles of conduct, and in moral practice; and lastly, by the real improvement of our faculties, moral, intellectual and physical, which may be the result either of the improvement of the instruments which increase the power and direct the exercise of those faculties, or of the improvement of our natural organization itself. (…) Would it even be absurd to suppose this quality of melioration in the human species as susceptible of an indefinite advancement; to suppose that a period must one day arrive when death will be nothing more than the effect either of extraordinary accidents, or of the flow and gradual decay of the vital powers; and the duration of the middle space, of the interval between the birth of man and his decay, will itself have no assignable limit? (CONDORCET *apud* MORE: 2013: pg. 9-10).**

Since then, the word “transhumanism” has assumed several meanings, whose common point regards to the possibility of becoming more than human. Conversely, differences among ancient and contemporary meanings are huge. Dante’s *trasumanar*, for example, is a gift given by God. A grace not only spiritual but also corporeal, which is parallel with the Christian concept of resurrection: never a disembodied afterlife, given that the earthly Paradise is built in a post-apocalyptic world divinely created. Under this belief, the transformation of the mortal flesh into a glorious body is a promise, and promises do not depend on us. The Christian and Dantesque *trasumanar* is above all *hope.* The hope of being blessed and resurrected by God in new transhumanised bodies, in which our souls will be free from weakness or suffering in any instance.

[25] Marie Jean Antoine Nicolas de Caritat (1743-1794), also known as Nicolas de Condorcet, French philosopher and mathematician.

Another noteworthy difference between the Christian *trasumanar* and the contemporary transhumanism regards the distinction between *quality* and *quantity*. Contemporary transhumanism is dedicated to achieving *more*: more time, more life, more power, more pleasure, more places to go. The Christian *trasumanar*, in turn, by believing in a post-apocalyptic eternal life as reward, is not concerned with the extension of a bodily life, but with the quality of its even short existence. This concern for quality demands to dedicate life to the virtues that will guarantee a place in the Kingdom of God. It should be noted that in neither case is the Earthly Paradise incorporeal: from the Christian perspective, there is work to be done in the Divine Kingdom. From Christian *trasumanar* to contemporary transhumanism, the crucial difference is between *having hope* (in order to obtain a grace, a divine reward for our qualities/virtues) and *acting* (in order to guarantee more time and self-enhancement). If in Dante the *trasumanar* is a Godlike gift (*grazia*), the current transhumanistic movement is not interested in waiting for a possibility grounded in faith and hope. Instead of waiting for an eventual future Paradise, contemporary transhumanists want to make it real here and now.

The transhumanism proposed here is contrary to any guarantees provided by the Christian *trasumanar.* The Christian *trasumanar* is an apocalyptic guarantee, it is heaven established after the dead are resurrected in new glorious bodies. It is a promise rising in the horizon pending on the three theological virtues/qualities: hope (of one day reaching heaven), faith (in the existence of heaven itself) and charity (as a condition to enter heaven).

Conversely, contemporary transhumanism is not a guarantee, it is a goal founded in *desperation*[26]. There is no heaven guaranteed for this universe, although this heaven could be highly likely to exist in *some* universe, considering the cosmic adventure unfolds in multiple realities. Hence, it is imperative that we fight so that our universe is one of the successful scenarios since this is a universe prone to the emergence of life and which finds in the emergence of consciousness its greatest realisation. We should follow an ethic imperative: to see this planet not as our *destiny*, but as a *starting point*, given that the natural mortality of this world

[26] In the sense of: “the feeling of being in such a bad situation that you will take any risk to change it”.

is a concrete fact[27]. Raising the odds for life and consciousness is mandatory, and should be considered as our moral obligation as intelligent beings we indeed are.

At this point, it is worth to note that some theses and articles on transhumanism tend to turn to the *summum bonum* as a main theme. A good example is available in David Pearce[28]'s manifesto against all suffering:

> **This manifesto outlines a strategy to eradicate suffering in all sentient life. The abolitionist project is ambitious, implausible, but technically feasible. It is defended here on ethical utilitarian grounds. Genetic engineering and nanotechnology allow *Homo sapiens* to discard the legacy-wetware of our evolutionary past. Our post-human successors will rewrite the vertebrate genome, redesign the global ecosystem, and abolish suffering throughout the living world. (…) Our descendants may live in a civilisation of serenely well-motivated "high-achievers", animated by gradients of bliss. Their productivity may far eclipse our own[29].**

Although the transhumanistic approach sometimes may be utopian in several ways, the current thesis is focused on harm reduction policies. Many propositions have been put forward by transhumanists, but the idea that *techne* be intentionally employed to actively promote enhancement is one that is shared by all of them. This human intent that architects, plans, designs and produces results through technology is endorsed by transhumanists as part of the set of desirable items, provided that said directed intention is guided by an ethical criteria within a non-anthropocentric framework. The transhumanist *ethos* defends the maximum reduction of any involuntary suffering of sentient beings based on damage control. Although the many existing organised groups who self identify as transhumanists[30] subscribe to different strands of political positions, the alleviation of the suffering of all sentient beings is a commonality among them.

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[27] One could argue that the mortality of the universe is also a concrete fact. There is nothing to say, however, that other universes cannot be created from information provisioned by the consciousness that emerged here (*baby universes*, as imagined by Gardner, whose hypothesis we are going to analyse in the next chapter), constituting an *endless game*, a *never ending story* this way.

[28] A British philosopher, and co-founder of the World Transhumanist Association.

[29] PEARCE, D. *The Hedonistic Imperative.* Available at: https://www.hedweb.com/hedab.htm. Accessed on March 14, 2019.

[30] See for example the "Humanity Plus", who constitutes an organised transhumanist group. Official website: http://hplusmagazine.com (accessed December 1, 2018). There are also organised political movements such as the "Transhumanist Party" who in 2016 nominated Zoltan Istvan - a self-proclaimed "libertarian" - to the presidency of the USA. Official website: http://transhumanist-party.org (accessed December 1, 2018).

The term “transhumanism” as referring to the view that humans should better themselves through science and technology was first devised by Julian Huxley[31]. In 1957, Huxley publishes his article *Transhumanism*, with the premise that the human superior intellect did not grant us special rights but rather that it imposes us duties and demands that we be more responsible toward other beings and the universe as a whole. Huxley’s text is especially meaningful as it presents our enhancement not as a complimentary of a frivolous, vain, arrogant or self-absorbed motivation, but as the foundation on top of which a human *responsibility* that cannot be ignored is built:

> **As a result of a thousand million years of evolution, the universe is becoming conscious of itself, able to understand something of its past history and its possible future. This cosmic self-awareness is being realised in one tiny fragment of the universe — in a few of us human beings. Perhaps it has been realised elsewhere too, through the evolution of conscious living creatures on the planets of other stars. But on this our planet, it has never happened before (HUXLEY: 1957: p. 13-17).**

It is interesting to note Huxley’s considerations in regard to alien intelligence. That is the utmost tenet of transhumanism: in contrast with other outlooks, it does not ascribe inherent worth to humankind but to a *cosmic self-awareness*. The same type of awareness might have already come into shape at some other corner of the universe and might even be artificially created in our own world. That said, it is possible to postulate that transhumanism as conceived by Huxley, and defended here is not anthropocentric. Humankind’s inherent worth does not rest upon its form, but in its *intellect and awareness*. Therefore, said worth could take any other shape, including one of our own design.

When the claims driving the debate assert that a given being has value in their own right, chances are the focus is on how entitled said being is to have rights and why it is special in contrast with all the other ones whose value is merely instrumental. To Huxley, however, what matters is not a being’s right to something but its *responsibility*, *id est*, the duty that follows *the gift of intelligence*. But what is the nature of this responsibility?

[31] Julian Sorell Huxley (1887-1975), a British biologist, first director of United Nations Educational, Scientific and Cultural Organisation (UNESCO).

In an attempt to answer this question, one should not ignore the fact that much is said about humankind's destructive potential, about our impact on the planet, that our actions lead to the extinction of whole species and how we have been drastically changing the climate. All this is true. Nevertheless, it is also true that extinction is nature's default rule. The very same nature that was time and again referred to as possessing the intelligence of a watchmaker would be more accurately described as a *blind* watchmaker. Any sense of stability and safety are but an illusion that our brief existence in this world allows us to entertain.

While human destructive power is to be feared, mass extinction events have already taken place long before we came into being and will happen again at some point in the future. Be as damning as human impact on the planet may be, it still is not capable of making life utterly unsustainable. The same cannot be said about extreme cosmic events. It is a matter of time until the sun extinguishes, putting an end to all life on the planet. All shortcomings aside, the human species is the only one capable of protecting life – beyond that of its own species - against the fatal cosmic extinction. As pointed by Huxley:

> **The new understanding of the universe has come about through the new knowledge amassed in the last hundred years — by psychologists, biologists, and other scientists, by archaeologists, anthropologists, and historians. It has defined man's responsibility and destiny — to be an agent for the rest of the world in the job of realising its inherent potentialities as fully as possible. (…) That is his inescapable destiny, and the sooner he realises it and starts believing in it, the better for all concerned (HUXLEY: 1957: p. 13-17).**

That is the centre of Huxley's transhumanism, which this thesis agrees with: *intelligent beings who have a destiny and a responsibility to nature and the universe*. Some features of non-accidentality are made clear when Huxley holds that this responsibility constitutes an "inescapable destiny". Defining something as "inescapable" entails non-contingency, which seems quite out of place for a biologist, given the fact that the existence of humankind is nothing but a mere contingency like any other in the light of natural selection. A contingency susceptible to destruction as a result of an asteroid collision, any other random cosmic phenomenon or even as a result of its own technological advances run amok.

It is relevant to highlight that although Huxley opens his article by pointing out that self-awareness is being realised in us human beings, he does not rule out the possibility of it being realised elsewhere as well. Once Huxley establishes consciousness is a product of an evolving universe, it stands to reason that this consciousness has already been realised, is being realised and will be realised at other places and at other times given how vast the universe is. Our universe would thus be biophilic and the second chapter of this thesis demonstrates that there is enough evidence to support this view satisfactorily.

If consciousness is the result of an evolutionary process of the universe and if the universe is so vast, in the event of humankind not taking the lead of its *inescapable destiny* of *responsibility*, one day some other intelligent/self-aware species will. Nevertheless, it is possible to argue that Huxley's view is optimistic since the realisation of consciousness could well be unique to Earth, considering that which we call the "universe" is still a finite and limited set – no matter its size. The unlikelihood of this statement does not make it utterly impossible. Why is it then that Huxley bets on an “inescapable destiny” for intelligence?

As far as beliefs go, one might contend that perhaps there is a cosmic *telos* to favour the emergence of life. The realisation of intelligence, and self-awareness has however worse odds. After all, even if we work with the concept of infinity, not even the spatial nor the temporal endlessness of multiple universes may guarantee intelligence to come about.

Three philosophical questions arise from this Huxley’s excerpt. The first question is: *does the author advocates a cosmic Darwinism?* It would seem so in light of the link he establishes between the realisation of consciousness on planet Earth and an evolutionary process of thousands of years to subsequently state that the very same process could have happened elsewhere; The second one is: *does Huxley defend the existence of a cosmic plan*? The answer to this is: likely so, though hardly in a theist sense. The intelligence/self-awareness that is noticeable in us would act as an agent to make the *intrinsic potentialities* come to their own; that applies not only to humankind but *to the rest of the world*; This begets the third question: *which potentialities are these?*

Alas, Huxley does not provide an answer in his article to nature’s intrinsic potentialities to which he alludes. He propounds we have a responsibility to the

universe, but does not describe what constitutes said responsibility. Huxley's scope is limited to outlining our potential for self-enhancement by means of science and technology, our ability to overcome unnecessary misery:

> **Up till now, human life has generally been, as Hobbes described it, *nasty, brutish and short*; the great majority of human beings (if they have not already died young) have been afflicted with misery in one form or another— poverty, disease, ill-health, over-work, cruelty, or oppression. They have attempted to lighten their misery by means of their hopes and their ideals. (…) We are already justified in the conviction that human life as we know it in history is a wretched makeshift, rooted in ignorance; and that it could be transcended by a state of existence based on the illumination of knowledge and comprehension, just as our modern control of physical nature based on science transcends the tentative fumbling of our ancestors, that were rooted in superstition and professional secrecy (HUXLEY: 1957: p. 13-17).**

Huxley introduces a powerful point that appears to have gotten off track along the text. Clearly, the responsibility of which he speaks is one that the human species has over *the rest of the world*. The focus prematurely shifts, however, to a description of our capacity to overcome limitations. Notwithstanding, the transhumanists that ensued made clear that such responsibility and destiny is twofold: (1) there is a need to preserve life and consciousness - though not necessarily the anthropomorphic one through which consciousness is realised; (2) and the need to ensure the proliferation of life and of consciousness throughout the cosmos.

Huxley concludes his article by emphasising yet another important element of this *responsibility and destiny*: that it is not restricted to an individual process. That it is, instead, a collective one involving the whole species, which translates into a *new form of existence*.

> **The human species can, if it wishes, transcend itself — not just sporadically, an individual here in one way, an individual there in another way, but in its entirety, as humanity. We need a name for this new belief. Perhaps transhumanism will serve: man remaining man, but transcending himself, by realising new possibilities of and for his human nature. *I believe in transhumanism*: once there are enough people who can truly say that, the human species will be on the threshold of a new kind of existence, as different from ours as ours is from that of Peking man. It will at last be consciously fulfilling its real destiny (HUXLEY: 1957: p. 13-17).**

The ancient myths abound with tales of human transmutation into other species, not to mention people with magical powers. According to contemporary

transhumanists, that which we dreamed of in the form of fiction can now be realised by means of technological advancements. Those fantasies of ours from the past gradually take shape in present reality and in a likely future one, which calls for a new ethics.

This new ethics, as seen here, emerges from the stress between Dante and Huxley's concept of transhumanism: on Dante's perspective, a new Earth and a new body given by God (hope); on Huxley's view, there is nothing guaranteed, but a goal we should fight for instead of waiting for.

1.3. Prometheus unbound.

Even human beings who are contrary to transhumanism are *transanimals*, for their history is one of a constant plight against their biological limitations. Though some animal species are intellectually advanced to the point that they are able to make use of tools, the human species is the only one capable of not only transcending the biological limitations imposed upon them but also of altering many future possible outcomes by means of ever more sophisticated technological enhancements. The Darwinian mechanism for natural selection where those best suited to the environment survive is reshaped by human intelligence now that it is the environment that changes to adapt after our influence. We now detain the power to bring about river diversions, deforestation or reforestation. In a very likely future, such human modifications to entire worlds could be made possible by planetary engineering processes known as "terraforming". Technology - which encompasses genetic engineering - has advanced to the point whereby we can redesign ourselves as well as future generations.

This is paramount to the transhumanist thinking: the idea that not only is it feasible but also *desirable* that humankind draws upon *techne* to reshape itself and the surrounding environment to the extent that limitations and suffering of biological roots are mitigated or ultimately overcome altogether. Those evolutionary mechanisms driven by blind nature bear *intentionality* when driven by us. The claims asserting the *desirability* of this enterprise must, however, undergo philosophical scrutiny once an action grounded merely on its feasibility does not

entail ethics in its foundation. The fact that something is *possible* is not akin to it being *advisable*.

Such inquiry over the foundations of ethics is imperative considering that, at the present, the bulk of human activities is not limited to temporal-spatial confines as it once was. As pointed by Jonas, if our ancestors' misguided deeds put people in danger and posed a threat to a general quality of life that could linger for some time into the future, the contemporary human power of influence has a much farther reach. Our actions may affect the whole extent of the Earth as well as deprive our descendants of any future (JONAS: 2015: p. 31-34). The contentions regarding the prescriptive role of psychology no longer apply before this scenario. New ethical systems must be set forth. To that intent, the use of imagination as a tool is pivotal, since resigning to the contemplation of that which is and that which once was will not suffice anymore. A philosophy dedicated to probable futures is critical in light of the implications of the power we currently detain.

It is worth to remember that in the early nineteenth century Hegel[32] said, regarding our desire to establish how the world ought to be, that (...) *philosophy, at any rate, always comes too late to perform this function* (...) *the owl of Minerva begins its flight only with the onset of the dusk* (HEGEL: 1991: p. 23). This Hegelian allegory could however be reread by noting that the moment the owl of Minerva begins its flight, it has a brief overview of the world *before* a new dawn. Hence one of the reasons why this thesis is concerned with the philosopher Hans Jonas for the greater part: throughout his life work – notably in *Das Prinzip Verantwortung* - Jonas pleads for the outlining of a philosophy that contemplates the future. For instance, Jonas's words *Knowledge of the Possible is Heuristically Sufficient for the Doctrine of Principles* (JONAS: 2015: p. 73) are the philosopher's admission that the uncertainty of prognostications require extrapolations of an exponentially higher degree of complexity, but he goes on to say that

> **(…) this, however, does not preclude the projection of probable or arguably possible end effects. (…) Its means are thought experiences, which are not only hypothetical in the assumption of premises (...) but also conjectural in the inference from "if" to "then" (...) (JONAS: 2015: p. 73-74).**

[32] Georg Wilhelm Friedrich Hegel (1770-1831), German philosopher.

Traditional ethics is proven insufficient to perform such conjectural endeavour. Fiction then comes into play, pointed out by Jonas as:

> **(...) a casuistry of the imagination which, unlike the customary casuistries of law and morality that serve the trying out of principles already known, assists in the tracking and discovering of principles still unknown. The serious side of science fiction lies precisely in its performing such well-informed thought experiments, whose vivid imaginary results may assume the heuristic function proposed. (See, for e.g., A. Huxley's Brave New World.) (JONAS: 2015: p. 74).**

Other thinkers are in alignment with Jonas when they characterise the significance of science fiction to society. Clarke, for one, defends that:

> **Fiction is more than non-fiction in some ways (…). You can stretch people's minds, alerting them to the possibilities of the future, which is very important in an age where things are changing rapidly**[33].

Foucault viewed fiction as not being reduced to an instrumental conjectural role, one for foresight and admonition, but also as an inchoative tool to produce the future:

> **It seems to me that the possibility exists for fiction to function in truth, for a fictional discourse to induce effects of truth, and for bringing it about that a true discourse engenders or "manufactures" something that does not as yet exist, that is, "fictions" it. One "fictions" history on the basis of a political reality that make it true, one "fictions" a politics not yet in existence on the basis of a historical truth (FOUCAULT: 1994: p. 236).**

Thus, there are at least two distinct senses to the act of *fictioning* – embracing here the Foucaultian neologism. One is ascribed by Foucault himself, which is that of imagining something in order to bring such thing into existence, a productive engagement with the aim of realisation, which is the intent of the transhumanist movement. The second sense of *fictioning* is that of prescribing a desirable future. Prescribing a city of the future is a simpler task than the other sense of *fictioning*: to use fiction as a toolkit for anticipation in order to lay grounds for an ethic, as put forward by Clarke. After all, envisioning the future involves the assessment of an immeasurable number of different degrees of likelihood inherent

[33] Clarke, Arthur C. Interviewed by *The AV Club* (2004, February 18). Retrieved from: https://www.avclub.com/arthur-c-clarke-1798208319. October 12 2018.

to a barrage of possible outcomes that are hard to grasp due to our cognitive limitations. Prescribing a desirable future, on the other hand, is more reasonable. It is what the current thesis intends to do, given that it is, as Huxley sustains, our responsibility as intelligent species.

In light of all this, the present thesis is in consonance with Jonas in his quest for the elaboration of a new ethic that meets the demands of the current human condition, in view that in the past:

> **(...) *techne* in the form of modern technology has turned into an infinite forward-thrust of the race, its most significant enterprise, in whose permanent, self-transcending advance to ever greater things the vocation of man tends to be seen, and whose success of maximal control over things and himself appears as the consummation of his destiny (...) Ethical significance belonged to the direct dealing of man with man, including the dealing with himself: all traditional ethics is *anthropocentric* (...) The good and evil about which action had to care lay close to the act, either in the praxis itself or in its immediate reach, and were not a matter for remote planning. This proximity of ends pertained to time as well as space. The effective range of action was small, the time-span of foresight, goal-setting and accountability was short, control of circumstances limited (...). The long run of consequences beyond was left to chance, fate or providence (JONAS: 2015: p. 35).**

The Kantian ethics comprising human-human relationships is not rendered obsolete by the emergence of this new ethic but has its scope expanded instead. Both Jonas and transhumanists alike converge in the argument for a model that stretches beyond anthropocentric views in order to escape the greatest of all evils: the extinction of human species. Although this argument seems anthropocentric, it is not. Humankind is seen as the only species who is *responsible* for the other living beings, not as *more valuable* than them. We shall see later the main points that sustain such argument. Shared common grounds notwithstanding, there are points of rupture between Jonas and transhumanists that require closer examination.

Just as in the myth of Prometheus, fire is the element that endows us with the power of the gods. Since its discovery, we have been ceaselessly changing nature - our own and that which surrounds us - like no other sentient being on this planet has. Our *transanimal* condition entices us to “fiction” worlds in order to create them. One may ponder that the gods represented in our myths are much more than an expression of our superstitious understanding of nature. Perhaps

such gods are a product of transposed nostalgia: a longing for the future. The fictional drive, so far manifested only in humans, allows us to build narratives that illustrate not only fears but aspirations as well. Technological advances progressively turn real what once was fiction and transfigures us into the mythical entities we dreaded and revered erstwhile as we become beings able to fly, to master electricity and magnetism and even to unveil secrets of life and death.

We would be easily taken for gods or wizards if our existence were to be witnessed by a 19th century villager since current technology can only be discerned from yesterday's magic due to the degree of acquired knowledge. As formulated by Clarke in his third law: *Any sufficiently advanced technology is indistinguishable from magic*[34]. It just so happens that knowledge and power of such scale may create just like it may destroy, so that it would be naive to praise our state-of-the-art *techne* as being inherently good. The urgency of a new ethical system that accounts for the future is justified precisely by the enormity of the technological power and knowledge acquired by humankind, as argued by Jonas:

> **Prometheus definitively unbound, invested with unprecedented strength by science, which also pushes the economy into uncontrolled expansion, requires a system of ethics involving freely accepted restraints to prevent the power of human beings from becoming a curse to them. No previous ethics thus provides guidance as for to which norms of "good" or "evil" the entirely novel forms of power and its possible creations should subscribe. (…) is that the golden promises of modern technology have turned into a threat, and that technology is inseparably linked with the threat. (…) The new territory humankind has conquered with high technology is still a no-man's land for ethical theory (JONAS: 2015: p. 21).**

All things considered, the current thesis holds Jonas's premises are perfectly correct (the pressing need for a new non-anthropocentric ethic, the advance of the heuristic of fear), but his conclusions regarding action are in contradiction with these very same premises. From a transhumanist perspective, one must go beyond anthropocentrism, which is what Jonas also proposes. But, further than that, one must also go beyond his *biogeocentrism*.

In order to do that, it is necessary to take into serious consideration the main critics against contemporary transhumanism. On the basis thereof, the main

[34] Clarke describes his third law é in the 1973 edition of *Profiles of the Future: An Inquiry into the Limits of the Possible*. Different versions of this same law made earlier appearance, most frequently within literary works of fiction, such as in *The Hound of Death* by Agatha Christie (1933), where it reads: *The supernatural is only the natural of which the laws are not yet understood*.

actors calling for the ethical discussion are presented here: on the one side there is the transhumanist movement and its apology for the application of *techne* to improve and overcome the human condition. Conversely, there are contemporary philosophers who speak from a conservative standpoint, such as Fukuyama[35], Sandel[36], and Jonas himself, whose objections and warnings must be seriously taken into account.

1.4. Objections to transhumanism.

1.4.1. First objection: the "Ship of Theseus Paradox".

One of the most recurrent of the existing criticisms against transhumanism is the assumption of a supposed dualism between mind and matter preconized by transhumanists. This misconception is the result of the use of the verb *to upload* to describe the hypothetical process of transferring a human mind to an augmented artificial construct of indefinite longevity, something like a synthetic and enhanced version of our bodies. Nevertheless, with few exceptions, transhumanists tend to be materialists and concede that conscience requires a physical vessel and therefore discard the approach that contemplates the existence of incorporeal consciousness. As elucidated by More[37]:

> **A functionalist holds that a particular mental state or cognitive system is independent of any specific physical instantiation, but must always be physically instantiated at any time in some physical form. Functionalism is a form of physicalism that differs from both identity theory (a mental state is identical to a specific brain state) and behaviourism (mental terms can be reduced to behavioural descriptions). According to functionalism, mental states such as beliefs and desires consist of their causal role. That is, mental states are causal relations to other mental states, sensory inputs, and behavioural outputs. Because mental states are constituted by their functional role, they can be realized on multiple levels and manifested in many systems, including non-biological systems, so long as the system performs the appropriate functions (MORE: 2013: p. 7).**

[35] American philosopher, and economist. Birth: Chicago, EUA, 1952.
[36] American philosopher. Birth: Minneapolis, EUA, 1953.
[37] Max More, born in 1964, British philosopher and futurist.

The ship of Theseus paradox, as posited by Plutarch[38] in *Parallel Lives*, gave rise to a great variety of considerations and answers provided by philosophers and serves as a great tool to demonstrate transhumanist functionalism. Plainly speaking, the paradox goes something like this (PLUTARCH: 2008: pg. 20): Theseus sets sail in his ship Argos to a long voyage. As time goes by, the decayed parts of Argos are gradually replaced by new ones of the same material until that, eventually, every plank was replaced. The question thus posited is: would it still have been the same ship? Does Argos remain the same Argos? If we are to think in Aristotelian terms and take into account the four causes (formal, material, final and efficient), the mere change in its material cause is not enough to make it a new ship. After all, the replacement of the composing parts of Argos was performed with other parts of the same nature: wood being replaced by wood.

However, if a wood part were to be replaced by a metal one, the ship would now be composed of an entirely different material whereby not only the material cause would have been modified, the efficient cause that makes the existence of the ship possible would also have been altered. Following Leibniz[39], one would conclude this not to be the same Argos, as he claims “A” is identical with “B” if and only if “A” and “B” have all of the same properties, then everything that is true for “A” must thus be true for “B”. It is interesting to observe that a metallic Argos should be more resistant than its previous wood version. It is even conceivable that engineers reassemble the ship in such a way that its formal cause is modified, presuming the new design makes it more efficient. At the end of the process, the only common cause between the original Argos and the one found decades later is its final cause, for the object remains a ship and retains its finality, which is that of transporting people through the ocean. We could even envision a situation wherein the engineers do not limit their modifications to the nature of the parts of the ship but also its existential end, converting the vessel into a means of transportation to be used not only at sea but also on land and air. Having its final cause modified, its name would be the single remaining aspect still shared between the old and the new Argos.

[38] Lucius Mestrius Plutarchus (46-120), Greek philosopher.
[39] Gottfried Wilhelm Leibniz (1646-1716), German philosopher.

The allegory of the ship of Theseus may be used as a proxy for the human identity. It is known that, within the span of years, a body has its components replaced by others of equivalent nature. The fundamental difference between a ship and a human lies on the fact that the replacement process of human parts is *autopoietic* and does not require – not necessarily – any interference of external agents. The growth process of the body and the modifications it undergoes, such as hair growth or hair loss, increase or decrease of muscle tissue and the like are not tantamount to change of shape, as it remains anthropic and both its origin and the end of its replaced parts persist. A fifty-year-old man shares almost no cells with his twenty-year-old self, but he is understood to be "the same man". A muscle cell is replaced by another muscle cell and so on and so forth so that the efficient cause remains identical[40].

Regardless of the autopoietic nature of the replenishing process of the human body (and that of any other biological body), *techne* allows us to exert direct influence and promote the replacement of parts with other parts whose efficient cause is diverse. It is the *homo faber* that redesigns itself through its transbiological action. Artificial parts perform the same functions as the replaced biological ones, *id est*, their final cause is identical.

Does this biotechnology that is capable of mitigating or eliminating suffering ultimately alter our human nature? We are not likely to find any legal or philosophical considerations offering grounds to deny the status of humanity to an individual who has prosthetic organs or limbs. But what if *every* body part were to be replaced by more resistant and long-lasting synthetic equivalent ones? What if said replacement granted super-human advantages? At which point, if there is any, does one cease being human and become something else?

Although transhumanism is not dualistic, but rather, as previously explained, functionalist, this functionalism posits us before another question that is of particular relevance to the medical praxis: is it ethical to allow for the voluntary removal of healthy biological parts in order to accommodate their more efficient synthetic counterparts in the absence of any ailment that demands treatment? The

[40] Note that when the efficient cause of a cell changes we have cancer, and if this condition is not corrected, the organism will meet its end.

transhumanist movement promotes the right to such replacements, as can be seen in point 7 on the *Transhumanist Declaration:*

> **We favour morphological freedom – the right to modify and enhance one's body, cognition, and emotions. This freedom includes the right to use techniques and technologies to extend life, preserve the self though cryonics, uploading, and other means, and to choose further modifications and enhancements (VITA-MORE et al: 2013: p. 55).**

It is important to note that if the technological replacements do not entail function modification, they may characterise *transbiologism*, *transanimalism*, but not transhumanism. An artificial lens is built so as to replicate the exact same functions of a biological lens. A prosthetic arm developed with currently available technology is capable of performing many - but not all - of the functions performed by an organic arm. A synthetic heart is intended as a replacement only to its faulty counterpart.

For the sake of argument, let us contemplate a scenario where every piece of the human biological machinery is gradually replaced, including its neurons until there is nothing organic left in the individual in question. It is the memory that sustains identity in this case: a hypothetical human artificially rebuilt from the ground up would be identified as being the same as its former biological human form. Even if he/she found him/herself having different thoughts and preferences, one could argue that he/she persists as the same human being due to a biographical line. Nonetheless, this holistic replacement that enables indefinite replenishment of parts would likewise enable indefinite mortality. Artificial limbs and organs are infused with increasingly sophisticated new technology, making them more powerful. Would it be appropriate to exclude an arguably immortal individual from the group of those we deem human? This is a whole new problem of dramatic social ramifications. Among the results emerging from these new biotechnologies is the decline of the mortality rate and the extension of lifespan that could have an economic impact on social security and the ecological implications of an ever increasing, enduring and interfering human population, to name a few of the consequences. Even bigger issues will follow, as we take longer to die or even stop dying altogether. That leads us to the second objection raised against transhumanism: the inherent risks posed by the rise of a new and more powerful species.

1.4.2. Second objection: the rise of the super-humans.

Fukuyama nominates transhumanism "the world's most dangerous idea": the rise of a class capable of enhancing themselves to super-human levels by means of private economic resources. According to him:

> **The first victim of transhumanism might be equality. (...) Underlying this idea of the equality of rights is the belief that we all possess a human essence that dwarfs manifest differences in skin color, beauty, and even intelligence. This essence and the view that individuals thus have inherent value is at the heart of political liberalism. But modifying that essence is the core of the transhumanist project. If we start transforming ourselves into something superior, what rights will these enhanced creatures claim, and what rights will they possess when compared to those left behind? If some move ahead, can anyone afford not to follow? These questions are troubling enough within rich, developed societies. Add in the implications for citizens of the world's poorest countries -- for whom biotechnology's marvels likely will be out of reach -- and the threat to the idea of equality becomes even more menacing.[41]**

The fact that such concerns might seem to belong only to the realm of fiction[42] does not mean we should take them lightly. Given that our world is one of such acute disparities where some people have access to resources denied to others, would it not be possible for transhumanism to contribute to the exacerbation of inequalities by giving birth to technologically enhanced human beings?

Despite Fukuyama's pertinent concerns, it is relevant to note that technology tends to become more affordable as it advances. Frontier technologies, which are at first within the exclusive reach of a wealthy few, are made accessible to those of more limited means not so later on. Michio Kaku[43] alludes to this matter demonstrating that, historically, technologies evolve in four basic stages: at an initial stage, a product is so precious it remains unattainable even to the most wealthy ones; to that, follows the stage where it becomes accessible to those who have the means to afford it at its high costs; the third stage is marked by prices plummeting in such a way that the technology is amply

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[41] FUKUYAMA, Francis. *Transhumanism: The World's Most Dangerous Idea*. Available at: http://www.au.dk/fukuyama/boger/essay/. Accessed in November 2nd, 2018.
[42] It is indeed frequently denounced in science fiction movies and books such as *GATTACA* (1997) where ordinary humans suffer genetic discrimination.
[43] Michio Kaku (born in 1947), American physicist.

diffused; in its fourth stage, technology is assimilated to quotidian life to the extent that it becomes a *fashion statement*, turning to mere decorative accessories. A good example is human-mastered electricity: initially inaccessible and restricted to laboratories it then went on to become a product available to those who could pay a steep price for it; next, it was made so cheap that just about anyone may currently enjoy it; in developed societies, electricity is so commonplace that this technology has moved on to its fourth economic stage where it is used as decoration (KAKU: 2011: p. 335-337). Examples of this trend abound and the same stages could be described in the history of medication, of medical procedures and its related technologies all without losing sight of the fact that just a pair of shoes or glasses were a luxury of the financially privileged not too long ago. With all this in mind, it is considerably reasonable to assume that transhumanist enhancements are likely to start off as exclusive to the rich but become more affordable over time. In effect, the first rich adopters pay more to have access to a technology that is still in its early stages and in need of much refinement. They play the role of "guinea pigs" or "beta users" thus paving the way for the further development of the technology so that by the time it reaches the masses, it is actually safer.

However, these human enhancements becoming more broadly widespread do not preclude the risk of irresponsible use of these technologies. As further elaborates Fukuyama:

> **Nobody knows what technological possibilities will emerge for human self-modification. But we can already see the stirrings of Promethean desires in how we prescribe drugs to alter the behaviour and personalities of our children. The environmental movement has taught us humility and respect for the integrity of nonhuman nature. We need a similar humility concerning our human nature. If we do not develop it soon, we may unwittingly invite the transhumanists to deface humanity with their genetic bulldozers and psychotropic shopping malls.**[44]

Furthermore, another concern raised is precisely the possible environmental impact given the extended - potentially indefinite - longevity of the transhumanists on a planet where new babies come to the world every minute.

[44] FUKUYAMA, Francis. *Transhumanism: The World's Most Dangerous Idea*. Available at: http://www.au.dk/fukuyama/boger/essay/. Accessed in November 2nd, 2018.

Despite the relevance of these forewarnings, these are issues that could be solved with adequate public policies and regulations.

If to Fukuyama “the world’s most dangerous idea” is transhumanism, this thesis upholds the exact opposite: the most dangerous idea is staying human, restricted to Earth at the mercy of the whims of chance. The fact that there are contingent dangers inherent to technical progress or the need for regulations is not disputed here. However, in light of the fact that we exist within a universe where chance may be ruthless - as seen in global extinction events - our hope to survive as a species lies on the ethical application of technology and perforce on overcoming our terrestrial confinements. Although it is true that this same Promethean impulse may render our current world impracticable and destroy us, that is a contingent scenario. Natural extinction because our restriction to planet Earth, however, constitutes certainty. Humankind has been lucky for an amount of time that is extremely short cosmically speaking, and it is the burden of this thesis to remind that:

> **(...) that all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius are destined to extinction in the vast death of the solar system, and that the whole temple of Man's achievement must inevitably be buried beneath the debris of a universe in ruins – all these things, if not quite beyond dispute, are yet so nearly certain that no philosophy which rejects them can hope to stand (RUSSEL *apud* CLARKE: 1970: p. 256)**

In view of all the above, we now move on to the third objection made against transhumanism: the dangers in “playing God”.

1.4.3. Third objection: genetic engineering

Finally, one of the main reservations regarding transhumanism accuses the movement of seeking to achieve an alleged “perfection” of humankind making use of eugenics or genetic manipulation. Perfection as an end characterises utopian ideals, which is quite distinctive from that which transhumanism intends. According to Max More:

> **(…) Transhumanists seek not utopia, but perpetual progress – a never-ending movement toward the ever-distant goal of extropia. If the transhumanist project is successful, we may no longer suffer some of the miseries that have always plagued human existence. But that is no reason to expect life to be free of risks, dangers, conflicts, and struggle. Outside, perhaps, of David Pearce's goal of eliminating all suffering, you will have to search far and wide to find any suggestion of utopia or perfection in transhumanist writing. (…) Transhumanism is defined by its commitment to shaping fundamentally better futures as defined by values, goals, and general direction, not specific goals. Even to the extent that a goal is somewhat specific – say, abolishing aging, becoming post-biological, or enhancing cognitive abilities to some arbitrary degree – the means and time frame in which these might be achieved are open to differing views. Transhumanism per se says much about goals but nothing about specific means or schedules. (…) Transhumanists do seek to improve the human body, by making it resistant to aging, damage, and disease, and by enhancing its senses and sharpening the cognition of our biological brains. (…) In reality, transhumanism doesn't find the biological human body disgusting or frightening. It does find it to be a marvelous yet flawed piece of engineering. It could hardly be otherwise, given that it was designed by a blind watchmaker, as Richard Dawkins put it. True transhumanism *does* seek to enable each of us to alter and improve (…) the human body and champions morphological freedom. Rather than denying the body, transhumanists typically want to choose its form and be able to inhabit different bodies, including virtual bodies (MORE: 2013: p. 14-15).**

In view of this, it is not accurate to assert that transhumanism strives for *perfection* (a final state). It is *enhancement* - an endless process - that which transhumanism seeks. Should the hypothetical state of perfection be the goal of transhumanism, the movement's ideals would then be consistent with the eugenic motivations conceptualised by the Nazi and their ideal of “superior race”. Nazism, however, hinges on negative eugenics, namely compulsory or encouraged sterilisation of people appearing to have deemed undesirable traits and the abortion of embryos and ferns bearing derelict genetic properties. Such practices were not reserved to the unborn only once Nazism, as it is putative knowledge, is also a proponent of genocide.

Transhumanists reject negative eugenics in all its forms but embrace the new positive eugenics, which has in the screening of desirable embryos *in vitru* a prominent practice. This screening, one must add, would not be - or should not be - based on sheer aesthetic criteria, but on the intent of freeing humans of genetic markers that are cause for grave suffering.

Take the case of the Huntington gene by way of illustration: an autosomal dominant disease highly prevalent among Europeans (one in every hundred

thousand born is estimated to be afflicted[45]) to which there is no known cure. The offspring of a bearer of the Huntington gene has a 50% chance of inheriting the disorder[46], which normally manifests around one's forties and is characterised by progressive and irreversible loss of motor and cognitive functions, which is to say one's complete autonomy and results in a premature death after many years of slow and painful degeneration. It is not the sterilisation of those carrying the Huntington gene – either willing or unwilling - that is encouraged, but the positive eugenics instead: the *in vitru* selection of those embryos that do not carry the disease. The question "Is it ethical to screen embryos?" is contrasted with another question "Is it ethical to sentence an individual to an existence with an incurable disease that imposes such unbearable pain when this could be averted?".

Under extreme circumstances, positive eugenics is regarded as acceptable by the medical ethics, which does not entail that its practices should be adopted in other instances, however tempting they might seem. An *in vitru* fertilisation usually produces many embryos, but only one of them is implanted in the uterus while the remainder is discarded. Advances in modern technology allow us to detect which among those embryos present severe oncogenes or other less desirable predispositions, from simple myopia to genetic markers for depression. Medical ethics have no qualms about discarding syndromic embryos once they are identified but does not apply the same conduct to any genetic defect without distinction. Some traits, as undesired as they might be, have available preventive measures or treatments and their removal could result in the elimination of other highly desirable traits. In eliminating an organism on account of its cancer, myopia or Alzheimer genes, we would also be eliminating all the important uniqueness of this life in the process. We would be depriving the world of an individual whose existence would hold meaning to him/herself and to many others, regardless of an incidental suffering resulting from any given condition. To avoid any misconstruction, let it be clear this is not an appeal to the conception of an "elevated importance" of genius individuals, but a defence to *the right of every single human being to exist*. Is that however not the case when we test for more severe conditions in order to eliminate them as with the Huntington gene? What

[45] According to European Huntington's Disease Network. Available at http://www.ehdn.org/ accessed on 2nd December, 2018.
[46] If both parents are carriers of the gene, the odds are increased to 75%.

right do we have to bereave a person of at least four decades of existence, especially if we consider the possibility of the discovery of a cure at any point? The answers to these questions do not come easily and pose even a bigger challenge in light of the fact that many embryos will invariably be discarded in any case within the context of *in vitru* fertilisation. Why not select the best seed? However, in so doing, what would stop this from being permissible to anyone else, at risk of engendering a *GATTACA*[47]*- like society?* Although it may be tantalising to put positive eugenics into practice - and this is a position many transhumanists uphold - there is yet another process that does not deny anyone the right to exist: genetic editing.

The *Clustered Regularly Interspaced Short Palindromic Repeats* technology (CRISPR), under full development, allows for selected DNA segments to be targeted for deletion[48]. Biology is essentially information. Once the genes responsible for suffering are identified, it is possible to delete them much like a text editor removes grammar errors. In theory, it is even possible to add information, conferring once inexistent qualities to the organism. The possibilities offered by this technology are vast and include the suppression or reversion of not only diseases but of the aging process, the enhancement of strength and improvement of cognitive capacities. In other words: *enhancement*, the core drive to transhumanism. As CRISPR technology develops and goes through the four technological stages previously described and becomes sufficiently advanced and widely spread, new regulatory framework will be required.

The transhumanist aim of correcting nature's faults tends to find resistance in the conservative thought resting on the premise that such practices are unnatural, rejecting the *gift* and the *openness to the unbidden* (SANDEL: 2007: p. 59). At this point, it is interesting to observe the similarities between Sandel and Jonas: both see the unforeseen, chance, error, and chaos as a transcending factor. The transhumanist efforts to eliminate "error" from nature would thus be a

[47] North American science fiction movie (1997) depicting a world where it is mandatory that reproduction occurs exclusively by means of genetic selection and individuals born without undergoing this previous screening suffer discrimination. Written and directed by Andrew Niccol.
[48] In a matter of fact, in 2018 a Chinese scientist claimed to have created the first human beings HIV-immune, which poses serious bioethical questions. Information available at https://www.technologyreview.com/s/612458/exclusive-chinese-scientists-are-creating-crispr-babies/, link accessed on 2nd December, 2018.

negation of said transcendence. A crucial distinction sets the way these authors regard chance, though: Sandel views practical aspects, human values and life in society as the major problem. In his words:

> **(...) That we care deeply about our children and yet can't choose the kind we want teaches parents to be open to the unbidden.. (...) One of the blessings of seeing ourselves as creatures of nature, God, or fortune is that we are not wholly responsible for the way we are. The more we become masters of our genetic endowments, the greater the burden we bear for the talents we have and the way we perform (SANDEL: 2013: p. 98-99).**

Sandel goes on to demonstrate the intrinsic relation between the gifts of happenstance and human virtues:

> **Why, after all, do the successful owe anything to the least-advantaged members of society? One compelling answer to this question leans heavily on the notion of giftedness. The natural talents that enable the successful to flourish are not their own doing but, rather, their good fortune – a result of genetic lottery. If our genetic endowments are gifts, rather than achievements for which we can claim credit, it is a mistake and a conceit to assume that we are entitled to the full measure of the bounty they reap in a market economy. We, therefore, have an obligation to share this bounty with those who, through no fault of their own, lack comparable gifts. Here, then, is the connection between solidarity and giftedness: A lively sense of the contingency of our gifts — an awareness that none of us is wholly responsible for his or her success — saves a meritocratic society from sliding into the smug assumption that success is the crown of virtue, that the rich are rich because they are more deserving than the poor (SANDEL: 2013: p. 98-99).**

Although he is right when emphasising that none of us is solely responsible by our own success, Sandel makes a mistake by placing the fundamental source of solidarity on natural inequality. Genes are not destiny and there are no guarantees to determine that a genetically well-endowed person becomes successful in the future. At best, it is only possible to ensure the preclusion of certain intrinsic ailments - but not of the extrinsic ones, those related to misfortune, accidents and other happenstances. Conferring an optimum organic structure for a person to act in the world is the most that can be achieved and nothing can be definitively done regarding this person's relationship with others and their existence. No matter how much the playing field of each individual's origin is levelled by genetic engineering, the environmental circumstances will remain random and under the rule of "luck". The contingency of life is not removed by the

selection or edition of genes. It is the uneven organic starting point that is mitigated or completely eliminated. The existence of human solidarity is not dependent on the extreme suffering of others as there is plenty randomness of fate and accidents in the world to trigger in us the impulse to help those in need. An existence free from diseases or filled with super-humans who are mentally and physically powerful is not an existence free from suffering that does not require mutual support. As much as genetic engineering may improve social and individual conditions, it cannot eliminate chance from life.

Moreover, it is possible to use one of Sandel's arguments *in favour of* transhumanism. The idea that we have an obligation to share this bounty with those who, through no fault of their own, lack comparable gifts is precisely what may serve as justification to support the socialisation of advantageous genes. Genetic edition therapies would join the ranks of solidary acts, which is quite distant from selecting one's offspring, creating thus a divide between the "accidental" and the "chosen ones".

There is yet another way to contemplate chance: a metaphysical one. That is what Jonas offers us in asking:

> **How, then, does development come about? Why didn't the universe stop with the attainment of the elements, radiation, and the laws of causality? Why didn't it simply remain at this stage of most general order, with the macrocosmic and chemical formations that grew directly out of it? The answer to this question was given by Darwin There was always enough "disorder" left over to occasion the formation of new characteristics (structural factors) by accidental, random events, and the momentary successes were subject to the process of selection with its criterion of survival by sheer numbers. This is the required 'transcending factor' that leads to the new and then to the higher, and it does so without pre-information, without logos, without planning, even without striving, but only by means of the susceptibility of a given order, already coded for "information", to a surrounding disorder that forces itself upon it as additional information (JONAS: 2010: p. 17).**

In regarding "disorder" and "blind chance" as the transcending factors of the universe and supposing this to be true we face a problem: the human intent, the wish to impose order to chaos, to fix the disorganisation. In short, does the impulse to *direct* evolution constitute a metaphysical problem? Human intelligence is the exact opposite of disorganised and blind chance. With our intelligence, would we be deniers of transcendence? The ontological aspects underlying the

nature of our universe and life itself must be addressed if we are to answer these questions. These are the grounds we are to walk in the chapter *Metaphysics*.

1.5. The *Starchild*[49] beyond anthropocentrism.

All things considered, we return to the transhumanist key ethical point in this thesis: *the biocosmic expansion as a moral imperative*. Faced with the question “why should this be done?” even the answer because we should survive" may sound insufficient, and generates another question: “what is the relevance of our survival? What makes us so important?” This thesis intends to demonstrate every sentient being is endowed with intrinsic value. Human intelligence does not endow us with more intrinsic value in comparison to other animals, but poses us moral obligations on one another, on the animals, and on the world.

The matter of a clear distinction between intrinsic value and instrumental value is one of the oldest contentions in bioethics history. Among all existing things in the universe, which of them hold value in their own right and which of them would solely hold value as a tool? This debate is not foreign to that between contingency and necessity. Instrumental value is always contingent as it depends on context. Inherent value, in turn, evokes the concept that an entity has value in itself, which poses a philosophical conundrum that is hard to solve: how can one speak of intrinsic value if any value depends on an observer capable of recognising it? To some thinkers, the notion of a “truncated intrinsic value” would be more suitable (CALLICOTT *apud* COCKELL: 2016: p. 169), whereas others prefer the concept of a truly inherent intrinsic value (ROLSTON *apud* COCKELL: 2016: p. 169). It is not the intent of this thesis to dispute whether there is a “metaphysical realism” in the concept of intrinsic value or whether this concept is nothing more than a nominalist convention. The matter at hand here is: *once the existence of intrinsic value is recognised, which beings are intrinsically valuable and why?*

From an anthropocentric viewpoint, humans are the sole bearers of intrinsic value, whilst all other elements in the universe are but mere instruments. It is worth saying that it may be tempting to define anthropocentrism as

[49] The Starchild, in Clarke’s opera, is a kind of newborn cosmic entity.

environmentally destructive since everything that is not a human being is taken as merely instrumental. There is some reason in this criticism against anthropocentrism if we take into account how predatory our behaviour on this planet is. Ignorance, however, is rather a contingent element of anthropocentrism, not its essence at all. Even if nature is seen as a mere instrument, this instrument can be well taken care of. There is the possibility of an environmentally correct anthropocentrism characterised for an enlightened self-interest by establishing a non-predatory relationship with the ecosystem. Given that humankind depends on a huge set of instrumentally valuable beings (plants, animals, inanimate objects), it is perfectly possible to conceive anthropocentrism as a non-egoistic approach, which takes future generations into account.

That is to say that it is not anthropocentrism as such that is to blame for environmental issues but one of its problematic forms: in particular, those that are egoistic or otherwise narrowly focused on satisfying individual needs and short-term interests irrespective of future generations. A truly anthropocentric ethic would account not only for existing individuals but for the whole of the human species – present and future. In light of all this, a question arises: *why must anthropocentrism be surpassed, even in its best form?*

In order to provide an answer, we must revisit Jonas. Committed to the elaboration of a most needed new ethical imperative that would enable us to prevent what he himself defines as being the *summum malum*, Jonas is guided by Kant. In contrast with the private quality of the imperative devised by Kant, which addressed primarily the private individual, the Jonasian injunction addresses public policies. Nonetheless, it must be noted that the new Jonasian imperatives remain in keeping with a subtle anthropocentric perspective. This is summarised by the author in the following:

> **A suitable imperative to serve as a new guide for human action and for the new form of acting individual should roughly go along the following lines: "Act in such a way that the effects of your action are compatible with the permanence of truly human life on Earth; or, expressed in negative terms: "act so that the effects of your actions are not destructive for the future possibility of such life"; or simply: "Do not compromise the conditions for an indefinite continuation of humanity on Earth"; or, again turned positive: "In your present choices, include the future wholeness of Man among the object of your will" (JONAS: 2015: p. 47-48).**

Upon reflecting on any of the proposed variants, one would come to the same conclusion: it is of foremost urgency to ensure the future of humankind by caring for nature. If the ultimate goal is, as the philosopher puts it, to secure *a truly human life* and *wholeness of Man,* that means human life possesses intrinsic value. In regarding humans as the ultimate goal of the ethical action, Jonas fails to fully reject anthropocentrism. Though moving away from a short-term oriented and egocentric anthropocentrism, which focuses on satisfaction rather than the collective future wellbeing of all humankind, his stance remains anthropocentric even that Jonas does not realise it.

This new imperative accounts for the pressing environmental needs but still proves insufficient to avoid the Jonasian *summum malum*, once it establishes human life as being restricted to this world. The human type and the Earth are, indeed, inexorably interconnected. The self-awareness realised in us will have to take new post-human forms so that one may survive the fatal end of our own world. The insistence in an attachment to Earth and to human form is sure to lead us to our extinction rather than prevent it.

All things considered, the new Jonasian imperative may be reformulated drawing upon Huxley's transhumanist criteria: *Act in such a way that the effects of your actions are compatible with the permanence of self-awareness in this and other worlds*. The observance of the preservation of the planet on which we currently find ourselves and its relevance - which is not opposed in the slightest by this thesis – does not exclude the more adequate proposition: *Act in such a way that the effects may ensure the possibility of future self-awareness.* The dangers of inaction are also noteworthy, as a non-action itself falls into the category of action, particularly if the agent detains knowledge of the elements at stake: *May your inaction not endanger the conditions needed for the preservation of self-awareness*. Note that, in not restricting self-awareness to this planet, the versions presented here meet the proposition of avoiding extinction.

Surpassing anthropocentrism requires an understanding of the cardinal tenet of transhumanism: the humankind as we know is not the ultimate goal, but one of the stages of an incessant cosmic mutation. It is our *conscience*, not our *shape* that endows us with intrinsic value. Though there is no such thing as a *res cogitans* disconnected from the *res extensa* to transhumanist in general, the latter

may be shaped or modified as it is but an instrument of the first, which is the one that truly holds intrinsic value.

The seventh point on the *Transhumanist Declaration* reveals a zoocentric ethical system inasmuch as it accounts for every single sentient being instead of simply acknowledging humans. Yet, it does not constitute a classic zoocentrism since it encompasses alien life should it be discovered as well as artificial life forms. Despite being fictitious at present, these hypothetical life forms may well be identified or created at some point in the future. As said on the declaration:

> **We advocate the well being of all sentience, including humans, non-human animals, and any future artificial intellects, modified life forms, or other intelligences to which technological and scientific advance may give rise (VITA-MORE et al: 2013: p. 54).**

The notion of "desirability", as made clear in the excerpt above, is limited to the *minus bonum*, which refers to the well being of sentient entities, be them human or not. Even though such account goes beyond the anthropocentric perspective, it would not stand as a satisfactory basis for a new ethic. The *minus bonum* offers insufficient grounds to attend the ends of thinking technology and envisioning possible and dangerous scenarios within this process of intentional action imposed on the world. All in all, taking into account the well being of existing individuals does not necessarily entail taking into account the future of the different species and their right to exist. Case in point, the dire state of the planet as it has been serving the purpose of ensuring the well being of contemporary humans. Comfort and well being come at a price, one that has been proven to be very high and with which we find ourselves in debt.

In points three and four, transhumanists subscribe to Jonas' view by also acknowledging the misuse of technology and the risks of an unbridled Promethean impulse:

> **We recognize that humanity faces serious risks, especially from the misuse of new technologies. There are possible realistic scenarios that lead to the loss of the most, or even all, of what we hold valuable. Some of these scenarios are drastic, others are subtle. Although all progress is change, not all change is progress. Research effort needs to be invented into understanding these prospects. We need to carefully deliberate how best to reduce risks and expedite beneficial applications. (VITA-MORE et al: 2013: p. 54)**

Transhumanists mainly differ from Jonas in the assessment of the risks and proposed ways to avoid the *summum malum*. If on the one hand, transhumanists extol technological development as a means to free us from Earth in order to avoid extinction, Jonas fears such development will lead us to extinction. Jonas's fear resides within the enormous realm of possible scenarios and is not foreordained, whereas the transhumanist fear constitutes a definitive outcome: without technological advancements, all possible scenarios converge in extinction. The fifth point on the *Transhumanist Declaration* propounds:

> **Reduction of risks of human extinction, and development of means for the preservation of life and health, the alleviation of grave suffering and the improvement of human foresight and wisdom, be pursued as urgent priorities and generously funded (VITA-MORE et al: 2013: p. 54).**

Even though the ethical system put forth by transhumanists requires that sentience be regarded as intrinsic value, there is no attachment to Earth to characterise this ethic as ecocentrist. This lack of attachment - far from originating from a lack of concern for the planet - is rooted in the knowledge of our home planet's lapse. Hence, Earth is seen as our starting point, not as our final destination.

Overall, the transhumanist ethical system may be defined as zoocentric, in contrast with Jonas's ecocentric one (the ecocentrism is a type of biocentrism, but in its geocentric form: *biogeocentrism*). The entity endowed with intrinsic value is not even embodied in the intelligent being as it might look at first but in *sentience* itself. Sentience is the imperative to be defended. This premise evokes some classic philosophical questions such as: what is life? What is intelligence and how it differs from sentience? Could life be a cosmic *telos*?

The basis for the defence of a long-term plan able to assure human existence beyond Earth is not anthropocentric as it might seem at first glance. It is not a question of advocating human survival due to the belief that *only* humans are endowed with intrinsic value, but of doing so because only humans - at least so far - are endowed with the intellectual resources that are capable of looking after other life forms. In assuring the existence of humankind beyond Earth, the continuity of the existence of *other* life forms that may be cared for is *also* assured,

be they extant ones or possible life forms yet to emerge.

In order to illustrate this, let us contemplate the analogical example of the procedures to be observed in the event of depressurisation inside an aircraft. Adults are instructed to put their oxygen masks on first and only then proceed to assist the children to put them on. This order of priority makes sense because adults are better equipped for problem solving, and not because they are held in higher regard than children. The opposite procedure would increase the risk of the tutor losing his/her conscience, resulting in the deaths of both the tutor and the tutee. To hold that only humans should be entitled to an extended existence due to their unique intrinsic value would be an anthropocentric statement, which is against this thesis. Our intrinsic value stems from our *conscience*, not from our anthropomorphic form much less from our superior intellect.

At this point, it is relevant to duly indicate the distinctions setting conscience and intelligence apart since one is frequently mistaken by the other. As a general rule, "intelligence" is defined as the "capacity to solve problems". Some species are more intelligent than others just like some humans are more intelligent than others. However, no moral philosophy worthy of that title would argue that more intelligent people are imbued with a higher intrinsic value than those less gifted. Therefore, intelligence is of *instrumental* value and there are no moral concerns in stating that Einstein's intellect was instrumentally more valuable than that of the author of this thesis. Nonetheless, it should also be noted that intelligence not only solves problems, it also creates them. Curiosity is a feature of intelligence and there seems to be a proportional correlation between the two. With that in mind, one cannot help reminding that intelligence - the Promethean fire capable of creating marvels - is also capable of inventing nuclear bombs. Fermi's paradox[50] questions the reasons why we are yet to succeed in contacting intelligent extraterrestrial species. A possible answer is that such species would have been so intelligent that curiosity led them to create or investigate some problem dangerous enough to bring them to destruction. Given their instrumental power, intelligence and its creations require ethical regulations that should not be left entirely subject to mere markets. Conscience, on the other hand, is the attribute that allows beings the capacity to feel pleasure or experience suffering, avoiding

[50] Enrico Fermi (1901-1954), Italian-American physicist.

the last and seeking the first. A cat, a snail, an ant and a human are all capable of experiencing pleasure and suffering. However, only humans are capable of persisting in suffering situations by their own will, and it occurs exactly due to the intelligence in high levels. Cows and bees live driven by basic impulses of attraction and repulsion in relation to that which is pleasurable or painful, precisely because of their limited intellect. In humans, the opposite is observed. Humans who are trying to find the solution to a complex mathematical problem, for example, are capable to ignore the organic urges of hunger, sleep deprivation or even an occasional back pain for quite some time because the intelligence in them tends to overcome their consciousness. In light of all this, this thesis argues that intrinsic value stems from the existence of consciousness, not intelligence. Human intelligence is capable of debating the concept of intrinsic value, and this ability may lead to the misperception that it is *the reason* that which makes us intrinsically valuable. Nevertheless, although a dolphin might not be able to do the same, the animal *knows* what is valuable, at least to itself. It *knows*, physiologically speaking, what is good and bad for its own life.

Additionally, it is important to highlight the fact that if the value is *intrinsic*, there is no degree of said value by definition. Degree is a contingency, and thus characteristic of instrumental values: a knife may be more or less valuable than another, a computer may be more or less efficient than another, and so a human may be more intelligent than another. While there are no moral qualms in stating that Einstein is intellectually more valuable than a mentally handicapped individual, it would be abhorrent to suggest there is any difference between them regarding their intrinsic value. Why is it then that human moral establishes distinctions of value between human animals and non-human ones? The answer lies in the anthropocentric paradigm, which not only mistakes consciousness for intelligence as it also instrumentalises animals as if they were nothing more than “things”, or assets. Animals are considered “livestock goods”, according to the Civil Law of most Western countries. When an exception is made, it is always cultural: dogs and cats are humanised, considered to be "part of the family", "our children", just like some Indians humanise cows, calling them "mothers". In none of these cases does the animal possess intrinsic value by right of its own nature so much as due to an extension of our humanising and anthropocentric view. If cats and dogs often

seem "human" to us, such notion constitutes a mistake. That which we deem "human" in a dog is, in fact, the animal portion we recognise in ourselves.

The transhumanist ethic parts with this logic. If cats and dogs are considered to be worthy of being treated with dignity in our society, why not cows, pigs, bees, lobsters and rats? Treating them with dignity does not mean treating them as if they were humans, especially because they are not. The transhumanist point is: dignity should not be a value restricted to human beings.

Ample philosophical debate may unfold from this, such as wondering whether it is ethical to feed from other animals. In fact, many transhumanists like David Pearce[51] in his *The Hedonistic Imperative*[52] will argue we do not. But even non-vegetarian transhumanists concede that we do not have the right to bring intentional harm to any animal whatsoever, but that it does not mean we cannot eat them, only that it is unethical to mistreat them. This debate is not in the scope of the present thesis, but it is worth mentioning that our current technology is already capable of producing meat from the cloning of specific animal cells without killing them[53]. The cost of creating a mere single steak is still high, but keeping in mind the notion that technology tends to become cheaper, maybe in the future it will be possible to have a barbecue without the killing of a single cow.

Critics of the idea of attributing intrinsic value to every sentient being usually contend that only humans are endowed with intrinsic value due to the fact that we are the ones who came up with the very concept. They mistake "word" for "thing". An apple exists even if I do not call it an apple. Ants may not be capable of explaining or rationalising about intrinsic value, but they all know that which is valuable to them. They show understanding of what has value and what does not in their actions. Intrinsic value is an attribute of the sentient living beings.

The aforementioned statement leads us to a new question: what is a "living being"? We adopt here the definition put forth by NASA: *A self-sustaining chemical system capable of Darwinian evolution*[54]. An artificial being could fit the bill of

[51] British philosopher, co-founder of the World Transhumanist Association.
[52] Available at https://www.hedweb.com/hedab.htm. Accessed in March 11, 2019.
[53] *A closer look at cellular agriculture and the processes defining it*. Available at: https://agfundernews.com/closer-look-cellular-agriculture-and-the-processes-defining-it.html. Accessed in March 16, 2019.
[54] Available at: https://astrobiology.nasa.gov/research/life-detection/about/. Accessed in February 22, 2019.

these attributes. Here is a curious provocation written by Ellery[55]:

> **Ever since Erwin Schrodinger penned his monograph "What is life?" (1944) from the perspective of the physical scientist, physicists and engineers have had an enduring fascination with the biological world. Although the question posed by Schrodinger appears to defy definitive answers, there is nevertheless substantial agreement on the fundamental properties of life: (i) the ability to self-replicate; (ii) metabolism and growth powered through the ingestion of matter and energy; (iii) cellular encapsulation from the environment; and (iv) the capacity to evolve and adapt to the environment. In fact, this could be reduced to the first three properties because the fourth is derivative from the first two properties through the second law of thermodynamics. Artificial life emphasises exploration of this fourth property of evolution. Unlike synthetic biology in which biological components are configured into engineering functions, we are configuring engineering components into a form of artificial life, not in software but in hardware. We are developing a self- replicating machine. (…) We are using robotics as existence proofs for physical mechanisms of self-replication – a similar approach of using robotics has been used in cognitive robotics and robotic zoology. So, can building an artificial robotic lifeform using engineering materials provide any insight into the astrobiology quest – to understand the limits and scope of life beyond the Earth? I shall leave it to the astrobiology community to decide but it is worth noting that our artificial creature possesses the three properties of life (ELLERY: 2016: p. 67-68).**

Let us then think of a synthetic being, a self-sufficient one, capable of reproducing itself and to adapt to its environment. Would it be alive? If we consider NASA's definition, then the answer is "yes". Would it be intelligent? Yes, it might be even more than the most intelligent human being. But would it be *conscious*? That is a good question to which science does not have the answer and thus constitutes a philosophical quandary around which we can only hypothesise. If this entity, with all its peculiarities, does not avoid suffering, does not seek pleasure and reproduces solely motivated by the imperatives of its programming, how can we say it is anything but an impressive instrument? A computer is capable of solving highly complex math problems but is not proper to say it is aware, much less alive.

Here are some of the philosophical questions that arise: (1) could it be that consciousness depends on the inherent imperfection of organic bodies? Could beings incapable of feeling pleasure or pain be considered intrinsically valuable? Or would they be mere highly sophisticated instruments? (2) Could consciousness emerge from a certain degree of intelligence, even in a synthetic organism? It is a

[55] Alex Ellery, Canadian engineer, and associate professor at Carleton University.

curious question, for it is akin to saying that something intrinsic is born from something instrumental, and thus contingency precedes essence. In nature, the opposite is observed: consciousness (intrinsic value) manifests itself first - even in the most primitive beings - as an indistinguishable part of every life, whereas intelligence (instrumental value) emerges later and in different degrees depending upon the different degree of complexity of the being.

Speculations aside, up to the present moment, what we know for sure is that the human species is the only one endowed with the intelligence capable of assuring the existence of life when Earth and the solar system become non-viable. Technological projects that for now sound like science fiction are quite feasible, such as the terraforming of other worlds, and the creation of new life forms (biologic or synthetic) within these alien contexts, for instance; as well as the creation of autonomous space stations; a genetic database capable of restoring species that have gone extinct not by the course of nature but by the disastrous and anti-ecological actions of our fellow contemporary or ancestors; a possible genetic improvement that could equip us to adapt to alien contexts. The latter is the most ethically disputable, and the trauma of the eugenic ideal of the Nazis is far too recent not to cause a deep discomfort before the idea of human genetic enhancement. This notwithstanding, we must face the fact that the future will require that we adapt to extraterrestrial contexts if we are to survive as a species. The necessary physical enhancements could be carefully studied starting now, lest we are forced to do everything hastily when the real need arises.

Among bioethical models, the only one who is totally opposed to any projects of human space expansion is cosmocentrism, also known as "cosmic preservationism". It is the environmental ethics theory contrary to the idea that terrestrial values should be imposed on alien contexts. The supportive principle of cosmocentric thinking is the premise that there is something *unique* in alien environments, and that this *uniqueness* must be preserved. Cosmocentric ethics is non-utilitarian, precisely because it regards intrinsic value as *inherent in existence itself*, which obviously includes inanimate things, such as Martian rocks. As said by Fogg[56], regarding cosmocentrists:

[56] Martyn J. Fogg (born in 1960), British physicist, and geologist.

> **The Cosmos has its own values, they claim, and its mere existence gives it not only the right to exist, but the right to be preserved from any human intent. Such a moral principle we might call the Principle of the Sanctity of Existence, with uniqueness as its basis of intrinsic value. Moral behavior under such a system would involve non-violation of the extraterrestrial environment and the preservation of its existence state (FOGG: 1999: p. 6).**

Taking into account the ethics promulgated by cosmocentrists, it would be correct to affirm that their perspective is incompatible with the first point of the transhumanist manifesto, especially in the passage that advocates overcoming human confinement to the planet Earth. Still according to Fogg:

> **In the absence of extraterrestrial life, only preservationism concludes that space settlement would be immoral if it was seen to be to the benefit of terrestrial life (FOGG: 1999: p. 1).**

From the transhumanist perspective, which is zoocentric, it would be permissible to carry out planetary interventions, *as long as* in alien environments in which there is currently no life; *provided that* in order to stimulate the emergence of life within prebiotic contexts; and *provided that* such interventions are able to protect any living planets from extinction events. As sustained by Wilks[57], from a typical biocentrist perspective:

> **(...) I am merely arguing that our moral obligations to them[58] ought to be determined in consideration of the intrinsic value of other living beings – especially those possessing greater intrinsic value. Furthermore, given that, on this view, all life forms have intrinsic value, and that life has value and priority over non-life. I agree with Christopher McKay that it is morally permissible to undertake technological endeavours both (a) to protect and promote the survival, richness and diversity of indigenous, extraterrestrial life forms on other planets, and also (b) to create an extraterrestrial biosphere that could generate and sustain life on planets that do not currently have life (…) (WILKS: 2016: pg. 192-193).**

Intervention is a strong transhumanist goal indeed. Conversely, the cosmocentric ethical principle is based on the assumption that all existing things, whether they are living or not, have the right to be as they are, from a spontaneous construction. This implies that Lunar rocks or Martian clays, for example, have the cosmic right to be what they are. There would be, as it were, an ethos prior to humanity, and to life itself, which is independent of our existence and therefore

[57] Anna Frammartino Wilks, PhD, University of Toronto.
[58] Microbes.

transcends it. Cosmocentrists advocate that human space policies should establish total interdictions regarding space exploration, even if those alien sites have nothing but rocks. According to Marshall[59]:

> **If Mars, or any other planetary body, is devoid of life, it does not follow that it is devoid of value beyond any resources it may have that are useful to humans. An extension of human ethics to animals and thence to other organisms if taken to the next step would include an extension of ethics to abiotic objects (be they rocks, rivers or ringed planets) even if they do not contribute to a living ecosystem. Although it (N.A.: Mars) might seem to be a great useless hunk of red rock to us, human could, in the view of Martian rocks, be merely living organisms who are yet to attain the blissful state of satori only afforded to non-living entities. (…) We must not consider Mars or any other celestial body to be unlucky just because it does not support life. Indeed, even in the absence of indigenous lifeform, Mars possesses its own uniqueness and diversity, which are worthy to respect (MARSHALL: 1993: p. 227-236).**

In contrast to cosmocentrists, Fogg says that:

> **(…) whilst it is reasonable to propose that animals with advanced nervous systems might have feelings, and therefore a point of view, surely it is gross sentimentality to propose such a thing for rocks. After all, a sentimental terraforming enthusiast might propose that, far from the rocks on Mars existing in a state of "blissful satori" (as a preservationist would have it) they might instead be "crying out for life." Both arguments are unedifying. Rocks don't think, don't act and don't care. They cannot have values of their own (FOGG: 1999: p. 7).**

The transhumanist bioethical model is therefore strongly opposed to any cosmocentric idealisation. This does not allow us to act irresponsibly on alien worlds, since they are elements of significant instrumental value. But it is necessary to keep in mind that rejecting the idea of expanding our existence beyond Earth is flirting with collective suicide.

As seen on the previous presentation of this thesis, extraterrestrial environments as exploitable and colonisable places have occupied human thought ever since Galileo Galilei desacralized the supralunar world, converting it into a *place*. Even with all the evidence, however, humanity remains contrary to the idea of colonising the sky as it was a sacred place. According to Foucault:

[59] Alan Marshall, a New Zealand researcher in environmental studies.

> **Now, despite all the techniques for appropriating space, despite the whole network of knowledge that enables us to delimit or to formalize it, contemporary space is perhaps still not entirely desanctified (apparently unlike time, it would seem, which was detached from the sacred in the nineteenth century). To be sure a certain theoretical desanctification of space (the one signaled by Galileo's work) has occurred, but we may still not have reached the point of a practical desanctification of space. And perhaps our life is still governed by a certain number of oppositions that remain inviolable, that our institutions and practices have not yet dared to break down. These are oppositions that we regard as simple givens: for example between private space and public space, between family space and social space, between cultural space and useful space, between the space of leisure and that of work. All these are still nurtured by the hidden presence of the sacred.**[60]

We still think of Earth and Cosmos as separate things, as if the latter were a kind of sacred, impenetrable zone, whose access is wholly or partially vetoed. It is this sacralisation still present in human thought that grounds rhetoric contrary to the space research with arguments of order of economic, religious or scientific importance. The average citizen does not recognise the value of space research and tends to judge such investments as a waste of resources. A social perception survey commissioned by NASA in 2004 concludes that:

> **NASA does not have a branding problem; it has a communication problem, in that people do not understand the connection between the NASA brand and its current activities. While NASA has many stories to tell about their accomplishments, people don't have the scientific training to evaluate their technical importance within the brand. (…) when asked to judge between two competing arguments in which they have little or no expertise, people will default to the more compelling vision. NASA is not currently communicating a compelling overarching vision that reflects their brand in the minds of the public. (…) Today American society seems to have returned to the attitudes of the mid 1950s. The public believes manned space flight to Mars and other planets is possible. But they don't believe the government should billions of dollars to do it.**[61]

Social resistance to investment in space exploration can be understood by considering the fact that, despite the human brain is highly developed it is not so different from the brain of our prehistoric ancestors. Natural selection was won by those good enough to evaluate short-term events and get instant gratification in

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[60] FOUCAULT, M. *Of Other Spaces.* Available at: http://web.mit.edu/allanmc/www/foucault1.pdf. Accessed in February 22, 2019. Translated from the French by Jay Miskowiec.

[61] *American Perception of Space Exploration: A Cultural Analysis for Harmonic International and The National Aeronautics and Space Administration*. Washington: 2004. Available at: http://www.hq.nasa.gov/office/hqlibrary/documents/o55201537.pdf. Accessed in February 22, 2019.

the form of promising partnerships, food and water. Although it is known that it is necessary to save for the old age or for the education of the children, the tendency of the average citizen is to spend more than it should, as if there were no tomorrow. The immediatist behaviour observed in individuals finds its reflection amplified in a pattern quite similar not only in the public policies built by governments, as in the policies of private companies. Space exploration is considered "frivolous" for not offering a satisfaction that is identified in a short-term basis. However, as an illustrative example of our brain's cognitive failure to make judgments regarding what is valuable, here is the NASA's 2004 annual budget compared to the spending of US citizens with alcohol, tobacco, gambling and junkie food[62]:

Category	**Total amount spent (average value in ten years – American dollars)**
NASA budget	16 billion
Junkie food sales	110 billion
Alcohol and tobacco sales	170 billions
Legalised gambling	350 billion

Despite our collective resistance to the idea of a post-human space expanse, we are potential world builders, able to establish ethical plans that enable life to keep its existence and even to flourish in other worlds. And we, as "masters of this world", are endowed with remarkable powers and incredible technology. We can destroy everything, we can keep pretending Earth is an everlasting blue pearl or we can assume the protection of our world and existence as a moral duty. We can even ensure that other worlds flourish with life. As the fifth topic of *Transhumanist Declaration* says,

> **(…) reduction of risks of human extinction and development of means for the preservation of life and health, the alleviation of grave suffering and the improvement of human foresight and wisdom, must be pursued as urgent priorities and generously funded (VITA-MORE et al: 2013: pg. 54).**

We should urgently think of what our duties as rational beings are. As the

[62] Idem.

fictional *Starchild* in Clarke's *2001 – A Space Odyssey*, we are looking at our own planet with fascination, and the power of life and death, creation and destruction, *eros* and *thanatos*, lays on our hands. Future generations depend on our urgent space expanse. For a while, our *ethos* is still based on hope, and we are playing with the wishful thinking that our existence is special, protected, guaranteed. We strongly believe there is a cosmic super father who takes care of us. Maybe there is indeed, but as we are going to discuss in the next chapter, what if this God has sacrificed His power in order to allow our existence? And what if He depends on us? For a while this God-in-us is still waiting, or, as Clarke writes, he is

> **(…) marshalling his thoughts and brooding over his still untested powers. For though he was master of the world, he was not quite sure what to do next. But he would think of something[63].**

2. METAPHYSICS: THE EMMERGENCE OF A COSMIC AWARENESS.

[63] CLARKE, Arthur. *2001, A Space Odyssey.*

Thermodynamic miracles... events with odds against so astronomical they're effectively impossible, like oxygen spontaneously becoming gold. I long to observe such a thing. And yet, in each human coupling, a thousand million sperm vie for a single egg. Multiply those odds by countless generations, against the odds of your ancestors being alive. Meeting. Siring this precise son, that exact daughter, until your mother loves a man she has every reason to hate, and of that union, of the thousand million children competing for fertilization, it was you, only you, that emerged. To distill so specific a form from that chaos of improbability, like turning air to gold... that is the crowning unlikelihood. The thermodynamic miracle. (…) But the world is so full of people, so crowded with these miracles that they become commonplace and we forget. We gaze continually at the world and it grows dull in our perceptions. Yet seen from another's vantage point, as if new, it may still take our breath away. Come... dry your eyes. For you are life, rarer than a quark and unpredictable beyond the dreams of Heisenberg. The clay in which the forces that shape all things leave their fingerprints most clearly. Dry your eyes... and let's go home[64]*.*

2.1. Transhumanism and metaphysics: initial considerations.

This chapter outlines a few metaphysical hypotheses with the aim to provide grounds for the ethical proposal of biocosmic expansion presented in this thesis. The question from which we started is: *in the case of an existing cosmic telos, what role humankind poses in this supposed project?*

First and foremost, it is worth to note that there is no dependence of ethics upon metaphysics as has been deftly demonstrated, for instance, by Hume[65] (HUME: 2003: p. 372). The fact that he stated that

> **(…) If we take in our hand any volume of divinity or school metaphysics, for instance; let us ask, *does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of act and existence?* No. Commit it then to the flames: For it can contain nothing but sophistry and illusion (HUME: 2003: p. 222).**

did not preclude Hume from investigating the principles of morals. And yet, metaphysical systems or truths inevitably ensue specific ethical systems. It is the main purpose here to introduce a hypothetical system whose metaphysical qualities lead to an ethical system sustained as a thesis: *the ethic of desperation*, and the imperative of a biocosmic expansion.

It is true that it would have been possible to uphold this system while ignoring the considerations made in this chapter. Overall, the ethics of the transhumanist movement is not guided by metaphysics. Despite this, in order to

[64] Doctor Manhattan, in: "Watchmen", a 1987's comic book, by Alan Moore.
[65] David Home (1711-1776), better known as David Hume, Scottish philosopher.

propose an ethical system underpinned by the opposition to a classic theological virtue (hope) - as it is intended here - one cannot dispense with contesting some metaphysical truths laid out by the main monotheistic religions. In every case and in different ways, hope provides us with the fortitude to endure the afflictions of existence. Such is, for example, the hope of the coming of the Messiah (Judaism), or even the hope of an eternal and perfect life in Paradise – as a matter of fact, the Christian *trasumanar*, as coined by Dante. The ethic of desperation as an alternative to the ethic of hope, as shall be seen, is more properly defended from cosmological standpoints – or even from cosmogonical ones as put forward by Jonas - and such considerations demand propositions of a metaphysical nature.

It should be noted that while most transhumanists tend to be quite dismissive of religious dogmas, there are those who acknowledge some common grounds between transhumanism and faith. As pointed out by More:

> **The content of some religious beliefs is easier to reconcile with transhumanism than the content of others. Christian transhumanists, while not completely unknown, are very rare (…). There are more Mormon transhumanists (although some of these are cultural rather than religious Mormons), perhaps because that religion allows for humans to ascend to a higher, more godlike level, rather than sharply dividing God from man. Several transhumanists describe themselves as Buddhists (presumably of the secular, philosophical type), and there seem to be few obstacles to combining transhumanism with liberal Judaism. However, the vast majority of transhumanists do not identify with any religion. A pilot study published in 2005 found that religious attitudes were negatively correlated with acceptance of transhumanist ideas. Those with strong religious views tended to regard transhumanism as competing with their beliefs (Bainbridge 2005) (MORE: 2013: p. 8).**

Its penchant for materialism, physicalism and functionalism does not make the transhumanist movement impliable to supra-empirical matters. Perhaps the most recurrent metaphysical hypothesis among transhumanists, as More ponders, is:

> **(...) the idea of the world as simulation. As computers have become ever more powerful, simulations for both scientific and ludic purposes have proliferated and rapidly grown in sophistication. Although humans have always lived their lives entirely in the physical world as revealed by the unmediated senses, we may come to spend much of our time in simulation environments, or in "real" environments with virtual overlays. Simulated worlds raise questions about what we value. For instance, we do value the experience of achieving something or *actually* achieving it, and how clear is the distinction (Nozick 1974)? Taking this line of thinking further,**

> **transhumanists from Hans Moravec to Nick Bostrom have asked how likely it is that we are *already* living in a simulation (Moravec 1989; Bostrom 2003) (MORE: 2013: p. 8).**

Nonetheless, the view that the world consists of a virtual simulation merely reallocates the existence of a "reality". If we live in a virtual world, there is nothing to say reality does not exist somewhere else. Unless we account for Buddhist perspectives that state all worlds are simulations and thereby nothing akin to a "reality" exists.

There is however a metaphysical question in the history of philosophy that tends to be wrongfully underestimated by the transhumanist movement. That question is: does our universe have a *telos*? It is the purpose of this thesis to argue that *whether* the suggested metaphysical system be correct, Huxley's *inescapable responsibility* has a fundamental role in the realisation of this *telos*, given that this supposed cosmic end is not *ensured by itself* despite the spike in the odds that is due to both the grand scale of the universe and its likely splitting into multiple quantum possibilities.

In the hopes of minimising the chances for misunderstandings, it is crucial that we establish the proper distinction between *metaphysical systems* and *metaphysical truths* before we move on to cover such aspects. These are not the same and this work intends to demonstrate the pillars that uphold *systems* rather than state *truths*.

2.2. On systems and truths.

Duhem[66] determines that the study of physics (i.e. the study of *things*[67]) logically precedes that of metaphysics (i.e., of the *causes*). This organisation, as Duhem points out, is not in alignment with that established by peripatetic philosophers, as the motions and modifications of things were of the domain of physics to them. To Duhem, these very same motions are object of study of the field of cosmology, which to the philosopher belongs in the realm of that which is called "metaphysics" (DUHEM: 1996: p. 30). In respecting this logical order

[66] Pierre Maurice Marie Duhem (1861-1916), French physicist, and philosopher of Science.
[67] *Things* are considered in three phases: the observation of facts; the discovery of laws; and the construction of theories (DUHEM: 1996: p. 30).

wherein physics must precede metaphysics, we will be better equipped to obtain answers if we are to derive them from the observation of a phenomenon. Conversely, if the order is reversed, it is reality that has to fit in a given explanation, even if that means to preserve appearances before the insistence of the world of things in contradicting the metaphysical belief[68].

That is not to say physics cannot be understood from a metaphysical standpoint. The issue of the matter is that such procedures are prone to grave errors. Among these errors, one noteworthy mistake is that of establishing a mono-causal scheme wherein "A" causes "B". Even if "A" *unequivocally* incurs in "B" – thereby the full understanding of the causes allows for a full understanding of the effects - knowing the effects of "B" does not equate with the absolute certainty that "A" is its *unequivocal* cause. The same effects might have been produced by different causes. Human understanding is limited and allows us to grasp an imperfect knowledge of the *raisons d'être* of things at best (DUHEM: 1996: p. 43-44). Hence the critical need to distinguish *metaphysical systems* from *metaphysical truths*. According to Duhem, metaphysical truths are characterised as:

> **(...) a very incomplete and imperfect knowledge of the essence of material things. This knowledge proceeds more through negation than through affirmation, more by the exclusion of some hypotheses that might be made about the nature of things than by positive indications of that nature (...) To understand this essential point properly, it is important never to confuse the *truths established by metaphysics* with *metaphysical systems*. The truths of metaphysics are propositions few in number and, for the most part, negative in form, which we obtain in ascending from observed phenomena to the substances which cause them (DUHEM: 1996: p. 33).**

Conversely, a metaphysical system:

> **(...) is a collection of positive judgments – although hypothetical for the most part – by means of which a philosopher seeks to relate metaphysical truths among themselves in a logical and harmonious order. Such a system is acceptable provided none of the hypotheses composing its conflicts with an established metaphysical truth. But it remains always highly problematic and**

[68] Such is the case, for instance, of first stating the metaphysical truth that supra-lunar world is immutable and eternal and therefore conclude shooting stars can be nothing else but atmospheric phenomena. Or even blaming the dirty lens of Galileo's telescope to deny the unexpected imperfections observed on the surface of the moon. No matter how much reality contradicts the metaphysical truth, it is reality that ends up being denied or even "adjusted" to accommodate the presupposed truth.

> **never forces itself on reason in an unavoidable fashion (DUHEM: 1996: p. 33).**

Having established this distinction, it is now appropriate to underscore how all considerations presented in this thesis consist of metaphysical *systems,* never *truths*, in keeping with Jonas, who was careful enough not to refer to his works as "truth", but rather as a *cosmogonical supposition*[69]. Although Duhem defends a radical separation between physics and metaphysics, warning against mixing the two fields together for we would be bound to give comfort to the cause of positivism as a result (DUHEM: 1996: p. 34-38), it should be stressed that an exception is made: *when metaphysical hypotheses contemplate astronomical matters*. As put by Duhem:

> **On the subject of the relations between physics and metaphysics, Aristotle and the peripatetic philosophy admitted a thesis which essentially agrees with the one we have developed. They made little use of it <u>except in astronomy</u>, the only branch of physics which was developed at that period, but what they said about the motion of the stars can be extended readily to other natural phenomena (DUHEM: 1996: p. 40).**

By way of example concerning the admissibility of hypotheses presented by metaphysical systems within an astronomical setup, Duhem reminds us of the instance when Copernicus added a summary under the title *A Little Book of Nicolas Copernicus on the hypotheses of the celestial motions put together by him*[70] in his book *Revolutions*. Let us highlight the way Copernicus addresses the reader: *if our different assumptions, called axioms, are admitted*[71] (COPERNICO: 1984: p. 9).

What Copernicus proposed was an *alternate explanation* to the celestial display. He had no means to demonstrate his model empirically and the Ptolemaic model provided explanations that were sufficiently satisfactory. The advantage of the Copernican model over the Ptolemaic one, which stands out as a decisive distinction, is that the first has proven to be more elegant and to require fewer

[69] In his book *Materie, Geist und Schöpfung. Kosmologischer Befund und Kosmogonische Vermutung*.
[70] This summary is currently known as *Commentariolus*.
[71] From the original in Latin: *si nobis aliquae petitiones, quas axiomata vocant, concedantur.*

explanatory elements than the latter[72]. In other words, between two hypotheses that may equally account for a given phenomenon, the one judged most adequate is the one that requires fewer entities to support it. This principle of restricted entities does not constitute *any guarantees* that the simplest explanation be the true one, which is not a constraint since the purpose of a metaphysical hypothesis is not to be certain of its assertions. They are thought experiments.

In conclusion, there are two important considerations that should be observed if this chapter is to be fully and correctly understood. The first aspect to be considered is how difficult and even imprudent and pretentious it is to explain the universe from a standpoint of metaphysical *truths*. Physical knowledge, as established by Duhem, is elaborated based on experimental/observational methods, which are not dependent on metaphysics. The need for this independence is paramount in light of the self-evident limitation of human intelligence. Anyone who engages in mixing physics with metaphysics is claiming to possess an angelical intelligence. According to Duhem:

> **(...) An intellect which had a direct intuitive view of the essence of things – such as, according to the teaching of the theologians, an angel's intellect – would not make any distinction between physics and metaphysics; such an intellect would not know successively the phenomena and the substance – that is, the cause of these phenomena. It would know substance and its modifications simultaneously. It would be much the same for an intellect that had no direct intuition of the essence of things, but an adequate – though indirect – view through a beatific vision of divine thought (DUHEM: 1996: p. 31-32).**

The second consideration states the importance of not confusing *truth* and *system* here. That said it is worth to once again stress that at no point a *metaphysical truth* is presented in the present thesis. It is the burden of this thesis to defend a *system* all the while underpinned by the Copernican and Jonasian caution. Saying that "if we are to admit that" and "if we suppose that" is the complete opposite of saying "we assert that". In order to successfully achieve the defence of said system, it is relevant to consider that which must come first in logical order: *the physical things*. Any reverse procedure to the one previously

[72] If the Earth is to be accepted as the centre of the system rather than the Sun, epicycles and deferents must be established in a way that explains the apparent retrograde motions of the planets in relation to an observer from Earth. If the Sun is the centre, the entities "epicycles" and "deferents" become unnecessary to justify said retrograde motions.

detailed here would take the shape not of philosophy but of theosophy, as some form of unveiled truth.

We thus now move on to the hypotheses that give support to the metaphysical system of this thesis.

2.3. Life, sentience, and intelligence: is there a cosmic *telos*?

Humankind has wondered throughout the centuries, and in a number of varied ways, whether the universe has an *entelekheia* or not. As conceived by Aristotle, “entelechy” is a quality possible to all existing things - inanimate ones included – and it represents a transformative process wherein the potentiality of something is realised in action. Such concept is at odds with the Platonic philosophy as it places the cause for the development of things in the exterior (the “world of ideas”).

However, if on the one hand it is possible to easily sustain the idea that a peach seed has the development of a peach tree as its *telos*, and that this fully grown tree is the entelechy of the seed that originated it, on the other hand, applying the same analogy to the universe is a hard and polemic endeavour. A peach tree - the final cause of a peach seed - requires time and space to be realised. Whether in proper soil or never planted, the seed shall forever remain a tree in potential but not in action. It is thus possible to assert that the final cause of the seed was not realised due to the lack of an adequate place. Regardless of that, we can still know its entelechy from a seed of the same nature, which has been properly grown. Every potentiality requires a *topos* (place), a *chronos* (time) and often times a *kairós* (opportune moment) for the realisation of an action.

Thereupon lies the first hindrance: contrary to seeds or any other existing thing that may be compared with the intent of verifying the difference between its dormant potentiality and the action, there have been so far no means by which to compare our universe to another. Moreover, the universe does not require time and space as a context. It *is* the time and space where the potentialities are realised, on account of which the assertion that emerging elements within the universe constitute finality tends to be regarded as a sophisticated tautology by the positivists. Nevertheless, numerous were the times when the universe was argued

to have a finality throughout the history of philosophy. All of these propositions share the same teleological argument, which defends the existence of an ordering force that goes by many names: force, intelligence, God. Despite all of them having the hypothesis of a *telos* in common, these names are not be taken as synonyms. “Force” has a very specific meaning with very distinctive implications from those of “intelligence”, for example. The concept of “force” does not imply “intelligence” (intentional action), let alone “goodness”. It is possible to argue in defence of a universe with a *telos*, and still not believe that it answers to our prayers, for instance.

Although there are many forms of teleology, the idea that the emergence of life is a cosmic imperative or finality derives from a considerably elaborated teleological defence. The physical-teleological argument in its most ingenuous form evokes elements such as the beauty of a flower, the symmetry in nature, and all the things human perception sees as "pleasant", which would then imply they would have been created by a kind of *intelligent designer*. This form of ingenuous teleological argument is thus marked by a flagrantly anthropocentric bias. Whereas the cosmic teleology in its non-anthropocentric form explores the evidence that points to our universe being structurally biophilic, *id est*, prone to the emergence of life. Life’s form would be contingent but its existence necessary. That is to say that even if life is a cosmic inevitability, there are still no guarantees that it shall endure or even evolve towards the development of awareness or intelligence.

It is possible to find among transhumanists those who defend the hypothesis that not only life but also mind and intelligence constitute cosmic finality. Following the inevitable surge of sentient beings (humans, aliens or artificially conceived entities), said beings would go on to contaminate the cosmos with intelligence to the point the universe would awaken and become capable of generating its own baby universes. This sort of belief – or wager - is found among authors such as Gardner[73], whose main thesis concerns an emerging cosmic mind:

[73] James N. Gardner (born in 1946), American writer and complexity theorist, author of *The Biocosm Hypothesis*.

> **The hypothesis of selfish biocosm asserts that the anthropic qualities which our universe exhibits might be explained as incidental consequences of a cosmic replication cycle in which the emergence of a cosmologically extended biosphere could conceivably supply two[74] of the logically essential elements of self-replication identified by the mathematician and computer pioneer John von Neumann. Furthermore, the hypothesis implies that the emergence of life and intelligence are key epigenetic thresholds in the cosmic replication cycle, strongly favored by the physical laws and constants which prevail in our particular universe (GARDNER: 2007: p. 170-171).**

Gardner says in another similar article:

> **The central assertions of the SB[75] hypothesis are: (1) that highly evolved life and intelligence play an essential role in a hypothesized process of cosmic replication and (2) that the peculiarly life-friendly laws and physical constants that prevail in our universe—an extraordinarily improbable ensemble that Pagels dubbed the cosmic code (Pagels, 1983) — play a cosmological role functionally equivalent to that of DNA in an earthly organism: they provide a recipe for cosmic ontogeny and a blueprint for cosmic reproduction. Thus, a key retrodiction of the SB hypothesis is that the suite of physical laws and constants that prevail in our cosmos will, in fact, be life-friendly. Moreover — and alone among the various cosmological scenarios offered to explain the phenomenon of a bio-friendly universe — the SB hypothesis implies that this suite of laws and constants comprise a robust program that will reliably generate life and advanced intelligence just as the DNA of a particular species constitutes a robust program that will reliably generate individual organisms that are members of that particular species[76].**

Gardner's hypotheses bring one of Teilhard de Chardin's[77] most significant works to mind. The thought expressed in *The Phenomenon of Man* allows us to consider him a proto-transhumanist. Despite the differences between Gardner's and Chardin's approaches, they converge at (1) their conviction of the emergence of life as constituting final cause to the cosmos; (2) an optimism regarding the transformation of this potentiality into action. Summing it up broadly, we may assert that Chardin proposes an orthogenesis, *id est*, the idea that evolution happens in a unidirectional trend toward a supposed "omega point", where all consciousness is to be reunited with Christ. Not surprisingly, it is Julian Huxley himself - the first to coin the term "transhumanism" in the XX century – who is the author of the introduction to the most widely known issue of *Phenomenon*:

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[74] These "two logically essential elements" are a controller, and a duplication device.
[75] Selfish biocosm.
[76] Originally published in *The International Journal of Astrobiology* (May, 2005). Reprinted on http://www.kurzweilai.net/the-physical-constants-as-biosignature-an-anthropic-retrodiction-of-the-selfish-biocosm-hypothesis (February 28, 2006). Accessed in December 16, 2018.
[77] Pierre Teilhard de Chardin (1881-1955), French philosopher and Jesuit priest

> **The different branches of science combine to demonstrate that the universe in its entirety must be regarded as one gigantic process, a process of becoming, of attaining new levels of existence and organisation, which can properly be called a genesis or an evolution. For this reason, he[78] uses words like *noogenesis*, to mean the gradual evolution of mind or mental properties, and repeatedly stresses that we should no longer speak of a cosmology but of a cosmogenesis. Similarly, he likes to use a pregnant term like *hominisation* to denote the process by which the original proto-human stock became (and is still becoming) more truly human, the process by which potential man realised more and more of his possibilities. Indeed, he extends this evolutionary terminology by employing terms like *ultra-hominisation* to denote the deducible future stage of the process in which man will have so far transcended himself as to demand some new appellation (HUXLEY: 1947: p. 12).**

Although the present thesis is in agreement with the hypothesis that *the emergence of life characterises a strong cosmic tendency in our universe*, Chardin and Gardner's evolutional optimism is not conceded here. In that regard, in light of this higher affinity, Jonas's admonitions must be referred to:

> **The reader will, however, find nothing here of the evolutionary optimism of a Teilhard de Chardin, with life's sure and majestic march toward a sublime consummation. He will find life viewed as an experiment with mounting stakes and risks which in the fateful freedom of man may end in disaster as well as in success. And the difference from Chardin's as also from other, and better conceived, metaphysical success will, I hope, be recognized as one not merely of temperament but of philosophical justness (JONAS: 2001: XXIV).**

If we are to reject the guarantees offered by Chardin's thesis, we still have to address the radical teleological rejection established by the scientific method since the XVII century. It is worth clarifying that this rejection is more concerned with that which is understood as the anthropocentric fantasy encouraged by the major monotheistic religions - the one that preaches the universe is made for the enjoyment of the human type - than with the concept of final causes. There is, as it shall be demonstrated, *physical* evidence that the cosmos is biophilic and even capable of favouring the emergence of life[79].

2.4. Cosmic physical constants.

[78] A reference to Chardin.
[79] Considering here that *anthropos* concerns the human, the primate form. As transhumanism sees it, the human form is a stage, not a final cause. That would be awareness.

Goal 7 of the National Aeronautics and Space Administration's Astrobiology Institute (NAI)[80] contemplates the importance of finding methods to recognise biosignatures around the universe. In respect of this objective, astrophysicists and astrobiologists employ the available technical tools in order to detect at least some good indication that there is or there has ever been another world capable of supporting life forms as we know them. These investigations encompass empirical approaches, such as when, on September of 2003, the Galileo probe detected *in situ* that the Jovian moon Europa had an ocean far more voluminous than that of the Earth. In regard to extremely distant worlds-as is the case of exoplanets - the use of spectroscopy allows us to identify which worlds are Earth-like[81].

In this thesis, we define biosignals as a set of measurable factors classified into two types: (1) biosignals as *potency*, capable of identifying physical or mathematical conditions that make the existence of life or its future emergence possible, which characterises the environment as biophilic; (2) biosignals as an *action*, understood as biosignatures and capable of identifying environments where life effectively emerged and exists (post-biotic worlds). While the detection of chlorophyll would fall under the type-2 biosignal category, something like the presence of water in liquid state would be characterised as a type-1 biosignal, which makes the Jupiter moons Europa, Enceladus and Io good candidates for astrobiological investigation. Likewise, an exoplanet[82] orbiting a certain star at a specific distance and being thus suitable for harbouring liquid water would also be considered a type-1 biosignal, regardless of the lack of any indication of life. In essence, type-1 is characterised by *potency*: one or more identifiable and measurable hallmarks whose presence alters the existence of life from merely *possible* to *probable* whereas type-2 is an *action*: probability converted into fact.

Gardner, in turn, argues that:

[80] NASA Astrobiology Roadmap, printed on: https://nai.nasa.gov/media/medialibrary/2013/09/AB_roadmap_2008.pdf. Accessed in December 16, 2018.

[81] Exoplanets that have rocky composition, are Earth-size, and capable of maintaining surface liquid water. Currently, there are ten good candidates among all known exoplanets, according to the Planetary Habitability Laboratory of Arecibo, in Puerto Rico: http://phl.upr.edu/projects/habitable-exoplanets-catalog. Accessed in December 16, 2018.

[82] For example: TRAPPIST-1e, planet located 39 light-years from our solar system.

> **Goal 7 of the NASA Astrobiology Roadmap states: "Determine how to recognize signatures of life on other worlds and on early Earth. Identify biosignatures that can reveal and characterize past or present life in ancient samples from Earth, extraterrestrial samples measured *in situ*, samples returned to Earth, remotely measured planetary atmospheres and surfaces, and other cosmic phenomena." The cryptic reference to "other cosmic phenomena" would appear to be broad enough to include the possible identification of biosignatures embedded in the dimensionless constants of physics. (…) According to the SB[83] hypothesis, the laws and constants of physics function as the cosmic equivalent of DNA, guiding a cosmologically extended evolutionary process and providing a blueprint for the replication of new life-friendly progeny universes[84].**

In the excerpt above, Gardner alludes to Rees's [85] postulation that reality is shaped by six numbers that are "fine-tuned"[86] in order to permit the existence of life. Any modifications to these numbers, no matter how negligible, would make life impossible. These six numbers are (REES: 1999): (1) **N**, the electrical forces that hold atoms together, divided by the force of gravity between them, which result in 10^{36}. If **N** were feebler, the universe would be short-lived and so small that no living beings larger than insects could develop; (2) the number $\boldsymbol{\varepsilon}$, whose value is 0.007, defines how firmly atomic nuclei bind together. Stellar chemosynthesis transmutes hydrogen into all other existing elements so that every single atom in our universe has been forged within stars. Some elements are quite common, like carbon, and hydrogen. Some of them are rare, like uranium. If $\boldsymbol{\varepsilon}$ were different, molecule could not be formed, and life could not exist; (3) the number regards to the amount of matter in our universe, which includes dark matter as well. If its value overcame a critical point, the cosmos would have already collapsed. Conversely, if this number were lower than a critical point, the consequence would be a starless cosmos; (4) $\boldsymbol{\lambda}$ is a new force only discovered in 1998, which refers to an antigravity that controls the cosmic expansion. It is so subtle that its effects are not discernible on scales lower than a billion light-years. If $\boldsymbol{\lambda}$ were stronger, stars

[83] Selfish biocosm.
[84] GARDNER, J. *The Physical Constants as Biosignature: An Anthropic Retrodiction of the Selfish Biocosm Hypothesis.* Originally published in *The International Journal of Astrobiology* (May, 2005). Reprinted on http://www.kurzweilai.net/the-physical-constants-as-biosignature-an-anthropic-retrodiction-of-the-selfish-biocosm-hypothesis (February 28, 2006). Accessed in December 16, 2018.
[85] Martin John Rees (Born in 1942), British astrophysicist, and cosmologist.
[86] The phrase "fine-tuned" presents a number of issues, the main one being the fact that it implies somebody or something was responsible for the tuning. It is entirely possible to make the case for an accidental tuning as shall be demonstrated.

and galaxies would have been precluded from forming; (5) **Q** is a number (about 0.000001) that represents the ratio of two fundamental energies. A smaller **Q** would result in an inert cosmos. If larger than the actual number, **Q** would produce a universe replete of giant black holes, a cosmos hostile to life; (6) last but not least we have the number **D**, the most known among all of them: the number of spatial dimensions. Life, as we know it, could not exist in a two-dimensional or four-dimensional[87] reality.

That indicates most astrophysicists tend to agree with the view that our universe is strangely biophilic. As a result, those who adhere to the existence of a cosmic *telos* are quick to find in this fact the basis for the argument that these numbers show such an astounding degree of fine-tuning that it cannot be coincidental thus signalising the existence of an ordering intelligence. To them, life would not constitute a contingent attribute of the universe, but a necessary one. It is the *form* life takes that is contingent instead. In an even bigger leap of faith, these principles - as expressed by Chardin in his *Phenomenon* - are considered *anthropic*, *id est*, the human type would then be the final cause of the universe, as a product of the cosmological logos whereas Gardner considers the mind - not the human type - to be a final cause. Given the fact that such mind could arise in alien entities whose physiology would possibly be radically different from ours it is not without reason that Gardner's allusion to an anthropic principle in his articles is frequently accompanied by the reservation of inverted commas.

Nonetheless, philosophical rigor demands that we do not overlook in Gardner's article the fact that he considers these physical constants to be *biosignatures*. As previously explained, said physical constants are better classified as *type-1 biosignals*. "Biosignatures" belong in the set of type-2 biosignals given that the term *signature* means "the act of signing". Therefore, the distinction between a "sign" and a "signature" is based on the difference between potency and act. NASA's definition conveys that *all biosignatures are characteristic of the modification of a local or planetary environment by life*[88], which means the American agency only considers to be "*biosignatures*" those

[87] Time is considered a fourth dimension, but, unlike the other three, time is seemingly irreversible.
[88] NASA Astrobiology Roadmap, printed on: https://nai.nasa.gov/media/medialibrary/2013/09/AB_roadmap_2008.pdf. Accessed in December 16, 2018.

characteristic described as type-2 in this thesis. In that case, it is said that *A biosignature is an object, substance and/or pattern whose origin specifically requires a biological agent*[89] (i.e., an action). Still, both the American and the European spatial agencies (NASA and ESA, respectively) dedicate their efforts toward investigating worlds whose biosignals are type-1, for they present better odds of finding type-2 biosignals.

To acknowledge that the universe is biophilic is to acknowledge that it is so due to numbers so precise that any slight difference in them would render it barren. Biophilia would thus be a necessary characteristic of the universe and not merely contingent. Positivists are likely to criticise the phrase “fine-tuning”, arguing that the term itself is controversial as it implies that *something* or *someone* must have been responsible for said tuning. Indeed, if we base ourselves on Chardin’s work, we can see very clearly that he deals with a cosmological logos wherein life’s evolutionary march is regarded as an inexorable story of success toward the cosmic Christ. It is Jonas himself who challenges his ideas by saying that:

> **“Information” requires for itself, as its physical substrate, a differentiated and stable system. For living things, this would be the genome with its molecularly full articulation and constancy (for the computer it would be the magnetically spelled-out programming or “software”). Information, therefore, is not only a cause, but already a result of organization. It is a deposit and expression of something previously attained, which is perpetuated through this information, but not surmounted by it. Now *neither* articulation *nor* stability have a place in the totally undifferentiated and dynamic "substance" (hypothetically speaking) of the "Big Bang" or in any "chaos" at all. For this reason, the hypothesis of a cosmological "logos" – in general, every pre-established programming and systematic arrangement – dwelling already in developing matter right from the start, is eliminated as an explanatory model of development. Briefly put, information is something stored, and the “Big Bang” had no time for storing anything (JONAS: 1996: p. 167).**

Despite not being available since the beginning of time due to both a genetic and logical impossibility, information or *logos* appears at the heart of matter thanks to the transcending factor which is, as explained by Jonas, the Darwinian factor of *copying error*. In the absence of error, without chaos or disorder, information would be bound to reproduce *ipsis litteris* to the end of time. In reality, significant mutations have occurred throughout the cosmic history: the primordial hydrogen turned into helium, stars were born and so were the galaxies

[89] Idem.

and life emerged with all its interiority. Only then the *logos* emerged. This subjectivity is a fundamental ontological feature of the being, for it is from this standpoint that the universe contemplates itself and attributes value to things. But if there was no information present at the time of the Big Bang, how could we understand the emerging universe *before* the cyclical order fit for supporting life was established? It is Jonas who, once again, offers an answer, contending that no guarantees existed. Rather, there was an incidental possibility of interiority. A mere possibility is not to be confused with a positive willing Being (*Angelegtsein*) since there was no purpose but a yearning, a tendency at best. Jonas asserts that *willingness* is the most there is to it - certainly not a plan - and for that reason he coins the phrase *cosmogonic eros* in contrast with *cosmological cosmos* (JONAS: 1996: p. 172). Finality follows the emergence of life instead of preceding it. Jonas avers:

> **Life is its own purpose (*Selbstzweck*), i.e., an end actively willing itself and pursuing itself. Purposiveness as such, by means of its eager "yes" to itself, is infinitely superior to that which is indifferent, and can easily be seen for its part as the purpose – the secretly longed-for goal – of the entire undertaking of the universe which otherwise seems so empty. This means that right from the beginning matter is subjectivity in its latent form, even if aeons, plus exceptional luck, are required for the actualizing of this potential. Only this much about "teleology" can be gleaned from the evidence of life alone (JONAS: 1996: p. 173).**

There are however other problems to be considered when talking about a supposed cosmic biophilia:

The first problem is an issue of a contingency and necessity order. How these values relate is unknown. Modifications imposed on one could lead to changes in another and if such is the case, there would be nothing "special" in the way our reality is shaped. The numbers described by Rees would not be necessary but contingent and life would come about, one way or the other. It should be noted, however, that even if the numbers are contingent and follow in tune with one another, if we are to contend that life would inevitably emerge, it follows that we attribute a quality of necessity to its existence.

The second problem contemplates the possibility that our universe is but one among many others and could thus be an accident where life emerged while

many other universes would be devoid of stars. Universes solely constituted by hydrogen molecules, for instance. As outlined by Rees:

> **These six numbers constitute a "recipe" for a universe. Moreover, the outcome is sensitive to their values: if any one of them were to be "untuned", there would be no stars and no life. Is this tuning just a brute fact, a coincidence? Or is it the providence of a benign Creator? I take the view that it is neither. An infinity of other universes may well exist where the numbers are different. Most would be stillborn or sterile. We could only have emerged (and therefore we naturally now find ourselves) in a universe with the "right" combination (REES: 1999).**

Rees' considerations take us to the next metaphysical wagers of this thesis: there are other universes (countless or infinite ones), this can be demonstrated and their existence raises the odds of the teleology of life. A teleology that, as put forward by Gardner, Chardin and Jonas alike - observing the differences[90] among them – is characterised by the emergence of a cosmic super-mind.

2.5. On the existence of multiple universes.

Addressing the existence of multiple universes in this thesis is two-fold: (1) to demonstrate that the elements of *guarantee and optimism* present in Chardin's thesis *Phenomenon* pale before a multiverse scenario once not even microrganisms – let alone the cosmic mind - could emerge in sterile universes. The universe in which we find ourselves then would cease being *necessary* and would thus move under the category of merely *contingent*. It is true that the possibility of a multiverse in Gardner's thesis presented in *The Intelligent Universe* does not pose any great disturbances given that the feasibility of the emergence of a cosmic intelligence in this universe - but not necessarily in another - is inconsequential. Gardner is not committed to the possibility of a pre-existing divinity but to that of an emerging and future super-entity, a *natural God*. Chardin's optimistic thesis built on certainty and necessity is challenged by a multiverse constituted of universes where nothing is realised; (2) on another note, to demonstrate that the concept of a multiverse considerably raises *chance*, a

[90] To Gardner, the spread of intelligence and consequent contamination of the whole universe, which would lead to the emergence of the cosmic mind; to Chardin, the guaranteed and inevitable return of Christ; to Jonas, the possible- but not guaranteed- resurrection of the God who sacrificed himself so that the universe could exist.

fundamental element in Jonas' *alternative speculation of cosmogony* (JONAS: 1996: p. 189-191), which tells the story of a God who abdicates his own power so that the universe may exist, wherein the human type is perhaps - and only perhaps - tasked with reconstituting Him.

We shall resume Jonas' speculations further ahead. For the present, suffice to bear in mind that his heuristic of fear is guided precisely by the risk of us destroying said *chance*. It follows that *if* Jonas is right concerning his cosmogonical speculations, we have a God who plays a game. Why He chooses to do so is something to which Jonas provides no answers and it is not the intention of this thesis to offer one. This thesis intends, however, to demonstrate that this "God who plays a game" and who voluntarily becomes *omni(m)potent* - a meaningful neologism - does not place His bets on a single universe. It does so on many others, perhaps on infinite others and although multiplicity does not constitute any guarantees, it certainly raises the probabilities. That is to say that although Chardin is not justified in his optimism, Jonas in his turn could find some peace in his heuristic, given that the chances are better than those conceived by him.

There are at least two distinct manners to argue for the existence of multiple universes. One of them is by means of a pure exercise of the philosophy of the mind, which regards the infinite possible scenarios as ontologically real as the scenario where the author of this thesis and its readers are. According to Lewis[91]:

> **There are so many other worlds[92], in fact, that absolutely *every* way that a world could possibly be is a way that some world *is*. And as with worlds, so it is with parts of the worlds. There are ever so many ways that a part of a world could be; and so many and so varied are the other worlds that absolutely every way that a part of world could possibly be is a way that some part of world is (LEWIS: 1986: pg. 6).**

[91] David Kellogg Lewis (1941-2001), American philosopher.
[92] In this particular subchapter, the term "worlds" is always to be read as a synonym for "universes" and not of "planets". This word choice aims to be in keeping with the terminology used by Lewis and other authors such as the physicist Hugh Everett III.

Id est, when we say that something is "real", we refer to the universe in which we find ourselves. Lewis's thesis[93] defends that every possible universe is real, even the most bizarre ones ever imagined and our own universe is not any more real than any other. Anything conceived as possible is effectively possible, and in some universe Harry Potter is enrolling in magic classes at Hogwarts. Dracula the vampire is being hunted down by Van Helsing. There are, however, substantial differences between Lewis' modal realism and the thesis defended here. Although the present thesis advocates the existence of other universes, Lewis conceives them as *disconnected*:

> **There are countless other worlds (…) and they are not remote. Neither are they nearby. They are not at any spatial distance whatever from here. They are not far in the past or future, nor for that matter near; they are not at any temporal distance whatever from now. They are isolated: there are no spatiotemporal relations at all between things that belong to different worlds. Nor does anything that happens at one world cause anything to happen at another. Nor do they overlap; they have no parts in common with the exception, perhaps, of immanent universals exercising their characteristic privilege of repeated occurrence (LEWIS: 1986: p. 6).**

Contrary to Lewis, this thesis subscribes to the notion that some universes are *intersectional*, i.e., not only do they exist but they also interfere with one another on a physical level. Said interference is weak but sufficiently clear to be subject to identification. Moreover, Lewis defends that every possibility necessarily entails existence, which introduces an element of guarantee whose implications are tantamount to Nihilism: if anything that could ever come into existence does exist, fighting for anything would thus be pointless, for things will have been actualised in some universe regardless. This *guarantee*, as shall be seen in the last chapter, constitutes the opposite of life force, which is realised by way of tension, doubt, uncertainty, and desire.

The difference between this thesis and Lewis' is not limited to the ontology of the multiple universes but to the reason why its existence should be seriously considered. To Lewis, the modal realism thesis is a *useful exercise*. In his words:

> **Why believe in a plurality of worlds? – Because the hypothesis is serviceable, and that is a reason to think that is true. The familiar analysis of**

[93] Lewis's ideas on multiple universes seem to be based on Anselm's traditional ontological argument, which attributes actuality to God because of the idea of God. This is very evident in one of his early papers, *Anselm and Actuality* (1970).

> **necessity as truth at all possible worlds was only the beginning. In the last two decades, philosophers have offered a great many more analyses that make reference to possible worlds, or to possible individuals that inhabit possible worlds. I find that record most impressive. I think it is clear that talk about *possibilia* has clarified questions in many parts of philosophy of logic, of mind, of language, and of science – not to mention metaphysics itself. (…) As the realm of sets is for mathematicians, so logical space is a paradise for philosophers. We have only to believe in the vast realm of *possibilia*, and there we find what we need to advance our endeavours (LEWIS: 1986: p. 8).**

This thesis, in turn, sustains that the multiplicity of universes is not just a useful mental/philosophical exercise but a fact whose demonstration requires (1) some considerations regarding the philosophy of science; (2) a physical experiment – namely, on the behaviour of light. These points are both contemplated by Deutsch[94] in his work *The Fabric of Reality* as shall be described ahead.

Let us thus delve into the first point. According to Deutsch, the assumption that science is produced from empirical experiments and then validated by the reproduction of said experiments within the constraints of laboratories is a common scientific misconception. Although such experiments are necessary, it is the *explanation* that stands as science's defining feature, for there can be no science without it. Throughout history, numerous were the times when the simple observation of the behaviour of light altered our understanding of the universe completely. The observed phenomenon remained the same. The understanding drawn from it, however, was different. In order to illustrate this, let us consider the following examples:

Copernicus' heliocentric hypothesis is largely grounded on the fact that, in placing the Sun in the centre of the system in lieu of the Earth, the explanation given to describe the planetary orbits is made much simpler. The position of the stars marked by dots of light in the night sky was less aberrant this way. Notwithstanding the technological constraints that did not allow him to send a probe to space in order to provide confirmation of heliocentrism, Copernicus offered a more reasonable *explanation* than the one that previously stood[95].

[94] David Elieser Deutsch (Born in 1953), Israeli-born, British physicist.

[95] The previously accepted explanation, which was based on Ptolemaic cosmology, although reasonable, demanded more complexity. The sophistication in the Ptolemaic model "salvage", so to speak, the positioning of the Earth in the centre of the system as propounded by Aristotle.

While the Copernican heliocentric theory rightly placed the Sun in the centre of the system, it also held that the planets moved in circular orbits. There was a slight, almost undetectable inaccuracy between the calculated position shown in the ephemerides of the time and the real sunlight reflected by the planets in the sky. By correcting the calculations, Kepler was able to conclude that the orbits were supposed to be elliptical rather than circular. The light was not where it was supposed to be and so Kepler proposed *an alternate explanation* for the phenomenon despite lacking our current technological advances.

As for Newton[96], he *explained* the ellipses proposed by Kepler with the inverse square law of gravitational force. With time, it became clear that, in light of Newton's law, the attraction among planets was bound to cause tiny perturbations in the elliptical orbits. As these perturbations were noticed, or, put in other words, thanks once again to the light being observed to not be where it was supposed to be, astronomers figured there ought to be another planet besides Uranus and sure enough, Neptune is discovered in 1846, further validating Newton's theory.

Centuries later, knowledge of the nature of space and gravity was once again amplified due to aberrant behaviours of light. The solar eclipse of 1919 in the Brazilian town of Sobral[97], for one, allowed Crommelin[98] to confirm the *explanation* propounded by Einstein that stated that space is *curved* which causes the light of the stars to suffer double the expected deflection as they pass by the Sun. Once more, the observation of the eclipse took into consideration the fact that light did not behave as expected.

The finitude of our universe is relatively simple to evince and its explanation has been largely accepted in astrophysics up to this point. The behaviour of light makes said *explanation* possible even though it cannot be proven empirically. Let us take daylight for instance first. That which we call "day sky" is not the way it is due to the reasons one could draw from common sense, which would tell us the reason why we have daylight is that the Sun is above the horizon at a particular location. That, however, is only partially true. Even if the Sun finds itself above the

[96] Isaac Newton (1643-1727), English mathematician, physicist, and philosopher.
[97] Although a different team had travelled to São Tomé and Príncipe in order to observe the eclipse, the meteorological conditions did not allow proper observation. It fell to the other team lead by Crommelin to obtain images of the same eclipse in Sobral. Crommelin's photographic plates clearly showed a luminous deflection of 1.98, confirming Einstein's predicted calculations.
[98] Andrew Claude de la Cherois Crommelin (1865-1939), British astrophysicist.

horizon of the Moon, its sky remains in the dark. Our planet differs in that because it is surrounded by an atmosphere whose composing gas molecules scatter the small fraction of sunlight beamed at us. Considering the existing hundred billion stars in our galaxy, should our universe be eternal or spatially infinite, there would be no “night sky”. Each and every observable corner of the sky would be filled with the visible light of a star or galaxy, even if the Sun finds itself on the other side of the horizon. This is not so because there has not been enough time for the light to reach us. *Id est*, the universe is immense but finite.

All aforementioned examples help illustrate how far considerations on light distortions, be they sophisticated or trivial, can trigger significant changes in the way we understand reality. The continuing sophistication of our measuring instruments such as the telescope has allowed us to identify minute details. The greater the minutia, the more refined our understanding of reality becomes. Such was the case of the measurements of light in the Sobral eclipse: a minimum difference in the deflection was sufficient to make apparent to us that space is curved.

Despite our current ability to verify some things directly, such as the fact that the Sun is the centre of the system rather than the Earth, other things are not guaranteed even if they consist in explanations that have virtually achieved a consensus in contemporary science. Space curvature and even the existence of dark matter are indirectly inferred facts and therefore subject to the proposition of new different explanations for the same observed phenomena. Scientific theories do not gain credence - as some naive instrumentalists are likely to contend - because of the predictability of a given experiment. Practical or laboratory physics usually conducts reproducible experiments whose results are the cornerstone of the subsequently derived generalisations that will serve as the basis for a certain theory. This procedure is correct. To reckon that the credibility of a theory is based singularly on its replications is however a mistake which is clearly inductive and false on many levels, regardless of how induction may provide us with information that allows us to bet – though never assure – that a given theory will hold true. As elucidated by Popper[99], it is not – contrarily to what is usually attributed to the

[99] Karl Raimund Popper (1902-1994), Austrian-British philosopher of science.

author - the mere falsifiability of the experiment that confers validity to a given scientific theory but the *explanation* provided by the theory in question.

Reproducibility and statistic frequency are necessary but insufficient conditions to validate a theory. Inconsistent and incorrect predictions render the explanation unsatisfactory, but precise predictions do not necessarily equate with correct explanations and a consistent theory[100]. As highlighted by Deutsch:

> **What we need is an explanation-centred theory of knowledge: a theory of how explanations come into being and how they are justified; a theory of how, why and when we should allow our perceptions to change our world-view. Once we have such a theory, we need to separate theory of predictions. For, given an explanation of some observable phenomenon, it is no mystery how one obtain predictions. And if one has justified an explanation, then any predictions derived from that explanation are automatically justified too (DEUTSCH: 1997: p. 61).**

Another common misconception is conditioning theories to the reproducibility factor. In these instances, there is the preponderant illusion that theories provide definitive understanding when they actually convey *the best possible understanding at a given moment*. According to Deutsch:

> **In science the object of the exercise is not to find a theory that will, or is likely to, be deemed true forever; it is to find the best theory available now, and if possible to improve on all available theories. A scientific argument is intended to persuade us that a given explanation is the best one available. It does not and could not say anything about how that explanation will fare when in the future it is subjected to new types of criticism and compared with explanations that have yet to be invented. A good explanation may make good predictions about the future, but the one thing that no explanation can even begin to predict is the content or quality of its future rivals (DEUTSCH: 1997: p. 62).**

An important criterion for a good explanation is avoiding metaphors and analogies. Although analogies may play a role in abridging explanations, it is a very delicate cognitive resource, as the qualities of an entity are lent to another. As

[100] Let us contemplate astrology, for instance: that an astrologer makes ninety per cent correct predictions - no matter how objective they may be - is irrelevant. Despite this high rate of accuracy, the explanation offered for the astrological phenomenon remains inconsistent: if the cause is "planetary influence", how is it exerted? Why can this force of influence not be measured? If there is no such influence, then what is the cause for the correct predictions? Astrology could present objective and accurate predictions - all the while allowing them to be reproduced - but it would still be impossible to deem it "astrological science" in the absence of an explanation for the phenomenon, so "astrological knowledge" is appropriate instead. The distinction made here between the terms "science" and "knowledge" is established by the element of explanation, which is present in the first case but absent or void in the second.

remarkable as resemblances may be, an analogy does not equal identity and should never disregard the differences in any shape or form. If we are to establish that “A” is to “B” as “C” is to “D”, that might be efficient in terms of communication, perception and emotion and as a mnemonic device but it does not resist the scrutiny of an analysis that will lay bare grave flaws in the analogy. One may explain that “cats” are to “lions” as “dogs” are to “wolves”, but the analogy will prove to contain serious issues from the moment we start investigating the differences in the relation between the entities cat/lion and dog/wolf.

When it comes to scientific explanations, the use of metaphors is even more delicate since it evokes highly imprecise symbolic meanings that are a tell tale sign of the difficulty in elaborating an efficient explanation. If we assert that “A” behaves *as if* it were “B”, in reality, we do not know how “A” really behaves. We just assume that its behaviour is *reminiscent* of “B”.

All things considered, we shall see ahead that metaphors and their typical linguistic constructions impregnated with “as if” are present in one of the most important contemporary scientific theories: the quantum interference theory. The contaminating metaphors and analogies must be eliminated so that the explanation may be perfected.

Since this thesis is a philosophical one and this chapter makes reference to a physical experiment, it is necessary to describe said experiment to the lay ones. To that intent, we use the description provided by Deutsch:

If we consider any artificial light-emitting device, and gradually distance ourselves from it without taking our eyes off of it, the reflector bulb will seem ever smaller to the point it will look like a puny dot. Given enough distance, the light will disappear altogether, or, to be more accurate, we shall no longer be able to see it, although it lingers at the same place. The flashlight experiment is trivial and the derived conclusions would be frivolous if we limited ourselves to the constraints of our human senses to lay the basis for our conjectures If that were to be our approach, we would incur in a naive empiricism. Trusting the conclusions derived from senses of well known limited nature is everything we do not need when the issue at hand is doing science.

The flashlight experiment would differ greatly if it were to be described by a frog. Deutsch uses a frog as an example due to the fact that this animal has eyes

that are several times more sensitive than the best available human sight, so much so that a frog would never lose sight of the light after distancing from it[101]. The light will not disappear nor become dimmer, it will *flicker*. The longer the distance between the frog and the flashlight, the longer will the intervals between flickers be so that at a distance of one hundred million kilometres the interval between flickers will be of a whole day. However, that light will be perceived as bright as at any other observed distance. It is possible to realise light does not become uniformly fainter as it does when our human eyes are involved. The flickering, whose brightness shall remain unaltered, has in its intervals the indication of the distance. These flickers demonstrate that if light is spread, there are physical limits to this. The flickers detected by the retina of the frog's eye or by the photomultipliers are not the result of the "light dimming " due to the distance of a given luminous object. That which we call "light" is the perception we have of the trillions of photons that form a beam. The further away the frog is from the flashlight, the further away the individual photons are from each other. And so, thanks to the remarkable features of its sight, the frog is able to detect each photon. The light did not turn "fainter", it was the distance between photons that became larger.

As a result of all the properties previously described here, photons are said to be *particles*. The term *quantum* may be attributed to any existing measurable thing; such is the case of light here. If we were to be guided by our senses, we would come to the conclusion that light always travels in a straight line. And yet, relatively simple experiments show light bends. Even more curiously, they show light is no more ductile than, for instance, a gold thread. Suppose that a beam of light goes through the whole of a perfectly opaque screen; next, it goes through another hole of a smaller diameter in an otherwise identical opaque screen arranged in perfect parallel alignment; and thus proceeding successively, screen after screen of ever smaller holes and light starts to behave oddly. As it passes through holes not as small as a millimetre or so in diameter, the light begins to spread, to fray. The smaller the hole is, the more the light frays, generating patterns of intercalated light and shadow.

[101]We know this thanks to our knowledge of the eyesight capacity of frogs. We are able to mimic this capacity with the use of highly sensitive photomultipliers after passing light through dark filters

At this point, it is relevant to note that gold can be drawn into threads one ten-thousandth of a millimetre thick. That means a hole this size could fit a gold thread but not a light beam. Could this be due to the "size" of the photon? Could it be possible to determine the “size” of the luminal particles? If so, would a photon be larger than an atom of gold? Therein lies the problem: in physics, photons are traditionally said to have “zero weight” since they are considered to be elementary particles deprived of dimensions. Curiously enough, atoms – no matter how small- do have a size. The smallest of all, hydrogen, measures 53 picometres radius, i.e., $53*10^{-12}$ metres. The atom of gold measures 174 picometres radius or $174*10^{-12}$ metres. What stands out as curious is that something measurable- the gold thread - can go through a ten-thousandth of a millimetre hole whereas the theoretically massless light deviates when going through the very same hole.

Suppose we emit a laser beam [102] through two parallel slits spaced one-fifth of a millimetre apart on an opaque barrier. The following pattern of shadows is then cast on a wall standing three meters away from the apparatus:

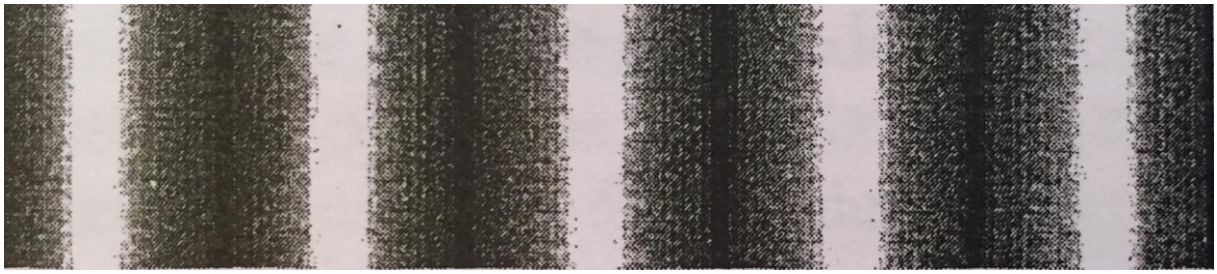

Figure 1: the shadow pattern. The real image obtained from the description of the experiment has been enlarged here[103].

The resulting shadow pattern indicates light does not travel in a straight line and frays when passing through the small slits of the opaque barrier. If light travelled in straight lines and did not fray, the result produced would consist in a single pair of bright bands whose edges would be sharp. The remainder would be dark. On the contrary, not only do we have many bright bands, but we also have shadows ranging from pitch black to penumbras.

[102] A red laser is chosen in lieu of a flashlight due to the fact that the shape the shadows may take heavily depends on the colour of the light that casts it. White light is a mixture of all colours and thus it casts shadows of multi-coloured fringes. Even if we used a monochromatic filter over a flashlight, the filter would not be as discriminating as a laser, which could be tuned to emit a particular color, virtually removing all other colours of the spectrum.
[103] Images extracted from Deutsch’s work, *The Fabric of Reality*.

What would happen if we added to the same opaque apparatus another pair of identical slits spaced one-tenth of a millimetre apart? Common sense might lead us to expect that two pairs of slits produce the same pattern though brighter, and more blurred. What follows, in reality, is nothing of the sort. Let us observe the result of the second experiment in figure 2. With the intent to make the differences clear, Deutsch contrasts the results of the second experiment (a) with the results of the first experiment (b):

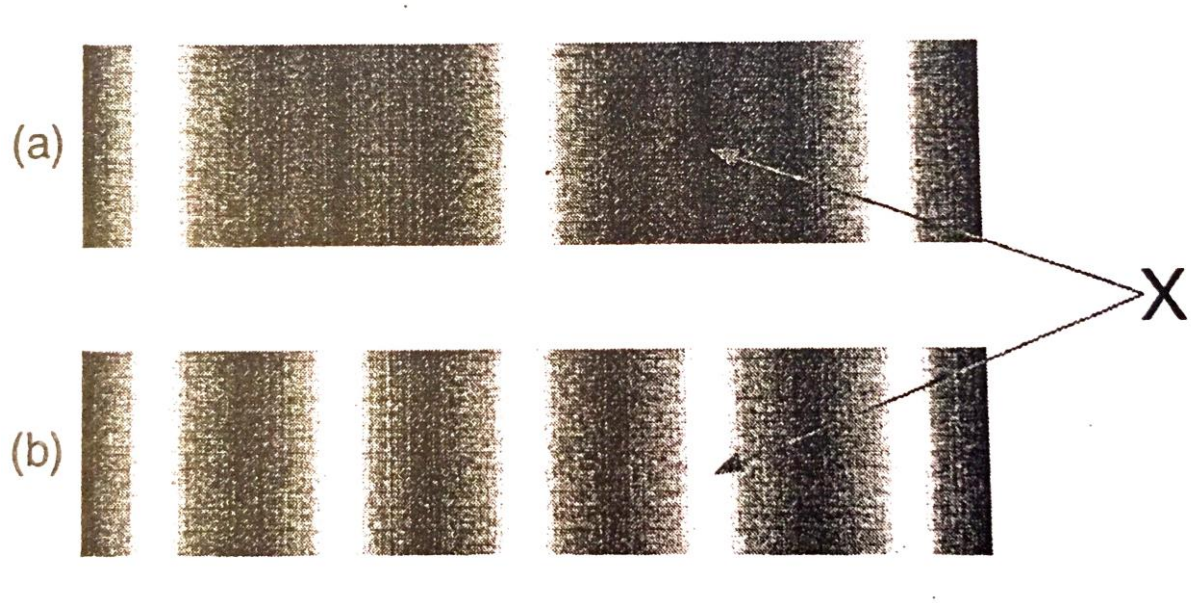

Figure 2: the shadow pattern, comparison between experiment 2 ("a") and experiment 1 ("b"). The real image obtained from the description of the experiment has been enlarged here [104].

The counter-intuitive phenomenon appears in the area defined in figure 2 as "X". The area was bright when there were two slits, but darkened when we doubled the number of slits.

A possible but invalid explanation would be that as the two photons crossed the slits, they collided and the collision made them deviate, causing them to hit a different place on the wall. It is possible to demonstrate this explanation is invalid by conducting the experiment one photon at a time. If it were true that the photons collided with each other in the second experiment generating the dark "X" area, sending a single photon at a time should be enough to prevent the collision from happening altogether. In spite of this, in conducting the experiment in such

[104] Image extracted from Deutsch's work, *The Fabric of Reality*.

fashion, the pattern of shadows cast *is exactly the same*. As we send one photon at a time, a pattern - chaotic and incoherent at first - is gradually formed up to the moment when it reveals the exact same image “a” shown in figure 2. Hence the question is posed once again: if a single random photon goes through the opaque four slit apparatus, *what does explain this organised pattern at the end after many photons have been sent?*

It is worth mentioning, especially to those foreign to physics, that the nature of light has been subject to much controversy throughout the history of science. At first, western civilization characterised light as being constituted by particles[105]; conjectures progressed to later on regard it as a wave[106]. At the turn of century XIX to century XX, however, the wave nature of light started being questioned due to contradictions made clear in photoelectric emission experiments. Drawing upon Planck’s ideas[107], Einstein demonstrated that a light beam is not a wave, rather, it is constituted by “packets of energy” called “photons”.

The nature of light has been considered dual ever since, and the currently accepted theory is that of wave-particle duality: as light propagates through space, it behaves like a wave; as it hits a surface, it behaves like a particle. The “wave-particle duality” is the current mainstream *explanation*, finding little resistance.

Nonetheless, in the eyes of Deutsch, Everett III[108], DeWitt[109] and other physicists who subscribe to the notion of the multiple worlds (*many-worlds interpretation*, henceforth referred to as MWI), there is a serious explanatory issue in these considerations concerning the nature of light. We encapsulate this alleged issue with that which has been previously mentioned: *resorting to metaphors, and analogies, which overtly indicate the lack of knowledge of what is actually happening*. That is precisely what happens when a scientist says it is as *if* light were both wave and particle.

It is not the prediction of the phenomenon of the double slit experiment that is being questioned. The prediction remains the same and so do the methods and

[105] With atomism, from Epicurus (341 BC – 271/270 BC) to Lucretius (99 BC – 55 BC.), including Newton’s theories (1643-1727), and his followers in the centuries XVII and XVIII.
[106] As defined by Huygens (1629-1695), and also defended by Grimaldi (1618-1663), as well as demonstrated by means of experiments conducted by Young (1773-1829) and Fresnel (1788-1827), and later on by Maxwell (1831-1879).
[107] Max Karl Ernest Ludwig Planck (1858-1947), German theoretical physicist.
[108] Hugh Everett III (1930-1982), American physicist.
[109] Bryce DeWitt (1923-2004), American theoretical physicist.

instruments applied just like those used by Ptolemy and Copernicus with a century between them. It is the *understanding* of the phenomenon that changes. What the proponents of MWI defend is *another explanation*. An explanation based on realism, free from metaphors and analogies.

Let us return to the experiment: it is known that something[110] interferes with the passage of the photon as it goes through any of the four slits, redirecting it to apparently random points on the wall. Something, however, goes through he other slits, colliding with the only photon sent. This "thing", whatever it is, cannot be seen or directly detected, but makes its presence known. What could this "thing" be? As explained by Deutsch, *it is precisely another photon, though of a different nature than that of those that have been emitted:*

> **I shall now start calling the interfering entities "photons". That is what they are, though for the moment it does appear that photons come in two sorts, which I shall temporarily call *tangible* photons and *shadow* photons. Tangible photons are the ones we can see, or detect with instruments, whereas the shadow photons are intangible (invisible) – detectable only indirectly through their interference effects on the tangible photons (…) What we have inferred so far is only that each tangible photon has an accompanying retinue of shadow photons, and that when a photon passes through one of our four slits, some shadow photons pass through the other three slits. Since different interference patterns appear when we cut slits at other places in the screen, provided that they are within the beam, shadow photons must be arriving all over the illuminated part of the screen whenever a tangible photon arrives. Therefore there are many more shadow photons than tangible ones. How many? Experiments cannot put an upper bound on the number, but they do set a rough lower bound. In a laboratory, the largest area that we could conveniently illuminate with a laser might be about a square meter, and the smallest manageable size for the holes might be about 10^{12} (one trillion) possible hole-locations on the screen. Therefore there must be at least a trillion shadow photons accompanying each tangible one (DEUTSCH: 1996: p. 43-44).**

A *shadow photon* would thus be undetectable by observers, but its effects could be detected by its interaction with the tangible photons accompanying it. To each photon sent, at least a trillion other shadow photons follow it. The phenomenon of the interference occurs - as can be experimentally demonstrated - with any type of particle. According to Deutsch:

> **Thus we have inferred the existence of a seething, prodigiously complicated, hidden world of shadow photons. They travel at the speed of light, bounce off mirrors, are refracted by lenses, and are stopped by opaque barriers or**

[110] Said thing could not be another identifiable photon, given that we are sending one at a time.

> **filters of the wrong colour. Yet they do not trigger even the most sensitive detectors. The only in the universe that a shadow photon can be observed to affect is the tangible photon that it accompanies. That is the phenomenon of interference. (...) Interference is not a special property of photons alone. Quantum theory predicts, and experiment confirms, that it occurs for every sort of particle. So there must be hosts of shadow neutrons accompanying every tangible neutron, hosts of shadow electrons accompanying every electron and so on. Each of these shadow particles is detectable only indirectly, through its interference with the motion of its tangible counterpart (DEUTSCH: 1996: p. 44).**

To the collection of tangible particles, be they photons, neutrons or electrons, in other words, to the reality directly perceived in its whole, we give the name of *universe*. Such particles interact among themselves and constitute that which we call *matter*. Supporters of MWI define shadow particles as belonging to *other universes*. As put by Deutsch:

> **(...) they do not form a single, homogeneous parallel universe vastly larger than the tangible one, but rather a huge number of parallel universes, each similar in composition to the tangible one, and each obeying the same laws of physics, but differing in that the particles are in different positions in each universe. (DEUTSCH: 1996: p. 45)**

Evidently, we could call this set containing all these supposed universes "universe", but this new definition would be at odds with the existing one so that the word *multiverse* will henceforth be used to convey the reunion of all universes – ours and the supposed parallel ones. Each universe has an extremely week effect on the other but this interaction is strong enough to be perceived in interference experiments.

Here is a conundrum: the phenomenon of interference is incontrovertible, and yet MWI is accepted, but only for a minority of physicists. The vast majority subscribes to the *Copenhagen interpretation* (CI). It just so happens that this majority of adherents of the CI, according to the arguments of MWI supporters, derive their stance from *metaphorical assumptions*. Asserting that the photon behaves *as if* it were colliding with virtual photons explains nothing about the behaviour of the photon. Saying that light behaves *as if* it were both wave and particle at the same time is nothing short of admitting the lack of knowledge on the behaviour of light. The circumstances are salvaged by the use of a metaphor that will state in every case: *it is as if...*

Whereas MWI supporters take an ontologically realistic stance, that removes the “ifs” and any other metaphorical features or analogous resources. As stated by Deutsch:

> **(...) The key fact is that a real, tangible photon *behaves differently* according to what paths are open, elsewhere in the apparatus, for something to travel along and eventually intercept the tangible photon. Something does travel along those paths, and to refuse to call it “real” is merely to play with words. “The possible” cannot interact with the real: non-existent entities cannot deflect real ones from their paths. If a photon is deflected, it must have been deflected by something, and I have called that thing a “shadow photon”. Giving it a name does not make it real, but it cannot be true that an actual event, such as the arrival and detection of a tangible photon, is caused by an imaginary event such as what that photon “could have done” but did not do. It is only what really happens that can cause other things really to happen. If the complex motions of the shadow photons is an interference experiment were more possibilities that did not in fact take place, then the interference phenomena we see would not, in fact, take place (DEUTSCH: 1996: p. 48-49).**

Assuming MWI is true, we would then be faced with the following aspects: (1) multiple universes exist. It is not known whether these universes are, as suggested by Lewis with his modal realism, infinite. Despite this, according to Deutsch, it is possible to establish the minimum figure of a trillion; (2) every particle has its counterpart in another universe; (3) the interference occurs exclusively among particles of the same nature. A tangible photon cannot be affected by another universe photon; (4) the interference can only be detected when it occurs among particles of very similar universes. In the experiment previously explained in particular**,** the difference between the parallel photons is their position**.** In a hypothetically existing universe in which the speed of light is different, the parallel photon will not affect the photon in our reality; (5) the particles in our universe are in their turn shadow particles in other universes; (6) since the collective of particles forms that which we know as “matter”, at this very moment there are at least a trillion versions of the reader reading a trillion versions of this thesis, written by a trillion alternative versions of the author. But contradicting Lewis, no actual Harry Potter nor Dracula. The Big Bang did not create a single universe but countless ones whose existence we can detect through the phenomenon of interference. Jonas’ cosmogonical speculations take place not in a single scenario. Rather, the game and *chance* are actualised in at least a trillion more scenarios.

2.6. On wagers.

By way of general conclusion, we anticipate questions likely aroused from the topics brought up in this chapter: does it befit philosophy to be speculative? Jonas provides a good answer when he says the ban on metaphysics is an attempt of philosophy to mimic natural sciences. The “flights of thought” warranted by philosophy should, however, be performed from time to time, constituting a typical venture that Jonas calls *philosophia perennis* and practiced by the likes of Plato, Spinoza, Hegel, Leibniz and many others who dared to speculate about the universe (JONAS: 1996: p. 193-194). We may, therefore, add that considering all these classic philosophy characters speculated and drank from their rich intuition, it makes no sense that we should bar ourselves from this endeavour. Especially if we consider the cosmological data they lacked and that we now find at our disposal, such as the physical constants aforementioned here and our understanding of quantum physics, which point us in the direction of more accurate intuitions. It is also noteworthy to mention that contemporary theoretical physicists do not shy away from such speculative ventures. Thus it makes no sense whatsoever that philosophy of all things be prohibited from exercising speculation. In doing so, we would be killing *thaumázein*, or *wonder*, the driving force of philosophy from its very early days. Furthermore, as explained from the onset of this chapter, none of the content presented here is intended to hold the value of a metaphysical truth. The intended proposition is that of a system grounded on the interpretation of physical data.

One might also ask: why labour these questions in a thesis committed to conclusions of an ethical nature? As previously said, there is no dependence of ethics upon metaphysics, even though it is possible to derive a wager from this type of lucubration. By way of illustration such is done by Pascal[111], when he tells us in his *Pensées* that it is better to bet on the existence of God, given that infinite gains or losses are at stake:

> **(…) you must wager. It is not optional. You are embarked. Which will you choose then? Let us see. Since you must choose, let us see which interests**

[111] Blaise Pascal (1623-1662), French mathematician, physicist, and Catholic theologian.

> **you least. You have two things to lose, the true and the good; and two things to stake, your reason and your will, your knowledge and your happiness; and your nature has two things to shun, error and misery. Your reason is no more shocked in choosing one rather than the other, since you must of necessity choose. This is one point settled. But your happiness? Let us weigh the gain and the loss in wagering that God is. Let us estimate these two chances. If you gain, you gain all; if you lose, you lose nothing. Wager, then, without hesitation that He is. "That is very fine. Yes, I must wager; but I may perhaps wager too much." Let us see. Since there is an equal risk of gain and of loss, if you had only to gain two lives, instead of one, you might still wager. But if there were three lives to gain, you would have to play (since you are under the necessity of playing), and you would be imprudent, when you are forced to play, not to chance your life to gain three at a game where there is an equal risk of loss and gain. But there is an eternity of life and happiness. And this being so, if there were an infinity of chances, of which one only would be for you, you would still be right in wagering one to win two, and you would act stupidly, being obliged to play, by refusing to stake one life against three at a game in which out of an infinity of chances there is one for you, if there were an infinity of an infinitely happy life to gain. But there is here an infinity of an infinitely happy life to gain, a chance of gain against a finite number of chances of loss, and what you stake is finite. It is all divided; where-ever the infinite is and there is not an infinity of chances of loss against that of gain, there is no time to hesitate, you must give all. And thus, when one is forced to play, he must renounce reason to preserve his life, rather than risk it for infinite gain, as likely to happen as the loss of nothingness (PASCAL: 2003: 233)**

As shall be argued, there is a wager in place, but in this bet subject and object are inverted in relation to Pascal's classic wager. It is not the human type who has to bet on God's existence. Rather, it is God who, from the very beginning of it all, has been betting on the human type. Drawing upon Jonas once again, we are led to understand it is God – *if* we are to consider His existence - who effectively depends on us. This sustains the imperative evoked by Huxley, father of contemporary transhumanism: *we are not entitled to more rights than other beings. Rather, we have a bigger responsibility within the framework of existence*. This responsibility, according to transhumanists such as Gardner and Kurzweil, is to spread life and consciousness throughout the universe, raising the odds for survival and precluding the final entropy. Huxley does not address these ideas in his original article, despite verging upon the proposition of the emergence of an awoken universe in his introduction to Chardin 's *Phenomenon*.

But what God is this to whom this thesis alludes? The word is complicated due to the myriad of meanings that come to surface when evoked. As shall be seen, His past existence is admissible and it is highly likely that He voluntarily

abdicated his own power *to play a game without any guarantees of success*. Therefore, we now move on to the proper elucidations:

Anselm's ontological argument may be summarised in the following proposition *God exists in the mind as an idea; therefore, God necessarily exists in reality*. Since even atheists bear the idea of God in their minds, to Anselm, the existence of divinity is ontologically inescapable. Whereas some transhumanists hold that *God exists in the mind as an idea; therefore, a natural God will exist in reality*, which characterises a temporal transfer of the ontological argument: the idea of God does not stem from His previous existence, rather, it reveals above all the wish to bring Him into existence. As previously established, myths, with all their gods and hybrid creatures are not to be interpreted as metaphors but as yearnings and even the saints of monotheistic religions rival ancient pagan deities when it comes to performing supernatural deeds. Where shall this yearning that more and more propels us as a species toward a – at the same time both dangerous and wondrous – enhancement that could turn us into something beyond human lead us to? As seen throughout this chapter, some authors, such as Gardner and Chardin - to name only but two – assume everything marches toward the creation of a super-mind. Although differences exist[112] in respect with this process, converging aspects may be spotted: the divine realisation that is actualised within the framework of immanence, stemming from matter; optimism based on the belief that such realisation is inescapable, especially considering Lewis's perspective of the infinite worlds where anything that could shall be. In light of such guarantees, what else is there besides the blind faith that there is nothing we need to do? Either we are bound to Chardin's omega point or we remain at peace before the belief that any incidental existing misery in this reality is of little importance since this is just one more world out of infinite other universes where potency is realised in every way it can. It matters not whether we toss a die and obtain "1" as a result for, in some other universe, the numbers are bound to be different. Before this speculation, why would anyone fight for anything at all?

[112] To Chardin, this is the *Ouroboros*: to reach the omega, which in its turn returns to the alpha; to Gardner, it means the birth of a divine super-mind.

It is not unusual for transhumanists to adopt outlooks of different levels of optimism when faced with the perspective of technological singularity, which is the event that marks the emergence of an artificial super-intelligence capable of self-enhancement. Its implications to society encompass a number of scenarios that tend to be generally optimistic, envisioning our overcoming of aging, of diseases, the achievement of indefinite longevity and even the surge of super abilities. But where is this all heading? To many transhumanists, there is a final cause and it is the transformation of the universe where we find ourselves into a living entity capable of reproducing and generating baby-universes in an infinite process of constant recreation. By way of illustration, here is Gardner's wager, outlining what *our fate is to be very clearly*:

> **We and other living creatures throughout the cosmos are part of a vast, still undiscovered transterrestrial community of lives and intelligences spread across billions of galaxies and countless parsecs who are collectively engaged in a portentous mission of truly cosmic importance. Under the Biocosm vision, we share a common fate with that community – to help shape the future of the universe and transform it from a collection of lifeless atoms into a vast, transcendent mind (GARDNER *apud* KURZWEIL: 2005: p. 361-362).**

Under this transhumanist perspective, human enhancement does not aim to cater to our vanities nor to the mere desire for power or fear of death. Instead, it is, in fact, a strategy of intelligence whose innate traits drive us to: (1) have the impulse of surviving for as long as we can, averting the Jonasian *summum malum*; (2) have the impulse to spread. Let us consider what Kurzweil[113] - to whom intelligence constitutes the most powerful force in the universe, capable of overcoming the final entropy and in this way going after its own survival - has to say:

> **How relevant is intelligence to the universe? (…) The common wisdom is *not very*. Stars are born and die; galaxies go through their cycles of creation and destruction; the universe itself was born in a big bang and will end with a crunch or a whimper, we're not yet sure which. But intelligence has little to do with it. Intelligence is just a bit of froth, and ebullition of little creatures darting in and out of inexorable universal forces. The mindless mechanism of the universe is winding up or down to a distant future, and there's nothing intelligence can do about it. That's the common wisdom. But I don't agree with it. My conjecture is the intelligence will ultimately prove more powerful**

[113] Raymond Kurzweil (Born in 1948), American inventor, transhumanist, and futurist.

> **than these big impersonal forces (…) So will the universe end in a big crunch, or in an infinite expansion of dead stars, or in some other manner? In my view, the primary issue is not the mass of the universe, or the possible existence of antigravity, or of Einstein's so-called cosmological constant. Rather, the fate of the universe is a decision yet to be made, one which will intelligently consider when the time is right (KURZWEIL: 1999: p. 258-260).**

The emergence of the cosmic mind would thus be driven by the same imperative of any other life: surviving for as long as possible. To our universe, that would mean to reproduce through black holes. Further according to Kurzweil:

> **Leonard Susskind, the discoverer of string theory, and Lee Smolin, a theoretical physicist and expect on quantum gravity, have suggested that universes give rise to other universes in a natural, evolutionary process that gradually refines the natural constants. In other words it is not by accident that the rules and constants of our universe are ideal for evolving intelligent life but rather that they themselves evolved to be that way. In Smolin's theory the mechanism that gives rise to new universes is the creation of black holes, so those universes best able to produce black holes are the ones that are most likely to reproduce. According to Smolin a universe best able to create increasing complexity – that is, biological life – is also most likely to create new universe-generating black holes. As he explains, "Reproduction through black holes leads to a multiverse in which the conditions for life are common – essentially because some of the conditions life requires, such as plentiful carbon, also boost the formation of stars massive enough to become black holes". Susskind's proposal differs in detail from Smolin's but is also based on black holes, as well as the nature of "inflation", the force that caused the very early universe to expand rapidly (KURZWEIL: 2005: p. 360).**

It would thus be plausible to state that our universe derives from a previous universe, an intelligent one, which reproduced generating a baby-universe of physical constants that favour the emergence of life and consciousness. Such intelligence gives birth to our universe and, according to Deutsch, possibly to countless others at the same time in random, Darwinist processes that shall culminate in the emergence of life in some universes, in the surge of consciousness in many of them and perhaps converting into super-minds with the capacity to reproduce in some of them. Still in keeping with this hypothesis, in many universes, nothing happens. The key here is to understand that, contrary to Chardin's wager and Lewis's hypothesis wherein anything that can be shall effectively come into being, there is no guarantee of success. Nonetheless, considering our own biophilic universe exists, one could bet on the existence of a previous generating super-mind. Success was actualised and now attempts to repeat itself through us. Such perspective revisits Anselm's ontological argument

and explains that perhaps the innate idea of God derives from the fact that we have actually been created by a pre-existing intelligence. Contemplating the plausibility of this proposition, however, does not mean one has to believe that said intelligence possesses anthropomorphic attributes nor that it answers to our prayers let alone that it is kind or moral in the sense human religions would have it. In reality, the wager of this thesis is in consonance with the cosmogonic supposition sustained by Jonas: If there has ever been a God, He outstripped himself of His potency so that the universe could exist, *or* He kept His divine qualities but is unable to intervene. Hence that which has been described here as a reverse Pascal's wager: we are not the ones who have to bet on God's existence rather, it is God who effectively bets it all on us. According to Jonas:

> **As our first proposition we say that the self-divesting of mind at the beginning was more serious than the cheerful prophet of reason was willing to admit. He abandoned Himself and His destiny entirely to the outwardly exploding universe and thus to the pure chance of *possibilities* contained in it under the conditions of space and time. Why He did this remains unknowable. We are allowed to speculate that it happened because *only* in the endless play of the finite, and in the inexhaustibility of chance, in the surprises of unplanned, *and* in the distress caused by mortality, can mind experience itself in the variety of its possibilities. For this the deity had to renounce His own power. (…) From all this, the fact follows that the destiny of the divine adventure is placed in our unsteady hands, in this earthly corner of the universe, and that the responsibility for it rests in our own shoulders. So the deity, I imagine, must become anxious about His own cause. There is no doubt that we have the power in our hands to thwart the purpose of creation – and this precisely in its apparent triumph in us – and that we are perhaps energetic in doing so. (…) By the events of Auschwitz and from the rather of safe harbour of not having been there, wherefrom one can easily speculate, I was impelled to the view, which every doctrine of faith would probably find heretical, that it is not God who can help us, but we who must help God (JONAS: 1996: p. 189-191).**

To back his thoughts, Jonas tells us the story of the Dutch Jewish woman Etty Hillesum (1914-1943), who voluntarily reported to a concentration camp in order to be of help to her people. Hillesum perished, murdered in a gas chamber in Auschwitz. One excerpt of her journal particularly exemplifies Jonas' theological supposition:

> **(…) and if God does not continue to help me, then I must help God (…) I will always endeavour to help God as well as I can (…) I will help you O God, that you do not forsake me, but right from the start I can vouch for nothing. Only this one thing becomes more and more clear to me: that you cannot help us, but that we must help you, and in so doing we ultimately help ourselves.**

> **That is the only thing that matters: to save in us, O God, a piece of yourself. Yes, my God, even you in these circumstances seem powerless to change very much (…) I demand no account from you; you will later call us to account. And with almost every heartbeat it becomes clearer to me that you cannot help us, but that we must help you and defend up to the last your dwelling within us (HILLESUM *apud* JONAS: 1996: p. 192).**

This metaphysical wager concludes the suppositions brought forth in this chapter. *If* – let us highlight here the underlying quality of supposition – there is or there has ever been a God, a super-mind or whatever name we wish to call this vast intelligence, He plays a game and bets all his chips on conscious beings that emerge in the biophilic dynamic of the universe. But if on the one hand this is not a God sure of His success as assumed by Chardin – and as well as by Gardner to an extent – on the other, he does not take as many chances as originally conceived by Jonas either, given that the first expansion generated not one but many other universes where the game is also played and the odds are consequently made higher.

This bet on a God who does not provide, who does not offer any guarantees, who voluntarily turns omni(m)potent lays the foundation for a nomothetic ethic and proposition: there is nothing God can do for us. Rather, we are the ones who should help God. Many are the metaphysical objections against Jonas' cosmogonical supposition regarding a God who would have voluntarily abdicated His omnipotence so that the universe could come into existence. Does it make sense that a God has been suffering since the beginning of the universe, sacrificing Himself driven by inscrutable reasons? A God who starts playing a game with unpredictable results and who could thus not be deemed omniscient either? Could we call Him "God" when He bears such imperfection? These queries would make for an entire thesis on metaphysics imbued with good counter-arguments made by different philosophers aplenty. That is not, however, the object of this thesis, especially considering there is nothing to indicate Jonas intended to effectively put forth any form of metaphysical consolation, rather, we find the proposition of an ethic system to serve as a guide for the whole of humankind to take responsibility for the course of its actions.

It is possible to contend that which we call "evil" exists solely as a result of our own cognitive limitations before the grand plans of this deity. In spite of this, one must concede that such an argument demands faith or at least some

considerable degree of optimism when faced with a hecatomb of the likes of Auschwitz. It is also possible to contend that God does not even exist except as a myth of comforting effect, a metaphysical wishful thinking. In the first scenario, there is the risk of a dangerous resignation. After all, why would anyone fight and what for, if everything that happens is in accordance with divine plans? In the latter, there is the risk of Nihilism. Could there be any alternative to these extremes?

Jonas presents us with a third way: one in which a God abdicates His power. He existed. However, He played a role in the creation and nothing more. A distinct cosmogonical supposition - though partly grounded on Jonas' hypotheses – is offered here. This is not a God who suffers, but one who plays and takes part in the game in the shape of consciousness with the intent to experience whatever may be possible. As pointed out by Hawking[114], despite Einstein having said on a particular occasion: "God does not play dice with the universe", the physical evidence points to the exact opposite: if there is a God, He is a great gambler and the universe - or multiverse - is like a giant casino wherein the dice roll and the roulette spins at all times (HAWKING: 2018: p. 75). Furthermore, if we regard Jonas' cosmogonical supposition as valid and apply Deutsch's interpretation of the many worlds to it, we are bound to conclude that not only God does play, but he also does so in countless scenarios (alternative universes), thus enhancing His chances of success. One must note that raising the odds is not akin to assuring success. Should we toss a die in a trillion alternative scenarios, we are highly likely to obtain every number possible as a result. Notwithstanding said results are not guaranteed. There is no logical hindrance to the possibility that the die will always show "1" in a trillion universes (minimum figure established by Deutsch), or even in infinite ones (as postulated by Lewis).

[114] Stephen William Hawking (1942-2018), English cosmologist, and theoretical physicist.

3. CONCLUSIONS.

Although he has correctly revised the Hobbesian concept of *summum malum* by presenting it as "the extinction of species", Hans Jonas remains bound to a geocentric perspective regarding life, and establishes the Earth as the "final destination of humankind", which constitutes a contradiction in itself. Scientific evidence obtained at the end of the twentieth century demonstrates that our world is subject to mass extinction cosmic events, therefore any conception of planet Earth as a place in which we must be restrict is unacceptable. Such a thought only aggravates the risk of extinction, which is the supreme evil to be avoided. Proposed by Jonas, the *heuristic of fear* is reasonable, and the regulation of human technological development is of fundamental importance. However, the risks posed by technology constitute a set of probabilities that are less dangerous in comparison to the certainty of destruction posed by random cosmic events. A responsible use of technology does not cancel risks totally, but improves our chance of survival beyond planetary borders.

Therefore, in order to survive on a long-term basis, humankind must understand the Earth not as our *final destiny* as sustained by Jonas, but as our *starting point* from which a biosphere expanded beyond planetary boundaries might be created. In contrast to Christian ethics, which is guided by hope, transhumanistic ethics is here defined as an *ethical desperation*, given that it is necessary to act in order to create the Earthly Paradise rather than wait for a possible but improbable godlike grace. The sense of *responsibility*, as evoked by Julian Huxley, demands no faith nor hope, but an anticipated action that takes into account we humans are not endowed with more privileges, but with more duties, not only among us, but also among our species and the others. Moreover, transhumanist ethics does not regard the present human form as the ultimate form of self-awareness. In order to survive beyond Earth limitations, humankind (at least a part of it) needs to become *other being*.

As Jonas highlights, in the very end even if there is a God, His omnipotence was voluntarily sacrificed. Conversely to Pascal's wager, it is God that bets on us, and according to the many worlds interpretation, such a wager happens within uncountable alternative universes. Thus it is our moral obligation to act in order to

spread life across the universe, and to favour the emergence of a cosmic awareness.

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