
LIFE SCIENCES, APOPHATISM AND BIOETHICS

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Abstract

Defining life scientifically, rolls in circles around the manifest traits ('life-the manifestations') of the living matter. New definitions of life have been elaborated trying to incorporate elements from fashionable fields such as informatics. They also speak about 'life-the manifestations' when they are not purely artificial, illogical and irrelevant for the subject. 'Life-the essence' continues to escape from being defined from a scientific perspective and perhaps this should not come as a surprise, as the problem might rather be of the resort of metaphysics. Still, science (or the curious hybrid between it and metaphysics that is sometimes mistaken for pure science) pretends to offer exclusively naturalistic explanations for everything and *a priori* reject considering alternative non-naturalistic justifications. Ethical systems have been developed following such inappropriate concoctions. In the particular case of human beings the main questions are what is *human* life and also when does it begin and when does it end. The quarrel between theology and rationalist science has a favourite subject here. If defining life can puzzle specialists and non-specialists neither in defining death is the situation much better. The medical definition(s) of death is/are also confusing. All these hesitations lead to rough practical problems in biomedicine and its companion Bioethics. Perhaps at some point when it becomes clear that pure reasoning is no longer suitable rational thinking has to make place for some other manner of investigation if we want to grasp certain meanings.

Keywords: definition of life, reductionism, definition of death, apophatism

1. Introduction

There is much disagreement among biologists with respect to the very object of their domain. They talk about life sciences but they cannot agree on what life is. 'Classical' definitions of life are descriptive insisting on traits of the living by which alive beings should be recognised as such and delineated from things, from the lifeless. Most of these definitions acknowledge the ability of the living to grow, develop, reproduce, and respond to stimuli. Such definitions do not clarify *what* life is but *how* it is; they allow us to identify *living beings*, not life. It can also be added that they are not always suitable at least for the

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identification of a being as a living one, a problem that will be examined in the following. 'Modern' definitions of life are even less informative in their desperate attempt to accommodate what is now fashionable in science (e.g. cybernetics) with the same old problem usually managing to confuse things even more or simply to end into pure nonsense, which will also be examined below.

One might say that science is not supposed to deal with a question like that, that trying to answer to the 'whats' and 'whys' science would trespass the territory of metaphysics. Indeed, but this might ask for a correction to be made—the formulation 'definition of life' should be replaced with 'definition of living beings' or even with '*a proposed* definition of living beings' since there are many and none perfect as a tool for identifying the living. Another question might rise namely if what we call definitions of life or living beings are indeed definitions or they might rather qualify as descriptions.

Either way can always be remarked that these 'definitions' speak about how living entities are but they do not cover the aspect of what precisely makes them to be like that, i.e. 'alive', differentiating them from inert matter. This is the point where life escapes to science. The naturalistic approach, which is the one held to be appropriate for science, gets exceeded by 'life—the essence'. No instrument, no experimental approach could elucidate why living beings are alive as compared to non-living entities or even to their own dead bodies. Nothing identifiable and quantifiable by scientific means could be traced till now and labelled as 'life—the essence' or simply 'life'. Will 'life—the essence' escape to scientific examination forever? Materialists or scientists will say 'no' while idealists will say 'yes'. By then the discussion would have left the territory of science and stepped into that of metaphysics.

If the border would have been kept clear then no problem would have arisen for the society. Science and metaphysics could have very well cohabited as different, complementary tools of the human being in its pursuit for understanding herself and the world. Unfortunately not always has the separation been kept clear and a strange mixture of science *and* metaphysics penetrated society. Whether we call it 'scitaphysics' or 'mesience' its effects were quite unpleasant for both domains and also for our everyday existence. At some point the honest equitable stance of the naturalistic approach of science became misplaced. From the idea of science keeping explanations naturalistic not science but some scientists moved to find naturalistic explanations for anything and *a priori* excluding any non-naturalistic alternative explanations. The means substituted the scope and, at least when done by some scientists, science as a search for the truth by materialistic means became a search for the naturalistic truth, as the one and only possible.

This kind of 'science' (in quote marks or, for the aims of this paper, 'mesience') does not envisage any more the possibility that the alternative non-naturalistic explanation just might be the true one. If it is not for science to prove or disprove non-naturalistic explanations then for scientists to *a priori* reject them constitutes unprofessional conduct. What if the non-naturalistic explanation of a natural phenomenon really is the true one? Should the 'purist'

scientist stubbornly reject it as non-scientific and try to concoct various flawed naturalistic scenarios instead?

A formulation of the ‘mescientific’ creed centred on the move from keeping scientific explanations naturalistic to *a priori* not accepting but naturalistic explanations and also an exemplification of the attitude adopted by the followers of this current towards those that do not adhere to their opinions can be found in the following: “Their arguments are dressed up with a good deal of philosophical and mathematical formalism, but conclude with an appeal to the continual intervention of an unobservable designing intelligence in the course of nature. This smacks of the Middle Ages.” [1]

Why can be claimed that this is an example of ‘mescience’ intruding science? Because it was published not in a newspaper but into a well known and very much respected scientific journal and some might regard this type of attitude as an expression of materialistic ideology infesting a publication supposed to be a scientific one and also metaphysically neutral.

Defining death used to be much easier before the development of methods to reverse cardiac and/or respiratory arrest and mainly before the development of transplantation techniques. Many specialists draw attention over the fact that the introduction of the brain-dead concept was purely utilitarian. Still, it became widespread in Western medicine and the definition of death based upon the death of the brainstem is nowadays the operative one in the field of transplantation. Things moved even further. Some voices could be heard claiming for the definitions of death to be expanded from the classical perspective based upon physiology to a modern understanding that would be applicable to the condition of all people unable to relate properly with the world, to demonstrate a social identity of which they would be aware (death as ‘irreversible loss of personhood’). It has been proposed for the metaphysical concept of personhood to be connected to the scientific concept of brain dead: “Brain dead entities are suitable donors because of irreversible loss of personhood, accurately and robustly defined by the current brain stem criteria.” [2]. Personhood gets to be regarded as a (by)product of the brain in spite of the fact that there is no scientific prove for this and in defiance of the fact that the definition of personhood is in itself relative and more of a cultural product than of a scientific construction.

It seems that following the adoption in a ‘mescientific’ manner of reductionism and utilitarianism in biomedical sciences as having not philosophical but scientific value a journey into the land of confusion began. Far from reaching its terminus it gets more and more difficult as new fake traffic signs are planted from time to time depending on the interests of the moment. Meanwhile, theology keeps its position regarding life as a gift from God and by this continuing to point out *what* life is. Of course one cannot expect contemporary atheist-reductionist ‘science’ to (re)consider admitting this perspective could have been valid after programmatically rejecting it ages ago on ideological basis nor theology to accept recent developments in establishing

by (allegedly) scientific means value scales for something that it holds to be irreducible namely human life.

There is after all a point on which science and theology agree when it comes about life - they both speak about 'the mystery of life'. The difference would be that in theology the mystery belongs to God while in science it belongs to 'not yet'- not yet investigated, not yet known and so on. Contemporary 'mescience' simply cannot acknowledge the reality of the term 'impossible' as in impossible to be proved by scientific means. Of course many things will be in future proved and fully described by scientific means but perhaps some mysteries will keep resisting to any type of investigation. To pretend that assuming some mysteries will never be elucidated by science and provided with a naturalistic explanation is unscientific would be an unscientific position in itself. But this can be acknowledged not by 'mescientists' or 'sciphysicians' but only by scientists on one hand and metaphysicians on the other hand.

2. Defining life

Defining life from a scientific perspective did not succeed as definitions are many, not one universally accepted, show important feeble points, both logically and biologically, allow significant exceptions that are contrary to common sense and usually enumerate the manifest traits of living beings without being able to point to the intended subject.

The dictionary definition of life is: "The property or quality that distinguishes living organisms from dead organisms and inanimate matter, manifested in functions such as metabolism, growth, reproduction, and response to stimuli or adaptation to the environment originating from within the organism." [3]. Even though a non-specialized dictionary definition it shares its content with those provided by publications in biology which say something about the degree biology as a science managed to go beyond the empiric common perspective. This approach was criticized but not because of trying to define something by aspects of the same but for its imprecision as a tool for identifying the living.

Indeed, sequences of what is called metabolism can be copied in artificial environments without opening the possibility for the employed industrial or laboratory equipment to be considered alive. Biochemical modifications taking place into living organisms can hardly be equated with the way life and only life operates. Ultimately, they are nothing but chemical reactions taking place into living beings, leading to specific products and obeying the same laws any other chemical reactions obey regardless the environment they take place into. Scientists realized that what they were looking for in biology, generally speaking, beyond the narrow specializations was not in the atoms. There are no 'special' chemical elements incorporated into them: "The intuitive disparity between atomic reality and the 'biological reality' inherent in direct experience became the dialectic that underlay the development of 20th century biology." [4]

The medieval argument pointing out that there is no difference in terms of matter between the body of a living being and the same body after death keeps its force. What enables the body to preserve its properties when in the state we acknowledge as 'alive' as opposed to the state of 'dead (and decaying)' remains an unsolved puzzle at least till now and there are no arguments in favour of the supposition it will be eventually solved exclusively by scientific means. The second part of the medieval argument admitted the existence of the soul and trusted it with the power of life (as a matter of fact, theologically speaking this is a pretty simplistic view but we will not get into more subtle details as they are not relevant for this talk). Contemporary 'mesience' that ideologically rejects the last part of the cited argument, namely that it might be the soul that makes the difference while reiterating the former part has no prove for the inexistence of the soul. As for (real) science it is not concerned with solving metaphysical puzzles.

Living organisms grow- other entities are also able to grow and even with the preservation of their structure that gets magnified without being disrupted. Crystals are a classical example. Living organisms reproduce, computer viruses also reproduce, generating more copies of themselves. Some organisms never reproduce- are sterile beings dead? If one wants to pay respect to scientific methodology then it cannot be decided if an organism is alive or dead till it reproduces; or not, which leads to the necessity to wait until it vanishes in decay and it becomes clear that it was absolutely unable to reproduce. And then comes the question- was it dead or alive prior to its disappearance? Living organisms respond to stimuli and adapt to the environment- there are many other entities, artificial ones that are able to issue adaptive reactions based on feedback. Thermostats make a handy example.

Simple examples that challenge traits-based definitions to an even larger extent can also be found: "Can a wild fire – which feeds, grows, and reproduces – be considered a living entity?" [5]

If feeding means a process by which an entity incorporates matter from the environment in order to continue to exist, if growing means getting bigger (which does not exclude the preservation of the structure), if to reproduce means to generate more entities similar to the original one, then a wild fire feeds, grows and reproduces. And so does a living being. A traits-based definition incorporating the feed, grow, reproduce triad is not of much use e.g. for someone that has never seen a living being and is supposed to look exclusively for this manifestations in order to decide whether it is alive or not. It is ludicrous but logically and methodologically valid to comment that if one follows the scientific way, growing and reproduction can be observed without harming a living entity but in order to show it takes matter from the environment in order to continue its existence one should let it die out of hunger to get the incontestable scientific proof. Putting a small animal (e.g. a mouse) under glass in order to prove it needed oxygen makes a classical example of hilarious scientific experiment. In school textbooks the conclusion drew by such scientific methods is that without oxygen the animal dies. Proving something is alive in accordance

with some of the actual definitions of life can be odd enough to decide whether an entity is (or was) alive one should adopt a method leading to its death.

Facing the fact that biology - the science of life - did not really have the answer to the question *what is life?*, not admitting that was out their league and that they did not have to feel obliged to provide a scientific (naturalistic) answer to any question, some scientists adopted a position which is a classic in psychology - if you cannot cope with a problem you deny its existence or just reject it: "I am not going to answer this question." [6]; "We have to explain the evolution of cells from inorganic matter; we do not have to define 'life' in an abstract way." [7]; "You can't put forward a simple definition of life. It's a term that really only has popular meaning." [8]

Another sample of inadequately mixing things (up) is the *Declaration in Defence of Cloning and the Integrity of Scientific Research* "As far as the scientific enterprise can determine, *Homo sapiens* is a member of the animal kingdom. Human capabilities appear to differ in degree, not in kind, from those found among the higher animals. Humankind's rich repertoire of thoughts, feelings, aspirations, and hopes seems to arise from electrochemical brain processes, not from an immaterial soul that operates in ways no instrument can discover." [9] The *Declaration...* was signed by 31 prominent personalities. The fact that the document bore not only their signature but also highlighted their affiliation might prove to be significant. People tend to be impressed by one's position and more tempted to follow a personality's lead than what another 'commoner' says. "Affiliations listed for identification only," says the document. That was precisely the idea- to identify them as 'the' Francis Crick or 'the' Kurt Vonnegut.

From such scientists' (or 'mescientists'') perspective, biologists *have* to explain the supposed evolution of the living from non-living, a must for every biologist even though some of them might reject the very idea of evolution and not on philosophical or religious basis but making use of scientific arguments. Even to those accepting the idea of evolution the problem is still there. They have to explain how did matter make a jump from its inorganic state to another state that exhibits different properties in spite of the preservation of its composition and structure. While trying to explain the way it happened, they continue to avoid the core of the issue namely that the qualitative difference between animate and inanimate might not reside in anything positive sciences can describe. Perhaps here it is the key distinction - the talk should not be about inorganic and organic but about what is called inanimate and animate. It is easy to pass from inorganic to organic under experimental conditions, the synthesis of organic compounds is no longer a challenge for our days chemistry but it should not be confounded with the jump from inanimate to animate.

Scientists synthesize organic compounds and connect their work with the discussion about the origin of life from inorganic matter by self-organization [10-12]. The move from inorganic to the living organic suffered a significant alteration, from being regarded as nothing more than a regular theory waiting for its demonstration to being regarded as a postulate. This postulate circulates in

biology in spite of the fact that from the moment it was unscientifically upgraded from theory to postulate it should have been relegated to philosophy.

“Because neither borate minerals nor interstellar organics are excluded from the early Earth, we also cannot exclude the availability of ribose formed prebiotically at the time when life emerged on Earth.” [12] One should not be candid about the subtle and not-so-subtle implications of a comment like that, especially if one is aware of the ‘origin of life’ debate. The talk is about the postulated state of prebiotic ribose, which is postulated to have participated in reactions that ‘somehow’ yielded life. The fact that if one puts together ready-made biochemicals that are typical for a living cell they do not self-organize and yield life is programmatically overlooked. So far none of the proposed combinations succeeded in transforming organic cocktails into living entities when applied in laboratory.

It is perhaps superfluous to observe that if the term ‘life’ only has a popular meaning then *what* does Biology study, after all? And also to ask whether the term ‘death’ is a concept having only popular meaning, too.

In response to the old criticism new sets of comments, comparisons, metaphors were issued in order to deepen our understanding on *what is life*. There is always a chance to fall into the same traps as your antecessors in spite of the precautions taken. After acknowledging the fact that “although everyone knows what life is there is no simple definition of life” and assuming the elaboration of one, Koshland ends in speaking about ‘the seven pillars of life’-program, improvisation, compartmentalisation, energy, regeneration, adaptability, seclusion or ‘PICERAS, for short’ which are nothing else but *traits* of the living. [13] On short, the author firstly comments about other people’s failure with respect to defining life because they did that referring to the traits of the living and then he does exactly the same. The traits he reflects on are more and to some extent different from the ‘classical’ ones but they are still traits of the living, not of life, namely the quality that enables living entities to exhibit the considered traits.

It might be noticed that the newest these developments in defining life, the more confusing they are. The following example is easily understandable for specialists in the field of life sciences but also for non-specialists: “This self organization can also be seen in hurricanes, which are the organized structures that develop to facilitate degradation of the thermal gradient that has built up between the atmosphere and ocean over the summer. In an analogous manner, living systems are the organized structures that develop to degrade incoming solar radiation and chemical potential.” [14]

The theory of self-organization in living systems has not been proved yet up to the level of life emerging from a certain level of organization on. Biomolecules matching each other is one thing and biomolecules organizing into a being that becomes alive because of self-organization is an entirely different thing. As opposed to hurricanes, living beings are not a consequence of a disequilibrium in the environment. They achieve, by dissipating energy, not an equilibrium but a characteristic thermodynamic non-equilibrium state that

belongs to them, not to the environment. As opposed to any other known phenomenon, living beings do not appear spontaneously following a physical necessity and it is of extreme importance to underline that such a necessity was and still is impossible to theorize: “living beings need to be in non-equilibrium state by intrinsic reasons.” [15] There is no external disequilibrium in need to be calmed, ‘dissipated’ by the existence of living organisms. Au contraire, you may call living beings ‘de luxe’ products of the existence. They are expensive in terms of energy and completely unnecessary. Negentropy - the struggle against entropy - was said to characterize living organisms in opposition with inanimate systems that gradually move towards states of more and more entropy, losing their typical structure in favour of a comfortable low - energy state. Even this struggle is not exclusively typical for the living as a fire makes again a counterexample from the world of the inanimate because it postpones the moment of achieving low- energy. Of course, we cannot equate the ‘effort’ of a wild fire to keep burning, which is directed by physical extrinsic factors to the aspiration for survival that characterizes living beings. The idea is that even negentropy is just a trait of the living and does not say much more about defining life than any other trait. Speculating on negentropy can even lead to null arguments in Biology. Here it is an attempt to reveal the necessity of reproduction as derived from the necessity to preserve negentropy that characterizes the living: “Individual death leads to equilibrium and entropy increase. Thus, a necessary condition for the preservation of entropy decrease is the population reproduction. To further decrease the entropy, i.e. to increase genetic information, the population must change and adapt to changing conditions.” [16]

It is true that death equals equilibrium and the increase of entropy but it is all about the individual level. It is the individual that does not preserve its negentropy any more and projecting that at the population’s level does not make sense. This is also valid for mixing genetic information with thermodynamic information, as it is the latter one that is related to entropy. An absolute objective necessity for the organisms to reproduce cannot be formulated. Not only that a necessity for the living beings to appear spontaneously cannot be formulated but also it does not seem possible to theorize from a scientific stand a necessity for life to perpetuate.

Another class of definitions for life encompasses evolution, which is assumed to be an incontestable truth in spite of the weaknesses of the theory: “life is a self-sustained chemical system capable of undergoing Darwinian evolution” [17]. The common objection to this perspective is that even if one accepts that evolution takes place it is not observable during a generation then such a definition cannot be considered a working one as it does not allow us to recognize life at first glance.

The fact that the few examples of observing evolution in action can be proved as being the result of misinterpretations of experimental results or of lack of essential information that has been added later consequently changing the previously established perspective is not one of the main points here. Still, it

might be interesting to examine briefly just one situation of assumed observable evolution.

A famous example of alleged speciation refers to some ‘false’ insect species in which reproductive isolation is actually caused by *Wolbachia* bacteria [18]. Insect infected by different bacteria strains can only mate with insects harbouring the same bacterial strain – otherwise bacterial proteins inactivate the male sperm. This has been ignored by some scientists claiming to have observed rapid speciation between insect demes, asserting the mosquito subspecies *Culex pipiens pipiens* and *C. p. molestus* have developed reproductive incompatibility within historical times [19]. The fact was presented as powerful evidence for evolution [20]. *Wolbachia* is widespread in insect including some frequently used in evolutionary models, such as *Drosophila* species; yet “*Drosophila* researchers rarely consider *Wolbachia*’s effects” [21]. On the same Internet page, *Wolbachia* infection was postulated to be a way to sympatric speciation – namely bacterial infection causes strains to be reproductively isolated until they ‘evolve’ to be specifically different [20]. But once treated with antibiotics the two alleged newly established species became fully interfertile generating viable offspring that was also fertile [22].

Another definition from the same family hold that “life is any self-replicating, evolving system.” [23] Not only that there are computer viruses capable of ‘mutating’ and ‘evolving’ but there are even programs especially designed for modelling the alleged evolution of biological systems. To this analogy is attributed such relevance for biology that comments on developing this particular type of software are published under titles such as ‘Evolution of biological complexity’ [24]. The adopted language advances forced analogies that unfortunately have no logical or scientific basis: “To make a case for or against a trend in the evolution of complexity in biological evolution, complexity needs to be both rigorously defined and measurable. A recent information-theoretic (but intuitively evident) definition identifies genomic complexity with the amount of information a sequence stores about its environment. We investigate the evolution of genomic complexity in populations of digital organisms and monitor in detail the evolutionary transitions that increase complexity.” If one speaks about biological systems and their complexity, then it is precisely *biological* complexity that needs to be rigorously defined and measured, a goal that cannot be achieved using a simplistic computer model that has not much to do with real life situations except for the fact that its authors make use of terms from biology such as organism, population, genome (without at least putting them between quotes). Still, the authors advance their model as a reliable substitute for laboratory experiments designed to prove the evolution of living beings.

If some sort of evolution could be observed during such an experiment then it was the evolution of computer programs, not of the living beings and valid arguments in favour of extrapolating the results to the living are hard to produce.

Informatics abusing biology finally led to the birth of a novel, entirely original definition of life: “In this formulation, life (a living individual) is defined as a network of inferior negative feedbacks (regulatory mechanisms) subordinated to (being at service of) a superior positive feedback (potential of expansion). It is suggested that this definition is the minimal definition, necessary and sufficient, for life to be distinguished from inanimate phenomena *and, as such, it describes the essence of life.*” [25] Korzeniewski’s ‘living individual’ is also an ‘evoluon’ i.e. a subject of evolution. Also, “in many situations the cybernetic individual (evoluon) is not equivalent to the ‘classical’ biological individual, defined mostly according to structural criteria as some internally integrated entity that is clearly separated from the surroundings.” The concept of ‘biological relevant information’ introduced by the same work even though appealing ends into being totally uninformative after being defined as “the amount of the type of order that is specific for life” as opposed to thermodynamic information which measures the degree of general order. The question that pops up is what precisely is and is not this biological(ly) relevant information and how can it be quantified if not for other reasons because of the fact that such an investigation is further required in order to become able to appreciate ‘the degree of individuality’ and thereby identify living individuals or evoluons according to the following equation:

$$D_i = I_{Bi}/(I_{Bi} + I_{Be})$$

where D_i is the degree of individuality (for example of a polyp into a colony of coelenterates), I_{Bi} stands for the purposeful information related to internal negative feedbacks (feedbacks belonging to the individual) and I_{Be} stands for the purposeful information related to external negative feedbacks (feedback connecting the individual with the colony).

From the perspective of the cybernetic definition of life, sterile casts of ants or bees are not composed of living individuals as they subordinate to the higher interest of the colony, namely the positive feedback consisting of reproduction. Therefore, the colony is a cybernetic individual or an evoluon and not the entities composing it. The author also sustains that in the case of humans cybernetic individuals are “(almost) identical to the classical (structural) individual” and that “the main difference between the human body and a social insect colony is that the former is structurally much more integrated” as “the functional (regulatory) integration, however, plays the most important role in the framework of a cybernetic definition of life.” There is no clue with respect to what hides behind that ‘almost’ in the above quoted remark. Anyway, Korzeniewski contradicts himself when it comes about applying the cybernetic definition of life to humans and admitting for them the status of cybernetic individuals since a single human cannot pay respect to the superior positive feedback being unable to reproduce. Even two or more human beings of the same sex cannot reproduce. It seems that only couples with members pertaining to opposite sexes actually satisfy the conditions imposed by the cybernetic definition of life. Which can be considered valid not only for humans but for all species with sexual reproduction and also revives the ancient bias of defining

life *via* reproduction as an ultimate goal that seems to have infested the ‘cybernetic definition of life’ regardless its innovative, sophisticated appearance.

Perhaps it should have been useful to remember the fact that regulation of the functions of living organisms also implies positive feedbacks that are clearly different from the ‘supreme’ one of reproduction but the idea that from the very beginning such a crude observation would have made the above comments completely unnecessary acted as an argument against making it. It is interesting that the author himself admits that “regulatory mechanisms in living organisms can be more complicated than simple negative feedbacks discussed before” and introduces the notion of ‘parallel activation mechanism’. But this mechanism “works within the network of negative feedbacks of the entire organism and constitutes an integral part of this network”. “Therefore, the fact of existence of the parallel activation mechanism does not affect much the general cybernetic definition of life quoted above.” The correspondence between this newly coined term and real biological phenomena remains unclear even though an (sole) example is provided. Finally, it is said that “the phenomenon of life consists in a directed- at- itself identity of living organisms.” In other words, life- is- living-organisms- struggling- to- remain- as- they- are- when- alive.

3. Pride and prejudice

Not a biologist but a great physicist, Albert Einstein, spoke about the failure of biology in understanding its own object of study years before the above listed not at all convincing attempts to define life, or at least to provide a reliable set of criteria for identifying living beings: “We have penetrated far less deeply into the regularities obtaining within the realm of living things...What is still lacking here is a grasp of connections of profound generality, but not a knowledge of order in itself.” [26]

Was that really a failure or just the bitter consequence of prejudice, of assuming a biased perspective, of trying to adjust reality to match a pre-conception instead of developing concepts according to what reality had to teach to the scientists? Indeed: “biology of the 20th century was in the strange position of having to contort itself to conform to a world view (fundamentalist reductionism) that 20th century physics was simultaneously in the process of rejecting.” [27] Is Woese speaking about biology as a science or as ‘mes-science’? Where did those mes-scientific accents come from? He advances the idea that a particular philosophical perspective continued to be residual in life sciences in spite of the other sciences getting rid of it as it was narrowing their view and interfering with a pursuit that was supposed to rely upon pure reason, indifferent to metaphysical interferences.

What is the meaning of fundamentalist reductionism? “Fundamentalist reductionism (...) is in essence metaphysical. It is ipso facto a statement about the nature of the world: living systems (like all else) can be completely understood in terms of the properties of their constituent parts.” [27]

The menace of metaphysics intruding into science became greater and greater and again it was not a biologist but a physicist that drew attention on what was going to happen. Bohm's words have described, by projecting in the future on a perfectly logical basis, the status quo of life sciences of his time. What is tragic and by no means appealing is the fact that some people reacted like that for real, fitting Bohm's futurology. The trend continued and many life scientists actually came to regard living and intelligent beings as some sort of special mechanisms, 'special' but still 'mechanisms'. Not even inanimate matter is that predictable as people sometimes are: "It does seem odd . . . that just when physics is . . . moving away from mechanism biology and psychology are moving closer to it. If the trend continues . . . scientists will be regarding living and intelligent beings as mechanical, while they suppose that inanimate matter is too complex and subtle to fit into the limited categories of mechanism." [27].

Almost forty years after Bohm's 'prediction' a biologist wonders about the 'unexplainable' paradox of a domain that on one hand underwent a spectacular development in terms of methodology and on the other preserved some atavist traits of philosophical extraction that constantly torment its existence as some sort of a malformation that could have nevertheless been corrected, of course, if the patient would have agreed: "What makes this curious period in biology's history doubly bizarre is that a fundamentalist reductionist perspective wasn't even needed in the first place in order to study biology on the molecular level." [27]

Today some scientists regard systems biology as a long expected child born without the bad gene of fundamentalist reductionism. Would that be true? Or has the idea of being able to fully understand living systems in terms of the properties of their constituent parts just been upgraded? Systems biology admits the coherence of the system and the subordination of the parts' behaviour to the higher purposes encompassed by the existence of the organism they compose. Developments in metabolic engineering however follow the old idea that the behaviour of the whole, of the living being can still be predicted using formulae, mathematical models that are much more complex than a reductionist from the past could have imagined but this seems to be the only difference.

"Network reconstruction and analysis are starting to be widely used to characterize and predict biosystem behaviour, giving rise to a new branch of biological knowledge, 'network genomics' ... progressive system characterization involves integrating multiple levels of realization of the genetic information, for example, by superimposing transcript, protein, and metabolite profiles." [28]

And, again: "To understand the causal connections between genotype and phenotype will require a very significant expansion of the traditional toolbox used by molecular biologists. It must include concepts and techniques from many other scientific disciplines such as physics, mathematics, numerical analysis, stochastic processes, and control theory. ... The development of such an extended toolbox for quantitative reasoning about the dynamics of living systems, and the application of its contents to solve a variety of scientific

problems, is one way to define systems biology, analogous to our definition of molecular biology above.” [29]

‘Quantitative reasoning’ is the key word here. It seems that not the perspective is considered insufficient and inefficient but the level of technical development, the number and quality of tools available for studying the components and how they work together. Admittance of a qualitative difference between living and non-living entities that could not be examined *via* quantitative reasoning no matter how extended is still lacking.

How come such a strange thing happened? A possible explanation might be that fundamentalist reductionism became a necessity since Biology driven by a stronger, more aggressive and socially significant rationalism than other sciences felt a compulsive urge to get rid of any possible ‘mystery of life’. Fundamentalist reductionism could have been preserved as a natural companion of ontological reductionism. This might be an explanation of the apparent ankylosis in Biological thinking. Physicists, chemists, mathematicians and other scientists that accused biology of ankylosis could have simply missed the point. Perhaps a certain perspective was to be promoted and everything had to be adjusted in agreement with that perspective. In a world without God and mystery in the sense of what does not belong to the ‘not yet’ perspective but really truly deeply is beyond our understanding for ever life clearly kept harbouring something that eluded scientific approaches. Therefore, stubbornly claiming that “living systems (*like everything else*) can be completely understood in terms of the properties of their constituent parts” in spite of evidence became prove that the one sustaining that was a properly trained free-minded biologist, a true scientist. A move towards contemplating the qualitative difference between the living and the non-living might have kept the gate open for explanations of metaphysical extraction.

Did the Biology of the 20th century develop with a huge mescientific bias? Did it have to place the origin of life and especially the origin of man somewhere exclusively in this material world without leaving any possibility for a connection with other ‘levels of reality’. Was it the same old story- people wanting to get rid of the annoying rules that used to govern their lives but that time with the help of science more significant than ever? If one just could demonstrate that life was nothing more than a level of development chemicals jumped to somehow, at some point, then one got rid of the idea of its supernatural origin and, subsequently, of the supernatural involved. The same supernatural known for having elaborated the annoying rules mentioned.

In order to give an answer to these questions one should have access to the individual motivations of the involved scientists. It would be perhaps interesting to draw the psychological profiles of people working in research and to discover how much of their motivation consists in curiosity, ambition, pride, selfishness or on the contrary, abnegation and the pursuit of a greater good as well as other human affects. People perform research, not machines (alone), and people do have individual motivations for engaging in any type of action. Full objectivity and lack of emotional implication into one’s activity is a thesis that no matter

how appealing cannot be defended on the territory of psychology. Scientists are also, as every human, social beings and they might tend to bow in front of the societal context they live within in order not to get problems of integration. In other words: “The idea that you can divorce science from the social context in which it’s done is completely naive.” [30] Powerful ideologies like communism or Nazism make only the extreme examples of societal context interfering with the free pursuit of science. Admitting these basic facts might throw a new light upon the whole discussion about science and metaphysics as opposed to ‘mes-science’.

If for the sake of the argument, reason is replaced by emotion as a motivation the fact that science engaged in enterprises having no other merit than being resources and time-consuming might become less startling. Except for curiosity or other purely emotional motivations (that can very well include some regarded as noble such as promoting the development of medicine but cannot also exclude ideological incentives such as showing that life can be ‘created’ by humans, so there is no need for God at least in a process that has been held as God driven for centuries) why would we need artificial life for, especially since we did not manage to deal with the naturally occurring phenomenon?

Scientists are trying to reproduce, to imitate something without having understood the way it is made and functions. From the perspective of reason this does not make any sense. What is the motivation, then? Does contemporary society have too much money, time and energy to spend or too much pride to “dissipate”? Did artificial life become an ideal of contemporary biology, as an important part of the struggle to demonstrate man can do anything he pleases? Examples of research in this field are experiments that make use of pre-existent structures (taken from living organisms) that are put to work in an artificial environment for some time, that is to say till the system cracks down as being unable to regulate and self-perpetuate its capacities. [31]. When facts like that got to be examined by society three main classes of reactions develop as it can be deduced from newspaper articles or other sources of information that reflect where society stands. Some were enthusiastic about Noireaux work [32], others criticized it [33] while others adopted a neutral position [34]. Why is life and what has to do with generating life so fascinating for both scientists and lay people? Do past and thought to be passed over quarrels between reason and faith have anything to do with this?

Failures in designing artificial life are not presented as failures but as steps towards conquering the ‘not yet’. At least from the perspective of the public scientists come to speak about a myth or an anti-myth that seems to be very appealing to contemporary people who trust science as their ancestors trusted God. Perhaps it should be underlined that if our ancestors trusted God with the power and benevolence to create life, we trust science with the same power but not with the same benevolence - it has been shown that many people fear biotechnologies.

Blind trust into the powers of science also combined with ignorance leads sometimes to ridiculous socio-political outcomes [35]. When the synthesis of a bacteriophage genome (a virus that lives in bacteria) was announced in the United States, the US Secretary of Energy “acknowledged the possibility of harmful misuse of this new technology, but were quick to reassure the public about the engagement of both the scientific and national security communities to tackle ethical and security concerns.” He also announced the creation of a special subcommittee of the Department’s Biological and Environmental Research Advisory Committee that was supposed to keep an eye on the dangerous work revealed. Such reactions make a small but relevant sample of the paranoia elicited by biotechnology.

As a matter of fact, the results of the experiment were slightly different than understood by the public and information can still be found in the paper published by Smith and co-workers [36]. Normal, ‘natural’ viruses infect the cells by themselves and subsequently determine the bacteria to provide them with proteins that form a ‘coat’ for the genetic material of the viruses (the capsid). Smith and co-workers did not obtain viruses but some DNA molecules, which is pretty common in nowadays biotechnology. We will not engage into the talk about viruses being alive or not but perhaps it is worth to underline that the ‘synthetic’ viruses were lacking some important functions that ‘natural’ viruses exhibit. The ‘synthetic’ virus was not a full virus but the genome of a virus that was not able to infect the bacterial cells by itself but it was introduced into them ‘by force’ using a laboratory method. Scientists put living cells at work in order to activate the information from the artificial genome, which is pretty common in genetic engineering. Genes are commonly transferred into living cells that under certain circumstances make the information contained in the foreign genes active. But when the principle was applied to viruses fear emerged. As a matter of fact, the technology has been there for quite a long time and the fact that finally someone applied it on viruses should not have been too much of a surprise. Which also applies to the fact that society could not regard such an experiment as pure, indifferent science.

In parallel, due to the fact that informatics is gaining more and more attention and that it became trendy to have a touch of it even in biology whether it makes sense or not, the attempts to imitate the living moved from playing with molecules to computer games. In the same old spirit of reductionism, it has been proposed “the reconstruction of the gene/metabolite network with implemented causal directionality” as a novel tool that should enable us to design new drugs or to discover the causing agent of a disease [28]. What if the implemented function is not correct and one gets to design ineffective or even dangerous drugs and to identify erroneously the cause of a disease? Who and how can be sure of knowing each and every interaction taking place into a living organism so that the network reproduces it properly? Expressing such Promethean hopes might seem a bit of a paradox as the same authors acknowledge that “Living organisms are complex multi-elemental, multi-functional systems existing in ever-changing environments. The viability of the system is provided via flexible

and effective control circuits of multiple informational fluxes inter-connecting in a dense network.” Early criticism was brought to the idea of reverse engineering described above by other authors that agree the approach was too simplistic but keep their confidence in the success of the new field of systems biology with the condition of developing the mathematical apparatus [29]. It seems that in their opinion it is only a matter of time till mathematics will be able to fully describe the living and elaborate complete, functional theoretical models of the processes of life, which is nothing but more sophisticated fundamental reductionism. Once the not-yet conquered the benefits of knowledge will spread and that is beyond any doubt (“its results *are bound to...*”): “The methods and concepts of systems biology will not only expand into all areas of the biological sciences; its results are bound to have repercussions in and inspire other sciences such as physics, engineering, mathematics, and social sciences.” [29]

4. Human life - a journey from pre-personhood to non-personhood

Besides Bohm and from a distinct perspective the consequences of life sciences fully embracing reductionism were expressed by the Romanian Nobel prize winner George Palade: “For our times, life- human life included- is the outcome of an elaborate organization based on trivial ingredients and ordinary forces. Historically speaking, this has been a drastic readjustment which is still affecting, sometimes with devastating force, whole fields of human endeavour.” [37] Feeling sorry for a scientific domain, for human knowledge that would suffer because of an inappropriate approach, might be a decent thing to do for a scientist but there are deeper consequences of that approach that go beyond crippling human knowledge, consequences that might very well bring us to feeling sorry for ourselves.

Indeed, after people ripping up life’s mystery and their own mystery the situation presented itself as comfortable for a small deceiving period after which it became clear that things risked get out of control. A need emerged to put something in place of the ancient respect for life previously discarded together with its supernatural origin, and that was Bioethics. It has been said that Bioethics is a name for the transition between the traditional ‘sanctity of life ethics’ and the new ‘quality of life’ ethics and its founder regarded it as an essential ‘science of survival’ in the context of the modern rapid scientific development [38].

Bioethics’ and bioethicists’ task however is not easy at all. Once the value of human life its beginning and its ending became all relative as well as its due respect various humanist collections of rules emerged, commonly ending up in being relative in their logic, inconsistent with themselves. Some relevant examples of such inconsistent, self-contradicting judgment can be set. In the United Kingdom, abortion is legal up to the end of the 24th week of gestation (23 weeks plus 6 days), not a minute later. Starting from the first day of the 24th week, if the baby is prematurely born then he/she should be properly taken care of by the medical personnel and if someone fails to do that then that caregiver

will be punished according to the rules of professional conduct and to the law. Indeed, "If we agree that the foetus *in utero* is not morally distinct from the baby *ex utero*, then current practice rests on a premise that the foetus suddenly becomes a person at 24 weeks' gestation; a view which has no physiological or philosophical basis." [39] The humanist system is contradicting itself when adopting such positions.

Even though the inconsistency of such a way of thinking should have been evident not only that it was not abandoned but it benefited of further developments and the ethics of 'non-persons' became an important philosophical topic, with significant 'actual' and 'potential' social implications. It preserves, of course, the touch of relativism and relativism-derived absurdity that characterized this trend from the very beginning: "The life cycle of a given individual passes through a number of stages of different moral significance. Once a new human individual comes into existence she will gradually move from being a potential or a preperson into an actual person when she becomes capable of valuing her own existence. And it is very difficult to say precisely when this is". [40]

Is a small child a person? Is an old man having Alzheimer a person? If "a person is a creature capable of valuing its own existence" [40] then they are not persons, but 'pre-persons' or 'non-persons'. Contemporary ethics brings to contemporary people some news and it does not always try to put it as delicate as possible. Today, one lives in a world where, of course, he ought to prepare to die but first prepare while still alive to cease to be a person and become a 'non-person'. Afterwards one's children or other '(still)-persons' will take care of one's living remains according to the new ethics of non- persons. There might be some impediments with being (or becoming) a non-person: "Non-persons or potential persons cannot be wronged in this way (i.e. by being killed) because death does not deprive them of anything they can value. If they cannot wish to live, they cannot have that wish frustrated by being killed. Creatures other than persons can, of course, be harmed in other ways, by being caused gratuitous suffering, for example, but not by being painlessly killed." [40] If today's society can accept this type of vision then it should accept other rational constructs such as the following. Killing should not be punished under any circumstances because if there is no God and no afterlife, if everything ceases with death then the victim is not wronged by being killed. The killer is not guilty of going against a Creator's will and the victim does not need her time on the Earth for the pursuit of her redemption. If the victim went directly to non-existence then the victim is no more aware of anything, her brutal end and the fact that she could have very well lived longer included. Then why punish the killer? From his perspective he might have had good reasons for killing that person, that's for sure. Perhaps that person was annoying and disturbing the killer's well being. By eliminating her there is no loss on the side of the victim (see the above reasoning) but a plus on the side of the killer. Zero and a plus results in a plus. Consequently, killing is OK.

Professionals in biomedicine accepted the prevailing humanist rationalist decree in academia with respect to the beginning of human life to such extent that they risk becoming strangers to their own culture. The results of a surveillance taken by the International Federation of Fertility Societies in 2004 show that scientists became that independent of the old perspective upon life as God's gift once common all over Christian Europe that they are not even aware of the fact that the culture they belong to still acknowledges things like that [41]. They are not aware of and or/admit such ideas at least as plain cultural facts, not as personal beliefs or anything like that. The representative of Greece was the only one among those talking about a perspective different from the traditional one that also pointed out the difference between the approach of the secular state and the religious prevailing Orthodox Christian perspective of his people.

5. Recognizing death

When and why does death occur continues to be a puzzling question, also. Much has been said about the fact that the cells composing the human body die slowly, population after population some time after the moment when the person has already been pronounced death.

Why are living organisms able to preserve their negentropy for only a limited time? Some think that "A necessary condition of entropy decrease is an energy supply (metabolism) whose destructive by-product is a lethal irreparable molecular damage, which limits the maximal lifespan. So, individual death is an inevitable implication of life, and metabolism is related to the maximal (in the absence of all other factors) mean lifespan." [16]

At least two distinct problems rise from such an affirmation. The first one is logical by nature and also methodological - how can the other factors' influence upon the lifespan be precisely determined and neatly separated from that of the rate of metabolism? Unfortunately mathematics tends to be applied in biology without taking into account the fact that the 'way' of the living can be approximated by mathematical models only to a very limited (and limitative) extent. The myriads of interactions and variables occurring during the life of a creature surpass the capacity of mathematics to follow such an explosion of ever-changing elements. As for the 'lethal irreparable molecular damage' as a 'by-product' of metabolism, more precisely of producing energy it is not clear at all about what kind of molecular damage are we talking here. Molecules are renewed, even cells are renewed, cells of a dying body are not the same as those it was born with years ago. The question is why the body gradually loses its ability to renew itself at a sufficient rate to keep working on and on without aging and dying. If the 'lethal molecular damage' is assimilated to mutations then it does not make sense to correlate the phenomenon with metabolism, as mutations are by no means the result of metabolism.

The second problem consists in the existence of exceptions to the inevitability of death as referred to above. Many biological individuals, e.g. bacteria do not actually die. They divide - a bacterium becomes two bacteria without knowing death. And they can do that for very long time if they grow under proper conditions with nutrients supplied on a steady basis and metabolites evacuated from the environment. Of course, some cells, some individuals will die but the majority will pass from generation to generation circumventing individual death.

Nowadays it is incredibly complicated to decide whether a human being is dead. All current perspectives upon death are challenged. One upon a time things were simple- when the heart ceased to beat and the person was not breathing anymore then he/she was declared death. Advances in the medical field complicated the situation as cardiac arrest can be reversed, patients can be kept on life sustaining systems that required a change of mentality and terminology. These patients are dying, not dead, prior to applying the adequate measures available at that moment in the field of medicine with the aim to restore their functions.

In today's medicine, people are considered dead when they exhibit absence of cardiac output and respiratory effort (classical criteria) *or* absence of all brain function demonstrated by profound coma, apnoea and absence of all brain-stem reflexes (brain death). Irreversible loss of personhood was also proposed as the newest and most problematic criterion.

The so-called 'classical' criteria are still reliable to some extent if corrections are made according to modern health care possibilities. Cardiac and respiratory arrest is reversible if adequate measures are taken but there still are cases when the patient does not respond to treatment and he/she should finally be declared dead. The problem is what does 'finally' mean? This is quite unclear, still, there have been established intervals after which medical personnel can very well resign from according further assistance and the patient can be considered dead enough for the organs to be retrieved without opening the possibility of being accused of crime. In a discrete manner, classical criteria leave the scene for the brain death concept to enter. Are these conventionally defined intervals beyond dispute? Generally speaking, are the criteria of death beyond dispute? The very detail that they are diverse from set of rules to set of rules (intervals included) and consequently contradictory says something in this respect [42, 43].

The 'brain death' definition of death was adopted in the sixties after performance of transplantation from a heart- beating patient who was *afterwards* declared 'brain dead' which for ethical purposes should have equalled 'dead'. The new definition relied upon the idea that the brainstem was the supreme integrator of bodily functions. Since then the affirmation was challenged scientifically with various arguments- there are capacities of the organism (e.g. immunity, haematopoiesis, glucose metabolism) that do not depend of brainstem and 'brain dead' pregnant women have been maintained on life support systems for months finally giving birth to healthy infants while brain dead children have

been reported to survive for up to 14 years with a ventilator and nutritional support [44]. Specialists complain about the confusion related to this particular definition of death and the poor guidelines existing in the field, which are imprecise and leave place for interpretation [45].

In other words brain stem criteria can still be used to define prognosis, although the timing of death depends upon provision or withdrawal of intensive care. "Thus, any sharp dichotomy between life and death based on brain functioning although convenient and appealing is biologically artificial." [46] Brain dead patients are not really dead, not even more 'dying' than any other human being as everyone's body deteriorates progressively with age or because of illness, which is happening to the 'brain dead', too. They suffered some major damage but their state can become stable and remain like that for years as in the case of a person that suffers an acute episode of a serious disease and then goes further with some more damage into his/her body but still functioning sufficiently so to remain alive. Brain dead people are no more dead than someone with a metastasis hampering the functions of most of his/her organs they are unconscious but not dead. Both cancer patients and 'brain dead' people are very, very ill but still alive. Stopping medication or life support will hasten their death not to say removing their organs, which is often done with the 'brain dead' as "brain stem criteria can still be used to define prognosis, although the timing of death depends upon provision or withdrawal of intensive care." [44]

Adoption of the brain dead criterion was purely utilitarian as organs deteriorate after circulation and respiration cease therefore to increase the success of transplantation one needs to harvest the organs prior to cardio-respiratory arrest or 'classical death'. Finally, the brain dead criterion remained the only one in use when it comes about identifying organ donors at least in Western countries [43].

Cynic contemporary society even proposed a further step in establishing the perfect theoretical frame of killing people for their organs namely to set things clear for the relatives with respect to the fact that brain dead people are actually alive but they - the relatives - should agree for their organs to be harvested in the noble spirit of utilitarianism: "If families are told that brain stem criteria define the point where consciousness is not recoverable and where physical recovery is impossible, but where organ donation is an option, although the patient is not yet dead, this may be more commensurable with common morality and may more honestly acknowledge the layers of moral difficulty than the present situation. Rather than redefining those who are 'brain dead' as 'dead' it may be more honest to acknowledge that such individuals are not dead and that removing their organs is in fact killing them." [44] This 'call for the truth' reveals that the problem does not consist in the fact that removing their organs will kill the brain dead but in the up-to-date failure to get the public to accept the facts serenely.

The idea is more clearly expressed in connection with patients in persistent vegetative state that are also alive (they are not dead according to any current medical criterion, the brain dead one included). The cynical ‘call for truth’ goes even further: “The shortage of available organs has led to the consideration of using organs from vegetative patients and to the proposal that we use organs from anencephalic infants. It might be suggested that organs can be obtained from such patients if we adopt a new criterion for death. We rejected that argument above. But we also feel that the criterion for death is not where the discussion should be centred. For us, it should centre around the attempt to balance the advantage of lives saved through increased organ availability (which argues for harvesting organs in such cases) against the need for public acceptance of organ donation (which may require forgoing harvesting organs in such cases)” [44].

Persistent vegetative state (PVS, also used to define a person in the corresponding condition) is currently defined as a persistent state of eyes-open unconsciousness in which the patient has periods of wakefulness and physiologic sleep-wake cycles without awareness of self or environment. The term ‘permanent’ is also employed even though its use was challenged as such patients sometimes recover. Specialists agree that no one can predict the outcome in the case of a PVS and that even an accurate diagnosis is hard to establish (a significant risk of misdiagnosing does exist) [47].

Older approaches holding that a PSV cannot be regarded as fully human anymore because all that’s left human in him/her is his/her anatomic structure and his/her physiology as he/she is no more able to communicate, to express himself/herself in behaviour are considered obsolete even from a purely scientific perspective. “The identification of ‘consciousness’ with ‘rational expressive behaviour’ that originates in folk psychology does not hold any longer, since people who cannot control their behaviour can nevertheless perform cognitive operations of different levels of difficulty.” [48] Still, many disputes continue to be fuelled by PVS and many caregivers think there is no use for someone to be kept alive in such a condition. Withdrawal of life sustaining treatment for people that are PV is no more regarded as a crime in some parts of the world [49].

As for death as ‘irreversible loss of personhood’, it has been rejected by scientists because of the lack of a proper definition of personhood and also of a tool to measure it, which does not prevent ethicists to elaborate on the concept: “One major problem with such ideas is the absence of a clear definition, anatomic localization, or tool to measure personhood. (...) This, in turn, makes it difficult to assess whether a patient is dead or not, and whether the state they are in is irreversible. Indeed some patients who are thought to have irreversible loss of consciousness do recover. In the end, the only robust means for establishing irreversible loss of personhood appears to be the current brain stem criteria.” [44] The spirit of self-contradiction appears here once again by firstly acknowledging the fact that there is no anatomic localization of personhood and

secondly placing it at the level of the brainstem or somewhere else in the human body but by all means under the coordination of the brain stem.

In spite of ‘mescience’'s pride and philosophy's prejudice there are scientists continuing to honestly admit the fact that human death is something more than biology or medicine can explain: “A determination of death is a legal determination that a collection of living cells is no longer entitled to the rights granted to human beings, rather than a scientific or medical determination that all biological life has ended. The question is, at its core, not a medical question but a moral or religious one.” [50]

In the middle of all scientific complications even if it might sound cynical it can be said that the traditional perspective wins and decay is ultimately the only incontestable sign of death. The custom of waiting for a few days before the burial of a deceased seems to be very considerate. If the body exhibits signs of decay then one can be sure that they are not about to bury a living person.

6. Conclusive comments

Defining life as well as defining death seems to be audacious initiatives that risk to end up into circular reasoning. Another important point is that perhaps more than other scientific projects defining life as well as defining death might suffer from ideological constraints but of different natures. These two subjects seem to be especially adequate for generating science X metaphysics unwanted hybrids. Materialistic ‘mescience’ or ‘scitaphysics’ quite unscientifically refuses even to consider relegating the problem of ‘life-the essence’ to theology in spite of the perpetuating failure of reason in describing something that so far escaped the boundaries of science, temporary structuring ordinary atoms into what is called ‘the living’ and then leaving them to turn into dust again. Even though there is no proof of the invalidity of the supposition that the mystery of life will never be revealed by scientific means as it might be correlated to the immaterial which is out of the range of science by definition this possibility is programmatically rejected. The search for truth by naturalistic means has mutated into the search for naturalistic truth as the one and only acceptable. For some, what was supposed to be an honest enterprise of human reason trying to examine reality ended up into a battle for contesting the need for a Creator in spite of the fact that such a need might be shown to result from the very order of the world without forcing the arguments more than materialists do in order to sustain the opposite.

In the second case, contemporary philosophy of ‘competition’ and ‘usefulness’ (in other words distilled social Darwinism) replaces traditional values emerging from theology such as the irreducible value of human life with arbitrary scales good to justify everything, murder included in the name of a greater common good. This can be envisaged as the next step after denying the existence of a Creator by (pseudo) scientific means - there is no God but the position should be kept available and occupied by MAN. Man came to decide

who lives and who dies. And he does that without having the unlimited wisdom, knowledge and more important, love God possesses.

What is next? Would it be possible for scientists to acknowledge their own limitations and also the limitations of science itself without trying to fabricate answers even to questions that science is not the one supposed to address? Do we have enough honesty left so to admit that at least in some cases it is much too obvious that the core of the things is not accessible to pure reason? Can we still frankly admit our defeat and surrender to the transcendent? It is not a matter of being able to but of wanting to, as in the case of salvation. Yes, of course, all this is perfectly possible for scientists and impossible for ‘mescientists’. Perhaps scientists and society as a whole should increase their awareness with respect to ‘mescience’ invading their life, confiscating their work and manipulating their perspective upon existence.

The reader might very well ask a simple question - how come a paper having in its title the word ‘apophatism’ does not say anything about it? The answer is as simple as the question: the paper is not explicitly about apophatism but about some facts that might point to the admittance of its necessity and we speak here about apophatism, as it is understood in Eastern Orthodox theology. If Western apophatism is nothing but an extra, more sophisticated perspective upon a supposed barrier irreducibly separating God from people, Eastern apophatism is precisely about the inexistence of such a barrier. Apophatism in Orthodoxy is about getting to know the unknown by embracing it and being embraced by it because of our love for Him that originates from His love for us. In the Orthodox apophatic approach not reason but all conquering love becomes the instrument of expanded knowledge of God and His mysteries.

Nevertheless to modern-day people apophatism is something strange both theoretically and practically regardless their religious identity. The very idea of things beyond reason that we can get to know by other means than reason is more than most contemporary can face. Even for many members of the Orthodox Church apophatism is something indistinct, elusive as even for them it is hard to think differently in the middle of the culture of reductionism and pure reason in spite of the many ‘evidences of the unseen things’ our Church holds as fruits of the typically apophatic touch of Eastern religious life.

Indeed, “blessed are they that have not seen, and yet have believed” (John, 20.29). But when people do not trust anything else but reason then its inability to dissect some things should also be accepted as prove if the investigator is honest. Some things were proven to resist to rational investigation and seem to be of the resort of ‘beyond reason’. In the matter of life and death science does not offer coherent answers and many scientists concede this is not only about the actual level of knowledge. What if pure reason works up to a certain point where other tools become necessary in order to understand reality? Science admits that life is more than molecules matching in a huge puzzle but does not know *what* it is, after all. Science admits that to be human goes beyond basic biological traits of the species but it cannot point out by what. Science does not manage to be convincing in demonstrations about the start and the end points of human life.

On the other hand theological answers to the same questions are pretty clear as part of a coherent system that holds answers to all our disquietudes. They do not conflict with reason by no means as it 'mescience' claims. We talk about different approaches to reality, which are supposed to be complementary not mutually exclusive. The impression of mutual exclusiveness is a false one and it has been viciously developed by 'mescientists'. A scientist would not reject *a priori* the possibility that to some questions the answers might be obtained otherwise than solely by reason as this would be an unscientific position in itself.

Some of the sad consequences of science being unable to deal with the questions about life and death and 'mescience' taking over were presented. What shall we do - keep trying to define life in a godless manner with people being killed meanwhile by justification of a pretended void of knowledge or accept there is a line beyond which reason simply cannot pass? What would an honest researcher do - unreasonably stick with reason only or accept that some extra approaches such as the apophatic one could be justified under particular circumstances when reason reaches the end of its ladder?

As already stated above, tragically but beautifully this will always be a matter of personal choice regardless how many die meanwhile because of atheistic Bioethics. This is precisely why this paper is not intended to convince anybody of anything but to *draw attention* over some facts and among them over the existence of alternatives to plain reason, which nowadays happens to be a very sensitive subject. Since modern society usually presumes nothing is beyond reason then a need arises to help people keep their options open in the very spirit of equity that is so claimed these days and in order to prevent some regrettable exceptions to occur.

The picture of life as drawn by nowadays science has many colourless spots. Perhaps we should use not only our reason but also other capacities to complete the picture and discover its coherence and beauty.

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