

Philosophical foundations of the Death and Anti-Death discussion

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Perhaps there has been no greater opportunity than in this “VOLUME FIFTEEN of our Death And Anti-Death set of anthologies” to write about how might think about life and how to avoid death. There are two reasons to discuss “life”, the first being enhancing our understanding of who we are and why we may be here in the Universe. The second is more practical: how humans meet the physical challenges brought about by the way they have interacted with their environment.

Many persons discussing “life” beg the question about what “life” is. Surely, when one discusses how to overcome its opposite, death, they are not referring to another “living” thing such as a plant. There seems to be a commonality, though, and it is this commonality is one needing elaboration. It ostensibly seems to be the boundary condition separating what is completely passive (inert) from what attempts to maintain its integrity, as well as fulfilling other conditions we think “life” has. In our present discussion, there will be a reminder that it by no means has been unequivocally established what life really is by placing quotes around the word, namely, “life”. Consider it a tag representing a bundle of philosophical ideas that will be unpacked in this paper.

Each of us in our isolated way since humans have been able to think for themselves has known in advance that their individual existences are limited. Yet, the question has risen to global urgency. Over the past decade there have been numerous programs and articles about how life on Earth might end. As recent as 18 August 2017 the British Broadcast Corporation ran on its front web page and article by Rachael Nuwer (2017), “How Western Civilization Could Collapse”, citing numerous studies by academicians in describing resource depletion, global warming, and income stratification as the leading indicators. Indeed, the BBC referred to its “Apocalypse Week”. Joseph Tainter (2003) writes to the issue by the title in his book, *The Collapse of Complex Societies*. Most stark, however, is what scientists have come to call the Sixth Great Extinction (CNN, 2017; Ceballos, G. et al., 2015; Center for Biological Diversity, 2017; Darroch, S.A.F., Erwin, D.H., Hull, P.M., 2015; Drake, 2015; 2015; Firth, 2010; Holocene extinction, 2017). In essence, if the *homo sapiens sapiens* (2017) subspecies does not confront and correct or solve the problems of global warming, income stratification, and resource depletion, the subspecies will not survive. Does humanity have the capacity to survive?

How do we think about “surviving”? “Survive” means over and above living. Etymologically, survive (v.) means:

mid-15c. (implied in surviving), “to outlive, continue in existence after the death of another,” originally in the legal (inheritance) sense, from Anglo-French *survivre*, Old French *souvivre* (12c., Modern French *survivre*), from Latin *supervivere* “live beyond, live longer than,” from *super* “over, beyond” (see *super-*) + *vivere* “to live” (from PIE root **gwei-* “to live”). Intransitive sense “to live on” is from late 15c. Related: *Survived*; *surviving*. (*Survive - etymology*, 2017)

In this case, we are to outlive ourselves in two senses. The first is outliving ourselves in the present condition by successfully meeting the Sixth Great Extinction. The second is transcending life in our present condition. The etymology captures all the issues we will be discussing here – what “life”, as well as what may be beyond ours in its present form. Especially Western history since the time of Martin Luther (1483-1546) *angst* (literally “anxiety”, translated from the German) has dominated the philosophical landscape (Martin Luther, 2017). What happens after we die? Luther said that one does not know what will happen until s/he dies whether Heaven or Hell awaits. This *angst* has been fueled by religious descriptions to what happens to the ego, Dante's *Divine Comedy* (1320) depicting a world of unending and eternal torment. For Westerners, at least, searches for the “Fountain of Youth”, life extension, cryonics, and continuing our lives by artificial means (as in “superlife”) are very attractive. Alternatives to the Heaven or Hell dichotomy are found in Asian literature. This paper will visit all of these. Let's review some background before entering into how we discuss philosophically the etymology of “survive”, or overcoming “death”. One should note here that the quotes around life and death emphasize how we really do not know what these are.

BACKGROUND TO THE HUMAN DILEMMA

Over the years, the subspecies has evolved, and when there were fewer people and before industrialization, the subspecies could make mistakes, and there would be little effect on the environment. How persons interacted each

other would be of local affair. With the Industrial Revolution all of that changed, where there were increasing requirements for more sophisticated thinking. Technological management in the latter 18th century and through the middle-latter part of the 19th was comparatively simple in resolving how increasingly larger populations competed for fewer resources, but the nature of conflict reflected how the growing complexity affected larger portions of the globe and signaled that countries no longer could be islands unto themselves. World War I was milestone in demonstrating how technology could obliterate populations on a large scale. World War II saw the systematization and bureaucratization of mass death, coupled with technological advances, the most destructive, of course, being the atomic bomb.

In the background has been the question of whether the subspecies has or even can evolve rapidly enough to have its intelligence “catch up” the requirements of the age. With scientists predicting how the whole human species may die the conversation about an individual meeting the end of life has also been widened in scope. Mental capacity – intellectual, psychological, ethical, emotional, and so forth – has been quantified, as in intelligence quotients, critical thinking tests, and psychological-neuroimaging assessments. A person may be measured with an exceedingly high artistic intelligence but low kinesthetic ability. Regardless of criteria used to give a quantified description of mental ability, there is an average for the whole of humanity. Out of this one then can ask whether the “best and the brightest” have the capacity to fulfill the requirements for successfully avoiding the Sixth Great Extinction. For example, humanity needs to use “reason and science to guide decisions”, says archeologist Homer Dixon (Nuwer, 2017), but if the intellectual capacity simply is not there biologically, then it appears the subspecies is programmed to die, unless it can find a “tool”. More will be said on this later in this article in the context of skirting “death”.

Suffice it to say the moment, though, we need to understand what “anti-death” means, both in terms of what “life” is, as well as to the means of sustaining it, with and without a physical means. As a prelude, reference to “without a physical means” entails a philosophical discussion appearing towards the end of this whole excursion. We now then can consider the alternative, what has been deemed for time immemorial that which has been called “death”. However, there is a twist to identifying the “death” that has caused so much mental anguish in *homo sapiens sapiens*. If we do not know what “life” is, then, “death” is just as puzzling. We are “alive” and there is a widespread desire to live forever, but all the questions in the world for that “fountain of youth” have come to naught – at least apparently.

Our starting point for discussing what may be facing us in the Sixth Great Extinction is in the prefix of the title of this anthology:

Anti-Death

One needs to do a “double take”, as this author did in thinking initially that “anti-death” simply means life. However “anti” is an active term meaning “against”. After all, are not those who like their present status as “living” entities opposed to “death”, as in being anti anything? They would be expected to work towards defeating “death”. One often thinks of “anti” coupled with another word, such as “war”, “fascist”, “social”, and so forth. Words like “antipode”, “antibiotic”, and “antioxidant” carry the same sense of meaning. We also have “antiparticle” (particle with opposite electrical charge) and “anti-matter”. All of these imply annihilation. Actually, though, it is not only the prefix “anti” but the second word, “death” that commands our attention. Hence, there are two rivers of philosophical transport that emanate from perhaps the two most vital foundations of our existence.

Against our life is the backdrop of how we contemplate it. Since Plato’s time humans have been wrestling with the question of truth and reality. Plato 2500 years ago in the seventh book of his *Republic* said:

See human beings as though they were in an underground cave-like dwelling with its entrance, a long one, open to the light across the whole width of the cave. They are in it from childhood with their legs and necks in bonds so that they are fixed, seeing only in front of them, unable because of the bond to turn their heads all the way around. Their light is from a fire burning far above and behind them. Between the fire and the prisoners there is a road above, along which see a wall, built like the partitions puppet-handlers set in front of the human beings and over which they show the puppets.

Then also see along this wall human beings carrying all sorts of artifacts, which project above the wall, and statues of men and other animals wrought from stone, wood, and every kind of material; as is to be expected, some of the carriers utter sounds while others are silent. (*Plato*, 1968, Book VII, 514a – 516a, p. 193-194)

People take these shadows to be reality but when they are led outside into the bright sunlight, the reality appears. How we understand that reality, hobbled by it being accessible to us, save through representations, is our dilemma. How does one apprehend the reality through the shadows? More pointedly “Life” and “death” are realities that manifest themselves only as shadows.



Figure 1. Plato's Allegory of the cave (Mito de la cavern, 2017)

We write of “life” and “death” as if we know what they are, attributing to them characteristics that may only be suppositions, rather than what it really is. Ours is from our viewpoint only; there may be other points from which it can be viewed, as in dimensions. Edwin Abbott (1884) in his 1884 book *Flatland* described world as being perspectival and dimensional. In his hypothetical worlds consisting of objects in various dimensions beings in one dimension, such as the two-dimensional world of geometric shapes cannot see what beings in the third dimension can see. For example, a sphere passing through the plane would be perceived by the one two-dimensional world as a dot on the horizon, growing to be a line of maximum length at the equator of the sphere, followed by a dot as the sphere completes its passage. Humans are imbued with a dimensional bias, philosophers referring this to a “fishbowl”, where human only can see what is inside. They cannot get outside of themselves to see themselves. Our understanding of what life is, death is, or how come to know will be lost unless we revisit the edifice upon which our perspectival (from one's perspective, or point of view) apprehension rests.

Our exploration in these pages not only is from a philosophical perspective but is extensively interdisciplinary. Such only can be the case, because each human both is the subject and object of the discussion. One may refer to the old South Asian parable (Udana, 2012, Passage 6.4) of a number of “contemplatives, Brahmans, & wanderers of various” arguing about the nature of Dhamma, or Truth. They went to their Blessed One, or Lord and asked.” The answer was that people are like the blind attempting to discern the elephant. The head is like a jar, the ear like a winnowing basket, the trunk like a plow, the tusk like a plowshare, and so forth. (Udana 6:4 Sectarions (1) (Tittha Sutta), p. 95 - 6.4, p. 96). We are trapped within ourselves as a species and have to come to terms with how we collectively ascertain what we are touching. This paper looks at “life” as that elephant.

WHAT IS THE NATURE OF SAPIENS, HENCE OUR WORLD?

Reference frames and how to use them

Our discussion is about “life” and its opposite, but before we discuss these things, we need to visit some philosophical foundations before reflecting on the world in which any conversation about “life” can occur. At issue is the kernel of life, that which identifies us as being “organic”, or having “life”. In discussing “anti-life”, it is doubtful if a person wishing to overcome death would be content with human life being replaced by that of a plant, let us say. Ours is *homo sapiens sapiens*, and it is the second “*sapiens*” that one probably has in focus and which is desired for continuation. To attain that continuation of “life” it is necessary to come to terms with that “*sapiens*”.

One looks at humans, themselves. People often think that there is an unintentional mistyping or duplication of “sapiens” in the expression *homo sapiens sapiens* (Homo sapiens sapiens, 2017), and it is common to see only *homo sapiens*. Humans are a subspecies of the species “sapiens”. This deletion of the second “sapiens” is convenient (albeit technically incorrect) shortening, because the other subspecies *Homo sapiens idaltu* died out. While the “sapiens” usually rendered as “wise” is repeated, and ostensibly appears as an error, *homo sapiens sapiens* is the correct description of ourselves. The second “sapiens” designates the subspecies of, again, “sapiens” the Latin for “to know”, sane, rational (Sapiens, 2017) often rendered “intelligent”, as an Internet search will

illustrate. This second “*sapiens*” will become ever more important as we move on.

How we look at ourselves in the way we think shapes our views on “life” - what it is and how it defines us. In teaching introduction to philosophy this author answered the question “what is philosophy” by telling students to examine the reflections in a mirror – introspection, literally viewing oneself through oneself. (Introspection, 2017). The examining, it is to be emphasized, is not simply looking at the mirror (analogous to hearing one speak) but contemplating the image (as in listening to the speaker). After a fashion it is common for one to sense being apart from the image, the observer examining her/himself outside of her/himself.

Georg Wilhelm Friedrich Hegel, arguably one of the most important modern Western philosophers starts his philosophical system in his *Phenomenology of Mind* by one becoming apart from herself or himself. Immediately is established not only a division within ourselves but a way of regarding the environment in terms of this relationship. In addition, the individual is to avoid solipsism, that hers/his is not the only one in front of a mirror. Later, we will see how this very abstract idea translates into how we may view “life”. Everything we comprehend in our environment passes through what is seen in the mirror. For now, however, we will regard it as a special point of reference. Here is why.

It is questionable at best whether the human species knows something for all times and circumstances, i.e., absolutely. Philosophers recognize that one claiming to know “the Truth” very likely does not, as we have seen how the “Truth” later changes. If the “Truth” were known, it would be obvious, and there would be no controversies or contradictions about claims to it. We also have observed contradictory versions of assertions about something, perhaps the most obvious cases in conflicting religious or political ideologies. The word “Truth” is a proper noun, a specific thing, something with a unique status. How one arrives at an assertion, be it a claim of “Truth” or a mere supposition we for granted as having a starting point, or reference frame.

One may imagine her/himself in deep space with no objects in sight. Or, one may be in the middle of the ocean at night. To navigate s/he needs some fixed points for comparison. We also do this in measurement. There is nothing sacred about the metric system, although it is founded on natural phenomena, such as the distance over the Earth's surface (great circle arc) and how fast a pendulum swings (Metric system origin, 2017). A second reason for the logical method is that we do not seem to be able to “absolutely” or for all time convincingly seize on universal truths that never change. In the case of that reference frame, it is that which passes between the subject observing the object in the mirror.

What we see in the world is seen through ourselves. Humans in their observations performe impart their biases. Scientists include the observer in an experiment; the observer becomes the observed. In this turn “second order cybernetics” (2017) (after the original cybernetics, the study of systems behaving like organisms). The outcome of an observation includes the observer feeding back into how s/he sees things, this view in turn affecting what is observed. In one sense, this recursive relationship is reflexive. In mathematical logic the expression “Rxx”, something is reflexive of itself (Self reference, 2017), the following figure 2 being an example.



Figure 2. Reflexivity in life (*Blonde walk*, 2017)

Schematically, we have:

Mirror ← Object → Mirror

While the content “bouncing back and forth” between the two mirrors may change, the scheme refers to the process of one side feeding upon the other. Also in a sense we have that “fishbowl” problem, where what we apprehend in our world is a reflection of ourselves, the mirrors confining those perceptions. This world is the reference frame, reaching back up on itself.

It is in mainstream discourse that this refers to identity, something in and of itself. This is not the same as equivalence, where something is apart from another but still alike in every respect. For example two papers clips out of the same box are not identical, but equivalent, as there is something different about them, even if it's a different set of atoms, albeit of the same substance, iron. Equivalence, then, implies reference frames, even though one object is the reference frame for the other. We see this in the logic of relations, such as $(R_{xy} \wedge R_{yz}) \rightarrow R_{xz}$, where something bears a specific relation to a second thing, and that second thing bears the same relation to a third, so the first bears that relation to the third – transitivity. In this way, the properties of a reference frame are populated.

Is the way the world “really works? Is this “really true”? Until recently, people referred to scientific methods being “objective” - “really true” for everyone. One describes the environment and attempts to say what will happen in the future or how events may be related by positing a hypothesis, a conjecture. The hypothesis is tested and the results observed. If the observation experiment can be independently replicated, one accepts the hypothesis and being the case, it being incorporated to a wider explanation, known as a “theory”. The method was regarded as being free of opinions or personal perspectives, but eventually it was realized that the way persons view the environment they are describing, experimental setup, and interpretation of results all is from a person's point of view. Whenever a person reports anything it is inherently biased, even the observation itself. Such was discovered by Werner von Heisenberg in his now famous “uncertainty principle”. If we measure the location of a “particle” first and its momentum second, and then we reverse the process - measuring momentum first and location second, we will not get the same results. By choosing which to measure first, we bias the outcome. For example, if one were to measure position, another momentum at the same time, the outcomes would be different (Heisenberg, 1959, pp. 38-44; Heisenberg, 2017). In the double slit experiment an observer detects which slit in a grating a particle passes through, even though on the screen detecting all particles there clearly is a wave interference pattern (bands of light, rather than single lines, indicating the “particle” strikes the screen everywhere) (Double slit experiment, 2017). As a side note, in the case of each slit, there is a band, the question being one of proportional size of the band to the “particle”, the relationship being one of probability of where the “particle” will strike the screen.

What these experiments indicate is that our knowledge not only is from one's viewpoint but is probabilistic in nature. Back to our immediate relevance, whatever one says about “life” has the same caveats. How then does one escape her/himself? How can one climb out of that fishbowl? Inasmuch as we cannot seem to identify “the Truth”, we look to each other, as well as our environment and settle on views that seem to bring each individual perspective on what is “real” together in an attempt to avoid bias. That is, one tries to be “objective”. Without elaborating and simplifying enormously, philosophers refer to consensus (an agreement exists with others that something is the case), correspondence (what we see matches what really is there), and coherence (holding something to be true doesn't conflict with the way one holds other things to be true). Each, however, depends upon reference framing and bootstrapping. That the observations, evaluations, and determinations of what others do all is processed through humans, and even though the individual “fishbowl” dilemma appears to have been transcended, still human bias pervades the whole process. Humans cannot get outside of themselves. Even if a non-human being came in from the outside whatever s/he/it said would be processed through human mentation.

How we know all this?

Philosophers have identified a number of ways we think we know, these ways being under the rubric “epistemology” (Epistemology, 2017), or how we know, formally defined as “justified belief”. What is the “audit trail” of our assertions? As in the endpoint of a game, a mathematical problem, or computer program, we can look at the previous steps to see how we arrived at the present. Several common methods are:

One can identify some ways that we know things:

- *Tradition* – It was always done that way and it worked. Included in this may be tales, myths, parables, and the like. Tradition, more often than not, is in the realm of environments in which there is no written account of events, i.e., history.
- *History* – There is a record of the way it was done, and we rely on that for affirming an assertion. Time transforms itself from being circular in the orally-based societies to being linear in written or historically-oriented ones.
- *Reason* – All knowledge comes from how we arrange things in our minds according to certain rules, precepts,

etc.

- *Empiricism* – We know things through observation, the senses, and experience and make extrapolations based upon past events.

Scientific methods use a combination of the above in attempt to extrapolate from the past to project to the future.

With reason there are two basic methods, logic students learning about deduction and induction. Deduction, or analysis, means that the conclusions can be inferred from the premises with certainty. Games are like this, where one starts with pieces, rules, and the playing field. Whoever wins can be accounted for by following the previous plays, or steps. All closed systems are deductive, where one or more components can be derived from the rules establishing the system embracing them. Before doing a logic proof, one needs to know the system, the mode of expression (well formed formulas), definitions, starting points (as in axioms), and rules.

Induction, also referred to as “synthesis”, means that the conclusions can be inferred only with a degree of probability less than one (certainty). Getting the illusion of solidness from the dots a newspaper photograph is an example of deduction. Statistics is induction. Our very biology is inductive, as in the eyes and their rods and cones detecting photons, the photons in turn knocking electrons out of their shells in the synapses and traveling through nerves to the brain. Sense datum in our point in space samples all that is about us in order to get an idea of what the whole is. In all argumentation, then, a logician often will, based on how a system is described in this manner, start an argument with some assumptions and attempt to reach a conclusion based on them, either with certainty (deduction) with a degree of probability (induction). There are at least two reasons for our method.

There is a fundamental problem with this division, however. From where does one obtain the starting points of constructing a deductive argument? Logicians use definitions, rules, axioms, to create starting points. In the end, it turns out that these are drawn not from any necessarily well-defined procedure or methodology but a “common sense” (Axiom, 2017). So is the case with induction, as in how we select the samples, the mode of relating them to each other to produce what ultimately is our interpretation of the environment. Returning to the blind persons and the elephant, we can see the very close resemblance to the foundation of statistics, each person apprehending through her/his eyes a piece of the environment. In this way by consensus, one mode of “objectivity” is achieved. In this sense our environment is created by us. In essence, all conclusions, be their being deductive or inductive, come from us, fraught with all the bias and other cognitive limitations. Hence, one comes to appreciate the importance of second order cybernetics.

So, how to we integrate the second order cybernetics issue and still try to maintain “objectivity”? In our consideration of objectivity, we saw that all three aspects – consensus, coherence, and correspondence all are from the human's perspective, i.e., perspectival, or biased. None of them even purport to be about Truth. Perforce, they are reference frame-based. The consensus mere is a “vote”, and history is rife with examples of uniform assent being wrong later, as in Newtonian worlds. How one views an idea corresponding to what it is involves interpretation. Whether a set of ideas cohere (make sense) also is dependent upon one's knowledge, interpretation, culture, and world view (Popper, 1959; Kuhn, 1962; Objectivity, 2017).

One may refer to our knowledge methods as “bootstrapping”, identifying a starting point and seeing where it leads. If the direction is unsatisfactory, we always can return to the starting point and try something else. Hence, for our philosophical exploration this “measurement” system is described by which everything is tied to that bootstrap as the “unit measurement”, not too comfortably stated, “our bias”.

Once we have grasped these precepts, we can then explore the idea of “life”. One sees life through life, itself in true cybernetic fashion. If our conclusions about it are not satisfactory, we can come back to our starting points. Repeated exploration with unsatisfactory results, however, most likely means we have to get more fundamental and examine the starting points, themselves.

The most fundamental law

Let us take a phenomenological perspective on our world, taking in what we see about us and attempting to discern meaning. The first thing we start reflecting upon is how we are able to see things. Ancients might have been afraid of the dark; surely this was commonplace in medieval times, before modern science and electric lights. Even now, there may be reticence in walking out at night for an apprehension of the unknown. We simply cannot see at night without illumination. Indeed, the whole period of “The Enlightenment” referred to shining light on that dark area

of the unknown to reveal knowledge. Walking into a room without lights presents to us objects that cannot be seen because of the uniformity of the darkness. The phenomenological awareness is that things are apprehended because of what they are not. If all the objects are of uniform color and in the same shade of light, distinguishing them is nigh impossible...at least insofar as vision is concerned. Yet, walking up to one of those objects and touching it will reveal its difference from others, merely by the texture and physical boundary. At this point, we realize that apprehension has at least two aspects – visual and tactile. The other three senses may present themselves through objects as smell, sound, and taste. In these ways, we come to know the objects, philosophers referring to “empiricism”. One has knowledge through the senses or experience. That there are these five ways of sensory perception causes us to stop and reflect on other ways, something to which we will return later (ways of knowing). The primary lesson from this experience is that something is apprehended in terms of what it is not. That is, nothing can be perceived by itself. Nothing exists except by what it is not. Our “parlor room experiment” with the room is but a smaller version of how we live in our universe.

Again, on a phenomenological scale, one looks out past Earth and beyond the solar system, and even beyond to however far may be measured, if not measured, even beyond that. Astrophysicists have calculated that the size of the Universe is 13.8 billion light years. However, one needs to bear in mind that this size is a light speed determined one. There is nothing to say that the Universe is not larger. The 13.8 billion light years, as the physicists qualify, is the visible Universe. That we cannot place a limit is the definition of infinity. Our gaze tires and we come back to Earth, reflecting not only on the infinite but about its opposite. The dialectic of phenomenology about the objects makes us realize that something is in terms of what it is not. How does this affect our way of identifying anything from everything else? In practical terms can one measure anything, as the things we measure have boundaries, or limits? A clue to the answer is that such is not nominally, at least, an issue in our abilities to think.

No boundary to boundary

A word about “boundary” is order before one starts thinking that there are absolute limits on anything. Physicists have determined that at Planck scale we cannot locate an entity's position and momentum at the same time. A *Gedankenexperiment*, or thought experiment, will further establish the indeterminacy of boundary. One may take an ordinary measuring stick, and proceed to ascertain the length of an object by reading between the marks of the stick. Add to the problem a large number of demarcation lines. S/he will immediately encounter the number and width of the marks, themselves, as well as more explicitly the edge of the mark, itself up against the object. The number of lines is shaped by the width of the lines as well as the spaces between them into which more lines can fit. Using the Cartesian method of subdivision, a world exists where there is no boundary. Hawking refers to particles “flicking in and out of existence (Hawking, 2017). The observer makes the judgment as to length, depending upon the precision of measurement needed, the number of measurement lines, and her/his vision.

Two similar problems occur with measurement, an ancient Greek one, as well as measuring areas under curves, which we will revisit shortly. The first was the fable of a hare running to overcome a Tortoise but never being able to overcome it. This distance lessens but never goes away. Each time the distance is reduced; there is always another space to be halved. On one hand, there seems to be an insurmountable never ending distance. On the other, the number of attempts to reduce that distance becomes infinitely large. The more precise we attempt to get, the less precise it is.

In returning to the looking out in space and subdividing the world, we have the infinite and infinitesimal, and we also have a provisional way of solving the problems of limits that amounts to bootstrapping. It is the mathematics of the differential and integral calculus, a method that also extends far beyond into other domains and with profound philosophical ramifications and ones bearing on how we view “life”.

With the differential calculus (Differential Calculus, 2017) one defines a range and compares it to another range, as in dy/dx , the “d” signifying the difference of some entity “y”, i.e., the change in 'Y' divided by the change in “x”, $\Delta y/\Delta x$. “Dy”, then, would be the span of “y”. In calculus, this is the vertical, or “y” axis on a graph. The opposite is the difference of a second entity “x”, or the horizontal axis of a graph. The comparison is in the form of a division, finding out how many of the range of the denominator – bottom value – fits into the range in the numerator, the top value. Otherwise stated, instead of comparing static values, as in simple division, we compare dynamic ones, or ranges.

In the integral calculus, one takes a quantity and analyzes it, such as the area under a curve. The curve is

divided into a number of polygons, usually rectangles, the rectangles are added giving a sum. It is to be emphasized that this Riemann approach to integration (Riemann Sum, 2017) only approximates the area under the curve, precision dependent upon how close we want the result. That is, we set the limits (Limits, 2017).

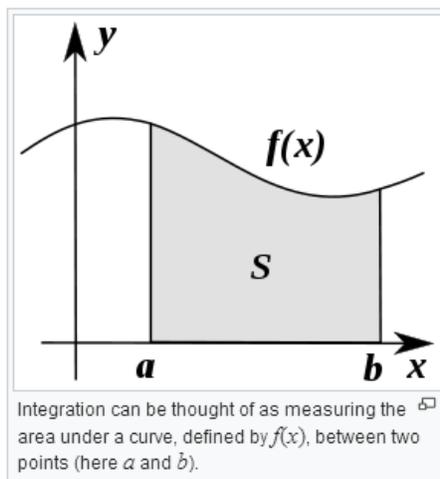


Figure 3. Concept of integration

We add up a number of demarcated areas under the curve to arrive at what we think is the whole. The way those areas are constructed is of our own choosing. “Our own choosing” is the limit. This should sound familiar; we are the reference frame. The boundaries are of our own making.

In terms of reasoning in logic – deduction (analysis), one cuts up the pieces to a desired granularity to understand the whole. The process is reversed with induction (synthesis), attempting to understand the whole by sampling various points and subjectively drawing a conclusion about its nature. The setting of the limits is analogous to setting the degree of granularity; the induction is taking these samples (the limit being subjectively attained) and assembling them to get that area under the curve. It is worthy to note the dialectic, understanding something by the infinite (induction) in terms of the deduction (infinitesimal).

We see in all three dimensions one expands because they can contract, just as s/he realizes that black is apprehended in terms of what it is not. Neither the infinite nor the infinitesimal can exist alone. One has to expand from something; conversely one can subdivide only with something in hand. It is neither this nor that but a process that shapes our apprehension.

In summary, then, humanity lives in between two process boundaries. Setting the limit in calculus, bootstrapping, Heisenberg, reference framing, and bias – these all are in that same “ball of wax”.

On what exists

Now that we have an idea of how we know something and are familiar with bootstrapping, we start with an idea of something very fundamental, that which exists. In philosophy one refers to “ontology”. Somewhat in a jocular fashion we should know what we are talking about before bringing it into a conversation. Above, infinite and infinitesimal were discussed, the calculus referring to dividing an area under a curve with rectangles measured according to dimension we prescribe (limits). Let us look at this process of subdivision more closely.

What is not large, as in the vastness of the Universe is small. To achieve small, we reduce, or get smaller. Getting smaller was formalized by Rene Descartes with knowing something was “...to divide each of the difficulties under examination into as many parts as possible, and as might be necessary for its adequate solution. “...by showing that we cannot conceive body unless as divisible” (Descartes, 1641, p. 122). Take any object. One carries this process of subdivision far enough and s/he will arrive at Planck scale, $1.61619926 \times 10^{-35}$ meters. Conceptually, there is no limit to how far one can go, just as there is with looking out over the Universe. At this level, we see the dialectic in action, where the “unit” comes and goes from view, those “particles” flicking in and out of existence. It is a two bit world that underpins all of our existence. It is the digital Universe (Digital physics, 2017), one, lacking for any other way avoiding the controversy about “matter”, “particles”, and so forth, one composed of information. We will visit information later. That our world is based on the binary is not new.

Binary thinking is reflected in the *Creation Hymn* in the Rig Veda: "Whence all creation had its origin, he, whether he fashioned it or whether he did not, he, who surveys it all from highest heaven, he knows--or maybe even he does not know" (*Rig Veda*, 2017, CXXIX – Creation, p. 1073. Book the Tenth). In the Vedic view creation emanates from the self-consciousness of the primeval being (Purusha) that modern philosophers of consciousness equate with the universe, itself, being conscious (Kafatos, 1990).

We see binary thinking in the ancient (1000–750 BC) I Ching.

The binary notation in the I Ching is used to interpret its quaternary divination technique. It is based on taoistic duality of yin and yang eight trigrams (Bagua) and a set of 64 hexagrams ("sixty-four" gua), analogous to the three-bit and six-bit binary numerals, were in use at least as early as the Zhou Dynasty of ancient China. (I Ching, 2017)

Moving forward rapidly to more modern times, Gottfried Leibniz (1703) set forth the binary counting system in his *Explication de l'Arithmétique Binaire* over three hundred years ago.

A concept that is not easy to impart to the pagans, is the creation *ex nihilo* through God's almighty power. No one can say that nothing in the world can better present and demonstrate this power than the origin of numbers, as it is presented here through the simple and unadorned presentation of One and Zero or Nothing.

—Leibniz's letter to the Duke of Brunswick attached with the I Ching hexagrams (Binary number, 2017)

Into the twentieth century Jean Piaget, child psychologist asserted:

There exist outline structures which are precursors of logical structures,... It is not inconceivable that a general theory of structures will...be worked out, which will permit the comparative analysis of structures characterizing the outline structures to the logical structures characteristic of the higher stages of development. The use of the logical calculus in the description of neural networks on the one hand, and in cybernetic models on the other, shows that such a programme is not out of the question. (emphasis included). (Piaget 1958, p. 48).

Tononi (2012) reinforces this idea by demonstrating how mentation, even with graduated concepts, may be translated into binary form. Physicists also write of the arrangement in the universe according to a "pregeometry as the calculus of propositions," such that "...a machinery for the combination of yes-no or true-false elements does not have to be invented. It already exists" (Misner, Thorne, and Wheeler, 1973, p. 1208 et seq.). Wheeler further said, "...it is not unreasonable to imagine that information sits at the core of physics, just as it sits at the core of a computer" (Wheeler, 1998, p. 340). In his "It from bit", Wheeler states:

...every 'it'—every particle, every field of force, even the space-time continuum itself—derives its function, its meaning, its very existence entirely—even if in some contexts indirectly—from the apparatus-elicited answers to yes-or-no questions, binary choices, bits. 'It from bit' symbolizes the idea that every item of the physical world has at bottom—a very deep bottom, in most instances—an immaterial source and explanation; that which we call reality arises in the last analysis from the posing of yes–no questions and the registering of equipment- evoked responses; in short, that all things physical are information-theoretic in origin and that this is a participatory universe. (Wheeler, 1990)

Neither the pole of this digital world of ours exists by itself, but, again, the dialectics affirms each because of the other. It is a world that also gives rise to the binary space in which we express our ideas, as in binary arithmetic underscoring the computer world (Horne, 2012). If the binary is what the entire Universe is composed of, does this mean that "life", itself at its core is binary as well? This is foreshadowing of research explaining quotes around "death", suggesting that such may not have to be guaranteed. To appreciate the argument, we need first to be more focused on what "life" may be.

Autopoiesis and Emergence

Autopoiesis

No discussion about the origin of life would be complete without attention being paid to "autopoiesis", or self-organization. Many discussions about what "life" is revolve about it, but this author does not see that there is much conceptual elucidation by its proponents. Hence, the following is only in the form of acknowledging that autopoiesis is "out there", but does not satisfactorily address the nature of "life". From Wikipedia, we learn the

origin of the term, as well as the essential definition taken from original works:

Autopoiesis (from Greek αὐτο- (auto-), meaning "self", and ποίησις (poiesis), meaning "creation, production") literally means "self-creation" and expresses a fundamental dialectic among structure, mechanism and function. The term was introduced in 1972 by Chilean biologists Humberto Maturana and Francisco Varela:

An autopoietic machine is a machine organized (defined as a unity) as a network of processes of production (transformation and destruction) of components which: (i) through their interactions and transformations continuously regenerate and realize the network of processes (relations) that produced them; and (ii) constitute it (the machine) as a concrete unity in space in which they (the components) exist by specifying the topological domain of its realization as such a network.

... the space defined by an autopoietic system is self-contained and cannot be described by using dimensions that define another space. When we refer to our interactions with a concrete autopoietic system, however, we project this system on the space of our manipulations and make a description of this projection. (Autopoiesis Etymology, 2017)

One originators of the term – Humberto Maturana Romesin (full name) - gave “autopoiesis as the name of the organization of living systems as discrete autonomous entities...closed networks of molecular production...the necessary and sufficient condition for the constitution of living systems,[existing] only as long as their autopoietic organization [is] conserve” (Romesin, H. M., 2002, p. 8).

The requirements for cognition or knowing re minimal for Maturana:

...if we see a living system behaving according to what we consider is adequate behavior in the circumstances in which we observe it, we claim that it knows. What we see in such circumstances underlying the adequate behavior of the living system is: a) that the living system under our attention shows or exhibits a structural dynamics that flows in congruence with the structural dynamics of the medium in which we see it; and, b) that it is through that dynamic structural congruence that the living system conserves its living. (Ibid., p. 26 2002)

All through this, Maturana and Varela seem to be assuming that one knows what “life” is but giving it characteristic of it being “self-organized”. Too, their description of “self-organization” appears to be tautological and does not give any richness to this bootstrapping approach to understanding what gives rise to “life” (Varela, F., H. Maturana, and R. Uribe, 1974). That is, there is no outside intervention to create it. Francis Heylighen, Research Professor, Director of the Global Brain Institute, Vrije Universiteit Brussel, outlines numerous self-organizing systems that fit the “autopoiesis” of Maturana and Varela (Heylighen, F., 2001) Plasma balls, crystals, and thermodynamic systems are candidates for autopoiesis; no Maturana or Varela are needed. Such did not seem to concern the upscale Santa Fe Institute in New Mexico in promulgating strange metaphysics and tautological explanation of autopoiesis being that of “life”. From nothing, nothing comes, and as Parmenides said, and bootstrapping doesn't seem to offer a very satisfying explanation of the origin of life, especially that having mentation.

However, there is one aspect that does develop into a significantly relevant topic to “life”. Maturana says: “The properties of the components of an autopoietic system do not determine its properties as a unity. The properties of an autopoietic system (as is the case for every system) are determined by the constitution of this unity, and are, in fact, the properties of the network created by, and creating, its components” (Maturana, 1974, p. 192).

Let us say that Maturana and Varela have identified a vital idea in “autopoiesis”, something “innate” that allows things to come together seemingly unaided. Cannot there by similar logic be autodestruction? While Maturana and Varela do not seem to have brought us any closer to identifying what “life” is, we can contemplate the opposite of what they are saying and apply it to our own circumstances. If one can posit “self-organization”, dialectic thinking points to its opposite, autodestruction. That is, what about a “germ” for self-destruction, the logical opposite of autopoiesis? Autodestructive elements already exist in systems, an example being the IL-18 T-cells in humans, and there is no logical reason to think that programmed self-destruction doesn't exist at the species level. After all, natural selection is predicated upon an organic system's ability to adapt, the lack of ability to adapt indicates a self-destructive core. Aside from this stark death-life dialectic, there is the persuasive argument that the human body, itself not only is imperfect, but that it is the death of itself (Prescott, B., 2012).

Maturana, even though he does not use the word, defines “emergence”, and emergence is important in considering how humans attempt to construct “life” with “components”.

Emergence

Emergence is a phenomenon that cannot be explained by a description of a phenomenon resulting from the interaction of components but which cannot be described by the properties of those components by themselves (Emergence,2017). Not much will be said about “emergence” here, except to say that emergence is generally well accepted, with abundant examples, such as swarms of birds or insects, cellular automata, the Internet, all organisms, and, yes, ourselves. This is the case for now, arguably the greatest barrier being what “life” really is. There is even a thinking extending through history about societies being organic, as expressed by Auguste Comte (19 January 1798 – 5 September 1857) Georg Wilhelm Friedrich Hegel (27 August 1770 – 14 November 1831), and Johann Caspar (also Kaspar) Bluntschli (7 March 1808 – 21 October 1881),.

One may be in the future be able to assemble a hydrocarbon-based organism and call it life, but right now we do not seem to be able to describe why it behaves the way it does by looking at the components. Such a question becomes all the more pertinent in research we have seen above, such as the NIMH Research Domain Criteria, and what will be discussed shortly with modifying and ultimately constructing *ab initio* artificial beings.

WHAT IS LIFE?

The criteria

We ask now what “life” is. At the same time the question is implied, “Does “death” then exist?” Insofar as the subject of death is concerned, our way of knowing about “death” is for someone to have reported the experience of what we call “dying”, self-animation leaving a physical entity- body and having instruments detecting activity register zero. Here, the controversy rages over out of body experiences, persons who have reported “dying” and returning to what we call “life”. As somewhat an aside, it behooves scientists to maintain an open forum on the topic and prioritize research in the area.

Standard discussions about what life is center on these features but with seeming non-life examples being able to do the same as the characteristic listed (Casti, 1992; Life, 2017; Schrödinger, 1944):

- Life has complex patterns, but so does the World Wide Web (WWW), thermodynamic systems, swarms of insects, and so forth.
- A living thing has metabolism (processing inputs as food to provide sustenance to sustain itself), and the WWW takes in information and output it, and it is said that any dynamic system interacting with its environment does the same thing.
- One can obliterate the “living” entity, but if that entity is a network, anyone can literally pull the plug, albeit many plugs, as in the Internet.
- Life can maintain itself (or even adapt) despite environmental changes or even modify the environment. Operating systems can have procedures that can be called to modify web pages to respond to environmental changes. The second about the Internet modifying the environment, it surely is the case that web page content does affect us and what we do to change the environment in which the Internet exists.
- All the functions need to be performed by specialized components, and surely the Internet does this.
- All the parts depend upon each other for their existence. Without the servers, the communications technologies, software, and so forth -all dependent upon each other for their rationale for being, the Internet would collapse.
- The entity is able to reproduce itself. This may happen at the most basic – binary level, and Alan Turing answered in the affirmative (Turing, 1950). Machines can reproduce themselves (Self Replicating Machine, 2017).

These are all dynamic descriptions. They also are consistent with what we observe at Planck scale where there is nothing but movement. We are reminded of Heraclitus of Ephesus, who said “You cannot step twice into the same river, for other waters and yet others go ever flowing on. They go forward and back again” (Harris, 2017) . We should say in passing that if all there is constantly being displaced (notice the dialectic here), then is this sufficient that everything is nothing but “energy”? This is not necessarily the “New Age” energy but a philosophical idea grounded in physics, more about which will be discussed later. But for now, we ask how

independent is something that is moving?

A convenient taxonomy of independent mobility is described in Autonomy Levels in Unmanned Systems (ALFUS, 2008; Huang, 2004). These levels describe how removed the human is from the entity in action.

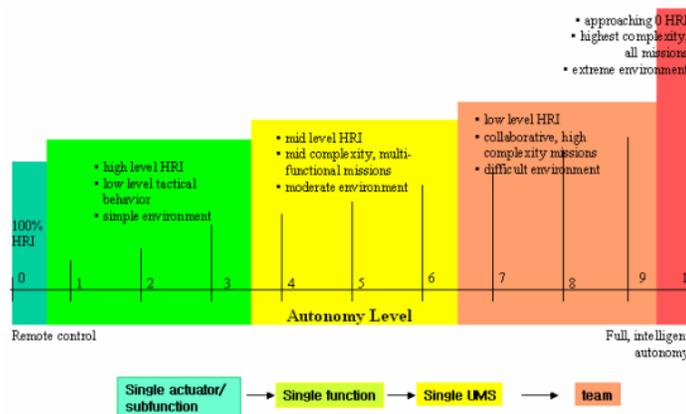


Figure 4. Autonomy Levels of Unmanned Systems (ALFUS, 2008)

Yet, we see examples of moving things that fulfill all the above criteria but still do not seem to fit our ideas of “life”. We start by looking at some obvious examples from a historical point of view and then some examples that seem to defy categorization.

Applying the criteria

Something that moves appears at first sight to many persons as being “alive”. In classical Greek times, there was the Antikythera mechanism (Antikythera, 2017), Hero's engine, and the moving owl of Ktesibios (Automaton, 2017), the first being a device being apparently able to display the relationship of planets interdependently of human intervention, the second inventor not only being able to have an artificial owl move independently but have other similar devices and collections of them do the same. Leonardo di Vinci sketched and built similar devices in the 15th century. In the latter 18th and during the latter 18th and early 19th century a flurry of very elaborate clocks and other automatons appeared in Europe and Far East with whole social scenes being animated. In modern times, there are computers, not only being able to initiate and sustain motion but some exhibiting mention that crosses over into the domain of independent thinking. In 1994 it was reported that a computer generated scientific laws independently from human intervention (Langley, P., Simon, H. A., Bradshaw, G. L., and Zytkow, J. M., 1987).

All through history humans have attempted to replicate “life”, but central questions have remained the same: A) is what these devices do “life”; B) do they have consciousness? So pervasive has been the question that the idea of organicity has bled over into collections of individuals as societies, formally stated, “is the State a living being?” A major difference between the humanly constructed automaton and humans is the material out of which each is made, more explicitly hydrocarbon-based and non-hydrocarbon-based. All that we consider “living” are of the former. Yet, the question is not answered about the latter being capable of exhibiting the criteria listed above.

Perhaps one can review how life came about by discovering the comparing the conditions in the “living” entity before and after. It is reasoned that something “crossed the line “to produce what we call life, but it is by no means clear what that “something is” (Bada, J.L. and Lazcano, A., 2009). Technical theories abound, such as various amino acid composites attaching themselves to crystalline structures, thus imparting growth to the hydrocarbons. (Crystalline Growth, 2017). Proteins, themselves are capable of being transformed into crystals, after all, and some proteins have been observed in nature.

It seems that the simplest hydrocarbon-based entity having all these features is *Mycoplasma mycoides* (Hutchison III, C.a., Chuang, R-Y, Noskov, V.N., et al., 2016). However, even at this simplest level, humans do not seem to have been able to recreate the “life” of this organism, although its genome has been synthesized, i.e., “synthetic genome”. The production of this life was by “converting a digitized DNA sequence, stored in a computer file, into a living entity capable of growth and self replication”, with the claim, “they have created (or perhaps more correctly ‘recreated’) life from scratch“. The nature of the ability for this organism to move, replicate, and otherwise be automated is apparently unknown.

These scientific observations and experiments present questions of non-hydrocarbon entities being capable of organicity. There is something very mechanical about what was done, but that unknown is the nature of self-animation. That is “life” may not have to be hydro-carbon-based. Atoms aggregate by complex electrostatic bonding – called “valence bonding” (Bond Theory (2017)). How this gets translated would be the answer about the origin of biological life and give us insights on how to create it.

... a life-form needs some way to collect, store and utilize energy. The energy must come from the environment. Once absorbed or ingested, the energy must be released exactly where and when it is needed. Otherwise, all of the energy might liberate its heat at once, incinerating the life-form. In a carbon-based world, the basic storage element is a carbohydrate having the formula $C_x(HOH)_y$. This carbohydrate oxidizes to water and carbon dioxide, which are then exchanged with the air; the carbons are connected by single bonds into a chain, a process called catenation. A carbon-based life-form 'burns' this fuel in controlled steps using speed regulators called enzymes.

...

Many chemists believe that the first "handed" carbon compounds formed in a "soupy" rock pool having a "handed" silica surface. And the handedness of this surface encouraged the creation of those carbon compounds now preferred in Earth's life-forms. (Dessy, 2017 ; Henriques , M. , 2016)

Bordering on these discoveries are “DNA glue to guide gel bricks [a water-filled gel] to self-assemble, we’re creating sophisticated programmable architecture” (Qi et al, 2013). Photosynthesis has been duplicated artificially. Harris says quotes Peidong Yang, a chemist with Berkeley Lab's Materials Sciences Division and leading a team of scientists to do this: "The bacteria/inorganic-semiconductor hybrid artificial photosynthesis system we've created is self-replicating through the bio-precipitation of cadmium sulfide nanoparticles, which serve as the light harvester to sustain cellular metabolism. Demonstrating this cyborg ability to self-augment the functionality of biological systems through inorganic chemistry opens up the integration of biotic and abiotic components for the next generation of advanced solar-to-chemical conversion technologies" (Harris, L., 2016). If this is not the replication of life, it comes very close.

In the non-hydrocarbon-based arena, it seems that the above criteria for life may be fulfilled, as indicated by reference above to Zytgow, and Simon (1987). Much work is being done to validate this (Dzeroski1, Langley, and Todorovski, 2013, p.9). Too, computer programs can reproduce themselves (Self Replicating Computer Program, 2017; Turing, A., 1950, pp. 433–460), all this setting the stage for an independent thinking device.

If these criteria can be satisfied both in the hydrocarbon and non-hydrocarbon domains, where is that “crossover”. One may do another *Gedankenexperiment* and consider a human being progressively fitted with prosthetic devices so that all hydrocarbon-based parts of the body are replaced by non-hydrocarbon-based ones. In reality this has been and is being done now. For thousands of years there have been prosthetic devices, such as artificial toes and hands in ancient Egypt and Rome (Prosthetics, 2017). “All” that remains is the head with five sensory organs (eyes, ears, nose, upper dermis with its nerves, and tongue), and the brain. Natural organs, as in hearts, are well on the way of being replaced by artificial ones. Sections of the brain have been replaced for years, as in an artificial hippocampus (Graham-Rowe, D., 2003). Artificial neurons are being fabricated to comprise artificial neural networks as in language processing (Sassari, U., 2015). A network of artificial neurons learns to use human language) and in pattern recognition as discussed by Anne Condon (2011) (Department of Computer Science, University of British Columbia), thereby creating an elementary cyborg. Tantalizing research indicates that we are beginning to identify the genetic components of intelligence, as in “40 more ‘intelligence’ genes found” (Sniekers et al., 2017). Future research directions include, “achieving a ‘high-level’ communication and functional synergy between natural and artificial neuronal networks *in vivo*, will allow the development of a heterogeneous world of neurobiohybrids, which will include ‘living robots’ but will also embrace ‘intelligent’ neuroprostheses for augmentation of brain function” (Vassanelli, S., and Mahmud, M., 2016). As early as 2006 we find that research in self healing was well established (Bongard J., Zykov V, Lipson H. (2006). Still, there is something missing to what we think of as life anywhere near approaching to what is inside of us as humans.

MENTATION – WHAT “SAPIENS” MEANS - MIND, CONSCIOUSNESS, INTELLIGENCE, AND ALL THAT

Types and complexity of mentation

While the following excursion about “sapiens” appears to be mere quibbling and “off topic” (from the discussion of our capacity to avoid death from the Sixth Great extinction), it very much is relevant, as it focuses not only on an intelligence, but that which distinguishes in basic concept between being merely rational, intelligent, knowing, and so forth from wisdom. We will return to the distinction in some detail below. For now, we can return to the title of this article, “Philosophical foundations of the Death and Anti-Death” and focus on “philosophical”, which extends far beyond mere “knowing”. Surely, Plato and Aristotle were more than intelligent, knowing, or rational.

If karma was the case and we had a choice of returning to this planet, that is, continuing to “live”, it is doubtful that many would want to return in the form of a plant. Insects would not be preferred, nor any mammal less than a *homo sapiens sapiens*. The reason presumably is that which separates this sub-species from the rest, that second “*sapiens*”. This section places the word under a microscope.

Then, too, what will be regarded as “mentation” (“thinking”, all psychological processes, and even ethics) is what it is all about in whether this species continues in its present capacity or is able to adapt sufficiently to avoid dying as a species in the Sixth Great Extinction. Perhaps most important for the purposes of this paper is in focusing on what seems to be the characteristic that separates “life” from “non-life”. If there is to be any “anti-life” we need to know more about the composition of mentation.

“Mentation” refers to all effects that the brain produces as abstractions – intelligence, ethics, psychology, emotion, and so forth. We will see that there is a gradation, just as there is for the color spectrum. One may ask if the increasing complexity of entity that seems to be living, according to the criteria described earlier, makes it all the more “alive”.

To appreciate the ascending complexity levels of life, we may posit an “abstraction line” as in

Solid uniform particle → collection of differentiated solid particles → collection of differentiated solid particle with at least one component in motion → ...all components in motion → collection all components in motion but where one area is motion but there are no particles. → .collection only of areas in motion

Here, we regard motion not related to particle in the realm of the abstract, or mentation. This is to say that the complexity of mentation corresponds to the complexity of physical organization. At what point mentation enters is part of the debate about what life is. A plant – does it have mentation? Most consider it living. Also, all the factors making up a plant can be expressed by a computer.

In our reductionist (Cartesian) we come now to how to replicate what the brain produces. Mentation is a critical crossover point between self-directed animation never needing any human intervention and able to generate new and sophisticated mentation, and that requiring intervention. “Sophisticated” can be a very subjective word. Literature refers to the “Turing Test” (Turing, 1950), where an individual is placed behind one screen and a device apparently able to thinking on its own is behind another screen. The audience attempts to tell by the responses each of the human and the device gives to questions which is which. A more complicated version is the 3-D Turing Test, and beyond, perhaps n-dimensional tests.

To date (1 September 2017) humans with their mentation have not been replicated by non-hydrocarbon devices. One asks, then, where in the transition between a plant and humans is the “crossover” point that makes life what it is for us? A sobering aside is that with all the prosthetics and building cyborgs, there is missing a focus on awareness. In particular is the Glasgow Coma Scale (2017) as an example of awareness measurement or the Rancho Los Amigos Scale (2017).

Mentation, then, has a wide range of qualities. Mentation is part of the scientific definition of us as a special “living” thing. If we are to construct something that is “living” in the human sense, it would seem that we would have to incorporate minimally the following descriptions of mentation.

Intelligence-related mentation

A somewhat detailed explication mental processes follows, but one rightly may ask for the rationale. Why bring these details into a discussion of “life”? When we consider how to overcome death, anti-Death, we need to know what distinguishes us from animate things. This section outlines minimally what one has to impart to a device having human mentation. In addition, examining these mental processes helps assess our prospects for survivability. Most important, though, is for how humans may seriously and in a positive way affirm that “anti-death” is possible. Much more will be said about this later, though.

Without going into a lengthy discussion, suffice it to say that there is what we know little about, some words describing the problem being “consciousness”, “mind”, “thinking”, intelligence”, “emotion”, and so forth. We think we know the effects, as in intelligent quotient (IQ) tests, behavioral testing, and other inventories. A safer way of describing brain processes and to incorporate these words is “mentation”. Let's see why by a couple of examples. “Intelligence” for many decades was measured by various tests, such as the Stanford-Binet and Weschler survey instruments. These simply asked the test taker various questions about quantitative relations, symbolic construction, pattern recognition, and sequences. Questions arose about these being the only indications of “intelligence”. Then were the test conditions, themselves. Would a person perform differently at various points in times and under different circumstances? For example a test taker who was cold, hungry, or otherwise stressed may behave differently. Physical integrity, such as sensory organ compromise might affect results. A person with a depth perception problem might not be able to answer the questions correctly but be quite brilliant. Culture and upbringing also were factors, where persons might not be familiar with the environment within which questions are framed. Idiot savants, persons seemingly talented or brilliant in a special area, as in being able to play a piece of music after having heard it only once, or correctly identifying the day of the week of a specific date are examples. What of a person of average IQ as measured by these tests having outstanding musical talents? Then, IQ measurements can vary in an individual (IQ Reliability, 2017), as well as behavioral measurements. Questions like these lead Howard Gardner to identify seven intelligence areas (Theory of Multiple Intelligences 2017), best described by this extended quote:

Visual-Spatial - think in terms of physical space, as do architects and sailors. Very aware of their environments. They like to draw, do jigsaw puzzles, read maps, daydream. They can be taught through drawings, verbal and physical imagery. Tools include models, graphics, charts, photographs, drawings, 3-D modeling, video, videoconferencing, television, multimedia, texts with pictures/charts/graphs.

Bodily-kinesthetic - use the body effectively, like a dancer or a surgeon. Keen sense of body awareness. They like movement, making things, touching. They communicate well through body language and be taught through physical activity, hands-on learning, acting out, role playing. Tools include equipment and real objects.

Musical - show sensitivity to rhythm and sound. They love music, but they are also sensitive to sounds in their environments. They may study better with music in the background. They can be taught by turning lessons into lyrics, speaking rhythmically, tapping out time. Tools include musical instruments, music, radio, stereo, CD-ROM, multimedia.

Interpersonal - understanding, interacting with others. These students learn through interaction. They have many friends, empathy for others, street smarts. They can be taught through group activities, seminars, dialogues. Tools include the telephone, audio conferencing, time and attention from the instructor, video conferencing, writing, computer conferencing, E-mail.

Intrapersonal - understanding one's own interests, goals. These learners tend to shy away from others. They're in tune with their inner feelings; they have wisdom, intuition and motivation, as well as a strong will, confidence and opinions. They can be taught through independent study and introspection. Tools include books, creative materials, diaries, privacy and time. They are the most independent of the learners.

Linguistic - using words effectively. These learners have highly developed auditory skills and often think in words. They like reading, playing word games, making up poetry or stories. They can be taught by encouraging them to say and see words, read books together. Tools include computers, games, multimedia, books, tape recorders, and lecture.

Logical -Mathematical - reasoning, calculating. Think conceptually, abstractly and are able to see and

explore patterns and relationships. They like to experiment, solve puzzles, and ask cosmic questions. They can be taught through logic games, investigations, mysteries. They need to learn and form concepts before they can deal with details. (Gardner, 1993)

A revised list is:

- 1.1 Musical–rhythmic and harmonic
- 1.2 Visual–spatial
- 1.3 Verbal–linguistic
- 1.4 Logical–mathematical
- 1.5 Bodily–kinesthetic
- 1.6 Interpersonal
- 1.7 Intrapersonal
- 1.8 Naturalistic
- 1.9 Existential
- 1.10 Additional Intelligences. (Ibid.)

For Gardner “...an intelligence is a psychobiological potential to process information so as to solve problems or to fashion products that are valued in at least one cultural context. (Ibid.)”. Gardner refers to “...capacities, ranging from those based in the senses to those having to do with planning to such possibilities as sense of humor or sexual prowess” (Ibid.).

Gardner says, “In 1983, I concluded that seven candidate intelligences met the criteria sufficiently well: linguistic, logical-mathematical, musical, spatial, bodily- kinesthetic, interpersonal, and intrapersonal (Gardner 2004, p. 4). In 2004 he modified it to mean “an intelligence is a psychobiological potential to process information so as to solve problems or to fashion products that are valued in at least one cultural context” (Ibid., p. 3).

He correctly points out, “different capacities have evolved in specific environments for specific purposes” (Ibid., p. 6). He mentions, “argue, debate, look at data, critique experiments, execute works of art, and so on” (p. 12), among others. One may couple Gardner's “multiple intelligences” with the ability to think in a multi and cross-disciplinary manner. An insight into how intelligence tests extending past the standard ones is presented at www.criticalthinking.com, where some exercises in reflecting some of these multiple intelligences are described.

There are other models that suggest qualitative degrees of apprehension. For example, there is, paraphrasing Bloom's Taxonomy of Educational Objectives, cognitive areas ranging from knowledge of:

- 1.10 specifics
- 1.11 terminology
- 1.12 specific facts
- 1.20 ways and means of dealing with specifics
- 1.21 conventions
- 1.22 trends and sequences
- 1.23 classifications and categories
- 1.24 criteria
- 1.25 methodology
- 1.30 the universals and abstractions in a field
- 1.31 principles and generalizations
- 1.32 theories and structures (Bloom, et al., 1956)

Other aspects of Gardner's multiple intelligence deserve assessments as well, such as ethics, ability to think about one's physical environment, critical thinking, aesthetics, and so forth, as examples of individual intelligences. Too, there always is out front that idea of virtue, doing the best that one is able in following a high-road ethos, our core values that are the source of how we behave in life. These are all parts of “life”, at least the human variety.

This is all fine for intelligence, but we have said that intelligence may not be enough to sustain human life on Earth – at least as we know it. Often, the relationship of everything leading up to intelligence is expressed as “knowledge”, a topic discussed earlier. Knowledge is the result of our ability to find out, i.e., epistemology, the way we know, or technically and philosophic “justified belief”. If knowledge is not sufficient, what then? How does one distinguish between the two “sapiens”? The first is the knowing species, but the second places us more

apart from other primates up to and including the *Homo sapiens idaltu* .

There is a hierarchical taxonomy of how our senses and mentation process what is in our environment. Data is equivalent to unevaluated fact, such as numbers, images, symbols, and any other thing that stimulates the sense. Information is an arrangement of data according to some scheme. Knowledge is evaluated information, according to an epistemology, or way of knowing. Wisdom stems from an ethos, i.e., how one uses that knowledge. We see in the literature, the data, information, knowledge, wisdom pyramid (DIKW Pyramid, 2017).

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Figure 5. Data-Information-Knowledge-Wisdom Pyramid (Ibid.)

While this is not the place to enter into an analysis of the DIKW pyramid, one referring to it needs to be aware of the subjectivity of placing a phenomenon into one of the categories, as well as bias and the nature of the epistemologies involved. Often, there is a confabulation between “knowing and wisdom.

Recall the discussion above about the nature of the Universe originating from the Planck world, where those “particles” come and go from view and digital physics saying that the “building block” is information. Now, the DIKW pyramid and the foregoing detailed discussion have this context. The data consists of the bits, one's existence defined by the other, but the information comes from the assemblage. The assemblage assumes value-knowledge – and wisdom is perhaps the nature of the conscious Universe (Kafatos, M. and Nadeau, R., 1990).

We are climbing upward, narrowing what we accept into our cognitive domain, filtering our all those data points, relating them, and settling on what is useful to us, given our argued beliefs, argumentation that is an accounting for how we got to that point of acceptance. .What we do with these refinements results in the ultimate synthesis as “wisdom.

Spatiotemporality and the question of our autonomy

Winnowing out data ultimately to yield knowledge so one can be wise is shaped by another process that also may be regarded as “intelligence”. Science depends upon the ability to discern what was in the past, paying particular attention not only to the objects but what gave rise to them as natural processes, or laws. William Whewell , geologist in 1847, observed that in this way, the future resembles the past, and this has become the bulwark of all scientific methods. One looks at the stratigraphy in a road cut through a hill or mountain and realizes that what caused the layering sediments and changes in rock composition and formation are not only occurring at present but will continue into all time. A particular example of the ability to apprehend spatiotemporality in this

fashion is in the simple logical exercise of *modus ponens*. If event A occurs then event B will occur. A does occur; hence B does. This has been observed many times before and is now deemed as what the future will look like. The statement is made that event A indeed is happening. The person is asked, what s/he thinks now will happen. One is “reaching back” into the past, assessing contemporary events and needs to ascertain what will happen now that the first event A is going on. The inability to do this is a hallmark of insufficient mental capacity. So, too, a similar inability to apprehend the meaning of other logical relations (such as and, or, and double negation) indicates the incapacity to manage space-time complexity. One may note that spatiotemporal processing is another distinction between *homo sapiens sapiens* and the rest of the species. Here is how humans express it.

We think of ourselves in terms of our ego and how “independent” we are, how we have our own identity, or are autonomous in our own right. The ALFUS model represents a guidepost for assessing whether something is autonomous, apart from whom or what we are. Here is a curious departure point: what of the created entity that seems to be acting on its own? To bring Maturana and Varela back into the discussion, their “autopoietic” systems also had some source, although they do much hand waving in trying to convince us that these systems just happened on the scene. Let us, for a moment place ourselves in the position of the creator. We need a preliminary review of what the two most basic verbs of European languages express: “to be” and “to have”.

The first – to be - posits an individual; the second – to have - attributes to that individual various characteristics, or properties. In logic we have Px, the x, the individual noted by its P, properties, or characteristics. Analogously, the x is the particle; the P is the field. “To be” brings into our consciousness ontology, that which exists. Dialectically, though, identity is affirmed in terms of what is not, in this case, the characteristics. Neither can the individual or the characteristics exist alone. Corresponding to the individual is the verb “to be”. To the property, or characteristic, it is “to have”.

Here is a rendition of the following verb conjugation for “to be” that rarely, if ever appears:

	ACTIVE VOICE		PASSIVE VOICE	
PRESENT				
I	am	I	am been	
You	are	You	are been	
S/he, it	is	S/he, it	is been	
PAST				
I	was	I	was been	
You	were	You	were been	
S/he, it	was	S/he, it	was been	
FUTURE				
I	will be	I	will be been	
You	will be	You	will be been	
S/he, it	will be	S/he, it	will be been	
PRESENT				
I	have been	I	have been <u>been</u>	
You	have been	You	have been <u>been</u>	
S/he, it	has been	S/he, it	has been <u>been</u>	
PAST				
I	had been	I	had been <u>been</u>	
You	had been	You	had been <u>been</u>	
S/he, it	had been	S/he, it	had been <u>been</u>	
FUTURE				
I	will have been	I	will have been <u>been</u>	
You	will have been	You	will have been <u>been</u>	
S/he, it	will have been	S/he, it	will have been <u>been</u>	

Figure 6. Verb “to be” in 72 forms

It may come as a surprise to use the passive voice. How can one say to another “you are been”. Logically, however, this makes perfect sense, if we are to understand that tense expression permeates everything and completely in our Universe. Someone humorously put, how would a creator tell us about how we came about? Similarly, a person also could have been created in the past and be continuing in the same state, as in “I have been been for thirty some years, now.” Whole population equally can be so regarded, as in “we had been been”, as in a now deceased writer telling the world how s/he and her/his kind were created and existed for a period of time, as in “we had been been for twelve years before the catastrophe occurred and after which you, the reader may be now learning.” The term “incomplete” is correctly applied to current renditions of “to be” in that the passive voice,

describing one as not the originator of her/his own existence is not conjugated. The more central and sensitive question is “did one really create her/himself?” It deflates the ego to deny one’s own power of self-creation, although this idea, itself, is rather strange. The reality is that were, after all, created by our parents (most of us, at least. ☺). As we have just seen, though, the verb really is not incomplete. More explicitly, that existence is thrust upon the person from the outside, more crudely meaning that the person was created by another. An aside here is that Varela and Maturana offer a back door via “autopoiesis” to explain the dilemma, even though it really is vacuous.

The second verb “to have” is:

	ACTIVE VOICE		PASSIVE VOICE	
PRESENT				
I	have	I	am had	
You	have	You	are had	
S/he, it	has	S/he, it	is had	
PAST				
I	had	I	was had	
You	had	You	were had	
S/he, it	had	S/he, it	was had	
FUTURE				
I	will have	I	will be had	
You	will have	You	will be had	
S/he, it	will have	S/he, it	will be had	
PRESENT				
I	have had	I	have been had	
You	have had	You	have been had	
S/he, it	has had	S/he, it	has been had	
PAST				
I	had had	I	had been had	
You	had had	You	had been had	
S/he, it	had had	S/he, it	had been had	
FUTURE				
I	will have had	I	will have been had	
You	will have had	You	will have been had	
S/he, it	will have had	S/he, it	will have been had	

Figure 7. Verb “to have” in 72 forms

“To have” doesn’t pose that dilemma of autogeneration. For example, to say that a person has been had can assume one or two (among others) correct meanings. First, and in the ordinary sense, a person has been swindled, for example, is a common expression, “I have been had”. A second sense, although not often used, is that a person has been made, such as by behavioral condition or set up in business, or given an advantage by someone else. This is used in contradistinction to “self-made person”, where one’s status is achieved by individual effort.

As somewhat of a sidebar, we recall our ability to apprehend spatiotemporality in terms of extrapolating from the past to project to the future, the foundation for our ability to do scientific work. Might it be that these basic conjugations (and there are other forms, as in progressive tenses) be another way of assessing “intelligence”? One may ask also how this shapes “life” for us, compared to that the other animals. It is beyond the scope of this paper to describe the apparent inability of the species to meet that complexity successfully, but suffice it to say that it may be substantially argued that it is by no means certain that we will survive with current mental abilities.

Behavior (psychology)

Intelligence is not the only parameter that can be questioned in considering mentation. Behaviorism has long been a way of assessing psychological condition, the Diagnostic and Statistical Manual of Mental Disorders (DSM) being the “catalog” listing conditions exhibited by persons seemingly unable to adapt to social conditions. The International Classification of Diseases, Revision 10 (ICD-10) is the DSM counterpart created by the World Health Organization. Both biologically-based behavior, as well as behavior not having any apparent organic cause is

listed. Two problems emerge in using the DSM. First, the assessment by a professional is subjective. The client takes a test, such as the Minnesota Multiphasic Personality Inventory (MMPI) and based on the responses, the individual is determined to have a disorder or not. The diagnosis is not based on any other metrics, such as neurotransmitter level or brain activity as would be recorded by neuroimaging. A second problem is that the MMPI is given once. As with the IQ test the client may respond differently according to environmental conditions, as in being physically compromised or being in a tumultuous environment. Dynamic evaluation to account for changing circumstances is not normally done. In addition, if the person is professional and familiar with the DSM and MMPI (test effect), it is possible to foretell the outcome and alter the responses, as this author has done. If one wishes to be diagnosed as depressive, it really is not that difficult to identify and answer the depression-related questions accordingly.

Yet all of these are behavioral-oriented, assessing the effects of self-reports. There is no validation against a physical manifestation, let alone a measured one. Such a statement rests upon the assumption of that the behavior can be mapped to the physical state of the physical entity producing that behavior, i.e., the brain. The recordable presence of neuroanatomy is by neuroimaging, such as computed axial tomography (CAT), magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI) and positron emission tomography (PET).

There is a confidence in seeing a physical correlate to a non-material phenomenon, since the question naturally arises “what produces the effect?” A similar question may be asked about electromagnetic phenomena, waves, and mentation. It is not enough to observe electrons for what causes their movements. Descending to Planck scale raises even more questions, as we observe sub-atomic entities, “particles”, flick in and out of existence. Ocean waves may be produced by earthquakes, wind, temperature changes, or other movements of the Earth, but, again, Cartesian reductionism has observations reduced to Planck scale.

Again, we should be reminded that all of the foregoing is a part of human life, and some defines other nonhuman, as well. *Homo sapiens sapiens*, though, are the ones who now will determine the future of all life on Earth.

Other mentation

In continuing to identify the quality of human life by types of mentation, one considers, especially in light of Gardner's multiple intelligences other area, like ethics. It is sufficient to remark at this point that an impetus driving the Sixth Great Extinction is the ethics stemming from the core values, or ethos. If humans are not biologically equipped to adapt to their environment by introspecting and changing their core values, they will be little different than other species. Different here, though, is the potential for this species to change the environment, much of that potential having been realized destructively.

Given what we have said about multiple intelligences, the Gaussian, or bell curve of intelligence exists for each area, and, there is a composite, as well. Humans, like other species, have been evolving, and it is assumed that they will continue to do so. One may consider that in continuous evolution, at least some characteristics of one species elide into the next and higher species. Even with bursts of change, such as in punctuated evolution (Punctuated Equilibrium, 2017), there seems to be this ever increasing ascent in complexity of mentation. For example, abstraction abilities present in *homo sapiens sapiens* are not present in apes. This all goes say that there may be types of mentation not scientifically documented in our subspecies now but might occur in the future, such as precognition, psychokinesis, telepathy., and so forth. With animals research needs to occur in their communicative abilities, where they may be more acutely aware of physical cues, like body language, sound –based communication (as intonation, volume, frequency, and so forth), features that humans may not either have or use effectively. We need to be open to other types of mentation. In our considerations of consciousness, ideas, and the more abstract areas of mentation, one views, perhaps not unlike radio transmissions from earlier periods still traveling in space, the consciousness of persons we regard as deceased. Spatiotemporality may be one of those dimensional limitations of our mentation but transcendent once the physical vessel – the brain – decomposes. Here is coupled the need for scientific research into reported experiences, some even by neuroanatomists (Stang, D., 2014) into phenomena such as out-of-body experiences.

Aside from the mentation discussed previously there are other human conditions that raise questions about its nature. For example, we need to know more about synesthesia, “sleep paralysis” (hypnagogia), hypnosis, dreaming, and mentation under anesthetic. It may be that Sheldrake is correct in that consciousness is independent of the brain, as whatever it is that causes electrons to move, our being to know that movement only by their effects.

(Sheldrake, R., 2017). Electromagnetic waves are like this, their effects detectable by meters. Towards a Science of Consciousness (2017) (a conference this author helped form) after a quarter of a century still has not been able to unambiguously identify what consciousness really is.

Mentation also includes factors that we experience but have not been able to measure, such as “intuition”. Paul Feyerabend (1993) in his *Against Method* argues that in the ultimate analysis there really is no method. Many scientific discoveries, such as the Benzene Ring by Kekulé came from his having an image of a hoop snake eating its tail. As somewhat of a trivial example, this author for “mindless” diversion frequently plays cards on his computers and finds out that he paces through a sequence of successful moves not really having any detailed forethought in placing the cards, other than being aware of what general options are available and how to use them. The same applies to logic proofs. In logic, in particular, there is no algorithm for telling one how to do a proof. This famous Church's Theorem (2017), as well as Gödel's (Gödel, 1931/1992) incompleteness theorem (1931/1992) indicates a lacuna in our understanding of consciousnesses. We can tell that a proof or card game has been done correctly by the outcome but not give any algorithm for making that outcome successful. The same can be said for any deductive operation, as a game surely is an example. All the rules are there, the “playing field”, definitions, axioms, and so forth. We know it is a deductive situation, as the premises embrace entirely the outcome, the “proof” being the audit trail of steps one used to go from the beginning to the end. Assuming that all of these aspects of mentation could be identified there is the question of the figurative Frankenstein activating a device so that it lives.

REMAKING OURSELVES – TRANSHUMANISM

The simple part

Cryonics is the freezing of humans, all or in part, so as to revive them at a future date when technology has advanced sufficiently. Life extension focuses on reversing the aging process such as by supplements, hormone “therapy”, lifestyle modification, and organ replacement. Other than these two techniques for avoiding permanent “death”, there are efforts either to change humans in their present form or going beyond that with making humans in their present form as a “super human” both physically and in mentation, i.e., “transhumanism”. Transhumanism (2017), literally and etymologically means “across humanism”, “From Latin *trāns* (“across, on the far side, beyond”)” (Trans, 2017). Beyond being human implies non-physically corporal, or non-hydrocarbon-based. Only the imagination is the limit, and it is not inconceivable that an artificial consciousness may advance the idea beyond what we may conceive.



Figure 8. *Towards transhumanism – prosthetic toe (circa 1550-1000 BC) found in Sheikh 'Abd el-Qurna (Mummies' Fake Toes, 2007)*

Perforce, humans are defective. They wear out, i.e., get sick and “die”. They have vestigial and necessary parts, like tonsils, toenails, fingernails, and even hair. Each is an additional and potential source of infection and maintenance. It may be said that teeth and intestines are paradigms of poor design. Stepping back from a more deeply philosophical perspective, one may ask about why such a construction came about in the first place? In the overall picture of how the whole Universe evolved is the argument made by English ethologist, evolutionary biologist Richard Dawkins in his book *The Blind Watchmaker* that humans could be a statistical probability. String out a series of objects or projects and there will be some assemblage that results in our world. At the other end of this spectrum are the Creationists who argue that there is an intelligent creator. As we have observed, humans do not seem to be the best that there could be. The transhumanists are showing why this is the case. At the threshold are humans coupling their knowledge with the technology produced by science to continue mentation.

Discussed above was the *Gedankenexperiment*, or thought exercise successfully replacing human parts with artificial ones. Remain is the brain, and work is being done in two areas, the first by replacing parts of it (recall the artificial hippocampus and an example) and constructing an artificial brain, also discussed above. The mechanical aspect of transhumanism is comparatively simple to the mentation, not only with respect to identifying what it is but how this should be done.

The mentation problem

Earlier we discussed “life” in terms of what persons would like to see perpetual in themselves, at least to avoid the *angst*, or anxiety of what the post-“life” experience might be like. It is doubtful that most persons have in mind “life” as a plant or species below that of *homo sapiens sapiens*. We have divided the world into the “physical”, or “material” and the world of the “mental”, or that of “ideas”. Again, the quotes are used, as it is doubtful whether either really exists, given our excursions into the Planck-scale world. One can consider the following.

What if we could construct a device nano “particle” by nano “particle”, each mapped to the same sized area of the human brain, in essence, an artificial clone?. The substrate does not have to be hydrocarbon-based. The question is if this entity would assume human mentation? That is, does structure, itself contain a consciousness? Here, one speaks of the problems associated with recreating the brain or building an artificial a brain, analogous to a prosthesis or an artificial organ or.

Examples of projects are:

- Riken Brain Science Institute (Riken, 2017).
- IBM SyNAPSE (2015).
- Research Domain Criteria – U.S. National Institutes of Mental Health - correlating mental states with neuroimaging and genetics (RDOC, 2017)
- Human Brain Project (Human Brain Project, 2017)
- Project on the Decade of the Brain (Brain Project, 2017)

In context one may consider the relatively short time span since the ENIAC (2017) computer of 1946, with its 17,468 vacuum tubes. Ray Kurzweil (2011) has argued, “Within a quarter century, nonbiological intelligence will match the range and subtlety of human intelligence. It will then soar past it because of the continuing acceleration of information-based technologies, as well as the ability of machines to instantly share their knowledge”.

The Intelligence Advanced Research Projects Agency (IARPA) has major research afoot in attempting to understand human mentation, as in machine learning, modeling the human senses, attention, memory, and decision making, theories explaining how the human brain represents conceptual knowledge, neural imaging methods, predicting an individual’s job performance, and face recognition. IARPA is soliciting proposals, such as in:

- Logic, human judgment, critical thinking, forecasting, machine learning
- Bioinformatics, DNA sequence screening, functional genomics, systems biology, infectious disease, and synthetic biology
- Technical emergence, text analytics, knowledge discovery, big data, social network analysis, natural language processing, forecasting, machine learning
- Forecasting, human judgment, machine learning, decision making, human/machine interfaces, text analysis
- Knowledge discovery, brain, neuroscience, artificial intelligence, cognitive bias, judgment, decision making, behavioral science, human factors, training, tradecraft, data sense-making, linguistics, language, semantics, culture
- Natural language processing, machine translation, cross-lingual information retrieval, domain recognition and adaptation, multilingual ontologies, Multilingual speech recognition, cross-lingual summarization, keyword search algorithms, low resource languages, automatic language identification, machine learning, rapid adaptation to new languages, domains and genres
- Behavioral science, cognitive psychology, human performance, mobile computing, context sensing, signal processing, data fusion, machine learning, data privacy and security

- Cognition, psychometrics, fluid reasoning and intelligence, neuroscience, human performance. (IARPA, 2017).
- All of this research in mentation, there is doubt, represented by neuroscientists such as Christopher Koch (Koch, 2013), typically represented as “And even the lowly roundworm *Caenorhabditis elegans*, a creature no bigger than the letter l and with exactly 302 nerve cells, is for now beyond the ability of computational neuroscience to comprehend. ... Functional human brain imaging has yet to affect standard medical practice (the upcoming fifth edition of the Diagnostic and Statistical Manual of Mental Disorders does not even mention any functional magnetic resonance imaging diagnostic criteria)” (Koch, 2013). Yet, it is deterministic and logically fallacious (*argumentum ad ignorantiam*) to say that even simple mentation is “beyond the ability of computational neuroscience to comprehend”, again, being reminded of ENIAC. On the other hand, it is a minimally clear that we need to know much more about the “life” humans seek to extend and which needs to be included in any advanced mentative entity, such as an artificial human.

- ***Autonomy in a transhumanistic world***

A main but not exclusive distinction between life and that which is inert is movement, the same entity that seems to be the substratum of Aristotle. Yet, dialectics affirms that there is an opposite. Without doing the thorough research to identify the degree of peer acceptance, it is nevertheless valuable to advance and explore the implication of Daniel Canarutto (2011) of the Department of Applied Mathematics, Università degli Studi di Firenze. In “Nature’s software”, Canarutto argues “nature is fundamentally discrete”, where there are only “quantum particles”. The two prevailing views are “fields” and “particles”. The most fundamental element of the Universe is fields; “particles” are the effects (as in angular momentum) of them. “Particles” are what really exists, and the continuum in between (fields) is a convenient tool to describe their relationships. In neither is there an identification of what a field or particle really are in terms of Cartesian reductionism, but a philosophical stance one may perhaps at least see an analogy: field is to energy as particle is to matter, or field is to mental as particle is to physical. Dialectics does not take this approach but sees that both are two sides of the same coin. Movement (field) is in terms of particle (stasis), and vice versa. One overcomes the either-or dichotomy and apprehends the unity of both by a transcendent framework of thinking. The phrase “unity of opposites” assumes a quantum-cosmological meaning. Recall the discussion of the infinitesimal in terms of the infinite, and this is the world in between in which we find ourselves. The Universe is what emerges from the quantum-cosmological dialectic.

Canarutto arrives at a startling conclusion that is worth quoting in its entirety, literally because of its gravity of importance:

Imagine a very powerful computer, where a simulation of some virtual world was implemented from basic entities. Certain rules of behaviour (call them “physical laws”) have been assigned to these entities (“elementary particles”). Eventually the simulation grows so complex that intelligent beings are born in this world, and begin to wonder about the ultimate nature of it. How far can they reach in their quest? They could be so smart as to guess the “physical laws”, namely to understand the software of the simulation; but the knowledge of the hardware and of the programmer will be forever unattainable for them (unless the programmer decides to insert some special communication). (Canarutto, 2011, p. 6)

The “physical laws” are very similar to Feynman's (Feynman, 2001) *Character of Physical Law* which is not only an assignment of a concept to a phenomenon but inherent processes, exemplified by the angular momentum as an effect of a “particle”. The “particle” might be the code, the laws the functions. Analogizing and more broadly to logic, the “particles” are the definitions, axioms, variables, and so forth, the “laws” being the rules, or how the “particles” relate to each other. Computer programs essentially are a type of deductive logic, where we can account for how we arrive at the outcome (result, conclusion, etc.) by inspecting the preceding steps, the initial “set-up” of the proof being based on the “particles”.

Frank Tipler (1994) in his *Physics of Immortality* argues that it may be possible to transfer human mentation into digital form and contained by an artificial device – digital immortality, a step beyond artificial mentation. Immortality depends upon the ability of building those devices. It gets interesting to speculate upon the ability to alter that transferred mentation.

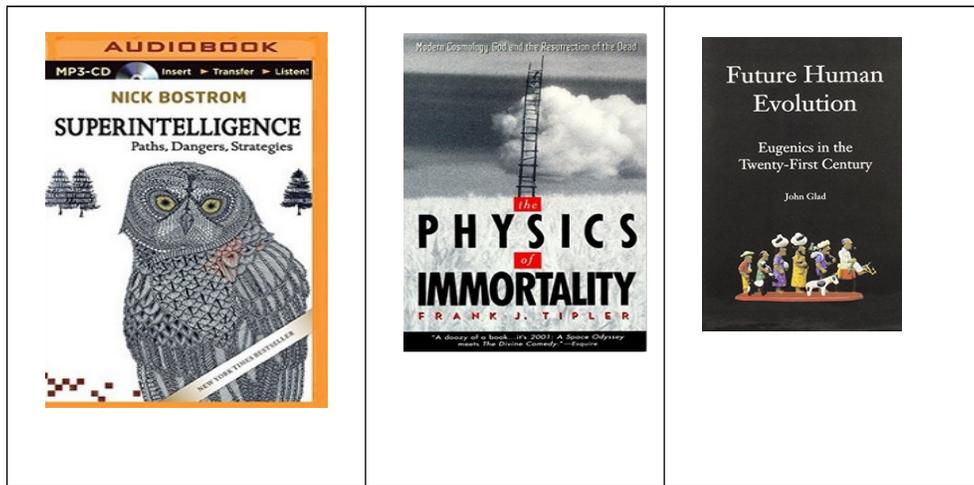


Figure 9. Remaking ourselves

There is a more startling similarity to Nick Bostrom's (2003) speculation that “we are almost certainly living in a computer simulation.” He is more explicit about the possible origin of the simulation, an origin not too much different than that proposed by Tipler in his *The Physics of Immortality*, where humans ultimately may be able to digitize their minds and transfer the digits to non-hydrocarbon devices. Bostrom says,

Then it could be the case that the vast majority of minds like ours do not belong to the original race but rather to people simulated by the advanced descendants of an original race. It is then possible to argue that, if this were the case, we would be rational to think that we are likely among the simulated minds rather than among the original biological ones. (Ibid., p. 1)

As an aside, the popular 1999 movie, “The Matrix” posits the same idea of humans being a simulation.

Tipler and Bostrom reflect in a very similar way an outcome of transhumanism, the next phase past prosthetic devices. Are transhumanism, simulations, and existence being imposed on humans outside our ability to express these things directly in our communications? Indeed, we have in our verb conjugation forms described above the very structure to describe a Canarutto/Bostrom condition. Language does account not only for these possible worlds, as well as how “objects” such as we are animated.

One may ask about the difference between artificial and natural mentation, or even if there would be any difference, especially if humans were able to create an artificially intelligent device, transferred human mentation to a device, and ultimately “mate” the two.

Eugenics and transhumanism

Above, reference was made to the discovery of 40 genes related to intelligence (XXX). It then is not inconceivable that intelligence (as with other physical aspects now being genetically modified) can be engineered, as well.

A major revulsion to eugenics is because the horrible “medical” experiments and euthanasia under the Nationalist Socialist regime in Germany. However, John Glad (2008; 2017), professor of Russian studies at the University of Maryland, and writer about Nazi atrocities says, that there already is implicit in society to select the best humans, as in university admissions, civil service jobs, and granting licenses. Right now, “A post-human or even a non-human evolutionary path to intelligence – as opposed to a general uplifting of the whole population – therefore appears more and more likely” (Glad, 2008, p. 84). Therefore, a general or widespread programme needs to be ongoing to avoid this. In the past simply false ideas about race, genetics, and ethnicity, stemming from mere prejudice (pre-judgment without evidence) have been responsible for millions of deaths on this planet. Then, even if we did know the precise genetic make-up of the best qualities in a human, there has not been sufficient research to predict accurately how a modification will appear in future generations, although we very well may be on the verge of this. Another argument is from those of whether we should breed for the best, as in who determines what “best” is. A sidebar and practical observation is from Huxley’s *Brave New World*, as well as the social need for work to be done that otherwise cannot be done by automation. There are those also who see nothing wrong or it being desirable to have a variety of individuals with differing abilities, a view that seems to draw more upon

subjective aesthetics than practicality.

HOW WE MAY CONCLUDE IF REMAKING OURSELVES FAILS

Of course, so much still is unknown about “life”, and just a list the possible research areas would be longer than this paper. There are some words that can be said if such research does not yield a way of perpetuating humanity, either in the short term with respect to meeting the Sixth Great Extinction successfully or the long term if that challenge is met. Our whole conceptual framework needs reshaping if we are to learn about “life”. There are so many contradictions and paradoxes in our world, but these are conceived as such as long as we are dimensionally bound.

Our environment speaks the language we are to use in expressing what life is. What exists does so because of what it is not, as in:

- Future – past
- Stasis - movement (Parmenides – Heraclitus)
- Deduction (closed) – Induction (open)
- Bounded – unbounded
- Infinitesimal - infinite
- Order – Entropy (random)
- autopoiesis – autodestruction
- Particle - wave
- Property – individual.

How does the unity of opposites (2017) - well known since classical Greek times - translate into something we can understand? An Oriental answer is mediation. Another approach is necessary. The way we regard existence (ontology) through dialectics will shape how we view life. In between the dialectic extremes is what exists. It is not a thing itself that is real but the dialectic process that make it real. The future exists because of the past, but that “boundary” is more elusive than ever, physicists questioning whether time even exists (American Physical Society, 2017). Given what we know the “present” seems to be dynamic in and of itself. For the order – entropy range, for sure the Universe is “in between” the singularity that was maximum order and what awaits us as “heat death”, or maximum disorder, randomness, or entropy (Heat Death of the Universe, 2017). The contradiction between the randomness (maximum disorder, or entropy) upon which scientists rely to obtain as many different samples as possible (maximum order) disappears with the unity of opposites (Horne, 2017). The particle-wave duality not only describes the relationship between Plato's reality and illusion but our very selves. Immanuel Kant in his *Critique of Pure Reason* (Kant, 1787/1929, pp. 266, et seq.) discussed reality as the totality of existence of something from the past and into the future. We see it only in one of its moments, but this moment, of course, does not describe the whole thing in its entire existence. These successive “snapshots” of something by themselves are illusory, shadows on Plato's cave wall, statistical samples of the whole. In a quantum-cosmological way, it is the open or inductive world of the infinite statistically described in terms of the infinitesimal closed deductive world. It is the deductive description of the infinitesimal within the framework of the infinite. Does this not remind the quantum physicist of the dilemma of discerning whether a wave or particle is reality? The wave is the universe for the particle, and the particle is a sample of the wave. Kant would be right at home here. Again, it is the dialectic of one existing because of the other. To think of the particle only is an illusion, as well as the wave. Paradoxes like this really are not paradoxes at all if we apprehend the unity of opposites. So, too, we are individuals only with properties, the individual being a “particle”, the properties the “wave”. These particles are the “material”; the wave is the “abstract”. Yet, neither can exist without the other.

To define “life” would be illusory without observing its complement “death”. The quotes are removed with the unity of opposites. The process is just as much a part of the object as the object, itself. Shifting to this level of consciousness may be Abbot's *Flatland* approach to shifting from a three-dimensional view of the world (as in Newton's absolute space) to the fourth dimension. It is this dialectic that is likened to another dimension, as the fourth dimension of space-time was realized as an addition to the traditional three of Newton. It was that fourth dimension introduced that dialectic, with space being the accommodation for particle, and time the field, or

movement. After all to produce “time”, whether it is real or not, one has to have displacement.

An nth dimension characterized by the dialectic may be the “next” one beyond our contemporary fourth and to our ability to apprehend being the problem of induction (Hume, 2015; Mill, 1843; Russell, 1919). Is it so outrageous to speculate that “death” not only is illusory but may be dimensionally bound, the next for us?

Our perceptions are so bound by the nature of space-time, as well, something this author refers to as “perceptual lag”. As soon as we see any objects outside of Earth, such as the sun, an amount of time has elapsed. In the sun's case it is eight minutes. This is similar to the problem of measuring position and momentum. Momentum (p) of mass (m), (“particle”) depends upon velocity (v) ($m=mv$). One always is measuring either in the “past”. The lesson here is in innate processes that manifest themselves differently, as in this case the “uncertainty principle” and problems of knowing the “present” of something. Carrying the logic further there is a commutable perceptual lag for any distance, including that between sub-atomic particles. By the time one entity is aware of the condition of a proximate entity that awareness is in the past. Each entity may experience an event, but the “awareness” of each by the other involves that lag. From a distance, however, the events are simultaneous.

So, whither humanity, life, and all that? Dialectics is a law unto itself, and our existence is passing within that dialectic but also will embrace us at our demise. Our being is defined by our property, and property defines our being. Humans are fascinated with their own ego, but, like the perturbations in space-time, this ego is transitory, a momentary bubble in the quantum-cosmological soup that is the dialectic of the Universe.

Let's do that exercise in reflexivity again. In between the mirror and the one viewing lies the answer to life (and the character of mentation).

*So from spontaneity that's unique,
Replete with the Buddha's perfections,
Are all sentient beings born, and in it come to rest
But it is neither concrete nor abstract. (Saraha, 2017)*

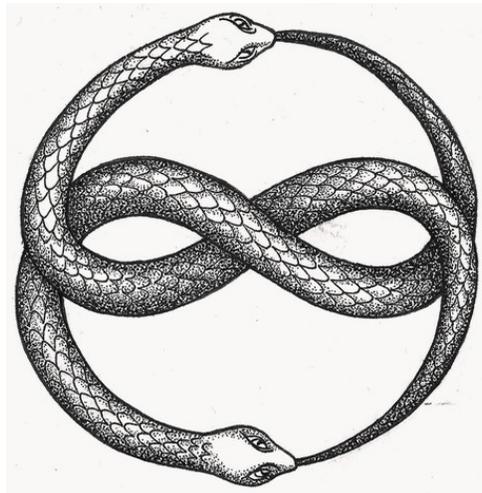


Figure 10. *Our world and the answers for us: (Ouroboros-egypt, 2017)*

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Note on sources

A final word should be said here about sources – their quality and their uses. Throughout at particular places, when the author thinks the reader should have more background on a less familiar concept, background information has been referenced through sources like Wikipedia, the Stanford Encyclopedia of Philosophy, and the On-Line Etymology Dictionary.

Academics criticize using Wikipedia as a source, and a number proscribe it for the students in class (e.g.: <https://integrity.mit.edu/handbook/citing-your-sources/citing-electronic-sources>). However, while a number of articles are of questionable value, so we can say about a lot of presumably peer-reviewed research. Often, there will be an admonishment that the article is only a “stub” or incompletely referenced. The reader, as would any competent researcher, should do two things. First, read the content of what is being said to become acquainted with the ideas being discussed. Wikipedia's standards are readily accessible (https://en.wikipedia.org/wiki/Wikipedia:Editor_integrity). Then, one consults the Wikipedia sources to get familiar with the topic, albeit thinking critically about the assertions. Chances are that the more scientific and technical, the more accurate it is, especially in mathematics. Articles I political thinking or those about controversial issues are more problematic. One should advance to the references, treating each on as any scholar would. An excellent discussion is contained in the research advice given to the University of Michigan student community (<http://www-personal.umich.edu/~sdcamp/up540/writingtips.html>).

In addition, the *Online Etymology Dictionary* has been used many times, but it, too provides sources, and in many cases is a much more comprehensive treatment of a word than found in most dictionaries. There are no apologies here. As a final note, a number of classical works are free of copyright and can be downloaded usually in PDF form. The Internet Archive (<https://archive.org/>) and Project Gutenberg (www.gutenberg.org) are excellent sources.