

The theory of the essence of life, (self) awareness and intelligence

Dr Grzegorz Hoppe, 20.12.2017

One of humanity's longest quests has been the search for life beyond our planet, and yet we are a self-centered and self-righteous species, believing ourselves to be extraordinary.

Everything that exists in the universe consists of matter and energy which are equivalent to each other ($E=\pm mc^2$). Furthermore, it should be assumed that the universe itself, that is, without the effects of change in it caused by any life forms, is deterministic¹ (although this assumption is not necessary, as will be indicated).

What, or who, are humans? Matter and energy, joined together in the right way. If it was possible for us to do (technically), we could record everyone mathematically as appropriately-arranged matter and energy.

So let's start with the right definitions.

***Life** can be defined any arbitrary arrangement of matter and energy, which creates a specific, limited whole, featuring the possibility of non-deterministic² movement in the space of its system.*

***Conscious (self-aware) life** can be defined as any form of life endowed (equipped) with the possibility of conscious non-deterministic action, i.e. the possibility to make an informed choice in a probabilistic situation. Self-awareness is a feature of conscious beings, and involves realizing that one exists.*

***Intelligent life** can be defined as self-aware life, which makes conscious decisions about choices of behaviour when it finds itself in a state of discomfort (a non-optimal state) and*

¹ I am of the opinion that this is an absolute truth, which I can prove. However, as I pointed out, this condition is unnecessary, so there is no reason to give proof of the determinism of the universe here.

² At this point, we have a logical problem assuming the determinism of the universe itself, in that if the opposite were true, that is, if the world was probabilistic, life would not have a possible reference point of its own motion, so we would not be able to distinguish it from something that is not life.

acts in order to gain benefits and/or pleasure. We can call this form of intelligent life hedonistic intelligence.

Logical intelligent life is a name that we can give to beings that in each of their actions are guided by formal logic, by which they achieve self-awareness of the fact that their altruistic activities contribute to increasing the achievement of their hedonistic needs.

Higher life forms certainly exist; however, I believe that we do not know them (because humanity belongs to the second from last definition), so there is no point involving ourselves with this matter, especially since each subsequent life form must have features of the previous one.

In the light of the above definitions, let's check where life should exist:

1. Life can arise anywhere in the universe where matter and energy are found, so almost everywhere;
2. Conscious life can arise in an environment where it can move around in space and where probabilistic events can occur. Because the universe is in itself deterministic, such life can exist only where the life form can probabilistically change its surroundings. So, everywhere in the universe matter and energy exist, with material and energetic surroundings;
3. Self-conscious life also needs the opportunity to become aware of its own existence. To do this, it is also necessary for this conscious life to have the senses needed for such an act of self-awareness. Such a sense is the ability to pick up electromagnetic waves (at any frequency) by means of which it will be able to have conscious life, and to realize its own existence. Our current state of knowledge allows us to assume that such a life form can only exist on planets similar to ours, but this is an unverified assumption, so we should assume that it is possible on any material object in the universe;
4. Intelligent life requires an additional condition, which is that discomfort may exist for such a being and that it may be felt by that being. Thus, such a being would have to possess senses. We need a minimum of senses to measure the amount of energy in our environment (e.g. ambient temperature). Such a being would also have to be able to change its uncomfortable (suboptimal) position in space, and level out (change) its own internal discomfort. A further situation is required in which the being has the opportunity to gain benefits and / or enjoyment.

Unfortunately, we personally cannot define every possible pleasure and benefit for intelligent life defined in this way. For this reason, let's assume that our current boundary conditions for the search for terrestrial planets are correct. If we take into account, however, that our life form uses senses that pick up only the specific fre-

quencies of electromagnetic waves in the ranges known to us ((3.75 - 7.5) x10¹⁴ Hz (vision) and 20 - 20,000 Hz (hearing)), and then we compare it to all common electromagnetic waves (103 Hz - 1021 Hz), this is 3.75:10.000.000 = 0.000000375, which means that we only make use of (our senses in) 0.000000375 % of existing electromagnetic waves. However, it should be assumed that there are intelligent life forms that can communicate with any frequency of electromagnetic waves (because we have no logical reasons to think differently).

Based on this logical thought structure, we can determine the probabilities of occurrence of certain life forms in the universe with similar senses to us, i.e. they use the same electromagnetic waves to communicate with their surroundings:

1. Life – everywhere, is a certainty,
2. Conscious life – the number of material objects in the universe multiplied by 0.000000375 %, i.e. it can be said this is a certainty,
3. Self-aware life – the number of planets in existence multiplied by 0.000000375 %, i.e. it can be said this is a certainty,
4. Intelligent life (like our planet) – the number of Earth-like planets multiplied by 0.000000375 %, which is also a near certainty.

Life is a common phenomenon in the universe and intelligent life, with which we can communicate, is a near certainty.