International Conference – Environment at a Crossroads: SMART approaches for a sustainable future

Evolutionism. Logic, Language and Thought. On the "miraculous" order of the world

Alexandru Anghelescu*

University of Bucharest, Mihail Kogălniceanu nr. 36-46, sector 5, Bucharest

Abstract

Do other earthly forms of life evolved to the level of intelligent life? Cancer and resistance to antibiotics obliged to ask this question. Signs of intelligence are found at its simplest levels. We try to see if logic is *used* at these levels. Peter of Spain's *suppositio materialis* is applied to the chemical signals of cells. Dynamic Logic is used to understand these chemical communications. <System of communications> is used, instead of "language". The development of life appears as the development of an axiomatic system. The rights of unborn humans and God's rights over His own creation appear as the most powerful arguments for conservationism.

1. Introduction

This paper develops the 2013 paper on evolutionism - Evolutionism. Some logical-epistemological puzzles [1]. The so called Paradox of identity (in its soft version) would point to a kind of holistic logic, where the relations between intension and extension are described by different logically valid schemes.

The fallacy of misplaced knowledge shows that "strategy" comes after the intension-extension relations are established, as strategy presupposed the intension-extension duo. A strategy presupposes the part of reality it allows us to manipulate.

––––––––

* Corresponding author.
  E-mail address: angelealex@yahoo.com

As for the instrument, we noticed that once criteria(s) is/are used to choose between competing instruments, criteria(s) encrypt knowledge. All these make the tabula rasa of empirists a quite difficult affair. If tabula rasa would go to humans or to amoeba it makes no difference for its existence.

As life seems to have evolved from simple to more complex forms, it is of interest if signs of intelligence are present at some of the simplest levels of life that we can access today. The search will also focus on cells, with the belief that simplicity might give us a hint of what life was in the beginnings.

On 30th of March 1952, Einstein wrote to Solovine on the "miraculous" order of the world [2]: "You find it strange that I consider the comprehensibility of the world (to the extent we are authorized to speak of such a comprehensibility) as a miracle or as an eternal mystery. Well, *a priori* one should expect a chaotic world which cannot be grasped by the mind in any way. One could (yes *one should*) expect the world to be subject to law only to the extent that we order it through our intelligence. Ordering of this kind would be like the alphabetical ordering of words of a language. By contrast, the kind of order created by Newton's theory of gravitation, for instance, is wholly different. Even if the axioms of the theory are proposed by man, the success of such a project presupposes a high degree of ordering of the objective world, and this cannot be expected *a priori*. That's the "miracle" which is being constantly reinforced as our knowledge expands".

The MW', of Anghelescu and Rozylowicz [1] exploited these lines as an imaginary region of space where none of our knowledge can be applied and where the process of knowledge should start again, form zero.

Einstein's "miracle" might be explained in these terms: if life started some billion years ago on this Earth [3] that we have and if we are the result of this process (where knowledge is encrypted into any seed of life that there is) then our own being is a Holy Grail of knowledge where outside and inside are one and Einstein meets Plato's innate Ideas. Socrate's "know yourself" and Lao Zi "without going out of the window you can know the world-under-the-heaven" are some of the oldest expressions of this idea [4].

Each being on this Earth discovered at least a part of the order of this world: it is that knowledge which allows that being to exist and send s/his existence into the future.

"Nature" and, mostly, "instinct" were the beloved children of evolutionism. Humans had reason (or intelligence or the sort of), non humans had a mysterious "instinct" present within and with the actions of "nature". Decades of research sent this "instinct" into the paper basket. Two facts triggered this silenced revolution: cancer and resistance to antibiotics.

2. Logic

Using Logic and meditating on Logic might come together or not. If we do not break the barrier of language we can not know if non humans meditate on logic or not. As long as we do not break this barrier all that we can say is if logic is *used* or not.

In Anghelescu and Rozylowicz [1] I showed that the know-how and know-that distinction must be understood in a different way. The common idea that the "know" - that is a sign of humanity - might prove to be false. Not only that the distinction has its limits, but it may be that it doesn't even hold in some cases.

The evidence gathered till now [5] amounts to the conclusion that some parts of that that we humans call Logic are used by non humans. Dolphins use the intension-extension distinction and logically valid schemes; if our reality is one-sense (eye) constructed, it does not follow that a many-sense or not one-sense (eye) constructed reality cannot "lead" to logically valid schemes.

Would the holists (e.g., Quine) meet the innateists (e.g., Chomsky): knowledge (be it language and /or logic) come together like the words in a dictionary, but it develops some inborn "structures"? Would we have to introduce another element into our analysis to cope with Einstein's expanding knowledge?

The vaccine-virus puzzle [1] shows that the main issue at stake here is: <what "know" is?>. For, if my organism knows the ways of defence, but I don't (and that's the puzzle), would we have to say that the organism knows-that, but I , the author of these lines, don't ?

On the platonic scheme of body-mind (soma-nous), logic would go to the nous/mind/intellect and it is innate. Is this knowledge of the organism innate? What would innate be, now? Or is it a know-how? Or, to better put it, the distinction does not even work here and some new concepts are needed to explain the vaccine-virus puzzle? I would rather go for the last option.

Another obvious choice was to use some notions from Dynamic Logic [6, 7], meant to deal with computer programs: first do X then do Y, repeat X a finite number of times, do α followed by β, do α or β non –

deterministically, proceed A if is true, else fail, etc.; if a chemical reaction "translates" a program to be executed, language, logic and thought might be one (in this realm, at least).

This logical tool may be developed into another one (with noticeable presence in the Arabic Logic (via Chinese): temporal quantifications over relevant performing.

Note with T a certain moment in time, take an event E, which happens (or "is performed") during a certain period of time, say: from T 22 to T 47. Note this as T22…T47. The E has a range of possibility, in the sense that it can happen only within a T with a certain LENGHT. Call it the domain D of the possible range of the event. Note this D. Put after T22…T47 graphic signs to mark the D, such as in T 22…T47 [T 13….T 191].

T 22…T 47[T13…T191] would be an existential temporal quantification, if you think that the range of the event could be as long as the whole D (D, which in this case is [T 13….T 191]).

T13…T191 [T 13…T191] would be a universal temporal quantification, for the range of E covers all the D.

A temporal quantification determines the truth of the entire formula which comes after it.

Add modals now, as: possible, impossible, necessary, at least.

When you put the arrow, take it to stay for [if p than necessarily q]. This is different than [if p than q]. Write it as: (p →│ │q) as you differentiate it from (p → q).

Write the "if x does y from T2 to T77, then x can do z" as T2…T 77 [T1…T 90] p →│ │◊ q).

You can get a negation in front of the temporal quantification to mark that 'if p is not performed during a relevant D, than q becomes an impossibility for that that performs p'.

¬(T1…Tn [T1…Tn] p) →│ │¬◊q

Get a sign to mark that p is performed, for it can be performed at the irrelevant moment. Write the p in bold, such as **p.** If you write ¬ (T1…Tn [T1…Tn] p), it means that' p is not performed at all of [T1…Tn]';if you write ¬(T1…Tm [T1…Tn] **p)** , it means that 'p is performed, but at an irrelevant moment for [T1…Tn]'. If you write [T1…Tn] p, it means that p is not performed at all, as related to any temporal sequence.

If you write ¬ (T 2…T 7 [T 1…T11] p), it means that 'p is not performed at the sequence T 2…T 7 of [T 1…T11]'. If you write ¬ (T 2…T 7 [T 1…T 11] **p)**, it means that 'p is performed at the [T1…T11], except the sequence T2…T7'.

You can get modals in front of it to express "it is possible that", "it necessary that"," it is necessary that it is possible", and the like. Example: ◊ (¬ (T2…T7 [T 1…T 11] **p)),** which means: 'it is possible that p is performed at [T 1…T 11], except the sequence from T2 to T 7'. That is different from ◊ (¬ (T2…T7 [T1…T11] p), which means: 'it is possible that p is not performed at the sequence T2…T7 of [T1….T11]'.

You will get a sentence as:" if he wants to know Christ before the year 20 A.D., than it is impossible that he can know him", or "if she tries to explain the Trinity before the year a.d.0, it is impossible that she can do it". For the last one, take "she tries to explain the Trinity" as p and "she explains the Trinity" as q, and you get a ¬◊ (¬(T 1…Tn [T 1…Tn] **p)** → │ │◊q), which it is taken down to saying that p is performed at an irrelevant moment.

'To perform at relevant moment' means 'to perform it at a moment that can bring the consequent'. Let's work with [if I say to her now (now that she loves me):" I love you" then she will also tell me:" I love you":] or [if I ask her now (now that she wants to marry me): "do you want to marry me?" then she will say: "yes, I do want to marry you"].

What can help us is the double relevance of temporal quantification. The way it is better to write the formulas is from the right to the left. For, first you have to see if p is or is not performed at all or if it is an (ir) relevant performing. Here, you use the truth table of the strong disjunction. You make a choice, and then you pass to one of the strong disjunction.

You get:

not performed at all, as [T1…Tn] p

performed at a relevant moment of [T1…Tn], as T1…Tn [T1….Tn]**p**

performed at an irrelevant moment of [T1…Tn], as ¬ (T1….Tn [T1…Tn] **p)** or better say: (T1…Tn) ((T1…Tn))**p)**, where the **p,** informs you of the fact that the performing takes place at an irrelevant moment ; you can introduce the 3rd value here: you do not know if the performing is relevant or irrelevant, and note "possible **p**" in case you believe that it is closed to relevant performing, "possible **p**", if you believe that it is closed to irrelevant performing, and "possible **p** w **p**", if you do not know anything at al about the relevance or irrelevance of performing. Here you can chose the 3 valued logic you consider to be the, say, best, or you can choose simpler symbols, for the 3rd value, differentiating even between unknown and unknowable.

P might have no moments of relevance at all. Say: he loves her and he asks her to marry him all of his life. But she never falls in love with him and she does not agree to marry him. In this case we will get: ¬(T15….T56 [T15….T56] **p)**→□q

P might have a moment of relevance in D, so if it is performed at all the length of D, q will realize.

Say: he loves her, and all of his life he asks her to marry him. One day she fals in love with him so that she agrees to marry him. In this example the supposition is that one accepts to marry someone only in case of love. We know that this is not always the case. We get a:T15…T56 [T15….T56]**p**→q

We encounter the situation when p is not performed at all, while it is relevant on the entire D.

She always loves him, but he never asks her to marry him.

First note availability, then performance

P can be available only on one section of D. That is: she sometimes loves him.

1) if performed on that section, it can realize.

2) if performed on another section of D, it does not realize.

3) if performed on all sections, it can realize.

4) if not performed at all, it will not realize P can be available on the entire D. That is: she always loves him.

5) if performed on any of the sections of D , it will realize.

6) if not performed at all, it will not realize.

7) if performed on all sections, it realizes on all sections

8) if performed on some sections, it can realize. 1,1/2 =1; P can be unavailable on the entire D. That is: she never loves him.

9) if performed on any section of D, it will not realize

10) if not performed, it will not realize .

11) if performed on some sections of Dm it will not realize.

12) if not performed on some sections, it will not realize

Ethically and logically (5) and (6) have different consequences.

We notice that the idea of availability is the most important, as it determines the chances of p to realize. Cell's communications may be best modeled by/with this tool.

3. Language

That there are many theories on the market for the uniqueness / superiority / etcetera of the human languages vs. non-human languages (in case the second's existence is accepted) it is obvious; but if I cannot understand English I cannot pass "beauty judgment" on the qualitative differences between X or Y.

To change the angle: if an Alien encounters for the first time a trace of a human language s/he might believe that A: (rolisteneanerenertilteaniskorrazeadomeantilezviitaminerazilta) and B: (autetiamautnonautsciletassumendofalsumautnonsillogizandoealsiealnowv) and C:(nazcanairobicairoathensnewdelhishandongun) belong to the same language.

Since ancient times it was obvious that content judgments on any L are possible if at least a part of L is interpreted. All we can do is to "translate" the sounds we hear on a scale of intensity of sound, etcetera (more or less what we do to the "songs" of whales). Then, it is a well-established fact that meanings are , in part, culturally determined, where this culture is further understood in terms of social groups, rules and customs of social groups, etc. When it comes to non-human speakers we may not know the history of theirs "cultures", so we face the risk of not grasping a historically constructed meaning of an item.

For practical reason I abandon the term "language" (so that such talk as: language is this or that, when is fact one speaks of different things using the same succession of letters (: l-a-n-g-u-a-g-e) is avoided) and use "system of communications", not entering into topics of intentionality of utterances and the sort related. Such system has repetitive items. The same item is used to express the same "thought".

For a long time, Peter of Spain's jargon [8] was an obvious choice; His *suppositio personalis confusa* (Summulae Logicale 6.9) solved the puzzle of the Trinity (as the Kneals suspected long ago [9]), via *noesis noeseos noesis* , a predicate predicated of itself (the supposit is taken as a predicate); today, he could be of good help again. Peter of Spain put the "material" form of a language under the heading *suppositio materialis*, which can be put down to its chemical from; in this way the chemical signals (as they were named) of cells may enter into our analysis. At

the end of the day we know that all human languages can be pined down to a chemical form and it might be the variation of the form that gave the feeling of uniqueness.

4. Thought

Problem solving abilities was and still is one of the most powerful signs for the presence of thinking. Examples are many for large mammals [10]. What was puzzling was that even amoeboid organisms solve problems. An amoeboid organism can solve a maze problem [11], "solve the U-shaped trap problem" [12], anticipate future events [13].

It was a kind of a fashion to refuse the ideas of a computer program or/and of a thinking organism when dealing with simpler-then-humans-beings. So, (we were advised) resistance to antibiotics must not be explained by the idea that a/some bacteria(s) is/are thinking, nor by the idea that a/some bacteria(s) is/are like a computer program which knows all (or most or the most important) alternatives of attack-defense. We cannot answer today if non organic matter can or cannot assemble (itself?) into organic matter in such a way as to act as a computer program. Inability to chose X or Y does not equal non X (or non Y).

El-Halfawy and Valvano [14] speak of knowledge transmitted from high-level resistant to antibiotics cells to less resistant cells, using the expression "universal language" of bacteria for theirs chemical communications. So, resistance to antibiotics can be tackled, according to them, by blocking the lines of communications between these cells.

5. Conclusions

The love for axiomatic systems, showed during the last century, already found a place here (dynamic axiomaticism): those first seeds of life, carriers of knowledge, are like the elements of an axiom in an axiomatic system, which developed during the millennia.

Well formed formulas go to forms of life, etcetera. So that, indeed, Darwin is a Hegel without "know/ledge". We may never be able to test such an idea (as we can do with < the behaviour of radio waves is or is not influenced by the behaviour of heat and /or light particles >).

At an ethical level the most powerful arguments for conservationism are (among the many presented):

 - on the legal track: the next generations have the right (notice: the right) to receive the Earth we received; unborn humans have the same rights as living humans (Plato)

- on the religious track: if God made the Earth and let the seeds of life he would not be very pleased to see His creation destroyed.

For centuries, humans looked for the true Ethics. Unfortunately, conservationism become that one.

Acknowledgments

References

1.   Anghelescu A and Rozylowicz L. Evolutionism. Some logical-epistemological puzzles. *Comunicari de Geografie*. 2013.
2.   Einstein A. *Letters to Solovine: 1906-1955*. New York: Philosophical Library, 1987.
3.   Mojzsis SJ, Arrhenius G, McKeegan K, Harrison T, Nutman A and Friend C. Evidence for life on Earth before 3,800 million years ago. *Nature*. 1996: 55-9.
4.   Lao Zi. The Book on Tao. In: Shi J, (ed.). *Selected readings from famous Chinese philosophers*. Beijing: People's University of China Press, 1988.
5.   Schusterman R, Thomas JA and Wood FG. Dolphin Cognition and Behavior: A Comparative Approach *Comparative Cognition and Neuroscience Series*. New Jersey: Psychology Press, 2013.
6.   Troquard N and Balbiani P. Propositional Dynamic Logic. The Stanford Encyclopedia of Philosophy (Spring 2015 Edition). available at: http://plato.stanford.edu/archives/spr2015/entries/logic-dynamic. In: Zalta EN, (ed.). 2015.
7.   Drucker T. Perspectives on the History of Mathematical Logic. Boston, Basel, Berlin; Birkhäuser1991.
8.   Dinneen FP. *Peter of Spain: language in dispute. An English translation of Peter of Spain's Tractatus called afterwards Summulae*

Logicales. Amsterdam. Philadephia: John Benjamins Publishing Company, 1990.

9.   Kneale WC and Kneale M. *The development of logic*. Oxford University Press, 1962.

10. Dunbar RI and Shultz S. Evolution in the social brain. *Science*. 2007; 317: 1344-7.

11. Nakagaki T, Kobayashi R, Nishiura Y and Ueda T. Obtaining multiple separate food sources: behavioural intelligence in the Physarum plasmodium. *Proceedings of the Royal Society of London B: Biological Sciences*. 2004; 271: 2305-10.

12. Reid CR, Latty T, Dussutour A and Beekman M. Slime mold uses an externalized spatial "memory" to navigate in complex environments. *Proceedings of the National Academy of Sciences*. 2012; 109: 17490-4.

13. Saigusa T, Tero A, Nakagaki T and Kuramoto Y. Amoebae anticipate periodic events. *Physical Review Letters*. 2008; 100: 018101.

14. El-Halfawy OM and Valvano MA. Chemical communication of antibiotic resistance by a highly resistant subpopulation of bacterial cells. *PloS One*. 2013; 8: e68874.