

ON THE MARGINS OF M. BENETATOU'S PAPER¹: SEVERAL NOTES

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ABSTRACT. *We find that both learnings (of Plato and Aristotle) about ideas, beyond the existing differences (knowledge as memory, etc.), have abundantly testified about the possibility of knowledge the world in logos (in number, form, etc.), it as an objective reality, while emphasizing final causes and the understanding that form (he morphe) instigates substance (he hyle) to convert potentialities it contains into actualities, Aristotle has insofar complemented learning about knowledge, in general, by that about a subjective experience of things and beings that are learned. Giving in a sense right to Sophists too (Protagoras: "Man is the measure of all things"), and not only to Socrates: "Knowledge as necessary and general", and what in the last century has been anew reconfirmed in philosophy (phenomenology, existentialism), psychology (psychoanalysis), literature and others.*

We believe after that programming languages and programs in informatics now could largely be used for it, but that one reaches up to true (ethical) problems when we have to rethink as individual, as group (global) objectives, in a world governing rather by the laws of evolution: the struggle for survival, adaptation of individual to conditions of environment and the like.

KEYWORDS: *eidos, one, many, for what, subjective, program*

1. Plato: Timaeus

When Biocosmology claims to be "the world view as ideology and science" [9], in our opinion, such a thoughtful viewpoint can find basic elements for its founding in Plato's *Timaeus* (*Critias*, *Laws*, *Republic*), as in Aristotle's work *On the soul* – and not only in them. The point is to be fruitful in the balance, from one end to the other of the mind, and especially - is there at all a method of investigation as conducive to such an (universal) purpose?

The basis for it is of course, according to Plato, that what is rational (*he noeton*) there is forever, although visible (*ta horata*) and sensory things (*ta aestheta*) are perishable. For like eternal, mental movement is by nature cyclical (circular, spiral), and as such can be recognized in all creations of the mind: starting from dialogue, through tragedy, to Socratic idea of an ideal state, of Critias myth of Atlantis and ancient Athens, or Timaeus learning on the nature of cosmos and man [*Timaeus* 38 a]. And since the Hellenistic world view is to be a living organism – at its micro and

¹ It is about the paper: *Does Plato outline a mathematical-reductionist model of the physical world? The creation of the world in the Timaeus and Aristotle's criticism in De anima.*

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macro level – the body and the soul that make it are now subordinated to the mentioned cosmic mind. Further by following the myth of the origin of the world in *Timaeus*, the mind, as a demiurge, having created a "work by nature fairest and best" [*Timaeus* 38 b], did by it the matter of the universe so far dispersed to be organized and chaotic motion to be transformed in harmonious one, the creator should put after the "intelligence in soul, and soul in body" [*ibid*]. The cosmic soul is therefore an expedient organization of the matter of universe, and what would be the case too with "all life processes on all levels of organization (biological, ecological, anthropological ...)" [9]

Otherwise, Socrates in *Philebus* [91 d] argues that the soul must be something more than harmony of body parts, as it would be more reasonable an image of the world as a living organism, conceiving and developing from seed and differentiating from it. Plato explains it in *Timaeus* too [*Timaeus* 35 a], when he takes as seeds of cosmic life *the same (to tauton)* and *the different (to heteron)*, as germs in the soul, and whose second name is *the one (to hen)* and *many (ta polla)* [*Philebus* 14 c], otherwise, opposed to each other. Now those principles should provide a series of (particular) properties of real things: like identity of individual souls, their diversity, and recognition on the basis of these differences, etc. The very differentiation of the world soul to an overall diversity in the real world, takes place also "lawfully", for the demiurge had separated first large parts of being out of it, according to a geometric progression, and the middle parts – by the arithmetic and harmonic progression afterwards.

Both times it is, therefore, a view of the world as an arranged whole, made in the image of living organisms, that know the highest interdependence of their parts and a lawful development. As what *Timaeus* says further in his story, goes in favor of the same. For instance, the center of the soul is on the Earth, which is, in turn, in the center of the universe, the soul corresponds to the number one, which is of a round form (as the universe) and principle of other numbers, etc., so that the creator would finally "bring the two together, and unite them centre to centre." [*Timaeus* 36 d - e] Hence, all that is visible and material in the world will bring on itself the ideal too (*to eidon, he idea*), as virtual one, what could be discovered by the effort of the mind, by following Empedocles' principle: "The same (similar) is reached by the same (similar)". The same ideal makes also the whole architectonics of the world – as an arithmetic, geometric, or anatomical structure – and which all is "shown" in the visible world, making it intelligible. Since it is a single, uniform and perceptually observable world, while the intellectual order is present in it as far as it serves as a paradigm, pattern and model of it. By those words *Timaeus* ends his story too in this work: "We may now say that our discourse about the nature of the universe has an end. The world has received animals, mortal and immortal, and is fulfilled with them, and has become a visible animal containing the visible – the sensible God who is the image of the intellectual, the greatest, best, fairest, most perfect – the one only-begotten heaven." [*Timaeus* 92 c]

It remains, however, that the "same" ideas bring now both (inanimate) things and (living) beings, since they do one (and the same) geometric-arithmetic skeleton

of being, although the inanimate matter is separated by a qualitative leap from a living one – things of living beings. For the world of living beings is always different and new one, while the ideal skeleton is given once and for all, as sterile and the same, so Plato, in *Timaeus*, the creation of all other leaves to gods lower than the supreme creator, etc. At that important place, as it is known, Aristotle will (essentially) diverge from his teacher too, earmarking this time to ideas of the mind to instigate things and beings in which they are contained consecutively to attain all forms given potentially in them. And what is, of course, closer to the diversity of earthly life and so on.

Let us say something about the matter, as a mother "recipient" of things and beings, from this work of Plato, to point out in so far to those "atoms" of everything, as the smallest number of them. It is, precisely, on the right triangles (isosceles and unequal), to which he is brought by an analysis of planar, as well as of spatial bodies and forms – and not to points without dimensions – so that in the macro-world he would stop on five (forms) of polyhedra, also composed of right triangles. These are: tetrahedron, octahedron, icosahedron, hexahedron (cube) and dodecahedron, which are, as tiny, invisible (except the dodecahedron), and which, as such, allow forms to each of four ancient praelementa: earth, water, fire and air too. The earth is namely in the form of a cube, water in the form of icosahedron, fire – of the tetrahedron, and the air – of octahedron etc.

But by completing the creation of the world, as a regulated order of things and beings, as mortal, and immortal, the creator, says Timaeus, did not shape by the end the mortal beings, men. It was done by titans, lower gods, so that human nature has in itself as immortal, intellectual soul, as mortal, sensual. The latter is being loaded by instincts, passions, what is the path to evil, but it remains that (the cosmic) intellectual soul can to bring into human nature the order and harmony.

2. Aristotle: On the soul

Aristotle brought the knowledge on the soul to a closest relationship with the somatic knowledge (those on the body), denying that the soul moves, that it moves by itself, or by a circular motion³. Because, he says, it would be said that "the soul is grieved, rejoices, is confident and afraid, and again is angry, perceives, and thinks", and "one might conclude from this that the soul itself is moved", although it can be said "that such a motion is only caused by the soul (e.g. that being angry and being afraid consist in the heart's being moved in a particular way; ...)". And instead of saying: "soul pities", "soul learns", "soul thinks", ... it would be surely better to say: "the man does these with his soul". [*On the soul*, I 4, 408].

Then, when it denies the view of auto-mobility of the soul (Xenocrates), or of its materiality (Democritus), Aristotle will say, in the first case, if the soul were "the number putting in motion itself", then it would be part of the space etc., and if it were tangible, in the second case, then two bodies would be in the same place, what can not be allowed. Finally, when trying to refute the view that soul follows in knowing

³ Nor, say, it enters living creatures, driven by the wind, as in the orphic poems and the like.

the principle according to which "similar is learned by similar", he concludes that if the soul is composed of the same elements as body, it would not be able to embrace in the knowledge all their properties and mutual relations too, which are of a different nature and far beyond their number. For instance: the being appears to us as substance, as quantity, as quality ... and if the soul contains only elements of substance, how it learns other genera of beings, who are not substance, etc.

Similarly, Aristotle speaks on the mind too, which is, in itself, something divine, and equally depends on the condition of the body – when it weakens, it perish too, and when the body fails, it disappears too – so what it reaches in conclusion is that "the soul is *the entelechy* of the body", as that *for what* the body is. Because, according to him, otherwise, everything that exists in the nature: body, plants, animals ... exists "for something". So the living bodies acquire their essence by the soul, as well as all movements (changes) of bodies are conceived *in* it, and realized *for* it, while it occurs as mentioned "purpose" of a body too, as its "final cause".

Otherwise, when he wanted to compare four types of causes by relevance, Aristotle has found that the highest place belongs just to the final cause, because it appears as a *cause* of overall changes, and their *purpose*. It illustrates, for instance, the citation: "So also no hand of bronze or wood or constituted in any but the appropriate way can possibly be a hand in more than name. For like a physician in a painting, or like a flute in a sculpture, in spite of its name it will be unable to do the office which that name implies". [*Parts of animals* 640 a] And in the same way, the formal cause of a thing is "higher" than the material one etc. Besides by performing our mental states from motions (changes) in the body, Aristotle has attributed to the doctrine of the soul (psychology) the character of a science, although too complex phenomenon of the soul (life) eluded to a more accurate determination. As, after all, the learning of hylomorphism has brought an amalgam of substance (*he hyle*) and form (*he morphe*), of materials and ideas, as well as, implicitly, one speaks about the relation of correspondence – of originals and copies – of two worlds in Plato's teaching about ideas.

Differently, say, from Descartes' dualism of substances, where nothing in the sphere of thought is of the order of extension and *vice versa*. So, if in Plato, and in Aristotle, do fail a precise definition of concepts as: the idea, the soul, a living being, essence and the like – they have remained to be it until today! – or if both Plato and Aristotle, along the length of their works, somehow differed from their earlier views about the same, as, after all, nor their teachings were fully complete and consistent systems et al., there is no doubt that they both bring fruitful incarnations of those basic principles, from the very beginning of philosophical thought: "The world is one" (Thales), or "One and all" (Xenophon) etc.

Both Plato and Aristotle, therefore – and not only they – explain the image of an – to the maximum extent – ordered world, which allows (equally rational) approaches to the knowledge and where from the same perspective one looks at the generation and corruption of the living and inanimate nature etc., so that it would fit them rather any holistic (this time: Biocosmological) standpoint, than any reductionist (objective, empirical, physical, mathematical, etc.) representation. For instance, the objective

knowledge of some tree is "lower" than an image about it supplemented with a subjective experience of the landscape to which it belongs, etc. Insofar Aristotle's words "for what", from his formulation of *causa finalis*, delve deeper and more truly into being of the world, as well as into us, the individuals which learn it. Giving somewhat the right to Sophists (Protagoras: "Man is the measure of all things"), and what in the last century has been anew reconfirmed in philosophy (phenomenology, existentialism), psychology (psychoanalysis), literature and others.

Then, when the idea of Biocosmology takes this very moment in Aristotle as the essential one, it is certainly because it comprehensively and convincingly expresses one point of view, albeit its "traces" can be found in Plato, in Thales⁴, in Anaximenes⁵ etc. In addition, here is offered a triadic model (with a fourfold causality) [8], which – explicitly – we do not meet either in Plato or in Aristotle, etc., so that, in general, Plato's "mathematism" does not resist to Aristotle's "organicism", but more than anything it could help it. And we have seen that both learnings are essentially intertwined, so that the two aforementioned marks, are rather conditional. And as the "theory of ideas" (Plato) historically preceded the learning of "hylomorphism" (Aristotle), it can be said that the first learning is in the lobby of the second one, in so far, in our opinion, both times, "arithmetic", "geometric", "logical", ... still have great power to go down into the phenomenon of the living and to bring on the truth about it. Even if a deep gulf separates the living from inanimate matter, especially living things from those governed by consciousness, as we have said.

3. The cases of set theory, of Turing's machines and programming languages

First, when it is about the ancient principles of "Love and Hate" (Heraclitus), "the same and different" (Plato), "one and many" (Parmenides), etc., as otherwise opposites, irreducible to each other, they are, in a formal way, by mathematics and informatics abundantly "upgraded" till today. We have in mind the concepts of "element" (one) and "set" (many) in set theory, or the state "0" (same) and "1" (different), in informatics. Namely, the concepts of elements, of sets and of operations over them, have proved to be appropriate in those terms to be reconstructed all existing mathematical theories, and one finds that the same-similar structure reveals all inanimate and living nature too [Chapouthier, 2009], and not only mathematical entities. Moreover, one of them – category theory – has the power to "replace" all others, while a particular variant of it – topos theory – meets application in most different "intuitive" domains [Caramello, 2010]. Let us add that the founder of the theory of set Georg Cantor succeeded, in the manner of transfinite numbers, (precisely) to define the notion itself of (actual) infinity, which now gives a way of a relief structure, made up of different levels of them and so on. All this certainly influenced French philosopher Alain Badiou to declare that "mathematics is ontology".

⁴ "The world is animated ..." (D. Laertius 11 a 3).

⁵ "Just as our soul, being air, holds us together, so do breath and air encompass the whole world." (Diels B 2).

In the second case, from the very beginning in the mathematics-philosophy – doing it for centuries until today – a few concepts, such as: number (Pythagoras), logos (Heraclitus), idea (Plato), entelechy (Aristotle), intuition, evidence (Euclid), etc..., "alternatively" emphasized their own advantage in the founding of sciences, as the last and irresolvable entities. But, for example, the intuition proved elusive in the case of the fifth postulate of Euclid, as well as nor the number (the formal, logical) succeeded to "reach" (all) true propositions in the (intuitive) mathematics (Gödel), nor to do to be consistent, etc. Thus failed the ability mathematics to be reduced to logic, the intuitive to the formal-logic, and what was the impossibility, in general, number, logic, formal, ... to express the whole truth about the reality.

However, in the last century comes Turing, who finds that what evades numbers, axioms, formalism is by character, just geometrical – like place, position, status, etc. – and what he brings into his definition of "Turing machine". It will thus allow, precisely, an accurate definition of the notion of computability, now expressed in such terms as: moves, stops, right, left, stamps, ... and in this concept mathematics (as science of idealities) and physics (as science of space) anew obtain the starting unity. (As it is known, physics, which was based in so far on Euclidean geometry, when it is shown that the fifth postulate is independent of other axioms, has "resorted" to the geometry of Lobachevsky, which in turn will properly express Einstein's theory of curved space-time.) Turing machines are most directly reflected, precisely, in the construction of programming languages and of compiling of *programs* (software and hardware) in the informatics today, which otherwise testify on enormous possibilities of applications in different areas. The notion of "program" has included, therefore, both arithmetic and geometric, logical, formal, ... that we have mentioned, expressing a special advantage in processing of a large amount of data. In the basis of the so-called "artificial intelligence" (Turing) are also included programs and so on.

So, in short, achieved an overall idea of "computability" so far, to which was tending throughout history, when thousands of languages were grammaticized (modeled after the Greek original) and where the natural sciences postulated legality, determinism, mechanicism, ... There is no doubt, however, that programming languages and programs can be of a supreme benefit in the sciences, equally in those humanitarian, and that they can contribute to the clarification itself of the concept of life, of living being, of consciousness. Because, even if they are extremely complex phenomena (with hundreds of definitions so far), it is interesting, say, that there are such programs [Ray, 1991], which generate artifacts ("digital beings") able to replicate and mutate in an arbitrary way, mimicking, therefore, the laws of evolution. Here we recognize their generation and corruption (life and death), as well as some properties of organic life we know, and moreover "parasites" who survive at the expense of other beings. Or the attempts such "beings" to create "immunity" and to protect themselves, and even to parasite themselves on parasites, ... while isolated, they try to work together and to complete each other, what is a form of relation between the sexes, or relationship in the community of people and so on.

No doubt, all it tells primarily about the unity of the world, of its inorganic and organic "part", which obey to the same, or similar – and certainly "readable" *for us*, if not *in itself* – laws of nature, even if it is about different degrees of their complexity.

So mathematism along with experience, experiments, ... has the power to express to a higher degree the truth about the organic world (artificial intelligence projects, the construction of human brain etc.), such as those of inorganic one, so there is no principal difference between the learning subject, on the one hand, and an (inorganic) thing in itself and an organism, on the other. Because they are both – the object and the living entity – unknowable to the end, just as any natural law is not absolutely undeniable truth, forever, and what can be said about any truth of the organic world.

It remains, finally, that a (large) area of man's subjective relationship with the world, things and beings that surround him, which – even if it is unique – when it has to be expressed, it may be "constructed", at least at the schematic level, of (possible) real elements that make it. Whatever they would be by nature: unconscious ("The unconscious is structured like a language", Lacan would say), educational, social, and so on. Programs, softwares, therefore, have the power to go behind the area of "taste" and to express the optimal "solutions" for the individual, and the objectives he/she chooses, and what he/she could not realize through any formula, analysis, forecast, ... until now.

Thus it is possible to "populate" the world, from its micro to macro-level, by both personal, particular, and general objectives – of individuals, social groups, nations – and which do offer optimum chance to be realized, but to true problems leads "disagreement" of the nature, of the world which follow the laws of evolution in the development and any of "ethical matrices", which, otherwise, are always based on the principles of reason. And since the imperatives of the "struggle for survival", of the "adaptation to the environment", etc., at least in principle are opposed to a harmonious survival of people within the natural and social environment. Therefore, the biocosmological project would acquire the more sense, if more optimal possibilities of living would be rethought in as much as wider areas: local, social, geographic, ... – in accordance with the pristine principles of humanity.

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