WHAT IS ARISTOTELIAN LOGIC MISSING?
IDENTITY AND LOGICAL DIFFERENTIALS. (OTHERNESS)

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ABSTRACT. With this text I try to open a gate toward the acceptance of Logical Differentials, of a logic in which a law of The Otherness prevails over the laws of Identity, of Non-Contradiction and Excluded Middle. In other words this logic of Identity, Non-Contradiction and Excluded Middle will be functional under some limits. Under those conditions we may exclude ambiguity because we humans need logic.

This would mean that identity, this necessary law of logic, would leave space for a possible diversity, would leave space for another (the other). This means we need to introduce in logic limits of thinking, limits that mean negative judgment (diverse negative judgments), which will be able to describe, delineate a certain Universe of Discourse, different Universes of Discourse, in which identity, non-contradiction, and the excluded middle can be local laws, if I may express myself this way. In other words, identity, non-contradiction and the excluded middle should have the same function they currently have in mathematical logic, in the logics that were built on the Aristotelian pattern, and function limited by a Universe of Discourse.

Of course, it will be possible to also take steps opposite to differentiation. These logical differentials will be able to be integrated together, if needed, under the umbrella of a more comprehensive Universe of Discourse. Covering these paths will allow us to always be able to understand a thought which can be individualized or which can retreat down the corridor or a larger or smaller generality. I repeat all these possible paths will be able to offer us the understanding of the malleability and diversity of our thinking lead by the need for an existent which surrounds us.

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KEYWORDS: Logical Differentials, Identity, Non-Contradiction, Excluded Middle, local laws, otherness.

Discussion About Identity

When we open our eyes, when we are born, what is, I wonder, the most important moment in our animal behavior? An umbilical cord no longer ties us to our mother. Still, with all our senses, smell, hearing, touch, taste, even that weak eyesight, we know who mother is. Without any sort of mistake, we identify her, we sense her. Maybe our blood, which was connected to hers, has its own significance.

The same happens to all babies who are born, in the viviparous world, of course. But in ducklings, in little chicks, something similar takes place. The chicks who come out of eggs attach themselves without mistake to the being that is next to them at that moment. Most of the time this is their own mother, who laid the eggs. The chick follows her around in order to be fed, to live.

Mother Nature made it such that all babies recognize their own mothers in the same way that mothers recognize their own babies, without mistake. It is a biological law which, even if we don't completely understand how it takes place, is unshakeable. Why? Because otherwise we wouldn't exist. A baby must be taken care of, must be fed, washed – cleaned and watched until it learns to avoid danger on its own. A biological organism in development is fragile, and that's why it needs to be protected, taken care of. Thus nature gave us identity, because what else does it mean to recognize that a person is the same? It is a constant identification of an object, that is a being, and who is one's own mother, one's own baby. Except it's not all so simple.

Nature uses identification for the perpetuation of species. Without this identification, performed each time, Earth would have been filled only with plants and insects (living beings that do not need special care from their parents). This is how a biological need imposed a behavior that humans called the identification of the same, then *identity*, and which humans again, later considered a law of correct thinking, the logical law of *identity*. Here they took, I hope with your will, a rather large jump from an ontological identity to a logical one.

Of course, there is a long road from the need of some reptiles, birds, or viviparous animals to what man, who started thinking, named

identity. This seems to always be the case; a need, a necessity, day and night, a constant revolution of certain planets or the sun, gave man the idea of time; a certain chemical reaction, a relation between cosmic particles, ended up being deciphered by the humans who had started to think, and organized into sciences and scientific laws. This is how identity came to man's mind, identity to which, as we saw, he had been tied for a long time without being conscious of it.

Here we need an explanation, a clarification. We know today that the whole world is very well organized and that scientific laws, all known laws, to which we can add some that we don't know yet, the laws of correct thinking, the laws of physics, of chemistry, all laws, everything, represent a need of our mind. Of course there are regularities in nature, like the sun rising every day, but we needed, and still need, for everything to be well organized by our mind. To easily find, by looking in a dictionary or a scientific treaty this regularity which for us has become something fixed. We wouldn't be able to move easily in a world going through constant change, as it happens when we follow a car driving on a road with valleys and hills, or if we wanted to know how a thrown stone travels, how we move our arm, or the trajectory these bodies make, or what happens in the world of microparticles. This is what happens in contemporary physics, in which it is impossible to say something exactly about the behavior of a particle, the laws of quantum mechanics being the only ones that can tell us something about the behavior of particle swarms. Newton and Leibniz taught us how to describe exactly the movement of a certain body, be it a planet, a car, or our arm.

Our mind needs a certain stability in order to think, a false stability, because we cannot find it anywhere in nature, sometimes not even approximately.

Let's leave these thorny problems in the hands of men of science and let's see what happens with our mind and how it reached some laws which it calls logical, and last but not least how correct were, are, these steps.

In our European antiquity we have certain written texts from the civilization, the thinkers of Ionia and Sicily. Actually, I am referring to the civilizations around the Mediterranean. We cannot forget the Egyptian civilization, which was 4–5000 years ahead of the Greek, and where many Greeks went to drink from its wisdom. The same with the

Jewish civilization, which left us the most beautiful epic of a people, and immortal myths all devoted to Jehovah, or the Mesopotamian civilization, or the Phoenician. Still, we Europeans are followers of the Greek thinkers, who start with Pythagoras from Samos and his school, with Heraclitus, Parmenides and Zeno from Elea together with the entire Eleatic school, with Plato and Aristotle, to mention only the most preeminent ones.

These thinkers dominated their epoch with their authority and dominated the posterity through the writings they left us. Pythagoras, from whom we only have commentaries, develops a philosophy of numbers, a metaphysics of numbers starting with the unit, *the principle of all things*, the unit will double and two together with the unity will give us the number three. From here all numbers can easily be generated, numbers that, according to Pythagoras, and are also the ones that will generate all the sensitive things, the cosmos. Xenophanes of Colophon, the founder of the Eleatic school, will say something similar – *One is Everything*. Similar but, as we will see, not identical. Parmenides will be more radical. For him, the sensitive world does not have truth, only thinking, pure thinking, is true, thinking is reality. *To think is to be* says Parmenides and the entire Eleatic school will follow him. Perhaps it would be best to skip over Plato, in whim dichotomy is the means to find the sophist and the Idea leads toward identity, as well as toward the opposite. This is how later Aristotle will be reached, even though he was not of the same opinion as Parmenides, or Plato, and the *Law of Identity*, the most powerful law of formal logic. For Parmenides, I said and I repeat, only thinking has reality, reality is the existent, the truth, it is even *being*, and it is eternal, immobile, and indivisible.

For Pythagoras Unity – *Monas* – Monad, was the most important but it generated the Dyad, Triad and, as I said, all things together with the four elements of which everything is made: water, fire, air and earth.

With Heraclitus something happened, a revolution in thinking, a revolution that shook the entire Hellenic antiquity. He introduced an uncertainty when he stated that everything is in change, everything flows and we cannot dip our feet in the same water of a river. Every second different water is bathing our feet. Maybe that's why he was named *the obscure*. Maybe it was also a feeling of uncertainty of the domain of thinking. He was shaking the trust in things, deeds, people,

and the correctness of thought. The Eleatic school came to reinstate this trust. Everything is One and nonbeing does not exist, neither does movement. We no longer have the *Monad* with which *more* can be made, with which the world is generated. We have *Unity*, which is given once and forever and in which there are no transformations. For Zeno, as well as for Parmenides, only thinking has truth, reality, that's why he builds his well-known paradoxes. The arrow cannot reach its target. Achilles the quick-footed one cannot catch up to the tortoise. Movement does not exist for Eleatics, reality is one and it is static. The thought arrow will remain in the air and Achilles' steps are powerless. Everything is fixed and unmovable. In spite of the fact that everybody saw arrows that reached their target and people running. His proof was simple. Achilles took one step and reached the place where the tortoise previously was before taking a step away. Achilles took another step but the tortoise also took another step, and even though it was smaller it moved away from Achilles. Achilles again took a step to reach the place where the tortoise was, who again had moved away and so on without ending. Achilles couldn't reach the frog in these conditions. Lucian Blaga in *The Dogmatic Eon* is of the opinion that *trying to* logically *think movement and not succeeding, he negated its existence. Zenon's thesis is the expression of the supreme dictatorship of logic*"[2]. I will return to Achilles' paradox but I want to point out why he marked the entire European thinking. Aristotle, even though he was not of the same opinion as Parmenides about reality, and is the builder of logic in Europe, was unable to not stop at identity and was also unable to pass the paradox of Achilles and the tortoise. Aristotle will place the Law of Identity like a crown on his own logic. The laws of logic, the laws of *Identity*, of *Noncontradiction*, and of the *Excluded Third* to which Aristotle adds a law of sufficient reasoning (a law slightly different from the others). It would have been sufficient if he used only the law of identity, because the other laws, of noncontradiction and the excluded third cannot exist outside a law of identity, but he wanted to bring a novelty, not to remain a Parmenidian. The law if *Identity* is the most powerful law of logic, which can only be explained by a domination of Eleatic thinking. It is curious that Aristotle could be influenced, who, I repeat, did not agree with Parmenides. Maybe Zeno's aperies were too

[2] Lucian Blaga. *The Trilogy of Knowing, The Dogmatic Eon*, Editura Regală pentru Literatură și Artă, București, 1943, p. 62.

strong for the epoch. It is even more interesting because Socrates and Plato, otherwise admirers of Parmenides, don't seem to be dominated by the idea of Unity or the Eleatic paradoxes.

Today, with 0, with infinity, with the addition of an infinite number of zeroes, the division by zero (mathematical analysis) and with the notion of limit, such paradoxes of thought can be avoided. It is true that other has appeared but this is the mathematicians' problem. For us maybe it is important that this Eleatic thinking dominated European thinking for over 2000 years and it dominates it still today. Mathematicians, through differential calculus, infinitesimal calculus, did not shy away from breaking logical laws (Newton and Leibniz) and to offer us mathematics close to the reality that surrounds us. Logicians, through beautiful axiomatic systems that place in the first place the same law of identity, keep us away from reality, from the necessary link to ontology (mathematicians did not shy away from doing it, from *correcting* logic). We no longer wonder that these, I repeat, beautiful logical systems, we also include the deontic ones which pretend to be closer to ontology, all these systems have no important applicability– let's set aside computers and binarity because they also need the notion of limit and we will discuss this later.

From Aristotle we have laws, as I have said earlier, laws of correct thinking, logical laws, among which the law, the principle of identity was the strongest. The laws of noncontradiction is a consequence of the law of identity because we can say that, in the same conditions, we cannot both have and not have an egg on our plate. It is obvious that we can say this.

Let's see what can happen if we have two eggs on our plate? If the second egg is identical to or different from (even slightly, even infinitesimally slightly different) the first, then we can have on our plate a couple of eggs that are not even similar, and are definitely not identical–an ontological identity. Between them there isn't a relation of contradiction, but neither is there one of identity. What type of relation is between these two eggs that are slightly different? If it was an egg and an apple, they would have been completely different, but they are similar, they are both eggs, but they are not identical. This means that two objects can be completely different or only a little different. Who should take responsibility for understanding this difference, a large difference or one that is barely perceptible? No logical law answers for

this. Do we perhaps need another law in logic? It seems so. A law that is as strong as that of identity, maybe even stronger, that does not depend on it, and that allows for the existence of the opposite, of the "other". Could it be a law of otherness, of the other?

For us, in Europe, with all the formidable development of mathematics after Newton and Leibniz, Greek thinking, the thinking of the Eleatic school made an unmistakable impression. We are dominated by this law of logical identity of which it is very difficult to detach. Maybe there are explanations of this attitude, historical explanations, and influences. I prefer to use the terminology and thinking of Lucian Blaga and to say that the domination of the identical over our thinking depends on our *Unconscious Matrix*[3].

I do not want to fight against identity, against the principle of identity, because *persisting upon one opinion, one idea*, which might not be the only one, can be dangerous. Moreover, we need the principle of identity, it is useful, as we have seen and will see again, but not under the form offered today. That's why I will propose in what follows, along a principle of identity, which I see slightly weak, but very necessary, another principle that will allow another to exist with at least the same power as the identical. Yes. I will propose a *Law of the Other*, of *Otherness*, as I said above, or, if you prefer, a law of *logical differentials*. It could be a law that was forgotten in Greek thinking, a law that exists on other meridians where another *unconscious stylistic matrix* was that one that dominated, a law that we also need. A law that Plato was ready to bring to life but, as the Romanian says, "It wasn't meant to be"!

It is necessary to remind that in the domain of logic, in the last hundred (plus) years, there is a constant battle to avoid the laws of contradiction and of the excluded third. Trivalent logics were built, pentavalent ones also, ones with infinity of values, modal logics, dialectic logics, Grigore Moisil at the end of a life full of efforts to support mathematical logic and computer technique wrote a *Logic of the Nuanced Rationale*, in which he tried, unsuccessfully, the same taming of the Aristotelian logic. It was believed that once formal

[3] We can say, respecting perfectly Blaga's idiom, *Unconscious Stylistic Matrix*. Unfortunately few are familiar with Blaga's terminology and the notion of *stylistic*, even if it is perfectly correct, it requires some explanations that would weigh down the present text. That's why I preferred *Unconscious Matrix*, term which covers Blaga's point of view regarding the *stylistic*, which is our unconscious.

logic was abandoned and replaced by mathematical logic, something will change. Many have changed but the law of identity remained as strong as before, everything was attempted, but the result was not the expected one. Thinkers of the XXth century, like Deleuze, have tried to weaken the principle of identity but commentators don't see in him either real success.

I want to point out that the Romanian cultural space has always been sensitive to the domain of the contradictory and how to overcome it. Stefan Lupascu built a *Logic of the Contradictory* in several volumes, Lucian Blaga wrote a *Trilogy of Knowledge* which started with sustaining the contradictory through the dogmatic, he continued with the *Luciferian Knowledge* which rules in knowledge the need to overcome formal logic with its laws in order to use a logic that sustains continued creativity in *Transcendent Censorship,* censorship which establishes limits to knowledge and he ends with *The Divine Differentials*, which can be interpreted as a logic of differentials. Petre Botezatu builds an *Operational Logic*, which is a *Natural Logic*. Octav Onicescu builds logic with a single value, for the same purpose, to avoid the contradictory, and Constantin Noica writes about logic of Hermes in which the part is equal to the whole, as in Cantor's transfinite.

Buddhist Logic and Plato's Sofist

When you try to read a book about Indian mythology, Indian culture, you are, at first, rather dizzy from all the Sanskrit names for as many deities. If you don't give up and continue to read you start to understand that some deities have several names. You are confused, our thinking, without preparation in the subject, has opacity for understanding why this happens. If you succeed to free your thinking a little from the blocking of the education you received and you start to come near the meanings of those you are reading about, you start to decipher that the gods, the medium and small ones as well as the important ones, sometimes have names related to one of their qualities and a certain action they perform. If a god has more than one quality or more than one activity then they can have diverse names which, each of them, still speak of the same god. The same happens to words, in a text one word can be replaced by 4–5 other words, which are all synonyms (not perfect synonyms but close enough – here is a difficulty related to the understanding of identity and a certain play that identity

can have in the Sanskrit world, in the Indian world, but also the Tibetan one), have a very similar meaning[4]. The Indian is not confused by this complication of the language because he knew how to manage in it, because in their culture the law of identity was doubled by a law of another, or otherness, or others.

In India of antiquity, whose depth of time is not well known, cultural evolution had a different development than the one in Ancient Greece. The first preoccupation was rituals, followed by grammar, and only then started the development of logic and mathematics. This means that the custom of using words in rituals as well as the ulterior analysis in treaties of the spoken and written language, the usage from these domains influenced logic.

This use of certain words for the same character, the wealth of approximate synonyms, different words for different properties, even when these properties did not differ too much, meant a strong link to ontology of the language used in rituals. Ulterior grammatical construction only sanctioned this more. It was a long evolution, Sergiu Al-George tells us, in his book *Language and Thought in the Indian Culture*, that some grammarians whose texts he studied had 50–60 previous generations. This tight bond between spoken and written language and the reality that surrounds people was eventually transmitted to philosophy and logic. The play on words related to the qualities of certain characters and not necessarily to the characters themselves is again a strong bond to the action of a character, the action upon a certain object, the predicate and not the subject, the way we learned, this strengthened the link between language and the existent, what the Greeks called *To on*.

It would be good to take a short break so that we don't miss anything important. It would be good to understand from the beginning that Indian logic, ulterior Buddhist logic because it retreated to Tibet due to persecution, regardless of the philosophical school that proposed it, was a logic tied to ontic, a logic tied to reality. A different attitude than that of the evolution of logic in the European space. Formal logic, symbolic logic, mathematical logic being, from the beginnings, more

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[4] Sergiu Al-George, *Limbă și gândire în cultura indiană,* Editura paralela 45, Pitești, 1945. On p.199 we can read a text translated from the Sanskrit: *The sense of the word "invisible" (adarsana) does not defer from "inaudibility", "unpronounceability", "inperception", "absense", disappearance of sounds".*

and more free from enunciation, from reality, which is why it was called formal. It respected the shape and relation between symbols, no matter what the ontic correspondent of these symbols was. "Indian logic", says Sergiu Al-George[5], "was related to ontology and each enunciation was only considered if it referred to an objective entity, a locus (asraya, adhikarana, adhara, dravya)."

Logic and linguistics – Indian grammar – were related to real existence. Grammar considered the most important part of a sentence that which tells some something about the action, as I have already said and I repeat, about what is being done, not about who is doing it. The predicate dominated the subject, the opposite of what we are used to. In any case, the connection to reality, to ontology changes the relationship between words – if the subject is the important one then identity is in play, if the predicate, the action, the qualities are important then *otherness* is dominant and not identity.

For the Indian, the negative, negation, has a positive value because it "...corresponded in the plane of reality to an «absence» (abhava), and this determined or qualified a locus, which is the equivalent of the subject in the theory of predication. The subject of a logical expression could not be conceived of itself, without a reference to the real, to a substance (drayya) that was always first. Aristotle's secondary substances, of pure conceptual nature, could not constitute a reference plan in the Indian logic related to primary perception, notions, the general, are important only in the synthesis achieved by reasoning. Therefore, negation could never be nonexistential. Even the negative form of our universal judgments of the type «a man who is not mortal does not exist» = «all men are mortal», returned in its Indian analysis:

«the fact of being man» is absent in a locus
in which the absence of mortality exists.

...even the apodictic universal was inconceivable outside of existence."[6]

I will ask your permission, in order to be able to continue the discussion about the importance of Indian logic, Buddhist logic, that while we are in this domain to make as few as possible references – other than the absolutely necessary ones – to a possible interpretation

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[5] Sergiu Al-George, *Limbă și gândire în cultura indiană,* Ed. Paralela 45, Pitești, 2005, p. 181.

[6] *Op. cit.*, p. 181.

of this thinking through the means, the instruments of European thinking, using our logic(s), in order to understand the thinking from that cultural space. It is best to leave aside what we know in order not to produce too large deformations of our thinking related to the Indian one, what could lead to a misunderstanding. Without wanting it, we have a learned conceptual baggage, we have another unconscious stylistic matrix, and we are built differently from an intellectual perspective. That's why I propose we leave behind our culture and try to enter without prejudice – attention: without making a value judgment before knowing something new and that doesn't fit us at first sight – into a domain otherwise fascinating, a domain in which we may find answers too many of the things we cannot untangle. Finally, I will not propose that we move with (cultural) weapons and baggage in their world of ideas in order to help understanding, because this requires a certain preparation; I will simply ask for the acceptance of another way of thinking.

For this I will propose a small stop in the orthodox theological thinking. Vladimir Lossky and Dumitru Staniloaie are the theologians who introduced the study of proximity to Divinity, through two paths of thinking named in opposition: the negative, cataphatic one, and the negative, apophatic one. Cataphatic Theology searches the knowledge of Divinity through its attributes and qualities; the Apophatic one follows a path through negations, referring to what is not Divinity[7], being conscious of the incommensurability of Divinity and the impossibility of knowing it in a positive way.

The fact that in Europe theology, the ritual domain, has such a preoccupation was not undertaken until now neither by linguists nor by logicians although apophaticism raises some questions that would deserve a larger preoccupation in these domains.

What does the path of apophatic knowledge of Divinity, of God, mean? It means the use of a sequence of negations. In other words, what is not God. It means that He is not an attribute, another attribute... and other attributes... It means God is **not** a whole series of attributes. God is not *a*, not *b*, ...not *z*. These negative sentences are reasoning in which an attribute is negated, but the negation is never related to the entire Universe, it has a limit within the Universe of Discourse, and this limit is Divinity.

[7] Gorun Manolescu, *Dincolo de ironie și ironism*, Paideia, 2010, p. 164.

Let's restart this sequence of negations in a banal domain, that of fruit. I have in front of me, on a plate, a fruit, and I don't know what type of fruit it is, what to call it. It is not a pear, it is not a grape, it is not a plum... and I will end up negating, using negation, all known fruit, because I know how to negate in the domain of the Universe of Discourse of fruits. I am not in the domain of flowers, or insects, or animals, or in any other domain than that of fruit. This means that I know where I am and that there is a fruit there. In the same manner, the theologian knows that God exists and through repeated negations he realizes why He cannot be contained by human reason. We need a different proximity to God than the rational one. This is a real logical theme.

I may have in front of me a plate on which there was an apple, I know this, and now there is nothing. I may have the phrase: *on my plate there is no longer an apple* , or *there is no apple*, without mentioning the plate. It is a negative sentence but it is still related to a certain Universe of Discourse. It is not about a plate on which there is nothing, but a plate on which there is not an apple. Here may it arise another logical problem. There is a great difference between saying that on the plate in front of me there is nothing and saying that there isn't an apple on it. It means that there may have been an apple sometime in the past, or there may be an apple at someday. Thought and its expression, in this case, are strictly related to a possible past or a possible time. In the case that there is nothing on the plate I may say and write, even symbolically, that whatever an object may be, it is not on the plate, but in the second scenario, any way I say it or symbolize it I must take notice of a certain existing object I am referring to. Logic fumbles here. In other words, it needs an ontological rapport without which it cannot affirm or negate anything. Of course I can say and write: whatever x may be, x is not on my plate when x is an apple. Therefore it is necessary to refer to this x that is an apple and not to another x. Without being the same, the example I have given resembles the Indian one in which we have an empty *locus*.

Let's go deeper. I apologize for tiring you but it is necessary to know, together, something about what Indian logic means, Buddhist logic – and what its evolution was. You will see in the two volumes written by F. Th. Stcherbatsky and dedicated to *Buddhist Logic* everything you will want to know. The volumes were translated into English in 1962 but published in Russian in 1930 by the Science

Academy of the USSR, Leningrad (on our knowledge). Volume I is a complete synthetic compendium and Volume II is *A short treatise of logic by Dharmakirti with its Commentary by Dharmottara*, as well as a voluminous *Appendices*.

We thank Stcherbatsky for the heroic work he achieved by re-giving us what we couldn't take, more so, he chose from the multitude of Sanskrit and Tibetan texts those that are connected to Indian logic and philosophy, and his interpretation is of great help. Due to Stcherbatsky we can have valuable information not only about Buddhist logic, but in the commentaries he translates we can learn many things about the disputes between them and the Realists, Vedantini Brahmans or idealist Buddhist logicians. India offered in antiquity over 1000 years of free disputes in the domains of philology, philosophy and logic, which lead to a spiritual prosperity kept, at first, orally by monks, then in writing in Sanskrit, and later also in Tibetan[8]. That's why we can benefit from this wisdom but only due to these wonderful translations.

For those interested, I will let the original texts speak on their own, texts that are very rich. Don't be frightened, I will quote as little as possible. I will use punctual quotes to support me in the theme I am trying to present. I am not interested in presenting you a commentary of Buddhist Logic, but to address our logic, and if there is something missing, how could we bring here something new even if it might have old roots. This is the reason I was attracted to these texts and their authors, whom I wished to make friends through reading.

Indian thinking starts from *ontology*, goes through epistemology, where it has preoccupations that we, today, leave to psychology (the theory of perception) and then it reaches logic. Their first question is related to the success of human actions: maybe this is normal, to be interested in how we can succeed in what we are trying to do. This way, maybe we can understand why logic has value, or understand what logic means. Logic helps us understand our way of thinking and help it toward an efficiency of our thinking, to be efficient when we have something to do, to achieve what we wish through our thought and will.

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[8] Buddhism was banished from India by the Muslim conquest, Sanskrit texts burnt. Many were kept by fleeing to Tibet where they were translated. That's why today we are missing some original Sanskrit texts but we have them in Tibetan. There are new translations from the Tibetan into Hindi and Sanskrit.

Perception

Logic starts with the perception, which guarantees our control system. But it doesn't start immediately with perception, it continues the need to be successful, efficient in our actions.

1. *Because all successful human action is preceded by right knowledge. Therefore this knowledge will be here investigated*.[9]

What follows is the definition of right knowledge: *Right knowledge is knowledge not contradicted by experience. ... Similarly … that knowledge is right when it makes us reach an object it did point to. … Indeed knowledge does not create an object and does not offer it to us, but in turning our attention straight to the object it makes us reach it.*[10] If we are paying attention, here is shown the ontological support of logic, support that will be repeated each time in similar conditions. Moreover, in the next pages Dharmakirti will tell us what *the object of direct knowledge* means. *The object of direct knowledge is the particular.* And what is this particular? *The particular means an entity or an essence which is unique, which is shared by nothing else.*[11] We are in ontology, which is the starting point of any thought path in the Indian world. The particular (name given because it is related to the *particle* and not to a certain quality a collection of individuals might have) is unique, an individual that is not repeatable. This means that the image that forms for a second in our minds is unique and not repeatable, image that for us is the only reality related to the object that attracted our attention, and which we fixed with our senses. Indians will even say that this is the *ultimate reality*, in the sense that, with our common senses we will not be able to enter further into the knowledge of reality through perception[12]. This point-instant (what Stcherbatsky calls it) from our mind cannot have duration and spatiality, although there can be sequences of point-instant, moments of an instant, points of an instant, which in indirect perception achieve a synthesis, these will be able to give us knowledge of the object that attracted us, and which will give us the possibility to be efficient in our actions.

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[9] Th. Stcherbatsky, *Buddhist Logic,* Volume 2, *A short Treatise of Logic (Nyana-bindu) by Dharmakirti with its commentary (Nyaya-bindu-tika) by Darmottara translated from Sanskrit text edited in the Bibliotheca Buddica,* p.1

[10] *Op. cit.*, p. 3.

[11] *Op. cit.*, p. 33.

[12] I will thank professor VASANT – DAHAKE, from the Amravati University, that he supports a discussion on this theme with me in December 2009.

We saw that any human action of success, or that can be achieved, starts from a right knowledge; also we saw that a right knowledge means turning our attention straight toward a certain object. We will take another step to learn that there are two types of perception, a direct perception – sense-perception – and a mediated one, an indirect perception or inference, reasoning, or even understanding.

According to Dharmottara…the function of pure sensation … is to signalize the presence of the object in the ken[13]…while indirect perception, reasoning, is always a general, a synthesis between a particular offered by point-instant perception and the categories of thinking, categories which are a general notion and which will give the perceived particular a certain spatiality, time, as well as other qualities. A perception, or a perceptual judgment, is an act of conceiving … what does the term "conception" properly mean? The answer is that to conceive means to imagine, or to construct an object in imagination … To imagine productively means to produce unity in difference, to synthesize in a unity a variety of time, place and conditions. … Consequently there is no substantial difference between a perceptual judgment and a conception, on the one hand, and between a conception, an image, productive imagination and a general notion and the other. Particular conceptions, images and notions do not exist. There are images referred to particulars and they may be metaphorically called particulars, but in themselves they are always general.[14]

In the first place is the issue of importance which the object has in perception, in knowledge. This image of first contact with an object, presence that will trigger knowledge, is, of course, an unreality for the Buddhist schools, but an unreality in the same manner that the world for Kant is an unreality because we cannot know the **thing in itself**. The ultimate reality, point-instant (ksana), the thing in itself (laksana) tells us how we can have a direct perception, which we will call reality, a direct perception of a form of energy which we do not have the possibility of knowing and which manifests itself through its efficiency to produce an action. This is for the Indian reality, for the Buddhist school, but also for Vedanta.

Direct knowledge means neither construction (judgment) nor illusion,[15] which means that this is not about an indirect perception in

[13] Th. Stcherbatsky, *Buddhist Logic,* vol. one, p. 207.
[14] *Op. cit.,* p. 213–214.
[15] *Op. cit.,* p. 14.

which the direct perception of the ultimate reality is associated with general notions, and it's also not an imagination that no longer has any connection to reality. Dhamakirti will repeat: That alone (which is unique) represent ultimate reality. Ultimately real means something not constructed, not imagined. What so exists is the ultimately real. … it is just that thing which is the object (producing) direct perception, therefore the particular, (i.e., the unique moment, the thing in itself) is the exclusive object of sense-perception…the essence of reality is just efficiency. … The efficiency, i.e., the capacity to produce something, is a force. Just that is the character, or the essence of reality, (viz. to be a center of forces). The test (of reality) is to be a force producing action (attracting or repelling something). For this reason (the unique, i.e., the point-instant is the only reality. The term "real object" is synonymous with "ultimate reality".[16]

Indians underline the importance of the ontological for knowledge. We cannot have knowledge if we don't first have a perception of a real object, the same way that we only have knowledge through synthesis, through judgment, the synthesis of a general – a category – and what direct perception captures, point-instant.

Pure sense perception thus becomes a real source of our knowledge only it has been elicited a judgment. As long as the judgment has not been produced, our cognition has not determined in its essence of a self-conscious idea of the blue…. If it is so, then sense-perception becomes a real source of our knowledge only in combination with a constructed judgment, "Seeing" is the function of direct cognition, we call it presenting the object directly (in our ken). "Imagining", on the other hand, is the function of constructive (synthetic) thought.[17]

I ask permission to repeat myself. Indirect perception means, in the Indian world and indifferent of philosophical schools, a construction achieved between sense-perception, point-instant, between the immediate reality offered to us by our sense organs and a general, categories, which we have in our mind, a synthesis like in Kant's phenomenal world. Sense-perception, point-instant, don't have space and time because these are universals, notions, the same as categories. That's why point-instant lacks time and space, even though there can be sequences of point-instants. In a footnote Stcherbatsky

[16] *Op. cit.,* p. 36.
[17] *Op. cit.,* p.45.

writes: The transcendent reality of what appears as a motion is but a series of point- instants in contiguous spaces following one-another, each representing an „other" thing.[18] But we must consider that a series of point-instants can appear as a motion only within the framework of a synthesis of these series with the space and time necessary for such a notion. Knowledge does not mean direct perception, but only indirect perception, reasoning.

In order to have an example from the Indian categories I will deliver to you the Nyaya-Vaisesika system of categories. The Nyaya-Vaisesika system establishes (finally) a table of Categories containing 7 items: Substance, Quality, Motion, Universals, Differentials, Inherence and Non-existence. Here Space and Time are included in Motion.

In order to be convinced that it exists, what Stcherbatsky says in his two volumes of Buddhist Logic, what I showed above and is an obvious fact, in human thought of the highest quality, such as ontology and the theory of knowledge exposed in *Critique of Pure Reason* but also in the ontology and theory of knowledge from *A short Treatise of Logic* by Dharmakirti, there are similarities which cannot be explained unless we agree that anthropogenesis, even at great distances, has created individuals that are similar and with the same imaginative and creative power of the brain. I will also try to bring other proofs of the similarity of the human intelligence indifferent of meridian or parallel, but also of its differences, differences which do nothing else but bring another proof for the creative force of our brain. However, the differences are only as interpretation, but perception, judgment, syllogistic are present both in Ancient Greece as well as Ancient India.

If until now A short Treatise of Logic proposed by Dharmakirti was similar to the one proposed by Aristotle and even surpassing it, reaching Kantian ontology and gnoseology, now I will direct myself toward a part of Buddhist logic that is rather different in interpretation from the Aristotelian one. I am referring to the laws of logic. Indians have the laws of identity, noncontradiction and the excluded middle but with other connotations, moreover there is a law of the different – the Law of Otherness, and a law of Contradiction, even though non-contradiction is respected where it appears. The laws of Identity and the Excluded Middle are weakened. As a matter of fact,

[18] *Op. cit.,* p. 8.

everything starts from the detailed study of negation. It is true that negation is an important chapter of logic but negative sentences were studied by many generations of philologists and by many generations of grammarians before a first logic was built.

Negation

Since every cognition is regarded by the Buddhists as a direct or indirect cognition of some point of external reality, and the interest which they take in logic is not formal, but epistemological, the problem of negation contains for them special difficulties.[19] They realized that an object that does not exist cannot be perceived, just as the Eleatics realized it. Then they understood that they need a negative reasoning, a negative inference that must be based on an indirect perception, and not a direct one, which is impossible, the object being non-existent. And this inference must affirm something positive. For example: *a jar* is no longer in front of me but I have in my memory the fact that over there was – *a jar* – which I know. *Negative behavior is successful when a present or a past negative experience of an observer has happened, provided the memory of this fact has not been obliterated... Consequently when we assert the absence of the perceptible jar, we necessarily assert something positive (we assert the presence of the bare place and the fact of its cognition).*[20] This is negative reasoning which affirms something positive.

But attention. My memory of the memory of he who saw the *jar* was activated through direct perception. This means that I/he saw a certain *jar* and not any *jar* and the negative reasoning will be made related to this *jar*, this unique *jar* perceived in the past. It is a judgment limited to a certain individual and it is not an infinite negative judgment. Of course there are multiple such negative judgments in Indian logic but I am interested in this type of judgment that introduces limits in reasoning.

It is very interesting that Dharmottara, commentator of Dharmakirti's logic, declares: *The essence of knowledge is limitation*[21]. Let's see what this means, because here is a very important key which can give value to Aristotelian logic, mathematical logics, just as the limit introduced by d'Alambert in differential calculus removed some

[19] Th. Stcherbatsky, *Buddhist Logic*, vol. I, p. 363.
[20] *Op. cit.,* p. 79–80.
[21] Th. Stcerbatdky, *Buddhist Logic,* vol. I, p. 410.

remarkable difficulties that this calculus was having by allowing itself to add an infinite number of zeroes and to divide number by 0 and ∞. But before that let's rest a little while longer in negation, in the law of Contradiction and the law of Otherness.

In order to understand what the concept of limitation is in Indian logic, in Buddhist logic, it is necessary that we stop at the laws of logic. In Buddhist logic the most important law is the *law of Contradiction*. *Dharmakirti defines the law of Contradiction as that feature of each thing, whether real or imagined, owing to which everything presents itself in couples of two parts, of which one is the complete negation of the other*.[22] The Law of Contradiction is the most powerful law of Buddhist logic and it contains the Law of Otherness, as well as the Law of Identity (which becomes a limit condition). Instead of an explanation I will again quote from Th. Stcherbatsky: *All and everything in the universe, whether real or only imagined, is subject to the law of "otherness", owing to which it is what it is, viz. it is different, or separate from all other things of the universe. This law could also be called the law of Identity, since it determines that the object is what it is, it is identical with itself. … The law, according to which two things are forbidden to be one thing" is the law of Contradiction*.[23]

As you can see, Buddhist logic has a different approach to logic than we have in Europe after Aristotle. The most powerful law in Buddhist logic is that of Contradiction, as well as that of Otherness. Identity becomes a particular case because for the Buddhist, the same object is not identical to itself, it does not respect the need for identity. If we change its space and time it no longer is the same indiscernible object, of course if we look at an object from a different angle or if there is a variation of time, even an infinitesimal variation, that object can look different. The same object is identical to itself only in a particular case. Moreover, the law of the excluded middle becomes a particular case also because between light and dark, between day and night, between good and evil, between true and false, there are innumerable other possibilities of existence, innumerable middles are possible, not all at the same time but taken one at a time and with limitations between them.

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[22] *Op. cit*., p. 403.
[23] *Op. cit*.. p. 402.

Why does Aristotle put the Law of Identity at the forefront of his logic, the law of Non-Contradiction, of the Excluded Middle, the double negation, important logical laws? Because Aristotle targeted the achievement of a formal logic which would correspond to an idea-game, actually the same as Parmenides thought, because truth was only one, and it was *in mente*. Maybe everything happened because Aristotle avoided the link to ontology, which in Indian logic, in Buddhist logic is the first fact required in order starting the study of the way we think, before researching what perception means and how many types of it there are.

We have two correct constructions but with a different starting point and with a different development; for Aristotle, the starting point is formal, for the Buddhists the starting point is ontological.

The next question is which if these logical systems is better, or desired? I believe that I have shown in this paper, as well as in my previous paper[24] that formal logic, as well as mathematical logic lack efficiency and I don't see why we would continue on this road, the way they are currently constructed.

I have said this before, we do not need to throw away the principles of Identity, Non-Contradiction and the Excluded Middle, we simply need to no longer consider them laws with Universal validity, and to introduce limits in their application, I repeat, the same way d'Alambert introduced limits in the application of differential calculus. It wouldn't be bad to also accept a law of Otherness with all its consequences. This was we may be able to understand why Dharmottara said: *The essence of knowledge is limitation* and we would be more lenient with another, with the other, with another's right to be.

Who will give us the limits? Of course, just as in differential calculus, the limits will be those of ontological situations. What does this mean? This simply means no more than to have the point of view of the engineer, he who dominated, and the need for integral calculus, to see what would be a given situation and this will tell us everything about the limit we should use. Calculus. It remains the same, or at least I hope so. In any case, a calculation will have to prove efficient, to prove the success of its thinking. This is what I call the point of view of the engineer. Engineer comes from ingenious, the one who finds a solution

[24] Geo Savulescu, *L.J.Brouwer și cum ar trebui să arate gândirea noastră,* in Noema, vol. IX, 2010.

to save us from trouble, the one who brings us the well-being of the new. Where there not engineers in Ancient India? There was, because they always gave solutions toward to success, the efficiency of their thinking. The word did not exist, but the people existed, because people sanctify places. You will tell me that Old India was dominated by mythology, by the sacred. Yes, that's true, but not only Old India, the current India is also dominated by the sacred. Only the fact that they place great value on the learned man and they especially respect elders is a sign of the presence of the sacred. You don't really see people begging in India or you will see them only in special places, or arguing people, fighting in public, on the street, neither do you see somebody raising their voice on the street, I never heard somebody swear. Today's Indian is full of common sense even if he is poor. This Law of Otherness is not a law with calculable consequences even if it is the most important logic, it is simply the right of the person next to you to exist just as you exist. It can also be a moral law that Kant forgot. Besides I am of the opinion that the sacred, sacrality should be the most important Universal constant. Without the sacred, people approach the animal condition. Even the Greek from antiquity was dominated by mythology, but we, Vlahs have been from antiquity, from the time of Dacians, linked to mythology and we still are today, even if we are Christian or maybe because of it. I repeat. The sacred is ubiquitous, nothing is possible without it. Even if we refuse it, if we refuse religion, the sacred returns to our behavior, from which it cannot leave so easily. A civilized man, we say, is one who is correct with his neighbor, who knows what is good and what is evil, who respects the elders, who respects his parents, brothers, sisters, and other people, who speaks nicely and if possible swears as little as possible. This means respecting the sacred.

Come back to the logic. So: let's introduce some *logical differentials*, modeled after mathematical differentials, from infinitesimal differentials to differences as between day and night, light and dark, calculating in each case on one hand what we need to use in our reasoning and what we can leave behind, because it has no value to us. What we leave behind is the *middle* that we don't need. I repeat, as many times as you want, the problem is to get rid of formalism and to base a logic on ontology. By the way, I remember when I was in my last year of philosophy and Grigore Moisil offered us some voluntary courses and seminars. There were many of us. That's where I met,

among those who audited, Constantin Noica. I presented at such an open seminar my attempts at the Logic of Complementariness through Levels, which, no much later, I linked to lattices or a graph, in which appeared intermediary parts that I considered, back then, complementariness by degree. There were some middles which I was trying to not exclude. Sometimes, in the evening after the course, I walked Moisil home and we talked. One evening he game me to read some reports by a certain Zaddeh. It was about affiliation or non-affiliation. A few days later, when I walked him home again, I told him that it didn't resemble what I was thinking. Unfortunately, he left us the following year. Even now I don't think that fuzzy logic can resolve what I now understand by logical differentials.

Can logical differentials be a solution?

I will start by giving you an example. It may seem aberrant. Blaga wrote a book about *Divine Differentials*. He wrote this book of Metaphysics instead of a book of Logic. The differentials that the Great Anonymous sends into the world integrate creating beings. Similarly he could have written, taking the reverse route, that logical differentials are determined by reality and we can integrate them creating reasoning. Actually, Blaga's book is a book about metaphysics and logic, you can read the *Divine Differentials* but also the *Logical Differentials*. It's true, the contents of the book are a little different in the case of logical differentials. Maybe he would also not have needed a Great Anonymous.

As I was saying about the Law of Otherness, it is not a law that implies logical calculations. It is rather a law of common sense, but which changes completely the perspective of using contradictions, the excluded middle, identity or double negation, which are laws that imply a series of calculations.

Likewise we could look at Lucian Blaga's book about *Divine Differentials*, if we were to read it as a logic – let's not forget that Blaga was well versed in self-taught superior mathematics. If we were to also add d'Alambert's limit we would actually have logical differentials. Constantin Noica pointed out that a category apparently forgotten, Kant's category of the *limit that does not limit* is one of the most important categories. Constantin Noica, as well as Kant, had the great intuition to feel the need for such a universal – a sort of fence, a separation – which means a limit that doesn't limit itself from the

entire reality that surrounds us. It is the fence that separates us from our neighbor, it is a milestone, nothing more but how much! It is everything, it is the secret of our way of thinking – yes, this is how we think, putting limits on the impetuous way our ideas come to us.

What is Aristotle's logic missing? After this rich introduction I have made please have a little more patience and let's stop before Aristotle on Plato. We will choose Plato's *Sophist* which has as subtitle: *About what is* [25]. The *Sophist* is the dialogue from which I used the dichotomy from the first part in order to support by complementariness by degree, how I called it then, in 1972, and I tried to use a logic of complementariness, because Plato was trying to replace negation with complementariness. Now everything has gained new valences for me while keeping what I built then.

As the philosopher Constantin Noica writes in *Preliminary Clarifications*, before the translation from Hellenic of *The Sophist*, scolding Aristotle, who considered the dichotomy, used by Plato "a weakened syllogism", "Nothing in this method justifies the Aristotelian interpretation. Instead, it can be given a modern interpretation, of successive elimination of the part that does not interest in the proposed search. Exactly what cybernetics does today ... with the example given for looking a word up in a dictionary. You open the dictionary into two parts, let's say what you are looking for, the word, is not in the first half, so it is in the second; you continue with the division and you see that it's also not in the second half of the second half; you continue ... finding after about ten searches the desired word. ... Plato obtains, with seven or eight bits, the type of man desired, the sophist?...

Likewise we are tempted to understand, in a modern way, equally the solution invoked by Plato for his seventh definition. Apparently, for many commentators and definitely for the unaware reader, the great problem of being and non-being might be in play. It is in play, it's true, but indirectly. In reality, Plato speaks of something that *is*, around which there "might be", in a way, an immensity of realities that are not. An oak tree is nothing more than an oak tree, it is not a linden tree, not a forest, not a bird. But the linden tree and the bird, "others" than the oak tree that is, *are* also, and here starts the new status of non-being, understood as the fact of being another,... Something like this ... has today a precise name: it is the *complementary* of a given reality,

[25] Platon, *Sofistul,* Editura Științifică și Enciclopedică, București, 1989.

everything that is not it. ... At most there could be levels of non-being, saying that the elm, plane-tree, fir tree, which are not the oak tree, represent the first level; the horse, bird, another more distant level; and normal life as well as technical objects, a third level of non-bring. ... We do not realize if it's worth taking on such "ontological" distinctions ... The essential is that through an "other" than what it is, Plato has only encountered a relative type of non-being ... the same the complementary of today, rather a type of logical non-being ..."[26]

I cannot afford to forget how much I fought, as I was saying as early as my student years in Philosophy, first with my colleagues from the *Circle of Medical Phisolophy* from the Romanian Academy, then with logicians, with mathematicians – I even audited mathematics courses at the Faculty of Mathematics for almost a year, I don't know what I didn't do, because I was convinced that the problem of complementariness and negation deserves more attention in contemporary logic. With my weak powers in mathematics I made efforts to know certain simple mathematical structures such as the theory of graphs, the lattice. I tried to speak of a latticeal logic. At the proceedings of the IV-th World Congress of Futurology, Bucharest, 1972 I presented the paper *Application of the Theory of Graphs in Futurology with Axiological Illustrations*, where I built a lattice, a graph, of *n* dimensions. Together with Mrs. Petri I published in the Revue Romaine de Lingvistique, *Distribution and Dichotomy*; *Ambiguous and Diffuse* in 1973 and *Subject and Predicate* in 1975, trying to attract attention about the importance of dichotomy and complementariness, to show that there is a great difference between *fuzzy sets*, in fashion then, and a complementariness by degree – by distance, the same as the role of the predicate in logic, role that is more important than that of the subject. The predicate carries, actually – we still don't grasp the importance of ontology for logic – the entire ontological load by virtue of determining the action. In that period I had several meetings and conversations with Constantin Virgil Negoiță related to *fuzzy sets*. The only mathematician who, without being enthusiastic, supported me to publish *Relative Negation I and II* in Revue Rumaine de *Sciences Sociales*[27]

[26] Platon, *Sofistul,* Editura Științifică și Enciclopedică, București, 1989, *lămuriri preliminare,* la dialogul *Sofistul,* p. 308–309. Translated by Ana-Catrina Buchser.

[27] Revue Roumaine de Sciences Sociales serie de Filosophie et Logique, nr. 19, 3,1975, and 20, nr. 20,2,1976

was Professor Solomon Marcus. Time passed and I told myself there is an old Romanian saying that goes: "When two tell you that you're drunk, go sleep", and I had drunk from the nectar of philosophy and logic, so I calmed myself down and started painting (actually I had already started when I was younger. Now I simply continued). Without forgetting anything, because this new theory of complementariness I had tried to nurse had become second nature to me, I did anything else, but I no longer interested myself in logic, purposefully.

A few years ago a friend of the School of Wisdom, through which we meet monthly, when I am in the capital, and we discuss freely themes chosen by us, the participants, so a friend with whom I restarted to discuss *complementariness by degree*, Gorun Manolescu, systems engineer and more and more philosopher, pointed out some books written by a Russian, Th. Stcherbatsky, books very well documented in Sanskrit and Tibetan texts, about Buddhist logic, where I could find something new about ontology, logic and negation. He even lent me the first volume. For two years I read, I studied, I obtained copies so that I can underline them after my liking. In May 2008, Professor Paul Flondor, mathematician and logician of great finery doubled by a subtle thinker, presented, also at one our meetings, the way mathematicians of this century see Cantor's transfinite mathematics. We were all profoundly interested and the discussions were intense. We listened to the statement a few times, because I didn't forget to turn on the recorder. It was an experienced that marked me also. Toward the end of 2008 Professor Solomon Marcus helped me a second time, and I want to thank him even more. On TV Professor Solomon Marcus talked to a few students about the book *Zero* by Charles Seife. I found it, read it, and I felt like someone was lighting up my mind. How good those lighters exist!

I understood that the mathematics of differentials, derivatives and integrals such as Newton and Leibniz brought to life, are turning points in knowledge. I understood why Poincaré and Brouwer considered mathematics free of logic, it is true, for other reasons, but I understood why mathematics cannot lean on logic. If logic were the basis of mathematics then how can a calculation, such as differential calculus, in *which* one can *divide by zero and add an infinite number of zeroes. Both illogical operations...*[28] still have such a good application in practical reality?

[28] Charles Seife, *Zero,* Humanitas, București, 2008, p.118–119. Translated by Ana-Catrina Buchser.

But it is not the only curiosity, the only *strangeness*, what takes place in superior mathematics, as well as in physics are situations that make researchers put less trust in logic. In differential calculus the situation was elegantly resolved by d'Alambert who introduced the notion of *limit*. Seife tell us that ... *putting the limit symbol in front of a series, you are making a distinction between the process in itself and its finality. This way you can avoid the use of infinity and zeroes. Just as Achilles' sub-races are finite, each* partial sum *from a limit is finite. You can add them, divide them, square them; you can do whatever you want. Mathematical rules continue to function, because everything is finite.* [29]

Dharmakirti's Logic and Plato's *Sophist*.

In Plato's *Sophist* we will find, in the second part, striking similarities with what Dharmakirti says in *A Short Treatise of Logic*.

Maybe first we should underline the link between *to be* and to have an action upon things, upon what is.

Stranger. I suggest that everything which possesses any power ... to produce a change in anything of any nature ... has real existence. For I set up as a definition which defines being, that it is nothing else but power. (247e). ... It is a relation between being, knowing and acting. ... that ... to know is active... (248e)

The dual nature of reality affirms itself in being and motion;

Stranger. Then the philosopher, who pays the highest honor to these things, must ... refuse to accept the theory of those who say the universe is at rest, whether as a unity or in many forms, and must also refuse utterly to listen to those who say that being is universal motion; he must quote the children's prayer, "all things immovable and in motion," and must say that being and the universe consist of both. (249d) In all things there is both movement and being, you cannot separate one from the other saying about one that it is true and the other false. That's how everything is in this world in complementary couples. But it's not possible to have only being or only movement because they both participate in the being of things:

Stranger. Being, then, you consider to be something else in the soul, a third in addition to these two, inasmuch as you think rest and motion are embraced by it; and since you comprehend and observe that they participate in existence, you therefore said that they are ...

[29] *Op. cit.,* p. 145.

*Theaetetus. We really do seem to have a vague vision of being as some third thing, when we say that motion and rest are. (250b,c).*We witness the affirmation of the first three supreme types, categories, that can combine with each other ...

Stranger. But being can mingle with both of them, for they both are ... Then these prove to be three ... Each of them is, then, other than the remaining two, but the same as itself. (254d). ... But what do we mean by these words, "the same" and "other," which we have just used? Are they two new classes, different from the other three, but always of necessity mingled with them, and must we conduct our inquiry on the assumption that there are five classes, not three, or are we unconsciously speaking of one of those three when we say "the same" or "other"? ... But certainly motion and rest are neither other nor the same. ... Both certainly partake of the same and the other. ... Then we must not say that motion, or rest either, is the same or other. (254e, 255a,b) ...

Stranger. But should we conceive of "being" and "the same" as one? ...

Stranger. So we shall consider "the same" a fourth class in addition to the other three?

Theaetetus. Certainly. (255b,c).

The identical (tauton) gains the right to be a supreme type but it will also gain the "opposite", "other" (Heteros, a, ov), negation, contradiction[30], which will have a greater application through complementariness, and the identical will be used only for the identity of the thing (being) with itself.

Stranger. Then shall we call "the other" a fifth class? Or must we conceive of this and "being" as two names for one class? (255c) ...

Stranger. ... whatever is other is just what it is through compulsion of some other. ... Then we must place the nature of "the other" as a fifth among the classes in which we select our examples. (255d,e).

Plato proposes a revue of the five categories.

Stranger. Let us now state our conclusions, taking up the five classes one at a time. (255e), it's clear it is about the five maximum types.

It is remarkable that through these maximum types Plato places being, the first maximum type and which doesn't have a pair, it is alone. What is thing "being"? "Being of itself", 'being by itself"? Or the "being

[30] At note (240d) Constantin Noica will write: *Only Aristotel, in Categories ... will put order in the difference between contraries and contradictories. But here it must be said that in play are not even the contraries but only the realities from within the "complementary".* The relation of the general, the universal, to realities.

of things"? It doesn't seem like this dialogue is called upon to resolve this problem, although the maximum type "being" is a predicate of all the other categories, which is why motion, rest, identity and other (*heteros*) ***are***. The other, otherness, is not non-being because then it would have been put in balance with being from the beginning. It is only another's right to be, to exist, and that's also why this category is dressed with the category of being[31]. Why does this happen? Maybe in order to not attack Parmenides directly, on whose side Plato, actually, is, but ... up to a point. This point is the right of another, of the opposite, it is *heteros*, its right to existence. That's why the five categories: rest, motion, being – *ousia* – the identical and the opposite – *heteros*, the other. Plato introduces negation which has been tamed, it doesn't mean cancellation, just the rights of another. From here until complementariness there is only one step which leads to the acceptance of a couple of opposites.

Stranger. Now motion again is other than the same ...

... Therefore it is not the same ...

But yet we found it was the same, because all things partake of the same. (256a)

This rational motion can be considered by some as a mathematical artifice, such as done by mathematicians. Maybe that's how it is.

Stranger. In relation to motion, then, not-being is. That is inevitable. And this extends to all the classes; for in all of them the nature of other so operates as to make each one other than being, and therefore not-being. So we may, from this point of view, rightly say of all of them alike that they are not; and again, since they partake of being[32], that they are and have being.

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[31] It is a delicate moment for the history of philosophy, actually for Plato's philosophy, for *The Theory of Ideas*. Plato uses *ousia* – for being of itself – and *To on* for the being of things, for the existent, for – using a term of Latin origins – *reality*. It was easy for some Hellenists influenced by Aristotle to burden Plato with an immutable theory of ideas. In *The Republic* that's what it seems to be but *The Republic* is not the only dialogue. Maybe it would be correct to give the thinker Plato the right to have other opinions in *The Sophist*. Let's accept that *ousia* is *being of itself*, as a philosophical category, and *To on*, *ontos*, is the being of things, as Constantin Noica translates it. Then there will also be a place for smaller universals which are no longer philosophical categories, but also for the general – like a synthesis extracted from multiple individuals. The Theory of Ideas can then be gentler.

[32] In the *Elino* – Romanescu dictionary of G. Ioanidu, published circa 1850, *to ov, ontos* is translated as *his*, it can take the place of a relative pronoun *os – which, who,* as many trivial uses for beings, things, so for the existent.

Theaetetus. Yes, I suppose so.

Stranger. And so, in relation to each of the classes, being is many, and not-being is infinite in number.

Theaetetus. So it seems.

Stranger. Then being itself must also be said to be other than all other things.

Theaetetus. Yes, it must.

Stranger. And we conclude that whatever the number of other things is, just that is the number of the things in relation to which being is not; for not being those things, it is itself one, and again, those other things are not unlimited in number.

Theaetetus. That is not far from the truth.

Stranger. ... by their nature the classes have participation in one another. ...

Stranger. When we say not-being, we speak, I think, not of something that is the opposite of being, but only of something different. (257a,b)

...Stranger. Then when we are told that the negative signifies the opposite, we shall not admit it; we shall admit only that the particle "not" indicates something different from the words to which it is prefixed, or rather from the things denoted by the words that follow the negative. (257c)

...Stranger. ...the beautiful is more and the not-beautiful less a part of being?

Theaetetus. Not at all. (257e)

Stranger. Hence the not-great must be said to be no less truly than the great?

Theaetetus. No less truly. (258a)

Stranger. And so we must recognize the same relation between the just and the not-just, in so far as neither has any more being than the other?

Theaetetus. Of course.

Stranger. And we shall, then, say the same of other things, since the nature of the other is proved to possess real being; and if it has being, we must necessarily ascribe being in no less degree to its parts also.

Theaetetus. Of course.

Stranger. ... the opposition ... signifies not the opposite of being, but only the other of being, and nothing more.

Theaetetus. That is perfectly clear.

Stranger. Then what shall we call this?

Theaetetus. Evidently this is precisely not-being, which we were looking for because of the sophist.

Stranger. And is this, as you were saying, as fully endowed with being as anything else, and shall we henceforth say with confidence that not-being has an assured existence and a nature of its own? Just as we found that the great was great and the beautiful was beautiful, the not-great was not-great and the not-beautiful was not-beautiful, shall we in the same way say that not-being was and is not-being, to be counted as one class among the many classes of being? Or have we ... (258a,b,c)

Stranger. Do you observe, then, that we have gone farther in our distrust of Parmenides than the limit set by his prohibition? ... We have proceeded farther in our investigation and have shown him more than that which he forbade us to examine. ... Because he says somewhere:"Never shall this thought prevail, that not-being is;

Nay, keep your mind from this path of investigation,

"Parmenides Fr. 7.1 (258d).

Stranger. But we have not only pointed out that things which are not exist, but we have even shown what the form or class of not-being is; for we have pointed out that the nature of the other exists and is distributed in small bits throughout all existing things in their relations to one another, and we have ventured to say that each part of the other which is contrasted with being, really is exactly not-being. ... he too must say, as we do, that the classes mingle with one another, and being and the other permeate all things, including each other, and the other, since it participates in being, is, by reason of this participation, yet is not that in which it participates, but other, and since it is other than being, must inevitably be not-being. But being, in turn, participates in the other and is therefore other than the rest of the classes, and since it is other than all of them, it is not each one of them or all the rest, but only itself; there is therefore no doubt that there are thousands and thousands of things which being is not, and just so all other things, both individually and collectively, in many relations are, and in many are not.

Theaetetus. True.(258e,259a,b,c,d,e). ...

I don't know if this rational construction can be likened to an Artifice of calculation, as I said above, because Plato underlines that

he did not stop at a ban on using reasoning. **He proves** everything he affirms, like a mathematician, using a rational construction that cannot easily be overthrown. That's why he doesn't shy away from questioning Parmenides' statement. Still, it seems we can say, if we pay attention to the economy of the dialogue that he writes a dialogue about the sophist, a learned and very intelligent character but who uses *falsehood* in his reasoning in order to impress the rich kids who will boast about meeting him. Moreover, he actually hides in his fight against the sophist his true intention, to be able to contradict, with strong proofs, rational proofs, the great Parmenides. Maybe, due to this hat, Aristotle didn't give much attention to this dialogue.

Stranger. What I have spoken of before—the ability to let those quibbles go as of no account and to follow and refute in detail the arguments of a man who says that other is in a sense the same, or that the same is other, and to do this from that point of view and with regard for those relations which he presupposes for either of these conditions. But to show that in some sort of fashion the same is the other, and the other the same, and the great small, and the like unlike, and to take pleasure in thus always bringing forward opposites in the argument,—all that is no true refutation, but is plainly the newborn offspring of some brain that has just begun to lay hold upon the problem of realities.

Theaetetus. Exactly so.

Stranger. For certainly, my friend, the attempt to separate everything from everything else is not only not in good taste but alsoshows that a man is utterly uncultivated and unphilosophical. (259d,e).[33]

Stranger. ... if falsehood exists, deceit exists. (260c)

Why was this dialogue not understood in Hellenic antiquity? Maybe it couldn't be. Aristotle was the young scholar who was revolutionizing the world with his logic, acclaimed by all. They couldn't have time to discover hidden in the fight against sophism, the sophist, another road in thought other than the one proposed by Aristotle. Everything perpetuated because Aristotle's logic was charming and that's how we find ourselves today with beautiful logics but not very useful ones, less efficient.

I will remind you that in Dharmalirti's logic there is a law of Otherness and one of contradiction, that negation has an important

[33] Plato, Sophist. All quotes from the Perseus Digital Library at Tufts University, online at http://www.perseus.tufts.edu

place and that Identity, as well as the Excluded Middle are limit cases. Another's right to be permits complementariness which does not exclude, as they are possible, different levels of complementariness, but a special interest for something like this does not exist.

I have already posed this question and I will pose it again, is logic good for anything? It is not a model of our thinking, you will tell me that it does wonders in computers. It's true. The binary system was discovered by G. Boole and made to work with 0 and 1 by Leibniz. But here let's not forget that 0 and 1 are the simplest dichotomy, 0 and 1 divide the world, the existent, the cosmos, into everything and nothing. If we accept reality it is true that here also we can introduce limits, and between these limits, again other limits. Yes. But this is only seemingly logic, it is more mathematics. And the logical schemes of software are ontological schemes. We are not making a scheme for the sake of the scheme or of a calculation, but in order to solve a real situation.

Let's return for a little bit to searching for a word in a dictionary. We have a word and a dictionary, and we know this word is in this dictionary. The search can only take place if we have certain objects about which we know something. This is ontological reference. This is also how it takes place, each time, in complementariness. Complementariness is not only a formal structure. The searched object and its complement need to be loaded with realities. Only this way can we know what is the part we must eliminate, to which we must apply the negation. It seems like in logic, in any case in logic of complementariness, we cannot escape an ontological reference. You will tell me that in Plato logic had not yet separated from ontology, that's right, and maybe it shouldn't separate. At lease this is my thesis.

I don't think I need to repeat the lattice schemes and graphs which I gave in other papers, you can find them there. Anyway, I say it again, I am amateurish formality and mathematics, so it's possible that somebody more skilled may give another, better solution, of course if the thinking I propose is the good one.

A few free thoughts about mathematics and logic

Are mathematics and logic, really, the same body of ideas? The same kind of work? In other words, do logic and mathematics use the same way of thinking and resolving a problem?

I will give you a quote from Robert Musil who has a very short and, I say, beautiful definition of logic in *The Man Without Qualities* "...logic, domain in which a thought follows of itself from the previous one..."[34] Is this definition correct, or is it given by a mathematician for whom logic can only be another type of mathematics? Let's attempt a dissection.

First I want to apologize. When I make affirmations, when I allow myself to speak about mathematics, I do it, of course, as an amateur, and I know that nothing is more bothersome to the ear of a mathematician that amateurism in this domain. They are right. But what can I do? I cannot stop myself from having an opinion about mathematics in our world. I apologize again that I have certain opinions but I would like to be understood that I can't help myself, I am forced to make certain statements about mathematics even if I am wrong.

What is a thought? We all know what a thought is but it is difficult to define it. Can we think without an object? It seems difficult to have a thought without referring to something. The attempt to suspend thinking is very difficult to achieve because thoughts race through our minds and it is very difficult to stop this onrush of thoughts. Moreover, those who propose as an exercise to stop thinking actually tell us to fix our thought on a certain imaginary object such as a blue stain, or another color, or the image of a key. Try it, and you will see how difficult it is, almost impossible without significant exercise. So, even when we try to stop our thoughts we need an object on which to stop, a real or imaginary one.

Now we can say that a thought is an activity of the cerebral cortex, a conscious activity, which puts in contact our being with objects, beings, diverse situations, actions, thoughts, our thinking sustains our control system. This means that it is our connection to the reality that surrounds us.

It is true that there can be successions of thoughts linked to each other like a chain, chained thoughts, a thought from now being able to follow, I don't know if by itself, from a previous thought. It is true that such a chain may have a succession which we could call logical. This does not exclude the possibility that in an action, even in a banal one,

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[34] Robert Musil, *Omul fără însușiri,* cap. 58. *Acținea paralelă trezește îndoieli. …* Ed. Polirom, București, 2008, p.300. Quote for this paper translated by Ana-Catrina Buchser.

such as planting flowers in the garden on a sunny morning, something breaks the chain of thought. The attention given to a flower we were not thinking about, or the fact that someone enters the garden, our thought breaks and is replaced by a different thought, related to another object, person, or action. In this case the new thought does not follow from the previous one, having a different motivation.

May be the fact underlined above is important, that in order to think we need the connection of our conscious mind to objects, beings or real or imaginary actions. Thoughts cannot follow by themselves one from another in any other way. In mathematics, as well as in the real world, this thought interruption by changing an object or an action, having as its result the birth of a new thought, a new rationale, was proven to be very productive and was always at the basis of great renewal. When Cantor uses a mathematical artifice placing in bi-univocal correspondence the set of natural numbers with its subset of even numbers, showing that two sets, of which one if a subset of the other, are equivalent, it marveled the entire mathematical world, and it revolutionized it. The same happened when he took out of the set of natural numbers the number 1 and he added it to the end of the set of infinite natural numbers, or when he proved that the set of real numbers is strictly greater than that of natural numbers. Actually Cantor did not prove through mathematical proof anything other than the creative power of the human brain, which it wouldn't be good if it stumbled on apparent contradictions – the part is equal to the whole, adding a finite number to an infinite series is possible, and two infinite sets can be different, one being strictly greater than the other – or as Lucian Blaga said in *The Dogmatic Eon*, contradictoriness, which he also called dogmatic thinking, quoting Philon: *...from the primary substance emanate secondary existences, without the primary substance suffering any diminution through this process.*[35] The primary substance was a sort of set of all sets from which secondary substances emanated, like personal subsets.

An artifice in resolving a mathematical problem... I remember, in 5th grade at the Spiru Haret High School during the war we had a math teacher, his name was Zverca, who had been a gunner in the First World War and was a little hard of hearing, so we messed around in his

[35] Lucian Blaga, *Trilogia cunoașterii,* Editura Regală pentru Literatură și Artă, București, 1943, p. 19. Translated for this paper by Ana-Catrina Buchser.

class. Still... Professor Zverca taught us what it means to use an artifice to solve an equation, a problem. He gave us problems for the highest grade (a 10), too, to stimulate our creativity, problems for which not few hands were raised and we all participated with animation. One time he gave us a harder problem. Then he said it was for a11. A classmate solved it. The entire class was climbing on the teacher's desk to see him write 11 in the grade book. Zverca wrote 11. Those math lessons were a joy for all the students in class. Nobody skipped those classes.

Be they ARTIFICII from a mathematical construction, be it using thinking in everyday life, in which apparently contradictory situations are abundant and it doesn't bother us, in any case from these events our thinking which orients itself after objects, beings or actions (be they realities, ideal objects such as numbers, or even imaginary objects), our thinking is far from following by itself only from a previous thought. Novelty, the unpredictable, something that comes over a previous thought, is often the law of a productive thinking.

Until now I showed more what is similar between logic (thinking related to objects, beings – be the ideal, imaginary or real) and mathematics (ideal object: numbers, symbols, operators, etc.) Let's see if something differentiates them, if they are different and how different they are.

The mathematician seems to only have as objects for thinking numbers, symbols. He is in an ideal, abstract world, which can be abstracted from reality because 10 apples and 10 pears are first apples and pears, and only then can you associate a number with them, whatever the number, because the number does not change anything from the qualities of apples and pears. The same happened in geometry, mathematical discipline that appeared from the need to separate agricultural properties, especially when floods erased any dividing markings, as it took place in the Valley of Nile, Tigris and Euphrates, as well as in other river valleys in India, Pakistan or China. But geometry, just like counting fruit at the market (and most likely their weighing) quickly made its way into the abstract world of numbers and symbols. Mathematics evolved into an abstract, ideal world, much like Pythagoras understood the world of numbers, even if for Pythagoras this world of numbers was the existent. For him thinking created the existent, ontology.

For logic it is more difficult to avoid reality, real objects. Plato, when he tries to find the sophist, to define him, he is looking for the sophist, not someone else. He finds the fisherman, whose trade is close to the sophist's (even if the sophist doesn't catch fish, doesn't fish, he is a sort of water hunter). In the dichotomous structure, dichotomous logic used by Plato *x* can be used as symbol for the one searched, and couldn't we state? What do you think? Correctly that *There is an x, whatever this x may be, which x is the Sophist.* Of course we would need a man that makes demonstrations which Socrates called *sophisms*, but this man can be anybody.

What happens in Aristotle? Logical figures send to objects, beings or actions. *All people are mortal, Socrates is a man; therefore, Socrates is mortal*. Still, Aristotle tries to build a formal logic in which the existential and universal functors, *One exists...*, *All...* can be as free as possible from ontological reference. All these attempts continued for a long time, around 2000 years, until mathematical logic took over logic, transforming it into mathematics, or into calculus with symbols instead of numbers. This meant the elimination of any ontological reference. The transformation of logic into mathematics happened in about the same way apples, pears, agricultural surfaces transformed into mathematics. There is a very important difference. Arithmetic and geometry were useful, so was algebra. Mathematical logic, I don't know to whom they are useful, or to whom they were ever useful...

There is another important difference. Logic claims to offer us the laws of correct thinking. The question arises: before Aristotle, people couldn't think correctly? If we think correctly without knowing the laws and theorems of logic, then what does logic mean? Especially since nobody uses it when they go to the market, or they cross the street. Yes, but... we still think, and sometimes we think correctly while sometimes we don't. Logic should be an explanation of the way we think correctly, or incorrectly, which is something else other than a science which gives us laws with which to think correctly. It should be a science related to the processes of thinking, a science different from psychology but a science related to ontology. Or related to what we live with every day, the objects and people we meet, with whom we have an interaction.

The question remains: Is logic, I wonder, mathematics? Logic was lost and what was left behind was mathematics, a little sterile. Outside of

the boolean logic which abstracted and placed in the world of numbers the Platonic dichotomy (perhaps it also added Augustus De Morgan's universal discourse or, if you prefer, D'Alambert's Limit), logic of great success in the world of computers, world which dominates us today. Outside of computers, logic remains with only minor attempts that have limited application, such as polyvalent logics, modal logics and fuzzy logic.

Modal logics are those that try to recover the ontological, on some rather limited areas, introducing ontological references in their axiomatic. As Anton Dumitriu[36] tells us in his *History of Logic* (Ed. Didactică și Pedagogică, București, 1975), "...there appears a logic with practical character ... Under a generic name it is known as the *deontic logic*, this logic will have many parts, as it will occupy itself with one domain or another: the logic of values; the logic of norms; the logic of imperatives ... normative logic, axiological logic, optative logic, preferential logic, the logic of choice, the logic of "better", juridical logic". Gorun Manolescu writes about the logics that appeared as a result of new discoveries in microparticle physics "...this happens every time a new crumb of (empirical) reality is investigated experimentally – objectively and it no longer resembles other crumbs investigated earlier. Thus appeared quantic logic, the logic of paradoxes, of non-linearity, superstructural logic, probabilistic logic, etc, etc, etc,... this is how we arrived at *paraconsistent* logics...", logics that can no longer guarantee the consistency of a series of steps of thinking, pasaconsistency which is defined "...so vaguely that it could sub-add any new instance of particular logic ... for example Florentin Smarandache's "neutrosophic" metalogic..."[37] From this point of view it is interesting that there seems to be the need of logics related to reality, ontological. We started with the logic of three values, Lukasiewicz, we arrived quickly, which was to be expected, at logics with infinity of values. Polyvalent logics try to avoid the excluded middle and the law of contradiction into which, in the end, they keep bumping. The contradictory logic proposed by Ștefan Lupașcu replaces the values of true and false with those of *Actuality* and *Potentiality*, transforming contradiction into a couple that anyone can

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[36] *Istoria logicii,* Ed, Didactica şo pedagogică, București, 1975, p. 964, translated for this paper by Ana-Catrina Buchser

[37] From the volume "*Despre postpredictibilitate*", în www.roliteratura.ro ,Filosofie-Istorie. Translated for this paper by Ana-Catrina Buchser.

accept which leads to the annulment of the law of the excluded middle, as I said above. There are other attempts to surpass the inefficiency and mistrust in school logic, be it formal or contemporary axiomatic systems. All, or most, are attempts to approach reality, the life that surrounds us. Still, these attempts to approach reality remain tributary to axiomatic models and, even though they are built on an ontological basis, want to become free of ontology, they would like to remain only in the ontology of numbers, which is a mathematical domain.

I would like to be able to prove, and I tried in the paper *L.E.J. Brouwer and what our thinking should look like*[38], that here is, despite their force borrowed from mathematics, the great weakness of logics called mathematical, it is exactly their inefficiency. Who uses Aristotelian syllogism, the formalism of this logic in an argument, in everyday thinking? And how effective are the attempts to build a logic that will bring rigor to a domain of reality – be it in contemporary physical reality or in less rigorous domains?

In the existent, in *to on*, in the world that surrounds us it is very difficult to make a doubtless statement, in general terms, which cannot be contradicted. But this is possible when we address a certain known domain that we can describe when we apply the known rationale strictly to a certain domain. Let me explain. When we speak of a certain object we can state that it is in front of us or it's not in front of us. An action, a certain situation, we can easily say if it is, was, correct or not, if it has truth in it, or if it is a falsity, a lie. When we have something determined we can make clear statements. That's why juridical law which wants to be applicable to any similar situation is useless and an experienced lawyer can free any criminal. The only legal, penal court that is correct is that one with a jury who can decide, many of them and not just one, according to the laws in place, the facts at hand. A judge who applies the law can become a lawyer in contumacy and apply the laws wrongly without needing justification (especially when he is *stimulated* to do this). When you know how to use lies, justifying anything is always possible. I will not continue, for ethics is not my theme, but logic.

It is true that I introduced here a term I did not explain. *Efficiency*. Does logic need to be efficient? Let me pose another question: Why do we think? Allow me to answer (without climbing into the metaphysics

[38] In Noema, IX, 2010, p. 133/148.

of being like Heidegger): in order to exist; in order to recognize the objects and beings with which we come into contact (closer or further), in order to have actions that are for our benefit or for the benefit of those we love, in order to have efficiency in life; in order to be able to work our land or someone else's and to produce, to achieve, something that we are someone else needs, in order to be useful. Everything we think is under the sign of efficiency. If I place a step in front of the other and I walk down the street it is because I want to go somewhere, because I need to go there. That's why we saw that Dharmakirti's Indian logic starts with the efficiency of our thinking in an action.

Here I will open a virtual parenthesis. *Occam's razor* (William of Ockhman 1285–1349) is well known among thinkers: "pluralitas non est ponenda sine necessitate" (plurality should not be posited without necessity) as well as " entia non sunt multiplicanda praeter necesitatem" (entities should not be multiplied without necessity), or " Numquam ponenda est pluralitas sine necessitate" (Plurality must never be posited without necessity)[39]. A statement much used, especially by logicians and mathematicians of today. A very harsh statement which can easily be used in an exaggerated way. As a matter of fact, great thinkers pointed out this possibility. Statements considered anti razor. Immanuel Kant stated "The variety of beings should not rashly be diminished"[40] and Einstein said "Everything should be made as simple as possible, but not simpler".

It's true, and this is what I'm trying to say, that efficiency is what leads man's thought, most of the time. Efficiency, need, necessity, it is an unwritten law of human thinking of which each one of us takes notice. But it is equally true that it can be dangerous when we refuse, leave outside, a theoretical construction because it seems we don't need it. Here it is sometimes very hard to choose, especially when we are contradicted *post factum*. Maybe sometimes it's better to allow our sensibility to make such a choice, even if it may be wrong (something nonviable is uncovered pretty quickly), instead of our rational faculties.

Maybe I have brought you to a place where efficiency of thinking meets the need to have a logic related to ontology.

Let me explain. Thought needs efficiency so that we may survive on this Earth, efficiency in every daily act, efficiency in scientific domains,

[39] Occam´s razor, Encyclopedia Wikipedia.

[40] Free Encyclopedia Wikipedia.

such that *Occam's razor* does not apply to us. Logic pretends to want to support thinking, to model it, possibly correct and sustain it. This means it will support the need for efficiency of thinking. Thinking can only be efficient when it describes real or imaginary facts and objects, describing a certain fact or object, which means it is very close to ontology, to what is, to what we can perceive with our senses or imagine.

It is such a simple, clear and old statement that it may be hard to accept. The work of 2000 years of so many wise minds from Europe who made efforts to build a logic as free as possible from reality, as abstract as possible, so that it can be closer to the truth, to the truth given by reason and reason only, is very difficult to surpass. Sometimes we prefer what is more complicated instead of simplicity and clarity (what is simple and clear is too available to everybody). Why would freedom from ontology, distancing from reality, mean proximity to truth? I don't understand this prejudice.

Actually I should understand it. Everything, in our European world, as I said above and I apologize for repeating myself, everything comes from Heraclitus and gains being in the Eleatics. The "obscure" Heraclitus taught us that everything has a flow, a constant change because we cannot dip our legs in the same river water. He, Heraclitus, frightened the Greeks who started to search for support in thinking. Parmenides and Zeno of Elea offered it through unity, through 1. Zeno's proof that Achilles the quick footed cannot reach, while running, the tortoise, or the arrow that stayed suspended in the air, confused them. The students who didn't understand were beaten so they would understand that one is reality and another thinking. The horse goggles that this Unity means for the Eleatics stopped them from approaching infinitesimal measurements and the number 0. Since only 1 exists, zero could not exist, non-being did not exist for them. Although this Eleatic thinking was surpassed, the prejudice remained and we inherited it in logic. Mathematics freed itself from it through mathematical analysis, as we will see. I will be accused of infantilism because I ask logic to be related to ontology, maybe even to come back to certain materialistic positions which were, I admit, dangerous for freedom of thought in philosophy.

Many years ago, when I stilled battled with preparing by doctorate in logic (doctorate which I did not defend advised by someone older than me who said "doctor, why do you need a doctorate in philosophy?") a mathematician friend of great finery, algebraist and

specialist in the theory of categories – Nicolae Ionescu – university professor at the Faculty of Mathematics, laughed when I talked about the logical fundamentals of mathematics. I was after my first encounter with the Cantorian theory of sets. He didn't give me an explanation, but I always remembered that laugh. Every now and then I wondered what was wrong in this statement? What is the difference between logic and mathematics? Why is mathematics not logic? At that moment I reached the conclusion that the most important difference between logic and mathematics is related to ontology. Mathematics has their own ontology, numbers, and they no longer need in the construction of a proof any other ontological reference (we will later see the final thought). Logic, on the other hand, disconnects more difficultly from ontology. However much logic would like to be mathematics it cannot, it is related to thinking, which in turn is related to reality, to the existent. In mathematics, thought can break off from what exists, and it can run freely through infinite and abstract spaces.

I understand the logicians' desire to gain the freedom of the abstract. It can become mathematics, as many creators in this domain have proved it. Becoming mathematics, it no longer has anything to do with our everyday thinking. Its efficiency, the efficiency we talked about earlier, and which is *primum movens* of any thought, this efficiency becomes evanescent, it no longer is, it vanished. Then where is logic?

It seems that the *Great Goethe makes, in a certain passage from Wilhelm Meister ... a recommendation about the way life can be correctly lived, and that is "Think so you can act; act so you can think!" ..."It is a recommendation that contains in it the entire wisdom of life", he reflects...*[41] How much this resembles the way Dharmakirti begins logic "*Because all successful human action is preceded by right knowledge ...*", truly, any successful human action must be preceded by thought, by logic, by correct knowledge, this should be the entire wisdom of life, and that's because life is something other than reason! And logic cannot avoid life.

The great Parmenides believed only in reason. Aristotle followed him closely and in order to convince he used inference and syllogism. Contemporary mathematical logic searches with desperation new proofs of a trust without limits in reason. I propose "the taming of the

[41] Robert Musil, *Der Mann ohne Eigenschaften,* în romanește de Mircea Ivănescu, capitolul 112, *Arnheim își trece tatăl* …,Polirom, 2008, p.703. Translated for this paper by Ana-Catrina Buchser

shrew", or a reason that needs to lean onto the existent, on reality, on what *is*, on *to ov*.

I said that European logic maintains its identity principle unchanged from Aristotle until today. Without these laws of identity logic would lose its consistency, everything being possible. It seems we couldn't think anything for sure without knowing what is identical with itself, what is identity. I already said that there probably also needs to be a principle of the other, of otherness. Just as I must know that I am identical to myself I should know and allow the right to exist of the other, the one next to me, of another.

If these two principles were recognized, both, not only just that of identity, then we could finally separate ourselves from Eleatism and be able to build logic close to reality.

European mathematics took zero from the Indians through the Arab succession. Infinity was known from antiquity but 0 couldn't be known because of the Eleatics. Their use as numbers lead to difficulties especially in multiplication, division, and power. A simple infinite series of numbers can raise problems. We will show you that the addition of an infinite number of zeroes can raise difficulties, reaching contradictions.

ANNEX

Differentials

Suiseth Series ... an infinite sum of numbers smaller than 1/2 can be infinite even if the respective numbers approach **zero**.

½+(1/3+1/4)+(1/5+1/6+1/7+1/8)+.....0

... the bizarre nature of infinity appears clearly in...

series 1–1+1–1+1–1+1–1+1.....

0+ 0 + 0 +0 +0 0

grouped otherwise

1+(–1+1)+(–1+1)+(–1+1) .....

1+ 0 + 0 + 0 1

The same infinite sum of zeroes can be equal to 0 or to 1

The addition of an infinite series of terms can lead us to strange and contradictory results

An infinite sum of zeroes can be equal to anything and nothing at the same time.

The infinite series of zeroes has no logical sense but mathematicians have ignored the difficulties of logical variety... provoked by the addition of an infinite number of zeroes...

Moreover: every time they tried to work with infinity or zero, mathematicians obtained illogical results...

Mathematical analysis does this.

Newton, in differential calculus, proposes a method of calculation based on the **fluxes – fluctuations – of mathematical expressions** which he names **fluents**.

$$Y = x^2 + x + 1$$

The fluents are y and x: Newton presumed that y and x change, fluctuate!!!

Yes, but; it is an infinitesimal change – here he uses a trick of notation.

There appears (0x)2 which being too small, he can make disappear. The same with (0x), they are all 0.

Berkeley will write against Newton "Can we name these quantities infinitely small spirits of the disappeared quantities?

Newton and Leibniz were right. These infinitesimals changes gave engineers, scientists, a mathematical instrument, **mathematical analysis**, very efficient, which they could use practically. So they won and nobody cared that the laws of logic were being broken, not respected.

Fluctuations, fluxions, fluents, are the possibility to change (even infinitesimally) ***the Identity*** **in order to approach reality, *TO OV*, to give an *other***.

This was Newton's trick. It didn't matter that Bishop Berkeley was right, logic was broken.

Newton also broke some of the prescriptions of mathematicians before him: **division by 0**.

The fluxion method through which Newton eliminated 0 from the numerator and then also from the denominator (dividing by 0) **was an illegal mathematical operation** which had the advantage of **WORKING**.

It gave exact results.

Even more. Newton gave the solution to the calculation of an **Area**. Operation opposite of differentiation, **integration**.

Mathematical analysis is a combination between differentiation and integration, maybe we can say, a combination between *other* and *identical*.

Newton broke a few important mathematical rules: the game with the powers of 0 and infinity. But – **mathematical analysis was so strong that no mathematician could reject it.**

Let's see what happens with a well-known relation

vt=x (distant)

Most of the time it is a erroneous formula. It is only useful it v is constant – again here appears identity which must be broken through the calculation of Newton's fluctuations who also includes variable speed.

That's why the relation above cannot be a universal law.

Nature speaks in equations. Yes; but in differential or integral equations. **This means that mathematics is strong only if it folds itself after reality!**

Mathematical analysis applies in all cases and in all conditions!!! It is a Universal law!!!

This was possible, with all its gaps, because of the mathematics of 0 and infinity.

Mathematical analysis – Newton and Leibniz – bring together the concepts of

Position, speed and acceleration

X – position; v is fluxion – **derivated**; and acceleration is the **derivate** of speed.

Position would be **Identity**. But position can deviate, derive. How is it produced? Through acceleration.

Fluxion of Identity.

A simple differential equation describes the motion of all bodies in the universe

$$\mathbf{F = mx}$$

Newton was able to create a simple differential equation which describes the motion of all bodies in the universe ... where F is the force that acts upon the object, and m is its mass. ... The general version of Newton's law is $\mathbf{F = p}$, where p is the kinetic moment of an object when mass varies, which was later perfected by Einstein.

(Universal Law)

After this model we can say that Identity when it is constant can be a law in a particular case, but not a Universal law. If a fluxion is applies to identity (even if it is infinitesimal), a modification through a differential law that we can call **Logical Differentials**, then it can become a Universal logical law.

How can such a logic function?

Allow me to use the same path. To use the evolution of mathematics.

Newton's and Leibniz's work was based on a shaky foundation – the division of 0 by itself.

I will not linger at L'Hopital's rule who was able to transform 0/0 into 1/1, or 1.

Newton's and Leibniz's method of mathematical analysis depended on the division by 0 and on the numbers that disappeared miraculously when they were raised to the 2nd power.

Nobody worried anymore about dividing by zero when ignoring mathematical rules was convenient, explaining absolutely everything...

LIMIT or The Universe of Discourse

D'Alambert gave life to the idea of limit in mathematics.

When in a mathematical expression infinity appears or when you divide by zero, all mathematical operations go astray... Nothing has logic anymore. Even the + sign seems deceiving. Putting the limit symbol in front of a series ... avoids using infinity and zeroes.

Achilles' sub-races are finite...

Every partial sum from a limit is finite...

Infinity is transformed in finite and all mathematical operations start to function.[42]

In the 1970s, being still a philosophy student, I used the Universe of Discourse, notion introduced by Augustus De Morgan, with which I considered a delimitation into a logical expression. For example **negation**. Non – apple is not any object on Earth and the skies. You can make a negation related to fruit, a negation related to food in general, or only to certain types of apples.

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[42] Everything is quotes from Charles Seife's book *Zero,* chapter 5, subchapter *Zero and the mysterious mathematical analysis.* Translated for this paper by Ana-Catrina Buchser.

In the theory of sets, the notion of set is rather ambiguous. In the (cited) example given by Professor Paul Flondor last year a set was formed from diverse and varied objects, but the author of that example felt the need to enumerate all these objects. He therefore had, implicitly but without declaring it, a limit that contained these objects.

In logic, even if we are not talking about infinities or zeroes, like in mathematics, we need to delineate the Universe of Discourse which we are referring to in order to avoid an ambiguous expression. This delineation can change the laws of **Identity, Non-Contradiction and the Excluded Middle**, from laws with quasi-universal validity to laws with a limited application between certain limits.

Conclusions:

Especially in logic but also in mathematics[43], as we have seen, we cannot make statements or negations with meaning without a strong tie to the existent on which we depend.

Logic cannot abstract itself from this ontological relation, it cannot be completely formal, free of content and built axiomatically. Better said, it can do such a thing, but then it finds itself in the situation described by Parmenides, it is a mental construction that uses symbols that no longer have any connection to reality, to the existent, to the moment from which these symbols were extracted, abstracted, at a certain point.

The Law of Identity is necessary for our daily life, but it is not a strict identity but one that is relative to a certain Universe of Discourse.

The Laws of Contradiction and Excluded Middle have the same fate, they also depend on a certain Universe of Discourse.

Only thus can logic becomes a **Universal Law**, only thus **Logical Differentials** may tell us something about our way of thinking, or in other words, our way of thinking may be modeled, a model can be found for it, a scheme, through which we might understand thinking.

My grateful thanks to my daughter Ana – Catrina Buchser for her help in the translation of this paper.

[43] In mathematics a reduction is applied, we are only interested in the quantitative, the number.