THE MICROENVIRONMENT AND THE HUMAN SPACE

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ABSTRACT

The paper uses the concept of *microenvironment* both literally and figuratively, as a targeted focus of the scientific research on delimited spaces. And the *human space* is the entire world of both cultural meanings and physical factors, landscapes and systems which constitute the "nest" of the human species. The point is that though there are microenvironments, the human space is more than the ensemble of all their types. Thus, the core of the paper structures around the manners in which both the scholars and the large public in different positions treat these two hypostases of space.

The present situation of the treatment of space has its origin in both the different scientific traditions of the concept of space – transposed into "worldviews" (something more than philosophy) and the social relations with their constructions of practical and conceptual order. Accordingly, the paper highlights some aspects in the evolution of scientific boarding of space: especially the research of matter-energy-information as underpinning the representations of space, the objectivity and the constructed character of space, space as a receptacle or as a relation, and also continuity and discontinuity in/as space. The scientific approach of space has erased the speculative philosophy as source of knowledge about it, but this scientific approach took place *after* the development of philosophical speculative theories about space.

The "science of space" has arrived to the demonstration of the inexistence of a unique space for all the living beings – and in some respects, for humans – and at the same time to the *dialectics* of *objective* measurements and treatment of the *subjective* spaces.

The main concepts through which people envisage space are nowadays those related mainly to environment, to ecology. They are confronted with anthropocentrism, but first of all with the difference between the advances in the present science and, on the other hand, the inertia of practical treatment of space. Concerning science, the research of both microenvironments (of different sizes) and the ecology of Earth shows the necessity of coherent global policies in order to *slow* the various crises of the human space: it's too late to stop them; but not because of objective natural logic of the processes related to space, but because of the socially induced postponement.

The present crisis of the human space is so huge that one speaks about the end of the human species. The critique of this theory shows that the future is open, but at the same time that today more and more people search for and experience new ways of life. The necessity of these ways is deduced not from ideal social models but from scientific research. Therefore, the problems of space are under the sign of time, even more clear, of emergency.

KEYWORDS: space, science, nature, environment, microenvironment, anthropocentrism, ecology, constructivism according to meanings and values, reductionism, ecosystem, biosphere, landscape, habitat, truth, amnesia related to nature, "finitics"/end of the human species.

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1. Warning

The paper uses "science" (in singular) only for convenience. In no way does it consider a unique science/scientific authority. On the contrary, science is "situated"[2]/it is contextual and a profoundly socially framed institution, thus full of contradictions, reflecting the social contradictions; namely, the power relations/*the domination-submission relations which are first of all, economic*. One of the reasons of the paper is just to emphasise some of these contradictions. They refer to the approaches by which science has understood and understands space in both its natural and social forms and, on the other hand, to the ways in which space is treated by the power structures. The above contrast between science and politics should not be taken as between the good and the bad. The institution of science, too, has expressly contributed to these policies: it is not only a helpless *ancilla* in the service of power relations. However, the development of science shows its pluralism: competing interpretations, starting from competing paradigms to competing conclusions, both technically and socially. And certainly, there is not only about science and policies, *as if* there would not be people outside them. These people are influenced by both policies and knowledge paradigms, and they are divided as well. But this branchy picture does not suggest the immobility resulted from the impossibility of judgement: the *outcomes* of human actions and deeds are those which send people, including scientists, to remake their trajectories[3]. Science, as philosophy, is a part of the human culture and thus it is not only deployment of specific discourses and their tools, but also action. Only when science and philosophy detach the discourses from practice they do become political means for narrow effects, separated by the general ones. However, as each element of culture, science is historical as well: here we cut out the element of subordination to restrictive policies, seeking to demonstrate the causes of historicity (temporariness) of this element.

2. Instead of introduction: space is objective only if it is constructed by (human) beings

Space, as time, exists only for humans. Or for the living beings, said von Uexküll, since only the living beings enter intentional relations and thus give significances which configure *their* space and time[4]. However, because the *meanings*[5] given by humans and thus the space they construct are

[2] See David N. Livingstone, *Putting Science in its Place: Geographies of Scientific Knowledge*, Chicago and London, University of Chicago Press, 2003, but also Isabelle Stengers, William James**,** *Une autre science est possible ! Manifeste pour un ralentissement des sciences (suivi de Le poulpe du doctorat)* (2013), Paris, La Découverte, coll. « Sciences humaines et sociales », 2017.

[3] David Holmgren, *The Apology: from baby boomers to the handicapped generations*, March 14, 2019, https://holmgren.com.au/the-apology-from-baby-boomers-to-the-handicapped-generations/.

[4] The mental self projection in time is far more developed than the self projection is space. This is the reason of humans' need to experience alien spaces. But this experience is culturally, namely, ideologically forged. In order to transform the need to experience spaces into lucrative means, the modern system has imposed the image of "void" spaces ready to welcome the tourists, as if these spaces were lacking in local people other than those serving them in different manners: in this modern image, spaces are receptacles, and *not* human relations.

not only quantitatively but also qualitatively superior to the meanings and space generated by the living beings, we can accept the generally expressed first proposition.

Certainly, we can assume that all the objective relationships are aimed at forming space if we understand that existence means *relations/interactions*. (Through these relations the entity – *matter* with its energy and information properties/faces or, more or less poetically, entities having *three faces*[6] (matter, energy and information) configured and manifested just in and as a result of the relations which configure positions, arrangements, agglomeration and diffusion etc. and in which and from which the entities "respond" manifesting their informational face[7] and at the same time behave in specific manners, manifesting their material faces, this including energy[8] – is

[5] The meanings were conceived of as the *raison d'être* of knowledge, as showing their relevancy or pertinence. See Luis J. Prieto, « Le 'point de vue' dans les sciences », *Linx*, 7, 1995, pp. 1-5; Jeanne Martinet, "The Semiotics of Luis Jorge Prieto", pp. 89-108, in Thomas A. Sebeok (Ed.) et al., *The Semiotic Web 1989*, Berlin, Walter de Gruyter, 1990.

[6] Pierre Madl & Maricela Yip, "Information, Matter and Energy – a non-linear world-view", ResearchGate, 2006, pp. 1-10.

[7] See Shoichi Toyabe, Takahiro Sagawa, Masahito Ueda, Eiro Muneyuki, and Masaki Sano, "Information heat engine: converting information to energy by feedback control", *arXiv:1009.5287.v2* [cond-mat-stat-mech] 29 Sep 2010, pp. 1-6.

[8] *Energy can be defined only through its consequences*. But it is *relation*/movement: internal to a *substance* – matter moving at a slower speed than the speed of light, while the *radiant energy* moves at the speed of light – and related to the *interaction of the substance with its environment* (that is a field of energy). There are different types of energy, according to the relations of matter: energy of movement (mechanical, electrical, thermal), energy of binding (of molecular cohesion, of chemical binding, of atomic binding and dis-binding, of nuclear binding), potential gravitational energy or energy of gravitational binding, rest energy, activation energy, work and effect energies, physical and bio-energy of different forms/at different levels. In all these types there is about a *conversion* of energy in new states of matter and energy. The energy that is converted is called *free energy*, and the result of conversion is always twofold: the *new state* and the energy waste/*degradation*.

All of these types may be understood on the basis of some *principles* (see Valeriu V. Jinescu, *Energia, energonica și termodinamica*, București, Editura AGIR, 2016 [Energy, energonics and thermodynamics]): conservation, irreversibility, accessibility, critical energy, reluctance, minimal action; and all these types highlight some *laws* (of energonics): of the critical states of matter, of the equivalence of processes and phenomena, of the coexistence and complementarity of order and disorder, and of transitory regimes. Their functioning shows that, on the one hand, because the degradation of energy in heat (thermal energy) is irreversible, in order to compensate this process a *supplementary* energy is needed (added from without and irrespective here of its integration in the internal functioning of the system); on the other hand, in all the natural processes, the degradation of energy tends to minima/is minimal.

The V.V. Jinescu's critique of the second law of thermodynamics – that it is confuse (including because it refers either to the accessibility of thermal energy, or to the irreversibility of cyclical processes because of friction, or to the processes of heat transmission in the sense of lowering the temperature); it derives physical concepts from mathematical notations (or physics needs the subordination of mathematisation to its concepts and quantities); it does not differentiates between the *irreversible dissipation of energy* and the *accessibility of energy* it "deduces" from it, the irreversibility of processes always taking place in time, thus irreversibly (while the accessibility of energy results from the irreversibility of physical processes in time, to which the order/disorder and equilibriums are related) etc. (pp. 278-280, 285, 289) – is consonant with that from the article of Arto Annila, Keith Baverstock, "Discourse on order vs. disorder", *Communicative and Integrative Biology*, 9(4), 2016, 1187348, doi: 10.1080/19420889.2016.1187348. (https://dx.doi.org/10.1080/19420889.2016.1187348)

The authors demonstrate that the law – as it is used – focuses on disorder and order, and not on the logic of energy conversion, i.e. not on the "consumption of free energy", because Boltzmann's supply of concept of entropy was based on the ideal gas' internal uniformity of positions and moments, and did not consider at all the real processes where only energy transmission/conversion transform the states of a substance. On the contrary, when taking into account this energy movement, the order/disorder of a system strikingly appears as *relation* between the system and its surroundings (as energy differentials) and is always *in* these surroundings, concerning the states of the *two* systems (the system and the surroundings). Consequently, and because the systems themselves aim the consumption of free energy, what is important in this process is the consumption of energy lying in the interstices between the system and its surroundings and, on the other hand, that the conversion – from the system to the surroundings or vice-versa – takes place until the last amount of free energy was used. Until the conversion of energy takes place, entropy is high, and fluctuant

specified and transformed involving interstices, internal and external spaces and vacuum, energy storage and dissipation, order/negative entropy and disorder/entropy, fields, potentials and differentials of energy. Therefore, existence means both material and informational[9] *relations* inherently connecting proximal/successive matter-information forms/quantum states (for example, as the strong and weak nuclear interactions).

In all these relations, what appears first is not quite the space, but the distance: between all of the delimited forms within the continuity and movement of fields entering reciprocal relations. Only as a result of these relations, something is generated as space: the fields. And conceiving existence as the result of relations – generating the *substances*, in Aristotle's meaning, or forms of matter-information entities[10] – we may go further by arriving, from the topology and transitivity of relations *hic et nunc*, to the waves and gravitational and electromagnetic interactions/ forces. All of these show the link of the local symmetries with the global ones or the correspondence between them, a resonance of the proximal distances with the large space. However, according to the quantum theory, the entire existence is interconnected, the discrete appearance in the world we know as being only "forms", certainly real just through the movements and manifestation of the three faces of the existent entity, but no lesser transient. What is remaining is the *continuity* where *space is relative, fluctuant and just a measure subordinated to the idea of interactions*. Only in the sensible world distinctness and discontinuity are taken for granted. The living beings perceive separate things according to their focus on them/to their intentionality, as Brentano and Husserl made this last concept famous; and then, the world appears for the living beings – and for humans, obviously – as both the big grey and the innumerable collections of objects (which are objects just

according to which of the systems is considered. When all the free energy was converted, there is no longer conversion and the entropy of the two systems is balanced, excluding any gain/loss of energy on one side or the other.

In the living systems, the quest for balance with the surroundings in the least time is more obvious, including because the self-organising processes specific to life are dependent on the surroundings. At the same time, the order of a living system may organise at the expense of both other living systems and by overflowing the surroundings with non-necessary/even harmful disorder. And because the living systems have initiatives in using and transporting energy, they do not depend only on the initial conditions, but also on the initiatives along their entire life.

[9] Information is physical, too, and is inserted and enhanced in the energy flows and differentials. It is explained in the frame of thermodynamics, as "a way to disperse energy" and "machinery for energy transduction". Information happens in energetic terms", see Mahesh Karnani, Kimmo Pääkkönen, Arto Annila, "The physical character of information", *Proceedings of the Royal Society A*, 465, 2009, pp. 2155–2175, doi:10.1098/rspa.2009.0063.

[10] In fact, from ontological standpoint, there is a difference between the structural information of systems and, on the other hand, the information contained in/carried in the "message". As it is known, in this latter meaning, information is an informational *relation* – as exchange of signals – between two (or more) systems. The exchange as such is a transport of energy (related to matter, thus to material relations) and the forms/modulations related to the transport of energy give/is information: for the receiver that translates this information and uses it as a basis of new matter-energy-information relations. Thus, information means both *in-forming* the material systems (through energy differentials and matter modification) and *interpretation* of this in-forming: interpretation that means, in its turn, both simple translation of the in-forming in the "language"/form of matter-energy of the receiver, directly and indirectly, and the use of the informational process/result. In this way, it is possible to separate information from the material system, and treat it. See Victor Săhleanu, « Vers une théorie physique de la liaison informationnelle », *Actes du 4^{e} Congrès Internationale de Cybernétique*, Namur, 1964, pp. 102-106.

For the multiple definitions/meanings and thus, aspects of information, see Victor Săhleanu, "Ontologia și metodologia universului informațional", *Revista de Filozofie*, 9, 1971, pp. 1147-1155 [Ontology and methodology of the informational universe]: comprising/vaguely defined (speaking about generalised entropy and generalised redundancy), formally or mathematically defined, or as a means of modelling in statistical physics, or related to ontological aspects (quasi-information, matter-energy-information or substance-energy-information, these triads parallel to matter-movement-mirror (with loss/gain, amplification/copying, semantic concentration, abstracting, distortion, representation and translatability, imitation, mediation, correction and triggering, coding, invariants, reaction circuits), or related to (statistical) selectivity, or to ordering, or to physical entropy, etc.

because they have meanings given by the living beings, irrespective of the qualities of these meanings).

Anyway, space – that, in quantum theory, is always *space-time* structure, i.e. structure of energies in both fixed/discrete and dynamic states – is always at plural (spaces), organising "the flow of energy"[11]. But the same *space-time* unity with dimensions exists according to the General Theory of Relativity (GTR) about the Universe: however, this unity is no longer fixed, as the traditional philosophical representation of space as "receptacle" of events, but, from 1905/the special theory of relativity, it is rather a direction, while from 1915/GTR, it participates, being influenced by and influencing the events[12]. This turn in theory occured because, from Einstein, the world as it is known became *dependent on the observer*. In philosophical language, the object remained objective (existent) but its qualities appeared as dependent on the subject's position, sensitivity and knowledge: both the certainty and uncertainty becoming historical, i.e. transient and ephemeral properties. And the new physics has developed even by advancing the *potential* properties at small quantum states and the complete description of a quantum state only by including its *potentialities* – a very interesting translation of Aristotle's ontology – which show that a particle in quantum is understood only on the basis of its "every possible history" or, better, of all its histories/"the sum over histories", even imaginary, just this being a premise for the efficient calculus in the real world[13].

But all of these were demonstrated, i.e. mathematically calculated. And something very interesting happened – and must be understood as an *epistemological* phenomenon and model: while for mathematics the time does not exist – and the space is always a calculable variable and, thus, fixed, just in order to helping the calculus of the problems – thus while mathematics operates with absolute essences, its use helped to arrive to physical theories where these essences do not exist (anymore) and, on the contrary, the theories emphasise a deep *existentialist* pattern. Once more, mathematics is a human tool without which the events do not exist in a scientific theory, being only "intuitions". And the space-time may be *measured* both in the *small* quantum world and the *large* scale universe: irrespective here of the different meanings of matter and energy on quantum *small* scale and the Universe' *large* scale considered through the GTR, or of different laws for the *small* and the *large* the mathematical measurement describes, and irrespective of the *mental space* as the boundary/the in-between of these two kinds of laws and spaces[14].

However, all the above are, letting aside the scientific conclusions they integrated, a philosophical image. It is legitimate until the scientific research does not offer a better accurate theory, the only problem being thus *to not prolong the philosophical theory beyond its life*[15]. It

[11] Pierre Madl & Maricela Yip, p. 4.

[12] Stephen Hawking, "Einstein's Dream" (1991) in Stephen Hawking, *Black Holes and Baby Universes and Other Essays*, Toronto, Bantam Books, 1993, p. 65.

[13] Idem, p. 72.

[14] Roger Penrose with Abner Shimony, Nancy Cartwright, Stephen Hawking, *The Large, the Small and the Human Mind* (1997), Edited by Malcolm Longair, Cambridge, Cambridge University Press, Foundation Books, 1999. Penrose said that time – and I add, space – is the condition of memory, thus of knowledge, as in Plato's absolute world illustrated by mathematics.

[15] Abel Rey, *La théorie de la physique chez les physiciens contemporains*, Paris, Félix Alcan, 1907, has shown that the old "mechanism" (the mechanism being always the causal pattern and trajectory to understand the matter) was dogmatic because it was metaphysic, full of absolute concepts (pp. 275, 281), while the new mechanism is critical, flexible and relativist; this new mechanism does not annul the objectivity of science, but conceives it of in a new manner (p. 385), maintaining the relationship between truth and necessity (the true knowledge is necessary) but dependent on the experience.

This means the increasing role of the scientific hypothesis (p. 280). Karl Popper, *Conjectures and Refutations. The Growth of the Scientific Knowledge*, New York, London, Basic Books, 1963, has pointed out that while Kant has

remains in the world library of culture, but it cannot substitute the scientific demonstrations and supplies.

At the same time, all the above show the necessity for the philosophical theories to reflect the *latest* scientific theories: for only in this form they bring valuable ideas for science. For instance, if indeed, science does not yet know what dark matter and dark energy are and if the known particles occupy only 4% of the universe[16], philosophy has to both question and offer its own concepts related to the building blocks of existence and to insist that the building blocks and the existence as such have *meanings* and in this sense they *are* only for the beings who give these meanings. And indeed, they give meanings in the *interactions* with the world, but "the reality of an amoeba or a robot differs from the reality of a human"[17]. All the beings – the amoeba as well as the robot – interact with and in the world and have their own image about it, but if the amoeba has no the concept (of space) neither the robot has constructed it but took it from the programmes it contains. Certainly, it is/may be improved until it arrives independently to the construction of concepts, which today are only applied as information/tools to *react in the world according to its programmes*.

Further, from the above we could retain that space would exist first in the inorganic world, since science makes its observations in space-time. Yes, but the *space-time* is a *human concept*: as the *distance* is, or the *potential* properties at small quantum states and the *probability of transition* even in these states. Accordingly – and irrespective of the many proofs of objective space in existence we can provide – there is about a *concept*, a human creation. No particle/system of particles is conscious that "there is a distance/there is (a) space". Space is constructed by humans. But it is, first, not a physical reality – as intra-atomic, gardens, cities etc. – but a set of *meanings* selected and advanced as a criterion of practical orientation, localisation, measurement and judgement of facts and phenomena. In this respect, there is no "objective space" except for humans: the space is not subjective in the sense it is not a unique feeling or "taste judgement" in Kant's term, it may be measured and inter-subjectively attested, but it is the *human viewpoint attached to the inanimate existence*. The humans measure the distances and consider the spaces: but *the existence means only relations*. There is no superposition of the *concepts* we use and the *interactions* within existence: even in the best demonstrations where the physical phenomena and their particular aspects carefully measured seem to confirm the superposition, the concepts only *correspond* to, but *are not* the existence / *are not instead of* the existence. (Obviously, the concepts correspond in a relative, historical manner, according to the suppositions they include).

Also, from the quantum theory mentioned above we can understand both the transition from *continuous* to *discontinuous* and back and the *basis* of the transition of visible phenomena in our human "middle" space: thus, from *discrete* to *discrete* phenomena; both matter "and" information being continuous and discontinuous and generating both a continuous and discontinuous world. Nevertheless, in the *sensible* world there are also processes and mechanisms specific to *this* world; and the quantum level of the existence/the quantum theory did not yet say enough in order to be translated into the explanation of the sensible world as the ultimate fundamental explanation[18]. This

emphasised the role of the observer, creating an epistemological climate without which Einstein and Bohr are difficultly conceived of (p. 181), Kant and, later, Poincaré, has/have considered that Newton's theory was the only one true; while Einstein has demonstrated that Newton's theory was not false, but not the only one possible for the celestial mechanics (p. 191).

[16] Gordana Dodig Crnkovic, "Information and Energy/Matter", *Information*, 3, 2012, pp. 751-755; doi:10.3390/info3040751 (p. 751).

[17] Idem, p. 752.

[18] P.W. Anderson, "More is Different", *Science*, New Series, Vol. 177, No. 4047. (Aug. 4, 1972), pp. 393-396.

is the reason why – related to our topic – the scientists do not agree on the same explanations of the interactions between the micro-spaces and the macro-space related to the Earth.

3. The speculative philosophy is not better than reductionism in science

Therefore, if science evolves, being not perfect but just knowledge in progress[19], it is both exceeding of the speculative philosophy and a self-critique of its different reductionism tendencies. For example, one tendency was/is to consider the explanation of the sensible world as only the result of the fundamental physical laws[20]. Another reductionism tendency is to *separate populations from ecosystems* or to *separate the structures from the functions* or to *focus only on the ecology of plants and animals but not on the organisms which ensure the nutrient cycle as well*[21]. To surpass the focus on precise systems with clear boundaries does not mean to assume the speculative philosophical holism, but the scientific one. This means, first, to be aware of the *constructed* character of concepts and theories (thus, of the scientific objects), namely, of the *assumptions* professed and the *controversies*/ *debates* of the recent theories.

An important aspect of the constructed character of theories is the consciousness of the reasonability of extrapolations. Generally, science has studied *ideal* situations/*models* and then *individual* behaviours (of particles, plants, animals etc.). But the *scale* and *complexity* of structures (large amount of particles, groups of plants etc.) bring about *new* properties[22] and structures and functions. And this shows once more that the old vulgar reductionism of biology to chemistry and of chemistry to physics is wrong since the *final system is always more complex than its parts* or original structure and just this new peculiarity must be explained; nevertheless, to a certain point that reductionism is possible[23]. And we should draw attention also on the positive side of reductionism: it emphasises the possibility of simple solutions – which the human beings and, concretely, the scientists find in the internal structure of matter-energy-information system; the logic of nanotechnologies and IT is, in fact, just the result of "reductionism", i.e. the explanation and moving of higher systems with the help of/through fundamental relationships.

In the classical dialectics (Hegel-Marx), the transition from quantity to quality brought a transformation, a new quality. In the reductionist tendency of science, the bigger quantity is a simple extrapolation of the behaviour of the units/individuals: in the biology considering only the organism and not the unity environment-organisms; the neoclassical economics does the same reductionism; as well as the projections extrapolating only some tendencies, but not also those challenging these projections which isolate some ideologically convenient tendencies[24].

Reductionism is only a moment of science, and should remain a historical moment even in every scientific research. It entails the first precise understanding of the studied object, its configuration and measures as well as its predictable evolution in a fixed model with only few/definite correlations. It arrives to discover some laws, even paradigms which become the

[19] It is not a theological authority, see Pascal, « Préface sur le traité du vide » (1651), *Œuvres complétes*, II, éd. Jean Mesnard, Paris, Desclée de Brouver, 1964, pp. 777-785.
[20] See the critique of this standpoint in P.W. Anderson.
[21] Edmundas Lekevičius, "The Russian Paradigm in Ecology and Evolutionary Biology: *Pro et contra*", *Acta Zoologica Lituanica*, 2006, Volumen 16, Numerus 1, pp. 3-19.
[22] P.W. Anderson, p. 393.
[23] See Stephen Hawking, "The Objections of an Unashamed Reductionist", in Roger Penrose with Abner Shimony, Nancy Cartwright, Stephen Hawking, *The Large, the Small and the Human Mind* (1997), Edited by Malcolm Longair, Cambridge, Cambridge University Press, Foundation Books, 1999.
[24] See all the projections of growth of the world population, denied by the latest *World Population Prospect 2019*.

framework of many analyses of the object and related objects, deepening their understanding in this framework. All these analyses constitute the "normal science", as Kuhn conceived it. But when the normal science confronts some and more and more anomalies towards the paradigms, it has to transform assuming *different* paradigms. The biological sciences face the ecological challenges and this paper refers to an aspect of this process.

4. Attitudes towards space

If space is interesting for humans *according to the meanings and values* they assume, the *history* of its presence in the Popper's "world 3" of cultural creation is enlightening. It appeared in different discourses[25], but the discourses which remained did pertain to those who could write, develop their reasoning and express their feelings. Then, the discourses were selected by those who could appreciate them, both from knowledge and social standpoints. One of these social standpoints was the Euro-centric and even racist perspective that did not consider the discourse about space deployed outside this type of European culture. Even the present tradition of "culture" was constituted in the rut of this perspective. Obviously, in this European culture the major subtleties were developed and their minimisation would be a similar mistake: but the above aspect must not be ignored.

And although we started from the meanings of space as concept related to the natural world, the attitudes towards the social space show the same relational understanding. The *sites* – which are the spaces of the present – have substituted the *extension* of space put by Galileo as *open* space replacing the *emplacement* of things in a strict medieval hierarchy: but they may be described only as relations (thus, only functions). From this standpoint, Foucault spoke about *real* social places, usual, having transparent functions, and in adverse, about *utopias*/non-spaces and *heterotopias*: these ones being real but "simultaneously represented, contested, and inverted"[26], as crisis spaces (privileged, sacred or forbidden), deviation spaces (hospitals, cemeteries), substitute spaces for superposed spaces (theatre, gardens, museums, libraries), refuges etc.

5. The knowing of things

There are two origins of the *structural* level of the attitudes towards space/of the concepts of space. One is the *logic of the epistemological process* as such. The other is the historical *separation of the physical and intellectual labour*. They have their relative autonomy to each other but historically they intertwined.

Indeed, to know means, first of all, to *discriminate* from the vague whole the thing towards which one is curious. It was/is the same process in the common and the scientific knowledge. When Aristotle has focused on the parts of animals, he put in parentheses the animals' milieu, being interested only in the functions of the parts in order to maintain the integrity of the whole organism[27]. And the understanding of the organism gave the first tradition in the European biology: but the bracketing of the environment, or not, was the result of the limits put by scientists as a result of the (even ideological) patterns they assumed and which stopped, or not, their curiosity; or better, from an epistemological standpoint, they bracketed the environment as long as they did not need it

[25] See Ana Bazac, "The approach of space and an inter-war anthropological model", *Analele Universităţii din Craiova, Seria Filosofie*, nr. 33, (2/2014), pp. 127-161.

[26] Michel Foucault, "Of Other Spaces: Utopias and Heterotopias" (March 1967), taken from *Architecture /Mouvement/ Continuité*, October, 1984, Translated from the French by Jay Miskowiec, pp. 1-9 (p.3).

[27] See Milana Tasić, "On The Classification of Animals According to Biological Functions, after Aristotle," *Biocosmology –Neo-Aristotelism*, Vol. 7, Nos. 3&4, 2017, pp. 513–523.

in order to understand the mechanisms and functions of and within the organism. When they went up to grasp the historical evolution of organisms, functions and parts – beyond Aristotle's philosophical theory of active and passive forces etc., but ly the Stagirite has mostly applied his theory to the problem of organism[28], and not to the historical links between organisms – they have gradually transformed the animals' environments from *things* existing and influencing from without the animate beings into *scientific objects*[29].

The other origin, ideological and arising from the separation of physical and intellectual labour, is the separation of both the philosophical interpretations and the scientific attempts from the practical wisdom acquired by those who could not transmit the discourses of this wisdom. The first two types of knowledge have focused exclusively on the inanimate and animate entities – and at the level of individuals – and have sought only from (the standpoint of) their inner essence the forces of their existence and development. This tradition was so strong that when the genetic researches have showed their really extraordinary results, for some ones the biological rationale was reduced to genetics, considering it as the discovery of the only, ultimate cause of the living being. Epigenetics – formation and evolution of acquired traits in the existence of organisms in their environment – was thus rejected as non-scientific and even "ideologically unwelcome", an "obstacle" to the development of genetics[30].

But already the ancient agronomists have mentioned the practical wisdom of those working in agriculture (thus, including animal husbandry). Cato the Censor and Columella have described the importance of correctly feeding the animals, the cultivation of plants as fertilizer for crops of other plants, Pliny – the ploughing of a field from which the plants were harvested by cutting them, or the already named agronomists as well as Palladius – the succession of the plants cultivated and the techniques of cultivation according to the type of land, while Collumella has insisted on the deep ploughing[31].

If we remember Lyssenko's *project*, it was not structurally different from the millennial agricultural practices. If the Greeks knew from the 4th century BCE the crop rotation, one of the agricultural techniques imposed by Lyssenko was just the crop rotation, together with other techniques transforming the *phenotype* (the observable characteristics of the organism – morphology, development, biochemical and physiological features, its behaviour and products) as a result of the controlled distance between plants, of the temperatures and humidity of soils and seeds, therefore as a result of the environment. Not Lyssenko's personality is important, but just the results of his project, otherwise experimented in many, and publicised, experiments: to increase the agricultural productivity by *natural fertilisation, without chemical fertilisers*[32]. And letting aside the ideological papers despising genetics – which were not at all more numerous than the ideological

[28] Milana Tasić, "On the notion of *dynamis* in Aristotle's embriology, *Biocosmology –Neo-Aristotelism*, Vol. 9, Nos. 1&2, 2019, pp. 167-178.
[29] See Ana Bazac, "The construction of the scientific object and its confrontation", *Noema*, XVI, 2017, pp. 219-240.
[30] Denis Buican, *L'Éternel Retour de Lyssenko*, Paris, Copernic, 1978; *Lyssenko et le Lyssenkisme*, Paris, PUF, Que sais-je?, 1988.
[31] *Les agronomes latins : Caton, Varron, Columelle, Palladius*, avec la traduction en français, publiés sous la direction de M. Nisard, Paris, Firmin Didot Frères, 1844, pp. 49-51, 513-514, 648.
[32] See also the analysis of clash between the traditional agricultural techique and the agrobusiness intending "on expanding herbicide markets and opening a niche for next-generation genetically modified cotton", Glenn Davis Stone and Andrew Flachs, "The ox fall down: path-breaking and technology treadmills in Indian cotton agriculture", *The Journal of Peasant Studies*, 2017, pp. 1-24, https://doi.org/10.1080/03066150.2017.1291505.

papers despising epigenetics[33] – the genetic and epigenetic transmission of the characteristics of an organism *are related*, while the different scientific researches do not compete but, on the contrary, mutually help each other. The epigenetic transformations are more rapid and have a big role in the adaptation of the organisms.

Though Lyssenko did not theorise its concrete researches – and not this aspect is important here –, according to the *epigenetic* model the organism and its environment form a *unity*. In this model, there is also a mutual aid relation between the members of the same species, and even between species, and not only of competition. The performances of such a model concern both a generation of plants and the trans-generational transmission of adaptation levels. And the epigenetic model was verified also at animals' learned behaviour, by imitation, exercising and training, certainly related and transferred to the genetic level[34]. Finally, if no organism behaviour may be explained without the genetic basis, it lives/is viable only by "solving the problems" it encounters in its concrete environment. Just this "problem solving" was demonstrated by plants[35], and birds – long time considered without intelligence but now proven to "flexibly solve novel problems using cognition rather than merely instinct or learning"[36] – and even by fish[37]. Every experience shaking the survival was transposed from simple epigenetic adaptation to genetic inscriptions, thus abilities to better face the everyday life-and-death experiences[38].

Related to this example – an agri- permaculture *avant la lettre* –, we may conclude that, even though in a certain time span science has not yet arrived to the "last explanations"[39] of a

[33] See Jaurès Medvedev, *Grandeur et chute de Lyssenko*, Paris, Gallimard, 1971 ; Gilles Harpoutian*, La petite histoire des grandes impostures scientifiques*, Paris, Éditions du Chêne, 2016, considering the rotation of plants as an unscientific method, promoted only by Stalin but abandoned by Khrushchev.

See the article of a biologist, Guillaume Suing, *Lyssenko, un imposteur ?*, 10 mai 2016, http://www.legrandsoir.info/lyssenko-un-imposteur.html, showing "the "lyssenkist" agronomists were lavishly caricatured by post-war Westerners simply because they opposed the system of intensive agriculture (chemical fertilizers and pesticides). If it allowed maximum profit in a minimum amount of time, it is now obvious that this system has contributed to the massive destruction of soils on a global scale, and was the source of innumerable and undeniable ecological disasters on the long term. But here of course, no "sham"! .. Lyssenko and his collaborators wished, even if the results were not immediate, to develop throughout the territory a sustainable agriculture based on currently accepted techniques: "Seeding under vegetal cover", " agro -sylvo-pastoral equilibrium" linked to the rotation of crops and the development of "forest strips "between cultivated fields, ... in general, they favored the fertilization of soils by biological rather than chemical means".

[34] See Robert Djidjian, Rima Avalyan, "Animal learned genetic cognition and the limits of anthropomorphic approach", *Wisdom*, 1(8), 2017, pp. 11-24.

[35] Stefano Mancuso and Alessandra Viola, *Brilliant Green: The Surprising History and Science of Plant Intelligence* (2013), Translated by Joan Benham, Foreword by Michael Pollan, Washington D.C., Island Press, 2015.

[36] Nathan Emery, *Bird Brain: An Exploration of Avian Intelligence*, Foreword by Frans De Waal, Princeton, Princeton University Press, 2016.

[37] Masanori Kohda, Takashi Hotta, Tomohiro Takeyama, Satoshi Awata, Hirokazu Tanaka, Jun-ya Asai, L. Alex Jordan, "Cleaner wrasse pass the mark test. What are the implications for consciousness and self-awareness testing in animals?", ResearchGate, bioRχiv, 2018, doi: https://doi.org/10.1101/397067; / Masanori Kohda, Takashi Hotta, Tomohiro Takeyama, Satoshi Awata, Hirokazu Tanaka, Jun-ya Asai, Alex L. Jordan. "If a fish can pass the mark test, what are the implications for consciousness and self-awareness testing in animals?", *PLOS Biology*, 2019; 17 (2): e3000021 DOI: 10.1371/journal.pbio.3000021.

[38] See Monica Gagliano's extraordinary researches in plant cognition and behaviour, at https://www.monicagagliano.com/. Or H. M. Appel, & R. B. Cocroft, "Plants respond to leaf vibrations caused by insect herbivore chewing", 175(4), 2014, pp. 1257-66. doi: 10.1007/s00442-014-2995-6. Or Ariel Novoplansky, "Future Perception in Plants", pp. 57-70, in *Anticipation Across Disciplines*, Mihai Nadin Editor. Heidelberg, New York, Dordrecht, London, Springer International Publishing Switzerland, 2016 (demonstrating *learning* process of plants, and adaptation *beyond* their genetics).

[39] Here, the genetic and epigenetic answers, together with behavioural and symbolic, united in a complex, demonstrated theory. See Eva Jablonka, Marion J. Lamb, *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and*

problem but there are, on the contrary, some *best probable responses according to the empirical data* – leaving many questions but at the same time "enhancing knowledge"[40] – these probable answers have to be considered as *sine qua non* information for that problem. *The more so they are evidence-based*. And in this manner they are both "truth generation" and "truth preservation"[41], although the authoritative theories of the time dismiss the above answers as theoretically implausible. But if theory and praxis are not congruent, not only that the practical "irrelevance and implausibility" from the standpoint of existing theories must be excluded/"exculpated"[42], but also the temporarily "approximate descriptions must again be at the forefront"[43]. From the standpoint of science, this is not a heresy, on the contrary: these descriptions reflect that the problems and at least some causal aspects are already *detected*, even though they are not yet (fully) measured with the classical scientific means[44].

6. The concept of space…

We only remember two *ontological* landmarks between which the representations of space took place from ancient times till nowadays: the landmark of the *absolute or relative* space (and although space and time were always related to one another, we speak here only about the space) and that of space *as relation or as receptacle*. The two landmarks are intertwined. At the same time, we'll point the difference between the *philosophical* and the *scientific* views.

Obviously, because philosophy was the mother of science, we recall the ancient *philosophical intuitions*/*speculative demonstrations*. They were multiple and even opposed, and we follow this entire evolution and inherent oscillation in the conceptions about matter[45] because space was the place of matter.

Thus, on the one hand, if matter was *infinite* – space had to be *infinite*, too. The examples go:

- from the Ionian's original principles of water and air seeming to better suggest this infinity, while the fire had a special infinite character, the earth being only the solid that, as principle, did not contradict the first three principles, being rather the sign of infinite condensation of matter, but that which was never unidirectional,
- to the Parmenidean One, arrived at/thought by the *logos* and being the infinite being,
- to the Heraclitean infinite movement,
- to Anaximander's *apeiron*,

Symbolic Variation in the History of Life, Revised edition, Cambridge, Ma., London, England, A Bradford Book, The MIT Press, 2014.

[40] Lorenzo Magnani, *The Abductive Structure of Scientific Creativity: An Essay on the Ecology of Cognition*, Springer, 2017, p. 1.

[41] Idem, p. 90.

[42] Idem, p. 115.

[43] Madl, p. 10.

[44] See the difference between detection and measurement in Henri Poincaré, « Lettre à L. Walras » (1901), Appendice à Léon Walras, « Économique et mécanique », *Bulletin de la Société Vaudoise de Sciences Naturelles*, vol. 45, 1909, http://homepage.newschool.edu/het//texts/walras/walrasmech.pdf. Poincaré has insisted that the detected aspects are not arbitrary and, at the same time, their approximate character do not transform them into something external to the scientific interest.

[45] See Ana Bazac, „Materia – observații epistemologice cu prilejul aniversării modelului atomului al lui Rutherford (I)", *Noema*, Vol. XI, 2012, pp.133-158 [Matter – epistemological remarks on the anniversary of Rutherford's atom model].

- to Zeno of Kition's matter as a "substance without qualities" having inside it the *logos*/active principle of movement,
- to Zeno of Elea, with the same standpoint and insisting on the inexistence of void space in the world,
- to the atomists, where the atoms[46] were infinite both in number and qualities, as the void was.

On the other hand, there was Plato's indefinite *space* where the concrete things deploy/appear/disappear, because without being in space – located and extended (as later on Descartes will speak about *res extensa*, the material aspect of the existence) – there is nothing[47], certainly except the Ideas, but their qualification as pertaining to existence is at least ambiguous. We have to be careful: at Plato, perhaps even because of the creation of things as copies of the Ideas, matter was *no longer infinite*, but only *indefinite*, as at many of the above-mentioned thinkers who have gradually conceived abstract concepts as explanation of the world. Concretely, at Plato the world was *finite*, because of the relatively clearly separate spheres[48]. And for Plato the space was tantamount to – as some ones have retained[49] – the indefinite matter, the substratum of concrete things, but at the same time the indefinite *place* where the things appear. As a place[50], space was a subtler substratum/rather of other order of abstraction than that represented by the concept of matter or its designations. Plato has called the space the *receptacle* of things and, letting aside the meaning

[46] For Democritus, the atom was the element of the world, the substratum, while for Epicurus it was both the element and the principle grasped by the human logos, see Karl Marx, *The Difference Between the Democritean and Epicurean Philosophy of Natur*e, 1841, Part two, Chapter three: *Atomoi archai* and *atoma stoicheia*, in Karl Marx, Frederick Engels, *Collected Works*, Volume 1 (Marx: 1835-1843), Moscow, Progress Publishers, 1975, pp. 58-62.

[47] It is very useful to compare the philosophical concepts appeared in different cultures. In Japan, the existence/God was tantamount to both emptiness and non-emptiness, and the metaphysical concepts related to existence and transformation process invite the present readers to think about the spatial aspect contained just in these metaphysical concepts. For example, the Absolute Emptiness and the Absolute Totality mutually transform one in the other, or transform in multitudes; accordingly, there is no remaining space, is there? See Makoto Ozaki, "Kyoto School Philosophy in Relation to neo-Confucianist Metaphysics", *Biocosmology – Neo-Aristotelism*, Vo. 9, No. 1&2, 2019, pp. 137-152.

[48] Spheres are spaces. See Peter Sloterdijk's trilogy: *Bubbles: Spheres Volume I: Microspherology* (1998), translation by Wieland Hoban, Los Angeles, Semiotext(e), 2011; *Globes: Spheres Volume II: Macrospherology* (1999), translation by Wieland Hoban, Los Angeles, Semiotext(e), 2014; *Foams: Spheres Volume III: Plural Spherology* (2004), translation by Wieland Hoban, Los Angeles, Semiotext(e), 2016. In these books, the spheres are spaces of coexistence of objects, allowing their common perception. The humans are, each of them, in not one but many spheres, of different sizes and qualities, and always in relations with other objects and subjects, as well as being in different relations between them (including relations of enclosure within themselves, of separation). And the place of man in these spheres is more important than his essence. (This last aspect was underlined by Marx, too. My remark is only methodological with two aspects: 1) in philosophy – but not only, although in different manners – a new creation must remember the historical approach of the topic. The valuable *phenomenological* analysis of Sloterdijk around the concepts would have been more important if he would have underscored the novelty brought by him towards all the *types* of former philosophy; 2) though each philosophical creation relates to the history and "space" of the philosophical school it assumes, in fact they are not un-translatable, as the representatives of the paradigm of philosophy's neutrality and technicality based on un-translatability assert. Actually, just the *reciprocal translation* of different philosophical schools' paradigms allows the highlighting of the novelties and, thus, the *reason to be* of the philosophical creations). The attitudes of humans towards their worlds, the inclusion and exclusion of spaces from the different worlds are continued by the transformation of the present into "architecture of foam", of relative homes in relative worlds where the feeling of being inside is that which structures the homes and worlds.

[49] See Aristotle's reference to the matter-space identity in Plato; and Diogenes Laertius, *Lives of Eminent Philosophers*, (Ed.) R.D. Hicks, Book III (Plato), [69] and [71] has certified. See "He set forth two universal principles, God and matter, and he calls God mind and cause; he held that matter is devoid of form and unlimited, and that composite things arise out of it"; Diogenes Laertius used *hyle*, the word used by Aristotle, too, for matter.

[50] See Makoto Ozaki, p. 150: "the primary agricultural society in Japan might be highly significant to take into consideration Nishida's last notions of Absolute Nothingness as the metaphysical Place or *Topos* and the self-identity".

given by Plato as the condition to have things or to speak about them, this idea of receptacle *as something distinct from things*, *exterior* and *absolutely* objective was taken over by the cohort of subsequent philosophers. However, it was contradictory: a concept about the indefinite general substratum/the most general concept/determination explaining the existence of things, and at the same time, the place of things (*chora*, the occupied place[51]).

Actually, this image reflected the unsolvable problems of space before the 20th century[52]. Thus, at both Plato and Aristotle the world was finite. That meant that matter and space were also *finite*. But they were conceived of in different ways. If for Plato the indefinite substratum was that of the entire world/the receptacle where the things appeared and disappeared as a result of the play of Ideas, in Aristotle not the general material substratum – that not even Plato has denied – was the most important, but the *actual* unity between this substratum and the form, thus the bricks of the universe were the concrete things/*substances*. Thus, it resulted that the space was the *place of the concrete things*. In this sense it was, indeed, only an occupied place and denied the void. But general receptacle or concrete place, the space became a separate something from the material world. Nevertheless, because things move, the spaces containing them move as well[53]. But in this respect the space is immobile, because it is always the boundary of the thing it contains. Is thus Aristotle's place thing dependent? Threefold positive answer: in the above meaning of *space moving together with the object*, or fitting to the moving object; in the meaning of relations between objects (the movement of objects on the Earth depends on the fixed position of the latter). And at the same time, this thing dependence has generated the quality of space (and time): of being a *category* allowing the classification of concrete things.

The modern thinkers have continued and developed the above inherently contradictory conclusions. At Descartes, space was the absolute quality in fact containing the *res cogitans*. For Newton the space was absolutely external to any body, an eternal and immobile container of all the bodies (ultimately constituted from solid independent atoms) moving in relation just with this immobile reference point, and thus *absolute*, reflected by the metaphysical concept (of absolute space). And Newton has added the *relative* space, measured through the relations between bodies, but only "in common affairs". However, Leibniz has considered[54] that the space as such does not exist at all (it is not a "Substance" and nor "an absolute Being", and the monads as such/substances but not atoms had their internal force and end, but *coordinated* with the others), but only the result

[51] Plato has used this term, χορα – an occupied space by something/some one, thus its limit is given by the entity that occupies the place – both as place (*Sophist*, 254a, *Timaeus*, 52a) and a more limited space than the word *topos* meant. In *Laws*, 705c, Plato used χορα as an interval, a space between two objects. And though Plato was the promoter of mathematics, Aristotle was the one who used *topos*, a restricted, limited space, suggesting the next-ness.

[52] An interesting aspect of these problems – and letting aside the physical and mathematical demonstrations related to space and spaces – is the epistemology of the existence as such. If in Plato, the existence was certified by space, the things occupying it/concretising the existence being copies of the Ideas, a specific and separate existence from that of the terrestrial things, in Aristotle, the existence/the being was a *category*, not a concept generalising something. In Plato, the existence was concrete and, at the same time, being certified by both the external world of Ideas and entities, while in Aristotle, the existence was abstract, sending to metaphysical discussions about categories (these discussions as such being contradictory, emphasising mind's constructivism and some "transcendental" entities), but not deducing the concrete beings from being as a category. The explanation of these concrete beings (substances…) being of a different epistemological order.

[53] This is, perhaps, the reason Aristotle has used the word *topos*, an indefinite space but more or less confined by other spaces (irrespective of the things which occupy those spaces).

[54] He considered the problem of space in the framework of his radically new understanding of matter and force – no longer exterior to each other, as in Descartes. See Dan Bădărău, "Dinamica și principiile ei; conceptul de forță și cantitatea de mișcare" (1966), *Noema*, XV, 2016, pp. 245-261 [Dynamics and its principles; the concept of force and the quantity of movement].

of the *relations* between bodies: and thus, space is not a container but "an *Order of Coexistences…/ an Order* of Things which exist at the same time, considered as existing *together*; without enquiring into their Manner of Existing. And when many Things are seen *together*, one perceives *That Order of Things among themselves…Order* or *Relation*."[55] Consequently, the Newtonian image is only a "*Chimerical* Supposition of the *Reality* of Space in it self"[56].

It is not here the place to discuss whose standpoint was then dominant and why. Neither that just Leibniz's philosophical sketch – together with Kant's concept of space as a transcendental *category*/an *a priori* of the consciousness, finally founding the constructivist approach so necessary in order to transcend the naïve objectivism – was/were the philosophical basis of the radical turn occurred in *science* at the beginning of the 20th century. And nor that the concept of order, advanced by Leibniz, could – and can – be interpreted in opposite ways, including a metaphysical one, long time in fashion, but also a scientific one: where *order*[57] is related to *situation*[58], both concepts used by Leibniz and prefiguring the *complexity* – as the most evident property of *systems* – as well as the *importance and responsibility* of the observer[59].

In any case, *the scientific research* – divided/developing between the necessity to circumscribe the phenomena in order to analyse them in depth, and the *relational* pattern that was either clearly assumed or simply bracketed but not ignored[60] – *gradually began to supersede the authority of philosophy*[61] *concerning the problems of space*. No philosophy has then attempted to negate the scientific conclusions related to space, because its intuitions were overwhelmed by the *scientific* theories based on (repeatable) experiments, mathematical calculus and demonstrations

[55] "Mr. Leibnitz's Third Paper" (25 February 1716) in Samuel Clarke, *A Collection of Papers, Which passed between the late Learned Mr. Leibnitz, and Dr. Clarke, In the Years 1715 and 1716* (London: 1717), https://web.archive.org/web/20110721021001/http://www.newtonproject.sussex.ac.uk/catalogue/viewcat.php?id=THEM00224.

[56] Ibidem.

[57] It is difficult to say if the ancient concept of order – from the verb *kosmeo*, to put order – was conceived of by the philosophers only as an external order to the humans: because these ones could understand that order, and because both the order of the world and the human reason were the same. The order was the result of the *logos*, but the human reason, too, meant *logos*.

[58] An existentialist concept, *par excellence* (Sartre).

[59] It s not without importance to note that the *relational* pattern - that, letting aside the problem of space, was older than Leibniz – was applied in the later philosophy. Starting from Kant's relational ethics, Hegel has demonstrated that freedom itself is relational, there is no absolute freedom: in this respect has Hegel provided the idea that freedom is the understanding of necessity. But in this theory the cardinal place of the observer does appear, does it?

[60] See, besides the founding father of the idea of *system of nature*, the Swedish Carl Linnaeus, and Alexander von Humboldt with the interdependence of all the natural phenomena: the English Alfred Russel Wallace with biogeography and ecology, the German Karl August Möbius with the marine biocoenosis, the Danish Eugen Warming with plant ecology, the Austrian geologist Eduard Suess (1831-1914) who coined the concept of biosphere; the English zoologist Ray Lankester, "The Effacement of Nature by Man", in *More Science from the Easy Chair* (1913), London, Methuen & Co., 1920; the American zoologist Victor Shelford, with "dynamic relations of organisms to their environment"; the Russian geochemist Vladimir Vernadsky, the definition of the concept of biosphere and the French geologist and palaeontologist Teilhard de Chardin, in the early 1920 (George S. Levit, "The Biosphere and the Noosphere Theories of V.I. Vernadsky and P. Teilhard de Chardin: A Methodological Essay", *Archives Internationales d'Historie des Sciences*, Vol. 50, 2000, pp. 160-176), the American Charles Adams with *Relation of General Ecology to Human Ecology*, 1935

[61] The authority of philosophy was powerful not only/not so much for it was the only one serching for existential problems and answering them beyond the simple religious creationism, but especially because it prefigured reasonable answers, giving through its intuitions the basis of latter cardinal concepts: although the forms of intuitions were disputable. But even these forms have generated philosophical debates which are very interesting as pre-scientific speculations signalling some of the latter problems highlighted by the scientific research. See, for example Charles T. Wolfe, "Endowed Molecules and Emergent Organisation: The Maupertuis-Diderot Debate", in Tobias Cheung (ed.), *Early Science and Medicine*. Leiden, Brill, 2010, pp. 38-65.

defeating the necessary falsification attempts. At the same time, after the first theoretical offers, irrespective of how important, the problem of *relations* within space was not developed in a constant "topological" manner[62]: neither science is the example of an anyway inexistent "progress without stops, detours and deviations". Only in the last decades has science more and more clearly developed what however existed in the human language: the *relational* consideration of space and the *spatial meanings generated in spatial contexts*[63].

Applying and uniting the *empirical correspondence* principle and *constructivism*, the Einstein turn consisted in the demonstration of a physical *unique* and *relative* space, measured only according to relative objects and positions, because there are no absolute, immobile objects according to which one might consider the movement in space. In this sense, the space is not exterior to (all) the bodies but, together with time, constitute the parameters framework and result of their manifestation/movement. And because the observers are bodies, too, the *dependence* of space *on the observers* was demonstrated: and how many observers so many measurements of space (position, distance). But did all of these conclusions lead to "the objective basis" of moral relativism? Only in the ideological translations which have cherished this relativism either as their own credo or as the "enemy" they opposed. Apart from these translations, the space has appeared to scientists as both *interactions* and *structures* in a constitutive and permanent feedback: for this reason, space too, and not only matter, appeared as *probabilistic*, *implicit* and as interface *within* the connexions.

7. …and some of its forms

Though the main ideas from the above reminder are the conceptual tools for the development of this article, now we enumerate the forms of space we focus on or, simply, we use without analysing them. All these forms are *meanings* constructed by humans in concrete experiences.

a) First, it is just *space*. It was considered as a *large and indefinite* – thus, somehow far away, or neutral or meaningless: a simple – *envelope* for humans. In this sense, the contradistinction between *space* and *place* has appeared. The latter seemed to be a "safe heaven" for the folks who wanted to isolate their place from the common space. They made human "signs" on and within their places which, as a result of this marking, became "theirs", familiar. Each human being is related to a familiar place[64]. But the humans need also more than their place: the *space* that, because it is already marked by the meanings put by the human needs, more and more loses its indefinite feature. And in their relations towards and with the place and the space, the humans experience both "the limitation of the place and the openness of the space"[65]. Can the entire space become place? The

[62] See Robert Dyball, "A Brief History of Human Ecology within the Ecological Society of America and Speculation on Future Direction", *Human Ecology Review*, Volume 23, Number 2, 2017, Canberra, ANU Press, pp. 7-15.
[63] See for example Scott Freundschuh and Mark Blades, "The Cognitive Development of the Spatial Concepts NEXT, NEAR, AWAY and FAR", pp. 43-62, in Martin Raubal, David M. Mark and Andrew U. Frank (Eds.), *Cognitive and Linguistic Aspects of Geographic Space: New Perspectives on Geographic Information Research*, Berlin, Heidelberg, Springer Verlag, 2013.
[64] We certainly remember that neither little children nor elderly persons should be moved from their familiar places but only if a supplementary care compensates the removal of the familiar. But if this psychological cognisance is clear for the individual level, it must be so for the human groups, too. The huge problem of immigrants is, thus, not first that of the human rights and conditions in the receiving country, but the eradication of the structural causes which have pushed them to abandon the familiar place.
[65] Krzysztof Łojek, "Personal space experience", *Parerga*, międzynarodowe studia filozoficzne, 3/2007, pp. 201-204.

answer ought not to be the abstract assertion about the multiplication of places within the space/the occupation of the entire space by humans, but the concrete emphasis of *what kinds of meanings* put the humans into the space. But all the meanings given to *all the representations* about objects and the processes of their objective movement as well as their cognition depend on a spatial-temporal substrate; without such a substrate, they cannot exist, although it is not about a specific substrate but about the multitude of relations between structures/about structures which, all of them, form the space and the time, so they exist spatially and temporally[66].

From this standpoint, we can observe the *integration* of living systems one in another structurally and functionally, meaning that the structural and functional adjustment of each system is depending on the structural and functional adjustment of all other, up and down their "embedding" in the unity of the living matter. The *biosphere* – all the living beings related to Earth – is constituted from n *ecosystems*, where the adjustment takes place at the levels of each living being, of each population of the same species and of as many species live in the ecosystem[67], and where the material, energetic and informational constitution of each species and individual is the result of the entire living constitution, all seeming to be an "extended phenotype"[68] annulling the supposition of an external environment[69]; but the ecosystem may be also the entire space[70] used by the species beyond the temporary localisation in their ecosystems (as the atmosphere crossed by migratory birds). And since the space is *open* – the "spheres" of the Earth are open systems – once more we do understand at what degree the specific capitalist utilitarian treatment of space, of the atmosphere, of the oceans and rivers, of the earth, has arrived a malignant factor: the degree where *this malignant treatment is so general that the late and restricted corrections are no longer efficient*.

If space is not a substance, as Leibniz has emphasised, and the concept of system may suggest a stable and closed coherence, it (space) was conceived of as a mesh[71], something that is much more difficultly controlled, and especially in a non-malign way and with a non-malign end, this way reclaiming a proactive and holist strategy. For this reason, *the simple hope that by limited actions one may save "the environment" is irrational*. At any rate, in order to control space, the humans need science/*ecology* – not only fragmented data and theories, but also/especially a holistic reasoning about the deep problems of nature – and not "environmentalism"[72], beautiful words at countless conferences or sophisticate debates, or considerations about the congruity of some reforms and the continuation of capitalist trade[73] with the defence of ecology[74].

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[66] Christian Freksa, "Spatial Computing: How Spatial Structures Replace Computational Effort" (pp.23-42), in Martin Raubal, David M. Mark and Andrew U. Frank (Eds.), *Cognitive and Linguistic Aspects of Geographic Space: New Perspectives on Geographic Information Research*, Berlin, Heidelberg, Springer Verlag, 2013, pp. 38-39.

[67] See Victor Săhleanu, "Quelques problèmes concernant la méthodologie de la cybernetique biologique", *Atti del 3° Congresso Internazionale de Medicina Cibernetica*, Napoli, 21-25 marzo 1964, pp. 425-429.

[68] The concept, taken over by Morton, too, is of Richard Dawkins, *The Extended Phenotype*, Oxford University Press, 1982.

[69] Timothy Morton, "Ecology after Capitalism", *Polygraph*, 22, 2010, 46–59.

[70] It's important to note that these terms (as ecosystem) are used even for virtual relation and connections between different objects – all virtually translated/mediated – and the programmes allowing these connections.

[71] Timothy Morton, ibidem.

[72] J. Donald Hughes, "Interview" (by Mark Cioc and Charles Miller), *Environmental History*, January 2010, pp. 1-14.

[73] This includes the excessive souvenirs for tourists depleting the water of visited sites and generating deep environmental damages. For the relations tourists – environment see James Conlon, *Nature, Heritage and Spatial Technologies of Fear: Uncanny Experiences in Kruger National Park*, http://www.ctheory.net/articles.aspx?id=497.

[74] Avner de-Shalit, "Down to Earth Environmentalism: Sustainability and Future Persons", in *Contingent Future Persons: On the Ethics of Deciding Who Will Live, or Not, in the Future*, (Eds.) Nick Fotion, Jan C. Heller, Springer Nature, 2019, pp. 123-135.

The concept of space has many *dimensions*, giving it the different meanings[75] one uses on its own and metaphorically[76]. But all these dimensions are faces of the *complexity* and concretise – thus in more than the concept/phenomenon of embedding – various manners of *mosaic* structuring of all the forms of life, including the human and, certainly, including the human/culture-nature relationships. All the relations "from space" or, more coherently, *constituting the space* are *juxtaposition and integration* of similar units – the integration as such generating their transformation – into structures of higher level, these ones continuing the juxtaposition and integration/formation of higher structures; these processes take place *in the most economical manner possible* so as no material, energy and informational part of the living beings be lost[77]. The loss occurs only when catastrophes and humans intervene, i.e. when the mosaic structuring of many biomes and human meanings and actions is damaged by excessive and unbalanced use[78].

Finally, a portion of space is – only for humans, obviously – a *landscape*. It is "mosaic embodying the interpenetration of nature and culture"[79], not an "annex" for space, but just its valuing: the landscape is the first intention and result of humans to discriminate the grey space, to focus on an area and understand the interdependencies and the forms, to be aware of the criteria used in the inquiry of the chosen landscape, and to value it; thus, to systematically describe it and to arrive to concepts coherently corresponding to the forms. "Culture is the agent, the natural area is the medium, the cultural landscape the result"[80].

All living beings form the natural world around them, but only the humans can become (relatively) independent from their natural environment, because they create/form their own cultural

[75] Henri Prat, *L'espace multidimensionnel*, Montréal, Presses de l'Université de Montréal, 1971 (not the simple/traditional geometric but – in consonance with the mathematical spaces where the relationships between mathematical objects are specific and characterise the objects, and thus the spaces – also

i. the spaces of *temporal* evolution and of different objects as the physiological or the psychical space,
ii. the *potential* spaces as the unitary fields in electrical, magnetic, gravitational, nuclear, biotic, as continuous groups,
iii. the *particular*/discontinuous spaces as densities, concentration of infra-particles, particles, atoms, ions, molecules,
iv. the *amorphous* spaces of temperature and temperature genesis, entropy, pressures, enthalpy, viscosity,
v. the informational/structural spaces of negative entropy, integration, homeostasis, crystalline forms, biotic, psycho-social, thus cultural).

[76] See the spaces of the many types of discourse, the *linguistic* spaces, the *mental* spaces, the *cognitive* spaces (as the specific "space of reasons", the "private visual", p. 243, but also the "logical space", 117 and…, in Wilfrid Sellars, *In the Space of Reasons*, Selected Essays, Edited by Kevin Sharp and Robert B. Brandom, Cambridge, Ma., London, England, Harvard University Press, 2007)) – a model of cognitive space being the trans-disciplinary, opposed to the rigid spaces of the scientific disciplines –, the spaces of *meanings* (where, apart from the meanings of objects and relations, there is also the meaning of space corresponding to the existence, idem, p. 315) but which create models of spaces, as territories and enclaves, but also as trajectories, having both cultural and physical meanings; spaces of signs, the architectural, plastic, literary spaces, the virtual etc.: but with the entire relative autonomy of spaces – helping for a while their analysis as discontinuities – we have to not forget that they are integrated, and that the psychical cannot be understood independently from the social. This is the reason of the *mediation*s/the concept of mediations in the structuring of spaces.

[77] See Georges Chapouthier's studies at last from 2001 about the *mosaic s*tructuring. For a summary, see his *The Mosaic Structure of Natural Complexity: A Scientific and Philosophical Approach*, Preface by Peter McCormick, Paris, Collection Interdisciplinaire, EMSHA Éditions, 2018, OpenEdition Books, http://books.openedition.org/emsha/200.

[78] See J. Donald Hughes, "The Mosaic of Culture and Nature: Organization of Space in an Inhabited Cosmos," *Nature and Culture*, Vol. 1, No 1, Spring 2006, pp. 1-9.

[79] Ibidem.

[80] Carl Ortwin Sauer, "The Morphology of Landscape", 1925, re-published in John A. Agnew, David N. Livingstone, Alisdair Rogers (eds.), *Human Geography: An Essential Anthology*, Oxford, Blackwell, 1996, pp. 296-315 (p. 310).

world. And if the characteristic of humans is the making of theirs and all objects' *functions* – via the meanings they construct – in a *collective* and *practical* intercommunicative process, it results that the cultural world is social.

b) Then, it is *nature*. It was the first concept the humans understood as being both something different – and even inimical, sometimes – and familiar as their own house and even being, since they were born, raised and died just as all in their surroundings. But as they strengthened, building their civilisation, they forgot their first intuition that they were the children of nature. The concept of nature is *historical*, too, and the contemporary researchers investigate just the concrete manifestations of the methodological principle advanced more than 150 years before[81].

If Marx has long before demonstrated that the *instrumentalisation of nature* is related to the *instrumentalisation of humans by other humans*[82], nowadays some philosophers have advanced the concept of "anthropocentrism"[83] as cause of the violation of nature: "because the flourishing of humans would be, 'especially in Marx', possible only if structured upon a material base of abundance/even superabundance"[84]. But *it is not about "anthropocentrism"/the guilt of humans acting unreasonably in order to maximise their material basis*; *it is about modernity whose (capitalist) relations have generated the aggressive attach on nature*[85]. Concerning the concepts of *abundance* and *sufficiency*, they are *relative* in a complex historical meaning, but if for Marx the material abundance was only a *condition* for a society where the respect for *every* human being *and* nature made the difference between *having* (*material* wealth) and *being* as both a unique individual

[81] See also Peter Coates, *Nature: Western Attitudes Since Ancient Times* (1998), Berkeley, University of California Press, 2005.

[82] This instrumentalisation of humans by humans was countered by Kant's categorical imperative to always treating the humans as ends and not only as means.

Concerning the "ecological materialism" of Marx, see John Bellamy Foster, "Marx and the Rift in the Universal Metabolism of Nature", *Monthly Review*, Volume 65, issue 07, 2013; John Bellamy Foster and Paul Burkett, *Marx and the Earth*, Chicago, Haymarket, 2017. (It is about the rupture created by capitalism in the material exchanges between natural and social systems. See Marx, *Capital* Vol. III Part VI, Transformation of Surplus-Profit into Ground-Rent, Chapter 47. Genesis of Capitalist Ground-Rent: "It thereby creates conditions which cause an irreparable break in the coherence of social interchange prescribed by the natural laws of life").

[83] In the Western philosophy, the anthropocentric view was dominant, of course: because of both the need to highlight the peculiarity of man towards animals (being distinct and superior) and, on the other hand, because the superiority of man towards animals was a manner to legitimise the social differences and to give to the slaves and serfs the status of inferior beings on which they could manifest their superiority. This is not a "too sociological" view: the anthropocentric view was forged by those whose task was just to legitimate the domination relations as such. For this reason, I am convergent with Giorgio Agamben, *The Open: Man and Animal* (2002), Translated by Kevin Attell, Stanford, Stanford University Press, 2004, p.30, who considered that the development of the "anthropological machine of humanism" has confronted, in fact, the anthropocentric view. For example, both in Pico della Mirandola and Carl Linnaeus, man is "without face", suspended between animal and human and, for he is *capable to shape himself* according to his own will, his superiority as mirror of God has vanished.

Logically, from this discovery of the European thinking, the conclusion of responsibility derives. But the Western philosophy has preferred to restrict responsibility and to focus on arguments against anthropocentrism. However, by only minimising man showing both his positive predisposition to tuning and his finitude marked by the consciousness of death (Heidegger), neither anthropocentrism and nor responsibility have flourished. (Somehow, anthropocentrism is not the biggest evil if it urges to the reason to be of the "master" man).

[84] Keekok Lee, "Aristotle: Toward an Environmental Philosophy", pp. 121-127, in Philosophy and Ecology, Greek Philosophy and the Environment, Volume I, Edited by Konstantine Boudouris and Kostas Kalimitzis, Athens, International Center for Greek Philosophy and Culture, 1999 (p. 123).

[85] This attack has manifested including though the ecological imperialism of directing the material flows from periphery to the core countries of the capitalist system. See Brett Clark and John Bellamy Foster, "Ecological Imperialism and the Global Metabolic Rift: Unequal Exchange and the Guano/Nitrates Trade", *International Journal of Comparative Sociology*, Vol 50 (3–4), 2009, pp. 311–334.

and a species being, thus *having time*, for the modern logic the abundance of goods for sale was/is the basis of the increase of private profit.

However, as for the above mentioned philosophy the *instrumentalisation of nature* was/is absolutely separated from the *instrumentalisation of humans* (but this last topic is inexistent in this philosophy because it excludes the social causation from its topics), so it considers the "intrinsic values" pertaining to nature "in virtue of the fact that they have come into existence independently of the humankind". By *negating* that the *source of valuing is the human consciousness in its historical experiences*, some ones oppose in an abstract manner the "intrinsic values" of nature to the "artifactual" peculiarity of the modern "Narcissistic civilisation"[86]. But again, not humankind in general is Narcissistic, and as the "intrinsic value" of nature is qualitative – but not reduced to the first appearance; the quality of nature is its *uniqueness and unrepeatable* character, like that of every human being as well – so its existence is no longer independent of the humans since we speak about the Anthropocene. (For this reason, to consider the "autonomy of nature" as independence "from human domination" is confusing and too vague, not being at all an argument for nature's restoration/the legitimacy of nature restoration)[87].

From a philosophical standpoint, just for the human-nature coexistence is historical and the humans arrived to the level of ecological consciousness, one should not annul the human *aid* for preserving the nature's uniqueness, certainly only by stopping the historical economic activities destroying nature. Consequently, still from a philosophical viewpoint and just in order to understand the causes of the destruction of nature, one should not cover the historicity of human-nature relationships with an abstract conclusion of the undifferentiated illustrations of that destruction ("the humans"), and one must transcend the a-social explanation of these relationships. *By removing the social from the ontology of nature, the analytic philosophy proceeds "against nature", since in reality the world is social* and the worldviews about nature reflect exact social positions. For this reason, the arguments cannot be abstract and nor infringing the dialectic/*contradictory* character of things[88]. Only on that confuse basis the messages have mixed concepts as the "superiority of culture towards nature" and at the same time "nature as the only place to evade".

Therefore, when correcting the former history when humans occupied nature, destroying its unique peculiarity by utilising it, by reducing it to only the immediate utilitarian standards, and by accelerating and systematically deepening these processes by the capitalist logic, one has to imagine the *alternative* of humans helping nature to regain its equilibriums which will diminish its need of human help. This does not mean – as in some dystopia – "the return of the wild (nature)" and of the humans suitable for the wilderness: on the contrary, the more the nature will be helped to become autonomous towards the help of humans, the more they will be more human.

[86] Keekok Lee, *The Natural and the Artefactual: The Implications of Deep Science and Deep Technology for Environmental Philosophy*, Lanham, Lexington Books (Rowman & Littlefield), 1999.
[87] See Thomas Heid (Ed.), *Recognizing the Autonomy of Nature: Theory and Practice*, New York, Columbia University Press, 2005.
[88] Marx has demonstrated the *contradictory* characteristic of the capitalist progress: the accumulation of wealth is paid by human and natural dysfunctions and falls. See a more recent analysis demonstrating that the creation of economic surplus – thus, profit – was dependent on an extensive use of resources/nature. When the proportion of the extensive use of nature becomes subunitary towards the necessity of economic surplus, i.e. the exaustion of the conditions which sustain accumulation, the model of this type of relationship with nature fails, Jason W. Moore, "The End of the Road? Agricultural Revolutions in the Capitalist World-Ecology", *Journal of Agrarian Change,* Vol. 10 No. 3, July 2010, pp. 389–413.

This is the reason that nature became *synonym* to space: the specific knowledge of each of them arrives to the same *value contents* measured according to human criteria. And if the criteria of the measurement were denied by the *results* of the old/existing values, is there any human criterion at all? The immensity of space and the motley appearance of nature seem to some ones to substantiate relativism, the lack of any human criterion. Actually, the moral relativism has no basis, because the human criteria are those demonstrated long time ago: the individual[89] fulfilment only with the fulfilment of humanity/the humanity fulfilment only with the fulfilment of every human being. *Only in the present dominant ideology, is the individual opposed to its species.* This is the reason of the *persistence* and *promotion*, in this ideology, of the historical tradition of beast of prey: for both the individuals who can and for humanity. Or, another criterion long before advanced was the humanity fulfilment by moving away from its tradition of beast of prey towards both humans and nature.

By incriminating "anthropocentrism" – the entire *species* and not just the decision-makers representing clear power relations – the discussed philosophy reduces the human species to its animal face. But the humans have also their unique non-animal face: they have the capability to not destroy their inanimate and animate environment when they struggle for life. *The ancestral destructions this species has caused are not tantamount to the present destructions*: it's no continuity in this process, because nowadays the humans *know* to protect, to conserve, to prevent, to restore.

c) Then it is *environment*. If space associates with movement, the place signals rather rest, a pause necessary to better enjoy the movement and to feeling good in this moment of re-balancing. The environment is not tantamount to the space and is more than the place. It reminds the old image of space as an envelope of things. And if so, the environment must always have – and it has – a *centre*, somehow external to it.

Since the environment has a centre, it results it is relative to the living being that is the subject in the talk about environment. This one surrounds the subject, so it is *local*, irrespective how large it is[90]. But if for some ones this local environment and nature is the same thing, and preserving/restoring a local environment is tantamount to the preservation of nature, for those who consider that a system is more than the sum of its parts, the environment refers only to a part of nature.

Obviously, if related to a specific living being, but also to a species and more, to all the living beings in a *biotope*[91]or *habitat*, the environment is specialised, specific to the interactions between all its living beings. The interactions form the *biocoenosis*, where the phenomenon of *niche* construction – both spatially, tending to confiscate and stabilise as much space as it is possible, and in terms of dominance of a species in that habitat – once more shows that the *biocoenosis and the biotope form the ecosystem*[92]. Consequently, the environment is diverse; it divides into parts according to the functions these parts assure[93].

[89] See Ana Bazac, "The philosophy of the *raison d'être*: Aristotle's *telos* and Kant's categorical imperative", *Biocosmology – Neo-Aristotelism*, Vol. 6, No. 2, 2016, pp. 286-304.
[90] Vir Singh, "Soil Ecology: Key to Climate Solution and Sustainability", *Journal of Ecology and Toxicology*, 1, 2017, p 101e.
[91] A biological *topos*.
[92] See the beautiful Chris Maser, *Forest Primeval: The Natural History of an Ancient Forest*, Oregon State University Press, 2001.
[93] David Basanta and Alexander R.A. Anderson, "Exploiting ecological principles to better understand cancer progression and treatment", *Interface Focus*, 3 (4), 2013, doi: 10.1098/rsfs.2013.0020.

From the standpoint of the individual living being, and thus of the species, the environment is specialised according to its functions created in the endeavour of the living being to last. Jakob von Uexküll has demonstrated that for the same animal, the environment is divided, or better, is constituted from three spheres, like the Russian dolls embedded one in the other: but the environment as the whole nature has no direct, but only indirect significance, *it is not felt directly*; in this space there is *Umwelt* (the world around), the *directly* perceived surrounding milieu, while in the *Umwelt* there is the individual home/*Heimat*[94]. Von Uexküll's theory is important not only for the animal psychology, but also for ecology, i.e. the interdependence between living beings and nature, as well as between man and all the rest.

Here, it is interesting to point out the difference between the individual animate being and man. The former gives significances only to its restricted milieu, more correctly only to the *elements* which interest the animal: only these elements – called by von Uexküll "carriers of significance" – form the structure of the animal's milieu as receptacle, irrespective here of how large it is; the nature that comprises the carriers of significance of the *Umwelt* of the animal but is external to that *Umwelt* has any meaning for the animal. While *man gives significances to more than his milieu*, since he *reasons in an abstract way*, and *imagine*, letting aside that he explores everything he can, much beyond his milieu. For the animal, the milieu is the only environment it knows. For man, his milieu – and obviously, man, and every man, too, has its *Umwelt*, but it – is only a criterion of comparison/interpretation, a mediation between him and the more comprising existence constituted from n integrated systems. More: because meanings are contextual, namely related to the human's centres of interest, neither for him the nature he encounters is the same. When he hunts he sees that part of nature differently than when he walks and wants to enjoy seeing the beauty of that part of nature. But only for man the dialectics of a subjective nature that however can be measured etc. is possible.

Epistemologically, we can highlight the big discovery of von Uexküll: though from the standpoint of physics there is one single space, from the viewpoint of the meanings given by man and animals there is no only one single space as we, humans, imagine; and the beings see/"value" the space in different ways[95]; because space is relation.

8. Anthropocentrism (with and without quotation marks)

In the politically dominant worldview – as we saw, transposed into a kind of philosophy – the cause of the domination of nature would be, philosophically said, just anthropocentrism: inherent to the human nature manner of thinking, a general attitude towards everything that is outside man. However, *it is not anthropocentrism*, as *the paradigm of the human unique specificity in the field of living*, but the *manner to transform it into "reason" of domination of nature* that is questionable. Because of the human-nature interdependence and interference, both the concept of nature and its domination should be seen in their social and historical embedding. The philosophers have formulated some principles and questions related to nature – respect towards nature, the end in

[94] See Mihai Beniuc, "Mediu, preajmă, vatră. Principii de psihologie animală" (1937), *Noema*, XVIII, 2019, pp.47-74 [Environment, surroundings, home: principles of animal psychology].

[95] Giorgio Agamben, *The Open: Man and Animal*, p. 40: "Too often, he affirms, we imagine that the relations a certain animal subject has to the things in its environment take place in the same space and in the same time as those which bind us to the objects in our human world. This illusion rests on the belief in a single world in which all living beings are situated. Uexküll shows that such a unitary world does not exist, just as a space and a time that are equal for all living things do not exist".

itself/intrinsic value of the non-human living beings, the *telos*[96]/purpose that is the *conatus*, the will to persist of every living being, what does 'naturalness' mean? – but since they did not relate them to the concrete social relations, they arrived to the guilt of the "human nature" where the idea of superiority of man would be structural. But in what sense is the centrality of man responsible for the meanings it gives to nature?[97] The answer should be given by both science and philosophy. But both science and philosophy have plural answers: because both are *socially forged and directed instruments, as two means of power*. For this reason, their plural solutions should be mutually criticised.

Would the alternative to anthropocentrism be biocentrism, the new centre of the attitudes of humans towards every living being? However, at least in the present stage of the human existence, we have to know that, with all the *common*[98] aspects/*continuity* of the intelligence line between the non-human living beings and the humans[99],

- the knowledge of the *why* of things, as the ancient sages stated,
- the development of *language for concepts and abstract reasoning*, therefore, not only to react but also to contemplate and generalise much beyond the seen world,
- the consciousness of *complexity*, of space and time *much beyond the individual life*, thus
- the construction of real objects and virtual realities much beyond the direct needs, and in order to *anticipate*, and not only to foresee[100] the destiny of this construction,
- the human characteristic to create and communicate ethical *values*, as well as the immense "world 3" of culture, including
- the counter-intuitive – from an animal standpoint – *care, solidarity and sacrifice much beyond the family circle*,
- the huge importance of ideal ends and *human ideals* – and not only of material well-being –
- conclusively, the *geometric* progress of culture as a result of the "snowballing" effect of the growth of knowledge[101]

[96] The fourth cause, in Aristotle.

[97] See the excellent Gerhold K. Becker, "*Je suis le grand tout*: Respect for nature in the Age of Environmental Responsibility", pp. 23-42, in King-Tak Ip (Ed.), *Environmental Ethics: Intercultural Perspectives*, Amsterdam, New York, Rodopi, 2009.

[98] Including those not pleasant at all, as with the dung-beetle (Ladislav Kovàč, *Closing Human Evolution: Life in the Ultimate Age*", Heidelberg, Springer, 2015, pp. 37-39) or, I may say, the microbes which occupy every habitable environment on the planet.

[99] See Satoshi Hirata, Naruki Morimura, Naive chimpanzees' (Pan troglodytes) observation of experienced conspecifics in a tool-using task, *Journal of comparative psychology*, 2000, DOI:10.1037//D735-7036.114.3.291; Gabriela-Alina Sauciuc, Thomas Persson & Elainie Madsen, "The social side of imitation in human evolution and development: Shared intentionality and imitation games in chimpanzees and 6-month old infants", in Arweström Jansson, A., Axelsson, A., Andreasson, R. & Billing, E. (Eds.). *Proceedings of the 13th SweCog Conference*, Skövde: University of Skövde, (Skövde University Studies in Informatics ; vol. 2017, no. 2), 2017, pp. 21-23; the already quoted Masanori Kohda, Takashi Hotta, Tomohiro Takeyama, Satoshi Awata, Hirokazu Tanaka, Jun-ya Asai, L. Alex Jordan, "Cleaner wrasse pass the mark test. What are the implications for consciousness and self-awareness testing in animals?", *bioRxiv*, 2018, DOI: 10.1101/397067, or Liz A. D. Campbell, "Fostering of a wild, injured, juvenile by a neighbouring group: implications for rehabilitation and release of Barbary macaques confiscated from illegal trade", *Primates*, Volume 60, Issue 4, 2019, pp. 339-345.

[100] The difference between foresight and anticipation is – according to Mihai Nadin, *Anticipation: The end is where we start from*, Computer Science Colloquium, University of Bremen, 11 June 2003, PDF, and in general, https://www.nadin.ws/ – that the first starts from the present state of things and, trying to accommodate some contradictory aspects at the same time considers the present state as unquestionable; while anticipation is the start of the human actions from the images of the future state of things resulted from the continuation of the present processes and, focusing on the contradictory and negative aspects, questions the present state of things and proposes alternatives.

are, at least all of these, the reasons of "anthropocentrism"[102]. But obviously, as every direct social concept, anthropocentrism was ideologically generated and thus its *dominant* forms could substantiate the model of "privileging man at the expense of infringing all the other living entities". These dominant forms of anthropocentrism were given as framework of people's behaviours, but not even this "objective" and "natural" situation should have determined some philosophers to consider the understanding of the specificity of man as a conceptual cause of individual and collective cruelty towards the living beings.

Not anthropocentrism was the ultimate conceptual reason of the domination of nature. With the development of modernity – if our landmark is philosophy and science – but rather with the first evidences of the first agglomeration of consequences of the exploitation of nature[103], the thesis of the guilt of anthropocentrism as such became inconsistent. Also, the fact that, especially in the last decades[104] there is a visible "erosion of universally acknowledged values and moral standards" (Becker) is not the result of anthropocentrism, but of complex *social* causes. The erosion has manifested also through the rupture between man's *power* and his responsibility: *towards both the human relations and the human-nature relations*. The erosion has manifested also through the *disdain towards the human peculiarity* and the transformation of all the criteria into unsubstantiated words. But this process reflected deep changes in the power relations worldwide and through all their forms. This is the reason why: for a long time the mainstream ethics, rejecting the reference to the concrete social/power relations, was a tool of these relations and thus, its effort to deduce from the concepts treated through the lens of "standard moral intuitions" the best arguments to support nature, did not become practically important to halt the destruction of nature. An entire deployment of (*in se* interesting) aspects of the ethical problem of normativity of nature according to "standard moral intuitions" and resulting from arguments related only to concepts seen in the framework of these intuitions, has arrived only to possibilities to think the theory of normativity in this framework[105].

But the same process happened in the *human* ethics: even after Kant's highlighting of the *relational* ethics[106] of ends and means and Marx's relational *ontology* of humans as both individual and species beings, the "professionals of thinking" have made the same detours pertinaciously ignoring Kant and Marx. This *common* position towards the humans, nature and the living beings shows the *same* phenomenon: of historical delay of most philosophical theories towards the concrete problems and their absolute or selective disconnection with science. This is the reason of

[101] Ladislav Kovàč, *Closing Human Evolution: Life in the Ultimate Age*, p. 27.
[102] There are also some human biological peculiarities related to the above elements. One is neoteny, the lasting juvenile traits which assure lasting curiosity, pleasure of playing and ability to learn. See Georges Chapouthier et Alain Policar, « La néoténie humaine, une idée ŕ relancer », *Pour la Science*, 452, 2015, pp. 14-15.
[103] This exploitation of nature was the copy of the exploitation of humans, till their exhausting; or vice versa. For the evidences, see the already quoted Ray Lankester.
[104] This moral erosion is not specific only to the last decades. Let's remember at least Nietzsche's critique of this fact. And the permanent lament about the decay of morals (see this lament after the WWI); but this latter lament was not merely the same with Nietzsche's position, because it did not criticise the dominant moral, but on the contrary its helplessness to fully dominate and the adverse moral positions.
[105] For example Robert Elliot, "The Normative Side of Nature", pp. 11-22, in King-Tak Ip (Ed.), *Environmental Ethics: Intercultural Perspectives*, Amsterdam, New York, Rodopi, 2009.
[106] It is important to note that as Leibniz was the promoter of the precedence of relations towards the concept/"entity" of space, so Kant was the pioneer of the precedence of relations towards the moral qualities. The bricks of ethics ceased to be the moral qualities, being substituted by inter-human relations. Actually, this epistemological paradigm change has led to the big ethical content paradigm: the categorical imperative to treat the humans as ends, and not only as means.

their isolation. Consequently, as important as they are, the present environmental ethical theories are, simply, contemporary with the official strong trajectory of destruction of nature.

Actually, what does "centrism" mean in these ethical theories (anthropocentrism, biocentrism, ecocentrism)? It means that the humans/the living beings/nature are "moral objects", namely must be treated according to the (same) moral values. Simpler: as we treat the humans so we should treat the non-human living beings. They are not simple objects considered only in a utilitarian view, but moral objects. Therefore, the subject is here somehow ubiquitous: first, it is the human who considers the other living beings; secondly, it is every living being since the treatment of these living beings is based on the intrinsic value these beings have. This value – highlighted by Albert Schweitzer in 1923 – is life itself, promoted by every living being as the well-known will-to-live[107]. However (and although Albert Schweitzer thought that the conclusion of his ethics – "responsibility without limits towards all that lives"[108] – does not imply any contradiction between the duties) this is not the Kantian demonstration without any fissure: in fact, there are many and fundamental contradictions. If to treat the other humans always as ends and not only as means cannot be falsified, the respect towards every individual living being analogously to the respect towards every human being is more than easily falsified[109], since first of all it is (a historically and socially forged concept) infringed by the necessity of humans to eat, even only in a vegetarian manner. Finally, if we take the before mentioned definition of centrism related to moral objects, can't we put biocentrism and anthropocentrism on the same level?

9. The distance between the scientific representation of space and the common worldviews

The idea of the chapter title is very important: because it has deep practical end results. As mentioned before, if not all the post-Newtonian scientists, at least those of the 20th century have definitely put into the museum of the history of science the belief of an absolute space independent of any physical thing, and the "two standards" manner of simultaneously accept the absolute space as the "true" one and the relative space as a vulgar profane license.

But the overall common worldview – result of the dominant message of the entire dominant communicative action, of isolation/separation of things (domain of knowledge, practices, values) and especially of humans towards humans – considers the space and time *as if* it would be absolutely exterior to people, *in this meaning* "objective", flowing outside them/comprising them as a fatality. This is the foundation of effective education for lack of accountability in the treatment of space in a consistent ecological and human manner. This type of education marks even those with highest degree of technical instruction: because the ecological and humanist sensitivity is related, first, not to the scientific illiteracy but to the assumed *ideological* tenets[110]. Excepting the interest for the near spaces, the treatment of natural and human space is lacking both the *foresight* and

[107] Albert Schweitzer, *Civilization and Ethics* (1923), Third edition, London, Adam & Charles Black, 1949, p. 242: "Ethics consists, therefore, in my experiencing the compulsion to show to all will-to-live the same reverence as I do to my own".
[108] Idem, p. 244.
[109] If we consider the intrinsic *telos* of every living being – to last (letting aside the specification "at any costs") – then this individual *telos* may well oppose to the external *telos* of the habitat it lives and to the *telos* of its own species. Less philosophically, if for the living being its *homeostasis* (equilibration) is the most important, for the ecological space/habitat/ the biotope the living being lives, the *biocoenosis* is the most important, i.e. the balance of that entire biotope, including through the destruction of some living beings by other ones.
[110] Donald Braman, Dan M. Kahan, Ellen Peters, Maggie Wittlin, Paul Slovic, Lisa Larrimore Ouellette, and Gregory N. Mandel, "The Polarizing Impact of Science Literacy and Numeracy on Perceived Climate Change Risks", *Nature Climate Change*, 2, 2012, pp. 732-735.

anticipation which could change the humanity's trajectory even nowadays. The common worldview is marked by the "illusion of transparency" – i.e. the superfluous character of the theoretical distancing and analysis – and the "realistic illusion" where the ideological transcriptions of the pictures of space are covered[111]. It is clear that the common worldview is specific not only/not first to the ordinary people but to the political decision-makers – who transpose the private economy's interest and view related to the public space –: they do not apply the conclusions of the scientific researches (even hinder the scientific work), or apply it partially, that is inefficient for the whole space, and in any case they apply partial programmes late, *after* the agglomeration of imbalances and crises.

Also, the role of the observer in the consideration of space is cardinal in the scientific approach. In fact, it is related to the cardinal problem of *coexistence* of the human awareness of the ecological problems of space and the lack of intervention and correction of these problems. Certainly, on the one hand, we speak about the difference between and the precedence of scientists to the common public: there is a de-phasing between the ecological knowledge and the (efficient) transmission of this knowledge to the common public. On the other hand, it is about the difference between knowledge and action. But the impact of discourses on the common people and on the policy-makers is not dependent only on the level of both the transmitted knowledge and the general cognisance, as well as the cognitive level of the decision-makers: it is dependent on the *power relations* which determine both the level of education/formative messages toward the public and the rupture between the political decisions and the scientific knowledge demonstrating practical imperatives. One cannot accuse a general "greed": since this greed as such is a historical and social, politically and economically driven attitude.

In this respect, we may compare the situation of the Roman civilisation – where "although the value of the fertilizing of the soil, of composting, of crop rotation, of the fallowing, and of seed selection were all known, exhaustion of the soil became widespread"[112], and overgrazing, deforestation, wildlife depletion, urban life with its excesses, even though deplored by poets and philosophers, took place[113] – with the expanding ecological destructions of the last more than a hundred years and the crisis of at least the last 30 years: in the first situation, on the one hand, the standpoint of poets and philosophers was only an empirical intuition and, obviously, not a scientific demonstration, while on the other hand, there were *no scientific means* to counter those negative practices which were the sign of a primitive *extensive* economy (people exploited the *local* soil until it exhausted and then they based on new, different lands); while in the last 30 years, on the one hand, *the decision-makers know but do not act sufficiently*; and on the other hand, *know and even act somehow, but not enough*. The result is the degradation, the decay: but worldwide, *as if* the economy still would be primitive *extensive.*

Finally, and as a result of space as mirror of man, only in this way urging to his responsibility, space as the absolute interdependence of things and humans is the creation of the latter. Consequently, the contradictions[114] of spaces and within spaces are not – as the common

[111] Henri Lefebvre, *The Production of Space* (1974), Translated by Donald Nicholson-Smith, Oxford UK and Cambridge USA, Blackwell, 1991, p. 26.
[112] Jeremiah Reedy, "Greek Thought and the Right to Clean and Healthy Environment" (pp. 146-154), in Philosophy and Ecology, Greek Philosophy and the Environment, Volume I, Edited by Konstantine Boudouris and Kostas Kalimitzis, Athens, International Center for Greek Philosophy and Culture, 1999 (p. 147).
[113] See J. Donald Hughes, *Pan's Travail: Environmental Problems of the Ancient Greeks and Romans*, Baltimore, Johns Hopkins University Press, 1994.
[114] In the trail of Henri Lefebvre, op. cit., who described the contradictions of space and thus the constitution of *differential* spaces, see the present "fashion" of small dwelling/tiny house for the homelessness or poor (near the

public is taught – inevitable because of the "objective" "natural" tendencies of "the human nature" (greed, egoism and natural hierarchies), but they are the result of the power relations and, thus, can be changed.

10. The microenvironment…

We can now point to some aspects related to the first concept put in relation by our topic.

The analysis of "microenvironments" – though the concept became modish only in the last two decades[115] – or concrete particular spaces was habitual as the modern science developed. Science, in this modern acceptance, means just the *delimiting* of the "territory"/topic in order to investigate it in depth. In this respect, the modern science is *epistemologically* space dependent. Obviously, the topic concerned different sizes of the space circumscribed at the beginning of investigations. The researchers were interested to understand the *functioning* – thus, the *functions* and *structures* – and the *adjustment* of different systems. They started from the "medium size" of systems, and arrived to the many types of micro systems.

For example, in biology, they started from the functioning of organs and arrived to the level of cells (cellular biology) and of molecules (molecular biology). Once arrived to micro-levels, the scientists have understood that they have to start from these micro-levels in order to understand the whole organism. The functioning or the organism is based on the adjustment of each micro-level but also on the adjustment of reciprocal relations between micro-levels:

- at the level of cell, the adjustment of nucleic acids – but these ones involve also the chemistry of pentose, of heterocyclic components and phosphates, the movement of atoms, electrons and organic and inorganic compounds – of proteins and metabolites, therefore the sub-cellular organelles, all of these once again involving the chemistry of molecules etc.; but it is not a "simple" chemistry, because the molecules of proteins distinguish between the type of other proteins etc., i.e. their different functions;
- at the level of inter-cell, the adjustment of hormones;
- at the level of inter-organs, the adjustment of hormones and the nerve flow.

Thus, in *every* process we have to grasp the *physics*[116] of *matter* and *energy* and the existence and role of *information* in their deep intertwining/rather, overlapping, since signals and the recognitions of molecules and atoms are the result of electrical charges, activity of electrons, ions etc.: the

traditional slums beyond fashion, and also new ones, see Robert Neuwirth, *Shadow Cities: a billion squatters, a new urban world*, Routledge, 2004)) at *the same time* with opulence and space waste as well as the space's malign use. But the neglecting of *measure* in the human relations with space generates only impossibility of order/significances in and of all the contents of space, and thus – if we do not forget Plato's image about space as the sign of existence – including of the human life, and life in general. Measure is just the "catalyst" facilitating the process of valorisation of space and all its contents.

[115] See Valerie Zartarian, Tina Bahadori, and Tom McKone, "Adoption of an official ISEA glossary", *Journal of Exposure Analysis and Environmental Epidemiology*, 15, 1, 2005 pp. 1-5: "surroundings that can be treated as homogeneous or well characterized in the concentration of an agent".

[116] For example, the circadian rhythms which have an inner molecular mechanisms origin, found in almost every cell of the organism, are the result of the correlation between the *rhythm* of certain (redox) molecular transformations and the informational signalling, and the light-dark/day-night succession, genetically fixed. Just because that rhythm had to be lowered from the level attaint in day light, the circadian rhythm/clock is present in almost all cells, in order to transmit – from one cell to another – the "order" of the process, necessary to life. In this way we do explain the different composition of breast milk in day and night time, composition that directly influences the psychological attitudes related to activity and alertness or to rest and sleep of the child's organism, while indirectly – the molecular and hormonal immune system. See Jennifer Hahn-Holbrook, Darby Saxbe, Christine Bixby, Caroline Steele, Laura Glynn, "Human milk as "chrononutrition": implications for child health and development**"**, *Pediatric Research*, volume 85, 2019, pp. 936–942**.**

matter-energy-information triad is significant in the metabolic processes where the enzymes are induced or repressed, the products of reactions intervene in the play of enzymes and thus, of metabolism as such, and the competition between organs for the same material and energy substratum takes place.

While the inhibition and excitation at every level are "meta-explanations" or principles of functioning, the connexions of all parts into the organism are the most interesting, because their directions are not only from the micro-level to a superior one but also – and always – from the superior one to the micro level. And even – and this is the most miraculous – from the organism to the inferior levels. One reason is obvious: *only the superior levels* – the external organs and the organism as a whole – *are directly related to the environment*, and the experiences of the organism in the environment are integrated ("internalised") in a reverse direction from the organism to the inferior levels. The nerve flow and the "consciousness space" are the main responsible for this forcing of the inferior levels to subordinate to the whole organism's will-to-live, and this process of straining all efforts works. But it is, certainly, related to both the resistance/resources of the lower levels to re-balance and to the psychical resources transcribed in the world of the consciousness as reasons, stimuli, vectors; and certainly, again, to the bidirectional informational flow "matter"-consciousness and back.

And if everything depends on the psyche, and the human psyche is social/depends on the social interactions and constructs (as concepts and values), it results that the *human being* is more than its biological architecture[117]: "man is the result of social relations", as it was demonstrated long before. The human being is its entire biological integrity, its cultural endowment *and* the *whole social – thus including natural – space* in their cumulated histories. This entire space is his environment.

If the old Aristotelian concept of *telos* was the philosophical explanation of all the organisms, it explains to a certain extent every biological system[118]. And in order to understand how, why and up to which point the equilibrium of different systems is reached/lost/regained, and with what costs and consequences, the researchers have focused on these systems, starting from the molecular level.

And because matter itself is creative and unpredictable, as Richard Feynman said, as well as the biological structures[119], a long and heroic research of the biological micro-environments began,

[117] We have to add to the former warning against reductionism, that though the physical laws and the chemical composition and reactions are underpinning the existence of living beings and of man, the biological laws and the social ones – related to the experiences of the living beings and man – may influence and even direct, at least for a while, the rhythm of chemical processes.

[118] But not only: it is the philosophical solution for, let' say, the strong and weak fundamental interactions which bind the particles together.

[119] One aspect, related to the above mentioned recognition of molecules – which are not-yet living beings – is the *continuity* of *information processing* to *cognition*: from reactions to signals and their treatment to the *meanings* given to information and the use of *symbols* as representing, not copying, even in the absence of the original information; therefore, cognition means *memory* of the former information and patterns of actions *in new conditions/experiences/environments*, including through projecting in different space-time environments; in this respect, cognition is virtual, four-dimensional, while information processing is reductive, atemporal; thus, cognition means creative instruction for action in these new environments.

If the information processing at the level of molecules and sub-molecular components involves the selection of the "best"/suitable alternative, and the destruction of this alternative leads to possible destruction of the entire complex, probable after attempts to substitute the pattern of the suitable alternative, cognition is more than this selection, it is coping with/dealing with the new alternative and creation of substitutes, adjuvants/"cathalists" in order to solve the new problem. In other words, in information processing, there are fixed relations and interpretations, every violation of these relations meaning a perturbation of the informational process, necessitating the creation of a new pattern of relations

these micro-environments being just the *structures of relations* inquired *starting from core elements*. The objectives were/are how the functions and adjustments take place within the micro-environments and if and how the consequences of these relations challenge the structures already established.

11. …and its micro-surroundings

Nowadays, the molecular biology and the micro-environment approach are in the moment when they still discover the functions and adjustment of the elements in their circumscribed spaces (for example, the cellular signalling, the functions of proteins and their transportation, the behaviour of sub-molecular organelles). Actually, the systems – let' say, the protein molecules and their atoms – are not isolated since they function. In this respect, the micro-environment is the small surroundings of one single organ/structure. There are micro-environments not only of cells, but also of parts of the cell. At the same time, as the models of the functioning of the micro-environments become reliable[120], new correlations and elements are added as new problems (see the research of extra-cellular proteins and the recognition of cellular interactions). The micro-environments change and enlarge. And first of all: because the living beings live in an *open* space where the sun is the source of energy allowing their internal productive relations (of photosynthesis, for example). The micro-environments are used – letting aside ecology as such – through the integration of organs and functions, and even of organisms in their own surroundings or in changing ones, even in changing environments. At this level, the micro-environment is the *Umwelt* of an organism. The change of the *Umwelt* leads to the change of appearance and habits of animals, just because of their different experiences[121]: this is epigenetics.

Or, the object of research is no longer the individual living structure/or even being, but a population/species: related to climate or geographical surroundings[122], or as members of the same species – related to the chemical signals, as well as to the genetic data differentiating them according to pre-established functions, or to the new stresses of the environment; or related to the

from without; in its turn, cognition means only formal fixity, but it depends on the using of this formal fixity according to virtual alternatives (imagination based both on memory and meanings related to the new context). Finally here, information processing is participation to the objective order; cognition is an active creation of different orders.

Anyway, for the "cognitive" aspect of pre-living structures (the recognition of molecules etc.) – but the author does not discuss the discontinuity information processing-cognition – see the excellent Ladislav Kovàč, "Life, chemistry and cognition: Conceiving life as knowledge embodied in sentient chemical systems might provide new insights into the nature of cognition", *Embo Reports*, 2006, June, 7 (6), pp. 562-566.

Also, for the understanding of *information* processing as *energy* creation (for further superior processing) in living beings, see Jacques Monod, *Le hasard et la nécessité. Essai sur la philosophie naturelle de la biologie moderne*, éditions du Seuil, 1970.

But do not forget the reverse process, of *energy* creation as a basis for the development of *informational* structures like that of human culture.

However, for life the energy storage – this meaning also information storage – is as important as the flux and transformation of energy.

[120] See Sachi Fujimori, "The 'Ecology' of Cancer: Studying the 'Soil' that Enables the Disease to Thrive", *Disruptive Science*, Jul 03, 2018.

[121] See T. Kimchi, and J. Terkel, "Spatial learning and memory in the blind mole-rat in comparison with the laboratory rat and Levant vole", *Animal Behaviour*, 61 (1), 2001, pp. 171-180.

[122] Arun Chettri, Saroj K. Barik, Harendra N. Pandey, & Mark K. Lyngdoh, "Liana diversity and abundance as related to microenvironment in three forest types located in different elevational ranges of the Eastern Himalayas", *Plant Ecology & Diversity*, Vol. 3, Issue 2, 2010, pp. 175-185, https://doi.org/10.1080/17550874.2010.495140.

symbiotic relationships with other species in their environment, or related to the change of environment[123].

Or, one scrutinises the different types of coexistence in the same *biota* of two or more species etc. They form *biomes* where "adaptation as a never-ending multilevel hierarchical process of individual-, population- and community-level adjustments to a constantly changing environment" occurs and shows the phenotype plasticity limits, with genotypes proliferation[124] but – pay attention – in different time intervals for different species[125]. In this respect, the topics are the *microclimate* – climatic variable in small places – and *microhabitat*s, as sites for one or few individuals from the same or different species[126]. The models created after micro-environments explain the functions and adjustments at this level, but *all the micro-levels are encapsulated one in the other*, *all the aspects combine* and, because we experience the influence of the imbalances of the entire environment of the Earth on all the micro-environments, the same analytical inquiry (climate etc.) was deployed on macro-environments[127]. But while the research of micro-environments – besides responding to the passion and curiosity of researchers – has practical applications and thus is lucrative, benefiting from a generous financing, the research of macro-environments is seen with positive appreciation only if it helps/is subordinated to political purposes. If the whether forecast helps the army, it is respectable. If the same forecast pertains to the larger research about the general environmental crisis/the influence of the whole on the parts and thus it strongly suggests the transformation of its anthropogenic cause, it is minimised and ridiculed.

However, both the micro-environments and the macro-environments highlight the same process of cardinal importance: the *tolerance breaking*, the threshold between the possibilities of homeostasis/balance *and* a paroxysmal moment when these possibilities seem to be over. In this moment, new stressors enter in relation with/within the system and, because the system could not integrate them / it was not possible for the system to get used to these new phenomena – and because the *resulted state of the system is just that of accumulation of harmful phenomena not integrated/not fully integrated within it*, though *as there are many causes of imbalances, so are many ways to correct/compensate them* – the new stressors added to this accumulation can play the role of the drop that causes the glass to reverse. And although it is about a quantity – but, certainly, the stressors may be qualitatively new, as radioactivity – it becomes a quality threatening the system whose response is deregulated.

[123] Menachem Goren, Gregory Lipsky, Eran Brokovich and Avigdor Abelson, "A 'flood' of alien cardinal fishes in the eastern Mediterranean - first record of the Indo-Pacific *Cheilodipterus novemstriatus* (Rüppell, 1838) in the Mediterranean Sea", *Aquatic Invasion*, 5, 2010, Supplement 1: S49-S51; Trevor C. Lantz, Steven V. Kokelj, Sarah E. Gergel, and Greg H.R. Henry, "Relative impacts of disturbance and temperature: persistent changes in microenvironment and vegetation in retrogressive thaw slumps", Global *Change Biology*, 15, 2009, pp. 1664–1675, doi: 10.1111/j.1365-2486.2009.01917.x; Benjamin Blonder, Rozalia E. Kapas, Rebecca M. Dalton, Bente J. Graae, Jacob M. Heiling, Øystein H. Opedal, "Microenvironment and functional-trait context dependence predict alpine plant community dynamics", *Journal of Ecology*, 106, 2018, pp. 1323-1337, DOI: 10.1111/1365-2745.12973.

[124] See Adrian A. Smith, "Prey specialization and chemical mimicry between *Formica archboldi* and *Odontomachus* ants", *Insectes Sociaux*, 2018, pp. 1-12; L. R. Peckre, C Defolie, P.M. Kappeler, C. Fichtel, "Potential self-medication using millipede secretions in red-fronted lemurs: combining anointment and ingestion for a joint action against gastrointestinal parasites?", *Primates*, 2018, doi: 10.1007/s10329-018-0674-7.

[125] Edmundas Lekevičius**,** Michel Loreau**,** "Adaptability and functional stability in forest ecosystems: a hierarchical conceptual framework", *Ekologija*, Vol. 58, No. 4, 2012, pp. 391–404.

[126] Vitek Jirinec, Robert E. Isdell, Matthias Leu, "Prey availability and habitat structure explain breeding space use of a migratory songbird", *The Condor*, 118 (2), 2016, pp. 309-328.

[127] There are different sizes of macro-environments. The location and the problems of the interdependencies of species etc. are the choice of researchers.

As we know, the micro and macro-environments of non-human living beings was definitely shaken by the human species' march: from the beginning and, certainly, nowadays[128]. And thus, the environments as such were conceived of as both *nature* and *people and social relationships*[129].

12. Epistemology of the approach of the human space

We have to remind the dominant pattern of thinking about human affairs, because otherwise it's difficult to understand that *though many problems are already known with all the scientific credentials*, the general policies are deployed *as if* no one would know nothing, and the only logical way to assure the human existence would be the agglomeration of new theoretical "introductions in.." near the continuation of usual harmful practical strategies.

The dominant pattern means:

- the separation of the *individual* from the human *species*, and the corollary separation of the humans from the living beings, as well as from all the material and spiritual resources of this species;
- as a conclusion from the above aspect, the *ignorance of all the interdependencies* related to humans,
- and the continuation of the *old* standpoint that everything that exists would be only to serve, abstractly said, the humans, but concretely, some humans;
- the implicit conclusion, leading to the attitude towards the existential crisis of nature, i.e. of the crises of living beings and the whole inorganic milieu: "they are objective", thus people should bear them – as the "new normal" – and confront them *as if* they would be inevitable;
- the dominant viewpoint of the individual against everything and all manifests also through the *separation* of the individual *rights* from the *responsibilities*[130];
- the *simplified* view about the individual – and the humans – reducing it/them to the material satisfaction: *as if* the human being would be only an animal, lacking trans-wellbeing and trans-individual purposes[131];
- the simplified view generated the privileging of the *individual identity* without any connection to the identity of the human species, or even the covering of the species identity by biological aspects of individual identity;
- the above separation and reductionism manifest through the *rupture between the individual and the social*: the individual identity is never social according to the reductionism pattern;

[128] Nicole L. Boivin, Melinda A. Zeder, Dorian Q. Fuller, Alison Crowther, Greger Larson, Jon M. Erlandson, Tim Denham, Michael D. Petraglia, "Ecological consequences of human niche construction: Examining long-term anthropogenic shaping of global species distributions", *Proceedings of National Academy of Sciences of the USA*, 2016 Jun 7; 113(23), pp. 6388–6396, doi: 10.1073/pnas.1525200113; however, with all the bad changes introduced by agriculture, until the (capitalist) industrial revolution, the climate zone was safe, see Jos Hagelaars, *The two epochs of Marcott*, https://ourchangingclimate.wordpress.com/2013/03/19/the-two-epochs-of-marcott/; but see also Yinon M. Bar-On, Rob Phillips, and Ron Milo, "The biomass distribution on Earth", *Proceedings of National Academy of Sciences of the USA*, June 19, 2018 115 (25) pp. 6506-6511; published ahead of print May 21, 2018 https://doi.org/10.1073/pnas.1711842115.

[129] Koos Neefjes, *Environments and Livelihoods: Strategies for Sustainability*, Oxfam GB, Practical Action Publishing, 2000.

[130] But responsibility is both individual and collective, towards the human *species* as such, and not just for those close to me.

[131] But the quiddity of man is just its reasoning according to *values* and just the *coexistence of individual and species purposes*; and the reduction to material consumption is not "specific to the human nature" but, on the contrary, is the result of the old scarcity and the new capitalist education.

- as a result of the a- and anti-social reductionism, the models of the individual' situation and the world are conceived of as *static* and absolutely *exterior to the real functioning* of the vital and social processes. Here the models are not ideal projections but "realist" descriptions: but they are false because either they do not include the inherent contradictions of every process or they conceive of some contradictions only as "un-natural", exterior to the described phenomena and rather put by the "enemies";
- this is the reason of description of things in an absolute Manichaean manner: *as if* there always would be only two alternatives: the "good" one following from the simplified image about the world "or" that suspect from this standpoint; but there always are *three/many/ alternatives to the existing simplified pattern*;
- therefore, *Manichaeism* is the manner to treat both the individual and the environment;
- Manichaeism appears even as *separation* between politics and economics: the dominant – including in number – "political analysts" absolutely ignore the economic logic, *as if* in reality economy and politics would even be separated[132]; as a result, the political analysis is always subordinated to the dominant individual and a-social identity that ignores/rejects the rights-duties and individual-social interdependencies and the social and long-term consequences of the *hic et nunc* individualism; this is the reason of the official rejection of any alternative to the present official way of life;
- and a subsidiary form of above Manichaeism is the false dominant image that the financial system would be *autonomous* from the real economy and hence the financial regulations would suffice to halt the critical problems of the real economy; but as it is proven, they do not solve but, on the contrary, they amplify the absurd imbalances of the economic system; the tenet of the present financial paradigm – the play of exchange-values (so including financial means) would "invisibly" regulate the economic logic – is thought to being able to avoid the change of the economic rationale toward the creation of *use-values*;
- finally, the human space – i.e. the whole space having human significances – is decided *exclusively* according to the dominant power relations paradigm; this paradigm avoids the multiple and deep interdependencies (for example showing the necessity of *economical* measures, but not saying a word about the military waste and the military consumption of space in an aberrant manner); letting aside the *selectivity* of *the decisions in the frame of this paradigm, they are neither preventive and nor anticipative*, but are only *post* crisis, when the agglomeration of malignant facts are too dangerous politically and even economically; consequently, the *precautionary* principle – indicating the necessity to inquiry all the results of a decision, of both its theoretical rationale and its potential practical implementation, *before* transforming it into a policy – is not welcomed by this paradigm[133]; the example of the *externalisation of damages* by the individual profit deals,

[132] But they are not. See only Israel Shamir, *House Niggers Mutiny*, August 22, 2019, http://www.unz.com/ishamir/house-niggers-mutiny/.

[133] See only Kay Van Damme, Lisa Banfield, "Past and present human impacts on the biodiversity of Socotra Island (Yemen): implications for future conservation", *Biodiversity Conservation in the Arabian Peninsula. Zoology in the Middle East*, *Supplementum* 3, 2011, Heidelberg, Kasparek Verlag, pp. 31–88. Or – a phenomenon experienced in Socotra, too – in order to develop market relations, highways are constructed – but not electrical railways – for n polluting trucks destroying the habitats of the last virgin forests*: Aimed at linking communities, Malaysian highway may damage forests*, 23 August 2019, https://news.mongabay.com/2019/08/aimed-at-linking-communities-malaysian-highway-may-damage-forests/.

including the externalisation of damages in the natural environment, pertains just to this paradigm[134].

13. The human space

First of all: knowledge – and, here, the knowledge of space – is not neutral, not timeless and not a-spatial. Neither the epistemological knowledge is so. *It cannot be taken out of the social practices*.

Then, on the one hand, the human space is the world of artefacts or culture. On the other hand, it is scratchy and speckled. In the same geography we have many different ones: space of more or less affluence, but also space emptied from human significances and generating the march towards the shrinking of intelligence, since intelligence is just the capacity to connect significances and to imagine on the basis of connections. Thus, the empty space is a "space of boredom"[135]. Dryly: because culture is social, it is not enough to speak generally about the social characteristic of culture: "every society - and hence every mode of production with its subvariants (i.e. all those societies which exemplify the general concept) produces a space, its own space"[136].

People were educated to not being interested about the human terrestrial space. When special institutes for space research were founded – as, for example, the one from Brazil, *Instituto Nacional de Pesquisas Espaciais* – they were devoted to atmospheric and cosmic space: as if even nowadays the humans would be terrified in front of the terrestrial space[137] and would be seeking for another haven.

What is the most obvious and worrying is that (not only in the general representation) the human space is something huge divided in more or less small spaces of different sizes. The problem is how can the humans manage their entire space since the management itself is separated according to the division of space? The theoretical modern answers ranged from the *absolute negation of the reason of this general management* to the *negation of its possibility as such* and to the *definition of this general management as the simple sum of management of the separated spaces*. The modern

[134] See Mazin Qumsiyeh, Anton Khalilieh, Issa Musa Albaradeiya, Banan Al-Shaikh, "Biodiversity Conservation of Wadi Al-Quff Protected Area: Challenges and Opportunities", *Jordan Journal of Natural History*, Special Issue, 1, 3, 2016, pp. 6-24, showing the fragmenting and destruction of habitats through the use of pesticides, over-extraction of water, over-grazing by domestic animals, building development, extensive wood-cutting, road splitting the area (AB, like in Socotra), artificialising activities (recreational but also agriculture); or Mazin Qumsiyeh, N. Khlaif, "Genotoxicity of recycling electronic waste in Idhna, Hebron district, Palestine", *International Journal of Environmental Studies*, 73, 2016, pp. 1-9; or Z.S. Amr, E.N. Handal, F. Bibi, M.H. Najajreh, M.B. Qumsiyeh, "Change of Diet of the Eurasian Eagle Owl, *Bubo bubo*, Suggests Decline in Biodiversity in Wadi Al Makhrour, Bethlehem Governorate, Palestinian Territories, *Slovak Raptor Journal*, 10, 2016, pp. 75-79.

But also, the huge pollution of oceans outside national jurisdiction: Vanessa Baird, "Who Owns the Sea?", *Global Research*, September 20, 2019, https://www.globalresearch.ca/who-owns-sea/5689740.

[135] Bruce O'Neill, *The Space of Boredom. Homelessness in the Slowing Global Order*, Durham, Duke University Press Books, 2007. Letting aside the illustration of this type of space – that may well function as a model – the problem of boredom, but in/rather, *for* a different (geographical, social and theoretical) space, was analysed by Martin Heidegger, *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude* (1929-1930/1983), Translated by William McNeill and Nicholas Walker, Bloomington and Indianapolis, Indiana University Press, 1995.

[136] Henri Lefebvre, op. cit., p. 31.

[137] It's interesting that the Latin word for land/earth – *terra, ae* – is cognate with the verb *terreo, ere*, to terrify, to frighten. But their root, from Greek, is *teras*, monster, extraordinary (intelligent), while *terastis* is enormous, and *terma*, end. When the humans began to conceive the *general* space as endless land or as Earth (and not the particular country or region), have they not transposed in this concept their old experiences related to the undefined space that comprised them and their places, but was unknown, terrifying?

praxis was consonant with these answers. The result was the general destruction of the human environment, as well as of many of its portions, including many cultural spaces.

However, let's not forget: both the theoretical answers and the practical manners were/are the result of the power relations/the *domination-submission relations*. And because the social – here, the power – relations were/are historical, both the *theoretical answers and the practical manners should be understood in their historicity*.

At least from the 70s of the last century, the main watchword of the treatment of the human space was "the tragedy of the commons", i.e. the idea of the counter-productive management of assets when they are common property. The "demonstration" was based on the individual greed that would maximise the individual shares on the expense of the common property shared with others. Actually, the history of the commons (pasture, forest, water) in the ancient and Middle Ages villages shows a very strict use of the commons, decided by communal councils in order to both assure the needs of peasants and the preservation of commons for further common use. The individual greed grew with modernity and was the liberal and neo-liberal argument against the public property and against the public goods, in order to privatise them.

It is not the place to refer to the results of the neo-liberal policies of attack to public goods and of their privatisation[138]. But we have to remind the scientific demonstrations related to the *management of commons without the overexploitation and depletion of resources and the ecological imbalances*[139]. In this way, since the systems are interpenetrated or even integrated one in the other, we *can not consider only islands of self-governance and production controlled locally*[140] as the way to "the commons". These islands may well exist in the general system opposing the commons and, sooner or later, they are over-flooded by this general system.

In fact, if we want to explain in a humorous manner the non-contradiction between cooperative behaviour and the long-term survival, the example of some microbes – although no example is a demonstration – is special[141]. The researchers have combined mathematical models and ecological observation and manipulation of the behaviour of *Saccharomyces cerevisiae* microbes; normally, these ones metabolise sucrose in a "public" manner, namely in their exterior and thus they offer to the other microbes "free" products of metabolism. Through manipulation, two more types of microbes have been created: one of private metabolism, exclusively internally, and other of cheats, feeding exclusively from the products leaved by the native microbes. But although for short-term the privates overwhelmed the population of natives and cheats, for long term they proliferated and then declined (even through biological processes), because the sucrose was finite. Therefore, the "public" management seems to be non-economical, imperfect, but in the long run efficient, while the private one, though apparently economic/"rational", for the long term it is suicidal.

[138] See only EWG Original Research: Curt DellaValle, *Rethinking Carcinogens: New View of Cancer Development focuses on Subtle, Combined Effects*, Washington DC., EWG, 2015; the recent UN Report IPCC *Special Report on Climate Change and Land*, https://www.ipcc.ch/site/assets/uploads/2019/08/SRCCL-leaflet.pdf.

[139] Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge, UK: Cambridge University Press*, 1990.

[140] As was the image provided by David Bollier, *Think Like a Commoner. A Short Introduction to the Life of the Commons*, Gabriola Island: Canada, New Society Publishers, 2014.

[141] Richard J. Lindsay, Bogna J. Pawlowska, Ivana Gudelj, "Privatization of public goods can cause population decline", *Nature Ecology & Evolution,* volume 3, 2109, pp. 1206–1216.

Certainly, we must keep the proportions[142]. Though similar to microbes by their tenacity, the humans are not microbes (at least, that's how they like to imagine). If the meanings of space are human – if we consider the development of consciousness – the humans have something that other beings from Terra do not have: *responsibility*. But if this responsibility is weak[143] since its results in the imbalances of nature are so huge, the cause is not a general and indefinite guilt of humans, but the dominant power relations. These relations construct a *mutant* space[144], deconstructed and opposed only by knowledge. The sustainability of humans-nature relationships is not considered with the tools given by science, but: a) is subordinated to the private profit and b) is postponed. The most important tools given by the present science are those related to the modelling of the humans-nature relationships parameters and the deduction of practical actions based on the newest and most fruitful concepts[145]. But these tools *are not used*, *or insufficiently used*.

People were taught to not care about the space that is outside their home or region. But from only a couple of years many of them have become very concerned[146]. The big problem is that some ones do not conceive of the problems of space in a holistic way, while others do not understand that *for a holistic solution, the former half measures do not work at all*[147].

The result is the *domination of the irrational*, i.e. of *ignorance of/indifference towards the general consequences of a human fact* thought to be efficient for individual or private ends. For example and applying all the above mentioned epistemological shortcomings, for the change of the

[142] Letting aside the message of this phrase, the proportions are very important: in biology and in the human behaviour. See Patrick Tort, *L'Intelligence des limites. Essai sur le concept d'hypertélie*, Paris, Gruppen, 2019.

[143] On the one hand, responsibility is weak because people are not aware/ not educated to be aware and thus they do no longer remember the right relationships with nature; on the other hand, the existing ecological laws proved to be false and inefficient. Thus, new laws and new consciousness of rights to protect nature are necessary: Mary Christina Wood, *Nature's Trust: Environmental Law for a New Ecological Age*, Cambridge University Press, 2013.

[144] Atif Akin with Hillit Zwick, *Mutant Space*, *CTheory,* New York, November 2016.

[145] See for example, Josef Zelenka and Jaroslav Kacetl, "The Concept of Carrying Capacity in Tourism", *Amfiteatru Economic*, Vol. XVI, No. 36, May 2014, pp. 641-654. Also Yufeng Zhao and Lei Jiao, "Resources development and tourism environmental carrying capacity of ecotourism industry in Pingdingshan City, China", *Ecological Processes*, 8(7), 2019, https://doi.org/10.1186/s13717-019-0161-0; but also the challenging Mehdi Marzouki, Géraldine Froger and Jérôme Ballet, "Ecotourism versus Mass Tourism. A Comparison of Environmental Impacts Based on Ecological Footprint Analysis", *Sustainability*, 4, 2012, pp. 123-140; doi:10.3390/su4010123.

[146] Moira Fagan and Christine Huang, *A look at how people around the world view climate change*, April 18, 2019, https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/;
David Graeber, *If Politicians Can't Face Climate Change, Extinction Rebellion Will*, 21 May 2019*,* http://www.cadtm.org/If-Politicians-Can-t-Face-Climate-Change-Extinction-Rebellion-Will.

[147] See the divergence between a "conciliatory ecology" of some ecological reforms but by keeping the present logic of consumer capitalism's growth based on exchange-value for private profit, and on the other hand, the *radical* ecologies. However, the problem is that, if the former has no global results, the latter offer both the solution of "self reliant producers" – however, something more reasonable than the long time interval of "energy transition" and state policies postponing the reforms at least for 2030 – but also the remark that *there is no time* from the standpoint of the ecological crisis to wait until new and new self reliant producers add to a global movement (see David Holmgren, *Crash on Demand; Welcome to the Brown Tech World*, December 2013, pp. 1-24, pdf); on the other hand, there are "radicals" who conceive the non-selective destruction of the present civilisation or the contribution to the explosion of a new global economic crash as the only manner to apply an ecological transformation. But both the "'moderate" reformist ecologists and the "radicals" ignore that *only the transformation of property regime worldwide will preserve – in an ecologically selective manner – the achievements of the present civilisation without generating chaos and sufferings; and that this transformation can no longer be "gradual"*.

An example of fragmented, reformist image about the solving of problems – but *in this image the problems of nature are separated from the social problems which are "first"* and which *are seen only in a narrow manner* – is *Acte 41 des Gilets jaunes: le G7 en ligne de mire, Rodrigues et Boulo chez les Insoumis*, 26/08/2019, http://www.defenddemocracy.press/31007-2/: "your proposition of regime change is very scary. Or if we obtain the citizen initiative referendum, it's as if/in fact a regime change, Macron leaves definitely".

political regime in Yugoslavia in 1999 there were bombardments with 200 Tomahawk missiles, for the regime change in Iraq in 2003 – more than 800 of such missiles, and for the regime change in Libya in 2011 – more than 120, *every time together with many other weapons* (including carrying depleted uranium). The regime changes took place, but nature was devastated and the population condition has dramatically worsened from all the viewpoints excepting the one of installation of "friendly" regimes to the attacking powers. Or, from a standpoint, the struggle with pollution has in view volunteers gathering the waste from different places, refraining to use the airplane and turning off the light for a symbolic hour; but on the other hand, the military waste expands, including through military exercises and arbitrary bombing of large human and natural habitats[148] and the volunteers/ members of accepted environmentalist organisations do not say a word about that.

Or, though there are no counter-arguments to the medical theories proving the malignant role of tobacco, the world tobacco companies still insist for state subventions (as in Romania), for boosting the tobacco consumption and for their fusion in order to keep their power; and although the public transport, including the railway, is unanimously demonstrated by scientists that it is the ecological solution towards the individual cars and trucks, the world auto companies still impose these individual ways of transport, including the construction of express highways.

Or, the fires in forests and (almost) wild spaces *sine qua non* for the Earth's survival – as in Amazon, Greece, Siberia – *are not prevented* nor are they put out because either they are not private or "cost too much". But the fires are related to the privately initiated *deforestation*[149] – as in the primitive extensive economies – in order to have new space for lucrative activities: though no one would deny nowadays the destiny of humankind to being "on the same boat"[150].

Or, although science means freedom of scientific information just for increasing the role of scientific communities in the judgement of research and thus in its progress – and IT assure an unimaginable access to information – the fight for "intellectual property" (and the subsequent (huge) profits) hinders the information freedom and fragments information.

Or, the states – and first, just the above attacking powers – have debts which are more and more unsustainable; but they spend their money in a dement armaments race. Or, though every one speaks about the necessity to treat the resources in an economical manner, the official key of the economic progress is just the absurd waste of resources, including through the fuelling of unnecessary consumption[151]. Or, though the states were forced by the agglomeration of ecological dysfunctions to put some barriers (laws, official regulations) against them, that even they violate, when not simply ignore those barriers: worsening the situations and generating a space of "no man's land" everywhere, namely a space without rules[152] and thus, without any defence of nature

[148] See that even the deep sea animals, because feed on food from the surface, contain carbon-14 from the nuclear tests conducted in the 50s. Ning Wang, Chende Shen, Weidong Sun, Ping Ding, Sanyuan Zhu, Wixi Yi, Zhiqiang Yu, Zhongli Sha, Mei Mi, Lisheng He, Jiasong Fang, "Penetration of Bomb ^{14}C into the Deepest Ocean Trench", *Geophysical Research Letter,* 8 April 2019, https://doi.org/10.1029/2018GL081514.

[149] Daniel C. Nepstad, Claudia M. Stickler, Britaldo Soares-Filho, and Frank Merry, "Interactions among Amazon land use, forests and climate: prospects for a near-term forest tipping-point", *Philosophical Transanctions B*, *Biological Sciences*, of Royal Society, London, 363(1498), 2008, pp. 1737–1746.

[150] But this world interdependence is seen today also through non-scientific, political (imperialist) lens: see *Who Will Save the Amazon (and How)?*, August 5, 2019, https://foreignpolicy.com/2019/08/05/who-will-invade-brazil-to-save-the-amazon/ (It's only a matter of time until major powers try to stop climate change by any means necessary).

[151] See that the health of the economy is considered to be determined by the "consumer sentiment".

[152] See only *A Federal Ban on Making Lethal Viruses Is Lifted*, Dec. 19, 2017 https://www.nytimes.com/2017/12/19/health/lethal-viruses-nih.html?smid=tw-share&_r=1; R. G. Reeves, S. Voeneky, D. Caetano-Anollés, F. Beck, C. Boëte, "Agricultural research, or a new bioweapon system?", *Science*, 05 Oct 2018, Vol. 362, Issue 6410, pp. 35-37, DOI: 10.1126/science.aat7664; Dr. Gary G. Kohls, *Toxic Mine Waste. The Dangers of*

and people. Or, although the scientific research explains and warns, it is hidden[153] and/ ridiculed and some scientists, paid by the decision-makers in order to better impose the consumption frenzy, even mislead the "consumers": opposing in this way to science[154]. Or, states which respect the ecological requirements at home, but export oil (as Norway), and continue to *externalise the harmful aspects of their private domination of nature*. Or, the "brilliant" idea to substitute the fossil fuels with bio fuels, which at their turn use the land necessary to agriculture, use pesticides for the intensive cultivation of bio fuel plants, use water and leave depleted soils. Or: the idea to fight antimicrobial resistance with new medicines, including with local generic ones, but not with the universal and free health care[155]. Or, on the same note, because "effective vaccines and drugs are available for only a few" (in the Third World countries where the toll of mosquito-borne diseases is huge), the solution was not the universal health care, but the control of mosquitos. For the moment, this control is not met, but on the contrary, the experiences have led to new problems[156].

However, *science offers many solutions against the above absurd state of things*[157]. Actually, since at least 50 years, *science* provided the underpinning of an alternative ecologically

Copper Sulfide Mining, July 31, 2019, https://www.globalresearch.ca/lessons-polluted-superfund-copper-mine-used-dry-stacking-method-toxic-mine-tailings-storage/5685161; Colin Dwyer*, Tens Of Thousands Of Fires Ravage Brazilian Amazon, Where Deforestation Has Spiked*, August 21, 2019, https://choice.npr.org/index.html?origin=https://www.npr.org/2019/08/21/753140642/tens-of-thousands-of-fires-ravage-brazilian-amazon-where-deforestation-has-spike?t=1566473823877&t=1566524941228; *81% of Indonesia's oil palm plantations flouting regulations, audit finds*, 25 August 2019, https://news.mongabay.com/2019/08/81-of-indonesias-oil-palm-plantations-flouting-regulations-audit-finds.

[153] Pablo Olmedo, Walter Goessler, Stefan Tanda, Maria Grau-Perez, Stephanie Jarmul, Angela Aherrera, Rui Chen, Markus Hilpert, Joanna E. Cohen, Ana Navas-Acien, and Ana M. Rule, "Metal Concentrations in e-Cigarette Liquid and Aerosol Samples: The Contribution of Metallic Coils", *Journal of Environmental Health Perspective*, 126(02), 2018, DOI:10.1289/EHP2175.

[154] Naomi Oreskes, Eric M. Conway, *Merchants of Doubt, How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*, New York, Bloomsbury Press, 2010 and Naomi Oreskes, Eric M. Conway, *The Collapse of Western Civilization: A View from the Future*, New York, Columbia University Press, 2014.

[155] There is, certainly, interdependence between the universal health coverage and, on the other hand, the antimicrobial resistance: through the first, the prevention and early diagnostic allow the scarcest use of antibiotics, while the antimicrobial resistance is the result of the livestock feeding with antibiotics, of direct-to-consumer (DTC) hyper-prescription drug advertising and expensive/not affordable health care in order to prevent diseases, of industrial agriculture reducing the living powers of plants and animals for the human organism, of unhealthy air and water consumed by most of humankind, and unhealthy materials and modes of building (See only J. A. Stolwijk, "Sick-building syndrome", *Environmental Health Perspectives*, 95, 1991, pp. 99–100, doi: 10.1289/ehp.919599; A. Apter, A. Bracker, M. Hodgson, J. Sidman, W.Y. Leung, "Epidemiology of the sick building syndrome", *The Journal off Allergy and Clinical Immunology*, 94(2 Pt 2), 1994, pp. 277-88; Dr. Edward Group, *What is Sick Building Syndrome?*, Published on December 18, 2012, Last Updated on September 10, 2013, http://www.globalhealingcenter.com/natural-health/what-is-sick-building-syndrome/, and bibliography;

but for the synthesis of the connections between health and the entire environment, see Freeman Boro and Ajit Hazarika, "Ecosystem Exploitation: Environment, Human and Animal Health Risk", Journal of Ecology and Toxicology, Volume 1, issue 3, 2017, e.).

[156] See Benjamin R. Evans, Panayiota Kotsakiozi, Andre Luis Costa-da-Siva, Rafaella Sayuri Ioshino, Luiza Garziera, Michele C. Pedrosa, Aldo Malavasi, Jair F. Virginio, Margareth L. Capurro **&** Jeffrey R. Powell, "Transgenic Aedes Aegypti Mosquitoes Transfer Genes into a Natural Population", *Nature*, Scientific Reports, volume 9, Article number: 13047 (10 September 2019), where it is described that genetically modified mosquitoes have transferred the gene modification to original mosquitos.

[157] See P.F. South, A. P. Cavanagh, H.W. Liu, and D.R. Ort, "Synthetic glycolate metabolism pathways stimulate crop growth and productivity in the field", Science, January 4, 2019, where genetic engineering only improves photosynthesis, but do not transform plants into artificial/simplified beings dependent on pesticides. Or, Jennifer McConville, Jan-Olof Drangert, Pernilla Tidåker, Tina-Simone Neset, Sebastien Rauch, Ingrid Strid & Karin Tonderski, "Closing the food loops: guidelines and criteria for improving nutrient management", Sustainability: Science, Practice and Policy, 11:2, 2015, pp. 33-43, DOI: 10.1080/15487733.2015.11908144. Or, Walter Willett, Johan Rockström, Brent

sustainable society. However, in the present space and time *ruptures of coherence*[158], only the declarations of the power institutions are not enough: in fact, there is *no consistency* in the declarations-facts relation[159]. Concretely, the mark of the present time is that *the new scientific ideas are transposed into technologies used by/translated through private companies' logic.*

Is it an *impasse*? It is a deadlock, when the progress is translated through the capitalist dominant pattern – endless production of use-values for selling them and gaining private profit, and endless postponing of the re-balancing of the human space, and endless transfer of malignant phenomena in the "rest" of the world – and in this sense, a standstill, when it seems that is no movement to counter the existential crisis; although the scientists warn about the danger of not acting'/ not in a resolute manner[160].

14. Instead of conclusions: the end may be avoided if…[161]

Although the unification of so many aspects under the sign of (the human) space may seem hazardous, actually the ideas of this study are very simple.

1) First, the human ideas and, concretely, science, have to be substantiated as *rational*: manners of deployment of human rationality. Rationality is always contextual: as dependence of the development of rational abilities on the concrete social *contents* from all the standpoints.

2) With the constitution of science as a social institution, this occurring in modernity, the reason of things became the object of science, and the scientific disclosure of this reason became more prestigious than the philosophical: i.e. more and *directly* influential in economy and society. And in order to better serve the sponsors of its institutionalisation, science has outlined the rational knowledge as *instrumental*. But the subordination of knowledge to practice was marked by the logic of the concrete capitalist society: letting aside the types of rationality existent in different human actions and in the entire history of humans – all reflecting man's ability to correlate the means to the end of a certain task/action – and the power of values to support, or not, a certain action[162], knowledge and, concretely, science and technology, was/were transformed into *instruments* of the domination relations. The reference here is not so much to the ideological meanings given to science, and to a specific scientific image – that would be the only correct about man and nature[163]

Loken, Marco Springmann, Tim Lang, Sonja Vermeulen, Tara Garnett, David Tilman, Fabrice DeClerck, Amanda Wood, Malin Jonell, Michael Clark, Line J Gordon, Jessica Fanzo, Corinna Hawkes, Rami Zurayk, Juan A Rivera, Wim De Vries, Lindiwe Majele Sibanda, Ashkan Afshin, Abhishek Chaudhary, Mario Herrero, Rina Agustina, Francesco Branca, Anna Lartey, Shenggen Fan, Beatrice Crona, Elizabeth Fox, Victoria Bignet, Max Troell, Therese Lindahl, Sudhvir Singh, Sarah E Cornell, K Srinath Reddy, Sunita Narain, Sania Nishtar, Christopher J L Murray, Food in the Anthropocene: the EAT–*Lancet* Commission on healthy diets from sustainable food systems, January 16, 2019, DOI:https://doi.org/10.1016/S0140-6736(18)31788-4.

[158] Giorgio Agamben, *The Time That Remains: A Commentary on the Letter to the Romans* (2000), Translated by Patricia Dailey, Stanford, CA, Stanford University Press, 2005, p. 62: "time that contracts itself and begins to end".

[159] See *Ecological crimes, International Justice*, 14/10/2016, http://www.defenddemocracy.press/ecological-crimes-international-justice/, where the International Criminal Court has said that it will prosecute environmental destructions, but nothing happened.

[160] William J. Ripple, Chistopher Wolf, Thomas M. Newsome, Mauro Galetti, Mohammed Alamgir, Eileen Crist, Mahmoud I. Mahmoud, William F. Lawrence, "World Scientists' Warning to Humanity: A Second Notice", *BioScience*, Volume 67, Issue 12, December 2017, pp. 1026–1028, https://doi.org/10.1093/biosci/bix125.

[161] This title paraphrases Susan George's title: *Another world is possible if…*, London, Verso, 2004.

[162] See Stephen Kalberg, "Max Weber's Types of Rationality: Cornerstones for the Analysis of Rationalization Processes in History", *The American Journal of Sociology*, Vol. 85, No. 5, 1980, pp. 1145-1179.

[163] See William Leiss, "Ideology and Science", *Social Studies of Science*, Vol. 5, No. 2 (May, 1975), pp. 193-201.

– but to the functions of science in the development of the means to dominate both society and nature. Actually, just these functions have substantiated the ideological images of the above meaning of science: the ideology of separation between the formal and natural sciences, as "neutral", and the humanities; the image of the hierarchy of science and intellectual/scientific prestige with its top of formal and natural sciences; the "corporate" organisation of science within the military-industrial system.

When the *social contents* are inquired, rationality no longer appears as instrument to dominate an "idealised nature" and to reduce it to the science demonstrations, but as instrument to discover the *contradictions* of reality, "to discourage certain kinds of irrational human projections" not only on nature but also on humans, and to transpose into practice the results of the concepts and theories it arrives at; but as we saw, the concepts and theories are never definitive. Not only science, but the human rationality as such is ideological in its use, including its use by the dominant power relations.

3) If so, the human rationality always challenges the *truth values* of its demarche. And to being sensitive towards the truth values means the capacity of providing, not only but, necessarily, *universalisable* results as well. The universalizability is not absolute and forever, we all know this. But without poles, criteria, triumphs of logics and concrete demonstrations in different time-space frameworks, one cannot consider the rational ability of man as underpinning this species.

The universalisable is related to the process of *truth-saying*. Truth-saying is always *relation*: one cannot think the truth without any relations with the others. Even the words and their rules of connection and inference involve social relations. Certainly, truth has the facets of the domains it questions. But in all the domains it is able to *discern between the forms and the contents*. The truth related to forms is of no lesser import than the truth related to contents, but no truth can be limited to forms. The reason of truth as *truth of contents* – in different contexts and through different forms – is that it is never a simple theoretical conclusion, but always concerns the *consequences* of this conclusion. The outcomes do not put on truth a new seal of moral relativism: they are not those which are pleasant or useful for a discourse/ in the praxis that embodies the discourse; on the contrary, the effects warn about the *historical* character of truth and emphasise just the *contradictions* of truth, concretely, in their *temporal and spatial existence and imagination*.

Using Badiou's philosophy[164], truth is an *event*. It is both the baseline and the tipping point of any situation related to it. As an event, truth is a rupture that does not negate unless it asserts the continuity; but at the same time, truth is fidelity – as Badiou says – towards the process of truth-saying: and truth-saying is revolutionary, emphasises the *discontinuity*, i.e. the *reason* of the truth-saying. By saying the truth, the attitudes of the humans are never as if it would be about "the last dictum": truth is *open*, one does not know the final results of the process, but the only thing people can do is just to endeavour in this process.

In this respect, truth is always an *ideal alternative* to the existing data, since it relates, in fact interprets them: but it is rationally coherent and plausible, somehow as in the abductive logic/cognition where a premise may not be (fully) reliable, like the conclusion, but in perspective it's highly possible to be. What is needed is the consideration of the *conditions* of data – these conditions are called "ecological" – and their "situatedness", i.e. the understanding of the (necessity of) change of data, including through abductive reasoning related to each of them. Again, this does not mean moral relativism/dissolving of truth but, on the contrary, "epistemic responsibility" towards both data and their conditions. And the data which are not falsified, including by confronting them to their "ecology", are not valid for their processing in plausible theories. The

[164] Alain Badiou, *Being and Event* (1988), Translated by Oliver Feltham, London, New York, Continuum 2007.

most abductive cognition and the most open truth need "epistemic rigor"[165]. Accordingly, truth as an ideal is not fiction and nor absolute. It is process of "knowledge enhancing".

Let's take an example. A medical scientific discovery is an *event*. But if it is not used by the persons who need that discovery because they simply have no the money to buy it (a *situation*), one has to question this *consequence* of not only the situation but also of the event. If the reason to be of the medical scientific discovery is to cure/help the humans, but not all the humans can afford it, can we treat that discovery *as if* it is used by all? Fidelity towards science – the events of scientific discoveries – is just *fidelity towards the questioning of the conditions of events and situations*. The result of our questioning is not clear – we do not know the answers – but the only manner to be devoted to the event of truth-telling is to question.

In this sense, two interdependent aspects have to be emphasised. One is that the truth-telling should not be trivialised. Not every discourse should be considered a truth proposition. This does not mean suspending the truth finality. If indeed, every discourse aims at the truth – see only the children's expectations and habits – then we must manage the discourses and the truth value we give them in a *parsimonious* way. We must treat them with the *instruments of truth production*: critique, comparisons, confrontation with criteria, analysis of their declarative and implicit purposes and especially of their different consequences. Otherwise, if we distinguish difficultly/not distinguish at all the truth-telling from the mimicking of truth, we arrive not only to "everything is possible" but also to the *disappearance of meanings*. Discourses without truth-value mean the suspending of human meanings, of human rationality[166].

The other is that the truth-telling is assumed – as a general priority – by professionals. But just because the professionals – scientists and technicians, for example – are those competent in specific areas and develop this competence, they are not/at a much lesser extent interested about the "envelope" of their area. And this, letting aside the dominant ideological pattern that considers at least scientifically suspect the technicians who extend their curiosity and analysis to society, the envelope of envelopes. As a result, we are witnessing two phenomena: one is the mimicking of truth-telling in the over-publication offered without really transmitting truth, i.e. new ideas or standpoints, because the marketisation of university has led to the subordination of scientific research to extra- scientific reasons; the other is the already mentioned servitude of some scientists to the decision-makers.

The measure in the valuing of the professionals' truth-telling is given, obviously, by the *contents* at stake in their discourses: and the contents always mean the *consequences* of the discourses production as well.

4) Then, the treatment of the human space involves *memory*. This is important for both the humans' psychological development and their concrete relation with nature. Although the present generations have either learned to use the IT in their various forms or are directly natives[167] and certainly the natives IT determine a new type of learning, the reduction of human relations to the mediation, augmenting and virtual which replace the humans-nature direct relations is not good at all; the interactions with a technological nature – robot pets, instead of puppies – do not annul the

[165] Lorenzo Magnani, *The Abductive Structure of Scientific Creativity: An Essay on the Ecology of Cognition*, p. 162.
[166] Alexandre Kojève, *Introduction à la lecture de Hegel*, *Leçons sur la Phénoménologie de l'esprit professées de 1933 à 1939 à l'Ecole des Hautes-Etudes réunies et publiées par Raymond Queneau,* Paris, Gallimard, 1947, note 2, p. 435, spoke about man's death at the end *of history as rational confrontation between the human subject and his objects*, as disappearance of his humaneness and his discourse as *logos*, because (I add/interpret) if the discourse does not aim at truth-telling, "there is no longer any knowledge of the world and of himself".
[167] Mark Prensky, "Digital Natives, Digital Immigrants", *On the Horizon* (MCB University Press, Vol. 9 No. 5, October 2001, pp. 1-9.

necessity of nature, although children don't realise this[168]. The technologically enhanced mind is, obviously, more able to rapidly solve problems[169], but on the one hand it is not healthy for humans who have their natural part to not relate directly to nature and, on the other hand, by excluding from their focus nature (substituting it with mediated information about nature), a *generational amnesia* installs about the former state of nature[170] and the feelings experienced in the direct human-nature relations, weakening the environmental sensitivity. Indeed, a window open to the surrounding nature generates different feelings than a plasma display window. And the easy understood information about pollution is not tantamount to the feelings, related also to community relations, about pollution. The mediated relations with nature lead to a "shifting baseline" and more, to the melting of the baseline, people being no longer able to enter the process of comparisons between the necessary but no longer existing relative balance of nature and the present situation. In this way a general generational amnesia installs. Consequently, this amnesia perverts the research of the humans-nature relations and the generational valuing of nature-humans relations. The memory of direct human-nature relations is very important, just due to the fact that people adapt to the present and future "loss of nature", including through the IT mediation.

Concretely, since people – and especially the youth – have an altered perception of nature according to their own experience in the last 30 years, experience that leads to *their belief that the normal is just and only what is given in their everyday relations*, they do not understand or do it very difficultly why ecology, nature, biodiversity conservation are necessary. The new normal has become their baseline. Once more, nature related amnesia manifests at both individual and generational level[171].

5) The treatment of the human space involves, thus, *attention*. But people's attention has been "colonised" by the private economy generating consumerism: advertising and data-mining, entertainment media and social networking are instruments of this economy and generate a shallow, cursory attention, producing dependence on the instruments of consumerism and subordination. In this way, attention itself became an instrument of consumerism and subordination. Consequently, it has to be understood in its "ecological" relations, not only as attention technologies, but as *relation to these conditions*[172]: this is the reason of the focus of research on different conditions and relations[173]. Again it's important for these relations to be not only technologically mediated. It

[168] Peter H. Kahn, Jr., Rachel L. Severson, and Jolina H. Ruckert, "The Human Relation with Nature and Technological Nature", *Current Directions in Psychological Science*, Vol. 18, No. 1, 2009, pp. 37-42.

[169] Mark Prensky, "H. Sapiens Digital: From Digital Immigrants and Digital Natives to Digital Wisdom", *Innovate: Journal of Online Education*, Volume 5, Issue 3, 2009, pp. 1-9.

[170] In this respect, Lyssenko with his epigenetic underpinning of agriculture was a memory factor. Today and letting aside the nostalgia of those who "compare" the taste of the present fruits and vegetables with that of old, in fact, people do no longer remember/represent in a sensorial manner that taste. The old quality was the result of both non-chemical agriculture and natural seeds, respecting biodiversity selection. As it is well-known, today most of seeds are the ownership of big agribusiness companies and only the seeds compatible with the new pesticides and/the GMO seeds are sold to farmers, despite the international conventions (already too late, 2001). See Carlos M. Correa, *Implementing Farmers' Rights Relating to Seeds*, Research Paper 75, Geneva, South Centre, March 2017, pdf.

[171] S.K. Papworth, J. Rist, L. Coad, & E.J. Milner-Gulland, "Evidence for shifting baseline syndrome in conservation", *Conservation Letters*, 2, 2009, pp. 93–100.

[172] Attention is, letting aside the cognitive aspects, a social relation involving the relations with the others. When these relations are scarce, there are consequences related not only to society as a whole because of a deficitary integration of its members, but also to the psychical and biological health of the individuals. See Chris Segrin. "Indirect Effects of Social Skills on Health Through Stress and Loneliness", *Health Communication*, 34 (1), 2019, pp. 118-124, DOI: 10.1080/10410236.2017.1384434.

[173] Peter Doran, *A Political Economy of Attention, Mindfulness and Consumerism: Reclaiming the Mindful Commons*, Preface by David Bollier, Oxon, UK, New York, Routledge, 2017.

would be absurd to ignore this necessary mediation, but it cannot substitute the direct, thus responsible relations[174].

6) As we saw, the modern destruction of the human space has occurred both in bloody manners and in "peaceful" demolitions in order to have "new" vital spaces for investments and profit, thus in order to extend indefinitely what was called "creative destruction", but obviously more than to just substitute the obsolete technologies. This is the reason that even after science has discovered the nature-human system – something that was not known before – the opposed manner to treat nature have continued and aggravated.

7) Therefore, since science demonstrates that the causes of degradation of the entire human space *cannot be solved in a fragmentary manner*[175] and people begin to understand what was long

[174] See the interesting remarks – though on a basis of history of philosophy (Nietzsche) – in Graham and Helen Parkes: *Being in Place: There's No App for That*, 8 June 2016, YouTube 27 April 2017, and *Being Here: There's No App for That*, YouTube 11 June 2016.

[175] See only: the *Monaco Declaration* (Second International Symposium on the Ocean in a High-*CO2* World), Monaco, October 6-9, 2008, pdf; WWF, *Living Planet Report 2016: Risk and Resilience in a New Era*, pdf; United Nations Office on Drugs and Crime, *World Wildlife Crime Report: Trafficking in Protected Species*, 2016, pdf.; US Global Change Reseach Program, *Climate Science Special Report, Fourth National Climate Assessment*, Volume I, 2017, pdf; Kiel Declaration on Ocean Deoxygenation**,** "Ocean Deoxygenation: Drivers and Consequences – Past – Present – Future", 3 – 7 September 2018 in Kiel, Germany, pdf; *Earth Overshoot Day 2018 is August 1, the earliest date since ecological overshoot started in the early 1970s*, 13 June 2018, https://www.footprintnetwork.org/2018/06/13/earth-overshoot-day-2018-is-august-1-the-earliest-date-since-ecological-overshoot-started-in-the-early-1970s/; The Intergovernmental Panel on Climate Change, *Global Warming of 1,5° C*, October 2018, pdf; FAO, *The State of Food Security and Nutrition in the World*, 2018, pdf; FAO Commission on Genetic Resources for Food and Agriculture, *The State of the World's Biodiversity for Food and Agriculture*, 2019, pdf; The Intergovernmental Panel on Climate Change, *Climate Change and Land*, August 2019, pdf; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), *Assessment Report on Scenarios and Models of Biodiversity and Ecosystem Services*, 2019, https://www.ipbes.net/news/ipbes-global-assessment-summary-policymakers-pdf: three-quarters of the world's land area has been altered; More than 500,000 land species do not have enough natural habitat for their long-term survival; *The State of Food Security and Nutrition in the World*, 2019, pdf;

or Mark Anthony Browne, Phillip Crump, Stewart J. Niven, Emma Teuten, Andrew Tonkin, Tamara Galloway, and Richard Thomson, "Accumulation of Microplastic on Shorelines Woldwide: Sources and Sinks", *Environmental Science & Technology*, 2011, 45 (21), pp. 9175–9179, DOI: 10.1021/es201811s; Christian Schmidt, Tobias Krauth, Stephan Wagner, "Export of *Plastic Debris* by Rivers into the Sea", *Environmental Science & Technology*, 51 (22), 2017, pp. 2246-2253; Sven Seidensticker, Christiane Zarfl, Olaf A. Cirpka, Greta Fellenberg, and Peter Grathwohl, "Shift in Mass Transfer of Wastewater Contaminants from Microplastics in the Presence of Dissolved Substances", *Environmental Science & Technology*, 51 (21), 2017, pp. 12254–12263, DOI: 10.1021/acs.est.7b02664; Gerardo Ceballos, Paul R. Ehrlich, and Rodolfo Dirzo, "Biological annihilation via the ongoing sixth mass extinction signalled by vertebrate population losses and declines", *PNAS Plus*, 2017, pdf. ; Noël J. Diepens, Albert A. Koelmans, "Accumulation of Plastic Debris and Associated Contaminants in Aquatic Food Webs", *Environmental Science and Technology*, 2018, 52 (15), pp. 8510–8520, DOI: 10.1021/acs.est.8b02515; Olubukola S. Alimi, Jeffrey Farner Budarz, Laura M. Hernandez, and Nathalie Tufenkji, "Microplastics and Nanoplastics in Aquatic Environments: Aggregation, Deposition, and Enhanced Contaminant Transport", *Enviromental Science & Technology*, 2018, 52 (4), pp 1704–1724. Or Alethea Moutford, *Modelling the three-dimensional distribution of plastic in the global ocean*, December 2018, DOI: 10.13140/RG.2.2.11878.88645 pdf. (PhD thesis);

or *British mining firm in legal battle to stop Zambian farmers from suing it for polluting their source of water*, 21/01/2019, http://www.defenddemocracy.press/british-mining-firm-in-legal-battle-to-stop-zambian-farmers-from-suing-it-for-polluting-their-source-of-water/;

or showing that when there were coordinated unitary measures – as the Montreal Protocol (1989) – there are results (but the ozone layer will return to 1980 levels only between 2050 and 2070): Susan E. Strahan and Anne R. Douglass, "Decline in Antarctic ozone depletion and lower stratospheric chlorine determined from Aura Microwave Limb", *Research Letters*, 44, 2017, https://doi.org/10.1002/2017GL074830;

or Will Steffen, Johan Rockström, Katherine Richardson, Timothy M. Lenton, Carl Folke, Diana Liverman, Colin P. Summerhayes, Anthony D. Barnosky, Sarah E. Cornell, Michel Crucifix, Jonathan F. Donges, Ingo Fetzer, Steven J.

ago demonstrated in an alternative worldview[176] – but, as we saw, not even now do they consistently think about the relations involved in the problems of the human space on Earth – it is not science's fault that its warnings are not followed by unitary and consistent measures. And since humanity disposes nowadays of enough science so as to use ecologically the human space, the *unknown/not fully known aspects are not arguments to continue the present path*: *the alternatives can in no way be more expensive and harmful than the present system*. The strong opposed political will is only waste of the necessary time to better imagine alternatives and to continue the scientific research. And as the Earth has no time to wait for new layers of people to add to new ecological approaches, so it has no time to wait for the application of all the problems solved by science according to the law of market[177]: actually, the overall *market requirements are contradictory to science and hinder it*[178]. And though science and technology are marvellous in solving some vital needs of people, in fact, the *affordability of these results of science and technology are socially limited*. *The driver of inequality is not technology, but its political use as power source*[179]. In this meaning, not all the humans living now had/have the same force to change the Earth life: growth at all costs and the subordination of production to the consumption vortex were and are imposed by the decision-makers and beneficiaries of the present system[180].

8) The more *human* space the humans construct, the more the environment necessary for their creativity is bigger, even/just through letting to nature "its" biggest space possible. Thus, the human space is the ensemble of *human* meanings given to the known space-time framework, and not a quantitative grabbing by some humans of the space of other living species and of other humans. *This grabbing leads to the destruction of biodiversity in an irreparable way*. Let's imagine a planet/our planet with only one living species: ours (let's ignore the microbes). By continuing even today, *despite the fragmentary green policies*, the destruction of Earth, even in the most optimistic scenario the destruction of biodiversity by 2050 will not stop. This is because the Earth is a *system* and biodiversity – *too* (obviously, it is about systems of systems): accordingly, it/they involve *all* the local and global interdependencies and the remaking of new balances between the remaining species cannot occur in a shorter while than that of the *modern* destruction[181]; letting aside that the more optimistic scenario was created for the frame of the present private profit logic.

Lade, Marten Scheffer, Ricarda Winkelmann, and Hans Joachim Schellnhuber, "Trajectories of the Earth System in the Anthropocene", *Proceedings of the National Academy of Sciences* of the USA, 115 (33), 2018, pp. 8252-8259, https://doi.org/10.1073/pnas.1810141115 .

[176] John Bellamy Foster, "The Long Ecological Revolution", *Monthly Review*, Vol. 69, Issue 06, November 2017.

[177] See *Battery technology charges ahead*, July 2012, http://www.mckinsey.com/insights/energy_resources_materials/battery_technology_charges_ahead (New research suggests that the price of lithium-ion batteries could fall dramatically by 2020, creating conditions for the widespread adoption of electrified vehicles in some markets).

[178] See only Rod Schoonover, *The White House Blocked My Report on Climate Change and National Security*, July 30, 2019, https://www.nytimes.com/2019/07/30/opinion/trump-climate-change.html; also Laurent Delcourt, *Les nouveaux territoires de l'agrobusiness*, Mondialisation.ca, 18 septembre 2019, https://www.mondialisation.ca/les-nouveaux-territoires-de-lagrobusiness/5636893.

[179] Technology only makes inequality worse. See Stephen Hawking: *Technology Is Making Income Inequality Worse*, http://www.newsmax.com/Finance/StreetTalk/Stephen-Hawking-Technology-Income-Inequality/2015/10/12/id/695833/.

[180] Owen Gaffney, Will Stephen, "The Anthropocene equation", *The Anthropocene Review*, 2017, https://doi.org/10.1177/2053019616688022.

[181] Letting aside here the transformation of the Earth space from the oldest ages, we have to highlight that the *Western modernity was the direct cause of the famines generated by the monocultures imposed in Africa etc*., *of the over-hunting and fishing in all the areas, depleting the basis of reproduction and thus destroying species and habitats*; in its turn, this destruction – adding to the direct pollution generated by industrialized agriculture, by individual transport and by industry, by the consumerist way of life – has massively contributed to the climate crisis.

As mentioned before, in this logic there is no longer foresight: it is allowed, as well as the corrective actions, only *after* the agglomeration of damages, at the level of niches or limited ("micro") environments. In order to surpass the general situation even after some successes at the micro levels, the *micro view should be integrated with the holistic one*. Only on the basis of this pattern can we anticipate and prevent at global scale.

9) *The critique of the present dominant treatment of space is not developed from the standpoint of an ideal*. Actually, *the ideal is only a cognitive tool, functioning only as a criterion, a stake and, obviously, an abstract model*. There are models of natural structures and functions. But there are also social models derived from the desires of people. Unlike the former which are rather simplified and selective models of the normal, the latter models are deviations from the normal. But as people transform what is normal in every time span, they transform the ideals as well.

On the other hand, the models serving desires are either assumed as such or covered. The latter present themselves *as if* they would be as impersonal as the models of natural structures. Accordingly, they would be the "unique correct" models. For example, in these models the monetised aspect of economy covers everything, and everything that is not monetised does not exist for this economy. But the difference between these types of models and the models of assumed ideals is that in the former *there are never new problems*; every model solves problems, but if the models of assumed ideals have solved the problems which, in fact, have generated the modelling as such, but thus have "freed" *new* problems which will to be solved with the help of other models, *the models covering their desires do not generate new problems: since they do not solve the old ones*. Concretely, this is the reason of the present economic models which focus on measurements and factors stimulating/inhibiting the growth of sales and profits; at least from a century such models exists, but in this interval the waste of human creativity caused by untimely death in wars and unaffordable healthy conditions of life did not disappear; and all of these in a society that *can* solve from the *technical* standpoint these problems and at the same time it is very *rich*; it is not only about the redistribution of wealth, but about the *healthy correlations and balance of nature and society*; as well as about the *transformation of the economic logic* so as the humans have *free time* to create, not just more and more merchandises.

10) The ecological crisis is *not separated* from the crisis of the present civilisation; they are *not external* to one another, *as if* it would be about two logics, absolutely independent one of the other, on the contrary, in fact *they intertwine*. Meaning, that each of them imposes limits to the other. For example, the *necessity to surpass* the exchange-value economy aiming to sell more and more and gain profit (generating waste and depletion of resources) *is not the result of an ideal* or of a political prescription, but of the requirements of the Earth's nature. But if the preservation of nature, the parsimonious treatment of resources and the anticipative behaviour will be the new normal in front of the general ecological crisis, and these directions are hardly opposed on a reasonable basis, the consumption habits of the world "middle classes", made just on the basis of a consumerist economy of exchange-values, are used by the promoters of this economy as "arguments" against its transformation. "Who will fix the limits of consumption and the concept of sufficiency? Does this not sound as totalitarianism?" The theoretical answer is that just the communities will fix the limits: never absolute[182], never imposed by a neutral and irrefutable science, but always as the result of the debates and decisions of communities, and *never*

[182] See also André Gorz, *L'écologie politique entre expertocratie et autolimitation* (1992), https://collectiflieuxcommuns.fr/?264-l-ecologie-politique-entre&lang=fr.

disconnected from the world situations[183]. In this meaning, neither science nor nature is an extraneous/foreign power to communities, but both their creation and milieu without which they do not exist.

11) Beyond the reactive moment, there are emotions "as more general situation detectors"[184]; in humans, they are feelings/self-conscious emotions: all of them mediate the inter-human relations within their environments. Interpenetrated with reason, the feelings are drivers of the adaptability to life, according to the cognitive treasure resulted from experience. These drivers were called "Darwinian utility feelings" by Kovàč, i.e. according to the *biological* evolution. But the *cultural* evolution has detached the emotion ability from the Darwinian biological utility and led to the search for good emotions as end in itself: generating *excessiveness*. However, this situation is opposed just to the biological development of the ability for emotions and, implicitly, to the creative effort for constructing the basis of these emotions. Nevertheless, the market economy – that is certainly not the result of the biological mechanism – is a "pleasure-oriented economy"[185] and does not accord with science.

It is not simply about people's flooding with ware and entertainment through all its forms, but is also about the engineering of humans in order to make them more dependent on "pleasure": the present AI and drug stimulation of want and thus, of forging this kind of humans, is real. But all of these seem inevitable not only for Kovàč, but also for many people.

Let's begin with the most "abstract" aspect: the pleasure and, more, the *simplification of the human pleasure* made consciously by the capitalist system, leads only to some meanings created by humans. But people can create more: in fact, only through this creation of meanings has the moment of *homo sapiens* a significance in the history of Cosmos.

However, the human knowledge is more than the reason of the human species in the Universe. If science demonstrated that the densification of free energy and information has destructive effects, the social decision should support corresponding policies. The human knowledge is, with all its limits, the instrument against those destructive effects: if not totally, at least partially and gaining more time. *If this knowledge is not used* – it is not even popularized and thus its advancement is less than it could be – *it is not because of a fatal causality*, *but because of the social organization.*

12) From a biological standpoint, the species appear and die. Obviously, the desire of individual eternity and the image of eternity of "at least something from my individuality" were made in a pre- scientific era[186]. Philosophically, neither the eternal life of the human knowledge can be discussed without mentioning both the physical limits of life and consciousness in the

[183] In this respect, the present policies of redistribution through the development of internal consumption (internal market) and thus the control of entrepreneurs circles (see Maëlle Mariette**,** « Mérites et limites d'une 'révolution' pragmatique », *Le Monde Diplomatique*, septembre 2019), inherently postponing the ecological measures and externalising the private damages, are neither ecologically nor socially friendly; but they illustrate the structural contradictions between the *national* and *international* economic logic and, obviously, between the internal classes. For this reason, it is not possible to go back to the tradition of American "New Deal"/European welfare state.

[184] Ladislav Kováč, "The biology of happiness: Chasing pleasure and human destiny", EMBO *reports*, VOL 13,| NO 4,| 2012, pp. 297-302 (p. 298) (European Molecular Biology Organization).

But see also Gabriela-Alina Sauciuc, Thomas Persson, Rasmus Bååth, Katarzyna Bobrowicz & Mathias Osvath, "Affective forecasting in an orangutan: predicting the hedonic outcome of novel juice mixes", *Animal Cognition*, 19, 6, 2016, pp. 1081-1092.

[185] Ladislav Kováč, "The biology of happiness: Chasing pleasure and human destiny", p. 301.

[186] Ladislav Kováč, "'Finitics'. A plea for biological realism", *Embo Reports*, 9(8), 2008, pp. 703–708, doi: 10.1038/embor.2008.138.

Universe[187]. And today, to focus on "my" eternity when in present millions die prematurely – because of social causes – is irrelevant. It is also inconsistent to equate the individual and the species' finitude[188]. But, on one hand, the *cosmological* conditions of the death of the human species and its consciousness give humans enormous time to create[189], while the power relations have destroyed and *follow the path of destruction of the conditions of life*: much before the cosmologically possible time span. On the other hand, *the human species – a thinking reed, as Pascal has called it – has its special endowment that allows it to prevent absurd and untimely destructions*. If this does not happen, it is not because of the scientifically substantiated idea of finitude of life and nor of "the human destiny": but because of concrete social relations.

The logic that deduces from the scientific demonstrations of the end of life the impossibility of humans to counter the *present* existential crisis reflects the *separation* promoted by some natural and formal sciences academics *from the social critique*. The "destiny" of man is prefigured as inevitably following from the present political status quo. This logic is offered *as if* it would be the only one and there would not be any alternative[190]. (Consciously or not, these scientists legitimate just the present politics which they allusively reject).

And of course, it is possible that their resignation expresses the "only", irreplaceable alternative[191]. This alternative cannot be ignored: *the future is not prescribed*, irrespective of its known trends. The extinguishing of the human species is possible, and not necessarily because of catastrophic meteorites, thus not suddenly; but – because the natural phenomena as climate, floods

[187] Lawrence M. Krauss and Glenn D. Starkman, "Life, The Universe, and Nothing: Life and Death in an Ever-Expanding Universe", *The Astrophysical Journal*, 531 (1), 1999.

[188] See the critique of this equivalence and the discussion about finitude in Ana Bazac, "The Limit and the Burden: Around the Significances of the Finitude of Life", *Agathos*, Vol. 9, Issue 2 (17), 2018, pp. 59-82, pdf.

[189] Idem, p. 21.

[190] Ladislav Kovàč, *Closing Human Evolution: Life in the Ultimate Age*, Springer Briefs in Evolutionary Biology, 2015: "At the outset of the third millennium, mankind has entered the ultimate phase".

This theory may be compared with others discussing the end of history or the end of philosophy. The most famous theory about the end of history is, as it is generally stated, Hegel's. But in fact Hegel distinguished the end of *speculative* philosophy – end due to his own *dialectical and phenomenological* view – from the end of history. This one was not the result of philosophy, but of the *internal* logic of history and its contradictions and although at the level of direct empirical message of Hegel's philosophy of history the modern (Prussian) state could be understood as *culmination* of the political framework able to develop society and solve some contradictions, the new paradigm provided by Hegel – the social system as process of contradictions – was opposed just to this idea of the best, unique model of culmination. See Eric Michael Dale, *Hegel, the End of History, and the Future*, Cambridge University Press, 2017, p. 5: "The Hegelian end is the culmination of the *now*; not the foreclosure of the *next*".

(For this reason, one may not conclude from Hegel the concrete end of history as Fukuyama considered in the early 90s. In Fukuyama, the end of history is the metaphor for "capitalism – the last system"; for Hegel, the openness of history to the immanent movement of contradictions outlines a new paradigm, actually opposed to the banal glorification of the Prussian state etc. In his turn, Marx spoke about the end of the *subservient metaphysical* philosophy, and the necessity to link philosophy to science and life, but not about the end of philosophical interpretations as such. In Hegel, the Prussian state is only the basis of a new development of the immanent logic of history, not its end time: we must not forget that he criticised essential aspects of the functioning of capitalism. Marx was contemporary with Darwin and, including this kinship as well, he could not speak in terms of last things. Communism marked, for him, only the end of pre-history (based on exploitation etc.), and not of history.

Agamben has showed that the end of man at Heidegger presents either as "(*a*) posthistorical man no longer preserves his own animality as undisclosable, but rather seeks to take it on and govern it by means of technology; or (*b*) man, the shepherd of being, appropriates his own concealedness, his own animality, which neither remains hidden nor is made an object of mastery, but is thought as such, as pure abandonment", p. 80).

[191] It is very important to note that the present world dominant layers, assuming that "there is no alternative", support the search for other habitable planets; but not in order to move there the destitute billions, but to continue over there, too, the present waste economy of exchange-values for private profit.

and draughts and destruction of biodiversity were caused by the capitalist treatment of the human space, and this treatment seems to continue forever – slowly and through sufferings and alterations of the integrity of the human person.

But, first, *the present existential crisis of nature and man is not a natural phenomenon*, it was *consciously* generated – though/because the private entrepreneurs considered only their separate profits, hoping that "the invisible hand" of supply and demand, similar to God, will balance the opposed interests, they may well be considered as unconscious – and is continuing today, *despite all the warnings of nature and scientists*[192]. These ones have showed that population is literally fooled[193] by the media determined, not by politicians *in abstracto* but, by the *private interests of profit at any cost*; these private interests, politically dominant, impose that people be bombarded, when not with entertainment, with the idea that the climate and ecological crises would not be so tragic and, as humanity has solved until now the problems it faced so it will solve them 'but by fully keeping the present capitalist relations'. On the contrary, the scientists have *demonstrated* and warned that, even in comparison with official scientific (thus, collective) scenarios which have configured also middle/possibly controllable situations, the present state of things is not simply under the sign of absolute urgency, but even that no controllable situation is possible anymore because of the *interference* of three type of phenomena more or less neglected by the former official scenarios: *hysteresis* or the inertia of the former states of the natural systems even after the changes of the present one (therefore, the present one lags behind the presumed effects of the changes), the *snowballing* or augmentation of (former) effects as a result of their deployment, and the *tipping points* development when small additions to the unbalances have big effects. This situation is that of an "end-game, when very soon humanity must choose between taking unprecedented action, or accepting that it has been left too late and bear the consequences"[194].

The present worldwide crisis is not natural: fires can be prevented; the transformation of waters into dead seas can be prevented by putting first a world – and not only at nation-state scale – state-of-the-art sewage system etc.

Therefore, it can not be cured with *local* conservation, better management of waste[195] etc.; *just this local model of management, applied from some decades, has showed its insufficiency*. Since the present existential crisis of both nature and man is neither natural not technological, it means that only a radical and sudden *transformation* – not lasting for years "transitions towards…" – *of the structural economic relations worldwide* can prevent the extinction of human civilisation. Once more, since the technological means are known[196], it is not enough to point out the morals of

[192] This fact was highlighted by Jason W. Moore, "Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism", *Sociology Faculty Scholarship*, 2016, pdf.

[193] Justin B. Biddle, Ian James Kidd, and Anna Leuschner, "Epistemic corruption and manufactured doubt: the case of climate science", *Public Affairs Quarterly*, Volume 31, Number 3, July 2017, pp. 165-187; Jane Morton, *Don't mention the emergency? Making the case for emergency climate action*, Australia, Darebin Climate Action Now, 2018, pdf.

[194] Hans Joachim Scellnhuber, "Foreword", in David Spratt & Ian Dunlop, *What Lies Beneath: The Understatement of Climate Existential Risk*, Breakthrough – International Centre for Climate Restoration, 2018/2018, pdf.

[195] It's interesting – not the treatment as such, but the idea – that William Emerson Ritter, *The natural history of our conduct*, New York, Harcourt, Brace, & Company, 1927, has showed that there is a continuity between animals and humans from the standpoint of "maladaptive activity" and one of the most important was just the wastefulness in time, energy, useful materials, the conduct of both animals and humans being that of "excessiveness" and bad management.

[196] See also Lu Hang, "Conversion of farmland into forests to protect ecological environment", *Chinese Social Sciences Today*, 2019-08-23, http://english.cssn.cn/whatsnew/research1/201908/t20190823_4961267.shtml; Union of Concerned Scientists, *Subsidizing Waste: How Inefficient US Farm Policy Costs Taxpayers, Businesses, and Farmers Billions*, pdf; *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition*, report by The High Level Panel of Experts on Food Security and Nutrition, July 2019, HLPE

those who are responsible for the generalisation and deviation of ecological crisis to the non-Western countries[197], for the sacrifice of the future generations and for the passivity of most of people[198]. It is already a weak theorisation to speak about "individualism" without showing that the moral shortcomings are the result of concrete social domination relations and that the urging of individual citizens to take action without highlighting that *they cannot be successful without the radical transformation of economic relations* is inefficient.

At the same time, the present system itself, just through its contradictions[199], creates new institutions and ideas, so as people to understand, feel and act as active parts of society. The rise of the *multitude* (Spinoza) is as possible as the end of humans. Therefore, *there are alternatives*.

There is certainly a historical delay of the human organisation of the world, and this even when the cognitive-technological means to realise a better human order for the human space are already developed. Consequently, to show the causes of the present situations means to have the sense of responsibility. *To make a beautiful but untimely end is not enough*. Certainly, it's possible that with all the new ideas and institutions, the humans do not have the will to act in a consistent manner. But if the human species understands more than what is in the individual *Umwelten*, its end has to be discussed in other terms than the inevitability of the *present* end. Anyway, all the alternatives are important for theory: no one has to be silenced, but all of them freed to mutually criticise themselves.

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Report 14, pdf; Doug Gurian-Sherman, *Failure to Yield: Evaluating the Performance of Genetically Engineered Crops*, Union of Concerned Scientists, 2009, pdf.

[197] See Glenn Davis Stone, "Commentary: New histories of the Indian Green Revolution", *The Geographical Journal*, 2019, pp. 1‑8, DOI: 10.1111/geoj.12297.

[198] Stephen M. Gardiner, A Perfect Moral Storm: The Ethical Tragedy of Climate Change, Oxford Univesity Press, 2011.

[199] We may express one of the main contradictions in the terms of our problem here: the capitalist structure of relations behaves/changes only according to the private interests, as if the private owners would see only their narrow *Umwelt*; but the human beings were biologically constructed to have larger interests, to see more than fragmented *Umwelten*.

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