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## **Cosmology at the Crossroads of Natural and Human Sciences: is Demarcation Possible? Part 2. Explication**

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*This is the second part of the paper on the problem of demarcation between the dimensions of natural and the human sciences in contemporary cosmology. Here we explicate further the sense of some cosmology's claims in the perspective of philosophical phenomenology. The observation that in cosmology the subject of cosmological research and its "object" are inseparable is linked to such a feature of cosmology as its untestability. We discuss the sense of reality assigned to cosmological theories in the conditions of untestability and propose a hypothesis that theoretical cosmology operates along the lines of principles related to coherence of epistemic justification of its theories. Correspondingly the sense of reality changes by making an inseparable link between humanity and the sense of the universe more explicit. Finally the paper explicates in detail the sense of the interplay between natural and human sciences' dimensions in cosmology by appealing to a sort of calm in promoting of a definite ontological commitment in cosmology. It appeals to a dispassionate phenomenological description of the universe as it discloses itself in the natural attitude, in the language of causes on the one hand and in the language of intentional immanence through communion on the other hand. Hence the conclusion is made that the objective of a philosophical insight in cosmology, is not to find a unified language for understanding the universe, but rather to realise that in our approach to its totality, always initiated in the life-world, we progress by the various ways given to humanity. The reality of the universe then is much more than is met by the discursive mind, it forms a mysterious sense of "identity", which is intuited, but never completely grasped by the mind: it bedazzles us, while constituting our own sense of identity to the extent that we cannot circumscribe the universe in the rubrics of thought. The "I" of a cosmologist is constituted exactly to the extent this "I" cannot comprehend the universe.*

*Keywords: cosmology, phenomenology, coherence, untestability, intentionality, causality, subjectivity*

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### **The dilemma of the object-noematic and act-noetic: the paradox of subjectivity and cosmology's untestability**

The problem of the interplay between the two dimensions, natural and the human, in cosmological discourse has its origin in a simple

paradox belonging to perennial philosophy but polished within a phenomenological stream of thought, namely, that the universe of the physical cosmology is produced by means of special intellectual operations rooted in the life world and thus is specifically *different*

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from the latter, at the same time, the universe apparently proves to be part and parcel of the life world (Gurwitsch, 1974, p. 147). In other words, on the one hand the physical universe, as an “object” of the natural and scientific constitution, is different from and alien to the human world thus exceeding the human reality itself; on the other hand, being a mental accomplishment, the universe exhibits itself as cultural reality thus being contained within the life world. On the one hand, humanity’s position in the universe, interpreted through the natural sciences, is such that humanity is contained by the universe, that is humanity, through physical embodiment, is subjected to the necessities of physics and biology. On the other hand, the universe as being articulated in human perceptual and intellectual experience is contained in human subjectivity so that humanity is treated as a transcendental subject, that is as a free intentional agency, whose personal consciousness cannot be accounted through or reduced to the physical and thus “naturally” belongs to the enquiry of the human sciences. In spite of this paradox physics sees as its task the development of the theory of the universe in which conscious humanity would be a product of the universe’s law-like-necessities. In this case the paradox would be removed because the foundation of a scientific explanation of the universe (as a mode of humanity’s existence) would be part of the universe itself. If cosmology could sustain this ideal then it would prove its right to be qualified as a natural science in the strict sense. In this case the universe will be treated as an external object with no influence from the presence of humanity. Can cosmology, in fact, sustain this ideal? In order to answer this question let us, for a start, analyse one particular aspect in the object-noematic interpretation of cosmology related to its lack of testability.

In the conclusion to his survey of philosophical issues of modern cosmology, George Ellis stated the thesis that uncertainty constitutes a key aspect of cosmology: “scientific exploration can tell us much about the *universe* but not about its *ultimate nature*, or even much about some of its major geometrical and physical characteristics. Some of this uncertainty may be resolved, but much will remain. Cosmological theory should acknowledge this uncertainty” (Ellis, 2007, p. 1274; emphasis added). It seems that what is implied here is a distinction between “the universe” as it appears through study and construction by a cosmologist and that which can be termed as the ultimate, underlying sense of its contingent facticity (givenness). The uncertainty of cosmology lies in the fact that it is functioning in the framework of what is already given but, nevertheless, incapable to account for its own possibility as a fact of life.<sup>1</sup> Unlike other sciences (with respect to which one can assert a similar thing, namely that they do not account for their own foundations), cosmology has a particular status because it pretends to deal with the unique and all-encompassing object – the universe as a whole which, by definition, includes not only what is observed here and now (that is in a particular spatial location – home place – and in a particular historical period), but that totality to which human thinking assigns the sense of reality independent of space and time (this totality as a generic mathematical view can have a sense of a Platonic idea, thus being devoid of space-time propensities). Correspondingly, its intended object, that is the universe as a whole, cannot be constituted as accomplished here and now but, on the contrary, represents an asymptotic ideal reached through a self-correcting advance of knowing. In approaching this ideal cosmology invokes many ideas and intuitions (related to constructs and theories) introduced on the level of cosmologists’ *intentionality* (supported by

beliefs, such as, for example, in explainability of the universe) and not under the pressure of evidence based on empirically accessed physical causality. Thus, naturally, these ideas cannot be tested on the level of physical causality, and are, probably, untestable in principle in a finite span of time.<sup>2</sup>

The accentuation of *uncertainty* and *untestability* by Ellis can give the impression that cosmology, in those parts which do not refer to direct astronomical observations, is not what is usually classed as a “natural science”. For the natural sciences it is typical to bring unknown aspects of nature to their explicit presence which is confirmed by observations and tests. Theories typical for the natural sciences aim to refer to empirical reality by means of rules of correspondence, that is through tests and procedures established by scientific community and accessible to the public comprehension on the grounds of common sense. Mathematisation plays an important role in a theoretical advance of the natural sciences, but mathematics, associated by its historical origin with the natural sciences, remains a tool, a method, ultimately created from within the conditions of the life world in order to appropriate this world further through articulation and by means of theoretical thematisation.<sup>3</sup> The aim of the natural sciences is to explain facts by arranging them in the framework of physical causality as a sort of human control.

If now cosmology is perceived (in the spirit of Ellis) as an enterprise which bases itself in non-testable assumptions, there is a question that arises on the general sense of this enterprise and validity of its epistemic claims. Do cosmological theories indeed deal with physical reality, posed as existing in itself, so that cosmological constructs provide a set of convergent approximations to it? Or does, alternatively, cosmology, being a mode of cultural activity, just create an intellectual

environment with a corresponding narrative on humanity’s place in the universe without any ontological commitment? It seems reasonable to conjecture in this case that any narrative about the universe is based on empirical extrapolations and intellectual conjectures which in some cases are untestable *now* and some are untestable *in principle*. Nevertheless, these untestable conjectures contribute to the wholeness of the narrative thus becoming indispensable constituents of the idea of the universe. The natural origin of these conjectures is related to their historical contingency which entails cosmology’s *positive incertitude* and thus the “natural” presence in it of some untestable or eventually falsifiable and theoretically redundant statements.<sup>4</sup>

The problem is that by its definition *the universe as a whole* cannot be thought as a contingent “formation”(unless in a theological sense as created out of nothing) because it assumes a spatio-temporal totality which as such exceeds any contingency in terms of space and time. This invokes a conflict with the historical contingency of cosmology as activity of knowing. The question is: can the historically contingent discipline of cosmology (as related to contingent events of human subjectivity) pretend to encompass the universe as a whole which, by definition, exceeds all spatially distinct realms and eras and thus all aspects of contingent givenness.

The historical contingency of cosmological facts can be easily illustrated. By studying astronomical objects through their image in the two-dimensional celestial sphere we study *de facto free phenomena*, that is those which contain in themselves or establish from themselves the reasons for their being given to us. Their contingent facticity consists in that they are related to historically concrete and individual acts of consciousness. Their appearance is free from any underlying causes in

the following sense. Astronomical observations can be interpreted as caused by the contingent factors of human history; however, one cannot construct a trans-historical “trajectory of knowledge” as if it would be driven by a sort of law in the “space” of all possible knowledge and which as a potential possibility led to the given outcome of observations. Or, in different words, one cannot assume the existence of a universal “observer” which could anticipate the path of knowledge independently and apart from the acts of knowing as their first time happening. Knowledge and experience are accumulated in consequent observations in time from different perspectives where the conditions of knowledge, the very fashion in which this knowledge is collected, are not controlled by us; we do not know all factors which influence the course of that existential manifestation which is called “knowledge”.<sup>5</sup> This rephrases the sense of the contingency of knowledge as that process which is not exhausted or driven only by its subject matter: the choice of what to observe (or whether to observe or not) and of the notions for the description of the universe is based not in fully understood physical laws and interconnections, but remains hanging within the *free intentionality* of researchers. Correspondingly the untestable conjectures naturally contribute to this intentionality. Untestability of some conjectures about the universe thus reflects the contingency of the conditions of constitution of cosmology’s “object”, the process which is not one-to-one related to the causal developments in the object of knowledge and sources of experience.<sup>6</sup> The uncertainty of cosmology witnesses to the fact that the *intentional* acts of cosmological research which allegedly attempt to reveal causality in physical processes do not lead to the fulfilment of intentions and this constitutes an irreplaceable and unavoidable feature of any attempt of knowing the universe as a whole.

There are some elements in the sociology of cosmology which can be treated similarly to the work of a proper historian.<sup>7</sup> The cosmological narrative can receive a historical interpretation which vindicates in a different way the presence of untestable elements in cosmology. For example, by studying the history of astronomy (as a certain introduction into cosmology proper) one must take a neutral position with respect to epistemic claims of Ptolemy or Giordano Bruno. Certainly from a modern view their cosmologies were incomplete and contained untestable elements. But a *historical perspective* stops us from such an evaluation, accepting, rejecting or amending their epistemic claims concerning the knowledge of the universe unless we evaluate their theories through the eyes of the present era, and our understanding of history is fundamentally conditioned by present scientific views. The same perspective can be applied to modern cosmology. Indeed, if cosmology is seen as an ongoing narration (as intrinsically historical and hence contingent) about the universe, then the presence in its structures of untestable elements as well as overall uncertainty cannot be used to qualify for the epistemic unfoundedness of cosmology. On the contrary these untestable elements should be seen as *cultural artefacts* which must be accepted as existential events, that is as historically motivated actions. Then one must abstain from judgements on the truth of cosmology’s epistemic claims and keep neutrality with respect to them. In this case the presence of untestable hypotheses in cosmology can be treated as inevitable. From the point of view of physics this can be a misfortune, but seen philosophically this turns out to be a characteristic of the human condition in which knowledge of the universe takes place.

The narrative about the universe which contains untestable propositions, being historical, is subject to ongoing change and

renewal (in terms of the research practice this means that theories change rapidly and the survival of theories against the flow of data (that is testable propositions), let's say within two years, is treated as its success). In cosmology, especially related to ultimate questions (such as the origin and end of the universe, as well as multiverse), this renewal does not only follow the logic of revealing new causal connections among facts of nature (because nature is simply inaccessible), but is driven by intentionality which reflects the aspirations and advances of the human spirit, its "infinite tasks" in grasping the sense of existence.<sup>8</sup> In this sense some conjectures about the untestable aspects of the universe as a whole (being acts of free human will rather than necessities imposed by the logic of nature) represent *existential events* (manifestations and assertions of that which does not present itself through physical causation, that is elements of intentions, motivations and goals of a historical cosmologist-actor), through which personal experiences and intuitions of belonging to the universe attempt to express themselves outwardly in the scientific narrative.<sup>9</sup> Cosmological narrative thus appeals to the idea of a wider cosmic context, beyond this planet, by shifting home places not only in the visible space, but beyond it, towards the intelligible universe. This happens at the expense of leaving out the sphere of the empirical and sensible experience and making a transition to stable and allegedly non-corruptible intelligible entities which are inevitably beyond the reach of any straightforward testability. In some extreme versions of such a narrative its apologists appeal for the removal of all "human baggage" behind the underlying theories.<sup>10</sup> It then seems obvious that in this tendency the grain of untestability and the lack of correspondence with physical reality is posited in the very inception of the non-egocentric aspirations of cosmology. Put

another way, untestability becomes an explicit manifestation of the incommensurability between man and the universe resulting in an unavoidable positive uncertainty of cosmological knowledge. It is this incommensurability that is characteristically revealed through an attempt to construct a full computational synthesis of the universe.<sup>11</sup> The totality of the universe and its actual infinity, being the source of the incommensurability, is, however, not beyond its reach in the sense of manifestation. To the extent, therefore, that a particular cosmological theory is functioning adequately even in the conditions of untestability one can regard the structure which it articulates as constituting the intelligible pattern of the universe as a whole. Remembering, however, that this intelligible pattern never exhausts the ultimate sense of that which is intended as the universe, the untestability demonstrates itself as the constituting element of the apophatic intelligibility of the infinite universe.

Cosmology cannot avoid dealing with hardly testable conjectures just because it is not an experimental science: according to Ellis' theses "The universe itself cannot be subjected to physical experimentation" and "The universe cannot be observationally compared with other universes".<sup>12</sup> In this sense the presence of speculative mathematical elements which cannot be directly related to empirical reality must be accepted with a sort of humility, and in no way as the end of realistic commitment in research, assuming that reality stands here not for a pre-existent antecedent entity, but as being unceasingly constituted. The persistent absence of the physical correlate to that which is intuited through mathematics rather represents an invitation to continue the scientific quest when the reality of what is called the universe is withdrawn from a simplistic empirical grasp. The presence of unattained goals, as imaginatively

projected standards, encourages and activates in a scientist a different intentionality which is based on existential inspirations and not fully articulated insights.<sup>13</sup> The initiation of this intentionality allows a philosopher to appropriate cosmology not as that type of knowing which delivers ultimate truth about reality but rather as a particular *account* of the human encounter with the universe. In this case the demand for cosmology follows from existential orientation, that is from asserting the sense of human existence and its *telos*.<sup>14</sup> Correspondingly the introduction of untestable conjectures points rather to mechanisms of functioning of human subjectivity when it faces phenomena which exceed their capacity of constitution. This in turn contributes to a generic thesis that the study of the universe contributes toward the study of man.<sup>15</sup> Cosmology can be seen as revealing the structures of human subjectivity in the case of incommensurable phenomena thus explicating the general functioning of this subjectivity as embodied in the universe.<sup>16</sup>

By making explicit the workings of human corporeal subjectivity cosmology places itself within the cultural world thus exhibiting some features of the cultural and human sciences, in particular, along the lines argued by Husserl: namely that the cultural or human sciences reveal themselves as all-encompassing, since they also comprise the natural sciences and mathematised nature since it is itself a mental accomplishment, that is, a cultural phenomenon.<sup>17</sup> Cosmology acquires the meaning of a cultural science in the sense that it deals not only with the disclosure of “objective” reality of the universe (as humanity’s natural environment) but encodes human aspirations to disclose the sense of its place in the universe, for example, by measuring the universe through the standard of human life.<sup>18</sup> It is in this sense that cosmology exhibits itself not as a monological questioning of the universe

as if it was out there, but rather as a dialogue with the universe as a noematic pole through which humanity enquires of itself.<sup>19</sup> The fact that this noematic pole is not fixed and escapes its ultimate grasp constitutes a particular feature of the cosmological enquiry in which persons as centres of disclosure are formed, as disclosers, to the extent the universe discloses itself. The ego’s subjectivity is evolving through the invitation by the universe to disclose it in certain limits. Thus there is no independent object of disclosure, independent of those who are participating in the “dynamics” of this disclosure.<sup>20</sup> Correspondingly one intuits the universe as related to the continuity of human conscious experience of embodiment in the universe. Seen in this way, cosmology could acquire a teleological sense if one relates it to humanity’s “infinite tasks” of dealing with questions of the beginning and the end of the universe as having connotations with enquiries into the sense of its own beginning and its own consummation. It is because of the infinitude of these tasks that human subjectivity while attempting to comprehend the sense of the beginning and the end of the universe, is forming and comprehending itself. It is through the unlimited donation of the universe (as the field of possibilities) that humanity awakens to its own finitude in spite of a potentially infinite consciousness (based in the infinite human will), that is to the issue of the “beginning” and “end” of consciousness itself, that is, its contingent facticity. This sense of finitude entails another mode of incommensurability, that is the infinite can only be represented through symbols (apophaticism) which by their origin function not on the level of physical causality.<sup>21</sup> In this sense cosmological theorising as an ongoing symbolising the universe contains in itself logic and necessities which are not directly related to its subject matter, but rather to the sense of goals of humanity itself.

### Cosmology and human will

In the background of what we have said so far there still remains a question (related to Ellis' comments on the presence of untestable and unprovable assumptions in cosmology) as to why in spite of the a-priori understanding that cosmology will never achieve the fullness of explanatory power and adequacy with truth, the urge for cosmological search and narration continues. Indeed, even for a reader unexperienced in all the subtleties of the methodology of science the claim that cosmology is based in a fundamental uncertainty must make a staggering impression, that cosmology formed an exotic set of trans-scientific ideas and intuitions which, by virtue of popular science and mass culture, acquired the status of a stable social *belief*. However, cosmology is not a new mythology<sup>22</sup> or a kind of cosmic philosophy<sup>23</sup> (based on wishes and remote expectations of community), it is not a sheer imagination, but has its own logic and drive, which, reflects the sense and value (as well as *telos*) of communion with the universe conditioned by necessities of nature and, at the same time, pertaining to human freedom. This communion is rather a state of *apatheia* as transcending over the natural causes which are beyond human control and. At the same time, communion with the universe is the immanence to the universe through the sheer fact of human presence, through which the universe is transformed by human will, its *energeia* and operations of cognition. Thus the persistence of cosmological research comes not only from the logic of cosmological research, but from other factors originating in the human condition.<sup>24</sup> Indeed, finite human beings, because of their paradoxical standing in the universe are not content with the presence of things in the universe as they are given in their empirically contingent facticity. Cosmologists, by invoking the idea of the universe as a whole, manifest

their desire to understand the meaning of finite things (let us say astronomically observed objects or earthly phenomena) not only through their *nature* (that is through that which is subjected to physical causation), but through the *purposes and ends* of these things as they stand with respect to the universe as their ultimate foundation. But this intentionality directed into the foundations of the very facticity of things is not what can only be expressed outwardly in terms of physical causation (and thus subject to tests); it is sustained by humanity's aspirations not only to be commensurable to the universe but, in fact to be above it, to transcend it and thus to encompass it through the power of intellect rooted in human will. It is because of its paradoxical position in being which causes existential discomfort<sup>25</sup> that humanity appeals to the idea of the universe as a whole as an alternative to being contained by finite natures, that is being comprehended only as an "object" among other objects in the universe. Existentially it does not want to be manipulated through circumscribability and individualisation which are inherent in spatio-temporal forms of the finite cosmos and correspondingly long for the truth of their existence *in* the space-time rubrics of this universe as if it is not *of* the universe as it appears to us. Here humanity wants to recognise things not according to their compelling givenness, but as results of humanity's *free will* realised in its intentionality. This naturally leads to the transcendence of the empirical and the invocation of intelligible entities (sometimes untestable and unprovable) which serves as a pointer and invitation to further research rather than its end and ultimate certainty.<sup>26</sup> The presence of agents with free will in the universe imposes certain constraints on the nature of the universe: it must contain the necessary conditions for them to exist<sup>27</sup> (or, as argued elsewhere, the universe must be moral<sup>28</sup>).

The perception of cosmology as that block of insights which involves deeply human anxieties and correspondingly persists as an existential quest, invokes a different stance on the ontological commitment exercised by advocates of cosmology, all those who are engaged in its popularisation and adoration and who usually claim, that whatever is theoretically and mathematically formulated, is physically real and true, although non-observable and untestable.<sup>29</sup> The countersense which is put forward by the human sense of cosmology doubts not the legitimacy of the cosmological narrative (comprising theories of non-observable entities) *per se* but the validity of epistemic justification adopted for its realistic interpretation.

Indeed, if many cosmological hypotheses and inferences are not testable, that is the correspondence principle between theory and empirical reality as epistemic justification does not work, there is a way of interpreting cosmological propositions about the non-observable and invisible by assigning to the universe the sense of a mental accomplishment but achieved through the idea of *coherence* (Rescher, 1989, pp. 318-9) where “coherence” stands most of all not for the clarity of theoretical explication and cohesion of mathematical calculations, but for the “collaborative agreement”(Ibid., p. 333) among cosmologists. It is these cosmologists who, by exercising their will, effectively *hypostasise the notion of truth* related to the universe and postulate the ways of epistemic justification which lead to it.<sup>30</sup> In this case the implied truth of cosmology cannot be an ontological truth (that is physical truth as allegedly existing in itself) but is a human-dependent constitution of truth possessing the qualities related to the corporeality of human beings.<sup>31</sup> In this interpretation many cosmological constructions naturally acquire the status of coherent mental accomplishments

(based in beliefs) whose truth (being historically contingent) contributes towards the spiritual goals (*telos*) of community but obviously does not exhaust them. However, the question of whether the locally established truths are subject to convergence to ultimate truth remains beyond scientific scope and represents in turn a belief motivated by trans-scientific convictions. In this option the validity of cosmology’s claims is dictated not by a direct reference to reality but through the adoption of a consistent and creative set of beliefs which themselves constitute the sense of reality, although contingent as related to the goals of community of cosmologists.<sup>32</sup>

Since in thus treated cosmology the universe appears to be a collaborative construction, its knowledge cannot be treated as independent of human insight, so that cosmology’s alleged status of following the standards of a natural science (as that in which the “object” of study can be entirely separated or detached from the subject) is not achievable. Cosmology, in contradistinction with astronomy and astrophysics<sup>33</sup>, is rather the “universology” (Jaki, 1993, pp. 1-2) which deals with a single, unique totality of all, which not only cannot be treated as an object and hence subjected to experimentation, but also cannot be made devoid of the delimiters of human insight. This, as we mentioned before, implies that human beings, as part of the universe, cannot position the universe as a whole in front of their consciousness, unless as a mental abstraction.<sup>34</sup> If such a mentally constructed universe nevertheless were to be identified with the physical totality, this would imply a sort of impossible transcendence of the actual physical universe as if one were able to “look at it” from the outside and hence transcending one’s embodied existence.<sup>35</sup> The inseparability of humanity and the universe as their consubstantiality entails that all speculations about other worlds remain intrinsically immanent, being noematic

correlates of embodied subjectivity which is an irreducible element of being of this universe.<sup>36</sup> Thus the universe as an intentional correlate of cosmological consciousness represents a mental accomplishment and cultural achievement<sup>37</sup> exhibiting features of the sciences of human affairs.<sup>38</sup>

**The explication  
of the interplay between natural  
and human sciences in cosmology**

Let us articulate further the sense of the interplay between the elements of human and natural sciences in cosmology. Cosmology is a scientific activity of human beings: it is because of this that in its constitution it is a human science in a trivial sense.<sup>39</sup> This claim comes from a noetic pole and implies that the epistemic and socially significant achievements of cosmology just are cognitive and manipulative achievements of human beings.<sup>40</sup> To say that “cosmology is human science” is to say that the doing of cosmology is an existential characteristic of human beings, their mode of being-in-the-world.

However, if one looks at the interplay from the point of view of their noematic poles, one must admit that the difference between them is always understood in terms of the radically distinct object domains outlined by the faculties of cognition. The natural sciences are characterised by the conviction that their subject matter is always “an object”, and, in particular, a non-human object (whose principle of existence is not related to subjectivity and personhood), so that its reading does not require any mutual agreement or reciprocity apart from common substance based connotations (consubstantiality).<sup>41</sup> It is in this sense that if cosmology pretends to be consistently a natural science, it must fulfil the major requirement: the “object” of cosmology (allegedly the universe as a whole) must be “at distance” from subjects of

knowledge and thus, in a way, to be inhuman, whose contingent existence manifests *itself from itself*, and not conditioned by the constituting human subjectivity that is devoid of the noetic carriers.<sup>42</sup> However, this demand creates tension with the fact that the very constitution of any object is performed by a particular operation of reason, which in spite of its imposing detachment from an object still remains behind it. Correspondingly the noetic pole in predications of the universe can be removed only in particular applications of cosmology (its astronomical part) desiring to deal with particular distinct physical objects which do not have immediate impact on being of man, namely remote planets, stars or galaxies. Such objects are characterised by persistent identity through a span of historical time and their appearance in human experience is not a construction, but an empirical fact. It is this identity which gives them the status of objectively existent entities. Contrary to these, some cosmological “objects” are simply constructions because they are observed as wholes only from this particular location and cannot be treated as objects independently of this fact: this applies first of all to clusters of galaxies which consist of “galaxies”, which are at different distances from us and thus at different times (with respect to us), so that the question of the status of the cluster of galaxies as a distant and distinct “*object*” with *fixed spatio-temporal characteristics* (this is usually implied in physics and natural sciences) does not have sense – this “object” is a mental construction.<sup>43</sup> While introducing a construct of a “cluster” of galaxies on the basis of the manifested phenomena, a different intentionality is invoked which unifies different aspects of this “cluster” (different galaxies which do not exhibit directly any physical causation) in one “physical object” assigning to it such existence *as if* it is based on physical interaction (causation) of its parts. Here

one can see that the language of intentionality (pertaining to the human sciences) cascades towards the language of physical causes (pertaining to the natural sciences). This shows that the ideal of the natural sciences is not only problematic on the scale of the whole universe, but, in fact, on the scale of its “elementary constituents” such as clusters of galaxies.<sup>44</sup>

What happens then is that the same shift from intentionality to causality takes place in creating the idea of the universe as a whole, when the appearance of filaments of clusters of galaxies through observations and conscious articulation is referred to the universe as a whole understood as a singular entity allegedly unified on the basis of physical causality. Here the language of intentions (in this case a *belief* in existence of the overall physical totality) is transformed into the language of physical causality. The intention is to unify (on the basis of a successive theoretical synthesis) the empirical images of causally disconnected regions in the sky in one single whole. But this unification naturally cannot be achieved as an accomplished phenomenalisation; for if the thus constructed unity is formulated, it cannot be phenomenalisised simply because it does not belong to the same series of empirical appearances which were passed over by the theoretical synthesis. Such a synthesis distances itself from the contingently given appearances towards a simplified mathematical construction thus explaining away the problem of contingent givenness of its empirical references (a typical example is the cosmological principle which equates all positions in space thus making irrelevant the question on the contingency of the empirical display as it is given to us here and now: the universe is uniform and the same display would be in any position in space). Correspondingly, such a construct, represented by a global space-time diagram, being a logical digest of the variety of appearances reveals itself

as poor in intuitive donation in the same sense as all mathematical constructions are: it effectively does not produce any growth of knowledge apart from stating that we belong to the whole. Consequently the construct of the universe as a whole, while contributing to the constitution of the universe, does not explain the facticity of this particular constitution as contributing toward the facticity of the universe in general. Even less does it provide us with any insight on the physical causality in this whole. But it is this causality which is the object of desire of cosmologists. Unable to address this causality as being beyond phenomenalisation at present, cosmology makes its intentional objective that of producing a model where the unity of “all in all” in the universe would be explained in terms of *physical causality* but related to the past of the universe (where all causally disjoint regions were unified).<sup>45</sup> The move of thought is quite clear here: to assert the unity of the universe in terms of its absolute origin, that is to introduce physical causality among its presently contingent displays by referring them back to the point where “all was in all”, that is physically connected simply through its belonging to “one and the same” (consubstantiality through origination). Thus the introduction of the idea of the evolving universe, being certainly supported by all known evidences from observational astronomy, and the shift to the past of the universe in order to interpret its contingent present, manifests an *epistemic causation* from “intentions” to “physical causes”.

Such a unification of all different aspects of the universe appearances in one “original” substance implies, however, not causal connection based on physical processes (contemporary cosmology is clear about the fact that the universe consists of space-time disconnected sections<sup>46</sup>); here one means connectedness as belonging to the underlying foundation (be it

the overall encompassing space-time structure or substance), as consubstantiality of everything in the universe as a whole.<sup>47</sup> It is this type of consubstantiality that is implied when in some textbooks on cosmology the universe, containing according to relativity infinitely many causally disconnecting regions, is depicted in a single diagram meant to symbolise the totality of all.<sup>48</sup> Unlike a consubstantiality related to micro-particles constituting all physical objects, the large-scale cosmological consubstantiality does not have a clear image-like representation apart from mental diagrams. Thus this consubstantiality has rather a transcendental character referring to the conditions of knowledge of the universe as a whole. Correspondingly this consubstantiality is a product of intentionality which, in cosmology, cascades towards physical causality as cosmology desires to assign to this consubstantiality an explicit physical meaning. It is not difficult to grasp that the transition from the language of intentions to the language of physical causality cannot be made on strictly scientific grounds for consubstantiality is not an empirical fact. It rather implies *faith in the existence* of the universe, or the world where both words carry connotations of the overall totality and unity. It is this faith that delivers us the sense of the *given* when we use the term “universe” in the conditions when the givenness pertaining to the natural object is unattainable. Using Husserl’s words, “it is this *universal ground of belief in a world* which all praxis presupposes, not only the praxis of life but also the theoretical praxis of cognition. ... *Consciousness of the world is consciousness in the mode of certainty of belief*; it is not acquired by a specific act which breaks into the continuity of life as an act which posits being or grasps the existent or even as an act of judgement which predicates existence. All of these acts already presuppose consciousness of the world in the certainty of belief.” (Husserl, 1973, p. 30).<sup>49</sup> These

beliefs correspond to that which in the natural attitude can be described as empty and never fulfilled intentions. Then the very tendency to transform the language of intentions into the language of physical causes in the context of the universe as a whole represents an attempt to make the universe a target of ever-going but unfulfilled intentions (C.f. Sokolowski, 2000, p. 43).

On the one hand the notion of the universe comes from astronomical observations and theories based in the ideal of physical causality; on the other hand we have some stories of the Big Bang and the universe’s facticity expressed in philosophical enquiries and scientific-mythological narratives guided by the language of intentions and having origination in the human condition. This all suggests that either region in cosmological discourse (its observational base as well as eidetic extrapolations) encompasses the other; in other words, each type of cosmological understanding accounts for the hidden unity of both intentionalities dwelling in one and the same human person who discloses the universe. Put differently, cosmological theories need inputs from existential faith and hence from philosophy (regulative ideals in a Kantian sense), whereas philosophical imagination in the creation narrative borrows and exploits, for its “visualisation”, physico-mathematical images thus offering a metaphysical extension of physics.<sup>50</sup>

One now anticipates that any attempt of totalising the world view, that is making a unique and consistent whole in our perception of the universe, is doomed to fail. All these attempts start from within the life-world associated with a geocentric world, and it is the life world which remains patchy and incoherent through different articulations including not only philosophical and scientific, but also religious ones. In other words, the life world does not allow its totalisation either through the language of matter and body or that of spirit and soul, through physical causes

or through human intentions because it is the world of historically contingent *events* whose instantiation is not subject to the physical or purely spiritual.<sup>51</sup> The reality of the life world is far too existentially complex to allow a simple-minded reduction to either one of these. This implies that cosmology has to deal with this intrinsic dualism between its orientation towards the natural sciences and, at the same time, its dependence upon the dimensions of human life. One must then expect that the discursive language of physical causation as a mode of thematisation of the life-world will go side by side with the “language of *communion*” and the excess of intuition over reason, so that neither of them will be able to reduced to the other. Every attempt to semantically transgress the normalised sense-borders of everyday intentional life in the conditions of inescapable communion with the universe, by the use of causally reductive language which sees that universe in stages of evolution and hierarchy of objects, issues in a counter-sense. The same holds for attempts to transgress the causal domain with intentional language: intentional language is useful to analyse and refer causal language to existential motivations of research, but not to the truth of a *fact*, which causal language attempts to *affirm*.

As an example of how the language of intentionality takes control over the language of causality one can refer to the analogy between the phenomenology of birth (as absolute coming into being of a new hypostatic existence) and the phenomenology of the Big Bang: in both cases the “event” of birth and the origin of the universe are phenomenologically concealed because of the immanence of human life to itself as well as to the universe: one cannot transcend one’s own life or the universe in order to “look” at their origin from outside. However this analogy, originating essentially at the level of intentionality, does not cascade towards the explanatory level of physical

causation. It just points towards the fundamental limit in attempting to assign physical causation to the event of origination of the universe which originates from the fact of human embodiment in the universe.<sup>52</sup>

This analogy between the phenomenology of birth and the origin of the universe elucidates, in a non-trivial way, the sense of communion with the universe.<sup>53</sup> By referring to the mystery of origin of every particular personal existence, a physical problem of comprehending the temporal origin of the universe is transformed into a purely philosophical problem of the contingency of this origin, that is the problem of the sufficient ground for the whole temporal span of the universe. Using the analogy with famous Kantian antinomies one can say that the classical paradox of the temporal origin of the universe formulated by Kant in his first cosmological antinomy is shifted toward the antinomy of the absolutely necessary being as if it is the ground of the visible universe.<sup>54</sup> This transformation, which is not a result of the advance of the physical sciences but the work of the intentionality enquiring into the ground of its own facticity and hence the facticity of the universe, demonstrates that from within this intentionality the problem of the temporal origin of the universe and its explication through evolutionary stages is irrelevant for any attempt to understand the universe’s facticity.<sup>55</sup> The analogy with the phenomenological concealment of the origin of personal consciousness is crucial here. When achieving such a state of consciousness, when all the historical, temporal and spatial contingent aspects of the universe are reduced, this consciousness has to embrace itself to the uncertain infinity of its own being. Being absolute as an event of existence, every personal consciousness treats itself as indefinite and commensurable with the universe, where the commensurability manifests itself as an intuition of co-existence with the universe, which is not

fulfilled through acts of reason in spatial and temporal distinctions. According to G. Marcel's thought expressed at the beginning of the 20<sup>th</sup> century, "the universe as such, not being thought of or able to be thought of as an object, has strictly speaking no past: it entirely transcends what I called a 'cinematographic' representation. And the same is true of myself: on a certain level I cannot fail to appear to myself as contemporary with the universe (*coaevus universo*), that is, as eternal" (Marcel, 1965, p. 24). Marcel anticipates here a simple truth that for every human being the sense of communion with the universe makes existentially irrelevant any notion of evolution and stage-by-stage description of the universe ('cinematographic' representation).<sup>56</sup> Communion is here and now and it is absolute in its transcendent phenomenality as an event of life; in other words it is the facticity of life that retains transcendence of that with which and in which this life is as communion. Life implies internal time consciousness, its unending inevitability, but being integrated in one and the same person this consciousness is not obliged to be projected on the physical extension of time. If the universe in its phenomenality appears to be a stable and enduring background of existence then a human being as a communicant with the universe realises itself as commensurable with it and hence also co-eternal with it. One can say that human beings as long as they are alive experience the immanence of the infinite. The life of a human being is then an act of communion, an event whose fullness (perceived through the sense of living being) does not need any acknowledgement of history of the universe, although the impossibility of grasping the sense of facticity of this life perceived through the immanence remains the unavoidable *negative certitude* of a theological kind. Within the fact of life it is the universe that becomes a part of existential history of every human being and not

vice versa.<sup>57</sup> Thus the identity of the universe which receives its fulfilment in acts of communion with persons, transcends any phenomenalisation of the universe (as its representation) through cosmology.<sup>58</sup> However one must admit that the irrelevance of the non-lived cosmic history for a particular event of life does not entail the irrelevance of the *human history* as related to lived moments and memories imbued with a sense of telos related to the infinite tasks of humanity.

What happens in cosmology then is that physicists' intentionality (that is that one which pertained to the natural attitude) breaks the noetico-noematic (subject-object) inseparability and explicates the event of communion with the universe through creating theoretical models of the universe. By being in communion the knowing subject, a cosmologist, articulates the universe as a sort of "out there" which allegedly follows the objective laws of physics and thus is independent of a cosmologist's insight. Such a scientific notion of the universe naturally falls under the phenomenological critique which reinstates back a simple truth that any truth of the universe is an articulated truth, so that this truth is in man and his body, the body which is consubstantial to the universe and communes with it. Thus one comes back to the inevitability of the link between the universe and man in a deep philosophical sense. However, and this is important for us, this intertwining between man and the universe does not deprive the universe of independence from the conditions of its expression by the human subjectivity. The universe as communion, denying any complete synthesis in its phenomenalisation, always retains that overwhelming presence which cannot be conditioned by the rubrics of subjectivity, inducing an excess of intuition over any attempt to see or constitute them. Thus the universe appeals to man as a saturated phenomenon

always retaining its own transcendence with respect to all attempts of humanity to grasp the sense of its facticity.<sup>59</sup>

In conclusion one has to confirm the main thought of this paper that there is an obvious and probably unavoidable tension between the representation of the universe as an object in cosmology and its presence in existential communion which affects all our attempts to express the experience of living in the universe. To avoid this tension, one has to step into a dispassionate *phenomenological* description of the universe as it discloses itself in the natural attitude, in the language of causes on the one hand and in the language of intentional immanence through communion on the other hand. One might say that the *ontological commitment* should be left out and a certain phenomenological calm must be adopted with respect to various languages used for assessing the universe as a whole. This means that one can use discoveries achieved by natural scientific reduction as well as by philosophical insight and communion without committing semantically or ontologically to one region's priority over the other. The same idea can be expressed differently: the cosmological narrative follows either the logic of physical causes and is shaped by mathematics aiming at pure objectivity or, alternatively, the "logic" of life and inseparable communion with the universe (which is not subject to intellectual persuasion and thus is the free-willing employment of artistic expression), which is ever incomplete (metaphorical) and fundamentally open-ended. It is because of this dichotomy that one must learn how to live

with incomplete wholes, partial and shattered totalities – totalities requiring different languages although, after all, belonging to one culture.<sup>60</sup> Correspondingly the objective of a philosophical insight in cosmology, undertaken here, is not to find a unified language for understanding the universe, but rather to realise that in our approach to its totality, always initiated in the life-world, we progress by the various ways given to humanity. The reality of the universe then is much more than is met by the discursive mind, it forms a mysterious sense of "identity", which is intuited, but never completely grasped by the mind: it bedazzles us, while constituting our own sense of identity to the extent that we cannot circumscribe the universe in the rubrics of thought. In its perennial leap towards understanding the sense of the universe, humanity stretches its capacity to grasp itself. Indeed, ontologically, the universe we disclose through our embodiment involves us as disclosing it. Given this our personhood achieves its status as a "place" that permits disclosure of the universe through what this personhood is. The *I* as person discloses, by being structured by disclosure itself, that is, in the words of M. Merleau-Ponty, by being a "concrete emblem of general manner of being" (Merleau-Ponty, 1968, p. 147).

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<sup>1</sup> One can say, by using terms of J. L. Marion, that for cosmology as a scientific discipline it is typical to function in conditions of "positive incertitude", that is asserting things provisionally, which certainty will be complemented by new experimental and theoretical results, or even replaced by a more powerful scientific paradigm. Here lies the paradox of scientific cosmology's functioning: on the one hand it delivers truth about partial objects, but still provides only a provisional truth with respect to the universe as a whole. And it is this positive incertitude which as such forms the condition of cosmology's (and in general science's) progress. In contrast, if one approaches cosmology from a philosophical dimension, it becomes clear that philosophy was "certain" about general aspects of predicating the universe for centuries (remember, for example, Kant's analysis of the cosmological idea in order to realise that its actuality has not been extinguished after nearly a century of scientific cosmology). The perennial problem of the universe's facticity, that is its being, has not been removed from the philosophical scene in spite of desperate attempts of the apologists of

the multiverse and the Theory of Everything to remove this problem on the grounds of the immanent science. In this sense philosophy works in the conditions of the “certitude negative” which recognises that there are certain aspects of experience which are subject to discussion and explanation. The universe as donation and event in any life, as the beginning and end, as being and meaning, cannot be explicated in terms of positive definitions. In this sense Ellis’ recourse to uncertainty and untestability of cosmology represents an intellectual move towards the “negative certitude”. See (Marion, 2010).

- <sup>2</sup> Apart from using the adjective “untestable” 17 times in Ellis’ paper, one can find many propositions in which the words “unprovable” or “improbable” are used as characteristics of theories which represent a main stream of cosmology. This wording is used in both cases whether one speaks about the state of affairs in our universe (e.g. “the deduction of spatial homogeneity follows not directly from astronomical data, but because we add to the observations a philosophical principle that is plausible but *untestable*”(Ellis, 2007, p. 1226) or if one speculates about the so called multiverse when one attempts to predicate other worlds in terms of that one which is ours (e.g. “multiverse proposals are unprovable by observation or experiment...”, (Ellis, 2007, p. 1263).
- <sup>3</sup> One can remember of Husserl’s famous criticism of the radical mathematisation of nature on the grounds that mathematics, as a method providing a certain result of mathematical representation of nature was taken for reality of this nature. Husserl writes: “Mathematics and mathematical science, as a garb of ideas, or the garb of symbols of the symbolic mathematical theories, encompasses everything which, for scientists and the educated generally, *represents* the life-world, *dresses* it up as “objectively actual and true” nature. It is through the garb of ideas that we take for *true being* what is actually a *method* – a method which is designed for the purpose of progressively improving, in infinitum, through “scientific” predictions, those rough predictions which are the only ones originally possible within the sphere of what is actually experienced and experienceable in the life-world.” (E. Husserl, 1970, p. 51-52.)
- <sup>4</sup> One can generalise this thought by asserting the historical contingency of the conditions of disclosure in cosmology, that is of the historical relativising a-priori as relative to a certain situation of cosmology changing from one step to another of its history. It is this positive incertitude of cosmological research that guarantees its progress and at the same time makes it radically different in comparison with a “negative certitude” of philosophical insights in the topic of the universe or the world. According to the spirit of the volume on transcendentalism in modern physics (Bitbol et al, 2009, p. 13) the historical relativising of the conditions of cosmological knowledge could extend the Kantian understanding of constraints on knowledge, as transferred from a-historical a-priories to ever corrigible conditions of constitution of reality related to the evolving human condition.
- <sup>5</sup> Up to some extent this is true even in the case when the experiments are anticipated through theory and thus planned in advance within a given paradigmatic constraint. The resistance of the universe to its disclosure makes these experiments amendable and corrigible because their outcomes are still contingent.
- <sup>6</sup> One implies here a change in the conditions of constitution which are not related to the instrumental requirements and means of accessibility. As an example one can refer to changes of theoretical paradigms which have philosophical motivations; a typical example follows from a philosophical desire to explain away the problem of the contingency of the initial conditions which results in inflationary cosmological scenarios or ideas of the multiverse.
- <sup>7</sup> C.f. (Ellis, 2007, p.1221).
- <sup>8</sup> Husserl defines humanity as mankind with infinite tasks as a carrier of philosophy, conceptions of ideas through which “man gradually becomes a new man”, man who “lives toward poles of infinity.” Infinite tasks are associated with the theoretical attitude to the world. In this sense science itself signifies the idea of the infinity of tasks. See (Husserl, 1970, pp. 277-279.)
- <sup>9</sup> The creation of a cosmic narrative implies a deviation from the egocentric intentionalities which could be criticised by the philosophers of existence, who believed that it was wrong to interrogate the sense of the given facticity; on the contrary their philosophy takes this facticity for granted as an undeniable premise of all other enquiries.
- <sup>10</sup> See in this respect a paper (Tegmark, 2008), in which the author attempts to advocate an extreme view of mathematics as an underlying structure of reality, that is as reality itself, which is stripped off of all aspects of the human presence. However the hypothesis of the mathematical universe suffers from not being placed in the context of a serious philosophical discussion on realism in mathematics (such as given in, for example in (Balaguer, 2009), not to speak of a phenomenological stance on mathematics. In addition one must say that the claim that the universe is mathematical, which in the paper of Tegmark is tantamount to assertion of the universe’s epistemic exhaustability (that is knowability), contrasts with understanding that mathematical concepts have no intuitive content and are very poor in donation thus leaving behind all aspects of experience of the universe which, on the contrary, are so powerful in donation, that they block any pre-given structure of the discursive reason and constitute it to the extent this reason cannot cope with the saturation of the intuition. (See in this respect (Marion, 2002a, pp. 179-247). In simple words, all extreme views of mathematical realism assume that if the universe is only physical, then it must be mathematical. However, it is here, that philosophers could raise a serious doubt on whether the physical and hence mathematical representation of the universe exhausts the sense of its reality as perceived by human beings.
- <sup>11</sup> The fact that cosmology involves a “computational synthesis” of the observable astronomical phenomena implies that physical objectivity of these phenomena as well as of the universe as a whole cannot be tantamount to an ontology of some independent reality. The possibility of a complete mathematical reconstruction of such an ontological reality would ascribe to the human mind excessive intellectual capacities which transcend its finitude following from the limits of embodiment. Correspondingly, according to H. Weyl’s qualification, cosmology here concedes to idealism (we would say transcendental idealism) in the sense that “its objective reality is not given but to be constructed...”, and that it cannot be constructed absolutely, but only in relation to an arbitrarily assumed coordinate system and in mere symbols”. (Weyl, 2009, p. 117).

- <sup>12</sup> Here is the full version of his theses A1 and A2: (A1) “The universe itself cannot be subjected to physical experimentation. We cannot re-run the universe with the same or altered conditions to see what would happen if they were different, so we cannot carry out scientific experiments on the universe itself”; (A2) “The universe cannot be observationally compared with other universes. We cannot compare the universe with any similar object, nor can we test our hypotheses about it by observations determining statistical properties of a known class of physically existing universes.” (Ellis, 2007, p. 1216).
- <sup>13</sup> These existential inspirations initiate generic cosmological mythology which has already been described in terms of cosmogenesis, that is how the world was made, how the present universe which stands before our eyes developed from what went before, from the non-universe, the formless. C.f. (Ladrière, 1972, p. 153.)
- <sup>14</sup> This thought was expressed in numerous ways by philosophers and scientists. See in this respect, for example, (Minkowski, 1970, p. 244), (Munitz, 1951, p. 338), (Brockelman, 1999, p. 42), (Primack, Abrams, 2006, pp. 280-290).
- <sup>15</sup> Compare with P. Heelan: “By studying the forms of objectivity assumed to be present in nature, one can, however, infer the forms of subjectivity that are presupposed. Inquiry of this kind must proceed according to phenomenological method, the purpose of which is to uncover the noetic pole constitutive with the noematic pole, of the noetic-noematic (subject-object) intentionality structure within which the form of the question and the form of the answer mutually determine one another.” (Heelan, 1972, p. 486); also: “We can enhance the sense of ourselves, as we’ve been successfully doing with our other senses, by means of a scientific but nevertheless metaphorical telescope- a new cosmological lens through which we can see how the expanding universe really works and how astoundingly special our place is in it” (Primack, Abrams, 2006, p. 282). Placed in a cosmological context the following quotation from F. O’Murchadha points to the same thought: “The otherness of nature is beyond us, beyond our humanity, beyond history. Yet it is in a place carved out of nature that we dwell. In dwelling – as ethical being – we become what we are. Hence, *how our dwelling is conceived, how the relation of the history of this dwelling to the natural environment, through which it is carved out, occurs, relates directly to who we are.*” (O’Murchadha, 1995, p. 189).
- <sup>16</sup> One can make a parallel between our phenomenological interest and a similar approach to philosophical issues of physics which is developed in the movement called “formalised epistemology”. (See, for example, (Bailly, 2002, pp. 3-8). However, the reduction performed in the “formalised epistemology” does not reach the goal of this research which aims not only to explicate the cognitive structures underlying science, but also attempts to relate them to fundamental existential conditions predetermining their facticity.
- <sup>17</sup> (Husserl, 1970, p. 237). However the converse is not true, that is the cultural sciences cannot be given a place among the natural sciences. See in this respect (Gurwitsch, 1974, pp. 148-49).
- <sup>18</sup> Here it is appropriate to point to a certain similarity between the phenomenology of birth and theories of the beginning of the universe as related to a general problem of consciousness’ facticity. See (Nesteruk, 2008, pp. 247-250.) In the natural attitude the same problem can be addressed under the name of genetic similarity between the *biology* of birth and the stages of development of the universe See (Pavlenko, 2003, pp. 47-48) ; 2004, pp. 389-401). The views on the universe were always important for communities to draw some remote expectations having ethical character: ethics depends on the idea of environment and its developmental perspective. (See in this respect (Mathews, 1991, pp. 3-6).
- <sup>19</sup> The constitution of one’s ego through knowledge so that the “object” of this knowledge is formed together with its subject represents a crucial feature of the human sciences. According to M. Bakhtin, the object which is studied in the human sciences belongs to the same realm as the subject who studies, and thus it is no less active than the knowing subject (Bakhtin, 1979, p. 349). In this context it is interesting to make a reference to J. A. Wheeler who affirmed a similar thing with no recourse to the human sciences. For example: “In giving meaning to the universe, the observer gives meaning to himself, as part of that universe” (Patton, Wheeler, 1977, p. 31). That is, by disclosing the universe the observer forms its own structures of subjectivity which apprehend the universe.
- <sup>20</sup> The opposite would imply sheer idealism, resulting in the universe to be an intelligible entity graspable through the already formed intellect. The universe would be thought as pre-existent, but intelligible, Platonic-like entity. Its grasp, would imply a sheer mysticism as the communion with the realm which is beyond the empirical (this mysticism is similar to that one which is envisaged in the Platonic philosophy of mathematics). Even if one would allow for a complete computational synthesis of the universe, this would, as we mentioned above, exceed human finite capacities limited to the conditions of embodiment. The desire to know the universe in its totality (as “all in all”) brings to mind eschatological connotations as if the thinking of totality of the physical universe is equivalent to the anticipation of the eschaton in which the overall transfiguration of the world and human beings will allow one to see the universe from the perspective of the trans-worldly existence.
- <sup>21</sup> H. Weyl linked the human longing for the sense of the infinite with that moral and human standard by which all human deeds are judged: “...mind is freedom within the limitations of existence; it is open towards the infinite.... The completed infinite we can only represent in symbols. From this relationship every creative act of man receives its deep consecration and dignity.” (Weyl, 2009a, p. 82).
- <sup>22</sup> Here one must agree with Ellis that the fact that cosmologists write about contentious issues in cosmology “is proof that they consider it meaningful to argue about such issues” because their quality emerges naturally from knowledge of the physical universe (Ellis, 2007, p. 1272).
- <sup>23</sup> Here one means the so called cosmic philosophies and ideologies of the ancient past which aspired for humanity to be dissolved in cosmic immensities and which were strongly dismissed by the ecclesial authorities as pagan and gnostic.
- <sup>24</sup> J. Moltmann, by formulating the quest for the sense of cosmic utopia which creates in us the interest to know the universe, summarises that all that which the vast science-fiction tells can be reduced to the following: the infinite survival of human-kind and unlimited development of human consciousness (Moltmann, 2003, p. 72.)
- <sup>25</sup> E. Fromm, for example, speaks about existential and historical dichotomies in man. Existential dichotomies are related to man self-questioning the sense of its own existence: “Man is the only animal which can be bored, that can be discon-

tended, that can feel evicted from paradise. Man is the only animal for whom his own existence is a problem which he has to solve and from which he cannot escape.” These are dichotomies about life and death, loneliness and relatedness, individuality and sociality. Because of their free will man can attempt to annul historical contradictions through their actions, but it is futile to overcome existential contradictions, man remains dissatisfied, anxious and restless. Then “there is only one solution to his problem: to face truth, to acknowledge his fundamental aloneness and solitude in the universe indifferent to his fate, to recognise that there is no power transcending him which can solve his problem for him” (Fromm, 1967, pp. 41-44).

<sup>26</sup> As eloquently expressed by H. Küng there is no intellectual compulsion in questions beyond empirical reality, but *freedom* dominates in them (Küng, 2007, p. 78). Here comes to mind an analogy with the Kantian aesthetical ideas which, being qualified as unexpoundable presentations of imagination function according to “*free play*” (Kant, 2005, p. 142). The analogy is that the question about the invisible foundation of the universe falls under the rubric of aesthetical idea, rather than rational idea.

<sup>27</sup> This argument corresponds to what is generally called anthropic inference in cosmology, namely a very delicate interplay between the physical and biological parameters of human existence and large-scale properties of the universe as well as fundamental physical constants. It is important to realise that this inference does not account for the facticity of humanity’s existence, because it does not cover the realm of sufficient conditions which belong to the sphere of human morality and conscious will. Indeed the technological advance of humanity threatens its local survival on the planet without affecting the global physical properties in the world. This implies that the actual presence of humanity in the universe as an ongoing event is determined by human wisdom and morality rather than simply by the cosmic conditions. See, e.g., (Leslie, 1996), (Rees, 2003.)

<sup>28</sup> The assertion of the morality of the universe advocated in the book (Murphy, Ellis, 1996; in particular p. 207) does not have any straightforward scientific reference, for “free will” as well as the very facticity of consciousness in the universe cannot be accounted through any reduction to the physical or biological. One can add to this that the very existence of cosmology as a free and creative questioning of the universe is thus inherent in the fact of free human choice to explore the world at large. The initiation of cosmology lies in the freely made decision to act and exceed the limitedness of the empirically given. And this free decision as such is not subject to a scientific account.

<sup>29</sup> As an example one can point to M. Tegmark who conjectured a principle of “mathematical democracy” according to which whatever is mathematical is also physical. (Tegmark, 2003, pp. 480-85). The reader should remember, however, that the main issue here is whether the mathematical exhausts the whole of reality. One can adopt a different view on mathematical models of the universe regarding them as related not to one and the same physical original. In this case a cosmological model consistent from the mathematical point of view can give images of that which cannot be physical in this universe. In spite of this all mathematical models being created in this universe contribute in a sort of way to its articulated content.

<sup>30</sup> See a book of (Bowker, 2005, pp. 118-148), in which the author persuasively argues on the importance of coherence considerations in science (and religion) as a different form of justification in comparison with the correspondence principle. On the limited application of the idea of coherence of epistemic justification in cosmology see (Nesteruk, 2008, pp. 244-46; 2009, pp. 71-75).

<sup>31</sup> Cf. (Bitbol, et al., 2009, p. 4).

<sup>32</sup> This allows one to make a certain analogy between the forming of sense in cosmology and theology: indeed theology forms its sense of truth not through empirical references to the Divine, but through the experience of God as elaborated and established ecclesial agreement. See, for example, (Nesteruk, 2008, pp. 244-46).

<sup>33</sup> G. Ellis underlines the essential characteristic of cosmology’s proper subject matter: “...if we convince ourselves that some large scale physical phenomenon essentially occurs only once in the entire universe, then it should be regarded as part of cosmology proper; whereas if we are convinced it occurs in many places or times, even if we cannot observationally access them...then study of that class of object or events can be distinguished from cosmology proper precisely because there is a class of them to study”, (Ellis, 2007, p. 1219). This careful distinction is related to the universe as a whole and makes a clear-cut demarcation line between cosmology *proper* and other celestial sciences like astronomy and astrophysics.

<sup>34</sup> This would correspond to a Platonic treatment of the construct of the universe as an idea. In this case cosmology were to face, in analogy with the general Platonic stance in the philosophy of mathematics, a serious problem of justifying the interaction between the universe as an intelligible entity and its empirical appearance to embodied consciousness, the interaction which would imply a sort of mystical communion. (See in this context a nice discussion on the status of mathematical objects and their knowability in (Tieszen, 2005, pp. 46-68.)

<sup>35</sup> C.f. (Marcel, 1965, p. 24).

<sup>36</sup> One can argue that the very process of invocation of other worlds is reminiscent of that which phenomenology calls “eidetic variation”. One subjects the physical parameters of the universe to a sort of variation whose ultimate goal is to establish the stability or the *eidós* of the actual universe.

<sup>37</sup> C.f. (Gurwitsch, 1974, pp. 44-45). See also (Husserl, 1970, p. 227) on the “nature” as correlate of a universal abstraction.

<sup>38</sup> A similar observation, with no recourse to phenomenology and the concept of intentionality, has been made by a Russian philosopher V. Rosin. See, for example, (Rosin, 2000, p. 81). In another paper he writes: “The object of cosmology (in analogy with the objects of biology, cultural sciences and sociology) cannot be described within a single scientific discipline....From the point of view of the philosophy of science the universe represents an ideal object of theories pertaining to the human sciences, based in its construction in facts (astronomical observations and their interpretation) and related to the process of realisation of cosmologists’ values and approaches, as well as to the discourse of the human sciences (for example the treatment of astronomical observations as characteristic texts and activity of the Cosmos)....(Rosin, 2007, pp. 111-128). Rosin makes his claims on the human-sciences’ nature of cosmological knowledge by referring to works of another Russian philosopher V. Kazyutinski, in particular to his paper “Worlds of culture and

- world of science: an epistemological status of cosmology” in (Kazyutinsky, 1998, pp. 101-118). However Kazyutinski himself objects to Rozin’s strong claims on the status of cosmology as a human science. See (Kazyutinsky, 2007, pp. 125-129).
- <sup>39</sup> C.f. (Harvey, 1995, p. 122).
- <sup>40</sup> Cosmological research is driven by cultural and social factors, even by fashion. See, for example, (Penrose, 2005, pp. 1017-20).
- <sup>41</sup> E. Husserl accentuated a feature of “corporeity” which physics (as a typical representative of the natural sciences) only wants to see in that world from which this same physics originates, that is the life-world: “The natural science of the modern period, establishing itself as physics, has its roots in the consistent abstraction through which it *wants* to see, in the life-world only corporeity. Each “thing” *has* corporeity even though, if it is (say) a human being or a work of art, it is not merely bodily but is only “embodied”, like everything real.” (Husserl, 1970, p. 227).
- <sup>42</sup> An attempt like this can be found in M. Tegmark’s approach for whom the epistemic exhaustibility of the physical universe is equivalent to its description in a purely mathematical form devoid of “human baggage”. See (Tegmark, 2008).
- <sup>43</sup> That fact that intentionality plays here a pivotal role can be realised through an observation that a cluster of galaxies as a correlate of this intentionality remains unfulfilled on the level of physical causality. A cluster cannot be conceived as a physical system or object whose components are in physical interaction which are constitutive of this object. There is no “body” of the cluster of galaxies in the same way as there is a body of a train whose appearance through its front entails the assurance in its physical objectivity as a “solid body” localised in space and time. One can conjecture that the question of existence of such objects as clusters of galaxies is established through insistence on their epistemic identity and not space-time attributes.
- <sup>44</sup> This resonates with Ellis’s qualification that “cosmology is both a geographic and a historical science combined into one: we see distant sources at an earlier epoch, when their properties may have been different.”(Ellis, 2007, p. 1221).
- <sup>45</sup> Characteristically the work of intentionality presupposes a sort of transcendence. Intentionality gazes beyond things’ appearance, transcends the visible towards a non-visible, that is towards that which is not reducible to the visible and yet that which is the condition of it. Intentionality thus implies a speculative transcendence similar to that one of creative mythology inherent in the very human condition and may be having an evolutionary importance. The appeal to the past of the universe which “unites” the phenomenal in some unformed and undifferentiated matter means at the same time the invocation of the original time which in its actuality is infinitely far away but still active and present as an open-ended fulfilment. Being non-human this past is in radical discontinuity with this world, but it serves as a productive act in relation to the visible world, that is as the world at distance, that distance which can be crossed over but not immanently overcome. The transcendence in this case is a free flight from the past to that which is the condition of any possible. At the same time transcendence is not arbitrary fantasy and a lapse into the inarticulate, it is the intentional thematisation of that which makes the universe a unity, that is, in an ancient Greek parlance, the cosmos.
- <sup>46</sup> This fact is related to the potentially infinite geometry of space and the finitude of the speed of light. Since we observe the universe along the past light cone which imposes constraints on the maximal distance causally connected with the earth bound point of observation, we are not only detached from all regions which are beyond this light cone, but event within this light cone we effectively receive signals from regions which, according to the standard model of cosmology, have been disconnected in the past. This constitutes a famous horizon problem, whose alleged solution was assigned to inflationary cosmology. (Weinberg, 2008, pp. 205-6).
- <sup>47</sup> One must not understand substance straightforwardly in the style of an old fashion metaphysics. When, for example we talk about the unity of the universe in the Big Bang, we assume a sort of unified field which contains potentially all differentiated objects. This assumption, for example, corresponds to an old Greek idea of “water” as that underlying agency which gives rise to all varied forms of matter.
- <sup>48</sup> The examples of such diagram can be found in many standard books on cosmology; see, for example, (Harrison, 2000, pp. 345-55).
- <sup>49</sup> One must be aware, however, that Husserl’s usage of the term “world” does not correspond exactly to what is meant here by the universe. He does not reduce the meaning of the world to the all-encompassing extended spatiality and temporality, but rather means the world as an irreducible context of all experience, as the “horizon of all horizons” in all intentional acts. See in this respect a classical paper (Landgrebe, 1958).
- <sup>50</sup> As an example of such a metaphysical extension of cosmology one can point to diagrams which recapitulate the wholeness of the universe (with some particular physical details) and its link to the fact that it is articulated by human beings. As an example one can point to a famous “closed circuit” in J. A. Wheeler’s writings symbolising the world as a self-synthesising system of existence. See e.g. (Wheeler, 1988, p. 5), or a picture of the so called “Cosmic Uroboros” E.g. (Primack, Abrams, 2006, pp. 160, 284). These diagrams mean to stand for such a unity of the world in which the historically formulated physics is erected to the level of apodictic structure of being. One then understands the apophatic sense of these representations providing signifiers of the universe’s manifestation with no pretence for the exhaustion of the sense of that which is signified.
- <sup>51</sup> As was argued by J. L. Marion by referring to Kant, unique occurring typical for historical phenomena do not fall under the rubric of *analogies of experience* which concern only a “fringe of phenomenality typical of the objects constituted by the sciences, a phenomenality that is poor in intuition. See (Marion, 2001, p. 204).
- <sup>52</sup> See more details in (Nesteruk, 2008, pp. 247-50).
- <sup>53</sup> The sense of communion implied here exceeds its physical dimension of consubstantiality. The analogy which is developed by us differs from the hypothesis of “genetic similarity” between the evolution of the universe (cosmogogenesis) and development of a human being (anthropogenesis) introduced by A. Pavlenko. See, for example, (Pavlenko, 2003, pp.

- 47-48; 2004, pp. 389-401); 2008, pp. 128-130).
- <sup>54</sup> This shift can be observed by analysing R. Penrose's hypothesis on the origin of temporal irreversibility due to the local conditions and treated by him through a pseudo-theological metaphor. See (Penrose, 1989, pp. 435-447). See details in (Nesteruk, 1999, pp. 77-78; 2003, pp. 67-77).
- <sup>55</sup> If one thinks of the ontological "transcendental condition" for the possibility of consistent and varied processes in time in the universe, then no appeal can plausibly be made either to a set of fixed entities or to an ontic first cause since, within the material universe, neither the former nor the latter can "originally", that is ontologically, precede what is caused. The notion of 'cause' is acting here as a pragmatic fiction which disguises the fact that 'that which causes' is only something which is changing into something else. In this sense all ultimate causes are more primarily effects, that is an effect is described as *causatum* (rather than as *effectus*). In different words one expresses the same by saying that "causing means giving" implying the cause is a going out of itself as an effect, while the effect is wholly 'from' the cause in which it eminently abides. The sought explanation of the facticity of the universe thus implies the imminence of "givenness", that is that donation of the universe which we receive. Correspondingly all conventional mythologies acting on the premise of imitating the other-worldly "origin" of the universe as a precondition for the unfolding temporal flux fail to address this contingency in an "explanatory" manner: they just imitate the mode of donation of the universe through the appeal to creative power of imagination which allegedly refers to realities beyond the facticity of the donation. In other words, the donation itself is explicated in terms of layers and strata of this same donation which is not perceived as manifested.
- <sup>56</sup> The so called "cinematographic representation of the universe" (the term which goes back to H. Bergson) is irrelevant in the approach of communion even in spite of a trivial intuition that all material constituents of communicants contain elements of the historical past of the universe. Through its past the active communion with the universe manifests itself as being present in us in every cell and every breath.
- <sup>57</sup> This observation corresponds to a phenomenological stance on physical time as originating in the subjective time as well as in the internal time consciousness. See (Husserl, 1991). It also connotes with a problem of constitution of the sense of history in transcendental ego. See in this respect (Ricoeur, 1967, pp. 145-150).
- <sup>58</sup> The epistemological dichotomy between communion and discursive representation of the universe implied here can be expressed as the opposition between *subjective absolute* and *objective relative* mentioned by H. Weyl in reference to M. Born: "The immediate experience [as communion, A.N.] is *subjective and absolute*. ...The objective world, on the other hand with which we reckon continually in our daily lives and which the natural sciences attempt to crystallise...is of necessity *relative* [this relativity is first of all related to its historical contingency, A.N.]; it can be represented by definite things (numbers or other symbols) only after a system of coordinates has been arbitrarily [that is historically contingently, A. N.] carried into the world...Whoever desires the absolute must take the subjectivity and egocentricity into the bargain; whoever feels drawn toward the objective faces the problem of relativity" (H. Weyl, 2009b, p. 116.)
- <sup>59</sup> The notion of the "saturated phenomenon" was introduced by J. L. Marion in his paper (Marion, 2001), and developed further in his books (Marion, 2002a,b). The application of the idea of saturated phenomena in cosmology is undertaken by A. Nesteruk in his paper (Nesteruk, 2010, pp. 186-189).
- <sup>60</sup> C.f. (Harvey, 1995, p. 133). See also (Papin, 1992). The implied diversity and plurality, as a valid approach to knowledge of the universe, brings to a characteristic expression that, in cosmology, all signifiers in our experience of the universe do not exhaust that which is signified. As was conjectured by D. Bohm and D. Peat, each scientific theory bears the inscription "this is not a universe" meaning that "every kind of thought, mathematics included, is an abstraction which does not and cannot cover the whole of reality" and this is why "perhaps every theory of the universe should have in it the fundamental statement 'this is not a universe'" (Bohm, Peat, 1987, pp. 8-9).

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## **Космология на перекрестке естественных и гуманитарных наук: возможна ли демаркация?**

### **Часть 2. Экспликация**

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*Это вторая часть статьи по проблеме демаркации естественных и гуманитарных наук в современной космологии. В этой части мы эксплицируем далее смысл неких положений космологии, предпринимая феноменологический анализ. В частности, мы подробно анализируем смысл того факта, что современная космология функционирует в условиях непроверяемости ее теорий. Мы предлагаем гипотезу о том, что де факто современная космология работает в такой эпистемологической парадигме, которая не присуща естествознанию, а именно в парадигме так называемой когерентности объяснения, не требующей ссылок на эмпирический опыт и вырабатывающей критерий истинности теорий и смысл соответствующих им реальностей на основе группового, профессионального соглашения. Соответственно это усиливает наш аргумент в пользу того, что реальность того, что называется вселенной, то есть ее конструкт, еще больше зависит от структур человеческой субъективности, привнося в теорию элемент гуманитарных наук, а именно построение реальности не на основе физической каузальности, а на основе интенциональных актов сознания. Статья предлагает отказаться от претензий определенной онтологической установки в отношении конструктов космологии и взамен проводить беспристрастный феноменологический анализ, выявляющий взаимодействие каузальности и интенциональности в смыслополагающих актах. Соответственно задачей философского осмысления космологии становится не построение некоего унифицированного языка описания, а равноправное включение различных методов описания вселенной в общую картину жизненного мира. Реальность вселенной оказывается*

*при этом гораздо шире, чем любая конечная модель ее «идентичности». Вселенная являет себя человеческому сознанию с такой силой, что последнее не способно конституировать ее. Наоборот, сама вселенная формирует структуры субъективности точно в той мере, в которой эго исследователя не способно ее понять.*

*Ключевые слова: космология, феноменология, когерентность, нетестируемость, интенциональность, каузальность, субъективность.*

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