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The Universe and Humanity

Cosmology and Anthropology as Two Parts of the Book of Being

> *As the only being in the world conscious of itself, we are, at the same time, the consciousness of the world. . . . We cannot be aware of ourselves without being conscious of the world and of the things in it. The better we know the world, or the more aware we are of it, the more conscious we are of ourselves.*
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> *–Staniloae, Experience of God, p. 3*

Contemporary physical cosmology is a well-established and vast enterprise that includes astronomical observations, space programs, research institutions, and funding strategies. Cosmology develops fast: numerous conferences, workshops, and public lectures are held constantly, resulting in further publications of collective volumes, and numerous new studies, academic and popular, appear daily on the Internet and in bookstores. Apart from physical scientists, cosmology attracts historians and philosophers of science, as well as millions of

those who adore science and trust its final word on the nature of things. This is a dynamic set of enquiries about the world around us that constitutes an integral part of contemporary scientific and intellectual culture. The popularity of cosmology in mass media and among ordinary people demonstrates how deeply it affects the collective consciousness of people (including their ideology) and that it has existential and ethical implications. Cosmology is involved intimately in dialogue with religion too: it becomes an arena of theistic inferences and justifications of otherworldly transcendence when the results of its theories are brought into correlation with theological convictions. Contemporary cosmologists are often seen as exercising a certain priestly role in modern society,[1] signaling how cosmological ideas can have immediate existential and social impact that catch and fascinate public opinion.[2]

1. This happens in spite of appeals of some critics of cosmology that "it would be sad however to abandon the whole fascinating area [that is cosmology] to the priesthood." M. J. Disney, "The Case Against Cosmology," *General Relativity and Gravitation* 32 (2000): 1125–34. Disney implies here the ecclesial priesthood, not that modern-age scientific "priesthood" which definitely reveals itself through the culture of popular scientific books and exercises a certain ideological function in societies. The "priesthood" of scientists, who implicitly or openly oppose any idea of the Divine standing behind or lying in the foundation of the universe, creates a new and even more effective "scientific apologetics" for things that are not visible but are invented and believed. One can wonder then, what really sustains their credibility and how do these beliefs constitute the body of modern science in conditions where the criteria for truth are not sustained through the same traditions and practices that advocate access to truth in ecclesial context.
2. Commenting in March 2004 on Stephen Hawking's renunciation of his hope for the near end of theoretical physics through creating a theory of everything, J. Cornwell points out that the success of Hawking's theories in mass-consciousness was connected with the fact that "his fans came to regard him with an enthusiasm tantamount to religious fervour," which originated in Hawking's "rash philosophical peregrinations that appeared to enthral the students." As Cornwell writes, "[H]e [Hawking] was fast earning a reputation as the world's leading scientific guru." J. Cornwell, "Hawking's Quest: A Search without End," The Tablet (27 March 2004): 4. The religious "fervour" of Hawking's claims becomes even more obvious if one realizes that all his mathematical work incarnate in imagination about the universe did not bring any predictable and observable novelty. His invocation of intelligible realities (like the no-boundary condition or Euclidian structure of space time, etc.), whatever mathematical ingenuity is embedded in them, cannot be subjected to direct testing and indeed makes the whole enterprise very similar to those religious practices of the past and present whose aim is to proclaim access to truth through a direct appeal to basic anxieties and fears of humanity's sense of existence by bypassing the route of their empirical validation or reference to events of life. The lack of

In spite of all this, some claims of cosmology for possession of complete knowledge of the universe or, in a weaker form, that cosmology is approaching to being able to explain the essence and contingent facticity of all in the universe, are far from justified. Some cosmologists raise general doubts whether cosmology can pretend to follow rigorously the scientific method,[3] usually understood to be that all knowledge (including mathematical theories) is ultimately related to experimental verification. It is a fact of cosmology's sociology that there are extrapolations and conjectures in its claims to truth that go beyond scientific justification,[4] and this involves the whole field in an interdisciplinary discourse in which the criteria of validity and truth are much more vague than those in the natural sciences.

As asserted previously, the objective of this book is to elucidate the nature of cosmology's claims for the value and truth of its theories in a wider context: it deals *not* with physical cosmology *per se*, but with its standing in the cross-disciplinary field of links between humanity, its history, and the universe in its entirety.[5]

Physical Cosmology and an Input of Philosophy

Cosmology, understood as part of theoretical physics, forms a subject matter that by its very nature tests the boundaries and the very

existential meaning of cosmological symbols used for incantation of the universe points toward the fact that the "priestly character" of cosmology exhibits itself in the worst idolatrous sense unless it is subjected to a proper philosophical and theological critique.

3. A careful analysis of methodological weaknesses in cosmology has been done by George Ellis, "Issues in the Philosophy of Cosmology," in *Handbook of the Philosophy of Science*, *Philosophy of Physics*, Part B, ed. J. Butterfield and J. Earman (Amsterdam: Elsevier, 2007), 1183–1283.
4. Scientific justification is problematic *per se*, but in cosmology we have a situation where explanation exceeds the level of physical causality and appeals to the "facts" of intentional consciousness, which are themselves not subjected to any scientific methodology.
5. This is in the spirit of W. Stoeger, who argued that astronomy and cosmology play an important integrative role in phases of cultural evolution along different ways. See details in W. Stoeger, "Astronomy's Integrating Impact on Culture: A Ladrièrean Hypothesis," *Leonardo* 29 (1996): 153.

possibility of scientific explanation. Indeed, cosmology describes itself as a science that deals with "the universe as a whole," the universe as the all-encompassing, singular, and unique "object" of cosmology. However, the usage of the word "object" applied to the universe as a whole is problematic simply because the mainstream philosophical thought of reality does not allow the concept of the universe to fit in it. Indeed, according to this thought the universe consists of independent individual things (objects) that are embedded in space-time. These things as objects are *individuals*, because they have a spatio-temporal location (through their separation in the astronomical display, for example), they are a subject of predication of properties, and they are distinguishable from each other through some properties. The universe as a whole cannot be thought as an object (or as an individual) because as a whole it is not embedded in space-time (it is rather a *totality* of space and time, the totality to which such features of space and time as extension cannot be applied).[6] The universe is unique but not in the sense of an individual: one cannot relate it to anything outside it or to anything of the same qualitative order of existence; in other words, its uniqueness cannot be affirmed through a belonging to a set that would entail a sort of relationality. The universe cannot even be distinguishable from

6. The word "object" cannot be legitimately applied to the universe because the universe as a singular and self-contained whole cannot be detached from human insight and thus positioned as something outside and devoid of the human presence. There is a fundamental inseparability between the universe and the knowing subject who is always a part of the universe. Another problem emerges from the universe's uniqueness, which cannot be set among other universes. The modern view of the universe as developed from a singular state (Big Bang) that *de facto* encodes the universe in its totality invokes a counterintuitive sense of the universe as a singular, that is, unrepeatable *event* (not an object!) with respect to which the natural sciences experience a sense of fear and desire to explain it away. Edgar Morin expressed the idea that the cosmos reveals itself as the universe and event. On the one hand the physical universe is constituted through regular repetitive features; on the other it is a singular event as phenomenon, a phenomenon that evolves for more than ten billion years. The temporal unfolding of the universe that appears to human contemplation lies indissolubly in the advent-event (avènement-événement) of the world. E. Morin, *Science avec conscience* (Paris: Fayard, 1982), 120.

anything carrying particular properties inside the universe because, by definition, it comprises everything. The universe's individuality could be imagined if it were to be a hypostatic being who could affirm its existence from itself in a Divine manner of "I am who I am." However, it is exactly here that cosmology differs from theology: cosmology predicates the universe as totality devoid of any personal features; in theology, on the contrary, the universe rather appears as being disclosed and manifested by humanity as such a uniqueness and hence "individuality" that follows from human nature.

The predication of the universe as a whole in terms of properties is problematic because the universe does not attain original givenness in the manner characteristic of particular individual things.[7] The constitution of an individual thing as an object, that is, as a thing subjected to thematization and objectification, assumes as a condition the release from "environmental confinement"[8] or the context in which a thing is looked at. The universe as a whole cannot be released from such a confinement because it is itself, by definition, the ultimate environment and context for everything.[9] Thus the standard meaning of the phrase "object of explanation," as if its identity had been defined, cannot be applied to the universe with ontological

7. It is because of the inseparability between the human observer and the universe that the conditions of the universe's observability and mathematical expressibility are constitutive of the very concept of the universe. In this sense the "physical objectivity" of the universe cannot bear an independent reality in a classical sense. Indeed, unlike in classical physics, the basic conditions of the constitution of the universe as a whole have not been permanently available and thus have to be questioned. Cf. M. Bitbol, P. Kerszberg, and J. Petitot, eds., *Constituting Objectivity: Transcendental Perspectives on Modern Physics* (Dordrecht: Springer, 2009), 4, 18.
8. Terminology from M. Heidegger, *Being and Time* (Oxford: Blackwell, 1998), 413.
9. Here one sees an original sign that cosmology in a way has some features of the human sciences, because, it is known, that the releasing from environmental confinement is not necessary for thematization and objectification in the human sciences where a perspective on reality is crucially dependent on the researcher's intentionality originating in the existential and socio-historical condition (an thus cannot be environmentally free). Applied to cosmology, this would mean that if one implies the in-itself of the universe (as its identity) to be studied, it must preserve this identity as free from any change through the release from environmental confinement, that is, from the inherent subjectivity of a knower of the universe.

clarity.[10] But we do indeed understand and use this expression, "the universe," and therefore there must be a manner in which the universe is given, a consciousness of the universe that bestows sense on such language. Therefore, before any philosophical deliberation or scientific thematization of the universe, there must be experience of the universe as the recognition that there is something permanent and persistent in the background of the change or the variable. There is the sense of identity of the universe as an intentional correlate of subjectivity, but this identity remains an unfulfilled ideal. A possible scientifically reductive approach to the identity of the universe as an inherent and nonrelational aspect of an entity or a logical subject does not clarify the ontological status of this identity. Thus the universe of cosmology, being thematized, naturally represents the ultimate noematic limit in the process of scientific exploration and explanation. Nothing further is empirically or theoretically accessible to which recourse can be made in order to explain the most general properties of the universe as a whole and the facticity of its own existence.[11] In one way or another, natural scientific explanation stops right there.

The very existence of the universe turns out to be the precondition for physical science: the latter describes and explains phenomena that take place in the universe as something already given. This is the reason why the universe (as the totality of being) is not itself subject to a physical explanation. The phenomena with which physics deals have to be present. Physics simply takes the existence of its objects for

10. Cf. Theses A1 and A2 in Ellis, *Issues in the Philosophy of Cosmology*, 1216.

11. This was always realized by cosmologists themselves. As an example one can refer to Dennis Sciama's interview of 1978 where he underlined the existence of a borderline between the ultimate questions about the universe's facticity and the exploration of its properties: "None of us can understand why there is a Universe at all, why anything should exist; that's the ultimate question. But while we cannot answer this question, we can at least make progress with the next simpler one, of what the Universe as a whole is like." Quoted in H. Kragh, *Cosmology and Controversy* (Princeton: Princeton University Press, 1996), xi.

granted. The laws of physics are laws that hold *within* this universe; they are not supposed to be laws that hold across "universes" (these laws would be universal for many universes with different contingent properties), whatever that would mean.[12]

Physics is not able to enquire into the underlying facticity of the phenomena within the universe (in this sense physics is not a descriptive history). If this facticity is associated with the contingent appearance of phenomena (as contingent outcomes of physical laws[13]) as if these phenomena manifest the radical coming into being of that which has not been before, physics cannot link the being of these phenomena with that "something" (in a vague parlance "nonbeing") from which they come. In other words, physics can deal with the manifestations of being but not with the alleged ground of these manifestations in the otherness of being. It deals with something that obeys laws already in being. In technical philosophical language the same idea can be expressed differently: since physical cosmology is capable of apprehending the interior of the universe, the universe exhibits itself as intelligible; but because of the contingent nature of this intelligibility (it is not self-explanatory in the way of necessary

12. One must emphasize that we imply *physical laws* manifested through facts as individual phenomena particular to this actual universe. If, in a style of Leibniz for example, one defines laws as universal conditions that determine the structure of facts in a class of conceptually possible universes, namely that class of universes subject to those laws, then it would be better to drop the adjective "physical" in application to these laws. From this wide perspective, if a presumed physical law is valid for this actual universe only, it does not qualify as a law at all, according to the very definition of "law," but can at most be seen as an arbitrary generalization.
13. However, the very contingent appearance of things in the universe points toward the laws whose outcomes supply these appearances: there must be these laws in order to have these particular things. It is difficult to separate in the universe as a whole between its factual (material) and nomic (law-like) features. In this sense one can talk about the facticity of physical laws themselves as linked to the boundary or initial conditions in the universe. See, for example, in this respect Y. Balashov, "On the Evolution of Natural Laws," *The British Journal for the Philosophy of Science* 43, no. 3 (1992): 354–56; "Two Theories of the Universe: Essay Review," *Studies in History and Philosophy of Modern Physics* 29, no. 1 (1998): 147; "A Cognizable Universe: Transcendental Arguments in Physical Cosmology," in Bitbol et al., *Constituting Objectivity*, 269–77.

being, otherwise it would not be contingent) the universe embodies a semantic reference beyond its manifestations. Cosmologists cannot themselves retain the pointers to the otherworldly (if they are present at all) and conduct a proper philosophical work. Thus the clarification of the sense and ground of cosmology's own facticity in a way necessitates a transcendence of the scope of the natural sciences and appeals to the methods of the human sciences functioning in the conditions of irreducible historical contingency. Some physicists, in an attempt to address the foundational questions in cosmology, make manifest a "philosophical" mode, not because they adhere to a realm of "philosophy" but because they do not follow the normal ways of theory-assessment in the natural sciences. This was the original motivation, for example, for inflationary cosmologies, which aspired to explain away the problem of the special initial conditions of the universe responsible for the contingent display of the astronomical universe. A similar motivation lies in ideas of a multiverse. These models, having a developed mathematical basis and being successfully employed for problem solving, raise philosophical problems and need appraisal through methods of philosophy and of the human sciences.

One can generalize by saying that on the one hand, physical cosmology avoids touching upon ultimate questions; on the other hand, because of the special status of its subject matter, that is, the universe as a whole, as well as the fundamental inseparability of human subjectivity from the universe, cosmology is imbued with these questions and in order to attend to them one has to invoke a philosophical attitude to cosmology.[14] By conducting a philosophical

14. It is this mentioned inseparability that makes the cosmological idea (that is, the idea of totality of the world) fundamentally different among other ideas of reason, such as the idea of the soul or the idea of God. Kant wrote that neither psychological nor theological ideas entail contradiction and contain antinomies. I. Kant, *Critique of Pure Reason*, A673/B701, trans. N. K. Smith (London: Macmillan, 1933), 552. Practically, this means that one can easily deny the existence of a soul (let us say, on materialistic grounds) or deny the existence of God (on atheistic grounds). However, it is impossible to deny the existence of the universe, for it

analysis of cosmology one can on the one hand articulate the *qualities* of cosmological theory that make it scientific, and identify the naturalistic *limits* within cosmological methodology. On the other hand by transcending these limits through an enquiry into cosmology's facticity one inevitably brings cosmology beyond the scope of the natural sciences, since, de facto, here humanity enquires into the facticity of its own historically contingent subjectivity. Philosophy here manifests itself as a method of enquiry into the sense-forming activities of human subjectivity in the subject area of the universe as a whole.[15] However, since philosophers do not have a supply of knowledge about nature in advance, on which they can draw or to which they should refer, it would be wrong to take philosophy of cosmology as dealing with issues independently of the research going on in physics and mathematics. But in spite of the fact that the origin of scientifically motivated facts lies within cosmologists' thinking, which is obvious, the sense of cosmological ideas and their significance for the constitution of human subjectivity

would deny the empirical world of sense, which is part of the universe and which contains the foundation of all knowledge about universe. The antinomian nature of reasoning about the universe originates exactly here: by being in the sensible world one cannot disentangle from the universe; at the same time the universe as totality is never fully materialized in the world of the senses.

15. The fact that the encounter with the problem of the universe as a whole represents more of an epistemological issue than anything that can be associated with the natural sciences, was long ago understood by such thinkers as Nicholas of Cusa and Kant. The very concept of "learned ignorance," which amounts in modern terms to the apophaticism of knowledge in general, and which had been drawn from astronomical-cosmological considerations, had most of all an epistemological meaning pointing toward the limits of reason and the puzzles it has to encounter while dealing with such a limiting concept as the universe. See, for example, A. Koyré, *From the Closed World to the Infinite Universe* (New York: Harper & Brothers, 1958), 5-19. A similar sense was attached by Kant to his famous cosmological antinomies, which were indications of the fundamental paradoxical structures of reason rather than any constructive theories of the universe. Here is a characteristic quote from a contemporary study on Kant: "Because reason examines itself in order to extract laws from within itself, instead of simply greeting these laws, the cosmological antinomy is the place where the innermost depths of our humanity manifest themselves. In the antinomy, nature speaks to our inquiring minds in the most direct possible way, precisely because, as a complete whole, it is exposed to the danger of being lost in obstinacy or despair." P. Kerszberg, *Critique and Totality* (Albany: State University of New York Press, 1997), 101.

escapes the scope of the natural sciences and requires a philosophical approach not restricted in its scope to the causality of nature.

The Special Status of Cosmology as a Natural Science: From Substance to Manifestation

The special status of cosmology among other natural sciences is determined by two decisive factors: its subject matter is unique and cannot be posed as an outside object. In other words, there is a fundamental inseparability of the enquiring intellect and the universe as a whole. Said philosophically, the universe enters all forms of human cognition as the ultimate horizon of contexts.[16] Here we are confronted with a question about the status of cosmology as a natural science. In an attempt to study some aspects of these contexts, cosmology exhibits some features of the human sciences in the sense that the humanly made choice and emphasis of topics of investigation through their naming, methods, and goals have a genetic *historical* priority over the physicalist claims of cosmology about the universe, as if it is independent of the human-centered insight. The seeming epistemic priority of the human sciences' element in cosmology is linked to the fact that the human world (or the "premise-world") associated with the conditions of embodiment has object-noematic priority over all "other worlds." In other words, cosmology admits not only a bottom-up explanation (that is, based on an ascending series of physical *causation* from the macroscopic empirical

16. Here, in analogy in the Husserl's definition of the "world-horizon," the universe as such is never given in a manner pertaining to ordinary objects. The universe as a horizon of all contexts in the physical and mathematical enquiry into the structure of the world cannot be an object and is distinct from any object given in the background of contexts. The universe is co-perceived as the necessary horizon of all individual entities (astronomical or terrestrial) that are immediately experienced. E. Husserl, *Phenomenological Psychology* (The Hague: Nijhoff, 1977), 70–73. See also A. Steinbock, *Home and Beyond: Generative Phenomenology after Husserl* (Evanston, IL: Northwestern University Press, 1995), 104.

phenomena to the additive totality), but also a top-down *inference* based on *intentionality* of human subjectivity.[17] This intentionality includes, for example, the very idea of the universe as an overall totality.[18] From the point of view of the empirical physics the invocation of this idea is optional. Correspondingly, the idea of the origin of the universe does not proceed from earthly physics: it enters

17. This distinction can be elucidated by a long quote from a paper of C. Harvey, "Natural Science Is Human Science. Human Science Is Natural Science: Never the Twain Shall Meet," in *Continental and Postmodern Perspectives in the Philosophy of Science,* ed. B. E. Babich, D. B. Bergoffen, and S. V. Glynn (Aldershot, UK: Avebury, 1995), 121–36: "It is common parlance to say that whereas the natural scientists seek to explain, the human scientists seek to understand. This distinction between understanding and explanation, however, is itself predicated upon the deeper distinction between *intentionality* and *causality*. If the natural sciences rely upon physicalistic causality as the human sciences rely upon intentionalistic motivation, and the intentionalistic motivation is shown to be prior to causal rationality, then natural science will be shown to be posterior to, because ultimately explainable in terms of, human scientific motifs" (125, emphasis added).
18. The meaning of that which we call "intentionality" here demands explanation. Intentionality is employed as an indication of an action of human subjectivity that is associated with the freedom and potential inexhaustibility of the process of conscious acquisition of existence. Unlike physical causality, it is difficult to reduce intentionality to a scheme of operations in which even abstract terms are related according to a certain rule external to them. In this sense intentionality is free from logical constraints that follow from the physical universe as well as from constraints of any particular, for example discursive, mode of thinking. It works by association and free-willing acts based in existential certainties. One can say that intentionality is a relation of transcendence, directed either to an object of intention (the universe as a whole, for example), or to the other hypostatic human being. But intentionality pertains to a concrete human being, remaining as consciousness with itself, thus working within the given self-identity of consciousness and its potential indestructability. In going beyond the limits of consciousness, intentionality envisages the world as an infinite system of this consciousness's own possibilities. Intentionality envisages itself as the truth of all its partial experiences and the universe (seen, for example, through physical causality) to which it has access. In intentionality, consciousness and the universe belong reciprocally together: in other words, communion is effected. Intentionality (as manifestation of communion) is not operation and hence cannot be understood as such by abstract effectuation: it is impossible, for example, to re-effect in outward terms the movement of consciousness, which attempts to make human life commensurable to the whole universe. Yet, intentionality is accessible for detection and explication through the reflexive acts of consciousness: while being in communion with the universe one can invoke introspection upon this inseparable being, thus formulating the very initial quest for the position of this embodied consciousness in the universe. The disclosure of the functioning intentionality related to communion with the universe and which underlies the visible products of human life in apprehending the sense of the universe (for example in cosmology) must then be self-referential in the sense of the ultimate horizon of meanings that originate either in the universe, or in human subjectivity as such. In short, intentionality is thought of itself, that is, a fundamental movement of disclosure, the coming to light of signification in existence itself.

discourse through an intentional interrogation into the ground of all things, an interrogation that is not part of the physically causal enquiry. Ultimately intentionality means an appeal to intelligible, invisible entities (for example, the multiverse) in order to explain, or to be more precise, to interpret the phenomenal world. Cosmology in this respect provides an endless chain of illustrations. When we speak about the language of intentionality we assert that physical cosmology, in spite of being a science of the abstract and detached from human reality, yet is placed in the context of human affairs, thus exhibiting in a characteristic way the interplay between the nonhuman and human in man as an enquiring subject. This intrinsic ambivalence in cosmology originates in the paradoxical human condition of being in the world and constituting the world. In response to this paradox it is plausible to conjecture that the *content* of cosmological knowledge (that is, astronomical facts and theories of the universe as a whole, including its alleged origins) must be considered not as contraposed to human subjectivity, but as transcendentally constituted. In other words, cosmology itself must be seen as part of the transcendental discourse, that is, the discourse of the conditions that allow the universe to manifest itself (in particular, through mathematical expressibility). Correspondingly, one should make a subtle distinction between the principles that coordinate knowledge of the universe and those connecting principles (expressed mathematically) that state the relation between the properties of objects already constituted. It is this transcendental constitution through the stabilization of patterns of thought that has fundamental human origin in the very act of expression of interest and participation in the universe which gives itself for being constituted.

Seen in such a way, the intended "subject matter" of cosmology (the universe in its totality) exceeds the scope of the physical sciences,

for it refers not only to the content of what has already been manifested, but to the conditions of this manifestation, which are not part of the physical description *per se*. Seen in this perspective only, the phenomenal universe is a sort of static image in the ongoing process of manifestation. By its constitution, physical cosmology provides us with a particular, logically and physically accessible pattern in the interpretation of the universe which, however, does not exhaust the whole sense of human presence in the universe as the condition for its manifestation.[19] The transcendental sense of cosmological discourse arrives from the recognition that the universe is not that which is manifest, but that it is *the manifestation* related to humanity. In this sense the universe is always our universe. By its sense the discourse of the universe as *the manifestation* has to comprise not only the current scope of observations and theories about the universe, but the whole history of formation of views on the cosmos as well as all philosophical and theological issues on the conditions of knowledge of the universe, the *telos* of this knowledge and its value. The universe as manifestation implies a constant participation or communion with it, which is tantamount to saying that the universe as manifestation means life.

19. This concerns first of all the dimension of personal (hypostatic) embodiment. Indeed the discursive or linguistic expression of experience of the universe does not rule out the immediate corporeal presence of the universe on the level of sheer consubstantiality between human beings and the universe. Correspondingly, if this dimension is overlooked, then the perceived inability of cosmology to make results personally meaningful can be alienating and frustrating for nonspecialists: for example, the sheer insignificance of humanity in cosmic scales can create a sense of anxiety and despair related to the meaning of human life. However, cosmic physics does not exhaust the sense of the human experience of space, or of astronomical objects. Our experience of the universe as that mysterious environment with beautiful night skies and warming presence of the life-giving sun exceeds and is much richer than just knowledge of astronomy or solar physics. The problem is that the formalized and mathematized science sometimes makes an effect of de-legitimizing and de-appreciating other ways of communion with the wonders of space. See, for example, A. Nieman, "Welcome to the Neighbourhood: Belonging to the Universe," *Leonardo* 38, no. 5 (2005): 383–88.

The conditions of manifestation of the universe are always implicitly present behind all its empirical appearances and theoretical representations, yet escape an explicit constitution. They reveal themselves through an excess of intuition over logical simplicity and mathematical thoroughness, which delivers the paradoxical sense of *presence* of the universe, the sense that is never disclosed in discursive terms, thus leaving one with an immanent awareness of the universe's *absence*. The incompleteness of the physical description of the universe brings us to that stance in knowledge which is called "apophaticism," that is, such a mode of experience in which what is intended to be signified through discursive description is never exhausted through its signifiers. One can only mention that the "apophatic" conviction applied to some limiting situations in cognition is well known in the history of philosophical and theological thought.[20] The ambiguity of "presence in absence" of

20. Yannaras describes as "apophatic" that linguistic semantics and attitude to cognition which refuses to exhaust the content of knowledge in the logic of signifiers. C. Yannaras, *Postmodern Metaphysics* (Brookline, MA: Holy Cross Orthodox Press, 2004), 84. In philosophy, for example, it originates from an epistemological argument pertaining to a sort of linguistic reformulation of the Kantian transcendentalism (which is typical for poststructuralism) that language conditions the accessibility and intelligibility of reality. In this approach the very phrase "there is" points to a referent that the language cannot capture because the referent is not constituted by language and by definition is not the same as its linguistic effect. According to this view, there is no access to the referent outside the linguistic effect, but the linguistic effect is not the same as that referent it attempts but fails to capture. This situation entails, in analogy with theology, a variety of ways of making such a reference. A phenomenological philosopher, J. Ladrière, without using the notion of apophaticism, points toward the same feature of any knowledge, more precisely to the apophaticism of the kind in which the human existent approaches the encounter with the world. An object is never a pure reference to itself, but is also a revelation of the fashion of its comprehension. "This revelation is at once partial and total: partial because it cannot of itself exhaust that which essentially presents itself as inexhaustible, total because the project [that is, the fashion of comprehension] is indivisible and completely present in each of its manifestations." J. Ladrière, "Mathematics in a Philosophy of the Sciences," in *Phenomenology and the Natural Sciences*, ed. T. J. Kiesel and J. Kockelmans (Evanston, IL: Northwestern University Press, 1970), 448; see also 450. The whole range of cognitive situations that fall under the scope of apophaticism can be found in works of J.-L. Marion under the name of "saturated phenomenon." See his *In Excess: Studies of Saturated Phenomena* (New York: Fordham University Press, 2002). Theology on its side affirms that any knowledge of God if it pretends to be real and true cannot escape the conditions of incongruence between human knowing and the reality of God. This incongruence is the immanent feature of any

the universe deprives a genuine cosmological project of any flavor of *foundationalism* understood as an epistemological correlate of the notion of an ontological ground, be it the constituting subjectivity of the self, or the outer universe as underlying substance. Cosmology has to function in the conditions of the classical paradox of human subjectivity in the world, which arises in this context and points to the fundamental difficulty in attempting to formulate the sense of being of the universe in terms of ground-grounded relationship.[21] The universe as manifestation thus escapes any accomplished definitions and descriptions, and it is because of this that human subjectivity itself is being constituted through its openness to the universe to the extent that this very subjectivity cannot comprehend the universe. One sees thus that the cosmological discourse (as a

serious theologizing: one cannot raise questions on the reality of God from some position that excludes a particular feature of the Divine manifestation included in the very irreducibility of any speech about God. See, for example, T. Torrance, *Space, Time and Incarnation* (Edinburgh: T. & T. Clark, 1997), 52-55.

21. This paradox is a perennial problem of philosophy and was anticipated by ancient Greek philosophers and Christian thinkers. This paradox is discussed in detail in the next chapter. Anticipating our discussion below, one can briefly summarize the paradox as follows: on the one hand human beings in the facticity of their embodied condition form the center of disclosure and manifestation of the universe as a whole, modeling it as overall space and time which exceeds the limits of the attuned space related to humanity's comportment on the planet Earth (the home place). On the other hand the depicted universe as a vast continuum of space and time positions humanity in an insignificant place in the whole totality, making its existence not only contingent (in physical terms) but full of nonsense from the point of view of an actually infinite universe. Said bluntly, the actual infinity of the universe is attempted to be articulated from an infinitely small part of its formation. Cosmology as the discourse of the universe as a whole brings one face to face with a general philosophical objective of avoiding any sort of foundationalism in knowledge of the universe that insists on the ground-grounded relation between humanity and the universe leading either to an idealistic reduction (subjectivity as the ground of the world) or to a materialistic, mathematically deterministic diminution of consciousness to illusion. In either mode of reduction the reality of the ground absorbs the grounded and the grounded is reduced to the categories of the ground. See in this respect J. Mensch, *Postfoundational Phenomenology: Husserlian Reflections on Presence and Embodiment* (University Park: Pennsylvania State University Press, 2001), 9-11. To avoid these reductions, the embodiment, as a premise of the person's grasp of the world, must be rather considered as that "over here," where a particular and immediate indwelling of life and the universe comes to *presence*. It is this coming to presence that determines that "place" which constitutes person as a center of disclosure and manifestation of the universe.

mode of the natural sciences) cannot pretend to be complete without recourse to the essence of the agency disclosing the sense of the universe, that is, of human beings.[22] An interplay between the dimension of the human and natural sciences in cosmology manifests itself as its intrinsic and unavoidable feature.

The Nature of Manifestation and Ontological Commitment

In some cases cosmology claims the existence of things on the grounds of theoretical consistency and a fit with other plausible constructs, but for which we can have no observational evidence (that is, the principle of direct correspondence with empirical reality is not applicable).[23] Such a situation, for example, happens in the extreme case of the construct of the multiverse,[24] where no direct

22. Cf. "A philosophy of nature and a philosophy of man are mutually complementary; . . . neither can be completed unless it shows itself as the counterpart of the other." G. De Laguna, *On Existence and the Human World* (New Haven and London: Yale University Press, 1966), 81–82; as well as the statement "Anthropology and ontology are indeed two sides of the same coin," in H. Köhler, "The Relation between Man and the World," In *Astronomy and Civilisation in the New Enlightenment: Passions of the Skies*, ed. A.-T. Tymieniecka, *Analecta Husserliana* CVII (2011): 37. In the same vein J. Ladrière enquires: "Is there not, when we read it sufficiently profoundly, an analogy between the deep structure of nature and the structure of human existence as openness, creativity, possibility of accord with the event? The problematic of nature can thus be linked with the problematic of human existence." J. Ladrière, *Language and Belief* (Dublin: Gill & Macmillan, 1972), 186. However, one must not absolutize this analogy: cosmology provides only one particular dimension in the sense of disclosure of the human origin. It must not be treated literally. Cosmology as such does not provide any insight on the sufficient conditions in the facticity of human persons made in the divine image.
23. This, for example, can be related to the cosmological principle, which postulates uniformity of the universe beyond observational limits. Another example is the famous "inflaton" field, which drives the exponential expansion of the early universe.
24. Multiverse proposals in cosmology refer effectively to the old idea of the plurality of worlds understood either in a physical sense as an ensemble of worlds with all possible physical conditions, or a variety of mathematical structures that have or do not have their incarnation in the physical. In this case the existence of our universe in its contingent facticity is explained away through the inference that it simply belongs (in a generic sense) to an ensemble of universes that through its totality contains whatever is possible. The literature on the multiverse is vast; as an example, see M. Tegmark, "Parallel Universes," in *Science and Ultimate Reality: From Quantum to Cosmos*, ed. J. D. Barrow, P. C. W. Davies, and C. Harper (Cambridge: Cambridge University Press, 2003), 459–91, or B. J. Carr, ed., *Universe or Multiverse*

observational or experimental tests of the hypothesis are possible, and the assumed underlying physics is probably untestable in principle. These possibilities do not by themselves prove correct epistemic justification; even less do they point to the truth-content of what the theories claim. It is seen that here a sort of philosophical, that is, a trans-scientific insight is invoked.

In the case when cosmology predicates things beyond their verification through the principle of correspondence[25] it appeals first of all to the method of extrapolation (understood in a wide sense), which itself must be evaluated as tacitly committed to a sort of realism grounded in belief in the efficacy of extrapolation. Philosophically and scientifically the problem of extrapolation arises from those limits of scientific explanation that are set by the observational constraints inherent in our earthbound home-place. All that is in principle directly accessible to observation is positioned on the surface of the past light-cone with its apex on the planet Earth.[26] Outside that cone one has the uncertainties of extrapolation.[27] Thus the extension of a cosmologist's insight into the universe from earth in the attempt to encompass the universe in a single vision (including its absolute origin), requires an inference from what is already known to what is as yet only conjectured. For a form of knowledge that rests its claim

(Cambridge: Cambridge University Press, 2007), with a variety of papers on different aspects of the multiverse debate. In all multiverse proposals the question of existence, that is, of the contingent facticity of this universe, is thus quite illegitimately transferred to the question of selection, whereas the issue of the existence of the multiverse itself cannot be addressed at all for obvious philosophical reasons.

25. The sense of correspondence with empirical facts implied here must be distinguished from the principle of correspondence in quantum mechanics demanding that it should be constructed in correspondence with classical mechanics.
26. There is a tiny piece of the human observer's world line that relates to the immediate cosmic environment like the earth, planets in the solar system, and stars in our galaxy, which in terms of cosmic time and thus space are "close" to us, so that their separation from us is in a way "commensurable" with humankind's life span. We assert the existence of such objects in terms similar to those of earthly objects.
27. Thesis B1 in Ellis's "Issues in the Philosophy of Cosmology," 1220.

on its empirical, observation-based access to the world (most of the natural sciences), these limits raise clear difficulties.

One could claim that "extrapolations" (inferences) toward the fundamentally nonobservable and untestable are simply physical hypotheses that are assessed along a variety of lines, including observational tests as only one of these. These hypotheses may rely on appeal to analogy, on consistency with other cosmological contexts, on logical fertility and explanatory force, or a mathematical consistency and elegance. Over time they may be woven into a more and more tightly connected set of beliefs and ideas, each element of which derives support from the set as a whole.[28] One can claim even further that *extrapolations* in cosmology itself (whatever this means, including a shift of "home places"[29] in the cosmological principle, or a free eidetic variation[30] of the parameters of the whole world, which happens in theories of a multiverse) imply an extended sense of "scientific justification," for example epistemic coherence, which does not necessarily refer to tests and observations. This, in turn, entails a different commitment to realism. Let us briefly comment on this.

For example, in the models of origin of the universe, the major presumption is that one can extend the laws of physics

28. See, for example, E. McMullin, "Long Ago and Far Away: Cosmology and Extrapolation," in *Bang: The Evolving Cosmos*, ed. R. Fuller (Saint Peter, MN: Gustavus Adolphus College, 1994), 119–20.

29. This is the terminology of E. Husserl; see his paper "Foundational Investigations of the Phenomenological Origin of the Spatiality of Nature," in *Husserl Shorter Works*, ed. P. McCormick and F. A. Elliston (Notre Dame: University of Notre Dame Press, 1981), 222–33.

30. An eidetic variation in phenomenology is meant to subject to mental amendment some aspects of the intended "object" in order to reveal its true sense as that one which survives these variations. It is through this variation that the sense of individuality and identity of the universe is attempted to be constituted. An eidetic intuition of the universe moves us first to the realm of Platonic forms, where the universe as a whole is positioned as an intelligible "object" opened to our gaze. It is at this background that one can speculate about other possible universes as alternatives of that one where we live in. However no matter how much we may enjoy "living" among the intelligible forms, we never abandon the appearances of the real universe through which we can come to higher intelligibilities. See on eidetic variation in phenomenology, for example, Sokolowski, *Introduction to Phenomenology* (Cambridge: Cambridge University Press, 2000), 177–84.

(comprehended by us through mathematical formulae) toward something that cannot be physically independent of its mathematical gestalt. In other words, such an extension presumes effectively a set of beliefs that it is possible to catch the sense of reality beyond the sensible (corporeal, in the sense of physical equipment as an extension of one's bodily function) as its efficacious identity (which could be either on the level of the alleged substance or on the level of ideal forms) through time in spite of the postfactum resistance of reality to this.[31] The validity of these beliefs can only be justified on the grounds of their *coherence* as well as, to a lesser extent, agreement with that borderline physics which through observation is linked to empirical validation. The situation when justification is linked to beliefs is dealt with by that part of contemporary epistemology called the coherence theory of epistemic justification, which holds that a belief is justified to the extent to which the belief-set of which it is a member is coherent.[32] What is at issue in a coherence theory is a proposition's relation to other propositions, and not its correspondence with material facts.

Now we see that it becomes a task for philosophy to discuss the various sorts of hypothetical extrapolation that cosmologists make as a regular part of their work and the implied philosophical beliefs that drive them. As a matter of illustration, let us refer to the basic assumption lying in the very possibility and foundation of modern cosmology, that is, to the principle of uniformity of space-time and matter (the cosmological principle), which is based in extrapolation (in the certainty of a belief in an indifferent location of humanity in the universe)—that the average isotropic picture of the large-scale

31. This is a longstanding point made by E. Meyerson in his *Identity and Reality* (London: Allen & Unwin, 1964).

32. See, for example, J. Dancy, *Introduction to Contemporary Epistemology* (Oxford: Basil Blackwell, 1989), 116. The detailed discussion of the idea of coherence of epistemic justification in cosmology will be undertaken in chapter 4.

distribution of matter in the universe as observed from the Earth can be transferred to all possible locations (thus implying spatial homogeneity).[33] This extrapolation invokes a certain *philosophical* and, maybe, even a *theological commitment*, which acts in the cosmologist's mind as a regulative and indemonstrable belief.[34] The implication of this belief in cosmology is a particular causal structure of the global space-time of the universe; that is, this belief as an act of intentionality cascades down toward physical causality.[35]

Another illustration comes from inflationary cosmology: it confesses a belief that there exists a field φ (inflaton),[36] which is

33. One must point out that there are some discussions in scientific literature that try models that deviate from the spatial homogeneity of the universe.
34. Discussing the cosmological principle in close connection with the so-called Copernican principle, E. McMullin points out that the Copernican principle has to be understood in terms of what it rejects, namely older teleological beliefs about the uniqueness of the human and the likelihood that humanity has a selected position in space, for example being a cosmic center. "Indifference Principle and Anthropic Principle in Cosmology," *Studies in History and Philosophy of Science* 24, no. 3 (1993): 373. However, the desire to abandon the teleological explanation is itself based in intentionality, rather than any scientifically demonstrable conviction. The indifference postulated by the cosmological principle is indemonstrable because it itself lies in the foundation of the very possibility of scientific demonstration applied to cosmology. Thus it is based in the belief in knowability of the universe, which has a different motivation in comparison with that of teleology (but related to the latter).
35. Here one must make a comment by pointing out that the so-called "cosmological principle" (the principle of indifference or mediocrity) is applied not only in cosmology. Indeed the scientific method employs a principle of indifference with respect to similar objects that obey physical laws. For example, all atoms are considered as similar with respect to laws of atomic physics. However, this indifference does not deal with the outcomes of physical laws. Atoms are indifferent in what concerns them as constituting units, but their particular combinations, which give rise to complex structures (such as life-forms), are not subjected to laws of atomic physics and represent rather their outcomes, which can be different and specific. The cosmological principle states the uniformity of the universe at the level of the outcomes of physical laws, which led to a particular uniform structure of the observable universe. In this sense the cosmological principle is not simply the proclamation of the overall consubstantiality and uniformity of the universe at all structural levels, but a claim for a particular manifestation of this consubstantiality at the level of clusters of galaxies. The uniformity of the universe implies very specific initial conditions and topology, which theory attempts to explain away by inventing laws whose outcomes apodictically lead to the uniformity in the universe (an inflationary scenario, for example).
36. In spite of the fact that the hypothesis of this field, its very existence, is very efficient in a qualitative and quantitative modeling of observable phenomena, the physical nature of this field, that is, its relation to a certain class of observed particles, remains obscure. This is one of the major points of skepticism with respect to inflationary theories, which has been raised, for

described through a corresponding theory and which drives the evolution of the universe during the very early inflationary period. This belief coheres (as justification) with another scientific conjecture (belief) that there was a period of evolution of the universe with an exponential growth in time, which, in turn, solves some problems of radiation-dominated cosmology[37] and hence makes the so-called standard cosmological model even more coherent. One must stress here that the construction of a quite sophisticated theory of the inflationary universe is driven by the hidden desire to explain away the contingency of the initial conditions of the universe allegedly responsible for the contingent specificity of its present display. The very concept of contingency (as eventuality and historicity) is alien to physics, so that one observes a certain "pseudo-theological" commitment to overcome the "latent horror of the unique event."[38] A similar situation occurs with the idea of the so-called multiverse. Since no correspondence with empirical reality is possible, all

example, in the above-mentioned paper of Ellis, "Issues in the Philosophy of Cosmology," 1210. See a similar point made in R. Penrose, *The Road to Reality* (London: Vintage, 2005), 751; also S. Weinberg, *Cosmology* (Oxford: Oxford University Press, 2008), 202, 217.

37. These are the famous horizon, monopole, and flatness problems. See Weinberg, *Cosmology*, 201–8. See also R. Penrose, *The Road to Reality*, in what concerns a certain critique of the inflationary hypothesis, 753–57.

38. Through the discovery of the singularity in cosmology, as Torrance writes, "We have disclosed in the depth of our science a unique event of a staggering kind. It is this singularity that causes the trouble, for it arouses in so many people once again a latent horror of the unique event. It was rejection of the unique event that lay behind notions of the cyclic universe, or modern notions of the oscillating universe, . . . for there seems to be a regulative belief in many people's minds which insists that everything must be *repetitive* and thus equivalent, and that the world goes on as it always has in the past and always will go in the future." T. Torrance, "Ultimate and Penultimate Beliefs in Science," in *Facets of Faith & Science*, vol. 1, *Historiography and Modes of Interaction*, ed. J. M. van der Meer (Lanham, MD: University Press of America, 1996), 166–67. Since the unexplainability of the contingent original singularity initiates unexplainability of nearly all presently displayed features of the universe, the fear of singularity is equivalent, in a different language, to the fear of the *erratic* features of the universe, which are related simply to the fact that the universe is being comprehended by human beings who by virtue of their freedom constantly experience life as a breakthrough of the erratic in the allegedly present world order. To avoid singularity is tantamount to avoiding the fear and anxiety of erratic facts of life.

speculations about the multiverse are based in the belief that there is an extended meta-reality that comprises our universe, so that any justification for a theory of such a multiverse can only be based on the grounds of epistemic coherence, which is related to convention at the level of the community of cosmologists. The fact that the idea of the multiverse is driven by a pseudo-theological commitment to justify this universe through the reference to the "transcendent" can easily be detected by pointing to by-no-means rare discussions on how the multiverse competes with the idea of creation of the universe *ex nihilo* by God.[39] In the case of the multiverse, in fact, no realistic reference is even required. We are dealing here with a situation where the mental states (of cosmologists) affect our sense of reality and even contribute to its theory.[40] The idea of the multiverse can be approached from a different point of view if considered within the scope of phenomenology as an eidetic variation of the parameters pertaining to the actual universe. This variation takes place within human subjectivity and aims to articulate some apodictic features of this actual universe. In this case the invocation of the idea of the multiverse is a legitimate phenomenological procedure in order to reaffirm with new force the inevitability of the given contingency of this actual universe. But certainly this shows the causation implied

39. See, for example, discussion of this issue in J. Leslie, *Universes* (London: Routledge, 1989); D. Temple, "The New Design Argument: What Does It Prove?," in *Science, Technology, and Religious Ideas*, ed. M. H. Shale and G. W. Shields (Lanham, MD: University Press of America, 1994), 127–39; W. Stoeger, "Are Anthropic Arguments, Involving Multiverses and Beyond, Legitimate?," in *Universe or Multiverse*, ed. Carr, 445–57; R. Collins, "The Multiverse Hypothesis: A Theistic Perspective," in *Universe or Multiverse*, ed. Carr, 459–80. See a serious critique of the idea of multiverse in G. Ellis, "Does the Multiverse Really Exist?," *Scientific American*, August 2011, 38–43.

40. This thought was anticipated by Henry Margenau, who believed that modern physics could provide an evidence that the nature of its reality is determined not only through causation in empirical reality, but also through intentional acts of thought. In his approach to the nature of physical reality he posed a question: "Is sensed nature the only field of departure or arrival in the process of scientific verification, or will inspection of the eidetic structures of consciousness function in a similar way as dator of scientific fact?" H. Margenau, "Phenomenology and Physics," *Philosophy and Phenomenological Research* 5, no. 2 (1944): 278.

by the model of multiverse to be of a rather mental kind, so that the analysis of conscious states becomes the datum of scientific facts. Thus by an unexpected twist of reasoning, certain theories of cosmology can be used to illustrate phenomenologically the working of human subjectivity.

We see thus that the effectuation of coherence of epistemic justification in cosmology (which implies a communal, or transcendental dimension in cosmology) leads to a different stance on commitment to realism (that is, ontological commitment) in modern cosmological discourse. Cosmology is now seen as an enquiry into the condition of appearance of the universe, attaining reality such that it gives itself to be apprehended by human beings and their communities, the very reality of the world in which all sensible entities, astronomical objects, physical bodies, including human beings themselves, find their place and their meaning. However, this discourse of the appearance does not deal much with a description of what appears at the level of observational astronomy and constructs of theoretical physics, but deals in a more profound sense with a characterization of the very conditions that govern the possibility of appearance, or manifestation, of the universe. In other words, it is not, properly speaking, a discourse of the phenomena as such (related to knowledge of facts about the universe), but a discourse of the process of *phenomenalization* of the universe. In the traditional mode of language, a discourse pertaining to the *conditions* in which the phenomenon constitutes itself as phenomenon is called transcendental. By becoming more and more conscious of its own constraints and its own possibilities (as related to the place of humanity and its communities in being), the discourse of contemporary cosmology becomes more and more a transcendental discourse. This reveals the discourse of cosmology to be not only the discourse of the universe, but a discourse of human beings.

By being engaged in the discourse of the universe as a whole, human beings themselves are involved in and subjected to the process of their phenomenalization: on the one hand they take as their task to control this process through advancing (astronomical) praxis dependent upon their theories; on the other hand the universe remains that overall context and horizon of all horizons which escapes constitution by the discursive reason so that it is rather human subjectivity that is constituted by the universe to the extent it cannot comprehend the universe.[41] In this sense cosmology represents not so much that which is *manifest*, that is, the universe as such, but *the manifestation*, the manifestation that involves the universe and conscious human beings in the endless constitution.[42] Cosmology reveals itself as a contributor to the phenomenological project, as realization of a transcendental discourse.

Phenomenological Insight in Cosmology as Explication of the Human

A phenomenological insight into cosmology makes a reversal of its meaning by shifting the center of its enquiry from the noematic content to its noetic pole, that is, the generating human subjectivity. When scientific reason attempts to enquire into the origin of the universe in an absolute sense, the strategy of extrapolation acquires some features of *philosophical* transcendence. But here transcendence is not through physical causation (this would be an impossible break beyond the immanent), but through intentions based in acts of indemonstrable beliefs, beliefs that by their very existence and function point to science's limits of establishing the sense of the

41. The universe as a whole reveals itself in similarity with the "sublime" of Kant's *Critique of Judgment*.
42. Cf. J. Ladrière, *Language and Belief*, 169, 173, 176.

universe. Transcendence implies here an excess of intuition of the donation of the universe in the act of life, an excess over the discursive ability to grasp the sense of the universe. Transcendence points toward a simple truth—that the reality of the human embodied existence is not exhausted by its physical aspects.[43] Speaking philosophically, humanity stands at the crossroads of reality, being on the one hand embodied agency and, on the other, a dative of manifestation and nominative of disclosure. Correspondingly cosmology, if it is narrowed to the physical and expressed mathematically, cannot account for the ultimate sense of the universe because it cannot account for the ultimate sense of the human.[44] Since no science can give such an account, the question here is about the boundaries of the human in science. The atomic bomb, for example, being a human creation, characteristically points toward the inhuman, that is, to the limits of humanity as such. Thus the atomic bomb as a scientific achievement defines in an apophatic (negative) way the sense of the human. Cosmology plays a similar role: it provides some hints and pointers as to where human comprehension and articulation of the universe becomes paradoxically inhuman (the Big Bang, for example). In this sense the cosmology of the Big Bang becomes a characteristic, although apophatic, explication of the sense of humanity as that formation in being which is looking for

43. In the context of the so-called anthropic inference this was pointed out by M. Bitbol, "From the Anthropic Principle to the Subject Principle," *The Anthropic Principle: Proceedings of the Second Venice Conference on Cosmology and Philosophy*, ed. F. Bertola and U. Curi (Cambridge: Cambridge University Press, 1993), 91–100. In a wider philosophical and theological context this excess of humanity beyond nature was discussed in A. Nesteruk, "Human Image: World Image (Patristic insight into cosmological anthropology)," *Studies in Science and Theology* 9 (2004): 3–26; "Theology of Human Co-Creation and Modern Physics," *Mémoire du XXIe Siécle, numéro 3–4. Cahiers transdisciplinaires. Création et transcréation* (Paris: Du Rocher, 2001), 163–75.

44. The cosmic environment provides the necessary conditions for human corporeal existence (and this is exactly detected in anthropic arguments), whereas the sufficient conditions do not belong to the sphere of physics and point toward human morality, ethics, and some eschatological commitments. See discussion in A. Nesteruk, *Light from the East: Theology, Science and the Eastern Orthodox Tradition* (Minneapolis: Fortress Press, 2003), 200–214.

its own origin and its own history.[45] A phenomenological insight into the sense of cosmology as explicating humanity's quest for itself thus compensates the incompleteness of cosmology and reinstates its human creator to its ontological centeredness in disclosing and manifesting the universe.[46] At the same time, the limits of physics and scientific philosophy tested through cosmology in fact test the limits of humanity to understand its own sense of existence. The incomprehensible universe invokes in the human scientific mind humility and discernment in order to realize the limits of its pretensions for knowledge of the universe, the universe that resists disclosure and exceeds the capacity of understanding.[47] By being great and above the universe, humanity yet realizes its smallness. It is typically a human feature to have an idea of infinity in order to realize its own finitude.

Since cosmology, assessed phenomenologically, retrieves the "natural" centering of all non-egocentric tendencies of its world-building narrative in human hypostatic subjectivity, this assessment indirectly calls into question the purported neutrality and objectivity

45. One can point to similarities between the phenomenology of birth and aspirations of cosmologists to disclose the sense of birth (origin) of the universe. See Nesteruk, *The Universe as Communion: Towards a Neo-Patristic Synthesis of Theology and Science* (London: T. & T. Clark, 2008), 247–66.

46. The idea that a research into the underlying sense of science leads to enlightenment of the ways and *telos* of the human spirit was clearly formulated by many phenomenological philosophers starting from Husserl. Here is a quote from J. Ladrière: "The detail of the life of science must . . . be investigated in order to know something of the nature of reason and of its becoming. . . . The destiny of reason is outlined . . . in the incessant comings and goings that define the life of science. It is in the patient advance of its history that its finality reveals itself." J. Ladrière, "Mathematics in a Philosophy of the Sciences," 455.

47. The phenomenological construct of "presence in absence" can be easily applied to cosmology. For example: we see the universe back in time along the so-called past light-cone, so that the inference about the universe outside this cone can be considered as an attempt to deal with the universe as a whole which was present in its empirical absence. A similar thing can be said if one remembers that according to present-day models the visible matter represents only 4 percent of the whole material content of the universe. The other 96 percent (dark energy and dark matter) is postulated in order to balance the model with observations. In other words, the universe is present to us through 4 percent of what is visibly manifested but in empirical absence of the other 96 percent.

of some of its claims with respect to realities that are beyond empirical verification. It could suggest instead that such "neutral" descriptions of the world operate on the basis of existential concerns formulated in a set of *beliefs* (or myths, which may or may not be related to the *faith* of theology).[48] In this sense the phenomenological stance rejects that view that cosmological knowledge describes the world in itself;[49] rather these descriptions are seen as interpretations that are governed by controlled beliefs in the sense that they are related to a particular *path* of science in human history.[50] For example, if one is to understand and explain the past of the universe as constituted through human history, one must conceive it in terms of past possibilities of *this history* rather than as a defined and finished product. In this case the cosmologist's own historical consciousness is involved and in analogy with historical science, *cosmological discourse reveals itself*

48. A basic and unavoidable structure of any cosmological myth, including its contemporary scientific arrangement, is the duality between the factual and empirical on the one hand, and the intelligible (as allegedly stable and underlying) on the other hand. Here is how J. Ladrière describes this general typology: "The cosmological myth is an account of cosmogenesis. It tells how the world was made, how the contemporary world that stands before our eyes developed from what went before, from the non-world, the formless. . . . The schema of the representation is a successive unfolding in which there is a movement from homogeneous unity to a qualitatively differentiated multiplicity, passing through all the intermediary stages which progressively ensure differentiation from the origin and establish the link between the primordial moments and the complex, moving and multiform structure in which our cosmos was produced" (Ladrière, *Language and Belief*, 153).
49. As it was eloquently expressed by A. Gurwitsch, "The goal of phenomenology is not an exhaustive description of an infinite variety of immanent data, but the investigation of those contexts of consciousness owing to which there is a perceptible world, the universe of physical constructs, etc." A. Gurwitsch, "Comments on Henry Margenau's 'Phenomenology and Physics,'" in *Phenomenology of Natural Science*, ed. L. Hardy and L. Embree (Dordrecht: Kluwer, 1992), 43–44.
50. It is the presence of this concrete path of science that confirms our previous stance on cosmology as the working of constitution, that is, a reenactment of the production of the world. To clarify this point one can quote another paper of J. Ladrière: "The theoretical apparatus is thus not a description in the ordinary sense, as presentation of an entity, supposedly given, and of its properties, it is the characterization of something which is not a thing, but a *structural path along which a thing comes, from the ultimate horizon of every givenness, to the actual presence in which it is effectively given to apprehension*." J. Ladrière, "Physical Reality: A Phenomenological Approach," *Dialectica* 43, no. 1–2 (1989): 138, emphasis added.

as a form of consciousness that humanity (as community) has of itself (although most cosmologists do not have it).[51] By revealing the *telos* in the historical path of cosmological explanation (as related to the representation of the ultimate origin of the universe),[52] phenomenological analysis discloses the hidden "theological" commitment in cosmological research, meaning that the beginning and the end of the universe in human thought is just a mode of this same thought speaking of its own beginning and its own consummation and implying a transcendent reference. Seen from a slightly different angle, this theological commitment corresponds to an attempt to know and see the universe as "all in all" being that primary existential memory in the human constitution which drives cosmological research.

In spite of doubts regarding objectivity and neutrality, scientific cosmology remains an extremely important and useful instrument in demonstrating just how human subjectivity affirms itself through its non-egocentric attitude toward the external world. The universe that science depicts as something different from us and devoid of our influence and presence, represents in fact the product of articulation through words and thoughts by humanity.[53] By creating a cosmological narrative, we affirm ourselves in a very nontrivial,

51. Cf. R. Aron, *Introduction à la philosophie de l'histoire* (Paris: Gallimard, 1938), 80.

52. See Nesteruk, *The Universe as Communion*, 250–54; "From the Unknowability of the Universe to the Teleology of Reason: A Phenomenological Insight into Apophatic Cosmology," in *Knowing the Unknowable: Science and Religion on God and the Universe*, ed. J. Bowker (London: I. B. Tauris, 2009), 78–81.

53. This is the reason why humanity, in a theological context, is called "hypostasis" of the universe. Cf. O. Clément, *Le Christ, Terre des vivants. Essais théologiques.* Spiritualité Orientale, n. 17 (Bégrolles-en-Mauges: Abbaye de Bellefontaine, 1976), 102; also D. Staniloae, *Experience of God* (Brookline, MA: Holy Cross Orthodox Press, 1998), 3. According to T. Torrance, "The fact that the universe has expanded in such a way that the emergence of conscious mind in it is an essential property of the universe, must surely mean that we cannot give an adequate account of the universe in its astonishing structure and harmony without taking into account, that is, without including conscious mind as an essential factor in our scientific equations . . ." *The Grammar of Theology* (Edinburgh: T. & T. Clark, 2001), 4, 6.

sometimes nonobvious sense.[54] Indeed, by creating a physico-mathematical narrative cosmologists lose control over the intentions that motivate them, since any deeper reflection upon what they have created is not in the focus of their reasoning. To understand the "data" lying behind this narrative one must consider them as manifestations of an expressive act, that is, to move from their *given meaning* to their *giving meaning*, from their pure phenomenality to the intentional life that generated them. By predicating the evolving universe and attempting to phenomenalize the mystery of its contingent origin, human subjectivity employs that intentionality which effectuates the *telos* of human subjectivity's ongoing incarnation as "coming to presence," assigning thus a dynamic character to personhood's manifestation.[55] As it was expressed by M. Munitz, "The goals of cosmology are goals of human beings." However, the universe as such benefits from these goals: "Through the measure in which they are reached, the universe becomes understood, perhaps for the first time anywhere throughout its vast stretches in space and time."[56] By reflecting the goals of humanity,

54. Cf. "By learning the ways of the universe and by reflecting upon them as they surface in the daily life of family and work and community, we take the first steps into a new form of human understanding and existence." B. Swimme, *The Hidden Heart of Cosmos* (New York: Orbis, 2005), 7. Cosmology allows one to know where one stands and to that extent has a sense of its own identity in relation to the world. Correspondingly, a possible lack of a cosmological sense deprives human beings and communities of their centeredness in the world as persons. According to F. Mathews, "A culture deprived of any symbolic representation of the universe and of its own relation to it will be a culture of nonplussed, unmotivated individuals, set down inescapably in a world which makes no sense to them, and which accordingly baffles their agency. . . . With no cosmological foundation for their identity, they invent precarious individual self-pictures, self-stories, ego-images, but their sense of who they are is tenuous." F. Mathews, *The Ecological Self* (London: Routledge, 1991), 5. As was differently expressed by Morris Kline, man's "ceaseless search for knowledge about himself, about the wonders of nature, the structure of the universe . . . gives point to lives which would otherwise spend themselves in orgies of meaninglessness." M. Kline, *Mathematics in Western Culture* (New York: Penguin, 1977), 423.

55. Cf. P. Heelan, "Nature and Its Transformations," *Theological Studies* 33 (1972): 493–502. See also in this context J. Compton, "Natural Science and the Experience of Nature," in *Phenomenology in America: Studies in the Philosophy of Experience*, ed. J. M. Edie (Chicago: Quadrangle, 1967), 82.

cosmology exhibits the traditional features of all mythologies, namely that the perceptible aspects of the universe are expressed in terms of human social, behaviorial, and existential concerns. In this sense the picturing of the universe as a historical process cannot avoid containing erratic facts associated with the human condition, to be more precise, with the intimacy of personal communion with the universe and the extent of not being attuned to it. Any imaginable attempt to disregard these facts and assess cosmology only on the basis of law-like ordered concepts would be incomplete and historically inadequate: in this case cosmology would provide us only with a fringe of the universe's phenomenality. The other "part" of the universe's phenomenality, which reflects the erratic fact of not being attuned to the universe, is rather reflected in poetic and artistic depictions relying on ecstatic acts of personal being in the universe as communion. This only confirms an already-formulated view that cosmology cannot dispense with anthropology—not only in a high philosophical sense, but in the mundane sense of human affairs.[57] The so-called mythological aspect of any cosmology thus naturally arises from the intention to interpret erratic features of the human universe through a reference to the astronomical order, and it is this aspect that brings with new force a "coherence" dimension in its epistemic justifications mentioned before: indeed mythologies never present gaps in their "explanations" and are invoked by the communities of

56. M. Munitz, "Kantian Dialectic and Modern Scientific Cosmology," *Journal of Philosophy* 48, no. 10 (1951): 338. As was differently expressed by D. Staniloae, through the reference to St. Maximus the Confessor, "man is called to become a world," that is, "macro-anthropos," through the eternal humanization of nature as eternal progress (Staniloae, *Experience of God*, 4).

57. As was provocatively conjectured by one author from the camp of the human sciences and arts, we need "a sort of mytho-scientific, neo-anthropomorphic" theory, one that would stay operational by combining the findings of mainstream science with conjectures based on mythological thought. This type of theory would map features of the universe through images taken from the domain of human social behaviour. . . . Although anthropomorphic theories might not be operational, they can lead to a better understanding of the universe." Y. Friedman, "Scientific Theory as One of the Fine Arts," *Leonardo* 26, no. 4 (1993): 361.

adherents on the ground of coherence of their claims. All this points to the simple truth that cosmology is not devoid of that dimension in its functioning which pertains to the human sciences.