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Semiosphere: A chemistry of being

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Abstract. The concept of semiosphere coined by Lotman in analogy of Vernadsky's biosphere can be considered as a starting point for the new model in the semiotics of culture that enables us to conceptualise the human culture in its great diversity, as well as a certain single system as a part of this diversity. Present article will clarify some points of dissonance between Lotman and Vernadsky, as well as consider the dual influence of Vernadsky and Prigogine on the workings of the semiosphere in relation to the cultural dynamics. As a conclusion, the article entertains the idea that if we take the comparison with Vernadsky a bit further, the concept of semiosphere could be reinvented rather as a main transformative force of the (human) environment.

Introduction

The title of the article is motivated by the fact that the concept of semiosphere introduced by Yuri M. Lotman, and the dynamics of its development reflect the influence of the two theories of chemistry: the biogeochemistry of Vl. I. Vernadsky and the theory of dissipative structures proposed by Russian-Belgian scientist Ilya Prigogine and Isabelle Stengers. We will consider the dual influence of Vernadsky and Prigogine on the workings of semiosphere in relation to cultural dynamics. As a conclusion, we propose the idea that if we take a comparison with Vernadsky's theory of biosphere and its transition into noosphere a bit further, the concept of semiosphere could be reinvented as the main transformative device of the human environment. On the other hand, there is no doubt that the concept of

semiosphere coined by Lotman in analogy of Vernadsky's biosphere can be considered a starting point for the new model in the semiotics of culture that enables us to conceptualise the human culture in its great diversity, as well as a certain single system as a part of this diversity.[1]

Metaphor of biosphere in the concept of semiosphere

Lotman suggests that biosphere is "the totality and the organic whole of living matter" (Lotman 2000: 125) and by analogy he formulates the definition of a semiosphere as a "semiotic continuum" (Lotman 1984: 6), a heterogeneous space, enclosed in itself, that is in constant interaction with other similar structures. The points of contact between different systems (which in their own turn are part of a heterogeneous space of a higher order) enable the emergence of new meaning (i.e. the deviation from the algorithm of the given system).

Thus, analogy with Vernadsky enabled Lotman to formulate the position that counts for the general mechanism of cultural semiosis: "the unit of semiosis, the smallest functioning mechanism is not a separate language, but the whole semiotic space of culture in question" (Lotman 2000: 125). It also implies that any semiotic system presupposes the existence of at least two different participants that are at once similar and different. In conclusion, the definition of semiosphere entails the notion of asymmetry (dissymmetry) and heterogeneity in the semiosphere, the notion of boundary, and an assumption that any text is preceded by another text (for Vernadsky multiplication is not a single act of reproduction but a sequence of what he calls the Redi principle: *omne vivo e vivum*)[2] as well as the

[1] It can be argued, however, that the ideas inherent to the concept of semiosphere are recognisable in Lotman's thought already in 1960s. The evolution and paradoxes of these ideas are analysed in Lotman (2001).

[2] In his letter to Uspensky, written in 1982, Lotman testifies: "Once in our seminar in Moscow I was brave enough to declare my belief that a text can exist (i.e. it can socially be recognized as a text) if it is preceded by another text, and that any developed culture should be preceded by any other developed culture. And now I find Vernadsky's deeply argued idea with great experience of investigation in cosmic geology that life can arise only from the living, i.e. that it is preceded by life" (Lotman 1997: 630; English quotation in Kull (1999: 120–121).

priority of the semiotic space in relation to the single acts of communication.

Directly related to the workings of biosphere is also the concept of semiosphere proposed by Jesper Hoffmeyer (1997). Yet we must draw a clear distinction between the two notions. The semiosphere proposed by Hoffmeyer *is* biosphere: semiosis coincides with the processes of life,[3] whereas for Lotman, a semiosphere is an abstract space of semiosis, of texts and languages. A further distinction between the two theories is related to the structure of the semiosphere: as we already saw, Lotman's semiosphere can be considered only on the background of other similar structures, and that we can grasp a semiosphere as a semiotic system itself consisting of several semiospheric structures. Hoffmeyer, however, clearly states that:

> We already have the excellent term 'Umwelt' to designate the subjective aspect of the [semiotic] niche, and I would therefore recommend that we reserve the term semiosphere as a designation for the totality of semiotic processes going on at our planet. In this way, the term will remain related to well-known terms such as hydrosphere, atmosphere, or biosphere. And there will be only one semiosphere on Earth. (Hoffmeyer 1998: 470)[4]

Despite the fact that Lotman refers to Vernadsky, his use of the term biosphere has several remarkable differences as compared to Vernadsky's concept. We can only guess that the reason lies in the fact that Lotman used Vernadsky's concept rather as a working metaphor that enabled him to formulate his own ideas about the global semiotic sphere. Yet, the clarification of these differences may shed some new light on the concept of semiosphere as well.

The modern usage of the term 'biosphere' begins with Eduard Suess, a professor of palaeontology and geology at the University of Vienna. However, his view is somewhat ambivalent and can be interpreted in two ways: either the biosphere is the sum total of living organisms; or it is a geosphere, created and organised by the processes

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[3] Hoffmeyer even goes so far as to say: "[F]rom a biosemiotic point of view, the biosphere appears as a reductionist category which will have to be understood in the light of the yet more comprehensive category of the semiosphere." (Hoffmeyer 1997: 934)

[4] The further elaboration of the two semiospheric concepts on the background of the concept of Umwelt see Kull (1998). See also Yates (1998) for the discussion about semiosphere and biosphere in Hoffmeyers concept.

of life. Teilhard de Chardin uses the term 'biosphere' in the first sense (Levit 2001: 53–54). Lotman's remarks indicate that he also tends to rely on this interpretation. However, for Vernadsky, a biosphere is a "self-regulating system that embraces both the totality of living organisms (living matter) *and their environment* [my italics — *K.K.*] to the extent it is involved in the actual processes of life, that is, including the troposphere, the ocean, and the upper envelopes of the earth crust" (Levit 2001: 57).

Vernadsky first used the term in 1911, after he had met Suess in Vienna, to denote the object of biogeochemistry that deals with atoms and their chemical properties in life processes, focusing on the "cyclical processes of atom exchange between living matter and inert matter in the biosphere" (Vernadski 1977: 111). The processes of atom migration are also a fundamental source of change in the biosphere. According to the principles of biogeochemistry formulated by Vernadsky, the evolution in the biosphere is an irreversible process that proceeds "in the direction of increasing the level of self-regulation and stability" (Levit 2001: 61). One of the basic methods to achieve this is "to increase the intensity and the complexity of biogenic migration of atoms" (Levit 2001: 65), i.e. the basic determinant in the evolution of the biosphere is the growth of the atom exchange caused by the life processes.

According to Vernadsky, by the beginning of the 20th century, biosphere had reached in its evolution a transitional period from biosphere to noosphere. In this stage, the central stabilising force would not be living matter but human thought, more precisely, scientific thought. In this respect, the latter is a function of the biosphere and thus a geological phenomenon. Therefore, in noosphere, the functions of the biogenic energy created by living matter would be taken over by "the energy of human culture" (Vernadski 1977: 95) — a term coined by Vernadsky to denote the transformative force created by the activity of human mind.

Organisation of living matter and the structure of the semiotic space-time

In the introduction we stated that based on Vernadsky, we can establish semiosphere as the main transformative force of the human environment, instead of yet another synonym for "'culture' in one of the three hundred senses of the latter" as Sebeok concludes, asking "whether anything of substance has been gained by Lotman's substitution of his glittering, kindling locution for the overburdened traditional nomenclature" (Sebeok 2000: 532).

Indeed, Lotman's concept aims to grasp the totality of human culture as, in his view, Vernadsky's notion embraces the totality of living matter. Thus, as we already noted, Lotman ignores the aspect of inert matter in the organisation of Vernadsky's biosphere. As a consequence, it renders the semiospheric model of culture pan-semiotic or, rather, pan-textual[5], cutting it off from the "inert" yet real space human beings inhabit (in opposition to the "abstract space" of semiosphere [Lotman 1984: 6]). We have to consider semiosphere only in the context of other semiotic formations: "in reality no semiosphere is immersed in an amorphous, 'wild' space, it is in contact with other semiospheres which have their own organization (though from the point of view of former they may seem unorganised)" (Lotman 2000: 125).

Yet the vital points of consonance Lotman finds in Vernadsky in a way presuppose the coexistence as well as a sharp distinction between living matter and inert matter. Ignoring the distinction made by Vernadsky in his concept of semiosphere, Lotman also fails to take into account the fact so fascinating for Vernadsky: that living matter in biosphere is embedded in its environment, yet it is clearly distinct from it from either structural or energetic point of view so far as to say that it constitutes an independent space-time that functions according to the laws of its own and that yet reconstitutes the whole of the biosphere, i.e. including the inert environment. Here an explanation of

[5] Pan-semiotic is the term used in the context of pragmaticist semiotics to describe the aspirations to subsume a semiotics of culture, or just plain semiotics, under a semiotics of nature, or biosemiotics […]" to give way "to a unified doctrine of signs embedded in a vast comprehensive life sciences" (Sebeok 2000: 533). Sometimes, the term semiobiosphere or biosemiosphere is used in this context (respectively, Ponzio, Petrilli 2001; Merrell 2001).

Vernadsky's notion of the state of space is needed before we can proceed.

Vernadsky borrowed the term from Curie, stating that the space is structured not only according to the laws of geometry, but it also has different physical states that are characterised by the symmetry in the system. The state of space in the inert matter is completely describable in terms of the Euclidean geometry. Molecular dissymmetry of living organisms, however, defies the description in terms of the geometry; as a result, the space of living organisms is different from the space of inert matter. The dissymmetry of the space in living matter conditions also the asymmetry in time and thus the processes related to living matter are irreversible (Vernadski 1977: 133; see the further analysis of Vernadsky's space-time theory in Levit 2001: 17–32). Directly related to the asymmetry of the space-time of the living matter is the so-called Pasteur-Curie principle: "Dissymmetrical effects can be brought about only by a dissymmetrical cause" (Vernadski 1977: 129, 133; quoted in English in Levit 2001: 20), i.e. for the dissymmetry to occur, it presupposes a space whose organisation is also dissymmetrical.

Thus, the important features of living matter in the biosphere are: 1) it is clearly distinct from inert matter in the biosphere; 2) it is characterised by dissymmetry in its state of space; 3) it is subject to the Redi principle that life must precede life as well as to 4) the Pasteur-Curie principle that dissymmetry presupposes dissymmetry; 5) the processes in biosphere, related to the living organisms, are irreversible (because of the dissymmetric properties of the space-time of living matter).

As we saw above, the evolution of biosphere is directed towards "increasing the level of self-regulation and stability", whereas the central stabilising force is the transformative energy produced by the living matter. Life has spread through the biosphere during a process of gradual adaptation whose limits are unknown but are increasing with time (Vernadsky 1998: 103, 118). Now we confront a new factor in the evolution in biosphere:

> Man, in particular, being endowed with understanding and ability to direct his will, can reach places that are inaccessible to any other living organisms. Given the indissoluble unity of all living beings, an insight flashes upon us. When we view life as a planetary phenomenon, this capacity of *Homo sapiens* cannot be regarded as accidental. (Vernadsky 1998: 118–119)

Semiosphere and the transition into noosphere

Although Vernadsky did not use the term noosphere until 1936, the previous paragraph from *The Biosphere*, originally written in 1925, certainly gives an idea of the concept. The rise of civilization is a geological necessity, its continuous development is related to the dissymmetry of time in living matter whose function is scientific thought; according to Vernadsky:

> A civilization of 'cultural humanity' (being a form of a new geological force created in the biosphere) *cannot disappear or cease to exist*, for it is a great natural phenomenon corresponding historically, or more correctly, geologically, to the established organization of the biosphere. Forming the noosphere, the civilization becomes connected through all its terrestrial roots to its terrestrial envelope (*biosphere*), which has never happened in the previous history of mankind to a comparable degree. (Vernadsky 1977: 33; English quotation in Levit 2001: 77)

Noosphere, therefore, is not a layer *in* the biosphere but it *is* the biosphere, where the central role belongs to the "energy of human culture" (Vernadsky 1977: 95), to the "scientific thought".[6] Given Lotman's notion of biosphere, it is not surprising that he clearly denies the similarity between semiosphere and noosphere. He states that "we must be cautious not to confuse the concept of semiosphere with the term noosphere, which is a stage in the evolution of the biosphere [...] The existence of noosphere is material and spatial, it encompasses a

[6] Teilhard's concept of noosphere is probably more familiar in the west. Above we referred to Teilhard's concept of biosphere as an aggregate of terrestrial living organisms. In the same vein, Teilhard's noosphere is a "thinking layer" (Teilhard 1967: 202), one more envelope around and over the biosphere, its appearance marking not the next stage in the evolution of the biosphere but the rise of the split between the intelligence and its material matrix leading to the death of the Earth. "However convergent it be, evolution cannot attain to fulfillment on earth except through a point of dissociation." (Teilhard 1967: 300). Therefore, noosphere is only a transitional stage in the further development of supreme consciousness, "the end of all life on our globe, the death of the planet, the ultimate phase of the phenomenon of man" (Teilhard 1967: 300). For Vernadsky, scientific thought is a function of the biosphere, thus inseparable from it and it cannot in any way overcome biosphere. So it must emphasised that Lotman relies solely on Vernadsky; even if he acknowledges the abstract nature of the semiosphere, he does not mean that semiosphere could overcome biosphere or Earth in a singular point, where human culture, "mankind, *taken as a whole*, will be obliged […] to reflect upon itself at a single point" (Teilhard 1967: 315).

part of our planet, whereas the space of semiosphere is of an abstract kind" (Lotman 1984: 6).

However, as we elaborate the comparison between Lotman and Vernadsky further, we could re-establish the semiosphere as a function of human thinking, the main transformative force of the human environment that could be in complete accordance with the living matter, stated by Vernadsky as a definitive source of transformative energy in biosphere with its specific space-time characteristics. According to Lotman, semiosphere is characterised by a specific structure of space and time whose organization is established through the workings of the semiosphere itself and it is through this transformative activity that Lotman partially comes to terms with the "outside" reality: "The outside world in which human being is immersed in order to become culturally significant, is subject to semiotisation, i.e. it is divided into domains of objects which signify, symbolise, indicate something (have meaning), and objects which simply are themselves" (Lotman 2000: 133).

This is obviously largely due to the idea of the specific space-time of living matter expressed by Vernadsky.[7] Thus, for Lotman "conscious human life, i.e. the life of culture, also demands a special space-time structure, for culture organizes itself in the form of a special space-time and cannot exist without it. This organization is realized in the form of the semiosphere and at the same time comes into being with the help of the semiosphere" (Lotman 2000: 133). Thus, the relation between semiosphere and non-semiotic reality is partially established through the semiotic activity of human culture upon the surrounding, non-semiotic environment. Yet it is through this activity that the environment is semiotised and therefore transformed. Therefore we could state that the abstract sphere of texts and languages, semiosphere is *the main transformative device of the (human) environment.*[8] In this respect Lotman comes very close to the

[7] As noted by Alexandrov, "Lotman's use of Vernadskii can be seen as a valid attempt to locate human culture within a narrative continuum that includes the natural world" (Alexandrov 2000, 342).

[8] As stated by Ivanov (1998: 792): "The task of semiotics is to describe the semiosphere, without which the noosphere is unthinkable. Semiotics is the discipline that has to help us to orientate in the history." He also elaborates the idea that artistic texts form a part of the defence mechanism of the noosphere (Ivanov 1991). Therefore it is not only the internal methodological demand of the distinct disciplines engaged

idea of "semiotics as a post-modern recovery of the cultural unconscious" expressed by Deely (2000).

Chance and necessity in the semiosphere — a thermodynamic metaphor

The concept of semiosphere offers first of all a spatial description of culture, even if it encompasses the dynamics of relationships between its substructures or its relation to other similar structures. When we seek the aspect of time in the specific space-time of the semiosphere, we face the process of history. It is here that Lotman turns to the thermodynamics of the systems far-from-equilibrium, more specifically, to the theory of dissipative structures by Ilya Prigogine, but, first of all, to his book *Order out of Chaos* co-authored with Isabelle Stengers. What seems to be of central importance for Lotman, from the point of view of cultural dynamics is that Prigogine and Stengers reveal the stochastic and the lawful, chance and necessity as two sides of the same coin.

The second law of thermodynamics states the arrow of time determined by the growth of entropy. Yet the law only applies to closed systems near equilibrium: in open systems that exchange matter and/or energy with their environment, entropy appears to be the source of order through the mechanism Prigogine and Stengers describe as "order through fluctuations".

As we saw above, the dialogic mechanism responsible for the generation of new meaning in semiosphere presupposes at least two semiotically different participants. We can conclude that the system is able to engage in dialogic processes only if its structural identity is established. Now we come to the notion of semiotic individuality, inherent in the concept of semiosphere, that presupposes, according to Lotman, the notion of border and certain amount of homogeneity, i.e. semiosphere as a semiotic individuality consists only of one code, one language. Therefore, it is "closed" system in a sense that it is distinguished from and cannot have contact with non-semiotic or alien semiotic systems. However, we must remember that the homogeneity

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with individual texts and systems, but the social applications of semiotics that render semiotic as the science about semiosphere vital (Ivanov 1998).

of semiosphere is conceivable only insofar as we stick to the self-description of the given system.

Semiosphere comes to terms with the "outside" (semiotic or non-semiotic) reality only through the process of semiotic transformation: alien reality is semiotised and therefore the process of transformation presupposes the process of translation. According to Lotman, this transformation occurs only on borders of semiospheres, which are at least double-coded systems of translation filters. Therefore, border determines both the identity of the system as well as allows it to come into contact with its environment: to receive outside messages, new information. However, translation mechanisms of each culture also determine its stability or vulnerability in relation to outside influences: according to Prigogine and Stengers in open systems additional flow of energy and/or matter can disturb the initial thermodynamic equilibrium of the system. In the course of the process, system can reach a state far-from-equilibrium when the whole system is extremely sensible both to the fluctuations (disturbances) within the system as well as to the influences from the outside environment.

Depending on whether the size of the initial fluctuation region lies below or above some critical threshold the fluctuation either is repressed or spreads through the whole system. In either case the basic mechanism of the process can be understood in terms of communication: "the faster the communication takes place within the system, the greater the percentage of unsuccessful fluctuations and the more stable the system"[9] (Prigogine, Stengers 1984: 187). The mechanism of communication is also at work in the amplification of a single fluctuation through the positive feedback. As a result, the fluctuation can break the initial organisation and take the system to the bifurcation point where the future development of the system can take several directions, yet it is impossible to determine the path finally taken: the system can either dissolve or reach a new organisation of a higher order. As it appears, "the more complex the system is, the more numerous are the types of fluctuations that threaten its stability" (Prigogine and Stengers 1984: 188) — and the more complex must be the communication mechanisms within the system[10].

[9] This quote refers to something we could probably call a thermodynamic definition of socialisation.

[10] The structures of such higher order are called dissipative structures by Prigogine and Stengers because it takes more energy to keep their structural stability. Here we

In the point of bifurcation, the stable system of cause-and-effect is broken, and it is here that we can see the stochastic and lawful, chance and necessity as the two sides of the same coin: in the history of the system periods of stable evolution alternate with periods of rapid growth and qualitative leaps. Lotman (1999b, 1999c) develops the argument on the background of the history of human culture, noting that the bifurcation points are those moments in history when the tension between contradictory poles reaches its highest point and the whole system is taken out of balance. In these moments, neither the behaviour of individuals nor the masses is predictable. We must conceive the curricula of history not as a trajectory, but as a continuum that may be resolved in a multiple ways: these are the moments of revolutions or rapid social upheavals. As Lotman remarks: "It is not coincidental that exactly in these moments words, speech, and propaganda become historically significant" (Lotman 1999b: 134). In retrospect, the choice made seems determined and chance becomes necessity.

Prigogine and Stengers (1984: 176) also point out that "near a bifurcation, fluctuations or random elements play an important role, while between bifurcations the deterministic aspects would become dominant". Thus, under certain circumstances, "the role played by individual behaviour can be decisive" (Prigogine, Stengers 1984: 176). The choice of the possibility actually realised depends on chance but even more on the consciousness of the subjects involved in the process. Therefore it is not accidental that at these exact moments everything said or silenced acquires a particular historical relevance.

We referred to the role of semiotic borders in cultural systems: during the historic upheavals or longer periods of destabilisation, it is often the outside influence that will lead processes to some kind of resolution. The process of autocommunication will eventually stabilise the cultural order with new codes and new hierarchies. However, in case when two systems are relatively similar translation filters may fail and the element of alien culture may enter given culture unnoticeable. Thus the process of creolisation will begin that may lead to further cultural homogenisation. Such processes are also noticeable in

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can also see a certain parallel between Prigogine and Stengers and Vernadsky according to whom the evolution of the biosphere was directed towards the increase of the energy needed to maintain the stability of the system (in addition, we could draw certain parallels between Vernadsky's notion of living matter and the notion of active matter proposed by Prigogine and Stengers).

Estonia during the 1990s up to the beginning of the 21st century in the confrontation of 'nostalgic revolution' of the monolithic national values with cultural diversity and the policy of multiculturalism.

Conclusion: a chemistry of becoming

An analogy with Vernadsky enabled Lotman to formulate the position that counts for the general mechanism of cultural semiosis: the notion of asymmetry (dissymmetry) and heterogeneity in the semiosphere, the notion of boundary, and an assumption that any text is preceded by another text as well as the priority of the semiotic space in relation to the single acts of communication. The asymmetry of the substructures of the semiosphere provides a necessary condition for the dialogue that is a basic mechanism of any semiotic act; whereas the basic source of meaning generation, i.e. the source of possible fluctuations in the system breaking its algorithm, is the heterogeneity of the different elements in the system. The points of contacts between the elements ("semiotic monads" [Lotman 1999a]) made possible by the structure of semiotic border enable the emergence of new meaning. Therefore the heterogeneity of every cultural system is the source of instability as well as the condition for the (exponential) growth of information in the system. In his recent article (Prigogine 2000) Prigogine entertains the idea of a networked society that has emerged as a result of the recent developments in information technology, he also makes a remark: "I feel that there is some analogy between the present evolution towards the networkes society and the process of self-organization I have studied in physics and chemistry" (Prigogine 2000: 893). Semiospheric model could be seen as a powerful device that could help cultural theory come to terms with the complexities of the information society with its further notions of "hyper", "multi", and "inter" (cf. Kotov 2001).[11]

[11] In a way we could even conceive of hypertextuality as a more general characteristic of the conceptual system of the human culture whose ambitions in knowledge building are closely related to the system of libraries (cf. O'Donnell 1998). A remark made by fantasy writer Terry Pratchett goes in vein with the meaning-creational potential of the hyper-interaction of different texts within the semiosphere: "Books shouldn't be kept too close together, otherwise they interact in strange and unforeseeable ways."

It could be argued that the notion of semiosphere was inherent to Lotman's thought already in the 1960s. Nevertheless, the reliance on either Vernadsky or Prigogine and Stengers implies a certain moral stance whose core might be described as the recognition of the transformative force of the sign processes: either in the constitution of specific space-time or at the moments of conscious decision-making. Its theoretical stance implies a never-ending semiosis, whose basic mechanism is a dialogue between structurally different systems, the mechanisms of mutual translation that are the source of new meaning, but also of instability in the system. In this context, semiosis is both the stabilising as well as the destabilising mechanism of the (human) universe.

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Семиосфера: химия существования

Понятие семиосферы у Юрия Лотмана можно считать исходным пунктом новой модели анализа в семиотике культуры. Концепция, сформулированная по образцу биосферы Владимира Вернадского позволяет рассматривать культуру, с одной стороны, во всем ее разнообразии, с другой же, каждую отдельную систему как часть этого разнообразия. На оформление концепции семисферы кроме теории биосферы Вер-

надского существенным образом повлияла и теория диссипативных структур Ильи Пригожина, и настоящая статья как раз пытается рассмотреть влияние обеих теорий на концепцию Лотмана. Кроме того описывается, каким образом с помощью модели семиосферы можно описать культуру инфоэпохи, которая постоянно преобразовывает себя и свою среду.

Semiosfäär: olemise keemia

Juri Lotmani semiosfääri mõistet võib pidada uue kultuurisemiootilise analüüsimudeli lähtekohaks: Vladimir Vernadski biosfääri mõiste eeskujul formuleeritud kontseptsioon võimaldab vaadelda ühelt poolt kultuuri kogu tema mitmekesisuses, teiselt poolt aga iga üksikut süsteemi osana sellest mitmekesisusest. Semiosfääri kontseptsiooni kujunemist on lisaks Vernadski biosfääri teooriale olulisel määral mõjutanud ka Ilya Prigogine'i dissipatiivsete struktuuride teooria. Käesoleva artikli üks eesmärke on vaadelda nende teooriate koosmõju Lotmani kontseptsioonile. Teiseks heidame valgust sellele, mil moel semiosfääriline mudel võimaldab kirjeldada infoajastu kultuuri, mis pidevalt kujundab ümber end ja oma keskkonda.