Technology and Language Технологии в инфосфере.
2020. 1(1). 71-80
https://doi.org/10.48417/technolang.2020.01.16

Technology as Semiosis

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Abstract

This essay for the inaugural issue of *Technology and Language* develops a systematic conception of technology, both as the human way of being in the world and in its historical development. As such it continues a line of thought that was initiated by Ernst Kapp and Peter Engelmeyer – but does so from the point of view of contemporary philosophies of technology and language. Technology is presented as projective semiosis that works on the level of ideas, rules (including the laws of nature), and material or ontology, leading to the creation of artificial environments and finally to a second or third nature.

Keywords: Projective Semiosis; Semiotics of technology; Problem of the New; the Artificial; Triact

Аннотация

Данное эссе для первого выпуска журнала *“Технологии в инфосфере” (“Technology and Language”)* развивает систематическую концепцию технологии как способа существования человека в мире, и в качестве исторического развития. Таким образом, оно продолжает линию мысли, начатую Эрнстом Каппом и Петром Энгельмейером, но делает это с точки зрения современных философий технологии и языка. Технология представлена как проективный семиозис, работающий на уровне идей, правил (включая законы природы) и материи или онтологии, приводя к созданию искусственных сред и в итоге ко второй или третьей природе.

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Every individual deals with signs, with their production, naming, accounting, interpretation, application, and habitation. Natural and super-natural, natural and artificial sign systems constitute the foundations of knowledge, reasoning, and action. The rules that persons extract from the environment, from their own consciousness, from revelation, are the rules for distinguishing the sign and the unfamiliar, building the hierarchies of layers and stages of reality, for designating notions through systemic meanings, combining meanings in various systems. Participation in the processes of signing is a fundamental property of life: this or that subject, including human and non-human, a natural or artificial actor of life processes, is alive to the extent that it participates in semiotic processes, creating them and managing them.

Technology in its broadest sense – as the ability of an individual to understand and to change reality – is the most complete expression of the semiotic nature of life. Technology as a phenomenon, a set of artifacts, a medium and form of activity, a way of development, allows us to clearly identify and formulate the pragmatic, syntactic and semantic rules of refined semiosis – the language of the universe – in the substrata of which the processes of human activity run. This essay argues seven theses about technology in the context of semiotic ontology: 1) technology is a projective vector of knowledge, a vector of activity opposed to receptivity; 2) technology implies problem-solving, a new product; 3) technology is creation, creativity and co-creation; 4) technology is the detection and shift of boundaries between the conceivable and the actually possible; 5) technology is the application and modification of rules; 6) technology reveals itself in techniques; 7) technology invents and upholds the living environment.

COGNITION AND ACTIVITY. STAGES OF REPRESENTATION

A person, and apparently every kind of subject that a person can imagine, is engaged in knowledge, reflection, and action. Since classical antiquity, the two basic vectors of human manifestation in the world have been defined *as understanding* and *expression*, mediated by reflection. Peter K. Engelmeyer (2010), a major Russian philosopher of technology, begins his "Theory of Creativity" with the separation of subjectivizing and objectifying activities: the situations in which a person extracts knowledge from reality, and situations in which a person uses the extracted knowledge to change reality (p. 18). Psychologists study these situations in the models of internalization and exteriorization of knowledge.

The situation of cognition looks like this: a person as a subject learns to know in transcendental or biologically mediated forms independent *reality* or existence as it is, forming in the acts of cognition an image or a complex multi-layered picture of the universe, that is, *the actual* or being. The amazing feature of the human species is that the reality created in the acts of knowledge is historically variable. In the most banal example, the reality of the myth does not coincide with the reality of science or Christianity, and in general, we learn about the real from the violation of expectations regarding reality.

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This variability happens because reality itself, as the subject knows or sees it, is the product of objectifying activity: it is not created by the act of *perception*, but by the act of *projection*. The situation of expression, objectification, exteriorization, projection, or, generally, activity as such (if the concept of activity is opposed to the concept of knowledge) is actually the original and most general situation of technology.

Cognition is a complex step-by-step process. After Nicholas of Cusa, German classical philosophy, German and Russian neo-Hegelianism and neo-Kantianism – which in many ways gave rise to the philosophy of technology – we distinguish in the process of knowledge the stages of sensory perception, mind and reason. Each of these stages of representation of reality is described by a semiotic substratum, specific only for it, and by a set of semantic, syntactic and pragmatic rules. Reality is fixed by sense as an *object* of physical and chemical nature, by mind as a *subject* of logical and grammatical nature, and by reason as an imaginative *phantasm* or a strictly defined *concept* extracted from one or another version of Plato's world of ideas or from the depths of individual and collective consciousness. Reality is a clearly or vaguely reflected interaction of an object, subject, and concept (phantasm).

Technology in its original and most general sense is a *projection*, that is, a change in the order of the stages of representation. A fantasm or concept is realized in a subject of natural language or in a system of rational categories and is superimposed on the data received from the sense organs. Cognition as "the transformation of being into an object" and "the objectification of being into a subject" is in terms of logic described by the procedure of inductive generalization, technology as "all action outward" is defined by the procedure of deduction as "the interpretation of facts in the light of a theory." The first technical act, unconsciously performed by a person (subject), is an act of reflective construction of reality, implicitly including the ontology. The procedures of the subject's development are determined by awareness and purposeful use of the rules extracted from this act, thus they are technical procedures.

A PROBLEM OF THE NEW

Technology deals with novelty, starting from the first act of consciousness: the actual as such does not exist in known reality; it is contained only in the subjective reality of an individual and is historically transmitted by the collective cultural experience. "The actual" is the first result of the re-definition of reality by technology.

After Hegel, the new is defined through the violation of a subject's expectations as a mismatch between the actual and the real, and represents a certain shift of the boundaries of an object, subject, or concept in individual or collective consciousness. The source of the new is the problem that arises in situations of understanding and expression and is fixed by reflection.

In case of misunderstanding, the very notion of the problem fixes in semantic terms the inability of the subject to move from the sign to its meaning, in syntactic terms – the failure to include the sign in the combination of signs, find an alphabet or a rule of inference, the inability to distinguish between the sign and the context. At the same time, a misunderstanding occurs in the semiosis of sense perception, in the semiosis of mind, and in the semiosis of reason. In case of ineffability, the notion of the problem captures semantically the failure to find a sign for the current object, fantasm or concept,

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syntactically – the inability to create the desired sequence of signs, to build a sentence, pragmatically – the failure to find the necessary interpretant, the skill of distinguishing system and environment.

In general, the problem arises as a result of an overlap of representation systems in such a way that there is an incompleteness or uncertainty in the subject's reality, which then sets the task of filling in the "places of uncertainty." This process is described in all branches of learning, including the philosophy of technology as the process of creating needs, desires, managing attention, creating interest or commercial demand. The problem, understood as a need or an experience of incompleteness, entails a conscious transformation of reality by the subject, making the being appropriate, and requires a solution as a transition from reception to action that changes the state of things.

The new is the solution of the problem, the shift of certain boundaries at a particular stage of consciousness. In Plato's world, the solution is extracted by an individual from the world of ideas. Friedrich Dessauer, a major German philosopher of technology, called it the "Fourth Kingdom" or an invention. Access to the "preset form of solution," comprising the epistemic novelty of the problem solution, is determined by experience, knowledge of the rules: The invention is the only possible form of filling the place of uncertainty which is caused by obvious and hidden, historical and social preconditions of the way the problem was set which caused this uncertainty. The total sum of solutions to the problems that constitute human reality is the *actual cosmos*, in other words, a fragment of reality accessible to humans, where their theories are verified. The total sum of actual and speculative violations of expectations in problem-solving procedures constitutes a fragment of reality where theories are falsified, allowing us to infer an epistemically infinite *potential cosmos* as a reality containing new, but not yet available solutions (Dessauer, 1956).

The ontological distinction between the actual and the real, the actual and the potential cosmos allows us to justify the category of the new (as a transformation of a historically specific rule of semiosis) in terms of epistemology – and in terms of a theory of action that links it to the historical process of comprehending and applying the rules of semiosis of perception, mind and reason.

STAGES OF CREATIVITY

The very transition from reception to projection is called intuition. A significant difficulty in describing intuition is that the semiotic circle of activity at any given time includes both receptive and projective processes: the selection of the very moment of transition is due to the skills of conscious management of reflection and in different contexts of the world is fixed by different concepts – from "revelation" as direct knowledge to "decision-making" by the expert council in modern management theory. The transition from knowledge to action in the study of technology is interesting in two aspects. The first is related to the awareness of the mechanisms of consciousness in this process, the theory of knowledge in this regard distinguishes three types of intuition (sensory, intellectual, and rational, or mystical). The second aspect is related to the source

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of the integrity (ontology) that underlies every action – technical action tends to avoid ontologies that are not expressed in a particular sum of semiotic rules.

A projection as such, technology in the general sense, the creative process is carried out in three stages. Engelmeyer (2010) combined them in the concept of "triact," which includes idea, construction and execution (p. 103). Dessauer (1956) has used the concept of three human formative forces to describe them: homo investigator, homo inventor, and homo faber.

The "idea", or "homo investigator" marks the stage of reflective reason (*intellectus, Vernunft*), where the solution occurs as a shift of pragmatic rule (the correlation between an environment and a system, a context and a sign), a shift of syntactic rule (the combination of ideas, concepts, fantasms, images), a shift of the semantic rules (the formation of a new content of idea, image, etc.). The novelty of the "idea" as a sign of reason, as a rule, is associated with the transformation of the boundary of the conceivable, with a change in the structure of the subject's reflection.

The "construction" or "homo inventor" marks the stage of mind (*ratio, Verstand*), connected in the historical and philosophical tradition with the category of expression. The new from the point of view of pragmatics is realized as a shift in the possibilities of language style, a discovery of intersubjective language in the context of non-linguistic (individual) states. The new in syntactics is created by the methods of combining elements and new combinations fixed by rhetoric, logic, artificial mathematical languages. The new in semantics is related to a change in the interaction of the systems of notation and denotatum.

The "execution", or "homo faber" is the stage of embodiment in the substrate of the material, expressed in the physical and chemical interactions of semiosis. Pragmatically, the new appears as a shift in the possibilities of material embodiment, syntactically it appears as the discovery of new ways of interacting of the material elements, and semantically it appears as the creation of artifacts perceived by a subject on the same plane and forming a series with natural objects.

Creativity as the production of the new is the quintessence of projection, or technology in the general sense. Identifying the stages of implementation of an idea, the rules that were updated or transformed in this process, allows us to separate the complete and incomplete technical objects, to fix the areas where tasks are performed by one or another object.

(UN)CONCEIVABLE AND (IM)POSSIBLE

Technology is a projective semiosis that connects reason, mind, and sense perception in the act of solving a problem. The result of this act is an artificial object of perception, an artificial object of mind, or an artificial concept of reason, an artificial phantasm that performs its functions to change the fragment of reality in which the problem has arisen. The task assigned to artifacts is to change the way the systems of consciousness interact to transform the reality according to a particular model.

Technology reveals the objectivity of the rules of reflection, allowing the potential (unconscious, natural) to be realized in the actual (conscious, artificial). The conceivability of any idea or language construction does not guarantee the possibility of its implementation in the substratum of the physical world, and the unthinkability and

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unrepresentability of a material or linguistic syntactic interaction does not imply their impossibility in the real world.

There is a well-known epistemological scheme that allows us to distinguish four situations of knowledge: ignorance about ignorance (pre-problem situation), ignorance about knowledge, knowledge about ignorance (problem situation), and knowledge about knowledge (Dubrovsky, 1994). The praxiological scheme, which makes it possible to distinguish the situations of action in a simple binary model, identifies the conceivable (representable, known) with the possible (feasible, realized due to compliance with the objective rules of semiosis implementation). The four situations of action include unconceivable and impossible (pre-problem situation), unconceivable and possible, conceivable and impossible (problem situation), conceivable and possible.

A DISCOVERY OF SUBJECTIVITY. AN EXAMPLE OF MAGIC

Technology as a projective semiosis generally includes all forms of interaction between a human and reality. The narrowing of the concept of technology is preconditioned by the consistent discovery of objectively existing rules or laws that govern every manifestation of life. George Berkeley liberated rationalism from solipsism by a simple definition of existence, demonstrating the objectivity of observation structures relative to any possible observer. In the philosophy of technology, this kind of history is connected with the arguments of Ernst Cassirer addressed to James George Frazer and answering the question why technology is not magic.

Cassirer's argument is simple: the subjects of magical activity (regardless of whether they “tell fortunes” or “conjure”) do not know themselves as a source of problems, nor do they know the “cosmos” as a partner for dialogue – this is not a subject who constructs the actual against the background of super-complex reality. In contrast, the subjects of technical activity, proceeding from the situation of measuring experiment, reasonable questioning of nature, know themselves as persons acting under an objective law of nature in accordance with the objective restrictions imposed on them by this knowledge (Cassirer, 1985).

The projective semiosis is realized by a person in the process of an activity that adopts as its form the reality (immutability) of rules. Technology in a narrow sense can be defined as a set of semiotic rules of consciousness which the subject is aware of, as a language of reflection that is reflected at a particular historical stage of development as a sphere of the fulfilment of desires and solutions to problems. The technical inventions that create new forms of reality arise, historically, in the substratum of the physical world (from the wheel and sail to the blade of a turbine), in the substratum of the mind (from natural languages, art of counting, rhythm and meter to expert systems, and automatic translation programs), and in the substratum of the reason. Ivan Lapshin (1999) calls the reasonable (intellectual) inventions the latest inventions of humankind, which sets the forms of reflection of the spirit –this is an aphorism, this a dialogue, and this a system (p. 163-164).

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THE TIME FOR CREATION

Generally, technology is present where a person undertakes to solve certain problems and, making mistakes, achieves results in the form of new artificial objects, objects or concepts that complement problematic situations and resolve them with this addition. In a narrow sense, the technology as a form of activity arises together with the concept of dialogue with nature and unfolds as a system of changing the human environment. The aphoristic craft *téchn*e is dialogically revealed as "the art of evoking the desirable phenomena of nature" and systemically as "a force that is changing the face of the world." Art as the ability to act according to Aristotle's rule, as "that in relation to which there are rules, the combinatorial application of which is no longer regulated by rules" (Schleiermacher, 1984, p. 1273), unfolds as the scope of application of the rules of constructing reality in order to change reality (first locally, and then globally).

In common sense, technology is understood as a set of man-made artifacts. In philosophical reflection the artificial objects are exposing themselves as the fulfillment of the semantic rules of projective semiosis that is possible to the extent how deep is the correlation of the real and the actual available to a person at a particular historical time and how clearly the syntactic rules of the physical world are defined. From the correlation of common sense and philosophical reflection, it is clear that technology reveals itself in collective consciousness as a technology in analogy to the conclusions of logic: just as a certain syntactic combination of signs in a natural or mathematical language gives a guaranteed truthful judgment, so a certain combination of elements in the physical world gives a guaranteed result in the form of the expected solution of the problem. Technology is revealed in a particular technical system or technique as "a resultant of the efforts of man and Nature" (Lem, 1964/2005, p. 62) – in technical objects a resultant in time or in such algorithms that allow obtaining a given meaning of a sign by way of recombining syntactic elements in the substrate of the physical world.

NEW ARTIFICIAL NATURE

Technologies – the machines that work to transform energy in space and time of the physical world and to transform information in the realms of mind and reason – create a history of interaction between the natural and artificial. "Nature" as a natural integrity, in which humans continue to partake, is found in acts of knowing, that is, in the form of knowledge about immutable natural-scientific, logical-grammatical and intellectual rules verified by technology. In the forms of activity, nature presents itself as a medium and a condition for the possibility of applying knowledge to solve technical problems.

There is also a sense in which humans are not a part of nature, not only because of the Marxist and anti-Darwinian thesis that we do not adapt to the environment, but adapt the environment to ourselves, but also because of the Hegelian and Luhmannian thesis that a projective activity is forced to consider as the environment (initial chaos, noise, background, context) a particular model of its own natural form. The system of activity that generates the artificial is built within the boundaries of the natural system, so that we learn about the latter only through its reflexive – receptive or projective – models. Christianity and the ontological models of absolute idealism in general eliminate the emerging complexity through the concepts of "the seventh day of creation" and "divine

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co-creation", but, nevertheless, everything natural is known through the artificial and everything artificial is born from the natural.

The opposition between the artificial and the natural indicates that the artificial is a fragment or some particular approximation to the natural, in technology consciously used by humans in their reality, built on the basis of rational knowledge or tradition. The logic of development requires that the artificial coincides in its boundaries with the natural (the system in its complexity must coincide with the environment in order to reach a new level of opposition) and surpasses its capabilities, technically revealing really new, supernatural forms, methods and mechanisms of knowledge and activity. This is a Hegelian model, which is also reflected in the current development of technologies (NBIC-convergence and nature-like technologies). "How do you understand the superiority? [of artificial over natural – A. N.] ... it means the realization by Nature of what is impossible for Nature" (Lem, 1964/2005, p. 256).

The first artificial nature arises in the form of the human life environment created by the artifacts and technologies in the physical world. Technology produces new physical objects, each of them characterized by a changed (relative to the natural) order of its constituent elements. The increase in the number of unnatural objects leads to a change in the quality of perceived reality and forms the first unnatural environment. The first artificial nature is made up of projective versions of the semantic rule of sense perception, designed to solve the problems formulated for the natural, unchanged layers of human mind and reason; its qualitative development is associated with the change of the pragmatic rule of perception by scientific progress and the use of newly discovered syntactic combinations (for example, from the microcosm in convergent technologies) to create new artificial objects.

The second artificial nature has appeared together with cybernetics, when the skills of managing the pragmatic rule of reason were transformed from individual *téchn*e into technologies. It is characterized by the spread of artificial objects in the sphere of the mind, creating a changed order of elements, where the new systems are no longer in the sphere of perception, but in the sphere of logical and grammatical forms of thinking, reasoning and construction. In the dialectics of artificial and natural for machines that process information, the background is the first artificial nature – and the new complex system they create is unfolding as a secondary semiological system that builds itself on the physical reality of artifacts. Further development of artificial nature leads to the appearance of the third artificial nature, in which the artificial, technically created concepts and systems of concepts, that is, the mechanisms of reflexive control, are added to artificial objects and subjects (Nesterov, 2017). Some steps in this direction are made by transhumanism, which moves the point of application of technologies inside the human and the living organism as a whole – but the most noticeable results are obtained in the development of decision support systems in approaching the concept of a powerful AI. We can say with a high degree of confidence that humanity is already dealing with a third artificial nature, since artificial actors have appeared in society (and their number and types are increasing), making decisions that are significant for humans, using non-human forms of reflection, performing ontologies that are not transparent to a human.

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PROBLEMS AND CONCLUSIONS

Technology is the control of matter, where matter is the substrate of semiosis. Technology is a language, a complex interaction of pragmatic, syntactic and semantic rules of activity. Technology is a tool for liberation of the human mind from the influence of biological limitations. Technology is a force that creates new forms of nature, new images of a human being and life.

The state of technology at each moment of time clearly shows the level of development and self-knowledge of a society, the material form of culture, which fixes the ratio of actual and potential cosmos, the real and the actual, conceivable and possible in specific historical conditions. The mechanisms of development are set by the vertical logic of technology, which determines the auto-communicative self-determination of humanity as a species.

The global problems raised by modern philosophy of technology include 1) the separation of ethics and technology: humanity employs the systems of moral norms of archaic tradition and axial time, the ways of "being human" are fixed for the conditions of life of natural and the first artificial nature; however, there are no systems of proper ethical regulation for the age of cybernetics; 2) the construction of human technical evolution under the conditions of the third artificial nature, the digital revolution, or the "technological singularity" in the sense of Vernor Vinge. The various concepts of cyborgization, of the neo-human, of automation of the social processes all require understanding and development of the reflexive nature of technology. They require the integration of an awareness of semiosis in the development of models and model ontologies. With this awareness philosophers and engineers can evaluate themselves, technology, and their designs on and of the future.

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Acknowledgments

The reported study was funded by RFBR, project number 20-011-00462 A.

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