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Sources and Foundation of Pragmatic Knowledge

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Abstract—The structure and features of pragmatic information and pragmatic informational interaction are considered in the context of the real pragmatics—a purposeful human activity. Transformation of the empirical data into semantic knowledge represented as a dynamic structural model, i.e., an information–semantic information–semantic knowledge process, is investigated. The sources and foundations of pragmatic knowledge are analyzed in the context of the evolutionary theory of knowledge. The "information society" concept is discussed.

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1. INTRODUCTION

The swift development of information and communication technologies (ICTs) not only has qualitatively facilitated and accelerated an access to information but also led to an unprecedented synformism—the synthesis of information (data bases) intrinsic to different scientific and technical fields. A formal (and external) unification is caused by the ICT foundation, computer digitization, indifferent to the object content, semantics. In a wonderful manner, a general digitization sends us back to a Hellenistic idea—natural numbers underlies the universe—which was suggested by Aristotle in *Metaphysics* in the discussion of Pythagorean propositions: "Everything in the nature is undoubtedly similar to numbers" and numbers are first in nature ... and the elements of numbers are the elements of everything, and the whole heaven is harmony and number [1, vol. 1, pp. 75–76].

However, such synthesis does not play a major role. In spite of subjective opinions and interests, the real paradigm—purposeful human activity—combines most different types of matter and interaction, such as natural, physicotechnological and scientific, social-political, economical, international, military, and cultural. People and nature are inseparable worlds, and their intertwining becomes more tight with progress in science, technology, and civilization as a whole (e.g., it is quite reasonable to investigate military-political problems in the context of geopolitical analysis). People makes decisions and take actions according to strategic and tactical plans, which can be adequate and correct only if all significant factors and all participating persons are taken into account. Hence, when the problems of real pragmatics are analyzed, we are dealing, strictly speaking, with the system analysis of subjective and objective problems instead of recognizing a human role in the surrounding world.

In this approach, pragmatic problems are objectified to a great extent and can be regarded as the humanitarian and natural scientific problems of system analysis applied to pragmatic informational interactions: the decision-making based on analyzed pragmatic data and strategic planning. The essence of pragmatic research and theory is determined by (i) the completeness and quality of information and (ii) the validity, adequacy, and corroboration of pragmatic theories.

The information theory involves the multidisciplinary approaches to information problems and technologies [2, p. 1]. In addition, the informational interaction of entities of different kind is assumed to be the subject of new science synthesizing the results of natural sciences and humanities. In this work, pragmatic information and the foundations of pragmatic knowledge are analyzed. The architectonics of pragmatic theories is the subject of separate research.

2. PRAGMATIC INFORMATION AND INFORMATIONAL INTERACTION

> "Without contemplation, our knowledge has no objects and, in this case, remains absolutely empty."
>
> I. Kant, *Critique of Pure Reason*, I, part 2, IV.

Pragmatic Information

Information appeared at the very beginning and contains the sources of plans and human actions. In the information theory, information of different type is understood as an intuitive description of objects and

phenomena (in detail, [2, p. 2]). According to the information theory, pragmatic information (from Greek πργματοζ signifying "action" or "manner"), i.e., data on the real pragmatics, constitutes an information base according to which society objects make decisions, act, and create strategic plans [2, p. 2]. The pragmatics must start with a reliable information base if we want to engage in the real pragmatics instead of mythmaking.

The physical world, nature, can exist and exists as a whole, irrespectively of a person (as a carrier of activity, consciousness, and awareness [3, p.155]) and individual's consciousness. In this sense, the physical world and its constituents are objective. Their fundamental property consists in that they can be observed and measured by both scientific instruments and a man. Facts—accurate results of observations and measurements—are empirical data. Natural scientific empirism allows *multiplication* (empirical repetition of a spontaneous observation and experiment), which helps to extract meaningful factors, filter a subjective component, formalize idealized speculative experiments, and define and verify initial hypotheses.

Observation and measurement tools must be available to any observer or researcher concerned to check factors. As was suggested by G. Follmer [4], this requirement is called intersubjective checkabilty. In addition, description tools must be intelligible ("intersubjective intelligibility"). In this case, the Follmer's requirement of common language is optional because the translation requirement (the existence of faithful translation) is sufficient. G. Follmer classifies these requirements (they are actually the condition of universalism) as "objectivity criteria." Together with other criteria, they have been discussed in [5]. Comprehensively investigating the biological problems of a knowledge process and its expression tools (first of all, language), H. Maturana and F. Varela [6] also rely on the requirement that the phenomenon description (translation) intelligibility is a necessary condition of knowledge.

The foundation of perception and cognition is biological (the subject of investigation of the "evolutionary theory of knowledge") [4, 6, 7]. In observation and perception of the real world (i.e., its physical and humanitarian aspects), the human physiological system is the same real tool as the physical world and the man-made technological facilities. The person–object coupling is described perfectly well in the striking metaphor of K. Lorentz [7, p. 260]:

"{Even in our days, a realist looks only at the external world and does not realize that he is its mirror. Even in our days, an idealist looks only at a mirror, averting his eyes from the external world. The direction of observation impedes them to see that the mirror has a nonreflective reverse side, relating it to the reflected real things: the physiological tool, the function of which is the cognition of the external world, has the same reality as this world.}"

In the light of the twentieth century discoveries in physics, an object and a subject (reference frame) are related more tightly than commonly thought: the object–perception dependence is also the immanent property of the physical world. The relativism noted by K. Lorentz is valid for physical objects proper: the fundamental attributes of bodies are noninvariant with respect to the reference frame. The most known attributes are size and shape (the abbreviation introduced by K. Lorentz) and time and age ("the clock paradox"). Together with physical laws, they can be noninvariant in different reference frames. This problem can be solved with the help of the "own reference frame" in which an object remains motionless. However, in the complicated system whose components move with respect to each other, the solution cannot be found. Thus, the Follmer's "reality postulate" (discussed in [5]), i.e., "there is the real world independent of perception," cannot be accepted.

A quantitative description of information is usually associated with three approaches based on entropy (K. Shannon and A.N. Kolmogorov [8]), algorithms (A.N. Kolmogorov), and the combinatorial theory (V. Goppa [2]). An advantage of these approaches is that they are supported by the developed mathematical apparatus. A disadvantage is that quantitative description makes it impossible to estimate the informational semantics—the meaningful content of information. A semantic approach was reported in the well-known study of Y. Bar-Hillel and R. Carnap [9] and developed by the author of Moscow semantic school, the foundations of which were provided by I.A. Vel'chuk and Yu.A. Apresyan.

It is needless to say that the contents of many objects and processes of natural science have been described quantitatively (as functions, matrices, and equations).

The major part of information on the nature allows *multiplication*—accumulation in quantity (repetition of experiments). As a consequence of this fundamental property, natural scientific data can be checked and accepted by any researcher.

In contrary to objective information on the physical world, the basic part of pragmatic data is subjective. In essence, they are evidences, and not facts. Hence, the probability of distortion in an actual pattern is very high. For comprehensible reason, a general pattern contains information of different observers. Hence, distortions are added with contradictions. Data on a historical process can be assumed to be pragmatic.

Firstly, pragmatic data consist of evidences formed due to observations of experts and, hence, having the highest confidence. However, random and unintentional distortions must be taken into account. Secondly, they involve evidences of accidental persons,

which are appreciably less reliable. It is obvious that the results of personal observations cannot be regarded as reliable. Thirdly, (this refers to the modern world), pragmatic data contain information recorded by observing devices or the governmental means of observation and inspection.

The events under consideration must be supplemented with man-made things and those not made by hand, historical sources or evidences of witnesses (or almost witnesses) irrelevant to the theme of analysis, literary and cultural monuments, private letters, and analytical manuscripts. A professional researcher withdraws data from all aspects of human activity in all manifestations.

However, there are special types (political, economical, and military) of information: signed international treaties and accepted governmental laws and regulations. If international treaties and foreign-policy documents objectively highlight foreign-policy interests, ordinance and regulations correspond to domestic interests and the goals of participators of political and economical processes inside the country (in the opposite case, it is impossible to rest on anything). Thus, it is this information, as well as the records of observing devices, that is fundamental for *understanding* of pragmatic processes.

In the absolute majority of cases, a pragmatic process is empirically irreproducible and, hence, denies an experimental repetition, i.e., multiplication, and, therefore, an empirical verification—another principle feature of pragmatic information.

It is self-evident that natural scientific experiments, investigations, and hypotheses can be inaccurate and even contradictory. At the same time, multiplication enables us to verify them. Pragmatic data are accumulated over time. Only a reliably described and correctly analyzed historical experience (in a wide sense) can underlie search for pragmatics laws. In connection with this, historians, sociologists, and economists who arbitrary "dissect" information, can be called the counterfeiters of real pragmatics.

From the viewpoint of etymology, the word "information" (Latin *informatio*) designating to a massage or explanation) implies the interaction (or dialog) between an information source and its consumer. Interaction is the base of human activity, and informational interaction is one of the forms of activity. Hence, data domains and actions must be investigated in parallel with the trends of events, interests giving their birth, words and deeds, and causes and effects. System analysis enables us to obtain important and unexpected results via pure mind. As was said by M. Bloch [10, p.23], reality can best be explained according to its causes. In addition, analysis of contradictions in pragmatic data can directly indicate sources where missing information or probative base must be sought and "bring historical witnesses to tell even against their will," wrote Marc Bloch [10, p.23] and, in connection with this, added, "I know questions that should be addressed" to history.

Informational Interaction. A man, including a desperate individualist, spends his life interacting with the world and people (even Diogenes of Sinope interacted with the Sun, its barrel, and nearest idlers, asking them not to disturb him). From the standpoint of philosophy, human existence involves dialogs with oneself, "the other," and "the others" (i.e., a community). According to the philosophic doctrine of M.M. Bakhtin [12], which is shared by V.A. Lektorskii [3, pp. 17, 36, 46], the essence and existence of an individual is inseparably linked with answers on "the appeal of another man and "another" is the necessary part of the individual [12, pp. 35–50]. Perception and subsequent knowledge arise from interaction with the nature and people, which affect the thoughts and actions of a man.

In the information theory, an informational interaction plays a significant role and is interpreted as the interaction between persons and objects, leading to a change in the data base (accumulated information) of one of them [2, p. 5].

The information transfer technologies have been discussed in 2, pp. 5, 6, 13, 82–84, 95–96]. Informational interactions can be divided into three classes (types), namely, interactions occurring in artificial (technical) systems (class 1), combined systems (class 2), and natural (living) systems (class 3).

The first class is informational interactions in technical systems: from simplest regulators to global computer networks. The second class contains “living organism–artificial organ,” “man–machine,” “researcher–inorganic object of investigations,” and other interactions. The third class corresponds to informational interactions occurring in the range between molecular-genetic levels to social communities. It should be emphasized that the aforementioned types of interactions are tightly coupled during decision making in the real pragmatics.

In recent years, the unprecedented systems of acquisition, storage, transmission, and analysis of data—computer systems—have been created [5, p. 91, references]. As a result of striking progress in computer technologies, computer systems has become the intellectual communicators, brokers, and competent partners of people in solving the problems of semantics (digital data conversion into conscious information) and pragmatics (data conversion into the knowledge of purposeful activity).

An important feature of informational interactions is linked with the biological aspects of formation of pragmatic knowledge, i.e., with the human properties understood as both the tools of world perception (and information obtainment) and the constituents participating in evolution and formation processes. In the latter case, both a biological species and the intellectual and social activities of a man are formed. These

problems are thoroughly valuated in the studies devoted to the evolutionary theory of knowledge (e.g., see [5]).

Biological aspects indicate that external world signals (i.e., objective and subjective data) are perceived by different organs and biological systems (constituents) of a human organism and, thereafter, undergo specific processing, filtering, and changes [5, pp. 77, 79, 84]. In connection with an evolutionary approach, G. Follmer indisputably summarizes as follows:

"{Our cognition apparatus is the result of evolution. Subjective cognitive structures correspond to the world due to their formation during adaptation to this real world. They agree (partially) with the real structures because such an agreement enables survival [4, p. 131].}"

The evolutionary theory of knowledge focuses on that the biological apparatus of a man and its organization were created phylogenetically when people evolved as the biological species. There is no doubt that they are given to each man a priori. The existence of inborn instincts can also be regarded as proven. An ancient problem is whether any man has "inborn concepts" or "inborn forms of cognition. In the metaphorical sense, the issue is whether a man a priori has an intellectual piano or an intellectual composition textbook. This problem will be of interest from the viewpoint of determining purposes in the pragmatic analysis technique. The aforesaid is also associated with the correlation between "information" and "knowledge."

3. SEMANTIC KNOWLEDGE

"Faust:
What is the meaning to know?
Answer to the question, my friend.
In this respect, there is no complete order."
J.W. Goethe, "Faust", part 1, "Night"
(translated by B.L. Pasternak).

Protoinformation Information of different kind, which contains the descriptions of objects, events, and processes [2, p. 2], is built into the foundation of knowledge and future theory (science). In Section 2, information and informational interactions were discussed as already existing events. Below, the perception and replication (obtainment) of data are considered only if it is necessary to understand the reliability of knowledge and theory.

As was postulated by J. Gibson [14], perception is an active process of gathering of object (organism) data. This position agrees closely with the information theory. Information carries—technical tools and people—are principally different. Technical tools are known rather well due to their artificial origin. Information can be transferred from an arbitrary technical carrier to computers, i.e., represented as computer data. Hence, computer information systems can be assumed to be universal informational equivalents just as gold or money is an equivalent of cost or a medium of exchange.

When represented with the help of computers, information is the digital implementation of ideas determining an algorithmic (combinatorial) approach. Owing to binary alphabet {0, 1}, words, subsequent algebraic operations, and recursive functions (or algorithms) are formed as though a philosophic ascent from simple to intricate things was carried out, making it possible to computerize all languages, texts, and visual and sound patterns and series.

A discrete set of bits or metasemantic information—computerized data without any sense—can acquire certain values and becomes intelligent and intentional information. This refutes the standpoint according to which representation objects can be formed and exist as a holistic perception.

Partial information or sensation can be considered the separate signs (properties) of observed objects, the certain set of which can characterize (attribute) an object. In practice, this set is used to perform expert examinations. The same principle underlies the uniqueness theorems in mathematics. In this case, a mathematical object satisfying certain conditions (having certain properties) is proved to exists and be unique.

The situation is more complicated if the biological aspects of human perception are investigated. The biological aspects of information obtainment are analyzed exhaustively in [4, 6, 7, 15, 16] and discussed in [5, 17]. The illusions of human perception (a Müller-Lyer illusion, a Nekker cube, a depth illusion, etc.), nonsensory factors, distortions, and instabilities are known, and their research is now being actively performed. In addition, observation and measurement techniques, which are technical and biological in nature, are inaccurate in principal. In a high- magnification microscope, a line segment drawn along the straightest edge of a ruler turns out to be a wavy line. A stretched paint thread, which is used to mark a straight line on a surface (after chalking and stretching, the thread is released, hit the surface, and remains a line of sawcut) is surely not a line segment, but does not differ from the segment by eye. The microscopic image of any straight line is a discrete series of dots instead of a continuous line, a smooth curve displayed by a computer is actually a broken line, etc.

In describing the nonidentity of the environmental reality and the world pattern constructed by each man on its base, R. Bandler and J. Grinder indicate that perception filters can be neurophysiological, social, and individual [18]. These problems are also discussed in [13].

In addition, the improved information obtainment techniques can cardinally vary our conceptions of the world. Observations with the help of modern high-precision instruments indicate that visually immovable and unchangeable objects can vibrate and change their shapes and chemical compositions. In particular, a bright example is a fixed DVD perceived as an immovable flat disk. During observations carried out via laser equipment, this disk exhibits a vibrating curved surface and its shape varies in time.

Inaccuracies and errors are the properties of any technical device. They are investigated, e.g., in the mathematical theory of errors. There are no reasons to attribute the accuracy to biological aspects of perceptions, including a man. What is the meaning of the statement "sensations cannot deceive themselves" and how is interpreted a hazy "argument" of Russel, "In reality, there are no illusions of senses, but data are erroneously interpreted as the signs of things other than themselves" [3, p. 116]? In the light of the valid physical property of relativism, can "things themselves" be the dependences between the fundamental properties of a substance and the reference (observation) frame? Thus, except for dogmatic reasons, there are no grounds to assert that "an absolute obviousness is a distinctive feature of sensations." Perception can be illusory not only because the activity of mind is conceivable [3, pp. 115, 116].

If the aforementioned statements are built into the foundation of the theory, they become veritable and indisputable for this theory, leading to a completely different formulation of the problem.

The object perception is complicatedly and ambiguously structured. An image is synthesized from the following components defined by researchers:

(i) the criteria of objects: textones (B. Julesz) and geons (I. Biederman);

(ii) the levels and stages of representations (perceptions) (D. Marr);

(iii) factors (genstalt psychology).

A controversial question is whether a human perception is composed of sensations and in what manner [3, p. 115]. The credo of genstalt psychology—a whole is not the sum between constituents, i.e., a negative reaction on a psychological structuralism—is beyond any doubt. Among other things, this principle is use to construct all mathematical theories: objects exist not only as things in themselves but also in relations and interactions with each other. However, a proposition that perceptions are always holistic nonatomized images is questionable. Our observing tools and knowledge of a human organism are still very imperfect for making categorical inferences similar to that of genstalt psychologists. However, strictly speaking, an argument is inconsistent when sensations do not exist as the individual images and fragments of perception (elements of perception), at least in this quality, because they are not recognized. Thus, genes, genetic information carriers, are not perceived and cannot be conscious in sensations.

Arguments of G. Riley [3, p. 116], which were extracted from the ideas of late Wittgenstein, are even more surprising. A man visually perceives concrete things with certain qualities instead of qualities themselves, e.g., only objects of the corresponding color rather than the color as a light spectrum—electromagnetic waves of definite waves and frequencies. Hence, sensations are declared as "imaginary objects" with the acquired features of perception and a "categorial error." In connection with this, natural numbers (and, therefore, mathematics based on natural numbers) would be announced as imaginary objects and the categorial error. In contrast to Riley, mathematicians are thought that the separation of numbers and objects is not an error but the discovery made thousands of years ago.

In the context of an evolutionary approach, a significant idea is that evolutionary changes caused by a natural selection lead to the appearance of adaptable sensory systems. As a consequence, all species adequately respond to the environmental features affecting their survival.

G. Follmer [4, p.152] associates information acquisition (or the representation of real objects) with designing in which tree components are taken into account: an object, a projection, and a screen. The designing mechanism has been discussed in [5, p. 86]. In the Follmer's scheme, both a "cognitive metaphor" and the term "designing" are successfully employed. However, it goes without saying that metaphors and new terms cannot solve problems, except for those inherent to the representations of adaptors of "language games."

Subjective relativity is capable of distorting the real pragmatics in the description of textual evidences to a greater extent. Hence, the previously noted proposition of K. Lorentz from *Reversed Side of the Mirror*, which is devoted to the equivalence and interdependence of human physiological systems as the tool of external world perception and the conscious real world [7, p. 260], is especially actual. Thus, critical analysis of information (or historical sources) is the first and obligatory stage in the construction of the subject theory.

The errors of perception and cognition can also arise from erroneous learning. Let us consider the fragment in the book of M. Goldstein and N. Goldstein, which describes learning of blind persons whose eyesight was recovered in the mature age. To reveal the shapes of geometric figures, the palpation problem is posed instead of the geometrical problem; i.e., a tomato is proposed to determine exclusively by color, combining incorrect cooking experiments and "palpation geometry" with the utilitarianism into an inconceivable mismatch of incorrect attainments. If the

similar technique is employed to learn experts, we will eat falsifications instead of qualitative products. However, such a situation is definitely encouraging: in our country, learning is not very bad because there are worse processes.

From Information to Semantic Knowledge. The perception of the world through experience and its cognition were inherent to people long before the formation of knowledge. Information was generated by combining conscious individual data and an informational interaction. A human biological system was formed during an evolutionary process, which required to obtain and estimate (or structurize to some extent) data and, most importantly, comprehend them and apply according to circumstances "here and now" (often instantly) in interactions with the external world. The problems concerning the man's survival as a biological species inevitably led to improvements in information base and behavioral stereotypes (and their subsequent (regular or random) fixation in mind). This phylogenetic aspect of human evolution is most important in the evolutionary theory of knowledge.

In the cognition and interaction processes, a man employs different significant tools: musical, plastic (gestures, dance, and ballet), and visual (painting, graphics, ideograms, and optical images) resources. From the viewpoint of a mathematician, graphics can say no less than words and symbols. Moreover, Zen and koan practices and language—the most powerful tool whose primary importance was noted by all the cited authors describing the evolutionary theory of knowledge—have not to be forgotten. The linguistic world, where human thought move, in conjunction with the external world provide the foundation of cognition. The correctly used language makes it possible to develop perfected deductive theories, the constituents of scientific cognition. However, the difficulties caused by the development of scientific theories (i.e., the construction of basic concepts, critical analysis of data and semantic knowledge, the validity of inferences, and their interpretation) are beyond the scopes of language problems. These features are known to each mathematician who comprehends the most arduous counterexamples or proofs of problems remained unsolved for centuries or theoreticians in the physical sciences who deal with cosmological models, the problems of quantum mechanics (or field theory), and foundations of theoretical physics as a whole (or any other specialists who solve the complicated technical problems). By a lucky chance, humanitarian dreamers do not suspect these difficulties and assume that the main world problems are the language problems—*sancta simplicitas*.

It is axiomatic that a man does more than creates and improves language and linguistic forms. During the development of new cognitive theories, the linguistics laws (as directives of thought motion) elevate the human mind, and such a process is not connected with any mysticism. However, the man–language, man–object, and language–object interactions do not deserve the new "language idol" instead of idols that were thrown down. (Language and images are synthesized as combination of zeros and unities in computers; i.e., is it required to venerate zeros and unities?) Linguists relying on the statement "a man has been created by language" must explain how primitive societies and first public institutions were created by *homo sapiens* when language did not exist or was more primitive than a man and was less important than gestures (it is necessary not to forget the influence of instruments of labor). Note that children better recognizes patterns than speech.

The process under consideration corresponds to a cognitive process in the three-stage scheme proposed by G. Follmer (perception–subscientific cognition–scientific cognition). From the viewpoint of the information theory, we deal with transition from nonconscious information of experimental perception to conscious data understood in the context of semantic information, followed by going to semantic knowledge. This process is the first and natural (as historically corresponding to a cognitive process) stage of acquired knowledge (note that the part of modern information is pseudosemantic). The semantic knowledge is the fixed structurized semantic information (from Greek σημαντικός signifying having a value).

The semantic knowledge precedes the scientific one. In this case, it is not assumed that the knowledge was concealed in the powerful spirit of Fichte "before all centuries" and patiently waited its birth or was hided in the world spirit and waited the birth of Hegel to manifests itself. During a purposeful human activity in all possible interactions and biological and social evolutions, the necessity of solving arising problems created both the modern civilization and modern scientific knowledge. The semantic knowledge about the physical world, secrets of handcrafts, human society, and people is more ancient than the scientific knowledge. In the Middle Ages, many discoveries of natural sciences, secrets of handcrafts, and remarkable culinary recipes have been obtained randomly without purposeful investigations. The semantic knowledge involves facts, data, statements, concepts, prejudice, stereotypes, rites, delusions, dogmas, etc.

The prescientific and extrascientific information is called ordinary data and characterized as cognitive, but uncritical. Different types of ordinary knowledge were directives of handcrafts and human behavior and could involve both true and false data. Disordered protoinformation can hardly be called the knowledge if its belittling is not the purpose. This is the so-called gold-carrying ore intended to extract gold. If the human activity is analyzed objectively, the part of knowledge is routinely used in the every day life and production activity at the level of ordinary instincts and without mental efforts. Hence, the slogan of Maturan and

Varel [6, p. 16, 17], "Any action is cognition; any cognition is action," is semicorrected. The action is not always cognition.

According to all cited authors of the publications on the evolutionary theory of knowledge, the human knowledge is greater that the scientific. As was noted by Lektorskii, the scientific knowledge not only contains the prescientific and extrascientific variants but also interact with them [3, p. 113]. We share this viewpoint and must add that the absolute majority of people has no common with sciences and this undisputable fact cannot be denied by the postulates of Kunh and Feyerabend.

Accurate definition of scientific knowledge is not obligatory. According to M. Castells, the knowledge is "the basic laws of the object domain by which a man can solve arising industrial, scientific, and other problems, i.e., facts, concepts, mutual relations, estimates, rules, heuristics (or actual knowledge), and strategies of solutions in this field (or strategic knowledge) [19]. The knowledge can be divided into declarative (to know what) and procedural (to know how). Declarative knowledge is theoretical because makes it possible to explain the reason of action. Procedural knowledge is pragmatic and corresponds to certain habits. Procedural knowledge can be divided into constructive (to know recipes and instructions) and situational (to act in arising situations). It is possible to separate the third type of knowledge characterizing the culture of the given social system. The behavior of knowledge can implicitly, i.e., unallowable for "profane."

The structurization of semantic knowledge, as well as its organization in the human brain (in particular, the known logical level scheme of P. Dilts and G. Bateson: *environment* (when, where, with whom) → *behavior* (what) → *capacities and strategies* (how) → *beliefs and values* (why) → *identity* (who) → *mission* (who and what else)), is discussed in [13].

4. FROM INFORMATION TO PRAGMATIC KNOWLEDGE

"All errors in management and the society arise from philosophic errors caused by the errors of natural sciences."

A. de Condorcet, "Project of the Decree about Organization of Public Education" reported in Convention in 1791.

On the Concept of "Information Society" Information society is a popular word combination. This term is commonly used in discussions devoted to society, economics, or education.

It is extremely useful to study what meaning has this term when scientists try to describe an information society. In the literature concerned with information society, the number of authors who operate with the undeveloped definitions of the subject is very large. As was emphasized by F. Webster at the beginning of his study *Information Society Theory* [20, p. 13], they continuously discuss the features of an information society, but their operational criteria remain uncleared.

The quantitative estimates of the high level of ICT influence on politics and economics are the most popular argument for classifying the modern society as an information community. Competent quantitative analysis performed by F. Muchlup and M. Porat are considered the strong argument in favor of the Porat's inference: the United States has become "the information society the main activity of which is the creation of informational products and services" [21, p. 32]. Analogous statement was postulated by D. Bell in 1973: "we enter into the information society (the synonym of postindustrial society, as was thought D. Bell) when the majority of people are engaged in the information sphere" [20, p. 21]. Well-known analytics R. Reich, P. Draker, and M. Castells also assume that the moving force of modern economics is people and their key feature is the use of information [20, p. 22]. M. Castells begins section *Technology, Society, and Historical Changes* by the words "revolution in information technology covers the entire region of human activity" (however, he explains, "the technology does not predetermine the evolution of society) [19, p. 28] and finishes this section as follows: "The modern technological revolution ... has appeared and developed during the global restructurization of capitalism and is an important tool of restructurization. Thus, a new society born due to this transformation is both capitalistic and informational."

Webster note that "the majority of definitions of an information society are based on quantitative characteristics" and separates five definitions associated with the identification of innovations: technological, economical, coupled with the sphere of employment, spatial, and cultural. Emphasizing that the grounds of these definitions are

(i) the statement that quantitative changes in the information sphere have led to the formation of a qualitatively new social structure—information society, and

(ii) the reasoning that our society is informational due to an increase in the volume of information and the appearance of information society is caused by the appearance of new information technologies [20, p. 17],

he criticizes this questionable structure.

Indicating the debatableness of the quantitative approach, Webster writes in the first chapters [20, p. 19]:

"{The main problem is that hidden subjective interpretations, as well as estimation statements related to the construction of categories and the incorporations and eliminations of an informational sector,

Table

1. To determine	What knowledge is determinant to attain success
2. To acquire	Gathering of existing knowledge, experience, methods, and qualification
3. To select	Flows of collected and ordered knowledge and the estimation of its usefulness
4. To store	Selected knowledge is classified and entered into the organized (human, paper, and electronic) memory
5. To disseminate	Knowledge is extracted from the corporative memory to become available for users
6. To apply	During implementation of tasks, problem solution, decision making, idea search, and learning
7. @	New knowledge is revealed by observing clients, feedback, cause analysis, reference testing, experiments, investigations, creative thinking, and data development
8. @	On the basis of intellectual capital—new products and services that can be implemented beyond the limits of an enterprise

stand behind the statistical tables, which must confirm the objectivity of proofs.}"

As a consequence, the principal problems are the unreliable foundation and structure of all quantitative approaches. Without analyzing the arguments of the different authors, we can indicate that the implementations of informfile ideas and the release out of the industrial society have led to the replacement of the Great Britain (the nineteenth century) and USA (the twentieth century) workshops of the world with the China workshop of the world (the twenty-first century).

Webster thoroughly discusses and denies the Bell's concept, engages in polemics with Castells, but must admit that information is the fundamental factor in the modern economics [20, p. 72]. Let us consider its role in the ICTs of the existing world and in the theoretical knowledge (which is of equal importance).

Although many intellectuals and politics interpret new technologies as the newest idols with keys to progress and healing, the situation is more complicated.

During historical evolution, none of the technologies was considered the determining factor of our society. The discovery of a wheel, the domestication of a horse, and the inventions of a metallurgical process, a steam engine, or a lifting vehicle (very important inventions) do not imply that "horse" or "steam" society has arisen.

Owing to the ICT influence on different aspects of current life, numerous investigations of an influence process are performed. Below, we do not consider the current political problems: globalization, a growth in ICT influence (and, therefore, national sovereignty restrictions), class problems of a traditional political economy (the works of Shiller), information distortions and its manipulations for political purposes (the favorite topic of Yu. Khabermas), but focuses on philosophic problems.

Coinciding with the substantiated inferences of Webster (i.e., the appearance and development of unprecedented ICTs, the sharply increased amount of information, the growth of its influence on the current activity, society organization, etc. cannot be regarded as the features of the new type of the society of the new epoch [20, p. 80]), we must indicate the occurred principle changes.

It is accepted that a distinctive feature of the existing "information society" is the information transformation into the good. "Knowledge is created to be sold and consumed to acquire cost in the new product", declares J.F. Lyotard [22, p. 19] (it is clear that he does not know the Pushkin's expression: "Inspiration is not sold, but a manuscript can be sold). G. Shiller has assumed that the information revolution is hallmarked with the continuously sharpened inequality (the point at issue). However, the information and knowledge transformation into the valuable product is scarcely the new process. The secrets of silk production, violin manufacturers, bell molding and other corporate secrets (including culinary), which were state secrets, military technologies, etc. always estimated higher than gold. Mongolian vanquishers and Tamerlane took care of captive artisans. In the Middle Ages, books were very expensive even after the discovery of paper. Beginning at least from the thirteenth century, both technological and legal literacies were valued highly. After Guttenberg discovered book printing, the number books printed in Europe for 50 years substantially exceeded the number books written for several preceding centuries; i.e., the revolution has occurred. Hence, this society could be called informational (in addition, this was the period of great geographical discoveries). Thus, from the viewpoint of aspects discussed above, it is necessary to note the continuity of our epoch instead of its exceptionality.

As to postmodernistic (proofless) prophecies that the entire data and science will be transformed into a commercial shop, they will fail. Mercenariness is an important, but not sole, aspect or motif. Even ancient Roman understood that *spiritus ubi vult spirum* (the spirit moves in an arbitrary direction). Scientific and technological investigations always required financing. However, many investigations and discoveries have been carried out without proper payments and even contrary

to mercantile interests. Moreover, profitable discoveries were not often supposed to be gainful.

However, the high data transmission rates, which have led to the new types of business; the information dissemination freedom, which has strongly hampered its concealment; and the state authority functioning with the help of internet technologies were not observed previously. The Castells' attention to informational networks [19, Ch. 3–5] and their constructive and destructive functions in the society is undoubtedly justified.

Intellectual aspects are as important as political-economical relations. According to F. Webster, "although the theoretical knowledge priority is little discussed in the information society theories, there are many grounds to interpret this property as a distinctive feature of modernity." In addition, it is proposed without proofs that "it is possible to prove that the theoretical knowledge plays a key role in the modern society in contrast to the preceding epoch with dominant practical and situational knowledges." [20, p. 38]. "This knowledge is formalized in texts and transferred mainly by learning." [20, p. 39]. In addition, Webster kindly cites D. Bell who assures us that industrial revolutions were performed by "talented dreamer indifferent to sciences and the fundamental laws underlying discoveries." It is likely that Bell both observed the flashes of inspirations of dreamers and penetrated into their thoughts. The current situation differs in that "innovations are initiated by principle knowledge; their initiation clearly manifests itself in the field of science and technology (note that these principles can be understood by a small number of experts)." [20, p. 38]. Let imagine yourselves that Aristotle's, Euclid's, Galilei's, and Newton's crowds roamed the streets in the previous years. It is of interest whether anyone can guarantee that the current dreamers will not call liars in 200 years.

Note that F. Webster uncritically expounds the views of D. Bernar and N. Shter [20, p. 163].

We agree with Webster's concept about the high significance of theoretical knowledge and the remark "in our time ... the theoretical knowledge underlies many political decisions and debates." [20, p. 39], but the words "in our time" are obscure. It seems that *State* of Plato, *Politicians* of Aristotle, *De Cavitate Dei* of St. Augustine, *De Monarchia* of Dante, *Prince* of Mackiavelli, *Mahaprajnaparamita-sutra* of Nagarjuna, and *Conversations and Statements* of K'ung Fu-tzu (Confucius) and other publications prepared his successors were not written or they weakly affected the minds of politicians. It is clear that there is no need to remember the influence of political and economical doctrines, which "became the material force and seized the masses.

We also assume that accents must be changed. "Theoretical knowledge has become the defining feature of our world," was written by Webster [20, p. 40]. The problem must be posed in the following manner: *what* (in the qualitative sense) theoretical knowledge has become the defining feature of our world.

Informational Society and Postmodernistic Concepts. The orthodox Marxism–Leninism crisis and the USSR decomposition had unexpected consequences. At the beginning of postmodernism, which is called both an intellectual process and our everyday life [20, p.312], postmodernists interested in culture and art. However, in the last two decades of the twentieth century, they have passed to total generalizations (it is rather surprising because they refused all total theories). As was interpreted by postmodernists, the collapse of the so-called socialist system confirms that not only "great statements" (a bright metaphor of Lyotard)—proofless doctrines pretended to the generality and infallibility—but also other theories aspired to the authenticity and truth are inconsistent. They began with correctly criticizing the precarious concepts of aforementioned theories, such as "progress," "humanism," and "civilization development." (In general, starting with Hegel, many philosophers better criticize and deny than create.) Thereafter, it was indicated that the dogmas of Enlightenment philosophers (i.e., the laws exist in the historical process and the political being and actions of people is rational and understandable as the a priory truth) cannot be accepted. However, postmodernists simultaneously threw the child out with bathwater. Let us briefly analyze this situation because the postmodernism intended to play the role of the main social-philosophic direction of modern times.

Postmodernistic arguments rely on four principal statements. Firstly, it is assumed that the adequate and objective description and analysis of the historical process and humanitarian world are impossible. A man and political existence are declared to be incognizable (because the course of history discredits such attempts).

The second principal statement is more radical: there no reality and truth due to the "multiplicity of representations", but imaginary meanings are possible.

The third statement is pseudopositive: the place of the reality is occupied by empty information (various symbols and linguistic games).

Fourthly, in the opinion of postmodernists, the unavoidable subjectivity of a researcher is caused by both personal subjective and political commitments. Its propagandistic purpose is the event orientation in the definite direction by means of arbitrary extrapolations.

Let us consider these problems. Let us begin with the second (deepest) statement. Indeed, the truth multiplicity is an important problem. The truth multiplicity proved by mathematicians in the twentieth century (e.g., Indian philosopher assumed that the truth multiplicity is a self-evident fact and denied the objec-

tive and absolute truths [23, p. 39]) resembles the postulation of a single absolute truth in the West philosophy and is the principal discovery. The simplest example is alternative geometries. It is firmly ascertained that the axiom of parallels, as well as its negation, is compatible with the axiomatics of absolute geometry. Similar to alternative geometries, the standard axiomatics of the theory of Zermelo–Fraenckel (ZF) sets is compatible with both the axiom of choice (AC) and its negation. In other words, ZF sets can be extended both to theory (ZF + AC) and to theory (ZF+? AC). However, each theory will have its own drawbacks [12, p. 177]. In addition, the well-known continuum hypothesis (to solve the continuum problem, investigations have been performed for almost a century) turns out to be independent of ZF sets. The possibility of existing of Lebesque nonmeasurable sets (not having the length or area), as well as the possibility of nonexisting, are considered in [25, Ch. 20]. *Here, the problem is solved in the completely opposite manner*: several truths are possible (however, only in the perfect theories with infinite basic positions).

In this case, there are no contradictions. In any theory, the contradiction is admissible. The truth multiplicity and inconsistency are completely different things. The problem can be solved by two methods. The first of them is to investigate the sources and grounds of alternative theories, as is done in mathematical logic, e.g., in the proof theory. The other method is to rely on contradictions. In this case, postmodernists are not pioneers: "contradiction is the source of any motion and vitality; something moves, has motivations, and is active only due to an internal contradiction," Hegel [26, Book 2, p. 65]. The problem is hampered by continuous mixing of contradictions and contrapositions, which was predicted by I. Kant [27] (this work was underestimated by his successors). The contradiction was previously related to the magic word "dialectics." At present, the magic word is "relativism."

Analyzing postmodernistic arguments of adequacy and truth in the context of the correlated first and second statements (in Ch. 9), Webster highlights their initial propositions:

(i) Each representation and description of the reality is mainly falsified ("truth versions"). This proposition is called by the godlessly disturbed term "relativism," which was borrowed from theoretical physics. Hence, search for authenticity is senseless.

(ii) The reality is replaced with symbols, linguistic games, and unreal and empty estimates. Events occur in the world where "the concept of reality" is eliminated (the scheme of J. Baudrillard).

(iii) Accepting contradictions inherent to the society as a whole and each person, we must forget about the existence of true I.

In addition, it is necessary to consider postmodernistic concepts of the practice of these linguistic games (see Lyotar*d, @Scientific Knowledge Pragmatics, Ch. 7*), which is interpreted as a learning process (i.e., the teacher–student process). Since the directives of learning have a certain degree of acceptability, they are regarded to be "scientific." "The truth" and "the scientific content" of directives are determined by the resolutions of the narrow-specialized isolated community of experts. Lyotard calls this community "the scientific institute" (such communities were referred to as sects in the days of old). "The truth of a directive and the competence of an expert depend mainly on the approval of group of expert with equal competences." [22, pp. 62–63].

In this case, all phenomena become reversed. The truth of phenomena is determined by checked observations and measurements, rather than resolutions and approvals of a certain community. The observations and measurements are primary, and the resolutions are their consequences. The geocentric system will not be true due to the resolutions of the scientific institute even after "the name of Trismegist Aristotle." At the same time, this system is true not only because of the approval by the Copernicus scientific institute, which "announced that planets have circular trajectories. The institute assumes that it can prove its announcements. On the other hand, any statement related to the same expert is eliminated if it is inverse or contradictory." [22, p. 62]. However, the reasons of elimination are unintelligible. As was declared by Webster, "the TRUTH is replace with "the truth multiplicity" and there is no commonly used method of selection among the components of this set. As was affirmed by Lyotard [28], the truth is the issue of selection (i.e., only the accepted residue remains). To give a complete picture, it should be said: according to the order of Lyotard in 1988.

To corroborate and justify the elimination of the reality, surprising assertions about freedom are used (by the way, how to philosophize without the freedom). "After making a decision on the essence of truth, we easily come to tyranny." [20, p. 319]. Then, the principal total tyranny is mathematics, and mathematicians are slaves. in In this case, without lapsing into tyranny and determining the criteria of estimation and selection, it is impossible to find whether Mahatma Gandi is better than Hitler. However, postmodernists, one and all, do not want to live under the control of Hitler or Stalin.

As postmodernists deny the truth, it would be correct to say that "the multiplicity of senses" (or, simply, "the multiplicity of subjective, erroneous, and contradictory senses") instead of "the multiplicity of truths." The reason is the uniqueness of researchers of the humanitarian world and history. What if natural sciences could be created by automatic machines or clowns? "Postmodernism denies all claims to the real-

ity: nothing can be true and authentic because everything is falsified." [22, p. 325]. Why postmodernists announce that researchers of the humanitarian world are falsifiers? Why they (in contrast to specialists of natural sciences) tend toward falsification? Why they demonstrate contempt both to other scientists and, strictly speaking, to themselves? These questions have no clear answers. It is likely that other purposes and means exist and, in addition, other requirements and criteria are imposed.

There are the other, absolutely correct, reasons: the subjectivity of observation tools (in the first place, a man as a biological tool of observations) and the subjectivity of evidences. They have already been discussed in the context of pragmatic information.

However, it is necessary to make an absolutely different inference: any pragmatic investigation must be preceded by thorough critical analysis accompanied by the detection of possible contradictions and their elimination or the explanation the impossibility of elimination. However, all occurs contrariwise: facts are arbitrary analyzed or remained unverified and proofs, including arguments, are replaced with declarations. In natural sciences, such a practice is inapplicable.

Why the humanitarian world is senseless and unreal? Why the actions of its objects are unreasonable, contradictory, and incognizable, as is announced by postmodernists in their total extrapolations from culture to the whole pragmatism? The fauna is real and is the subject of science. The behavior of unreasonable animals is characterized by the directivity and consistency. Biology has revealed the behavioral laws of animals. Why a man is defective even in comparison with animals?

Although sociologists and historians are in extremely intricate situation, biologists and evolutionists undergo greater difficulties. It can be thought that the quantum physics, cosmology, and genetics problems are simpler. The negation of the reality and truth is an ordinary dogma, which is not substantiated but is the indulgence of the lack of knowledge and skill. However, if "there is no reality, but the language," and the unreal world around us is created by information, what is the subject of postmodernistic investigations? Is it possible that they investigate themselves?

Let us only imagine that houses and bridges, aircrafts, and nuclear reactors are created on the basis of postmodernistic principles. Generally speaking, if postmodernists are collected on the separate territory and live according to their principles, the natural selection will rapidly lead to their extinction (God forbid, we do not wish it).

It is undoubted that constructive analysis is mach better than postmodernistic intellectual groans and round dances of general phrases and abstruse terms. However, for this purpose, the pragmatic analysis laws must be determined and pragmatic theories must be developed.

The reliability and completeness of information are very important factors. Postmodernists correctly indicate modern "informational hazards." As was noted by Lyotard, information is not only gathered and analyzed but also concealed and distorted due to propagandistic reasons. Indeed, we drown in the sea of symbols, ceasing to designate anything. T. Rozak [20, pp. 34–36] asks whether the increasing volume of information leads to the higher informativity of citizens. Thus, there appear two problems: data obtainment and their rejection. Therefore, information must be complete and properly structurized.

In this case, we encounter some problems and cardinally new possibilities, which make it possible to say about "the information society." All archives are being successfully digitized. It seems probable that this process will be finished in the nearest future. Thereafter, all the materials of natural and humanitarian sciences will be generally available in the Internet. In this case, an end will be put to the absolutely vicious practice of rational minds to select somewhat important parts from data according to their hierarchy of values, arbitrary concealing or distorting other parts. Then, any researcher and "scientific institute" (according to Lyotard) will be able to validate the completeness and consistency of the data base used to construct one or another concept, thereby checking the perfection of foundations.

Thus, each of us can validate the perfection of substantiations. In this case, the conception inferences must be confirmed by strict (error-free and complete) *proofs*, which must be correspond to definite true theorem instead of general statements comprising round dances of general phrases sanctified by a popular expert, *ism*th, or a political order. In addition, it can be checked that the concept has no contradictions with the known facts. As a consequence, intellectual dreamers will not mislead an ordinary leader and themselves.

The correctly structurized scientific part of the Internet (together with public libraries) will be "the keeper of facts" the significance of which was highlighted by F. Webster, M. Phillips, and K. Moser [20, p. 254]. Thus, it will be possible (by means of the power of thought) to enter into the epoch of the substantiated "theoretical knowledge" of new technologies and real pragmatics.

Pragmatic Knowledge: Structurization, Management, Competences, A Priori Forms, and Pragmatic Theories Knowledge applicable to the real pragmatics—purposeful human activity—is of special significance. From the pragmatic standpoint, there are good natural reasons to assume that knowledge is information capable of generating an action-stimulating comprehension [29].

In practice, knowledge can be considered intellectual assets, which can provide and provides real dividends to companies: patents, copyrights, the knowledge and professional quantities of specialists, trade marks, a client base, the network of loyal providers and partners, the culture of innovation implementation, a corporative memory and data bases, the quality of working procedures, etc. According to utilitarianism, this is an important factor and the challenging motif of an efficient and successful economical activity.

The professional knowledge involves the following aspects:

(i) Cognitive knowledge ("to know that): the mastering of a basic discipline. Specialists attain a high level of skill due to intensive learning and certification.

(ii) Applied skill ("to know how"): "book learning" is transformed into efficient execution. The ability of employing the rules belonging to a definite discipline to solve existing complicated problems. This is most widespread professional level leading to the creation of valuable products.

(iii) System understanding ("to know why"): the deep understanding of the entire system of mutual relations and causes and effects underlying a definite discipline.

(iv) Personal motivation of creative work ("to want to know why") embraces will, motivation, and aiming for success.

Together with creation and maintenance of intellectual capital, it is necessary to abandon certain obsolete and inappropriate types of knowledge. Therefore, the problem concerning knowledge acquisition and management is posed. The knowledge management is the key component of scientific and industrial activities in the mordent society.

The knowledge management has two trends:

(i) efficiency, the use of knowledge to increase productivity by increasing the speed and decreasing expenses, and

(ii) innovations intended to create new products and services, new enterprises, and new business processes.

According to the investigations of Liebowitz and Beckmann [30], the knowledge management can be divided into eight stages.

From the tactical standpoint, a knowledge management process is accepted to divide into four stages: information gathering (acquisition), application, learning, and dissemination. The basic problem is the development of system indices used to estimate the advantages of investments in a knowledge base. Practical recommendations and the structurization and systematization processes of knowledge management are discussed in [31].

Since the data exchange speed and the technological innovation rate have increased, it is necessary to update the traditional educational system. In the knowledge and human resource management and professional-technical education and training, the dominant position is occupied by the competence approach, which integrates education and training into practice (e.g., see [32]) and involves both a competence and a functional competency, i.e., the capability of demonstrating its competence.

The competence approach as a whole comprises three trends. In the *behavioral approach* (an American tradition), the main attention is devoted to a high motivation and an efficient operation during the interaction of a man and an environment. The *functional approach* (a British tradition) is based on the functional competency in which knowledge, comprehension, and skills are employed according to the specified standards, including the problem solution and compliance with varying requirements. The *multidimensional and holistic approach* (France, Germany, and Great Britain) deals with knowledge, skills, and comprehension (action), which are selected as the constituents of the structurally complicated competence model.

Competences are accepted to classify into three directions: cognitive, social, and personal competences. The Council of Europe has defined five groups of major social competences, which "must be attributed to young Europeans," as is reported by W. Hutmacher in [33].

However, in parallel with utilitarian and practical problems, which can be regarded as technological problems, an equivalent attention must be devoted to the following principal issues: How the reliable scientific knowledge is selected among the pragmatic knowledge; what is the necessary tool in "distinguishing between truth and conspicuity" (I. Kant); and how knowledge is transformed into scientific theories.

Semantic information structurization is an obligatory initial stage, which precedes the semantic knowledge transformation into a scientific theory. The selection problems concerned with the rapidly increasing flow of new data requires the cardinal reconstruction of the Internet, i.e., its division into free and professional parts. The free part is restricted only by legal requirements. The professional part must involve portals, the number of which can be increased according to expert council decisions. The existing situation, in which much time is spent to find desired data (their reliability is unknown) among garbage collections, is inadmissible.

At present, the amount of technical instruments is high enough (much greater than in the previous century) to implement adequate observations and measurements of the humanitarian world. In addition, it is interesting to know the correlation between the reality and the postmodernistic world, where "nothing can be true and authentic because everything is falsified." ("It is very interesting that you have no things I requested

from you," was said by Voland in the Bulgakov's novel *Master and Margarita*, Ch. 3.)

How important is the question about the world in which politicians, economists, and intellectuals play political-linguistic games without our participation. Is it good that the life and philosophy begin and end by linguistic games? Probably, there is a need to change existing guidelines and target designations compelling us to live in the world where proportions between an external form and the content (thought) are violated. Must we adore the newest technologies? Can we become wiser after the obtainment of a new electronic device?

What must determine pragmatic plans, decisions, and human actions? In the biological sense, the efficient behavior is the result of multicentury evolution and millions of tests and errors. In the social, political, and economical senses, a humanitarian community cannot allow such expanses. How pragmatic theories are created? What underlies their grounds? What is the pragmatic analysis procedure? What inferences can be regarded as reliable? In addition, there is a need to ascertain whether scientific investigations and strategic plans are prophecies or something like "ku-ka-re-ku" in the postmodernistic style.

To what degree the scientifically established laws of the physical world can be assumed to be hypothetical? Is it successful that a cognitive scheme is classified as the "hypothetical realism" (K. Lorentz, D. Campbell, and G. Follmer)? Is it possible to assert that "each hypothesis is an intuitive guesswork"? Is it true that D.I. Mendeleev fell asleep and the periodic system of elements was his intuitive guesswork in a dream?

Another important problem is related to the a priori forms of cognition. The existence of congenital instincts seems to be proven. Are there innate concepts and hypothesis? It may be that cognition is simple remembering of them. However, great Hellenes did not know about basic arithmetical symbols—modern Indian numbers and the radix notation. Moreover, they have no fundamental concepts about motion of celestial bodies. The "congenital concept" of an irrational segment appeared many years ago and led to the revolution in ancient mathematics. At the same time, the "congenital concept" of an irrational number was not created by Newton, Leibniz, and Euler. The fundamental concept of space (more exactly, spaces) was not formulated even by Kant and Hegel. The "congenital concepts" of mathematical logic were born only at the end of the twentieth century. Note that many "congenital physical concepts" have not been created up to the twentieth century. Thus, the problem under consideration remains unexplained.

The aforesaid is important to determine the correct technique if pragmatic analysis, the variant of which has been proposed in [11, 34] and called conceptual analysis.

G. Follmer was emphasized that scientific knowledge is based on observations and experiments. He correctly assumes that its attributes are critical analysis of information, the formulation and checkout of hypothesis, and the use of cognitive models and deductive conclusions. However, an especially significant aspect of pragmatic scientific knowledge is the construction of pragmatic theories. The architectonics of pragmatic theories, analysis of philosophy, and the results of analytical history will be discussed in the subsequent study.

REFERENCES

1. Aristotel', *Works in 4 Vol.* (Mysl', Moscow, 1976) [in Russian].
2. N. A. Kuznetsov, "Information Interaction in Technological Living Systems," Inf. Protsessy **1**, 1–9 (2001).
3. V. A. Lektorskii, *Epistemology Classical and Not-Classical* (Editorial URSS, Moscow, 2009) [in Russian].
4. G. Vollmer, *Evolutionare Erkenntnistheorie: Angeborene Erkenntnisstrukturen im Kontext von Biologie, Psychologie, Linguistik, Philosophie und Wissenschaftstheorie* (Hirzel, Stuttgart, 1981; Moskow, 1998).
5. N. A. Kuznetsov, O. E. Baksanskii, and N. A. Grechishkina, "Origin of Knowledge: Backgrounds and Foundations," Inf. Protsessy **7** (1), 72–92 (2007).
6. H. R. Maturana and F. H. Varela, *Tree of Knowledge. Biological Roots of Human Understanding* (Shambhala, Boston, 1987; Progress-Traditsiya, Moscow, 1999) [in Russian].
7. K. Lorenz, *Die Ruckseite des Spiegels: Versuch einer Naturgeschichte menschlichen Erkennens* (Piper, Munchen, 1973; Respublika, Moscow, 1998).
8. N. F. G. Martin, and J. W. England, *Mathematical Theory of Entropy* (Addison-Wesley, Reading, 1981; Mir, Moscow, 1988).
9. Y. Barr-Hillel and R. Carnap, "Semantic Information," British J. Philosophy Sci. **4** (4), 7 (1953).
10. M. Bloch, *Apologie pour l'histoire ou Metier d'historien* (Armand Colin, Paris, 1949, Mir, Moscow, 1986).
11. C. Yu. Zholkov, http://www.gubkin.ru/personal_sites/Zholkov).
12. M. M. Bakhtin, *Aesthetics of Verbal Creation* (Iskusstvo, Moscow, 1979) [in Russian].
13. N. A. Kuznetsov, O. E. Baksanskii, and N. A. Grechishkina, "Fundamental Importance of Informatics in Contemporary Scientific Picture of World," Inf. Protsessy **7**, 81–109 (2006).
14. J. J. Gibson, *The Ecological Approach to Visual Perception* (Houghton Mifflin, Boston, 1979; Progress, Moscow, 1988).
15. H. R. Schiffman, *Sensation and Perception. An Integrated Approach* (Wiley and Sons, New York, 2001; Piter, St. Petersburg, 2003).
16. H. Simon, *The Sciences of the Artificial* (MIT Press, Cambridge, MA, 1969; Editorial URSS, Moscow, 2004).
17. N. A. Kuznetsov, O. E. Baksanskii, and N. A. Grechishkina, "Modelling of Intellectual Activities: Touch

Input in Cognitive System," Inf. Protsessy **7**, 432–474 (2007).

18. R. Bandler, and J. Grinder, *The Structure of Magic: a Book about Language and Therapy* (Science and Behavior Books, Palo Alto, Calif., 1975; Al'yans, Moscow, 2001).
19. M. Castells, *The Information Age: Economy, Society and Culture* (Blackwell, Oxford, 1996, GU VShE, Moscow, 2000).
20. F. Webster, *Theories of the Information Society* (Routledge, London, 1995; Aspekt Press, Moscow, 2004).
21. M. U. Porat, "Communication Policy in an Information Society," in *Communications for Tomorrow,* Ed. by G. O. Robinson (Praeger, New York, 1978), pp. 3–60.
22. J.-F. Lyotard, *The Postmodern Condition, A Report on Knowledge* (Manchester Univ. Press, Manchester, 1984; Aleteja, St.-Petersburg, 1998).
23. N. A. Kanaeva, *Problem of Terminal Knowledge in India* (Vost. Literatua, Moscow, 2002).
24. S. Yu. Zholkov, *Mathematics and Informatics for Humanistes. Textbook* (INFRA-M, Moscow, 2004) [in Russian].
25. T. J. Jech, *Lectures in Set Theory, with Particular Emphasis on the Method of Forcing* (Springer-Verlag, Berlin, 1971; Mir, Moscow, 1973).
26. G. W. F. Hegel, *Die Wissenschaft der Logik* (Nurnberg, 1812-1813; Mysl', Moscow, 1970).
27. I. Kant, *Versuch den Begriff der negativen Gr@ossen in der Weltweisheit einzufuhren* (Johann Jacob Kanter, K@onigsberg, 1763; AK II, 165–204);

I. Kant, "Attempt to Introduce the Concept of Negative Magnitudes into Philosophy," in *Collected Works in 8 Vols.* (Mysl', Moscow, 1993-1996), Vol. 2 [in Russian].

28. J.-F. Lyotard, *The Difference: Phases in Dispute* (Manchester Univ. Press. Manchester, 1988).
29. M. C. Rumizen, *The Complete Idiot's Guide to Knowledge Management* (Alpha, Indianapolis, IN, 2002; AST, Moscow, 2004).
30. www.koism.rags.ru/publ/articles/26.php.
31. W. Bukowitz and R. Williams, *Knowledge Management Fieldbook* (Prentice-Hall, Old Tappan, NJ, 1999; Infra, Moscow, 2002).
32. *Competence in the Learning Society*, Ed. by J. Raven and J. Stephenson (Peter Lang, New York, 2001; Kogito-Tsentr, Moscow, 2002).
33. W. Hutmacher, "Key Competencies for Europe," in *Report of the Symposium Berne, Switzerland, 27–30 March, 1996* (Council for Cultural Co-operation (CDCC) /Secondary Education for Europe, Strasburg, 1997).
34. S. Yu. Zholkov, "On Laws of Society and History I," Alma-Mater – Vest. vysshei shkoly, No. 2, (2010).

SPELL: 1. intersubjective, 2. checkabilty, 3. informatio,