On the approaches to self-knowledge

ABSTRACT

Given publication provides a clear and exhaustive grounding the mission of human memory as the base of self-awareness, erudition and full-fledged creative activism. Well in a separate line, the transient attention is also paid to the extremal capabilities of a person which ordinarily fall under the category of fringe science (hypercalculia, phenomenon of Shereshevsky, versatile work-performance etc.). But the most important thing is that in his theoretical research the author makes one more (both for domestic philosophers and humanitarians on the whole) brave attempt to penetrate into the secret depths of spiritualized nature, mentally scanning the intracellular space and revealing thus complex evolutionary mechanism of programmed operating the central nervous system.

And besides, nearly from the very exordium, here it's raised another not unimportant block of questions relating to a quite heterodox opinion that all live organisms (and among them, of course, a person) by no means are divine creatures but plain bio-robots. Moreover this leitmotif runs like a red thread across the entire authorial narration. So ultimately the idea about the inevitability of the dictatorship of mind presented in the conclusion seems to a reader as pretty argued and comprehensively reasonable!

Introduction

Vague guesses about the veritable evolutionary essence of terrestrial organisms, which are not divine creatures at all, but simple bio-robots, haunted mankind for a long time. And even, by the way, that pretty piquant alignment for us, at which "his majesty" Homo sapiens can also personify some type of artificial, i.e. not really existing hypostasis, was discussed at one time as by solipsists (Lao-tzu, Buddha, Gorgias, Claude Brunet), as other famous sages of antiquity but, true, in a little different perspective.

However in serious science, idle pompous tirades are clearly not enough - instead specific arguments were required. And here almost one and a half centuries ago in St. Petersburg an epoch-making, one might say without exaggeration, book "Reflexes of the Brain" was published, therein all this evidence was clearly and quite convincingly presented. And though against the very "father of Russian physiology" I.M. Sechenov, many of then religious leaders immediately took up arms, accusing him of blasphemy, immorality and other grave, inexorable sins, - however, the corresponding initiation, as the saying goes, was successfully laid, and besides reliably documented. With which, by the way, the majority of the world scientific community agreed in the end too. While already after some couple-triple of decades, these progressive ideas of our illustrious countryman were maintained by Jewish emigrant Norbert Wiener, who practically equated any living creature with a machine.

But, be that as it may, in own new philosophical treatise the author makes a bold attempt to penetrate even deeper to the most secret labyrinths of the spiritualized nature – with the mind's eye scanning the intracellular space and substantiating thus the entire complex evolutionary mechanism of optimal program control in the system of higher nervous regulation.

Yes, indeed, there is really no need to argue here: we are all aesthetically graceful, morally perfect and, besides, well-lettered bio-robots! But just why, however, many in practice are so wary, and sometimes even belligerent about this?

It turns out, because in the sphere of humanitarian education of post-Soviet countries, either the trite aboriginal materialism or - as its polar opposite – ignorant church idolatry dominates up to the present. While the verily idealistic wing (I emphasize: not religious but research one), in fact, simply does not exist - with the exception perhaps of a few singular enthusiasts like Natalia P.

Bekhtereva, Elizaveta P. Glinka, Vladimir V. Kozlov or Yulia S. Shoigu. And though new advanced knowledge has begun to pour out into society by a runaway rapid stream, however adequate state encouragement is still, alack, not enough for it.

Plus to this, given problem is particularly urgent that if we move on to the entire planetary civilization, it also sooner or later realizes completely own mission and purpose unless with the help of robots. It is interesting both proteins and highly organized robots are able to accumulate and dissect information about external world, in theory, even without any support from DNA or, respectively, modern scientific community. Therefore, here once again the hypothesis offered by us earlier (the main point of which is that the evolution of cosmic intelligence in its rates is noticeably ahead of the evolution of living systems) is confirmed in actuality. And hence, only in developed human society (after all, some tailless upright walking specimen torn out of it doesn't, alas, mean anything in himself) for the mature earthly mind - as the single efficacious tool on the way to find the truth – the far-reaching and very attractive prospects are prepared.

I

As known, human memory functions on several levels, and primary (which localized in the dominant thalamus) is directly linked to sensory imprinting. It's essentially the involved here monads' memory. A few seconds later, emotionally colored informational sensations can still be restored in consciousness due to reverberation of nerve impulses along the contour of thalamic nuclei or even on the overlying brain layers (if it is about, for example, the perception of speech, gestures, hieroglyphs and other difficult abstract images). Such memory can be named momentary.

Generally, the limbic structures, including the hippocampus, are able to accept not only targeted orders from the thalamus, but also to catch the emotional background of any symbolically encoded messages which arrive in suitable for assimilation kind from the cortex. Wherein the hippocampus is responsible for the functioning of human working memory too. And the latter, among other things, is mentioned here, in substance, not by chance. Because, it turns out, it's directly involved in the distinct evolutionary mechanism of eco-adaptation (both at the level of an individual and of a biological species as a whole). With that, I was led to suited theories and inferences in this scientific field, oddly enough, by observing the rouse current rate of qualitative improvement in electronic-computing devices. Particularly, I noticed that RAM-modules[1] in almost every new version of the computer are invading the adjacent functional blocks (processor, hard drive disk, motherboard and at times even data highway) more deeply and effective.

Differently speaking, after comparison of this fact with the peculiarities of the neuro-regulation of progressing species, we nolens-volens come to the conclusion that similar phenomena must certainly take place in live nature. At Corvids, for example, the nidopallium increasingly penetrates into neighboring dorsal sections of the avian telencephalon, and in service dogs, the influence of the hippocampus is gradually extrapolated to the prefrontal region. Wherein from a physiological point of view, the whole secret of this is in the amazing plasticity of cerebral tissue, which in ontogenesis develops as demanded by concrete life circumstances.

So there is definitely do some hard thinking about all that – and not only for practicing neurosurgeons but dry armchair academicians too! And generally we will certainly return to this multifaceted topic a little later...

It's common knowledge that in the course of the epoch-making universal evolution of natural systems, a quite proper continuity is distinctly traced - moreover as in the character itself as the way of forming sensations & emotions specific to this particular stage. But still it's most clearly noticed in the example of memory, for the short-term memory of each subsequent system holds on to the remembrance substrate of the previous one. By the by, momentary (reverberative) memory is also apparently present at any step of the evolutionary hierarchy. But it mainly depends on the nature of the imprinting and methods the signals are transmitted, not on the underlying structures; because systems of different levels perceive the passage of time (and hence, the very chronology of events) unequally.

Despite that a long-term memory of chordates is based, in principle, on astrocytes, yet it's quite capable, if necessary, of appealing to similar memo-substance of a lower order represented obviously by intranuclear (but sometimes, possibly, even extracellular) proteins[2]. However in all people without exception, long-term memory (confined - recall just in case - to the gray matter of the cortex of cerebral hemispheres) is generated from the working one and moreover, as a rule, during minutes of sensory lull, i.e. basically in the afternoon. At night it is completed only what was not done in daylight hours (and unless in separate brief ”stripes”, for most of the time the brain just rests).

Though astrocytes (which, as you know, have a much shorter evolutionary "experience") store their database in analog form, and peptides - in digital, both of these functions anyway are all the same selective. Particularly, in the course of the selection of more important material, concept-proteins already present in neurons obviously play leading role, meanwhile the stem’s structures are helper. Wherein the phenomenon of total memorization is inherent solely in the prime quasi-monadic "Self" (and even then, not everyone is able to get a similar kind of information).

Well, in conclusion of this chapter, returning to a quite evident parallel “human – biorobot”, I’d also like a little to detail some of the previously deduced synergetic_patterns, which are applied equally to both animate and artificial objects. For example, such: “The possibilities for adaptation, development and progress are more favorable for that calculating machine (or, respectively, organism, species, taxon) which is ahead of its contestants in the value of the fundamental indicator CAsh”. Wherein per definitionem it is measured by the ratio between operant (RAM) and read-only (BIOS $\veebar$ OpenBoot $\veebar$ BootROM) memory of a given robotic system. With that, its universal acceptability is largely ensured namely due to the physical dimensionlessness of the very magnitude CAsh[3]. Which in computing is presented as a quotient from the division of bits by bits, however when applied to living creatures - already in the form of a similar masses’ fraction (or at last case - the correlation $\mathbf{N}_{\mathbf{op.}} / \mathbf{n}_{\mathbf{bas.}}$ where is considered the summary number of neurons involved in the memorative cycle). Although on the whole, thoroughly about this is told in the extended Russian-language variant of author’s research.

II

Human thinking is based on long-term memory and is formed in areas directly adjacent to the corresponding sensory analyzers of the cerebral hemispheres. The same concepts, what is quite natural, are capable of being duplicated several times, depending on their etiological background. In addition, one should consider the possible ramification of notions not only in the sensory aspect, but also at a higher ordinal level: as homonyms, synonyms, idioms, neologisms, and even by purely emotional signs. At that new astrocytic & protein notions are built (with reference, of course, to the material already available here) on the basis of fresh relevant images worthy of entering into long-term memory.

In the thickness of the cerebral hemispheres, just like in complex cyber devices or propositions of formal logic, hierarchical pyramids are located, at the very top of which super-concepts lie. Besides, here are present as well analogues of the categorical-semantic apparatus, associative zones, structures responsible for the functioning of the feedback principle etc. By the way, within formal logic, one might say, there is nothing at all that would not be somehow realized in the brain of highly developed representatives of the earthly fauna. For instance, using the well-known law: "If B follows from A, then non-A follows from non-B", we must be prepared to find “the non-B protein” directly linked to “the non-A protein”. Of course, in order to save space, such abstract structures are laid mainly at the level of super-concepts.

Specific "departmental" chromosomes are responsible for the connection between individual protein-concepts, whilst the neurons themselves are for the formation of the resulting associative tracks, using, to all appearance, ordinary electrical impulses for this (in contrast to the sound signals of their nucleic precursors by the system hierarchy). These neurons can work at any time, regardless of the involvement in the area of consciousness, but basically they do it during the day, in the

waking period. When the long syllogistic chain "protein A - protein B - protein C - protein D" is closed by means of "protein A - protein D", cells are excited, which, as we know, leads to the release of additional portions of energy. Energy, being converted into a nerve impulse, reaches the thalamus, but it is not always properly perceived there. When this signal is irrelevant to the organism, the "Ego" does not react to it. Although in other cases, our “main post” singly can send a request to the cortex, if he needs to remember something or urgently find an answer. Such way of communication is, at least, much more effective.

As for astrocytes, they here (and above all - in the folds of gray matter) act only as passive albeit rather reliable keepers of memory. At that, as mentioned earlier (see the previous section), the author is inclined to believe that it is analog in nature, not digital, being directly caused by the close biochemical interaction between glia- and neuro-transmitters.

III

Thus, in contrast to instant recognition with sensory implications, all other memo-images (i.e., not related to the acute immediate needs of an individual) owe their genesis exclusively to the cortex. Although they are transmitted, perhaps, by the quantum-wave path but even so are projected into human consciousness for sure through a material (or rather, monad) substrate that is quite familiar to us. Moreover practically the same should be said about all sorts of dreams, fantasies, complex multi-stage abstractions, and, of course, about any mentally creative processes that are characteristic, in one way or another, for serious scientific developments. By and large, their implementation, in fact, is not much different from similar previously described phenomena, occurring in the sensory nuclei, but here, however, it still cannot do without the direct active participation of higher cerebral structures. Firstly, an abstract image of the observer is created, from the point of view of which the represented object is considered; secondly, here it is necessary every now and then to involve, besides, such formal categories as magnitude, dimension, angle of perception, etc. All these operating procedures are the paramount vital concern of thinking, while the finally created image is transferred into the central “Self”. Although the latter, at the same time, it would hardly be correct to assign some minor, purely facultative role in these processes. And here, for example, is visual confirmation of what was said: it has long been well known that weak-willed people, as a rule, do not have stable and sufficiently strong thought associations. The images arisen in them are unsteady, vague and quickly disappear from consciousness, again and again replaced by some new ones...

In addition, the general nature of the produced cognitive representations may also depend on the concrete emotional attitude, the specific hemispherity of given person, the degree of development of cerebral cyto-architectonics and a number of other important factors.

IV

Formal logic is a science that studies the key laws and principles of thinking; i.e. its conceptual apparatus can be considered as slightly simplified model of multiple working structures and communications existing in the cortex. After all, as we know, in everyday human logic there is no place not only for irrationalism or absurdity, but also on the whole for something that is absent in the nature around us. Any syllogistic connections are based on the fundamental axiom of causality, which takes its origins from the steadfast principle of uni-nomy & equability both in interactions at the micro-level and at the highest stages of development of systems. From a philosophical point of view, this unshakable permanency can be argued by a finite set of elementary particles (including, of course, informons), which, in turn, have a finite set of their constant characteristics too. Wherein in the case of outlook rejection of the version of the deep inexhaustibility of matter (in the spirit of Anaxagoras), such an explanation can be considered, apparently, quite sufficient.

Mathematical logic is more artificial and abstract than formal one. Roughly the same should be said about cybernetics either, which only in its initial phase to the full reflected the methodology and style of brain structures’ work. Meanwhile if robots independently become to produce own

“iron colleagues”, then they will obviously try to improve practical ways of creating new computational algorithms, surpassing in this sooner or later their master – Homo sapiens.

There are several fundamental principles and axioms of thinking, all of which, of course, are rooted in the actuality surrounding us. Here they are.

1. The subject cannot affect himself; from this, in particular, follows the assertion that the subject will never be able to know himself as adequately, open-mindedly and timely as to do it in relation to neighboring objects.

Self-knowledge is a more trivial term, therefore, despite its seeming secondary nature it cannot be directly determined by primary human self-awareness. But still it will be discussed about that in more detail later.

2. All in the world should be considered only from the point of view of something concrete, but not as a phenomenon in general.

This is the so-called principle of total relativism which is manifested most clearly applied to attributes and predicates. Though, various definitions, statements and terms associated with fabrications of the human mind and used in the categorical apparatus as well as in other similar constructions, are not obliged to follow it. This remark concerns, by the way, the next point too.

3. **Everything can be judged only in a probabilistic plan.**

This is also indirectly adjoining to spiritually close principle of space-time uncertainty at the origins of which yet Heraclitus was. Nevertheless, it is often abused in order to avoid the cardinal solution to the issue, which was reflected, for example, in the discussion of the problem of the electron's free will. That's why in serious scientific pioneering, until all spare arguments have been exhausted, it is better to try not to appeal to the principle of uncertainty.

4. **Theoretical knowledge, in contrast to empirical, is possible only on the basis of deep abstracting with the obligatory use of syllogistics, induction and retro-induction** – moreover in the framework of the above postulates of formal logic.

5. **The criterion of truth is in practice.**

This axiom is more of an outlook character, since it’s built on the a priori fact of a naive-realistic human understanding actuality. Which automatically leads (unless, of course, one introduces any superfluous entities) to the prerogative of the scientific exploration of the world over the religious & mystical.

V

Well, in the closing section, let’s still try to find out, due to what at the level of an individual or even humanity as a whole, such an amazing natural phenomenon as self-conscience is realized.

First of all, it should be clarified here that without highly-basic proteins and astrocytes, neither the genome, nor the primary "Ego", nor the thalamus by themselves would probably ever have guessed about their fleshly existence. So, it only looks like some insignificant detail, because in translation into epistemological language, one might say that such important scientific disciplines as psychology, biomedicine (namely, in the context of the genesis of the spiritualized planetary matter and its radical difference from inert), ethics, jurisprudence, and many other truly fundamental branches. In historical terms, some vague glimpses of self-awareness have arisen among those primitive savages who have been able to compare the fact of death of the best hail-fellows, neighbors or relatives with the fatal inevitability of own demise.

But still it would be, of course, wrongfully and even illogical to give some exclusive role to proteins alone here. After all, in fact, already in the initial author's works, it was quite rightly noted that the most important necessary and sufficient prerequisites for the emergence of such a significant process for earthly evolution should be considered: a) the presence of at least two mentally similar persons in a limited area of habitation; b) an increase in early representatives of the tribe Homo - starting from Australopithecus - of the degree of generalizing thoughtful operations to the conceptual level (moreover, apparently, one can say that extrasensory perception or gestural language in this case, for sure, does not work); and, finally, the birth of the so-called second

signaling system. By the way, the term "process" itself is used here by no means accidentally, because it directly and unequivocally denies the idea of an explosive appearance or even (as, for example, some of our hugely popular among the ignorant masses of pseudo-authorities talk about this) "export" of such cognitive reflection from somewhere outside. On the off-chance, let us recall once again in this regard that according to the ground axiom of formal logic about the impossibility of cognizing the subject by the subject, any arbitrarily developed creature (even up to aliens or super-humanoids from other planets), being lonely, is fundamentally unable to master the factor of self-awareness.

In addition, the problem of potential grassroots self-identification is also of considerable interest here, because any unprejudiced investigator, by and large, would probably be care at all to know whether, say, the ordinary thermal neutrons or some other long-lived particles possess by this native gift. For we have no right to mechanically extrapolate to them the arguments that are fashionable nowadays about a certain obligatory minimum of accumulated information and on this basis without hesitation to disown such an important attribute of the vital activity of any organized matter. Not only is one information different from another, but yet absolutely nobody has proven that those bits which are embedded in each monad or perimonadic structures are beneficial to a person. Maybe the human mind is able to refer exclusively to the cellular chromatin, and the monads of one particular nitrogenous base or amino group carry two kinds of information: polytypic - for own local purposes, and unified - for especially universal needs?! Thus in this case it's difficult, perhaps, to immediately find 100% accurate answer: after all, the range of issues touched upon here is already far beyond the scope of any of the natural sciences, acquiring, in fact, a pronounced philosophical orientation.

There is another paradox too, not so vital and burning, but still worthy of at least illuminating it in brief. The point is that any actively cognizing subject, on the one hand - a purely formal – understands nobody and nothing as thoroughly and harmoniously as himself; while on the other – contentual - he will never be able to get as complete and exhaustive information about himself as regarding some physical bodies around. Which he, if desired, at any time can touch, disassemble into parts, look inside and even remake to own liking.

CONCLUSION

Here, perhaps, is all that may be said for today on the launch and implementation of the most difficult thought mechanisms at the level of an individual as well as the grandiose, truly invaluable consequents of this paramount process for destiny of the planetary civilization on the whole.

And generally the matter of author's article could be reproduced in six laconic points:

1) Human memory functions on several layers, and primary, which inherent to the dominating thalamus, is immediately conditioned by the current perception (or, say, early childhood imprinting).

2) In the process of long-term memory formation, the principal role is given by us to histone macro-molecules and astrocytes, not to the network architectonics of the cortex (as some of purblind overseas naturalists mistakenly believe).

3) Astrocytes are capable of acting except the role of passive memory keepers in this case; and, plus to that, carry apparently an analog, not a digital code (i.e. are as though a pocket-book for a lecturer or museum exhibits for a historian).

4) Unlike long-term, instant memory, being directly related to apprehension, imbibes totally all sensory information entering the brain and, in addition, is preserved forever - regardless of any traumas or illnesses. But in everyday life, it's extremely hard to claim it, since for this we need to penetrate in the integrative field of the primal "Ego".

5) If sensations arise at once - as a mirror reaction to an object, then emotions do only after checking with hereditary memory, that is, a little are quasi delayed. Wherein specific "drawing" the adequate type of sensitivity is realized downright at the degree of the congruent thalamic nucleus - without even reaching the Self-substrate.

6) Formal logic's conceptual apparatus can be considered as somewhat simplified model of numerous working structures and communications existing in the cortex.

Well, finally, in the course of conducted us investigations, it was proven strictly (with the help of digits) that the evolution of reason is ahead of live beings' one. In view of the fact the CAsh of secondary systems, as however the accelerating growth index[4] (what was already discussed thoroughly in ch. 1) quickens an order of magnitude more impetuously than of their direct creators!

And this - given coming Universal energy collapse - in turn, lead to the actual hegemony of robots!..

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[1] *RAM = "random access memory".*

[2] *However, it's not excluded that professional magicians and wonderworkers might even turn to amino-groups for the necessary information, and also to gluons, mesons, etc. (as if plunging into the truly bottomless mnemo-storage of downward systems).*

[3] *By the way, this indicator literally means "Coefficient of Ashursky".*

[4] *Which is formally expressed by the common numeral increase of brain areas occupied by working (operant) memory in any viable offspring - compared to his immediate genetic ancestors.*

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