

# SYSTEM INFORMATION APPROACH TO MIND UPLOADING

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## Summary

The system-information approach to the mind uploading process was developed in the 80s by interdisciplinary group of scientists in Bulgaria united in an NGO. The ideas of this approach are based on a certain materialistic solution to the mind-body problem. Central to this solution are the idea of general systems theory (L. von Bertalanffy) and its specific developments: the concept of "system" (P.K. Anokhin) in general theory of functional systems and the concept of "systems of information" (V.I. Kremyansky). The process of the mind uploading to a new carrier is understood not as reproduction, but as moving (or migration) of a system of information of the psyche (the inf of the psyche), from one material carrier to another, preserving its authenticity and uniqueness. Such a possibility exists if the psyche exists objectively, as a hyperstructure of the immediate carrier system - the central nervous system. It is assumed that technologically, the resettlement process can be carried out by creating a specific bridge - an artificial commissure between the two brains - donor and receiver, carrying out their joint functioning as a whole. The artificial commissure could be built similarly to the natural cerebral commissure (corpus calosum). The relocation procedure is conditionally referred to as "artificial commissure". The mind uploading through the "artificial commissure" procedure naturally solves the problem of personal identity, as the system of the psyche moves without disturbing its integrity and dynamics. The procedure is feasible with the capabilities of today's technology. The system-information approach to the mind uploading and the general view it gives allow us to build a general scientific theory of the process on the fundamental concepts of "preservation-change". The mind uploading in this framework seems like over-preservation, which has no limits and overcomes any competition - a well-defined singularity. And the nature of this singularity allows a model of the universe to be built.

## Introduction

Over the past ten years there has been growing interest in the problem "mind uploading" and published numerous scientific articles and books.[1] A whole group of issues of different nature and degree of community are discussed and analyzed, from equipment and technology to methodology and philosophy. A more complete picture of this hypothetical process is gradually being developed. I have been closely following the development of the mind uploading idea and the whole flow of related research in this area from the very beginning. And I am convinced that there is a need for optimization and much larger philosophical and methodological developments than the existing ones. [2] The purpose of this article is to outline, in a large stroke, a slightly different overall picture of the mind-uploading process and to outline some important directions for further research and concretization.

From the outset, I would point out that the process of "mind uploading" must be viewed in close connection with the idea of immortality in man, and not just immortality, but *personal immortality*. Some researchers think that being directly involved with the idea of personal immortality narrows the horizon and moves away from scientific thinking, but I think the

opposite is true. The idea of personal immortality, even in its most general and abstract form, served as *a heuristic in the search for concrete solutions*, both in philosophical and methodological analysis and in experiment and technology. I will try to demonstrate this in this article.

The idea of personal immortality, based on science and technology, has been formulated and discussed since the middle of the twentieth century and has a long history. The seeds were most likely planted in an early publication [3] by the physicist John Bernal in which he argues on the hypothesis that the numerous constrictions, so typical of the human organism, could be bypassed through artificial organ prostheses – the anticipated result of the constructive and technological advance of humanity. A full body prosthesis is very close to the mind uploading!

Futurologist Arthur Clarke in "Profiles of the Future" [4], in the chapter " The obsolescence of man " in the 60's discussed the issue of personal immortality and improvement of people by merging with machines. Integration to such an extent that all human organic components fall away and only the spirit, the consciousness, the personality remain from man on an artificially created carrier, more perfect than the organic body of man. A complete picture of mind uploading, even artistically recreated in "Odyssey -...".

One part of the scientific community called these ideas "unbridled scientism" and demonstrated a strong negative reaction [5], which was based more on political and ideological arguments than on analysis, science and reason. Quite often, the authors of the ideas of rational immortality were accused of incompetence, incorrectness, speculating on avant-garde scientific achievements. In this context one can easily recognize the great value of the position taken by Academician V. Glushkov who, at that time, bravely announced before the whole public audience:

*“I think that man will be capable of giving much more to the machine. At some point at the very end of passing information to the computer, humans will seem to pass on to the machine their own consciousness and just then they will suddenly begin to feel that they are what they are, and yet, they are simultaneously the machine, too. It would be unwise to rule out such a possibility, if the core of the consciousness is not inseparably connected to certain brain cells, but it has the capacity and is in a condition to migrate... That, that is the final transit – namely the transit not only of intellectual power to the computer, but the transition of human consciousness and self-awareness, too. In all factuality, this is immortality completed to the fullest...”* [6]

It was this idea that my colleagues and I called the "*cybernetic version of personal immortality*" and began working on it. As a commentary, continuation and concretization of the views of Acad. Glushkov are our first publications [7] and attempts [8] to withdraw the cybernetic version of personal immortality from the level of journalistic sensations and comments to the level of scientific testing and research.

One of our findings from that time significantly strengthened our confidence, both for the existence of a principled possibility for the realization of the cybernetic version of personal immortality, and for its realization in practice. I will mention this "light in the tunnel" as briefly as possible, not so much for the sake of "evidence" but to somehow recreate the emotional background of the search. It is rooted in the properties of neurological memory - *associativity and distribution*. These memory properties of brain structures and neural networks allow the holographic model of memory to be applied and worked with. According to the model, the engrams of neurophysiological memory can be considered as neurocholograms.

What would happen if we appropriately connected two brains, conventionally called: "donor" and "receiver" and begin crawling the memory of the "donor" associatively. After a sufficiently long process of memory activation, an array of engrams will be formed that will be common to both brains. As it happens in the two hemispheres of the brain associated with corpus calosum. We do not know all the details of the processes in the brain that carry the mental and the conscious.

Yes! But we know that these processes span the two hemispheres and respectively the two brains in our thought experiment.

What if the connection between the two brains was broken !?

What happens if you break a hologram in half !?

Two identical copies! The same happens when the neurochologram is torn!

Doubling memory, and the ability to transfer the psychic and consciousness from one brain to another. Undoubtedly, this notion is too profound, but as a general scheme it is a vision for achieving the cybernetic variant of personal immortality, but also of the hypothetical process known as mind uploading (a specific vision).

The request is followed by the time of serious and in-depth analysis, the flow of ideas, theories and developments, the extensive discussions. This is a time of competition and cooperation of approaches, methodologies, theories and technologies, of countries, working groups and individuals. However, today, more than ever, we are in need of one unified common theory. The idea of cyber immortality and the development of mankind along this pivotal new road has to be transformed into a unified theory which will allow for bringing forward specified issues which are to be researched by means and methods which science provides for.

The time has come for a general theory to emerge!

The proposed and developed technologies and technical developments can be evaluated according to objective criteria, to perform knowledge synthesis and to optimally manage the whole process of transition from "Homo sapiens" to "Homo immortalis" or if you want to

"Homo aeternitatis ". There is nothing more practical than a good theory, moreover, that as individuals and as a society, moving in this direction, we enter a territory full of surprises.

The suggested and developed technologies and theories have to allow for evaluation according to objective criteria; for a synthesis of knowledge to be achieved, for an optimum guidance to be performed on the whole process of transition from "Homo sapiens" to "Homo immortalis", or "Homo aeternitatis", if you will. Nothing serves better than a good theory, especially given the inevitability of the circumstances – we, as individuals and as a society, are moving in that specific direction, we are entering a territory full of surprises.

In this article I will try to formulate the framework of such a general theory!

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### **A cybernetic variant of personal immortality.**

In the initial formulations of the idea of personal immortality made by A. Clark, V. Glushkov and others it is not yet specified how this will happen. Much later, the following procedures were devised and formulated: *Uploading by the Microtome Procedure; Uploading by the Nanoreplacement Procedure; Uploading by the Moravec Procedure; Nondestructive Uploading Procedures*. [9]. As, of course, the multitude of procedures is open. Here, perhaps here is the place to recall one more procedure:

Some three or four decades ago the journalist popularizer of science V. Pekelis wrote in the "Literary Russia":

*„Can human life be significantly prolonged?...*

*In a far perspective, at the end of the long road cybernetics has just stepped on, we can imagine how the artificial brain connects to the natural healthy brain. For a certain period of time they work together, side by side, and the artificial brain adopts all habits and tastes of its 'host'. Then, when the old natural brain switches off, the human continues to exist with the artificial one, after having inherited memories, knowledge, tastes and personal traits. An artificial brain implanted into a body of prostheses! This means that the human as a human dies, yes. The body dies, the brain dies!? Yes, but then again a human keeps on living as an intellect, having transferred their being into the artificial brain. Hence, theoretically, immortality is possible."* [10]

I call this procedure - ***Artificial Commissure!***

The name was chosen bearing in mind the analogy with the natural commissure between the two hemispheres of the brain - corpus calosum, ensuring their joint work, unity and

wholeness. The Artificial Commissure should ensure the joint work of the „brain – donor“ and the „brain – recipient“, their unity and integrity.

The "Artificial commissure" procedure can be illustrated by several schemes, which partially reflect the notion of the human individual from a point of view of systems:

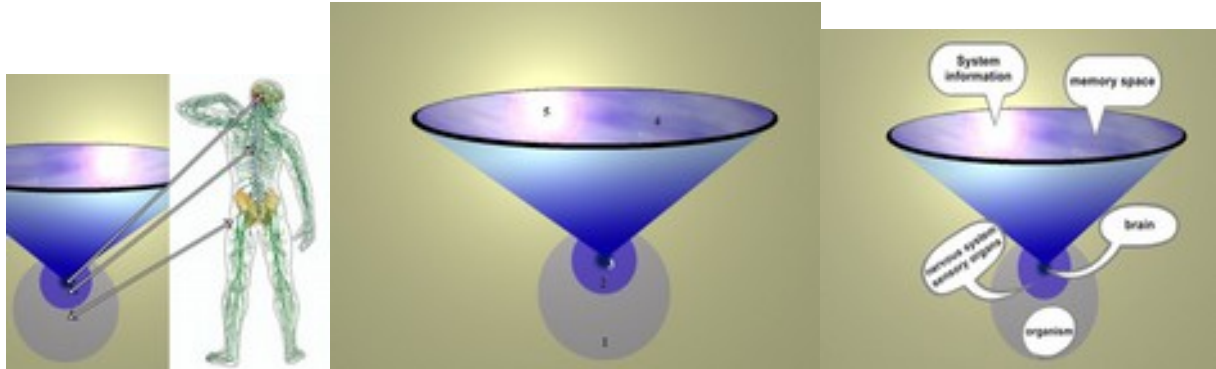


Fig. № 1 - human individual

The numbers mean:

1. The human body as a whole;
2. Sensory organs and nervous system;
3. Central nervous system and brain;
4. Memory engram space (memory space);
5. The psyche (consciousness, self-consciousness), as a system of information, that arises, exists and develops in the space of memory.

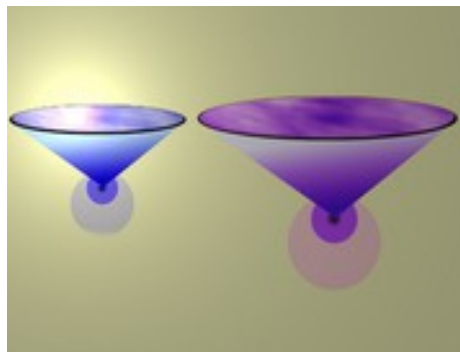


Fig №2

Figure 2 shows a human-individual (donor) and an artificial organism (receiver), with the artificial organism (receiver) being a more perfect functional analogue of the human biological organism and the memory space is empty „tabula rasa“.

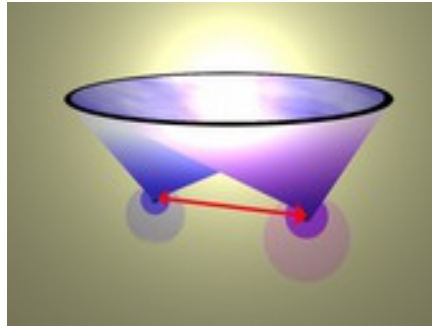


Fig.№3

Figure 3 shows an **artificial commissure** that connects the two brains and ensures their functioning as a whole. It also means *a common memory space* in which the psyche, consciousness and self-consciousness exist and function.

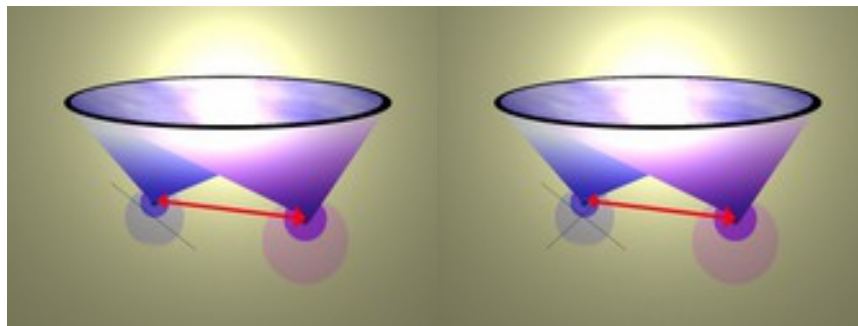


Fig.4 “I”,”II”

After sufficiently long functioning in a coupled state to allow associative crawling of the entire space of the memory of the donor organism, it may first begin partially and then completely shut down. When can this happen !?

Once the transferring entity begins successfully managing the senses and other organs of the host organism.

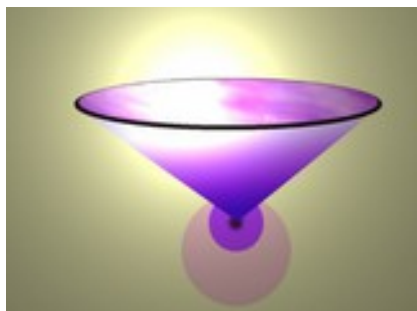


Fig.№5

After the removal of the donor organism, the psyche, consciousness and self-consciousness of the person do not disappear, but remain to exist and develop in the new artificial organism. In this case, the person inherits memory, abilities and all individual characteristics, but there are richer opportunities for development than before.

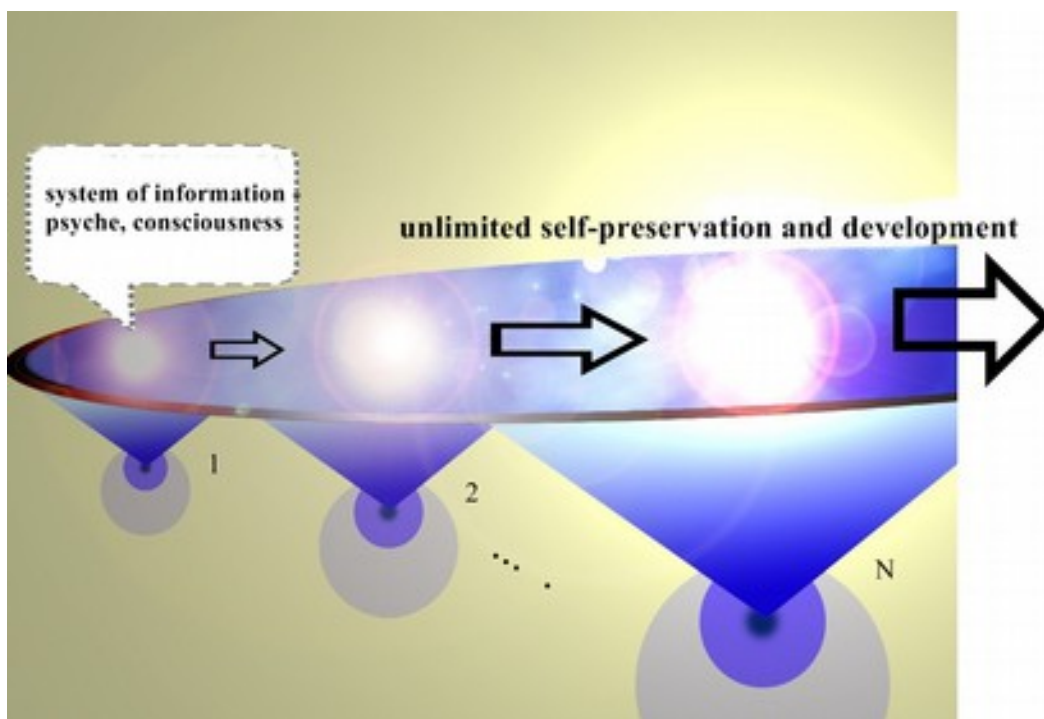


Fig.№6

There is no limit to this process of relocation of the psychic components (memory, psyche, consciousness and self-consciousness) to be performed an unlimited number of times. And so to make unlimited existence and development of personality in a series of bodies of increasing perfection.

This is real personal immortality.

Apparently, this vision of personal immortality depicts a process of growing unfolding spiral where the human personality is preserved and develops for eternity and with no constrictions whatsoever in a sequence of host organisms with continuity and increasing perfection. The first organism of this sequence is the biological one, the one we get from nature, but the next ones are artificial organisms – a product of the creative activity of society. Yet, the fact of highest significance is that after consequent removal of the carriers the personality with its memories, self-awareness and consciousness is **preserved and further developed** into the new carrier with new potential abilities. By design, this resettlement, preservation and development can take place an unlimited number of times and expand indefinitely, acquiring the character of over-preservation, without restriction.

The idea of personal immortality in its cyber version is definitely related to the term “**preservation**”. If we really insist on the rational character of the idea, and since the shortcut to its formulating in the scientific terms is the category “preservation”, here the necessity for several questions to be answered emerges clearly and precisely:

- \* *What is preserved?*
- \* *What are the mechanisms of preservation?*
- \* *What are the limits of this preservation?*
- \* *Can this so-called preservation be classified? (Are there actual analogues in reality?)*

However, here is the place to be stressed out that the road to science is well laid out, that it's not just a path – it's a highway, that the whole contemporary science is nothing else, but searching for and finding the structure of preservation under the forms of laws of nature, social laws, and their explication and generalization. Yet, here is the time to also immediately point out that we are still too far from one unified theory for preservation, despite the fact that some remarkable attempts have been made in this direction.

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### **General systems theory - general theory of preservation!**

The most prominent attempt for developing a common preservation theory, and a general scientific concept to go with it, was offered in the middle of the twentieth century by L. von Bertalanffy – “**General System Theory**” [11], as well as the consequent broad system research [12]. Unfortunately, this process of theoretical synthesis is not completed as yet. In the years to follow, new useful ideas [13] have been added and they will probably lead to a leap in direction towards achieving a unified, and most importantly, working system theory. The essential connection between systematic and preservation was spotted in the early years of the research in this field, and it has been acknowledged today. Here are a few quotations in proof of the stated above:



- *“The whole is created by the integrating elements through a complicated process of internal and external interaction... Each element in its capacity of a future functional unit in a future structure, and is inexhaustible as to its possibilities. These possibilities come to realization through statistic means, through their multiple sorting out. For this purpose, nature has at hand limitless time. Amongst the truly inexhaustible systems, to utter fulfillment and realization reach those that form stable systems. There exists, so to say, a principle of natural selection among the emerging systems. The most enduring “survive”. From this basic point, it is safe to say, that in order for the wholeness of the emerging systems to be understood, there comes the inevitability of research on the laws of their durability.” [14]*

- *“Change is an attributive state of matter, a natural background for all occurrences. Only those structures, which possess inner durability, are in a dynamic equilibrium with the surroundings, and that is the only way they can ‘survive’, preserve themselves in the stream of changes, in the constant struggle with destructive forces. [15]*

- *“A system is a random type of elements between which there are stable connections. The term ‘durability’ brings a really important notional weight to the process of defining a system. A system lacking endurance and stability is not capable of continuity of existence. Durability and stability are the most common qualities of any system and they define mostly of its other features.” [16]*

Sometimes the much too obvious things are the most difficult to see, and that is how they remain neglected and do not receive the needed attention. However, for us this particular aspect (the significant connection between systemizing and preservation) was of priority importance and led us to a common system theory which can most surely be called **a unified preservation theory** because of the particular role of the term ‘system’ in its development. At the chosen level of the research, it is crucial to stress upon the fact that precisely this common aspect, which is not neglected in the classical system research works, and yet it had to be emphasized on and researched by us[17], happened to be the most vital in bringing forward of the idea of personal immortality.

A new, original concept on the system theories had to be developed [18], and it had to correspond fully to the researched idea. The general theory on the functional systems by P. K. Anokhin and his definition for a “system” served as a base for this work:

***“A system could be called such a complex of selected components between which the cooperation and the interrelation are becoming mutual COoperation between the components for the obtaining of focused beneficial result ” [19] (P.K. Anokhin)***

The definition was chosen from several dozen others. It is preferred to others because P.K. Anokhin brings it as a summary of his research on higher nervous activity and the psyche in his quest to solve the mind-body problem. On the other hand, it has been criticized as

insufficiently general, but we can easily realize that the *mutual COoperation between the components*, after all, directly or indirectly, leads to a universal result - **self-preservation**. In the predominant number of research developments, misled by the system of generalization, most of the functions (results) are presented as a spectrum whose separate lines are equally important. But the functions (results) in nature can be arranged with greater success and more precisely in the form of a “tree” with a one common root, and that is: *self preservation* [20]. This can be easily explained by the existing of such a common regularity like the second law of thermodynamics, according to which each totality of elements limited by the environment and performing a certain uneven distribution of matter and energy, during each energetic transformation seems to go through a certain amount of “pressure” resulting in equalizing the heterogeneity. This, in the end, leads to disassembling of the totality, in case it meets no counteraction. However, this is a task set by the character of our world, which task the interacting totalities of elements (systems) can or cannot solve, with more or less success in the following manner: **survival is not given for granted – it is a fundamental problem** for the systems of a random nature, including for living systems. Cybernetics has revealed a new characteristic form of preservation based on management, information and information processes, which we call - self-preservation. There is a large enough group of systems that develop preservation other than physical systems. This preservation is realized through internal and external processes for the system, which to one degree or another "neutralize" the destructive impact. "Neutralization" goes along different lines - by restructuring its own structure and changing certain properties, or simply by avoiding the impact, changing the location and many other different ways ..., but all these ways require *information and management*. Of course, these systems are still physical, but they build on something new in which energy and energy transformations are not the most important thing. The most important thing is the phenomenon of information, information processes and management, resting in their memory. They are able to evolve and develop, improving self-preservation.

How far can they go in this process of improvement!?

Can they reach over-preservation!?

The answer to this question is extremely important because:

*“... there exists a universal war between the systems. In this war the unstable ones are being destroyed, the strongest survive and they are the ones which determine what our world looks like.” [21] (G. Klaus)*

The very nature of self preservation as a result is what it has to be – it has to take it above all other results, since the unstable and not endurable systems are destroyed, and only the stable ones remain (the self-preserving ones). Quite naturally, only the super stable, the leaders in self preservation are to play the prime role in defining the shape and appearance of the world and the

Universe. It is also natural for the generalized naturally selected system to create in time super powerful self preserving systems which we can rather safely to call **immortal**.

For the cybernetic variant of personal immortality, for the process of mind uploading, the most appropriate theoretical basis, both for placement and formulation, and for further research, is *general preservation theory (general systems theory)*, because the category of "preservation" together with dialectics "preservation" - "change" is fundamental not only for the materialist view of the world, but also for effective contact with private areas of science. This is extremely important for any interdisciplinary project and especially important for mind uploading.

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### **Systems of Information**

Essential for understanding the cybernetic variant of personal immortality and the process of mind uploading is the well-known and repeatedly discussed division in man: man as an organism and man as a psyche and personality. But not just the statement of the problem [22], but its definite solution - from the point of view of system-wide ideas.

The beginning of the personality is a long, complex and multi-phase process of socialization which is most intensive during the second to the third year after the birth. The formation of the person as a character requires a high level of development of the nervous and psychic system. "Each personality is a temporary formation with materials borrowed by the surroundings, while consciousness is an untraceable development of extracerebral information. The "individual" half represents regrouping of the elements from the environment," [23]wrote H. Delgado in "Physical control of the mind". For the sake of determining this new line of the human development, B. Ananiev uses the term "life path" [24] : this implies the history of formation and development of the individual as a personality in a certain social environment.

The system approach to this paradoxical division in man (man as an organism and man as a person) goes further, revealing the cause, the mechanism and its immediate carrier. This is a definite solution to the problem of "body- psyche" within the system. The system approach sets and develops three directions simultaneously - the human individual as a system, the psyche as a system and the organism as a system. Here the place would not be enough just to quote the results in each of these areas, but there are "nodes" that are extremely important!

Here we come to a key point in the development of these ideas. It has a key role because it comprises of a decision provoking movement in several directions at the same time. Firstly, this is an idea which to a great extend rationalizes and specifies the primary vision on "soul" and "body", offering a purely materialistic solution of the psycho-physiological and psycho-physical paradox (respectively problem), leaning on the system ideas, and not of crude physicalism and mechanistic materialism. Secondly, at the same time it allows for the idea of cyber immortality to be brought into a version, strictly and most certainly within the boundaries of science. Lastly,

it allows for broadening of the system ideas coming straight from the source (L. von Bertalanffi, P.K. Anohkin and others), based on universality of a certain form of system to a unified theory on the systems, but already in a complete and fully logical wholeness and clarity. One has to emphasize on the fact that the heuristics for such a development happened to be the idea for personal immortality.

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The quoted on numerous occasions position, expressed by N. Wiener from the time when cybernetics was settling in, has its rightful place here:

*“Information is information. It is neither matter, nor energy. Any materialism, which does not acknowledge this, cannot be viable right now.” [25]*

From the time this position was expressed till now many deep and thorough research endeavors have been made, thousands of books have been written, which more or less give a successful answer to the question: “What is information?” But in the huge pile of ideas and findings, some remained misunderstood and underrated. One of these lines of work on a philosophical-methodological level were the ideas presented in the research performed by V. I. Kremianski which proved to be absolutely precious and helpful in our specific research, but remained beyond the circle of attention to the better part of scientists and researchers.

Plainly put, in detail V.I. Kremianski tried to apply a system approach to information as a phenomenon and offered a new term – **systems of information (infs)**<sup>1</sup> at a time when any introduction of new terminology and wording was looked upon with a frown. His new idea proved to be a significant leap forward to synthesis between cybernetics and systemology. (That was the synthesis predicted and promoted by L. von Bertalanffi [26])

In the very prologue to his monograph “Methodological issues and a system approach to information”[27] (Moscow, 1977, “Nauka”) which presents his profound exposure in its wholeness and his general concept, the author formulates his major idea:

*“Information does not occur only in the form of simple in their nature purely additive multitudes of units, as per the classical theory; in real nature and in the society as a whole, information undergoes its own specific stages of development, along with a considerable level of evolutionary changes. In genotypes, in instincts, in habits, or in other forms of psychic characteristics with animals, in the scientific knowledge, in technical projects and programmes, plans and in general in all kinds of reflection, **information does not only swarm and thicken round the centers for connection, management, research, but it also becomes more integrated. It is brought to its own levels of a specific organization and external organizational activity. Its genesis, history, and functioning gain relative independence.**” [28]*

1 **systems of information (infs)** - these are systems whose substrate is the information, but the information is understood as a hyperstructure of a certain carrier system! The term "hyperstructure" is explained below.

By reviewing the ideas for the formation of specific objects from the integration of information in various particular cases (living systems, living systems with psyche, social systems, etc.) VI Kremyansky concludes:

*“Looking closely at these schematically drawn tendencies in their totality, we can observe the movement, formation and to some degree the ‘construction’ of one new in its essence system object in them. This is the information which is used for management and gaining of its own specific organization and activity... **They correspond to the term systems of information, acting in the capacity of organizers...** Indeed, it is the development of the systems of information in the living nature and in the society which create the most meaningful foundations of continuity and “the development of development”, the most complete expression of “historicism” of the object, characterized by the complexity of organization.” [29]*

In several publications of his, the author outlines the paths of research for the three major stages of systematization of information – genetic systems from information, zoo-psyche systems from information and social systems from information, which go by the common term **infos**.

The process of self-organization and betterment of the preservation function, as well as the accompanying selection and elimination of the less perfect systems has been going on for millions of years, but schematically it can be presented as a sequence of larger leaps from one stage to another –

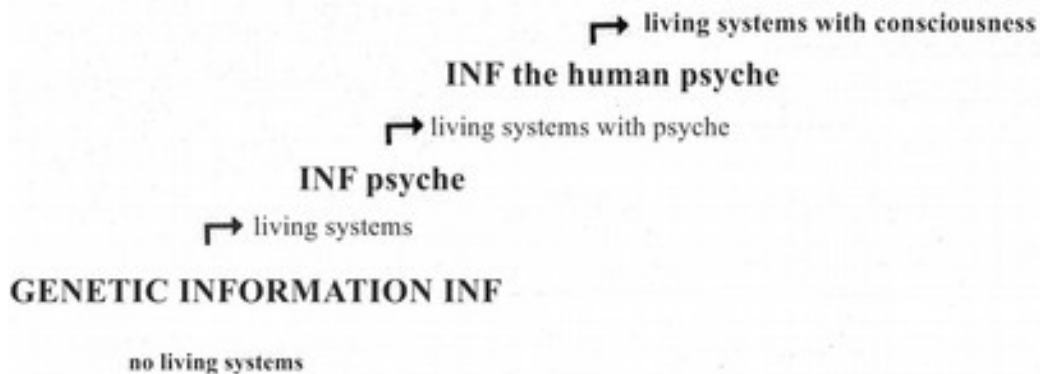


Fig.№7

VI Kremyansky's concept turned out to be the most valuable precisely because of understanding of these jumps, since each of these jumps is in essence a leap towards the function of self-preservation, this leap occurred because of the emergence of a new type of system formation and more precisely - a new type system - a system of information.

The idea for observation of specific systems – systems of information (infs), is well backed-up with solid arguments in the exact science, but it would have remained not well clarified, unless V. I Kremianski had not put an extra effort into comparing the traditional systems with the systems from information. In brief, the systems of information could be characterized as follows:

### **a /. Information as a hyper structure.**

With reference to the publications by C. C. Smith [30] , V.I. Kremianski draws the attention to certain specific characteristic traits of the structure which come to the surface as a result of the fact that *not all levels of freedom of the elements are engaged in structural connections*. Let us analyze in detail one typical example for the sake of clarification – the icy formations on the glass surface at low temperatures. Given the lower temperature and the dramatic fall in the intensity of movement of the water molecules, from the state of vapor, they go through a phase change – they turn into liquid, and yet a second phase change – crystallization (from water to a solid substance). During this process certain connections between the water molecules are formed. The main connections are on the axes, positioned at angles 60 degrees one against the other – the so- called needle-shaped mono crystals. However, since the crystallization takes place on a glass surface, which has its uneven parts, scratches, dirty stains, and so on, the formation of the needle-shaped crystals bears the impact of the given circumstances for each microscopic spot. The connections between the single molecules are the same. Moreover, in the period of formation of each monocrystal, the freedom of choice is intact at the point of formation of each new crystal „beam” (or crystal needle). To sum up, within the limits of the connections between the water molecules, the practically unlimited diversity of variations of the specific structure of the polycrystal mass is preserved, provided there is enough quantity of source material. That is how, the same laws of crystallization of water allow for unlimited diversity of external forms and shapes and polycrystal structure (icy feathers, snowflakes, and so on). Moreover and most importantly – these laws (related to the connection between the water molecules) cannot provide any explanation why exactly these, and no other, no different shapes are formed. C.C. Smith calls these external forms “superstructure”. Vedenov and Kremianski specify the term and introduce the new term “**hyper structure**” [31]. They do bear in mind that “hyper” means more than excess, and even more than the necessary, their term corresponds well with the depicted occurrences in the example: more than just a structure, something external by origin, related not only to the connections between the elements, but also to much larger territories of interconnection (for example the glass surface). In essence, Kremianski’s contribution comes

down to the following: he drew the attention to the fact that these modification in the structure, which occur not as a consequence of the given structure, but within it, and under the influence of the surroundings and the interaction within the metasystem, at a given point of the development can begin exercising massive influence upon the very fate of the system. There also comes to light the fact that there exists an element of historicism of great importance, and that the commonly adopted definition of structure turns out **insufficient** to cover all these phenomena. Rather in the same way, the generally adopted laws of mechanics and physics are not sufficient when it comes to understanding the specific correlations, typical for the construction of different types of machines (engineer science). The chosen term, “hyper structure” (a combination between the Greek “hyper” and the Latin “structure”) serves to describe well the most important part – more than a structure, external by origin, and an expression of the impact of larger, broader and engulfing systems (metasystems), but coming into existence in no other way but down to imposed impacts of the external changes of the immediate own structures of the body which turns into the closest and most direct carrier of information of the given units – underdeveloped and primitive. The hyper structure becomes information when it starts exercising its impact upon the self preservation of the system as a whole and of its own self preservation in particular.

### **b /. The true manifestation of the information structures**

(a structure within a structure)

The hyperstructure is also present in inanimate purely physical systems and is of great interest for solid state physics - it is a question of secondary quantization and quasiparticles, spin-glass theory - the structure of the states of free energy, etc. But the real manifestation of this phenomenon begins when the real encoding and decoding comes on the scene. The change imposed by this on the immediate structures, physico-chemical in origin, acquires the character of signs and sign systems. Using codes enables the transformation of a certain randomly taken object, which at given circumstances is capable of performing as a material carrier of information, into something more than “the object itself is”. The examples are many and too diverse – from ordinary polymers in the cell nucleus and the cytoplasm and the domains on the surface of the magnetic band, to the signs on the white sheets of paper. Characteristic of these sufficiently developed examples is that here we are not talking about fragmented and separated traces and contours, but rather about connected whole images, models, plans, and so on. We are talking about events which pre-determine how a melody will sound, how a complex mechanism will be formed, the new behavioral patterns and the life itself, as well as the survival of a given species, and even the life system of the planet. Their reflections (put in broad terms) are not simply streams of energy, matter and order; they are streams of systems of information in the very meaning of the word itself. The systems of information, which with regard to their material carrier turn out to be superstructures or hyper structures, have to be set apart and examined separately and in detail. The physical, chemical and other immediate structures come to

existence as a result of a certain interaction between the elements in a given single system, while the information structures come to life and they shape out as a result of much more complicated processes oriented towards the metasystem and a hierarchy inclusion of the carrier system into it. The understanding of **information as a hyperstructure** is in full accordance with the classical interpretations [32]: “Information as reflected diversification” and “information as downloaded ambiguity”, but it also does give us more – it opens certain opportunities for a **qualitative approach to the phenomenon of information**, it allows to put forward the thesis of **systems of information**.

**c /.The systems from information have to be seen and considered as triple in their essence and formations.**

In fact, they exist in a “triple unity” with its own material carriers, as well as with their metasystem. In the meantime, they they develop in their capacity as a center for “memory” and organization as per their own, mostly matasystematic laws, while simultaneously they become more and more independent with regards to their carriers, and the metasystem itself. Hence, **the infs are more “material” than their immediate material (or field) carriers**. Indeed, they are directed to something bigger and represent something far larger and all-embracing (the metasystem), rather than their carriers or the sigh systems which coordinate them, especially when they step into the capacity of organizers.

Such a short introduction to the idea of systems of the information, the idea of the formation of new systems – infs, can only provoke the interest without any further claim of completeness. In case a deeper understanding and getting acquainted with the author’s original work, one has to get down to more profound research on those [33]. The concept of information can truly be understood in fullest only after certain specific systems are put to thorough observation. Moreover, if these systems of information are subjected to comparative analysis, some general conclusions on this form of systematizing and its development can be reached. We already have the necessary conceptual means to give an answer to the set at the beginning issues.

**What is preserved in the mind uploading process performed under the ARTIFICIAL COMMISSURE procedure?**

I already have the necessary conceptual tools to answer the questions posed at the beginning! Obviously, that is the specific system of information on “psyche” or “personality”, while baring in mind that personality, as a system, grows on the foundation of the psyche in the process of socialization of the individual. As S. Petrov states: *“The significant leap forward, related to the coming into existence of the human consciousness, is so much bigger, beyond any comparison to the transition between irritability and psychic, but it is headed in a different*



*direction. For the ontology of the intracranial occurrences, the way consciousness exists does not differ significantly from the way the normal psyche exists...” [34]*

Based on the system-information approach, we can state with great degree of concreteness and accuracy that in mind uploading done under the procedure "artificial commissure", that which changes its medium and develops in a series of bodies with continuity and increasing perfection, is ***the system of information - personality***.

In the schemes from Fig. 1 to Fig. 6 with a shining sphere, this system is indicated. Its essence can be briefly expressed as an associative self-sustaining vortex in the space of memory engrams. This system of information with a distinct individuality and uniqueness achieves self-preservation and is a manifestation of *self-organization at the level of hyperstructure*. Its dynamics are mainly determined by two factors: the sensory flow of information coming from the external and internal environment of the body and from the memory „landscape“, temporary and permanent. On the other hand, both the content and the structure of the memory of the psyche depend on the dynamics of the system in question. That is why, after creating an appropriate "artificial commissure" between two brains, a common memory space is formed. (fig. №3) If one brain stops functioning, for whatever reason, the psyche will continue to exist and function because the memory space is preserved. Something similar happens in experiments to disrupt corpus calossum and other brain commissures [35].

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### **INF psyche.**

I am tempted to outline the directions of our research related to the concretization of the info of the psyche. Of course, the results of these studies deserve a separate publication, which is already planned. We have followed in detail and with great precision the whole discussion on the opportunities of the information stream to the problem psyche and personality. The wondrous idea about the informational nature of the psyche is discovered in many classical works in the field of psychology [36], but as it is often the case, in the real-life development of science, there are always those few authors who are in quite a hurry to formulate the major thesis:

The psyche is information! [37]

Yes, but at a closer inspection and through the proper analyses [38] it comes to view that this statement, no matter how easily argument it can be, is not sufficient. Information is a very broad term and cannot specify the psyche. As a result, thousands of pages of criticism were written and many people were ready to burn the wet with the dry. Realizing the empiric characteristics of the psyche [39], even only down to an epitomized form, enables us to comprehend the enormity of the challenge and the needed endeavors to dive into any attempt to develop a theory on the psyche and the psychic processes. This theory has to naturally overcome at least two paradoxes – the psycho-physiological [40] and the thermo-dynamical [41], and

along with those, as a logical continuation, to allow for deriving different specific mental processes – cognitive processes, emotions, will, consciousness, self-consciousness and awareness, and so on, from a one only standing point. Although the task represents an incredible challenge with a staggering difficulty, there happened to be authors, who took the risk of being crushed and demolished by the criticism, but who have offered ideas, and are trying to outline the shapes of the future theory [42].

For us the most impressive of all steps was the so-called “given object of the subject” [43] , in which the image of the object is revealed to the subject immediately, as if in "pure" form. "Such a givenness of the subject, through the mediation of brain processes, the object beyond it is the image **possessing ideality and subjectivity.**" [44] In a whole sequence of publications [45], it was clearly pointed out, that the terms “information” and “information processes” could fundamentally solve this problem. Amongst the impressive amount of publications, Mr. D. I. Dubrivskii’s work stands out. He states:

*“The starting point will be the correlation between information and signal. These terms are in no way identical. The signal is the material carrier of the information in the systems of information. Following N. Wiener’s logic, the information can be determined as the contents of the signal (the message)...*

*Let us examine a relatively elementary example of a mental reflection. On the one hand we have a person who is perceiving visually and for a short enough time object A (lets us assign the symbol **a** to the object) which is experienced by the person. Meanwhile in the central brain of the person there is a certain neurodynamic process going on) a certain neurodynamic structure) provoked by the impact of object A and responsible for the experience through which the individual is going through. (Let us assign the letter **x** to this neurodynamic equivalent of the object .) Naturally, it is considered that the subjective image and the neurodynamic carrier (**a** and **x**) happen simultaneously and have one and the same cause. However, these processes have to be distinguished: **a** is the ideal process, the subjective reality, and **x** is the material process happening in the brain; “**x**” is not a psychics process, it is not an ideal image of the object. It is an encoded reflection of object A. This neurodynamic code, existing in the central nervous system in the brain of the person is experienced by him or her exactly as an image; it is, so to say, subjected to decoding. The ratio between “**a**” and “**x**” can be referred to as a single case of the ratio between the information as a content and the signal as its form; “**a**” – the information in the object A received by the individual ; “**x**” – the material neurodynamic carrier of this information/ signal.*

***All these psychical occurrences, which we can call ideal, are nothing more than information passed on to the individual in it s immediate “pure” form. The signal, as a given***

***organization of the elements, and the processes in the nervous system is always eliminated for the individual.” [46]***

DI Dubrovsky developed his concept of the ideal, but in fact he demonstrated the possibilities of the concepts of information and information process to cover the more general problem of the mental. He suggests that we interpret the mental as the ability of the individual to have information directly and in pure form. The analysis of the ability of the social individual to operate with this information in time, that is to activate and inactivate the relative sequences of the neurodynamic systems, without giving any thought to them, leaning only on the information in its content, directly leads to the idea of ***individual organization of the information on a personal level and respectively to systems of information related to the psyche***. Dubrovskii states: *“The personality is capable of activating and inactivating a certain sequence of neurodynamic systems of x type and in fact is able to manage neurodynamic systems of a certain type. This can be interpreted only in the sense that the neurodynamic systems of x-type are self-controlled, organize themselves alone and that they create a personal level of self-organization in the whole system of the human individual.” [47]*

In a later work, DI Dubrovsky developed in detail the possibilities of the information approach to the problem of the ideal mental image. Anyone who wishes can get acquainted with these ideas in detail, but it was more interesting for us to study the roots of the stubborn resistance to this approach and the sharp criticism to which it was subjected. Our attitude towards the informational approach to the mental was and remains constructively critical, because these are the first working ideas I have encountered in this area. It was obvious to me that something was missing, something needed to be supplemented and refined, but the direction of the search, I think, was right. Furthermore, I could compare these ideas with Kremyansky's ideas about information systems and anticipate the emergence of a better theory.

In Dubrovski's studies it is cleanly and quite obviously emphasized on the necessity of a *“personal level of organization”*. But this specific need is even easier to identify while looking into some specific issues, derived from the concept. Let us take for example the question “How are we to interpret the fact that the objectively existent in the brain neurodynamic code is experienced by the subject as a subjective reality?” Of course, there is interest in this group of authors who believe that there are no copies, drawings or models of reflected reality in the nervous system, and only codes that are the neurodynamic equivalent of the image of that reality.

There is a problem with the decoding !?

And it is decided very differently. P.K. Anokhin defends the thesis that "there is a high probability that consciousness is the last and most perfect decoding device that turns all types of nerve codes into a natural image of the external object." [48] This thesis is severely attacked on the grounds that if that is true, the consciousness will end up being an external object in relation to the brain, something like a “third eye” or “a small creature” and so on.

Dubrovskii, who also stands against this thesis, solves the issue by introducing “natural” and “alien” to the self-organizing system codes. Here the neural codes in their essence do not need any decoding procedures and represent the information in its pure and immediate form.

But, in fact, to whom is this information provided ?!

On the nervous system, on the body ...?!

What does "natural" code mean ... for whom is this code natural ?!

The answer to this question is directly related to the thesis of the existence of a specific *system of information - inf of the psyche*, and also to the specific features of this system!

Apparently, the nervous system is an excitable, capable of remembering environment with certain features. Our individual experience as psyche and the characteristics of the neuro-physiological memory suggests that the first impacts coming from the environment (internal and external) for the given organism are not experienced as a subjective psychic image. A certain quantity of repetitions and impacts are needed here to allow for the subject of the psychic image to form.

Who and what decodes the newly perceived influence?

Not the organism, not the nervous system, nor the brain or any of the brain subdivisions, ***but the memorized previous influence!***

The nervous system happens to be the environment where, as a result of the memory possessing, certain characteristics (associations, compartmenting), the influences begin to pile up, between which the cooperation and the interrelation are becoming mutual COoperation between the components , and to actively form a new type of a system – a system of information of the psyche. The contents of the signals at the input point are related to the environment, and that is why the contents of the psyche can be depicted in such terms only.

As precisely pointed out in the far 60-s of the twentieth century by Hose Delgado, for the normal functioning of the system of the psyche a certain minimum sensory flow is needed. If, by any chance, this sensory flow is limited below the minimum [49], serious disturbances in the psyche will occur. In general, those are reversible processes if the sensory flow is resumed. What is more, these types of impacts have recently become an extremely modern and informative tendency in the psychological research [50]and they deserve serious attention. In the process of our research, these results presented an independent line of thought which possess the ability to focus the attention to the character of the system of information formed in the nervous system in the process of the individual development. Most likely this is a system of information of a streaming type, a dissipative structure (something quite similar to Benard's cells) [51],formed in the space of the engrams of memory. This leads the researching process to the answer to the question how to overcome not only the psyche-physiological, but also the thermodynamic paradox of the psyche.

Our conclusion is that the information approach to the psyche inevitably *must be developed and refined as a system-information approach that actively uses the concept of system of information*, and not just the psyche to be defined as a system of information, but to be a system of information of a certain type (a certain *dissipative system of information*).

V.I. Kremyansky took the first step, presenting the psyche as a system of information, but his description is too general, something like a "bird's eye view". The development of the system-information approach to the mental requires a more developed and concrete theory. The thesis: the psyche is a system of information of flow type (dissipative hyperstructure) needs to be separately analyzed, studied and presented.

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### **What are the mechanisms of preservation?**

#### **Can this so-called preservation be classified? Are there actual analogues in reality!?**

It is quite natural to trace the "mechanism" of preservation in the genetic system of information, as it precedes in time the appearance of the info of the psyche. The information of the genetic system of information carries out self-preservation and improves self-preservation in a process we call *evolution*. It is not necessary to state in detail the theory of evolution and modern genetics to claim that the "key link" here is the process of DNA replication [52]. In DNA replication, all information about the organism and the species is overwritten on a new DNA molecule that is identical to the original. An exceptional process of rewriting all genetic information, creating a completely identical copy of it, using the features of the DNA molecule. For the evolutionary process, of course, errors (mutations) and the emergence of new gains are important, as well as the elimination of unsuccessful changes, but without replication there would be no! Replication is a way to double the memory of the system, along with all the auxiliary mechanisms of decoding and using the information stored in the memory. It is replication that allows the system of genetic information to be transferred and a new organism to emerge, carrying this same system of genetic information. Through division and differentiation of cells follows the construction of the whole organism with all its features. For our purpose it is not necessary to describe the whole process, it is sufficient to make the following principled distinction:

*„... There are two types of units of natural selection and there is no dispute between them. The gene is a unit of natural selection as a replicator. The body is a unit of natural selection as a carrier. Both units are important. None of them need to be downplayed. They are*

*two completely different types of units and we would be hopelessly confused until we understand the distinction in question." [53]*

The evolution of living systems is realized by the scheme:

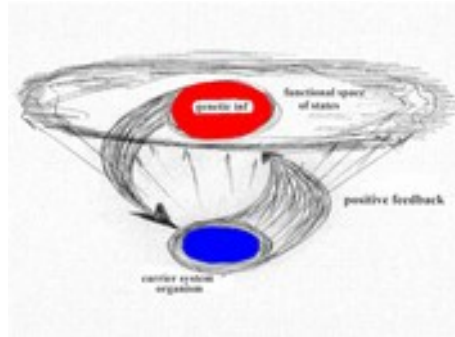


Fig.№8

Essentially, the scheme reveals a positive feedback in self-preservation and development as a system of information (in this case genetic) is developing a series of specific carriers (organisms, generations of organisms). If we take into account the mutations and evolutionary enhancements, this represents a sequence of organisms with increasing perfection and continuation.

The existence and the enhancement of the systems of information can be comprehended as a process of self-organization at a hyper-structural level based on the stream of diversity of the internal and external environment for the system (meaning the dissipative hyper-structure). The existence and the normal functioning of a given inf require specific space, provided by the system-carrier. This certain space is created by the organ which supports the needed memory and the processes in it – the DNA for the inf of the genetic information; the neuron net (the brain) for the inf for the psychic information, as well as the organs which account for the stream of information from the external and the internal environment (the sensors), so as the organs which exercise the controlling influence upon the carrier system (the effectors), its behavior and the processes inside it, and so on. The space, which the carrier system provides, largely determines what qualities the information system will have. On the contrary, since self-reproduction, the regulation and the overall behavior depend on the system of information, the perfection of the carrier system depends on it, too. Of interest is the positive feedback - it leads to development. Negative feedback leads to stagnation and elimination of the individual or species.

Obviously, the improvement is performed in a closed loop: the system of information refines its carrier system; the carrier system creates "space" for the existence and development of the system of information with advanced capabilities, which again leads to a new refinement of the carrier system, etc. And this process can be reformulated as: *existence and development of the system of information in a series of carrier bodies with continuity and increasing perfection in relation to self-preservation*. I used the same wording to describe the process of mind

uploading performed under the "artificial commissure" procedure or the cybernetic variant of personal immortality.

And this means that mind uploading is a request to achieve such immortality as the inf of genetic information has already achieved.

Is such a scheme possible for psyche and personality inf !?

As is well known, the nervous system and the brain of higher animals (humans) have evolved, with the old parts of the brain being digested and upgraded with the addition of new ones, which in certain cases begin to dominate. [54]

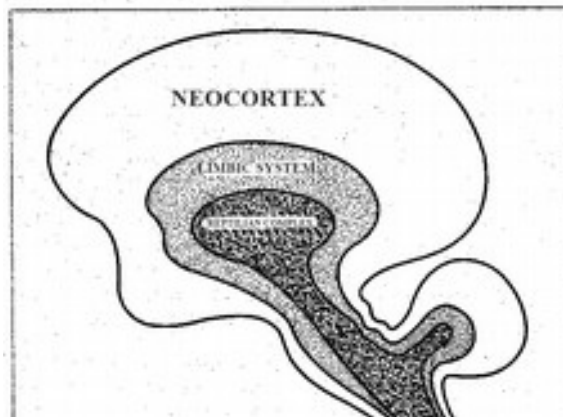


Fig.№9

On page 63, K. Sagan writes: *“It is very difficult to achieve progressive development, if vital structures are changed, every step here can be deadly. But capital change can be achieved if new systems are upgraded over old ones.”*

This feature of biological systems is extremely important in evolutionary terms, as well as for the realization of the next step in development - personal immortality. The nervous system we have is insensitive (or weakly sensitive) to defects and most importantly can be upgraded by adding new structures and departments. Creating an artificial commissure between two brains can be viewed from this angle. It can be seen as the completion and expansion of any one (or just only one!) specific brain structure. I think that this principle should be observed in mind uploading performed under the procedure "Artificial Commissariat" in order to obtain continuity in the transfer of the psyche from one carrier to another without disturbances.

From a different angle, but this principle is observed in the launch of the idea of exocortes [55], as a means of realizing mind uploading, which makes the idea of exocortes close to the system-information approach.

I will also note that our nature suggests a solution in another rare and unique way - the Craniopagus twins. Yes, the fused brains of these twins are extremely rare. Even rarer are the cases in which the fusion leads to the exchange of psyche, thought images. However, there have been cases [56] in which such an exchange can be observed and is thought to exist.

The properties of *associativity and distribution of neurophysiological memory*, which ensure that the memory space of the brain is capable of a process similar to DNA replication, make it perfectly acceptable to discuss the unlimited and continuous development of mental psyche in a series of continuity carriers. and increasing perfection. This series of host organisms is no longer a product of evolution, it is no longer a product of the development and refinement of the genetic system of information, but created in a creative, artificial way based on science and technology. This in turn allows jumps that are impossible for evolution, jumps creating carrier bodies with a substrate that is not biological.

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### **What are the limits of this preservation?**

The inf of the psyche, in the individual, makes a qualitative leap, which is connected with all the manifestations of the transition from sensory to rational knowledge of reality. Preserving certain qualities of the psyche and on its basis, a new system of information emerges - personality. The personality grows on the basis of the psyche, but the leap is huge and has serious consequences for the whole system.

The personality as a system of information has qualities such as consciousness and self-consciousness, which dynamize and structure the activity of the system. Compared to the psyche of animals, the human psyche not only differs qualitatively (presence of consciousness and self-consciousness), but also becomes a much more efficient operator of information. Moreover, the consciousness and self-consciousness of the individual is information and knowledge about reality, which in its forms of scientific consciousness is not just any knowledge, but knowledge that reaches the hidden nature of things, which penetrates deep into the phenomena and reaches their nature, to the causal chains responsible for the occurrence of one or another phenomenon, the truth about reality. The richer and more adequate the network of concepts and laws is, the more advanced the scientific consciousness is, the greater the opportunity for growth and deeper comprehension and stepping into the essence of the world is. The richer and more detailed picture of the world is more adequate to the real Universe and is the strongest tool for achieving survival and self-preservation.



The personality as a system of information receives a potential opportunity for *unlimited improvement and development*. The root of this possibility lies in the fact that personal content is knowledge of the internal and external reality of the system, which can be verified in practice and brought to a degree of truth about this reality. The more developed, dynamic and true the system of knowledge, the more new lines of growth and development are discovered. Adequate and true knowledge is directly related to the management and successful solution of the problem of survival, which in the future includes guidelines for improvement. Improving the system of information and its carrier.

If we accept the infinite diversity of the world and the ability of consciousness to know it to the degree of truth, the model of "personality" - "carrier" connected in positive feedback, is immediately realized as *positive feedback without limitations*.

The hypothesis that the cybernetic variant of personal immortality has already been realized allows scenarios to be created and studied. The dynamics of the adopted model is determined by the positive feedback in human development without limitations, which means continuous, accelerated expansion and system formation. Continuous improvement of self-preservation and its transformation into super-preservation. Exponentially growing "explosion" of self-preservation and system formation, acquiring the character of super-preservation, which spreads like a wave in the macro, micro and mega world and rearranges and restructures it. This "wave" is able to rise above any competition in preservation and define a new look for the whole Universe.

The most important points are:

a /. **The presence of a threshold.**

Overcoming it quickly leads to the transformation of positive feedback into a singularity.

There has been positive feedback since the advent of primordial life, and there has been over-preservation. But this over-preservation and this positive feedback are significantly limited by the conditions of the planet where life originated. The substrate and shape of living systems is determined by the chemical composition and physical conditions of the planet's surface, and in its blind evolutionary development, life cannot abruptly exceed the parameters of the environment in which it originated. It was only with the emergence of man, human society and civilization, and with it the cessation of biological evolution and the replacement and development of society, that it became possible to overcome the limitations of primary conditions and expand life in unfamiliar conditions. This expansion is based on the activity of consciousness and reason and on the human environment of existence. But the further we move away from the primary conditions of the origin and development of life, the more the difficulties increase and the costs of various resources increase. The biological substrate becomes an insurmountable obstacle to unlimited development.

This contradiction in the development of human society is connected precisely with overcoming the threshold, and it is: while preserving the continuity, the most essential of human nature - consciousness and "I", to move to a new substrate basis of the carrier, with more qualities and opportunities for existence and development of the biological substrate. Overcoming this threshold for the first time means the transition of consciousness and reason from a conservative and unchanging carrier (from a biological substrate) to new carrier systems with a different substrate basis, but appropriate organization and structure, such as the process of substrate change. something habitual and natural will happen [57] so that the process can expand continuously and grow indefinitely without restrictions.

#### **b /. Positive feedback without restrictions.**

Positive feedback "inf - carrier" in the case of the cybernetic variant of personal immortality becomes positive feedback without restrictions. This characteristic is due primarily to the properties of the human psyche - reason and consciousness. In order to achieve effective and optimal management, it is essential how the systems of information reflect the internal and external environment of the system, what is the degree of correspondence between the original and the reflection. It is known that the public consciousness is what, as a whole, reaches in the process of search - the truth, but it should not be forgotten *that the carrier of public consciousness is the consciousness of the individual*. The relay principle of reproduction of the public consciousness, through the emergence of new personalities and the disappearance of others (aging and death) has certain merits, but at present its shortcomings are increasingly felt. And they are painfully tangible for the time in which we live: it is difficult to deal with the information explosion, we naturally stratify, alienate and our interests oppose, each stratum is at war with others, the limited resources of the planet are in gross dissonance with the growing number of people and their ever-increasing needs, along with raising the standard of living, etc.

A basic value for society is the individual with his creative potential and his "I", free and inspired, active and creative. Can such self-consciousness exist and develop, subject to the laws of biology with the obligatory aging and death !? The need for long life and immortality, as a continuous and unlimited existence and development of the "I", is becoming more and more urgent and clearly realized. Personal immortality becomes imperative.

The Inf, whose movement and development acquires the quality of consciousness, is not just another step in the development of this type of systems, but a qualitative leap in which a *minimum threshold of perfection* is reached. These *sufficiently perfect systems* (ie possessing consciousness!) are capable of creating cognitive constructions that reflect reality with an arbitrarily high degree of accuracy and adequacy and achieve the truth. Consciousness is able to react to any change in the system and environment, even one that will occur in the future, as long as it is in the area of objective possibilities. It is capable of realizing any moment of self-preservation, as long as it is embedded in the existing reality and thus exhausts these possibilities in an extreme way, achieving over-preservation (the other name of the cybernetic variant of

personal immortality). This process realizes an optimal "trajectory" of system formation in terms of self-preservation.

The process of system formation, which I describe quite schematically, can indeed be presented as a wave of new order in the universe, which penetrates both the microworld and the megaworld, achieving unity and integrity. And given that every process of system formation is associated with the "splitting" and "transformation" of space-time, this means that personal immortality and the process of the mind uploading become a space-time factor of transformation relevant to the whole Universe. It is this line of theoretical analysis that has allowed us, on the basis of the cybernetic model of personal immortality, to develop and present [58] a model of the Universe from a systemic point of view. This model is based on a certain vision of the technological singularity and a different independent direction for its study.

### **Conclusions:**

Cybernetic personal immortality is a variant of the mind uploading process strongly connected with the idea of personal immortality - preservation and unlimited existence and development of the "personality" system in a series of bodies with continuity and increasing perfection.

The opportunity to formulate and study this option is given by the developed concepts of system (P.K. Anokhin) and system of information (V.I. Kremyanski), as well as the understanding of general systems theory as a general theory of preservation. This is the conceptual basis of the system-information approach.

Developed notions define another procedure for achieving mind uploading - the "artificial commissure" procedure. Performed by this procedure, the transfer of the human psyche and mind on an artificial medium seems achievable in the foreseeable future. The questions of preserving personal identity are completely eliminated, because the psyche with all its attributes is not reproduced, but moved or relocated.

The most important part of the scheme is the understanding of information, such as hyperstructure and the existence of information systems at the hyperstructural level in some systems. Defining the psyche as a system of information existing at the hyperstructural level is essentially a definite solution to the more general mind-body problem, from a system point of view. As a hyperstructure, systems of information are even more material than their carriers, but the proposed materialism differs radically from gross physicalism and reductionism.

The revealed positive feedback between a system of information and its carrier, which in humans can turn into positive feedback without limitation in the implementation of mind uploading, allows to see this process in a much more general framework. Mind uploading is the

beginning of a singularity, which cannot be limited to a certain point, but covers the whole physical universe. This allows us to propose a system model of the universe and to look in a new way at the place and role of the human mind in the world.

The fixed systemic notions of the process of personal immortality in its cybernetic version definitely deprive it of the qualification "miracle" and turn it into a natural and necessary process for the existence and development of human society.

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