

V. SETTLERS – 2.

The issue of transfer the consciousness. [\[1\]](#)

[\[1\]](#) Корчмарюк Я. И. Переселенцы–2. К вопросу о пересадке сознания. //«Химия и Жизнь», 1999, № № 5 – 6. С. 20 – 21.

«In short, we coded the Okada's brain over a crystal biomass. We have the cypher for the Okada's brain, the cypher for his thoughts, the cypher for his «self». Remain to find a way to transfer this code in another brain.»

1. A. N. Strugatski, B . N. Strugatski. «Midday, XXII century».

For consciousness as information.

As is known, the awareness is a function of highly organized matter. It exists in the form of encoded information, concentrated in the brain of humans, primarily in the neocortex (portion of the cerebral cortex, occupying 96% of the surface of the cerebral hemispheres). Moreover, in terms of natural laws should be a ban on «transfer» of personality and consciousness on another carrier material because the information is invariant regarding the carrier – as a material (on which encodes this information) so and ideal (i. e. the code itself). For principle possible to perform such an operation writes as doctor of technical sciences E. M. Kussul in his article «Settlers» (Note: **Куссуль Е. М. «Переселенцы»**. //«Химия и жизнь», 1986, № 2. С. 56 – 60): «The information contained in the human brain can be reproduced on other physical basis, so let say, by using a cybernetic machine. In this case it can be attempted to extend human life whether science will be able to fight the aging of the body.».

What to transfer?

To answer this question, we must know the principles of coding. Nobody knows exactly, but there are hypotheses and experimental data enabling them to assess different functional levels. Let's start with the lowest level – the nerve cell.

It is not excluded for the purposes of the project concerned, the most interesting may be the model of operation of the nerve cell and intracellular levels, built by the doctor of biological sciences A. F. Lieberman in 1965 – 1990. According to this model, the inside in neurons act «molecular computing machine», analyzing the input. Programs of this machine are encoded by the DNA structure, as a result of its work, the neuron produces a sequence of electrical pulses and substances mediators that transmit information through the membrane to the other neurons or managing organs.

At the next level are the between neuronal interactions and popular among «the neurocomputer maniacs» hypothesis memory realization in the form of a network of so-called «artificial or formal neurons». At this level, according to the concept of Neurobiologists G. A. Vartanian and A. A. Pirogov, chief information element, «unit» for the neural code is the interval of time between pulses.

On the top level is the brain as a whole, whose behavior is judged by different EEG and CT scans, while some of the results may be interpreted in the context of the theory of self-organizing systems. For example, in 1994 I. Prigogine mentioned works, from which it follows that during «the stage of deep sleep, the activity in the brain establishes deterministic chaos with a fractal attractor in five-dimensional space».

So let's try to build a technological scheme of «pervasive» coordinated neural coding. At different levels it is carried out as follows: in the neocortex as a whole – from attractors of phase space and game auto-wave electromagnetic and chemical «fields» of the brain; in the neural network – from inter-pulse intervals; in the membrane - the structure of the conducting ion channels; in the body of the neural cell – the activity of the cell structures; at the core of the neural cell – from the structure of DNA. If this scheme is correct, the process of deciphering the mind can go in the scientific and technical plane.

How to transfer it?

In fact, there is evidence (Note: «Техника – Молодёжи», 1997, № 11) that are already trying to treat spinal injuries with neural prostheses: doctors want to manage immobilized muscles using either an external computer, or by implantation a microcircuit in the damaged area of the spinal cord. Only for the project bid, like «implantation» is rough and inadequate half-measure. The information must be decoded and then re-encoded in the new environment. The task is complicated by the fact that we want to do not just copy information, and to ensure continuity of life of «transferred» personality.

But it is not necessarily to transmit information outside of the skull. It can slowly creating new brain, by gradually replace the natural neural cells with artificial and the current information can be write down on them. (The initial work on the modeling of artificial membrane which is functionally similar to the natural and to train during the life of the body is described, e. g. by L. D. Bergelson).

If it comes only for downloading information from a working brain the work would be done only by tomography, even more that their authorization capability is now $0,05 \text{ mm}^2$. This resolution is sufficient for the ability to monitor, for example, the electrical activity of nerve cells in the visual center. Here, rather, to remove code inter-pulse intervals should be done neuro-tomography to work at the level of their own resonant frequencies of nerves (dendrites and axons) in which electromagnetic radiation we can try to determine the transmitting functions of bodies neurons as «black boxes». It should be borne in mind that according to the evaluation of the author of this article, a hypothetical own frequency of nerves must be of the order of 10

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Hz, i. e. to the border of radio and optical range and transverse electromagnetic waves to be extinguished by water-lipid environment of the brain.

But even destroy the entire electrical activity of the brain donor and to record the brain recipient, there is no guarantee that the meaning of the information will be transmitted accurately. The brain recipient neural structure, including cloned from the donor organism may be different from the structure of «the settler». They will be able to comply only if you really brain represents self-organizing environment. Then the principle of «the resettlement» would become the definition and transmission parameters of the equations describing the dynamics of the brain of «the settler» as an entity.

Where to transfer?

The first thing that occurs to a person is a computer. As Russian academician V. M. Glushkov and American professor A. Bolonkin believe that the industry will develop to this level required for somewhere to.

It is likely a chess game with a tie between the computer «Deep Blue 2» and ex-world champion Garry Kasparov is testament to that the ability of people are aligned with those of the computer. At that time, «Deep Blue – 2» had $160 \cdot 10^9$ computer cells and it was able to analyze for one second $200 \cdot 10^6$ moves ($160 \cdot 10^9 \cdot 200 \cdot 10^6 = 32 \cdot 10^{18}$), while the man was tripped $(1 - 2) \cdot 10^{11}$

neural cells-moves/sec. Then one «cell-move» of the man matched $(0,8 - 1,6) \cdot 10^8$

machine «cell-moves», for average clock-frequency of the brain equal to 10 Hz (alpha-rhythm) the volume of the neuron is not less than 1 — 2 MB.

The works of American neuroscientist Vernon Benjamin Mountcastle in the mid seventies know that the neocortex is built from mini columns (bars) – vertical groups of neurons with 110 large number of connections in the vertical and horizontal smaller number. The mini columns were gathered in 600 thousand macro columns of the neocortex. One mini column manages memory of 220 MB, one macro column – 220 GB, and the entire neocortex – 132 TB. Moreover, productivity of an equivalent computer must be 10^{18} Bytes/sec. Is it too much or too little? So for example there will be a machine with 1,000 parallel connected processors with a clock frequency of 1 GHz, where IBM has promised to release in 2002. Marginal productivity of solid-state electronics is 10^{21} Bytes/sec.

Only, the transfer of consciousness is possible not only on neural, but also carrier of biological origin. Success in genetic engineering and cloning of mammals indicate that mass production of carriers with such a complex construction that take moved consciousness is no longer so far in the future.

It is not excluded, somewhere in the middle of the XXI century longer be practicable regular «transfer» of the personality and mind of the human body from aging in young bodies - biological clones or through intermediate neurocybernetics «brain-carrier», or as a result of symbiosis alive and parallel work of the original organism and the body-double. Moreover, organizing a network of virtually immortal personalities can lead under the laws of synergy to the emergence of planetary superbrain with common planetary consciousness.

Bibliography.

About mentioned concepts it is possible to read in following books:

1. **Бергельсон Л. Д.** Мембраны, молекулы, клетки. М.: Наука. 1982.
2. **Вартанян Г. А., Пирогов А. А.** Нейробиологические основы высшей нервной деятельности. Л.: Наука, 1991.
3. **Либерман Е. А.** Как работает живая клетка. М.: Знание, 1990.
4. **Максимович Г.** Беседы с академиком В. М. Глушковым. М.: Молодая гвардия, 1978.
5. **Пригожин И., Стенгерс И.** Время, хаос, квант. М.: Прогресс, 1994.
6. **Иваницкий Г. Р.** Нейроинформатика и мозг человека. М.: Знание, 1991.
7. **Болонкин А.** Добро пожаловать в бессмертие. «Техника — молодежи», 1997, № 10.
8. **Кузнецов Г. Я** – памятник себе. Цель жизни. «Компьютерра», 1996, № 35.