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**FIELD OF THE CODE.
ARTIFICIAL GENETIC
MACHINES**

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In this systematized work, physicist Nikolay Bodyagin explains the nature of unknown properties of the genome in a simple way and, thus, brings about an opportunity of solving complex problems of genomics, etc. The combination of “classical” scientific canons with an artistic style and humor provides a special atmosphere of creative freedom and intuition. The work offers a wide range of experimental tips for further research. It proposes a project guide in the field of future technologies of self-organizing materials and artificial intelligence.

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CHAPTER 1. FIELD OF THE CODE

1.1. RULES TO FOLLOW

It goes without saying that reading other people's articles and books is hard and time-consuming work. This comes to a pretty penny for a person who is creatively active and knows how to dispose of this brief and costly life. Therefore, I set the following rules:

1. Do not rephrase what other people have stated, but write what think, on your own behalf.
2. Write as concisely and clearly as possible.
3. Use only familiar physical concepts and terminology.
4. Do not use mathematical calculations.
5. Do not present things that you are not sure of.
6. For all hypotheses and ideas, formulate testing experiments.

1.2. HYPOTHESIS

In the current view, the Code is a system of chemical elements organized into a specific spatial structure, which is capable of self-reproduction, extracting energy and matter from outside.

I assume that, in addition to a linear sequence of nucleotides, part of genetic information is contained in the spatial structure of the Code, which creates a specific field. The latter is in charge of assembly of individual elements into a whole organism and of its communication with the environment.

The spiral structure of DNA as we know it is worth admir-

ing; it also logically highlights parallels with other miracles of nature that are helix-shaped. However, to date, there is no intelligible explanation of the helix, its origin and functions, and there is still no place for it in the mechanisms of heredity.

But we know that Mother Nature always works to a certain purpose. She just won't lift a finger for nothing. For example, Nature will not decorate window-panes with frosty patterns or create helices merely for our aesthetic pleasure. She is so much smarter than us conceited humans. I wouldn't even venture to suggest that the helices are atavistic remnants, preserved through the whole evolution. It is worth considering that spiral hierarchical geometry plays a very important role in Nature and, in particular, in the genome, and is a form fundamental to all living things.

1.3. FIELDS OF GENOME

1.3.1. SPATIAL ORGANIZATION OF GENOME

DNA is a long polymer molecule made up of reiterating proteins called nucleotides. Its two chains are oriented with their nitrogenous bases versus each other and form the primary structure. This molecule is further twisted in a spiral line. This is its secondary structure.

When increasing in scale, it becomes more complex and forms a tertiary structure: a spiral convolution of the secondary one. This is followed by another spiral compactification. The sizes will consequently increase to 10 nm, 30 nm, and so on. These are the upper levels of the structure.

The overall length of DNA in higher organisms is about two meters. It is compactly packed into a cell nucleus with a diameter of 10 microns, as a hierarchical structure. The key condition here is spiral compactification at all levels of the genome organization. This amazing packaging is not only aimed at saving space, but above all, at protection, storing and transfer of genetic information.

The ultimate external shape of DNA is likely to be a sphere,

which allows minimal potential power (as far as this concept is applicable in the case). This allows it to maintain stability isomorphically, under various external influences. This is, for example, the form of liquids in their “free condition.” The outer, looser layers form a flexible elastic shell capable of absorbing external influences and resisting thermal fluctuations, the way a rubber ball does. At acceptable levels of external impact, the genome will remain integral. But if DNA were stretched in a line, it would have a very different stability level.

1.3.2. LC CONTOUR

As far as electromagnetism goes, the secondary spiral structure of DNA is inductance, as a source of a magnetic field (MF), very much like an ordinary coil with a current. The same applies to the higher levels of the spiral structure. Thus, the magnetic field is a result of spatial organization.

The capacity of DNA as an electromagnetic (EM) system is due to two parallel chains of connections that form a linear sequence (similar to charge plates in a capacitor), and interactions of the upper levels.

Thus, we can conventionally regard the genome as a sequential oscillatory circuit with distributed parameters. Similar technological devices have very narrow bandwidths and are commonly used as filters. This may explain the selectivity of all processes determined by the genome: from interactions at the micro level to cognitive mechanisms and, as a consequence, the organism's hypersensitivity to its environment. This is especially evident in kinship relations, i.e., in biological objects whose past background is resonance-related, even if such objects are significantly distanced. There are many experimental facts accumulated to substantiate this statement.

1.3.3. CHARGE CURRENTS

The characters of the genetic Code are sequentially implemented in RNA and proteins. In the process, the shifts in electrons' density are due to rearrangement of chemical bonds. Such pro-

cesses are numerous. Biological dynamics is a network of EM-supported biochemical reactions. In fact, this includes the flow of electric current and the emergence of EM fields (Fig. 1).

Such fields exist not only in a replication mode, but also in the “static” modes. The reasons are as follows: asymmetrical electron density, fluctuations, and also dynamic external and internal factors.

1.3.4. THE GENOME AS A TRANSMITTER AND RECEIVER

The information that is stored in a linear chain of nucleotides is geometrically convoluted to form an LC circuit that acts as a transmitter-receiver for EM signals. Its electrodynamic potential exists as internal fields and radiations. Therefore, genetic information can translate itself outside and is activated without additional triggers. This is fundamentally different from artificial systems, where the source of information and its transmitter are usually separated.

It is the upper levels of the structure that provide two-way communication of the genome with the external and internal environment. This ensures the stability of the genome and its consistent evolution.

Changes in the genome during the life of an organism are caused not only by high-energy impact, but also by its sensitivity as a resonant electrodynamic system.

1.3.5. PROPERTIES OF DNA FIELDS

The properties of the fields (energy, intensity, frequency, etc.) are determined by the spatial organization of the structure, the linear chain of nucleotides and associated physicochemical processes, external and internal factors and their fluctuations. The DNA field is a dynamic volumetric structure and, most probably, a fractal one.

The structure of an organism’s field is always individual, as it relates to a unique set of natural frequencies at which we can observe resonance or synchronization. The selective activities of DNA, RNA and proteins are due to their intrinsic vibrations.

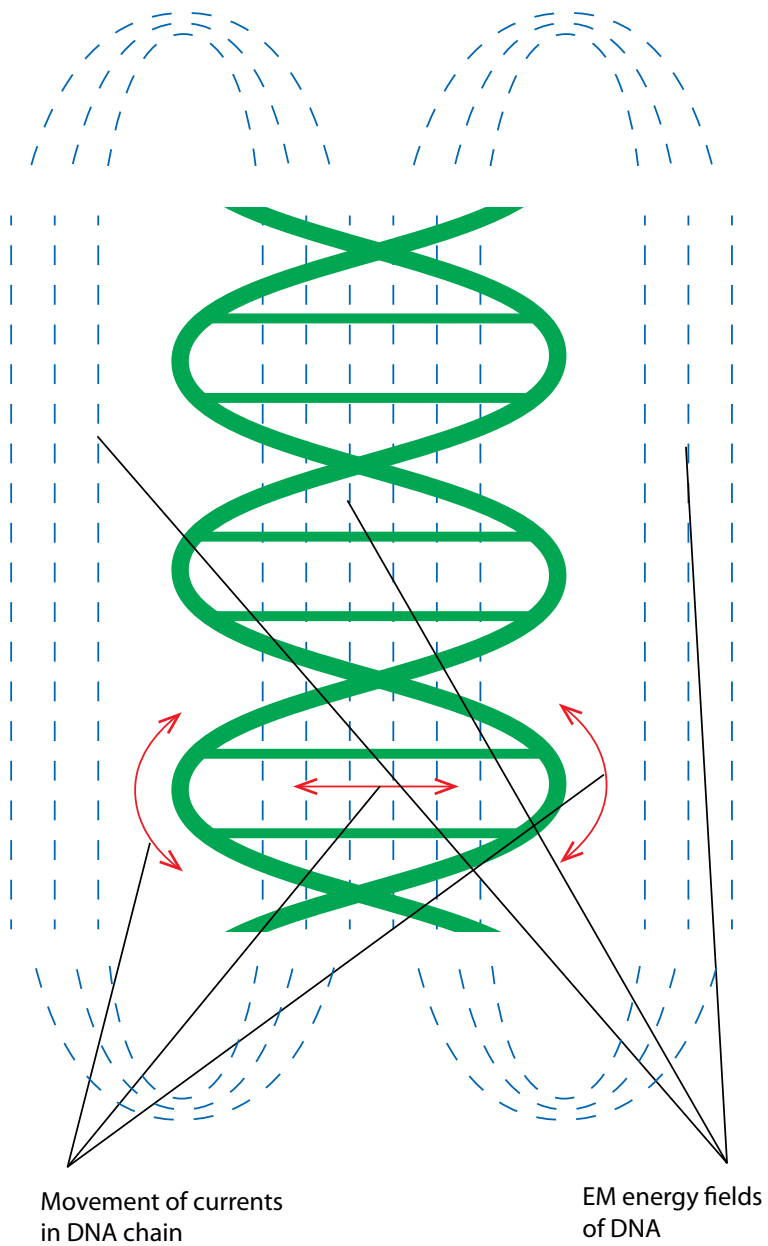


Figure 1. Currents and EM fields of DNA

DNA electromagnetic fields exert influence over much greater distances than interatomic ones. This may be a reason why magnetic fields penetrate deep inside an organism and effectively interact with it. This property is implemented in a number of active devices.

When organized in helices, fields, radiations and matter flows acquire specific properties. Below, we provide details about such properties and the ways they are generated.

1.3.6. THE NATURE OF FIELDS

We can use the term “biofield,” though we do not mean that biofields are inherent exclusively to biomatter or are different from fields definitely established in science. The thing is that they are generated by biological objects, along with other known radiation (infrared, ultraviolet, etc.). Today, there is enough theoretical and experimental substantiation to explain phenomena occurring in biological objects, and, in particular, in DNA, without employing novel entities.

Transfer of genetic information can be interpreted in the language of EM phenomena, such as fields, charges, vibrations, frequencies, etc. And this “novel” vision can lead us to significant advances in genomics and its applications.

1.3.7. ELLIPSE

It is generally assumed that the helix of the genome in a projection perpendicular to the axis is a circle. However, it is an asymmetric figure, approaching an ellipse. This is due to the asymmetry of the complementary groups. The ellipse contains and generates polarity and rhythm, which are the basis of development and existence of all living and nonliving matter. A similar topology can be observed in the trajectories of planets and electrons in atoms, in living organisms, etc. This power-generating geometry means that the system vibrates in a sequence of contraction and expansion. If this assumption is correct, it will have serious implications for understanding the processes of replication.

1.3.8. WATER

In real life conditions, DNA exists in close relationship with the ambient water. Water is a material substrate for the connection of the genome with the “outer world.” It acts as a protective coat for the genome and significantly modulates the intrinsic fields of DNA and the impact of the external environment. It resembles the Earth’s protective ozone layer. Moreover, B. Feng conducted experiments (Feng B. et al. PNAS, 2019, v. 116, n. 35, p. 17169–17174) and concluded that DNA is not only surrounded by a water layer, but its very helical structure depends on the properties of the water.

Thus, the operation of the genome is inextricably linked with the properties of internal water (which remain virtually unknown), which are essentially important for error-free continuous operation of the replication mechanism. This implies that a vibrational control of genetic processes has to consider interaction with natural vibrations of the water. We can carry out a number of experiments that may reveal their resonance relationship.

The reverse is also true: DNA modulates the structure of the boundary layer of water. As it approaches the border of the genome, its structure becomes more orderly, losing the former degrees of freedom and gaining new ones.

In the well-known experiments of L. Montagnier (Montagnier L. et al. Electromagn. Biol. Med. 2015, 34, 106–112) that employed an external magnetic field, information was transferred from concentrated DNA samples to water, with further reverse restoration of the genome. This may mean that internal water carries genetic information and connects all parts of the organism, traveling between them. We can employ a magnetic field with special set properties (including those used in Montagnier's experiments) as additional means of enhancing the interaction of processes in different parts of the organism.

1.3.9. PARTNER FIELDS

Everything we know about DNA fields also applies to its part-

ners: RNA and proteins, which also generate EM fields. The form of biorobots and the essence of their movements are not abstract patterns, but an embodiment of geometry, which generates the parameters of a specific configuration and the functionality of such biorobots.

The geometry of proteins and RNA cannot be considered as purely spiral. However, due to its evolution, it turns out to be topologically adequate to the DNA structure. This determines the resonance (synchronization) mechanisms of interaction between the proteins and DNA and unites them into a single system. This idea is essential, as information about any of the participants in the replication process can be symmetrically used towards others.

Thus, self-replication is a synergistic, field-based vibrational process. All of the participants, connected through resonances and synchronization, give rise to a new quality called life.

It is extremely difficult to establish correlations between the genome geometry and the final shapes of organisms. But we can assume that the spiral geometry potentially generates a powerful continuum of degrees of freedom for the substances it contains, allowing them to accept various spatial forms.

1.4. EXPERIMENTAL CAPACITY

The fields and creative capabilities of the Code can be subjected to many-sided experimental testing. However, this is beyond my strength and capabilities, which served as the main incentive for the publication of this work.

Further, we offer some options of experimental study of the genome field, which, slightly amended, can be transformed into applied methods.

We also dwell on ideas for experiments with the genome in other sections of the research.

1.4.1. THE THINGS WE KNOW

At first, it is worth clarifying the essence of several known experiments and their interpretations. I have to do so, although

the clarification results may end up as a form of even denser fogginess.

We know about many experiments aimed at studying mutual relationships between biological objects and at their correlations. Such experiments have been conducted by Gurvich, Kaznacheev, Popp, and Garyaev, to name a few. Their experimental results are sometimes poorly reproducible. But their great number, employment of modern recording techniques, and other important features definitely prove the existence of such mutual relationships.

Things are less certain in the theory and terminology, where elements of artistic and physical anarchy are numerous. But, as you know, all chaos contains some arrangement.

However, all these problems are not fundamental, and we can safely assume that biochemical processes entail emission and absorption of electromagnetic and acoustic energy, which are not at all “useless noise,” as they stimulate inner and external processes in biosystems.

Therefore, it should not come as an unpleasant surprise that the carriers of genetic information and all agents in replication processes use their own fields to interact synergistically. Besides, some genetic information is determined by the geometry of their structure.

Section 1.3.8 mentioned the result of Montagnier's experiments: successful transfer of information from DNA to water. In my opinion, it is impossible to explain this phenomenon without recognizing the presence of internal fields in DNA.

I hope that the ideas proposed will help to systematize the results of many well-known experiments and to implement new research methods. This may contribute to an emergence of a common scientific terminology and crystallization of the theory.

1.4.2. CALCULATIONS

The following geometrical characteristics are essential in calculating genome fields:

- spiral diameters;

- turn-to-turn distances in secondary structures;
- the size of tertiary and upper formations;
- organization of substructures within the upper levels;
- distance between chains, etc.

It is possible that the geometry of the spiral also matters: the ratio of the spiral length corresponding to its complete revolution cycle to its diameter or to the size of the strand, or something else may be related to mathematical proportions found in nature, such as the Golden Ratio, the Fibonacci numbers, the Feigenbaum sequence, etc.

Other important parameters are those that have full independent geometrical, chemical, and semantic meanings:

- the size of nucleotides;
- codon size;
- the sizes of upper-level substructures, etc.

The corresponding degrees of freedom determine the genome's intrinsic vibrations, which are interconnected in an integral vibrational matrix. From these positions, the genome is a complex multifrequency dynamic machine.

Intrinsic frequencies can be calculated according to this familiar formula:

$$f = L/v,$$

where L is the size of the structural element and v is the velocity of passage of disturbance.

It can be the velocity of light, or of sound, the rate of movement of charges, or another indicator. It is also possible to calculate the energies of interatomic and molecular bonds, using de Broglie's formula (based on the amount of energy required for destruction of the structure, depending on the mechanical properties). As a result, we will define the spectrum of fundamental and derived frequencies for different levels of the structure.

The frequencies themselves are important, and their interrelationships also present some interest:

- among the frequencies;
- with DNA absorption spectra, IR spectra, etc.;

- with EMF properties that have a significant impact on biological objects. If such a correlation is found, then a resonance with wave properties of the code may be possible;
- with intrinsic frequencies of water, cells, Earth, Moon, and Universe (e.g., cosmic background radiation).

All of these suggestions also relate to the partner fields of RNA and proteins.

1.4.3. MEASUREMENTS

I assume that it is possible to measure a field, using the DNA sequencing technology and high-precision measuring tools. In addition to these, we can use such sensory elements as biological objects and various physicochemical processes, including phase transitions.

We are likely to discover there a hierarchy of fields with different frequencies corresponding to levels of DNA, RNA and protein structures.

Two processes define the functions of the genome: fertilization from a partner (another organism) and continuous self-replication of proteins during life. The dynamics of these acts and consequent transformations of the fields vary greatly in intensity and duration, but they will probably have a similar general topology.

It is very difficult to study such a changeable and adaptive object as the genome field without intervening into it and distorting it. I suggest several directions of research:

- the dynamics of fields and of radiation at 0 time (the moment of fertilization), like in the MIT experiment on sea stars (*Patiria miniata*) (cf. details in 1.7);
- modulation of external fields (EM and acoustic) and radiation using DNA samples, and applying similar actions to other substances and processes, including biosystems (Fig. 2);
- difference in the fields of DNA samples: (1) when extracted from an organism, and (2) “in operation” inside it;
- changes in a genome and its field due to external distortions (Fig. 3);

- change in the Code sample field after its structural modification, for example, after removing one link;
- using Kirlian photography for massive DNA samples;
- amplification, focusing, deflection and other manipulations with Code fields;
- application of an external field to change the direction and conditions of genetic information transfer;
- anisotropy of DNA sample fields, aligning the structure in one direction; with possible enhancement of the effect by external fields;
- direction of the field rotation;
- the field as a standing wave;
- DNA fields affecting the quantum level: particle deflection, diffraction, etc.;



Figure 2. Transfer of function of DNA images to objects, biosystems, substances, and processes via external fields

- fields of proteins, RNA, etc.;
- fields as indicators of movement and temporal dynamics of the genome;
- diagnostics of the evolution of the structure and field of the genome in short-lived objects, with AFM or another real-time technology;
- the genome is a highly selective system, so its operation and sensitivity will manifest themselves in narrow frequency intervals. Therefore, using appropriate sensors and emitters, we can definitely identify it in the spectrum of accompanying fields, e.g., using spectroscopy. This will probably allow developing spatial diagnostics resembling magnetic resonance tomography. Since MRI is based on changes in states of hydrogen atoms, then perhaps an

appropriate element or molecule will be found for DNA. To do this, we can apply methods of studying magnetic materials, substances containing magnetic clusters, et al. As a result, we visualize the genome field with its defects, heterogeneity, etc. This can examine an individual cell, a body organ, and the organism as a whole. We can assume that the field of a healthy organism will differ significantly from that of a damaged or diseased one. It still remains to

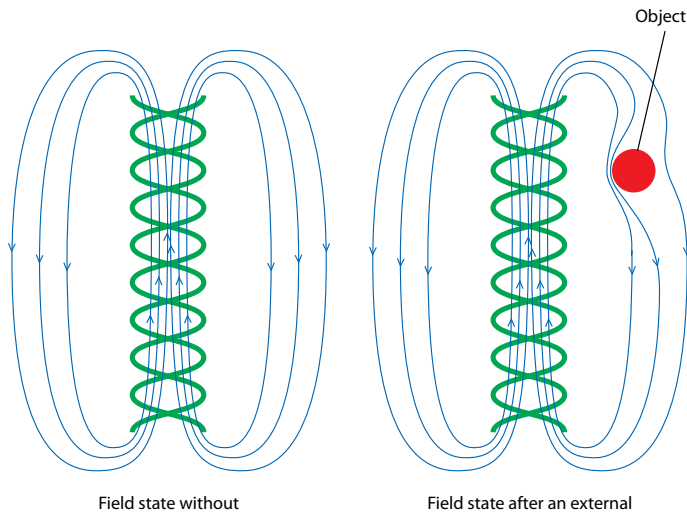


Figure 3. Genome field changes under impact of an external object

be seen whether we can find the holographic structure so much talked about?

- study of the states of internal water that contacts with a genome.

At present, I cannot visualize a direct experiment that could prove that some genetic information is contained in the geometric structure itself. You can try to destructure DNA into a simple linear sequence, stretching the spiral structure with the help of a field, and you evaluate the effect on replication processes. But I am not sure if this is possible without breaking

the natural structure of the chain. The results can be compared with the familiar effect of factors that distort genetic information or its transmission.

1.4.4. USING THE FORM EFFECT

By the effect of form, I mean the possible influence on the state and characteristics of an object of a certain material geometric shape, which is not a part of the object and is external to it. My entire work devoted to the description of this effect is beyond the scope of the present discussion. Below, I list a few of its statements:

EXTERNAL LIMITING FORM

Examples: Chladni figures, processes happening inside pyramids, growth of crystals, self-organizing phenomena, etc. A recent illustration from biology is the experimentally established effect of reprogramming stem cells into a different type, by changing the shape of the limiting area on which the cells were grown. Also, the experiment did not include any special molecular regulators (R. Venkatachalapathy et al. PNAS, 2018, v / 115, n / 21, p. 4741–4750).

Thus, in some cases the macro-form can determine the structure at the micro level. What we know allows us to formulate several options for explaining this effect:

- Code fields in cell colonies form a single field structure and “feel” the shapes that limit them. This brings about change in the whole system and in every cell that is a part of it. It is absolutely impossible that an individual could identify this influence. This is a synergistic effect leading to a transition to a new quality level. Probably only a long-range field can unite cells together;
- vibrations and radiation generated by cells are reflected from the walls of the form, bounce back and stimulate internal processes. This is the effect of auto-stimulation;
- external vibrations applied to the limiting form create a special energy environment, similar to Chladni’s shapes.

It is possible to replicate this effect on a larger scale, so as to avoid precision measurements. In this, we can use representatives of both types of matter: bacteria, yeast, monocultures of small objects, crystals, polymers, etc. It is essential that the effect depends on the scale. As an enhancement, the form can be made of materials that strongly affect EMF, with frequencies that are close to natural vibrations of cells.

The results of these experiments certainly have scientific value, together with other numerous data, including those on the effect of form on inorganic systems. They also have broad prospects for practical application.

INTERNAL FORM OF OBJECTS

As an external limiting form produces an effect, then it is possible that a form placed inside the object also has some influence. The materials and dimensions of the form are important in relation to the size of an object.

ACTIVE FORM

Various vibrations and radiation can be applied to the external or internal form. For example, in the well-known experiment of Chladni, vibrations supplied to the platform create the energy landscape and the spatial distribution of the substrate that lies on it. In order to enhance the effect, vibration characteristics should match the properties of the object.

1.4.5. USING GENOME TOPOLOGY

A multilevel helical structure is the natural topological state of the genome. Probably the phenomena of self-organization that we observe in inorganic matter arise when movement of energy or matter in a certain space-time “volume” becomes cycloidal and consequently active. V. Schauburger made a huge contribution to our understanding and applied uses of this phenomenon.

The idea is to artificially form a cycloid shape in fields, radiation, physicochemical processes, flows of matter, etc. This

will allow achieving revolutionary results in both the worlds of matter.

To take an easier way, we can send a specially formed spiral field through a reference sample of information and direct it at the control object. This field is either independently generated by a certain source, or is obtained with special techniques (massive DNA samples, a coil with a current, coils brought to the structure of the genome, spiral resonators, devices that form spiral beams of light (Abramochkin E.G., Volostnikov V. G. "Spiral beams of light." UFN, 174, 1273–1300 (2004)).

The available biological reactors that attempt to reproduce life, are actually focused on the declared goal. They aim at synthesizing biomatter from inorganic substances under impact of extreme conditions. This may have been the case at the beginning of all life. But these reactors do not have the required conditions for implementation of the spiral topology, which appeared due to an external "impulse" or an unlikely event that wrapped this "croissant." Therefore, it is worthwhile supplementing such devices with an artificial "spiral" factor in the form of radiation, shape, etc.

1.4.6. MEASUREMENT ISSUES

Experiments with the Code and bio-radiation are poorly reproducible, due to their high sensitivity. Therefore, development of measurement standards and optimization of technologies are going to be very difficult.

The factors to be considered are:

- the contact materials. It is not the short-range interactions at the "material—substrate" interface, but inner vibrations of the material, which, in their synchronization with the self-organizing substrate, can penetrate deep inside it;
- the interface can produce the effect of auto-stimulation, when the vibrations emitted by the substrate will be reflected from it and bounce back, forming a positive feedback loop. This can drastically change the whole picture;
- vibrations, including mechanical ones, coming from the out-

side, and influencing the samples, too. These can result in uncontrolled resonance or synchronization;

- influence of the form in which the substrate is enclosed.

I am sure that this list is far from complete. But, besides the issues named, it contains powerful ideas and opportunities for technological advancement.

1.5. ENCODING GENETIC INFORMATION

Like a linear sequence, the upper structural levels contain genetic information. The physical causes of this fact are that at each stage of twisting and folding of a linear nucleotide chain, the number of adjacent elements increases, interaction between the loops of primary and subsequent spiral additions becomes more complicated, and, as a consequence, new complex bonds appear within the structure (Fig. 4). Obviously, the spiral structure itself is information. This is how the upper level Code naturally arises. The fields transmitting it, as they become more complex, create more and more complex sets of biological instructions. Then, the secondary and tertiary encodings, that is, the sentences, paragraphs, and chapters in the huge book of life, are produced).

The chemical and topological coding mechanisms operate simultaneously as a single whole.

The structure of the genome, despite its general similarity with all living things, is individual for each organism. And I dare suggest that it is even different in each part of the same organism. The difference does not probably lie in the linear sequence of genes, but in the fine structure of the upper levels.

All code elements form and modulate its field. This integral coding involves not only the "tested and functionally significant" elements, but also the part of DNA that is currently considered "junk," or passive ballast. At least in the storage and transmission of information, it has the same rights as the "useful" part. (And this is quite different from "dark matter," which was artificially born to harmonize the theory with experiments.) The genome is a machine of life, unified in all of its

manifestations, free of any unnecessary components.

The multiplicity of DNA carriers (all body cells contain them) greatly enhances the storage's reliability, stability, and most importantly, accuracy of transmission. We know that the total signal of a number of identical transmitters with floating properties will be more accurate than a signal emitted by a single transmitter in the set.

It has long been obvious that the linear concept of the Code can by no means embody the complex hierarchy of meanings that are inherent in living things. Therefore, this concept cannot find the essence of the Code: where it holds a frog, an oak, or a person. The proposed geometric and field coding approach could be a way to solve such problems.

It is necessary to introduce informational topological measures that can describe the interconnected hierarchical structure of DNA.

1.6. EPIGENETICS

Epigenetics studies inherited changes in a phenotype, where the formation of mechanisms is not generally associated with changes in the original DNA sequence. Such changes can persist in cell division throughout its life and even be passed on to the successive generations. In this case, the original sequence of genes in linear DNA elements will remain unchanged. It is assumed that this process is due to changes in the gene expression profile. But such explanations focus on the consequences, leaving the reasons undisclosed. Epigenetic phenomena and propagation of life in space, its accommodation to new physical conditions, the emergence and development of various branches of life, and other miracles of the living matter cannot be accounted for by the central dogma and the relatively rigid linear sequence of the genome. This dogma cannot quickly and flexibly respond to external challenges, as it has a low potential of internal development and remains unchanged under normal conditions for a long time. In this sense, it is generally difficult to identify it as a "living" system.

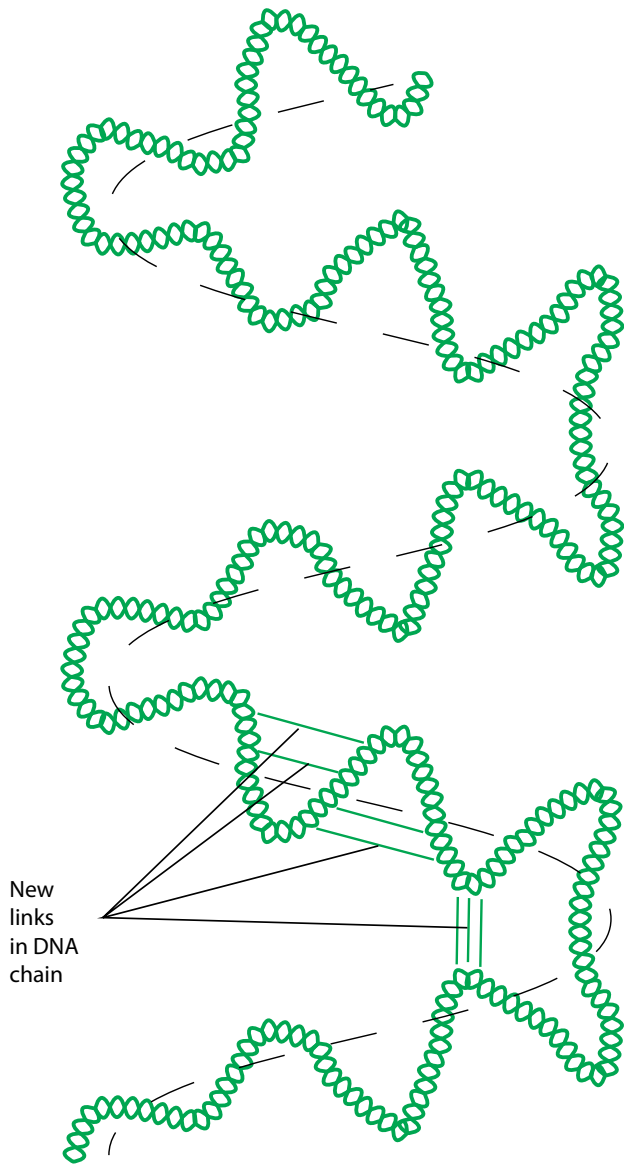


Figure 4. Activity of new links in DNA chain after multiple folding

But in fact, epigenetic phenomena mean that under the influence of external factors, the characteristics of a genome can change very quickly, adjusting to external influences.

In my opinion, this happens while changing the weaker links of the upper flexible levels of the Code. At first, there occurs a change of inter-spiral relations in neighboring regions at different levels, as well as in distances between them, and in the environment of nucleotides. Once it happens, they are fixed and further inherited throughout life, unless, of course, new changes occur. In this case, the linear sequence remains relatively stable. This means that the linear part of the genome is the same in all parts of the organism, but the topology of the upper levels may differ. And this depends on the influences to which this or that area of the body was subjected. At the same time, changes in the structure of the genome, even in a localized area, are fixed in the “field memory” of the whole organism.

After a long time, quantitative changes at the upper levels accumulate and, due to the rearrangement of chemical bonds, they turn into qualitative ones – at the linear Code level. Another proof of dialectical materialism! This automatically changes the thin upper structure, through a feedback loop. And this goes on in a circle.

During this, the linear circuit, while remaining unchanged, constantly corrects its external changes. In an effort to eliminate their influence, it stabilizes the upper-level fields. This allows the Code to preserve itself. This is the mechanism of the “genetic immune system,” and it is certainly closely related to the body’s immune system, which consists of inborn and acquired (adaptive) subsystems. The genome similarly consists of a rigid component, unchanged during its lifetime, embodied in a linear sequence of nucleotides, and the soft adaptive topological part. Both the immune and genetic systems perform essentially the same functions and use similar algorithms in the body’s relationship with its external environment. Perhaps this is where the lexical similarity ends. But it is unlikely that Nature arranges the parts of the same thing in different ways.

No such waste is characteristic of Nature. Its diversity is a way to save resources, to employ all those available, and to employ the evolutionarily hard-won method of protection against instability.

I do not intend to discuss this relationship here in great detail. But it is obvious that if the “field” concept of the genome is effective for the genetic constituent, we accept its positive role in understanding other systems of the organism.

The genome has a flexible, yet extremely resilient mechanism. While maintaining its integrity through a globally stable helical structure, it also demonstrates an ability to change. This allows surviving in this evolving and changeable world. It is the upper levels of the genome that are responsible for the development, and for the variety of biological matter. If this property did not exist, there would be no one to discuss it now.

The linear sequence of the genome does not contain any coding for the inevitable death of the organism, as there is no integrated ageing program, and initially, there are no prerequisites for death, which nevertheless remains inevitable. Perhaps it begins with the destruction, degradation, and decomposition of the upper structures. These are the most easily deformable elements of the Code. “Errors” and failures of the Code arise from self-closed loops and circuits at the higher code levels, subject to ongoing attacks from the outside. This is somewhat similar to processes that are subordinated to the second law of thermodynamics.

The destruction of the upper structure can result in partial loss of the Code, its distortion, dissolution of fields and, consequently, in malfunction of the organism as an integral structure, decrease in its replication processes, disturbances in exchange with the external environment, loss of stability and flexibility, etc.

Of course, the linear Code is also subject to degradation. The causes can be extreme external influences and gradual degradation of the upper levels, which is transmitted and fixed at the level of the linear part.

How can this be changed? It is very important that the fight against negative influences, and against death, is in line with the Code's own evolutionary strategy. Therefore, we can expect assistance from it. Much can be done in terms of maintaining and restoring the structure of the upper levels by simulation and auto-stimulation of their own topology.

1.7. GENOME DYNAMICS

All types of protein robots and cell residents share a matrix of rhythms that can probably be described by a certain law. This connection goes in both directions: down to the microcosm and up to the macro level. Rhythmic dynamics should also be observed in the fields of the genome. We will surely see this in experiments. This is the basis for vibration resonance control.

The dynamics of genome fields are determined not only by the physicochemical processes of replication, but also by thermal instability, movement of organisms, external influences, etc. Even under normal conditions, DNA is a whirling spiral, due to the Brownian motion or to other flows. Therefore, the overall field of the genome has a complex dynamic configuration, where in addition to inner oscillations, we also observe external ones.

Some consequences:

- the genome is a process. And this concept is completely different from the notion of a static linear structure, the carrier of all information about living things. It can be the dad or the mom or someone else, but not both at the same time;
- DNA, RNA, and proteins exist in constant motion, matching their structures. Their frequencies are the "harmonic" decomposition of a certain basic dance pattern into simple "steps".

Such a dance of life was observed in an important but little-noticed experiment on sea stars (*Patiria miniata*), recently conducted at MIT. Life begins with mysterious wave disturbances. When an egg is fertilized, billions of proteins are scattered around it, creating a spiral wave phenomenon, something like

a whirlpool or vortex, which can be a fundamental part of the origin of life. This dance is a consequence of the spiral shape of the genome and the field generated by it. At the moment of fertilization, the topologically organized energy of a field is released, capturing the mass of proteins and launching self-replicating and self-congruent movement.

I doubt if the Code generates the chaotic vibrations thoughtlessly, as if boasting of its own greatness. These fluctuations help to adapt and synchronize it with a changing external environment. They provide a global connection and integration between everything and everyone, the integrity and stability of an organism. This allows the Code to survive changes. Thermal chaos allows this ultra-intelligent machine to continuously probe and update its environment, operating like a 3D radar. By updating I mean the process of activation and spatial orientation of connections that are necessary for the Code to work.

But I think there is something even more important behind this... The imperfection of the spiral structure (described above) contains polarity and a productive force. This force translates the energy of disordered thermal movement into high-quality energy of replication and its products. This can be described by comparing the rhythms of substances involved in the replication process and the frequencies of molecular chaos.

Moreover, this hypothesis should not be surprising for a living system, since a phenomenon similar in physical nature is found in the inorganic world: a ballistic resonance effect in ultrapure crystalline materials, at the nano- and microlevels. In fact, it means that heat can also flow from a colder area to a hotter one.

The genome can be conventionally represented as a long solenoid of complex spatial organization, carrying an electric current. If the body as the genome carrier starts moving, it inevitably crosses lines of the Earth's magnetic field (we mean the overall field: geomagnetic, anomalous, external). Physically,

this leads to induction of additional EMF and current in the genome, which in turn can activate genetic processes.

In this sense, there is probably a connection between the active lifestyle of the carrier of the genome, which leads to multiple intersections of the force lines of the Earth's MF, with genetic processes. And the motto "Movement is life" no longer sounds a mere slogan. For the same reason, for example, magnetic storms can distort not only the physicochemical processes of exchange, but also the genetic processes of replication. The Earth's magnetic field is an anthropogenic factor not only for biological bodies, but also for the genome. This circumstance confirms the hypothesis of a hierarchy of intrinsic fields at all levels of organization of organisms.

Proceeding from this concept, we can develop various generators of magnetic fields for selective activation of some genetic processes. The speed of movement of artificial fields in relation to an object and the MF intensity are calculated based on the topology of the genome, the typical movement velocities and properties of natural fields. For a start, experimental testing can be performed on short-lived biological objects.

The activity of the Code and its performance are determined by its movement.

1.8. PROPAGATION OF GENETIC INFORMATION

1.8.1. LONG-RANGE ACTION

It is generally accepted that genetic information is contained in a linear chain of nucleotides and is translated through the "classical" chemical replication mechanism. But in this case, the range of the information would be limited only by the radius of interatomic and molecular bonds. But in fact, it is broadcast from each carrier of the Code at significantly large, macroscopic distances, which allows the body to constantly reproduce. EM and other fields, in contrast to atoms and molecules, have a long-range character, which allows them to unite large extended collectives that occupy substantially

large spaces into a single whole.

Long-range action manifests itself as interaction of genome fields with each other at considerable distances. This is due to the geometric properties of the upper levels, which generate EM fields and radiation, nonlocal in their nature.

1.8.2. FIELDS AND THEIR INTEGRATION IN AN ORGANISM

Physics views a genome as a double dynamic magnetic coil with interactions and stable dynamic interference among its loops at all levels of the spiral structure. These processes glue together the entire sequence of elements in a genome. They give it stability and allow it to dynamically correct its condition in case of emergency in any specific link. Due to the built-in internal inductance, any change in a local area of the genome is signaled not only in the specific cell, but throughout the organism.

We cannot consider specific genetic phrases and even sentences in a 1D chain as isolated and independent in their meanings and functions, because each of them contains both information and operates a receiver-transmitter. This is the means of information exchange between different areas, forming a single field image. Together they contain a plan of the whole organism.

Self-replication is a synergistic, field-effect, vibrational process. All its actors are connected through resonances and synchronization, and this gives rise to a new quality, life. The same mechanisms work everywhere, inherent not only in living things, but also in all matter. It is worth remembering the words of Schrödinger, *“Only one thing should be adhered to, namely: that the interaction between microscopic physical systems is controlled by specific laws of resonance.”*

Fields of different cells and parts of the body are synchronized. They act and are recorded as a hologram. Each cell contains information about the entire body. This idea is not new and was expressed earlier by Bohm, Capra, Schrödinger, Davis, Lem, and others. And when we assume the presence of a field in the genome, we obtain at least intelligible physical substan-

tiation of this hypothesis.

The internal fields created by the characters of the genome alphabet do not simply integrate and assemble them into sentences, but produce a new meaning that is not contained either in a single character or phrase, or in the whole sequence. Each subsequent helix generates a higher-level meaning.

The DNA fields and its partners, RNA and proteins, are integrated due to resonance and synchronization, and form a unique field image of a biological object – an interference pattern in the form of a standing wave; this determines the growth and development of an organism and evolves throughout the life. (We can identify it by measuring the genome fields at different stages of the object's development). The total field of an object polarizes the ambient space that provides life-supporting resources.

The opposite is also true. The external environment can deform the overall picture of the field of an object or of a colony of objects. This, in turn, may lead to changes in internal fields and consequently in the properties of the object itself. This is also true where the external environment has a form that limits the object (Section 1.4.4).

Of course, one should not simplify the problem of communication in a living organism to mere interaction of fields. There is no reason to exclude other options, for example, the principle of induction, like in lasers. But none of these, besides the field, can be now accepted as a physical basis of the plan for the development of an organism.

See in 1.8.2 a few possible experiments that confirm the above hypotheses.

1.9. SAVING THE CODE

The overall goal of modern medicine is to keep our body in good working order. Although this strategy may solve current problems, it cannot be absolutely successful because it is incomplete.

If we extend the life of an organism, then this also pre-

serves the Code, as the Code is the body's carrier.

We can also view the situation from a different angle. If our goal is to record and safeguard the Code, this will ensure the body's health and longevity. These two approaches seem to solve the same problem, but their methods can vary greatly. Besides, it may turn out that safeguarding the Code is a more promising way of maintaining a long, healthy and happy life.

Unlike a mortal body, the Code has managed to preserve itself for hundreds of millions of years. This is a great success of the strategy. We can take advantage of such clues by enriching them with modern scientific advancements. This allows compressing the long evolutionary history and applying the safeguarding methods to individuals, rather than to the total of biomatter, as the Code does.

The methods of preserving and treating the Code can be very different from traditional medicine and modern genetic engineering, which is barely capable of solving a few short-term problems. We need new methods of preserving and maintaining this supersystem. One option is to apply the ideas of field and topology as methods. The very structure of DNA contains clues to algorithms for proper interacting with it. Sustainable reproduction of replication processes, victories over diseases and aging, – these opportunities lie in the use of DNA essential properties, including its topology.

A few ideas:

- enhance the Code's immunity to noise. When it is impossible to isolate an object from its environment, the most important thing is to exclude factors leading to damage of the field and of the Code's linear structure. The solutions to the challenges can be quite unexpected;
- damage restoration, such as regeneration of fields and areas of the Code;
- repairing inherited defects.

The present chapter outlines the possible ways of implementing such methods: action transfer, shape effect, topological correction and restoration, etc. The fields for influencing

the genome and effecting its topological activation must conform to the requirements of the form-resonance calculated as in Section 1.4.2.

These techniques allow us to save and transfer information from a saved record of the state of the patient's Code at an early age or that of his/her close relatives, which ensures maximum compatibility of exposure with the patient's inner vibrations.

Let me illustrate this. DNA samples recorded in childhood and can be stored under special conditions: low temperature, isolation from external influences, retaining the form, etc. The genetic information is constantly activated and transmitted to the object. Activation occurs by specially organized radiation at frequencies associated with the natural vibrations of the genome (Fig. 5). The amplifier has to generate sufficient power to achieve the result and to reduce the impact on the reference sample. There are many possible options of this scheme.

1.10. CODE AND INORGANIC MATTER

1.10.1. INORGANIC CODES

Inorganic matter and its constituent electrons, neutrons, protons, atoms, molecules, etc. are also defined by stable self-sustaining codes. For example, the Code of water is its molecule. It replicates itself in structures formed in freezing conditions: snowflakes, patterns on window panes, etc.

1.10.2. CODES RATIO

The genetics of the atom and the genetics of living bodies study the same thing, but at different levels and in different states of matter. The difference between information encoding in living and non-living objects lies in the way the information is packed. Apparently, only the genome – the only carrier of living matter – has a multilevel spiral structure.

Hypothetically, at a certain time, under some powerful impact, some combination of substances degenerated into a self-

sustaining algorithm. And now the “spirally” rotating genome captures and transforms inorganic matter from the atomic-molecular level to higher structural forms, such as consciousness.

Probably, our understanding of the genome will radically change when we consider it in conjunction with the generative codes of inorganic matter. It is quite a challenge to bring together and compare the properties of particles, atoms, molecules and genomes, when they are all described in physical terms: charge, spin, parity, mass, etc. This seems a promising idea.

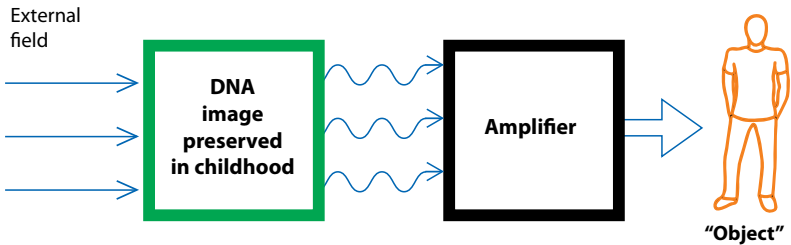


Figure 5. Transfer of the genetic state from one’s childhood

1.10.3. LANGUAGES

The microlevel forms the “genetic” basis and is common to both types of matter, but at the macrolevel, they already look completely different. The reason lies in different rules of their topological transformations. In future, discovery and application of the laws of geometric transformations of matter may significantly advance our understanding of the essence of self-organizing phenomena.

Various crystals, polymers, et al. are actually lower-level languages, generated by codes of matter at the level of interatomic and intermolecular interactions. However, on Earth, many of these languages with very limited articulation have formed a new-level language, capable of supporting its “speech” and developing. Non-organic matter used symbols available to write the book of biological being (Fig. 6). We have not found other authors of this treatise yet, but this does not

mean that there are none.

The theory of this hierarchical field, uniting both worlds of matter, “...will be as incomplete as the physical theories, establishing the specific properties of this genetic linguistic field but keeping silent about the initial conditions.” Here, we can quote some examples from physics: the theories of Maxwell and Einstein, and from mathematics: the Feigenbaum constants, Ulam’s map, etc. And this theory is likely to become universal for

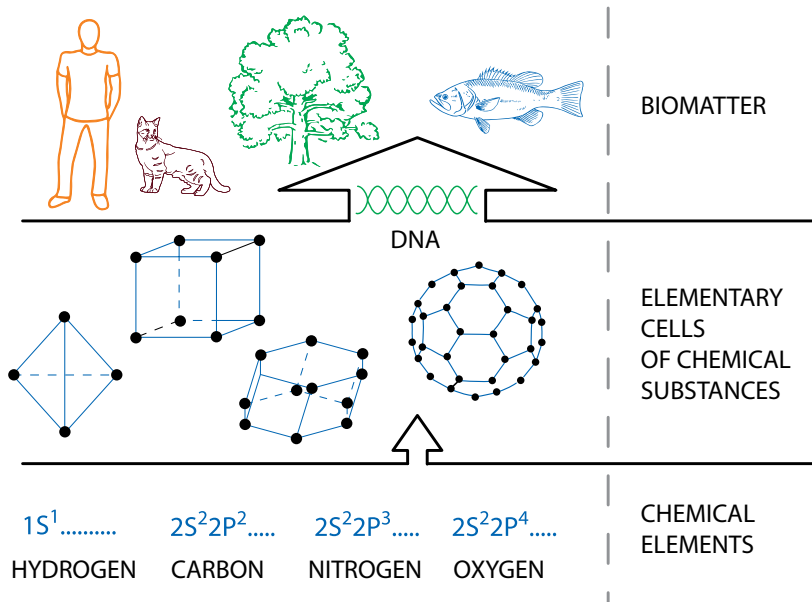


Figure 6. Evolution, from chemical elements to biological matter

the genome and techno codes of the future. Yet, this does not mean that the set of future code languages will be limited.

We can assume, with some degree of confidence, that such mechanisms as resonance and synchronization are responsible for the emergence of this bio-language. But chemical elements and compounds are just characters and syllables (nuts and bolts), and even resonance and synchronization are the assembly tools, and so are the rules of language (screwdrivers

and keys). They do not even hint at how to write a novel (to assemble a vehicle), no idea at all. It is not known how and why ever more complex codes of living things appear. And on the horizon there are no ideas or signs, which can be useful in this case, no existing physical and other theories. Perhaps the first step is to recognize the potential limitations of existing thermodynamics and create a new branch of physics, the dynamics of order, and then wait.

1.11. CODE, LOGIC, AND LANGUAGE

The code and its echo-shadow—language—arise from the lower levels of the microworld as synchronization and self-organization of its constituents.

“Like everything metaphysical, harmony between thought and reality should be sought in the grammar of language” (L. Wittgenstein). There seem to be some general laws for the principles of action, essential characteristics and patterns of evolution: Code, language, consciousness, and artificial intelligence (AI) of the future. These are distinguishable in their colors and levels of vibration, but they coincide in their logical basis. Therefore, they are just as subject to experiment as the genome is. And we can employ similar research methods.

The first story relates to logic. Below we quote some ideas and theses from the *Tractatus Logico-Philosophicus* by L. Wittgenstein.

Both genome and language resist logical errors, but each of them does so in its own way. Language represents thinking and, like the Code, it cannot a priori go beyond its logic. Both comprehensively reflect the world, linking their manifestations into an infinitely thin network, a huge mirror. This should fully apply to the technocodes of the future: the ability to independently overcome the errors of the processes they generate.

Another issue is mistakes of language and of the Code. The presence of logic in Code and language does not mean that they are error-free. We understand errors as self-closing of coding processes, where the impetus for future development is lost,

which leads to degradation and destruction of genomes and their carriers, to insoluble problems in science and philosophy.

“Many problems of philosophy are like inextricable tangles of thought, self-entangled, with loops and Gordian knots of language—of language, but not of the world.” And in their origin and essence, these structures are a product of the meandering Code. They are as real as the derivatives of the Code themselves. We should not consider matter, the Code, or evolution as Mosaic tables of ultimate truth, given to us once and forever. They contain a huge potential for improvement on the way of increasing in complexity, resulting in simpler forms and approaching the absolute. This is revealed through self-determination and self-knowledge...

When genetics (in the broad sense), language, mathematics and physics converge at one point, then the Code will acquire its true nature, and we will be able to see it. Perhaps it will be the Divine Absolute Power, or maybe it will be Absolute Silence. They are probably the same thing.

1.12. “AUTOMATIC” CONSCIOUSNESS

The complex dynamic structure of the genome has many freedom degrees, which also depend on external conditions and on time. This opens up a wide window of opportunities.

From the collective synchronized fields of the genome of the individual and of social groups, we do not only obtain a field that controls the development of a body, but also more bizarre forms of organization: consciousness, the collective unconscious, culture, science, and some things of even greater complexity. This is due to the increasing complexity of topology and presence of higher organization levels.

It is possible to compare the topology of DNA in lower entities and in humans. We are likely to see varying degrees of complexity in the upper structures and a basic similarity in nucleotide sequences. It is possible to investigate the difference in topology and their other proteins.

The genome, due to its topology, extracts energy and mat-

ter of required quality. Then it multiplies their vibrations to the upper levels. This is like the birth of a sculpture. *“All a sculptor has to do is to take a big block of marble and just chip off all that isn't necessary” (Michelangelo).*

Such metaphors can be found in the ancient oriental ideas about the multitude of bodies. But in the end it is just appearance of higher vibration levels. This does not contradict classical physics. It just lacks clarity about the laws of addition and multiplication of frequencies and their connection with topology.

The law of multiplication of vibrations must imply a certain algorithm for such an action. In its sequence, we will be able to find both intermediate results of transformations and “waste.”

These are some of the possible ways to increase the speed of vibrations:

- the rule arising from the law of energy conservation, i.e., the law of conservation of frequencies. This is true for matter at the micro level, where frequency is related to energy according to Planck's formula:

$$E = h \nu,$$

where h is the Planck constant.

Let some abstract system initially have two natural frequencies: ν_1 and ν_2 . As a result of internal transformations, it can be transformed to a state with other natural frequencies: ν_3 and ν_4 . Then the frequency conservation law can be written like this: $\nu_1 + \nu_2 = \nu_3 + \nu_4$.

There are no strict limitations for the rate of ν_3 , and it could not be much larger than ν_1 and ν_2 (Section 1.7). Such an increase in ν_3 would mean the emergence of new higher levels of vibration. Then ν_4 will become much smaller than ν_1 , ν_2 , and ν_3 , and may be assumed as “low-quality energy.” I believe that there is a natural algorithm that regulates the multiplication and division of vibrations in systems and processes. If such changes were random, this would rule out the existence of reproducible forms of matter organization.

There are also other options for multiplying frequencies:

- laser effect;

- form factor. If a particle (energy) is localized in a smaller space, then its frequency increases. Thus, the genome can extract energy from thermal chaos and localize it inside the genome structure. This will increase oscillatory frequencies;
- increase in the rate of excitation propagation, e.g., due to the topology of the spiral structure, with a corresponding increase in frequency.

This could also be unfavorable news for us. Once the law of vibration multiplication is discovered, we will reveal a “terrible” mystery of our mechanical origins. We may find out that not only the body, but also our consciousness has resulted from multiplication of vibrations. And we are a “machine of cosmic forces,” basically a mechanical system, deprived of all romance, mystery, and the divine spark. It is possible that our uniqueness and divine origin will be refuted by a simple equation describing a vibration multiplication. Even love will be a combination of frequencies. This will overthrow our divinity. But is it important? In any case, we will find a reason and a place for fairy tales.

1.13. FIELD OR CODE?

Which is primary: the field or the Code?

“...What can be said at all can be said clearly, and what we cannot talk about we must pass over in silence.” This famous formula of L. Wittgenstein instructs us to cancel this entire paragraph. But something tells me that, nevertheless, certain things can be said, if we propose a completely different story.

It was not the Code that generated the field, but a certain initial field (radiation) that found implementation on the Earth in the form of the Code. Once, this radiation (or many radiations) transformed inorganic matter into life. And it is most likely to be active today. It created the genome in the form of a spiral chain, stringing sequences of chemical elements that were compatible with the field. This “fundamental” geometry was the progenitor of all substances in the genetic process.

That is why *“...it is impossible to determine from a purely*

logical scheme of biocode operations why it contains this character set and not another, and why it performs exactly so many operational steps” (S. Lem). In this sense, neither the elements themselves nor their arrangement played any independent active role. But everything that matched the field according to some criterion (for example, topological resonance) was put to passive use. The genome developed its existing chemical shape in the course of a long evolution. As it evolves, it becomes more complex in structure and translates its activity and philosophy to all areas of matter accessible to its energy. It is possible that its life-generating music contains a quintessence common to all processes of self-organization.

In this case, the general properties of the genome field are of primary importance. Then, they do not look like just an additional way of describing it. If we find fields with the same properties outside our planet, then we have to look for the answer to the question of life origin elsewhere, but not on Earth.

If we assume that our Code originated on Earth, and in other parts and times of the Universe it is different, the radiation of the Sun could be life-forming. Then, the first living things were those who could directly absorb solar radiation as food. In the process of evolution and expansion into other spheres of matter, the Code learned to live without direct use of this function. But all life uses radiation from the Sun, through various food chains. Therefore, we should look for coincidences in the vibrational matrices of the genome and the Sun. It is not difficult to make such a comparative experiment. If the result is positive, it is very important, but it does not exclude the possibility of finding other sources of life-generating fields and radiation.

1.14. CONCLUSIONS

The Code is an admirable natural entity, far more complex than our consciousness. Without producing incredible syntactic combinations that are inherent, for example, in philosophy and literature, the Code solved the problem of increasing evolutionary complication with a small number of chemical signs

and their groups and with consistent compactification of space.

I associate our current understanding of the Code with the state of a first grader who has got acquainted with the alphabet. Its signs are still very far from the full essence of things, but they are a whole world for the pupil.

Modern genomics dissects DNA into separate blocks and elements and reassembles in a different order, generating a new quality, but at the same time, the original state is lost and is destroyed irreversibly, and it is completely unclear what meaning is generated. With such reductionism, there is no place for genius, inspiration or even individuality (which you need to perform music, for example). The sequence of notes is the same, but it sounds different when performed by different musicians.

When we learn that the genome generates a field, we sober up from our euphoria about the success of DNA sequencing technology and obtaining new codes. Mother Nature is much more complex. We believe that she recorded the whole truth about life in the form of a linear Code, which can be freely handled, like a computer program, but this belief may soon turn out to be another illusion.

The properties of a particular genome are determined not only by the order and sequence of nucleotides, but also by the field bonds among them, throughout the chain. This is the feature that makes DNA the Code of a specific organism. Of course, the “general” laws of physics apply to the Code just as to everything else. But this is precisely why they do not explain anything on the individual level.

The spatial structure of the genome is as important for the performance of its functions as linearly recorded information. Compactification of DNA is not just an evolved way to fit into a cell, but above all a way of storing and transmitting hereditary information. The upper levels of the structure contain a part of the “soft” genetic information in the form of weak bonds and EM interactions between coils of linear filaments, coils of secondary helices, bonds with internal water that surrounds DNA,

etc. These structural genome levels are critical for:

- coding, storage and transmission of genetic information;
- stability of the genome functioning;
- receiving information from external sources;
- adaptation, emergence and development of a variety of forms of biomatter;
- emergence of a hierarchy of meanings, resulting in consciousness;
- integration of internal fields from different cells and parts of the body into a system united in its manifestations.

The fact that the Code has intrinsic fields allows us to comprehend the processes of aging and medical treatment in a new way and to form new principles of dialogue with biomaterial. This is no longer just chemical interaction and genetic engineering in the familiar sense; it also involves vibrations, the language of synchronization and resonance, field interactions, etc. Activating and corrective external influences have to be consistent with the field properties, including their dynamic constituents.

Up to the present time, such concepts as vibrations, harmonic relationships, topological compatibility, biofields and others have not been subjects of study and use, but were regarded as metaphysical substances. But everything changes, and they are now filled with a new, completely scientific meaning.

I am far from the naive idea that the “inventor” of DNA, when giving it a shape, set out to create an oscillatory circuit. This is merely an available simple and obvious analogy from the body of our knowledge. And, of course, this simplified concept of the genome is questionable, since its real structure is much more complicated. But our knowledge of EM phenomena is also based on rather simplified models, and their nature has not yet been revealed. However, this has not prevented tremendous progress. Therefore, the issue of further study becomes topical.

The idea of a hierarchy among DNA intrinsic fields is a chance to gain a novel understanding of the nature of living

things. It will help to understand why a frog grows, but the stump of a tree does not, the essence of epigenetics and morphogenesis, why “junk” DNAs exist, why new species arise, etc.

In addition, the field approach brings us back to common sense, from the mysterious parameters and metaphysical concepts of life.

The idea of the presence of stable spatial codes that generate a hierarchy of their own long-range fields in self-organizing systems will inject new blood into the fading attractiveness of the theory of complexity and self-organization. The nature of these fields does not go beyond the range of interactions known in physics. Therefore, in foreseeable future, mechanism will gain an attractive creative, productive perspective in biology, once again defeating vitalism, morphogenetic fields and other physical-fictional studies.

Science, like life, is full of surprises. It develops according to its own laws. Its branches enrich one another in most unpredictable ways. I mean the following, for example. Recently Grigori Perelman proved the Poincaré conjecture, significantly strengthening the proof base of topology. Obviously, modern physics needs new concepts of development, especially for dynamic phenomena and self-organization. These cannot be mere coincidences. Too often, this has turned out to be a regularity manifested at the “right” time.

The main problem still remains: we do not understand the relationship between properties and fields of systems with geometry. Because of this, we are stopped in understanding self-organizing systems. The laws of physics are likely to be further supplemented by laws of topology, which are still to be determined. As V. Schauberger put it, *“We do not need physics of formulas, but physics of forms.”*

The form as such generally remains outside physics, in a peculiar position. It can be observed, but it is not put to any use, except for the concept of symmetry and as metaphysical aesthetic criteria of the truth in different theories.

But we must not oversimplify the situation or conclude that

microforms control the structures of the upper systems. Evolution does not go only from the bottom up, but also vice versa. And neither of the directions shows advantages. There exists a dynamic reciprocity between them, and operation of general topological laws of transformation.

The idea of localizing genetic information in a linear chain (the central dogma) seems to have exhausted its creative resource. The linear Code is just a part of the life transfer process. In the future, we should take into account other sources and methods of transferring genetic information:

- loose connections due to the structure topology;
- EM interaction between upper-level coils of the structure;
- interaction with water through formation of chemical bonds, acoustic and EM interactions.

The more we learn about the genome, the more we have to expand our understanding of its “occupied” areas functionally and spatially, up and down the scale, which is quite understandable. *“Life-giving power is contained in such a wide range of properties of matter, both on the larger and the smaller scales, that I cannot believe that the mechanism of life generation can be recognized with all certainty” (S. Lem).*

This means that genetic information is basically non-localized, but this is not the end of certainty. Gradual development, increasing consideration and integration of emerging circumstances, transition to a qualitatively new perception,—all these form a normal evolutionary way of any science. I see many advantages in recognizing, accounting for and using more significant parameters that will determine future models of the Code.

Of course, this non-localization of life is an extremely complicated challenge to modern scientific methods. Despite the fact that it is gradually collapsing, it is not worth hoping for its complete exhaustion, including some fundamental reasons. They are partially defined in quantum mechanics. I am convinced that the problems expressed by Heisenberg’s uncertainty in quantum mechanics and in life science do not have a semantic similarity, but reflect the natural evolution of the

cognitive process and, in general, the structure of the universe as a general unity and connections. Ultimately, the microcosmic uncertainty gives rise to degrees of freedom on the scale we perceive.

Like all other fields, the fields of DNA have a long-range wave character. Knowing this makes it possible, without being confined to a limited range of nucleotide bases without much perspective for progress, to ensure the further understanding and development of genomic technology.

Confirmation of this field hypothesis would mean direct penetration of physics into genomics. This opens a new level of understanding and new opportunities. Interestingly, the opposite is also true. Progress in physics will be achieved not through its internal development, but from the life sciences. Biology and genomics are sciences about higher levels, while physics talks about the lower ones. And “... *we will not be able to fully understand the processes occurring at the lower levels until we understand the laws of the higher levels*” (P. Davis). Therefore, we should be wary of direct applications of quantum mechanics and other physical theories to genetic and other processes in biosystems.

I do not believe the field hypothesis to be the final theory of the genome, but it is a feasible way of describing it. And it is not aimed at obtaining the final truth, but it rather shows that none of the existing or future theories have such exclusive claims. Its value lies in opening new ways of exploring the Code and talking with it. At the same time, I do not know exact answers to many questions that may arise concerning this theory, and belong in the darker side of life science. Here are some of them:

- how is the field transformed during the transition from the “stationary” state to the replication mode?
- how are fields of the copies formed?
- their connection with the mechanism of natural selection;
- the mechanism of cell differentiation;
- the evolution of fields at the time of fertilization, and many

others.

But the same problems cannot be solved within the framework of the central dogma. On the contrary, the field model, without denying the general provisions of modern genomics, presupposes the existence of significantly greater powers of the Code.

Each new major discovery generates a new model of the Code, always more complicated. Today, it is chemical-mechanical. Topological, field, vibrational and further linguistic models, etc. are coming. Opportunities for our productive dialogue with the Code are going to be expanded. Technologies of technocenosis will emerge, becoming more complex.

In my view, living is like ballet, a dance of interacting entities: DNA, RNA, proteins, and other participants. Their fields lead to copulation and constant reproduction of performance taking place in the water sphere, where each molecule acts in unison with the director. Each participant perfectly knows his role and the libretto lines. His movements and his whole part are synchronized with others and fed by a matrix of harmonious relationships.

I had to resort to this poetic image both for decorating my story, and for considering that very different and distant things often turn out to be unexpectedly close and related in their essence. Genomic sciences can learn a lot from the construction of our "artificial" products: music, dance, etc. This constructivism has a clear practical value.

The structure and fields of the genome provide an instrument for playing the music of Nature. They do not reveal the musical notation to us. This is like a puppet show: the arm and leg movements are visible, but we do not see the puppeteer. The issue of the driving force is still open. Can this driving force extend to inorganic matter? Perhaps some fragments of the answer will be found after a further cross fertilization of topology, physics and biology.

The hypothesis about the presence of such a complex structure as the genome and related processes of field and vibra-

tional components seems quite logical, simple and flexible. It is free from pure speculation and, most importantly, it is completely verifiable. This accounts for its prospects and stimulates us to work with it. These may just be signs of my heart's desire. But I have not found contradictions inherent in it or in myself. But I know the helices may end up as just a way of storing information compactly in space, devoid of an independent value for replication processes.

1.15. DOES THE CODE HAVE A PURPOSE?

In this section, my reflections are not based on practical context, so you can skip them without losing much meaning.

Does the Code have an independent goal and strategy?

It is wrong to ascribe properties of an independent entity only to man. Why should the Code that generated man and the entire biosphere be deprived of such an opportunity?

The evolution of physical and biological systems is built on a common law: struggle for independent survival. This is the strategy of any piece of matter. *“First of all, a living being seeks to show its strength — life itself consists in striving for power” (F. Nietzsche).*

On the other hand, this reflects the general power of matter to generate order wherever possible. The universe constantly produces order while simultaneously disrupting it. That is, what we see is not deterioration and decay of the once created order, but its constant regeneration and reproduction.

Every system that uses an order gradient strives to preserve it. And this leads to struggle. The Code strategies are an example of the implementation of an active aggressive policy. The Code acts like a virus and captures non-living matter, revives it, forcing it to serve man.

The Code uses two different strategies, or technologies for preserving and prolonging itself:

- reproduction. Using a minimal self-replicating algorithm (the minimal Code) that probably has not changed throughout its existence. It can be activated and developed in other worlds;

– evolution. The genome forms organisms with an increasing intelligent component, which makes it possible to ensure their stability and viability.

The multiple implementations guarantee preservation of the Code even despite inevitable changes, interference and, as a result, numerous transmission errors.

Natural selection is a mechanism of the genome preservation, a guillotine that selects the winning horse with a view to greater chances of success.

The products of epigenetics, the emergence and development of various branches of life, the spatial expansion of life, the development of new areas and other miracles of life are all ways of adapting the Code for its survival. But this does not have any independent practical value. Evolutionary improvement is not a goal, but a tool. In the course of this, the Code has accumulated massive layers and moved from the necessary minimum to complexity that allows it to flexibly respond and survive in a changing external environment. Over-complexity implies multiple degrees of freedom. This allows it, in a wide range of conditions, to extract matter and energy from any available source for its reproduction. Like Maxwell's demon, the Code overcomes and exploits even thermal chaos.

Both the meaning and the mystery of biomatter evolution are embedded in the process of transferring order. The linear Code itself is secondary. It is just a tool, an instruction. *“...The only defense against the relentless attacks of chaos, the roadmap stretching over the entropic gap, could only be a reliable transmitter of orderliness; thus, the Code arose... Here, evolution acted under constant supervision, as required by the goal: to maintain the existence of the code, hence the greatest concentration and the variety of means. That is why Evolution entrusted the gene chain to embryogenesis, i.e., not the structure, but the construction of organisms” (S. Lem).*

Life is not a puzzle, it is the embodiment of the Code, a system of chemical elements organized in a specific spatial structure. But life cannot be just adaptation. If this were life's only

purpose and meaning, then it would have ended long ago, having adapted and merged with the environment. It will be sad if life turns out to be such a withering probability.

Once upon a time, atoms, electrons, protons, photons, and other “partners” made the Code. Now it is going down, coming back to them. With the help of reverse processes, the genome seeks to change its basis to a more reliable one, which allows increasing the resistance and survival power.

Man is a special link in the transmission of the Code, in the creation of an “immortal” body of the genome of a new level. Our future bodies are going to be EM biogeometric substrates, capable of consuming energy and maintaining order under varied conditions, performing mental and motor actions extremely fast. The Code embodied in such a form will retain only a small and therefore stable material-substantial structure, replacing the rest with fields and vibrations.

The Codes of different substances vary greatly: some are stable and exist for a relatively long time, others are activated only under specially created conditions, etc. But all these are like punctuation marks, at best syllables or grammar functions. Only the Code of life was able to write a huge novel made of its inner matter, about itself and the world, in its language. It continues writing rapidly, as if sensing a near end and trying to appeal to the Universe with a powerful farewell chord. To capture and imprint itself to the maximum into the foundation of matter, in the hope of saving itself from inevitable decay of the fragile biomatter. Maybe this is its goal, which came from the depth of understanding the deadlock of bioevolution.

Or maybe, in the ecstasy of it “successes,” the Code is moving in circles and losing impetus for development? Could it have been mistaken and, trying to curb the blind and powerful forces of Nature, which can easily destroy its fragile bio-sketches, approached the threshold of self-destruction?

It is also possible that we expect too much of the Code, perhaps willing to delegate responsibility for our life and its consequences onto God or the Code? Since it's easier this way,

when we have found the culprit of all our troubles!



CHAPTER 2. CODE ACTIVATION

2.1. CAPACITIES OF THE CODE

The code implies active performance at all levels, from microprocesses to vigorous activity of the carriers. It penetrates matter as deep as its molecular order can withstand the activity, energy potential, and creative capacity. But it cannot overcome intrinsic connections and involve them in activity of a substance, as it cannot change them.

The genome possesses energy of certain properties. The quality of energy is determined by its frequency, distribution in space and time, and the form it is enclosed in. The quality can be measured by the energy productive potential.

The quality may be viewed as a mysterious “hidden parameter”, associated with “life force.” The polarity inherent in the fields of the Code is pure potential. It is discharged outside, through arousal and fertilization. Doing so, it draws available matter in its circulation. During fertilization, for instance, the polarity manifests itself in the form of periodic waves (Section 1.7).

This creative, self-renewing energy is not something from the world beyond and, therefore, special. We can also find it in inorganic matter. We observe it in the well-organized, but at the same time “vague” structure of a microcosm. Once having spotted it in any of the worlds, we will be able to comprehend its other manifestations. The study of nature and its role in the spatial organization of matter is a very promising field of research.

I believe that the energy and causal model of the genome can be activated and used both in the biosphere and inorganic matter.

2.2. THE CONCEPT AND PURPOSE OF ACTIVATION

“All raw materials and all materials of our technologies are essentially passive and require processing, according to production plans. We are talking about moving from our passive position to the technology of substrates that are active at the molecular level... You are blind to the true creative power of the code, because Evolution has barely had time to try it, crawling along the very bottom of the space of possibilities. So she has worked on an incredibly narrow area, but also incredibly deep: she played her concerto, her miraculous solo, with a single music note of colloid, because the plan was that the score itself should become a listener – as a descendant who would repeat the cycle. However, for you there will be no interest in the fact that the Code in your hands could do nothing but reproduce itself... Soon you will go beyond the protein. You will extract the Code from the protein monotony, from this hole where it has stuck since the Archaeozoic, and take it onto new paths. Expelled from warm colloidal solutions, it will form new words, phrases and sentences, enabling you to penetrate all levels of matter, go down to zero and reach the flame of the stars ... ”
(S. Lem).

In the process of evolution, we domesticated cattle, to use it for food and as draft power. We learned to control energy fields and matter, synthesized a variety of materials, and improved our computing skills. Currently we are trying to tame the creative self-organizing forces of nature. But before generating them at our own discretion, we have to undergo the stage of imitation and plagiarism, collecting models and principles of self-organization from Nature’s library. Of all the known “codons” the Code of life is the only one that has generated an astounding variety of forms, which has enabled it to exist for hundreds of millions of years. It managed to draw inorganic

bone tissues into its activity, and to create the palace of consciousness. More than that, it is the only self-sustaining and self-replicating Code we know. It is the research of the Code of life that can trigger off further technological evolution.

There are still some doubts as to whether we will be able to reactivate the Code in other spheres of matter. Can it be used for purposes other than life in its present state? Can the genome work in areas other than colloidal solutions? Have we, in the continuous process of evolution, exhausted all the possible means and ways to achieve self-replication? I assume we have not. The development of technology, which has led to an increase in mankind's productive power in ways not known to natural evolution, may bear witness to this. The potentials of the Code, hidden in our silent body, multiplied by knowledge obtained and spaces conquered, can become a perfect tool for transforming the Universe. The answers to the above-mentioned questions may be negative, but in any case we will be able to produce something completely new, if we use the genome under appropriate conditions.

By activation of the Code, I mean the ways of realizing its creative potential in various physical and informational environments.

2.3. TECHNOLOGY OF TECHNOCENOSIS

To apply the current genome is a relatively simple task, but this is only the initial stage of artificial "life" technology. The most complicated and interesting problem is to create an artificial Code and make it work in matter.

I cannot resist the temptation of quoting S. Lem again: *"The sum of its (code) articulations – the systems of plants and animals – is potentially infinite, although limited, since in such a code it is impossible to articulate a phenotype of, say, a dynamo machine or a nuclear reactor. As for trans-biological technology, we understand it as accepting the basic principles of life, but not as a model for plagiarism or even daring recombinations, but as a logical and causal scheme for incorporat-*

ing post-biological matter. The technocode becomes a record of "guilty" information, possibly built from abiological elements."

"This is not about the originality of the building material, but about the technique based on the fact that certain information can be a self-fulfilling forecast of its own structural composition ...the root of evolutionary technology is in information encoded so that it itself was transformed into the desired material system. If we introduce this rule into energy and substances to which life has no access, then we will get out of the limitations characteristic of all living things, and from limitations inherent in our numerous technologies."

The process of creating the technology of technocenosis should be divided into the following stages:

1. Searching for a technogene.
2. Encoding "genetic" information
3. Searching for a suitable environment.
4. Releasing and transmitting the coded information into the environment.
5. Integrating the transmitted information into its environment.

2.3.1. SEARCHING FOR A TECHNOGENE

The Code can be obtained from the existing libraries of the biological and inorganic worlds. The Code may exist in the form of information, stored in the structure of a substance or physico-chemical processes, including those of self-organization, their radiation and vibration.

It is quite reasonable for us to imitate the current Code. But it cannot be just a direct copy, which is then equipped with the appropriate energy potential for implementation in other environments. Copying is possible only as a reproduction of the logical-causal scheme, typical of the genome. Its elements, that is topology, sequence of replication actions, and algorithms of linear packing of information may be recorded on different carriers, which we can use in the future. Take music, for example. The same sound sequence may be recorded on magnetic tape,

hard disc, etc. and, of course, in human memory. The physical properties of the recording will depend on the carrier.

There are many self-organizing systems in Nature, each having its own algorithm. There are even more hidden systems, which exist potentially. The more we learn about them, the less the gap between our ideas about them and the processes, occurring in biomatter, will be. Who knows, maybe we will manage to create something more perfect than the genome, limited by nothing except our imagination.

The self-organizing potential of the Code is determined by its ability to change without losing integrity. The more flexible the Code is, the more forms it can take. The dependency is determined by the topological structure of the Code. Thus, the more complex the structure of a substance or a process is, the bigger potential it possesses.

The current Code is a material substance with a certain topology. Among other things, the artificial Code may exist, in the form of fields or vibrations in different carriers. This form can vary from a phrase encoded in the Morse code or a binary code, to Bach's music, converted to an EM or acoustic field, may serve as the artificial code.

We can combine codes of significantly different types. This is akin to quantum entanglement. We can carry out cross-hybridization: for genes of living things and codes of inorganic matter.

We can apply holography for the hybridization. In a certain area of space static holographic images of different codes may be superimposed on each other.

Section 2.3.3 provides considerations for the material base of synthetic genomics.

2.3.2 ENCODING "GENETIC" INFORMATION

The genome contains information ready for self-replication. However, in the process of its transfer with the help of fields and radiation its topological structure may be destroyed, and then the information will become inactive. Additional encod-

ing may be required, as well as for artificial technogenes. The methods are analyzed in the section “Fields of the Code.” It is possible to create an even more complex topology, using different stages of “spiralization.” At each stage, we can apply identical spiral structures, gradually increasing (reducing) their scale. It is possible to reverse the direction of rotation.

2.3.3. SEARCHING FOR A SUITABLE ENVIRONMENT

2.3.3.1. THE MAIN PROBLEM OF TECHNOCENOSIS

“Genes are static and proteins are dynamic, and the representation of genes is the same as translating from a nucleotide dialect to an amino acid dialect. For the same reason, we can say that nucleotides form the memory of life, and proteins serve as processors of life...” “It is possible to synthesize genes that do not exist in nature, but genes are the builders and managers of proteins, therefore, we will first have to design such cycles of processes that have not yet been included in the repertoire of biological metabolism” (S. Lem).

There is at least some practical basis for creating technogenes. Everything is much more complicated when it comes to the environments in which the genes can be activated. The search may turn out to be the most difficult stage of technocenosis.

Code activation objectives may be as follows:

- a process, in which the desired function is implemented. For example, the synthesis of a substance capable of adsorbing heavy metals from the external environment in a constant self-reproduction mode, and then releasing them in the form of a sediment;
- a material with the desired structure and properties. Cloning a human organ, with the resulting product as close to the original as possible, may serve as an example. For this, while growing the organ clone, we introduce the necessary active genetic information, which forms its structure and relations with the environment.

2.3.3.2. GENERAL REQUIREMENTS:

- a cellular (or quasi-cellular) structure;
- the ability to repair itself,
- the ability to self-replicate in a process cycle (when we deal with a process);
- the presence of conditions for resonance or synchronization between substances (processes) that are the partners of the Code.

When activating and synthesizing technocodes, it is necessary to take into account the universal evolutionary strategy of such objects – the struggle for matter, information, energy, and space. Therefore, for successful cultivation of the technocode, it is necessary to supply it with such components of required quality and in sufficient quantity.

More than that, we must observe the optimal characteristics of the “(quasi)cellular ensemble”. It cannot be too dense, since this will reduce the chances of each element to survive, due to lack of available resources. It cannot be too sparse, because in this case the necessary collective behavior may not be formed. We can find its approximate analogue in the theory of self-organization and structure formation. It is the minimum size of the nucleation, below which the system cannot gain the necessary potential for self-replication.

One can determine the effective density of the “ensemble members” by taking into consideration the following properties of the current Code of life: the density of information structure, a single DNA size, the distance between them, and the ratio of these measurements.

The spacing between genes should correspond to the volume of the culture medium necessary for stable functioning of each gene. The distance is determined by the productivity of a gene and the size of its partners in biocenosis: proteins, etc. On the other hand, it should be sufficient to form a stable connection between neighbors, to integrate them into a single organism, and to form a collective response to external influences. These conditions may have determined the differences in cell sizes.

There seems to be a universal relationship between the size of a cell and the distance from its nearest neighbor. The relationship can be described by a simple equation or by well-known constants such as the “golden ratio”. These distances will play an important role in the design of the technocode.

Here we can find a direct analogy with the interaction in the kingdom of animals, birds and other species, living within limited habitats. In such communities, the density of “population” is influenced by the same factors as in the spatial distribution of genes. Such analogies help us to learn a lot and to better understand the operation of the Code and its goals.

As a matter of fact, the size of the DNA in existing organisms is much larger than the minimum required for self-replication. In the process of long evolutionary meanderings, the Code has accumulated a lot of particulars, details, and many of those are not vital for its functioning. They are dependent on a certain carrier of the Code, which is just a temporary stage in its struggle for survival.

To find a technocode and to discover a suitable environment for its activation, – these are two distinct goals. But everything stated above is applicable for reaching both of them.

2.3.3.3. PROSPECTIVE MATERIALS

The coding element should possess “chemical characteristics” that match its “replicational reactivity”. It may turn out that “life rests on hydrogen,” because this was a substance (element) most suitable for Earth.

Below, I present several potential candidates for such elements, the suggestions being based on my limited knowledge of modern materials. But it is certain that we are far from finding ways to generate self-replicating processes. *“Still the history of our civilization can provide multiple examples of surprises that warn against premature rejection <...> of such <...> proposals and ideas...”*

We should first and foremost search for and synthesize substances with a quasi-cellular structure that show some life-like

features – the ability to self-reproduce and self-replicate. Substances with a rigid crystalline structure are hardly suitable for a new non-protein evolution. Amorphous, cluster, polycrystalline and liquid states are of potential interest.

LIQUIDS

«...the liquid phase provided biocenosis with more or less favorable experimental space...” The structure of liquids is multi-conformational, mobile and sensitive to external factors, which makes them potential candidates, still mostly suitable for biological objects, water being the most suitable one. The main problem of its use is the standardization of its characteristics.

For more information see Section 2.3.5.

POLYMERS

Polymers can be used to create technogenes and environments for replication. We can employ them now for testing the influence of the genome.

Selection criteria:

- similarity to the chemical structure of DNA or, an ability to interact with similar organic compounds;
- ability to imitate complex protein topology and the dynamics of biocenotic processes. Multiple degrees of freedom and a low energy threshold are needed for rearranging the structure.

NANOSTRUCTURES

Nanostructures have some anomalous properties that may be useful for our purposes. A number of nanostructures possess a quasi-cellular structure: fullerenes, graphene, complex inorganic molecules, etc. It is likely that they have internal long-range fields that can be amplified from the outside.

First of all, we should assess the level of the Code influence on the processes of synthesizing different carbon structures and its compounds. As a matter of fact, they are capable of self-assembly and self-programming, which is determined by

the fact that carbon is basic to all life.

Silicon can form compounds similar to inorganic combinations containing carbon. The skeletal structure of a biological process serves as an example. Therefore, silicon is also on the list.

BIOMATERIALS

There is a class of materials we can use as parts of our body: joints, kidneys, etc. Their biocompatibility hints at the possibility of potential encoding.

MESOPHASE STATE

Mesophase is a state of a substance caught between liquid (gas) and solid. It exists in the form of an intermediate layer that possesses anomalous properties and shows signs of self-organization. Unfortunately, due to lack of research we cannot use its potential (see my other works for more details). The results of the processes in the layer can be observed everywhere: snowflakes, frost patterns, etc. The mesophase state is a very promising candidate!

2.3.4 RELEASE AND TRANSMISSION OF CODED INFORMATION INTO THE ENVIRONMENT

“The potential force that the so-called metainformation contains is just this self-organization, devoid of iterative, progressive and linear processes, which is no longer dependent on its carrier as much as life in nature is, or as a computer model created by a programmer” (S. Lem).

As long as the information is associated with a certain Code, it is nothing more than a property of the latter. Its potential is locally limited and hidden. Therefore, before being transmitted to a substance to become active and creative, the information must be extracted from its material carrier. Currently this can be seen in the transfer of information from DNA to RNA and proteins.

There are many solutions to this problem, depending on

specific conditions.

A laser, a Tesla coil, sources of magnetic, electrostatic, 3D vortex fields, acoustic vibrations, etc. can be used as a source to activate a genome sample (for example, concentrated DNA) and transmit its information to an object. The sample modulates this field or radiation.

We can give a spiral topology to fields and radiations carrying information, using familiar technological methods (Section 1.4.5). The properties of such radiation can significantly enhance the coding results. In some cases, there may be no effect without this.

Moreover, using water and Earth vibrations, chronorhythms, and other natural sources that form the biosphere we can introduce changes into these information carriers.

One can propose several options for systems that can transmit the Code information into an environment. Such information transfer systems differ in the related positions of a sample, the source of the carrier field, a modulator, and the environment. We show an example in [Fig. 7](#).

2.3.5. ADAPTING INFORMATION AND ENVIRONMENT

At this stage, we must solve the following tasks.

ADJUSTING THE ENVIRONMENT

Here, the objective is to eliminate restrictions that hinder successful implementation and development of the Code. For instance, with the help of different methods we can change the structure of the environment, in order to exclude factors that may interfere with its future self-organization.

COORDINATION WITH ENVIRONMENT VIBRATIONS

The processes realized in an environment possess certain rhythms, frequencies and vibrations. Therefore, to achieve maximum efficiency, it is necessary to synchronize them with the incoming genetic information.

ENVIRONMENT ACTIVATION

Even if steps 1–4 have been successfully completed and the environment can get the information, it may not be able to activate the Code, due to energy limitations. In other words, information released from the Code cannot influence the environment directly. Still, this does not necessarily mean that the result will not be achieved.

We can overcome the energy barrier of the environment with the help of external fields and catalysts. Catalysis is an efficient way to remove the restrictions on the use of the genome. From genes to the depth of inanimate matter, we will gradually get through a chain of successive steps using catalysts at each stage). For example: Genome → Biopolymer → Polymer → Carbon (or another substance) → Atom.

Thus, we can increase the activity and quantity of substances used as the environment for replication. Example: we cook, heat, grind food in order to increase its digestibility or to be able to use products that are not very suitable as food without processing.

Therefore, information transfer diagrams similar to the one shown in [Fig. 7](#) should be supplemented, if necessary, with a flowchart representing catalytic action.

Some additional considerations:

- to determine the influence of the Code on inorganic matter, we may need to reduce the latter to nano-size so that it can be compatible with the size of the target object;
- it may turn out that, due to general restrictions, the introduction of additional substances into the environment is impossible. For example, due to structural conservativeness and rigidity of the environment or chemical incompatibility. In this case, we can use non-contact activation methods: field effects, vibrations, etc.

Another way is to dissolve this substance in an additional substance, which will be an intermediate link in the activation scheme. By absorbing the control signal, the substance will either transform it, or transmit it to the object practically with-

out distortion. In this case, the mobility or activity of the elements that make up the target object in such a substance must be much higher than in its usual state. The rapid formation of large crystals in volcanic rocks dissolved in water may serve as an example.

We can say that water is a unique substance due to the enormous mobility of its structural elements and their ability to take a configuration in accordance with external conditions. However, natural water cannot be standardized for use in technologies. It must undergo preliminary processing, for example, purification, destructurization, etc. Another way is to obtain water artificially, using some standard technology. Still we should also consider other candidates for this work. Their list is long.

The algorithm for technocenosis optimization consists in forming the space “Code—encoder—environment” and going through all the possible relations in it. To reduce the time required for finding optimal modes, we can apply resonance or synchronization phenomena.

2.4. GENOME AND BIOLOGICAL OBJECTS

Technocenosis is the ultimate goal, which marks a new level of relationship between man and matter. On this path, relevant intermediate results are also possible. I am speaking about new ways of using genetic information for biological objects and inorganic matter. A number of ideas are common to both worlds and can complement each other.

The simplest option is to transfer genome information to various biological objects, using fields, radiation and forms, and to record possible changes during and after the exposure (...and why not before it? But that is another story).

Montagnier’s successful experiments with transmission of genetic information to water for some samples of concentrated DNA are worth mentioning. In these experiments, the parameters of an external field were selected randomly. The fact that the effect was not detected for all the substances does not in-

dicating its absence. The failure was caused by the incompatibility of external fields with internal ones: different frequencies and directionality, absence of complex spatial modulation, etc. Maximum effects are highly probable, provided these parameters are synchronized.

These results indicate the presence and selectivity of genome fields and can serve as the basis for their resonance diagnostics.

The idea of contactless transfer of genetic information is essentially equivalent to the concept of genetic engineering. However, if the results are comparable, the use of remote transmission will significantly simplify and reduce the cost of genetic manipulations. This is an exciting prospect of transition from genetic to vibrational and topological control of biocenotic processes. The possibilities of dialogue and genome management within the field paradigm are much wider than those of the tailors of modern genomics. But today, both methods can successfully complement each other.

We can propose detailed descriptions of experiments demonstrating this approach. With a high degree of reliability, these may determine the influence of the Code and the fields generated by it.

Influence of genome fields can be transferred over long distances. We can amplify them using different methods, or use them to modulate external radiations and fields. A few ideas for experiment ideas follow:

- The influence of a colony of cells, bacteria, plants on their “relatives” at a significant distance.
- An analogue of the Einstein—Podolski—Rosen paradox. The effect of changes in one genome sample on another. Previously, both these genomes formed one entity. Stimulation by various fields and radiation.
- Influence of a young or healthy biological object’s genome on an old or unhealthy one. Stimulation by various fields and radiation.
- Wired transmission of genetic information and other

properties.

- Studying the dependence of the magnitude of transfer effects on the distance between the object and the reference sample in order to detect standing EM waves around DNA samples.
- We can play the Code like a musical instrument. The mechanism is the same. We press, excite, reduce, or increase something, and finally receive a resonant melody. In the experiment, you can use genome segments responsible for certain functions.

Auto-stimulation (AS). Genome information can produce radiation, vibrations, fields, etc. in the target object. If we redirect the radiation back into the object with the help of special means ("mirrors"), the processes will be intensified. A positive feedback occurs. Such a technique can solve the problem of detecting internal radiation and can help to improve control efficiency. AS may consist in reflecting the response impulse caused by some external stimulus back into the object. In the process of AS, we can employ the existing mechanisms and material structures that constitute consciousness, which itself is an ideal "copying" machine.

Modern life sciences and medicine are trying to simplify and overcome the individuality inherent in all living things, for the sake of universality. And this can be a very dangerous way when it comes to a specific biological object. AS uses methods that meet its own needs. Nature often resorts to them. Modern technologies allow us to use AS with maximum efficiency. For example, we can use amplifiers to increase the power of a reflected signal.

Similar experiments with RNA, proteins, etc.

And yet this approach is not fundamentally new, because it uses existing natural structures. At best, we can expect new promising biological combinations.

2.5. GENOME AND INORGANIC MATTER

Probably, we largely ignore the influence of biological fields

and phenomena on inorganic and organic matter. It is easy to overlook it, unless we employ unconventional methods of scientific research.

I believe that the Code can serve as a productive force not only for colloidal solutions, but also for types of matter that are “beyond its powers.” As mentioned above, indirect experimental confirmation of this is present in the works of Montagnier, Garyaev and other scientists. Further evidence is that in the process of evolution, through its incarnation in man, the genome constantly increases its influence on non-living matter.

Some ideas:

- If we find ways to activate the genome artificially or to lower the environment perception threshold, we will be able to use it (including inorganic codes) to fertilize both types of matter.
- Influence via water. If we examine “genetically modified” water using known physical and chemical methods, we will be able to assess its effect on food, plant growth, inorganic and organic aqueous solutions, microorganisms, etc.
- The influence of the genome on environments that are not suitable for life. For example, at high or low “lifeless” temperatures.
- Influencing the structure and properties of substances by decreasing and increasing them. The scaling must differ from the size of the Code.

Transfer of information to a higher level is made possible through irradiation of a macroscopic object with genetic information and further measurement of its physical and chemical characteristics. An example can be provided in a simple experiment with visualizing gene information, using the method of obtaining Chladni patterns. An acoustic signal is sent to a plate surface with a movable component (such as sand), modulated by gene information from one or more sources. Then, it is possible to use Emoto’s method and to observe the growth of water crystals, including snowflakes, when influenced by genetic data.

When exploring the quantum level, we can apply the meth-

ods described in Section 1.4. However, although the genome is an ideal chemical machine, it still does not have access to the quantum dimension. It can investigate the quantum reality only from the outside, but not from the inside, due to the fundamental reasons described by the Heisenberg inequality. That is why quantum processes are so complex and exotic for human comprehension, generated by the Code. If this is the case, then the principle of upward causality applies.

We can learn a lot by understanding how the Code involves and draws inorganic matter into its circulation. For this, we can turn to autotrophs. These organisms make up the first level in the food pyramid and synthesize organic substances from inorganic ones. The code embodied in them extracts inorganic matter and radiation. It is not the details of this complex process that matter, but the general laws.

The signal extracted from the genome can work independently, be a carrier for another signal and mix with information from other codes, including inorganic ones.

We mentioned the capability of the genome to transform inorganic matter. But the opposite, that is, influence of non-biological codes on living things, cannot be ruled out, either. The experimental schemes are described in different parts of this work. The actions of inorganic codes can be intensified by biotopological encoding of information extracted from them.

2.6. IDEAS FOR ARTIFICIAL INTELLIGENCE

One of the main problems of artificial intelligence (AI) is the search for materials in which we can create controllable quantum entanglement that maintains coherence as long as possible.

The genome is an ideal candidate for this. In it the conditions mentioned above can be realized and maintained for a long period of time. It has learned to resist constant pressure of its environment and demonstrates outstanding ability to replicate self-organization processes at the quantum level, it is able to combine genetic information from different sources

and can be transformed under the influence of external factors. All of these can be controlled.

A single code or a mixture of codes forming a collective field can be activated and transferred to a certain logical environment (LE) with the help of the technologies proposed above. The necessary properties of LE include the following: standardization at the level of quantum properties, flexibility, represented in a variety of freedom degrees, and the tempo at which it can change its structure, compatibility with the genome. The LE, fertilized by the Code, will serve as the basis of AI. The best available candidate is colloidal solutions, in which the genome now resides. Yet it is necessary to find ways to imitate their structure. Other candidates are listed in the chapter Code Activation. I am convinced that the zigzags of our technologies will once inevitably present a solution.

Genome derivatives, language and consciousness, can be used for AI strategies. They differ in color and in vibration levels, but they coincide in their logical basis.

Of course, these are only general and weak proposals in terms of their validity. But after all, the Code has successfully generated our intelligence, and it has no potential limitations for the implementation of auto-intelligence of the next level.

But there is something fundamental that can seriously reduce the optimism in the search for AI proper.

“Every thing that is not a human person can be understandable to us only to the extent to which it becomes human. Reason that is enclosed within the boundaries of its own species is not universal, but the walls of this unusual prison stretch to infinity... We can cognize endlessly, but in our own human manner...” (S. Lem). Quoting this, I want to say that turning to the genome when generating AI seems to be inevitable, and moreover, another strategy is not conceivable at all. We can generate an intellect that in the long run will be similar to ours, but develop independently. No matter how far our consciousness, intelligence, and all their derivatives expand, the genome matrix will always limit them. And we will still refer to it as the

original creation, the primary source of our mind. And since the genome is inseparable from its limiting material basis – proteins, it cannot ever go beyond the boundaries of their creative topological capacities.

We will not be able to get rid of this legacy until we create something capable of self-reproduction on a material basis that is fundamentally different from what the Code uses today. We will have to wait for the emergence of technocenotic technologies that will overcome barriers inaccessible to natural evolution. AI proper will be the pinnacle of autoevolution. But even this will only be a part of the truth of evolution, which is everywhere, but cannot be spotted.

Another opportunity to go beyond natural limitations is provided by “death” as a natural stop and transition beyond the boundaries of the thinkable. I mean mental death, not the physical one. It is akin to the state experienced, for example, during meditation. Having overcome the limitations of the material substrate with the help of a mental transition, it is possible to generate, albeit temporarily, a new reality.

Another problem is that AI as such is always a surprise. It cannot be created from technical drawings and designed for a specific purpose. When it arises, we will not see what we hoped for. Only after its actual appearance will we be able to understand its real capabilities, through experiments and modeling.

2.7. SUPPLEMENTS

The physical legislation in effect is quite sufficient for description and management of genetic processes. We will only have to develop some articles on resonance, frequency capture, synchronization, etc. No new entities are required, at least until the potency of existing ones is exhausted.

In the future, physical theories will play the role of a filter of “natural” selection, setting limits, boundaries of evolutionary change, rules of the game for new codes at all levels of physical reality.

Man as a product of the Code has managed to domesticate

inanimate matter, from the macrolevel to the quantum one, created theoretical tools with good predictive capability, and can go further in understanding his master. In fact, the Code has started to reflect in itself. This opens up a completely new meaning and opportunities. By exploring the unconscious, as well as its unconscious, the Code may develop the ability to express itself, to strengthen its power, sustainability and chances of survival.

This may sound blasphemous, but I do not consider Nature the height of perfection. And therefore, we may be able not only to take genetic lessons from it, but also go beyond the limits, rather observable than imaginable, and create effective and powerful technocenosis. Although nature is smarter than us, it is definitely not more perfect.

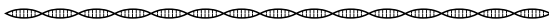
“Without knowing the specific variability of the Code, we cannot know in advance how to use its organizing potential to the full.” The results that can be obtained during genomic activation and technocenosis will not always or, frankly speaking, only in exceptional cases, meet our expectations. This fundamental principle of “unpredictability resulting from uncertainty” applies to all technologies. Growth of reliability and reproducibility will be achieved through gradual iterations. Resonant interaction can reduce the cost of going along the technology optimization path.

Any self-reproducing scheme invented or extracted from natural “storehouses” will be aimed at maintaining its own existence and living its own “life,” independent of our programs. And we will have to work very hard to “tame” it or learn to use its capabilities.

Over the course of evolution, the Code has accumulated a lot of garments in the form of mega-complications, in its numerous incarnations. But something must be minimally common in this splendor. It seems to me that this statement has a mathematical justification. The Fermi-Ulam paradox is a good argument. Still, the effective laws of physics do not consider such a capability.

Finding or calculating the minimum length of a self-replicating algorithm that can be implemented in a material medium is of paramount importance in the success of genomic activation and technogenic synthesis. This fundamental structure of order cannot be merely self-sustaining: it has to generate another, higher order. But I am afraid that searching for such an entity will end exactly with what we discovered when trying to find the fundamental level of matter, which ended in nothing. The deeper we go, the further the bottom will recede. Therefore, it is worthwhile leaving alone our search for the ultimate truth and striving for obtainable intermediate goals. As for the genome, it is certainly possible to determine the minimum self-replicating chemical algorithms, which will yield substantial practical results. A significant consequence of this may be a union of physics with topology.

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