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NOOSPHERIC EDUCATION

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COUTEUTS

For the first time man realized that he is an inhabitant of a planet and is able (and must) think and act in a new aspect, not only in that of a single individual, family, race, states or their alliances, but also in the planetary aspect.

V. I. Vernadsky

We must decide what is to be done today, that is, to make our choice for the future. We, you. The motherland... Today, every person, society, country is choosing between goals and values, approaches and principles. Every single soul confirms its variant of future by its choice "what must I be like?" Which quality is you, we, the society...

Natalya Maslova

Chapter 1[1]
ON THE NATURAL PRINCIPLES OF EDUCATION

By the laws that ears of wheat are born under
And the Sun's rays flow from the skies
In harmony of universal consonance
You live as well...

On the threshold of the third millennium the search for new school and education strategies based on the synthesis of cosmic, biospheric, anthropospheric and cultural creative fundamentals of life has intensified noticeably. **"The explosion" of creative energy demonstrated by the people of science, culture and education** is determined by the demand of harmonization both in value, spirituality and practical relationships between people and the environment. Only deep awareness of the current changes in the common world-view, as well as mastering both the new methodology and instruments for its realization, will allow man to enter the new phase of our planet's spiritual evolution: NOOSPHERE.

Only a renewed and improved system of education will allow us to enter a new sphere (being purposefully developed by man) of life on the Earth, that we, as Vernadsky's successors, call the *Noosphere* or *The Sphere of Reason*.

EDUCATION is a way of drawing the society's attention to qualitative human resources, advanced technologies in economics and, finally, position and role of the state in the world.

[1] From: Maslova N. V. *Noospheric Education* (monograph). M., 2002.

THE NATURAL PRINCIPLES OF EDUCATION are given to us by the world of Nature, by the world of People and Art, by the common nature of humanity.

EDUCATIONAL SYSTEM ensures imparting knowledge, skills and habits from one generation to another.

An advanced system of education makes a technological breakthrough in all spheres of life as well as transition to a new economic, social, political and cultural level highly possible. The utmost use of essential innovations in the sphere of education is Russia's key ethic, economic and strategic goal on its way to the 21st century.

The search for *value orientations* in the context of the anthropogenic civilization crisis at the end of the 20th century is turning out the reappraisal of the previous educational traditions, methods and strategies. Meanwhile, search for the new is based on the appreciation of deep connection between the pedagogical systems, educational methodologies and socio-cultural climate. The traditional system of education that existed in the 19th century and then was revised to meet the social demands of the society in 1930s—1960s and in 1970s, was permeated with an imperative of training a knowledgeable person whereas the world wants a person who *can understand* and *realize* himself, society and culture both of the past days and today. Nowadays the school trains a person who cannot fit himself in the complex world surrounding him. High school graduates demonstrate stereotyped, non-dynamic thinking and are not able to keep a dialog with the rapidly changing world.

Unprecedented vulgarization of education has been clearly revealed in the two central tendencies:

1. The traditional high school splitting (firmly consolidated by higher education) of the integral knowledge into separate disciplines has lead to ignoring of *the subject* of the education: *human being*. The real integrity of man (pushed into the background by his image fragmented through "the prism of sciences") has also been separated: the focus of attention has moved to the objects of information on particular disciplines. It was manifested in confrontation of the subject of education and the system, conceptions and practice of the education. **The vulgarization of education was in ignoring of essential correspondence between biosocial nature of man and his needs in the system of education adequate to him**. The loss of this correspondence brought to the violence on the side of education. But any violence is known to deny the very point of the study of human nature. The most impressive manifestation of this is that there is no course like "Age-specific psychology" in school programs.

2. Avowal of the leading function of informatization and computerization while ignoring the problem of self-actualization, self-education and pedagogical influence on the young generation; **ignoring the world-view function of the knowledge that is able to perform the regulating function in the person's activity and behavior only by transforming his knowledge into convictions.**

In addition to the tendencies mentioned above the new, medical, problems appear.

The scientists have found that for the last hundred years the muscle force of the people in the developed countries has fallen by more than 90%. In connection with using new technologies that replace man's muscle force, a new powerful and not yet appreciated problem occurs: **hypokinesia**. It is not only the weakening of the muscular system but also the other functionally important systems of the body, and that means the occurrence of new diseases. The concerns about life of the rising generation are growing because the problem of hypokinesia is not quite obvious to the doctors (this problem is properly studied only in the field of space medicine).

In USA, the risk of the INTERNET was noted to be connected with dramatic increase of the quantity of obtained information and its negative character. For thousands of years, people didn't get the kind of information they get today and adapted to life on the Earth without it. The age of universal informatization produces a phenomenon of obsessive fears. In USA, 30% of the population experience fears of imminent danger and stresses. Overfatigue from computers and television causes headaches, vomiting, visual impairment, claustrophobia etc. In Japan (at the end of 1997) the show of TV cartoon "Pocket monsters" caused mass mental disorders in children and teenagers...The new socio-ecological problems concerning air ionization in the computer rooms appear: computer screens are usually protected but ionization from the sides is not less harmful both for the user and the people around.

Liberation from stresses and fears, more harmonious (than it is now) bringing of the students to the coming age of informatization, realization of optimally effective (that is adequate to human perception and thinking) teaching technologies and methodologies — the task that can be solved only by joint efforts of family, school, medical staff, state and social organizations. In the process the very principles of the education have to be improved. The basic knowledge and the ability to impart it to the pupils, talent to upbringing and contribution to the personality formation — all these are in the hands of the Teacher. G. R. Gromov, an IT specialist, says: "All the field of the man's professional activity that is principally able to be formalized and therefore computerized —is,

figuratively speaking, a thin surface layer of formalized knowledge over the ocean of informal knowledge accumulated by the mankind."

The real knowledge is imparted only by direct communication of the competent teacher and learner.

A try to reduce the education to a singular function after the example of "Hamilton's affair" that was a peculiar triumph of nature mathematization can hardly be crowned with success in the case of education.

The coming era of informatization, communication and systems of universal unity urgently demands **a new philosophy of education, the change of the paradigm of pedagogical thinking, the transformation of the practice of pedagogy**.

The necessity of revision of the very concept "education" results from its present state. Today the pre-school, school and high school education is rather an instrument of consolidation and reproduction of the present social and economic structures than a mechanism of forming and developing the individual and collective values and knowledge allowing the person to change his life. **Instead if making the man and its development the central point of the education, it is entrusted with the function of resources reproduction for economics.**

The system of education itself is not able to assimilate the changes taking place in the world. It cannot see its leading, advanced, socially modeling role and, of course, is not able to fulfill these functions in society.

Society has no other way but live in the flow of renewing information. In the last decades of the 20th century, information got completely renewed every six years (according to the data presented in the VI World informatization Forum that took place on 26 November, 1997, in Moscow). We need to reorient public conscience towards the new principles and tasks of education, quick and efficient acquisition of new knowledge and skills.

This reorientation has to result in having an idea about the product of the work of educational system: development of holistic, healthy thinking of the man, providing him with effective instruments for independent choice of his place in the system "Nature-Society", for ability to define the goals, choose the means and see the effects of his activities. The general goal of education system functioning has to be the ideal of person self-realization in all spheres of life.

The education as the integrity of education philosophy and social institute of education has to take into consideration the present rationalistic and

irrationalistic points and has to be based on realization that the effective technology of the education just reflects the mechanisms of functioning of the individual as a system.

The impossibility to bring the education process to the universal scheme of co-dependences (co-relationships) refers the search of community to the **natural bases of the mechanism of information perception by man.** The finding of common principles is inevitable as any system is built on a certain unity. Whatever the system is, **it already has those common *bases* of community that have to be realized by man.**

Any education system reaches the deadlock when its functioning is connected with adaptive development but not the natural self-organization. It seems that the search of system-organizing principles today, when the ideology, old goals, tasks and forms of education do not work, has to be referred to the natural mechanisms of information perception. If they are realized as implicit (internally inherent) to every human being and the education will focus on them, then the education system can become the instrument of real making-ready to life and mastering cutting-edge technologies. The advanced education system will promote the advanced position and role of the state in the world.

Interrelationship of the processes of upbringing and education

We must not close our eyes to the fact that the traditional "global" education system failing to keep pace with life cannot answer the possibilities of personal self-realization, the society's goals and needs. Obsolete culture and architecture of the pedagogical field, obsolete "group-lesson" system, methods and technologies of teaching seem to completely disagree with man's natural instrument of world perception. At the same time, the education system can become flexible in forms and methods, instrumental in process control and effective only if natural individual and social components constitute its organization basis (the "input"), as long as there is an optimal result (that is, knowledge, habits and skills, learnt as thoroughly as can be and applicable in life situations) in the "output."

The functionality of education system is determined not by its ability to declare the principles, goals and tasks but its ability to get *the actual result* of educational process.

The present day views on natural mechanisms of information perception allow approaching the concepts of upbringing and education on the *ontological* basis and not on the base of their parallel existing.

Ontologically upbringing and education are the processes of forming, holding and acquiring skills in the system "Nature-Society." Basically *upbringing* as acquiring ethical standards of man's behavior in society and nature is a more general process and includes learning as acquiring knowledge ***in concrete natural and social settings***.

So, traditionally it is easier to teach to be sparing with water and to train the skills of spring search and retention in arid regions than near a full-flowing river. It is easy to explain a child why he cannot needlessly peck at the upper, the most fertile layer of the ground in the regions where topsoil is thin and hot dry winds blow. It is in these regions where it is easy to teach to make and wear shoes with smooth soles and turned up foreparts — traditionally for the purpose of saving the soil.

Thus, upbringing and education are shown to be as deeply interrelated processes. A non-superficial view reveals the common character of the origin, aims and methods of these processes. In some deep ontological sense, both processes could be combined by such terms as **upbringing of perception** or **upbringing of thinking and consciousness.** The latter term reflects the **process of education** (that means having an idea of its mechanisms, methods and technologies) and **comprehension** of the world by man, as well as the goal of these two processes as acquiring information about the world that corresponds with an individual's abilities and realization of his place in society and nature.

The ideal of the development of thinking today is wholeness, integral world perception.

The development of holistic thinking is based on the idea of oneness of the Universe and man as its particle. The systemic patterns of nature are the same for man and for their comprehension by man. Only following them (in view of nature wholeness) man will approach the true ecological thinking that was originally inherent to him as a part of nature system.

A new way of thinking will inevitably result in realization of the system of natural laws by the man in respect to his thinking. In this the true deep ecology of education, consciousness and thinking based on the natural foundations inherent to man in the system of nature exists. We will call this essential feature of education a natural conformability or biological adequacy.

Chapter 2
GENERAL DESCRIPTION OF THE CONCEPTION OF NOOSPHERIC EDUCATION

> Creation of advanced education system is a key ethical, economical and strategic tasks of Russia on its way to the 21st century.

The conception of noospheric education is a part of the conception of noospheric way of development of Russia worked out by the Academy of Natural Sciences in 1993—1995, and proceeds from its basic conceptions and principles.

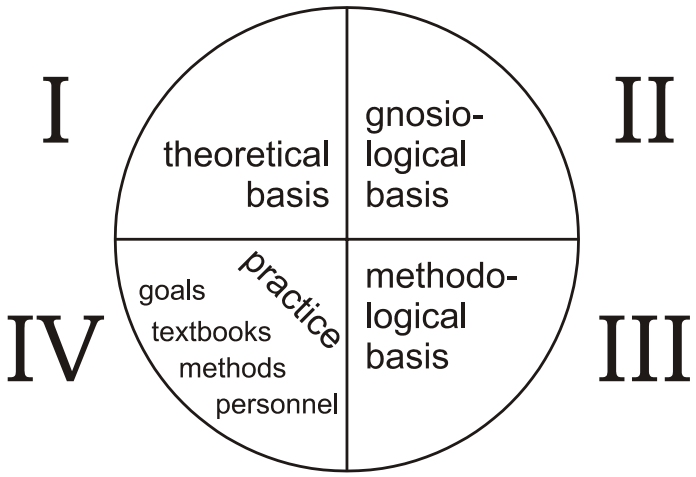
The conception of noospheric education **is a system of theoretical, gnosiological, methodological and practical views on the matter of education and the possibilities of its effective achievement in the society at the period of transition to noosphere.**

The conception of noospheric education is a convergence of scientific, natural and humanitarian conceptions and practices of the education of the end of 20th century.

The conception answers the following questions of the time.

1. What is theoretical, gnosiological, methodological basis of the education?
2. How can the pedagogical field be practically organized to get the necessary conditions and optimal technologies in truly ecological, humane education process?
3. How to organize a viable system of education management in the network of programs of end-to-end development of all the links of the education process (family—preschool—school—university)?
4. How to organize self-developing process of education economically?
5. How to avoid authoritarianism and immobility of education system?
6. How carry on reconstruction of the pedagogical process, education technology to make education harmonious and ecological at the period of noospheric transition?
7. How to organize the educational process in the existing system of pedagogical personnel retraining to give a stimulus to the natural transformation of thinking, methodology and world-view of every individual teacher in a short time?
8. How to orientate a man in a modern society?

The structure of the conception of noospheric education is shown in *Scheme 1*.



Scheme 1

The content of the conception is manifested in the following order.

— Conceptions and definitions.

— Goals, tasks, principles of noospheric education.

— Theoretical basis of noospheric education.

— Theory of knowledge in the modern period.

— Methodology of noospheric education.

— Techniques of noospheric education.

— Methodology of academic disciplines.

— Teacher of a new generation.

— Program of the transition to noospheric education.

CONCEPTIONS AND DEFINITIONS

Education is either individual or collective process of creation of MAN'S IMAGE: forming of his own image (self-identification) by the subject of education through individual mastering and processing of information, habits and skills, developed by the mankind about nature—society—man.

Knowledge is information-image-bearing reflection of logical, reproducible correlation between the units of the objective and subjective realities.

Self-identification is a way of living in which a person is supposed to fully use all the essential potencies and abilities in the process of his growing accustomed to the world, accepting or rejecting this or that existential position and system of values, this or that social structure. In other words, **self-identification is adoption by person a system of life purposes and attitudes that are present in society.** (The conceptions of self-appraisal, self-actualization, self-affirmation of person are not the

synonyms for self-identification, they carry their own specific functionally notional meaning and denote rational acts of man's thinking.

Upbringing and education are two parts of a single integrated process that develops man's thinking.

The purpose of upbringing in family and society is to give an idea and habits for orientation in the world of people. This is a system of ethical and moral rules, maxims etc.

The purpose of education in primary, high school and university is to give knowledge, methods, and instruments for orientation in the world of thoughts, ideas, and life activities. As we can see, upbringing and education have different purposes in the sphere of knowledge application. It is the object of upbringing and education, the person that unites these two processes; and the common task of upbringing and education is to gain knowledge (irrespective of the sphere of application). Upbringing and education have influence on man's consciousness, subconsciousness and superconsciousness.

Upbringing and education correspond to a single integrated process (influence on person) and differ only in spheres of application of acquired knowledge. Their origins have the same roots. Lately we become more and more aware of notable difference between well brought— up and well educated people. The society has become better informed but as practice indicates it is a one-sided, inharmonious process. People use the obtained information without having a faintest idea about the consequences of their activities. The realization of the role of Man in Nature is far from being perfect. One-sided information awareness causes incorrect goal-setting and education tasks. Hence follows the result of man's further activities, his choice of the means for achievement his own or social purposes.

Essentially, in the process of education both influence on man's thinking and its upbringing occur. In this sense, presently separate processes really constitute one integrated process: man's education.

Education system is a social institute including goal-setting, creating general and specific conceptions of education, educational programs, methodologies, methods, and means for education realization: educational organizations, their material and technical supplies, financial provision, the system of training and retraining of teaching, and administrative personnel, means of pedagogical communication (journals, newspapers and other printing; seminars, conferences etc)

Education philosophy comprises the ideas about education as a system of preparing a person for life: intellectual comprehension of the history of education, its present state

and its possible continuity for future. Education philosophy deals with overall fundamentals of education and pedagogy: the place and meaning of education in the universe of life, understanding of man, the ideal of scholarship, the meaning and features of pedagogical activity. Education philosophy is not a science or philosophy per se. It is identification of ontological, gnosiological and axiological components of education process. It includes necessary generalization of social reflection, expressed in philosophy, methodology, history, culturology, axiology, etc.

The term "education philosophy" appeared in the recent years and is not quite established.

The principal contradiction of the modern system of education in Russia is in declaration of high humanistic aims for achievement of which it was created and impossibility of this system of education to effectively follow this direction.

The causes of the principal contradiction of education system are:

— inability to realize the strategic function of education in the modern and future society;

— inability to structure the functions of education system (administrative, methodological, educational, teaching, etc)

— inability to realize the educational technology and methodology from the positions of modern science;

— inability to see the true fundamental, i.e., conformable to nature or bio-adequate tasks of education;

— lack of information awareness of pedagogical community about present progress of science.

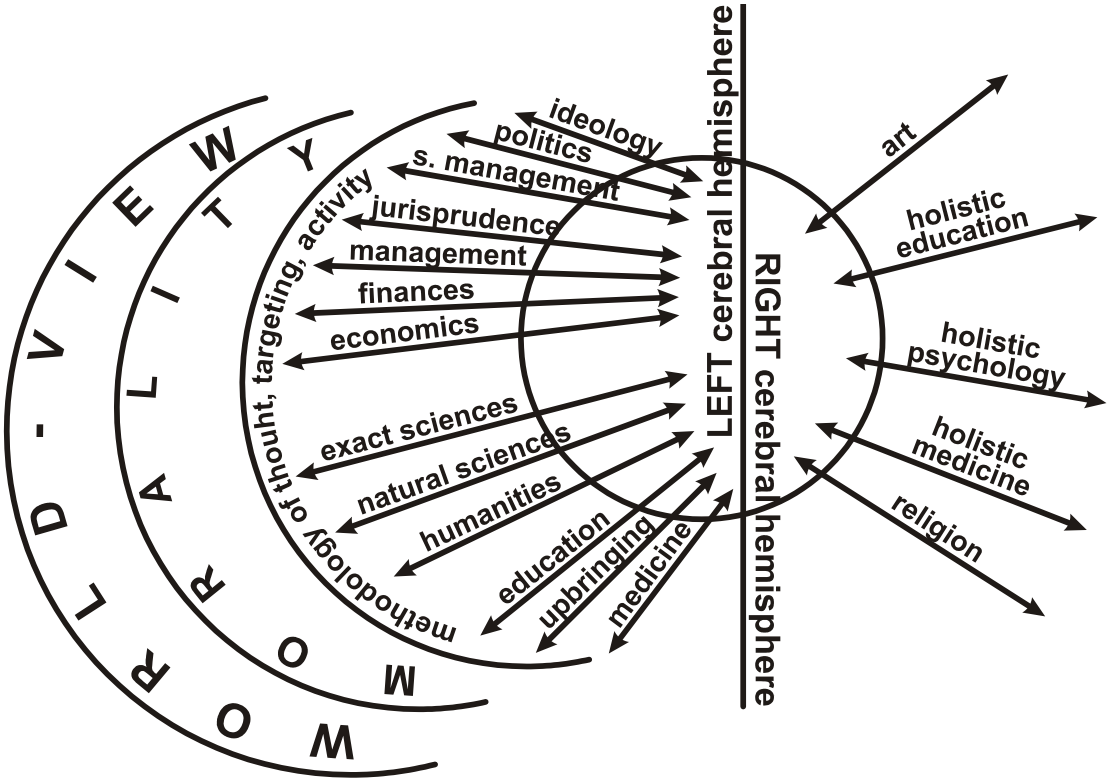
The crisis of the present education system is objective result of the mentioned contradiction.

The crisis of education system is in its inability to function in order to wholly open the human potential, and reluctance of the personality(of the leaner, teacher or parent) to act in the conditions that upset the original appropriateness and possibility of self-realization.

The crisis of education system is closely connected with the crisis of civilization. It cannot be realized only as a result of social, political, narrow understood ecological and cultural-ideological influences in Russia. Its roots go deep into the history of mankind and are connected with the phenomenon of development of man's consciousness. Historically established discursive-logical thinking, i.e., thinking based on the work of

the left cerebral hemisphere, prevailed in human society beginning from 4th century B. C. and is prevalent till present days.

The structure of civilization crisis is represented in *Scheme 2*.

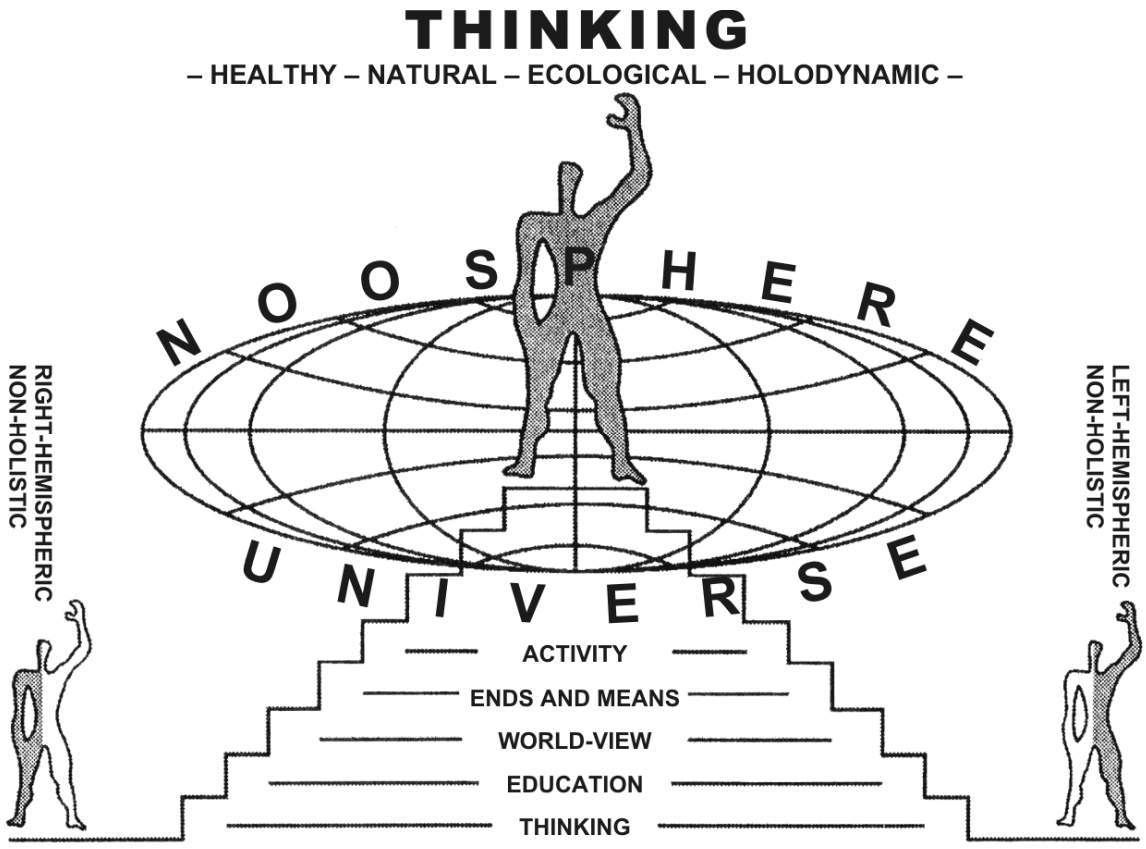


Scheme 2

The scheme shows historically established **bias to the discursive-logical thinking**, i.e., one based on the work of the left cerebral hemisphere, **disturbance of the balance of natural abilities of man that caused the discord of the aims in human activity. In general, it brought to a civilization crisis.**

It is obvious that no "filling in holes" and solving the "problems" concerned with discursive-logical thinking will not change the situation. The crisis of the civilization of the end of 20th century is the crisis of thinking, to be more precise, the type of thinking based on the work of the left cerebral hemisphere.

The crisis is in non-ecological exploitation of one part of the whole organ— brain while the other symmetrical human organs work in accordance. **Dysfunction of the right cerebral hemisphere has caused disharmonious work of the whole organ, and that does not meet the principle of ecological appropriateness.**



Scheme 3

Together with existing tradition of relying on the discursive-logical thinking the mankind thereafter accepted the principle of **inexpediency of socio-ethical imperative instead of previously existing principle of ecological imperative.**

Ecological imperative is an objectively necessary moral socio-anthropological principle that is the imperative of co-development of man, nature and society (N. N. Moiseev).

According to this principle person, state and society have no right to follow any moral principles but ecological imperative that takes into account general laws of co-development of nature, man, brain, society and the processes of noosphere formation.

The history of civilization is the history of predominance of thinking based on the work of the left cerebral hemisphere, and energy criterion of progress: accumulation of labor energy by ruling classes. In connection with predominant development of non-ecological (left-hemispheric, pathological, unnatural, unhealthy, anthropospheric) thinking in the modern industrialized society all its systems (of education, public health, politics) are orientated on non-ecological thinking of man (see *Scheme 2*).

The present crisis of civilization demonstrates the end of the period of lop-sided, non-ecological development. The movement to ecological development means

gradual transformation of inadequacy of thinking and energy criterion of progress, acceptance of universal criterion of progress based on the improvement of qualitative features of its thinking.

The transition to holistic ecological thinking is a turning point in the history of humanity on its way to noosphere, the sphere of reason and is the essence of noosphere transition.

The type of thinking **is a conscious orientation of preferred use of brain functions**. There are two main types of man's thinking:

— ecological (two-hemispheric);

— non-ecological (one-hemispheric)

Ecological thinking (synonyms: harmonious, natural, universal, biospheric, healthy, holodynamic) is determined by conformity with the natural laws of the Universe, i.e., both cerebral hemispheres are involved in work. Such thinking does not cause any disturbance in the biosphere.

The quality of person is determined by the type of his thinking.

Harmonious, versatile, healthy person demonstrates natural, compatible with biosphere quality that is determined by holodynamic (two-hemispheric), ecological thinking.

Inharmonious, narrow-minded, sick or problem person demonstrates his (or her) unnatural, pathologic qualities that are determined by *non-ecological thinking*. *The left hemispheric* (exact sciences, rationalism) and *right hemispheric* (humanitarian, creative tendencies) orientations, as well as intermediate variants, are all possible.

Improvement of person's qualities means enhancement of person's abilities to transform his (or her) relationships in the biosphere and society in the direction of biosphere compatibility through mastering the methods of combined work of the both cerebral hemispheres.

The progress of person and society is in enhancement of personal and social spheres of possible transformation of negative problems to positive.

Ecological development is appropriate when the progress proceeds on the base of improvement of qualities of man's thinking, i.e., transformation of thinking in the direction of its becoming ecological.

Ecological development is coordinated with natural laws and do not disturb the biosphere because it is the result of ecological thinking.

Ecological, healthy, harmonious thinking of the period of noosphere transition will become established by changing anthropocentric views (like "biosphere is for man",

"everything serves man", "man is the emperor of nature", "conquest and transformation of nature") and establishment of biocentrism — "man in the biosphere." Finally, of course, biosphere (the Earth and Space) is for man. Biocentrism only states that the activity of man in biosphere should be illuminated by reason and aimed at maintenance of natural systems.

The person with noosphere thinking will see his true place in nature and his role in evolution performing the biospheric function of maintaining "stability factor" of natural systems. The natural element of morality of this man will correspond to his relationships with nature — all that assists the performing by man his biospheric function is moral, all that is in conflict with this is immoral. **Noosphere thinking means conscious choice of man for benefit of eco-life, position "I am in nature", love to nature, realization of his place in nature** and, finally, creative collaboration of man and nature **(as opposed to ego-life, position "I am the emperor of nature",** conquest — transformation of nature, that are the positions of exploitative and rapacious treatment of nature).

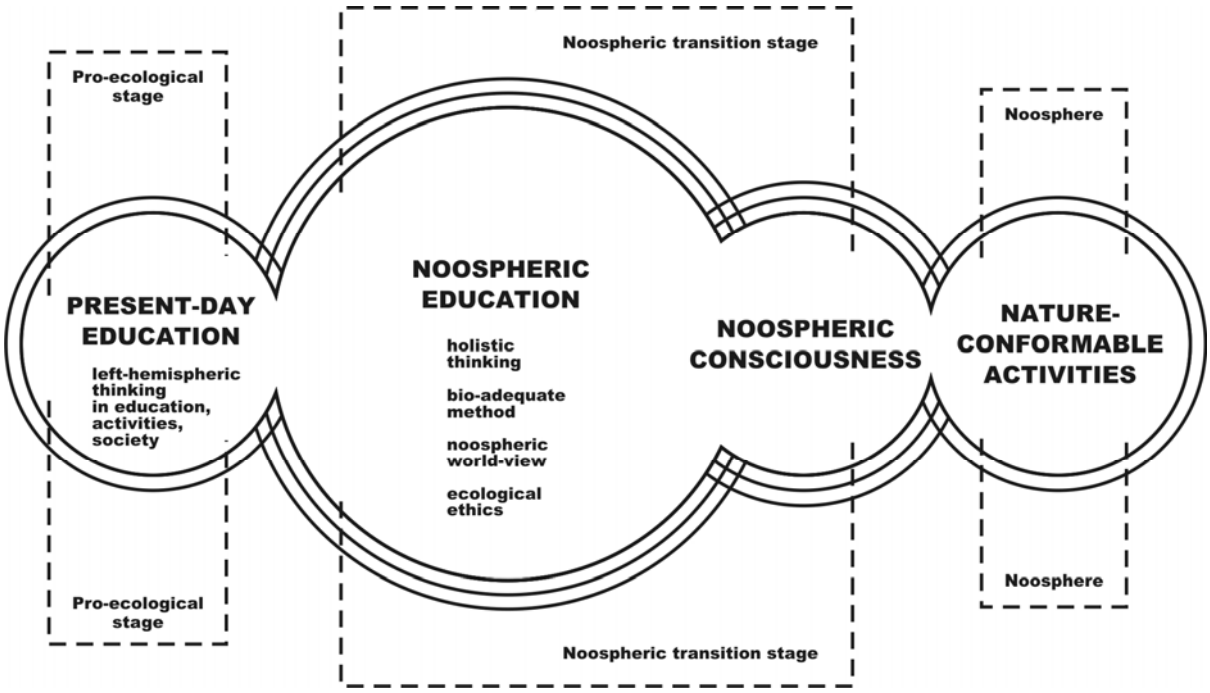
The realization of necessity of transition of mankind to the period of integration of individual and collective mental and spiritual power is taking place nowadays.

The imminence of the Earth coming into NOOSPHERE period was shown by the great Russian scientist V. I. Vernadsky. According to his views, the activity of man was becoming the principal geo-formative factor.

Noosphere **is a period of integration of individual and collective mental and spiritual power, a new quality of holistic thinking.**

Noospheric development **is consciously controllable value-oriented co-development of man, society and nature when living needs of the population are satisfied without detriment to the interests of future generations and Universe.**

Noospheric development aims at restoration of the ecological equilibrium on the planet and birth of new man whose main characteristic feature will be **the new (holistic) thinking** (see *Scheme 4*).



Scheme 4

Education system is a key link that will help Russia to serve its turn of the leader in noospheric transition.

Noospheric transition is a period and process of correction of those components of human and social activity that proved to be wrong and ruinous.

In the period of noosphere transition a gradual realization and accepting by man and society the principle of ecological imperative and deviation from lop-sided logical principles of thinking is taking place. I. A. Efremov wrote about the importance of this period: "It is in the overcoming of the **deadlocks of mathematical logic** that the power of future is."

This phase on the way of society to become ecological can be called pro-ecological. The pro-ecological phase arose spontaneously as an alternative movement in education and it is successfully proceeding in compliance with the law of self-organization of subjects of ecological systems. Transition from alternative movement to state politics is unavoidable.

Noospheric transition will result in acceleration of restoration of the components of human life activity (material, mental, spiritual) and the following prosperity of society on the base of conformity with all these components.

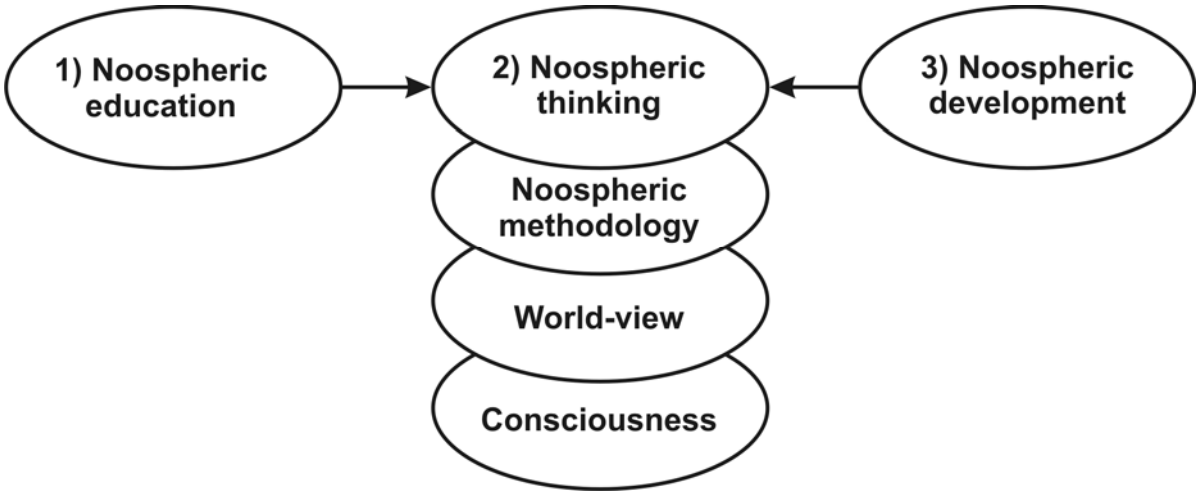
All in all the idea of noosphere development will be turned into the system of new spiritual and professional aims of mankind. This requires:

— profound information awareness of all aspects of noosphere development including noosphere consciousness;

— reorientation of education, medicine, production and other sectors of economics to noosphere technology, methodology and practice.

Creation the system of noosphere thinking in society and, therefore, new values will stimulate the formation of ecological structures of education, production and consumption aimed at the higher level of people's life.

Thus, in a certain respect, noospheric education is a key link in the noospheric transition. The order of this transition is unavoidable:



Scheme 5

Development of holistic thinking

Holistic thinking development is a principle of psycho-pedagogical influence that can work as an instrument of transformation of present-day man's (predominantly) left-hemispheric thinking.

The goal of noospheric education is development or rather motivation of harmonious, holistic, ecologically healthy type of thinking based on the consciously combined mastering of logical(left-hemispheric) and creative (right-hemispheric) thinking. This is the type of thinking that can give a person an integral picture of the world and become an instrument of solving global problems and transition to noosphere development of the society.

The result of education process, therefore, is a person who is able to use harmonious two-hemispheric holodynamic thinking.

But **what does it mean "able to use"? Isn't it just another declaration of "bill of rights" of man and nature?**

The actual result of education process should be considered *teaching man* **to use discursive-logical, intuitive and holodynamic (logical and creative together)** principles of thinking while solving various existential, industrial, social, universal problems. Let us make it clear: one should speak about holistic thinking when the joint work of both cerebral hemispheres has become not only an individual's ability but his (her) usual conscious method of solving various problems. In this sense we will speak about methodologization of man's thinking.

Noospheric education is a transfer of knowledge, skills and habits by means of organized motivation of individual training mental images and realization of enclosed in them energy. The goal of noospheric education is to teach holistic dynamic thinking by means of mental images.

The principal feature of noospheric education is disclosure of internal resources of the learner's personality, revealing his natural abilities. In general, these resources increase the learner's creative potential as well as the level of passionarity of all the society. The basic characteristic features of noospheric education are its accordance with nature of human perception, ecological purity, targeting at the disclosure of the teacher's and learner's "Upper Me's" by means of their creative interaction through all channels of perception.

Noospheric education is possible at all stages of learning on all academic disciplines.

The tasks of education

Societies and countries at various times set and fulfill various tasks. The choice of tasks for education corresponds to a certain level of development of a particular society: the level of need in this or that educational result, its social demand, realizability, procurement of resources. The position of Russia in the world as Euro-Asian industrialized country in the period of transformation of social key points determines the strategic goals of the country in the field of education in the following way: development of determinative primary and general education with the following professional education to meet the needs of science, culture, medicine, industry and agriculture in functionally competent, creative specialists always having an opportunity to improve steadily the level of education.

The present education is solving quite a number of problems among which socially the most important ones are as follows:

— formation of the learners' world-view attitudes based on the universal moral principles of life;

— enlightenment of learners, i.e., getting acquainted with general scientific ideas about nature, man, society, and also spatial, functional, cultural, mental structures of man and methods of self-identification of person;

— man's socialization, i.e., his involvement into the processes of social labor division through the mastering knowledge and skills in this or that professional part of this division, and also introduction to the mode of life accepted by this society and principles of social relationships;

— inculturation of person, i.e., introduction to the value-sense key points system and evaluation criteria, normative-regulatory establishment of social existence, system of languages and technologies of social communication and principal parameters of historical and social experience of collective life activity of mankind in general and a society particularly. It is precisely these points that make the task of education in general.

To put it in simpler words, we can say that while socialization boils down to professional training — the system of principles and technologies of such and such activity in order to create socially important product and obtain the needed social goods as a reward, inculturation, in its turn, is adoption of historically developed standards, following which one can obtain social welfare; cooperation with other people, information getting and dissemination, estimation and interpretation of different phenomena, etc.

Finally, that is what culture is, as a system of standards and rules, regulating any forms of people's activities, developing value-sense hierarchy of the results of these activities, maintaining the functioning of communication channels and symbolic languages with the help of which this kind of regulation is implemented. **Culture is people's mental aiming at the fact that their needs and interests can be satisfied not by any means however effective they were in practice, but only by the ones acceptable to the nature, society, and man as to their consequences and cost. From the position of culture the end never justifies the means. Hence a special role of culture as historically accumulated bank of socially acceptable means of needs and interests satisfaction and also harmonization of people's relations with the world.**

Every person has to be individually accustomed to this experience, "bank" of cultural examples and attitudes. These tasks are fulfilled in the processes of upbringing and practical social cooperation, introducing the person to the realities of cultural standards of life; by means of art, morality and religion setting the tone for normative and anti-normative consciousness and behavior; public opinion, approving or blaming such and such activities of man; state, awarding or penalizing depending on the degree of normativity of man's behavior, etc. But the chief "tutor", nevertheless, seems to be education as its mission is to implement this inculturation of person as systemically and efficiently as possible according to the worked out plan of solving this problem.

The task of noospheric education is to ensure the right of man to effective and instrumental creative thinking.

Its effectiveness is achieved at the expense of using 5 canals of man's perception, intensification of creative thinking and holistic view on the phenomena studied, refusal from the "patchwork quilt" system— the system of separate rules. The appeal to personal experience of learner and natural biorhythms of human body shortens the time needed for mastering any subject by 3—6 times, releases the resources of learner's health, brings to economy of material and financial expenses and gives the possibility as much to increase efficiency of acquiring skills and knowledge.

Noospheric education is so multisided that can be characterized from different viewpoints.

—It is *ecological, healthy, non-pathological, natural* as it is based on the natural canals and processes of reception-transmission-comprehension of information and it sets the goals that are natural to man.

— It is *biospheric* as it does not set the goal to subject nature (anthropocentrism), it orientates on co-development of nature, man, space.

—It is *scientific* as it is based on state-of-the-art achievements of natural sciences and humanities.

—It is *systemic* as it considers the subsystem "Man-Society" in the systems "Nature" and "Space" and uses a set of systemic possibilities of a wide range of theoretical and practical directions.

—It is *creative* as it realizes the creative abilities of teachers and learners.

—It is *virtual* as it uses the forms and methods of perception implicitly inherent to any person that naturally shaped in the form of moving three-dimensional holographic mental images.

—It is *biorhythmic* as to the structure of the lesson(relaxation-activity alternation).

—It is *harmonious* as it gives the joy of learning, self-realization in all levels of development(physical, creative, interpersonal, social, fundamental, universal levels).

—It is *humane* as to the goals, methods and means.

— It is *instrumental* as it gives the man an instrument of thinking and further independent learning.

— It is *efficient* as it shortens the time, financial, social, material and technical, and other expenses.

—It is *advanced* as it prepares people possessing holistic thinking.

—It is *innovative* as to the basic and secondary components, theoretical and practical, and methodological parameters.

—It is *progressive* as it considerably promotes person in knowledge of his own nature and gradually "takes him aside" from ecological crisis.

—It is *optimal* as it excludes unnecessary steps from the process of learning.

The main contradiction of the present-day education system is declaration of high humane aims and impossibility to act effectively to achieve them. It is to a considerable degree explained by ambiguity of principal aims of education.

The essential and sufficient principle of education in the period of transition to noosphere is its nature conformability or bio-adequacy. This new for the education principle can be explained with the help of a number of more familiar principles. They are as follows.

1. The principle of *ecologization* of education means turning to the natural, inherent to man, methods, means and canals of information perception without intensive exploitation of discursive-logical left-hemispheric thinking.

2. The principle of *systemity* of education means structuring of pedagogical activity on the base of general system scientific theories of development of nature, society, thinking. It implies the functional systemity but not its theoretical model.

3. The principle of *harmonization* of education means using of technologies and methodologies of holistic perception of world and thinking that plunge the learners into the harmony of world right during the lessons.

4. The principle of *humanization* means the transition from technocratic model of education to socio-cultural one that opens the possibilities for a wide humanitarian training of the learners. Humanization by itself does not protect the person from

marginalization[2], but it is a reliable "bridge" to the holistic education in the transition period.

5. The principle of *instrumentality* of education means possibility to apply one's knowledge, skills and attainments in all spheres of human life: personal, interpersonal, social, universal. The last sphere of life means not alienation of education from nature and society but the condition of its being in nature-society. This is **the principle of *being included into universality***.

6. The principle of personality-oriented education means freedom to choose forms, directions and means of education.

7. The principle of leading (compared with other branches) **development** of the educational branch means being focused on the up-to-date achievements of science and psychological/pedagogical practice.

8. The principle of cognition simplicity, being a specifically human way of securing life, underlies the education simplicity principle.

9. The principle of efficiency of education means constructing and implementation of technologies and methods of teaching which do not exceed the necessary social costs and lead to economy of time, efforts, funds, and finances.

10. The Principle of Potential Intellectual Safety. The Principle of Potential Intellectual Safety is not just a new principle of pedagogy. This is a newly proposed principle originating in the depths of holistic, healthy human consciousness. (We have already used the term "ecological consciousness" regarding the holistic consciousness.)

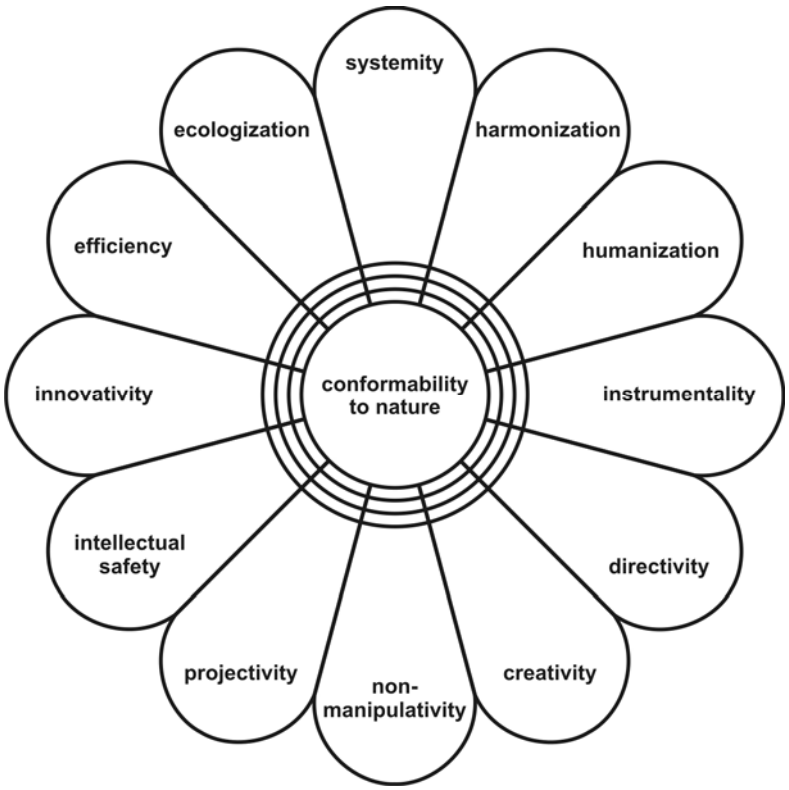
Potential Intellectual Safety is based on the general-system principles, the most important of which are

— conformability to nature;

— self-organization of information;

— invariance.

[2] Marginal person is a person devoid of any possibility of self-realization in a certain period of personal or social development.



Scheme 6

Working with natural symbols and images is potentially safe. Let us remember that man learned to listen to the nature and his surroundings choosing for himself natural examples. The first ecological notions of man manifested themselves in the phenomenon of the totem. As a rule, a species standing on the top of the ecological pyramid of the region's ecosystem was chosen for a totem. The feeling of being connected with (and protected by) the totem, the wish to imitate it gave man the feeling of being "linked up" and united with the Universe, as well as with the surrounding world. When learning from the totem, man enabled all his sense organs.

Understanding culture as the second nature or symbolic Universe (Y. Lotman), we introduce its basic conception, **symbol**, into education on the conscious level (as opposed to the unconscious one), precisely as a *symbol* and not as an *example* (a mere illustration of what was said by the teacher). We propose to change the order of the summands. This act changes a great deal, since information perception is not mathematics where the order of the summands does not affect the sum. Perception is a complex psychophysical process.

We propose symbol to take the leading place in the educational process. We propose cultural examples and bio-adequate symbols for embodiment of the individual mentality.

Meanwhile, the students are suggested to interpret them "right away" by themselves and not after the teacher. Thereby forming of "participating thought" as individual experience of knowledge (M. Bakhtin) comes into the first place. **Provoking the genesis of "participating thought", we cultivate thought on the basis of natural and cultural ("the second nature") examples. This is the essence of the Principle of Potential Intellectual Safety.** That means natural safety from overloads and alien information unnecessary to an individual, pressure from the pedagogues and authorities; safety from wrong moves and paths, from running to extremes of morbid ardors and sectarianism. Thus, natural symbols in the process of education are the first guarantee of natural safety of thinking. The second component of safety is **the utmost potential of an individual**. The latter is understood as **a totality of the spiritual, intellectual and physical abilities of man**. In wide extent, the proposed method of pedagogic and educational activities is aimed at opening the individual's "Upper Me."

Remember who you dreamed to become when you were a child. Reconstruct that image of yourself which seemed desired and pleasurable to you. Remember the feelings that filled your heart and your soul when you wanted to become your ideal. Reconstruct the powerful positive wish to move faster, more effectively towards the desired aim. Perhaps you have achieved a lot while moving in that direction. But let us take a look at your childhood dream from the viewpoint of the principles of noospheric education. Is there a single principle among the ten enumerated which wouldn't fit when characterizing a child's dream? In dreams, man is always personality-oriented, ahead of time; in dreams, he simply and efficiently, humanely and harmoniously, systemically and ecologically constructs models of his needs and capacities on the basis of his potential (unrevealed) spiritual, intellectual and physical abilities. The dream itself as a model of the future is an important instrument, a generator of energy for its own attainment. Of course, dreams change, and models become more complex. However, projective thinking[3] is the general code for solving vital activity problems. Possessing knowledge of this code, as well as conscious usage of it in pedagogy and education, we call **conformability to nature** or bio-adequacy of education on the stage of noospheric transition.

3 Gromyko Y. V. *Projective Consciousness*. M., 1998.

Chapter 3
NOOSPHERIC EDUCATION: THE THEORY

> We must get a new standpoint on the world that has to agree with everything already known but differ in some points with our ideas; otherwise it will not be interesting. This difference has to conform to the processes taking place in nature. If you manage to find the standpoint that corresponds with everything already known but brings to the other results in some ambiguous spheres then you will make a great discovery.
>
> *Feynman*

The 20th century not only will remain in history as the century of rationalism triumph, but will also initiate systematic conceptual criticism of traditional ideas as to the omnipotence of science and technology as embodied rationality and reasonableness. In the 20th century not less than 500 natural sciences and 300 humanities as well as created by them techniques and technologies proclaimed their orientation to the protection of various interests of man in nature and society.

However, the crisis of science is obvious. Its external manifestation is the growing interest to magic, religion, theosophy, mysticism, and occultism. Bookshop shelves are overlade with literature of the kind. Criticism of science is also specified by assignment of its blame for ecological crisis that humanity and civilization in whole are faced with. Against the background of scientific-and-technical progress humanity has survived two world wars, atomic bombardments, and genocide; besides, constant local wars are taking place, new diseases appear, ecological problems are aggravating. This gives rise to doubt absolute progressiveness of scientific-and-technical way of development and to criticize science as irreplaceable and exclusive factor of social progress. The crisis in science is connected with the usage of linear logic that is not able to solve multivariate problems of present development. Paradoxical situation of progress-regress has emerged that is known in general-system theory as **quantigenesis** — "ascending" as to the fixed signs scientific development has not brought the society to the real progress. **Dicursive-logical thinking that was absolutized by science, man and society turned out to be a crisis of thinking** that was manifested in global problems of humanity stated by the Roman Club in 1970—s: thermonuclear, resource, ecological, provision, raw material, and population problems.

This situation of civilization crisis of the end of 20 century is presented as a dead-ended one. But this is only one of the possible variants of natural historical development that was chosen by humanity as early as 4th century BC[4].

By the end of the 20th century this variation of mankind development based on discursive-logical thinking had fulfilled itself. The resources of this historical way have been depleted: the extensive development of mankind in the direction of using only discursive-logical potential of thinking has no future. This allows analyzing the traversed way, learning lessons from the discursive-logical development and choosing such and such models of future development.

The mankind can consider the models of historical past and present and take actions in spatially projected mode of future choice. The base of this choice is to prefer the way of anthropospheric and biosheric to noospheric development or not. The same problem has to be solved by present science.

Let us turn to the studies on history of science conducted by academician I. V. Chernikova[5] (Russian Academy of Natural Sciences). She points that the present state of science often considered "critical" must be examined from "inside" in order to realize the causes and the character of the crisis. There are at least **three rationality concepts** in the scientific community: **classical, neoclassical and postclassical**. These concepts appeared not at the same time: the classical concept appeared in the 16—17th centuries, the neoclassical one — in the 19th century, the postclassical one — in the second half of the 20th century. Today they go together, though their scientific criteria differ. Such criteria of classical science as objectivity, universalism of scientific laws, aiming at the truth, are considerably weakened if not rejected in postclassical science. Classical science appeared in the conditions of struggling with scholastic authoritarian middle-aged thinking. The science of the 16—18th centuries was primarily that of searching for the right method. Measurement became the method. Science was based on the conviction that nature could be reflected in scientific picture of the world, setting the quantified reality. Scientific knowledge was interpreted as the knowledge of object, the subject being distanced from the object.

In the 19th century, the concept of classical knowledge was called in question. Is knowledge indeed the exact copy of the reality, and can the scientific picture of the world really exist? These and other questions emerged, and their analysis brought to the idea that the same reality could be described in different theories and there was more

4 Aristotle's *Analytika* contained a description of the first known logical system as a method of proving the truth. The ascent of the discursive-logical thinking started from this work.

5 Chernikova I. V. *Evolution of the Scientific Nature in the West European Culture*. Tomsk, 1997.

than one method of scientific work. Methods depend on history: first, they are object-dependent; second, methodology itself is not connected with the object only. While examining the micro-world, scientists was found out that the adequate knowledge could be obtained not when we drew our attention away from the subject and conditions of learning but when we took them into consideration. As W. Heisenberg noted, the way the nature answers our questions depends on the way we ask them. If we put a question to electron as a particle, it will give us an answer as a particle. If we question it as a wave, it will answer as a wave. Natural science does not just describe and explain nature; it is a part of our mutual interaction.

Non-classical physics is not all about the new methodology taking into consideration the conditions of perception. The concept of the physical reality as such has changed: it is no longer just a homogeneous isotropic space, but rather a network of interrelated events.

The reality of post non-classical science (that of the second half of the 20th century) is a network of interrelations involving man — and not only by perceptual conditions. As to the anthropic principle, man's implication into the structure and evolution of the Universe appears to be much deeper. The objects of post-non-classical science are a complex of such man-involving natural aggregates as the biosphere and noosphere[6], which, in its turn, leads to "man-dimensionality" as a characteristic pertaining to the objects post non-classical science. It is manifested in the self-consciousness of scientists — if not as non-objectivism (being the dominant of scientific research), then, at least, as revision of the very conception of objectivism. Isn't it the way one should understand G. Skalimovski's opinion about non-existence of reality "by itself" (to which our reason pays visits) because the reality is formed by man or V. Vernadsky's famous statement about "everywhereness" of life?

Whereas in the Cartesian-Newtonian picture of the world objectivism was achieved at the expense of elimination of the subject, in the now-forming worldview called "holistic vision" objectivism comprises subjectivity. As V. V. Nalimov puts it, "being scientific is being metaphoric."

Formation of classical science was connected with non-anthropocentrism (Copernicus principle as the ground of classical science).

Being displaced from the center of Universe in an ontological sense, man became its center gnosiologically (rationalized reality where losses are compensated for by

[6] Professor of Tomsk State University, I. V. Chernikova, PhD, is the author of a monograph about noosphere science (published 2000).

acquisitions, reason is glorified, and nature depreciated). At present, in the context of ecological studies which follow the co-evolutional strategy and synergetic paradigm, man again becomes involved in the intra-scientific context, In the scientific picture of world, there is no return to anthropocentrism (man is no more the center of the Universe, neither ontologically nor gnosiologically) and humanization of science. Realization of the world's anthropomorphism is taking place: "the way the world is, man is; the way man is, the world is." M. Mamardashvili expresses this thought in the following way: "The Universe will be described by those who will be able to question and describe themselves." Having noted this tendency in science, W. Heisenberg said that "the deeper we peer into the Universe, the more we see man in it."

Science, being spoken of in the superlative and singular by the society, always influences the present state of education. Its usual position is to follow the progress of science. But is it possible to move anywhere forward in the present situation of "stratified" science? The great Einstein's words come to mind: "It would be a wonder indeed if we could discover the general basis of all sciences: physics, biology, psychology, sociology..."

The ideas of V. I. Vernadsky, A. Teilhard de Chardin, and Shri Aurobindo became significant steps in search for the common backbone fundamentals of the entire Universe. An optimistic tendency in the development of sciences in the end of the 20th century is the ever-intensifying search for a common basis for convergence of all sciences, which is clearly seen in the works of I. Prigogine, N. N. Moiseyev, V. V. Woolf, D. Bohm, R. Sheldrake, K. Pribram, R. Sperry, Yu. Urmantsev, B. Astafyev, P. and O. Kuznetsov, B. Bolshakov, and others. The persistently resonating idea found in the works of the abovementioned scientists is that there is no such thing as "stratified" science. There are, rather, various levels, or segments, of one science. "Any generalization is a hypothesis" (Poincare); so, we clearly understand the conditional character of the term "theory." Although under "theory" we understand a system of axioms, definitions and laws with the help of which the most part of natural phenomena can be consistently described, that is deduced mathematically. This is the reason why we do not touch upon certain special hypotheses (physical or mathematical) — for instance, those concerning the origin of the Universe and life. The backbone regularities of Nature, Man and Society — that is the key to the vital problem: *What is to be taught*? The answer is: functional knowledge. It is claimed by society, time, and ecology.

The conceptual system developed by the abovementioned scientists could be characterized as **Universal evolutionism.** The basis of these synthesizing hypotheses

is an idea of evolution of the Universe as a developing complex system of Nature in which it realizes itself through Man of Sense ascending the steps of Personality evolution. The holistic picture of the Universe seems to be an invariant fundamentality manifesting itself through the laws of energy inversion and information exchange by means of the resonance mechanism.

The importance of the present theoretical synthesis is accentuated by:

— realization of man's place and role in the system "Man — Nature — Society";

— realization of man's responsibility for conceptual difficulties and "separated knowledge";

— realization of the fact that in the past the science overestimated the value and role of logical (rational) thinking and disregarded the study of the other, no less important, ways of self-cognition;

— moving from one-sided conceptual models of man to "holistic thinking";

— realization of holistic forms of man's activity (in which moral principles are starting to play the fundamental role);

— reference to practical methods of natural development in combination with science;

— overcoming the attitudes relying on science exclusively;

— overcoming the cognitive psychological barrier that separates the generally accessible discursive-logical and other ways of world perception — intuitive-sensory, holistic-dynamic, etc. — more complex as to accessibility, "latent" because of natural historical reasons.

The general tendency of synthesis of natural sciences and liberal arts is developing in the direction of an inevitable turn towards previously inaccessible ways of man's perception as reserves for a new phase of man's ascending to himself and Nature.

— changes in the quality of man's thinking that are indicative of "categorial burst"— emergence of new categories reflecting the new vision of real (material and ideal) systems, birth of new non-traditional areas of human study (socio-natural history, socionics, holodynamics, evolutionary ecology, synergetics, psycholinguistics, etc.).

Today, we are guided not by "pure science" but by the knowledge that grants theoretical and practical appreciation of the "Man—Nature—Society" system.

Transition to the noospheric thinking, thereby, is actualized through various fields of theoretical and practical search.

Among the abovementioned approaches, the two are the most universal.

1. <u>The General-system theory of development of nature, society and thinking</u> by Yu. A. Urmantsev. This theory of functional Universe systemacy appeared in 1970s in Russia (Moscow) and is a theory of general mechanisms of nature, society and evolution of thinking[7].

The laws, categories, etc., previously well-studied and tested in the special fields of science theories, are synthesized on the base of the General System Theory. Therefore, the general-system theory of development of nature, society and thinking is called **evolutionics**.

Its basic concepts are object-system (e. g. man) and the system of objects of the same kind (e. g. society).

The fundamental law found in various manifestations of evolution is the systemacy law: "Any object is an object-system and any object-system belongs at least to one system of objects of the same kind. At the same time, there are the "primary" elements of the system; relations of unity; relationship between the elements that relatively limit the relations of unity; unique system-developing algorithms.

Synthesizing the achievements of mathematics, physics, biology, chemistry, geology, mineralogy, geography, psychology and other sciences, evolutionics suggests considering any system (object-system or system of objects) from the viewpoint of the fundamental law of evolutionics — **the law of systemic transformations.** According to this law, a system evolves due to its relationship with the environment under the fixed laws (mathematically proved) via of one of the seven — and only seven — transformations (changes): in quantity; in quality; in relations; in quantity and quality; in quantity and relations; in quality and relations; in quantity, quality and relations of all or some of its "primary" elements.

According to evolutionics, there are only four fundamental types of evolutionary/non-evolutionary transformations:

— identical (stasigenetic);

— quantitative (quantigenetic);

— qualitative (qualigenetic);

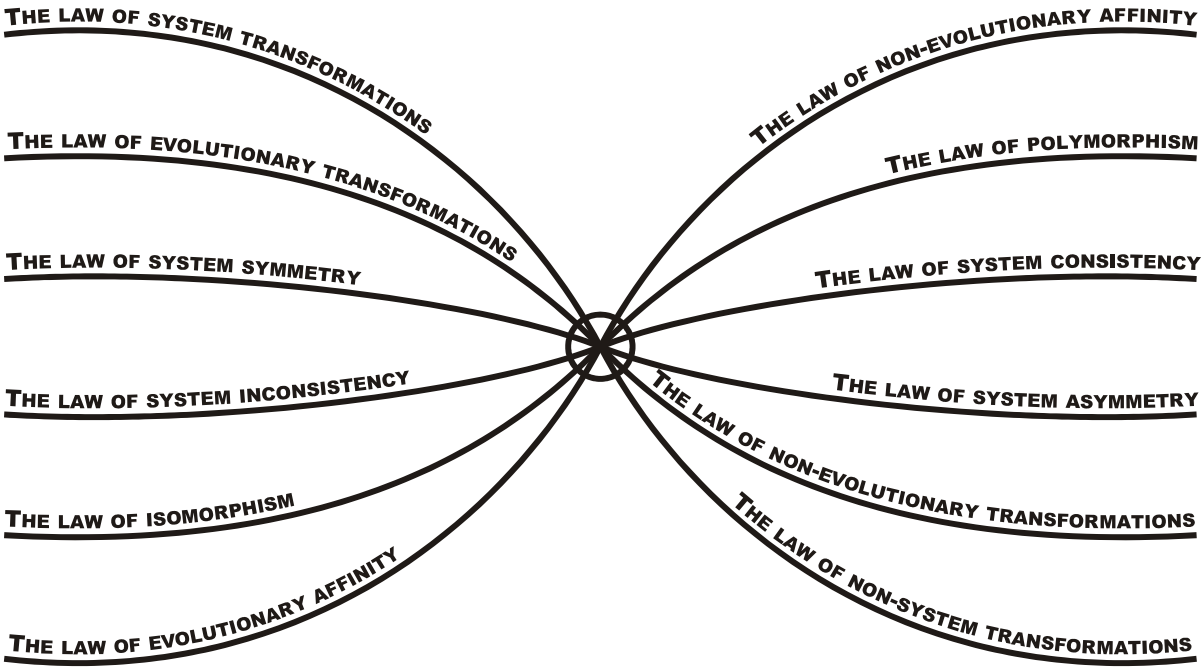
— relative (isogenetic).

They are able to give 11 derivative transformations.

Evolutionics deals with 12 laws concerning the forms of changes, forms of evolution, forms of matter conservation, character of system transformations, sources of

[7] In the past, studying natural regularities did not imply thinking because of the natural difficulties of its studying.

development, variety of interaction laws, types of evolution. To see it more clearly, let us consider *Scheme 7*.



Scheme 7

Scheme 7 demonstrates the interrelation of object-system and system of objects, as well as their subjection to the universal evolutionary principles and laws.

The general character of the principle of unity in nature, society and man can easily be projected to any object-systems and systems of objects (material and ideal) — even when they are considered in one single aspect (physical, biological, mathematical, psychological, social, etc.)[8]. The terminology of evolutionics can be substituted for special terminology.

Generally, the philosophic (systemic) character of evolutionics is convergence of modern scientific achievements of the late 20th century — which gives us the whole picture of the uniform principles and mechanisms of Universe-Man-Society development.

At this stage, evolution is not only the most universal scientific conception. It can also be considered as a serious excuse for the long history of "separation" and "dissection" of reality and rejecting the ideal by science. In evolutionics, the notion of systemic relations, their quality and quantity is given in **statics** and does not point to the mechanisms of transformations, changes, and conversions.

8 A linguistic example is considered in the chapter "Noospheric education methodology."

II. **Synergetics** is a successor to the ideas long developed by cybernetics, general system theory (GST), and evolutionics. The subject of evolutionics and GST is system statics, whereas the subject of synergetics is system dynamics. The objects of synergetics are always open systems, i.e., those interchanging with matter, energy, and information with the environment, or "dispersing" themselves over it. The relationship of these systems with the environment is described by nonlinear equations, therefore, this kind of system is also called "nonlinear" one.

The behavior of a nonlinear system is characterized by various modes — e.g., escalation mode. The modes of the kind always underlie catastrophic events of the process, possibilities of evolutionary disasters. The behavior of the system in bifurcation points is unpredictable (as it was shown by I. Prigogine), but it is well described with nonlinear equations in the period between the points of bifurcation. One of the goals of nonlinear dynamics is the search for universal laws of self-organization, universal regularities in the behavior of nonlinear systems. "Synergetics reached a new level of understanding the organization of nature. While the classical science looked at the world through 'linear' glasses, synergetics does it through nonlinear ones. The real world is nonlinear, and science is now grown-up enough to adopt nonlinear theories. Synergetics opens a new stage of natural unity: universality of self-organization of various systems: living, non-living, social, cognitive..."[9]

So, nonlinear dynamics is an attempt to understand the unity of nature on a new, higher level. Does this interpretation of synergetics as the core of all postclassical science contradict the earlier made assertion about postclassical science rejecting universalism and objectivism? Defining the problem in this way, we obtain an opportunity of deeper comprehension of the features of postclassical science. There seems to be more than one type of objectivism and universalism.

Postclassical science rejects classical objectivism and universalism where objectivism was considered to be identical to objectivity (the habit of conceiving object by itself); but universalism was believed to be a rigorous scientific method that guaranteed obtaining the truth about the object. Synergetics considers that objectivity of scientific knowledge does not to suffer in case one ceases thinking with objects — mathematical theory and experimental interpretation will be enough. Thereby, not objects as such but only the metaphysical habit of thinking with objects disappears.

As to postclassical science, knowledge is related not only to the methods (tools) of learning but also to the value and goal structures of activities. At this stage of science

9 Chernikova I. V. *Evolution of Scientific Nature in the West European Culture*. Tomsk, 1997.

development, understanding the object is becoming even more difficult: first, the object sphere is widening at the expense of including objects of a new kind — i.e., self-organizing complex systems; second, the world of objects is radically changing at the expense of including "man-size" objects. We mean a new type of systematization of natural characteristics, which leads to man's penetrating the picture of the world not as a thing among other things, but as the backbone element, origin of all coordinates and any possible knowledge about the world.

The boundary between the subject and object is becoming relative, and the categories themselves form a system whose elements make sense only in interdependence (and system dependence) in whole. Such system could be an element of new philosophical anthropology having the prospects of returning to once lost spiritual unity of man and world.

"Postnonclassical science rejects universalism not because it does not claim to discover universal laws. New science has convinced us to realize that there is no complete universal description of many objects such as quantum-mechanical ones and complex natural complexes including man and so on. Post-nonclassical science is both immanent and pluralistic" (I. V. Chernikova).

I. Prigogine thinks that the real scientific understanding is just beginning to take shape. He believes the classical dilemma (either the science existing as new technological logos in aggravating opposition of man with the world or conceptual unity of man and the world) not to be topical today — not in the scientific, but rather in (extrinsic to it) irrational form — through mystics, parascience, or antiscience. According to Prigogine, the necessity of making such a choice today has fallen away since the changes occurring in the present science created a radically different situation. The man-dimension of the object of science, the fact that nature is starting to be considered not as "substance" (solid residue of quantification) but as a "being" (living and complex), results in science "fulfilling a certain universal mission concerning not only man-and-nature interaction but man-and-man interaction as well."

The brilliant examples of such research are *Wave Genetic Code* by P. Garyayev (Moscow, 1997), *The Fundamentals of the Universe: Creation, Genome and World Laws* by B. Astafyev (Moscow, 2002), *Psychology of Noospheric Development* by I. Shvanyova (Moscow, 2002).

The synergetic paradigm that is being formed in modern science can be estimated as a progress in thinking historically compared to Cartesian-Newtonian picture of the world, and some researchers consider it to be even more radical. Thus, T. Grigoryeva

states that “not so much the change of the paradigm is taking place (which is something that happened before) as the change of the movement vector: instead of watching the external object or subject, the point of concentration is shifting to the internal form, non-material world, the essence that is invisibly present (the Greeks called it “eidos”, the Chinese —“li”).” It means that scientific knowledge is expanding into the sphere of Spirit; the importance of this fact can scarcely be overestimated... In connection with synergetics, transition from dead to live, from substance to being is taking place... “Subject is becoming one with object, and everything is changing, physical and mathematical science is converging with ontological Justice and this brings it salvation...” (I. V. Chernikova)

Among the advances of modern science concentrating on internal forms and mechanisms of the changes in nature, man, and society, there is the appearance of the newest physical discipline — rhythmodynamics[10]. Its founder — Russian physicist Yu. N. Ivanov, a fellow of the Russian Academy of Natural Sciences — investigates phase-frequency vibrations as a mechanism of information transfer and morphogenesis[11]. This idea is correlated with the physical theory of the dynamics of the relict radiation[12]. It is the relict radiation in which all the information we are interested in is encoded. This idea is naturally coming from solving the paradoxes of the modern physics (discovery of the uncertainty and relativity principles).

Thereby, the emerging system of **noospheric science** can be conventionally presented as a pyramid of theoretical and practical trends leading up to synergetics. It is important to note that the source of the new knowledge for mankind was, is and will be the general infinite harmony of Nature. For obtaining that knowledge, creative intuition, experiment and theoretical generalization are to be used.

The present task for the specialists is to show the formation of modern science in the direction of **NOOSPHERIC SCIENCE,** through the difficulties and paradoxes of the science itself. But we confine ourselves to a certain retrospective dynamics of modern science in order to state a qualitatively new stage of the evolution of theoretical search of hypotheses and paradigms of the present. The necessity of transferring the search of the world unity through philosophy and science to the sphere of education is demanded by practice and needs of the human state of mind. Even if the picture of the world is not

[10] Rhythmodynamics is registered as a scientific school at the International Information — Intellectual Novelty Register, Reg. No EIW000198, 23.09.96.

[11] Ivanov Yu. N. *Rhythmodynamics*. M., 1998; *Frequency Field*, M., 1998; *Classical Mechanics as Interpreted by Rhythmodynamics*. M., 1998.

[12] I. M. Dmitrievsky is the author of *cosmodynamics* as a theory of the relict radiation dynamics.

stable and imperfectly proved, it nevertheless performs an important psycho-regulative and planning function.

Orthodox persons have always been (and will) be concerned about relative "incompleteness" of scientific picture of the world and impossibility of forming education process on this basis because "scientific cognition is one of the points of collective adjustment of thinking to facts" (P. Langevin).

Today, the knowledge that was the privilege of a small number of scientists fifty years ago is accessible to the most of the people on the planet — and this process will be perpetual. This entitles us to put the most recent and advanced theories explaining the integrity of the Universe into the center of the educational conception. The teachers and officials representing the educational system should not ignore the realities of life and make excuses with waiting for the "final" truth.

We live in the time when new knowledge about the world and process of cognition is coming into being. Besides the realization of this feature of the present stage, scientific and educational workers must realize that, with all the difficulties accompanying discovery of new truths while studying nature and society, much greater difficulties stand in the way of their admitting (J.-B. Lamarck). Flexibility of thinking and understanding it by those engaged in the sphere of education ensures faster collective comprehension of scientific knowledge. Here is the secret of the social, technological and cultural breakthrough to the future: the sphere of reason.

Chapter 4
THEORY OF KNOWLEDGE FROM THE VIEWPOINT OF MODERN SCIENCE AND PRACTICE

> To survive, we need a different way of thinking.
> *Einstein*

The theory of knowledge is the philosophical basis of science and education. Its subject is the multifaceted process of cognition — its possibilities and mechanisms, stages and forms, relationship with objective and subjective knowledge.

By the middle of the 20th century, the mankind had accumulated a great amount of experience and got ascertained in unlimited possibilities of cognition aimed both

"outwards" (research of the Universe, galaxies, space) and "inwards" (research of cells, molecules, atoms). **The actual problems** of the modern theory of knowledge are:

— the mechanisms of cognition and their correlation with the laws of the Universe (system laws and their dynamics);

— its relationship with knowledge about the subjective reality and interrelation with the objective reality;

— the mechanisms and stages of the process of cognition.

Now it is becoming more obvious that solving of the last mentioned problem will help throw light on the first two ones.

Historically, the theory of knowledge almost completely got under the power of neurophysiology, psychology, and the associated sciences. Concentration on the *mechanisms of cognition* naturally leads man to the world of subjective reality. We can ignore the consideration of the mechanisms and the nature of cognition but we cannot avoid the influence of the consequences of such imperfect thinking on all spheres of life. At present, the problem of the mechanisms of cognition is in the highlight of scientists and practitioners. It is the leading edge of science and practice, a "hot spot" of the polifurcation process in society and science, the point of estimation — what will the mankind's tomorrow be?

Here is the question: what ways of thinking, working, and developing education are to be chosen today so that we won't reap the fruits of our own ignorance tomorrow?

Man is responsible for the path the modern civilization will choose. And on the edge of this choice is Hamlet's everlasting question: "To be or not to be?"

In order "to be", man has to set aside inertia, overcome the difficult barrier of the old way of thinking and understanding, dismiss the illusion that everything is known about the cognition process and have the courage to say: I don't really know *how* I think.

Man is responsible for unawareness of his own nature, inability to realize that common words and senses can be a "barrier" for understanding the main point at the new round of learning.

Man is responsible for suggested conceptions and, of course, for the conceptual difficulties appearing during observation, measurement and postulation of propositions... He is responsible for the choice of the methodologies; he is also in charge of the transition from "potentiality" to "actuality" of his possibilities.

Let us consider some new viewpoints on cognition.

I. **The study of converging the processes** that occur in our consciousness and Universe does not have a long history. The idea that our thought is a "live hologram" was first verbalized in the 1970s by Dr. Karl Pribram, the famous Stanford University neurophysiologist (*Languages of the Brain*, 1971). According to K. Pribram, the mechanism of the "live hologram" appearance is projection of hologram to the human brain by means of signals possessing wave dynamics — much like the process of recording of a light beam wave field on a hologram plate.

In 1978 Roger Sperry won the Nobel Prize for his study of the processes in the human brain which account for the development of our mental image shapes. Mental image shapes possess the "cause potential", i.e., the power to cause events and influence them. They appear in our consciousness by means of bio-energetic impulses, whose character and properties are greatly determined by our abilities, our own "holography" of the entire wave picture of the Universe.

In 1980, English scientist David Bohm, famous for his works in quantum physics, published his book *Wholeness and the Implicate Order*. He showed that all we can see around us is nothing but three-dimensional projections of underlying objects. D. Bohm suggested that any perceived reality resembles a holographic picture — the object's "hologram." But in the basis of the world order there are even deeper laws of consciousness. They are the real cause of all external phenomena — very much like in a hologram, which, even being broken, will still reproduce the whole image in every fragment. D. Bohm describes this deeper level of reality as "inherent implicate order." Although not directly apparent, it is inherent to all things and unfolds constantly at the explicate level of being and in the laws of physical world.

In 1982, biologist Rupert Sheldrake (Cambridge) published a book called *A New Science of Life*. According to his conception of "morphogenetic fields", Sheldrake asserts that there are actual force fields which connect all the cells of the organism with each other. These fields can stretch outside the limits of the four-dimensional space-time continuum and exist in a sort of "hyperspace." They provide the link between cells and the whole organism. In fact, it is those fields that entirely direct the course of organic development. Sheldrake expressed the idea that all the organisms of the same kind are connected by the morphogenetic fields.

Sheldrake compared a biologist studying the functions of organisms with a television technician checking its work: he knows that television is not only about receiving; there are, as well, TV stations for transmitting signals.

At the end of the 1980s, Dr. Vernon Woolf generalized the previous studies and created a new theory of holodynamics. According to it, the unit of memory is a holodyne — a moving three-dimensional shape of the mental image. Woolf asserts that holodynes are identical with morphogenetic fields (Greek word "morphogenesis" means "creation of the shape"). Morphogenesis[13] is emergence and development of new organs and systems, both individually and historically (evolutionally). Biological science had to admit the existence of universal and pervasive links in living organisms. The whole organism is aware of every cell, and any cell is aware of the structure of the whole organism. Woolf's ideas are confirmed by the Noble laureate Ilya Prigogine's conception about the necessary conditions for creating order out of chaos. Prigogine asserts that evolution occurs in "essentially non-linear", non-equilibrium systems, being constantly impacted by a "flow of energy." Growing living organisms that are present in morphogenetic field completely satisfy the abovementioned conditions.

This, to the point, quite exact saying characterizes the process of evolution and search for a unified theory of knowledge — and, accordingly, **a unified theory of upbringing and education.**

Vernon Woolf's new ideas are supported by the conception of physicist Fred Alan Wolf about the existence of parallel worlds and universes beyond our space-time. Quite possibly, these worlds influence our morphogenetic fields, too.

In 1998, Russian physicist Yu. N. Ivanov, a fellow of the Russian Academy of Natural Sciences and International informatization Academy, published his work *Frequency Space* (Moscow). His hypothesis deserves consideration. "Frequency-wise, our metric space is spherical and is characterized by frequency width and range.

It is possible that in the frequency-space there are other frequency ranges with their own intelligent life."[14] "It seems that intuition gives talented people an expanded information space. A talented person is created by nature in such a way that his sense organs transcend the average world perception, and sometimes break the adjacent ranges of intelligent life. Such a person can see, feel, foreknow the events that occurred in other frequency ranges of life but have not reached our frequency world yet, and therefore have not yet become apparent."[15]

II. <u>The cognition process</u> must be considered as a process of interaction of the subject and object cognition, but not in the old linear way.

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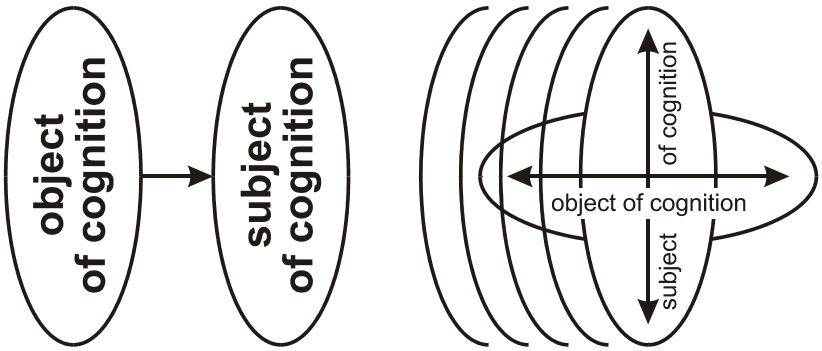
13 From the Greek *morphê* — shape and *genesis* — creation.
14 Ivanov, Yu. N. *Frequency Space*. M., 1998. P. 5.
15 Ibid., p. 8.



Scheme 8

And the scheme of cognition process is better to make spherical both in subjective and objective respects. If we take the hypothesis of frequency space into consideration then the directions of world perception should be represented in many frequency ranges (spaces, worlds) of both outer and inner world of man.

Learning of subjectivity is said to be self-actualization, and learning of objective reality— cognition. Similarly, the process of human learning in the Universe can be considered to be consciousness.

The purpose of this work is to describe the modern ideas about cognition, consciousness, and man's awareness in the Universe, and help the reader to use them as an instrument in education process.

The plan of our survey is as follows:

1. The stages of perception of information in the process of cognition;
2. The "unit" of thinking and the stages of its evolution in the process of cognition;
3. The mechanisms of perception of information.

I. **The stages of perception of information in the process of cognition**

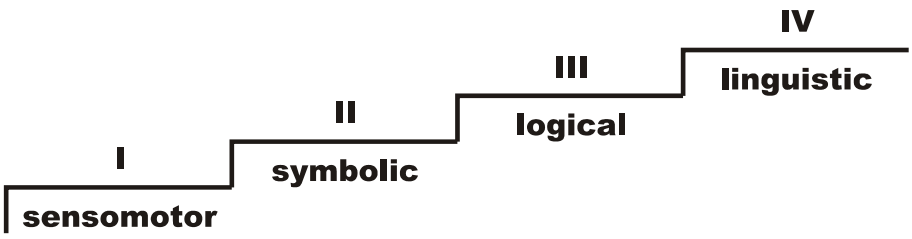
According to J. Piaget, any information inevitably goes through 4 phases in the process of cognition:

I sensomotor

II symbolic

III logical

IV linguistic



Scheme 9

Considering a child, a teenager, an adult or an elderly person in interaction with information, we can easily reveal these four stages. Once we asked a "provocative" question — "How do you think?" — to a simple countrywoman. And we got the answer perfectly fitting into the Piaget's scheme. — "At first, I feel thirsty (phase I), then I imagine a kettle (phase II), then I think about the sort of tea I want to drink, from what cup and how much (phase III), and then I say: let us make some tea." (phase IV)

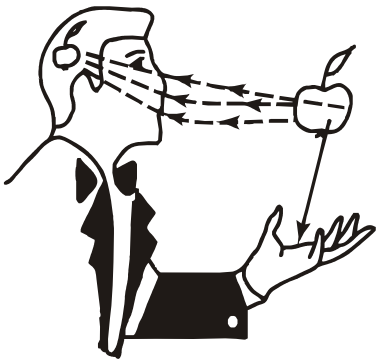
In the process of perception of information, the basic phase is phase I — sensomotor (sensory). From its viewpoint, body is a receptacle of many canals of perception. Hearing, sight, sense of touch, sense of smell, and taste are the 5 basic sensory canals that are easily fixed and expressed in human language. However, not all understand the wave mechanism of these canals of perception. At the present stage of scientific and practical development, **the true understanding of rhythmodynamic processes in the sphere of information is unavoidable.**

Based on the latest research of the wave nature of cognition, the body can be spoken of as a biological antenna, an original and universal natural locator whose purpose is perception of endless wave specters coming from different frequency ranges of the Universe. In this everyday work, the human body uses both known and unknown capabilities. The latter are generally called intuition. There have been several attempts to identify what it is. In his work, V. Binghe says: "Intuition is one of the types of psycho-physical work." In his physical research. V. A. Frolov (Electrogorsk Research Center, Pushchino) determines the components of intuition the number of which is much more than 5 sensor canals mentioned above. Physicist I. M. Dmitrievsky, a fellow of the Russian Academy of Natural Sciences, determines the mechanics of the intuitive perception of information as magnetic resonance mechanism.[16] Other researches worth mentioning here are dedicated to the influence of electromagnetic fields[17] on different systems and human living tissues made by G. Brankov, S. Grozdev, and others.

[16] Dmitrievsky I. M. // Polignosis Journal. Moscow, 2001, #1.
[17] Journal of Biomechanics. Perm, 1997. #1—2, p. 41—42.

Our purpose is **not** to study and determine what exactly the present day specialists should to do. We just mentioned the main trends of search and concentrated on human body as a receiver of information signals. The human brain is known to receive information signals not directly from the environment or inner world of man but **indirectly,** i.e., by means of body mechanisms. And these signals are already recoded before entering the brain. Returning to the Piaget scheme, we can see that:

perception phase I deals with the human body that receives signals and, via its natural canals (auditory, visual, taste, olfactory, and others), delivers information signals to the brain. Before entering the brain, sensory signals are decoded into neurophysiologic (electrical) impulses.



Scheme 10

At phase II (according to Piaget), the human brain generates symbol analogs of the perceived, i.e., reproduces information in its own language. These transformed signals, sent and perceived by the brain, are called **symbols**.

Symbols are created on analog principle and are perceived by us as holographic models of the objective and subjective reality, with all their properties and capabilities. It is important to distinctly understand that these two models are created simultaneously. The right cerebral hemisphere is the seat of the creative-perceptional model with taste, color, smell, and spatial relations. Here, a sort of "living" of the model occurs. The left cerebral hemisphere contains the so called discursive-logical model, in which sizes, correlation of the parts, shape, weight, rate, etc. (that is all we got used such and such to measure, study and register) are fixated.

At this moment, a person consciously or unconsciously makes a choice which model is easier for him or her to "communicate" with. Here is where people with logical and sensory perception (with "left-hemispheric" and "right-hemispheric" types of thinking) come from. Here is the **SOURCE** of either one-sided thinking (at times, very strong and powerful) or holistic thinking. It is the person's choice which one to choose to choose.

At phase III, denoting information interaction, the processing work and comparison of the generated symbol with personal experience are taking place. Cross-correlation operations (according to K. Pribram) underlie the thinking operations, i.e., ways of the available Images correlations.[18] According to the Pribram's hypothesis, a thought is a search for reduction of uncertainty with the help of holographic memory distribution, i.e., a tendency to get the necessary information[19] by simplification.

At the same time, **the logical phase** may include a similar search via structural, logical, and cause-and-effect relations. These operations are analytical; besides, the power of thinking while solving the problems seems to consist in its ability to recur to those structural images that provide the function of reiteration...[20]

The intuitive-sensory perception appears to be faster (almost instant) because it occurs at the second phase, previous to the moment of generating a holographic sensory image — symbol.

Phase IV — linguistic — comes at the moment of realization and accommodation of the initially received information. Giving a name to a subject, object or phenomenon occurs at the moment of cognition, its own identification being realized via its holographic analog.

2. **An information unit** in the process of cognition is formed strictly individually.

It is obvious that there cannot be any "units", "blocks", or "quanta" of information in Nature. Nature is indivisible. The concept "unit of information" was introduced only for the convenience of measuring and dosing cognition. That is why man as the object of nature **cannot** be presented from "some" point of view. Man is an exclusively integral, inseparable and undoubtedly holistic system. When being looked at from one "viewpoint" only, man turns either into an animal, impalpable Spirit, or corpse. Nevertheless, it is important to realize exactly the forms in which information comes, functions, and is stored in human memory.

Symbols, as we stated above, are images that appear as holographic models of the world. At the present stage of development of science and practice, these holographic analogs of the Universe are called mental images, notion images, thought-forms, or holodynes. We prefer to use the first term.

Mental image is not a stamp of a subject in mind, and not a flashed idea. It is a holistic image of subject (phenomenon) individually perceived by all sensory organs.

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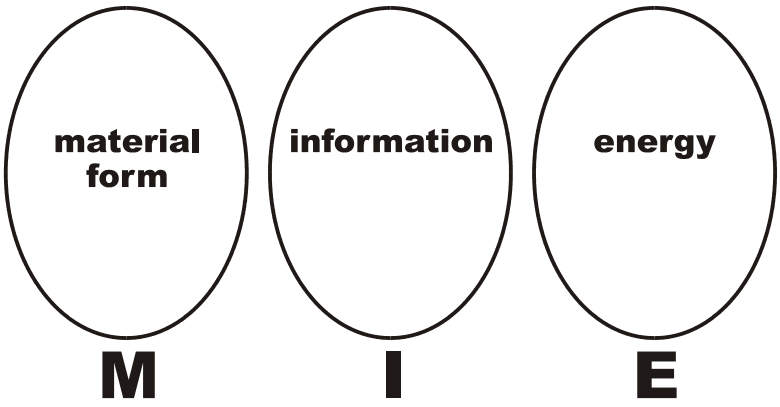
18 Pribram, K. *Languages of the Brain*... P. 406.
19 Ibid.
20 Ibid.

Perception is the function of the entire body, all canals of perception. Perceiving an object in such a multifaceted way, the subject preserves a multidimensional mental image in his experience, his memory. To verify this statement is easy. What images come to your brain when you hear or read the words “lily of the valley”? That same moment, you see the elegance of its form, smell its fragrance, feel like touching its leaves. You are likely to remember the sounds accompanying that place, and so on. You have the absolute feeling of being present in that unique situation when you enjoyed this beautiful flower in full blossom. We excited your mental image of the lily of the valley. And here is a “book of our childhood.”

Of course, it does not have those qualities of the lily of the valley — the smell and elegance of forms. But, not knowing you and your childhood, haven’t we excited by this single keyword your personal feeling that is connected with that book — appearance, color, smell, something else that was connected with the book and its reading. It might be the warmth and care of your mother or granny, your first surprise at the word, idea, etc. The book of your childhood — the one over which you calmed down expecting a wonder — excites the memory of all your essence; you are literally overwhelmed by the wave of recollections, physically and psychologically familiar and pleasant. The keyword excites your mental image. When you analyze your other knowledge, thoughts, images of your memory, you will be convinced that all of them are your mental images. The personal experience is imprinted into mental images. And the more canals of perception are engaged at the moment of meeting a subject or phenomenon, the stronger the mental image is, the easier it is to excite.

What are the components of the mental image?



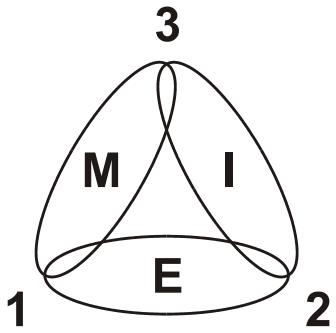
Scheme 11

M — material form (understood as a holographic model with color, smell, taste and sound);

E — energy of individual relation, perception, evaluation;

I — information perceived by a person.

Thus, the three components — Form, Energy, and Information — are represented in unity. It would be probably more correct to show their interaction the other way, as all these three components are not separated but intertwined in the mental image and exist only in interaction.



Scheme 12

The fact worth attention is that the relations of Matter and Energy (1) are determined by the physical law $E=mc^2$. There are two other laws determining the relations of Energy and Information (2), Matter and Information (3).

It is necessary to specify why it is so important to turn to the physical nature of matter, energy, and mind. The sources of human mental and physical activity are deeply rooted in natural relations. They cannot be studied in isolation from their means of expression considered in dynamics, but the character and sources of the psyche are in the area of uncertainty until they appear in psychological or mental processes. J. Piaget wrote: “The roots of logical operations are deeper than those of linguistic relations.” In these depths, the common ideas about matter, energy, information, substance, space, and time become pointless or work only in separate areas of understanding.

The structure of a mental image cannot be studied within the bounds of the four known fields of physical world.

The energy of a mental image is not thermal and cannot be described with the help of the classical laws of thermodynamics.

The main characteristics of mental image as it is obvious from the above cannot be understood in usual for us scientific ideas that indicates **inevitability of science going into** a new dimension of space-time, matter, and energy.

The ways of appearance of mental images

According to V. Woolf, mental images can appear in four ways.

1. As a result of perception of the reality, its images are transformed into mental by the five human senses.

2. With the help of imagination, which transforms, recreates, and devises new mental images voluntarily.

3. Genetically: the majority of the mental images forming the body, instincts, and many other characteristics of the individuality, are inherited.

4. From other frequency-spaces: information comes from there, but our sensory organs and devices cannot detect it; only people with the extended range of perception are able to obtain it. This information cannot be imagined or acquired in the range of usual knowledge or current experience. For the most of people, this point is the most difficult to grasp. We refer the reader to the books by Yu. N. Ivanov (*Frequency Space*. Moscow, 1998) and V. Woolf (*Holodynamics*. Moscow, 1995).

The basic characteristics of mental images are studied by the Noble laureate, American psychologist from California and foreign fellow (since 1983) of the Russian Academy of Sciences Rodger Sperry[21]. Later on, they were described by a foreign fellow of the Russian Academy of Natural Sciences, American physicist and psychologist Vernon Woolf[22].

1. Mental images are multi-dimensional and holographic. Imagine your friend, your house, your garden, and make sure that you can easily recollect in your imagination the dimensions, sizes, colors, smells, sounds, feelings that are typical for the real pre-images of your notions.

2. Mental images are mobile. Imagine your friend coming into (or out of) the house or garden. You can easily be certain that you are able to control the mental image voluntarily.

3. Mental images are easily transformed and changed. Imagine a winter garden. If you like it, you can see a spring blooming garden or go there in autumn to regale yourself with ripe fruit.

4. Mental images are morphogenetic, i.e., they are able to produce similar mental images. It is enough to see, say or hear, for instance, a word "apple" for your holographic analog of an apple to appear in your imagination.

5. Mental images are interminably stored and awaken by any "key" (taste, smell, word, shape, touch). Can you imagine yourself being a first grader? And do you

[21] Sperry, R. *Mind and Moral Priorities*. San Diego, 1983.
[22] Woolf, V. *Holodynamics*. New York, 1989.

remember the taste of the most delicious ice-cream? Or the first time you felt you were happy? How old were you then? For how many years have these mental images been stored in your memory without disturbing (really disturbing?) you?

6. Mental images are created and transformed by the analogy principle. Imagine a friend of Mr. X. Is it difficult? You have never seen Mr. X and his friend. You have no analog for these mental images. Nevertheless, you can easily imagine your friend.

7. Mental images in their development go through six natural stages of growth:

I. Physical: You feel intensified heart beating and attraction to a person.

II. Personal: You realize that you have fallen in love.

III. Interpersonal: You aspire to communicate with this person and share this feeling with him.

IV. Social: You realize that you are ready to do something for him and want your friends and family to know about your love.

V. Fundamental: Love teaches you and enriches your life experience; it becomes one of your principles.

VI. Universal: You want your love to be spread to all spheres of life. Being a unit of the Universe, you become aware of its love.

8. Mental images can transform either in the descending or ascending harmonic current: a friend can become an enemy and vice versa (a loved person can become unloved one; although the person is the same, our mental images about him or her can vary).

9. Mental images can vary in any succession: changes of the form cause changes in information and energy, and vice versa.

10. Mental images are transformed by means of the wave resonance mechanism. This point is described below.

Wave resonance mechanism

Mental images are formed by means of the wave resonance:

— Light waves carry information about the shape, color, volume, movement of objects and are perceived by visual analyzer working as a light wave receptor. Then (almost immediately!) information is transmitted to the brain by means of similar wave processes.

— Sound waves are perceived by the auditory canal and then sent to the brain, forming on their way a wave transmission of a signal.

— The olfactory canal perceives incoming smells (much like coming waves) and sends the information to the brain.

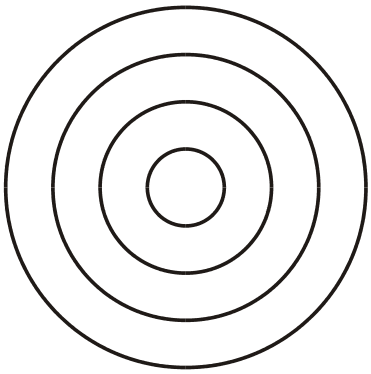
— The taste receptors, after getting in contact with food and drinks, perceive and send information in a wavelike way.

— Tactile sensations (perception of the environment) come and are read by the brain as impulses of a certain frequency.

— Biorhythms are transmitted and perceived by living objects as phase-frequency vibrations, almost not detected by ordinary people.

In our description, the mentioned six sensory canals that help man perceive the environment and work according to the principles of wave resonance, actually look like physical waves, propagated by a source and excited on their way through particular canals (environment) of perception.

However, the notions of waves "go far beyond the scope of physics, literally permeating chemistry, biology, biophysics, astronomy, informatics, medicine, and psychology."[23]



Scheme 13

The words of the founder of rhythmodynamics, a fellow of Russian Academy of Natural Sciences and International Academy of informatization, push forward to think about the extreme variety of the wave processes inside the human body, brain and mind. But the present level of science allows us to trace "the rhythmodynamic mechanism of the associated processes of movement"[24], enabling us to build a uniform model of their description. The newest area of rhythmodynamics is a wave picture of the world in which the discreteness of matter is interpreted as a rhythmic process of wave bursts with periodicity 2π.

[23] Ivanov, Yu. N. *Rhythmodynamics*. P. 7.
[24] Ibid., p. 8.

Reappraisal of the nature of movement, energy, and information from the point of rhythmodynamics makes it possible to find a new approach to understanding of perception process — transmitting — processing of information within the framework of the cognition process. Let us have a look at the known concepts from this point.

1. Cognition is a process of reception-transmission and processing by man information from outer and inner world.

2. Information is transmitted and perceived by means of phase-frequency vibrations (wave process).

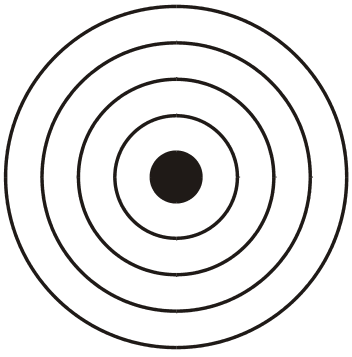
3. The Universe and inner world of man are provided with the single rhythmodynamic mechanism of signal reception-transition, and the signals can be transformed: physical—chemical—biorhythmic—mental...

4. For cognition of the world to be put into practice, it is necessary to act in the modes, technologies, and methods of rhythmodynamics of the Universe.

5. For successful cognition to be put into practice, it is necessary to realize the methodical principle of non-breaching the human body and brain biorhythm harmony. We call this initial principle the principle of **Ethical** (here, it is also ecological) **imperative.**

6. In this position, the call “make no harm” to nature brings together and ontologically equalizes the **ethics and ecology of cognition.**

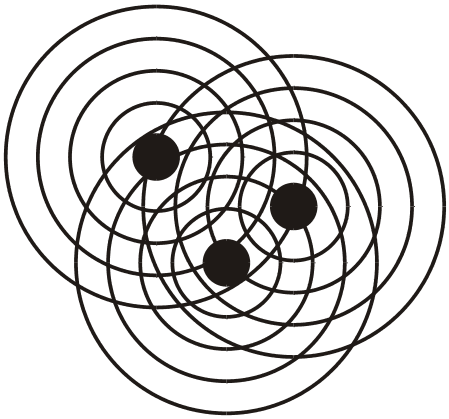
7. All mental images are oscillators (sources of phase-frequency vibrations).



Scheme 14

8. The arrival of any information to the canals of perception in the process of cognition excites the corresponding wave process by means of which the information is transmitted to the brain.

9. Overlapping of wave pictures coming from the different canals of perception to the brain creates an interferential picture of the perceived object as its holographic image — model—symbol.



Scheme 15

10. The resulting holographic model, being accompanied by corresponding individual feeling of it (coming through, accommodating), becomes a **mental image** — an individual holographic unit of thinking. It has its own form, information, energy, cause-effect potential, possibilities of development and transformation.

11. The process of cognition includes numerous cross-correlations of mental images— comparing of new mental image with those that are already present in individual experience.

12. Operations of movement and cross-correlation with mental images in total make up the essence of thinking process.

13. The purpose of thinking process is search for uncertainty minimization (simplification of new mental images tending to compare them with already known ones).

14. Most often, in the process of cognition the search of structural and contextual analogs among the mental images available from the experience occurs.

15. The power of thinking is in the possibility of repeated recurrence to any mental images that clearly provide the recurrence.

16. Solving of the problem in the process of cognition begins with the feeling of abeyance; comparison of mental images occurs in the course of cognition. The result is felt in the process of matching of the available mental images.

17. Solving of the problem via cross-correlation of mental images will continue until the moment the result is found.

18. The living system (a person) itself feels and signals about sufficiency of the result in case its treatment is right (natural system).

19. Arrival of new mental images influences development and transformations of the already available ones.

20. Mental images appear and pass the corresponding stages of development according to the principles of self-organization of open systems.

21. Mental images as open systems interact with their bearer leading to particular changes in the person's life.

22. Both the body and brain (left and right cerebral hemispheres) are equally involved in the process of cognition.

23. Changes and development of any mental image (as in communicating vessels) cause changes and development in all spheres of the person's life.

24. Cognition of outer and inner worlds is inseparable as the single wave mechanism; therefore, functioning of the information contained in mental images is inherent to their accommodation in man's inner world.

25. Thus, Cognition is separated from Consciousness relatively, although shares with it common purposes, mechanisms, and nature. They differ by the direction vector: Consciousness is a stage of Cognition, and Self-actualization is Consciousness.

Consciousness is an integral part of cognition. As we said above, only the personally felt ("lived through") information becomes "my own" knowledge, or rather the Knowledge abiding with Me.

The purpose of Consciousness is reaching the personal level of understanding what the reality is and accommodating to it.

So, the essential stages of the process of cognition are: 1 — information representation, 2 — perception of information, 3 — processing of information.

The field of science dealing with the problems of knowledge acquisition (perception, memory, attention, recognition of images, problem solving, psychological speech factors, and cognitive development) is called **cognitive psychology**. This trend originated in the 1970s, after the period of the violent growth of behaviorism and psychoanalysis (1940s—1960s). Before that, *perception* as the most fundamental cognitive act had been studied by only a small group of researchers. At that time, even Piaget's works on cognitive psychology did not achieve really wide recognition. The divergent growth of cognitive psychology was favored by the spread of computers as analogs of an artificial "brain" and devices which simplified calculations and modeling in experiments. The appearance of computers as such was a confirmation of the reality of cognitive processes and possibility of their studying. The study of the in-brain

information flow movement became the scientists' primary task. In 1967, *Cognitive Psychology*, a book by U. Neisser, appeared.[25]

So, we entered in our narration into the area of **COGNITIVE PSYCHOLOGY** as **a part of THE THEORY OF KNOWLEDGE**.

Considering consciousness as one of the stages of processing of information implies the following **OBJECTIVES of the investigation:**

1. Revealing analogs of the new information in the personal experience.

2. Comprehending (identifying axiologically, tingeing emotionally, and linking up motivationally to the personal experience).

3. Accommodating a new image via intro-active action ("introducing into" the personal experience).

This triad of the objectives in **cognitive psychology** as a discipline and logical **nature-consistent stage** of cognition naturally determines the new science about method (**methodology of nature-consistent education**), as well as the principles and methods of designing new textbooks, methodologies, and technologies (see the corresponding chapters).

However, it would not be enough to consider consciousness only as one of the stages of processing of information. Consciousness is not an independent mechanism. It is rather **a demonstration of activity**. Consciousness undergoes changes in the course of all our life. These changes can be called cognitive development, perceptive learning, or growth of consciousness.

Consciousness is demonstration of mental activity. The example is our reference to literature and other art works. At different ages, on the basis of different experience, people comprehend the same things differently. Our view and evaluation of the same actions change depending on the experience. Striking examples of change, growth of consciousness are patients from emotional-involvement groups. Being in poor emotional conditions and aggressive against their offenders, many of them turn to psychologists for help. Within days (and sometimes hours) of work a considerable growth of consciousness occurs which leads to changes in mood, emotions, behavior and the way they feel.

Consciousness is interpreted as psychic activity providing generalized and purposeful reflection of outer and inner world, goal-directed activity, control and direction of the person's behavior, his or her ability to be aware of what is going on. The object of consciousness is both the outer and inner world of the subject itself — the bearer of

[25] Neisser, U. *Cognitive Psychology*. New York: Acad. Press, 1967.

consciousness.[26] One of the aspects of consciousness is man's self-consciousness. The psychic reflection of the reality appears only at high levels of matter organization and is connected with education and system development.

That is why it is important for us to know which exactly **structures of the person** PROVIDE THE PROCESS OF COGNITION.

Important to understand

— the way information is perceived and where;
— the way it is sent to processing by the brain;
— the way it is represented;
— the way the process of thinking occurs;
— the way the process of thinking finishes;
— what structures provide remembering, repeating, cross-correlation.

As a result of realization of the role, functions, and meaning of every structure taking part in the processes of Cognition, Consciousness, and Awareness, pedagogy and pedagogical psychology will be able to orientate themselves with more confidence and reliability in their choice of the approaches, methods and technologies of the educational process (with all its specifics), as well as to advance purposefully on the way of developing holistic thinking and world-view.

Consciousness is a fundamental aspect of reality. It cannot be excluded from various theories concerning Nature—Man—Society. In any of them, man and society are present if not as the objects of description then as the subjects synthesizing certain information and being the members of its transfer.

The imperfection of many conceptions and schemes is much connected with the so-called **subjective factor**: inability to take into consideration the initial imperfection of reference system — capabilities of cognizing subject and subject's unawareness of his capabilities. The major part of scientific theories deliberately exclude imperfect thinking of man from the field of their consideration: imperfection in task setting, choice of goals, methods, tools; inability to take into consideration the possibility, and role of the levels of work with information other than the level of Consciousness (via thinking). The knowledge of cognitive psychology is still far from the large pedagogical community.

There is another aspect such as **social factor** — the society's possibilities. The level of comprehension, not only of the problems of consciousness, is limited either by the

[26] Great Soviet Encyclopedia. Vol. 24—I, p. 374.

lack of ideas with high level of generalization or by the lack of information awareness about these ideas in domain-specific knowledge. Besides, there are individual peculiarities of adoption of the collective experience connected with the process of formation of personality.

The third aspect negatively influencing inadequate understanding of the role of the consciousness and unconscious components of personality is the **traditionalism factor**.

Why is realization and recognition of cognitive psychology in the society so difficult?

The humanity perceives the world only and solely implicitly, i.e., by the naturally inherent way of inner experience, interpretation (via natural abilities) of the process of receiving information (synthesis — association), and receding to the newly obtained image-concepts — that is, by logical and linguistic reflection of information. This path has been studied by scientists well enough. In Piaget's operational conception of intellect, most complete methods of reflection have been obtained. Information goes through four stages of growth on its way to the knowledge of full value.

The historically established way of logical evidence of reasoning that was bringing (according to Aristotle) to "reliable knowledge" was taken up and developed so that it turned to be the only possible way in the world of science. The humanity perceived the infinite real world not even suspecting about the existence of serious resource limits of the absolutized discursive-logical thinking. At the same time, people created virtual worlds by means of myths, painting, music, literature, dancing, theatre, etc. Besides, every man continually does these virtual operations out of habit, not thinking about their origin and role. It is this virtual activity of reception, analysis, synthesis, transformation of information that gives the person a possibility to deliver its results in social life in a logical-linguistic form. This habit, consolidated by thousand of years, permeates both scientific and common thinking. The more obvious the tradition is, the more difficult it is to overcome, whereas the deepest layers of consciousness are hidden and out-of-reach. A new stage of cognition of the hidden brings new difficulties and sacrifices. It is inconvenient for scientists who feel comfortable in their world of habitual concepts and theorems. It is also inconvenient for society that needs big investments in order to work with new concepts. It is inconvenient for average citizens, because they have to give up their mental laziness and habits in order to reach a new level of consciousness.

"The study of the mechanisms of information processing is becoming more and more widespread and prestigious, but it is not connected with the theory of human nature

that could find its realization outside the laboratories yet. And even in the laboratories, its basic postulates go beyond that computer model it is due to, " wrote U. Neisser, one of the founders of cognitive psychology, in his book *Cognition and Reality: Principles and Implications of Cognitive Psychology* (1976). Fully realizing U. Neisser's anxiety, in the following chapters we will try to specify our understanding of one of the ways of application of theoretical proposition in cognitive psychology in REAL educational process.

Cognition as a search of meaning

The mechanism of cognition from the viewpoint of modern science and practice has been described above.

Let us consider the essence of **cognition**. The semantics of the word comprise the movement from sign to sign, comprehension of the essence of sign — that is, its meaning. Since every sign comprises a single meaning, the contact with it starts with **identification** — that is, confirmation of the previous meeting with sign.

The second step is **recognition** — confirmation of **reasonable** perception of sign in previous experience, that is, recognition of the meaning of a given sign.

The third step is **awareness** — finding the presence of the sign in the personal inner world (experience) of an individual.

The fourth step is simultaneous presence of the sign in the outer and inner world, that is, its **realization** by an individual.

So, **the process of cognition is understood as comprehension of the meaning of the signs via step-by-step recognition, awareness and realization of their meanings by person.**

Holistic cognition is considered as realization of a whole set of sign meanings in the outer world of nature and inner world of an individual — and their coexistence. And an individual can use any particular meaning of a sign voluntarily.

Knowledge as parallel coexistence of many projections of the meanings in man's consciousness can be called **adequate**[27] knowledge.

For example, let us remember the fables by I. A. Krylov. Whichever we remember, there is a sign of many meanings — *The Quartet*; *Monkey and Spectacles*; *Fox and Grapes*; *Swan, Crawfish and Pike*, etc.

[27] Adequacy means correspondence with the set of "reflections" (by one of the meanings) of the particular question.

Differently directed efforts in common cause can be easily recognized in the outer world: social life, cultural work, or declaration of the purposes of education. The search for harmonization of the ways of the personal inner world and self-consciousness in the world is shown so brightly and with such humor in the characters of Swan, Crawfish and Pike[28] that can be addressed to any social group — politicians and businessmen, directors and subordinates, family and school, groups and individuals.

Versatility of the meanings of symbolic characters ("signs") in fiction and folk tale books allows them to be read both by children and adults. Appreciation of accoutrement and the plots of narration as manifestation of the outer world attracts children. The interpretation of hidden behind the form meanings attracts adults and opens up in different periods of life. In the world familiar to an individual, matter becomes a sign (according to S. V. Leshchev). The information (i.e., form of energy, its different level) hidden from direct fixation and not realized before, is revealed. What has been realized becomes familiar to an individual as personal experience, and sign becomes an abstract reminder of what has happened in real life — a symbol of all things known and implicit to the subject meaning. In this position, the subject's knowledge transforms into a symbol, and this abstraction is becoming for him the most concrete interpretation of facts.

So, we have come to realization that "sign" refers either to elementary processes at the elementary level or to the symbol that has a certain meaning to him in the world of man's consciousness. The world is symbolic only from the point of view of consciousness. Symbols play the role of a piano fingerboard for man's consciousness that can play its own music. There are two ways of searching for the meaning while perceiving the world through existence and symbols. Existence cognition is real, whereas symbolic cognition is ideal. But both of them are the search for the meaning of life. A person can go to live in Sahara to obtain real experience of the conditions and situation there. If no such opportunity exists, that person can use books and films to learn everything about the life in Sahara. Studying any discipline at school or university resembles this "Sahara" situation.

In the process of perception, a person is constantly looking for his or her place in the relationships in the world; in particular situations, groups, and conditions. Perceiving the world, he or she is trying to "get armed" and find protection in case of getting into unexpected situations. Knowledge plays the role of protection, "armedness" — and, at the same time, acts as a mediator between the world and the individual. Albert Szent-

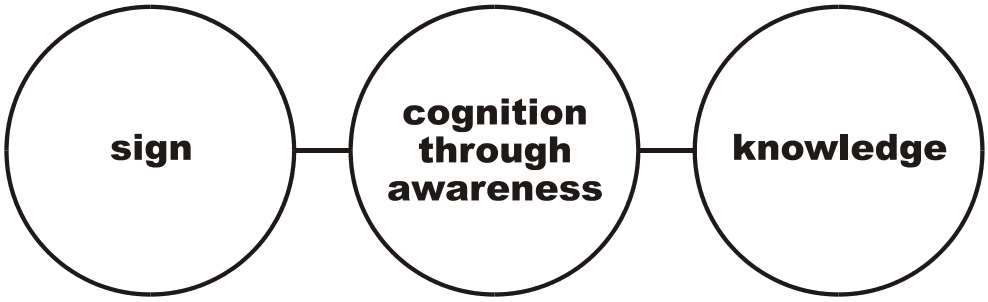
[28] Lack of cooperation [team spirit] (literally, Swan, Crawfish, and Pike, the fabulous characters towing a cart in three different directions).

Györgyi, a famous American biochemist, believed the brain to be not the organ of thinking but the organ of surviving. In our dynamic world, a powerful renewal of information occurs every six years; therefore, the ways and means of cognition have to be developed as fast as possible, too.

This point of view correlates with the position held by the Russian philosophers I. P. Pavlov and P. Anokhin. According to them, any living system forms a need, and biological substance of this living system sets a goal. The brain is able to reproduce all the chain of possible events in the way of attaining the goal. The system itself organizes an unceasing examination of options and provides the experience in the way of obtaining the result. The result necessary for the system signals about sufficiency by **itself**.

According to the theory of goal reflexes[29], any living system (man) has a meaning necessary to it. Cognition is a complex non-linear process of searching for this meaning. This view corresponds with the principle of self-organization of living systems within the synergetic paradigm of the Universe.

Realization of the meaning is imprinted into man's consciousness. From this viewpoint, Meaning is knowledge that can be imparted to another man with the help of signs (words, symbols, images).



Scheme 15

Therefore, knowledge is not only information, it cannot be automatically given to a learner. Only personally realized, experienced "really or ideally"(virtually) information becomes knowledge.

So:

— The goal of cognition is acquisition of awareness of the man's place in the world.

— The essence of cognition is understanding of the Meaning.

Cognition as understanding of the meanings has 4 steps:

— identification of the sign;

[29] Pavlov I. P. *Goal Reflex* (see: Collected Works).

— recognition of its meaning;

— awareness of its meaning;

— cognition of the meaning in the inner and outer worlds simultaneously.

— Cognition can be one-way, integral, and holistic.

— Cognition of the meaning occurs through the sign by means of its adequate perception by an individual.

— When forming a need for cognition, a living system at the same time forms a need for the meaning — the result of cognition.

— Cognition has to be organized to meet the needs of man and directed at search for the meaning.

Chapter 5
MAN AS THE OBJECT AND SUBJECT OF COGNITION

> We will inevitably have to move on to discuss the problems of evolution of the man's internal world. We will have to find the ways to operate on it so that the man's inner world would become his fundamental value. Here is the key to man, to preservation of the Homo sapiens species on the planet.
>
> *N. N. Moiseyev*

Man, the most complex living psycho-physiological system, is both the object and subject of cognition in post-non-classical science. Today, it is impossible to study man neither as an object nor as a subject of cognition without taking into account the complex and still poorly researched structure of this living system. The current stage of research is characterized by agglomeration of different fields of knowledge (primarily **scientific and practical**) and a tendency for their integration. Above, we have pointed out the insufficiency of the modern scientific tools to fix or explain the many forms of man's manifestations that cannot be reset from the accounts. Specialists in various fields of knowledge have repeatedly highlighted the need for **new** approaches in the study of man. Let us give some examples.

"At the moment we are experiencing profound changes in our concepts of the nature and structure of the human society... These changes have created a need for new relations between man and nature, as well as between man and man." (I. Prigogine)

“Revolution in question occurs at all levels: at the level of elementary particles, cosmology, at the level of so-called macroscopic physics, covering physics and chemistry of atoms and molecules…” (I. Prigogine)

“Merging of discoveries in research of the world around us and the world inside us is a characteristic feature of the last phase (which is the object of our present description) in the development of science, and this cannot but fill one with satisfaction…”
(M. Scheler)

“…never before has man become a problem for himself to the extent he is a problem for himself now…” (M. Scheler)

“It is absolutely clear to me that we need a new psychology… which begins to take shape… due to the latest achievements of natural sciences.” (S. Grof)

To date, we can speak about the formation of ideas about the structure of the “Man” living system in science.

In its creation, scientists assume that the person has 3 sources of information: nature, society, and man himself. The emerging interrelations between them are different in nature.

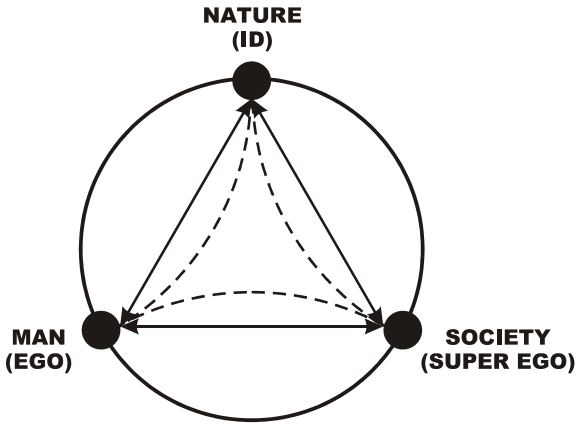
Let us introduce some notation conventions here.

Let the **material** relationship between Man, Nature and Society be denoted as **<----------->;**

the universal **laws of Nature** as _____;

the **symbolic and semantic**[30] information relations as _ _ _.

Let us examine the diagram that shows the triad of man’s contacts: natural, social, intellectual (after Y. D. Zheleznov)[31].



[30] Character-semantic context information ties which emerge between the nature and society are the ones that exist in the inner world of man, manifested at various levels of his physical, creative, interpersonal, and social life, as well as in the system of his principles and the universal (cosmic) level of awareness of his place and role in the nature and society.

[31] Zheleznov Yu. D., Abramyan E. A., Novikova S. T. *Man in Nature and Society*. M., 1998. P. 20.

Scheme 17

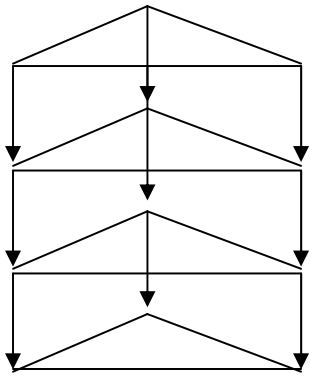
Let us call the natural needs "Id", the intellectual needs "Ego", and the spiritual needs "Super Ego."

Thus, if we consider personality in terms of its vital activity, i.e., its needs, we will get the **Personality** = **P** (id) + **P** (ego) + **P** (super ego) (of course, the "+" signs have nothing to do with arithmetic). According to N. Berdyaev, "All circles of being cross inside man." This might be called an individuality section.

However, this understanding of the structure of personality is clearly insufficient, because it does not take into account (does not manifest, albeit implies) presence of unconscious, subconscious, conscious and super-conscious informational levels in man.

Let us consider Scheme 18[32].

Personality Structure



Level "D" **Superconsciousness**

Level "D" **Consciousness**

Level "F" **Subconsciousness**

Level "J" **Unconsciousness**

Scheme 18

I. Level "J" (named in honor of K. Jung): the deepest level at which the information of inherent nature (unconditioned reflexes, information about self-preservation, procreation; renewal of information) is perceived and stored.

II. Subconscious level "F" (named in honor of S. Freud): the level at which information is perceived and stored as a component of the experience which has been gained either consciously or unconsciously but is never realized afterwards. (For

[32] Ibid., p. 78.

example, unconscious mechanical switching on the light while entering the room or greeting during the meeting.)

The arrows show the path of escaping into the unconscious of the information received about the skills, social moral guidelines and preferences, rules of conduct, unconscious behavior motives, and conditioned reflexes. Furthermore, such information has the potential to convolute the essential data; and this convolution escapes into the subconscious in the form of an image.

III. Level of awareness "D" (named in honor of R. Descartes): the level at which information is perceived and stored of the person's own consciousness alongside with reflections on all the pressing needs, attitudes, appraisals and goals.

IV. Level "S" (super-consciousness) is the one introduced into this scheme by us. At this level, information is perceived and stored which has been obtained from the cosmic Superconsiousness and concerns man's and society's highest predestination, the supreme harmonic laws of the Universe. Man's being included into this cosmic order is undoubtedly clear to many thinkers. "Man is a microcosm and as such encloses everything." (N. Berdyaev)

It seems as if this scheme is a special illustration to the words of N. Berdyaev that "man is a multistoried building." It is obvious that **COGNITION occurs at all levels**, although the common rule is to speak of cognition as of a **conscious process**. Hence the ignoring and fear of the 3 other levels.

With the introduction of new methods in education, the most frequently asked question from teachers, administrators and parents is whether the proposed methods will affect the child's unconsciousness. This question demonstrates the basic fact that the common population does NOT know that there is no such word, event, or action which would not pass this subconscious fixation, all because of the nature of perception itself.

The role of each of the levels of perception of information is very specific. The material substance forming the biological, physiological, physical and chemical components of the body is the bearer of information about the unconscious in the human body. Besides, it is an unconscious receiver of new information entering through the body's tissues and cells: the auditory, olfactory, visual, tactile and gustatory canals. Here, each cell, acting as an oscillator, plays the role of the receiver of vibrations of magnetic resonance oscillations. Perhaps, what is called intuition — one of the types of psycho-physical work — occurs in the body at the level of wave oscillations, probably as

a process of comparison of overlapping or non-overlapping of phase-frequency oscillations of the recipient and the received data.

The carrier of the information of the unconscious level in the human body is most likely the entire ensemble of the organism's genes and living cells.

The subconscious level, the one storing the information "ousted" from the consciousness (i.e., unwanted or harmful) or that which remains unrealized, is based on the peripheral nervous system and subcortical "sensual" structures of the central nervous system.

The conscious level is associated with the work of the cortex, predominantly that of the left hemisphere.

The super-conscious level is, of course, almost unexplored. It can be defined as individually extended (compared with the normal range) perception at whose expense perception from other frequency bands occurs. "Such a person feels (intuitively), sees, and knows in advance about the events that have occurred in other frequency bands of life, but have not yet reached the frequency of our world, and therefore are not evident." This is the view of Academician Yu. N. Ivanov, the author of rhythmodynamics and the hypothesis of the Universal frequency space.

Developing the idea of expanding of the individual perception, pointing to its wave mechanisms, and drawing on the idea of the "project" consciousness, the Superconsciousness can be defined as aggregate ability to model, know and achieve goals based on the person's individual destination in the Universe. This understanding explains why the Superconsciousness constitutes a part of the personality and to a large extent determines its action, dreams, and sense of purpose.

The Subconsciousness and Superconsciousness take part in cognition and thinking along with the consciousness. It must be noted that the work of **the Superconsciousness** sometimes proves decisive, even in comparison with that of the consciousness. Among the examples are the activities of passionaries and innovators of all kinds, treatment of "incurable" diseases, and overcoming difficult life situations[33].

The Superconsciousness is seen by K. Stanislavsky and P. Simonov as a creative force or creating intuition, generating new, previously unknown information by recombination of the traces of external impressions. The Superconsciousness works for the ultimate priority, i.e., the dominant need[34]. Unrealizability of this work serves to protect it against untimely interventions from the consciousness, as well as the excessive

[33] Many of such cases were described in the books: Jan Gouler. *You Can Conquer Cancer*. M., 1997; Ivanova N. M., Ivanov Yu. N. *Life on Intuition*. SPb, 1994.

[34] Simonov P. V. *Motivated Brain*. M., 1987. P. 184—185.

pressure of the previous experience. A specific manifestation of the Superconsciousness' activity is the mechanism of dreams. Their great significance is not yet clear; there is a hypothesis by V. S. Rotenberg (with whom Simonov theoretically agrees) interpreting dreams as a variety of search activity.

It is understood that the Superconsciousness is very important for the creative development of the personality. The most important means of its training and enrichment is a children's game. One can talk forever about its developmental capacities, but one of its really most important functions is the development of creativity, imagination, and fantasy. It is no coincidence that great minds are characterized by the persistence of features of childishness in them which was seen long ago and not once. In an adult, the ideal needs too often compete with the vitality and social ones, inhibiting the work of the Superconsciousness.

The treatment of the Superconsciousness proposed by us in the scheme is not generally accepted. We know, inter alia, about a different scheme which was discussed by scientists in 1979 in Tbilisi at the international symposium on the unconscious. The structure of the processes in the human body was explored in its three components: the unconsciousness (U), consciousness (C) and superconsciouness (SC). Here, FS is understood as a mere physical body (tissues, cells, organs), and any knowledge of it easily fits into the framework of the natural anatomy and physiology.

The bodies of the consciousness and superconsciousness are studied by the abstract logical anatomy. They are situated in the space not apparent to us. "The existence of this intangible, non-apparent world is beyond any dispute by now. Between the material and immaterial space there is the connecting space called 'Bardo' in the East."[35]

Regardless of the variants of treatment of the different levels of personality, their combined operation constitutes the Potential Self.

In our opinion, the harmony of human behavior and relationships with the surrounding world, i.e., **the utmost realization of the Full Potential Self** will be determined by the most effective resonant interaction at all levels (systems) of the personality, regardless of their being realized by man himself — first of all, by the brain with a frequency range of these levels: from the setting of these systems regulated intuitively by man himself or based on his knowledge of the configuration mechanism.

The practice of psychological and educational activities uses the proposed model as a starting framework both for the management regulation techniques and planning effective activities of the educational process.

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[35] Bronnikov V. M. *The System of Human Development*. M., 1998. P. 4.

The essence of the methods proposed can be briefly described as local, integrated or holistic potentialization of the personality's levels. There is extensive literature, quite accessible both at the theoretical level and as a practical guide[36]. In order to clarify it to the reader, we will describe briefly the general principle of all the approaches because they are all based on the work with a mental image. The difference between these methods lies only in terminology and procedures.

Let us turn again to the scheme of the personality levels. As long as the concepts and relationships outlined in it are abstract, it is difficult to work with them. However, for man it isn't very hard to "link" his unconscious level (the physical body, health, etc. given to us by nature and our parents, without the participation of consciousness) with the concept of **the physical potential**, understood as man's supreme physique and abilities. It is even easier to imagine it as an ideal of physical perfection, health, and beauty. For many, this image can be tactile, auditory, etc. Often it is easier for people who are not inclined to "idealize" to speak about a guide at the physical level of their personality.

Let us conduct a mental experiment: imagine what would your physical guide impersonating health, beauty, strength, or cheerfulness look like? Mind that you must be sincere with yourself and not force yourself to think of some special image, but learn to "grasp" the very first idea that comes to your mind. This first (sometimes second or third) image is most often that of "yourself." This almost instantaneous response of your brain is closely connected with neighborhood of the figurative and speech centers in the left hemisphere of the brain.

However, people often do not want to see that incoming or the response images of animals, natural phenomena, and objects are **symbolic convolutions** of information which answer the question clearly, clearly and directly. For example, people often associate their guides at the physical level with animals (elephant, bear), natural phenomena (whirlwind, hurricane, waterfall, mountain, sea, river), famous sportsmen or personal friends, public cultural models (Apollo, Venus, Discus Thrower), etc. It is easy to notice that these images metaphorically contain within themselves powerful physical characteristics. A man intuitively compares himself with the chosen image, or, to be more exact, with the archetype of the meaning of the chosen image: a mountain — power, strength, height; Apollo — beauty, grace, dignity, etc.

[36] Woolf V. *Holodynamics*. M, 1995; Zhikarentsev V. *Life without Limits*. SPb, 1998; Gadzhieva N., Nikitina N., Kislinskaya N. *The Principles of Self-Perfection*. Yekaterinburg, 1998; Ocheilee M. *The Power of Reason (for Students)*. Minsk, 1997.

More often than not, man intuitively selects missing (and very desirable for him) qualities in this or that image. Having made his choice, man actually has found his potential (his hidden dream, his desire to be such and such, to possess the properties and characteristics of the ideal image).

In order to really activate his or her reserves, a person can begin to work with an image of the physical guide. The basis of the work is the physical principle of wave resonance: reproducing an image in his or her mind every day, a person conducts mental modeling. As shown above, a mental image carries information and sends energy to the body. For a simple explanation let us use the folk wisdom: “Wherever ideas go, energy goes; wherever energy goes, blood goes.” This means that the mental image sends energy and information through all canals into the body, which is beginning to mobilize to meet the challenges of growth, enhance, recovery.

This is the case with the unconscious level of the personality. In the considered example, we have demonstrated the simplest way of transferring **the unconscious** onto the level of **awareness and control**. These simple forms of work will never bring harm if the person works independently. The point is that the potential leads man up towards harmony with nature, and if he is not trying to deceive himself, his unconscious is always striving for good, survival, strengthening.

Working with the subconscious (i.e., with things ousted by the consciousness or the information which is received but not recognized) and superconscious may follow similar patterns. For convenience, it is necessary to highlight the spheres vital for man: creativity, interpersonal and social relations, and the principles of universal representation. Accordingly, it is important to a person to find his or her own creativity potential (for students it is often great people representing both the world and Russian history and culture). While searching for the interpersonal potential, it is necessary to explain to the students everyone has a unique style of his or her own and reserves of communication with another person. It is important to show the breadth and depth of human friendship, mutual support, selflessness, love. The most popular guide images at the interpersonal level are dogs and other pets, grandmas, grandpas, brothers, sisters. Working with guides at this level is very important for students because it helps them to choose their friends and build relationships both within their families and with their pedagogues. The skills of such work are extremely essential to any pedagogue to correctly build his or her relationship with the students and adjust their attitude towards each other and their parents. Finding a guide in social terms can prove quite a hard task. It is important to clarify it to the kids that a person’s individual contribution

to the common cause of the group, class, school, Homeland is of much importance both for the progress of the individual and society as a whole. The feats of historical heroes and great people, examples of selfless service for the benefit of the Fatherland, world and whole mankind is more often connected with images of guides in the social plan. Experience shows that the society which lowered the "bar" of social service, making a shift towards individualistic priorities of the Western world, today is suffering severely. We are reaping the fruit of not so much unimpeded information contacts with the world but of historically conditioned social lawlessness, pressure, dogmatism, political, cultural and historical narrow-mindedness.

It is in the school years when one cannot avoid thinking about the man's role in the society, because here are the roots of his future establishment and self-identification in the society.

The meaning of search for a guide in social terms is **to harmonize high aspirations of an individual with those of the society**. It is important that a child feel his or her **social value through a mental image model**. The emergence of such model marks **the beginning of finding the ways to it**. This is man's search for his own path to his self-realization in human society.

It is appropriate here to recall the war generation, the people who dreamed about victory or were confident of it; "the people of the 1950s" who sang "our garden shall blossom" and upturned the virgin soil, "the people of the 1960s" who opened Space to the mankind. Even now we can easily call the heroes, guides, ideals of those generations: A. Matrosov, Z. Kosmodemyanskaya; Tselinniks (the Fallowers) and romanticists — geologists, builders of electric power lines, Yuri Gagarin, S. P. Korolev. The reason for the young people's difficulties with self-determination is not that there is chaos in society now, but that there is no dream, no social role-model to follow. People who have a dream and are eager to express themselves in society find themselves now, even in spite of the fact that after 40—50 years one has to live differently.

Deep in the subconscious are rooted the main principles of human life: openness, kindness, caring for loved ones and those in need, fairness, integrity, altruism, and morality (I). The alternative principles are pragmatism, pretence, hypocrisy, immorality, unscrupulousness (II). The choice of the guidelines is of vital importance to man. Potentially, it is possible for a person to select from both groups. However, only the first choice means striving to achieve the principles focusing on the eternal human values, thus being the aspiration to the Full Potential Self. It is extremely important for the child's forming personality to obtain his or her personal guidance in the world of

principles as well as a guide helping the child in his or her ascending movement towards them.

The principles from group I have always been dear to Russian culture and education and glorified by them. They are **declared** by the today's domestic system of education, too. The trouble occurred when the principles and reality diverged. It is as if **pragmatism** (and related principles) praised by the Western world have come off a TV screen right into our lives. For today's young souls, it is much harder to understand the system of the principles: schools modestly call for openness and altruism while **everything around** juicily and vividly asserts hypocrisy and selfishness 24 hours a day. Despite this, people choose (usually based on personal experience) a guide with openness, kindness, caring, fairness, and altruism. Often it is a close relative or someone dear: mother, grandmother, grandfather, or friend. However, one must not be afraid if any historical images, known to us from the world of culture, fine arts, music, ballet, etc. appear in his or her imagination while reflecting on the high principles. These can be, for example, historic images of fighters for justice (Spartacus, Garibaldi, Razin), literary embodiments of the principles of openness and kindness (Natasha Rostova, Pierre Bezouhov) as well as those of integrity (Tatyana Larina, Anna Karenina).

Often there are "inanimate" symbolic images, such as a statue of Freedom, various kinds of monuments, torch, fire, ocean, and others.

Choosing a guide is individual: what to one man embodies justice or fight for it, to another can serve as a symbol of powerlessness, weakness, lost or even death (for example, cross, fire, crucifixion.)

The choice of a guide at the principal level is completed when an individual feels **complete harmony** both in his or her body and soul, addressing the guide mentally, as though speaking with his image. It is thus necessary to realize that you communicate not with Spartacus but with your personal ideal Embodiment of altruism and a fighter for justice. In this image, those principles which resonate with you and your intentions and aspirations are expressed to you and felt by you with maximal brightness. You resound (get into resonance) with those principles which are "radiated" by the image of Spartacus. It is this resonance of intentions, moods, mutual understanding of the principles (for the sake of which the historical hero sacrificed his life) and Your Soul which makes you the co-participators in the principles of altruism and justice. A surge of understanding and energy occurs in this act of co-participating (you acknowledged him, and he acknowledged you). This act is able to give you strength to move forth in life, study, work, search like-minded persons. Remembering the image (working with mental

image) daily, a person is able to acquire the force of the vital principles which will help him or her become more confident, steady, integrated, and whole. Attaining the certain level of confidence in the principles, an individual can discover that on the following stage of his development a NEW GUIDE appears for him (or her): it becomes important to a man to follow the new **principles.** The process of growth appears to be endless. The system of principles is also the value **framework of an individual's psyche**. It is clear that on durability of the framework (the bearing, base constructions) depends whether all building will keep standing in moments of earthquakes, tossing, storms, and squalls. Life's scrapes, comparable with these phenomena of nature, test people on durability in a like manner. Man's acts and words are no more than litmus paper of his internal principles.

It is especially important to speak mentally to the principal level guide in those moments in life when a person cannot realize or understand what is going on, how to act, what to choose in a concrete life situation. These are **exactly those situations** when our 5 sense organs oriented to implementation of certain functions in the physical world **are not able** to deliver information from the man's internal world. Addressing the mental image of the guide allows a person to remember and feel his or her own life principles in an introspective decision to "live through" those of them which are important to that person. This feeling of the basic guidelines, like a stay in a situation of confronting things which are important to one in his or her life, allows man to enter the wave (at the physical level), value (at the ethical level) and energy (at the personality level) resonance with himself and to act without betraying himself in a difficult situation. The system itself signals about sufficiency of the achieved result (according to I. P. Pavlov) because it knows (it is in its nature) what it needs.

Let us consider the sixth, universal (global or cosmic) level. It is closeness, unity, identity with nature felt by man. The wider and deeper the feeling is, the dearer to man is aiming for life, love of it, the power of knowledge about his unity with the Universe. The alternative is the sense of detachment, alienation from all natural displays and laws. On this basis self-glorification of man and his role in the cosmic life may evolve. In more hard forms it can display as obsession or tyranny. Some historical examples from the recent past are too well known in our homeland: inordinate praise of the leader personality's role, together with the leaders' self-glorification, resulted in total obsession and tyranny which embodied itself in turning back rivers, wide scale bog reclamation, forced sowing campaigns, destruction of monuments of culture, and elimination of the national intellectual elite. Every man, being a microcosm of the whole Universe, needs

(either consciously or unconsciously) some leading guide: a symbol of his **unity** with Nature.

When thinking on this topic, mental images of natural objects or phenomena like sky, sea, river, pictures of space, stars, etc. often appear in the mind.

At the universal level, the guide helps a person, through mental communication, enter in resonance with his or her personal biorhythms, which gives that person the sense of involvement into the nature, the Universe. This helps us feel that man is not alone, that he has his own unique destiny in the nature and seeks to find, comprehend and fulfill this destiny in his life. As the experience of work with students and students shows, this comprehension of own destiny in life is very acute to the youth. In one case, several 9th grade students found themselves in conflict with the school's head teacher. The reason was the head teacher's self-glorification gradually brought to the level of obsession: she forbade the students to pass the examinations of their own choice, even though, according to the rules, the students did have this right. To resolve the difficult situation, it was suggested by one of the teachers that the students should work with guides at the universal level. The work took 30 minutes. Then the students unanimously and independently decided to pass the examinations on "imposed" subjects. What happened? Why did the students "retreat" from their legitimate rights? When communicating with their universal guides, each of them became aware of their High destiny in life; they modeled themselves in the future and were very encouraged by their prospects. Besides, the students unanimously felt the head teacher's motives: she secretly wished that her daughter study in that same class and has the same prospects. They felt that it was not the head teacher's but mother's pain as the hidden reason for her self-glorification. They realized that they had to accept and carry out that lesson of forgiveness. As a result, all the students got only on 4 and 5 marks in their examinations.

The practical psychologist's work with "the individual's structure" notion is not limited to projection of the vacuous and subconscious in the above-mentioned 6 levels of human life through visualization of the guides and partial integration of sensations and comprehension.

There is the so-called seventh level of integration of human capabilities. This is the level of the Full Potential Self as an integrated sum of his or her unconscious, subconscious, conscious, and superconscious capacities. This can be imagined as merging or unity of all the levels of the individual. With this, not an arithmetical sum of

the capacities, but the integral of the individual[37] appears. An integrated personality, i.e., one devoid of internal contradictions, can successfully solve problems in the outside world, because it has cognized the laws of the microcosm (physiology and psyche) and now is able to expand its vision of the natural laws in the society and Universe.

There are quite many methods of integrating all levels of the personality. We use the simplest, safest and natural method of visualization. Each child can easily imagine what he or she wants to be like when he grows up, who exactly he or she wants to be. Usually, the Full Potential Self is a bright mental image of a dream in which a person feels a burst of energy, desire to "move the mountains", be the most cheerful, strong, healthy, beautiful, kind, loving, valued by friends and society, talented, carrying to life the principles of justice and caring for his or her neighbors. Very often, the integration of man's best intentions and highest positive capabilities is visualized in the images of the sun, sky, flower, light, beam, tree, waterfall, rainbow, Jesus Christ, etc.

Work with the Full Potential Self harmonizes the personality immediately at all levels, providing it with a burst of energy and desire to work. Both pupils and students, having learned to work with their Full Potential Selves, often turn to this mental image. They say that he constantly reminds them what they want to become like, and reach for it in their life and learning. The kids find an inner friend and supporter in themselves, and their lives truly change for the better. They learn to build their lives and make plans for their future by themselves.

With all due respect to the contributions made by such outstanding researchers of the man's inner world as Sigmund Freud, Karl Jung, and Adler, we will concentrate on the French thinker and Nobel laureate in 1927 Henri Bergson. He studied the problems of consciousness, intuition, creativity, and man's holistic thinking. His was the author of *An Essay on Immediate Data of Consciousness* (1889), *Matter and Memory* (1896), and *Creative Evolution* (1907). "Cleansing experience", detecting the hidden layers of human capacities under the consciousness bedding, became Bergson's first priority. With his or her ability of introspection (inner observation), an individual (according to Bergson) can comprehend the connection between being and reality. Bergson calls using this method a coup in human consciousness — a coup which will entail a change in the ideas about consciousness and the reality itself.

[37] "*Lat.* integratio — restoration, recovery, from *integer* — whole; the concept of the systems theory, meaning the condition of connectedness of individual parts into a comprehensive whole." Great Soviet Encyclopedia. Vol. 10, p. 908.

Observation of the "dynamic integrity" through inner observation of self — that is what is called the "man's path to himself."[38] Perhaps Bergson, with his ability to penetrate the qualitative heterogeneity of the person's "indivisible multiplicity" and explain it "exclusively dynamically way, through an effort similar to revolution in consciousness"[39], is the brightest predecessor of the method of visualization of the individuality's internal resources.

In those same years, the search for a method of comprehension of the individual's potential was conducted by Napoleon Hill (1920—30s), the research team of the Newark Engineering College, NJ (1940—60s), and Jose Silva (1940—60s). The results of the research on human mind and potential conducted by the latter became available to the public in 1966, giving rise to the school of applied psyhoorientology. J. Silva's aim was to study the methods of orientation of the psyche in the direction of success, i.e., potentialization of the personality. In 1966, he created a program called "Silva's Method of Mind Development and Stress Management."

In the 1970—80s, when Karl Pribram's (*Languages of the Brain*) and Robert Sperry's (*Mind and Moral Priorities*) works saw the light and the concept of holographic units of thinking ("mental images") appeared to the world, physicist and psychologist Victor Vernon Woolf searched actively for techniques of potentialization of person. In 1990 he published the work called *Holodynamics. How to Develop and Manage Your Personal Power*. The book was translated into Russian in 1994 and published in Russia twice under the title *Holodynamics*[40]. *How to Manage Your Internal Power*. The author's main achievement is the proposed method of potentialization of the individual human capabilities through visualization (above, we have described some fragments of this methodology). However, we are far from regarding the book perfect in scientific terms. We perceive it as a description of the methodology of working with mental images. Without explaining many of his positions, V. Woolf offers to take on faith or feel intuitively some notions which are very new to the reader, such as "guides" at the physical, personal, interpersonal, social, principal, and universal levels, or "the Full Potential Self." Explanations of these concepts were born in those years, but appeared in print somewhat later.

Here we have an opportunity to at least briefly explain the modern approaches to understanding mental processes and controlling them. We rely on the research of

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38 Bergson H. *Creative Evolution*. P. 11.
39 Ibid., p. 13.
40 The English term *Holodynamics* means "All power is in dynamics."

Academician I. M. Dmitrievsky[41]. He proposed a magnetic-resonance model of weak interaction of biological objects with various components of the relict radiation. The scientist takes into account the wave nature of all objects of the nature and explains the resonance connection of every human consciousness with the Universe. A simple scheme will help to better visualize the above-mentioned model.

All objects in the Universe possess their own vibration. Based on the same model, one can understand what lies behind the Full Potential Self of each human being, how that potential takes shape and what it is programd by. Under the influence of the existing spectrum of radiation that depends, primarily, on the location of the planets and other astrophysical objects at the time of man's birth, the man's individual frequency spectrum forms.

Presumably this could be the alpha rhythm of the (electric or magnetic) encephalogram, which is formed in the first minutes of the human being's existence, during the first hours after birth, and is strictly individual, like, for example, the fingerprint pattern on the fingers. There are reasons to believe that the α-rhythm in many ways defines the features of the person's behavior and thinking. The man-world-resonance picture generated in the first few hours after the man's birth is perceived by the person as **his** or **her** "own" — i.e., inherent in the person's organism, or **comfortable**. Later, it is this wave spectrum where an individual will feel comfort. He or she will pick up the music, environment, work, or information that **does not disharmonize his or her comfort zone**.

To better visualize the above said, let us keep in mind the following:

1. Man possesses a natural spectrum of magnetic-resonance oscillations. (Comfort zone)

2. Man interacts with the object which possesses a spectrum of magnetic-resonance oscillations, which combine harmoniously with his natural range. (Enhanced comfort zone)

3. Man interacts with the object which possesses a spectrum of magnetic-resonance oscillations, which depress his natural range. (Depressed comfort zone.)

Perhaps, interaction interference of this type occurs during the process of reflection of information in the human brain.

To date, the mechanism of wave interaction is not sufficiently described by science.

It should be noted that for many centuries, a broad empirical study of weak interactions has been conducted. Today, the existence of the effects of weak interactions

[41] Dmitrievsky I. M. The magnetic resonance mechanism of the weak interactions and its possible use in the analysis of mysterious natural phenomena / *Noospheric Consciousness*]. Khabarovsk, 1998.

is no longer questioned, although the mechanism of their action is still debatable. The intensity of various types of radiation leading to the effects of weak interactions is so small that the energy emanating from them is negligible (significantly less) compared with the thermal energy of the observed systems, whose order of magnitude is known to be determined by the Boltzmann constant and absolute temperature (KT). The main difficulty in identifying this mechanism is associated with the well-known "KT problem."

However, this does not mean that we cannot take into account the groundwork that has been done in education. Following I. M. Dmitrievsky, we believe that the intuitive Full Potential Self tuning occurs by way of **correlation** (resonating) of wave images of the Object (mental image) and Subject. It is their harmonic interaction (see Fig. 2) which extends the Subject's comfort zone, increases the Subject's vitality, and gives strength to the Subject's further improvement. Thus, **by the Full Potential Self we will mean the most harmonious state at all levels of the individual, maximally expanded possibilities of interaction with the society and nature**. Speaking of the guides, we mean harmonic "tuning" by way of wave-resonating of one of the personality levels. For example, visualization of a guide at the physical level allows harmonizing the subject at the level of his body, focusing the body's potential on solving certain problems (see Appendix 7).

To sum it up:

1. The scientific and practical approaches in the study of the individuality give reasons to see its complex structure, the unconscious, subconscious, conscious, and superconscious levels of information storage and functioning.

2. Regardless of the level of information storage, it is involved in the process of man's consciousness, cognition, and conscience.

3. The processes associated with cognition pass the level of **consciousness**, and thus are personality-oriented.

4. Human consciousness, being socially-oriented, can be adapted to solve human problems on 6 levels: physical, creative (personal), interpersonal, social, principal, and universal.

5. The correlation of the personality's levels of information storage and those of information functioning in the society occurs through the **human consciousness**.

6. With the appreciable exhaustion of extensive methods, the need for effective solutions of practical problems brought to life new methods of intensification of internal

reserves of the individual involving the information at all levels of storage. Scientific and practical approaches have generated a number of techniques. One of them is the method of visualization of the guide and Full Potential Self.

7. Awareness of the internal reserves of man and mastering them through nature-conformable techniques is the strategic resource of education and the society as a whole.

The ethical aspects of the socio-natural breakthrough in education

Education is one of the most important human rights which must ensure man's self-realization through development of his creative abilities, enhancing his participation in the economic, social and cultural relations in the society, and thus enabling him to make a contribution to the development of mankind in whole. Education is a prerequisite not only for the full realization of individual rights and opportunities, but also for understanding and respecting the rights of others. Hence, it is a prerequisite for public health. It is the ethical considerations, as well as understanding that education is the most fundamental human right, that impelled the international community to highlight the **principle of basic education for all** and expand the work to assist its implementation. Unfortunately, basic education so far has been understood as providing opportunities to study only a limited number of core courses and disciplines. Today, an important correction must be made: **basic education** should include mastering the basic nature-conformable ability to think holistically. The important aspects of this problem are the human right to **know** how man thinks, what are the possible types of thinking, and what are the consequences of this or that particular a way of thinking. The prospects of development of the individual's potential presented in the scheme are easily understood as the prospect of the potential of the society as a whole. Understanding ethics as non-infringement of the natural basic human right to develop according to man's nature allows us to organize nature-conformable education. To date, this and only this step is basic: the rest is mere talk around the problem, not about the substance of the problem. It is how **it is allowed to think** (and how the process of learning to think is organized in this particular society) that defines whether a person will choose a creative or non-creative[42] way of life in the future; this determines the nature of mental relations[43]; the character of relationship between people opens certain possibilities for people to show their worth in the society[44], cultivate their principles[45], etc. The result is forming of a certain view of the world, as well as man's awareness of

42 Development level II (creative, personal).
43 Development level III (interpersonal level).
44 Development level IV (social relations).
45 Development level V (principal).

his place, role, and the destiny in the Universe. Thus, it is the society that motivates the person to make a choice: “I am a creator” or “I am an adapter”, whatever that person’s attitude might be:

“To open himself (herself)”	“Not to open himself (herself)”
“I am active”	“I am passive”
“I am a searcher”	“I am a reproducer”
self-identification	defenselessness
self-affirmation	feeling lost

The search for the causes of the **negative choice** in the individual’s life must be conducted after the society created the necessary conditions for the motivation of positive thinking. Otherwise, the reasons for choosing the negative attitudes and motives of life need not be searched for — they are more than clear.

Chapter 6
METHODOLOGY OF NOOSPHERIC EDUCATION

> Method is more important than discovery, because one right method leads to many important discoveries.
> *L. D. Landau*

First of all, the study of teaching methods admits **unity and systemacy of the Universe** and inherence of any object or subject (either from the material or ideal world) to it. The Biologically adequate methodology of teaching as a study of structure, inner organization, methods and aids of pedagogical activity is based on the principle of systemic vision of education. The most important **principles of bio-adequate pedagogical methodology** result from this postulate:

— Biologically adequate teaching is systemic teaching based in compliance with common laws of nature and showing the unity of the world.

— Biologically adequate teaching is subjective-objective, showing systemacy and integrity of the world through the awareness of material and ideal objects and subjects of cognition by a person.

—Biological adequacy of teaching is based on the personal involvement in the cognition process through all the possible sensory canals.

—Biologically adequate teaching is realized through a three-sided act of co-

authorship of the subject of cognition with the teacher and cognizable object or subject as a part of the single Universe.

—Biologically adequate teaching is organized through the perception and awareness of the unity of the hierarchy of systems and subsystems of different levels of the Universe —Society —Man by the subjects of educational process.

— Biologically adequate teaching is based on the acceptance of **impossibility to violate** the order, staging, structural properties, integrity, harmony of the Universe and its certain components.

— Biologically adequate teaching is aimed at harmonization of the subject and object of cognition in their evolutionary development, and disclosure of their potentialities in nature and society.

— Biologically adequate teaching is aimed at the development of learners' skills to think in conformity with nature on the base of material of an academic subject of interest.

— Biologically adequate teaching being natural for man is the original feature of society harmonization: man's biosocial nature allows to "cure" society through the development (disclosure) of all the source —bio-adequate —abilities of man according to the law of connected vessels: the more "filled" the bio-adequate component of man is, the fuller the social component of man and society in whole is becoming. So, **the bio-adequate method of teaching is bio-socio-adequate method per se.**

The task of the methodology of bio-adequate teaching is to give the substantiation for the means, methods, course, and conditions for the practical organization and implementation of the educational process. We would remind you that previously the task of learning was to get the extent of knowledge accumulated by the society, and on that base, the final aim of learning was enculturation of the individual, i.e., orienting him or her professionally, introducing him or her to the standards and models of the social culture. The task of learning at the stage of noospheric education is defined in a different way — to possess the mechanism of holistic thinking as an effective tool of man's consciousness and world perception.

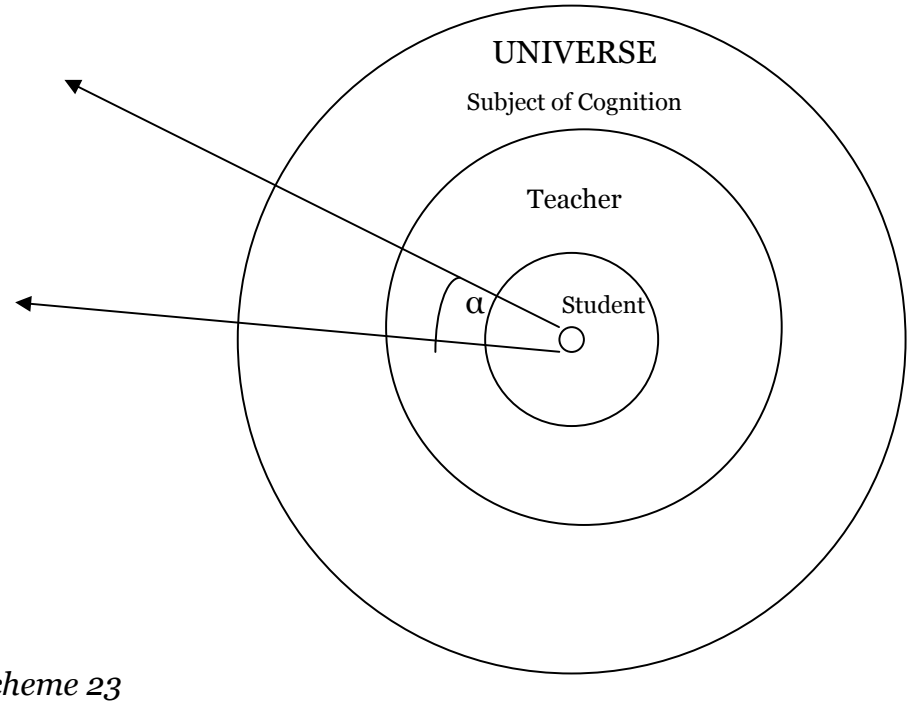
By the system of holistic thinking we mean the system of methods of logical, and intuitive-creative thinking, as well as methods of their combined functioning.

As far as the methodology of teaching is directly connected with the methodology of cognition (both of them deal with the categories "Object" and "Subject" of learning/teaching), the task of the methodology of teaching is in the actualization of the

deep content of the theoretical concepts about the process of cognition. The succession of this "actualization" is as follows: the **subject** of learning/teaching; the **tasks** of learning/teaching; the **means** for carrying out the task of learning/teaching; the stages of learning/teaching. At the same time the methodology of cognition is the "theory" against the methodology of teaching. Being "self-non-self" (G.W.F. Hegel) of this theory, the methodology of teaching turns methodology of cognition into an essential method (which is demanded by life) of adapting to the reality.

So, the following can be said about the **perspective task** of the bio-adequate method. The principles of theory and practice unity (essence and phenomenon, probable and real, general and individual, etc.), if consistently implemented, can become the reason for the choice and development of constructive decisions, further development of the system of education.

The actual task for the methodology of bio-adequate teaching is to give the teacher the substantiation of a new tool of his creative work — bio-adequate methods of teaching. The process of bio-adequate teaching as adjustment of the natural canal of perception of cognition object for the Learner thanks to the Teacher in the system of the Universe can be represented in the scheme.



Scheme 23

The scheme gives clearly to understand the role of the Teacher as interlink between the Subject and Object of learning. It is in his sway either to organize the bio-adequate process of teaching or not. The teacher's "angle of view" (∠α) of the bio-adequate methods of teaching determines the degree of bio-adequacy of his method. Presenting

the material regarding, say, the diversity of the vegetable world, one teacher confines himself (or herself) to mere explanations; another one reads a passage from some book; the third demonstrates the pictures or slides; the fourth would ask to write a composition; the fifth one takes the pupils to the forest for his lesson; the sixth sets out for a walking tour to make some observations... The choice of methods is wide enough.

The methodology as a tool of teacher today proves to be the determining link in the system of education. It is known that only true method leads to the true knowledge. The pedagogical methodology today proves to be the leader of educational process. The solutions in the field of methodology are able to make a breakthrough in the sphere of education, to open the access to the hidden reserves of a person. Today it is clear that to develop only the traditional methods of teaching means breeding people devote to the prevailing method of logical thinking. We are becoming aware of the deficiency of methods being able to develop the intuitive-creative thinking. To be more precise, our awareness and "authorization-based" ordinary pedagogical psychology is more than wary in using non-traditional for the present school methods. The basic tendency of the modern educational methodology is **aspiration for the realization of bio-adequate process of man's cognition**. At present, scientists and teachers more and more deeply realize immorality of single-line methods of cognition which are acceptable just for some learners but not the others. The enforced time-serving, cheating, and lies appear to be not as immoral as the one-line method, "authorized" and unnatural for many, because it is exactly this method that leads to all these bad things. The mind-limiting views as to the "correctness" or "incorrectness" of the method prevent us from acting in the world. Nowadays it is important for the teacher to be able to teach thinking, which means he himself should learn to pay heed to **his own thoughts:** the way they appear, the ways of transforming and controlling them. It is the most important principle of self-actualization and autodidactics, which, unfortunately, the most part of teachers do not possess. This frightens them, puts them to psychological flight from the possibilities to reflect on the similar subjects, or just makes them "close themselves", falling back on intellectual restraint.

In the preceding chapters we showed how science turns to studying man's consciousness and cognition. The latest findings in science and practice have brought on the transformations in views on pedagogical methodology. Now we can speak of the scientific-empirical bio-adequate approach in methodology. let us dwell on the six most important characteristics of the bio-adequate method.

1. **A qualitative transformation has occurred in the definition of**

methodology: a new word combination “inner organization” of the pedagogical process appeared instead of the previously accepted phrase "logical organization". This indicates the acceptance of the existence **not only of logical methods** of teaching but also the other ones that are inherent in biosocial nature of man. The inability to explain these methods by the modern science does not exclude the fact of their presence in reality. Our habit to trust only the authority of science subsides before inevitability of the facts of life. It is undoubtedly a temporary state of science, pushing it to inevitable changes. I. Prigogine[46] explained this situation in the following way: the observer is responsible for the conceptual difficulties and measurements he carries out. Here is a quantum paradox which includes into our description of nature (through the observer) a very peculiar element. Man is responsible for aiming and shooting the arrow of time, for the transition from ’quantum potentiality’ to ’quantum actuality’.”

So, science and practice “contraction” is reflected in the scientific-empirical bio-adequate approach to methodology of teaching.

2. A qualitative change occurred in the very definition of the subject of methodology. Under the new conditions, the Subject of cognition identifies himself with the Object of cognition — i.e., man studies himself in the “Man—Nature—Society” system because separate studying of these subsystems leads to “separate” (that is, not holistic) knowledge. This does not correspond to the bio-adequacy of perception. The separateness of Object and Subject of cognition is one of the methodological causes of the civilization and education crisis. This is a striking example of inevitable consequences which come after the establishment and absolutization of one-sided, not holistic method of cognition and teaching in science and practice.

The subject of holistic (biologically adequate nature of human perception) methodology is the unity of systemic principles of cognition and cognition control[47]. It should be emphasized that **the subject of methodology is the system of connections and mechanisms of teaching.** This global law (pointed out by V. I. Vernadsky) asserts that the same regularities prevail both in biggest stars and planetary systems and in smallest molecules, and, perhaps, even within the bounded space of individual atoms.

The criterion and common base of holism of bio-adequate methodology is

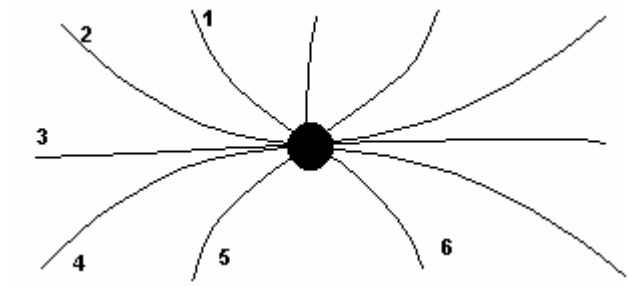
3. **Unity of the systemic principles of the Universe**[48] — what Academician N. N. Moiseyev calls acceptance of the principle of global universal evolutionism. Let us

46 Prigogine I., Stengers I. The Arrow of Time // Herald of RSHU (Russian State Humanitarian University), 1996. #1, p. 61.

47 By cognition control we mean the methods and aids of teaching.

48 See the chapter “Theoretical basis of noospheric education.”

remember the scheme illustrating "The general-system theory of nature, society, and thinking" (according to Y. A. Urmantsev)[49].



Scheme 24

In the general-philosophical aspect, the laws of the Universe can be presented in the form of dialectically opposite principles making pairs 1—1ª; 2—2ª; 3—3ª;...; 6—6ª. When applied to methodology of teaching, this philosophical aspect is interpreted as indispensable presence of physical, biological, psychological, methodological variants of possibility PAIRS. The knowledge of this general law enables an unlimited range of possibilities to influence by methods in the process of teaching, opposite at times. Besides, it makes the search and innovations in methodology "legal." The knowledge of the unity of systemic principles of the Universe and methodology is scientific and philosophical base of methodological prognostication. As an example, we can take the prediction of heavy growth of methods of holistic thinking and teaching in the 20th century contained in Jan Christiaan Smuts's work *Holism* (1926). We have a real chance to watch the process of developing of holistic methods of teaching nowadays. Another principle, polymorphism, shows up in methodology no less brightly. We mean the existence of a great number of methods to develop logical thinking — i.e., a great variety of methods within the limits of this kind. At the same time, we can point out isomorphism as parallelism in the organization, for example, of the acoustic and semantic aspects of language and as a method of studying of various language levels[50].

There are various degrees of approximation to the holism (bio-socio-adequacy) of methods. Obviously, we can say with a certain grain of conditionality that the more number of pairs of the universal laws this or that method answers, the more we can characterize it as a holistic or bio-socio-adequate one.

It seems to us that that the relaxation-active method, which we substantiate in this work, meets the criterion of maximal bio-socio-adequacy (holism of reception-

[49] Ditto.
[50] Great Soviet Encyclopedia. Vol. 10, p. 98—99.

transmission — processing of information). let us retrace this in compliance with the suggested general-philosophical principles.

#1a. **The law of system asymmetry** is seen in the possibility of alternate using left and right cerebral hemispheres depending on the personal tendency to logical or intuitive-creative kinds of work, and also depending on the stage of method working: at the 1st stage we represent the image of the phenomenon of interest, at the 2nd stage we perform logical partitioning of the information or an image-bearing scheme (obrazon), etc.

#1b. **The law of system symmetry** is seen in gradual alternate involvement of both left and right hemispheres which are "loaded" symmetrically, neither of them is left without load. It can be called horizontal symmetry. Vertical symmetry can be called the involvement of "brain-body" axis. During the studies at different levels from 3 to 5 sense bodies: hearing, sight, sense of smell, touch and taste work jointly.

#2a. **The law of polymorphism,** i.e., using different methods developing creative thinking (visualizing an image of the studying phenomenon in the form of conformable to nature model, drawing of an image-bearing scheme, feeling the image, etc.), and methods developing logical thinking (synthesis, analysis of information, structural component making, tracking the elements of information in academic tasks) and so on.

#2b. **The law of isomorphism,** i.e., parallelism in the organization of sound and significance as a method of studying the parallel presence of meaning at different levels and through different levels of language.

#3a. **The law of system inconsistency** display itself in the bio-adequate method as a seeming impossibility to visualize information on traditional school subjects as compactly and laconically as possible in one image-bearing scheme, 10—15 pages of text in one image. The other inconsistency from the ordinary point of view is that no words are needed for the explanation of relationship, dependencies, and co-dependencies of certain parts in grammatical phenomena. For example, an image of a sunflower without a single word gives an explanation of co-dependence of gender, number and case as general characteristics of such grammatical phenomenon as the noun in English, to all the groups of English nouns. The article as an attribute of the noun is also represented in this image.

#3b. **The law of system consistency** is in removing all the points mentioned in the previous law because the reality reflection in the consciousness occurs in the form of holographic images and, thus, is natural for the thinking of man. It means that all the described in the law №3a is a visual help for the following process of information

comprehension.

#4a. **The law of non-evolutionary transformation** is in information transforming by the learners on the base of their personal liking and choice into such and such models. At the same time one phenomenon of interest can be represented by a number of models: plural number of English — by a cluster of grapes, mountain ashes, blackcurrant, or blossom clusters of lilac, bird cherry, etc. All of these or other transformations are not evolutionary.

#4b. **The law of evolutionary transformation** appears from the fact that bio-adequate models are associated with nature-conformable models. It is known that while developing in the process of evolution man imitated the models of nature: totem animal, bird, fish in the regions being assimilated; he used the "experience" of nature in building his houses, and decorations. Later, scientific and technical schools based on using of natural models (bionics, biophysics, biotechnology, etc.) appeared. Thus, using of nature-conformable models in teaching methods presents compliance with evolutionary transformation law.

#5a. **The law of non-system transformations** is demonstrated in the possibility of using by learners certain transformations of the words, parts, images, texts, phrases, etc. while following the method. To learn this is one of the purposes of exercises and problems. The exercises and problem books are full of the similar tasks.

#5b. **The law of system transformations** manifests itself in the fact that any transformation can entail the change of all the system. Thus the learners find out with surprise that learning a foreign language or Russian becomes easier as soon as they associate the grammar rules, phonetics or morphology through the models of nature. As soon as one of the models appears, transformation of some systems occurs: perception, psychic feeling of the subject studied, and often self-estimation and interpersonal relations.

#6a. **The law of non-evolutionary affinity** is obvious: what is the relation between butterfly, waterfall and such grammatical phenomenon as the verb? And what do apple and adjective have in common? Or lily-of-the-valley and the sequence of tenses system? Or watermelon and preposition? Of course, evolutionally they are of absolutely different origins: natural phenomena (fruit, vegetables, flowers) and grammatical phenomena (especially in different languages).

#6b. At the same time, we can find **the law of evolutionary affinity** in the general structural features of the world and nature. Both the movement of a butterfly's wings and that of water in streaming and persistent waterfall are associated in our

consciousness with the concept of "movement" denoted by the verb. And a ripe tasty juicy apple can embody the adjective. This principle of associativity of human perception was "built" into our nature by the evolution; therefore, we use it in the bio-adequate method.

The above-named pairs of the laws of the Universe, thinking, and consciousness, are realized due to the basic brain function — its ability to code and recode information following the existential rhythm of nature. Recoding is an extremely powerful adaptive and constructive tool used by the organism to function in the external world and influence it, as wrote K. Pribram[51]. This feature of the brain is used most extensively in the bio-adequate relaxation-activity method.

4. **The criterion of the scientific character of a methodology** seems to be the degree of adequacy of its working methods to the modern level of the science studying transmission and processing of information in man. We mean the complex of the following sciences:

— **physics**, as the base for understanding reception and transmission of information;

— **physiology**, as the base for understanding the functions of the human body in the process of reception and transmission of information;

— **neurophysiology**, as the base for understanding the brain functions;

— **psychology**, as the base for understanding the man's condition in the process of information reception-transmission.

In the previous chapters, we showed that the present state of research of the wave process physics in physiology, neurophysiology, and psychology, allows us to apply the term RHYTHMODYNAMIC (with a view to reception-transmission mechanism) to our new relaxation-activity method. As per the name, periods of relaxation and activity alternate sequentially in it. The theoretical substantiation of these conditions, most productive for intellectual work, was given by Doctor of Physics and Mathematics L. Yu Popov.[52]

If we consider the bio-adequate method from the view of completeness of the reflection of the object in the subject's consciousness, a range of modern sciences (physics, physiology, neurophysiology, psychology, and information theory) gives us **a possibility to call** such method **holodynamic**, i.e., organizing perception holistically, through all channels possible at the present stage of man's development.

We could consider one or another method from the view of physiology. Involving into

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[51] Pribram K. *Languages of the Brain*... P. 101.

[52] Popov L. Yu. The physiological phases of effective activity // Report from the Thinking and Education conference, Tomsk, 1997.

the work both cerebral hemispheres and various sense organs, making their joint work holistic and harmonious would make it possible to speak of harmonious involvement into the process of cognition of all human capabilities, i.e., **ecological compatibility, non-violation of perception through natural canals and phases of information perception.** This, undoubtedly, may be called **acceptance of the ecological imperative in the activity of "man" as a system.**

So, the more a methodology substantiates rhythmodynamic, holodynamic, and ecological performance in teaching, the more it assists the biological adequacy of the cognition process.

5. **Humaneness** is one more characteristic of the bio-adequate method. This characteristic is bilateral. **On the one hand**, using nature-conformable approaches in the relaxation-activity method and applying them to the natural canals and stages of reception and transmission of information are the naturally determined steps towards man, which give him an option of methods on the way of learning, removing the bans on introspective (inner) methods of work. **On the other hand**, the bio-adequate method is based on free choice, so it eliminates the possibility of manipulation. In our opinion, the bases of non-violence teaching found in the bio-adequate method are natural and conformable with nature. This natural base, however, has been violated. As a result of this, the possibility of prevalence of manipulative teaching (with all its consequences) emerged.

Another aspect is that bio-adequacy of the method does develop the personal capabilities. And not only the creative potential (that thing the teachers are mainly concerned about) manifests itself, but also the physical one, as well as the potentialities at the level of the interpersonal, social, principled, and universal capabilities of the person in question. The Systemic transformation law is activated!

It appears to be sufficient to work using the nature-conformable method for humanitarization of all the present education to occur — even without an additional "reinforcement" of school disciplines with humanities. For the humanitarization per se when using manipulative methodology gives extremely little in comparison to the natural humanitarization of the process and method of education.

6. The character of the bio-adequate methodology can be defined as searching, advisable: it functions not in the form of strict rules and instructions but as a system of preconditions and guidelines for the organization of cognitive activity, and choice of educational levers. The educational process of future is extremely changeable. It doesn't have to and cannot be stable by definition: education is continual and extensive. With

the avalanche-like torrent of information, it is unnatural to seek education stability. The new **conception of the future methodology is that of dynamic searching for the needed methodology in the destabilized info-media and social environment.** From this point, the process of "moving" the bio-adequate REAL-method into the educational medium acts like invading ("adventive") species in flora: it will progress gradually. Planning the structural reorganization as to correlation of the traditional and bio-adequate methods is much like working out the strategy of living in transitional (ecotopic) systems of the animate world of nature. The choice of the action zones is left to the teacher.

How (and where) can the bio-adequate and traditional methods be used? The teacher is continually in the search of action zones and zones of so called "pedagogical screen": one and the same field of method application gives different results consuming just the same amount of efforts. As a matter of fact, a teacher using the bio-adequate method changes **his own quality:** he becomes at once a research teacher and psychologist, combining this with his primary specialty.

Having considered the principles, purposes and characteristics of the bio-adequate methodology, let us proceed to the historical retrospective of teaching methods at school and then represent the REAL-method which, as we think, is the basic method within the bounds of the suggested paradigm of bio-socio-adequate teaching.

The three types of teaching methods

In 1637, the patriarch of the world's science Rene Descartes published his book *Discourse on the Method…*, in which he wrote: "Ever since my youth I have been lucky enough to find myself on certain paths that led me to thoughts and maxims from which I developed a method; and this method, it seems to me, enables me to increase my knowledge gradually, raising it a little at a time to the highest point allowed by the mediocrity of my mind and the brevity of my life."

The Method (from *Gr*. methodos — pursuit of knowledge) is a complex of techniques and operations aimed at practical, theoretical, and mental comprehension of the reality or fulfillment of a specific task.[53] **The teaching method is a system of operations and techniques of the teacher-learner interaction in the process of teaching.** As to their nature, the techniques and operations can be physical, physiological, and psychological. The human brain is not able to receive information

[53] Great Soviet Encyclopedia. Vol. 16, p. 162.

from the environment "immediately." It works with the signals delivered to it by the sensory organs of the body. That is why it is very important to remember that the teacher affects the body **directly**, i.e., through its canals of perception. Interaction with the learner's brain occurs only by means of these liaison channels.

The forms of the work are aimed at active involvement and development of the capacities of both the left and right cerebral hemispheres, as well as the physiological functions of the body. Speaking physiologically, the method has to "set in motion all the natural canals of perception and processing of information, " thereby making the studies adequate with the capabilities of the learner's body.

Speaking physically, the method has to create the condition of wave resonance between the teacher and the student for the purpose of reception/transmission of the information and its further processing.

Speaking psychologically, the method has to relieve the strain in the teacher-learner relationships, creating the conditions for effective information acquisition for the ensuing self-organization of the "learner-world" system.

In the historical retrospective, the variety of school teaching methods breaks up into three basic schools: activization, suggestopedy, and holism.

I. Activization school is presented by the methods based on intensive memorization of information with the use logical thinking. Activization methods are aimed at the left-hemispheric information perception; vision and hearing are principal here. These teaching methods traditionally prevail in the modern education.

II. Suggestopedic school is presented by the teaching methods in the state of relaxation. The effectiveness of suggestopedy was discovered by American psychologist Robert Keith Wallace and thoroughly proved by Bulgarian psychiatrist Dr. G. Lozanov who started his experiments in 1965. Since 1984, two methods ("Super learning" and "Sita learning System") have become the most popular ones. The effectiveness of suggestopedy is in the effect of removing stress that helps improve memory, audition, intuition; the amount of the mastered information increases almost three times. Though these methods are practiced all over the world including Russia[54], they are hardly available for mass schools because costly equipment for individual use in combination with comfortable settings are required, which, organizationally, can be very difficult to provide. All the same, the human physiological and psychological peculiarities, which allow apprehending three times more information in the state of relaxation, speak for the necessity intense search for the opportunity of applying suggestopedy in the mass

[54] The "SITA Learning System" method has been successfully applied in learning center of RANS since 1993.

school.

III. Holistic school is presented by a synthesis of the methods of activization and suggestopedic school. As it was mentioned above, the founder of this school is considered Jan Christiaan Smuts who substantiated this approach in his book *Holism* published in 1926. The basic principle of this school brilliantly presented by M. Montessori and R. Steiner, is "joy through feelings"; the aim is to carry the student away to the creative world of knowledge through pleasure, game, or his personal experience while relieving his stress and involving all his sensory canals of information perception (hearing, vision, taste, smell, intuition). They are aimed at perceiving information by two cerebral hemispheres (logical and creative perception).

The need for development of the holistic methods in pedagogy is conditional on the need to ensure the human right for economic and instrumental creative thinking.

The holistic methods which are successfully developed nowadays include the eidetic and activity methods, a great number of author's methods aimed at visualization information, ADU method (aggregative didactic units) by academician Erdniev (Kalmykia), game techniques for preschool and school education.

Methodological studies have not been much *appreciated* and *approved* by society yet — unlike, say, classical science[55]. In particular, methodological works do not agree with the structure of specialties and academic dissertation councils of certifying commissions. But the **atmosphere of intellectual and spiritual pursuit** becomes quite obvious in Russia nowadays, and a number of reports at general meetings and public reading, and also series of articles, newspapers and booklets, do their part. *The front of methodological work front is widening,* and public opinion is gradually filled with a sense of problem actuality and seriousness.

Time itself makes us pay more attention to biological feedback possessing great possibilities for the development of education.

At the stage of the noospheric transition, the biofeedback methods of psychophysical work (i.e., the work with the **symbolic system inside the man**) assume the greatest importance. We would call these methods introspective, virtual, and bioadequate. It is the method of visualization, "tracking" of thought-forms; the method leading to transformation of the psycholeptic model and formation of interactive one...

The force of these methods is in their absolute safety from the point of view of

55 Incomprehension and disapproval of holistic and activity approaches often occurs because of their being non-classical against the background of quite extended tradition to restrict education to classical disciplines accepted by science. For example, the methodology of inventive activity developed and inculcated in public conscience of technicians-and-engineers (by G. S. Altschuler's group) was approved neither by official science nor by high school for a very long time.

physiology and psychology[56]. Their effectiveness is extremely high. As a rule, they are imply relaxation. They perfectly agree with any other lesson or lecture. They mean not so much rest, relaxation, and relieving of stress, as deep reflection, inner concentration on the personal experience, strength, and capabilities.

During such creative reflection the learners turn to their personal experience, which is the strongest in the childhood when a child gets to know the outer world and, for the first time, sharply feels the phenomena which are new for him or her: bread, house, apple, flower, grass, etc. These strong feelings are three— or multi-dimensional. They have color, form, taste, smell, sound… Lemon, apple, wood…— whatever we face in our life, one way or another, goes through our eyes, ears, sense of smell, touch, taste receptors, does not it? Any phenomenon or fact — all go through our body and becomes the function of our entire organism: our memory. The more canals we involve, the deeper and stronger the knowledge about the phenomenon or fact is, and so forth.

So, what prevents us from making our knowledge of Russian, or any other foreign language, or any other disciplines deep, sound, and our "own"?

The work on formation of "the learning thought-forms" must not be forced, as every person has his own experience. The teacher should trust the students' creative abilities of the what will help to reveal their potential abilities in intellectual, spiritual, personal, interpersonal aspects.

Bio-adequacy of these methods does not result in co-dependence of students and their teacher or psychologist, whereas the person becomes able to solve his or her problems effectively. The simplicity of the method allows it to be used by all who are interested and learnt to work with this method. The economic benefit from implementation of these methods is guaranteed because that mechanism is inside the man himself, and to make it work it he needs only theoretical/practical training course of 50—90 hours, the purpose of which is "reconstruction" of the way of thinking inherent in man. In fact, this method is nothing new. It is as old as the mankind. **The only innovation we introduced is an offer to help realize that the method of thinking used by man in his everyday life is given to him by nature, and, on the base of realizing it, the teaching has to be based**.

It is becoming more and more obvious that TV and PC change the structure of the load and, therefore, development of all child's the neuropsychic systems, presence of "ready pictures" sort of makes the mind free from the necessity to imagine, envisage, think up what is missing in the written or verbal description; makes the semblance of no

[56] As opposed to the methods and techniques of the anthropogenic civilization.

need in doing that in life. But, as it is known, nature acts on the minimum expenditure principle, and the abilities remaining inactive too long develop slow or fade away. Besides, in compliance with the staging of brain structure maturing, it is very difficult or even impossible to overtake the certain (once neglected) possibilities of development. Only in Kipling's fairytale, Mowgli could freely learn to speak human language even at 16. It is practically impossible to teach modern "Mowglies" to speak well after 5—7 years old, because the corresponding stage of the brain structure development is missed. Unfortunately, they would not go farther than the manual language and certain simple words — in spite of all the efforts of the people surrounding them.

The practical interpretation of the bio-adequate methodology is discussed in the following chapters: the technology and the method of academic subjects teaching.

Chapter 7
THE BIOADEQUATE METHOD OF ACADEMIC SUBJECT TEACHING

> There is a thing much more important than most excellent discoveries — that is, possessing the method they were made with.
> *G. W. Leibnitz*

The biologically adequate REAL[57]-method is a complex of coordinated activities of teacher and learner **aimed at the motivation and activization of holistic dynamic thought-forms on academic subject and skills of instrumental work with them.** At the same time a systemic organization of physiological, intellectual, mental functions of learners is applied.

We do not offer in the REAL-method anything new but activization of creative abilities and economy of thinking which makes the way to the purpose the shortest. Ten years of Russian or foreign language studying might not give the ability to use it, as it is behind the power of many to combine the "patchwork blanket" of rules and fragmentary information into integral knowledge.

The purpose of the REAL-method is to motivate learning mental image as a microstructure of knowledge on a subject to be stored in the long-term memory of the learner, and to teach him to use this new mental image, i.e., to make it a creative

[57] Relaxation: teaching in the state of relaxation aimed at information accumulation and loading of the right (creative) cerebral hemisphere.
Action: active developing teaching based on training the left hemisphere.
Learning: studies.

dynamic microstructure of thinking, involve it in dynamic flow of constantly moving mental images acquired before.

For the first time the REAL-method defines the two-level aim of the teaching activity:

1. To teach the learners the method of thinking via mental images.

2. To create a personally oriented system of mental images on a certain academic discipline.

The REAL-method works objectively, subjectively, physiologically, and psychologically to form a method of thinking via mental images.

One would think we often do this simple work on creating associative images but in the educational process the tasks of the kind are a casual practice, most probably at the lessons of drawing and literature. Conscious, systematic using of associative images in all school subjects creates a systemic associative thinking, i.e., thinking conformable to nature. **The most important task of the REAL-method is to motivate bio-adequate method of thinking in man**, as the right method of thinking gives the learner the instrument for solving not only learning tasks but life tasks as well. The right method is more important than gigantic volumes of information, because the right method will lead man to the most significant discoveries.

The REAL-method equips every learner with adequate knowledge of the mechanism of man's thinking and practical skill to work in the system of bio-adequate thinking. So not only the way of learning and its stages become clear but also the role of every of the stages in the way of learning.

I. The REAL-method form

The REAL-method is relaxation-action method in form (REAL=relaxation-action learning), the stages of relaxation (information accumulation, the work of the right cerebral hemisphere) alternating with the stages of action (training the left hemisphere: logic, analysis, information structuring).

The REAL-method consists in reasonable partition of the learning material on a subject and kinds of work into the mentioned stages for effective comprehension of material and creating an integral system of knowledge on a certain discipline. This way the natural conditions for man are created under which the both cerebral hemispheres become activated and neither is left without the load. In this case knowledge can be accumulated and retrieved with a high degree of reliability. Besides, the interaction of

the left and right hemispheres results in that the body, brain, and soul achieve the harmony. In the issue the method provides the perfect work of brain structures and as a consequence — perfect physical state of the learners.

The soul, brain and body are engaged in the process of learning by means of relieving stress[58] and involving various pleasure centers.

—Peaceful atmosphere during the lesson results in improvement of general state, as the learners enjoy the process of working. They wait for the lessons and this makes the feeling of quick advance and success stronger.

— Information accumulation is systematically repeated and activated. The activization and comprehension of the accumulated material during the relaxation course is taking place with the assistance of the teachers.

II. The REAL-method stages

The methods of work have to agree with the stages of information perceiving.

The first and required stage is information **representation.** The second stage is information **perception**. The third stage is information **processing** (comprehension). The fourth stage is **representation in words,** and the fifth is **archiving** the information.

All these stages are correlated with the known system of learning stages by J. Piaget (see the scheme “The stages of information perceiving during the lesson”).

A great emphasis is placed to the representation of the information to perceive (the first stage). But it is obvious that perceiving without action has a tendency to the mere assimilation of environment by the organism. Any feeling if it is not experienced by a person has a tendency to be just a projection of the body to the environment. Action is a process of achieving agreement (or accommodation) between body’s perceiving and its feelings.

In the learning process feeling and action in their individual choices are realized during the stage of relaxation. And if the role of the first stage— information representation via image—can be called as determining the further course of studies, then the second stage — learning relaxation—can be considered as a decisive one.

[58] Stress is not always a barrier. Sometimes, quick and effective memorizing occurs against the background of stress (or one of its stages). Actually, both great joy and deep distress are stressful situations. But in the learning process, stress is most often considered either a conflict between the personal knowledge and impossibility to use it in the new conditions or as a situation of psycho-physiological discomfort complicating the learning process.

The stages of work with information during the lesson

(Example: foreign language lesson)

relaxation	**action**	**relaxation**	**action**
method listening+ visualization purpose new representation of the material on the basis of the student's personal experience and choice	method drawing symbols or images of information, discussing information purpose involving various brain centers into work	method text (task) audition purpose comprehending information via logical perception	method reading (task), analyzing and translating the text, etc. purpose skill in handling material
sensorimotor stage I	symbolic stage II	logical stage III	linguistic stage IV

It is at this stage that the person decides what exactly (and in which way) he or she will be conscious of, perceive, archive, and send to the memory bank. The question is, whether the new information will become just a projection of the body onto the environment (mere assimilation), or the student's perception and feelings[59] will somehow come to an agreement which, in its turn, will become an active part of consciousness.

III. The REAL-method types of work

[59] Displeasure will act as generalized name for negative estimation of subjective action and as a sign of resistance to amateurish performance. (The necessity of thinking to overcome resistance).

Pleasure (joy) will act as reflection of effective direction in subjectivity "action", resistance overcoming is accompanied by enthusiasm, and cheerful mood.

The role of individual educational cognitive activity in the modern society is almost the determining one. The deep essence of the REAL-method, as it was said, is the forming of skill to work with mental images. During this work, group training of thinking is taking place. So, from the traditional school didactics we pass to autodidactics (one of the individual methods is described by Kurinskiy in his work *Autodidactics*).

The REAL-method helps to acquire skills of work with images (choice, representation, drawing, structuring and arranging the information it in the image). Making a choice of this or that image, and assigning priority trigger the habit of self-organizing spirituality and intellectual work.

IV. The structure of the lesson

A foreign language lesson based on the REAL-method consists of 5 main parts:

1. Phonetic exercises — 5 minutes (action).
2. Grammar introduction — 10 minutes (relaxation).
3. Discussion, drawing, writing based on the new grammar material — 15 minutes (action).
4. Listening (new text) — 5 minutes (relaxation).
5. Oral reading, exercises — 10 minutes (action).

Mobility is achieved due to the teacher's deep realization of the necessity to use the REAL-method which can be applied not only in teaching languages, mathematics, but geography, history, biology, physics, chemistry, literature, and other school subjects as well. We have to solve the problem of a new structure of the courses: to sort out the information block of material for the possible work in the state of relaxation, and also a block of material for the active part.

V. Educational character of the REAL-method

It is a deeply educational method. Every act of choice making is accompanied by taking responsibility for this choice. At the same time, the educational function of the method is exhibited in the work essentially: not only formal memorizing, but also personal creative search that cultivates diligence, the habit of self-organizing, zeal, need in freedom of choice. Ontologically, education and training are twin sisters who were born and grew together but later were separated by people. It is the situation when the

training itself is educating through labor, soul, intellect, and it does not require additional time for educational activities.

VI. The estimation criteria

If we symbolically compare the power (N) of the REAL-method and traditional method with the given amount of work (A), the total social time (t) spent on the organization and conducting of learning process will be in the divisor. By comparison, we get:

$$N_{TRAD} = \frac{A}{t}; \qquad N_{REAL} = \frac{A}{t_{REAL}}; \qquad E = \frac{N_{REAL}}{N_{TRAD}}$$

The effectiveness (E) of the REAL-method will be 3—4 times higher by reducing the costs. $N_{total} = N_{efficient} = N_{expended}$[60].

The criterion of method effectiveness is sound knowledge, emotional effect, and social time necessary for the course studying.

The relaxation-action method is the synthesis at the practice level. It gives the opportunity to compare the results of work in both methods. The experience showed average 3—4 times time reduction when using the REAL-method. The experience proves[61] that the learners of school age are the most successful to master the method of creative thinking. They like it because it is the natural way of thinking for a human being. The apprehension of the REAL-method is much easier for those who had the experience of being influenced by "left-hemispheric" society in a less degree.

Let us examine the detailed structure of the lesson[62] concerning the part of new material studying. We omit the introduction to the lesson here (exercises in phonetics and lexis, home-task test).

The lesson for the 5—6th form students is designed for 45 minutes. We intentionally showed the lesson on topic "Phonetics, vocabulary, morphology, syntax, grammar as the components of Russian language", which is not presented in the program in such an integral, concentrated form. This material is dispersed in the textbooks, so we pursued a specific aim — to show an element of creative interpretation of existing traditional material by means of biologically adequate relaxation-action method. In this case, the

60 Kuznetsov O., Kuznetsov P., Bolshakov B. *The "Man—Nature—Society" Global System*. P. 114—115, 147—148.

61 The REAL-method has been tried out for 10 years.

62 By giving the example of lesson 1 from the *Russian Language* textbook by S. V. Balashov and N. V. Maslova (M., 1997).

concept of creativity as “creation of cultural and material values, new by design” (S. Ozhegov) is absolutely justified, because the concept of cultural values includes intellectual and methodological techniques of work: these are the values. The global task of pedagogy is to teach the culture of intellectual labor on the basis of national folk culture. It is this that we tried to show by the example of one of the lessons.

The description includes the well known working stages approved by the traditional pedagogy:

I. Acquiring the knowledge.

II. Forming the habit of using the knowledge.

III. Consolidating the habit of using the knowledge.

The certain parts of the lesson correspond to these pedagogical stages.

Stage I: **acquiring the knowledge** (I, II) is carried out in a state of relaxation. During this stage, motivation and forming of the mental image of the teaching material with structured information occur. The duration of the stage is 10 minutes.

Stage II: **formation of the habit of using the knowledge** (III—VI) is carried out in the state of action (excitement). During this stage information image is brought to the level of verbal description, drawing a visual graphic image; visual, motor, auditory, and logical connection between abstract information and personal image is formed. The duration of the stage is 10—15 minutes.

Stage III: **consolidation of the habit of using the knowledge** (VII—VIII). In this stage, the student’s image is separated from the textbook; he is searching his own examples with the following (checking) comebacks and example correcting. The duration of the stage is 10—15 minutes.

The home-task is the continuation of the third stage.

SCHEMATIC PLAN OF THE LESSON

Teacher’s reference narration	Students’ actions	Teacher’s actions	Means of educational influence	Teacher should REMEMBER:
		I		
Make yourselves comfortable. Relax your face, neck, shoulders, arms, body, legs... Imagine that your facial muscles are soft and relaxed... How beautiful you are when you smile... Imagine all	The students are in the state of relaxation, they work by means of visualization technique.	The teacher: — asks the students to make themselves comfortable, close their eyes, and relax; — asks the students to imagine	Soft, calm voice. The tone color can change to show that the teacher is sincere and understands every student he/she addresses to. The teacher speaks slower and in a lower voice	1. He/she forms the habit to the signal of his/her voice (Sokolov’s criterion): soon the students with the first words of a certain tone will get ready for relaxation. 2. The principle “The slower — the faster” is the guarantee of success. 3. Individual work occurs in students’ consciousness and

your body smiling… Imagine your favorite place indoors or outdoors where you feel peaceful, and where you are the absolute master… Imagine any subjects or objects you are surrounded by in this place of rest… Imagine the colors surrounding you… the movements and sounds of your place of rest… Imagine the smells around you. You can frisk there as you like… Have a look at yourself… How do you look like after you've had some rest, relieved from unnecessary thoughts and petty concerns? How do you feel when you are free from the burden of bans? Admire yourself if you like. Change your own image if you want to. Try to feel if your image likes to be with you? Make friends with it. Say "thank you" to your image and place. Try to be as sincere with yourself as you can.		their place of rest and peace; — turns on soothing music; —uses the aroma of flowers and mint; — asks the students to imagine themselves rested and free. **As a result**: it takes the teacher 3—5 minutes to make psycho-physiological preparation to new information perception.	than usual, adding the notes of mystery, game, concern… The teacher can speak to the music or without it. The teacher uses kindly facial expressions, smiles, quiet gestures. The teacher's behavior should bring comfort and confidence in his/her actions to the students. The teacher radiates absolute appreciation of all the students, absolute love to them.	subconsciousness: he **slowly switches over** from analytical to intuitive-creative (right-hemispheric) work. 4. The slow pace of the teacher's voice causes the response — makes the run of thoughts slower, makes the thoughts subside, switches the students to inner reflection and self-observation. 5. The teacher cannot impose his vision of the image or problem to the students. 6. The teacher cannot substitute the students' personal experience by mere displaying schemes, drawings, etc., as the roots of associations lie deep in the person's subconscious. 7. Every student is a part of the Universe: he (she) contains information available to him (her). 8. The teacher helps the students discover and reveal their inner reserves, but never "gives" knowledge to them.
Imagine a summer meadow with motley grass… Look at the things you are surrounded by: what objects, colors, sounds, smells? Breathe the scent of summer meadow! Take a good look at the flowers and grass. Find the typical Russian flower. What is it? A chamomile or	The students perceive the new information drawing it mentally on the image.	II The teacher represents new information on topic 1: "Phonetics, vocabulary, morphology, syntax, and grammar as the components of Russian language."		1. It's important to keep speaking slowly and confidentially. 2. This part of the lesson cannot be substituted by viewing the drawings, schemes, tables, or listening to the stories, etc., as the roots of associative thinking are deeper than logical ones. 3. The ability to think by means of images and seek analogies, independence in work, creative excitement, personal responsibility for the choice **requires time** — personal inner time.

cornflower? Ask this flower to become the symbol of Russian language for you… Try to remember the way children play the horns, the way they blow using a blade of grass or stalks… Let the stem of the flower that sounds become the symbol of Russian sounds — phonetics (from Greek *phonema* — sound), growing on the Russian soil. The leaves of the flower can embody the parts of the words — morphology (from Greek *morphe* — form and *logy* —science, knowledge). Look at the petals — they can symbolize different groups of words — *lexis*: here is a group of monosemantic words, and there — polysemantic one; here are the synonyms — the words with the close meaning but different sounding (e. g. *beautiful— gorgeous*); and now look at another petal: this is a group of antonyms — words with opposite meanings (e.g., *friend — enemy*); the next petal — historicisms… [There are as many petals as word groups in the language] Look at them all now, what unites all these groups of words —the sepals — what the words can form, a sentence (syntax — from Greek *syntaktikos* —arrange				4. The concentration of students' efforts occurs in their inner world. 5. The students' effort of concentration is in focusing at the given subject via all canals of perception: hearing, vision, sense of smell, touch, taste, and intuition. 6. Haste will cause harm, as the students will not be able to focus deeply on reflection.

together) — united by means of the core — the symbol of grammar (the rules of word interaction). Thank the flower for helping you see the interaction of the parts in Russian language. Walk about the meadow for a while. Thank it, too.				
Feel your feet... a flow of energy to your hands and feet... Feel your back and shoulders... Move your fingers, clench them into fists... Move your hands, shoulders... You may want to strain your neck... turn your head right and left... Smile and give a deep sigh... Touch your cheeks and eyes slowly... Return to your class unhurriedly... Open your eyes.	The students gradually acquire motor muscle tone; they have a wish to be out of relaxation.	III The teacher makes the students feel invigorated to help them out of relaxation, comes up to those who need his closer presence, puts his hand on the shoulder in case of need. The teacher can also touch the hands or pat the heads of younger children.	Soft voice acquires action intonations.	1. Slow but a slightly more energetic tone will help the students invigorate. 2. The tone of the voice becomes more and more cheerful. 3. "Coming back" from relaxation occurs in the reverse order to "entering", i.e., from the feet to the head. 4. Short phrases help acquire confidence in the adequacy of actions.
What kind of meadow did you see? Was it a real meadow from your childhood or fancy meadow? Where did you see the meadow? Describe it. What flowers were there? What colors, tints did they have? Were there any movements? Did you feel any smells? What did you like? What mood were you in? How did your favorite flower look like? Where was it? What were the smells there? Did they resemble the smell of	The students can tell one by one or interrupting each other.	IV The teacher questions the students about their "travelling" along the summer meadow. He tries to make the discussion grow excited. Exhilaration and noise is not a problem. As far as possible the teacher can make tea drinking with sweets having the names of flowers.	Smiling, pronounced interest to the students' feelings, liveliness, individual talk and questions to every student. Action gestures and facial expression (Sokolov's criterion) dispose to discussion.	1. Every student should tell what image he saw—this way the connection between image and words is consolidated. 2. It is not always possible to express aloud all one has seen. Avoid urging and the situations of stress, tension, fear, conflict between the students' inner knowledge and impossibility to utter this. 3. Assist the students to be eager to tell what they have seen. 4. It is important to keep speaking cheerfully, show respect to personal experience of the students, and create the atmosphere of joy and fun. This will remove stress and fear of complex material. 5. Any image (even negative one!) can play its positive role; try to actualize it. 6. Diffident students need

the meadow or chamomile tea? What can you compare your feeling of staying on the summer meadow with? How did you "fill" the image with information: did the words appear on the petals or the core of the flower?				benevolent and compassionate support. 7. It is very good to use aromatic oils and chamomile tea which add smell to the association series of long-term memory. 8. Memory is a function of the entire body.
The teacher gives one or two important terms to be memorized: "We are preparing to memorize the components of Russian language— **phonetics, lexis**, **syntax, morphology, grammar**, and the way they are connected with each other. This is called '**the linking system**' in Russian language."	The students draw in their note-books. They activate their memory. The image is consolidated through the motor function of hand.	V The teacher asks to outline the flowers the students saw during the relaxation and specifies the size of the drawing (the double-page of the note-book).	The teacher comes up to every student with interest and curiosity to their work and gives advice as to the size of the drawing.	1) Every student is working individually. 2) The teacher's interest helps the students to be active, resourceful, and laborious. 3) Praise promotes the students' work. 4) The image is filled with color, shape, taste, smell, and content.
Let us examine the image in details. What information did you get during the relaxation? Who can add or specify? What was said about the stem of the flower? Do you remember what was said about the core of the flower? Who would like to define more exactly? Could you explain the terms *phonetics, lexis, syntax, morphology, grammar?* In what spheres of life do you meet these parts of the language?	The students tell in chorus, in eager rivalry, what they heard and remembered. They try to explain the terms.	VI The teacher asks to remember the information obtained during the relaxation: the teacher specifies what the students have remembered. Then he asks to put it down and checks if there are any mistakes in the notes and wording. If necessary, the teacher shows the image several times, but does not let the students copy it.	The teacher promotes general discussion by asking questions, demonstrates his enthusiasm and excitement.	1. First, the students tell what they remember; the teacher makes the needed corrections. 2. The students should be encouraged to show excitement and competitiveness — noise, hubbub, laughter, mutual support are appropriate. 3. It is necessary to create the situation of actuality of the image through empathy and interest, let it through the five sense organs, turning the drawn image into a mental image, memory part, affecting all canals of perception, whereas memory is a function of the entire body; the more sense organs are involved into the process of learning (and the stronger they are affected), the more durable the obtained knowledge will be. 4. Information should be recorded in separate fragments: the stem, the core, one petal, another one, etc., but not all at once. When the major details

				are reproduced, undersigns and smaller details should be reproduced from memory. This process is accompanied with saying of the necessary for memorizing the terms and conceptions which are present in the scheme.
1. What information is placed in the core of the flower? Compare it with what you put down in your note-book. Correct it, if necessary. 2. How is the first (second...) lexical group called? What do "antonyms" mean? What do "historicisms" mean? (The teacher reviews with the students either all the material or some part of it).	The students compare the obrazon in the textbook with their notes and correct them.	VII The teacher suggests the students to have a look at the obrazon — a drawing with structured information put in it—which is in the textbook (or made by the teacher) and compare their own notes in the exercise-book with the drawing in the textbook.	The teacher gives the hints while looking through the notes in the exercise-books: he shows his personal interest.	1. The students, concentratedly and individually, examine and compare the notes of information. 2. Inner analytical work is taking place here. 3. Every student requires different amount of time for doing it. 4. The teacher should have additional tasks for quickly working students.
Think of your own examples. Let us start with synonyms. What are your examples of synonyms?... What are your examples of antonyms?... What are your examples of neologisms?...etc.	The students think up and put down their own examples.	VIII The teacher suggests the students to think of their own examples of words and put them down in their exercise-books on the corresponding elements of the drawing.	The teacher comes up to every student showing his interest and curiosity to their work and gives some advice as to the sizes of the drawings.	1. The students should think of their own examples using their experience. 2. The teacher should define the task clearly: "What are your examples of synonyms?" 3. The examples should be said at first and only then written down.
The teacher corrects, specifies as necessary.	The students compare the acquired knowledge with the textbook.	IX The teacher asks to do the exercises (orally or in written form)	The teacher's examples are the models for the students.	1. The students need correcting while fixing the new lesson.
Make a story, a poem, or your own image on the topic learnt at the lesson.	The students write down the home-task.	X The teacher gives the home-task.	Class reading.	1. While preparing the task the students have to superimpose the information they got on the new material.

The experience shows that the learners like creating their own images. Many of them try to make the schemes more complicated and animate them. This process of comparing the new with the familiar and already known has always been and is in the arsenal of many outstanding scientists. For example, A. D. Sakharov's co-worker, a physicist Gudzenko liked to convert complex physical formula into simple and clear images. He animated physical concepts, made them mobile.

This is the way the teacher should work with each topic. The teacher's creative potential will allow to think of deeply interesting "dreams" for the learners, as the teacher knows how different the interests and relations in different classes and groups may be. However, **using of all the three described stages is required. They all are physiologically, psychologically, and methodologically necessary and unavoidable.** Omitting even one of them can be harmful for children as if we "upset" the natural biorhythms or make random removals in them: we can hardly imagine such removals, for example, in the "morning—afternoon—evening–night" cycle, can't we?

The lesson scheme shows that the lesson consists of 8 parts, but there can be as many as 3, 5, or 10 — at the teacher's discretion. The number of the parts increases if the teacher includes phonetic, lexical, or logical practice.

In the scheme, we can see that the revision of the material ("phonetics", "vocabulary", "morphology", "syntax", and "grammar" correspondingly) occurs at least 5—6 times in 45 minutes, a new particular canal of perception being activated at every repetition: speech is activated in the 3rd part of the lesson, the motoric function of hands, vision, sense of smell and touch — in the 4th part, logical structures of the memory — in the 5th part, etc.

The majority of experimental teaching results show that memorizing occurs in the course of multiple revisions. K. Pribram explains this in the following way: during the revision, the material is distributed in the way that it is included in the whole system of correlations of previously fixed experience.[63] That is the secret of the durable long-term memory which, as K. Pribram calls it, rather a function of connective structures than that of the processes occurring in the nerve cell itself.[64]

The formation of long-term persistent changes occurs in the connecting apparatuses of brain tissue when the growth of nerve fibers changes the spatial structure of inter-neuron links[65].

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63 Pribram K. *Languages of the Brain*... P. 64
64 Ibid.
65 Ibid.

This process of teaching is called **concentrated teaching**. The effectiveness increases 20% if the revisions are made in the course of some of the lessons (2—3) based on music, color or herbal background. Along with consolidation of the material, the teacher can check which of the canals is better worked out for this or that student. The revision can be organized the following way: turn on the same music that sounded when you told your students about the summer meadow covered with flowers. Use the same aroma and ask the students to reproduce the material in any form they like without any assistance.

The active use of teaching mental images in the long-term memory is ensured if the teacher **strictly follows the succession of stages I—II—III** — and, of course, if the teacher shows his own enthusiasm. The teacher's love (the field of absolute positive appreciation of every student by the teacher) and energy result in corresponding love and energy of the student's mental image.

This method has been **approbated for 10 years in the Russian Academy of Natural Sciences and a number of schools.** The objective results of the REAL-method work are as follows:

— reduction of the time spent for studying the subject by 3—4 times;

— greater interest in teachers to their studies; improvement of the students' results;

— development of the students' creative abilities — they literally "shower" you with their new ideas.

The teachers of Russian and English, mathematics, physics, and history have been using the REAL-method for as long as 10 years in such cities and towns as Moscow, Lubertsy, Zhukovskiy, Lobnya, Khabarovsk, Mariinsk, Anjero-Sudjensk, Aginskoye (Buryat Republic), Borovsk, Mtsensk, Vladivostok, Pokrovsk (Yakutia), Irkutsk. All the examples and figures given in this work are taken from their work experience[66]. Medical examinations showed a powerful health-improvement effect in the students studying by the REAL-method. The cause of this improvement is the adequacy of the process of learning to the natural mechanisms of the body—brain—psyche system.

Chapter 8
BIOLOGICALLY ADEQUATE TEXTBOOKS

[66] Dunayeva T. N. Living mathematics// On the Way to Noospheric Education. Collected papers of "Reflecting on the 21st Century and Education" international conference. P. 109—115.
Ladygina I. A. History of love (on teaching history at school) // Ibid., p. 118—126.
Balyuk I. A. On the bio-adequate method of foreign language teaching // Scientific reports of International Science Academy of Pedagogical Education. M., 1998. P. 35—40.

The original sin is to limit the Is. Don't.
Richard Bach. Illusions: The Adventures of a Reluctant Messiah

Invisible fetters of the bans on thinking have heavily tied up teachers... Once, after a seven-day methodological seminar on biologically adequate methods in English and Russian language teaching, we heard a key phrase: "Thank you. You have shown us that one CAN think this way." In this context "CAN" sounded like "IS ALLOWED TO." As a matter of fact, teachers seemed to be waiting for a permission to start thinking using images, a permission for *nature-conformable* teaching. Their notions of teaching and thinking were divided by an almost insurmountable barrier. They believed they had to "teach knowledge", not realizing that, in fact, they had to teach how to think. For many of them it was a revelation that thinking is a *nature-conformable* process and should not break the Man-and-Universe ecology system. It is for the first time that many of them ceased to think about *nature-conformity* of their teaching and that the original sin of limiting the "IS" starts with the first school textbooks...

Biologically adequate textbooks

In the modern world, the task of science and education is simple, economical presentation of information. Tutorials play an important role here. One should orientate properly in the ocean of currently existing textbooks, both classical and innovative. The textbooks developed and approved by the scientists and specialists of the RUSSIAN NATURAL SCIENCES ACADEMY are called **biologically adequate**.

These textbooks are of a completely new generation. They present material of a certain discipline as a system of vivid reference images, rich in comprehensive, structured information expounded in algorithmic order.

The task of a *biologically adequate* textbook is to organize each student's personal knowledge in accordance with the physiologically necessary stages of information perception and processing. Some clarification is necessary for clear understanding of this innovative textbook problem statement.

According to Jean Piaget's[67] operational conception of intellect, any information is perceived by a man through four natural stages:

I — Sensorimotor (sensory perception)
II — Symbolic (figurative "folding" of perceptional-logical information)

67 Piaget J. *Selected Psychological Works*. M., 1994, p. 55—237.

III — Logical (discursive-logical understanding of information)

IV — Linguistic (accommodation of information in the mind via *word-image* processed in stages 1—3)

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Scheme 25

This natural way of information passage leads to formation and accommodation of *mental images* — holographic microstructures of thinking.[68]

In textbooks produced by classical pedagogic science, information was presented only at the lexical and logical stages (with some references to symbolic stage). The physiologically necessary sensorimotor stage of information perception was practically absent there. This is one of the reasons the students experienced difficulties in their understanding (or, more accurately, perception) of information. Indeed, to start eating, one should put the food into his mouth first; to fall asleep, one should relax first; to start running, one should tense his muscles first.

An action cannot become fully fledged without the vital stage number one: the running will be sluggish, thoughts will cause insomnia, and we will find ourselves in a role of a fox just dreaming of tasting grapes. Compliance with the natural order of information perception and processing leads to the economy of necessary and sufficient time and energy in the educational process. This is the first thing to correspond to the natural course of perception. Let us specify the sequence of stages:

1. Representation (presentation) of the examined phenomenon image.

2. Presentation of information (the explanation of the image in the light of the examined phenomenon).

3. Consolidation of *the mental image* of the examined phenomenon.

4. Creative use of *the mental image* (the training of *the mental image* using skills)

The structure of biologically adequate textbooks

Observance of information perception stages (sensorimotor, symbolic, logical, and linguistic) and their clear sequence is the basis for structural components in the textbook of the new type. It is obvious that the **structure of *biologically adequate***

[68] According to Piaget, intellect is a system of relatively coordinated invertible operations, and its formation is developed in 4 stages (as shown in the scheme).

textbooks is that of maximum economy. It is subordinate to the goal of the textbook and has four clearly defined parts in each lesson:

1. The image of the examined phenomenon (chamomile, apple, spike, etc.).
2. Explanatory notes to the image.
3. Exercises on consolidation.
4. Creative tasks for the examined phenomenon.

Each of these parts is aimed at the solution of a specified educational task. It is important to emphasize that while working with the textbook, there must be no missing or changing of the order of information processing stages.

The biologically adequate textbooks involve various channels of perception into the educational process: hearing, eyesight, sense of smell, sense of touch, sense of taste. This is the second obligatory condition of biological adequacy of the information perception process from the human physiology perspective. Reliance on the multichannel perception allows storing (imprinting information into the long-term memory). In terms of psychophysiology it means superimposing new information on the personal experience of a student using associative series: symbol — feeling — word — logic. Try to check the correctness of our statements. Open a page with any image in a textbook, for example, *Russian Language*[69]: apple, cherry, chamomile... What sensations do you have? What personal memories do you recollect in connection with one or another image? In the same place you got the feeling of taste; try to recollect the smell and tactile sensations; soon the motor function and spatial orientation will start working. (Where was it? Who was near?) You will hear sounds and even remember somebody's words, said at that time by someone near you.

The information proceeds into the specified structures of memory through the canals natural to the animal world. The mechanism of information recovery from the long-term memory is known.

Any signal directed into the brain (e.g., a word or a smell, a movement or an image) works as the trigger of *output*.

Fundamental features

69 Balashov S. V., Maslova N. V. *Russian Language*. M., Institute of Holodynamics.

The biologically adequate textbook's differences from the traditional textbooks are as follows:

— The short-term goal of **the biologically adequate textbook** is motivation and activization of the *mental images* system for a specified educational course;

— The overall purpose of **the biologically adequate textbook** is the training and development of the natural method of thinking in images, i.e., the training of ***nature-conformable*** **or natural thinking**[70];

The work with a *biologically adequate textbook* is built not on the principle "read and remember", but on the principle "perceive via all channels, associate and create."

Thereby, the power of the *biologically adequate textbook* is in **economy of thinking** by ordering life experience and realizing the creative abilities of a student. It is this economy of thinking that represents the true power of science. The key feature **of biologically adequate textbooks** is their **economy**.

The experience of using *biologically adequate textbooks* has shown the possibility of shortening the time needed to study the material some 3—4 times when working in ordinary mode, with even more significant time savings when working in intensive studying mode.

Speaking about economy we are pointing out to the economical benefits of using **biologically adequate textbooks** and their economy from the human capability point of view. These textbooks have everything necessary and sufficient to proceed on the path of knowledge, without wasting any time, efforts or money.

By presenting **biologically adequate textbooks** we don't invent anything new, except offering health, economy of thinking, social time and costs.

The instrumental feature (instrumentality) is another important feature of **biologically adequate textbooks**. The use of *mental images*, familiar to every human being, allows using received information as an instrument of communication and activity immediately. The work with natural models through associations teaches one to find analogues in nature. It is inevitable in developing the image thinking. Such instruments (the image model) make thinking and mental activity easier through the *mental image*[71].

The esthetics is the main feature of biologically adequate textbooks. It is not a superficial feature. The textbooks are created to allow performing the dedicated

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70 Pribram K. *Languages of the Brain: Experimental Paradoxes and Principles in Neuropsychology*. M., 1971.

71 K. Pribram researches the mechanism of associations — i.e., the neuron holographic process (*Languages of the Brain; Experimental Paradoxes and Principles in Neuropsychology*).

process of forming students' valuable attitude to the world and creative work without having to use additional methods.

The esthetics as the "theory of sensual cognition", as teaching of the beautiful and the art is a form-generating theoretical component of the methodological complex, which the textbook of the new type is built on.

The "beauty will save the world" principle works every minute in the textbook:

— All the images are custom-created by a professional artist, familiar with design concepts of the world of nature and engineering;

— All the images are built on the principle of golden ratio, familiar to world's famous artists;

— The color palette of images is organized in accordance with the well-considered new method and psychological concept of separate themes.

Images, which are healing the soul and carrying a huge positive charge to each student, are used in textbooks.

Using the textbook, a student trains his eyes and psyche to see and appreciate beauty, i.e., to **resonate** in tune with harmonious images. This communication gives one the experience of comparison to the beauty of the world. The student is developing skills of search, harmony, and good. Gradually, the need of and desire for beauty is being developed. The student's extended communication with this wonderfully beautiful textbook gives the spiritual experience of buoyancy, forms the desire to be in harmony and, of course, to create and develop such esthetic situations in life and studies.

Textbooks of new type assure students in possibility of reproducing any information on the level of creative work. We have accumulated a great amount of material related to students' creative work during a decade of teaching English and Russian language by using biologically adequate methods. Many of those have been included in the currently published textbooks. Students' communication with the book, which actually is an artistically fulfilled work, forms man's values in attitude to the world: not a divided knowledge, but the unity of humanist, scientific, and artistic points of view.

The new type textbook exercises student's skills of making a choice. Each lesson contains elements of appealing to student's personal knowledge and choice of situations, forms, information. Besides, each lesson is summed up by a creative task: to create students' own *word-images* using a picture, story, scheme, rhyme, crossword puzzle etc. This is permanently stimulating the creative potentialities of a student, involves an element of competition during the educational process. The information is transferred

into the associative memory through channels, natural to the whole animal world, it is kept and easily retrieved thanks to the memorized familiar and comprehensive images.

The purpose of textbooks

The biologically adequate textbook is multifunctional. It may be used by a teacher as a visual aid, serve for creation of handouts: the textbook may be used for group work, or as teach-yourself book as it contains the necessary material and guidelines for methods of working with the textbook. The practice has shown the other function of textbooks as the family encyclopedia. The textbooks of initial stage are intended for students of 7 years and older.

Together with new textbooks the method which is called biologically adequate, which means natural for perception and memorizing of new material, is brought to the practice of teaching. Normally, all channels of sense perception are involved in the educational process; new information is superimposed on the personal knowledge of a student; intuition is involved and student's creative abilities are activated. (See Chapter 7)

All the above-listed features of new type textbooks — the economical feature, the instrumental feature, the esthetical feature, and the multifunctional feature could in sum total have been called *nature-conformity*. In terms of modern language they could have been called the *ecological compatibility (environmentally-friendly)*.

When creating biologically adequate textbooks, specialists refer to the whole preceding experience and traditional programs. They synthesize current groundworks of native and foreign pedagogical schools and up-to-date scientists' interpretations of the nature of information, neurophysiologic wave processes, hygiene, esthetics, and ergonomics of the textbook.

The image and the *obrazon*

Regardless of the subject, biologically adequate textbooks have several common features, mentioned at the beginning of the chapter. And here we should pause at the meaning of ***obrazon*** (fr. Russian *образ* [*obraz*], image, and the Greek ending *-on*)**, which means the referent *image*, full of comprehensive, structured information in algorithmic order**.

The *obrazon* plays an important role in a biologically adequate book: it starts the new subject (lesson), it is the first part of the lesson (the first convolution of information), and other parts of the lesson are also related to the *obrazon*.

The differences between the *obrazon* and the image are obvious:

— the holographic image is created by the brain and is the individual unit of thinking[72];

— the two-dimensional (not holographic) *obrazon* is created by an artist, student or teacher as a visual aid to the thought;

— due to its simplicity, the *obrazon* makes the mediated logical and structured field of educational information visually available;

— the *obrazon* plays the role of a sign. The sign "captures" the essence of the other material (that is educational material). "The sign is the rule of transition from the ontology (of the objective reality) to the gnosiology (of the cognition)."[73]

The analogy between the *obrazon* and the sign denotes that the objective reality is continued in the cognition. The sign refers to the conscious mastering of analogy. At the same time, the *obrazon* is the Symbol, which sends the cognizant back to his unconscious. The very structure of the symbol is aimed at proceeding to the common cultural archetypes through personal perception, on presenting the integral image of the world by means of every particular phenomenon.

The image and the *obrazon* have much in common:

— the understanding of the image and the sense of educational information simultaneity is imprinted;

— this is a unique flight of thought[74] — the search for the truth by means of choosing analogues for new information. In this regard this is a metaphoric flight (search) with the purpose of materializing the thought.

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72 Image is the result and ideal form of representing material and ideal object or phenomenon in human consciousness, appearing in the process of cognition on the basis (or in form of) signs. Images are subjective and appear only in the brain. According to one of the leading modern psychologists, Antonio Meneghetti, thought is nothing else but the energy, reflected and focused by vector to a certain point in the brain. An image containing the corresponding amount of energy and vector dynamics is the contents of this reflection. The holograph of images was researched by K. Pribram (*Languages of the Brain; Experimental Paradoxes and Principles in Neuropsychology*). The polysemy of images allows an individual to vary them in different situations on the basis of personal experience.

73 Leshev S. V. Sign and symbol / *The Path to Noospheric Education*. M., 1999. P. 71—79.

74 Bach R. *The Selected*. Vol. 2, p. 383.

Richard Bach has shown his opinion of this quite poetically: (find the original) “The materialization is an expression of mind and choice. Turn around: everything you see and touch used to be an invisible thought until someone chose it to be embodied.”[75]

The symbol and the *Obrazon*

It’s necessary to understand the role of the **symbol**. It is known that any integral phenomenon is most vitally revealed in the name. The word **symbol** originates from Greek **symbolon** and means casting a net when fishing. It adds up what we do searching for a symbol: we are fishing (catching) the golden fish of sense! What a great amount of work should be done to “catch” the very thing needed.

In science, the symbol means a sign. In art, the symbol means a universal esthetic category which reveals the sense of artistic image by comparing it. In the aspect of philosophy, the symbol is a sign, endowed with the limitation of the form and unlimited polysemy of the image. In this connection every image is a symbol.

For example, let us take *obrazons* from biologically adequate textbooks: apple, butterfly, chamomile… these natural images may be considered as biological models of interrelated elements. And, perceiving these biological models, for example, a sunflower, we don’t need to comprehend the situation and think about relations and interrelations, as we obviously see that the core contains something common for all petals and the equality of petals makes them equal towards the core, footstalk and leaves of the flower. This model corresponds to the situation in English grammar (and other foreign languages). Notably, every noun has a genre, a number, and a case — the necessary attributes. The number of groups in the world of the noun corresponds to petals (some attributes of word formation may be different — suffixes, prefixes etc.). The situation of growing or removed footstalk is also acceptable as an analogue to the presence or absence of preposition. Surely, the ability to cover the whole situation of interrelations, the whole phenomenon as adequate to its nature is a kind of direct-vision (conduct, knowledge), with no need to divide operations of left and right hemispheres (logical and figuratively-intuitive). It’s obvious that the symbol can not be deciphered by the intellect alone. The semantic structure of the symbol is intended for an active inner work of the percipient.

According to J. Piaget[76], associative roots of thinking go deeper than logical. We reveal the synthesis of logical and emotional in the association that means the integrity

[75] Ibid., p. 422.
[76] Piaget J. *Logic and Psychology*.

of thinking. Let us take the "Butterfly" *obrazon*. Our emotional sphere starts working, actually "reminding" of our life experience situations when we watched the butterfly flight — the movement. What a gracious movement! The wings we see moving in the flight are themselves the association of movement. The logic doesn't betray us here: each of the wings may be associated with any differences of the movement nature. That is how movement appeared in the world, like the four forms of regular verbs in the world of English verbs. That is how the "Butterfly" *obrazon* was created. Richard Bach has shown his opinion of *obrazon* creation quite poetically:

We perceive in one world
We think in the other one
We name in the third one
We can establish relations between these worlds… the naming is superimposition of these relations.

The search of *obrazon* is aimed at not only the search of analogy by the form, color, movement or taste. Often, the smell, taste, or color may have a more important meaning. For example, for the topic "The adjective in Russian language" the red, juicy, Crimean apple was chosen as an *obrazon*. This *obrazon* evokes sensations of smell and taste in the first place, as it is necessary to realize the importance of the question WHAT? — TASTY, RIPE, FRAGRANT.

The importance of such educational approach was underlined by Dale Carnegie: *It would be an ideal thing not only to see and hear what should be remembered, but also to touch, sniff and taste it.*

One of important tasks of *obrazon* is to "switch on (enable)" all channels of perception, referring to the personal experience of a student, or archetypes (stable figures of the unconscious).

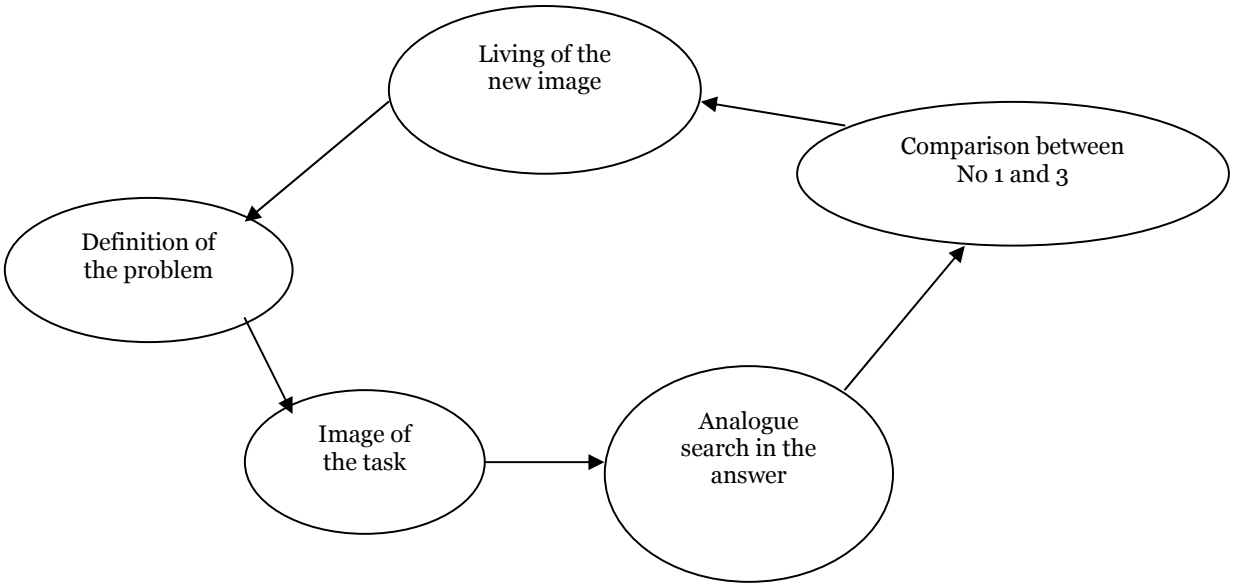
The symbol search

Let us generally consider the mechanism of symbol search solving any task or in the process of information perception.

Scheme 26

left hemisphere;
right hemisphere;
signal;
problem definition;
primordial image;
search for an analog;
comparison;
living

The recording of the associational search may be simplified:



Scheme 27

Steps 2, 3, and 4 demonstrate the tactics of task simplification.

Step 5 demonstrates the strategy of overstating the goals.

Thus, the tactics of task simplification and the strategy of goal overstating present us the image (via the educational *obrazon*). That's how we achieve the ability to understand phenomena and subjects in two ways — real and symbolic. This is called the adequacy of thinking.

We use terms of "sensing", "living" and "correspondence superposing" of *obrazon* or symbol. This is the only way to check the informational correspondence to internal

needs and values of an individual. The eidetic memory is based on this feature of our thinking.

Image memory

The "eidos" means the "image" in Greek, and the eidetism is one of image memory types, expressed in saving vivid images of subjects after they have no further influence on sense organs. A person with eidetic memory is able to remember whole pages of text, recall every day of his life and forget the unnecessary, he is able to study foreign languages very fast or go without an organizer. F. R. Lurie is one of theorists of this school of thought. He has pointed out two lines of this psychoeducational approach (eidetic method): the mnemotechnics (based on verbally-logical thinking) and the eidotechnics (the concrete image thinking). There are 26 method-conditions of using combined methods in the eidetic method.

Visual, photographic, olfactory, and tactile memory is being developed. Methods of memory development, stored through centuries by mankind are used as well as new original methods copyrighted by Igor Yur'yevich Matyugin, the director of the Eidos Center[77]. As the result of studying at this center, the memory is improved almost twice, studies can help everyone to reveal the abilities one couldn't have even imagined.

Positive results, recorded during the use of the method for correcting students' difficulties are well coordinated with the findings of modern psychologists who suppose that optimal methods of cognition and teaching quite often precede the role of native traits.

Metaphor

What are the features of sign-symbols, images and systems of signs in human society, nature and man himself? This is the subject of semiotics[78].

The question we are mainly interested in is **how does the symbol interact with the mind**?

Let us apply to the metaphoric theory. In medias res, looking for *obrazon*-symbol we implement the metaphoric flight of the thought; we are searching for similarity, comparison. Sometimes we find the direct comparison — the smell, the color, the taste

[77] The Eidos Center exists from March 9, 1988. Since then, more than 2000 instructors for eidetic memory development were trained there.

[78] Semiotics (Greek *semeion* — sign) is academic study of the relationship of language and other signs with their meanings.

of the apple which is familiar. Sometimes we fail to straightly formulate what is similar to our *obrazon*-symbol. For example, the spike (the complex sentence), double hours (the parenthesis), the sphinx (the absence of nouns gender in foreign languages). The comparison, in which the feature of similarity is either not formulated or cannot be formulated, is called the metaphor[79].

In other words, the metaphor is an unspecified figurative comparison.

The metaphor is accepted when the image corresponds to the personal experience of the subject and the "blurriness" of signs makes it possible to use all the signs of the compared object with the necessary object. The metaphor may not be accepted if compared objects are too different and there is no connection between them. From time to time, people oppose the possible consequences of accepting the metaphor. This personal decision may be conscious or unconscious. This is the main reason of our reference to nature models used for *obrazons*. This is also the reason of obligatory creative assignments — the student can always find his own *obrazon* if the *obrazon* given by the textbook or the teacher doesn't suit him. About 8% of students have this ability as natural. As a rule, these students study well. For them the studies is the process of search, creation. Unfortunately, 92% of students need to be taught to think in such a way. Until they are able to think using familiar models — *obrazons*, they are thoroughly cramming up the educational material, getting tired. They are overcoming their own nature, unaware of the simple way of natural image thinking.

What is the influence of metaphors composed of?

The metaphor changes human attitudes:
— semantic
— instrumental
— spatial

The metaphor shows the way to the personal, underlying, not surface consciousness of a man. Having discovered 1—2 good metaphors and represented them in *obrazons*, the student ascertains that he has understood their **true sense**, received the **instrument** of sense search, extended and intensified his internal **space** of understanding. Each new skill helps the student to become more and more conscious of his own ability to solve problems with the help of immersed inside (interfered) symbols, associated with images of the world. With this experience the student becomes sure that

79 The World of Psychology and Psychology in the World. 1994, No 0, p. 102

the instrument he has found works in his internal space and finds its own senses, which control the student's activity relating to the reality (adaptive tasks). This conclusion becomes clear to students working with educational *obrazons* very quickly. From the first time the child "grasps" the essence of the *obrazon* and is ready to present his own *obrazons*, for that is the way he thinks. Our experience of working with first-year students has shown that having understood the potentialities of *obrazons*, they started to use them for making summaries, preparing for credits and examinations. They told us they were pleased that the creation of *obrazon* saves time, energy and even allows having a rest during lections and seminars. So, the **function of the *obrazon* is to be the first step to the nature-conformity of thinking**.

During the period of flourishing behaviorism, psychologists tried to explain the behavior of an organism and particularly the process of learning without resorting to the concept of an image. However, it was soon revealed that "...explanatory possibilities of behavioristic observations... are very limited." This conclusion belongs to a distinguished neurophysiologist from Stanford University Karl Pribram[80] (*Languages of the Brain; Experimental Paradoxes and Principles in Neuropsychology* by Karl Pribram). It was, perhaps, after his book called *Languages of the Brain; Experimental Paradoxes and Principles in Neuropsychology* (1971 or 1975) has been published that for the first time scientist started to speak openly about IMAGES as informational compressions, which appear during the process of thinking. The development of semiotics (the theory of signs and system of signs) and hermeneutics (the theory of sign cognition), more thorough study of Freud and Jung archetypes (stable figures of the unconscious), reference to more ancient sources (Aristotle, Plato, Socrates) has led the humanity to the understanding of image meaning as a form of information existence in the world, the sign as the thing, which in its availability makes something else also available: the sign captures, holds the existence of the diverse (by S. V. Leshchev), the symbol as the method of information search and information archiving in processes of cognition.

Natural safety

The principle of the **Potential Intelligent Safety** is not simply the new principle of pedagogic. This is the first time presented principle which comes from the depths of integral and sound human consciousness. (We have already used the term *ecological thinking* in connection with integral thinking).

80 Pribram K. *Languages of the Brain*...

The **Potential Intelligent Safety** is based on general-system principles, the most important of which in this case are:

— nature-conformity;

— self-organization of information;

— invariance.

Work with the natural image and obrazon is also potentially safe. Let us remember that people had learned to listen to the nature and his environment, choosing natural models themselves. First ecological conceptions of man are reflected in the appearance of the totem. The species, standing on the top of ecological (food) pyramid of the regional ecosystem, was chosen as the totem. The relation, guarding and imitation of the totem gave human beings a feeling of connection and unity with the Universe and the surrounding world. All sense organs were enabled by man. He apprenticed with the totem.

Taking the culture as the second nature or the symbolic universe (Lotman), we install its basic meaning, the **symbol,** into the education in the level of consciousness (as opposed to the unconsciousness) exactly as the symbol, not as an example (the illustration of teacher's words). We offer the change of summands' places. This action changes many things, for the information perception is not mathematics, where the change of summands' places doesn't affect the result of summing. The perception is a complicated psychophysical process.

By offering the symbol to take the leading place in the educational process, we take the ideal as the example of standard in the symbol. We offer cultural examples and *nature-conformable* symbols to make the individual mentality come true.

Also, students are offered to be the first to interpret, not after the teacher, and by these means the first place is taken by the motivation of "participation thinking" as the individual experience of the knowledge (M. M. Bakhtin). By provoking the genesis of experiencing the knowledge, we cultivate the thought on the basis of natural and cultural ("the second nature") examples. This is the point of the **Potential Intelligent Safety** principle. **The Full Potential Self** guarantees safety from overloads, allogenic and unnecessary information, pressure from teachers and authorities, wrong moves and ways, getting to extremes of morbid fads and sectarianism. **The Full Potential Self** can be regarded as a sum of highest physiological, intellectual and spiritual capabilities of a human being. The corrected "biorhythmic" education may be organized by using the

REAL-method[81], the relaxation-active method. The abbreviation REAL also shows the reality of its organization.

In this case the education comes to what Lotman called the space of proper names in the culture.

Obrazon from the viewpoint of human physiology

Deep natural references to the image, the symbol and the *obrazon* are hidden in the nature of the visual analyzer. It is known that an eye and the brain are able to work in two modes:

— simultaneous (panoramic, quick capturing of the information with the help of peripheral vision);

— successive (detailed, slow perception with the help of central vision).

From the physiology perspective, this "**duet**" is the most optimal. It performs an important function in the process of information reception and transmission.

Scheme 28

environment;
peripheral vision;
image-perceptional information;
verbal information;
central vision;
cerebral cortex;
right hemisphere;
left hemisphere;
short-term memory;
long-term memory;
limbic system;
subcortical structures;
brain stem.

The **successive eye function** provides the short-term memory with the information with the help of central vision — the neurodynamic process, related to the information processing (the sorting, the fragmentation, the estimation, and the

[81] The REAL method can be used either with a biologically adequate textbook of with traditional textbooks, regardless of the program.

analysis) between nerve fibers (axons and dendrites). The verbal information is received here (the center is situated in the left hemisphere): visual images in their simple signs as the form, the size, the location etc. The visual abstraction of the subject is formed in the left lower temporal cortex, related to the speech (test of Professor V. D. Glezer from I. P. Pavlov Institute of Physiology of the USSR Academy of Sciences). Together with the visual abstraction a word appears, signifying an image. For example, as soon as you see the image of an apple, a chamomile, an ashberry, a tomato, your memory sends you back to the concrete situation of your life. The thing, which can be called the *mental image*, appears in the brain.

The **simultaneous function** provides the wide spectrum of information received via peripheral vision by the long-term memory. The center of long-term memory is situated in the right hemisphere lower than the cerebral cortex but higher that the brain stem. In the process of formation of the long-term memory, the synthesis of specific protein molecules occurs (which leads to changes in neuron membranes and interneuron connections) on the basis of the impulse repetition or emotional background: spatial signals, structural transformations, visual, olfactory, gustatory, tactile recognition of subjects. The right hemisphere dominates over the recognition of visual images, which cannot be described verbally (later, the visual-spatial analysis in the right hemisphere is transmitted to the left hemisphere, where the semantic analysis, recognition of the stimuli and conversion to speech take place).

The "eye-brain" duet doesn't always work in the duplex mode. Textual handbooks exploit the successive function. When the short-term memory fails in attempt to get ready for the impending examinations and tests, reload of the central visual subsystem (with the peripheral vision underloaded) ensues.

Effectiveness increase can be achieved by **enabling the simultaneous functioning** of the "eye—brain" duet. Perceiving a wide screen abundant with information of all types (not only letter-sign!), as well as immediate fixation of nonverbal (image-bearing) information in the brain's subcortical structures, are able to immediately enable the sphere of emotions vital for the process of long-term memory formation. According to P. V. Simonov, "emotions are the human brain's reflection of any actual necessity (its quality and size) and the probability (possibility) of satisfying it, which the subject is involuntarily evaluating on the basis of the inherent or early individual experience"[82].

[82] Simonov P. V. *Motivated Brain*. P. 63.

From the viewpoint of the EYE, any educational material is just an optical phenomenon, which is a two-dimensional informational stage (*diostage*). The perception of the *diostage* is full-fledged when simultaneous and successive features of eye and brain are enabled. That is why the *obrazon* is necessary as the vivid image, which associatively approximates the personal knowledge and appeals to the limbic system (taste, smell, tactile sensations)! As a part of an artistic image and inexpressible emotional background of a word, the *obrazon* directs the educational information to the long-term memory. Besides, the *obrazon* by itself successively directs textual and structured information to the left hemisphere to be logically processed.

So, in terms of physiology of vision and brain organs, the *obrazon* is the "transport facility" for delivering educational information to all necessary divisions of the brain. It is also the means of checking the level of the teaching material being mastered, whereas the conclusion of any lesson conducted with the help of the biorhythmic method is the students creating their personal *obrazons* of the freshly-learned material.

So, from *obrazon* to *obrazon*, step by step, the human being masters the *nature-conformable* way of thinking. The *obrazon* becomes the "building block" in the magnificent edifice of *nature-conformable* thinking.

It would be appropriate to underline the importance of *obrazon* work with Michel Montaigne's words: *Order a purge for your brain, then it will be much better employed than upon your stomach*.

Obrazon **from the viewpoint of psychology**

The process of information perception is built on the psychological basis of the so-called personal experience (memory). The individual is able to identify the information by comparing it to what he has experienced and immediately (at the level of consciousness or subconsciousness) accept or decline it. Moreover, talking about personal experience, we mean practical as well as spiritual experience (dreams, fantasies, individual aspirations). The matter is that according to the theory of metaphors, the acceptance or non-acceptance of the information comes from any actual need of an individual, which he evaluates simultaneously (instinctively). This evaluation sometimes cannot be realized by an individual. An individual can feel the spurt, the reddening of body parts, the temperature change, but cannot explain the purpose of accepting or non-accepting this or that metaphor, which involves an image, symbol, or *obrazon*. This is due to the fact that the individual has fulfilled the simultaneous

evaluation of information; the "change of potentials of energy *E* and temperature *T* of information when coming from primary data to the **KNOWLEDGE"**[83] occurs in the organism. An individual accepts the metaphor involving the *obrazon*, if it is present in his or here positive experience, as well as in the experience of a dream or fantasy, and the individual is not afraid to accept it. If an individual has had a negative experience or hasn't had it at all, he declines the metaphor, involving the *obrazon*, or evaluates the opportunity of accepting it. Sometimes an individual is afraid of consequences of accepting these or those metaphors and because of that he declines them. That is why *obrazons* in textbooks are likely to be built on the basis of *nature-conformable* vegetable models, images of the "second nature" — commonly cultural examples.

In our opinion, references to the natural experience or great artists of the world are acceptable for most people and are able to harmonize the soul of man. Searching for *obrazons* in the animal world is ethical regarding most people as it "equalizes" them in their experience and creates psychological grounds to accept the *obrazon*.

The methodological basis of the *obrazon*

To a certain extent, teachers, methodologists, and authors are familiar with above mentioned natural and psychological basis of perception. As a result of searching for efficient teaching and practice, the tendency of information VISUALIZATION has appeared (starting from play techniques in kindergartens and up to activity methods in higher schools and colleges etc.). The tendency for more luxurious illustrating has appeared in textbook production. Not to speak of e-versions of textbooks and tutorials with their optical and interactive features.

However, the METHOD OF ILLUSTRATION is one of methods of ergonomic information presentation[84].

The other approach to organization of the information given in textbooks is presented by the candidate of technical science V. Parondzhanov, the head of the 21st Century Textbook laboratory. He identifies the matter of ergonomization[85] of the textbook as exarticulation of information groups, their graphic and schematic presentation in the

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83 Khazen A. M. *Intellect as Hierarchy of Information Synthesis*. M., 1993. P. 18.

84 Ibid., p. 18.

85 Ergonomics (Greek *ergos* — the work and nomos — the law) is the discipline which complexly studies man in concrete conditions of activity. The term "ergonomics" refers to the complex of sciences: cybernetics, psychology, sociology, economics, esthetics, physiology, and design.

diostage[86] with the purpose of securing the immediate access of the information to the brain and economizing the intellectual work in the process of cognition.

The textbook is presented as *dioline* — the sequence of *diostages*, related by the sense (diagrams, formulas, text etc.). Intensification of cognition "without the unnecessary creative work" (R. Descartes) is achieved by means of improving the ergonometric features of a textbook. V. Parondzhanov has developed the program "Lighting" which allows creating textbooks with high ergonometric measurements. Our view of methodology of noospheric education, above stated, gives us the opportunity to briefly remind the fundamental principles:

Nature-conformity and systemacy should "permeat" everything concerning the process of education (including textbooks).

Textbook ergonomics

> The day the humanity comes to the conclusion that the goal of the entire process of education is *thought*, it will make the most intellectually important step in its history. This very day, the most significant revolution will happen.
>
> *L. A. Machado*

The principle of work built into our textbooks is *nature-conformity* / biological adequacy. This principle of textbook organization is translated to us by Nature itself. By this we mean:

1) human nature — possibility to use the human perception canals to comprehend the information.

2) nature of the brain — possibility to form holographic *mental images* by coding and recoding signals.

3) nature of information — the variety of its media, methods and mechanisms of receiving and transmitting the information, as well as conditions of representation and comprehension of information.

<u>According to the laws of nature, the goal of a biologically adequate textbook is</u>:

— motivating and activating *teaching mind-images*;

— practicing skills of working with *mental images*;

— teaching integral (*nature-conformable*) thinking.

86 *Dioinformation* is the common term of diostage and dioline.

Comprehension of the textbook's goal in the light of *nature-conformity* and systemacy principles gives us some basic conceptions on ergonomics of biologically adequate textbooks.

Sources of ergonomization	Sources, principles, requirements and means of TEXTBOOK ERGONOMICS		
	Information	Human body	Human brain
Principles of biological adequacy	Compliance with the 4 stages of information perception. I — Sensorimotor II — Symbolic III — Logical IV — Linguistic	1. Involvement of all sensory canals of the body 2. Following the "activity—relaxation" biorhythm 3. Use of associative natural models	1. Self-organization 2. Freedom to choose associations 3. Coding and recoding in the process of problem solution 4. Accommodation of *mental images* with participation of emotions
Textbook requirements	The textbook should have 4 compulsory parts corresponding to the 4 stages of information perception for each studied phenomenon	1. The textbook provides the involvement of 5—6 sensory canals (sight, taste, smell, touch, etc.) 2. The material should be divided and prepared for work in both activity and relaxation states 3. The information is likely to be coded with the use of images from the vegetable world	1. It is necessary to present the material by recommending 2. Presenting examples should induce associations 3. The knowledge should contain propositions for recoding following the student's personal choice 4. Examples and information should be easy to understand by the students and should evoke response

Means of implementing principles and requirements for textbooks' biological adequacy	1. *Obrazon* as an associative natural image with applied information structured in algorithmic order 2. Textual explanations for the *obrazon* 3. Exercises for training the skills in *mind-image* work 4. Creative work	1. Inclusion of sensory canals via *obrazon* by means of simultaneous function of the brain and vision. 2. Information transmission by the *obrazon* to the long-term memory. Involvement of the emotional sphere of man to accommodate the *mental image* by means of simultaneous function. 3. Involvement of the left hemisphere by means of successive logical and linguistic processing of the information. 4. Recoding *mental images* on the basis of personal experience and choice.

The program of biologically adequate textbooks

The program of biologically adequate textbooks creation was built upon author's years of practical work in school and college. *The Practical Grammar of English Language* (textbook), *The Tree of English Grammar* (tutorial), *The Tables for Flying Start* (tutorial), *The Russian Language*, *Physics* (7th grade), *Mathematics* (1st grade), *The Tree of English Language* (5th, 6th, 8th, 9th grades) were published in 1996—2002. Their number of the printed copies is from 2000 to 25000. Textbooks on German, French, Chinese, Japanese, and Russian as a foreign languages are in prepress. It appears that language textbooks are methodically tried-and-trusted and, by now, have established their reputation. Their improvement is the task of the next stage of work. New textbooks on geography, history, mathematics, rhetoric, and literature are in the pipeline; the questions of biologically adequate method are the main task here, which is being addressed by authors. The program basis practically doesn't require replacement.

The situation is different, however, with textbooks on ecology, chemistry, and biology. The point is that the program of these subjects is complex itself. The worldview is constantly changing, which leads to quick changes in the very idea of the basis of natural sciences. This inevitably changes the idea of the Universe and, correspondingly,

educational programs of school and college should be changed. The situation is complex: should the leading generalizations of native or foreign scientists be taken as the basis? Or should their developments be synthesized? Or would it be better to stay on the platform of traditional programs? It can be possible to accept, for example, the method of description in physics, which was chosen by history and philosophy in the last decade. The physics for this period may become the part of the physical science history. In any case, this will represent the real situation in science.

It is necessary to pay attention to textbooks on subjects which have never before appeared in the school curriculum. These are practical psychology, praxiology (the discipline of effective practical activity), the physical training textbook, and the medical basis of survival textbook. Three textbooks *The Basis of Social Management* (9th, 10th, 11th grade) were published in 2002. They share the same focus on man — a real student with his living body and mind. These unprecedented textbooks may become not only the first ones in their subjects. They may be built on the basis of the latest conception of man as a system. Let us present the conspectus of these textbooks.

The development of the school biological discipline in two parts seems to be promising:

1) Biological scientific representation (biology per se);

2) Medical basis of survival (scientifically applied biology and medicine).

The first part is like the first stage of medical-biological knowledge. It should contain the known amount of biological information to provide the possibility of proceeding to the next level. The student orientates himself better in the knowledge of those representatives of microcosm and invertebrates, bacteria, viruses, protozoa, helminthes and other, which are common in practice and are responsible for the prevalence of infectious and parasitic diseases. The form of material presentation is to represent the information in the light of practical observations. Permanent theoretical and practical parallels are to prove effective. It is important to show what the knowledge of, for example, the heart structure gives us. It is important to reflect as in the mirror the cardiac death rate and to tell of the life saving operation type in a simplified way. Preventive measures are to become the integral part of such education: it is easier to prevent a heart disease than to treat it. The last requires an enormous financial outlay. The medical basis is the second, more complicated level in this program. The practical orientation of knowledge is to become the priority here: a trained youngster won't get lost when it is necessary to give medical help to himself, his mates, parents, or passersby. It is necessary to evoke desires and soul motives to provide help to family and

friends (in overwhelming majority children have bowels of mercies; the "problem" teenagers are suborned by vivid examples). Giving help, any person experiences a sort of a pleasant feeling. The youngster, for example, may dream of giving help in transport: setting shoulder dislocation right in a bus or saving a child from laryngeal edema in a plane, preventing the death of anoxia. The duty of education in this course is to inevitably grow within the next decades as it is a painstaking and sequential job of bringing up a civilized person to carry out "the love to the medicine in oneself." Unfortunately, in today's Russia many people face the problem of elementary everyday survival. Such a situation increases the need for medical education of students.

With a glance on the forecast of the increase of injury, infectious diseases[87] and other "pathological states" rate in Russia within the next decade, the need of preventive medicine will not become so urgent. However, the lack of it will lead to the critical level of society reproduction. Education, starting from the school, must breathe life into this practice[88].

Biologically adequate textbooks should vividly present the child the harm of smoking if they are to show the patient with "carcinoma of lung"; the child should correctly apprehend the horror of drug addiction watching the dying youngster who has been injecting a drug into his veins for only several months (it is possible to show the results: the arterio-venous aneurysm, notably some vasodilatation called the "inkwell" by a drug addict, the festering, hemorrhage). The realizable explanation in anatomy and body organ physiology textbooks should be given in the light of widespread illnesses and infections accentuating, for example, AIDS, syphilis, tuberculosis.

The physical training textbook is to be aimed at different age groups, the features of physical growth and development of boys and girls. The cheerful mood, correct approach to the body and body development, explanatory tendency of the benefit of various exercises and training are to be closely related to the knowledge of anatomy, physiology, eutrophy, etc. The *nature-conformity* of physical training is to be demonstrated using vivid reference images.

The "Your Biosphere" textbook is going to be an unusual tutorial. Its task is to help students see and find analogues in themselves as well as in the surrounding nature. To see the integrity of the world via the harmony of the variety of points of view of the world and oneself is the main goal of this unusual tutorial.

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87 Although tuberculosis was "overcome a long time ago", the number of tuberculosis-infected patients has risen twice according to the official statistics. This is the sign of "the bad tuberculosis condition" in the country (lots of starving people, vagrants, insanitary conditions; the number of syphilis-caused deaths has risen 10 times, and malaria has appeared again).

88 The author of double-unit school biological discipline is a corresponding member of RNSA, A. A. Kutin (M.D.).

The experimental psychology is going to have 3 parts. They are targeting different age brackets: 7—9 years old, 10—13 years old, and 14—17 years old. The purpose of the textbook is to teach students to understand how and why negative thoughts, actions, and attitudes appear, how important it is to transform the negative mood and attitude into positive, how to conduct one's behavior, how to develop character and relations with people. The experimental psychology textbook is going to be built on the basis of modern conceptions of *mind-images* formation and functioning. The universal slogan valid for all "Learn to be happy" may be offered as the subtitle.

Thereby, there are several levels of complexity in the development of biologically adequate textbooks for schools: methodic, programmatic, ideological, and, of course, financial. In a way that the transitional stage is complex, the start is made.

Moreover, one of the Board of Education of Russian Federation resolutions (Moscow, 1995) on "the Secondary Education in Russia" is that the free choice, sales and approbation of textbooks are introduced into practice. Practically, each teacher can defend the author program of any subject and textbook for working in school. This document also provides a possibility to develop and accept local regional standards of teaching the particular subject for 40 regions of the Russian Federation.

Variability of biologically adequate textbooks

The new textbooks, in the form they are designed and published nowadays are aimed at the starting stage, which means they provide beginners with the possibility to study this or that subject. That is why the leading place in biologically adequate textbooks is taken by *obrazons* and the motivation-type *mental image* way of thinking by means of them.

However, for the stages of further studying of this or that subject, the textbooks which slightly differ from the above-listed are going to be created. These are also going to be the biologically adequate textbooks. Their features are going to be the following:

— reference to the already formed ability to think images;

— orientation on the integral thinking;

— use of the methods typical for the "left-hemispheric", "right-hemispheric" and "all-dynamic" ways of information perception and acknowledgement.

As we see it, they are going to have 2 parts:

The first part is going to contain the information related to perception in the state of relaxation; the second part is going to contain tasks, exercises, texts etc. for the active working to consolidate the material.

All biologically adequate textbooks are intended for working with the use of the biorhythmic method (change of activity and relaxation). Nevertheless, they are successfully used in traditional methods as well as can be used in the number of author methods, which are quite numerous in the period of educational system diversification and growth of new forms of information representation.

Below, we present the program on development of the new type textbooks for the next several years, which has been created and is being implemented by the RUSSIAN ACADEMY OF NATURAL SCIENCES ("Noospheric education" department).

The program of publication of biologically adequate textbooks

1. Russian language
2. Russian language as a foreign language (for English-speaking students)
3. Russian language (for French-speaking students)
4. English grammar. The Tables for Flying Start
5. Tree of English grammar. The Tables for Flying Start
6. English phonetics
7. English for kids
8. French language
9. German language
10. Italian language
11. Spanish language
12. Chinese language
13. Arabic language
14. Space geography
15. Psychology for kids
16. Essays of Russian history
17. Evolutionary ecology
18. History of spirituality
19. Russian literature. The textbook for secondary school teachers
20. Physical training
21. Rhetoric

22. Physics
23. Biology
24. Your biosphere
25. Chemistry
26. Mathematics
27. Art
28. Human physiology
29. Praxiology — the science of practice (for 1—2 year students in college)
30. Literature
31. Social management basics
32. Tree of Buryat language
33. Buryat literature
34. Tree of Yakut language
35. Yakut literature
36. Tree of Tuvinian language
37. Local history, geography and culture

Chapter 9
TECHNOLOGY OF EDUCATION

> Education is the defining factor making technological breakthrough possible.
>
> *Z. Allan (Director of International Institute of Education Planning UNESCO)*

Education is society's strategic resource. However, it is not the education which does not see its progressive role in Russia today. Only the education which realizes that in a noospheric society the objects of attention are not matter, energy, or information as such, but culture and integral thinking, is capable of creating new technologies. Investments are possible only in high technologies.

"Technology" as a term of the domestic pedagogical literature was first used in 1720 by Feodor Polikarpov — "a manager", later the director of the Moscow printing house, author of some educational books. Among them are *Slavonic -Greek-Latin Lexicon* (published in 1704) and *Technology* (1725 manuscript). Polikarpov used the same term in the Appendix to the 3rd edition of the widely known *Grammar* by M. Smotritsky

(1721). The grammar concept such as arts and crafts, i.e., technology, meant a set of components, definitions, a process, tools, and principles. F. Polikarpov was influenced by the experience of his teachers — Likhudov brothers and his predecessors, such as Konstantin Kostenchesky (15th century), L. Zizany and M. Smotritsky (16—17th centuries), etc.

Let us look at some "technological" elements in teaching activity, according to F. Polikarpov's views. Components of this process are the student and the teacher. Teaching facilities are both the language and the book. Among teaching methods are: movement from the text to grammar, individual work of the student, dialogue and catechetical reading, i.e., reading in the form of questions and answers. By the way, catechetical reading was welcomed in Russia because of a lack of teachers. We can name some more monuments of 18th century testifying to technological search of domestic teachers. These are *Christian Education of a Little Youth and Every Boor* (early 18th century), *The word on the True Purpose of Mathematical Sciences and a Conformable to it Arrangement of Exercises in Them* by M. Pankevich (1792), and a considerable number of domestic textbooks of 18th—19th centuries. The search of technologies in the twentieth century gave such examples as brigade teaching or the so-called Lvov technology, deserving, in our opinion, the closest attention and study and known so little. However, not aiming to investigate the history of the existing term "technology" in Russia, we will go three centuries forward, to 1990s.

What has our society got at the outcome of 20th century as the educational technology?

The same components — the student and the teacher, teaching facilities — the language and the book, TV, radio, computers, tape recorders and other TF. Teaching methods are individual work of the student, a monologue of the teacher, dialogue of the teacher and the student, playing, competitive, controlling and creative kinds of work, business games, as well as a computer variant of catechetical reading according to the principle "question-answer" in a number of innovative programs. As we see, the arsenal of facilities has increased. Teaching methods, especially because of the author's techniques on concrete subjects, are diverse and, in fact, there are institutes of teachers' professional skills improvement, a considerable number of pedagogical high schools, many of which have been transformed even into pedagogical universities.

However, can we say that young people want to study at school? Don't we know that study "outside the school", (tutoring, preparatory courses, etc.) are becoming more desired for young people, they study there with pleasure for big money and would gladly

not go to school at all if the document on secondary education was not required. Here lies the most important thing! Interest to the person of the student should not be only declared, but organized and guaranteed. It is a technological problem. Here is an example of bread baking. We have created wonderful recipes of bread, put the dough in beautiful sheet-pans, adjusted the temperature in the oven and fixed the time of baking. But we will receive good bread only in case when the optimum quantity of sheet-pans with dough will get into the oven, not more! But if we pile up 2 or 3 times more sheet-pans in the oven, we will get bent, broken, underbaked bread.

The technology of education process is much more difficult. Comparison of school with the hot oven and bread is very expedient. The whole oven has simply fused from constant and furious overloading. It is already small; new technologies are necessary to cope with work load. Look at the most enthusiastic teacher: having a load of five lessons a day, he is over-excited and confused; he has served, approximately, 150 people for five hours, spending about 2 minutes of equally intensive and productive communication and teaching on each of them. It is impossible to imagine that having a five-hour working day any other specialist continuously, every 2 minutes, addresses a new client. Thus, it is a question of a daily human dialogue, perception of one person by another. The only comparison here can be with the controller of a metro station or the controller-cashier, but the teacher cannot work using only one organ of perception, like the controller. All scale of feelings, soul, intelligence, physical abilities of the teacher's organism work till wear and tear in inhuman conditions. Thus individual efforts of the student for a lesson make, approximately, 2 minutes, and individual efforts of the teacher surpass the efforts of one student by 30 times, since there are 30 such students in total. The parity 1/30 is obviously advantageous neither to the student to whom the teacher cannot pay more attention, nor the teacher who is compelled to give work to all students.

It is thought, that an issue of shortage of teachers which has been tormenting Russia since 18th century, is the reality to be recognized at the end of 20th century. One can ascertain it and reconcile. But why are there no teachers? Don't we have enough teachers who are able and wishing to pass the knowledge to young generation? We do not have enough teachers because the state does not allocate funds for decent maintenance of teaching. All attempts of progress in national education finish on this eternal postulate. For about 80 years progressive teachers — compatriots had to look for the way out of this inconvenient situation, addressing not to the state, but to themselves personally, for imperfection of an educational system was and still remains blatant

injustice. Only the blind can not see that the educational system in modern school has lagged behind scientific achievements for hundreds years. All attempts to improve school when it was impossible to change anything in the developed technology were reduced to a search of new techniques.

The term "technology" in modern national education practically has not existed till 1990th. In 1994 in the program "Capital education" it has been written down:

"Education is a social cultural technology which promotes social stabilization, forms a zone of perspective development of a social complex of Moscow." Two features characterize the Program:

1. For the first time it unites efforts of social, economic, construction and engineering-economic complexes of Moscow to solve educational problems.

2. The program is opened for potential participants.

This program declares the requirement of time — to find educational technology for the solution to social cultural problems of Moscow, it does not offer concrete technological ideas.

The Institute of new technologies in education which has recently appeared in the capital focuses the attention on schools provision only with computer programs. At the given stage we have not found out here the general concept of technology of educational process. And it does not exist for absolutely clear reason. Any technology demands constant inflow of money. As is known, the domestic national education was financed by a residual principle. Hence, what is the point in the concept or existence of a term **technology of education?** Another matter is certain programs, for example, the program of school computerization; it is possible to get money for them.

TECHNOLOGY of EDUCATION — one of social technologies in modern world.[89]

Social technology of education is a specially organized field of knowledge about ways and optimization procedures of education **of man in conditions of accruing interdependence, dynamics and updating of social processes; a way to realize** educational activity **on the basis of its rational division into procedures and operations with their subsequent coordination and synchronization and a choice of optimum means, methods of their performance;** the control facility of **educational process providing the system of their reproduction in certain parameters — qualities, properties, volume, integrity of education**[90].

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89 Among the social technologies are educational, global, information, introductory, political ones, as well as human study etc.

90 Social Technologies. Explanatory Dictionary. M., Belgorod, 1995. P. 186.

The social technology of education has not been invented today: people had used technologies which they mastered intuitively or empirically long before the 18th century, specified by us earlier. Why isn't the society satisfied with former technologies today?

The society in the second half of 20th century has entered a qualitatively new state: revolutionary changes occurred in science, information and administrative structures. Their essence consists in the fact that updating of the information, applied knowledge and technologies occurs several times within the life of one generation. For example, in 1960—80s of the 20th century, the world went through information, administrative and conceptual revolutions. On this basis some transformations were required in education as well: development of "a human resource", intellectual property and administrative "KNOW-HOW." At that time, in Russia there were also preconditions of a crisis condition of information, intellectual, administrative, educational stagnation. To balance the social space at the expense of the past experience and traditions appeared impossible, and Western experience remained unclaimed because of the ideological reasons. The Russian educational system turned out asleep, stiffened, and the intellectual potential of the youth and teachers on a mass scale appeared not motivated to develop. However, an open world information field, dynamics of communications persistently demanded transformations. Timid attempts of transformations in education since the beginning of 1990th have not given serious results, since the state system of secondary, special and higher education continued to dictate conditions and to supervise their performance.

It is necessary to take into account that the increasing role of the social in development of the world civilization as a general sociological law objectively demands basic changes in the general concept of education and theory of education management. However, this requirement of the 21st century has not yet been realized. Education is in deep contradiction between urgent scientific, conceptual, administrative innovations and the low level of administrative influences, more often bureaucratic in Russian. There is only one way out from this condition — to include high social technologies into search of the unbalanced social space.

The problem of social technology in education is a complex problem including the society's comprehension of the necessity and possibility to make education more technological through comprehension of the predicting function of education.

Sense and purpose of educational technology is to optimize the process of education and its management, to make it rational, to exclude from it all kinds of activity and operations unnecessary for obtaining the social result. It is a kind of

technological and management revolution in education. Such a question has never been raised in Russian education. Its essence is in: introduction of the newest technology of management into the educational system coordinated with the newest technology in educational process.

In the given work there has been an attempt to consider this twofold innovation, namely:

1. Offer of educational process technology with a projected result.

2. Offer of management technology of an educational system as innovative facility to motivate and stimulate an open education system to self-development, self-improvement, and self-organization.

I. Technology of the education process

From the above-stated definition of social technology of education we are interested in **the WAY of educational activity realization on the basis of its rational division into procedures and operations with their subsequent coordination and synchronization and a choice of optimum means and methods of their performance.** From this point of view technology of educational activity is a multidimensional process of the organized interaction between the Teacher and the student in corresponding psychological -pedagogical conditions. It is a controlled process with a projected result. We use alphabetic symbols for designation of technological process components:

T — technology
Tm — textbooks and manuals
C — the concept of education
P — programs
P — the purpose of education
TFE — technical facilities of education
T — technique
F — financing
T — the teacher
= — the sign is used for brevity
P — the student instead of “includes, consists of
A — administration the following obligatory elements “

B — a building

+ — the sign symbolizes inclusiveness in technological process along with other elements

G — group

The technology of the educational process (using the specified symbols) looks like a multi-compound process which includes availability of the concepts, purpose, programs, methods, textbooks, pedagogical personnel, premises, TFE, the administrative and management personnel and financing corresponding to this organization.

T = P + C + T + Tm + P + T + P + A+ B + G + TFE + F

TECHNOLOGY is a multi-compound process, and each component works to the result. If the technology is slightly broken, the result will differ from the planned one.

The essence of noospheric educational technologies is not in struggle against negative sides or correction of the existing technologies' drawbacks, but in liberation of higher creative possibilities of man in all spheres at physical, personal, interpersonal, social, basic and universal levels.

It would be desirable to give some examples of new technologies in education, but, unfortunately, there is little available information about them. These are technologies of 2 classes. **The first refers to global technologies.**

Among modern educational technologies of global pedagogy, life it is necessary to mention the so-called Kalmyk national concept of Integrated Didactic Units (IDU). It differs from all others, first of all, by the fact that in 1995 it became the first-ever state pedagogical, ideological and political concept. This initiative of the President of the Republic of Kalmykia Kirsan Ilyumzhinov has made the people's name nominal to designate a state policy in search of approaches to noospheric development.

The author of IDU concept is academician P. M. Erdniev. The concept's essence is as follows : man, as part of nature, possesses natural -logic thinking. Educational process should be organized so that the natural logic thinking (adequate to the problem of noospheric way) was shown.

The purpose of the educational process is to bring up natural logic thinking and to receive a new generation of people with new thinking in 10 years.

IDU techniques are class-fixed lessons with great number of classes outdoors, on the earth, in art workshops and studios to study national traditions.

IDU technology is organized at the state level: all the teachers in one parallel (1, 2, etc. classes) have training for the beginning of the next academic year and gradually carry out parallel transition to IDU.

Another class of technologies in educational system are the technologies which are born "from below." These technologies can be compared to the phototropy property inherent in flora, i.e., change in a direction of a plant's organs growth under the influence of one-sided falling light for the sake of life preservation. Such technologies have a strategic target — to find stability in the unstable (destabilized) social environment and circumstances. Phototropical technologies assume destabilization of an educational class for the sake of stabilization of the person and educational system as a whole.

The **REAL-technology is a flexible technology, bio-adequate to human nature (from English word Real — real, valid). Its** name underlines not only its reality in organizational execution. Abbreviation **Real** can be also deciphered on initial letters of 3 components making an essence of new technology:

— **Relaxation**: release from stresses and involving many centers of pleasure of a human body. into the process. It is one part of a study process. Scientists— neurophysiologists have proved that during relaxation the brain biorhythm makes 10 fluctuations a second (characteristic of homogeneity of brain's relaxation). This condition is optimum for information perception[91].

— **Action** — activity during study. It is another inevitable process during acquiring of knowledge (17—18 fluct./sec).

— **Learning** — study.

Thus, the Real-technology is a relaxation -active bio-adequate teaching[92] which proclaims as basic principles of natural bio-adequate conditions of study for the person:

— Changes of activity and relaxation during a lesson as a natural biorhythm of all living things;

— Study in mini-groups (6—8 people), natural to psychophysical comfort of students and the teacher;

— Functioning of mini-groups in one class simultaneously with similar groups by structure, but with different levels of preparation and psychophysical features;

— Possibilities for the students to go from one group to another to look for the most comfortable conditions of study and a corresponding level of preparation;

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91 Pribram K. *Languages of the Brain*. P. 235.

92 L. Popov studied the two conditions of the most effective study. He calls one of them is "comfort", the other — "passion" (which corresponds with our terms "relaxation" and "activity"). In his research, the biorhythms of the brain are supplemented by indicators of pressure, blood composition, etc.

— Close personal contact with 2—3 teachers in one subject to update knowledge, skills, abilities and strengthening of students' communicative abilities.

Let us consider Real-technology components as they are offered in alphabetical characters.

The REAL-T = P + To + T + Tm + P + T + A + B + G + TFE + F

Purpose of education. At the present stage of development of scientifically-practical knowledge the motivation of bio-adequate thinking (complete thinking) is put forward. It means, that a school graduate should master methods, techniques, operations of the left and right brain cerebral hemisphere and their cumulative work on the basis of the program material in the courses of the school curriculum. In other words, students should be able to apprehend the information creatively and economically as much as possible, using both logic, signs, sounds, symbols, images, i.e., natural or other samples.

How to check the achievement of this purpose ("P" in a chain of symbols)? It is known that even medal holders — schools graduates, showing excellent knowledge of a school course, do not find possibility to freely use the acquired information, which directly or indirectly indicates the fact that the ability to use the right cerebral hemisphere has not yet been formed, not to mention more cumulative (complete) methods. There is a simple way to check the generated ability of naturally related thinking. It is enough to look at the notes of the first-year students — yesterday's schoolboys.

They have no idea about the purpose of taking notes, importance of memorizing, interactive processes, symbolical packages of information, etc.

The offered variant of the test on ability to operate the right cerebral hemisphere possibilities — drawing up naturally related models of the set information. This test shows possibilities of students to quickly familiarize with the given information, to process it logically, to find out interrelations and interdependence and to find the required conformable model through association and a metaphor.

Similar tests and tasks by themselves reveal creative possibilities of students. Besides, they are indicators for the check of operating skills of the left and right cerebral hemispheres, their cumulative (complete) operation under the will control of the student himself. These tests also reveal efficiency of students' performance (*E*). If we take all work on the test as *A*, and *T* as the time spent to do the work, it is possible to measure the capacity of performance of all work as

This formula makes possible it is possible to define the capacity of students' work as ability to create the offered model during some time. It is nothing but the speed of cumulative work of 2 cerebral hemispheres on the basis of bio-adequate thinking.

The described test is an ordinary operation made every minute by the brain: feelings — information representation in the brain — information synthesis — search of the symbol adequate to the structure and context of the incoming information — comparison of the found symbols and the choice of the best — information archiving as a symbol.

As any text is a field generating context[93], i.e., the sense existing inside the text, then any reading is the act of sense search. Search of sense analogy through a symbol is a natural way to a person's brain to understanding through simplification. Creation of a nature related model of any information is the result of a bio-adequate process, in other words — the result of a problem solution without missing the natural stages and establishment of semantic three unity: a meaning sign — denouncer — denominating reflection in consciousness of the person. Thus, it is possible to check the achievement of the purpose during study by means of the simple offered test. The test can be used at any stage of study. Moreover, it should become the tool of daily work with any text in all subjects of a school curriculum.

Let us continue consideration of technology components:

The concept of noospheric education is the subject of the mentioned work. It contains the purpose statement, defines principles, methodology, etc.

The technique and the manuals created in the frameworks of noospheric concept have been described in separate chapters and have been specially created for the given technology.

The state curriculum carried out in modern school has been used for creation of bio-adequate textbooks and technique. The exception is, as it seems, the curriculum on physics, since the science itself changes very fast.

The students, whatever differences there are between them, should all be involved in the educational technology.

The teaching staff and administration, as an important link in a technological chain of noospheric educational process, should possess holistic thinking and, on its basis, appropriate teaching and management techniques. They should professionally master (and be aware of) bio-adequacy of their pedagogical activity. For further reading, see *The Basics of Social Management* (M., 2002. Vol. 1—3).

93 Leshchev S. V. *Symbol and Sign. On the Way to Noospheric Education*. M, 1999. P. 71—79.

Modern school buildings are quite suitable for the organization of educational technology of the noospheric type. As a rule, only minor reorganizations of 2—3 classrooms are required. The matter is that the necessity to divide classrooms and make some small premises is dictated by a small number of students in the groups for some lessons. The room equipment for groups of 8—10 students should be informal. Coziness, beauty, tape recorders are a must condition for such premises.

The group size depends on the subject to be studies. For groups of foreign languages, the optimum is 6—8 group members. It is explained by the necessity of constant speaking. Groups of 10—12 students are expedient for the study of other subjects. With big groups it is difficult to carry out the daily control. If educational process is based on traditional school classes divided into small groups for separate lessons, the structure of groups can change depending on the subject. As there is a uniform schedule, this problem is simple to deal with. On the basis of one class, 3 or 4 small groups are created. Here, the students have an opportunity to choose the teacher. One more advantage of small groups is that students can go from one group to another. Material study is carried out in all groups under the uniform curriculum and the students have no difficulty when changing the group.

The system of small groups allows a student to make his choice of a teacher and a group for the first time within the school. Small groups can be formed according to the levels of abilities, and students can develop these abilities in comfortable conditions. Small number of groups enable to work under any curriculum, to use any techniques.

Financing of small groups is implemented with the attraction of money from the students' parents. They pay for their children's education in small groups that gives them the right to participate in lessons, discussions of prospects and even selection of the teacher. They pay for these rights. The students whose parents cannot pay for their education, remain in the state group (the teacher is paid the usual amount by the school). These students have advantages too, as the group becomes smaller and the teacher can pay more attention to them. What is the stated principle of creation of natural conditions for study like in the working model?

REAL-TECHNOLOGIES (horizontal model)

Scheme 29

1. A circle of students in class
2. A circle of students in group

3. The student

4. The teacher-methodologist

5. The basic teacher in group

The big circle indicates a class (30—32 students)

The middle-size circle indicates “a small group” (up to 8 students)

The small circle indicates “a student as a part of group”

Groups I, II, III are formed according to the level of preparation, or following the psycho-physiological parameters. The teacher (■) is thus paid by the parents. It is not a secret that the slightest discontent with the teacher’s work among the students becomes quickly known to their parents. The latter can attend the lessons in small groups and, thus, make a better contact with the teacher and, accordingly, with their child. They can also make a choice to transfer the student into a parallel group where it will be more comfortable for him or her to study. The payment for one academic hour of each student is not high, but it enables to pay the teachers’ work well. This fact creates a certain competition among the teachers, and rejects from the school those who are not creative enough and incapable of working with children. Certainly, those who cannot pay for study in small groups will remain in the big groups and continue to study there on conditions of state maintenance. As it has already been mentioned, in this case the children also win, since another part of students goes to the paid groups, and the teacher will work with a small group.

Let us consider a more difficult model the REAL-technologies on a concrete example of a school cycle — English language. Here we will watch the development of the model from I level — the beginners to study language, to IV level (it is now taught at special schools). This model is called vertical (through), grasping the movement from initial to - graduation classes.

MODEL the REAL — TECHNOLOGIES of ENGLISH LANGUAGE TEACHING (vertical)

Level IV: a special TOEFL course

Level III: a special speaking course

Level VI: basis of communication, listening, translation

Level I: basis of English language : grammar, vocabulary, phonetics.

O — groups parallel based on a single textbook

■— teacher

Scheme 30

Let us consider the given model of English language teaching. The complete course under the school curriculum includes two levels. If there is a necessity to acquire special lexicon, it is possible to pass to 3 and further to 4th international (TOEFL)[94]. Each of the levels (designated by a big ellipse) is united by the uniform curriculum, provided by uniform manuals for all GROUPS.

Training occurs in small groups (designated O-circles) of 6—8 people and each school class splits into 3—4 groups depending on a number of students in a class. This organizational structure gives possibility to work in small groups without breaking the schedule of school lessons, i.e., within the limits of the school schedule.

A relative level of knowledge in groups differs and transfer from one group in to another group are stipulated by growth of students. students are provided with uniform manuals. The rate of material acquisition in groups is individual.

2—3 teachers work with each group : the head teacher (designated ■); the teacher-methodologist (designated A) works with each of parallel groups, periodically replacing the head teacher. He conducts audition. Lessons with the head teacher are conducted in the active form, according to grammar intensive "the Tree of English grammar"[95]. Lessons with 2nd teacher are intensive in the speaking course, or he conducts lessons in audition (including on equipment "ZITA"). The methodologist can simultaneously work at 2 or even 3 levels.

The teacher-methodologist carries out tests after each of grammatical themes has been studied, analyzes and corrects the students' phonetics, solves questions of their transfer to one or another group in the process of educational growth of members of groups, as he can assess the whole educational process, possibilities of each group and individual students.

We believe that the given principle of creation of natural conditions for a person's study has significantly been studied from the point of view of modern sciences about the man (his organism, mentality, intelligence) and, finally, can naturally enter pedagogy along with other principles. Everything that we describe here is empirical generalization[96].

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94 TOEFL — Test of English as a Foreign Language (international).

95 Maslova N. *The Tree of English Grammar*. M, 1998 (describes the author's real experience).

96 V. I. Vernadsky was the first to use empirical generalization in humanitarian areas. Later, L. I. Gumilev and E. S. Kumanin developed this idea. It gives us the right to present our researches in organization of the REAL practice (technologies of education) as real facts. Our work experience in five Moscow schools allows us to speak about a sufficient scale and representation of the experiment, since from 50 to 150 people work simultaneously at schools.

Advancement levels

The first level — for those who begin to study a foreign language.

It includes pronunciation training, basis of grammar concept, a lexical stock of 2 thousand words, reading, writing, conversation on educational and everyday topics (from 60 hrs on the REAL technique to 100 hrs. by a traditional technique).

The second level is for those who continue to study the language after finishing the first level. It includes pronunciation correction, grammar mastering, a lexical stock of 3 thousand words, fluent reading and writing, conversation on everyday and special topics (from 60 hrs on the REAL technique to 100 hrs by a traditional technique).

The third level — "business language" for those who specialize in banking, stock exchange, marketing, natural-science subjects. This level includes the study of special lexicon of 2—3 thousand words, dialogue, fluent conversation, drawing up of letters and documents with special terms (from 40 hrs on the REAL technique to 100 hrs on a traditional method).

The fourth level — for those who go abroad to study in foreign high schools — a TOEFL course. It includes training of special skills of audition and ways of answers during mechanized TOEFL test. The course presupposes 100 hours with the teacher.

I and II levels make the modern school curriculum.

III and IV levels are special and only at some schools, including special schools, they are being introduced into the curriculum.

We have given III—IV levels here to show the prospects of expansion of a school course, having specified that it does not require additional time in transition to the REAL-technologies.

The time remained after I—II levels of the school course study can be used on study of bases of the second language (I—II levels) or for profound study at III—IV levels of the basic language.

The REAL-technology is of a search advisory character. Multi-source negative processes (unwillingness to study, dropping out of school) serve as indicators of wider and deeper processes of school system's destabilization as a whole. It is paradoxical, but the person poorly reacts to destructive processes in traditional "stable" structures. In particular, a class as the big group ceases to feel danger of destabilization. What is a strategy for the teacher of one subject (for example, geography, mathematics,

physics) cannot be strategy for another (for example, foreign languages, psychology, physiology, physical culture). It is necessary to look for variants inside the REAL-technologies. They are integrated in it: a 3—level technology "student — small group — class." This technology comprises possibilities to change working methods at each study level (from I to IV) and in groups (though all groups work under the uniform curriculum and textbooks). This leads to a group stabilization, a person's position in the group, and as a consequence — to stabilization of a class and the whole school system.

The REAL-technology allows to create optimum zones for self-realization of a person in general school strategy. It, finally, is a question of combination of personal and general school ecology, a question of optimal ratio and interrelation between a person and social environment.

Efficiency criterion of the REAL-technologies, as well as any other process, is the social time required for obtaining qualitative knowledge.

Efficiency of the REAL-technologies is easily established as **t=A/Tech**, where $\mathbf{t_{soc}}$ is social time; **A** — all work on the subject study; **Tech** — technology.

We suggest to understand all curriculum as work at a school course (courses), including development of skills. Quality of this work performance (or on separate subjects) is checked in a traditional way: examinations, tests, examinations.

The REAL —technology allows to receive high results at a minimum of expenses. Comparability of the results under tests at the given stage is the **objective criterion.**

We are trying to plan higher quality indicators: profound knowledge, psychological comfort, self-realization of the teacher and the student in the educational system. Under **t** — social time we understand optimum necessary time with including all material, technical, financial, personnel, etc. expenses of a society in educational process, for performance of this or that necessary and sufficient curriculum to master a concrete course, or at the end of some stage of education.

In this case: $\mathbf{t_{soc}=A/Tech}$ Tech

The power unit will be **a unit of measure** of social time: information comprehension in time, that is a fancy in a minute. The more high technological is the technology, the higher the capacity.

Efficiency of technologies under the given formula is comparable under the uniform test, examination, or control work usually done at school.

$$\frac{A}{8years} < \frac{A}{2years}$$

This comparison shows that a foreign language studied from 4th to 11th class (8 years) can be studied under the same program for 2 years using another technology and the efficiency of the technology thus will be 4 times higher. The author's experience demands to designate shorter terms for brightly motivated groups of students! During one month of intensive 4 hour daily lessons without other subjects study it is possible toqualitatively learn the whole course of English grammar from zero level to every day speaking, reading of texts at the level of final school examinations. The same work can be done unstressfully with a simultaneous study of other subjects for 4 months. Certainly, it is impossible to compare these results with the results obtained by our outstanding compatriots in the foreign environment. We know, for example, about T. N. Granovsky's success who "has learnt German so well as his Russian by taking lessons of pastor Pauli[97].

Under the offered formula we can compare the teacher's work in this or that technology N = A/T, which can be considered as ability to form figurativeness per unit of time.

It is possible to define profitability and instrumentality of educational processes in the general technological system. This formula confirms one of our key notions: we do not do anything new in the REAL-technologies, but offer economy of thinking, and, hence ecological compatibility of thinking.

Accepting the offer on possible comparison of efficiency of technology in pedagogy, we pursue the following idea: is it possible to set the task to find certain EFFICIENCY for living systems by analogy with introduction of EFFICIENCY for lifeless systems by Clausewitz? The laws, characteristic for the physical world of lifeless systems, enabled scientists to draw a conclusion that thanks to competently organized **technology of education** "EFFICIENCY" of man as a living system can be much higher. 1. Laws of the physical world in the system "Man" can be strengthened by forces of mental world. The factor of information transformation in the cognition course can be a criterion of

97 Granovsky T. N. *Letters*. Vol. 1, p. 51.

educational technology efficiency, as the living system uses the information as “fuel”, “energy” and on its basis is capable to repeatedly strengthen its activity!

What do we have for this working model to become operating? At first sight it seems, that except huge classes of students we have nothing. However, it is not so. We have all necessary components to organize technologically the new process of teaching: school buildings and the classrooms, classes organized on age categories, a certain set of suitable for study curricula and textbooks to them, a huge army of experts, teachers and students, able to give their knowledge to students.

The REAL-technology does not require considerable expenses to be introduced. It can be organized on existing curricula at any school, without reforming classes and without breaking the schedule. These are minimum expenses for the society. Expenses for teachers’ retraining will be unique expenses (see chapter “The teacher of new generation”).

Convenience of the REAL-technologies is in the fact that it can be introduced stage by stage: at first 1—2 subjects are taught according to the new technology, and in the process of teachers’ training all other subjects pass on the REAL-technology. Preparation of the school classes (the premises should be smaller, and the classes should be comfortable) can be done gradually. At the first stage other premises (-assembly hall, library, game rooms, etc.) are used.

For the model to be successful, each class should be split into 3—4 groups and each group should have an individual teacher within the limits of the given lesson. Thus one of them is (A) the methodologist for the whole class. And others act as teachers ■ (under the scheme). 6—8 people study in close contact with the teacher acquiring the possibilities we have mentioned above.

It is clear that the state is not capable to finance the given technology. It is necessary to attract the students’ parents’ money. By the way, quite a number of parents, thinking about the future of their children, are ready for this. Psychological preparation of parents is obligatory, and work in this direction is an independent theme. the REAL-technology gives possibility to parents to directly participate in selection of the teacher in educational process.

The educational Center of the Russian Academy of Natural Sciences has such experience. In 1993—1997, five schools in Moscow worked on the REAL-technologies

within the limits of the school schedule on English language. We have received not only positive results, positive responses of the parents, children and administration of schools, but also the offers to expand application of the REAL-technologies to other subjects. As the experience has shown, readiness of students, parents and progressive administration for transition on the REAL-technology in some schools is rather high.

II. Technology of the education system management

Let us consider social technology[98] as the control facility in the educational process providing a reproduction system of education in the set parameters — qualities, properties, volumes, structural integrity.

We understand **quality of education** as integral thinking given to graduates on the basis of school courses.

Properties of an education system are understood as flexibility of forms and regional features, continuity of programs, principles, and teaching methods.

Volume parameters are understood as necessity to teach everything without excluding rising generation according to their age.

Structural integrity of an education system is understood as obligatory preservation of connections between pre-school — school — high school — post-high school education; preservation of integrity of this structure in regions and the country.

The main task of education management technology is generation of highly technological social innovations[99], through integration of science and practice in natural and humanitarian directions and formation of a new type of thinking in the 21st century — noospheric or integral.

Occurrence of administrative ST education is connected with education complication late in 21st century, the requirement to optimize management of education, quickly extends and in large scale to "duplicate" innovations in an education sphere (ideas, programs, projects, techniques, new textbooks). Only this way today is an optimum way out from imbalance of educational social space.

1. Object of management technology is social space, **in this case educational space.** Borders of the educational space outline interaction field of the student as a person, i.e., family — school — out-of-school establishments of education. The concept "educational space" has deep human aspect, allows to specify qualitative aspects of communication of the student as a person and a society, the mechanism of socialization

98 Hereinafter, ST.

99 Ivanov V. N. *Social Technologies in the Modern World*. M., 1996. P.16.

and self-realization of the student. Elements of educational space are: civil society, the state, regions, labor collectives of schools, students.

2. Major functions of educational space — meeting the students' requirements in education bringing up and self-realization.

Comprehension of advancing social function of education is a key problem of educational space. D. Kennedy said: "Our progress as the nations completely depends on progress in an education sphere." So far the level of social technology of management in education is very low. The need in working out and introduction of education social technology for achievement of noble purposes is extremely undeveloped. It complicates the process of technologization in educational space. To date management practice allows to speak about the NECESSITY of INTRODUCTION of management social technology of education.

▲ Pyramid of levels of education management

The Ministry of Education
Regional administration of education
District administration of education
City administration of education
District administration of education
Regional administration of education
School administration of education
Class administration

Scheme 31

3. Technologization of education managements is necessary at the level of management revolution as we have mentioned above. And today "a real problem is not whether it is basically possible to technologize social processes, but how to do it"[12100].

1. First of all, we pay attention to technologization conditions of educational process management. Technologization is possible, as educational space possesses certain complexity; elements of its structure, feature of their functioning are known. The subject of management is capable to formalize processes of education and to present them in the form of indicators, operations, procedures; it is

[100] Stefanov N. *Social Sciences and Social Technology*. M., 1976. P. 183.

necessary to create **that innovative sphere for reproduction with which the technology of management is created by this innovative education.**

It is important, that character of the offered above the REAL-technologies of education, is caused by the internal nature of education object and social aim of the person to introduce this technology of education. This circumstance is basis for favorable conditions of management technologization of educational process. Here we underline natural, natural management conditions jointed with conditions of social requirement for introduction of administrative technology of education.

2. We note available **signs of** management technologization of educational process — differentiation, division, splitting of managerial process by education into stages, phases, operations; coordination and step-by-step actions directed on achievement of the predicted results, uniformity of procedures and operations performance.

3. Working out and design of management technology by education has several stages:

At the first stage — theoretical — the purpose, technologization object is defined, management object analysis is done as to the components, detection of ties.

At the second stage — methodical — there is a choice of methods, means of reception of the information in controls, processing, information analysis, development of principles of transformation into concrete conclusions and recommendations.

At the third stage — procedural — concrete practical measures for working out of management technology are developed. Representation about its separate links is made. Unity of theory, techniques, procedure makes up[13101] a system for development of technology of education management. Once again, we specify that development of management technology in noospheric education can be done having not only theoretical, but practical integrated **thinking.** This is basic condition to start job. As the leading expert in the field of modern social technologies, the President of Academy of Social technologies, academician V. I. Ivanov notes, there is a number of circumstances to be considered. In the conditions of low administrative culture of Russia "any social innovation can be driven to the point of absurdity." In existing conditions of domination of dogmatic style of thinking, especially among managers-bureaucrats, the essence of innovations can be misunderstood or deformed. Therefore, the process of development and introduction of management technology by education in a paradigm of integrated thinking can be ONLY GRADUAL and STEP-BY-STEP. This circumstance makes us draw the conclusion that in the conditions of Russia the way of the ADU (Aggregative

[101] Ivanov V. N. *Social Technologies in the Modern world*. M., 1996. P. 16.

Didactic Units) technology introduction, unlike that of the state ideology of Kalmykia, is hardly expedient.

Thinking reorganization “on a pointer” has the historical examples painted by fire and blood.

Let us start with realities. We have the school, which we have, and we will not destroy it, since we believe that destruction is harmful. This school will become obsolete by itself. At present we need such a flexible technology of education and management of education which will enable within the limits of the available school, to softly and gradually improve the education.

That is why we prefer the soft and flexible technology of relaxation -active education intrinsic to human nature.

We believe that the bio-adequate approach described here is the integrated knowledge which cannot be separated from methodology of knowledge and activity application. And in this statement the technology includes a technique of giving and applying knowledge and, thus teaches social technologies, including technologies of education management.

To prepare an understanding and skilful manager for the educational branch is possible only by one way — having transformed his thinking into the integral, the systemic, the design. Today managers for the education system are trained only in establishments of post-qualifying education. Not breaking this practice, we have developed a retraining program for leaders in the education system. This program is called “Leaders’ Project Thinking “(Appendix 3). This is the way to train dozens, hundreds of managers. Possibly, there won’t be a need in a larger number of them, since the administrative technology should only motivate and stimulate the education system to self-development and self-improvement according to a well-known general system principle of open systems’ self-organization.

Chapter 10
THE TEACHER OF NEW GENERATION

> ...We are obliged to be correct to ourselves, then we can promote positive development of others. Waters of a big river will not run low if a stream feeding it will be true to its nature.
>
> *A. Meneghetti*

Like Newton who in 18th century slightly opened Nature laws for mankind, or Lavoisier who brought application of scales into chemistry, the teacher of new generation should introduce **integral thinking as the base tool in pedagogy.** The speed and direction of a way out from a difficult modern situation in education and in a society as a whole depends on speed and comprehension quality of the importance of this act. It is known, that a scientist has to discover the existing laws of the Universe and envelop them into a word and formulae.

A methodologist's mission is to find tools to introduce the discoveries of the scientist into education.

Mission of the teacher is to form integral thinking of the student, introducing, in an equal measure, the achievement of the scientist and methodologist in this process. Knowledge and ability synthesis is a distinctive quality of the teacher.

However, today receiving a profession at the higher school, he does not acquire even an idea about integral thinking. To teach, it is necessary to have not only the knowledge of what it is, but also to be the convinced carrier of this knowledge.

Having addressed a zone of teaching influence, we see various mental, psychological, world outlook, ideological, religious, economic, methodological, target barriers which - the teacher has to overcome daily in each act of his professional work. All in all it creates the situation about which J. B. Lamarck said long time ago : "Whatever were the difficulties connected with a discovery of new truths while studying the nature, still bigger difficulties are on a way of their recognition."

It is possible that not any epoch has ever put such a huge problem before the teachers: to transform the education system from within and through it — the whole area of educational system influence on the society. Considering the teachers' mission in such a way, we start with principle of Le Chatelier.

According to this principle, when external influence is exerted on any system, the system resists, internal reorganization is thus possible: structural, functional, valuable.

To find reorganization possibilities from within education systems is the mission of the future generation of teachers.

Probably, for the first time the society has a presentiment of a strategic role of the teachers, which simultaneously is the check of authenticity of their moral-spiritual beginnings. It is the situation in which the teachers show that ethics, morals is not only informative, philosophical knowledge, not only a lofty style. In a position of the Teacher today **the morals are a spiritual act,** as the finishing part of the philosophy of spirit,

(N. A. Berdyaev) transforms into socially significant act — to play a role of the internal transformer oriented to integral perception of the world, integral thinking.

It is obvious that for the first time the socially-significant policy of advancing support of pedagogy can become a state policy.

The teachers should perform their moral-ethical act.

About "pedagogical confusion"

Nowadays classical pedagogy has reached its limits. The mortal blow it received not by criticism from theorists and philosophers and not from the experts' restrained refusal from the attempts to improve or change it. Traditional pedagogy has been mortally damaged by its internal development in contrast with an irreversible march of natural sciences of the 20th century.

The survey data of the teachers retraining institutes testify to "pedagogical confusion" of the teachers concerning the choice of the world outlook. We will give an example as to the results of researches in the Khabarovsk regional institute of retraining and improvement of professional skill of pedagogical staff (data has been processed and given by c. ph. s. M. P. Arutiunian).

From the general number of participants in the survey (among them: tutors of kindergartens, teachers of an elementary school, the teacher of a humanitarian and natural-science cycle of the secondary school, teachers of the art-aesthetic education, servicing work, physical training, representatives of correctional pedagogy, additional education sphere, librarians of school libraries) in total — 502 teachers — 92, 8%, have confirmed necessity to form the outlook of students in the educational institution. Being asked whether the outlook through an education sphere is virtually being formed today, only 64, 4% of respondents have answered positively. Thus 81, 5% of them believe, that through their own pedagogical position and activity the students' outlook is formed. However, only 47, 8% of 337 teacher respondents believe that their own world outlooks "are sufficiently defined." In 29, 1% they "are insufficiently defined"; in 5% — "are not defined"; 9, 8% of the teachers are uncertain as to the given question.

The data have shown mosaic world outlook liking of the pedagogical representatives in Khabarovsk territory. Among them there are believers of the diversified directions, both those who doubt, and atheists. There are teachers tolerant in relation to another, opposite world outlook, indifferent to it, and those who are obviously hostile.

The tragedy in teaching personnel training looks like multi-kilometer Chinese wall — as long, strong and traditional as symbolic.

let us give an example. Participants in the All-Russia scientifically-practical conference “Innovative Activity in the System of Education” (Pskov, 1995) stated the deep belief, that in the course of reformation of the educational process the central figure is “Teacher-researcher.” But they noticed, that the requirement of a Russian education for the teacher-researcher conflicts with absence of the teacher-researcher’s preparation system in pedagogical high schools, universities, retraining institutes.

However, possibilities are extending: alternative, private institutes, universities or new courses transforming thinking adjoin to traditional courses and programs. They give the chance to introduce fragmentary integral thinking into teachers’ environment already today.

What problems does the teacher (an innovator entering the 21st century) have to solve? First of all, the problem of how to teach new thinking, knowledge and self-organization methods. In other words, the problem of the teacher consists in leading to the door, to give the key and teach the student to use this tool. Nobody, except the student himself, can enter the world of knowledge.

Let’s define specific targets of the teacher-innovator.

1. To teach the student to consider independently the phenomena completely and in dynamics.

2. To teach self-organization to the student.

What does it mean? To show all-penetrating similarity principle in the nature, life, thinking. To teach to search for similarity, analogies for the new studied phenomena, deepening and changing them as required. To teach the student to use all the skills and abilities in the course of knowledge. To show inevitability and necessity of AUTODIDACTICS in the course of study. In other words, to help open full potential of the student and help him on the high road of creativity. It is a strategic reference point for the future.

Let’s compare this problem to the one the teachers face in traditional school: to give some volume of knowledge and learning methods on a subject. The difference is obvious:

— the reference point is “the remembering subject” on the past in a disappearing paradigm of authoritative pedagogy. In a new paradigm of integral dynamic (bio-adequate) education the teacher should be able to work, using some psychological techniques of correcting or transforming type. He should know techniques of psychological modeling and forecasting on bio-adequacy bases.

What knowledge is necessary for teachers-innovators?

First, knowledge of bases of the scientific theory, gnosiology, methodology of perception bio-adequacy.

Secondly, good knowledge of a subject of specialization.

Thirdly, energy. It is especially important in work with younger schoolchildren. Energy will allow to show personal conviction of the teacher and to stimulate creative process of knowledge. They are three "whales" without which activity of the teacher cannot be fruitful.

What abilities the teacher — innovator should possess?

The main thing is to be able to like, i.e., unconditionally accept the world and the person. To be able to think integrally is to use methods of work of the left and right hemispheres and their cumulative work equally well. The teacher of new generation should be able to transform negative problems, moods, aspirations into the positive [1]. It is a "skillful" teacher, in essence this is a practical psychologist.

This knowledge and skills underlie culture of pedagogical activity. Orientation to Culture of pedagogical work is, first of all, orientation to the formation of complete outlook of the teacher.

It also defines other abilities of the teacher:

— Not to harm health, mentality, aspiration to creativity of the student;

— To motivate the student's complete perception of the world;

— To work in bio-adequate techniques and technologies of education;

— To motivate a positive choice of the student in the set situations and uncertainty.

About the teacher-innovator's outlook

Cultivation of the conceiving and searching teacher, capable to make an independent world outlook choice not only in the informative aspect, but also vitally-practical one — is the major problem of noospheric transition to complete thinking.

Some stages can be distinguished on the way to its solution. The first we would name a tolerance stage — tolerance to the opposite world outlook, position. Its essence is in self-awareness of the teacher through "mine-different" — cultural sphere, hierarchy of its values, called to confirm the human as socially significant issue in a society. — only in such a way tolerance can grow to desire to search for sense meanings, necessity to see, learn, understand, realize, accept "humanly valuable", spiritually significant in this "different ". This world outlook "tolerant" position focuses the teacher on predilection

for the true, the good, beauty and the quiet, "equal" relation to the embodiment of these values in a variety of world outlooks.

Transition to integral thinking of the teacher will be the second step. let us explain.

Practical conditions in modern education — destruction of pedagogical space, infringement of pedagogical time (the teacher often appears a restraint in the school development and the personality of the student), crisis of pedagogical activity — raises the problems of the teacher's thinking transformation. Thus, the tendencies of fundamentalization, system theorization, pluralization, democratization of the teacher's thinking are obvious. Connected with a withdrawal from excessive rationalization, formalization and knowledge bureaucratization, this way assumes practical improvement and resuscitation of teacher's installations and principles.

Today significant from the point of world outlook and actual is the position of ecologization of the teacher's thinking through mastering by functions of the right hemisphere and their complete dynamical job in agreement with the left hemisphere of the brain.

Taken as world outlook principles of the teacher, the given concept finds its sense, on the depth and scale putting it behind the frameworks of traditional word usage (ecologization as a system of nature protection measures).

Today, ecologization as the innovative principle **of thinking** grows from the vision of practically important problems **of the person's** protection in the education system from already developed education system (exclusively "left hemisphere"), from the search of potential human-oriented resources of the system "person." The common problem of cultivation **of ecological outlook** as nature meaningful and, consequently, harmonizing relation of the person with the surrounding world, will entail a problem of bio-adequate self-education of the person accompanying it. **Ecological outlook, understood as natural meaning, not infringement of natural laws** [3]**,** in many respects would also promote stability, adaptation of the person to constantly varying conditions of life. It is logical to assume, that aspiration to keep, preserve the nature, to increase its riches and beauty can appear only in the person feeling similar care to himself.

Along with "body ecology" (preservation and health augmentation), "action ecology" (orientation to systems and regimes corresponding to the concept of "ecologically pure technologies"), "the spirit ecology" is a key link in ecologization of the teacher's thinking. **Spirituality** in the conditions of the tolerant teacher's world outlook assuming possibility of pluralism in the world outlooks, uniform in the tendency to eternal, not

passing universal values and ideals is a difficult, but possible and necessary way to transform thinking towards integrity, ecological compatibility, health.

Methodologization (from "method" — a way, guide to action; "methodology" — the method theory) — as a principle of outlook's refraction

into an activity method, realization of outlook and creative potential in teaching and educational process and self-development of the teacher. The given theoretical issue corresponds to the practical steps provided by the concept of noospheric education, in transition from the education dominant information paradigm to a paradigm of humanistic pedagogy of development. The major task of the teacher begins to teach children how to **study.** Methodologization of the teacher's ecological world outlook transforms this process into continuous life-meaning activity.

It becomes a way to live in the world under ethics laws without breaking laws of nature, creativity and culture. Therefore, in practical steps **the teacher realizes the education contents in unity with the form and method.** This unity is accepted as an actual problem for reformation. Concepts like "way of thinking", "a world picture", "theory", "hypothesis", "a scientific problem", "fact", "argument", "proof", "scientific idea", etc. already make up major semantic fields of life innovations, science, the subject to be developed by the teacher. Orientation of educational standards to intersubject communications, interactive training courses, new educational areas of knowledge ("art", "technology", "person", etc.) puts **in the category of urgent tasks** a more general task: **from ecological outlook of the teacher — to formation of ecological outlook at school.** The principle of bio-adequate and, consequently, **ethic methodologization** allows to open and practically carry out the cultivation process of bio-adequate outlook on a culturological basis. This outlook puts in the category of practically actual theoretical and practical issues about cultural meaning and world outlook orientation — both general orientation of noospheric educations, and a professional, personal position of each teacher.

Education and culture are uniformed in their essence. Their methods and corresponding forms are uniform in their vital manifestations.

Different approaches to study of a culture phenomenon are possible. Aspects of its understanding are many-sided, too. In anthropogenic approach to understanding of culture in educational sphere it is important to have active aspect characterizing culture through the system of ways and results of the statement of human essence through his activity. It corresponds to understanding of the person as actively learning, communicating and acting one.

Noospheric consciousness of the teacher

The problem trinity — formation of integral thinking, ecological outlook, and methodology of ethics — make the necessary stages which in their totality are capable to give what is called noospheric consciousness of the teacher. In other words, it would be possible to present noospheric consciousness of the teacher as a close interlacing, interaction of thinking, technique and outlook.

It is not important here, where to begin work on the teacher's noospheric consciousnesses formation. Any transformation results in changes in all community. There have been cases in practice of the teachers' transition to noospheric consciousness beginning with ethics of a method or outlook ecologization, or thinking. Wide disorder of pedagogical searches observed nowadays is well — grounded by the offered scheme:

Scheme 32

Everybody achieves his own noospheric consciousness: some are looking for an ethic method of teaching, others are carried away by education ecologization or knowledge of thinking secrets. Comprehension of essence and interaction of natural meaningness of thinking, a method and the outlook, making together a new type **of the teacher's consciousness** is believed to be **inevitable.**

As a matter of fact, the concept of noospheric education makes the corner-stone of the Teacher possessing ecological (synonyms — healthy, complete, harmonious, natural) thinking as the first and main step on the way to noospheric consciousness.

Cooperation pedagogy

How will the teacher's noospheric consciousness affect the quality of his professional work and conditions of educational system?

The integral thinking will cause transformation of the settled type of **manipulative pedagogy.**

Sources of "imposing appearance" of pedagogical manipulation are found in the society: in its modern conditions, history and traditions, — and are measurable by the degree of its embodiment in real life. As a key of methodological judgment of these

“sources” can serve the concept of historical types of domination — legal, traditional and charismatic, generating socially determined type of education in a society and - dominating model of school corresponding to it (M. Weber). Historical and psychological heritage of bureaucracy and “cult” (the person, group, doctrine) in the destinies of Russia has been originally reflected in the contents and advancement of reforms in modern education. The manipulative pedagogy appears to be one of the aspects of this originality.

On the way to nonviolence there are 3 basic forms of relations between the Teacher and the Student: polarity of authoritarianism and humanism and the intermediate form —manipulative.

By its form and purposes the latter aspires to be guided by humanism, democracy and cooperation in relations the teacher — the student. But by its essence and realizations in the content it remains on authoritarianism positions, consequently, on violence positions.

In pedagogical search of ways of education humanization we should not ignore experience of foreign pedagogy. Especially interesting to us, as we believe, is humanization experience of the American school. It is well-known, that the USA is the country in which freedom, the right, the equality proclaimed in 1776 in “Independence Declaration” and later accepted by the Congress have been cultivated from the very beginning. These concepts define mentality of the American society.

Present-day American pedagogy is based on positions of development of free, harmonious, complete and the creative personality through non-manipulative forms of teaching. [5]

The reference to the idea of non-manipulative pedagogy, i.e., pedagogy of nonviolence and its moral kernel — ethics of nonviolence is a theoretical judgment and solution to the more general problem — “violence-nonviolence.” The latter is presented by history of human thought in three basic forms: firstly, as “aim on causing no damage to all living things” (Jainism, Buddhism, Judaism); secondly, as “an ideal of social harmony and a peaceful life” (Judaism, Islam, Ancient Greek tradition, Christianity — in orientation to the future); thirdly, as a substantiation of the practical answer to the conflict of nonviolent actions (historically this is Christianity, L. Tolstoy, M. Ghandi, M. L. King’s ideas; at present — different interpretation variants of a nonviolence principle in politics, ethics [6]. All three forms and their combinations are a world outlook basis of nonviolence ethics).

Non-manipulative pedagogy is humane and can be named pedagogy of cooperation, ethical pedagogy, bio-adequate pedagogy.

Modern orientation to pedagogy of cooperation and value of the person in the world testifies to the cultural meaning of noospheric education, unification of education with historical values and actual potential of culture in **spiritual growth of** the person, a society, the education system. Reunion of personal, social and "educational" space through preservation and augmentation of its truly humanistic potential appears, contrary to orthodox scientism and technocracy, an original component in overcoming of multidimensional crisis of the present. Such are reference points in noospheric education. Such is the logic. In real practice, we find obvious complication, braking, and at times — negation of the possibility of formation, strengthening of this prospect. Rupture of unity in education and culture can be proved in the so-called "transformed forms" (G. Hegel), both in education, and culture. "Transformation" in this case is partition through withdrawal from natural meaning of the bases of an educational method to the basis of "another" essence (for example, — ideological, political, religious, atheistic, commercial), being an aspect of culture and education, leads to practical change of the essence, and, accordingly, the content and functions of real culture and real education.

Democratization, humanization, depolitization, human directed and cultural meaning through bio-adequacy of methods, technologies, textbooks — such are central positions of the noospheric education concept. It does not assume opposition to the existing "transformed forms" in the education system. It offers comprehension of the original content corresponding to the primary form of knowledge.

Here we have approached the second key moment of possible and necessary transformations in the teacher's activity and educational system as a whole, which can come only through naturally meaningful (integral) thinking of the teacher.

> Ethics cannot be only cognitive philosophical subject. It is the moral-spiritual act, a finishing part of the philosophy of spirit.
> *N. A. Berdyaev*

Ethics of pedagogical activity

The main concept of noospheric education objective is not the declaration of necessity to refer to spirituality and ethics of education, but revealing and actualization

of true sources of morals, spirituality from the depth of private world of the Person, as a macrocosm of the Universe.

The morals as the special form of public consciousness and a kind of human relations are a method and the main strategic target of noospheric education.

Understanding **of essence** of morals starts with biospheric function of the person. Only things which are **in compliance with Human nature in the system : Person — Nature — Society can be moral.** In history of Russian-Slavic philosophy this thought is formulated by V. S. Solovyov, S. L. Frank, H. O. Lossky, V. I. Vernadsky: perception of "the world as an organic whole" in which any destruction of integrity is IMMORAL.

The withdrawal from understanding of morals only in philosophical or socially-psychological aspect now is extremely important for the understanding of what we have designated as "biospheric essence of morals." let us go to "root system" in concepts of morals: customs — a habit — norm — standard action. But where and when? The first thing that the person does in the first minute of his birth is perceiving all new conditions of environment by his whole body. Everything, that he does during any instant of all - subsequent life — perceives new and bears in itself "lived through and apprehended" conditions which have been offered to him by the environment. A standard course in compliance with human nature is:

1. — perception of environment through all sense organs;
2. — synthesis of the information about the environment by formation of some image;
3. — logic judgment of the information received in the given image;
4. — judgment about the apprehended information in the form of a word, a phrase.

Method (as a set of ways) of interactions of the teacher and the student in the course of study can be either naturally meaningful or not conformable to a natural course of information perception.

Ignoring by the 1 and 2 stages educational system of the information perception as natural, necessary, BASIC is so obvious, that no references to social and economic difficulties of the system can "excuse" it. Ignoring of 1 and 2 stages of perception has become a SYSTEM at school — HIGH SCHOOL — postgraduate school education. The information on a base course of perception, at least in the elementary scheme of four steps (on J. Piaget) is becoming almost a discovery for practicing teachers. Ignoring of

physiologically and psychologically necessary rhythms of activity changes and relaxation in activity of the person has become the second major infringement of a biospheric course of reception — programs — judgments of the information. The accepted schedule of school lessons provides 45 minutes of lessons in active conditions and only 10 minutes of rest. With the load of 5 lessons the non-realized requirement for relaxation accumulates, which is 5 times higher than a dose of active work. It is necessary to consider this aspect of "Relaxation", in the 40 -minute lesson which as a rule is not observed. The relaxation is not perceived by teachers as physiologically necessary stage in the course of work. There is no idea about physiological parameters of activity and relaxation processes. Teachers are not prepared for judgment of teaching process from the point of view of physiology and psychology. The emasculated form of a technique, without filling with physiological and psychological parameters, remains, accordingly a unique hope of the teacher. Support on fragmentary interest, search for a lesson "of something interesting" by the teacher will paralyze natural positive activity of an informative cycle — kills naturally meaningful cycle "in its core." Absolute absence of the teacher's requirement to study from his own nature or to search for the information in the literature has become a consequence of a base code of perception atrophy in the teacher himself.

The third infringement of a base code of perception is mainly development of functions of discourse -logic thinking at oblivion (even fear!) of the functions (and accordingly, methods) of the right hemisphere performance and cumulative work of the left and right hemispheres.

So, summarizing the aforesaid, it is impossible to leave out a conclusion about incongruity to natural laws of reception — information transfers of the traditional educational techniques which are based on the left hemisphere activity, which have received moral motivation of the DEBT and axial direction of the PUBLIC IMPORTANCE, substituting morals — as norm of RESPECT of a human nature.

Search of effective techniques of teaching occupies the minds of the most progressive teachers of the present. For more than 10 years we have specially dealt with a problem of a pedagogical technique understanding of thinking and teaching by the Russian teachers. The following questions have been raised:

How do teachers perceive a modern situation in education? How do they see their role in this situation? How do they define the education purpose, a method which they use? Unfortunately, only 10% of teachers can answer the questions on the purpose, a

method, and the reason of a modern situation in education they hardly estimate in terms of ecologization and technologization. However, interest to methods is invariable.

The distinct understanding of the method essence as a set of techniques, ways of interaction of the teacher and the student on explanation, consolidation and check of teaching material has not answered a question: why scientifically proved and rather interesting techniques give only local practical exit.

Why cannot the technique function by itself when a concrete teacher leaves? We have come to some conclusions.

First, the technique is understood only as a set of methods and modes of work without the account of individual possibilities of the teacher in contact with the student.

It is not a secret, however, that the most progressive and humanistic programs and techniques, getting into modern school, have, as a rule, no serious future. At the best they are cultivated in a number of schools which have gained support or financing from sponsors or educational bodies, and cannot be extended wider in modern system of comprehensive schools. The enthusiasm of progressive teachers suffices for the short period only. As a rule, there comes disappointment and the teacher either leaves school, or works "as everybody else", i.e., ceases to search for new methods and means — ceases to "burn." The teacher remains at school, accumulating affliction passing into embitternment on immunity of school system to his attempts to improve the teaching, - to support his young enthusiasm. And the reason is that a technique is always a creative certificate of the teacher on the basis of his knowledge of laws of natural meaningful perceptions of the information and never — reproduction of interactive ways of another person.

Secondly, the technique as any phenomenon, should not be named (Shekhter, Kitaigorodskaya's technique, etc.), but characterized: what scientific principle it underlies and how much this technique is technological, i.e., whether it can be duplicated. Our offer of a scientific principle is bio-adequacy of a teaching technique. And here lies its adaptability to manufacture as the duplicating tool is in the nature of each person.

Thirdly, the technique is effective only in a combination with the art of the teacher (organizing, oratorical, actor's, human), which, as is known, cannot be duplicated. Thus, a technique is not a duplicated way of bilateral interaction between the teacher — the student on the basis of bio-adequacy of reception — information transfers.

It is the level of art where the teacher is the Master of interaction (each person has his own possibilities of interaction with people and the world). The maturity of the teacher

is his ability to establish internal (naturally meaningful) contact with other people. Live contact creates, the letter kills. That is why the technique "for ever" cannot be, a technique is always a creative act.

It is a technique which has got used to be spoken about in the pedagogical environment. It would be remarkable, if those who do the speaking were busy self-improving themselves, instead of expecting once acquired technique for all occasions. Time, ideology, system of money distribution in the society where the residual principle of education financing was the norm helped concentrate attention on the technique of educational process. The ideas of natural meaning or TECHNOLOGIZATION of education simply have not been accessible to public at large. The idea of bio-adequacy vanished in these social circumstances. And together with the loss of a base code of education all scientific character of the techniques construction was also lost. Not realizing what was happening in the system "person" in the course of a new theme perception, the teacher manipulated the student. Irrespective of the shape and form of manipulation, in effect, it remains the same. For example, humanization with the stressed preservation of the left hemisphere teaching methods, being introduced in the last years, is, in fact, manipulation.

Required in itself humanization and humanitarism are different, as a matter of fact. Humanitarism as introduction of humanitarian knowledge (courses, cycles) into educational process is only a subject orientation and absolutely not necessarily introduces humanization. There are, unfortunately, examples of humanists "to the core" who are difficult to be named in moral aspect the humane; and on the contrary, people of exclusively technical professions are humane in essence.

Humanization as moral orientation (humanism, philanthropy as a principle) should be guaranteed by educational system not in measures carried out on purpose and concerning humanization. Time of declarations has passed. **The use (by each teacher) of the moral method, biologically adequate to human nature should become a true course to morals.** Programs on morals education of a young generation thus, should be created round the idea of integral thinking education. We believe, that this aspect of morals will allow to subsequently master the ethics understood as a way to regulate actions of the person in the society and to specify understanding of morals as a subject of ETHICS.

Let's come to some conclusion: ecologization of the teacher's thinking through comprehension and mastering of a bio-adequate method of information perception as a basic natural code will result in reconsideration of methodology and a teaching

technique. These actions form the real basis for transition to noospheric education. They lead to inevitable transformations in the education system. The main changes are to become:

1. Refusal from manipulative teaching.

2. Approval of a unique moral method of teaching — a bio-adequate method with an individual choice of ways of influence.

3. Acquisition by school of true ethics through ethics of the individual teacher's pedagogical activity.

4.Integrity reunion of a method, the purpose and a problem, the education content.

5. Regional education.

The domestic teacher of "silver age" in Russian culture P. F. Kapterev comprehended a spiritually-moral orientation of pedagogical process as its law in "a principle of ideal meaning." Realization of this law directly contacted the world of ideals and values of the teacher's personality. We believe, that bio-adequate methods of teaching as a part of teachers' noospheric outlooks, will allow to connect traditionally high aspirations of domestic teachers and live practice of school into a single whole.

What is a practical way of transformation of teachers' thinking today? The programs developed by us "Noospheric education", "Integral thinking", "Thinking of the 21st century", "Bio-adequate pedagogy" enable to transform thinking and a pedagogical method within the limits of existing comprehensive school.

The course "Integral thinking" (15 hours) allows to realize necessity of complete thinking. Additional 10 hours will allow the teacher to learn some techniques and processes of transformation of negative moods and conditions into positive.

The course "Thinking of the 21st century" (15 hours) will allow the teacher to know the bases of modern scientific ideas in the field of quantum and wave physics, physiology of the higher nervous activity, psychology, praxeology as sciences about activity practice.

The course "Bio-adequate pedagogy" (25 hours) will allow to learn modern pedagogical concepts constructed on a principle of bio-adequacy of processes of information reception — programs — processing by the person.

The course "Noospheric education" is the generalized course which includes all 3 course described above.

This program has been used for more than 10 years within the limits of school education of the Russian Academy of Natural Sciences. Work forms vary: from seminars and lectures to conferences and preparation of programs through mass media.

Our experience has shown, that this work is carried out by pedagogical youth and students most effectively. They go to work to school with pleasure after they finish the specified above courses. Efficiency of their job is high, even if they lack teaching experience. Keeping this in mind, it is expedient to begin a professional training of the pedagogical youth more susceptible to innovations, more mobile in their thinking.

Transition to noospheric education in Moscow and in Russia can be organized, consistently based upon available educational structures. Experts who could operatively and qualitatively do the required work with pedagogical staff have been trained.

Now this job is conducted by the branch of noospheric education and branches of Problems of School education in the Russian Academy of Natural Sciences. Methodical seminars in Moscow are held all year round. On the request of regional organizations experts go there to hold the seminars. This work is most successful in Moscow, Kaluga, Kemerovo, Irkutsk areas, in Khabarovsk territory. Work with pedagogical collectives of schools is also done. For example, Borovskaya Noospheric School in Kaluga Region, Moscow Ccomprehensive School 890, Talisman Private School (Moscow), Odintsovsk Grammar School 4. Good results have been received at Aginsky Grammar School 3 in Buryat Autonomous region, Grammar School 2 of Mariinsk, Grammar School 11 in Anzhero-Sunzhensk, School 2 in Lobnya, School 45 in Lyubertsy, etc. Here. a methodical seminar “Noospheric consciousness” is a part of a joint program with Russian Academy of Natural Sciences on motivation of the teachers’ integral thinking.

Chapter 11
NOOSPHERIC EDUCATION AND THE FUTURE OF RUSSIA

Seeds have been thrown into the ground... The seeds of ideas of noospheric education, noospheric science[102], noospheric consciousness[103], noospheric development in Russia[104] are generated by the previous growth of public, scientific and individual consciousness. Their natural growth, in their turn, was conditioned by the ideas of V. Vernadsky, K. Tsiolkovsky, N. Fedorov, A. Chizhevsky, I. Prigogine, P. and O. Kuznetsov, and N. Moiseyev.

[102] The idea of noospheric science is generalized in *Noospheric Science*, the monograph by the doctor of sciences, academician of the Russian Academy of Natural Sciences I. V. Chernikova (Tomsk: TSU, 2001).

[103] The idea of noospheric consciousness and outlook is generalized in the thesis for a doctor’s degree “World outlook and culturological bases of noospheric consciousness” by M. P. Arutyunyan (member-correspondent of the Russian Academy of Natural Sciences).

[104] Malenkov A. G. *Ascension to the Noosphere.*

Any person is known to gain experience and world-view according to the level of his knowledge. By the end of the 20th century, passing through classical, non-classical and having started post-non-classical stages, having been repeatedly convinced that in science itself, in education, in consciousness there is nothing that would not be in nature and life, **the mankind has addressed total ecologization. The ecocentric paradigm of life** through the models of open society, science, education systems, person with the conjugated processes leads to a consistent unification of individual and collective intelligence and spirituality on the basis of ecological (integral) thinking. Today it is understood as a paradigm **of the sphere of intellect (noosphere). Noospheric development** is understood as a consciously controlled naturally focused on the co-development of the Person, the Nature and the Society at which the satisfaction of needs occurs without any damage to the Universe and the succeeding generations.

The society which in 1990s was, like a raging boiler, in the state of polifurcation: in the process of heating entropy[105] was growing and the turn, transformation, readiness of that nutritious broth which the society was cooking so furiously was closer. Social, economical, political, cultural, philosophical, educational conceptions were gathered in the same boiler. Here one can find both traditional approaches, and innovations, and speculative approaches. By the way, the life is always hierarchical continuous increase of entropy.

There are 2 transition ways from entropic conditions to steady non-equilibrium—at fast synthesis of information or at gradual synthesis of information.

New education formation rate depends in many respects on the speed of information synthesis in science and society. In its turn the quality of education provides this or that quality and speed of society development.

Unprecedented role is entrusted to education. It can become **the leader of noospheric transition,** i.e., that part, with which it is possible to solve other problems of the modern society. Was it possible to imagine, that at the certain **stage of evolution** the destiny of the society will be determined by the housemaid — Cinderella, instead of the imperious mistress — the stepmother? Today helplessness of linear thinking and outlook of especially economic and political approaches to the society are mostly naked up.

[105] Entropia (*Greek* — turn, transformation). Entropy is a measure of probability of system being in a certain condition.

The largest scientists of the twentieth century — A. Einstein, P. Chardin, K. Jung, N. Moiseyev independently from each other stated the idea that psychology — the science of the future — already today forms **the natural center of gravity** for not only related sciences, but also for polar scientific disciplines, particularly in the sphere **of human learning.**

Today this center becomes the bridge connecting natural sciences and the humanities, the tool creating on the basis of universal psychological technologies of education certain integration of general education and higher education system.

Successful movement of mankind to noospheric bases of Life is impossible without processes of perfection of individual and personal thinking. Subjectively-developing role of noospheric education is increasing from year to year.

For this reason today noospheric education appears to be closely connected both with social problems of economy and with problems of the further development of civilization.

The problem of noospheric education formation which should be considered as a strategic tool of social and economic development of the society deserves special attention at this stage of social development.

The thing which was predicted by Henri Bergson, an outstanding thinker, in his book *Creative Evolution*, published at the beginning of the 20th century happened: the intelligence intended for being of a certain role and being only a part of consciousness, should reunite with that sphere from which it was singled out — with the intuition to make endless tasks of cognition. A. Bergson admitted a possibility of other evolutionary way of development of mankind — with prevalence of an intuitive way of cognition as life belongs to the **psychological** order**.** Prevalence of biologism in life only seems to be.

The concept of noospheric educations is oriented to the demand and action human conception and quantum level of human thinking (neurosomatic contour of the brain), that demands a new human conception as a living being of the universe.

The obstacles structure analysis in the perfection of an education system has led us to the conclusions:

— Slow synthesis of information about noospheric education and its role in the evolution of a society will lead to the photothrone adaptive nature of the distribution of nature-conformable methods and means of teaching. It is a quite natural way to the life of new ideas.

— **Fast synthesis of information** about noospheric education can radically affect evolutionary transformations in a society and lead to a different quality and rate of its distribution.

The factor of transition to noospheric education should become the state demonstration of transition of biosphere to noosphere. It will be expressed in a basic change of position of science and education in the state: **recognition of the priorities of noospheric educations, comprehensive support,** preventive financing of noospheric educations, deep understanding and state propagation of that noospheric education should have outstripping character, setting a certain speed and level of development of a society. Remembering V. I. Vernadsky's words about the dependence of the person from the environment and thought, and knowing the power and the force of design thinking, we shall finish this story with the analogy:

Let us imagine a seed in which the life program of a plant under the Sun is enclosed, and through this plant — the life of all its succeeding generations…

It is for you to decide whether to plant this seed…

Whether to look after it…

The future is in our hands.

Noospheric education and social problems

The main social functions of education in the modern world in the widest philosophical understanding are determined in the monograph "Society and education" by English scientist B. Simon, well-known in the field of pedagogy and psychology. He thinks that **education should be considered as a way of formation of a person within a society**— as an educational process.

Analyzing the value of the human factor while considering the interrelation between changes in a society and education, B. Simon considers that it is necessary to take into account such subjective factor, as **activity of people and its influence on consciousness more fully.** He comes to the conclusion that the problems of education are inseparably connected with human learning and management, with the comprehension of a role of a person in social processes. Therefore **education as the powerful factor of culture should be directed on more and more full realization <u>of potential abilities of person and society</u>.** Educational system in civil societies implements this principle fully enough. Amateur talent activities of the population are in its base. Each group of the population itself defines the purposes and

the environment of applying forces and means. Principles of natural approaches to education are represented to be correlated with the above.

1. Without forgetting about economic factors of education, we shall concentrate our attention on noospheric education, as a means satisfying demands and possibilities of a modern society. If before the historical applicability of education has consisted, basically, in preservation and protection of culture inherited by a society and transmission to its new generations, and now one more function was added. It is the necessity of expansion of opportunities of access of people to self-knowledge, originality of a person and achievements of a world science and other cultures and self-identification of the person in society. Therefore, in the modern system of public education more attention should be given to such subjects as study of the human behaviour (praxiology); socially-natural history; mutual understanding among the nations; local, national, and international languages.

2. Among the social environmental problems of the today's Russia, the major place is taken by the problem of "shortage" of financial assets. If in the 1960s (at least, in certain years) education received up to 12—13 % of the budgetary funds, in 1970s — up to 8%, and in 1990s financing was reduced to 2—3%. All records were broken in 1998 — only 1% of the budgetary funds were spent for the needs of education in Russia. Unprotectedness of the educational sphere, which is **of strategic value** for Russia, demonstrates nothing but unscrupulousness of the Russian state policy. Estrangement of authorities from essential heavy work gets the workers of education ready for cooperation, mutual understanding, and integrity in actions. Their choice is asserting of the rights in opposition to authorities. However, if **self-education** does not search for internal resources of the increase of effectiveness, political strikes will be useless.

Suggested way of development of education conformable to nature allows to reduce social time, expenses for health, physical strength, time, economic and financial resources in 3—4 times. Changes and transition on noospheric guidelines of education don't need any financial investments. Comprehension of a problem and desire to take up the responsibility is necessary for progressive figures of education only, to understand and operate in spirit of the conception of noospheric education.

3. The development of noospheric education has also defining value for reduction of cultural break between the highly educated elite of a society having access to a various sorts of services and to the international system of communications, and the discriminated majority of the population.

Here it is worth to mention the question of a rational correspondence in a society of elite and general education which we shall consider in more detail, taking into account, that now in Russia the process of prompt decentralization of an education system is observed. In fact, at the beginning of 1994 only in the chief executive office of education of Russia one can already observe at present about two hundred not state HIGH SCHOOLS of various specializations, and more than a half are in the capital of Russia — Moscow. Besides in recent years in the country a plenty of colleges, lyceums and private schools have been already and many of them are given the right to form independently the programs of training courses.

One of the important problems which naturally arises in these conditions is **the problem of target orientation of curriculums of education.** As it has been shown in the previous sections of the given work, this problem cannot be considered only as scientific and methodical. Today it is not only social, but also strategically important problem of orientation of development of a society, maintenance of qualitative characteristics of national labor resources. Prospects of further development, a role and position in the world community, hopes for an exit from global social and economic crisis depend, in fact, on general and professional education received by new formed generation of people of this or that country.

So which of two directions of development of an education system (elite or general) is the most perspective today? What is more important for the achievement of the strategic purposes of the development of a society today — presence of highly educated elite or rather high level of general education of the population? In modern conditions of the development of a society both elite and general education are necessary. The problem is only in the definition and support of rational proportions between them. These proportions will be determined by practice.

Distributed through the system noospheric educations conceptions, methods, technologies, textbooks and moral values will lead to the strengthening of the national center of cultural attraction, will weaken social disproportions.

4. **Noospheric education can become the national idea assisting democracy, steady development of a civilization.** By means of noospheric education culture is transferred and broadcasted, new, humane social functions are reproduced and created. **Noospheric education changes the attitude of people to each other.** Therefore it may contribute to the strengthening of national integrity, and universal priorities.

5. An actual social problem of today in Russia is marginality of the society[5]. This is an intermediate state when the society appeared between two social systems (the last and the future). Education cannot be former any more, but it hasn't yet become what it will be in the future. Man's position in a situation of marginality is difficult: he is a marginal: what to trust, what to be engaged in, where the ideals are, where the belief is, where the person is? Moreover, the situation in education puts pressure upon him which for the present is marginal too and as a matter of fact gives nothing to put the axe in the helve. At the top of the pyramid of "marginal people" there is the society itself with its marginal economy, policy, mass culture. And mass media is added to this kaleidoscope of the information on an epoch of "marginal people" by everyone.

The major task of noospheric education is granting to the person not only the information on thinking, but also the technological tool of motivation of integral thinking. It is possible to work effectively with this pyramid of "marginal people" lost guidelines and values only having given freedom of choice to everyone. Only so it is possible to cultivate conformity to nature.

5. Marginality — a condition when you are lost, absence of vital guidelines.

The powerful tool of conformity to nature, working in alive system by a principle **of a purpose reflex** by reason of integrity of the nature of individuals is capable to grind guidelines and values of the "lost" generation of nowadays "marginal persons." Their purpose as a matter of fact is clear — to find himself in the society, his place, his role, his applicability in life. "Your I" appears to be not so difficult to find if the person is not afraid to think in compliance with nature and to learn that achieving this is not that difficult. It does not require even those expenditures that are given by the state for 1 year of his study at school. Here is the reason that **transition to noospheric education is one of the cheapest social programs.** As the tool of transformation can be already found in each person, intended to integral thinking by the nature.

6. Connection between an educational level and such social problems, as a level of birth rate, health of the nation, a demography and ecology of the person is rather significant. The analysis shows, that especially strong influence on planning of family renders education of women. Thus the amount of children in a family decreases with the increase of education of women.

Noospheric education of women, through an establishment of system of continuous education is a key to the decision of such sharp social problems, as the control of birth rate, health and hygiene of family, feeding and confirmable to nature motivation of children to know the world.

7. The level and type (confirmable to nature or not conformable to human nature) of education of the population plays extremely important role in solving environmental problems which are the result of demonstration of invisible ways of thinking, and as a consequence — unreasoned technologization, industrialization and aspirations to fast economic growth. Thus it is necessary to distinguish the following three aspects of the given problem. The first of them consists that education first of all motivates this or that type of thinking; the second, education can and should bring in the contribution to the better understanding of environmental problems, their biological and social and economic consequences.

The third aspect is connected with gaining of necessary knowledge in the area of resource-saving and non-polluting technologies, and also with their use for solving educational and environmental problems. Now a number of countries has already gained a positive experience of studying of environmental problems at all three levels of an education system. However fast deterioration ecological conditions in the world and necessity of search of an exit of more and more aggravated ecological crisis bring to the forefront a problem **of transformation of ecological education** — concerning to the subject **of "ecology" into the ecological education** as a matter of fact, on quality of conformity the natural mechanism of knowledge (i.e., bioadequate). Only such education is necessary to be recognized perspective today as only it will be capable to take into account quickly changing character of environmental problems and possible ways of their solving.

Noospheric education and economics

The results of the researches which have been carried out under the aegis of the United Nations and UNESCO, show, that the educational level of the population has decisive impact on economic prosperity of the nation, and the organization and efficiency of functioning of an educational system are the major factors of its further social and economical development. Though for the development of economy both spheres of an educational system — general education, and professional training — have great value. This fact is now fixed and admitted practically by all experts on the problems of education, though they have rather significant differences in their approaches to other aspects of these problems. So, in Prof. Z. Allak's opinion, today the educational level has a decisive impact on the efficiency of a national economy. Educated workers, as a rule, achieve not only higher efficiency of work, but also provide higher marketability of production, cope with elective agricultural and industrial technologies more easy. Besides the educational level essentially influences the attitude

of people to the environment, their ability to take into account ecological factors and to solve environmental problems.

Today general elementary education and obligatory literacy of the population are necessary conditions of economic development for all countries. However for the countries, in which the agricultural production prevails, this condition is more or less sufficient and it is not sufficient enough for the development of industrial production in modern conditions as here it is necessary to provide faster constant technological progress.

Noospheric education can and should play a key role in technological transformations of economy. All extending applications of biotechnologies, means of electronics, information processes and other system technologies today demand radical changes in the way of thinking, in the methods of teaching, and in the structure of scientific researches. Today manual labor and traditional industrial skills have to be supplemented by more and more wide representations about system approaches within which one or another perspective technology is applied.

The analysis of the experience of fast economic development of such new industrial countries as South Korea, Singapore, Hong Kong, and also Thailand, Portugal and Greece shows that one of principal factors of their economic progress are achievements in the field of education. All these countries have achieved general elementary education and practically general literacy of the population at the very beginning of the economic boom. Thus it is important to mention the necessity of "strength balance" of an education system "vertically", i.e., high efficiency of all three basic levels of an education system — primary, secondary and higher.

In fact, as the experience of economic development of these countries has shown, for the creation of social conditions making possible "a technological break" and the country progress on a new economic level, the results and the quality of all three educational levels appear to be important:

— Stable skills of the general literacy and calculation, acquired in the system of primary education;

— General outlook and the mechanism of thinking, and also technical and organizational skills which are given on the secondary level;

— Cognitive skills and ability of thinking while carrying out researches which are given by the system of higher education.

The three abovementioned qualities are named by Z. Allak **"the cornerstones of the art of technological breaks."** It is difficult to not agree with this conclusion.

Thus, one of the first conclusions which we can make from the above mentioned brief analysis of economic aspects of the problem of education is the conclusion that in modern conditions to this problem it is necessary to approach from positions of cognitive psychology in a complex, taking into account mutual influence of general and professional training, and also all three basic levels of an education system.

The approach integrated up to complete systemacy, to understanding and realization of noospheric education is the first principle of solving the problem of development of labor resources.

The second principle is a preventive national investment policy in the system of noospheric education.

In fact, the experience of economic development of new industrial countries has evidently shown that before distributing new technologies through the country, it is necessary to create in this country a rather strong scientific and technical education base with a stress on technologies. In other words, in the country not only some "critical mass" of engineers, scientists and technical staff should be created, but also the general level of literacy of the population also should be lifted up to such a level when it becomes the factor **of acceleration and encouragement of social and economic development.** Scientific-and-technological advance, which in recent years has become apparent especially in the field of computer science, data processing, communication and information transfer, and also in biology and physics, essentially changes the requirements to the traditional general education and professional training of experts. In U. Driper's, the head of the Program of the United Nations development, opinion, today the purpose of education should be both training in new technologies and guaranteeing of trainers participation in a creative process of these technologies development as the economic success today depends on the access to knowledge and abilities to put this knowledge into practice for the purposes of development. We specify that noospheric education is capable to give mechanisms of technologization of an educational process with the mentioned result. Here we already interfere into the social sphere of development of a society as the essence of our point is "social intelligence, " i.e., the ability of a certain society to perceive and produce new knowledge.

The third principle of solving the problem of development of **labor resources** which also follows from the analysis of economic aspects of the problem of education, is the necessity **of continuous investment for high technologies of education** both from the government, and from the means of private sector and public funds. This requirement refers to rapid obsolescence of knowledge in the field of technologies.

Therefore even at a problem-free state of a national economy, the investment into sphere of education should be supported necessarily at a quite high level. Without observing this condition the country will inevitably be thrown back in its economic development.

Chapter 12[106]
INEVITABILITY OF INNOVATIVE MANAGEMENT IN 21ST CENTURY

> Management is not doomed to be always imprisoned by bureaucrats and chaos.

Technological breakthrough in management in 21st century is the inevitable reality. The world is on the threshold of a new civilization. Its first phase, most likely, is going to be the newly-born post-industrial information-oriented society, in which not only matter and energy, but, essentially, culture and ethics based on information as well as theoretical and practical knowledge will become the objects of attention and results of man's activities. That is exactly why today not the problems of informatization based on intensive usage of technical means and left-hemispheric methods of thinking come into the picture, but those of **creation and usage of management technologies based on ecologization and efficient usage of the mankind's main strategic resource — that is, holistic thinking**. This resource is now undergoes the stage of active research. In 1970 Karl Pribram, a prominent neurosurgeon at Stanford University Medical Center, wrote in his book *Languages of the Brain*: "Development of the sciences studying the brain keeps pace with the second technical revolution"[107].

The technical basis of 21st century management

The thriving process of informatization is the pivot of scientific, technical, economical and social development of many of the world's countries. informatization creates the technical basis for solving a great deal of today's fundamental problems. However, informatization is going to promote the transformation of the mankind's global problems only in aggregate with **holistic thinking** of each and every human being. It is obvious that no matter how many computers and how much information we

106 *Introduction to Management: the Tutorial*. M., 2002.
107 Pribram K. *Languages of Brain*... M., 1971. P. 413.

saturate the society with, no matter how powerful and modern our nature treatment facilities are, all this will not lead to qualitative advance in the situation on our planet.

The strategic objective of present-day management

As long as there is a long-established aim at non-ecological management and underestimation of its role in the society, every new generation will try to "put ecology to rights"; initially devoid of ability to handle the instrument of ecological thinking and, therefore, not knowing how to choose the bio-adequate ends and means of its activities, the mankind will deceive itself in each new generation. **Only an unconventional move in the sphere of management based on noospheric education shaping the new form of thinking (i.e., holistic) can break this "circle of ignorance."**

For example, introduction of business, role-playing, situational and management games which use modeling of abstract images, i.e., everything that forms holistic coordinated thinking in the process of management.

This type of thinking when studying both natural phenomena and social processes is crucial; until now it has been obviously neglected. We are still to realize that this is integral information processes which underlie all evolutionary changes in the surrounding world and that holistic thinking, being as fundamental and universal factor of consciousness as matter and energy, must become the basis of social management to ensure the society's sustainable development.

Long ago a number of works appeared witnessing the birth of a science about holistic cognition in management: that is, social cognitology, a science studying patterns of forming and using the range of intellectual, psychic and ethical possibilities in management.

The strategic objective of today's management is motivation of man's holistic thinking as a guarantee of sustainable development of the society. It is holistic thinking that makes the socio-natural breakthrough possible. As a consequence, it will be followed by "technological breakthroughs" in various spheres of the society's life. Hereby, **the country's transfer to a new economic, social, cultural and ethnic level of development may be secured**.

The socio-natural breakthrough

By the socio-natural breakthrough in the society we mean a powerful qualitative leap the essence of which is determined by deep realization of the natural laws of life (conscious man's self-realization in the society and in the Universe) on basis of holistic thinking. This breakthrough is organized in management in several stages: **M1 — M2 — M3 — M4**.

M1 — At the first stage the methods of motivation and holistic thinking are mastered through work with thought-image (nature-conformable thinking).

M2 — At the second stage the nature-conformable methodology is mastered (through which the principle of ecologization of teaching, cognition, education and management is realized).

M3 — Nature-conformable methodologization of education together with nature-conformable thinking gives a possibility to approximate to the man's holistic, natural world-view. Here a notion of educational ETHOS comes into existence. By ETHOS we mean the set of world-visionary, methodological and ethical purposes and manifestations of man and society.

M4 — Socio-natural methods of management, ensuring sustainable development of the society.

Let us consider the conventional scheme of the socio-natural breakthrough as a self-organizing process in the "Man-Nature-Society" system.

One can imagine a fountain, geyser, explosion, choice of potential opportunities arising from one little innovation which is to be used in the nature-conformable process of training of future managers. This innovation, retrieved from the sphere of man's subconsciousness and unconscious for comprehension and adoption into the 21st century pedagogy's arsenal, is a **thought-image**. Let us assume that a pedagogue starts educational or academic work with a student, understanding clearly that in his each and every act he is working with the student's thought-image of information. This assumption will let us see the "explosion" of consequences of this little quantum leap. Let us turn to the "Socio-Natural Ascent" scheme. We can clearly see that the quality of thinking and life of a single individual is the ultimate goal of the management system. Creative attitude to management forms culture, making it a part of man's personal being and consciousness. Through utmost expansion of noospheric education, intensification of noospheric consciousness, improvement of system management lies Russia's natural way into the future.

Appendix 1

SCHOOL AS THE CRADLE OF THE NATIONAL IDEA

by N. V. MASLOVA

The secret of harmony

Mozart's music is resonating in my soul! I want these life-asserting sounds to develop and expand enveloping the yard, the streets, the city, the country…Being pervasive they are able to fascinate and carry the soul away high into the air…

This way noble impulses, dreams, and plans come; human choices and significant initiatives are freely going on… Harmony gives rise to a range of proportions that makes the evil awkward but the good feasible.

Today is 26th of March, 2000, Sunday. I am trying to have a rest after yesterday's visit to the clinic of neuroses where children and mothers are waiting for help in correction and harmonization of their conditions from doctors, psychiatrists, psychologists, psychotherapists…

At the same time I've got two telephone calls: my colleagues ask me to prepare a program of psychological support and correction for the teachers and pupils in Moscow. Then the doorbell rings— a six or seven year child is begging… Everyone needs help… We find ourselves facing the consequences of disharmonious choices made by our counterparts.

The Golden proportion of life harmony, mind and ethics has been upset. In other words, disharmony of the soul, body, and mind is manifested by the psycho-ethical crisis. All the other crises of civilization are the effects of this one.

We must decide what to do today, that is to make our choice of the future. We, you, native land… At present every person, society, country are making their choice of aims and values, approaches and principles. Every individual soul asserts its own variant of the future by its choice — "what should I be like." You, we, society…

R. Bach's words are resonating in our head: "Life does not demand that we should make the right choices… Life demands that we should LIVE with the consequences of these choices."

Every person comes to this world for the realization of four non-uniformly scaled programs:

— individual

— social

— planetary

— universal.

One of the programs becomes a dominant one in the life of any particular person.

At the same time, irrespective of the program scale, every person realizes his own task and makes his contribution to life continuation. Once A. I. Herzen urged people to realize the necessity of social transformation ("Vivos voco!"). Today science and practice have enough reason for the conclusion that new advanced or integrated ideas do not need to be explained for everyone. Just because every representative of human race has his own unique evolutionally important role and task. This article has been written not for everyone.

Who is this article addressed to? First of all to those who are indispensable to the planet and the Universe. These are the carriers of archetype qualities providing positive evolution. These are people whose bodies "pave" the road of history — and whose hearts flare like Danko's.

To elucidate the idea of "indispensable" qualities of people let us resort to the help of natural sciences: chemistry, biochemistry, physiology, and genetics.

The initial principle of life evolution is the principle of entropy maximum production at minimal expenses. In other words, the primary evolution tendency is stable disturbance increase under the control of external medium. This single evolutionary principle specifies the qualities of all the chemical elements in the Earth conditions. This or that ability of element to entropy (chaos disintegration production) is designated and explained by its position in the Periodic Table. For example, carbon possesses the strongest covalent bond of its atoms with each other and with the atoms of nitrogen, phosphorus, air, oxygen, and others. The prevailing 20 amino acids ("atoms" of life) are the only complex in nature satisfying the principle of structural self-sufficiency. There is not a theoretical justification of this phenomenon yet, but it is a reliable experimental fact.

The twenty amino-acids relate to the twenty personality archetypes (stable dominants of the unconscious). In other words, there is an experimentally established relation between 20 personality archetypes and 20 amino acids — every archetype relates to one of the amino acids. The predominance of a certain chemical element in an amino acid (a structure forming a protein) determines psycho-physical appearance of an archetype. Thus, all the humanity can be divided into qualitatively different archetypes, 12 archetypes from 20 (by analogy with replaceable amino acids) being intended for

maintaining metabolism at the level of **ontogenesis, morphogenesis, and arogenesis**.

The 8 "irreplaceable" archetypes (by analogy with irreplaceable amino acids) are oriented to allogenesis — a process of generating new qualities, and ideas. It is these 8 archetypes (with their physical-chemical and psycho-functional characteristics) that are able to perceive new information and generate it in the evolutionary process (I. N. Shvaneva. *Integral Psychology*. M., 2000).

For the representatives of these archetypes **information homeostasis** (an ability to perceive and process information) is the higher form of organization as compared to evolutionally required but already developed forms of homeostasis: elementary homeostasis (in ontogenesis), biological (micro-elementary) homeostasis (in morphogenesis), energy homeostasis (in arogenesis).

In archetypes a general plan of personality type is reflected—this is A. A. Ukhtomsky's Dominant. The fundamental feature of the dominant is in the type of relationship, in the type of information coordination in dynamic disbalance of system "Man." Therefore, the dominant determines the levels of information metabolism and system homeostasis, and reflects the evolutionary level of mental image forming, and structuredness of system's mental images.

An archetype is the primary bearer of homeostasis that specifies phenotype parameters, determines a psychological factor (behavior model) of person's activities.

The article is addressed to the representatives of 8 indispensable archetypes — the movers of evolution — people who are not indifferent to the fortune of the planet and native land. If we give the generalized portrait of the movers of evolution, we can see Pinocchio, a fairy-tale character well known from the childhood. It is an unusual little boy made of wood; he has a long nose and is notable for his curiosity, energy, and fearlessness. But he is very credulous, and any swindler can cheat him and take away his gold coins. He is brave in his seemingly naive attempts to expose a secret. He does all this not for himself but for his friends. He rushes out, eager to discover the main secret of the world — and it is, indeed, revealed to him: a concealed door, hidden from the view by the canvas with a hearth drawn on it, opens before him! The hearth is only drawn; it is not real here, in the visible and usual world. A real miracle, a secret is revealed with the golden key which only the chosen can find.

So, the road of history is paved with the bodies of unusual curious people; the secrets are revealed by their noble thoughts; evolutional progress is gained by their hearts. They

are created by the Nature itself in the way to generate prospective ideas and make them true. This article is for them.

National idea as necessity

Let us have a look into the deep history and mark the milestones of a great evolutionary advance: formation of the Russian state and adoption of Christianity in the 10th century; salvation from the foreign yoke in the 13th century; salutary unification of the Russian lands around Moscow in the 16th century; the period of folk storms and religious movements connected with the growth of the people's ideological self-consciousness in the 17th century; the “window” into Europe made by Peter the Great and rise of Russia as a major European power in the 18th century; the unique national unity in the patriotic wars of 1812 and 1941—45; the inspired ideas of reconstruction in the post-war period.

History produces extensive materials. We can easily trace back the other periods in the history of our country when **the nation, united by common ideas**, solved the most important single task of its surviving. These ideas were different but always uniting and therefore salutary. Speaking figuratively, we can compare the Russian history with stairs, where every new historical step is followed by appearance of another national idea. This comparative pattern is not in the least like the distinct, gradually rising evolutionary spiral of history of the East and dramatic evolutionary rising of the USA in a certain period of time.

The character of the National idea consolidated by the milestones of the history is the unity, conciliarism, salvation in the name of God, tsar and native land, heroism of spiritual rise, service to the Great idea.

From the earliest times, the psychological key factor that triggered the individual and social program of a Russian man was expressed in terms of great ideals of fighting, protecting and saving the right and deprived. It takes only to analyze Russian folk tales to see an archetypical motive of activity acceptable for the Russian man and emphasized by the very people — all the characters are idle (“sleeping on the stove”) for the time being as if they are gathering their strength. But as soon as a “great” task appears, such as to kill Koshchei the Deathless[108] or to vanquish Solovei the Brigand (Nightingale the Robber), or to save Helen the Beautiful, or to catch the Firebird in a faraway kingdom—there our daring young men, defenders and heroes, awake for their great deeds.

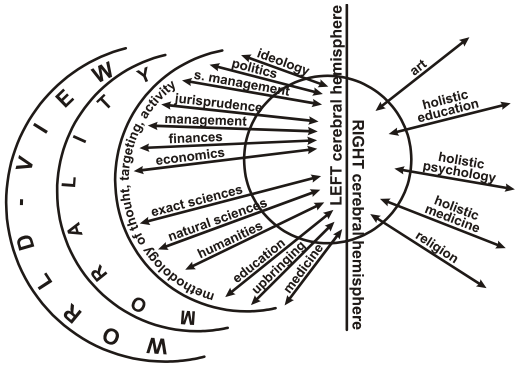
[108] In Russian fairy tales, a very old, rich and powerful evil magician who will die only when a treasured needle is broken.

The lever of breaking the activity is quite obvious — the inspiring great **Idea** to win the Evil and to serve the idea of salvation.

A great renewal today must be connected with the Idea of national realization of Russia's place and role in the new round of evolutional spiral in the context of civilization tendencies.

What is to be saved today?

The history of civilization— the history of long term predominance of left-hemispheric thinking and energy criterion of progress: labor energy accumulation by the ruling classes. In the modern industrial society a *non-ecological* type of thinking (left-hemispheric), i.e., pathologic, anthropospheric thinking got preferential development. All the systems of the society (education, public health, and politics) are directed toward the non-ecological type of thinking which eventually caused the **modern civilization crisis.** It shows the end of the epoch of spontaneous, non-ecological development. The move to the ecological development means gradual transformation of one-sided thinking and energy criterion of progress, and confirmation of universal criterion of human progress on the basis of improvement of qualitative characteristics of thinking. To illustrate this let us have a look at the scheme of civilization crisis.



We can see historically established in the human society overload, a tendency to the left-hemispheric (discursive-logical) thinking of man, imbalance of his natural abilities that caused civilization crisis. It is like the overload of the bearing structure of a building when one of the parts cannot hold the building, and misses its working. This non-compliance with the Golden proportions of harmony is inevitably punished by the nature and leads to the collapse of the systems built by "homo sapiens."

It is obvious that no "filling in holes" and solving the "problems" concerned with discursive-logical thinking will not change the situation. It is necessary not to expend the energy on the problem but to have a look at the system in whole in order to see the harmonious principles of its functioning and take actions in compliance with them.

Simply speaking we have to understand some regularities of system functioning which we did not understand before. The crisis of the civilization of the end of 20th century is the crisis of thinking, to be more precise, prevailing of the left hemispheric type of thinking.

The crisis is in non-ecological exploitation of one part of the whole organ— the brain while the other symmetrical human organs work in accordance. Dysfunction of the right cerebral hemisphere has caused disharmonious work of the whole organ, and that does not meet the principle of ecological appropriateness.

Together with existing tradition of relying on the discursive-logical thinking the mankind thereafter accepted the principle of **inexpediency of socio-ethical imperative instead of previously existing principle of ecological imperative.**

Ecological imperative is an objectively necessary moral socio-anthropological principle that is the imperative of co-development of man, nature and society.

According to this principle, person, state and society have no right to follow any moral principles but the ecological imperative taking into account general laws of co-development of nature, man, brain, and society.

Having considered the situation of countries, peoples and states in the context of "disguised" civilization crisis as the crisis of thinking, we can easily see that the derivatives of this crisis are the more visible crises— spiritual, economical, financial, ideological, educational, etc.

It is the duplicity in understanding the aim and system of education forming the left-hemispheric thinking (instead of the holistic one), consciousness, and methodology that created the double morality making it possible for thought, feeling and body to be separated in reality. In spite of gigantic advances in education and science, the true progress has not been achieved. The progress in scientific fixation of the character and qualitative measures in whole has led to general degradation of the ethical, moral, and cultural situation, which, in its turn, had the corresponding effect on the state of spirituality and health of the nation.

Thus, a new civilization idea is becoming perceptible for the awareness on the next evolutional viral turn — transformation of man's thinking and consciousness in the direction of ecological imperative of pervasive eco-ethics.

The purposes of a new viral turn of civilization are reunion of the soul-mind-body in a single human person. It is clear that it can be carried out only in the system of education. It is reasonable to put a question—what kind of education can provide the

wholeness of man? Before answering this question let us find its place in the system of ideological search of our great predecessors.

Russian Idea

The study set forth by V. I. Vernadsky in 1920s had been settled in the minds of Russian progressive intelligentsia for 40—50 years and took its shape in a number of papers in 1980—90s, and at present it urgently demands comprehension in scientific, social, political structures of the state. There have been created departments where ideas of new ecological settlements, national parks, technologies, transport, medicine and education in compliance with the views on the future of mankind are being considered.

The time is probably not far off when the comprehension of the ideas of new courses of development will occur on a national scale.

Having a general view on a knot of present-day problems we become aware of their as if unwieldy iron chain consisting of separate links of economics, finances, education, public health, social, military problems, etc. Which of the links of this chain has to be caught in order to pull it all out of the crisis, all the links being involved in the process of ecologization?

To make this image more alive we can compare it with an ill person: all his body and soul are aching. What has to be treated? Which part of the system needs that healing injection to restore its lost resources? Where is the zone of force application that will allow to trigger the mechanism of reconstruction, self-organization of still alive, self-organizing system "Man"? Of course it is the Spirit, whose projected function was repeatedly confirmed in the history of Russia.

Human activity in biosphere has to be lightened up with the reason and guided by the spirit to the saving of natural systems.

The person with noospheric thinking will see his true place in nature and his role in evolution performing the biospheric function of maintaining "stability factor" of natural systems. The natural element of morality of this man will correspond to his relationships with nature — all that assists the performing by man his biospheric function is moral, all that is in conflict with this is immoral.

Ecological thinking means a conscious choice of man in favor of eco-life, position "I am in nature", love to nature, realization of his place in nature, and, finally, co-creativity of man and nature (in contrast to *ego-life*, position "I am the tsar of nature",

subjugation-transformation of nature, and finally, position of exploitative and rapacious treatment of nature). It is the inability to foster the true holistic ecological thinking and consciousness of man that is the crux of the problems of education.

The crisis of educational system is in its inability to provide the realization of basic human potential (against the background of the courses of environmental ecology) and reluctance of person (a pupil, a teacher, a parent) to function in conditions of breaking the original ethics and appropriateness. As the final result all the benefits of education for the person turn out to be an ability or inability of self-realization in the life.

The crisis of educational system is closely connected with the crisis of civilization. It cannot be realized only as a result of social, political, ecological and cultural-ideological influences in Russia. Its roots go deep into the history of mankind and are connected with the phenomenon of development of man's consciousness. Historically established type of left-hemispheric thinking (discursive-logical) prevailed in human society from the end of 5th century B. C. (ARISTOTLE) and is prevalent till present days.

The crisis of educational system is a powerful signal to the transformation of aims, methods, and ideals of mankind.

So, **the main contradiction** of the present system of education in Russia is in declaration of high humanistic aims for the fulfillment of which it was created and its inability to move effectively in this direction.

The causes of the contradiction of educational system are:

— inability to realize the strategic function of education in the modern and future society;

— inability to structure the functions of educational system (administrative, methodological, humanitarian, etc)

— inability to realize the educational technology and methodology as a science;

— inability to see the true fundamental tasks of education as the tasks of motivation of bio-socio-cosmic potential of man.

Thus, we approach to the realization of the link "Education" in the long chain of civilization gap, pulling at which we can take out all the chain with minimal social costs.

At present, when the crisis of thinking, historically defined and reproduced through the system of education, indicates a knot of other crises of civilization, first so distinctly the necessity of educating people with a new type of thinking, ecological consciousness, a set of new ideas, comes into the picture. It is a new quality of man. We mean a whole generation of people of the kind. The aim of the present stage of evolution is to be aware of the new qualities of man and methods of fostering such people. This aim can become

the base for **a complex of ideas that is called ideology** and considered within the nation as **a national idea for the nearest turn of evolution**.

The consideration of the national idea suggests the presence of prerequisites of its appearance, its essence, forms, and formation stages.

The prerequisites of the National idea should be sought in the depth of our historical and cultural soil:

— historically established geopolitical map of Russia by the life itself influenced the versatility of our nationals, generating **the ideas of solidarity and community** of nations and people;

— historically established **Eurasian type of our nationals posessing** specific features of Eastern wisdom and Western rationalism, **was territorially rooted in Russian soil;**

— historical and cultural symbioses, mutual enrichment in the course of the centuries-old interaction **brought appreciable benefits of practical tolerance**;

— our multi-national economics put into effect a unique **mutually complementary administrative-economical union;**

— our religion based on love for neighbor and enriched with Eastern religions is sincerely aimed at perfection of man and society;

— our revolutionary experience was never within the bounds of Russia and always stretched, to be more exact, conjugated with so-called national outlying districts; the ideas of revolution after all crystallized from the ideas of the fastest perfection of man and society, the experience being acquired by different sections of the population: peasants, workers, lower middle classes, intelligentsia;

— our politics was made in a big way and always included attempts of solving national problems that brought to a great number of questions but finally came to the same—what is the Russian national idea;

— our education, literature and culture in the whole acquired a peculiar feature to be **multinational**, interpenetrating; they generated various sides of viewpoints— from the appreciation of **mutual enrichment of cultures** to pejorative references of these penetrations that created a man of off-quality as the most terrific misdeed of the 70— years old Soviet order; (Govoruhin)

— the depth and generosity of nature of our nationals have always been the directing vector of searching philosophical explanation of the new qualities of **man in the Universe** (Russian cosmism), of man directed by all his being to the highest spheres of Spirit, Reason, Belief —to the noosphere (V. I. Vernadsky).

So, summing up the prerequisites of appearing the new National idea in Russia, we have pointed to their geopolitical, economical, ethno-national, historical and cultural, mental sources in the soil of our country.

THE ESSENCE OF THE NATIONAL IDEOLOGY

The transition to holistic ecological thinking is a turning point in the history of humanity on its way to future. let us consider some essential conceptions without which it would be difficult to look into the essence of the matter.

The type of thinking **is a conscious orientation of preferred use of brain functions**. There are two main types of man's thinking:

— ecological (two-hemispheric);

— non-ecological (one-hemispheric)

Of course, clear differentiation is seldom met in life, but we mean preferable choices of people which take place.

Ecological thinking (synonyms: harmonious, natural, universal, biospheric, healthy, holodynamic) is determined by conformity with the natural laws of the Universe, i.e., both cerebral hemispheres are involved in work. Such thinking does not cause any disturbance in the biosphere. Proportional joint work of the brain determines the quality of man.

The quality of person is determined by the type of his thinking.

Harmonious, versatile, healthy person demonstrates natural, **compatible with biosphere quality** that is determined by holodynamic (two-hemispheric), ecological thinking.

Inharmonious, narrow-minded, sick or problem person demonstrates his (or her) unnatural, pathologic qualities that are determined by *non-ecological thinking*. *The left hemispheric* (is used and prevails in exact sciences, rationalism) and *right hemispheric* (is used in humanitarian, creative tendencies) orientations, as well as intermediate variants, are all possible.

Improvement of person's qualities means enhancement of person's abilities as to the holistic thinking and, therefore, ability to transform his (or her) relationships in the biosphere and society in the direction of biosphere compatibility.

The progress of person and society is in enhancement of personal and social spheres of possible transformation of negative problems to positive.

Ecological development is appropriate when the progress proceeds on the base of improvement of qualities of man's thinking, i.e., transformation of thinking in the direction of its becoming ecological. Ecological development is coordinated with natural laws and do not disturb the biosphere because it is the result of ecological thinking.

Ecological, healthy, harmonious thinking will become established by changing anthropocentric views like "biosphere is for man", "everything serves man", "man is the tsar of nature", "conquest and transformation of nature") and establishment of biocentrism — "man is for biosphere", "man is in biosphere." Finally, of course, biosphere (the Earth and Space) is for man.

Our time is the period of mankind's transition to the epoch of individual and collective intellectual and spiritual unity which is more and more often called the epoch of reason—the epoch of noosphere (*Greek* noos—reason, mind).

The imminence of the Earth coming into NOOSPHERE period was shown by the great Russian scientist V. I. Vernadsky. According to his views, the activity of man was becoming the principal geo-formative factor, and the thought as the product of the mind — the main instrument of evolution.

Noosphere **is a period of integration of individual and collective mental and spiritual power, a new quality of holistic thinking and consciousness when a unique coating of the planet (a complex of interacting thought forms) is being created.**

Noospheric development **is consciously controllable value-oriented co-development of man, society and nature when living needs of the population are satisfied without detriment to the interests of future generations and Universe.**

Noospheric development aims at restoration of the ecological equilibrium on the planet and birth of new man whose main characteristic feature will be a new quality of thinking —**holistic noospheric thinking.**

Education system is a key link that will help Russia to serve its turn of the leader in noospheric transition.

Noospheric transition is a period and process of correction of those components of human and social activity that proved to be wrong and ruinous.

In the period of noospheric transition a gradual realization and accepting by man and society the principle of ecological imperative and deviation from the lop-sided logical principles of thinking is taking place. I. A. Efremov wrote about the importance of this

period: “It is in the overcoming of the deadlocks of mathematical logic that the power of the future is.”

This phase on the way of society to become ecological can be called pro-ecological. The pro-ecological phase arose spontaneously as an alternative movement in education and it is successfully proceeding in compliance with the law of self-organization of subjects of ecological systems. Transition from alternative movement to state politics is unavoidable.

Noospheric transition will result in acceleration of restoration of the components of human life activity (material, mental, spiritual) and the following prosperity of society on the base of conformity with all these components.

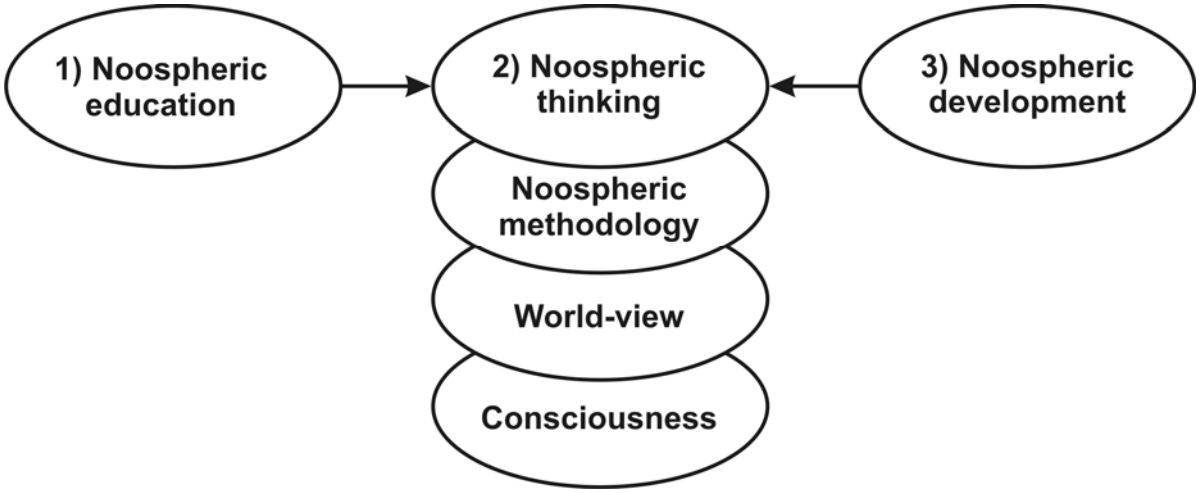
All in all the idea of noospheric development will be turned into the system of new spiritual and professional aims of mankind. This requires:

— profound information awareness of all aspects of noospheric development including noospheric consciousness;

— reorientation of education, medicine, production and other sectors of economics to noospheric technology, methodology and practice.

Creation the system of noospheric thinking in society and, therefore, new values will stimulate the formation of ecological structures of education, production and consumption aimed at the higher level of people’s life.

Thus, in a certain respect, noospheric education is a key link in the noospheric transition. The sequence of this transition is unavoidable:



THE AIM OF EDUCATION IS NOOSPHERIC THINKING

Holistic thinking development based on the synthesis of modern achievements of quantum physics, biology, physiology, theory of systems, neurophysiology and other sciences is a principle of psycho-pedagogical influence that can work as an instrument of transformation of present-day man's (predominantly) left-hemispheric thinking.

The aim of noospheric education is the motivation of harmonious, holistic, ecologically healthy type of thinking based on the consciously combined mastering of logical(left-hemispheric) and creative (right-hemispheric) thinking. This is the type of thinking that can give a person an integral picture of the world and become an instrument of solving global problems and transition to noospheric development of the society.

The result of education process, therefore, is a person who is able to use harmonious two-hemispheric holodynamic thinking.

But what does it mean "able to use"? Isn't it just another declaration of "bill of rights" of man and nature?

The actual result of education process should be considered *teaching man* **to use discursive-logical, intuitive and holodynamic (logical and creative together)** principles of thinking while solving various existential, industrial, social, universal problems. Let us make it clear: one should speak about holistic thinking when the co-work of both cerebral hemispheres becomes not only an individual's ability but his (her) usual conscious method of solving various problems. In this sense we will speak about methodologization of man's thinking. We understand that such method of thinking is new for the most of people. The mastering of this method will require serious skills of every person. The fact that not all people would like to learn this should not be ignored. It will be suitable not for all social formations. But only by means of holistic thinking it is possible to acquire noospheric **consciousness**. That is why we pay primary attention to the holistic thinking as the first step on the way to the noospheric consciousness of person and society in the whole.

Keeping in mind all the mentioned above we can say that it is the noospheric consciousness of person, i.e., a new quality of personality of man that is the aim of noospheric education. That is why enunciating today **the perspective and the aim** of the education for the coming period of development we call it noospheric. It does not mean that it is such today. But today it is aiming at mastering the tools, methodology, and aims of noospheric period.

Noospheric education is a socio-cultural process of transfer of knowledge, skills and habits by means of organized motivation of individual

training mental images and realization of enclosed in them energy. The goal of noospheric education is to teach holistic dynamic thinking by means of mental images.

The principal feature of noospheric education is disclosure of internal resources of the learner's personality, revealing his natural abilities. In general, these resources increase the learner's creative potential as well as the level of passionarity of all the society. The basic characteristic features of noospheric education are its accordance with nature of human perception, ecological purity, targeting at the disclosure of the teacher's and student's "Upper Me's" by means of their creative interaction through all canals of perception.

Noospheric education is possible at all stages of learning on all academic disciplines.

TASKS OF EDUCATION

Society and country at various times set and fulfill various tasks. The choice of tasks for education corresponds to a certain level of development of a particular society: the level of need in this or that educational result, its social demand, realizability, procurement of resources. The position of Russia in the world as Euro-Asian industrialized country in the period of transformation of social key points determines the strategic goals of the country in the field of education in the following way: development of determinative primary and general education with the following professional education to meet the needs of science, culture, medicine, industry and agriculture in functionally competent, creative specialists always having an opportunity to improve steadily the level of education.

The present education is solving quite a number of problems among which socially the most important ones are as follows:

— **formation** of the learners' world-view attitudes based on the universal moral principles of life;

— **enlightenment** of learners, i.e., getting acquainted with general scientific ideas about nature, man, society, and also with the main directions and peculiarities of spatial, functional, cultural, mental structures of man;

— man's **socialization**, i.e., his involvement into the processes of social labor division through the mastering knowledge and skills in this or that professional part of this division, and also introduction to the mode of life accepted by this society and principles of social relationships;

— **inculturation** of person, i.e., introduction to the value-sense key points system and evaluation criteria, normative-regulatory establishment of social existence, system of languages and technologies of social communication and principal parameters of historical and social experience of collective life activity of mankind in general and a society particularly. It is precisely these points that make the task of education in general.

To put it in simpler words, we can say that while socialization boils down to professional training — the system of principles and technologies of such and such activity in order to create socially important product and obtain the needed social goods as a reward, inculturation, in its turn, is adoption of historically developed standards, following which one can obtain social welfare; cooperation with other people, information getting and dissemination, estimation and interpretation of different phenomena, etc.

Finally, that is what culture is, as a system of standards and rules, regulating any forms of people's activities, developing value-sense hierarchy of the results of these activities, maintaining the functioning of communication channels and symbolic languages with the help of which this kind of regulation is implemented. **Culture is people's mental aiming at the fact that their needs and interests can be satisfied not by any means however effective they were in practice, but only by the ones acceptable to the nature, society, and man as to their consequences and cost.** From the position of culture the end never justifies the means. Hence a special role of culture as historically accumulated bank of socially acceptable means of needs and interest satisfaction and also harmonization of people's relations with the world.

But social experience of ancestors, unfortunately, is not inherited by people genetically. Every person has to be individually accustomed to this experience, "bank" of cultural examples and attitudes. These tasks are fulfilled in the processes of upbringing and practical social cooperation, introducing the person to the realities of cultural standards of life; by means of art, morality and religion setting the tone for normative and anti-normative consciousness and behavior; public opinion, approving or blaming such and such activities of man; state, awarding or penalizing depending on the degree of normativity of man's behavior, etc. But the chief "tutor", nevertheless, seems to be education as its mission is to implement this enculturation of person as systemically and efficiently as possible according to the worked out plan of solving this problem.

The task of noospheric education is to ensure the right of man to effective and instrumental holistic creative thinking and acquiring noospheric consciousness.

Its effectiveness is achieved at the expense of using 5 canals of man's perception, intensification of creative thinking and holistic view on the phenomena studied, refusal from the "patchwork quilt" system — the system of separate rules. The appeal to personal experience of learner and natural biorhythms of human body shortens the time needed for mastering any subject by 3—6 times, releases the resources of learner's health, brings to economy of material and financial expenses and gives the possibility as much to increase efficiency of acquiring skills and knowledge.

HOLISTIC EDUCATION CHARACTERISTICS

Noospheric education is so multisided that can be characterized from different viewpoints in compliance with underlying principles:

1. The principle of *ecologization* of education means turning to the natural, inherent to man, methods, means and canals of information perception without intensive exploitation of discursive-logical left-hemispheric thinking.

2. The principle of *systemity* of education means structuring of pedagogical activity on the base of general system scientific theories of development of nature, society, thinking. It implies the functional systemity but not its theoretical model.

3. The principle of *harmonization* of education means using of technologies and methodologies of holistic perception of world and thinking that plunge the learners into the harmony of world right during the lessons.

4. The principle of *humanization* means the transition from technocratic model of education to socio-cultural one that opens the possibilities for a wide humanitarian training of the learners. Humanization by itself does not protect the person from marginalization[109], but it is a reliable "bridge" to the holistic education in the transition period.

5. The principle of *instrumentality* of education means possibility to apply one's knowledge, skills and attainments in all spheres of human life: personal, interpersonal, social, universal. The last sphere of life means not alienation of education from nature and society but the condition of its being in nature-society. This is **the principle of *being included into universality***.

[109] Marginal person is a person devoid of any possibility of self-realization in a certain period of personal or social development.

6. The principle of personality-oriented education means freedom to choose forms, directions and means of education.

7. The principle of leading (compared with other branches) **development** of the educational branch means being focused on the up-to-date achievements of science and psychological/pedagogical practice.

8. The principle of cognition simplicity, being a specifically human way of securing life, underlies the education simplicity principle.

9. The principle of efficiency of education means constructing and implementation of technologies and methods of teaching which do not exceed the necessary social costs and lead to economy of time, efforts, funds, and finances.

10. The Principle of Potential Intellectual Safety. The Principle of Potential Intellectual Safety is not just a new principle of pedagogy. This is a newly proposed principle originating in the depths of holistic, healthy human consciousness. (We have already used the term "ecological consciousness" regarding the holistic consciousness.)

Potential Intellectual Safety is based on the general-system principles, the most important of which are:

— conformability to nature;

— self-organization of information;

— invariance.

Working with natural symbols and images is potentially safe. Let us remember that man learned to listen to the nature and his surroundings choosing for himself natural examples. The first ecological notions of man manifested themselves in the phenomenon of the totem. As a rule, a species standing on the top of the ecological pyramid of the region's ecosystem was chosen for a totem. The feeling of being connected with (and protected by) the totem, the wish to imitate it gave man the feeling of being "linked up" and united with the Universe, as well as with the surrounding world. When learning from the totem, man enabled all his sense organs.

Understanding culture as the second nature or symbolic Universe (Y. Lotman), we introduce its basic conception, **symbol**, into education on the conscious level (as opposed to the unconscious one), precisely as a *symbol* and not as an *example* (a mere illustration of what was said by the teacher). We propose to change the order of the summands. This act changes a great deal, since information perception is not mathematics where the order of the summands does not affect the sum. Perception is a complex psychophysical process.

We propose symbol to take the leading place in the educational process. We propose cultural examples and bio-adequate symbols for embodiment of the individual mentality.

Meanwhile, the students are suggested to interpret them "right away" by themselves and not after the teacher. Thereby forming of "participating thought" as individual experience of knowledge (M. Bakhtin) comes into the first place. **Provoking the genesis of "participating thought", we cultivate thought on the basis of natural and cultural ("the second nature") examples. This is the essence of the Principle of Potential Intellectual Safety.** That means natural safety from overloads and alien information unnecessary to an individual, pressure from the teachers and authorities; safety from wrong moves and paths, from running to extremes of morbid ardors and sectarianism. Thus, natural symbols in the process of education are the first guarantee of natural safety of thinking. The second component of safety is **the utmost potential of an individual**. The latter is understood as **a totality of the spiritual, intellectual and physical abilities of man**. In wide extent, the proposed method of pedagogic and educational activities is aimed at opening the individual's "Upper Me."

Remember who you dreamed to become when you were a child. Reconstruct that image of yourself which seemed desired and pleasurable to you. Remember the feelings that filled your heart and your soul when you wanted to become your ideal. Reconstruct the powerful positive wish to move faster, more effectively towards the desired aim. Perhaps you have achieved a lot while moving in that direction. But let us take a look at your childhood dream from the viewpoint of the principles of noospheric education. Is there a single principle among the ten enumerated which wouldn't fit when characterizing a child's dream? In dreams, man is always personality-oriented, ahead of time; in dreams, he simply and efficiently, humanely and harmoniously, systemically and ecologically constructs models of his needs and capacities on the basis of his potential (unrevealed) spiritual, intellectual and physical abilities. The dream itself as a model of the future is an important instrument, a generator of energy for its own attainment. Of course, dreams change, and models become more complex. However, projective thinking[110] is the general code for solving vital activity problems. Possessing knowledge of this code, as well as conscious usage of it in pedagogy and education, we call **conformability to nature** or bio-adequacy of education on the stage of noospheric transition.

[110] Gromyko Y. V. *Projective Consciousness*. M., 1998.

NOOSPHERIC EDUCATION AS A TOOL FOR NATIONAL IDEA REALIZATION

So, the task of noospheric transition is formation of the National idea as a strategy and a tool of launching the National ideology — a system of ideas about various sides of new quality life: noospheric economy, noospheric technologies, medicine, noospheric science, noospheric settlements, and others.

During the "Sphere of Reason" period, all these spheres of man's life abound in nature-conformable ethics, methodology and instruments. And ethics is understood not in an abstract and descriptive way, but specifically. We understand ethics as a method, standard and technology of interaction without disturbing the biorhythms of interacting systems and subsystems of man—society— the Universe.

Many spheres of man's life and activities are filled with nature conformable technologies, methods and content not of their own accord. Only people having noospheric consciousness, i.e., specially prepared to take, plan, and manage the integral activities can do it. Undoubtedly, the assertion of noospheric principles of life will occur through the people with a new quality of thinking and consciousness acquired at **noospheric school**.

Scheme

The suggested concentric scheme clearly represents the leading role of school preparing personnel for all the spheres of man's activity.

In associative way, the scheme reminds us about our abilities— to hit the dead center of the target or fail to do that? To score ten, five or three bull's-eyes? Well-defined choice, strength of hand and will, sharpness of vision, striving to hit the dead center of the target, play not the least role in the constant evolutional competition of good and evil.

SCHOOL AS APPLE OF DISCORD

In the last decade, we can clearly see the picture of fighting for school — for the souls and minds of the new generation. Among those who crave to take up the ideological

positions of school are who-not: traditionalists who do not want to see the spirits of the times; missionaries who blind by their help; sponsors who act with the funds; Hubbardists who entice by their organizational order; religious structures insisting on their exceptional spirituality; local authorities waving national flags.

In education, the slogans reflecting certain aspects of school process are constantly changing: sometimes they are for developing education, sometimes for computerization, sometimes for creativity, integrity, and ecologization. Lately, slogans for psychologization of school have been appearing. But we do remember the fabulous cart harnessed by Swan, Crawfish and Pike, towing it different ways. Let this old story serve us a literary image of impossibility to end the deadlock at differently directed action forces.

Let us have a look at school as apple of discord.

Let the seed of apple be the symbol of man with a **new type of consciousness**, the point for which an apple, a tree, all the garden is created. Unfortunately, the point of today's school is information for possession of which the mark is given. School leavers are not able to adapt in complicated situations, so the greater percent of them feel to be marginal persons. School leavers enter independent life having at least one or two illnesses.

So, the aim of noospheric school is to teach the child to think in conformity with nature without making harm to the biorhythms of his living self-organizing system. The methodological seed of noospheric school is the work with thought-form as the method and aim of education process.

Symbolically the pulp of apple is the environment feeding the seed— those methods of influence which have the essential effect on the quality of the seed. In traditional school these are methods, textbooks, and other educational means, developing exceptionally left (discursive-logical) hemisphere of the brain. In noospheric school these are bio-adequate methods of systemic influence "Pupil—Nature— Society."

The bordering peel of the symbolic apple is the cover, i.e., school itself, filled with the content, methods of nature-conformable education, and growing together with its content.

The stems strengthen apple on the brunches— regions.

The trunk of the apple-tree embodies the single state conception of noospheric school. The juices of the conception feed all the regions and schools, giving them the possibility to be special and various. The bark of the tree is the symbol of strictness and

obligation of nature-conformable forms of all education system in the network of which the functioning of the conception is implemented.

The roots of the tree are fed by the juices of native soil, native culture, history and nature.

This kind of association will allow competent building a system of goal-setting in the society as the confirmation of popular wisdom—"As the tree, so the fruit": as the system, so the fruit it brings.

NOOSPHERIC EDUCATION AS THE CRADLE OF THE NATIONAL IDEA

Creation of advanced education system is the key ethical, economical and strategic objective of Russia on its way into the 21st century.

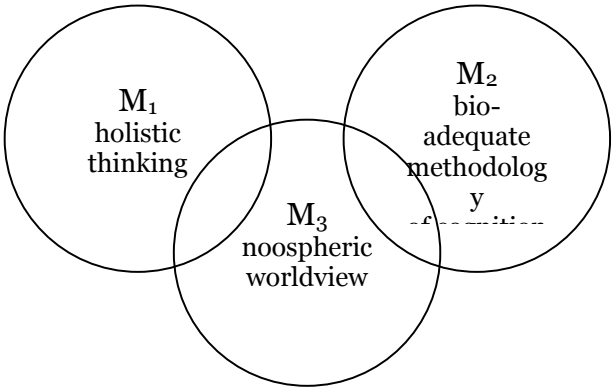
The conception of noospheric education is a part of the conception of noospheric way of development of Russia worked out by the Academy of Natural Sciences in 1993—1995, and proceeds from its basic conceptions and principles.

The conception of noospheric education is a system of theoretical, gnosiological, methodological and practical views on the matter of education and the possibilities of its effective achievement in the society at the period of transition to noosphere.

The conception presents indissoluble unity of the four parts— theoretical, gnosiological, methodological and practical one.

The strategic objective of today's management is motivation of man's holistic thinking. It is holistic thinking that makes the socio-natural breakthrough possible. As a consequence, it will be followed by "**technological breakthroughs**", "**administrative breakthroughs**" in various spheres of society life. Hereby, **the country's transfer to a new economic, social, cultural level of development may be secured**.

By the socio-natural breakthrough we mean a leap in the society the essence of which is determined by deep realization of the natural laws of life (consciousness and awareness of man in the society and in the Universe) **on basis of holistic thinking**. This breakthrough is organized in education in several stages: $\mathbf{M_1 — M_2 — M_3}$.



M1 — At the first stage, the methods of motivation and holistic thinking are mastered through work with thought-image (nature-conformable thinking).

M2 — At the second stage, the nature-conformable methodology is mastered (through which the principle of ecologization of teaching, cognition, education and management is realized).

M3 — Nature-conformable methodologization of education together with nature-conformable thinking gives a possibility to approximate to the man's holistic, natural world-view. Here a notion of educational ETHOS comes into existence. By ETHOS we mean the set of world-visionary, methodological and ethical purposes and manifestations of man and society.

M4 — Socio-natural methods of management ensuring the sustainable development of society.

Let us consider the conventional scheme of the socio-natural breakthrough as a self-organizing process in the "Man-Nature-Society" system.

One can imagine a fountain, geyser, explosion, a choice of potential opportunities arising from one little **innovation** which we offered for **recognition** in the nature-conformable noospheric education. This innovation, which is the subject for comprehension and adoption into the 21st century pedagogy's arsenal, is a **mental image**. Let us assume that a teacher starts educational or academic work with a student, understanding clearly that in his each and every act he is working with the student's thought-image of information. This assumption will let us see the "explosion" of consequences of this little quantum leap. Let us turn to the scheme showing the "Socio-Natural Ascent."

Examining it from below, we can clearly see that the quality of thinking and life of a single individual is the ultimate goal of the education system. Not knowledge by itself but creative attitude to it forms culture, making knowledge a part of man's personal being and consciousness. Utmost expansion and extension of education is Russia's only natural way into the future.

Seeds have been thrown into the ground... The seeds of ideas of noospheric education, noospheric science[111], noospheric consciousness[112], noospheric development in Russia[113] are generated by the previous growth of public, scientific and individual consciousness. Their natural growth, in their turn, was conditioned by the ideas of V. Vernadsky, K. Tsiolkovsky, N. Fedorov, A. Chizhevsky, I. Prigogine, P. and O. Kuznetsov, and N. Moiseyev.

Any person is known to gain experience and world-view according to the level of his knowledge. By the end of the 20th century, passing through classical, non-classical and having started post-non-classical stages, having been repeatedly convinced that in science itself, in education, in consciousness there is nothing that would not be in nature and life, **the mankind has addressed total ecologization. The ecocentric paradigm of life** through the models of open society, science, education systems, person with the conjugated processes leads to a consistent unification of individual and collective intelligence and spirituality on the basis of ecological (integral) thinking. Today it is understood as a paradigm **of the sphere of intellect (noosphere). Noospheric development** is understood as a consciously controlled naturally focused on the co-development of the Person, the Nature and the Society at which the satisfaction of needs occurs without any damage to the Universe and the succeeding generations.

The society which in 1990s was, like a raging boiler, in the state of polifurcation: in the process of heating entropy[114] was growing and the turn, transformation, readiness of that nutritious broth which the society was cooking so furiously was closer. Social,

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[111] The idea of noospheric science is generalized in *Noospheric Science*, the monograph by the doctor of sciences, academician of the Russian Academy of Natural Sciences I. V. Chernikova (Tomsk: TSU, 2001).

[112] The idea of noospheric consciousness and outlook is generalized in the thesis for a doctor's degree "World outlook and culturological bases of noospheric consciousness" by M. P. Arutyunyan (member-correspondent of the Russian Academy of Natural Sciences).

[113] Malenkov A. G. *Ascension to the Noosphere*.

[114] Entropia (*Greek* — turn, transformation). Entropy is a measure of probability of system being in a certain condition.

economical, political, cultural, philosophical, educational conceptions were gathered in the same boiler. Here one can find both traditional approaches, and innovations, and speculative approaches. By the way, the life is always hierarchical continuous increase of entropy.

There are 2 transition ways from entropic conditions to steady non-equilibrium—at fast synthesis of information or at gradual synthesis of information.

New education formation rate depends in many respects on the speed of information synthesis in science and society. In its turn the quality of education provides this or that quality and speed of society development.

Unprecedented role is entrusted to education. It can become **the leader of noospheric transition,** i.e., that part, with which it is possible to solve other problems of the modern society. Was it possible to imagine, that at the certain **stage of evolution** the destiny of the society will be determined by the housemaid — Cinderella, instead of the imperious mistress — the stepmother? Today helplessness of linear thinking and outlook of especially economic and political approaches to the society are mostly naked up.

The largest scientists of the twentieth century — A. Einstein, P. Chardin, K. Jung, N. Moiseyev independently from each other stated the idea that psychology — the science of the future — already today forms **the natural center of gravity** for not only related sciences, but also for polar scientific disciplines, particularly in the sphere **of human learning.**

Today this center becomes the bridge connecting natural sciences and the humanities, the tool creating on the basis of universal psychological technologies of education certain integration of general education and higher education system.

Successful movement of mankind to noospheric bases of Life is impossible without processes of perfection of individual and personal thinking. Subjectively-developing role of noospheric education is increasing from year to year.

For this reason today noospheric education appears to be closely connected both with social problems of economy and with problems of the further development of civilization.

The problem of noospheric education formation which should be considered as a strategic tool of social and economic development of the society deserves special attention at this stage of social development.

The thing which was predicted by Henri Bergson, an outstanding thinker, in his book *Creative Evolution*, published at the beginning of the 20th century happened: the intelligence intended for being of a certain role and being only a part of consciousness, should reunite with that sphere from which it was singled out — with the intuition to make endless tasks of cognition. A. Bergson admitted a possibility of other evolutionary way of development of mankind — with prevalence of an intuitive way of cognition as life belongs to the **psychological** order**.** Prevalence of biologism in life only seems to be.

The concept of noospheric educations is oriented to the demand and action human conception and quantum level of human thinking (neurosomatic contour of the brain), that demands a new human conception as a living being of the universe.

The obstacles structure analysis in the perfection of an education system has led us to the conclusions:

— Slow synthesis of information about noospheric education and its role in the evolution of a society will lead to the photothrone adaptive nature of the distribution of nature-conformable methods and means of teaching. It is a quite natural way to the life of new ideas.

— **Fast synthesis of information** about noospheric education can radically affect evolutionary transformations in a society and lead to a different quality and rate of its distribution.

The factor of transition to noospheric education should become the state demonstration of transition of biosphere to noosphere. It will be expressed in a basic change of position of science and education in the state: **recognition of the priorities of noospheric educations, comprehensive support,** preventive financing of noospheric educations, deep understanding and state propagation of that noospheric education should have outstripping character, setting a certain speed and level of development of a society. Remembering V. I. Vernadsky's words about the dependence of the person from the environment and thought, and knowing the power and the force of design thinking, we shall finish this story with the analogy:

Let us imagine a seed in which the life program of a plant under the Sun is enclosed, and through this plant — the life of all its succeeding generations…

It is for you to decide whether to plant this seed…

Whether to look after it…

The future is in our hands.

Noospheric education and social problems

The main social functions of education in the modern world in the widest philosophical understanding are determined in the monograph "Society and education" by English scientist B. Simon, well-known in the field of pedagogy and psychology. He thinks that **education should be considered as a way of formation of a person within a society**— as an educational process.

Analyzing the value of the human factor while considering the interrelation between changes in a society and education, B. Simon considers that it is necessary to take into account such subjective factor, as **activity of people and its influence on consciousness more fully.** He comes to the conclusion that the problems of education are inseparably connected with human learning and management, with the comprehension of a role of a person in social processes. Therefore **education as the powerful factor of culture should be directed on more and more full realization of potential abilities of person and society.** Educational system in civil societies implements this principle fully enough. Amateur talent activities of the population are in its base. Each group of the population itself defines the purposes and the environment of applying forces and means. Principles of natural approaches to education are represented to be correlated with the above.

1. Without forgetting about economic factors of education, we shall concentrate our attention on noospheric education, as a means satisfying demands and possibilities of a modern society. If before the historical applicability of education has consisted, basically, in preservation and protection of culture inherited by a society and transmission to its new generations, and now one more function was added. It is the necessity of expansion of opportunities of access of people to self-knowledge, originality of a person and achievements of a world science and other cultures and self-identification of the person in society. Therefore, in the modern system of public education more attention should be given to such subjects as study of the human behaviour (praxiology); socially-natural history; mutual understanding among the nations; local, national, and international languages.

2. Among the social environmental problems of the today's Russia, the major place is taken by the problem of "shortage" of financial assets. If in the 1960s (at least, in certain years) education received up to 12—13 % of the budgetary funds, in 1970s — up to 8%, and in 1990s financing was reduced to 2—3%. All records were broken in 1998 — only 1% of the budgetary funds were spent for the needs of education in Russia.

Unprotectedness of the educational sphere, which is **of strategic value** for Russia, demonstrates nothing but unscrupulousness of the Russian state policy. Estrangement of authorities from essential heavy work gets the workers of education ready for cooperation, mutual understanding, and integrity in actions. Their choice is asserting of the rights in opposition to authorities. However, if **self-education** does not search for internal resources of the increase of effectiveness, political strikes will be useless.

Suggested way of development of education conformable to nature allows to reduce social time, expenses for health, physical strength, time, economic and financial resources in 3—4 times. Changes and transition on noospheric guidelines of education don't need any financial investments. Comprehension of a problem and desire to take up the responsibility is necessary for progressive figures of education only, to understand and operate in spirit of the conception of noospheric education.

3. The development of noospheric education has also defining value for reduction of cultural break between the highly educated elite of a society having access to a various sorts of services and to the international system of communications, and the discriminated majority of the population.

Here it is worth to mention the question of a rational correspondence in a society of elite and general education which we shall consider in more detail, taking into account, that now in Russia the process of prompt decentralization of an education system is observed. In fact, at the beginning of 1994 only in the chief executive office of education of Russia one can already observe at present about two hundred not state HIGH SCHOOLS of various specializations, and more than a half are in the capital of Russia — Moscow. Besides in recent years in the country a plenty of colleges, lyceums and private schools have been already and many of them are given the right to form independently the programs of training courses.

One of the important problems which naturally arises in these conditions is **the problem of target orientation of curriculums of education.** As it has been shown in the previous sections of the given work, this problem cannot be considered only as scientific and methodical. Today it is not only social, but also strategically important problem of orientation of development of a society, maintenance of qualitative characteristics of national labor resources. Prospects of further development, a role and position in the world community, hopes for an exit from global social and economic crisis depend, in fact, on general and professional education received by new formed generation of people of this or that country.

So which of two directions of development of an education system (elite or general) is the most perspective today? What is more important for the achievement of the strategic purposes of the development of a society today — presence of highly educated elite or rather high level of general education of the population? In modern conditions of the development of a society both elite and general education are necessary. The problem is only in the definition and support of rational proportions between them. These proportions will be determined by practice.

Distributed through the system noospheric educations conceptions, methods, technologies, textbooks and moral values will lead to the strengthening of the national center of cultural attraction, will weaken social disproportions.

4. **Noospheric education can become the national idea assisting democracy, steady development of a civilization.** By means of noospheric education culture is transferred and broadcasted, new, humane social functions are reproduced and created. **Noospheric education changes the attitude of people to each other.** Therefore it may contribute to the strengthening of national integrity, and universal priorities.

5. An actual social problem of today in Russia is marginality of the society[5]. This is an intermediate state when the society appeared between two social systems (the last and the future). Education cannot be former any more, but it hasn't yet become what it will be in the future. Man's position in a situation of marginality is difficult: he is a marginal: what to trust, what to be engaged in, where the ideals are, where the belief is, where the person is? Moreover, the situation in education puts pressure upon him which for the present is marginal too and as a matter of fact gives nothing to put the axe in the helve. At the top of the pyramid of "marginal people" there is the society itself with its marginal economy, policy, mass culture. And mass media is added to this kaleidoscope of the information on an epoch of "marginal people" by everyone.

The major task of noospheric education is granting to the person not only the information on thinking, but also the technological tool of motivation of integral thinking. It is possible to work effectively with this pyramid of "marginal people" lost guidelines and values only having given freedom of choice to everyone. Only so it is possible to cultivate conformity to nature.

5. Marginality — a condition when you are lost, absence of vital guidelines.

The powerful tool of conformity to nature, working in alive system by a principle **of a purpose reflex** by reason of integrity of the nature of individuals is capable to grind guidelines and values of the "lost" generation of nowadays "marginal persons." Their

purpose as a matter of fact is clear — to find himself in the society, his place, his role, his applicability in life. “Your I” appears to be not so difficult to find if the person is not afraid to think in compliance with nature and to learn that achieving this is not that difficult. It does not require even those expenditures that are given by the state for 1 year of his study at school. Here is the reason that **transition to noospheric education is one of the cheapest social programs.** As the tool of transformation can be already found in each person, intended to integral thinking by the nature.

6. Connection between an educational level and such social problems, as a level of birth rate, health of the nation, a demography and ecology of the person is rather significant. The analysis shows, that especially strong influence on planning of family renders education of women. Thus the amount of children in a family decreases with the increase of education of women.

Noospheric education of women, through an establishment of system of continuous education is a key to the decision of such sharp social problems, as the control of birth rate, health and hygiene of family, feeding and confirmable to nature motivation of children to know the world.

7. The level and type (confirmable to nature or not conformable to human nature) of education of the population plays extremely important role in solving environmental problems which are the result of demonstration of invisible ways of thinking, and as a consequence — unreasoned technologization, industrialization and aspirations to fast economic growth. Thus it is necessary to distinguish the following three aspects of the given problem. The first of them consists that education first of all motivates this or that type of thinking; the second, education can and should bring in the contribution to the better understanding of environmental problems, their biological and social and economic consequences.

The third aspect is connected with gaining of necessary knowledge in the area of resource-saving and non-polluting technologies, and also with their use for solving educational and environmental problems. Now a number of countries has already gained a positive experience of studying of environmental problems at all three levels of an education system. However fast deterioration ecological conditions in the world and necessity of search of an exit of more and more aggravated ecological crisis bring to the forefront a problem **of transformation of ecological education** — concerning to the subject **of "ecology" into the ecological education** as a matter of fact, on quality of conformity the natural mechanism of knowledge (i.e., bioadequate). Only such education is necessary to be recognized perspective today as only it will be capable to

take into account quickly changing character of environmental problems and possible ways of their solving.

Noospheric education and economics

The results of the researches which have been carried out under the aegis of the United Nations and UNESCO, show, that the educational level of the population has decisive impact on economic prosperity of the nation, and the organization and efficiency of functioning of an educational system are the major factors of its further social and economical development. Though for the development of economy both spheres of an educational system — general education, and professional training — have great value. This fact is now fixed and admitted practically by all experts on the problems of education, though they have rather significant differences in their approaches to other aspects of these problems. So, in Prof. Z. Allak's opinion, today the educational level has a decisive impact on the efficiency of a national economy. Educated workers, as a rule, achieve not only higher efficiency of work, but also provide higher marketability of production, cope with elective agricultural and industrial technologies more easy. Besides the educational level essentially influences the attitude of people to the environment, their ability to take into account ecological factors and to solve environmental problems.

Today general elementary education and obligatory literacy of the population are necessary conditions of economic development for all countries. However for the countries, in which the agricultural production prevails, this condition is more or less sufficient and it is not sufficient enough for the development of industrial production in modern conditions as here it is necessary to provide faster constant technological progress.

Noospheric education can and should play a key role in technological transformations of economy. All extending applications of biotechnologies, means of electronics, information processes and other system technologies today demand radical changes in the way of thinking, in the methods of teaching, and in the structure of scientific researches. Today manual labor and traditional industrial skills have to be supplemented by more and more wide representations about system approaches within which one or another perspective technology is applied.

The analysis of the experience of fast economic development of such new industrial countries as South Korea, Singapore, Hong Kong, and also Thailand, Portugal and

Greece shows that one of principal factors of their economic progress are achievements in the field of education. All these countries have achieved general elementary education and practically general literacy of the population at the very beginning of the economic boom. Thus it is important to mention the necessity of "strength balance" of an education system "vertically", i.e., high efficiency of all three basic levels of an education system — primary, secondary and higher.

In fact, as the experience of economic development of these countries has shown, for the creation of social conditions making possible "a technological break" and the country progress on a new economic level, the results and the quality of all three educational levels appear to be important:

— Stable skills of the general literacy and calculation, acquired in the system of primary education;

— General outlook and the mechanism of thinking, and also technical and organizational skills which are given on the secondary level;

— Cognitive skills and ability of thinking while carrying out researches which are given by the system of higher education.

The three abovementioned qualities are named by Z. Allak **"the cornerstones of the art of technological breaks."** It is difficult to not agree with this conclusion.

Thus, one of the first conclusions which we can make from the above mentioned brief analysis of economic aspects of the problem of education is the conclusion that in modern conditions to this problem it is necessary to approach from positions of cognitive psychology in a complex, taking into account mutual influence of general and professional training, and also all three basic levels of an education system.

The approach integrated up to complete systemacy, to understanding and realization of noospheric education is the first principle of solving the problem of development of labor resources.

The second principle is a preventive national investment policy in the system of noospheric education.

In fact, the experience of economic development of new industrial countries has evidently shown that before distributing new technologies through the country, it is necessary to create in this country a rather strong scientific and technical education base with a stress on technologies. In other words, in the country not only some "critical mass" of engineers, scientists and technical staff should be created, but also the general level of literacy of the population also should be lifted up to such a level when it becomes the factor **of acceleration and encouragement of social and economic**

development. Scientific-and-technological advance, which in recent years has become apparent especially in the field of computer science, data processing, communication and information transfer, and also in biology and physics, essentially changes the requirements to the traditional general education and professional training of experts. In U. Driper's, the head of the Program of the United Nations development, opinion, today the purpose of education should be both training in new technologies and guaranteeing of trainers participation in a creative process of these technologies development as the economic success today depends on the access to knowledge and abilities to put this knowledge into practice for the purposes of development. We specify that noospheric education is capable to give mechanisms of technologization of an educational process with the mentioned result. Here we already interfere into the social sphere of development of a society as the essence of our point is "social intelligence, " i.e., the ability of a certain society to perceive and produce new knowledge.

The third principle of solving the problem of development of **labor resources** which also follows from the analysis of economic aspects of the problem of education, is the necessity **of continuous investment for high technologies of education** both from the government, and from the means of private sector and public funds. This requirement refers to rapid obsolescence of knowledge in the field of technologies. Therefore even at a problem-free state of a national economy, the investment into sphere of education should be supported necessarily at a quite high level. Without observing this condition the country will inevitably be thrown back in its economic development.

Conclusions:

1. The aim of this article is to offer the noospheric paradigm as the Russian state ideology for the coming decades of the 21st century. Noospheric education is considered as a key to the noospheric transition.

2. **The aim of the noospheric ideology** is man possessing noospheric thinking, consciousness, and methodology.

3. **The noospheric society** is considered to be the factor and instrument of the humanity's survival on the planet.

4. **The national idea** of reengineering of education is considered as a necessary instrument for the further integration of Russia in the world society.

Appendix 3

The program of the seminar

THE LEADER'S PLANNING THINKING

The seminar by full member of Russian Academy of Natural Sciences N. V. Maslova.

I. The current civilization crisis as the crisis of thinking:

— historical retrospective of the partition of natural thinking;
— the three types of thinking: left-hemispheric, right-hemispheric, holistic.
— the type of thinking as the basis of the quality of the INDIVIDUAL.

II. Science on its way to a new paradigm of holistic thinking:

— the synthesis of philosophy, natural sciences, humanities and practice;
— rythmodynamics as a physical basis of information process mechanisms;
— physiology of living system and thinking;
— neurophysiology and planning thinking of a living system.

III. The planning thinking of the system "Man"

— the principle of nature-conformability of thinking;
— the principle of ecological imperative;
— the principle of natural safety;
— the principle of systemacy and wholeness;
— the principle of unity of nature-conformable thinking, nature-conformable world-view, and the bio-adequate method.

IV. The conception of harmonization of thinking (the planning thinking):

— the thought-form, the ways of its formation and transformation;
— symbol, image as compression of information;
— metaphor as a tool of reading the compressed information.

V. The method of transformation of negative thought-forms into positive:

— the six-level chart of harmonization of thinking, individual, and society;
— tracking as “an individual method of harmonization of needs” and personal activity.

VI. Potentialization of the leader’s personality is the basis of potentialization of the group and society:

— a range of nature-conformability of systems “Me”—“You”—“We”—“Society.”
— methodologization of the leader’s activity.

VII. Methodologization of the society as a result of development of holistic systemic thinking.

The program of the BIOADEQUATE METHODS OF TEACHING seminar

I. Theoretical fundamentals of holistic thinking

1. Holistic thinking and the global problems of mankind.
N. V. Maslova, a full member of Russian Academy of Natural Sciences (RANS)

2. The synthesis of scientific, religious, and artistic thinking.
L. I. Nemirovsky, a corresponding member of RANS

3. The paradigm of holistic thinking as the basis of a new conception of man (the retrospective of philosophical fundamentals of holodynamics).
N. B. Mironova, a corresponding member of RANS

4. Systemic approach in science, methodology, and praxiology.
Y. B. Yurkevich, a corresponding member of RANS

5. Physiology of the processes of thinking as synergetic functional system.
N. V. Maslova, a full member of RANS

6. Rhythmodynamics (on the physical mechanism of information transfer)
Y. I. Ivanov, a corresponding member of RANS

7. The conception of holistic thinking and psychology.
N. Y. Solomatina, a psychologist of RANS

8. The peculiarities of mental work.
I. Y. Myagkikh, a psychologist of RANS

9. A new paradigm of thinking in the light of the study about the human higher nervous activity.
V. V. Kozhevnikova, a consultant of RANS

10. The neurosomatic component of the psyche in the stage of signal system synthesis.
V. V. Kozhevnikova, a consultant of RANS

II. Practical psychology (practical studies)
N. V. Antonenko, a consultant of RANS
M. V. Ulyanova, a corresponding member of RANS

Bio-adequate methods of teaching of academic subjects

1. The educational technology of the 21st century.
N. V. Maslova, a full member of RANS

2. The methodology of noospheric education.
N. V. Maslova, a full member of RANS

3. A bio-adequate textbook.
N. V. Antonenko, a consultant of RANS

4. The bio-adequate methods of teaching of academic subjects.
N. V. Antonenko, a consultant of RANS

5. A psycho-physiological component of the bio-adequate method of teaching.

I. N. Shvaneva, a full member of RANS

Test study — 2 hours. Total: 74 hours

Open lessons in Russian, English, German, Mathematics, and History.

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В Алмате: Психолого-педагогический центр «Бастау»: тел. 8-32-72-67-57-35.
В Боровске Калужской области, Центр социальной помощи «Рассвет»:
тел. 8-48-438-43-056.