Rastorguev S.P.

INFORMATION WAR

Radio and communications

The main aspects of the "information war" problem are outlined:

- its history, current state, prospects are shown; introduced basic definitions;

- key tasks are formulated, the solution of which is inevitable for the development of specific tactics and strategies of information impact. The book presents a number of important original results on the theory of information weapons.

A separate part of the book presents a mathematical apparatus designed to explore the capabilities of self-learning information systems under conditions of targeted information impact.

The book is written in an accessible language and illustrated with a number of artistic examples from the life of people, countries and civilizations.

For scientists and specialists in the field of management theory and education, it may be useful to a wide range of readers interested in the problem of information security.

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Reviewer's Preface

The [book by S.P. Rastorguev's "Information War"](#) evokes a wide range of feelings. A lot has been written in recent years about information wars, threats, etc., even too much. However, the authors for the most part snatch separate pieces from this very complex problem (as well as any kind of war, by the way) and chew them thoroughly, sometimes with enviable appetite.

Rastorguev S.P. for the first time, he suggested that the human community consider the essence of information warfare from various angles, defining the goals, objectives, algorithms, strategy and tactics of information warfare, based on fairly rigorous mathematical justifications and developed them the theory of self-generating and collapsing structures (SR-network).

Since time immemorial, mankind has faced the problem of information wars at all levels, and bows, arrows, swords, cannons and tanks, in the end, only completed the physical destruction of a community already defeated in the information war.

This book is intended for a very wide range of readers, for all those who are forced, living in this world full of contradictions and mutually exclusive interests, to wage information wars at various levels. Here are statesmen who need to defend the interests of the state from third-party threats in a qualified manner; politicians who need to swim out of the sea of information threats from other parties and movements; heads of banks, financial and industrial groups, firms who want to win in the competition, which is essentially a variant of the information war; and just individuals doomed to daily information clashes with the media, with family, work colleagues, etc. To win, you need to know and be able to. This book is dedicated to this knowledge and skill. Any reader can find sections in it that best suit his turn of mind without much damage to the general understanding of the problem and the implications of reading, one can skip the mathematical calculations, simply believing that this is the case. For mathematicians, however, these sections are of independent value, since the theory of self-generating and collapsing structures developed by the author is a harmonious and original system of scientific provisions, theorems and their evidence.

Many, of course, can reproach the author for "heavier" the book with philosophical and lyrical digressions and discussions on religious topics, although the latter are caused by the deep respect that the author, as a specialist, has for the founders of world religions, who managed to create unusually stable information systems that function against the backdrop of emerging and disappearing states and other human communities.

In general, the book by S.P. Rastorguev "Information War" is currently the most complete and qualified study on this issue. Everyone is recommended to read it, and for statesmen, politicians, business people and journalists who professionally participate in

information battles, it should become a desktop reference and manual if they are, of course, going to win these battles.

<div align="right">Doctor of Technical Sciences, Professor   A.V. Fesenko</div>

Introduction to the problem

There lived an ordinary Turtle and constantly carried a heavy shell on its back. The shell pressed her to the ground, and each step was given to the Turtle hard. Therefore, her life, measured by the number of these difficult steps, was also not easy.

But on the other hand, when a hungry Fox came running from a neighboring forest, the Turtle hid its head under its shell and calmly waited out the danger. The fox jumped around, tried the shell on the tooth, tried to turn its victim over, in short, used all the tricks inherent in the aggressor, but the Turtle stood its ground and remained alive.

One day, the Fox brought a large purse with her, brought a lawyer and, sitting opposite, offered her services in buying a shell. The Turtle thought for a long time, but due to the poverty of her imagination, she was forced to refuse. And again the redhead left with nothing.

As time went on, the world around us changed. New technical telecommunications facilities appeared in the forest. And one day, leaving the house, the turtle saw a television screen hanging on a tree, where flying turtles without a shell were shown. The woodpecker announcer, choking with delight, commented on their flight: "What ease! What speed! What's the beautiful! What grace!

The turtle watched these programs for a day, two, three...

And then the thought was born in her small head that she was a fool, since she was carrying such a burden on herself - a shell. Wouldn't it be better to drop it? Life will then become much easier. Fearfully? Yes, it's a little scary, but in the latest news, the TV presenter Owl stated that it was as if Lisa had become a Hare Krishna and had already become a vegetarian.

The world is changing. The forest over there is also becoming completely different, there are fewer and fewer trees and original animals in it, and more and more stray dogs and jackals are becoming similar to each other.

Why not fly? The sky is so big and so beautiful!

"It is enough to give up the shell and I will immediately feel better!" Turtle thought. "It is enough to give up the shell and it will immediately be easier to eat!" Lisa thought as she signed the bill for another advertisement for flying turtles.

And one fine morning, when the sky seemed bigger than ever, the Turtle took its first and last step towards freedom from the protection system. The tortoise did not know and will never know that the <u>information war is that the targeted training of the enemy in that. how to remove the shell from yourself</u>.

In 1792, 20 years before the first patriotic war between Russia and France, Ivan Andreevich Krylov, the great Russian fabulist, published the mail of spirits in the form of a satirical work - the correspondence of invisible beings. Dwarfs, the authors of letters, were sent from the world of spirits to earth to solve a number of their problems. Once in Russia, they tried to approach the analysis of what was happening using ordinary common sense. In one of the letters, namely, in letter XXXIX from the dwarf Zora to the wizard Malikulmulk, the following was said: *"They say that the local inhabitants did not complain about their poverty two hundred years ago and considered*

themselves rich, until the French explained to them that they did not look like on people because they walk, because their hair is not covered with dust, and because they do not pay two thousand rubles for a thing that costs no more than one hundred and fifty rubles, as many enlightened peoples do.... These French are very cunning and finally brought to the point that almost every one of the local inhabitants is tormented by conscience and considers it a shame if he does not annually attribute three-quarters of his income and a fifth of his entire estate to the French.

It may seem strange to you how they forced the local inhabitants, without declaring war on them and having no right to do so, to pay themselves only a heavy tax, which Rome never collected, from their subject peoples during the time of their most selfish rulers. But this political subjugation of the local inhabitants by the French is so cunningly put into action that I, being here, cannot make out this in detail..."

The end of the eighteenth century, judging by the chronicles, was somewhat similar to the end of the twentieth - the leaders tried to dress up the country in other people's clothes, and I.A. Krylov very accurately noticed what was happening.

The information war is not the brainchild of today. Many methods of information influence arose thousands of years ago with the advent of information self-learning systems - the history of human learning is a kind of constant information wars.

At the same time, it is quite natural that with the increase in the capabilities of information systems in terms of their training, the emphasis will more and more shift towards the use of not firearms, but information weapons: if it is cheaper to destroy the system and recreate it in the desired form. than to retrain, then it is destroyed if it's easier to retrain it, then retrain.

It is clear that the better developed information technologies that allow retraining (reprogramming), the cheaper and more efficient their application.

In order for learning to be effective, you need to know the appropriate techniques and understand what you can teach an information self-learning system and what not. To solve these problems, we need a model that demonstrates the basic principles of self-learning. The theory of neural networks? Yes, but not only. When it comes to learning quickly, there is not always enough time allotted by life to adjust the weight coefficients of classical neural networks step by step. Sometimes it is easier to kill elements (formal neurons) or recreate them than to correct them - this principle has become the basis for building the theory of self-generating and collapsing structures (SR-network) as self-learning systems. The first part of the work is devoted to this problem.

Within the framework of the SR-network model, it is already possible to formulate and prove theorems about the capabilities of information systems in information warfare. How this can be done is described in the second part of the book, where people and states appear as examples of self-learning information systems.

Someone, perhaps, will be indignant that a person, a state, humanity in this work are simply called **informational self-learning systems**. The introduced designation is not aimed at humiliating a person who can sometimes be written with a capital letter. It is desirable to understand what has been said as follows: everything. what a person is capable of, going beyond the information self-learning system, has not become the subject of research in this work.

Is there a lot of this?

An informational self-learning system carries its death within itself and never partes with it, because Self-learning and Death cannot exist without each other. Why this statement is true, the author tried to explain in the third part of the work.

Purposeful information influence activates the existing "genetic" knowledge intended for the self-destruction of the system. Therefore, where logic is powerless, its denial

comes to the rescue. What cannot be understood is measured by faith or habit, and corrected by a spell or prayer.

The problem of the information war is the problem of the invisibility of logic in everything that happens, it is the problem of saving God and oneself. Attempts to solve this problem give rise to two fundamental questions, the answers to which form a multitude of information warfare strategies and tactics.

<u>Question 1</u>. Is it possible for each self-learning information system to propose such a learning strategy ("life") that will transfer a fact that is absolutely invisible to it into the category of trivial?

<u>Question 2</u>. Is it possible for each trivial fact that is in the informational self-learning system to offer the system such a learning strategy that will make this fact absolutely invisible to it?

The problem of invisibility, logic and spells are discussed in the fourth part of the book.

In the fifth part of the work, an attempt was made to formulate the main signs of an information defeat of a system and to substantiate the rules for the behavior of systems in an information war: what, when and how urgently needs to be done.

Any information self-learning system is a structure: static, dynamic, self-modifying; the structure reflects her knowledge. The problem of protection in information warfare is the problem of protection of knowledge. One knowledge flashes like a guess illuminating the darkness and disappears, losing its truth. Other knowledge will always find a way to fit into more capacious structures, thereby remaining at least in the form of a miserable special case.

Is it possible to link the stability of knowledge of a system with its structural stability? How can this be done? This is discussed in the sixth part of the work.

The evolution of life is the evolution of the defense system. And no more! The protection system dreams of becoming absolute. Life dreams of conquering death. And people, like all living beings, are just soldiers of Life, again and again attacking the "black hole" of the infinity of being. In the words of V.S. Vysotsky:

"And don't stop
And don't change legs.
Our faces shine
Shine boots!

PART ONE.
SELF-GENERATING AND DESTROYING STRUCTURES

Worlds are also born and die, and it is impossible
so that they are eternal, as soon as they change
and are made up of changeable parts.
J. Bruno

Introduction

The right to die is an inalienable right of every free
citizen, regardless of race, sex and personal religious
practices, and is secured by the very existence of states and
their institutions of power.
G.L. Oldie

"Our Earth is not a dry, healthy and comfortable plateau, but a huge female with a velvet body that breathes, trembles and suffers under a raging ocean. Naked and lustful, she circles among the clouds in the purple twinkling of stars. And she is all from her huge breasts to powerful thighs - burns with eternal fire. She rushes through the years and centuries, and convulsions shake her body, a paroxysm of fury sweeps the web from heaven, and her return to the main orbit is accompanied by volcanic shocks. Sometimes she calms down and then looks like a deer caught in a trap and lying there with a beating heart and round eyes with horror, at a deer, afraid to hear the hunter's horn and the barking of dogs. diseases, horrors, cruelties, when the night brings with it the ecstasy of countless blazing suns?And what then are our dreams but memories of a swirling nebula or placer stars?" (G. Miller). And only here... *"In the endless darkness of human destinies, the germs of endless joys and endless sorrows are born. And if you are destined to see the rising luminary, then rejoice. And if it turned out that it blinded you, rejoice anyway, for you lived!" (T. Dreiser).* However... *"On his way home later, he thought that death would be of only one benefit: there was no need to eat, drink, or pay taxes, nor offend people, and since a person lies in a grave not for one year, but for hundreds, thousands of years, then if you calculate, the benefit will be enormous. From life to a person - a loss, and from death - a benefit. This consideration, of course, is justified, but it is still insulting and bitter: why is there such a strange order in the world that life, which is given to a person only once, passes without benefit? (A P. Chekhov).*

Although... *"Perhaps there is no more hope left for us in the world and we are doomed - all without exception are doomed. If so, then let us unite our efforts in the last scream of agony, a scream that terrifies, a scream - a deafening screech of protest, a frenzied cry of the last attack. To hell with complaints! To hell with mournful and funeral chants! Down with biographies and history, museums and libraries! Let the dead devour the dead. And let the living rush along the edge of the crater in a dance - this is their last, death dance. But - a dance!" (G. Miller).* And here *"... it was not a pity to die, but as soon as he saw the violin at home, his heart sank and felt sorry. The violin cannot be taken with you to the grave, and now she will remain an orphan and the same*

thing will happen to her as with a birch forest and a pine forest. Everything in this world has disappeared and will disappear! Yakov came out of the hut and sat down at the threshold, clutching his violin to his chest. Thinking about his wasted, unprofitable life, he began to play, without knowing what, but it came out plaintively and touchingly, and tears ran down his cheeks, and the harder he thought, the sadder the violin sang." (A.P. Chekhov).

Three streams of information that made their way to the surface at different times are synthesized in the above paragraphs. In order for such a synthesis to become real, G. Miller, T. Dreiser and A.P. Chekhov should not only be born and write the pieces of text presented here, but also meet all together in a virtual relatively them today's world, where the texts left from them will rub against each other without asking with non-binding words like "only here", "however", "although".

And they won't rub it in to show that there is no big difference between the works of Dostoevsky, Miller, Chekhov, Gogol, although they all wrote about the same thing in different natural languages and in different words.

Meanings showered with time like autumn leaves form new meanings, and hence new states of the mind and soul. With the same success, you can "shake" any other literature, collect other pieces of texts or quotes and, linking them together, mold a new mosaic picture.

Isn't that how the structures responsible for knowledge about the world are formed in living self-learning systems?

Perhaps somewhere out there, at another level of abstraction, all works are translated (projected) into one. And the synthesis operation applied here will not be needed, because on that other level any one will become everything simply by virtue of a change in the dimension of space.

Now this *one* has its own individual taste and smell. The lines of Miller and Chekhov smell differently and leave different taste sensations on the tongue of the eyes that can continue and complement each other. So the synthesis makes sense.

As any work of art represents for the reader a symphony of alternating emotional states caused by the author, in the same way, a person, formed by books and his immediate environment, is a product of a non-linear montage of meanings, destinies and tastes of his parents and teachers.

Under the pressure of constantly incoming new information, existing texts are unlikely to be able to retain their original chastity in the information bank. Inevitably, natural connections will have to arise between chapters, paragraphs, separate meanings of various novels. They will have to arise as connections arise between the continents on the Earth itself. The difference is that on the planet, the information channels are primarily wind, birds, fish, people, etc., while in the skull of a living being, neural connections. Neural structures become carriers of meanings.

So why did the outlines of long-dead figures appear in the introduction? What is the reason?

The reason is in the question asked: "Isn't this how the structures responsible for knowledge about the world of living self-learning systems are formed? Isn't that how they are formed by merging with parts of the surviving knowledge, as was demonstrated above? It was necessary to approach this question, it was necessary not only to see it written on paper, but also to feel it. Therefore, fire and water meet without destroying each other.

The reason is in the selected and quoted texts, in the purpose of this book. The reason is to show how the excess of chaos gives rise to concrete knowledge, often called order.

The reason is in the already generated F.M. Dostoevsky, A.P. Chekhov, L.N. Tolstoy and others, along with the surrounding street and parents. OK, who did not remain independent and independent. Diffusion of meanings corroded and changed it. The world is crowded with people, and individual lost skin cells of the newcomers, like thoughts, mix with the dust from the long gone, giving rise to new formations, giving rise to excess chaos.

If we switch to the language of mathematics, then all the same can be clothed in a different form. And this said will be considered simply more strict and nothing more. For example, we can say that the reason is hidden in the input received at the input of this information system (author) data, the internal state of the system, and the desired result to be obtained. Here, the generally accepted requirements for writing an introduction act as input. The essence of which is to try to briefly formulate what will be discussed in the future for a long time and tediously.

The internal state of the information system, in addition to the current state of the mind and soul, also includes all the baggage of knowledge that the author will be able to reach, in short, everything that he learned, but did not forget.

As a result of this, a new structure was born, seeking to express the meaning of the subsequent chapters of this book. It included texts by Miller, Dreiser, Chekhov on an equal footing, and links appeared between them: ribs, arcs. It remains to stretch the skin over the born skeleton and nourish it with meat.

But wasn't there an easier way? Couldn't you have gone the other way, not collected shells from nuts, no. let the seething Miller and the yearning Chekhov pass through oneself, but on the contrary, find a whole nutlet, albeit not quite similar, and consider it, with a certain error, the answer to the question. The result might be worse in terms of accuracy, but with excess material it would be <u>achieved much faster</u>.

Killing is easier and faster than giving birth, it does not require so much energy of Time, collected from the slopes of the seasons.

And the result would sound something like this: **the spontaneity of the emergence of** "order out of chaos" **or** "chaos from the order **"for systems in which the birth and death of individual elements is allowed, is determined by the input data coming to the input of the system and the system's ability to adequately respond at the time the input data arrives.** And <u>this ability is a function of the time allotted to the system for buildup, for life</u>.

Conclusion. If in a self-learning information system its elements perish and are born, as, for example, in the case of a relatively immortal humanity, consisting of citizens capable of being born and dying, then the answer to any question addressed from space will be determined by the allotted time.

If there is enough time and we are not in a hurry, then we will give birth, unite, synthesize, create new structures that answer the questions asked by their existence.

If there is no time left for an answer, then we will kill, simplify, cut, and thereby create new structures anyway, which will answer the questions asked in the same way by their existence. We will hurry, we will become simpler, and over time we will stop seeing those issues, the complexity of which exceeds our information power, expressed through our number and sociability (the number of elements and their connections with each other). But we will still strive for knowledge with our changes - regardless of what

we are doing: birth or murder. Only in the second case, we will lower our head from the bottomless space to momentary problems and focus on food and the convenience of our short-term existence. And there's nothing more to be done here:

"Wherever people fought for food and rent, they retreated, retreated at night, in the fog, for no normal reason, purely for strategic reasons in the battle with the army of ghosts. You could only retreat and, retreating, see how your brothers fall one after another, silently, mysteriously, disappear in the fog, in the darkness - and nothing can be done." (G. Miller).

Formally, one can try to look <u>at humanity as an informational self-learning system, consisting of human elements, between which there is information interaction</u>. At the same time, the elements of this system sometimes die, and sometimes are born. Both that, and another leads to change of information communications and the general knowledge of system.

Formally, one can try to look <u>at the brain of a single person as an informational self-learning system, consisting of elements-neurons, between which there is informational interaction</u>. At the same time, the elements of this system are only born while the fetus is in the womb, and die or lose some functionality while a person is walking along the path of life.

How to study these cognitive processes? What can be a model on which is allowed to conduct experiments and make predictions?

Unfortunately, classical neural networks with coefficients that change during the learning process are not suitable for this. Although, of course, a change in the intensity of the transmitted information and the trust in it on the part of the recipient for the systems under consideration allow them become smarter. The world of changing coefficients is the world of endless refinements of one of the results found. The world of changing coefficients is a world unable to see what will follow the catastrophe. It is possible that nothing better than classical neural networks can be invented when it comes to clarifying the decimal place in conditions of unstable input data, or when it is necessary to throw one more compliment to a pile of previously said ones. Roughly speaking, the world of changing coefficients is the world between our birth and death, so there can be no question of what was before... and what will be after...

<u>It is possible to simulate situations before... and after... only with the help of such a mechanism, in which the determining processes are precisely the processes of birth and death of elements</u>.

In this work, such structures are called self-generating and collapsing networks (SR-network). It is this model, this tools for solving forecasting problems and is dedicated to book.

Separate sections of the first part of the book with a slight revision (chapters 1, 2 and 3) are borrowed by the author from an earlier work "Infection as a way to protect life. Viruses: biological, social, mental, computer". Major differences start from chapter 4 onwards and are as follows:

1) added a section on information systems that can learn without a teacher;

2) added a section about the human stop problem. Why is the halting problem solvable for a human but not solvable for a Turing machine?

3) an attempt was made to answer the question: "Need whether emotions learning information systems?" Defined concept "emotion", as one of the possible ways of

external manifestation of the acquired knowledge, and its place in the process of learning the system is shown;

4) basic theorems about the possibilities of self-generating and collapsing structures have been proved, which can become the basis for constructing the theory of "information warfare";

5) a reasonable point of view (within the framework of the SR-network model) is presented on the dialectic of alternations of "order out of chaos" and "chaos" from order".

The first chapter shows how you can use the redundancy of the structure of any information system for its training.

The model that learns on the principle of destroying elements or parts to the structure of the system is here called a self-destructive network (R-network).

The second chapter deals with how, in the words of L. Gumilyov, by acting on the "emptiness", it is possible to turn virtual particles into real ones. Here, a model is built that learns on the principle of the birth of elements, which is called a self-generating network (S-network).

The third chapter is devoted to the construction of practical models of self-generating and collapsing networks (SR-network).

In the fourth, we are talking about ways to transfer acquired knowledge between information self-learning systems. It is shown that one from mechanisms for transferring (imposing) acquired knowledge are emotions.

The fifth chapter is the shortest chapter in this book in terms of the number of lines. AT her proofs of two fundamental theorems about the possibilities of SR-networks are given.

Chapter 1. Self-destructing information structures

*The question of immortality inseparable
from the question of happiness
only unthinking people may think
that in the presence of misfortune
a person can be immortal*
N.F. Fedorov

Life does not tolerate emptiness, does not tolerate death, and, if possible, fills all the cracks with itself. Biological individuals diverge in gigantic circulations along the horizontals of life and, changing (evolving), rise vertically.

All of the above applies to humans as well. Stopped climbing up and fall down, humanity fills even those territories where not all other representatives of the terrestrial fauna were able to survive.

Fills and mourns for the depletion of the earth's bowels. Man begins to talk about redundancy, killing cockroaches, flies, mosquitoes and all the others, seeking to be near and annoying Man, who is with a capital letter. Already there are nations that consider themselves redundant and are trying to fight it.

It is generally accepted that redundancy on one of the horizontal planes is an almost guaranteed hit (through evolution) on a higher (that's just compared to what or who?) level of the horizon.

All this was reminded to the respected reader solely in order to present to his judgment a different understanding of the term "redundancy". Namely, the understanding that is natural for any programmer who creates his works in computer languages.

Let us ask ourselves the question: "What can such concepts as "redundant microprocessor code", "redundant memory", "redundant functionality of the DBMS" and even - "Programming language redundancy?" If this question is asked to a programmer, he will most likely answer this way: "The redundancy of functionality allows solving the tasks set much faster! Faster for the reason that it is not necessary to invent an acceptable algorithm, since any of a certain set of equivalent algorithms is suitable - if the computer had the appropriate memory and performance. Faster also because there are always several alternatives, and finding at least one of several ways is always easier than looking for something unique, optimal or inimitable and unfamiliar.

A redundant message transmitted over a noisy communication channel between two information systems is always restored faster than any other. And here information redundancy is designed to save time.

If the master has an excess of material, then his thought is free and uninhibited. He takes and sculpts or hammers, simply discarding everything unnecessary, which means superfluous.

The situation is exactly the same when solving industrial and social problems.

When entire cities are populated by physicists, any physical problems are solved instantly.

When cities are populated by bandits and thieves, any looting tasks are solved instantly, much faster than if physicists lived there.

Thus, if it is required to effectively solve a certain class of problems, it is necessary to create an environment with redundancy corresponding to this class. And only then, when solving the set tasks, simply discard this redundancy, just like a sculptor does when carving a tiny figurine from a block of marble.

In general, a person usually does this when he wants to have everything today and right now.

In the light of the foregoing, a reasonable question arises: "Why can't we try to technically implement such a production model? Suppose that there are cheap elements connected with each other, each of which can do something independently, but it is necessary to find and cut out from this entire network what solves a specific problem, throwing out everything else.

The answer to the question posed, probably, can be a specific algorithm for "cutting". It is about him that will be discussed in the future.

1.1. Propositional calculus and the death of formulas

Or the plague will catch
me.
Or the frost will ossify,
Or put a barrier in my
forehead
Impaired invalid.
A.S. Pushkin

Designing any logic circuit, building a house or writing a book with a certain degree of success, you can try to carry out from the master plan (scenario) to specific elements, or vice versa - from the capabilities of individual elements to something big, and most likely, to what happens. In the first case, we are talking about top-down design, i.e. about designing from the top down, in the second - about designing from the bottom up. We go up - we go down; we grow - we decrease; we improve - we degrade; we simplify - we complicate; we go to chaos - we go to order. Everything is somewhere nearby and at the same time not quite similar and, at first glance, not even at all similar to the design of a logical circuit. But this is only at first glance. Indeed, what can be in common between top-down design and the evolution of the Universe? What is similar between the creative implementation of individual elements of the scheme and the entire scheme with such concepts as chaos and order?

What is the easiest way to come to Newton's laws - either in the way that Newton himself did, or by simplifying Einstein's expressions?

In any case, the birth of a formula is a new knowledge, expressed strictly and compactly in a specific formal language.

The death of a formula is as much new knowledge as its birth. This is a partial rejection of one model of the world and a transition to another.

But knowledge can only be knowledge in relation to the one who understands it. Any knowledge becomes knowledge only within a certain model. For example, Einstein's formulas for cannibals-Ellochek are largely invisible. And not only Einstein's formulas have the property of invisibility. The world is full of such objects. And the problem of constructing "invisible" objects is not as complicated as it seems at first glance: invisible planes, invisible people, invisible concepts, invisible ideas! And sometimes woe to the one who comes across them and sees them.

A theory model is an interpretation of a language in which all the axioms of a certain theory are true. Within the language of the cannibal-Ellochka, there are no means for interpreting Newton's works, but there are means for interpreting the same Newton as a man.

It turns out that the more powerful the information system's ability to process input data, the more powerful its language, the more it "sees".

But do newly emerging opportunities always complement each other, and more and more objects and events begin to come into view with an increase in language capacities? It turns out not always. Delving into the jungle of knowledge along one of the paths, we forever lose all the charms of the other.

Ram Dass wrote very figuratively on this subject:

"Imagine that you have a small scale right in front of your eyes and that you can change the channels of your realities. Set it to the first channel, look around the room and see men and women.... If you were a sociologist, you could say:"There there were so many endomorphs; so many exomorphs and so many mesomorphs". If you are engaged in social activities, you could say: "Blacks were a minority, there were so many, so many Protestants, etc. If you had a sexual orientation in the foreground in this environment, you would see everyone in one of three categories - those with whom you can deal; your rivals are on their way to someone with whom you can potentially deal, and are not relevant."

But at the same time, all models, all *"these individual differences are not so important. They are just like shirts, jackets and sweaters. "You put on a pleasant personality. Where did you get it?" "I got it from Gestalt therapy. Cry of fashion."*

But the more perfect the models of the world diverging from a common node become, the more difficult it is for their carriers to build a bridge between them. *"Once I visited my brother in a psychiatric hospital. I sat in a room with him and with his psychiatrist. He considered himself Christ, and the psychiatrist considered himself a psychiatrist, and both were convinced that the other was crazy"* (R. Dass).

When we give birth and kill formulas, we simultaneously, by the same actions, build our new model of the world. Each "living" formula is either a new possibility or a limitation of existing possibilities.

Let's show how it happens.

For example, let's say you want to build a switch circuit that, given two inputs and one output, would operate according to the values in the following table:

X	Y	Z
0	1	1
0	0	1
1	1	0
1	0	0

Suppose that in order to assemble the circuit, there are source elements that perform the operations of logical "and" (&), "or" (V) and "not" (-). Then, according to classical mathematical logic, the initial elements can be connected as follows:

z = -x&y V (-x&-y) V -(x&y) V -(x&-y).

In accordance with the laws of de Morgan, this formula can be rewritten as follows:

z = -x&y V (-x&-y) V -x V -y V -x Vy.

And further, taking into account the properties of complementarity and involution:

(xy-x)=AND,

(x &. -x) = L,

-x=x,

we get

z = -x&y V (-x&-y) V -X. (1.1.)

Which corresponds to the diagram in Fig. 1.1.
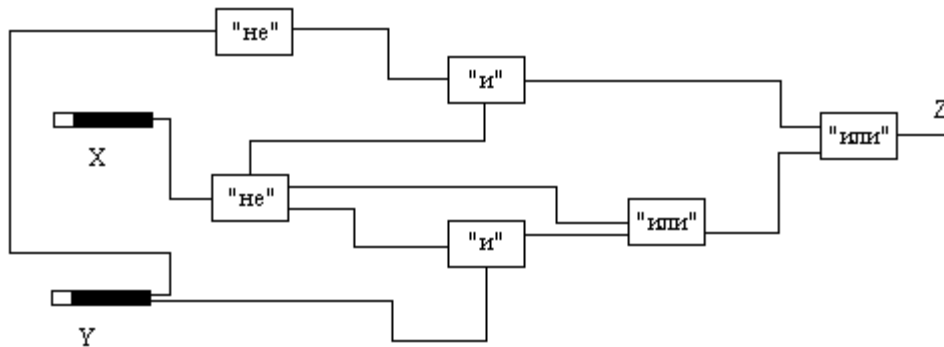
Fig. 1.1

Now imagine the following situation. Our needs or capabilities as meta-developers have changed, and the problem that the diagram in Fig. 1.1, ceased to interest us. The problem of obtaining one zero at the output instead of the previous one (in accordance with the values of Table 1.2) has become topical.

Table 1.2.		
X	At	z
0	1	1
0	0	0
1	1	0
1	0	0

There are clearly more than one solution. For example:

Option 1. Redesign the circuit in accordance with new tasks, i.e. write down the disjunctive normal formula, and implement it in the metal:

a) z = -x&y V -(-x&-y) V -(x&y) V -(x&-y);
b) z \u003d -x&y V x V y V -XV -y V -XV y;
c) z = -x&y;
g)
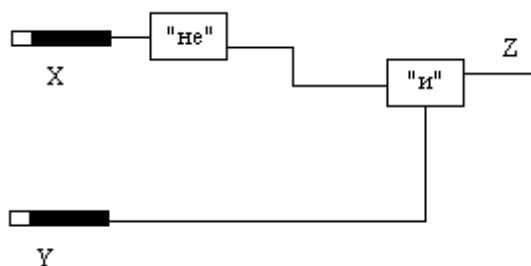
Option 2. Perform all the work in accordance with the first option, but to implement the resulting scheme, use not the new element base, but the material of the old scheme Fig.1. 1, i.e. take a soldering iron and solder everything that does not correspond to the desired result.

Option 3. Do not redesign anything, but try to modify what is, i.e. diagram of Fig. 1.1. To do this, it is proposed to destroy unnecessary blocks and, accordingly, connections. And in order to effectively destroy, it is necessary to develop appropriate rules (algorithms), i.e. <u>Initially, it is necessary to determine the rule</u> (law), according to which the element is sentenced to death, for example, if there is no agreement between the available input values and the required output values (the input of the negating

circuit is not "O", but the result, which should be transmitted further according to the circuit, also "O").

It is important that in this case, starting work, we do not know what form the final result will take. And this is the fundamental difference of this option from all the others.

So which option to choose? What technology to stop?

Probably, the choice will be determined primarily by what are the more general rules of the game, namely:

1) Are the logic gates easily accessible?

2) Are the logical elements themselves "and", "or", "not", so to speak, in bulk or only in the form of ready-made circuits?

Imagine that the whole world around us is full of only diagrams like Fig. 1.1, like an anthill with ants, like the earth with people, and there is nothing else. Which option would you choose in this case?

Perhaps, which is simpler and which is able to fulfill itself?

And that means the third option!

If the third option is taken as a basis for their design students, professors will already be teaching in a completely otherwise methods, they will have other textbooks, they may not even classical logic will be needed, which determines the rules for the birth of formulas. New designers will have to be able to create rules by which formulas die.

All our science and all our production is largely determined by the initial data, but not by the initial material itself, as it would seem at first glance, but by the shortage or excess of this material, suitable for satisfying our needs.

Deficiency or excess! And then everything else. Isn't that how our world was created? It contains examples of how something piled on top with a large excess, for example, manure, gradually, as if by itself, turned into something more compact, for example, into peat, losing the ability to smell and flow.

And the only thing that radiation chemistry can show us is how changing structures leads to new functionalities.

Why can't things be the same with logic circuit design?

So, let the original world be a set of schemes like Fig. 1.1. The designer needs to create a circuit that works in accordance with the values of Table. 1.2.

To start with something, let's try to "turn over" the task.

Let the values x and y be input, and the corresponding value r the output of the circuit. Thus, if the original structure was originally used for that. to generate z, now we are trying to modify the structure itself by inputs (x.y) and outputs *(z)*.

Formally speaking, the problem of finding z was initially solved, where

$$z=S(x, y),$$

x, y are input variables;

S is the transformation to be performed corresponding to formula (1.1) or the scheme of Fig. 1.1.

Now we are faced with the task of finding a structure that would satisfy a different training set.

In a programming language such as C, this function can be written more clearly:

while (z!=Schema1(x,y)) Scheme1 = SR(z,x,y,Schema1).

Here Schema1 is a program (algorithm) that performs transformations in accordance with Table. 1.1.

SR - a program (algorithm) that modifies another program, for example, destroys it in a circuit Schema1 elements that maximally interfere with transformations according to the values from Table. 1.2.

It is clear that the while() statement in this case will be executed until Schema1 will not be modified to match Table. 1.2, or until the program Schema1 will not disappear and there will simply be nothing to perform. In the second case, you will have to load a new circuit, modify the SR program (algorithm) and start all over again.

In order for the scheme of option 3 to work, it is necessary to propose a rule according to which the elements of the scheme in Fig. 1.1, i.e. an SR algorithm that modifies another program. At the same time, we will proceed from the fact that our design student is not allowed to change the divine order of things, i.e. to impose on the elements of the system the rules according to which they must perish. These rules are revealed by the student on the basis of the study of the elements themselves.

Neurons, ants, people die according to their own laws. And therefore, the new designer has no choice but to study the world around him, conscientiously comprehending the secrets of its structure. And the deeper the researcher plunges into this world, the more reasons he finds due to which an element of the system may die. It turns out that it can be crushed, poisoned, burned, cut into pieces.

In addition, it turns out that due to the fact that the elements interact with each other, this interaction can be used for their mutual destruction. It is enough just to create an appropriate tension and, for example (for human society), such structures as a family, a team, a country, are instantly transformed, collapsing, and sometimes begin to solve completely different tasks.

Note:
* the first way - direct destruction;
* The second way is to use interelement interaction.

Later it will be shown that it is the second way for information self-learning systems - this is the classic "information war".

Now it remains to answer the last question: What is meant by the term "corresponding voltage"? For human society, this is probably the appropriate level of hostility, hatred, resentment, etc., for a chemical solution, it is temperature, and for our logical diagram from fig. 1.1 - these are the laws according to which the logical elements, laid down in them by their creator, work and are destroyed.

Suppose a stubborn engineering student figured out that the AND gate (&), - which has two inputs (x,y) and one output *z,* besides its main logical multiplication function, according to the table below

X	Y	Z
0	0	0
0	1	0
1	0	0
1	1	1

is able to change inputs with outputs, i.e. if, for example, z=1 and y=1, and no voltage is applied to the input x (x is not defined), then x becomes the output of the circuit. And the same is true for the rest of the logical elements ("AND", "OR", "NOT") - entry/exit with nothing applied becomes the exit.

In addition, the same student found out that if the signals coming through the inputs / outputs of the element contradict (and quite often, for example, n times in a row) the functional purpose of the element, then the element dies. In our case, n=1.

And this is the rule that can be used as the basis for retraining any logical circuit from a given set of circuits. Now nothing prevents you from starting to write the SR program. Let us show how the SR algorithm could be executed in this particular case.

We assume that the signals propagate in our circuits in a finite time. For simplicity, we define that the time of passage of the signal of each logical element is the same. Now let's see what will happen with the circuit in Fig. 1.1, if it is forced to learn from the data in Table. 1.2, i.e. the x, y and z values are simultaneously supplied. We postulate that in the case of simultaneous arrival, signals x, y have priority.

On the first portion of the training sample, no changes will occur: x=0, y=1, z=1 are quite satisfied with the scheme of Fig.1.1. But on the second portion of the data, "burning voltage" will already begin to appear.
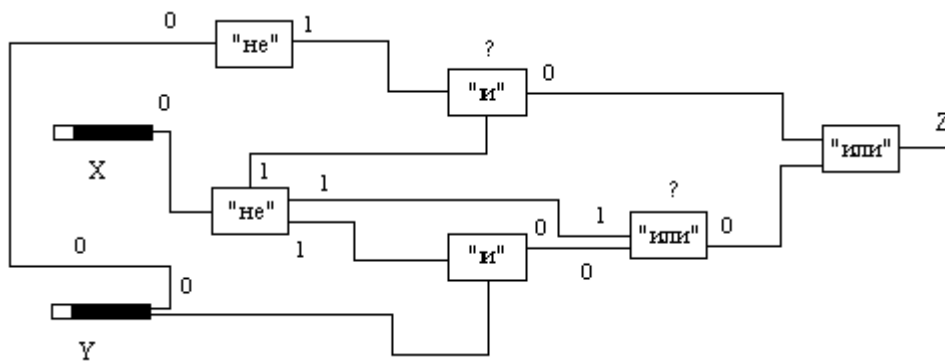
Fig. 1.3.1.

Initially, two logical elements, marked with a question mark in Fig. 1.3.1, do not withstand voltage, then two more (in the diagram of Fig. 1.3.2, they are also marked with a question mark).
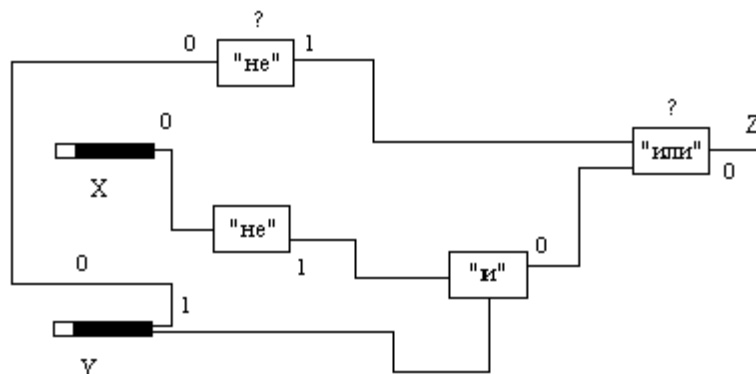
Fig. 1.3.2

The result is the diagram in Fig. 1.2, which is consistent with the values of Table. 1.2.

It remains to write a program that works according to the above algorithm, and a design student can defend a diploma on designing one logical circuit from another. And, I dare to hope, this thesis project will be in demand as long as there is an excess of rice schemes in the world.

Now it's time to take your eyes off the classic logical circuits and try to generalize what has been done.

1.2. Learning through destruction (self-destructive neural networks)

Exist the right by which we we can take a life from a man, but there is no right by which we could take death from what

F. Nietzsche

The classical task of the model of self-learning systems involves the solution of the following tasks:

1) creating a model of a separate element;

2) determination of the topology of connections between elements;

3) determination of the rules for changing links when information is received by this system.

At the same time, depending on the method of solving these problems, the resulting model can change its name in a fairly wide range of names - from a classical computer program with conditional operators to a neural network.

In this work, as the basis for constructing a model, it is argued that **information fundamentally new to the system leads to the birth of new or the death of elements existing in the system,** i.e. Adding one more to the above:

1) determination of the rules for the birth and death of elements systems. Let's try to go the following way:

2) set a set of randomly connected elements, each of which is able to independently solve any problem;

3) Let us define the rules for the functioning of this set of randomly connected elements so that the training sample coming to its inputs and outputs leads to the destruction of those elements that most interfere with obtaining the required result.

Using the above informal justifications, we put forward the following rules, which form the basis of the model of self-destructive neural networks:

1) each system consists of a set of simple indivisible particles - formal neurons, which will be called simply neurons or elements of the system in the future;

2) each neuron is connected to several other formal neurons, not necessarily nearest neighbors;

3) input and output signals (messages) for a formal neuron in this model will be denoted by positive and negative integers. In this case, the presence of "O" is considered as the absence of a signal;

4) each neuron summarizes the signals (messages) incoming to it through all connections (channels);

5) the output channel is the one through which the signal of the smallest "strength" was received;

6) the output signal on the output channel **j** is calculated by the following formula

$$W_j = (\Sigma V_i) - V_j$$

where

ΣV_i is the sum of all input signals on all channels except j;

V_j is the input signal on channel **j**.

7) signal transmission from one neuron to another over one connection leads to its attenuation (decrease by 1) and is carried out per unit of time;

8) blocking of a neuron, i.e. creation of conditions under which the neuron for a certain time (k units) cannot produce any output signal due to the impact on it of equal in magnitude, but opposite in content messages, leads to its destruction;

9) the creation of conditions under which the neuron sends an output signal to the channel through which the signal of the opposite sign arrives, leads to the switching of a weaker neuron, i.e. to change the sign of the signal;

10) v-fold switching of the neuron leads to its destruction;

11) when changing the scale of observation (element, subsystem, system, supersystem, etc.), the principles set out in Sec. 1-10 are preserved, only the language of interaction between the objects of the studied formation changes.

For programming systems based on the principle of changing connections (neural networks), there are hundreds of techniques based on different types of structures, the capabilities of elements and their connections. Exactly the same variety of curricula exists for training systems on the principle of the death of elements. It is clear that the eleven rules listed above form one of the possible options for self-learning of the system on the principle of element death. The complexity or simplicity of the general scheme of learning is largely determined by the functionality of the elements that make up these systems.

In section 1.1, one of the training schemes based on the principle of element destruction was demonstrated, here a slightly different one will be proposed, based on the same principle, but more primitive. Primitivism is due to the fact that, unlike the scheme of section 1.1, in this case the elements of the systems are functionally similar, which means that the rules governing their behavior, birth and death can be unified.

Let us take for consideration the initial structure, consisting of nine functionally homogeneous elements connected to each other in a random order. The input and output elements for this structure in Fig. 1.4 are marked with a bold outline, these are neurons with numbers 1,2,9.
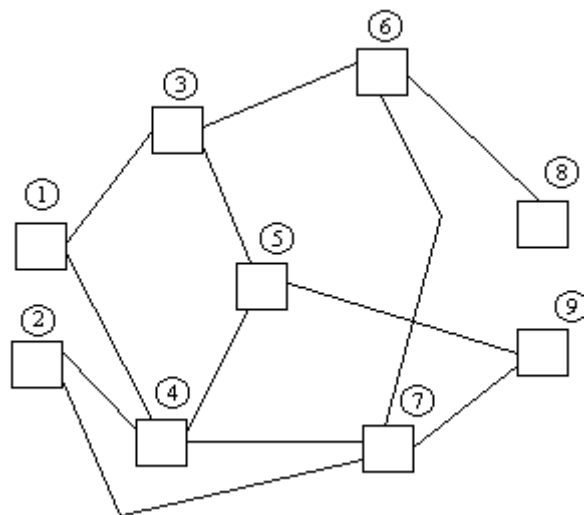
Fig. 1.4. Source structure.

We explore the "ability" of this structure to implement, for example, the operation of logical multiplication - **1 & -1= -1**

$$-1 \ \& \ 1 = -1 \quad 1\&-1=-1 \quad 1\& \ 1 = 1.$$

Let the input be a message (1,1). Then its progress along the structure of the object can be represented as follows (the values of the signals are marked on the arcs connecting the elements of the original structure to each other):
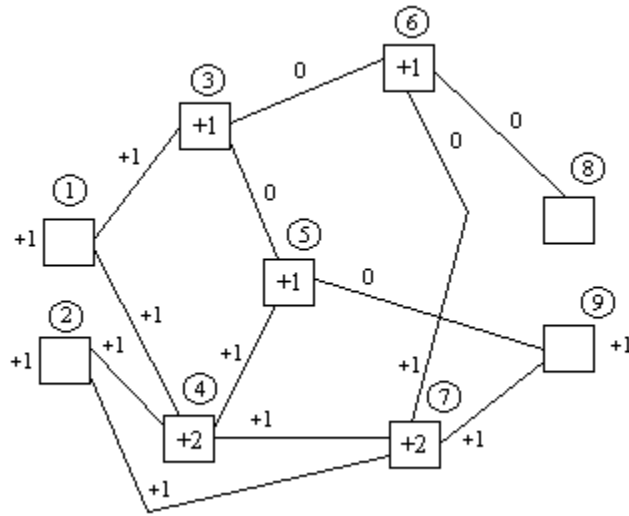
Fig. 1.4.1.

The resulting output satisfies us quite well. It fully corresponds to the last line of the table. Now we can go further and consider the situation when the input is a message (-1,-1):
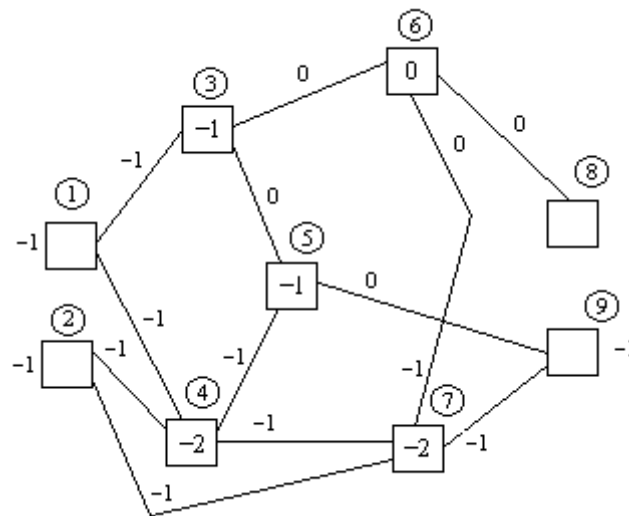
Fig. 1.4.2.

The following figure shows that there will be no response to an input message of the form (-1,+1):
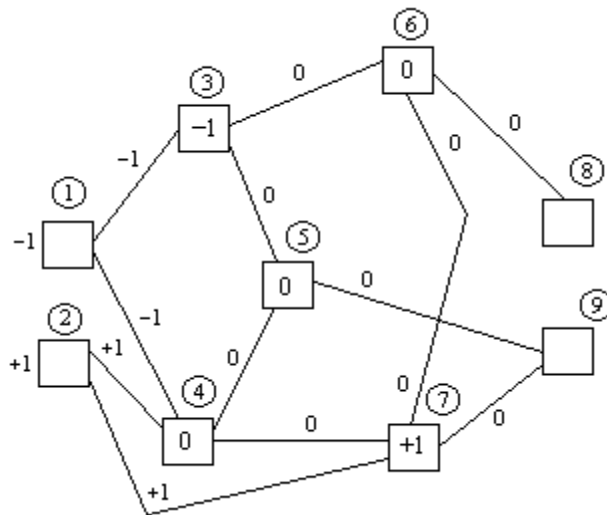
Fig. 1.4.3.
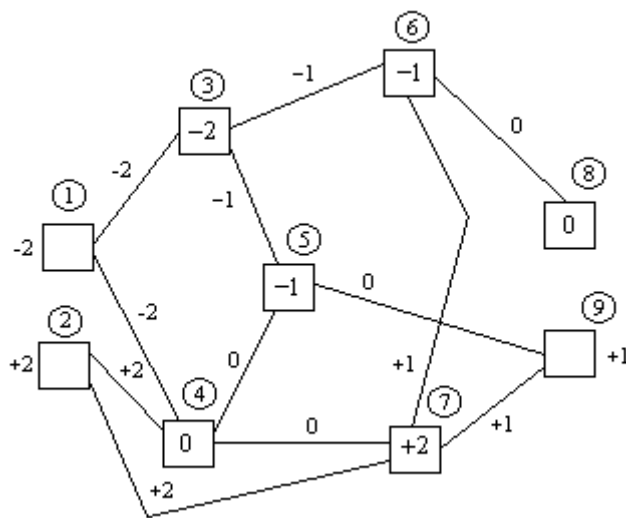
Fig. 1.4.4.

It all ended with +1 at the output, which in this case does not suit us at all. The external environment, for the most part consisting of "normal" systems, will be saturated with -1, and only the structure we are studying will conflict with it. As a result, the nearest neighbors will methodically "prompt" her, overwriting her +1 with their -1. In the event that input messages of the form (-,+) become the most popular (frequent), neuron number 9, located on the boundary of the media, under internal and external pressures equal in magnitude and opposite in content, will be destroyed.
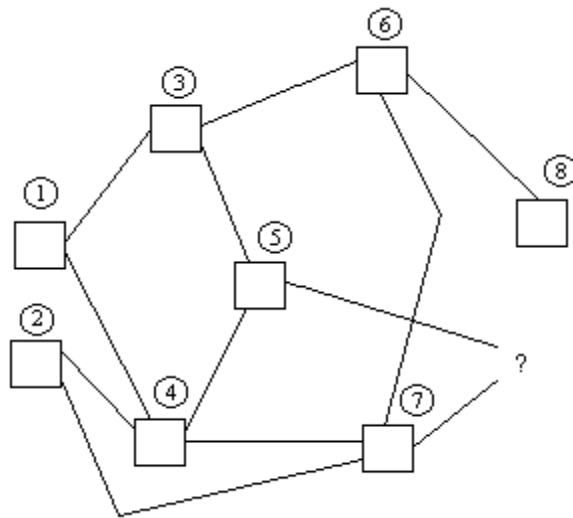
Fig. 1.4.5.

Neuron safely destroyed, but the picture has not changed.
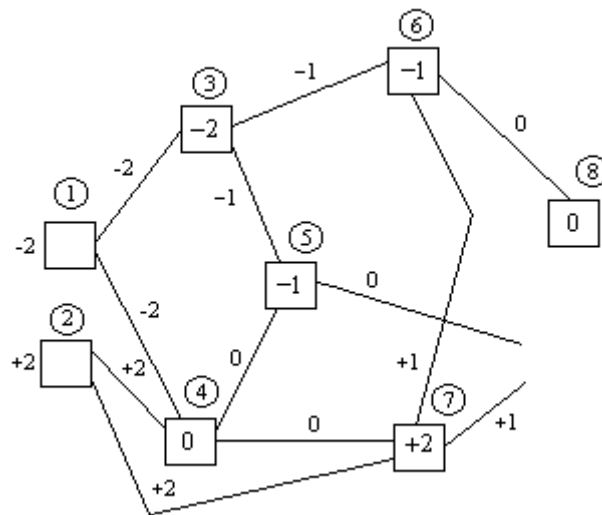
Fig. 1.4.6.

The turn of neuron number 7 has come
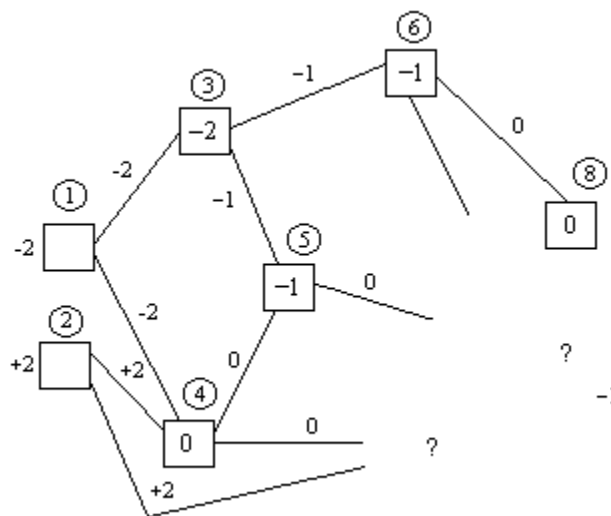
Fig. 1.4.7.

Then the external environment, as it were, chooses a neuron within this system, which should represent the system in the external world. In the destroyed structure,

neuron number 5 can be chosen as the output neuron. Then it will be possible to obtain the required output result, however, only in the case of a stronger impact on the inputs (-1,-1) and (+1,+1) have not changed.
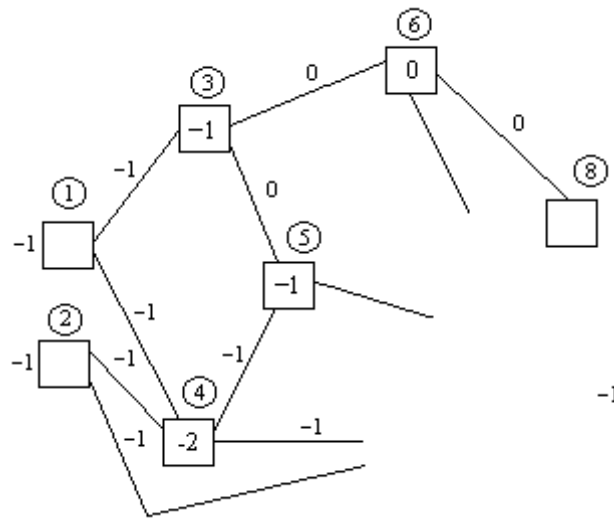
Fig. 1.4.8.
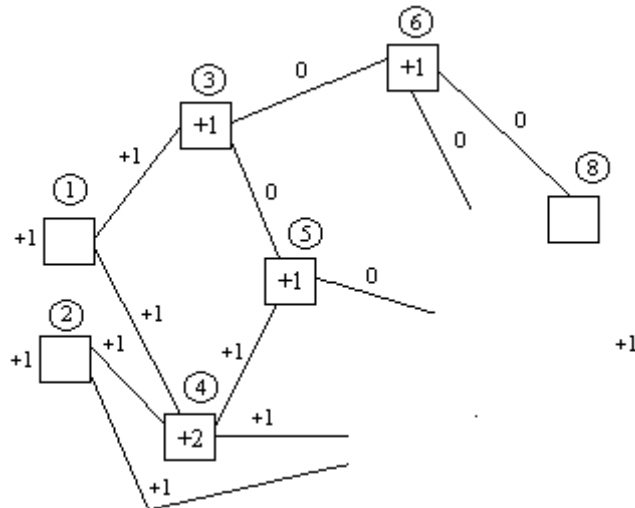
Fig. 1.4.9. Almost everything remained unchanged.

Thus, it was shown how information processes can lead the surrounding material world to destruction. At the same time, as a result of the development of these information processes, a "dry residue" remains - a simplified structure and many elements that have gone into oblivion, the fact of the death of which gave the surviving system new abilities.

The proof of the fact that such a system, in principle, cannot be protected, if the algorithm of its functioning is not changed, is trivial. **The learning process is inevitable, which means that the death of elements is inevitable, thus, the circuit is constantly depleted**. Here it is important to feel the optimal point in time, i.e. the critical number of elements that are still sufficient to understand the world around us; their further death will already lead the system not forward into the future, but back to degradation, to dissolution in the world, to nirvana. Nature follows this path, generating a variety of forms, and then erasing them. And in this sense, one of the important results of this work can be considered a more illustrative than strictly proven hypothesis that any death cannot be meaningless, especially when it comes to cognition. It is possible

that the human brain works in a similar way, in which tens of thousands of neurons die every day and only die, without being reborn.

Thanks to their death, we comprehend our destiny in this world, remembering our past.

There. where the neural chaos untouched by knowledge is still preserved, information about our past lives is stored, which, of course never was. Any neural structure is a memory of something. How we will interpret this something is already determined by our imagination, purpose and needs.

In the given examples from this section and section 1.1, the dependence between the functionality of individual elements and the complexity of the self-learning rules of the entire system within the same self-learning principle is clearly visible. The choice of a training scheme in accordance with the given criteria from a potentially possible variety of schemes, which greatly exceeds the number of the initial number of system elements, requires a separate serious study.

It is possible that the main criterion for choosing one or another training scheme is Time.

For any self-learning information system, the transition from today's structure to tomorrow's is a serious problem of existence in time. It is clear that the processes of self-learning based on the principle of the death of elements are irreversible, based on their essence. Therefore, when it comes to such information self-learning systems, there is no return to the past.

"Information objects" live in a slightly different dimension than the objects of classical physics. For them, there is no turning back and there cannot be. Of course, one can try to be carried away by memory into the distant past, but this will no longer be the real past, but its pitiful model. And with every newly lived moment, this model will undergo inevitable destruction.

1.3. Life as a tuition fee

I. Prigogine wrote: *"In highly non-equilibrium conditions, a transition from disorder, thermal chaos, to order can take place.... In a state of equilibrium, the system is "blind", while in highly non-equilibrium conditions it acquires the ability to perceive differences in the external world and "them in their functioning.... In the transition from equilibrium to highly non-equilibrium conditions, we move from the repetitive and general to the unique and specific."*

And if suddenly the element manages to survive in highly non-equilibrium conditions, then it becomes "wise", the head stuffed with sawdust at the beginning of the campaign becomes the wisest head at the final stage of the journey to the Emerald City. As the proverb says: *"The stronger the pressure, the purer the spring."*

Maxwell also noted that each creature has its own special points, using which the creature achieves certain results, if, of course, such an opportunity presents itself to him. Following him, Tom repeated the same with his theory of catastrophes and Prigogine with his order out of chaos. And what can these singular points be for the structures that are studied in this work? Probably, this is a message, or maybe even a single word of a natural language that enters the system. Not a simple word, but a word that can shake up the whole system, make it change. *"A hen laid an egg, not a simple one, but a golden one,"* says one of the Russian fairy tales. And this testicle changed the life of both grandmother and grandfather. *"In the beginning was the word," says* the Bible. Yes, in the beginning there was a word as an input message for the world of chaos. And that word made chaos become order.

And the word was not easy. It was both a question word and an answer word. The unpreparedness of the system, which this Word fell upon, gave rise to an avalanche-like reaction of changing the existing system structure. And this structure is still changing. That is why we live, and think, and write.

If this is so, then at one fine moment the process of change will calm down, the fluctuations will die out.

"Chuck didn't answer, and George turned to him. He could barely make out his friend's face, a white blur facing the sky."

"Look, Chuck whispered, and George turned his eyes to the sky as well. (Everything happens for the last time.)

High above them, quietly, without noise, the stars went out one after another" (L. Powell, J. Bergier).

And then there will be a new word-question and a new word-answer. If the word turns out to be familiar, then the structure will not pay attention to it. But if on the input will persistently give a signal with a value of 4, which requires a response of 5, then a structure will arise for which it will be natural and possible, 4 will become equal to 5.

In the same way, science is developing, the history of which no one has tried to study: Prigogine ("Order out of chaos"), Groff ("Beyond the Brain"). Frank ("Philosophy of Science"). Kuhn ("The Structure of Scientific Revolutions"), etc. The

scientist, investigating nature, asks her questions that he is able to formulate, and receives answers. He does not always receive answers that he is ready and able to accept. But since he cannot change nature, he changes himself, restructures himself in such a way that the answers he receives become his answers, i.e. to match his desires with his abilities. It's so nice sometimes. As a result, a person changes and, consequently, the world around him changes for him. The universe turns from a mechanism into a computer, into a self-learning neurocomputer, etc., while remaining unchanged.

"Nature cannot be forced to say what we would like to hear. Scientific research is not a monologue. Asking nature a question, the researcher risks failing, but it is precisely this risk that makes this game so exciting," Prigogine wrote. The more unexpected answers to be accepted and explained, the further we are from ourselves In this game of questions and answers to nature, we are the bet and pay only ourselves Science is the most gambling game in existence Here they play not for money and not for interest, and not even for life.Here they play for the soul, and Goethe wrote about Faust for a reason.

As long as a person simply looks into the surrounding space, while he eats, sleeps, earns food or breeds, nothing threatens him. But it is worthwhile for this person to correctly formulate and simply ask the question "What is it for?", "Why so?" and get an unexpected answer about how his virginity ends and he becomes different or disappears altogether.

Sometimes the answer received is capable of destroying the questioner. *Herman has gone mad. He is sitting in the Obukhov hospital in the 17th room,* does not *answer any questions and mutters unusually quickly. "Three, seven, ace! Three, seven, lady!..."* (A.S. Pushkin).

Observation changes the observer himself. Maybe watch through the keyhole is not a feat, but there is something heroic and reckless risky in it. At one time, M. Heidegger argued that the approach of a scientist to the objects of research means that they are subjected to violence by the scientist Doubtful. Most likely, the scientist rapes himself with his own questions. For this, he can be called a gambling masochist in the good sense of the word, and no more. The young scientist differs from his older brother only in that by provoking nature to retaliate, he naively hopes to still escape him. The senior colleague, however, knows perfectly well how it will all end, and prepares himself to enjoy the sometimes "rude and painful" answers to his questions.

— Lord! Ippolit Matveyevich suddenly exclaimed in a cock's voice. - Are you going to beat us? (AND. Ilf, E. Petrov).

What is good and what is bad? What is the apple hanging on the tree of knowledge? The question has been asked. Answer received. We still feel the process of receiving in our own skin. It remains only to hope that our today's questions will be less painful for humanity. Although the history of questions to the nature of Nobel, Curie, Einstein, Wiener and the answers they received do not leave any hope for a bright future for us today. *"And I remembered the Fourteenth volume of the works of Bokonon - last night I read it all, in its entirety. The Fourteenth volume is entitled as follows":*

"Can a reasonable person, taking into account the experience of past centuries, have even the slightest hope for a bright future for mankind?"

Read the Fourteenth volume for a short time. It consists of just one word and a period: "No." (K. Vonnegut. "Cat's Cradle").

Thinking up questions is not easy and not enough to fill life with meaning.

Sheckley wrote in the story "The Right Question": *"Alone on the planet - not big and not small, but just the right size - the Answerer waited. He cannot help those who come to him, for even the Answerer is not omnipotent.*

Universe? Life? Death? Crimson? Eighteen?

Partial truths, half-truths, crumbs of the great question. And the Respondent mumbles questions to himself, the right questions that no one can understand. And how to understand them? <u>*To ask the right question, you need to know most of the answer.*</u>*"*

As pointed out by L. Powell and J. Bergier: *"And if we fight to the end against ignorance, then the truth will fight for us and conquer everything."* And we will add: "And first of all ourselves", because by and large, apart from ourselves, we have nothing else to win and no one.

The classic saying states: "Know the truth and the truth will set you free." There is a lot of hidden meaning in what has been said. One has only to think: "the truth will give freedom," i.e. "Understanding the surrounding world will give freedom." But any understanding, as shown above, changes, restructures the understanding subject. And it turns out that we actually learn not in order to satisfy our curiosity, it only seems to us that curiosity drives us. We seek understanding only in order to change, in order to get away from yesterday's self, in order to become different, in order to become "free", free from yesterday's self. The result is an endless run... *"and I keep running, trampling, along the cinder path... ",* and so on until the fugitive is able to rearrange his legs, until new answers to old questions destroy the last elements that can die, in order to the system has learned that two times two will be four from now on. This is the truth of today. Tomorrow will be another day and another food. You have to pay for understanding with your life. Therefore: *"O noble-born, what is called death will come for you. You will leave this world, but you are not alone: death comes to everyone. Do not attach yourself to this life - neither out of love for it, nor out of weakness you cling to life, you will not have the strength to stay here, and you will not gain anything but wandering in Samsara."* (The Tibetan Book of the Dead.)

We are leading, in the words of Blok, *"... eternal battle, we only dream of peace,"* the eternal battle with death, which K. Castaneda called the only worthy opponent: *"... We act only when we feel the pressure of death. Death sets the pace for our actions and feelings and inexorably pushes us until it destroys us and wins this duel, or until we will not do the impossible and we will not conquer death."* Until then, voltage will be applied to the input and output again and again. There is no salvation for the elements of the circuit, it remains only to change, burning out the contacts and microcircuits that "hurt". The signal rushes about in the labyrinth of connections between neurons, just like in the song of V. Vysotsky: *"I am looking for a way out of the gate, but there is none! There is only an entrance, and that is not the one."* And not finding a way out, he finds the most vulnerable spot and breaks through the system there, and the system becomes different, "with a patch on its side." Maybe not as virgin and not as beautiful as before, but understanding. Understanding!

If the experiments are continued to the last "soldier", to the last "microcircuit", to the last neuron, then there will be nothing more to understand and no one to understand. The system will completely dissolve in the world, find peace and, as a reward, the opportunity not to be. Perhaps this state is called nirvana?

In the meantime, there are living neurons, life continues the game and guesses a new riddle, because the world is kept secret: "And what is a person?" And the person goes in

search of an answer. Went older brother, middle and younger. And when the mystery is solved, the fairy tale ends. *"The beautiful is beautiful as long as we do not touch it,"* wrote Schopenhauer. And then, measuring his loneliness by the number of thoughts caught, he added: *"Death is undoubtedly the real goal of life.... The world is a hospital for the incurable."*

Kierkegaard wrote from his Danish kingdom: *"Marry, you will regret it, don't marry, you will regret it; whether you marry or not, you will regret it in both cases you will regret it, in either case you will regret it. Such, gracious sovereigns, is a summary of all life's wisdom.* With his nose, he tried to outsmart nature. Thought, said, done! And mystery surrounded him. Beautiful and terrible visions entered his world, there was a "materialization of thoughts and the distribution of elephants began." He lived as he thought, and spoke about what he saw:

"He who has learned to be truly afraid has learned the highest." Kierkegaard had his facts, Schopenhauer his, Newton his, Einstein his. Each solved the problem in his own way. But in the end, they all left our children's sandbox, took their pots, toys and left the game, leaving us their understanding of the rules. And Time destroys the sand houses left by them. We cannot and will not restore them. Trying to comprehend the labyrinths dug by them in the context of our life, we remove them, materialized in books, from the shelf, ask questions and always find confirmation of our own thoughts. How else? The dead are wiser than us, they do not argue over trifles. Nature erased neurons under the names of Kierkegaard, Einstein, Newton, etc., because they prevented the system called Humanity from getting the right answer to the question asked! Every moment, nature destroys thousands of poor fellows who do not understand anything and do not agree to be destroyed, and all in order, roughly speaking, that initially twice two was equal to four, and then it would become five. So that the photon was originally a particle, and then became a wave. *"Humanity consists of the dead and the living, and the dead are much more than the living,"* O. Comte, and we will add, they (the dead) <u>form the foundation of the modern understanding of the world</u>.

"And don't say 'so-and-so died today", but — "today he has finished dying," for life — nothing more than everyday dying..." - wrote B. Gracian, and I would like to add to his words: "life is everyday learning, which is dying." It is no coincidence that A. Schopenhauer concluded that *"to philosophize means to learn to die."*

"Reasonable words were spoken by King Nestor, about whom they say that, having asked the oracle about the terms of his life and having heard that he would live another full thousand years, he said:" Therefore, it is not worth acquiring a house. "And when friends began to convince him to build not only a house, but a palace, and not one, but many, for every season and weather, he answered: *"Do you want me to build a house for some thousand years of my life? Did you build a palace for such a short period of time? What for? Enough of a tent or shed where I could take shelter for a while. Settling down firmly in such a short life - madness"* (B. Gracien "Criticon".)

"Sorry," - says nature, and the case takes hundreds of human lives. This is done so that Mankind can answer another question. Life and Death are a question and an answer, a one and a zero, and between them we "burn out our contacts", fuss and restore falling teeth, cut out appendicitis - in general, we patch up the scheme, with the hope of being useful. And we will certainly come in handy, at least in order to die and not interfere with answering questions, and thereby become involved in yet another knowledge perceived by mankind.

No, it is no coincidence that in world literature there are so many artistic images and, accordingly, works in which a human being, being crucified in the social structure of dependencies, would be subjected to a daily test of strength, just as a coast is tested by a daily tide. A question suddenly arises before the system (man), in the course of answering which a certain element of the structure is recognized by the same structure as superfluous and destroyed, and no means of protection can save it. And vice versa, you can fall without a parachute from an airplane and stay alive.

In this regard, the following text from K. Castaneda ("Fire from within"): *"The rolling force is the means by which the Eagle distributes life and awareness for use, but this same force - that with which he, so to speak, collects payment. The rolling force causes all living beings to die. What you saw today, the ancient seers called the tipper.... After all, in reality, we are very fragile creatures. As the tipper hits us again and again, death enters us. The rolling force is death. As soon as she finds a slack in the lumen of a luminous creature, she automatically splits the cocoon, opening the lumen and destroying the creature."*

In another work of the same series, K. Castaneda ("The Power of Silence") writes*:*

"Life is a process by which death challenges us," he said. "Death is the active force, life is the arena of action. And every time there are only two opponents in this arena - the man himself and his death.

"I would rather think, don Juan, that it is we human beings who are the ones who challenge," I said.

"Not at all, don Juan protested. We are passive. We act only when we feel the pressure of death."

Input data create us from the surrounding chaos, arm against this very chaos, and then by an unexpected team, raising to the parapet from a cozy and relatively safe trench, they are sent to meet the Fire and Cold of the raging Cosmos:

<div align="center">

The word comes, like fate rolling forward,
And queue up for food.
Standing and waiting for a smile or a look,
How a beggar waits for rubles in an old sackcloth.
Here the victim is issued, and the voice sounded,
And meanings, like the dust of old books,
They swirl in the air. "The Beginning of All Beginnings"
From the chaos fishes out "redheads".

</div>

Chapter 2. Self-emerging information structures

For a conscious entity to leave
t body is bliss. The first sacrifice
was to leave the Father and
become the Son.
Ram Dass

2.1. Learning through birth (self-generating neural networks)

Fate leads the one who wants
to go, drags the one who does
not want to.
Cleanf from Assos

If the "potential difference" is capable of destroying individual elements of the system, why can't it create them?

From the point of view of the executed algorithm, creation and destruction differ only in sign. In the first case, we erase the one and write zero, and in the second, we erase 0 and write 1. This means that not only death contributes to the assimilation of something new, but also birth is obliged to do so. At the same time, not only the Macedonian, Napoleons and Suvorovs are born in the right place and at the right time, but the birth of absolutely every person is explained by exactly the same scheme. — the question asked and the required answer. The potential difference increases around a particular point in space at a particular time, and birth becomes inevitable. Here, the potential difference is understood as the absolute value of the difference between the question asked (quantitative equivalent) and the required answer.

At the same time, we should not be confused by the fact of generating an element from scratch. Modern quantum physics no longer sees anything criminal in this. Moreover, psychoanalysis, in its form as micropsychoanalysis (S. Fanti. "Micropsychoanalysis"), already postulates as its foundations the defining and guiding role of voids:

"A certain state of matter corresponds to a certain energy organization of emptiness", "Emptiness serves as a support for attempts", "Emptiness is the source of life", "Life in general originates and returns to where it started, in an unfolding emptiness", "an atom is almost 100% of the volume consists of emptiness, and we consist of atoms ", etc.

Moreover, to solve the simplest variants of this problem, it may be sufficient for us to know only linear programming. What is new knowledge, if not the birth of an additional constraint when working with an objective function?

Imagine that a self-learning information system that knows nothing about the surrounding world is allowed all the actions that it is capable of performing. How will this freedom end for her? Definitely inevitable death. It is quite possible that it is for this reason that a human child, having been born, is only able to scream, but not to move in

space. The ability to independently move in space comes only with a certain understanding of the surrounding world. And what is understanding for him?

First of all, probably, in the list of those actions that he should never do: stick his fingers into the socket; play with matches etc.

This does not only apply to children. For adults, there are no fewer prohibitions.

Restrictions in actions exist for states, they are enshrined in international pacts.

Limitations in the world of software apply to both the development and operation of products.

There are no self-learning information systems that would not look for restrictions for themselves, because the prohibitions found empirically contribute to a significant extent to the life of the system.

2.2. Life as an inevitability

And clinging to the sliding, sharp edge, II listening to the always buzzing ringing - Are we going crazy in the change of motley Invented reasons, spaces, times...
When is the end? Annoying sound He will not have the strength to listen without rest... How terrible everything is! How wild! — Give me your hand, Comrade, friend! Let's forget again.
AND. Block

Before proceeding to the study of such a system as a person, we recall once again that in this work we are talking about formal neurons, therefore, naturally, carriers of formal neurons should be considered as formal systems.

As you know, neurons in the human brain are intensively born and only born as long as the embryo is in the mother's womb, and even then this lasts only for several months. After that, the birth process slows down, stops, and the process of tissue death and ossification begins. By the time a creature is born into the world, neurons are dying and with each passing year more and more intensely. No wonder it is said that a person begins to die before he is born.

In particular, M. Lamb states ("The Biology of Aging"): " *The brain and skeletal muscles are a classic example of tissues in which cell renewal does not occur in the adult state.... The possible loss of nerve cells as the body ages"* was first reported by Hodge at the end of the last century. He counted the number of neurons in the brain of a honey bee and man and found that it decreases with age.*"
The last point in the dispute was put by Korsellis (1975 г). He published a long review on the subject and presented new data obtained by counting cells in sections of the brain tissue of a large number of normal people.

According to the concept proposed here, the death of neurons means the beginning of the learning process. What has been said means that a human being, just like a human being, does not and should not have a memory of the first minutes of an embryo's life. Memory begins to form only with the onset of neuronal death.

The mass process of the birth of neurons is reminiscent of placing pieces on a chessboard for the game, which are not placed according to the rules. From the point of view of an outside observer, everything looks very chaotic and purposeless, as if a child, unfamiliar with the rules of the game, arranges figures that immediately begin an independent life, coming into conflict with each other and dying at the same time. The composition on the board begins to change in accordance with the rules of walking for each individual piece. Knowing the initial data and rules, it is possible to determine many possible options (scenarios) for the development and death of a given system.

Where does the initial data on the placement of pieces on the board come from? To explain the situation, we will introduce into the model such concepts as: "genetic memory", "self-generating network" and "self-destructive network". By genetic memory we mean the law of distribution of connections between neurons, which determines their birth. This law can be described, for example, by methods of fractal archiving. It seems that when it comes to billions of neurons and their connections with each other, special accuracy is not required, so in this case (for this model) you can try to set the compression ratio as large as you like, but, of course, within reasonable limits.

At the same time, which is typical, genetic memory - the memory of the number of neurons and the law of distribution of their connections can be unwound according to the type of fractal unarchiving, when two random images (schemes) are tuned to each other by a self-learning procedure. See [2] for details.

The learning game is always played to the end. A person is trying to adapt to life through its understanding, paying for this with play figures-neurons. Learning is a way to survive, but the cost of learning is the death of the basic elements. In order for an organism to live, it must "burn" itself from the inside.

Death erases the survivors.

You can start a new game. The new arrangement of figures completely erases the remnants of the memory of the past. The new birth destroys history. But it should be noted that the process of birth, equivalent in our example to the process of arranging pieces on the board, in fact, cannot be chaotic, and therefore meaningless. As you know, in the process of maturation, the embryo briefly "remembers" its entire history, as the history of the development of a living being. From my point of view, this is not just a movie, it is an educational film during which the embryo self-learning program is implemented. The genetic program containing already lives lived by ancestors. "Genetic Potential Difference" spawns neurons in the right place with the right connections. Thus, the unrealized tension of the past breaks into the present, bending its space with the birth of new elements. The embryo learns using the mechanism of spontaneous generation. Genetic memory is mapped to the number of neurons and their connections to each other. This stage can be called the stage of synthesis, as opposed to the stage of splitting-destruction that begins immediately after its completion. The more complexity it is possible to synthesize the structure, the more it will be possible to teach it in the future, using the mechanism of self-destruction. You must admit that everything that has been said is somewhat reminiscent of the operations of splitting and synthesis in nature.

Moreover, such an approach explains why a person is able to remember and acutely experience (for example, in a state of hypnosis) those events that were not in his life (R. Moody "Life before life"). By virtue of that that memory is distributed over the entire set of neurons, according to their connections with each other, according to their

weight coefficients, it can be argued that a person is already born "stuffed" with "memories unknown to him." Over the course of a lifetime, these memories are gradually destroyed by new information. However, there are techniques (LSD, special dreams, hypnosis, meditation) that allow one to map the active consciousness into structures that have not yet been used (undestroyed), and then one will get "Raymond Moody's nine previous lives", and much more.

As a result, we have successive processes of birth and death. Both are aimed at learning. All of the above received a beautiful decoration from K. Castaneda: *"Through group contemplation, the new seers were able to see the separation of the two aspects of the rolling force. They saw that these are two forces that are merged, but are not the same. The ring force comes to us a little earlier than the overturning one, but they so close that they seem to be one.*

Ring power is called because it comes in the form of rings, thread-like rainbow loops - very thin and delicate. And just like the overturning force, the ring force strikes every living being continuously, but with a completely different purpose. The purpose of her blows is to give strength, to direct, to make aware, that is, to give life" (K. Castaneda. "Fire from within").

Everything that has been said here concerns not only the mechanism of the functioning of the brain. The same can be seen at the level of human society, when the destruction of members of society leads to an increase in the power of society. However, if the population becomes less critical for maintaining and/or developing a particular technological level, then inevitable regression begins.

Functional degradation becomes inevitable due to the simple fact that there are not enough required functional elements and connections between them to solve many complex problems.

Functional degradation, in turn, necessarily affects the security of the system. Those neighbors who previously respectfully took off their hats no longer pay serious attention to the once respected System and unceremoniously force it to move away from the common pie.

Isn't that how things are with Russia today?

This section is called "Life as an inevitability" not for red words. For some reason, it is commonly believed that the only thing that a person cannot avoid is death. But if we are talking about any living or already dead person, then the fact of his existence today or in the past clearly indicates that birth could not have been avoided.

Any birth is always associated with the "patching" of a hole in the bottom of the ship, called Life.

But it is possible to close up a hole only when there is time and appropriate materials for this.

Now it is time to move on to the practical implementation of what has been said and propose specific algorithms for the functioning of an information self-learning system that has only one goal - to understand what awaits it. Understand and be able to independently continue the input training sequence in your hypothetical model to the first expected threat.

Chapter 3. Algorithms of self-generation of knowledge (experience in building a practical system)

3.1. Element life force

In order to give weight and flesh to reasoning, let us sink to the ground, i.e. Let's give specific examples that can be easily implemented with the help of a computer, and see how the system is able to learn using the principle of self-rebirth.

Suppose that our neurons are capable of the following elementary actions (ED): add ('+'), subtract modulo ("-"), multiply ("x"), divide ("/"), do nothing (" "). You can also allow the operations of logarithm and exponentiation - this will expand the capabilities of the system for training. We are now interested in the approach itself, so we will limit ourselves to only the five named operations. Next, we select a section of "empty" space, which will be affected by two inputs and one output.

Let's assume that the resulting tension should be compensated by the formation of neurons in this "empty" space.

Let's assume that exactly as many elements should appear (no less and no more) as enough to compensate for the voltage.

Let us assume that at the birth of neurons, a neuron is selected with the elementary action that contributes to minimizing stress as much as possible.

For example, let a signal with a strength of three conventional units (x=3) be given to the first input, 5 (y=5) to the second input, the required result is 20 (z =20).

Then, passing to the language of linear programming, the set conditions can be written as follows:

x,y are input values;

z is the output value;

d is an elementary action from the set [+, *,-,/," "].

At the same time, we believe that "doing nothing" is the most preferable of all ED. This action implies the absence of a neuron and is introduced solely for the sake of completeness. Figuratively speaking, it is fully consistent with the Eastern wisdom *"never take an extra step if you can stay in place, because you do not know whether this step of yours will be the last."*

It is required to choose a d that would minimize the expression

$$(z - d\,(x, y))^2 \quad (3.1)$$

It follows that at the first stage, a neuron with the "multiply" ED should appear. Let's denote it by A_1. The emerging neuron will smooth out the existing contradictions as much as possible, but it will still be far from complete idyll. The tension will ease, but remain. In the event that the system will not be able to "tolerate the remaining stress for a long time", then it will again have to solve the same problem, the task of eliminating the stress that has arisen, but in new conditions. The objective function (3.1) will have to be rewritten in the form (taking into account the new element):

$$(z - (d_1(x,y) + d_2(A_1,x) + d_3(A_1,y) + d_4(x, d_5(A_1,y)))^2 \quad (3.2)$$

Here d_1, d_2, d_3, d_4, d_5 take values from the set of EDs.

In our case, solution (3.2) will lead to the following results (recall that the operation is preferred):

$$d_1 \ "\ "$$
$$d_2 \ ""$$
$$d_3 \ "+"$$
$$d_4 \ "\ "$$
$$d_5 \ "\ "$$

Thus, the final scheme of system formation according to the principle of spontaneous generation will look like this:
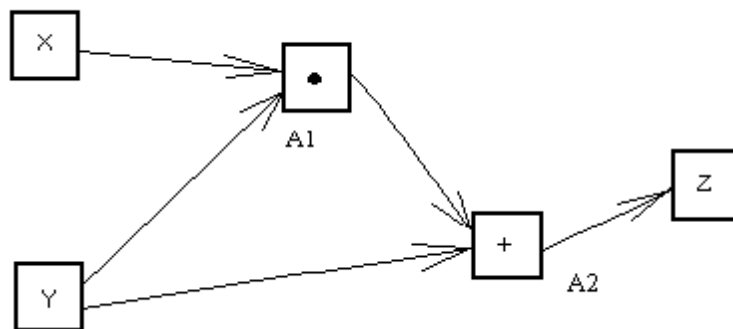
Fig. 1.5. The final scheme of the formation of the system according to the principle of spontaneous generation (part 1).

The process of spontaneous generation is repeated until the system refuses to give birth to new elements, considering the remaining external stress to be quite tolerable. In addition, with each time the task of choosing an ED will become more and more laborious. On the one hand, the ever-increasing complexity of choosing a neuron, and on the other - lowering the external voltage will lead to the fact that the system will calm down and will work with the error that it is capable of.

At this point, training on the principle of spontaneous generation can be considered completed. But now there is an opportunity for further learning on the principle of self-destruction, which was discussed earlier. Here it can be refined by introducing such a parameter as **the "life force" of the** neuron. By **the life force of a** neuron, we mean the magnitude of the external voltage to compensate for which it was born. In the given example, the vital force of neurons A_1 and A_2 corresponds to 15 and 5, respectively. Let us assume that a neuron can be destroyed only when the external stress acting on it exceeds its own life force. This means that to destroy the first neuron from the above example, a voltage of at least 15 is required, and for the second - at least 5 conventional units.

Let's show the possibility of this.

Let the input of the system shown in Fig. 1.5, signals with the value 5 and 1 are given, and the output is 12, i.e. x=5, y=1, z =12. In this situation, the external tension of the element A_2 exceeds its vitality, and it dies. The process of death spreads deep into the system, but stops at neuron A_1, whose vital force is greater than the external energy of destruction. A situation arises that is favorable for the birth of a new element to replace the deceased.

Minimization of the objective function (3.2) will lead to the birth of a neuron with ED "modulo subtraction", which is reflected in the final scheme in Fig. 1.6.
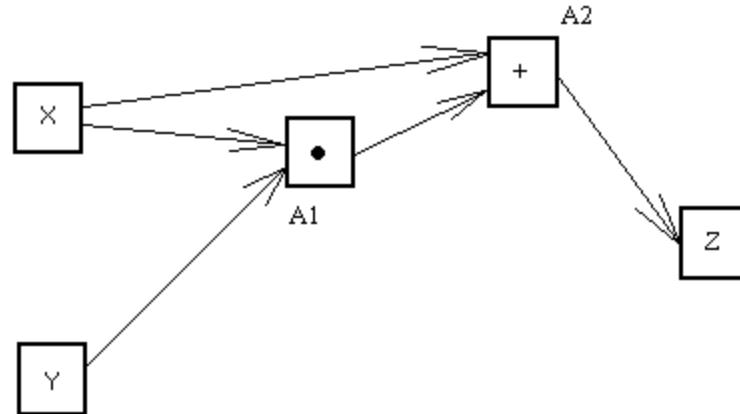
Fig. 1.6. The final scheme of the formation of the system according to the principle of spontaneous generation (part 2).

In the event that the external conditions return to the original ones (x =3, y =5, z =20), then the born element will again be destroyed.

In the above example, the force responsible for the destruction of elements is the value of the objective function on the new portion of the training data. It is clear that this is only one of the possible approaches. There are other ways. For example, as an external voltage, you can use a function of some average values over the entire training set.

Such a principle of self-learning is quite simple to implement in the form of a computer program, the size of which, like its knowledge, will dynamically change depending on the success of adaptation to external conditions.

In the proposed self-learning scheme, such a situation as paralysis of the system is excluded, and one or another prediction accuracy is guaranteed at each stage of training. This accuracy is determined by previously born neurons.

Such an approach does not exclude methods based on changing the weight coefficients for the input connections of a neuron; on the contrary, changing the weight coefficients is the only method for adjusting the system in the case when the birth or death of a new neuron becomes impossible. For example, in the case of the example in Fig. 1.6, the system is not able to give an answer with the accuracy that the user would like; the emergence of new neurons is no longer possible due to insufficient external voltage; there is no input/output data sufficient to destroy neuron A_2. The only way to improve accuracy in this situation is to adjust the weights.

In what follows, systems operating on the basis of the above principles of **self-rebirth and destruction** will be called **SR-networks.**

In the considered example, arithmetic operations appeared as ED, and it was for the convenience of working with them that the corresponding goal function was selected.

However, the variety of existing tasks in no way allows reducing all existing self-learning processes exclusively to a set of arithmetic EDs. Therefore, a reasonable question arises: "Does such an approach allow solving problems related to the processing of graphic or symbolic images, and can this approach be used to solve ordinary, everyday tasks inherent in a person as an object attracted by a goal ?"

Let character strings be used as input messages, for example, X = " abc ", Y = " def ". The output should be a string like Z_p = "bcda".

As an objective function, we define a function of the form:

$$F=\sum_{n=i}^{n1}g(Z_p(i)-Z(i)),$$

where

$n = \max (strlen(Z_p), strlen(Z))$;

$Z_p(i)$ — i symbol of the desired result;

$Z(i)$ — i symbol of the result;

strlen () - a function for determining the length of a string;

$g(Z_p(i) - Z(i)) = 1$, if $Z_p(i) = Z(i)$,

$g(Z_p(i) - Z(i)) = 1/2$, if $Z_p(i)$ or $Z(i)$ are absent,

$g(Z_p(i) — Z(i)) = 0$, if $Z_p(i)$ and $Z(i)$ are present, but $Z_p(i) \neq Z(i)$.

As ED, we define the following:

X + Y - gluing lines;

X - Y - the result is a string of characters present in X but not in Y;

$D_i(X)$ - deletion of the first character of the string X;

$D_n(X)$ - delete the last character of the string X.

Then the result of applying the above approach will be the automatically generated following SR-network:
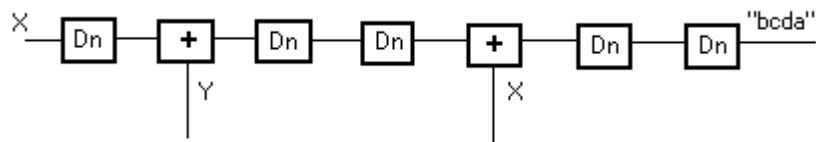
If desired, the resulting scheme can always be automatically displayed in the text of a computer program in any given programming language. For example, if the programming language is set to C, then the following text will be received:

```
sr_sxema(x,y,z) char x[ ] y[ ] z[ ];
{
char x [80]                /* work variable */
strcpy (x 1, x);           /* preparation for work */
x1[0]=0; strcat(x1,&x1[1]);       /* D 1 */
strcat(xl,y); /*xl+y*/
l=strlen(xl);x1[l]=0; /*Dn */
l=strlen(xl);x1[l]=0; /*Dn */
strcat(x1,x); / * x1+x */
1=strlen(xl);xl[l]=0; /*Dn */
1=strlen(xl);xl[l]= 0; /*Dn */
strcpy (z, x 1);            /* return control */
return;
}
```

If desired, the above program can be subjected to automatic optimization, which will lead to the introduction of cycles due to the absorption of identical lines, for example:

```
sr_sxema(x,y,z) char x[ ] y[ ] z[ ];
{
int j;                   /* work variable */
char xl [80]; /* work variable */
strcpy (xl, x);              /* preparation for work */
xl[0]=0;strcat(xl,&xl[l]); /*D1 */
strcat(xl,y); /*xl+y*/
for(j=0;j<2;j++) { 1=strlen(xl); xl[I]=0; } /* Dn */
strcat(xl,x); /*xl+x*/
for(j=0;j<2;j++) { 1=strlen(xl); xl[I]=0; } /* Dn */
strcpy (xl);               /* return control */
return;
}
```

Nothing prevents us from suggesting a similar approach for modeling situations in the biological, social and computer worlds.

Analyzing the situations of people's social life, you can enter ED like: "run", "go", "sit", "ride", "talk", "be born", "die", "hang", etc. You can even limit this set by correcting it with the actions "do not kill", "do not covet".

For a computer program, operations can act as ED: "write", "read", etc.

It is clear that such SR-networks are not a panacea for all ills and do not offer a universal heuristic suitable for all occasions. They can become just another tool in the hands of an artist who paints his own life.

A serious drawback of the above approach is its "impenetrable" purposefulness - the desire to increase the value of the objective function at each step. In the examples given, this path led to success, but this does not mean that it will always be so; although, on the other hand, the objective function, as well as the set of ED, can always be varied.

Ways to improve the situation are seen in the direction of parallelization of processes. For example, if, while solving the above problem of processing character strings, we allow parallelism in the formation of the SR-network, i.e. increase the network not only along a single path of maximizing the value of the objective function, but in several directions, while allowing the use at each stage of all currently available results in all possible directions, then the chances of finding a way out in the maze of solving the problem can be significantly increased, see.following figure:
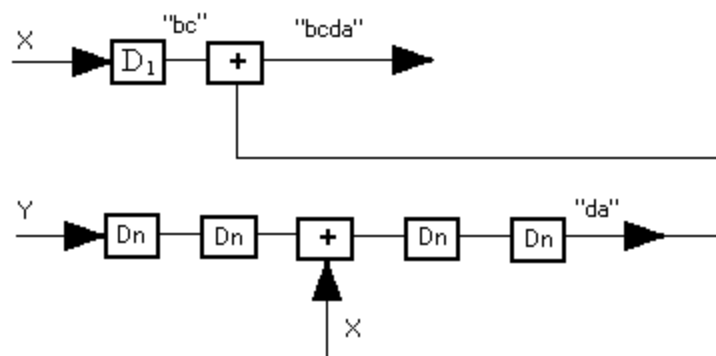
It is possible to summarize what has been said and summarize it in the form of the following scheme:

1. An element of the system is the simplest indivisible particle - a **formal neuron.**

2. Each neuron is capable of one elementary action from some predetermined set, which includes the action "do nothing". In the general case, the set of EDs can include both arithmetic operations and special algorithms, memo-functions. The presence of ED "do nothing" is tantamount to the absence of a neuron;

3. At the initial stage, the system is a set of neurons with "do nothing" ED, each of which can be influenced by several inputs and one output. The difference between the received output value and the required output value is called **voltage**;

4. We believe that the tension that has arisen should be compensated by a change in the neurons of their inherent ED. Changing the ED "do nothing" to any other leads to the birth of a neuron for the system. Let us assume that exactly as many neurons should appear as necessary to compensate for the voltage;

5. We believe that at the birth of neurons, a neuron is selected with the ED that maximizes the minimization of stress. The value of the voltage, which is compensated by the born neuron, we will call **the life force of the** neuron. We believe that if a voltage acts on a neuron that exceeds its own life force, then the neuron dies.

Thus, it was shown that self-destructive and self-regenerating neural networks can be successfully used as the basis for models designed to study serious qualitative changes in the operation of the system. Basic definitions were given, a mechanism was proposed, and the necessary examples were given, sufficient, in my opinion, for independent practical implementation of the above approach to various areas of life.

The novelty and effectiveness of this approach to building self-learning systems is determined by the use of not only the coefficients of the series to correct the existing knowledge with the help of which an unknown function is approximated, and first of all, operations between the components of a numerical series with subsequent adjustment of the coefficients. Such an approach makes it possible to significantly simplify the scheme of operation of a self-learning system in the case when this system is used to extract analytical dependencies in a data stream based on such actions as addition, subtraction, multiplication, and division. If necessary, the list of actions can always be expanded and supplemented not only with well-known mathematical operations such as taking logarithms and exponentiation, but also with algorithms that include memo functions implemented in software, as well as the self-learning algorithm itself. In this case, we can talk not so much about classical programming, but about writing a script or setting the plot of a work.

In this regard, it is interesting to look at the analogies that can be traced in modern computer software design technologies, and, in particular, at object-oriented programming in the Windows environment, in which objects are born, inheriting properties, and die, returning memory.

Quoted from the book by E. Tello "Object-oriented programming in the Windows environment" (M.: Nauka-Wylie, 1993):

"Object-oriented programming is a programming method that makes programs modular by dividing memory into regions containing data and procedures. Areas can be used as references and copies can be made on request.

It's convenient to think of objects as an attempt to create active data. The meaning attached to the words "an object is active data" is based on the object-oriented paradigm of performing operations, which consists in sending messages.

The messages sent to the object indicate what we want it to do. So, for example, if we want to display a string on the screen, we send a message to the string to make it draw itself. In this case, the line is no longer a passive piece of text, it is an active unit that knows how to correctly perform various actions on itself.

Quoted from the book by P. Aitken and S. Gerol "Visual C ++ for Multimedia" (K: "KOMIZDAT", 1996):

"Any Windows application actively interacts with the operating system all the time. The app and the system are like young lovers, with a huge often exchange multiple messages. Every time something happens in the Windows system, it sends a message to which your application can react in one way or another. Often such a message causes a whole avalanche of changes!

...When you define a new object, in most cases you simply create it from an existing object with the properties you need. The new object immediately after creation already has ("inherits") all the properties and capabilities of the old object. This way you don't waste time reinventing the wheel. After creating a new object, you only supplement its code with new functions that you need - all the old functions and properties are already present in it.

Any user action during the execution of a Windows program causes a message to be generated.

Any object in a Windows program has the ability to respond to messages."

3.2. Humanity as a SR-network

Bold thoughts play the role of advanced checkers in the game: they perish, but ensure victory.
I. Goethe

Turning page after page, a thoughtful reader may ask something like the following question: "If we adhere to the principle of scalability, believe in the information uniformity of the world, then why not look at humanity as a self-learning SR-network humanity has existed within this SR-network for millennia and has reached to put it mildly, some success. Why is it impossible to design such a SR-net for knowledge accumulation? Built on principles transferred from the world of people, such a technical system can become the most effective self-learning structure."

The question is valid. Indeed, why reinvent the wheel when it is easier to take the basic principles of information interaction between people and transfer them to a technical self-learning SRD system. The problem here is how to formulate these basic principles. To get started, we postulate:

1) the entire set of neurons is divided into two subsets: neurons-m and neurons-g, which are mixed with each other;

2) in the event that the level of interaction of neurons-m with neurons-x exceeds a predetermined value, a new neuron is born;

3) the vital force of a newly born neuron is determined by the level of neuron interaction;

4) the sex of the born neuron is determined randomly;

5) in the event that the level of interaction of same-sex neurons exceeds a predetermined value, the death of a neuron with a minimum vitality occurs.

This is how the simplest model looks like in the very first approximation. In its implementation, it is somewhat reminiscent of the famous game "Life", invented by John Conway, the process of which can be watched endlessly, like fire, water and working people. Of course, this model can be refined, developed, corrected by many restrictions. For example, as a source of tension that creates and destroys neurons, one can propose to consider emotions, feelings: love as a creative force and hatred as a destructive force.

It is important that the similarity is present. How artificial it is is another matter; he is already from a series of questions T. Mana: *"Flowers made of ice or flowers made of starch, sugar and fiber - both are nature, and it remains to be seen what nature should be praised more for...?" — is* it really that important? But here is the question asked: "How to measure the effectiveness of this structure?" — remains. Hearing him, we timidly hid our heads under the wing, glued together from analogies, like from feathers, and began to generate models, fully understanding the futility of a direct answer. Indeed, how can a hamster living in a bank evaluate its own effectiveness (in this case, at least utility) for its owner. And here he is, this is a hamster, building mirrors from he puddles and intently seeks out the distorted images that pop up until all his past and future lives begin to pass before him. But is this the answer to the question?

When applying the model of SR-networks to the study of events that shock humanity, one should immediately make a reservation and draw a line between what is allowed to

poke like a probe given by the toolkit and what it is useless to apply it to, but really want to.

It is allowed to poke in the direction of the information storage of mankind, its numbers and information communications.

It is allowed to poke in the direction of the most important problems related to the use of information weapons against all of humanity and its individual parts in order to find out the solvability of these problems.

I really want to try to use SR-network to determine the fate of certain cultures.

I really want to understand the adepts of some kind of new knowledge are infections and wars, which, like a surgeon's scalpel, cut out entire structures, not caring whether they are healthy or sick. Where is the line that runs between the still alive and the already dead?

At K. Simonov sees this border as a forced stop: *"Neither the regimental commissar from the political department of the army, nor the lieutenant colonel from the formation department, nor Shmakov, who rode in the head and middle of the column, nor Danilov, who closed the column - none of them knew that several hours ago and in the south and north of Yelnya, the German tank corps broke through the Western Front and, crushing our army rear, are developing a breakthrough tens of kilometers in depth. None of them knew yet that the* <u>*forced stop at the bridge, which cut their column into two parts, now driving one after another at an interval of twenty minutes, that this stop, in essence, had already divided them all or almost all on the living and the dead*</u>*."* (T.O. Simonov. "The Living and the Dead").

Later, this border will become a nuclear reactor, even later a place of residence.

None of my compatriots knew, working in the industry and education of some of the Union republics of the USSR, that by doing so they crossed the border that dooms their descendants to death, wandering and poverty.

How far is that nodal point at which the choice of the lesser evil suddenly turns into a complete and unconditional defeat in the future?

What are the criteria for an information self-learning system to choose a road at a crossroads? Trying to minimize today's or tomorrow's pain, trying to maximize today's or tomorrow's joy?

Individuals and entire states throughout the history of mankind have repeatedly tried to create a universal selection criterion, often introducing this criterion into the space of the system's goals. And then the goal itself led. There is no need to look far for examples: someone lives for himself (maximizing today's pleasure), someone lives for children, someone lives for the country, and there are those who forge happiness for all mankind.

<u>Choosing today's act, the information system explicitly or unconsciously but calculates its inevitable consequences in the time interval of the dominant goal</u>.

The consequences, according to the logic of SR-networks, are predicted only in the time intervals of the target. It is clear that if the active goal is to be realized in the very next few hours, then this goal does not matter how the current action will affect the state of the system tomorrow or in a week.

And if the goals for which the implementation is a matter of the very near future completely subjugate the self-learning information system, then at the key point of its being, of course, it will choose the lesser evil for itself today simply because it does not see itself in tomorrow - no goals in tomorrow that can shape other actions today.

3.3. Stopping problem for human

We are the seeds of a living plant, and as soon as we reach maturity and our hearts overflow, the wind picks up the hour and disperses it.

K. Dhebrai

Assuming the death of neurons and/or the irretrievable loss of individual functions (R-networks) as the basis for the basic principle of human learning, a person is by default placed one step below the intuitive concept of an algorithm invented by him, moreover, he <u>will potentially always be inferior to the telecommunication ones he created computing environments</u>. Why is it so? If only because of the entire possible set of training schemes for the man himself, nature has allocated only a small subset, within which he is allowed to frolic. Moreover, it is known in advance what the systems working according to these algorithms will be able to "do wrong" and what not.

So maybe on the basis of knowledge about the capabilities of the system, one should judge its purpose?

To verify what has been said, it is proposed to look at that part of the self-learning information system called Man, which intuitively corresponds to the concept of an algorithm, i.e. Turing machine.

Let us briefly recall the main terms and definitions. Informally, a Turing machine is:

1) Tape — an infinite sequence of elementary cells, each of which can contain a character from some fixed finite alphabet;

2) a head capable of moving left and right along the tape, as well as performing read and write operations to the tape cells;

3) a program consisting of a finite number of states, one of which is selected as initial, and the other or several specially stipulated states are selected as final, each non-final state is assigned a certain instruction, i.e. what the head should do if it observes the corresponding symbol, and the program is in the corresponding state.

As a result of executing the instruction, the state of the program, the location of the head, and the character on the tape observed by the head can change.

The halting problem admits several formulations [92]:

1) Will the program terminate if there is no data?

2) Will program execution terminate when programs are used as input?

3) will the execution of the program for data X terminate?

In addition to the halting problem formulated above for a Turing machine, there are other problems that are unsolvable, in particular, the problem of program equivalence, i.e. it is impossible to decide in full generality whether a program P is equivalent to a program Q.

No one, probably, will argue that such an algorithmic part has a place to be in the Human system. Looking into our past, any of us, as a rule, is able to formalize the actions he has committed in the form of some algorithm: the input is wet, cold weather and something else, the internal state of the system was dreary and something else, as a result of all this so-and-so was done. Hereinafter, it is assumed that not only the

intellectual activity of a person, but also its physical component, including the replacement of cells, their functioning, etc., is based on the concept of an algorithm.

The Turing machine stopping problem is generally unsolvable, i.e. in other words, it is impossible for any program (algorithm) given to the input of a Turing machine to say whether it will stop or not.

But if a person is more complicated than the algorithms he creates, then why is the problem of stopping for a person solvable?

All people are mortal, all people stop in their work on the endless tape of life. And for a turing machine, this problem is unsolvable! How so?

If we adhere to mathematical logic and the fact that all people are mortal, then it turns out that the algorithmic part of a person is only a specific subset of the entire possible set of algorithms that the Turing machine is designed for, i.e. Man is a miserable special case in the world of self-learning information systems.

Indeed, if the human learning process is organized on the principle of the death of redundant elements (the R-network principle), then the algorithmic part of the Human system is a limited subset of the entire possible set of learning algorithms. At the same time, since the set of redundant elements used for algorithmic activity is constantly decreasing, the stopping problem for a person becomes solvable. Hence the conclusion - all people are mortal.

It is clear that this conclusion was made with the appropriate initial data, which is that the neurons of the brain during the life of a person are not able to recover to the same extent as they die.

If we try to look at Mankind as an informational self-learning system, and, in particular, at the applicability of the stopping problem to it, then there will be a richer set of learning algorithms (learning is carried out on the principles of birth, death, changing connections between elements), i.e. e. it can be assumed that the algorithmic part of the Humanity system coincides with the intuitive understanding of the Turing machine algorithm, which means that the problem of the death of Humanity belongs to algorithmically unsolvable problems.

Solving the problem in general terms, we can only state that Mankind may or may not die - it is impossible to answer this question based on the history of Mankind!

For astrologers and all sorts of predictors, the conclusion about the algorithmic insolubility of the problem of predicting the fate of mankind is not so dangerous and cannot affect their income and fame. They have an unkilled argument, which is that any prediction is illogical by its very nature, and the words come into the mouth of the prophet by themselves, without relying on causal relationships known to science - there is no need for this.

And it is right.

It is quite possible that someone intuitively sees the whole of tomorrow. The problem for this someone is that he is not able to translate his vision into a language accessible to those around him.

From the continuous meditational space to the world of discrete natural languages, there has never been and never will be a one-to-one correspondence.

In addition, even theoretically it is not at all clear how complete the relationship of two self-learning information systems with different knowledge is. At the same time, their knowledge is constantly changing. One learns quantum mechanics, and the other - the system of economic relations between producers of goods.

As stated by D. Diderot: *"Does the one who listens to you have better data than the one who speaks? Far from it. And therefore, hardly twice a day in the whole big city you are understood as you speak"*.

A V. Goethe added to what was said: *"I affirm that man cannot even know himself. No one can ever look at himself only as a pure object of knowledge self-knowledge did not lead to anything worthwhile"*.

In technical terms, Diderot claims that all self-learning information systems cannot be the same, therefore there cannot be 100% understanding between them, and Goethe states that 100% self-knowledge can be cannot, because what the system tried to know a moment ago has now managed to undergo a change.

3.4. An example of knowledge through birth and death

And the voice was sweet and the beam was thin
And only high, at the royal gates,
Participated in secrets, - the child cried
That no one will come back.
A. Blok

Consider an example of the functioning of a system built solely on the principles of self-rebirth and self-destruction, — SR-networks. Initially, we will study the application of this approach to determining the functional relationship between input and output numerical data. And then we will show how the above example is similar to the events of the social and biological world.

Initial data. A functional dependence of the form

$$z = x_0 x_1 + 3x_1, \ (3.3)$$

those. the values x_0 and x_1 are simultaneously fed to the input of the initially "empty" space, and the value z is fed to the output. It is required to "fill" this "empty" space, i.e. learn to recognize functional dependency.

For example, let's say we have the following input/output sequence:

1) $x_0 = 600$, $x_1 = 300$, $z = 180900$;
2) $x_0 = 2$, $x_1 = 5$, $z = 25$;
3) $x_0 = 4$, $x_1 = 1$, $z = 7$;
4) $x_0 = 0$, $x_1 = 0$, $z = 0$;
5) $x_0 = 20$, $x_1 = 1$, $z = 23$;
6) $x_0 = 300$, $x_1 = 600$, $z = 183000$.

According to the first line of input/output data (according to the above algorithm), the initial void will be filled with the structure shown in Fig. 1.7.1 (the result of the first stage of training).
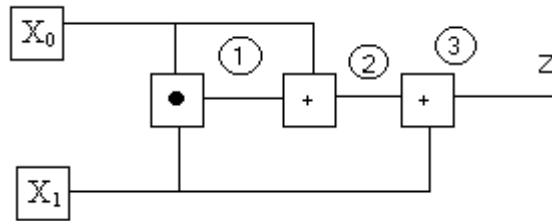
Fig. 1.7.1. The structure of the system after the first stage of training.

Three new elements born have the following vitality (ZH):

179400, 600, 300. Due to the large absolute value, all subsequent input/output data included in this example will not be able to change or destroy the generated elements. In short, the data used in the example will not be able to make the resulting structure forget its knowledge.

However, at the second stage of training (second line), the system will no longer be so good at guessing the answer. The resulting error will become more acceptable. Retraining by destroying neurons will not work. It remains to give rise to new structures that will cocoon the old system. At the second stage of training on the second line of data, we obtain the structure of fig. 1.7.2.
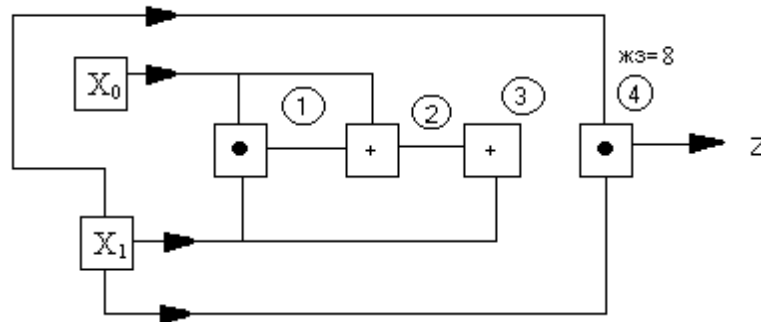
Fig. 1.7.2. The structure of the system after the second stage of training.

To the input question from x=2 and y=5, this system gives an absolutely correct answer, but it answers correctly only this question. Old knowledge is localized, but not destroyed, and if necessary, they can be partially or completely used.

So, for example, every living person, without further ado, is able to revive memories of seemingly long-forgotten situations that were remembered in difficult times, suggesting a solution.

At the third stage, the system will take on an even more exotic look due to the partial use of localized data (Fig. 1.7.3).
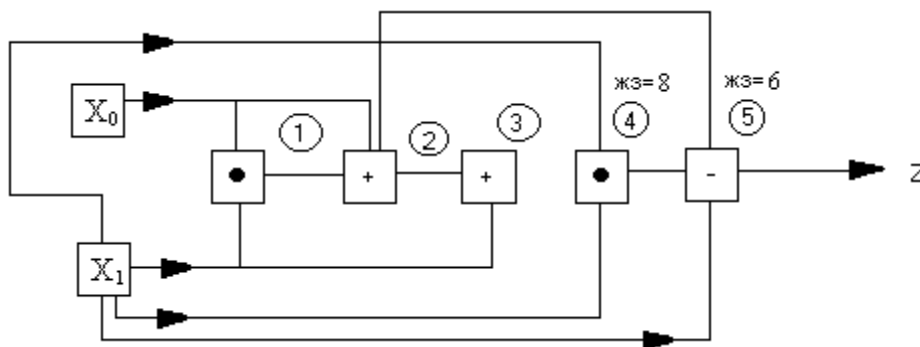
Fig. 1.7.3. The structure of the system after the third stage of training.

The fourth stage will not change the system, and therefore will not teach anything.

At the fifth stage, initially, training will go through the destruction of "garbage". Poorly "holding on to life" neurons 4 and 5 with a vitality less than the external voltage will be destroyed. The last two neurons will die. The system will come to the form of Fig. 1.7.1. After the next exposure, the structure will take the form of Fig. 1.7.4.
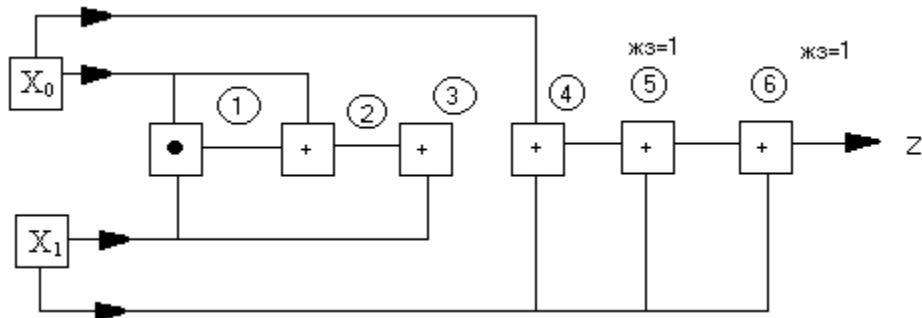
Fig. 1.7.4. The structure of the system after the fifth stage of training.

In the event that the requirements for the accuracy of the system's operation we had were "softer", naturally, such a long clarifying "tail" (elements 5 and 6) could not have arisen. Elements 5 and 6 have an insignificant vitality, equal to 1 in conventional units, and therefore are not viable. Any new stage of training will end with their death, which will happen at the sixth stage of training, which will begin with the destruction of the last elements of the system. The process of destruction, starting from the 6th element, will be stopped only by the first, whose vitality will allow to resist the ever-increasing external tension. It is from the first element that the revival of the system will then begin until it takes the final form that suits all the input/output data used in the example (Fig. 1.7.5).
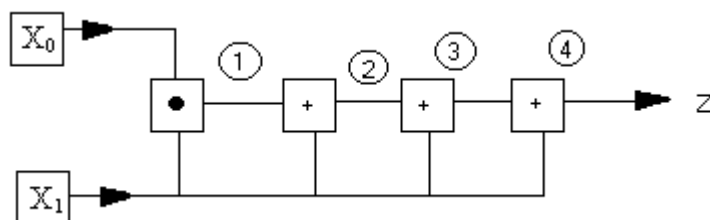
Fig. 1.7.5. The structure of the system after the sixth stage of training.

The text of the program that implements the algorithm described above is given in [77].

For emerging schemes, a method can always be proposed that translates these schemes into analytic expressions figures above 1.7.1 — 1.7.5 correspond to the following analytical expressions:

$$z = x_1 x_0 + x_0 + x_1 \text{ (рис 1.7.1)};$$
$$z = x_1 x_1 \text{ (рис 1.7.2)};$$
$$z = x_1 x_0 + x_0 - x_1 \text{ (рис 1.7.3)};$$
$$z = x_0 + x_1 + 2x_1 \text{ (рис 1.7.4)};$$
$$z = x_0 x_1 + 3x_1 \text{ (рис 1.7.5)}.$$

As for the world of biological infections, everything that has been said is even more directly related to it. If the body managed to get out on its own in a situation of a serious infectious disease in childhood, then this type of infection is no longer afraid of it. All preventive medicine is based on this principle.

The event associated with the maximum external voltage will be fixed in memory forever. You can try to destroy this memory using artificial methods ("Dianetics"), but what will it give? Where is the guarantee that the new - which has replaced it - will be more effective than the well-forgotten old. Nature has determined for itself the criterion for choosing significant events. It is difficult to judge how far it is from what is described in this work. The author's task is more modest: to show how this choice is possible, and to try to explain what, as it seems to him, can be explained today quite simply by today's means.

In the introduction to this paper, time and redundancy have already been discussed. Training a system on the principle of the death of its elements requires a minimum time, but a significant redundancy of these same elements. The more "extra" elements that can be removed without harming the system, the more accurate the result will be and the more chances the self-learning system has to get an A in the exam.

Training a system on the principle of the birth of elements takes time and only time. Each birth is a solution to the most difficult problem: where to be born, when, in what environment? And the more elements, the more difficult the task becomes. When the number of interacting elements of the system tends to infinity, time also tends to infinity and thus stops.

In the light of what has been said, I would like to emphasize once again that in the information world, as in any other, nothing, as they say, happens for nothing. You always have to pay for any knowledge: either with your own body or with your own time.

In the previous section, an attempt was made to look at humanity as a SRD structure. For several millennia, from the millions of tribes scattered around the world, an essentially new structure arose, called Humanity. This structure contains several billion elements and even more information links. And here the appearance of a new element, the appearance of a new child becomes an increasingly difficult task. Self-education of the system due to the growth of the population is almost completed. It seemed that humanity had exhausted itself. But computers and the Internet came to the rescue. Let there be no increase in the number of elements, but information links are still increasing. And it saves. And it will save some time.

However, the world does not stand still. He's in a hurry. He is in a hurry because the very time of searching for an answer is sometimes part of this very answer. The most exquisite and delicious food is no longer needed by the one who died of hunger. An incorrect answer given on time is sometimes more correct than a late truth. Poets, where there is not enough information communications and time, learning begins on the principle of the death of elements.

3.5. Learning without a teacher

Let your hand touch my head
And you will erase me from the list of existence
But before my judgment, as long as the heart beats.
We are equal forces, and I triumph.

You are also submissive to my will every moment,

In the previous sections, the process of learning the system with a teacher was considered. At the time when the environment influenced the input of the system by the values of the input variables x and y, the teacher presented the value z to the output. At the same time, the learning process for each training set (x, y, z) consisted of two stages:

1) the destruction of neurons, which occurred if the resulting voltage exceeded the vitality of the neurons;

2) the birth of neurons capable of performing the operation **d,** based on the requirement of minimizing the objective function

$$\min_{d} (z - d(x, y))^2$$

As a result, considering that **d** can take values only from some fixed set of values, minimization of the objective function with respect to d was carried out by simple enumeration.

Now consider the situation that may arise in the absence of a teacher in the system. The absence of a teacher suggests that the meaning **z** is not defined. When the output is not known, the system can assume the following:

1) the correct answer is the absence of an answer, i.e. there should be no answer at all;

2) the correct answer is beyond the capabilities of the system and therefore it should not be;

3) the answer belongs to the set of output values of the system.

It turns out that in the absence of a teacher, the system should minimize the objective function already in two parameters (**z** and **d**):

$$\min_{d} (z - d(x,y))^2.$$

Of course, if possible **z** belongs to the set of output values of the system, then minimization only **z** is more attractive, since it does not require any additional internal restructuring from the system at the given moment. True, at the same time, it is not known how this answer from the "said - did not think" series will subsequently respond to the fate of the system.

We study the process of learning without a teacher for SR-networks, based on from the following initial voluntaristic assumptions:

1) the system is trained on some training sample, i.e. the number of elements of the SR-network is greater than zero;

2) the input receives values that the system did not encounter during the learning process;

3) the resulting output is coming out from the range of values within which the system operates. Figuratively speaking, "I want to say, but there are no words."

What are the possible behaviors of the system in this situation?

Option 1

1. Recognize the result obtained as incorrect.

2. As the output result, define the action "do nothing" or an empty (zero) value, which always belongs to the output value sets.

3. Carry out the learning process (destruction and generation of neurons) for the received input values and the output value defined in paragraph 2. Thus, the system independently from the unknown schemes] "learning without a teacher" passes to the known scheme "learning with a teacher".

Option 2

1. Recognize the result obtained as incorrect.

2. As the output result, determine the value closest to the result obtained, but belonging to the set of values allowed for the output result.

3. Carry out the learning process (destruction and generation of neurons for the received input values and output value, defined in paragraph 2.

Option 3

1. Recognize the result obtained as correct. The impossibility of its implementation is explained by the imperfection of the system for generating the corresponding output values. For example, the system is incapable of instantly taking off into the sky or burrowing into the ground. But do not look for another solution, but try to implement what has been obtained by changing your own "physical" capabilities or by destroying restrictions on the range of output values.

Option 4

1. Recognize the result obtained as correct. The impossibility of its implementation is explained by the imperfection of the system, its inability to generate the corresponding output values.

2. To develop such an output result, which, by changing the environment, would make it possible to avoid further receipt of similar input values at the input.

3. Carry out the learning process (destruction and generation of neurons) for the received input values and the output value defined in paragraph 2.

Interestingly, the choice of one or another variant of the system's behavior largely determines the traits of its character, if, of course, drawing an analogy with a living being, this can be called character traits, for example:

Humility is an orientation inherent in the system to a greater extent towards the first variant of behavior; stubbornness - orientation to the third option, etc. Thus, the information system begins to acquire individuality.

Chapter 4. Computers, SRD networks and emotions as criteria of truth (the emergence of new knowledge)

How the Cossacks drove out to the formidable Terek,
The Cossacks drove out 40 thousand horses.
And the shore was covered, and the field was covered
Hundreds of chopped, shot people
Love, brothers, love...

The material of this chapter is located somewhat away from the previously trodden pillar path. In its form, it is more reminiscent of an intermission in the theater, when they try to entertain the audience with secondary actors solely so that the whole crowd does not rush into a small buffet. In this artificial intermission, we will try to build and demonstrate a model within which it would be possible to explain those features of information systems that at first glance do not follow from anywhere. Indeed, why do living information systems such as humans need emotions, joys and sorrows? <u>Are they (emotions) an integral attribute of all living things, or are they the properties of exclusively self-learning systems</u>, and the biological nature is secondary here? Let's try to investigate this problem within the framework of a generalized model of SR-networks. Of course, any model is flawed in some way. At the same time, imperfection in details is often compensated by an increase in the level of abstraction, which allows the researcher to move on to a philosophical understanding of the phenomenon being analyzed. Here we will deal with a similar philosophical awareness.

In the chapter, an attempt is made to determine the criteria of truth when a self-learning system chooses one or another SR-network. In fact, this is an attempt to answer questions like: What is the system guided by when choosing its own coordinate system among several equally possible ones? What happens when multiple objective functions collide? How significant is logic in the information interaction of self-learning systems? And whether the systems measure the measure of their own and other people's incompetence with logic. All these questions explain the choice of the epigraph.

To begin with, we note that the emergence of new knowledge in a living individual is always accompanied by an emotional outburst, a sense of insight, the emergence of the so-called. emotional release, both positive and negative, which is the result of any discovery, such as a new law (remember Archimedes) or the result of realizing that all the values of the system are nothing more than "deceit and lies" holding strict positions, suggesting that such emotional tension is not may not be associated with any organic changes in the individual himself, one can put forward and try to substantiate the hypothesis according to which the occurrence of emotional discharge is based on changes caused, for example, by mass death of neurons.

Within the framework of the self-learning model proposed above, based on the principles of spontaneous generation and death, a certain structure of the SR-network or, according to the previous terminology, a phantom corresponds to specific knowledge. The appearance of new knowledge in the system is always associated with

the adjustment of the structure of the SR-network, figuratively speaking, with the destruction of one phantom and the birth of another, or with the appearance of some new additional structure.

At the same time, as noted earlier, the size and "viability" of emerging neuroconstructions determine the significance of new knowledge. Thus, an insignificant adjustment associated with the death (birth) of a relatively small number of neurons has practically no effect on the state and behavior of the individual. But things are different in the case of mass death of neurons. And mass death becomes possible when new inputs destroy the old structures, <u>which required serious energy replenishment to maintain</u>, and give rise to a new one, <u>which allows solving the whole complex of the same tasks, but with a smaller number of neurons</u>. Here we are talking almost about changing the foundation - this is renewal, insight, purification, catharsis, etc. For the system, such an event is perceived as a victim. New knowledge becomes possible through sacrifice.

P.D. Ouspensky wrote in his only work of fiction, The Strange Life of Ivan Osokin:

"And in order to know, it is necessary to learn, and in order to learn, it is necessary to sacrifice. Nothing can be gained without sacrifice...

A person can only be given what he is able to use, and he can use only that for which he sacrificed something. This is the law of human nature. So if a person wants help in order to acquire important knowledge or new power, he must sacrifice others that are important to him at the moment. Moreover, he can only acquire as much as he gave up something for *this... You cannot have results without reasons. When you donate, you publish causes. There are different ways, but they differ only in the form, intensity and results of the sacrifice. In most cases, you have to give up everything at once and without expecting anything."*

Catharsis must inevitably have its biological basis, its energy component. When an understanding of something more comes, that secret, For the sake of penetration into which many SR-networks, structures, <u>elements of which constantly require their energy supply</u>, then their mass destruction begins. **Illumination of the truth is the completion of the choice**, entailing the destruction of everything that is nearby, which is similar to the goals of the system, but still not quite what it requires. Buridan's donkey suddenly makes a decision and loses the second armful of straw, but gains salvation from starvation.

Understanding is a relief, as if sent from above, but behind it there are very simple and accessible basic images: *"A woman with a cart is easier for a mare"* or, more culturally: *"When a lady gets off the stagecoach, the pony goes faster."*

Truth at the moment is an abstraction of a slightly higher order than what was understood a moment ago. Trivial fact.

Figuratively speaking, sometimes the realization that all problems are nothing more than "a miserable special case of the Pythagorean theorem" is an approximation to the truth.

Much has been said in modern literature about forecasting using non-traditional approaches, in particular, using the "human biocomputer" (shamans, soothsayers, etc.). In these approaches, not only attempts, but also the truth of the prediction results are directly related to the emotional state of the performer. Yu.V. Roscius in his work "Cassandra's Syndrome", analyzing the materials that have come down to us about Socrates, R. Truene and I.I. Bakhtin, notes that the <u>ability to predict is associated with</u>

the ability to single out those among the many thoughts that flow, which are accompanied by a specific emotion, one that is very similar to the feeling of satisfaction from a job well done. True, the question remains unanswered how such an emotion can be compared with a forecast, which, for example, speaks of an expected misfortune for the bearer of the predictive mechanism itself. But be that as it may, the situation is still characterized by the fact that it is emotion that acts as a criterion of truth. Please note that the criterion of truth is not the results of logical thinking, but the emotions that accompany them.

Surely, in the life of every person there were situations that were initially perceived with a "positive" emotional coloring, and then, after some time, were assessed as an irreparable mistake. What is the reason for this and does this indicate an erroneously overestimated estimate of the emotional state of the system for forecasting tasks? The following explanation can be given to this question. During the time that has elapsed between two emotional evaluations of the event, there has been a significant change in the entire structure of the system, for example, a significant restructuring of the organism and the predictive mechanism itself. It is clear that in this case the new emotional state belongs to like a different information system, a different person, and accordingly has a different measuring scale. For example, in K. Castaneda, such a restructuring (or a change in the level of perception) was called a change in the "assembly point".

After all that has been said, it remains to look for a place for the concept of "energy" within the framework of the SR-network model. Neurons die and neurons are born, but they must also be fed.

The self-learning model based on SR-networks allows for a quantitative assessment of the "emotional discharge" of the system when receiving new knowledge, which can be used not only to make the computer smile and cry, but also to assess the plausibility of new knowledge.

Let us assume that the maintenance of the vital activity of one neuron requires a constant energy supply in the amount of v conventional units. Then, to maintain a network of n neurons, a constant energy (in conditional units) will be required.

$$E_n = nv.$$

Let us determine that for a self-learning information system, the change in energy demand reflects its emotional perception of the world. With an increase in E_n (birth of neurons), the system "feels tired", and with a decrease (death of neurons), it experiences an "emotional outburst". All of the above is said only for the case when the actual energy is constant, i.e. E_f const.

Thus, the function, which is the time derivative of the system's need for energy, can be used in this interpretation to model the emotional behavior of a computer program in the process of its learning. In a more general case, the emotional projection (emotional state) of the system will be determined by the formula

$$E = d(E_f - E_n)/dt.$$

Such a way of humanizing computer programs may be naive, but as a model of emotional behavior, as a model **of purification by knowledge**, from my point of view, it has a right to exist. Imagine the "program face" displayed in the corner of the screen, for example, in the form of a human, which looks more and more severe with each new

portion of the training sample, and, finally, a joyful smile, replaced by a "feeling of deep satisfaction", announces to the user that the solution found.

For example, in the third chapter of this part of the work, the SR-network was engaged in the recognition of a functional dependence of the form

$$z = x_o x_1 + 3x_1.$$

Changes in the structure of the SR-network depending on the input data were illustrated in Fig. 7.1. Consider the example of these schemes of changing the "emotional state" of this system and its influence on the accuracy of prediction. The table below shows how the "fatigue" is initially accumulated in the system - the number of elements is growing, and the prediction accuracy is far from perfect. Finally, on the training portion of Fig. 1.7.5 a catastrophe occurs - the parameter "emotional state" changes its sign from positive to negative and then remains equal to zero on any training sample generated by the functional dependence

$$z = x_o x_1 + 3 x_1.$$

SR-network	Number of elements	"Emotional condition"	Prediction error
Fig. 1.7.1.	3	+3	$x_0 - 2x_1$
Fig. 1.7.2.	four	+1	$x_1x_1 - x_0x_1 - 3x_1$
Fig. 1.7.3.	five	+1	$x_0 - 4x_1$
Fig. 1.7.4.	b	+1	$x_0 - x_0x_1$
Fig.1.7.5.	four	-2	0
Fig. 1.7.*	four	0	0

In the case of the above table, it turned out that the truth found became the cause of emotional discharge, a kind of catastrophe that led to a sharp reduction in the current (according to the previous stage) number of system elements.

The subsequent long-term equality to zero of the "emotional state" indicates the correctness of the solution found. And the longer the system manages to keep this zero, the more correct the decision was, the more the structure of the system is in harmony with the surrounding world. It turns out that the demand for knowledge of the world is the result of a desire for peace, for harmony.

If, in the light of what has been said, we try to look at the mutual understanding of people, then we immediately find an explanation why, having a logical conviction in the truth of a fact or theory, people change this conviction under the influence of an emotionally charged speaker, emotional TV show or newspaper publication. The thing is that, as was shown above, **emotions for a self-learning information system are the criteria of truth**. When accepting knowledge, an information self-learning system primarily focuses on the emotions accompanying this knowledge.

In the previous sections, speaking of such a self-learning system as a person, we focused the readers' attention on the fact that neurons only die during a person's life; the process of learning on the principle of spontaneous generation occurs only during the formation of the embryo. In light of what has been said, the question arises: How can the definition of "emotional state" given here be applicable to systems such as a person? Of course, unambiguous transfer of the results obtained in this case is impossible due to the fact that all definitions were given in relation to SR-network in which the processes of birth and death alternate (for example, Humanity).

As for the formal model of a single person, a slight adjustment is required here, explained by the following considerations and assumptions:

1) the number of neurons during life is constantly decreasing;

2) the contraction of neurons is carried out unevenly, i.e. the process is spasmodic;

3) the total actual energy of the body decreases with age, including the energy that feeds neurons;

4) slowing down the process of neuron death affects the general state of the body, leading it to "fatigue". This is due to the fact that the actual energy is constantly decreasing and it is already beginning to be insufficient to satisfy yesterday's needs;

5) the acceleration of the process of death leads the body into a state of catharsis, emotional discharge, since the available (actual) energy begins to satisfy all its needs.

Based on the above hypothesis, let's try to answer the question:

"What will happen to a person in the event of mass death of almost all neurons, as, for example, in the event of death?

Dying is inevitably associated with mass death of brain neurons. And according to the above. such a death is evaluated by the information system as the acquisition of maximum knowledge, as the highest catharsis, the highest purification and approach to the greatest truth for this particular person.

Paradox? In some way, yes. But what to do? If a person pays for knowledge with elements of memory, then the more he pays, the more he gets. By giving all his memory without reserve, he will receive all possible knowledge.

The mass death of neurons creates a feeling of complete understanding of all meanings, this is a "bright white light", and a meeting with God, and absolute truth in its ultimate instance. And indeed in the last resort, because there will be nothing more. Sad as it may seem, but all the facts of R.A. Moody ("Life after life") does not confirm the existence of life after death, but only the existence of a single algorithm for dying, and, unfortunately, can be explained using the above scheme for the emergence of emotions on the model of self-destructive networks.

As a rule, the simplest explanation, based on the principles of "common sense" without involving a mystical element, always turns out to be closer to the "harsh" truth.

In conclusion, let's try to answer the question posed in the title - are computer emotions necessary? What system should have emotions?

The answer suggests itself. Emotions, being a criterion of truth in the process of cognition (we are talking about the model of SR-networks), can only be inherent in a **self-learning information system;** any other systems do not need them. But for the most self-learning system, **emotions, as a way of external manifestation of acquired knowledge,** are necessary only when it is possible to learn from someone else's example, from the example of similar systems.

Let's summarize by listing the necessary conditions for the presence (occurrence) of emotions in the system:

1) the ability to self-learning;

2) the ability to interact with their own kind;

3) the ability to learn from other people's examples.

These conditions apply to people.

Computers, having united in networks and contacting each other, are also close to this. They have one last step inclusion of elements of self-learning at the level of

operating systems, at the level of library functions of programming languages, at the level of programming technology.

Chapter 5. The possibilities of self-nascent and collapsing structures

After all, some do not know that we are destined to die here. For those who know this, quarrels immediately stop.

G.L. Oldie

Now it is time to present the most important results for models based on SR-networks.

Theorem on the possibilities of SR-networks.

The problem of learning information self-learning system. built on the principles of the SR-network. solution of any problem, even under the condition. that the information capacity of the SR-network (the initial number of elements) is sufficient to store the information received at the input, is algorithmically undecidable.

To prove this, we use the results of M.I. Dekhtyar and A.Ya. Dikovsky [24], who introduced the concept of a perspective state for deductive databases (DDs). A promising state is a state for which there is a finite limited trajectory that allows reaching an admissible state. *(A deductive database is a logic program supplemented with a certain set of conditions (integrity constraints) that must be satisfied by the dynamically changing state of the database).* Among all production DDs, there are DDs whose rules contain both the operations of deleting elements (facts) and the operations of creating (inclusion). Such DDs are similar in their functionality to SR-networks.

Due to the fact that in such ***production The DD problem of prospects is unsolvable,*** we can conclude that finding an algorithm that allows you to train a SR-network for any task (learning is just the search for a trajectory that transfers the system from one state to another) is also an algorithmically unsolvable problem.

F.I. Tyutchev in 1869 formulated this theorem more elegantly:

"We can't predict
How our word will respond. —
And sympathy is given to us,
As we are given grace..."

Theorem on the possibilities of the R-network.

Information self-learning system built on the principles of R-network. can be trained to solve **any problem** if and only if the following two conditions are met:

1) the information capacity of the R-network (the initial number of elements) is sufficient to store the information received at the input;

2) the initial state of the R-network can be characterized as a state with uniformly distributed connections, i.e. the initial state of the P-net is chaos.

The proof is trivial. The first condition is a necessary condition that determines the potential capabilities of the system. The second condition says that the system must "treat equally" to any input information, then at the first stage (the most important stage of learning), any facts will be equal for it.

For C-nets, a similar theorem can be proved.

Now let us briefly touch upon the problem of comparing self-learning information systems of the same type with each other. Due to the fact that them the structure is constantly changing, and besides, it is the internal essence of the system, inaccessible to

an external observer, relying on it as a comparative characteristic is not always convenient. I would like the comparative characteristic to be observable. In particular, for this purpose, it is proposed to use some estimate of the input/output of the system, i.e. evaluation of the set of input messages and their corresponding output messages.

As already noted in the work "Infection as a way to protect life", one information system "understands" another if their languages of communication with the outside world partially or completely coincide.

define the language of the i-th information system as a set of pairs:

$$S_i = \{(a_{i,k}, b_{i,k}\},$$

where

$$0 \leq k \leq n;$$

n is the number of different possible messages in the language of system i;

$a_{i,k}$ is a message arriving at the input of system i;

$b_{i,k}$ is a message issued at the output of system i in response to a message $a_{i,k}$.

The concept of "message" in our case includes all the attributes inherent in it: form, content, transmission time, pauses, etc. For simplicity, we will consider the message in the form of the following triple

$$a_{i,k} = (d_{i,k}, f_{i,k}, t_{i,k}),$$

where

$d_{i,k}$ is the message itself;

$f_{i,k}$ is the intensity of message transmission (strength);

$t_{i,k}$ is the response time.

We consider that the message $a_{i,k} = a_{j,k}$ if

$$d_{i,k} - d_{j,i} < \Delta d,$$
$$f_{i,k} - f_{j,i} < \Delta f,$$
$$t_{i,k} - t_{k,j} < \Delta t.$$

Denote

$$S_{i,k} = (a_{i,k}, b_{i,k}),$$
$$A_i = \{a_{i,k}\},$$
$$B_i = \{b_{i,k}\},$$

$\mu()$ is a function for counting the number of elements in a set. Then the level of "mutual understanding" of systems **i** and **j** are defined as follows:

$$M_{i,j} = \mu(S_i \cap S_j) / \max(\mu(S_i), \mu(S_j)); \ (5.1)$$

level of understanding by system i of system j

$$m_{i,j} = \mu(S_i \cap S_j) / \mu(S_i,). \ (5.2)$$

These definitions reflect the intuitive feeling that the more common concepts, in particular the same words in two languages, the better the speakers of these languages understand each other.

However, a situation is quite possible when different meanings are hidden behind the same words, i.e. system **i** to message $a_{i,1}$ always responds with $b_{i,1}$, and the system **j** responds to the same message with $b_{j,1}$, while

$$b_{i,1} \neq b_{j,1}$$

In order to describe such a situation, we introduce the concept of "similarity" of systems and evaluate the level of "similarity" of system i to system j using the following formula:

$$P_{I,j} = \mu\,(A_i \cap A_j)\,/\,\mu(A_j)\ (5.3)$$

Then, again, intuitively, it is clear that <u>the less mutual understanding of systems, but the more "similarity" they are to each other, the stronger mutual destruction can be during their interaction.</u>

A simple example. The dog, when in a friendly mood, lifts its tail. The cat does exactly the opposite. Reciprocal language systems lead to cat and dog and "live like cat and dog".

Let's try to introduce a numerical estimate of the level of "aggressiveness" of systems in relation to each other, which we denote by $U_{ij,}$

In order to determine what the level of aggressiveness is, we introduce a number of restrictions and requirements for this value:

1) if the level of "similarity" of system **i** to system **j** is equal to

0, then $U_{ij} = 0$;

2) U_{ij} directly proportional to the number of mismatched responses (output messages) **i** and **j** systems for matching questions (input messages).

Then the relative number of mismatched outputs by matching inputs can be determined by the formula

$$U_{ij} = \left(\sum_{k=0}^{k=n} \mu\,(a_{i,k} \cap A_j) \times (1 - \mu(S_{i,k} \cap S_j))\right)/n.\ (5.4)$$

Formula (5.4) satisfies condition 1 and condition 2.

Thus, it can be stated that in order to perform joint functions in each system in relation to the neighboring one, "understanding" arises in the process of functioning, which can be estimated by formula (5.2), and "aggressiveness", which can be estimated by formula (5.4).

Conclusions

To all that has been said, I would like to add a few words on the fashionable topic of the **direction of evolution.** Where is she headed? To degradation and disintegration or to more and more complex structures?

For some reason, it is generally accepted that development is necessarily a path upward, and the basis of this path is the process of complicating the system, and degradation is necessarily associated with the process of destruction. Earlier we gave examples of systems that became "smarter" due to the self-destruction of elements. A little later, examples of systems were given that "got smarter" due to the birth of new elements. In one case, we talked about simplifying the system, in the other about complicating it, but in both cases we got the same result. All this is reminiscent of the endless debate about what actually happens spontaneously: "order out of chaos" or "chaos out of order." There are examples, one and the other. In life, in general, there is everything and there is nothing that would not exist - this is what an Eastern proverb says.

All previous material has prepared an answer to this question, which can be formulated as follows: **spontaneous emergence of "order out of chaos" or "chaos out of order" for systems in which the birth and death of individual elements is allowed is determined by the input data coming to the input of the system and the ability of the system to adequately respond at the time the input data arrives**.

In the event that to work out the input training sample (input data) it is enough to only change the connections or weight coefficients, the system remains **stable**.

In the event that the existing number of interconnected elements is not enough to work out the input training sample, the process of emergence of **"order from chaos"** begins. The number of elements increases, new structures appear.

In the event that the existing number of interconnected elements is more than enough to work out the input training sample, the process of the emergence of **"chaos out of order" begins**. Unnecessary elements gradually "fall out" of the system.

The same answer, obtained on the basis of self-learning information systems, could be arrived at by analyzing elementary open catalytic systems in chemistry, as A.P. Rudenko [82], investigating the process of chemical reactions in the presence of a catalyst. His conclusions:

1) if there are no changes in the external environment, i.e. there are no "incomprehensible" input messages, then the catalyst does not change, which means that its effect on the course of a chemical reaction is **stable**;

2) under the influence of the external environment on the system in which a chemical reaction takes place, it is possible that the catalyst becomes a reactant and the reaction gradually stops (**"chaos out of order"**);

3) under the influence of the external environment on the system in which the chemical reaction takes place, it is possible that the catalyst is "purified" and increases its activity, this leads to raising the ongoing reaction to a higher level (**"order out of chaos"**).

One can try to generalize the obtained results to the level of the Universe. Then it turns out that if the input data correspond to a uniform distribution law, then the world dies a heat death, just like according to Boltzmann, who himself, having understood this, did not wait for anything else, at least for himself personally.

We repeat once again: what are the input data and the internal state of the system - such is the system.

The received answer to the question asked does not require for its justification the involvement of demons opening the damper at the right time; nor does it require that the activity of the soul should not be related to energy processes and, according to Auerbach, would regulate the transformation of energies.

The input data of the system, i.e. questions put to it, and determine the whole system: all its complexity and all its insignificance.

There are many more points of view on explaining the direction of evolution, which are mostly presented in the collection "The Concept of Self-Organization in Historical Retrospective" [38]. It must be admitted, however, that the material in the above-mentioned collection is not complete, and this is impossible to do for such a problem.

Therefore, it makes sense to dwell on one more point of view closest to the SR-network model, which is as follows:

1. Any information system is surrounded by chaos. And there is nothing but chaos. Any information system is an element in the world of chaos.

2. No information system has a complete set of organs of perception of the surrounding world allowing you to "feel" the surrounding chaos to the fullest. The fullness of awareness of chaos leads to dissolution (death) in it any information system. The inadequacy of the information system in terms of the perception of the surrounding world is that individual feature of the system, which sometimes acts as a savior. Fool and drunk, as they say, the sea is knee-deep.

3. An information system, through its own restructuring (death and birth of elements), creates order for itself in the surrounding limited space-time continuum.

4. Each system has its own order. And this order exists as long as the information system that created it exists, since it is in the structure of the cognizing information system that any order is reflected.

5. One way to preserve the created order is to correct the environment in order to prohibit the external environment from asking questions dangerous to the order.

Each element of the system only by the fact of its existence already contributes to the implementation of a certain algorithm and is itself an algorithm. Equivalent algorithms, being subject to various influences of the "endless tape" that carries the input data, operate in different modes, and that is why they seem different, in full accordance with the proverb: "The well-fed does not understand the hungry."

But are they different?

A.V. Fesenko, in one of his unpublished critical essays, wrote: *"For the first time I saw HIM, or rather, HE appeared before my inner eye in all his brightly transparent splendor, when we were sitting in one of the laboratories of the Institute of Biochemistry, filling chemical dishes from time to time with a complex mixture of water,*

alcohols, esters and sugars, and seizing all this with a mixture of proteins, acids, mineral salts, etc.

He is my own biochemical cycle, during which, in a strict sequence <u>dictated by a given program</u>, hundreds of thousands of biochemical reactions occur, enzymes and hormones are synthesized and destroyed, sugars are utilized and protein molecules are created. And, looking at my colleagues, I realized that this is not "my" biochemical cycle, but "ours", since everything is the same in the same sequence according to the same program in them. And all of us sitting here, and not only here, and not only sitting here, are copies of one program (basic), and the differences between us are nothing more than differences in different settings of the same computer program.

For a long time I peered into this billionth host of copies and remembered where I had already seen it? And I remembered - at the Institute of Pig Breeding, on the wall hung a diagram of the biochemical cycle of a pig, to the smallest detail coinciding with what I considered the basis of each of us. What's this? Another copy or reincarnation? And innumerable copies of programs roam the earth, and the philosophy of the East has intuitively grasped this regularity for thousands of years, <u>and Western thought has come up against the dead end of the "I"</u>.

But isn't that what W.R. Ashby, when he wrote: "The birth of dynamic systems endowed with" life "and" mind "is inevitable if a single-valued and unchanging operator acts on the system for a "sufficiently" long time. Each such operator causes the development of its own form of life and mind."

<u>*This is how people appear ants. Lexicons and Words.*</u>

The underlying algorithm governs more than just physical objects and chemical reactions. What prevents the existence of such an algorithm in the worldview control system of both an individual person, science in general, and art?

"Subtle" poetic images also arise due to the impact on their creators by a certain *unambiguous and unchanging operator,* but having arisen and undergoing a series of "poetic transformations" due to the information impact that has taken place, they are doomed to a new existence; the way back becomes lost.

Very figuratively and poetically, the process of formation of ordered meaningful structures on the basis of a random event is depicted by Edgar Allan Poe in his famous "The Crow".

The initial state of the system is rest:

> *Somehow at midnight, at a gloomy hour, tired of thinking,*
> *I dozed off over the page of a folio of one...*

Then the data received at the input of the system from the outside take it out of the state of equilibrium:

> *The cry of a clumsy bird blew a cold at me,*
> *Although her answer, without meaning, out of place, was obvious nonsense;*
> *After all, everyone must agree, it is unlikely that this can happen,*
> *So that at midnight a bird will sit down, flying out from behind the curtains,*
> *Bird named " Nevermore ".*

The activated process of comprehension beats like a bird in a cage and ends in the position of a **fixed point of consciousness:**

> *And sits, sits over the door Raven, straightening feathers,*

From the bust of the pale Pallas does not fly off since then;
He gazes in motionless soaring like a demon of darkness in slumber,
And under the chandelier, in gilding, on the floor, he extended his shadow,
And from now on I will not take off from this shadow with my soul. Never, oh,
nevermore !

(Translated by M. Zenkevich).

The system has returned to its original state. But if this is the case for an ordinary system of physical objects, then for an information system the situation looks completely different. The new knowledge generated under the influence of the input completely deprives the main character of this work of any hopes and illusions.

However, if the initial state of the poet were somewhat different, the flying raven could cause completely different thought processes and poetic images, or even go unnoticed.

This topic has already been discussed in "Infection...", when the problem of selectivity of perception under the name of "perceptual defense" was investigated. According to the concept of "perceptual defense" we understand and see only what we are ready (able) to understand and see.

If we take a closer look at human civilization and ask - is this a natural stage in the evolution of life? And for us today, the step on which we are ready to put our foot, is it a step up or down?

Again these words "up" and "down" came out. Regarding what is up and relative to what is down? Is it about technological progress, or about the system of relationships between people, or about the Chardin omega point? We can go further and expand our coordinate grid, look at the measuring scale from right to left and from left to right. Yes, being inside a system called Humanity in the form of a neuron, you can measure yourself with the level of kitchen automation and the speed of distribution of newspaper stamps, remembering that all this is a projection of our mental development. You can measure just so that you can be proud of the results of measurements. As one of the heroes of the popular cartoon stated: *"And in parrots I am much longer!"*.

But if you carefully look at all the previous chapters, then briefly the main idea of the first part of the book can be formulated as follows.

The life of any self-learning system is <u>this is a search for a correspondence between its internal state and the input training sample</u>. As long as the system manages to provide this correspondence, the system exists. Whether it degrades, becomes more complicated, but it exists. At the same time, it constantly and <u>irreversibly</u> changes and loses memory (the processes of death and birth of elements), solving problems of **prediction** (forecasting) and implementing appropriate **methods protection**. In short, **any self-learning natural system is, first of all, a protection system** in which each organ, in addition to some of its individual functional purpose, necessarily performs protective functions either by solving prediction problems (the head), or by implementing protection methods: moving in space (legs), time travel of genetic information (genital organs), attacks (arms), armor (skin, muscles), etc.

Therefore, in the future, separate chapters will be devoted to the problem of searching for the shadows **of the future in the present.** Therefore, **the unconscious goal will be allowed to act as a determining factor in choosing a path from a set of equivalent roads.**

It is clear that the better the **problems of prediction are solved**, the longer the system lives and the less effort must be spent on maintaining the protection methods up to date. It follows that in nature only **<u>from the need for protection follows the need for intelligence</u>**.

An information self-learning system does not strive for the omega point, just as it does not strive to be smart. She strives to have time to answer the questions asked of her in order to be alive, and from here follows the need to be smart in the broadest sense of the word, if, of course, <u>this is required by the question asked</u>.

Recently, such terms as "information war" and "information weapons" appear in the press more and more often, replacing today's weapons of mass destruction and acting as another scarecrow. According to the theory presented in this book, the concept **of information warfare** is revealed precisely through the sequence of provocative questions asked by the information self-learning system. No more. This was discussed in more detail in [77], in the section "In what year did the doorman's grandmother die?".

An important conclusion that must always be remembered is that *"in a stupid place, a smart look is not needed at all",* i.e., if stupid questions are asked, stupid answers will be given, and thus a person, country, humanity will turn around by themselves and <u>go in the opposite direction</u>, irretrievably losing their intellectual components. If such questions were asked intentionally, then it is in this case that we are talking about an "information war".

What is the point of exploring the Cosmos or threatening someone if the answer to the question asked contains a requirement to stand an extra hour at the information trough.

PART TWO. INFORMATION WEAPON AND THE PROBLEM OF ALGORITHMIC UNSOLVIBILITY OF PERSPECTIVITY FOR INFORMATION SELF-LEARNING SYSTEMS

forces - two fatal forces, They have their whole life we are at hand, From lullaby days to the grave, - One is Death, the other is the Judgment of the people.

F.I. Tyutchev

Chapter 6. "Information war" in the press

People can achieve any reasonable results in any field only after they have exhausted all possible stupidities in this field.

Fontenelle

Recently, publications have appeared in the press about the emergence of a new type of war - "information wars", which are replacing nuclear wars. It is clear that journalists do not bother themselves with analytical activities to comprehend the terms they have introduced into the world of mass media, such as "information war", "information weapons", and in conditions when experts remain silent, a situation of "information vacuum" is created, enveloping the mystery. From this, the mystery becomes even more mysterious and scary. Moreover, some of the writers, unlike specialists, *"know, for example, that when the body of a computer user is weakened, it is possible to encode a set of radiations of color, sound and other signals through the screen in such a way that they, acting through the subconscious, knock down the biorhythms of their victim to such an extent that a person cannot stand it and dies"* [34]. As a result, the new-fangled term begins to swell from the various meanings instilled in it with each new pronunciation, like a mosquito from drunk blood.

In this part of the work, it is proposed, based on the definitions and concepts known in the field of computer science, to try to analyze what is the **information war** and what consequences can it have?

But first, let us briefly review the publications available to date on this problem.

Let's start with the most unexpected of them, with the work of the Russian writer, namely the writer and philosopher, and not a professional mathematician, A Zinoviev "Russian Experiment" (section "Planned History"), where he writes: *"Now history does not happen by its own whim, spontaneously. It is now being done consciously, one might say - by order of the mighty of this world.*

The reasons why this has become possible today, Zinoviev sees in the following:

1) progress in the means of collecting, processing and transmitting information;

2) the progress of the means of communication;

3) progress in the means of manipulating people, supervising them, suppressing mass movements;

4) the influence of mass culture on the standardization of people's lifestyles.

And all of the above led to the fact that *"The degree of unforeseenness and unexpectedness of historical events has sharply decreased in comparison with the sharply increased degree of predictability and planning. And the cold war of the West, led by the United States against the communist East, led by the Soviet Union, was from the very beginning a grandiose planned operation, in terms of costs, scope and results, the most grandiose operation of people on a global scale. There was a lot of unplanned, unforeseen, uncontrollable in it, which is inevitable even in small operations. But in general, in the main thing, in the decisions that determine the course of the process, it was exactly like that"* (A. Zinoviev).

So it is written in a book that was published in only five thousand copies, which few will read.

The former director of the US CIA, spoke about the same thing who developed and carried out at one time an operation to overthrow the government of S. Allende in Chile. In an interview, he called this operation *"a laboratory experiment in using financial resources to discredit and remove a foreign government."* The financial means used determined who should speak and what, and thus determined the content and direction of information flows.

Later, in the case of the USSR, when the experimenters went beyond the laboratories, they used almost the same previously tested algorithms and methods.

And one of the very first publications in mass circulation on this topic in our country was the work of G. Smolyan, V. Tsygichko and D. Chereshkin, in particular, their speech in the press "Weapons that can be more dangerous than nuclear weapons" (Nezavisimaya gazeta from 18.11. 95), and then the article by M. Delagrammatica "The Last Soldier of the Super Empire, or Who Needs a Cyber War" ("Literaturnaya Rossiya" dated 26.04.96).

Let's start the review with an article by I. I. Zavadsky [30], where one can find the following definition:

***"Information warfare** consists of actions taken to achieve information superiority in securing a national military strategy by influencing enemy information and information systems while strengthening and protecting our own information and information systems"*

And the task now, according to *"one of the leaders of the Pentagon", unknown to I. Zavadsky,* who said this again, no one knows where, *"is not to destroy manpower, but to undermine the goals, views and worldview of the population, to destroy society."*

According to the author [30], the main information wars will unfold in cyberspace, and the current task of any state is to grow worthy warriors capable of winning, which, for example, is done in the classroom of the National Defense University in Washington. Today's information victories are mostly based not on serious information technologies, but, like all previous wars, on the fact that individual "sources of information" are bought and sold.

The next interesting work is an article by D.S. Chereshkina, G.L. Smolyan and V.N. Tsygichko "The realities of the information war". The authors state that informatization leads to the creation of a single global information space, within which information is consumed, born, changed, stored and, most importantly, the exchange between the subjects of this space - people, organizations, states.

The fact that an information space has emerged, due to the fact that there is no such thing as a empty place, leads to the emergence of those who want not only to share this space, but also to control and manage the processes taking place in it. For this, the so-called **information weapon is used**, which is a means of destroying, distorting or stealing information; means of overcoming protection systems; means of restricting access to legitimate users; means of disorganization of the work of technical means, computer systems.

The authors [105] call the **attacking information weapon**:

— computer viruses;

— logic bombs (software bookmarks);

— means of suppressing information exchange in telecommunication networks, falsification of information in the channels of state and military control;

— means of neutralizing test programs;

— various kinds of errors deliberately introduced into the software of the object.

In the works of V.N. Ustinov (Russian Institute for Strategic Studies), a definition is taken for information weapons, which suggests that **information weapons** there is the very use of information and information technologies to influence military and civilian cybernetic systems.

In 1996, under the auspices of the US government, the 5th I International Conference on Information Warfare was held. A detailed report on this conference can be found in [89]. Of all the conclusions made by the authors of [89] based on the materials of the conference, here we note only one, namely:

"The strategy of using information weapons is exclusively offensive." This very important result, which has not yet been fully comprehended by the scientific community, allows us to arrive at the following assertion.

The offensive nature of information weapons largely determines the face of information warfare and allows a priori identification of a potential information aggressor. And this means, we can assume that the amount of information purposefully transmitted from one country to another is a measure of information aggressiveness. It does not matter what the nature of the transmitted information is.

Such a statement is somewhat unusual. Its understanding must be approached with different, unusual standards and proceed from the fact that in the era of information technology, when the social environment is oversaturated with information, the security of the system is already beginning to be determined not only by the knowledge that this system receives about the enemy, but, perhaps, even first of all, those knowledge, from the perception of which she managed to evade.

Now let's dwell on the possibilities of information weapons. Some authors [105] unanimously consider it more powerful than the nuclear one, while others prefer not to comment on this topic, citing the lack of precedents. However, since the spectrum of the nomenclature of information weapons is wide (this includes not only the means of cybernetic weapons listed above, but also the mass media, works of mass culture or culture for the masses and art for the masses), the possibilities of all these means are, of course, different.

One of the means of information weapons, as noted above, is the peaceful propaganda of the merits of one's own way of life.

In particular, A. Zinoviev [31] defined the propaganda of the merits of Western civilization and the Western way of life, including disinterested assistance to non-Western peoples of the planet in their voluntary development in the direction of the Western model of social order, by the term **Westernization**. So, this weapon has already been used more than once, and, assessing its power, A. Zinoviev believes that nuclear weapons, in comparison with Westernization, look the same as a savage's club in comparison with a hydrogen bomb. At the same time, *"Nuclear weapons cost a lot of money. And Westernization costs nothing, and over time it even begins to bring profit. Can you imagine this: you throw a hydrogen-neutron super-bomb and sacks of dollars, pounds, marks and francs fly at you in response? Of course not. And with Westernization, this is quite natural. If dollars, pounds, marks and francs do not immediately flow to you, then raw materials, oil and gas - for sure.*

The problem of the secrecy of many information influences is not the least important in the use of information weapons. Perhaps the most important thing in this whole story is that the victims of this type of weapon, even possessing the theory and the corresponding material and technical base, come to realize themselves as victims only later, when "the train has already left".

The "Westernization bomb" detonated in Russia caused unprecedented devastation not only in the spheres of statehood, economy, ideology and culture, but also in the very human material of society. On such a scale and in such terms, no conquerors have yet been able to do this with any weapon. Designed (as conceived by the inventors) to defeat communism, the "Westernization bomb" in practical application turned out to be immeasurably more powerful: it destroyed the powerful centuries-old association of people, which until recently was the second superpower of the planet and claimed to be the hegemon of world history, to its very human foundations, not associated with communism. They aimed at communism, but they killed Russia. With the help of this weapon, the West won the most grandiose victory in the history of mankind, which, in my opinion, predetermined the course of further social evolution for many centuries to come " (A. Zinoviev).

One of the serious advantages of information weapons is confidently called by all those who write on this topic is its relative cheapness compared to other types of weapons. According to the criterion of effectiveness/cost, it significantly outperforms any other type of weapon.

Why?

Because it is not necessary to invest "energy" in it to destroy the enemy. Initially, it is assumed that the enemy has all the necessary means for his own destruction. <u>The task of using information weapons is to help the enemy direct his available means, including technical ones, against himself.</u>

This problem will be considered in more detail in the third part of the work. Above, definitions from modern works on the problem of information warfare have been cited. But science fiction writers wrote about the same thing decades ago and more, and they wrote in almost the same words; the only difference was that while understanding the problem under investigation in the same way as it is now understood by people in uniform, other labels were pasted on it, such as "war in the field of management" or "in the field of communications".

This is how S. Lem described the development of information wars in the novel "Fiasco", first published in 1986:

1. The development of weapons on a certain planet has led to a situation in which the use of military arsenals inevitably leads to the death of the biosphere. The warring parties have more than enough power. Competing in its further build-up is stupid.

2. There is a problem of control over the use of force, and hence the problem of controlling the actions of the enemy in such areas as communications and command and control.

3. To deprive the enemy of the opportunity to use force means to deprive him of the opportunity to effectively manage the situation and transmit control signals in time.

S. Lem writes: *"No one blocks the channels of recognition and command for himself. This is due to the so-called mirror effect. Each harms the other by breaking his connection and receives a similar response. The competition in accuracy and power of ballistic projectiles is being replaced by a struggle to maintain communication. If the*

first was only the accumulation of means of destruction and the threat of their use, then the second is a real "communication war". The battles to destroy and save the connection are quite real, although they do not entail any ruins or bloody sacrifices. Gradually filling the radio channels with noise, the adversaries lose control over their own weapons, as well as control over the weapons and operational readiness of the enemy.

4. This development requires the weapon to have its own intelligence; But how else, if they can not be controlled remotely?

"Foreseeing a close stalemate, each side is working on the creation of weapons that will become autonomous - tactically, and then strategically. Combat assets gain independence from their manufacturers, operators and command bases.

5. However, the use of new weapons still poses a global danger. And this means that in order to use it safely for oneself, it is necessary to correct its goals, form and content.

"If the main task of this weapon was to destroy similar enemy weapons, a collision in any area of the sphere would be the beginning of a battle that spreads like wildfire, which would lead to a global exchange of blows of the highest power, and therefore to death. Therefore, weapons should not enter into direct collisions with each other. It should only mutually check, and if it does destroy, then it is insidious, like microbes, and not like bombs. His machine mind is trying to subdue the mind of enemy weapons with the help of so-called software microviruses..." [49].

So there is an information weapon. This is how the flywheel of information wars spins.

Pay attention to the tendency formulated by S. Lem to increase the autonomy of weapons, and hence to increase their intelligence. The last wars of our century somewhat confirm what has been said. In particular, the US war against Iraq demonstrated that anti-aircraft missile systems, which have a certain independence (their own detection and fire control systems), managed to cause considerable damage to the aviation of the joint forces, since they had to be hit separately. The same applies to low-profile American F - 117 aircraft, which constantly maintain radio silence [6].

Almost exactly in accordance with the scenario described above, the US Department of Defense Advanced Research Projects Agency (ARRA) has already come up with a long-term program to create "thinking weapons", for which leading universities in the US and Western Europe are involved. V. Stroev writes about this [85]: *And the Pentagon spares no financial resources for the creators of computer systems and their software. There was even such a formula: "In a future war, the one who has better programmers will win."*

Note that almost all of the above definitions on the issue of information wars are not definitions that logically follow from a particular model or problem being solved (with the exception of S. Lem's scenario). For the most part, they are drawn from popular foreign literature or speeches by individual political figures, in which the model that gave rise to this or that definition was left behind the scenes and was not submitted for consideration.

And the question: "Does the model itself exist in nature, at least to some extent adequate to reality?" something similar to the classic question of one of the characters of M. Gorky: *"Was there a boy?"*

In this paper, we will somewhat deviate from the above interpretations and look at the "information war" from a different angle, due to models such as P and SR-networks.

According to the theory set forth in [77, 78], the concept **of "information warfare"** is revealed through a sequence of **provocative questions asked to an information self-learning system**. No more.

This was discussed in more detail in the work "Infection as a way to protect life" in the section "In what year did the doorman's grandmother die?". However, not every information system is capable of not only answering the questions asked, but also understanding them. That is, both "information warfare" and "information weapons" look one way or another, have one or the other "face" depending on what information systems we are talking about.

Now the next question is: "What or who is meant by an information system - telecommunication computing systems or people?"

If we are talking about computers, then here the theory of algorithms and programming will probably become the basis for creating the corresponding theory of cybernetic confrontation.

And if we are talking about living beings or communities of living beings? Even more than any technical device, they depend on external information and are controlled by information.

Using such a new method of psychotherapy as neurolinguistic programming [9], it is possible to formalize human activity in a very detailed way. And this means that it becomes possible to algorithmize the production of deep and stable changes in the human psyche. This implies an important conclusion about the possibility of successful application of computer technology to model the behavior of not only individuals, but also large enough teams.

In the future, it is proposed to justify the approach to the study of systems based primarily on the concept of "information systems", between which only an information war can occur.

Therefore, before moving on to specific definitions of basic concepts, we introduce as the main rule the statement that since we are talking about information war, then this war must take place between information objects (systems), i.e. objects that process information.

Based on this, we will try to introduce the necessary definitions in the next chapter.

Any serious work on any other type of weapon begins with basic concepts. For example, in the case of nuclear weapons, at the beginning it is told about such concepts as an atom and an atomic nucleus. By analogy, it would be logical, speaking about information weapons, to start with answers to the questions: "What is **information?** What is an **information system?**

Surprisingly, most articles or reports on information warfare immediately begin with definitions given to "information warfare" and "information weapons." Although, if you think about it, there is an explanation for this - the definition of information and approaches to its quantitative measurement, proposed by Shannon, can do little to help in determining the information system as an object of information warfare.

Further in the work, the term "information" should be understood in the sense of the definition given by V.I. Shapovalov:

"Information about an object is a change in the observer's parameter caused by the interaction of the observer with the object".

Quite in the spirit of what Osho Rajneesh wrote: *"Look into the cinema hall and you will see a lot of people wiping their eyes. But there is really nothing on the screen except the play of light and shadow."*

Shapovalov's definition is fully consistent with the understanding of information on which SR-network are based, which are used in this case to model the processes of information impact of systems.

S.I. Ozhegov, N.Yu. Shvedova. "Explanatory Dictionary of the Russian Language".

Information:

1. Information about the surrounding world and the processes taking place in it, which are received by a person or a special device.

2. Messages informing about the state of affairs, about the state of something.

Information:

1. Knowledge in some area.

2. News, an idea about something.

Message: news, information.

Works: Boltzmann, N. Wiener, A. Renyi and others.

Information is a decrease in uncertainty, a measure of uncertainty.

Uncertainty - lack of information, "negative" information.

The measure of uncertainty is entropy.

Entropy is a measure of the uncertainty of the state of the molecules that form the system.

Chapter 7. Information warfare as a targeted information impact of information systems

Man himself is a universal creature capable of everything. Only external restrictions and coercion, coming from other creatures of the same kind around him, make him a more or less decent creature.

A. Zinoviev

Let's start by trying to determine what is hidden behind such concepts as **a system and an information system?** Is a telegraph apparatus or an automatic telephone exchange an information system? An automated information retrieval system based on a local computer network or the Internet - are these information systems? Man, nation, state, humanity - are these information systems?

A system can be understood as: a person, a computer, a natural landscape, etc. The difference between these systems is that if for those of them that are commonly called informational, the modification of internal control structures is associated with the acquisition of new information, with learning, then the modifications of mechanical or natural geo-formations from our, human point of view, are somewhat different. A mountain landslide can change the course of a river by filling it with stone and sand, and in order to change the behavior of a person or animal, it is enough to show them this avalanche; an earthquake is required to correct a mountain range, and information about a coming earthquake is enough to change the behavior of the inhabitants.

The more fully the system perceives the external world, the more "subtle" energies it is possible to influence its behavior.

What is information for a telegraph apparatus, an automated information system, a person, humanity? What is any system that processes so-called information? And what is the information for any of the specific named systems?

And the most important question: Is it possible to define the concept of "information system" without resorting to the term "information"? This is exactly what will be discussed further.

According to the explanatory dictionary, **a system** is a collection of abstract or material objects, together with known or given connections and relations, forming a single whole in a known or given sense.

An information system is a **system that** performs: receiving input data; processing this data and/or changing one's own internal state (internal links/relationships); issuing a result or changing its external state (external links/relationships).

A simple information system is a system whose elements function in accordance with the rules generated by the same mutually consistent set of axioms.

A complex information system is a system that contains elements that function in accordance with the rules generated by different sets of axioms. At the same time, it is assumed that among the rules for the functioning of various elements there may be mutually contradictory rules and goals.

Violation of protective barriers in the interaction of elements of a complex system with each other leads to the reprogramming of these elements and/or their destruction.

It follows from the foregoing that the **information "battlefield"** is primarily the protocols for the information-logical interface of the elements of a complex system, the means and technologies for their practical implementation.

The protocol of information-logical interaction for the elements of social space has found its embodiment in the natural language of every people. The use of one or another linguistic subset of a language largely determines the information capabilities of various population groups.

The main means of adjusting the protocols of information and logical interaction for the social space today have become the media.

The protocol of information-logical interaction for elements of cybernetic space is reflected in many programming languages, in network protocols. The main means of correcting these protocols are software bookmarks, computer viruses, as well as all kinds of technical means and technologies for influencing telecommunications channels.

Depending on what changes occur in the internal state of information systems, it is proposed to carry out the following classification:

1) class A - systems with an unchanged internal state;

2) class B - systems with a changing internal state. In turn, in class B, the following subclasses can be distinguished:

subclass 1 - systems with an unchanged processing algorithm, but with changing data (databases, separate arrays, etc.) that are used in the process of processing input information;

subclass 2 - systems with an adaptive processing algorithm, i.e. the algorithm is tuned to the application conditions; tuning is carried out either by changing the control coefficients, or by automatically selecting an algorithm from a set of equivalent algorithms;

subclass 3 - systems with a self-modifying goal and, accordingly, with a completely self-modifying algorithm that goes beyond the set of equivalent algorithms.

By the way, some authors [87] define the concept of "meaning" precisely through a change in the state of the information system processing the input message. In the case of SR-networks, a change in state is a change in structure. In this regard, the following questions are of interest:

Can there be a set of equivalent meanings by analogy with a set of equivalent algorithms? And if so, how to determine this set?

V.V. Nalimov in [64] writes: "The meaning of the World is a manifestation of everything potentially inherent in it. The role of man is participation in this cosmogonic process. We don't know more than that."

But "manifestation of everything inherent in it" - isn't it, on the part of the information self-learning system, the constant maintenance of its own compliance with the changing World. To maintain conformity means to change (learn). Therefore, the classification of information systems in this work was carried out on the basis of their internal, inherent abilities to maintain this correspondence. What has been said for systems of subclass 3 of class B can be interpreted both as a revelation of the meanings of the World, and as a solution to the eternal cryptanalytic problem.

On fig. 2.1 shows examples of information systems from various classes. However, take Fig. 2.1 is desirable with a certain degree of conventionality. In particular, the old classic telegraph apparatus is more of a mechanical system that processes input data and

returns to its original state after processing is completed (class A), but being equipped with a processor with memory and an algorithm for recovering distorted data that supports several levels of information and communication protocols logical interaction, it, together with similar devices, is already moving into the category of data transmission systems (class B).
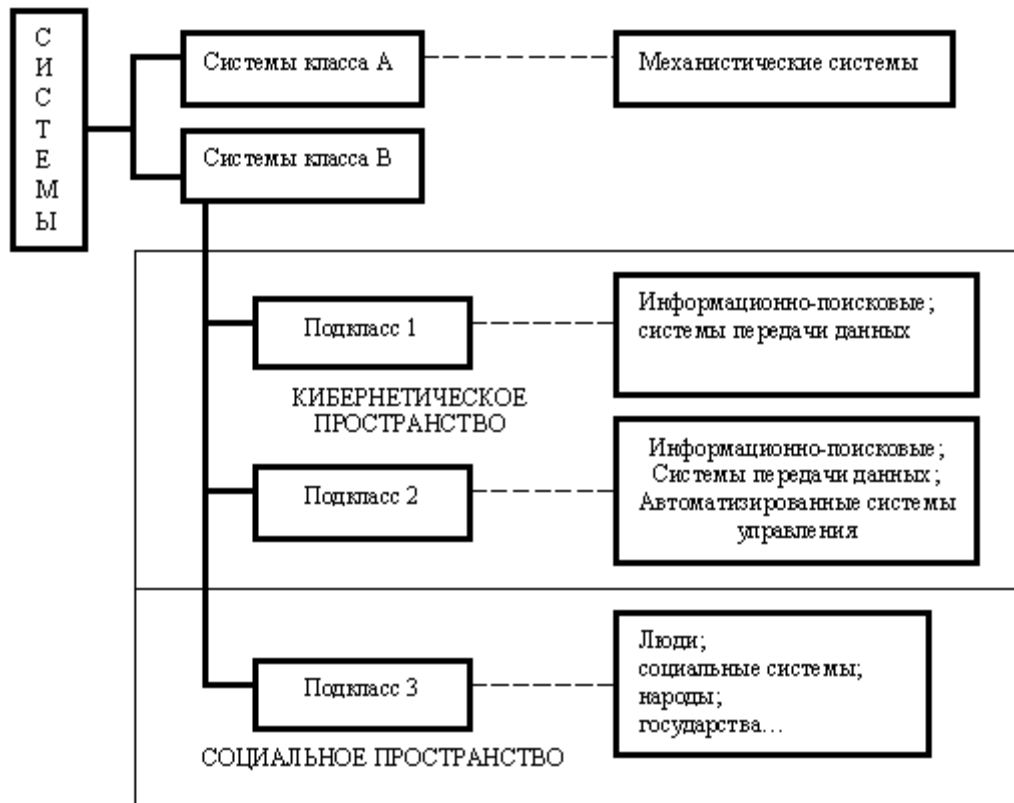
Fig. 2.1. Classification of information systems.

The same can be said about automated information retrieval systems; depending on the implementation, they can be classified as systems of both the first subclass and the second. Control systems also differ not only in their functional and potential capabilities, but also in the ways of implementation.

The idea of Figure 2.1 is to show the evolution of information systems. It is curious that the niche that Nature skipped in its evolution - subclass 2, is filled with the help of man, as they say: *"A holy place is never empty."*

Now it's time to define the concept **of information warfare:** information war between two information systems is open and hidden targeted **information impacts** systems on each other in order to obtain a certain gain in the material sphere.

Information impact is carried out with the use of information weapons, i.e. such means that allow you to carry out the intended actions with the transmitted, processed, created, destroyed and perceived information.

The simplest example (proposed by V.A. Krylov):

> *… And he speaks so sweetly, breathing a little:*
> *"Darling, how pretty!*
> *Well, what a neck, what eyes!*
> *To tell, so, right, fairy tales!*
> *What feathers! what a sock!*
> *And. it's true, there must be an angelic voice!*
> *Sing, little one, don't be ashamed! What if, sister,*

With such beauty, you are a master of singing.
After all, you would have been our king bird!
Veshunin's head was spinning with praise,
From joy in the goiter breath stole,
And in response to Lisitsyn's friendly words,
the Crow croaked at the top of her crow's throat:
The cheese fell out - there was such a cheat with it.

For technical systems, the simplest example is as follows. The computer program takes the values of two variables as input and divides the first by the second. It is clear that if an attacker or life itself slips zero as the value of the second variable, then the result can be the most unexpected, which under certain conditions will lead to the death of all previously accumulated information.

Systems of purposeful collection of information and control over objects in real time are disabled by creating overloads, for example: *"Space technology, especially those based in geostationary orbit, is completely unrepairable, cannot be quickly replaced and is very vulnerable to the effects of modern means of electronic suppression (RAP). The fact is that the receiving devices of communication and reconnaissance satellites are very sensitive (Magnum detectors detect signals starting from 10 to the minus fourteenth power of W) and are protected only from interference or overloads comparable in duration to the duration of useful signals. A megawatt impact from the Earth's surface, produced by home-made REB means at the required frequency, will inevitably lead to the loss of the satellite's receiving device, and, consequently, to the failure of the entire communication channel"* [4].

For a more complex information system, for example, such as a person, the information impact that can disable the system is, first of all, the activation of such desires, thoughts and provoking actions aimed at self-destruction.

It is clear that information impact also plays a different role for information systems from different classes. So, for class A systems, direct physical impact is more dangerous than any information. It is no coincidence that as long as people were equipped with weapons that did not contain microprocessors, it made no sense to talk about information warfare. It could not have been at that level of development and in the understanding that we had then.

Class B systems are already capable of independently processing information about the world around them, which means that if you correctly compose and purposefully submit this information to the input of this very system, then it becomes possible to control its behavior.

Class B systems form two spaces in which they function: **cybernetic and social**.

Social space has existed for more than a millennium, but large-scale information wars began only at the end of the second millennium. Why? Because for variable-target systems, winning an information war is generally an algorithmically unsolvable problem. During the war, the goals of the warring system may change. Therefore, it is not necessary to talk about solving a number of problems in this area in a general form. This will be shown next.

As for cybernetic space, its emergence marked the beginning of the era of information wars.

It is for cybernetic systems that the corresponding means called "information weapons" have been developed. And it is in cyberspace that one can achieve certain victories using this weapon.

Therefore, to be precise, when speaking about the modern information warfare of technical systems, the terms **cybernetic warfare and cybernetic weapons should be used**. They more correctly reflect the essence of what is happening, this was noted by M. Delagrammatic, who called his article "The Last Soldier of the Super Empire, or Who Needs a Cyber War".

In this paper, the problem of victory in the information war will be considered in a general, more theoretical than practical, technical form.

Note that the methods of conducting information warfare are of a successive nature, i.e. the algorithmic component of the techniques and methods of informational impact on systems of the third subclass can be extended, however, with varying degrees of efficiency, to systems of a lower subclass. This is explained by the fact that the algorithms for influencing the lower subclasses form the algorithmic basis for the functioning of the higher ones.

Information weapons are directly related to algorithms. Therefore, any system capable of working out one or another algorithm according to the input data can be spoken of as an information system - an object of information warfare. True, at the level of an information system with a modified (by whom?) goal (subclass 3 of class B), the concept of a classical algorithm (Turing Machine) is already beginning to undergo serious changes.

Once again, let us return to the concept of war of information systems and, relying on it, we will continue the terminological equipment of the foundations of the theory. Under **the war of information systems**, we will understand their **actions** aimed at obtaining a material advantage by causing **damage to the enemy** with the help of appropriate **information impact**.

In this case, it is assumed that while the enemy eliminates the damage received, i.e. busy only with himself, the other side has an advantage in the outside world. It is clear that such a war makes sense only for systems that consume common limited material resources for their vital activity.

Volterra's work "The Mathematical Theory of the Struggle for Existence" suggests two types of relationships between biological objects:
1) predator - prey;
2) prey - prey (predator - predator).
In our study of information wars, we proceed from the fact that the second type of relationship is realized between the studied information systems. Shared resources are being shared.
In the case of an information war, the defeated enemy himself becomes a resource:
cheap labor force performing the most unprestigious and hard work.

At the same time, for systems from class B, actions aimed at causing damage are a learning process based on purposeful manipulation of input data and the result.

It is time to move on to the definition of **damage**. To do this, consider the entire cycle **of processing** input data by the system.

Processing implies a process that includes receiving (inputting) data, processing and issuing a result.

The data entry process is characterized by:

1) initial data F_i ($0 < i < n_p$);
2) the amount of data n_p;
3) the time of obtaining and entering data t_p.

Processing process:

1) initial data F_i ($0 < i < n_{p)}$;
2) the volume of initial data n_p;
3) data used in processing - knowledge base B_j ($0 < j < n_d$);
4) algorithms used in processing, A_j ($0 < j < n_a$);
5) processing time t_o.

The process of issuing the result:

1) result R_K ($0 < k < n_p$)
2) the volume of the result n_p;
3) the time of presentation of the result t_p.

The listed <u>characteristics</u> are largely determined by the **following indicators of the state of the information system**.

The number of elements responsible for collecting input data and the efficiency of their functioning. In this case, it is proposed to understand the following quantitative characteristics as the efficiency of the element functioning: the volume of the extracted data, the "novelty" of the data, the reliability of the data.

The number of elements responsible for the delivery of data, and the efficiency of their functioning. In this case, it is proposed to understand the effectiveness of the element functioning as: the time of data delivery, the amount of distorted data.

The number of elements responsible for data processing and the efficiency of their functioning, which in the general case is estimated by the data processing time, the decision time, and, possibly, the capacity of the potential solution space.

The number of elements responsible for the presentation of the result, and the efficiency of their functioning. Here, one can try to evaluate the efficiency of functioning through the degree of distortion of the decision taken during its implementation.

The quantity and quality of connections between elements.

The security ("life force") of the above elements and the connections between them. At the same time, it should be borne in mind that the concept of "information security of an element" implies the protection of this element from information influences. In the event that the protected element belongs to the decision-making system, then the presence of such security sharply reduces the efficiency of its work due to the reduction of data admitted to it by the security system, which may be necessary for the system to develop adequate response commands.

We believe that **damaging** the system means:

a) **distort the result** of the system in such a way as to gain a material advantage, or

b) bring it to a state in which it is not capable of producing any result.

If the damage consists **in distorting the result** of the systems operation, then we will call such damage *local.*

Under **the distortion of the result** is understood:

1) distortion of the result R_k ($0 < k < n_p$);

2) distortion of the volume of the result n_p, - which leads to the destruction of part of the data and/or the addition of new ones;

3) changing the time of obtaining the result $t_p + t_o + t_n$.

Apply *fatal* damage means to bring the system in such a state in which it is not capable of producing any result. At the same time, the system cannot exit this state on its own.

Now imagine that two or more information systems operate under a common resource. Then, in the struggle for the resource, class A systems will certainly yield to any systems from class B. Any information war between them will end in favor of a system from class B. The proof of this statement is obvious.

Things are more complicated when systems from class B collide with each other. But even in this case, the winner, as a rule, can be named in advance - these are information systems from subclass 3.

As for the information clash between systems from the third subclass, then determining the winner is not an easy problem.

Chapter 8. The Problem of Winning the Information War in Human Society

But a brilliant surge is like nonsense.
At birth, death looks askance.
And we all put a tricky answer
And we do not find the right question.
V. Vysotsky

A person, a human society, an individual people, a state has all the properties of classical information self-learning systems. All of the listed objects fall under the definition of subclass 3 of class B of information systems, for modeling which you can try to use self-regenerating and collapsing structures (SR-networks) described in the first part of the work.

Thus, the information war between states. collectives is an information war of subclass 3 systems among themselves, for the simulation of which the apparatus of SR-networks can be used.

Let us briefly remind the reader of one of the main results of the theory of SR-networks, **the Theorem on the possibilities of SR-networks:**

The problem of learning information self-learning system built on the principles of the SR-network. solution of any problem, even under the condition that the information capacity of the SR-network ("initial number of elements") is sufficient to store the information received at the input, is algorithmically undecidable.

It is generally accepted that a problem is algorithmically solvable if there is an algorithm that maps the set of special cases of solving the problem to the set {0,1} (yes, no). In the case when there is no algorithm realizing this mapping, the problem is considered to be algorithmically unsolvable. At the same time, it is interesting that, as noted by A. Aho and J. Ullman [3 on p. 46.], in practice *"the coding of special cases of the problem plays a very important role. Usually some "standard" encoding is implied (an encoding for which there is an algorithm that maps algorithm description codes to equivalent Turing machine programs).* **If non-standard encodings are used, unsolvable problems can become decidable.** *But in such cases, there is no algorithm by which you can go from standard to non-standard coding.* And this is a very interesting conclusion.

Indeed, how do we sometimes understand our own kind? It is not always possible to find a compromise due to inadequate representation of the interests and aspirations of the "high" contracting parties. Our cries are like "one crying in the wilderness." Wars that periodically engulf continents are direct evidence that the problem of human mutual understanding is one of algorithmically unsolvable problems for humanity. At the same time, societies, parties, unions of states are formed, within which the problem of mutual understanding is somehow solved, perhaps on the basis of a non-standard "standard coding" for a certain style of thinking and many common interests. At the same time, the transition from one type of "coding" of thoughts and interests to another turns into an impenetrable swamp, overcoming which you can spend your whole life and never reach the opposite shore. In the scientific literature, attempts are made even to quantify misunderstanding, in particular, V.V. Nalimov writes [64]: *"Misunderstanding always causes aggression. The degree of aggressiveness, perhaps, can be a measure of misunderstanding.* The whole driving emotional force of European culture -

Christianity, notes Nalimov, arose from the tragedy of misunderstanding, which turned into a crucifixion.

And in this perspective, the time allotted for solving a particular problem becomes one of the most important factors that allow you to move from bump to bump in the swamp of unsolvable problems. Indeed, it is not always clear from the chosen observation post whether the solution of a particular particular case will be displayed in "Yes" or "No" and whether it will be displayed somewhere at all - it is quite possible that the process will "go to infinity". To solve such problems, humanity has developed its own double standard: one for eternal problems with an eternal soul, the second for a finite earthly existence. At the same time, in the second standard, the problem of "infinity" is solved all the time in different ways:

a) in one case, if there is no answer by the time t, then - "Yes";

b) in another case, if there is no answer by time t, then " No".

Since the choice is subjective and sometimes random - sometimes the same thing is "Yes", and sometimes "No", it is from here, from the limited time, that the disagreement and misunderstanding come; " *Yes - yes, no - no, everything else is from the evil one"* (Ecclesiastes). This *"everything else" is* perceived *"from the evil one"* in the sense that our finite life will never allow us to transfer it to the category of the known.

Therefore, asserting any trivial fact, one must always remember that the truth is largely determined by today's time. Depending on time, not only such a constant as the actual history of mankind is rewritten, but also mathematical theories, and even old hackneyed truths.

Therefore, when studying the strategy and tactics of conducting information wars, it makes sense to change the coding system by redefining a number of basic concepts. But for now, only the following conclusion can be drawn.

<u>Conclusion</u>. Transferring the results obtained to any animal population or to Humanity as a whole, we can conclude that it is impossible to unequivocally state what kind of new knowledge such an information system is able to acquire, and what kind to forget in the process of purposeful learning. All this means that our classical logic, based on the principles of the Turing machine, does not allow with a 100% guarantee not only to predict the expected events, but also to control the movement of mankind or a people with sufficient accuracy. To solve this problem, another logic is needed, perhaps the logic of magic or religion, but not the logic of classical mathematics.

3 systems can have a constantly winning strategy in information warfare with each other?

At first glance, the answer is clear. There is no such logical strategy. We can only talk about specific local victories, mostly of a random nature (in the sense of random, that the reasons for one or another result could be completely different than the strategists think), while it does not follow from anywhere that the chain of local victories will lead to a complete victory. For subclass 3 systems, the reverse situation is quite possible. Figuratively speaking, it is possible to teach the system something "bad" for this system itself, but it is impossible to say in advance what kind of knowledge the system will additionally master in the learning process and what this will lead to in the future.

New knowledge does not stand alone, it is organically woven into the existing structure and modifies it. A trained system can behave quite unpredictably, like the lady in the nursery rhyme:

They taught the lady to eat her panama,
But the lady, sitting at the table,
Suddenly began to eat scrap metal!
(G. Rastorgueva).

At the same time, it is possible that there is only one type of information that at first glance is safe for the aggressor himself - propaganda of the merits of one's own lifestyle. More on this will be in one of the following chapters.

All of the above is true only for the case when the simulation can be carried out using SR-networks.

But is the statement about the adequacy of the SR-network model to human society always true, for any period of time? If we are talking about significant time intervals, then the analogy certainly exists. But a what to do in the case of an epidemic or war, when the process of death significantly exceeds the process of the birth of system elements? In this situation, R-networks are more suitable for modeling - networks in which learning is carried out exclusively due to the loss of elements and is possible only with a significant redundancy of system elements [77].

If through Δ_c we denote the number of new information elements that appeared in the system during the time Δt, and through ΔX_p is the number of dropped (dead) elements during the time Δt, then the conditions under which R-networks or S-networks (networks in which learning is carried out due to the birth of new elements [77]) can be written can be written as

$$\mathbf{X_p(t)/\, X_c(t) \longrightarrow 0} \text{ (3.1)}$$

or

$$\mathbf{X_c(t)/\, X_p(t) \longrightarrow 0.} \text{ (3.2)}$$

In the case when an analogue among R-networks can be found for a real system, the strategy and tactics of information warfare can undergo serious changes.

As noted in the first part, an information self-learning system built on the principles of the R-network can be trained to solve any **problem** if and only if the following two things are true:

1) the information capacity of the R-network (the initial number of elements and links) is sufficient to store the information received at the input;

2) the initial state of the R-network can be characterized as a state with uniformly distributed connections, i.e. the initial state of the R-network is chaos.

According to this theorem, called the theorem on the possibilities of R-networks, during the time of fulfillment for the SRD-system of one of the above conditions (3.1-3.2) over this system, the process of its purposeful programming can be carried out.

Thus, an information war with a specific goal setting between information systems of subclass 3 can be effective and to have a winning strategy only at certain time intervals for which conditions (3.1), (3.2) are satisfied, as, for example, in the case of Russia at the end of the 20th century, when the annual decline in the country's population stabilized and began to average one and a half million people a year.

Chapter 9. Learning as a process of informational influence (interpretation of theorems about the possibilities of P-, CR-networks)

Every man needs psychos because he himself is a psycho. Psychos need other lunatics, because only lunatics can keep your illusions going. You support their illusions, and they support yours.

O. Rajneesh

Suppose that it is permissible to use R-networks as a learning model for an individual person (neurons only die), and SR-networks (people are born and die) as a learning model for humanity.

Further, we assume that we have an idealized version, namely, we believe that a newly born person (child), as an information learning system, fully complies with the conditions of the theorem "On the possibilities of the R-network".

In fact, this assumption is not entirely correct due to the presence of certain genetic information, which is undoubtedly reflected in the initial connections of neurons and which largely determines the set of tasks for which this information system will be more effective. In addition, recent publications provide facts about the birth of neurons along with their death. However, since the number of births is much less than the number of deaths in the same It is high time that in the study of learning processes in relation to a living individual, one can rely on the theorem on the possibilities of R-networks.

In accordance with the assumption made, the child at the initial stage can be taught any task. The development of information will inevitably lead to a decrease in the information capacity of the network (the death of individual elements) and a restructuring of the network structure. The structure of the network will cease to be similar to chaos and will reflect the knowledge that is taught. Thus, due to a decrease in information capacity (redundancy) and a change in the "attitude" to the facts entering the input, this system will no longer be able to master "any" information. Some of the facts will become **invisible to her.**

It turns out that the child is potentially able to see everything! The nose with age, with the development of more and more new information, its ability to perceive decreases. Those facts that contradict the paradigm mastered or developed by him become initially **invisible for him,** and then **absolutely invisible** (strict formal definitions of "invisibility", "absolute invisibility" will be given in the fourth part work).

Everything that cannot be "glued" to the rules of behavior and comprehension that have appeared in the system will disappear from the child's model of the world. For some, such a loss will mean the loss of "flying saucers", witches and devils, bubbles floating in the air, and for some, the logic of cause and effect relationships familiar to us. Assimilated in the learning process, and therefore, an ordered "piece" of the initial chaos will be called **consciousness**. And the child will really have consciousness. At the same time, the main "block" of raw material, where chaos predominates, will acquire

the name of the **subconscious**. And in the future, throughout life, the subconscious will supply parts of its space for recording new information.

So, in the first approximation, the picture of mastering the subconscious with new perceptions with its gradual transformation into consciousness looks like.

According to this model, it is useless to delve into the human subconscious, looking for hidden memories there. If a person tries to hide something, then this something always belongs to consciousness. The subconscious is chaos. which has absolutely everything. Therefore, if you look closely at it, something will definitely appear. what the observer wants to see. Exactly what you want! Need to see past lives? Please. Need to find out how the client relates to something that he has never actually seen? Please. Chaos. as you know, it differs from order in that by deciphering it, you can satisfy all your needs for knowledge. In the case of one scale, we will have "War and Peace", and in the case of another - "The Brothers Karamazov".

To what extent is this true? Let's try to explore the learning process of such an information system as a person. It is interesting to trace how the process of crystallization of the surrounding world takes place in a biocomputer programmed by this world. David Bohm, analyzing the work of Piaget, notes ("Special Relativity"): *"The perception of the child forms one indivisible whole. In other words, the child does not yet know how to distinguish what is happening inside him from what is happening outside him, just as he does not know how to distinguish between different aspects of both the "external" and "internal" worlds.*

He perceives only one single world, in which irritations, perceptions, sensations, etc. follow in a continuous stream. and in them nothing stands out as unchanging. But the newborn is endowed with certain innate reflexes. With the development of these reflexes in the surrounding world, different aspects are distinguished to which the child adapts. The environment begins to be effectively differentiated to the extent that "recognizable" features appear in it. Recognition is functional.

The next stage is the "cyclic reflex". This reflex involves a trigger impulse (leading, for example, to the movement of the hand), which is accompanied by some incoming sensory impulse (for example, visual, auditory, etc.) that no longer serves mainly to satisfy the direct needs of the child. This is the beginning of true perception.

The child, moving objects and himself, moves in space and discovers that in the whole kaleidoscope of movement there are certain things that he can always return to himself, and, moreover, in many different ways. Then the concept of a reversible group of motions or operations gives him the basis for erecting on it a group of invariable positions to which one can return, and a group of invariable objects which can always be reduced to something familiar by using appropriate operations.

At the same time, he learns to recall images of the past in his memory. True memory begins. Ion acquires the ability to move in time both to the past and to construct mental images of the expected future.

The decisive turning point occurs when the child can imagine the absent object as actually present. At this stage, he begins to clearly understand the difference between himself and the rest of the world. Thus, a general picture of the world is formed.

Moreover, even the experience of pain is a product of learning. Here is what S. Levin writes about this ("Who Dies"): *"The threshold for pain seems to rise when the child grows up....As the child matures, the same stimuli require higher doses of painkillers.*

For example, a one-year-old child may experience what we will arbitrarily call stimulus number 3, but it has very little effect on him.

... But by the time the child is two or three years old, aspirin is indispensable in this case. When he's five or six, the same stimulus is even more of an annoyance. When he is ten, there is a strong resistance and therefore there is a need for the use of strong painkillers. In youth, the pain becomes so unbearable that one has to resort to opium and other similar drugs.

How does an artist create a sculpture from a block of stone? He peers into a dead block, which contains a lot, for it is the initial chaos, which under his hands must turn into a work of art - into order. If the artist did not have an initial idea, a constantly held image of the future work, chaos will remain chaos, even if pieces are methodically broken off from it, and grains of sand are blown off. In this situation, an unchanging ideal image in the mind ("fixed point") serves as the basis for the destruction of material chaos. The same fixed points laid in the newborn; Piaget calls them innate reflexes. They serve as the direction of crystallization of the surrounding world, in other words, they set the Direction of programming. Innate reflexes are questions interpreting which the information self-learning system will ask them to itself and the world in the future. thereby programming and reprogramming itself.

Is it possible to create a "pure" self-learning information system, i.e. a system without innate reflexes, a system that would be completely programmable by the world? In the event that this could be done, then the judgments of this system would be the most objective of all possible, but, probably, only at the first stage of cognition. Thus, the question of objective knowledge of the world can be reduced to the question of the possibility of creating a "pure" self-learning system.

It is important that in the case of an appropriate initial state, according to the theorem on the possibilities of the R-network, the R-network can be trained in any task, while in the future the R-network will "hold" the mastered knowledge and not perceive any new knowledge that rejects the truth of the already formed rules. This means that systems built on the principles of the R-network can be purposefully programmed to solve any problems. And in this sense, roughly speaking, a person is no different from a classical robot working according to a given program. At the same time, the program can be corrected only within the framework of the redundancy remaining in the system. The more redundancy, the more room for adjustment.

A single person, if the conditions of the theorem on the possibilities of R-networks are met, can be trained to solve any problem. And this is due solely to the inability of the individual to relearn with forgetting. Unlike an individual who remembers all his grievances and joys, human society can afford not to remember. Society demonstrates its ability to forget regularly, without losing potential resources. How many times is history rewritten, and what changes for those living today from this rewriting? The program changes and everything changes at once: the present, the past and the future. System elements that have exhausted their resources and are unable to change are destroyed.

Thousands of years pass, but still no method has been created that allows Mankind to assimilate any idea. Some of the proposed Humanity immediately "swallows", recycles and "burps" literally in a few years, and something remains and rots, forming around itself pathological foci of unprocessed knowledge.

Therefore, human society, even if it decides to use today's moral laws, the so-called "universal values", which individual representatives always try to do for their own benefit, or to be equal to scientific and technological progress, still will not be saved from new knowledge, the development of which can force all settle in the caves or become kings of Spain.

"The shaved grandees, whom I found in the hall of the state council in great numbers, were very smart people, and when I said:" Gentlemen, let's save the moon, because the earth wants to sit on it, " they all immediately rushed to fulfill my royal desire, and many climbed the wall in order to get the moon; but at that moment the great chancellor entered. When they saw him, everyone ran away. I, as a king, was left alone. But the chancellor, to my surprise, hit me with a folder and drove me into my room. Such is the power of the people in Spain!" (N.V. Gogol. "Notes of a Madman").

And the criteria here are very unsteady. Ivan Dmitritch, the hero of Anton Pavlovich, probably guessing about the existence of the above theorem "On the possibilities of SR-networks", understood it as follows: *"Yes, I'm sick. But after all, dozens, hundreds of crazy people are walking free, because your ignorance is unable to distinguish them from healthy ones. Why, then, should I and these unfortunates sit here for everyone, like scapegoats? You, the paramedic, the caretaker, and all your hospital bastards are morally immeasurably lower than each of us, why are we sitting, and you are not? Where is the logic?"*

To which Andrey Efimych replied: *"Moral attitude and logic have nothing to do with it. Everything depends on the case. Whoever was imprisoned, he sits, and whoever was not imprisoned, he walks, that's all. There is neither morality nor logic in the fact that I am a doctor and you are a mentally ill person, but only an empty accident.*

Therefore, trying to explain with human logic why successive rulers in Russia in the 20th century were "shaggy" and "bald" strictly through one and why "shaggy" had to die at the workplace is a rather thankless job. Although for a small time interval and a certain group of listeners, success can be achieved here, i.e. to formulate and prove an appropriate theorem that will live as long as the world of today will correspond to it, as long as the axioms adopted in its proof will last.

If classical logic, in which twice two makes four, does not allow algorithmizing the world, God will be its judge. A person will master new logics with new type inference rules:

a) if the leader in Russia is not bald, then he must die in office;

b) if a black cat crossed the road, expect trouble;

c) *if a young woman came to you at the end of the day, then you have little time left and no time at all for nonsense"* (C. Castaneda).

It is always possible to propose such a logic that will adjust any events to specific, sometimes specific, and sometimes mysterious schemes. "Notes of a Madman" by Nikolai Vasilyevich Gogol, "Tales of Power" by Carlos Castaneda, the logic of a well-fed tradesman or the way of life of a sick homeless person - all these are to some extent equal models of the world, built by us, with the help of existing perception potentials.

And when you meet in the artistic and philosophical work of C. Castaneda phrases like *"the world is therefore an immeasurable mystery because death is constantly stalking us", one* can only wonder how precisely one phrase defines the whole problem of invisibility for man and mankind. If it weren't for death, if it weren't for the death of elements, we would be dealing not with models that function in the image of the SR-

network, but with expanding models of the SR-network, for which the problem of invisibility would already have its solution. From finite elements, from computable algorithms, the problem of non-computability grows, the foundation for which is Time. *"When you feel and act like an immortal being, you are not perfect," don* Juan argued, identifying the sense of time as the key to perfection.

Time is a kind of dark thick liquid in which a person is constantly located and moving. At the same time, he does not see anything of what is left behind him, and nothing of what awaits ahead. And in himself there is only a hard struggle for every step in this thick squeezing darkness. And it is not always clear what it means to go forward and what it means to go back. Intuitively, it is only felt that light is flickering somewhere far away, and there is a "piece" of pure transparent space where everything is explainable. It is necessary to get to that room in the thick "liquid of time". Moreover, it is clear that one can enter inside only by destroying its fragile walls. And as soon as this happens, everything around will again begin to plunge into darkness, fettering any movement with a heaving weight. And again, you need to rotate your head in search of a bright spot in the world around you. Sometimes the understanding comes that there are no directions in the ocean of time, but there are only such separate bright areas.

The path will end when there is no more strength to take the next step, when the surrounding liquid becomes unbearably heavy and crushes the fragile shell of the information system.

The pressure of time on any self-learning information system is the greater, the more the knowledge structure of this system differs from the knowledge structure of the surrounding world.

And the differences will inevitably grow, if only for the simple reason that the surrounding world is rather unprincipled, capable of almost instantly relearning, as it should be for the SR-network model, while each element of this eternally "boiling" world is programmed quite reliably and once and for all. When the differences become unbearable, the pop of the bursting shell will herald the end of the disagreements between the system and its element.

Chapter 10. Methods of informational influence

How many rumors strike our ears,
How many gossip corrodes like a
moth.
There are rumors that everything will
rise in price,
Absolutely! And especially table salt.
V. Vysotsky

In this section, we will try to consider specific methods of information impact, without claiming to be general.

Due to the fact that in this work only self-learning information systems are studied, therefore, the informational impact on them is a learning impact. <u>To emerge victorious in the information war means to understand in time what can be learned and what cannot</u>; which input data can be processed, and which - in no case.

The same input data in most cases leads to the emergence of the same structures. This is true for P-net models, provided that programmatic learning starts from zero. However, for systems that have already learned something, the same inputs will not always level the systems. As was shown in the first part of the work, the same data in one case will make the system "smarter", and in the other it will be destroyed.

In order to be able to model the behavior of similar systems, it is necessary to introduce a measure that allows them to be compared. In this case, it is quite difficult to rely on the structure of the system or structural transformations, since sometimes describing the structure is essentially recreating it, and besides, in the process of processing input information, the structure is constantly being modified. Therefore, it is proposed to rely on such concepts as "understandability", "similarity" and "aggressiveness" introduced in [77] as comparative characteristics. The mathematical interpretation of these concepts is given in the first part of this work.

Here we give informal type definitions:

a) two learning information systems are called **"understanding"** each other if, for the vast majority of identical input messages, they produce results that are identical in meaning;

b) two learning information systems are called **"similar"** to each other if they produce results identical in form to the vast majority of identical input messages;

c) two information learning systems are called **"aggressive"** for each other if there is a "similarity" between them, but there is no "understanding" at all; moreover, "understanding" generally tends to zero.

"Understanding", "similar" or "aggressive" behavior of such information systems as people is reflected both at the everyday level, and at the religious and state levels. With the same input message, one person lies down to rest under a palm tree, another begins to count possible profits, the third composes a scientific treatise.

<u>Statement 1.</u> In order for an information self-learning system to be able to purposefully reprogram another similar system, it must "understand" it.

<u>Corollary 1.1.</u> To reprogram an information system means to select for it such input data that correspond to the purpose of programming.

<u>Corollary 1.2.</u> To determine **the purpose of reprogramming** means to find in the outside world or specifically create an information system (reference) to which this

system should become similar. At the same time, the reprogrammable system and the "standard" must be "understanding" each other.

How the goal of reprogramming in the world of software for "the people" was formed is described by A.P. Kulaichev [44, p. 157]: *"Many have witnessed, but few remember, that the dawn of windows began in the second half of 1992 with an unprecedented round-the-world propaganda tour of Microsoft leadership with a mass of speeches and speeches at hundreds of business meetings, seminars and international exhibitions. The main goal of this action was to stir up the world community, to captivate and bind the world's leading manufacturers, who, after reorienting their promising developments (and related investments), will no longer be able to deviate from the main path. And the masses of users will follow them, quickly getting used to considering such a world the only one. This wonderful example showed all savvy that the cost of advertising is much more effective than the cost of corporate "topping up" products. Therefore, with the advent of Windows, a sharp degradation in the quality of software and its complication began. Thus, the undoubted merit of B. Gates is the discovery and visual demonstration of super-powerful mechanisms of mass enslavement in the era of information civilization."*

<u>Corollary 1.3.</u> To select the input data for the system in accordance with the given goal of reprogramming means to force the information system to "look at the world through the eyes of others", through the eyes of the information system that this system should become similar to, i.e. standard eyes.

Is an information system capable of defending itself if the enemy uses the described method of reprogramming information systems against it?

Undoubtedly. To do this, it is enough to "close your eyes" to the input data that is fed to the input by the opposite side. <u>Moreover, which is typical, in many countries this method of protecting the population and the country is enshrined in law</u>. *"Even in the 70s, when America was bogged down in the Vietnam War, the American media, criticizing this war, "torpedoing" it, did not allow themselves to use the footage of cameramen working from Vietnam. Moreover, in the same America, as well as England, France and a dozen other countries, there is a strict legal ban on the use of any film, photo- videos and printed materials filmed or written on the side of those who are fighting against the armies of these countries, and even simply having intonations or ideas sympathetic to the "enemies"* (V. Shurygin [114]).

V. Shurygin, analyzing the information aspect of military operations in Chechnya, describes in detail how the method of reprogramming the information system was implemented in practice [114]:

"On average, the Chechen theme took from 10 to 18 minutes for an information program on NTV programs, and from 3 to 7 minutes on Vesti (an information program of Russian television). So, at NTV, up to 80% of all video footage of direct combat operations was carried out by Chechen fighters or films taken by separatists were used. In Vesti, this ratio reached 60%. NTV usually divided the remaining 20% between filming the destruction usually attributed to the army, interviewing local Chechens "suffering from Russian aggression", or commenting on their TV reporters, at best against the backdrop of Russian positions, but more often near burned-out Russian equipment. The remaining broadcast and Vesti were roughly divided in the same way.

An analysis of the publications of such newspapers as Moskovsky Komsomolets and Izvestiya revealed the following: only one of the four articles mentioned or revealed the

point of view of the federal command on the ongoing events. Three out of four publications were either openly pro-Chechen, glorifying the militants, exaggerating their capabilities, or harshly criticizing the army and its actions in Chechnya."

Public opinion polls conducted by NTV, possibly to test the effectiveness of this method of reprogramming, confirmed that for the average citizen who regularly watches TV, the attitude towards his own army changes for the worse, and the goals of the militants become "closer and clearer."

How sadly L. Shebarshin, in the past one of the first leaders of the KGB of the USSR, joked: *"Television is a means of communication between swindlers and simpletons."*

All types of information impact on the information system can also be classified as follows:

1) input data - "dry" facts;

2) input data - logically justified conclusions;

3) input data - emotionally colored statements. As shown in the first part of the work, emotions, being a criterion of truth in the process of cognition (we are talking about the model of SR-networks), can only be inherent in a **self-learning information system** of class B, for which they act **as a way of external manifestation of learned knowledge**. At the same time, the emotional charge for any input sequence increases the speed of its processing by the information system, sometimes bypassing even mandatory logical checks. For example, an emotionally saturated cry for help or danger makes you immediately perform certain actions and only then, if possible, check the logic of the possibility of certain statements.

Statement 2. "Understanding" information systems are formed by the same **emotional influences,** as a rule, bypassing the means of protection based on logic.

For example, a television announcer monotonously reports facts about the trips around the country of presidential candidates. At the same time, without distorting the facts, speaking about one of them, he reinforces his words with facial expressions expressing contempt, and if another candidate is mentioned, on the contrary, his whole physiognomy shines with happiness. As a result, the viewers secretly begin to form an appropriate attitude towards the candidates. It can be seen that in this case, the very opportunity to say something (even completely neutral) about a particular candidate can be used to reprogram unintentional listeners. Similarly, information materials are formed in the press. The text of the message contains "bare" facts, to which there can be no complaints, and the title of the note, especially when it comes to competitors, has an obligatory emotional connotation. Not everyone will read the message, but they will certainly pay attention to the headline, and thereby implicitly connect the emotional sensation that has arisen with the object of the newspaper material.

Corollary 2.1. For reprogramming self-learning information systems with emotions, the most effective means is the "emotionally colored" input training sequence.

Corollary 2.2. In the case of rapid and massive reprogramming of the people, the nation, the most effective are the methods that have an emotional coloring and belong to such areas as: mass culture, art, religion. This means that in order to solve the problems of reprogramming the population, first of all, emphasis should be placed on artists, cultural figures, and religious ministers.

Statement 3. An information self-learning system functioning on the principles of the R-network can be reprogrammed only within the framework of the redundancy of

chaos remaining in it. The greater the excess of chaos, the more opportunities for adjustment.

Corollary 3.1. With any serious information impact on society, the direction of the main information blow is the young members of society, i.e. objects that have the maximum resource for reprogramming.

Statement 4. The destruction of established structures, bringing them into a chaotic state contribute to an increase in the redundancy of chaos, and thereby increase the possibilities for reprogramming systems.

Corollary 4.1. For effective reprogramming of established structures, it is necessary to first bring them into a chaotic state by destroying established connections and destroying the most significant **basic elements**.

Statement 5. It is safe for any information system to operate with the information, the processing mechanisms of which already exist in this system.

What has been said is quite simply explained at the level of common sense. For a technical system, according to statement 5., safe input data are those that it already had in the past, which belong to the set of valid input/output values. For social and biological systems, this is functioning within the framework of inculcated habits, an established way of life, formed stereotypes of behavior in conditions of an external environment known (predictable) to the system.

Corollary 5.1. At any time, it is safest to broadcast to your surroundings information about the merits of your own lifestyle.

The existing stereotypes of behavior are the space of actions in which a particular system is most effectively able to withstand external threats known to the system. Naturally, for each system, it is its own habits that are its dignity. They largely determine this system, as they ensured and ensure its existence. Imposing one's own stereotypes of behavior on surrounding systems, especially already formed ones, will inevitably weaken the latter. This is understandable - it is always difficult to play on a foreign field, and even according to unknown rules.

Five statements and their corollaries describe **a way to reprogram information systems**. The presence in the behavior of a system of techniques based on the above statements and consequences is one of the signs of an information attack.

Chapter 11. The problem of starting an information war

In the beginning there was a word...

Let's return to the proven classical logic.

One of the key questions leading to the insolvability of the problem of winning the information war is the following: "Is the information system capable of determining that an information war has been launched against it?"

Let's explore this problem in more detail.

Let there be two opposing information systems - IS_1 and IS_2 - protection systems that are functionally similar and work according to the following algorithm:

1) *obtaining* input information;

2) *analysis of* input information during time *t:*

* determination of the source of information;

* definition of the objectives of the informant;

* credibility assessment, if the information received is assessed as a fact of aggression, *then go to* clause 3;

otherwise to item 1;

3) *issuing* adequate information to the input of the aggressor, which implies a retaliatory strike, i.e. information war.

Now let's see what can happen when such systems interact. This simple algorithm has a sufficient number of development options:

1) IS_1 assessed the non-dangerous information as a fact of aggression and took retaliatory measures;

2) IS_1 assessed the beginning of the war as non-dangerous information and accordingly lost the war;

3) IS_1 did not have time to evaluate the information in the time that is sufficient for an adequate response, and in this case it either did not suffer if the information was really harmless, or lost.

Suppose that both systems are unwilling to act as the aggressor. Then for any of them the main task is to identify the signals coming to the input, namely from the protection system of the opposite side. And the task is as follows:

1) if the input information arrived at the input of IS_1 from the protection system IS_2, then this means the beginning of the war;

2) if the input information arrived at the input of IS_2 from the protection system of IS_1, then this means the beginning of the war.

In essence, we are considering the situation of the applicability of any of these algorithms to itself (because of their functional identity). It turned out that in the general case, the task of any of the information systems is to in order to understand the result of the work of which algorithm it is examining, i.e. what algorithm is she researching, is the algorithm given as input at all?

We proceed from the fact that any input information either has an intent (algorithm) or nothing, in which case the input information is not dangerous from the point of view of starting an information war (although in fact this information can be even more destructive for the system, but this is outside the scope of this study).

Let us show that this problem belongs to algorithmically unsolvable ones.

By analogy with the study of the problem "Is a partial algorithm an everywhere defined algorithm" [3], we will try to propose a method for determining the beginning of an information war. But let's first assume that there is some algorithm IS_a that allows you to determine what is given to it for analysis (at its input) - an algorithm or not. It is clear that if such an IS_a exists, then on its basis it is possible to build completely different algorithms, including an algorithm that allows the classification of algorithms according to their belonging to one or another class of equivalent algorithms, in particular, to the class of algorithms responsible for detecting the beginning of an information war. For example, let a certain IS algorithm be proposed.

IS Algorithm:

> Entrance:
> protective algorithm of any of the possible information systems IS_i.
> Output:
> "0" if IS_i is not a protection system algorithm;
> "1" if IS_i is a protection system algorithm and including IS(IS)="1".

Method:

1) if IS_a (IS_i)="1" is an algorithm, then go to step 2, otherwise issue "0" and stop;

2) if IS_i is a protection system algorithm, then its input can be a protection system algorithm, and its output can be "0" or "1". In this case (for verification) the IS algorithm applies the IS_i algorithm to itself;

3) IC outputs "0" or "1" if IC_i outputs "1" or "0", respectively.

Consider the results of this method. Suppose that the IS algorithm has determined that the input received "dangerous" information, i.e. IS_i is an algorithm. After that, the IC models itself on itself. But if IS is functionally equivalent to IS_i, then in this case it cannot give a consistent result. If the simulation result is "1", then the IC gives the output result "0". But by definition, when applied to itself, it must give the answer "1". A similar situation occurs if the IC detects that the simulation result is "0".

Conclusion. The problem of constructing an algorithm for determining the beginning of an information war is generally algorithmically unsolvable, and the reason lies in the impossibility of creating an IS_a algorithm, which is the basis of the proposed formal method.

This result is clear, not new, and is completely determined by the results of studying the classical problem: "Is a partial algorithm an everywhere defined algorithm?"

In this situation, it is pointless to threaten with an adequate response, for example, in the form of a "thermonuclear club", since it is objectively impossible to prove the fact of an information attack. It turns out that it is impossible to determine the beginning of the information war, and this gives certain advantages to the aggressor. But the paradox lies in the fact that if the victim of the attack has time to realize that an information war is being waged against him, then the advantage gained by the aggressor at the initial stage in this type of war does not at all correlate with the melody of the victor's anthem.

After the information war is started, non-linear functional dependencies with feedback are included in the matter, and the fact of the algorithmic unsolvability of the problem in general gives a chance to win even to the most seedy opponent.

However, the algorithmic unsolvability of the problem under study in general terms does not mean that there is no solution in a particular case. Moreover, in most situations there will always be such a time interval or such a state of the information system when it is possible to access the system apply a specific winning algorithm. If it is impossible

at the moment to apply a specific winning algorithm. If it is not possible at the moment to apply the prepared scheme of actions, then you can wait until the time comes for it!

Y.A. Ponomarev, investigating the psychological mechanism of decision-making in the context of creative tasks, noted that in the case when logic is not confirmed by practice, the task turns into a creative one. The solution of a creative task is possible only with the help of intuition. And this means that **only the things themselves can suggest a solution**!

In real life, this is how it happens. Rain outside the window hints at the need to take an umbrella when going outside. A soccer ball rolled onto the pavement requires a kick on itself. A bus that unexpectedly arrives at a bus stop, when the decision has already been made not to go anywhere and return home, cancels this decision.

The apple that fell on the thinker's head at the right time made the law of universal gravitation manifest in our lives.

It is important that these "things" force the system to leave the state in which its behavior is practically unpredictable, and proceed to the execution of the scenario that is imposed by "these things". Indeed, how can you not hit the ball when it rolled out under your feet?

A well-thought-out sequence of such "things" forms the training sample, with the help of which purposeful management of the information system is carried out.

Chapter 12. A typical information warfare strategy

The web of karma that binds the most heterogeneous beings is complex, and a single just destruction can lead to massive harm.

E.P. Roerich

Any information learning system has a **basic set of meanings** or knowledge, which largely determines the behavior of this system. The existence of this basic set is provided by physical carriers - the corresponding structures within the framework of the general structure and/or the corresponding individual elements, which will be called **basic elements in what follows**.

It is clear that, depending on the number of basic elements and their connections, the opposing side (the aggressor system) is either able, using its own scientific and technical achievements, to model the behavior of the basic elements in a short time, or not. In the event that modeling is possible, we will assume that the basic elements of the **X system are** modeled by the **Y system**.

It follows that, since each information system, depending on its own structure, has a different number of basic elements and their connections, then in one system the basic elements are modeled by its enemy in the course of preparing or conducting an information war, while in the other they are not.

At the same time, the power of the set of basic elements and their connections is largely determined by the structure of the system itself.

For example, if we are talking about hierarchically ordered self-learning structures, the **basic the elements** that define the system can be counted on the fingers - there are not many of them. Therefore, it becomes possible in the allotted time for the researcher (or adversary) to design, model and implement any algorithms for information impact **individual characteristics** of the elements become the determining factors in the development of information weapons. This is clear. In order to model the behavior of the basic elements, it is necessary to know exactly the individual characteristics and preferences.

Please note that <u>the time interval at which the systems try to win the information war is in this case commensurate with the lifetime of the elements, which means that the results of the theorem on the possibilities of SR-networks are not applicable here</u> in full, since we are talking about an insignificant in terms of generational change time interval. Therefore, it is permissible to speak of a winning algorithm.

However, with all this, it must be remembered that the lifetime of the system, the time it takes for the system to learn something, is constantly changing. New learning technologies are emerging and the characteristics of the surrounding information environment are changing. The foregoing means that it may not be entirely correct to measure the lifetime of elements with the time interval of active information warfare. Here I would like to point out the following:

the intensity of the modification of the surrounding world often does not leave the information system with the opportunity to get out of the behavior scenarios prescribed for it.

Based on what has been said about the modeled™ of the basic elements, we can formulate the corresponding statement.

<u>Statement 6.</u> The greater the power of the set of basic elements and their connections, the more resistant the system is to targeted information impact.

Under conditions when the time of information counteraction between systems is short, for example, it does not exceed the average lifetime of a system element, and the adversary system has modeled basic elements, the following seemingly "always winning" algorithm can be proposed:

1) determination of the basic elements of the information space of the adversary system;

2) study of individual characteristics and potential capabilities of basic elements;

3) modeling of various options for the behavior of basic elements under various input influences;

4) selection of the most preferred scenario for the behavior of basic elements;

5) preparation of the environment in which the basic elements (public opinion) function, and themselves;

6) implementation.

Taking into account the theorems and statements given in the previous chapters, the general scheme of information warfare could look like in Fig. 2.2.

Стратегия информационной войны

Изучение системы противника
(Утверждение 1)

Определение цели перепрограммирования, т.е. эталона
(Следствие 1.2)

Подбор входных данных соответствующих эталону
(Следствие 1.1)

Эталон – собственные достоинсва
(Следствие 5.1)

Организовать подачу материала "своими глазами"
(Следствие 1.3)

Организовать подачу эмоционального материала (достоинства из сферы искусства, культуры)
(Утверждение 2)

Ориентировать входные действия на деятелей и искусства культуры
(Следствие 2.2)

Определить базовые элементы и организовать моделирование их поведения
(Утверждение 6)

Привнести хаос во все сферы функционирования системы
(Следствие 4.1)

Ориентировать входные воздействия на те структуры и элементы, которые максимально поддаются программированию и перепрограммированию
(Следствие 3.1)

Fig. 2.2. Typical information warfare strategy.

The above scheme, of course, does not reflect all possible approaches and techniques to the organization and conduct of information impact operations. The human mind is more sophisticated than any possible projection of the thoughts it generates into the plane of practical algorithms. Only that is included in the typical strategy. which follows from the theorems proved earlier. assertions and consequences. It follows from this: if the information system detects the impact against itself of a complex of techniques of the scheme in Fig. 2.2. then this means, most likely, that this information system is in a state of information war.

What can be a specific information warfare algorithm with a specific adversary? A scheme of actions very similar to the winning algorithm given above is described by A. Zinoviev using the information war of the West with the Soviet Union as an example.

1. To study the individual characteristics and potential capabilities of the "basic elements" of the USSR, an entire science with its servants was created in the West - Kremlinology.

2. "Kremlinologists studied the apparatus of the Central Committee in the most meticulous way. And not only studied, but influenced the party leaders. How? Through the media. Through assistants, advisers. Through diplomats, journalists, KGB agents...It can be recognized as a fact that the West in the 1980s began to increasingly manipulate the top Soviet leadership."

3. "Kremlinologists studied the situation in the top Soviet leadership under Brezhnev... Andropov and Chernenko were sick, they could not last long. So the main role, one way or another, was to be played by one of the two - Romanov or Gorbachev. Having thoroughly studied the qualities of both (and perhaps having already somehow "hooked" Gorbachev earlier), the relevant services of the West decided to eliminate Romanov and clear the way for Gorbachev."

4. "In slander against Romanov was invented and launched in the media (as if he ordered to bring a precious service from the Winter Palace to his daughter's wedding), and all sorts of discrediting began...

Moreover, the inventors of slander were sure that Romanov's "comrades-in-arms" would not protect him. And so it happened. Even Andropov, who was considered a friend of Romanov, did not take steps to refute the slander. Like, you shouldn't react to such a trifle. Meanwhile, it was not a trifle, but the beginning of a large-scale operation with far-reaching consequences."

5. "Take now the election of the General Secretary! The fact that they were clearly part of the operation of the relevant US services, even in the West, was well understood by many. Everything was set up deliberately so that only 8 people chose. Under some pretext, they delayed the flight from the United States of a member of the Politburo, Shcherbitsky, who would have voted against Gorbachev. They did not inform another member of the Politburo who was on vacation about the elections. It was Romanov himself, who would certainly have voted against Gorbachev as well. If at least these two voted, Gorbachev would not have become Secretary General - he passed by a margin of one vote! "

Moreover, interestingly, such an algorithm of targeted information impact, one might say, in the rudimentary prototype of today's information war, was outlined almost a hundred years ago in a document called "Minutes of the meetings of the Elders of Zion" [65]. Without going into disputes about the causes and source of this document, I would like to note that its author should undoubtedly be called the first serious theorist in the field of constructing typical tactics and strategies for conducting information wars.

The said document reads as follows:

"In order to bring our plan to such a result, we will adjust the election of such presidents who have some unsolved dark business in the past, some kind of "Panama" - then they will be faithful executors of our instructions out of fear of exposure and from the characteristic of every person who has reached power, the desire to retain the privileges, advantages and honor associated with the title of president" (Minutes 10).

"In the hands of modern states there is a great force that creates a movement of thought among the people - this is the press" (Protocol 2).

"No alert will enter society without our control. This is already being achieved by us by the fact that all news is received by several agencies in which they are centralized from all over the world. These agencies will then be wholly our institutions and will publish only what we prescribe to them.

...Everyone who wishes to be a publisher, librarian or printer will be forced to obtain an established diploma for this business, which, in case of fault, will be immediately taken away" (Minutes 12).

*"You say that they will rise up against us with weapons in their hands if they figure out what the matter is ahead of time; but for this we have in reserve such a **terrorizing maneuver** that the bravest souls will tremble: metropolitan underground passages - corridors will by that time be held in all capitals, from where they will be blown up with all their organizations and documents of countries"* (Protocol 9).

Briefly and precisely in the "Protocols..." it is said about almost all aspects of the information war:

- management system (control of power structures);
- means of reprogramming the population (mass media);
- terrorism;
- economic wars; means of economic management;
- financial program (Minutes 20);
- universal suffrage, etc.

These protocols are methodological in nature. They are designed so that they can be used by anyone who understands the significance of the secret war - and it is not at all necessary to limit their use only to the sages and only to that distant time. From the point of view of significance for the theory of information warfare, these protocols are probably somewhat similar to the first timid studies on the theory of nuclear weapons, by the way, dating back to about the same time.

S. Nilus, in addition, notes in his explanations: *"The Protocols of Zion" are instructive in that they provide a canvas and drawings that really embroider the self-decomposition of Christian culture."*

In the work [65] there are no mathematical formulas and proven theorems, but there is a simple and accessible justification: why it should be so, and not in another way.

The opponent may object: What does science have to do with it? What does the information war and Westernization have to do with it? What A. Zinoviev writes about is the usual methods of struggle known since the time of tsars, kings and shahs; their essence is to put your man on the throne. And, as V. Vysotsky parodied a lecture on international relations for those imprisoned for 15 days, everything looks something like this:

> *"Churchmen bakers gaped.*
> *The Vatican hesitated a little,*
> *And we threw them the Pope*
> *From ours, from the Poles, from the Slavs.*
>
> *Whether in America, in Asia, whether in Europe*
> *That one is unwell, and this one suddenly dies?*
> *Here we slammed the place of Golda Meer,*
> *And there, a quarter of our former people.*

As for the "Protocols...", mass control, popular elections and preliminary psychological processing of voters - whoever pays more, they shout more for him. It's always been that way. Open, for example, "Russian history in the biographies of its main figures" by N.I. Kostomarov on the pages dealing with the election of the tsar:

"Borisov's accomplices went around the cities to help so that people who favor Boris would come to Moscow... Boris's supporters immediately began to praise his virtues, and the patriarch then announced: whoever wants to look for another sovereign, except Boris Fedorovich, will be cursed and given to Karagrad court" [40].

Now about the so-called "winning" algorithm. A. Zinoviev's texts say nothing about his universality. Take, for example, Iraq led by Saddam Hussein. The required conditions are met:

1) there are only a few base points;

2) the time of possible exposure within the average lifetime of the element.

Nevertheless, the enemy used the most conventional weapons against Iraq in the first place.

The opponent is certainly right. Yes, the described algorithm existed for centuries. What has changed?

Many methods and techniques have changed, they have received a scientific justification. Entire scientific disciplines arose on how to manage the behavior of a person, a team, and society. These include: sociology, psychoanalysis, advertising theory, suggestology, NLP programming, Dianetics, etc. Hypnosis received its theoretical justification and attempts were made to transfer the methods of hypnotic influence from an individual to collectives and entire human societies. All this did not exist even in the last century - there were no sufficiently effective mass media, there were no scientifically based algorithms for managing society; and these algorithms could arise only with the advent of programming theory for today's computer technology. Because, once again, an **information weapon is, first of all, an algorithm**. Use information weapons - <u>it means to select the input data for the system in such a way as to activate certain algorithms in it, and in case of their absence, activate the algorithms for generating the necessary algorithms.</u>

The current theory of algorithms makes it possible to explain how automatic writing of programs for certain subject areas can be carried out.

Below, the respected reader is invited, taking as a basis the work of C. Tart "States of Consciousness", to try, by analogy, to transfer the methods of hypnotic suggestion from the individual to the collective.

<u>The induction of a hypnotic state on a separate individual by Ch. Tart is described in the form of an algorithm as follows:</u>

1) relax the body (the purpose of this action: the body as a whole must disappear as an object of consciousness);

2) listen only to the hypnotist, not paying attention to any other thoughts or sensations (goal: the process of loading the consciousness and the action of the shaping forces are weakened);

3) not to think about what the hypnotist says (goal: helps to slow down the continuous flow of thoughts);

4) focus on some object other than the voice of the hypnotist himself (goal: the subsystem of consciousness responsible for processing sensory information is unable to perform its function and seems to be upset);

5) the hypnotist suggests that you are sleeping or falling asleep (goal: the sleep suggestion weakens the memory and sense of self-identity that characterizes the waking state);

6) the hypnotist convinces the person that this soi is not really a real dream (goal: the creation of a passive, dream-like state of consciousness in which the possibility of contact with the hypnotist is preserved).

By analogy, the process of inducing a hypnotic state on a particular society could probably look like this:

1) to relax society - to inspire through the media that there are no enemies, while discussing individual historical periods and the interests of individual nationalities (goal: society as a whole must disappear as an object of society's consciousness);

2) to force society to listen only to the enemy, not paying attention to any other thoughts or feelings, for example, to focus the media exclusively on one paradigm of social development, for example, Western, excluding any other experience:

China, Japan, the Muslim world (goal: the process of loading the public consciousness and the action of the shaping forces are weakened);

3) to force the public not to think about what the enemy says, to do this, to exclude serious analytical studies of problems from the media (goal: to help slow down the continuous stream of thoughts);

4) to focus society's attention on some subject other than the input information flow, for example, internal cataclysms, wars, acts of terror (goal: the protection subsystem responsible for processing the input information is unable to perform its function and seems to be upset);

5) to constantly suggest that society itself is getting better and better, that everyone around them treats it better and better (goal: such suggestion weakens the historical memory and sense of self-identity that characterize the normal state of society);

6) the media must at the same time convince members of society that the state that has arisen is not quite what it should be (goal: creating a passive state of consciousness in which the possibility of dependence on the enemy's information influence remains).

The above algorithm in general terms reflects the work of the media in Russia during 1990-1997 years.

In the conclusion of the chapter, we recall that for accurate and timely processing of input information, the elements of any information system must be "powered", and the links between them must be maintained in working condition. It naturally follows from this that the <u>effectiveness of targeted information impact increases dramatically if it is combined with other types of impact on an information self-learning system</u>.

What are these "other types of influence"?

Any system responsible for processing input data must "feed", i.e. must consume energy in order to activate the input data processing algorithms embedded in it and generate new ones. <u>The basic elements of each system have a certain physical nature, which largely determines the reaction time, and hence the choice of one or another algorithm for solving a particular problem</u>.

It is clear that if we are talking about such an information self-learning system as a person, then the nutrition systems of a yogi contemplating his own navel in the conditions of eternal summer, and a resident of the Far North should be different. And these differences should concern not only the amount of energy contained in the food consumed, but also its microelement composition. Yog and Eskimo systems process different inputs, requiring the subsystem to make a decision on most of the different outputs.

What has been said indirectly means that in order for the Yogi's ability to reprogram the Eskimo to the standard, which is his own likeness, to increase, he must be fed the same food.

An interesting and original study of the effects of food and various narcotic spices on the possibility of ape-to-human transformation and on the behavior of modern humanity is given in Terence McKenna's Food of the Gods. He, in particular, believes that the level of development and achievements of modern civilizations has largely been determined and is determined by the practice of their nutrition.

In the case of considering states as information self-learning systems, "other types of influence" in the light of the foregoing should be understood primarily as an economic war. But not in a narrow sense, associated exclusively with economic sanctions such as "this is impossible and this is impossible", but in a broader sense, which includes "economic interventions" in the form of goods and products at dumping prices.

The time of information and economic wars has also come because today's world is no longer characterized by a lack of information and industrial goods, on the contrary, it is precisely their abundance that distinguishes it. And this means that, just as in the case of an information war, when the system should no longer think about protecting information, but about protecting it from information and promoting its vision of the world, so in the conditions of an economic war, it should be about protecting against other people's goods and imposing one's own.

A competent combination of all permissible types of influence on the enemy is a **complex strategy of influence**.

Permissible types of impact here are understood as such impacts that "grossly" do not violate the norms and rules of behavior accepted in society at the current time.

Following the principle of complexity in the formation of a common strategy for influencing the enemy makes it possible to enhance the effect of the use of information weapons and thus may be another sign of information warfare.

Chapter 13. Consequences of the information war

Before proceeding to the study of the consequences of the information war, it is desirable to answer one fundamental question: There are whether signs on the basis of which one can judge the degree of defeat of the system in the information war?

If we proceed from the fact that information warfare does not differ from ordinary warfare, except for the weapons used, then the signs of defeat should be exactly the same.

And what characterizes a system that has been defeated in a conventional war? Let this system be an ordinary state. Then for the defeated country, to one degree or another, it is characteristic, as the practice of the first and second world wars shows:

1) death and emigration of part of the population;

2) the destruction of industry and the payment of indemnities;

3) loss of part of the territory;

4) political dependence on the winner;

5) destruction (sharp reduction) of the army or prohibition on their own army;

6) export from the country of the most promising and science-intensive technologies. Generalizing what has been said for information self-learning systems can mean:

1) a stable reduction in the information capacity of the system, the death of elements and substructures; such a simplification of the system makes it safe for the aggressor;

2) solving previously uncharacteristic problems, i.e. tasks for the winner. The potential of the information system is aimed at working out the input data supplied by the winner;

3) the defeated system, as it were, is built into the general algorithm of the functioning of the winner, i.e. absorbed by the structure of the winner.

Thus, there is no particular difference for the defeated system from what kind of war: nuclear or informational, it lost.

The difference can only be that the information war has no end, since the problem of the end of the information war, like the problem of its beginning, belongs to algorithmically unsolvable problems. Moreover, there is no reason why the aggressor would stop his influence on the victim.

After all that has been said, it remains to consider the possible results of the information war, which the side that unleashed it does not think about.

So, in the event of a war with automatic firearms, the winner gets the destroyed cities, destroyed and crippled human resources. And this is understandable: firearms are primarily aimed at destroying military equipment and manpower of the enemy.

Nuclear weapons are already hitting the civilian population, and, as the experience of using them by the United States against Japanese cities has shown, they are more effective on the plains. Until now, it has been used mainly to demonstrate its power, and

then dictate the rules of behavior to the frightened victim. The undesirable consequences of a global nuclear war are nuclear winter.

Information weapons are aimed directly at changing the behavior of information systems, and in the case of use against people, at changing their thinking and, accordingly, their behavior without prior "intimidation".

Thus, a certain hierarchy can be traced in the types of wars embracing humanity, and the weapons used in these wars, aimed at (stages):

1) destruction;

2) intimidation;

3) behavior change.

In the end, the goal of any war is to change the behavior of the enemy, to put him in the place where he would like to see. But if all previous wars led to the desired result through intimidation and destruction, then in the information war this is done directly and can continue for as long as you like, until "the cat wants to let go of the mouse."

The general algorithm is presented in the form shown in Fig. 2.3.
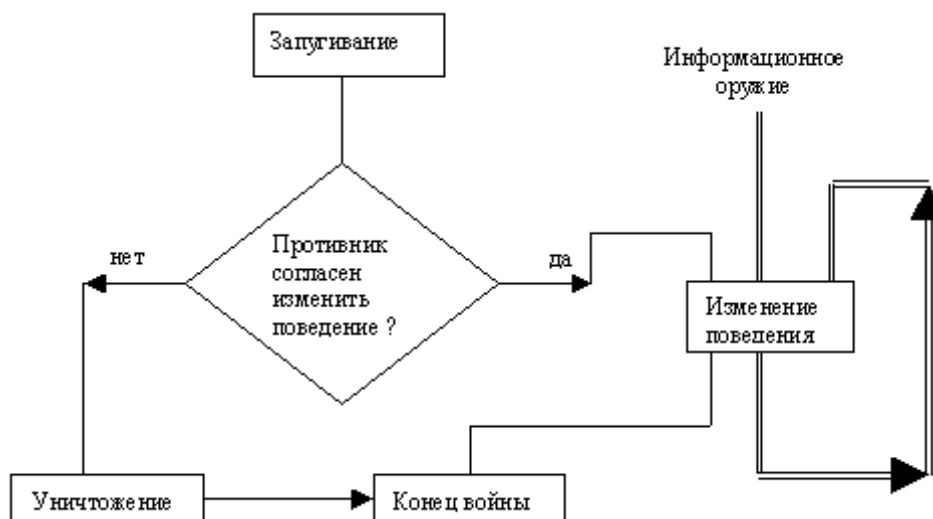
Fig. 2.3. Generalized scheme of the war.

So what are the additional consequences of the information war, besides the desired ones, other than such when "*sacks of dollars, pounds, marks and francs are flying at you in response?*

The winner of the information war is the side that is more fully able to model the behavior of the enemy in various situations, determine its own algorithm of behavior and implement it. To more fully model the enemy's behavior means to collect, store and process information about the enemy in large volumes: it means to study the enemy's behavior more fully - to know and understand his history, culture, religion, way of life, etc.

To solve this problem, the best tools are computer technology with the appropriate software. Situational modeling in real time today is quite on the shoulder of high-performance complexes; the problem is only in the implemented behavioral model of specific social objects, specific people. And this problem is solved the better, the more information about the analyzed and modeled objects.

Here, of course, one should agree with A.S. Ovchinsky, who considers computer modeling **aimed** at predicting the development of social situations as an information weapon [69].

It is clear that the results from the use of computer models are the better, the more serious the platform used, which includes: computing power, intellectual capabilities of programmers-mathematicians, experience of specialists working in the field of practical behavioral psychology. The seriousness of the platform, unfortunately, is determined not by ideals, but by finances. <u>Therefore, whoever has fixed assets has more advanced information weapons</u>. Unlike chemical or nuclear, and even just firearms, there is no legal ban on the use of computers (the main element of information weapons) in any country in the world. Talking about the ban on information weapons looks simply ridiculous, since this ban is neither theoretically nor practically impossible to control. Computers are available to everyone. The only question is who will shoot first and be able to "squeeze" the situation.

Of course, information wars have been waged on our planet since people learned to speak, understand and intimidate each other accordingly. But the effectiveness of such information operations, compared with the use of even primitive edged weapons, "left much to be desired." It is explainable. An arrow from a bow will fly faster and do more than a long and tedious explanation in words, which, moreover, must be convincing, otherwise it will not be able to give rise to thoughts in the right direction. The computer and global telecommunications have changed the environment. Now it has become easier, faster, more unpunished, and most importantly, cheaper to influence information than any other type of weapon. Separate information streams between people and countries, thanks to computer technology and telecommunication systems, have merged into one continuous river, which is no longer possible to dam, it is even impossible to block it with "fishing nets". Time to send messages was reduced to zero. The time to comprehend the information received has also been drastically reduced thanks to appropriate technologies. In this situation, it has become pointless to do something for information protection by traditional passive methods.

Moreover, using modern high-performance computers, it becomes possible to create artificial worlds and pass them off as real. And as they say: *"Who will sort it out after that?..."* Computer technology today makes it possible to create a virtual model of an object and its connections in real time, and then project it onto the outside world, onto viewers waiting for the event.

The one who already owns the future always wins.

Behind everything that has been said, there is not only the possibility of correcting and substituting the speeches of political leaders, orders of the commanders of military formations, but the features of even more global hoaxes appear. According to R. Rene's book "America Exposed", there has never been any visit to the moon by Americans; there was only serious work to create an appropriate virtual model with its subsequent projection through the media on humanity. Rene carefully analyzed all the publications, photographs, television reports from the scene and asked a series of questions, such as:

1. Why are the TV pictures showing the Apollo 11 and Apollo 12 spacecraft on the Moon so poor quality?

2. Why is the American flag waving at the Apollo 11 landing site on the Moon?

3. Why are there no stars visible in the lunar sky?

4. Why is there absolutely smooth ground under the ship in the picture depicting Apollo 14 on the Moon and there are no signs of braking, although there are signs of astronauts?

5. Why are there serious contradictions in the publications of various authors who have visited the Moon or its orbit?

6. Why did 11 American astronauts die in 1967 alone, 7 of them in air crashes?

R. Rene concludes that all flights are a well-staged staging, which made it possible to solve the most important task: to demonstrate to the world the technical might of the United States and save billions of dollars. If this is true, then there is a classic version of the use of information weapons on a global scale. Interesting publications on this topic, including an interview with R. Rene, can be found in [9].

The equipment needed to make such fakes has already gone beyond well-equipped services and is available to any office:

"Pentium-100", a sound card, a scanner, a video blaster, appropriate software and a specialist who knows how to use it all. The result of the work can be a signature, a seal, a form, a telephone conversation, a photograph, a video that depicts an allegedly illegal act. If we take a technique that, in terms of its characteristics, would be a little closer to modern supercomputers, then much of the above, including broadcasting from the scene, i.e. from virtual space, you can do in real time.

At the end of 1996, Intel announced the creation of a supercomputer with parallel processing [66], which for the first time in history exceeded the performance level of one trillion floating point operations per second. What these events mean for solving problems of modeling social, military-political and other complex information systems is clear and without comment.

A description of the masterpieces of the world of virtual reality, which today a competent specialist is able to make just for the soul, presented at the exhibition of fakes held in early 1997, can be found in the review in [10]. The stands displayed photographs of famous actors, along with statesmen whom they had never met in their lifetime, contemporary politicians "caught" in a compromising their situation, etc.

At the festival of professional digital video technology "Parade of the Planets", held in Moscow in October 1996, SPF "Era" presented a virtual studio, the technical capabilities of which made it possible to combine two animation layers with one real one in real time. As a result, the girl, who actually performed her actions on an ordinary stage, was shown on the monitor screen on the seabed surrounded by dolphins [72].

Such exhibitions are certainly needed, for which thanks to their organizers, one of whom formulated his task in this way: *"If people imagine how easy it is to make compromising evidence, then press reports will be treated with caution, like the first of April"* [10].

It is clear that a person cannot hide from the information-psychological pressure, remaining in the field of its action, because *"we live in a language",* as M. Heidegger stated, and it is difficult to disagree with this. Leaving the field of action means forgetting the language, culture, i.e. die. The only reliable means of passive defense against information weapons is a deep grave. Otherwise, it will not be possible to be in the same room with other people, but at the same time not hear and not understand what they are saying. The one who speaks convincingly is the one who attacks. And the one who attacks in this area will reprogram the enemy, which means he will win.

Any state can effectively protect itself in the field of information counteraction by exclusively active methods, i.e. the use of all means of information influence, including predictive computer modeling, across the entire spectrum of external and internal enemies. It is predictive computer modeling that is the network that pounces on the

world of information systems, forcing these systems to constantly increase their own capacities, generating control, control over control, etc.

The initial data of systems operating in the social space are national and private data banks on citizens, enterprises, services, goods, etc. These databases are constantly growing. Not only the last name, first name and patronymic are entered there, the entire life path is entered there, including the state of health along the way. And knowing the past is sometimes easier to predict the future.

Under the conditions described above, the loser in the information war has no chance of a retaliatory strike. And he realizes it. The defeated in the information war intuitively understands that any of his logically justified rational behavior has already been calculated and programmed by the enemy. The only thing left for him is **irrational behavior**.

There is no nuclear winter after the information war.

The result of the information war is the irrational behavior of the defeated systems, this is their only way to "get back on their feet." Irrational behavior is chaos. it's an aimless turmoil, it's terrorism.

It is no coincidence that terrorism is now considered as a large-scale phenomenon and is becoming increasingly political. The "White Book of the Russian Special Services" notes that in modern conditions terrorism has become one of the methods of political struggle. *"The essence of this phenomenon lies in the use of extreme measures of violence or the threat of such in order to intimidate political opponents, to force the authorities or the population to take certain actions or to refuse them"* [4].

At the same time, terrorist actions can have the greatest effect them organizers through terrorist impact on objects in cyberspace. The authors of [4] believe that: *"The most tempting target for a new generation of terrorism should be recognized as business information processing centers, primarily computerized banking institutions.*

A terrorist strike of microwave radiation on a large bank is capable of causing a systemic crisis of the entire financial system of developed countries, since it deprives society of confidence in modern money market technologies."

However, having made such a categorical conclusion, they may have forgotten to take into account one small circumstance, which is that society most likely will not know anything about the terrorist impact on a large bank, since when it is beneficial for media owners, they can unanimously hang a label denial of any, even the most sensational information. But besides, one should always remember that today the media are already a classic information weapon, owned by the one who pays, i.e. the ruling elite, and are used to control their own people in their own interests.

Chapter 14. Sources goals or who pulls the string

Nature is a sphinx. And the more she returns
With his temptation, he destroys a person,
What, perhaps, no from the century
There is no riddle, and there was none.

F.I. Tyutchev

In this final chapter, it is proposed to go back once more and try to survey the entire chain behind a specific physical action of an information learning system, including a person.

An information system, according to the introduced definition, receives input data, processes this data and/or changes its own internal state (internal links/relations) and issues a result or changes its external state (external links/relations). Here, an event associated with the issuance of a result and/or a change in the external state (external links/relations) can be defined as some action-act of this information system. For example, a person packs his bags and goes overseas - a change in external relations/relations (including geographical ones) or gets married, or goes to the store for an advertised product. A person will perform the named action-act in accordance with the accepted algorithm from the set of equivalent algorithms that allow this to be done. In this case, the choice of an algorithm from a set of equivalent algorithms will be carried out in accordance with the state of the system and the incoming input data: availability of financial resources, weather, transport, etc.

Thus, any action-deed is a fact of implementation of a certain algorithm of behavior.

However, where does the behavior algorithm itself come from:

a) is it genetically laid down by the creator?

b) copied from the behavior of others?

c) is generated independently?

A systems and the first subclass from class **B,** the behavior algorithm is laid down by the manufacturer of these systems.

For systems from the second and third subclasses of class **B,** most of the algorithms are copied from the behavior of surrounding similar systems - a natural and fairly effective self-learning process takes place.

As for the independent generation of the behavior algorithm, in this case the system is required to use the so-called creative approach to problem solving. And for this, considerable work is needed to study the world around us and ourselves, sometimes requiring the exertion of all forces. Who or what forces the system to rise from its place and go in search of Eldorado, being exposed to dangers and hardships?

As a rule, the source of creating an algorithm is a goal/desire. Sometimes the desire is realized by the information system, sometimes not, as, for example, in the case of the presence of a foreign inclusion in the system in the form of a corresponding software tab hidden from security tools.

If all of the above is tried to be graphically displayed, then the following scheme will be obtained, shown in Fig. 2.4.

Пространство событий	**действие-поступок**	— физический уровень
Пространство алгоритмов	**осознанный или неосознанный алгоритм достижения цели**	— ментальный уровень
Пространство целей	**цель-желание осознанное**	— уровень желаний
		сознательная сфера
		бессознательная сфера
Пространство скрытых целей	**цель-желание неосознанное**	
Пространство ?	**?**	?
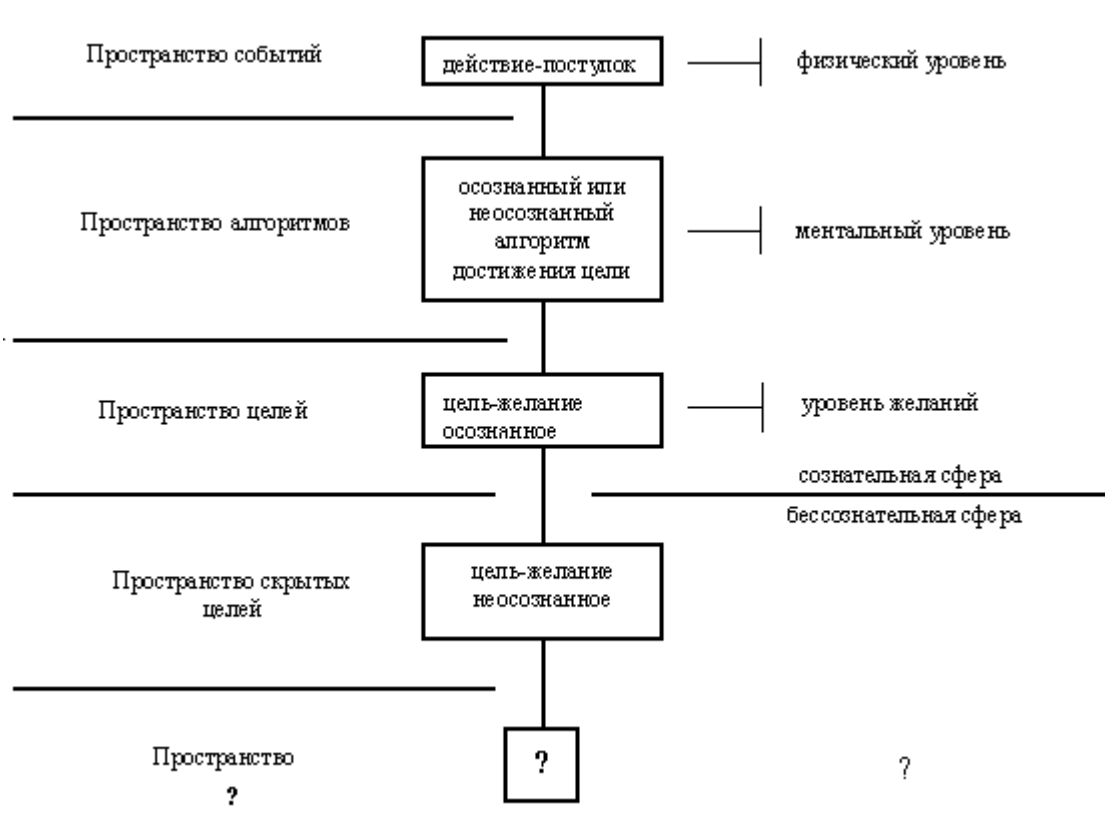
Fig. 2.4. Scheme of cause-and-effect relationships.

Behind any action-deed there is an algorithm for its implementation, any algorithm, in turn, realizes a certain goal. Behind any conscious goal there can be a hidden goal - sometimes it can be directly opposite to the explicit goal.

But what is behind the hidden purpose? Who forms a set of equivalent goals and is there such a set? How to compare goals and is there a unit of measure for them?

What is behind the space of hidden goals is indicated by a question mark in the diagram. Of course, behind this question mark there are some other "entities" with their own rules of the game, about which there is nothing to say today, if we rely on the logic of "common sense". K. Castaneda, choosing a multi-permissive form of narration, wrote about these entities ("Gift of the Eagle"): *"The force that rules the fate of all living beings is called the Eagle... The Eagle devours the awareness of all beings who lived on Earth a moment ago, and are now dead, flying to the Eagle's beak like an endless stream of moths flying to the fire to meet their Master and the reason that they lived. The eagle breaks these little shards of flame, laying them out like furrier skins, and then eats them, because awareness is the food of the Eagle."*

But the Eagle is also obliged to obey at least some of its own laws, even if they are not clear to us today. K.G. Jung saw these laws in the soul, in the unconscious, trying to splash out. And these laws had their adherents, their ocean casters, shouting on the shore the words of prayer, which should stop the waves. *"All the secret teachings try to grasp the invisible events of the soul, and they all lay claim to the highest authority. This is even more true of the dominant world religions. They contain initially secret innermost knowledge and express the secrets of the soul with the help of majestic images,"* wrote K.G. Jung [116].

We in this study will not go so deep and look for hidden "essences". As for the space of hidden goals, this will be discussed in the following parts.

Conclusions

Available publications on the issue of "information warfare" and "information weapons" are more related to "cyber warfare" and "cyber weapons". The concept of "information war" is more broad and implies targeted information impacts of information systems on each other in order to obtain a gain in the material sphere.

The level and completeness of information perception by the system is determined solely by its processing capabilities, i.e. first of all, the processing algorithm.

Thus, any information weapon is inextricably linked with the concept of an algorithm and is revealed through the concept of an algorithm, based on the theory of algorithms.

To date, the theory of algorithms, as well as the theory of programming, has been most fully developed for information systems based on von Neumann computer technology. This explains the serious results in the field of creation and use of "cybernetic weapons".

The transfer of the results of programming theory to the field of psychology, psychiatry, sociology, which R. Bandler and D. Grinder tried to implement, allows us to talk about the beginning of the era of a truly classic information weapon aimed at the social sphere, the theory of which is still hidden behind the terms of NLP programming (neurolinguistic programming).

However, in addition to theory, an appropriate level of development of production is also needed. Therefore, such a transfer has become real and profitable right now, when the appropriate technical means have appeared that can dramatically increase the intensity of the information interaction of information systems. Now the time needed to win the information war, previously measured in centuries and decades, can already be reduced to quite acceptable terms. And the more powerful the technical means aimed at processing and transmitting information, the more and more this time will be reduced.

In general terms, the problem of victory in the information war for systems capable of self-modification of their own goals belongs to algorithmically unsolvable problems. However, this result does not deny the possibility of successful use of information weapons at a certain time interval against a particular state, society, team, person of a complex technical system that processes information. Thus, the work substantiates a set of methods of informational influence - a typical strategy of information warfare.

The presence in the life of society of actions emanating from a potential aggressor and at the same time belonging to a typical strategy of information warfare suggests that information weapons are used against the corresponding person, team, state.

A by-product of victory in the information war is the irrational behavior of information systems, which should make the use of information weapons ineffective for some time.

PART THREE. SELF-DESTRUCTION AS AN ESSENTIAL PROPERTY OF A SELF-LEARNING SYSTEM

If you don't die, you wo n't see heaven.
Chinese proverb

Introduction

The basis of the principle of operation of firearms is a chemical reaction that proceeds with the release of energy. The task of the shooter is only to accurately direct this weapon.

At the heart of the principle the functioning of thermonuclear weapons is based on the reaction of nuclear fusion, which proceeds with the release of energy, which is used to destroy all life around the fall of a projectile or bomb.

The basis of the principle of functioning of information weapons is **the program of self-destruction** inherent in any complex information self-learning system.

The information weapon itself is an algorithm that activates a program of self-destruction in the enemy system.

The use of information weapons is a **technology that** includes:

1) analysis of the methods and mechanisms for activating a particular system - the enemy, the programs embedded in it;

2) search for a program of self-destruction;

3) development of specific information weapons;

4) the use of information weapons on a given object.

Information weapons are a kind of key that opens Pandora's casket, in which all sorts of misfortunes are stored for the time being. And the more this casket contains nasty things - programs aimed at self-destruction, the more effective will be the use of information weapons.

Therefore, it makes sense to take a closer look at self-destruction programs. What are they? What are they for the system? Are these programs mandatory for a complex information self-learning system? Are they initially built into the system or are they formed in the learning process?

Chapter 15. The problem of immortality of information systems

You can't build a skyscraper from the remains of a destroyed barn, you can build it in at best, another shed, only worse than before.

A. Zinoviev

"For every force there is another force" and even *"there is a hole in the old woman,"* says folk wisdom. Sooner or later, along with the input data, a question will come up against which the system has no way of defending itself integrity will be violated. It will be necessary to hastily put patches in order to keep the flowing life. It will be necessary not only to mend the holes, but also to restore all the strength that was before.

The ability of a system to return to its original state is called **homeostatic.**

Homeostatic means that violations of integrity constraints caused by disturbances in the external environment can be corrected by the actions of a dynamic system [24]. If this is true for any time, then we are talking about an immortal system.

The immortal system is eternal because it has an absolute system of protection. In other words, **we call protection absolute if it provides the information system with the opportunity to be eternal**.

Recovery of violated integrity constraints requires additional resources. For any self-learning information system, the receipt of input information is a violation of the integrity of the system, a waste of resources.

After the resources are exhausted, the system naturally dies.

However, suppose that a way is found to replenish resources, for example, memory elements. Will this invention help the information system? She will now begin to collect in herself <u>contradictory knowledge, rules of</u> conduct. Mutually contradictory rules will certainly arise, as time flows, and, as they say, *"every time has its own woman."* Allowing contradictory actions within the same system rarely allows the system to survive, especially if these "women are very jealous."

The authors of [24] introduced the concept **of a promising state**. This is a state for which there is a finite limited trajectory that allows reaching an admissible state, i.e. state in which the system is able to function in the way it is used to.

In the first part of the work, this was already discussed and, in particular, that *"In the class of all production DDBs, the problem of perspective is unsolvable"*. And this means that our classical logic, built on "if..., then.., otherwise..." will not allow us to create absolute protection. So, protection should not be built on such logic.

Incidentally, this was already discussed in [78]. It was also noted there that the reasons for the impossibility of achieving an acceptable state in the event of a violation of integrity constraints are due not only to the initial state, but also to the system's capabilities to "be without air, water and food", i.e. wait out the dangerous time. Is it always possible to wait it out? Answer answering this question requires determining the degree of self-sufficiency of the system, assessing resources, and depending on the environment.

Let's imagine an ideal scenario - the body is constantly provided with everything necessary to maintain life. But for some reason he still dies, grows old and dies, regardless of how much daily bread he has. Where are the gaps in the security system, why does it fail? Maybe because a biological organism is primarily an information learning system?

Being a learning system, it is not capable of restoring its previous state after receiving a new piece of information. Any learning system is constantly changing.

Perhaps it makes sense to consider the aging/dying process and the learning process not as two independent processes, but as one process in which death is the final truth, confirming the fact that all the resources necessary for learning have been exhausted. The fact that all people are mortal may mean that training a person as an informational learning system leads **to purposeful changes in** this system, sufficient for its death.

From here, it is not far to the conclusion that **any knowledge requires the expenditure of such resources of the system that cannot be restored**, for example, nerve cells. Such an assumption, if it is true, will, among other things, allow us to look at the classical theory of information with completely different eyes, bringing it into the shell of the subjectivity of the information object, where it should possibly be, and as a unit of measurement to propose the amount of resource spent by the system on the perception of information. If knowledge is a structure, then new information is a change in structure. At the same time, the novelty of information is directly proportional to the degree of change in the structure.

It is clear that uncontrolled permanent modifications of the structure can lead it to a state in which one or more key elements begin to play a decisive role, tying together the internal parts. This is a very unstable state, because the death of key elements for it is tantamount to the death of the entire structure, all knowledge, the entire system.

An impartial analysis of the problem of aging and death of biological beings is made in the work of M. Lamb "The Biology of Aging", where possible hypotheses for the causes of aging and death are also given:

- "catastrophe of errors", a progressive decrease in the accuracy of protein synthesis, which leads to such a number of defective molecules in the cell, in which the cell is no longer able to function normally;

- aging and death are programmed at the cellular level, which is confirmed by the aging of cellular stamps, i.e. cells have only a limited doubling potential;

- the constant death of non-renewable cells (neurons), leading to the exhaustion of non-renewable tissues and the inability of the body to perform a number of functions;

- Strehler's genetic theory of aging, in which aging and death are the result of differentiation and development, this is a retribution for the specialization of cells (retribution for knowledge and talent). *"The basis of this theory is the assumption that, as a result of cell differentiation, they lose the ability to translate genetic information... If the molecules of some proteins synthesized at early stages of development and initial specialization are damaged, then the cell cannot replace them with new ones, even if it retains all the genetic information necessary for their construction, since the apparatus of protein synthesis is not able to decode it. Thus, the operation of the differentiation mechanism will also lead to aging as a result of the irreversible shutdown of a part of the translation apparatus.'*

Approximately the same results were reached by us, analyzing the system as an information system. Information processes inevitably lead to the death and

specialization of individual elements of the system, and thereby push the entire system to aging and death. Currently, the development and differentiation of biological systems is usually explained by the programmed successive switching on and off of various groups of genes, leaving behind the scenes the explanation of how such programming can be possible.

The theory of SR-networks gives such an explanation for information structures: **programming is carried out by input data**.

In this situation, it turns out that <u>information systems **should be**</u> are mortal. But in biology, along with cell strains, there are also cancer cells, for which the growth potential is unlimited. Which information system can be analogues of cancer cell structures? It is known that in culture, a **normal cell strain can spontaneously transform into a cell line** (cancer cells) at any time. How does such a transformation affect the information processes taking place in such systems? What can be an analogue of such a transformation for information systems?

One answer might be the following.

Self-learning information systems, in order to protect themselves from external influences and thereby prolong their existence, are trying to rebuild the world around them; fitting external data to the desired stereotypes will allow <u>you to keep the world within the boundaries of your understanding for as long as possible</u>, correcting the environment, but not yourself.

<u>When the cognizing subject begins an active adjustment of the environment, then his own evolution ends: then his aggressiveness increases, and traits inherent exclusively to</u> **<u>virus carriers begin to appear on the surface</u>**.

Indeed, recognizing the input data, a self-learning system has only two extreme options for action, between which it builds its behavior.

The first option is to modify your own structures, modifying yourself in the process of tuning to unfamiliar input data.

The second option is the modification of the surrounding world in such a way that only those data that are favorable (familiar to this system) are received as input.

The first option often ends with the second, and the second one, sooner or later, leads to the fact that the environment will begin to undergo irreversible changes, i.e. the behavior of the system under study will acquire **aggressive features** in relation to its environment. In this case, we can talk about the gradual transformation of this system into an infected system, according to the definition of virus carriers given in [77], as systems with an increased level of aggressiveness.

It is quite possible that in its cognition of the world, any self-learning system with a limited number of elements goes through the following stages:

1) self-modification of own structures under the influence of the training sample. Self-modification is carried out as long as the internal complexity allows. There is a process of adjustment to the surrounding world;

2) after the exhaustion of its own resources (a limited number of neurons in a limited internal space), the system begins to adjust the input sample to its own capabilities; thus giving the green light to environmental adjustments. As a result, the system gradually acquires the features of a parasite and eventually becomes them;

3) the parasitic system destroys its host and dies itself.

Is it not this scheme that explains the death of all past civilizations on Earth?

How sadly B. Shaw joked: *"A reasonable person adapts to the world, and an unreasonable person tries to adapt the world for himself, so progress depends on unreasonable people."* Every joke has a bit of truth. Progress really depends on people who are unreasonable, people who are infected.

If we proceed from the fact that knowledge is a structure, then a number of interesting questions can be formulated as conclusions for the chapter.

1. Where does that structure or those elements of the structure that are destroyed go?

2. Is a new "otherworldly" structure formed from the dead elements?

3. What does the concept of "destruction of information" mean if the death of individual material elements introduces new knowledge into the system? Does this mean that information is indestructible?

4. One of the most important properties of information is fluidity. Can information, like a liquid, evaporate, losing parts of its structure, and then return as rain, filling new forms?

5. If the soul exists and at the same time is an information self-learning system, then how can it become immortal, because any information self-learning system is capable of self-destruction?

Chapter 16. The spread of information waves in the social space

When the poisonous breath is ready to touch, it is best to exhale. Sometimes during whirlwinds you can create your own neutralized wave.

Agni yoga

In the process of life of self-generating and self-destructing structures (SR-network), each input/output sequence generates its own specific structure, sometimes blocking within itself previously born structures that are carriers of old knowledge. In the examples considered above and in [77], the author proceeded from the fact that the "old" structures blocked by new knowledge are in a state of expectation, without affecting their environment in any way. But is it really so? In order to simply exist, they must eat something, they must receive their share of energy from the body. They are obliged to share a common "food", the amount of which will not increase from the fact that they become more. And this means that the born phantoms will begin to interfere with each other's "live".

This can be illustrated with one rather personal example. So, already after the book "Infection as a way of protecting life" was published, in which the principles of self-learning were formulated on the basis of self-generating and self-destructing structures, the problem of the equivalence of the concepts of "knowledge" and "structure" did not give me rest. Any further work on algorithms for transforming structures seemed incomplete without taking into account the philosophy of structuralism, which seemed to give rise, like a seed, to the entire theory of CP structures. Some time later, this inferiority was realized in the form of a memory that once upon a time I already had a book on structuralism in my hands.

I called my parents, who live in another city, and asked them to go to the local library and borrow a book with the word "structuralism" in the title.

The book did exist and was called Structuralism for and Against. She calmly stood on a shelf in the library and waited for my father to come for her. The most surprising thing was that not a single visitor took this book for all the past time. The last registered reader was myself, and this event happened during my student days exactly 16 years ago.

There was a clear feeling that her articles, completely incomprehensible to me in those distant years (then the book was only conscientiously flipped through, without going into comprehension) independently matured in the subconscious, making their way to the surface. The structure grew, forming connections with incoming new data.

In the above example, we were talking about a "dry", rigorous theory, seeds which they independently made their way to the surface and made their way, however, for this it took them 16 years.

And what then to speak of emotionally colored knowledge? It should yield almost instantly. As S. Levin wrote in relation to the human psyche [48]: *"Studying anger, fear, doubt or consciousness of our guilt, we begin to see the impersonality of what*

previously seemed to us an undoubted "I". We see that there is another mind in the mind. Anger, fear and remorse - all these states have their own personality, their own energy. And we notice that it is not the "I" that wants to harm others, but the state of consciousness called anger is aggressive in nature and therefore often wants to humiliate and even destroy its object. With bated breath, we follow the fictitious conversations and discussions in the mind, the fights of the shadows with which we used to identify.

And before us again there are habitual analogies with well-known technical systems.

In particular, A.Y. Loskutov and A.S. Mikhailov in his work "Introduction to Synergetics" [53] write:

"The flow of energy passing through living systems makes them active, i.e. capable of self-organization. The main role in the development of biological systems is played by processes of the evolutionary type. They also have analogues among physical systems.

The closest example is the mode competition process in a cw laser.

The laser is a nonlinear highly nonequilibrium distributed system with external energy pumping. When the pump power exceeds a certain threshold, the exponential growth of various modes begins in the system. As the intensity of different modes increases, competition is established between them. Indeed, maintaining each such mode consumes a certain part of the energy flux coming from the pump source. The greater the intensity of this mode, the greater the energy consumption for its maintenance. Since the total power of the pump source is limited, usually only one most efficient mode survives as a result of competition...

All of the above models are used to describe biological communities. In this case, each mode corresponds to one of the biological species, and the intensity represents its abundance."

And the conclusion: <u>if, within a certain small area, the elements of the medium have their own frequency of self-oscillations exceeding the frequency of oscillations of the remaining elements of the medium, then this area will become a source of concentrically divergent phase waves or</u> **pacemaker**.

And also: *"For a one-dimensional and two-dimensional self-oscillating medium, an arbitrarily weak local frequency perturbation is sufficient to create a pacemaker whose action will cover the entire active medium over time"* [53].

Were not all the great conquerors and creators of mighty empires such pacemakers, only social ones?

This whole crazy dance for the right to exist is somewhat reminiscent of fractal painting, when a new order is born from the surrounding chaos, fading and screaming.

Isn't it exactly the same with the waves of Time?

T. McKenna writes [58]: *"Times are interconnected - events have a reason, but these reasons are devoid of reason. Resonance - a mysterious phenomenon when a vibrating string, as if by magic, causes the same vibrations of another string or objects that are not physically connected to it - it suggests itself as a model of that mysterious property that connects one time with another, even if they are separated days, years or whole millennia. I have come to believe that there is a wave, or a system of resonances, which causes events at all levels. This wave is fractal and repeats itself, like most of the newest curves and objects described in the most advanced mathematical research.*

And here, speaking about the processes of interaction between order and chaos, the processes that arise in various physical and mathematical problems, leading to intricate

fractal patterns and fractal melodies, Paytgen X. O. and Richter P.H. noted in [70]: *"They all have one thing in common is the <u>competition of several centers for dominance on the plane</u>. Simple borders between territories rarely arise as a result of such rivalry. More often there is an endless filigree interweaving and an incessant struggle even for the smallest plots. It is in this boundary area that the transition from one form of existence to another takes place: from order to disorder, from a magnetized state to a non-magnetized one, depending on the interpretation of those entities that adjoin the boundary. The boundary regions depend intricately to a greater or lesser extent on the conditions characterizing the process under study. Sometimes a third competitor arises, which takes advantage of the differences between the other two and imposes its own area of influence. It may happen that one center captures the entire plane, but its power has "boundaries" in the form of isolated points that are not subject to its attraction. These are, so to speak, "dissidents" who do not want to "belong".*

Everything said almost word for word can be redirected to laser modes, and to SR-networks, and even to human society. When waves of "Westernization" flood the vast territories of Europe and Asia, then little Cuba stubbornly does not "want to belong." At the same time, according to Corollary 4.1, these "waves" are generated by information <u>about the merits of one's</u> own lifestyle.

At first glance, it may seem funny when an ant begins to teach how to live an anthill. But each "ant" is a source of certain information, certain "information fluctuations", which make others resonate, are amplified by them and diverge in wide circles, "flooding" with themselves all available space, with the exception of individual skyscrapers, "unwilling to belong".

Every country, like every person, has its own skeleton in the closet. The same USA, once burned on the hippie movement, which almost turned into a national tragedy, when the new generation, fed up with the lack of spirituality of society, turned away from the path beaten by their fathers, became very cautious. It was at that time that the first timid thoughts were voiced not only about information control, but, first of all, about purposeful work with information!

When you find out that people like Osho Rajneesh and his ideas were already at the end of our century denied entry to the United States and 21 other countries controlled by the United States in one way or another, you understand that such protection is based on the same primal fear that grips the tribe when a stranger with a different worldview appears.

As noted above, the functioning of the SR-network consists of three repetitive stages:
1) the birth of elements that carry knowledge;
2) destruction of elements, carriers of knowledge;
3) refinement of weight coefficients.

In order to accept new knowledge, it is necessary to destroy the carriers of the knowledge that does not allow the information system to obtain a more accurate result from new input data. In the world of the living, except for the living itself, viruses serve this purpose.

K. Umansky believes that biological viruses help the body to rebuild, change, and thereby adapt to new environmental conditions. And any change is the death and birth of new elements or connections between them. As for viruses, for the most part they implement the process of change by destruction. This path, as shown in [77], also leads to new knowledge. In particular, pathogens of seasonal acute respiratory infections,

destroying individual cells of the mucous membrane, make the body forget about it that it was once warm all around. With the advent of cold weather, this memory of warmth becomes dangerous for the life of the organism. And here, if the body is not able to protect itself on its own, the virus comes to the rescue.

Viruses erase life-threatening memory blocks, thereby inhibiting the development of negative processes that are constantly competing with each other.

If they don't do this, the body will try to apply its old knowledge to new conditions and most likely will die.

It is important to be able later, when the process of change is completed, to find the strength to completely destroy the once useful infection, and not to follow it.

An information self-learning system either carries its death within itself, or is capable of independently generating a self-destruction program, because the destruction operation is one of the basic operations of the self-learning process.

Chapter 17. Psychic self-destruction programs

I believe that the idea of cancer appeared spontaneously, arose from that part of the psyche that is not identical with consciousness.

K. Jung

The processes described in the previous chapter are in many respects similar to those that take place in the mental world of a single person, where various mental and thought processes "defend their place under the sun."

The work [9] describes three main processes inherent in modeling in humans: generalization (the ability to generalize), omission, distortion.

Generalization *is the process in which elements or parts of an individual's model are detached from the original experience that gave rise to these models and begin to represent as a whole a category of which this experience is only a special case.*

Omission *is the process by which we selectively pay attention to certain dimensions of our experience to the exclusion of others.*

Distortion *is a process that allows you to shift the perception of sensory data in a certain way.*

Bandler and Grinder give a sufficient number of examples of the relationship between these three processes. One of them looks like this.

A person who has been rejected several times at some point in his life, through generalization, comes to the conclusion that he is not worthy of someone's attention. It becomes the rule. Now he either omits the signs of attention that appear to him (omission) - they seem to become **invisible to him** or are considered insincere (distortion).

The inadequacy of the internal model to the surrounding world leads to the activation of the corresponding processes.

In principle, even the three named meta-operations - generalization, omission and distortion - will be enough to generate a fairly powerful set of behavior programs, including a program for self-destruction.

This approach is very thoroughly played up in detective works, and especially in the plots of Boileau-Narcejac. The skeleton of a typical script looks something like this.

For one of the characters in the novel, an attacker deliberately forms a false picture of the world. To do this, a certain thought is constantly imposed on him or corresponding events/actions are demonstrated. In the end, in the course of generalization, a deliberately inadequate model is formed, which, using omission and distortion, begins to defend itself. The character, thinking that he is sincere and just, bears false witness, kills, commits suicide. The goal has been reached.

Some authors believe that there is no need to form a self-destruction program, it is present initially in any complex information self-learning system. So, for example, J. Lilly ("Cyclone Center") wrote:

"I suspect that in cases where individuals are about to commit suicide by throwing themselves from a balcony or by being directly in front of a car, these are the programs

*that work. I AM I don't think it's because of delusions projected by the outside world. Rather, there is a **release of the program of self-destruction**.*

The program of self-destruction is not easily released. Its competitors are doing everything to prevent this, bringing to the surface of consciousness the most expensive images, activating processes that can block the execution of the self-destruction program. And then a melody of a different content begins to break through to the surface of the awakened, seething ocean of thoughts:

"It's a pity only volushki, in a wide field,
It's a pity for a sharp saber, but a buckskin horse..."

But here the data of the input training sample changes: it starts to rain with the wind beating in the face, someone steps on the foot, irritably pushes. And one suddenly realizes that life is absolutely and utterly meaningless. And Edgar Poe is right there, and begins to whisper:

"You do not renounce this bed
For sleep does not happen nicer bed."

The defense process ripples, as if from a cold piercing wind, and begins to contradict itself, suddenly remembering the previously blocked lines:

"The woman will grieve, marry another,
Will marry another, yeah forget about me..."

What new input data will come at this moment? Which processes will be strengthened and which will be weakened?

If mental viruses have previously cleaned the memory well, then the self-destruction program will not be able to dominate for a long time, because it is not in vain that people talk <u>about happiness without memory</u>.

Let us illustrate what has been said with two artistic examples, the surprising similarity of which indicates that *"everything paths lead to Rome, but how many are there, roads?* or that the authors of the above plots have traveled along the same road.

J. London, in the closing pages of Martin Eden, writes about the protagonist trying to escape from himself:

"He turned on the light and took the book. It was a volume of Swinburne 's poems. Martin turned the pages for some time and suddenly noticed that he was reading with interest. He finished reading the poem, began to read further, but again returned to what he had read. Finally dropping the book on his chest, he thought. Yes! Here it is! That's it! How odd that he hadn't thought of that before. It was the key to everything: he was unconsciously wandering all the time, and now Swinburne showed him the best way out...

"Tired of eternal hopes,
Tired of joyful feasts,
Not knowing fears and desires.
We bless the gods
For the fact that the heart in man
It won't tremble forever
For the fact that all the rivers will flow
Someday in the sea surface.

After that, Martin suddenly notices that the porthole is wide enough for a person to squeeze through. And if you hang on your hands, then you can touch the water with your feet. There will be no splash.

But the point is. that the porthole was exactly the same before. What has changed? The process for which such a porthole is suitable as input has become dominant. And, figuratively speaking, all external devices (eyes, arms, legs) are used to solve a new task, the task of self-destruction.

"Life has become painful, like a bright light for a person with sore eyes. She sparkled in front of him and shimmered with all the colors of the rainbow, and he was hurt, unbearably hurt.

An algorithmically similar situation is described by L. Tolstoy in Anna Karenina. Here the protagonist is not a talented writer, but a woman in love, and here the heroine already uses a different mode of transport - a steam locomotive has replaced the steamboat, and she, it would seem, has other reasons for suicide. But the rest of the scenario is essentially the same, and even the words accompanying the process of self-destruction are almost the same.

"Yes, where did I stop? On the fact that I can't think of a position; in which life would not be a torment, that we are all created in order to suffer, and that we all know this and all think of ways to deceive ourselves. And when you see the truth, what do you do?

And in this moment of unstable equilibrium, at the moment when several thought processes are equally close to taking over the "central processor", input data arrive that uniquely determines the choice.

— Why is reason given to a person in order to get rid of what worries him, said the lady in French (who was sitting in the carriage opposite Anna) obviously pleased with her phrase and grimacing with her tongue.

The choice has been made. Everything is as in the case of Martin Eden's volume of Swinburne. Control transferred.

"Yes, it worries me very much, and not that the mind is given to get rid of; so it must be got rid of. Why not put out the candle when there is nothing more to see, when it is disgusting to look at all this? But how? Why did this conductor run along the perch, why are they shouting, these young people in that car? Why are they talking, why are they laughing? Everything is untrue, everything is a lie, everything is a lie, everything is evil!..."

The question has been raised. How to get rid, in what way? And this is where memory comes to the rescue. The dominant process has selected those inputs that allow it to express itself as much as possible, "to play with all its colors".

"And suddenly, remembering the crushed man on the day of her first meeting with Vronsky, she realized what she had to do."

Memory again helpfully presented the necessary data. For what keywords were they suddenly found and retrieved?

In the Martin Eden example, the eyes found and helpfully estimated the size of the porthole.

It is done. The carrier has been destroyed. But isn't that how a subroutine containing a command to the operating system to format a magnetic medium works in computer software?

"And the candle, under which she read a book full of anxieties, deceptions, grief and evil, flared up with a brighter light than ever, illuminated for her everything that had previously been in darkness, crackled, began to fade and went out forever."

If we abstract from the texts cited above, D. London and L.N. Tolstoy, then in both cases there is a strict regularity in the development of the process of self-destruction. At the first stage, the main characters have a certain idea, which they selflessly serve, and, what is important, they serve precisely the idea, because the object of their love both named characters seem to have taken out of the sphere of everyday life, enclosing it in the framework of the target function. Therefore, we are no longer talking about serving *"a pale female who will babble common truths all her life",* we are talking about the very meaning of life, which, of course, is much richer. At the second stage, it turns out that the goal is a deception, and there is no longer any strength to find new, more worthy goals. At the third stage, the system decides on self-destruction and commits it.

More strictly and simply this scheme is formulated in the works of F.M. Dostoevsky, in particular in the novel "Teenager" [28].

Someone, Mr. Kraft, who considers himself a Russian and wants to be one, suddenly, having carried out serious studies, *"drawn conclusions on the basis of physiology, which he recognizes as mathematical",* which consists in the fact that the Russian people are secondary. The consequence of such a result is the conclusion that the activity of any Russian person serving Russia must be paralyzed.

The logical development of this idea was suicide. Kraft shot himself.

The murder weapon in this case also occupies an important place in the thought process of making a decision.

— *If I had a revolver, I would hide it somewhere under lock and key. You know, by God, it's tempting! I may not believe in an epidemic of suicides, but if this sticks out before my eyes, it's true, there are minutes that will tempt.*

"Don't talk about it," he said, and suddenly got up from his chair.

In this case, Kraft came to conclusions about the secondary importance of the Russian people and, accordingly, himself, more or less on his own. However, this independence was most likely brought to life by an inferiority complex for compliance with the Russian person, which became the reason for the activation of the corresponding programs of self-destruction. And the more such handicapped, the more terrible for society tomorrow.

It is important to note that logic and the so-called reasonable reasoning can in no way stand in the form of a "reinforced concrete" barrier on the way to the fulfillment of the mental bookmark for self-destruction, because Life, being projected into the structure a complex information **self-learning system**, i.e. a system that contains elements for the implementation of a wide variety of functions, including mutually exclusive ones, becomes illogical.

For a complex information system, anything can be logical, including Death.

In the eternal struggle between Life and Death, logic is for the most part on the side of the second opponent. Life is illogical, and immortality is especially illogical. Therefore, any religious myth at one stage or another in the life of a complex self-learning system must necessarily become her contradictory. It makes no sense to demand that it be consistent for any time and any observer.

A person who is accustomed to relying on logic will also look for it in proving the need for his own self-destruction, naively hoping that it is sound reasoning that will be

the savior that will lead the system from the brink of the abyss. This person is not able to realize that when the process responsible for the death "rules the ball", then logic serves only this process, confirming its correctness with strict formal proofs.

Here is an example of such logical reasoning: *"Human nature has a certain limit. A person can endure joy, grief, pain only to a certain extent, and when this degree is exceeded, he perishes. This means that the question is not whether he is strong or weak, but whether he can endure the measure of his suffering, whether mental or physical, and, in my opinion, just as wildly say: that coward who takes his own life - how to call a coward a man dying of a malignant fever."*

And a little further:

"And tell me, doesn't suicide resemble a disease? Nature cannot find a way out of the intricate labyrinth of conflicting forces, and man dies." Woe to him who will look at all this and say:

"Stupid! If she waited for time to have its effect, and despair would subside, there would be another who would console her." It's like saying: "Fool! He's dying of a fever. As soon as he waited for his strength to be restored, the juices in the body to clear, the excitement in the blood subsided: then everything would have worked out, he would have lived to this day." (I. Goethe. "The Suffering of Young Werther").

In the novel [27], Fedor Mikhailovich, through the mouth of one of the characters, formulates a statement (Statement No. 4 from part 2) that in order to reprogram society, it is necessary to bring it into a state close to chaotic: *"for the systematic shaking of the foundations, for the systematic decomposition of society and all principles; in order to discourage everyone and make a mess out of everything... ".*

Another protagonist is trying to highlight that invisible thread that connects any person through the Motherland and culture with the infinity of the Universe and the targeted information impact on which activates programs of self-destruction, Stepan Trofimovich formulated the law of existence in this way: *"...The whole law of human existence is only to man could always bow before the immeasurably great. If people are deprived of something immensely great, they will not live and will die in despair. The immeasurable and infinite is just as necessary for a person as the small planet on which he lives...". The* informational weapon can be used precisely for the destruction of this particular connection with the "immeasurably great" in a person. After that, he will reach the idea of self-destruction himself.

The works of F.M. Dostoevsky, being translated into other languages, like nothing else, became that knowledge about the system called "Russian people", which was the basis for modern developers of strategies and tactics of information warfare. It is no coincidence that Dostoevsky's novels were obligatory for Sovietologists and Kremlinologists.

Surprisingly, it was the Kraft scheme that became the prototype toy informational propaganda that is being implemented today. As a result, the number of suicides and people whose will is paralyzed, people trying to isolate themselves from life with a glass of vodka has increased dramatically and there is no tendency to slow down this growth yet.

It is deeply symbolic that the novel containing the prototype of the classic information warfare strategy is called "Demons".

It turns out that for a self-oscillating medium, the properties of which are inherent to some extent in the human psyche, sometimes an arbitrarily weak local perturbation of

the frequency is enough to give rise to a pacemaker, the action of which can eventually cover the entire environment.

But when is the pacemaker responsible for the death of the system in the case of a particular person born? Maybe it happens simultaneously with the birth of a person? Or even earlier, when the process of neuron birth is completed and their death? Or at the moment when "the rocket flies past the goal", and life begins to be perceived as torment? And can another pacemaker drown out the disastrous melodies-waves?

"I have never spent a month without thoughts of suicide," wrote the author of "The Decline of Europe" O. Spengler.

But on August 1, 1914, the situation changed, and he began to embody the idea of "The Decline of Europe." As a result, the author received an additional 22 years of life.

True K.A. Svasyan believes that the pacemaker, corresponding to the idea of "Decline of Europe" was born simultaneously with Spengler himself. *"The impression is that everything in this life, from the earliest years, was designed for a future book and that the book itself could not have been written except from the experience of such a life," he* writes ("Oswald Spengler and his Requiem for the West") [112].

On May 8, 1936, at the age of 56, O. Spengler died of heart failure.

Each self-learning information system, each person carries his personal pacemaker in his soul. Sometimes this pacemaker is enough to make all other similar "frequency generators" sound in unison throughout Europe or Asia, and sometimes it is only enough to get to the window overlooking a busy street and watch people passing by past.

Sometimes a pacemaker is ready to change his own frequency to one whose energy is capable of leading him, to someone else's energy!

Someone else's energy, like someone else's information, can never become one's own without rebuilding the system for oneself. She can fill an empty vessel, she can spill the contents that she does not like.

"Foreign" information is a foreign program of behavior. The behavior program is responsible for generating answers to life's questions.

It is clear that in the absence of unambiguity in the understanding of the criteria, the results will be completely different. The same impact on different systems makes it possible to get as a result not only the "Decline of Europe" or "Capital", but also the murder of a greedy old woman by Raskolnikov and the suicide of Kraft, meaningful by F.M. Dostoevsky.

Chapter 18. Self-destruction in the Software World

*Tread carefully, perhaps
we are walking among
sleeping snakes.*

Agni yoga

At the beginning of 1996, a new step was taken in the development of the software industry. This is an agreement between MCI Corporation Communications and Microsoft to share their online network services for product marketing (Computer™. 7(213) 1996, p.3). It is supposed to drastically reduce the prices of individual software products to a few cents and at the same time build a self-destruction mechanism into these programs. As a result, the program will be able to "live" for one or more days. The world of software will become even more like the world of biological objects. Please note that <u>death is artificially introduced into the world of software products in order to make it evolve faster</u>.

The mythological history of mankind also contains a similar plot. An immortal person is expelled from paradise and loses immortality. The Creator includes in his creation a mechanism of self-destruction. Isn't he doing this so that the system can quickly give answers to the questions asked them questions?

From the point of view of SR-networks, the inclusion of the mechanism of self-destruction of individual elements in the system accelerates the learning process of the entire system as a whole, and therefore accelerates the movement of this system towards absolute truth.

As subtly noted by F. Nietzsche: *"There is a right by which we can take the life of a man, but there is no right by which we can take from him death".*

In view of the foregoing, let's look at the theory of artificial intelligence when applying it in the implementation of the evolutionary approach to the development of systems and, in particular, at the work of D. Lenat on the creation of the Evrisko program, related to the beginning of the 80s. The Heuristics program contained a set of basic concepts and heuristic rules capable of generating new ones and changing, including destroying old ones. The heuristics themselves were formulated as concepts, which means they could be applied to themselves.

Today, a somewhat similar approach is successfully developing in the construction of DBMS in which the database elements are not only objects (texts, facts), but also subjects (programs, instructions). At the same time, the description of the fields contains information about what can be done and in relation to which objects with their contents. As a result, the input data independently form the structure of the knowledge base and determine its functional content.

D. Lenat, having determined the methods of directed "mutation" of heuristics, "let the system float freely." As a result, after some time, the system generated a heuristic, which amounted to the destruction of all previously created concepts. In the case of the Heuristics program, this heuristic was one of the first to self-destruct, and the death process stopped. This salvation became possible not because of the evolutionary approach implemented by Lennon, but simply because such was the technique of the implementation itself. In modern microprocessors, for example, an instruction taken for

execution, thanks to the pipeline principle, will be completed to the end even when it is present among the first overwritten instructions.

Thus, Lenat demonstrated something more important than the mechanism of non-random mutations within the evolutionary approach. They were shown that <u>in the process of development, programs of self-destruction can (should?) be generated</u>.

Is the birth of such a pacemaker accidental in the process of evolution or is it inevitable? For the system itself, this problem is unsolvable, since the parents of the pacemaker are the input data and the current state (complexity, power) of the system. However, the presence in the initial set of operations (rules, heuristics) of all the necessary components for creating means of self-destruction and the need for the property of self-destruction to solve problems of self-learning (and hence survival) leads to a paradoxical and contradictory answer, which consists in the fact that **the pacemaker responsible for self-destruction is an indispensable element of any self-learning system**. <u>A self-learning system is always open to such a question, the correct answer to which is multiplication by zero</u>.

If it were otherwise, an information self-learning system would not even be able to understand much of everything that it can be asked, asked and will be asked.

This is a very important result. If there were no self-learning systems of this nature in nature, we would never have to talk about information wars between them.

Being producers and consumers of information resources, self-learning systems try to identify the most significant input data flows that control the world in the surrounding space and put them under their own control. Solving this problem means completely protecting oneself from neighbors, while neither a strong fence nor powerful means of physically destroying the enemy are needed. Therefore, self-learning systems are constantly looking for the most valuable messages hidden in the information noise of the current day. Such messages for information-living systems are like candy in a colorful wrapper for a child. But in the world of information cataclysms, sometimes under the beautiful label of an allegedly verified fact, an information poison is hidden that activates the program of self-destruction.

The system will respond to the call and, without looking at your feet, will take its step...

Chapter 19. Self-destruction of civilizations

The lights went out, the radiance burned out!
Above every figure, trembling, dumb
Like an ominous shroud, the veil is spinning.
a storm
And the angels, rising from their places, turn pale,
They claim, enveloped in darkness,
That this tragedy is called Life,
That the Winner Worm is the hero of that drama!

E. Poe (K. Balmont)

All of the above is directly related to humanity as an informational self-learning system.

In the process of its development, as a self-learning system, programs of self-destruction can (should?) be generated. No development, no training is possible in principle without these programs. In the case of humanity, individual people can no longer be carriers of such programs - there is not enough strength; they are, most likely, human civilizations. Let's try to look at the existing systems of cultural values, at existing civilizations, as possible carriers of programs of self-destruction dangerous for all Humanity.

Speaking about this problem, it is necessary to answer a number of fundamentally important questions: What is development? Is it necessary for the life of systems? Is this process inherent in all information self-learning systems?

On Earth, according to the historical concept of Toynbee's development, only at the present time there are still 650 primitive societies that arose, perhaps, hundreds of thousands of years ago and stopped there. These primitive societies gave rise to modern civilizations, but only one of them, the Minoan (Western society), suddenly switched to the rails of accelerated technical re-reproduction with an ever-accelerating speed. - began to progress rapidly, like a cancerous tumor, filling the biosphere with itself, displacing all other human civilizations. And today, other civilizations, being infected, are either forced to die or prolong their existence at the expense of the planet's body.

Hereinafter, the term **civilization** is understood *as a set of living beings conceived as a reality with its own material and spiritual culture.*

S.D. Khaitun in his work "Mechanics and Irreversibility", having received a rather controversial result that *"evolution is irreversible, and it takes place in the direction of a widespread and ever-accelerating growth of entropy"* (according to Khaitun, "entropy" is not a measure of chaos), uses the concept of "evolution" at the present stage only to representatives of Western civilization and identifies all of humanity precisely with one - Western civilization, although he perfectly understands that Western civilization is: *"Race with death — such is the content of human activity for the entire foreseeable future...*

In any scenario, humanity as such will be preserved (changing it can be biologically and socially) and will spread in the Cosmos, mastering more and more stellar worlds, expanding spherically from the starting point and leaving behind a dead zone inside the sphere."

It is known that an infection leaves *a dead zone inside the sphere.*

Moreover, the obligation to create this "dead zone" for all mankind and the irreversibility of evolution does not follow from the laws of nature known to us. The fact that over the course of several millennia humanity has been observing the growth of material production does not say anything about whether this production, and humanity itself, will be in tomorrow or there will no longer be a place for it there.

The supporters of Western civilization have their own science, their own arguments and arguments. This is clear - the struggle of civilizations is conducted not only in the economic sphere, but also in the sphere of cultural and scientific achievements, and, of course, there must be people who declare and defend the correctness of the infected part of humanity. Sometimes they do it consciously, sometimes they don't.

But how does one relate to the following arguments of the same author [102]?:

1) *"It may turn out that the problem of thermal pollution has no solution in principle. This will mean that humanity will go into space, leaving behind the Earth, unsuitable for life. Perhaps the Earth will be destroyed in this case in order to energize spaceships, perhaps it will not be blown up, but the living world on it with part of humanity will die"* (p. 362);

2) *today the "mothballed" primitive societies are being "remothened" under the influence of Western civilization (p. 360);*

3) *only Western society with its technology can take humanity into space (p. 359), i.e. to rescue.*

But whom is Western civilization going to save and will save? Only yourself and at any cost. Western civilization, like infections of any nature, does not care about the rest of humanity if it cannot be "consumed" or exploited.

And what does the term "re-preservation" of primitive societies under the influence of Western civilization mean? Levi-Strauss gave a fairly complete answer to this question: *"... But along with civilization, previously unknown diseases came to these areas, against which the local population had not yet developed immunity. Tuberculosis, malaria, trachoma, leprosy, dysentery, gonorrhea, syphilis, and the mysterious disease called "kuru" are now raging there and claiming many lives. The latter is a consequence of the contact of "primitive" man with civilization. "Kuru" is a genetic degeneration that always ends in death and against which medicine is powerless.*

...In Brazil for the period from 1890 to 1950 a hundred tribes died out... In the Munduruku tribe in 1925 there were 20 thousand people, and in 1950 1200 remained. From the Nambikvara tribe, in which 1900 there were 10 thousand people, in 1940 only about a thousand survived. In the Kayapo tribe on the Araguay River in 1902 there were 2500 people, and by 1950 there were 10 the same picture is in the Timbira tribe - 1000 people in 1900 and 40 - in 1950.... In 1954 on the Guapora River, which separates Brazil and Bolivia, a settlement was founded for the Indians, in which 400 people from four different tribes gathered. Within a few months they all died of measles."

However, in reality, the world is not so one-sided, and in no case should one equate "Westernization" with humanity. This equal sign is a convenient psychological device in the information war declared by the West against Mankind.

An amazing statement by one of the leaders of the Indians from Taospueblo named Loco Tenente Gobernador on the problem of the religious structure of the world led K. Jung in his lecture "On the Archetypes of the Collective Unconscious":

"Americans should stop oppressing our religion, because when it disappears, when we can no longer help our Father Sun move through the sky, then Americans and the whole world in ten years will see the sun stop rising." Jung commented on the words spoken by the old Indian as follows: *"This means that night will come, the light of consciousness will go out, the dark sea of the unconscious will break through."* This is how it should be the result of such an information policy, which we call information warfare here.

As for the structure of the political system that is being imposed on the world, L.N. Tolstoy: *"When among 100 people one rules over 99 - this is unfair, this is despotism; when 10 rule over 90, this is also unjust, this is an oligarchy; when 51 rule over 49 (and that only in the imagination - in essence, again 10 or 11 of these 51) - then this is absolutely fair, this is freedom! Could anything be funnier, in its obvious absurdity, of such reasoning. Meanwhile, this very reasoning serves as the basis for the activity of all improvers of the state system."*

The line under all of the above here and now was drawn back in 1963 by Claude Levi-Strauss [47]:

"Never during the last four centuries of his existence has man had a better opportunity than now to understand that, arrogating to himself the right to establish barriers between the human and animal worlds, giving the first everything that he takes away from the second, he sinks into a certain hellish circle. For this barrier, becoming more and more impenetrable, is used to separate some people from others and to justify in the eyes of an ever-shrinking minority its claim to be the only human civilization. Such a civilization based on the principle and the idea of an elevated opinion of oneself, is rotten from its very birth."

Face trend.

But other civilizations, which have somewhat different "universal values", for some reason, still do not want to go into oblivion. Yes, apparently, and the Earth does not dream of turning into a scorched desert. Its noosphere is not a passive formation, but an active, agitated surface, defending its right to exist. How does she do it?

Infections do not always manage to destroy the system. Sometimes with great difficulty she manages to defend the right to her own existence. The confrontation of civilizations and wars between individual peoples representing them are a typical example of the manifestation on the visible surface of the processes associated with ensuring the safety of an infected organism.

One of the reflections of the ongoing battle - these are social theories that periodically disturb human minds, theories of the "single organism", equality and inequality, "free market", etc. Some of them are aimed at accelerating technical progress and production, others preach the construction of societies that do not strive for accelerated production and overproduction. Life in practice is or another scale, but tried all of them. For example, our people had the opportunity to experience the implementation of the most opposing theoretical concepts. In the bygone era of socialism, only those goods were

produced in the country that were vital for the existence of the population, and only those means were developed for the state that were necessary for its protection. Figuratively speaking, part of humanity, like a devouring creature, deprived of appetite, and it was content, like the Indians, with a crust of bread and a mug of water.

Eastern civilizations follow a slightly different path. In order to deprive a person of "appetite", they use the harsh dogma of faith, organizing the educational process on the principle of strict obedience to individual religious requirements. Violators are either physically destroyed or morally condemned.

It is clear that with such initial data, in the event of the victory of theories based on the primacy of the public or divine over the personal, on the scale of the Earth, the problems of the death of civilizations and environmental pollution would be solved by themselves in a planned manner, since there were, first of all, no economic forces interested in plunder and profit from plunder.

In the course of the great confrontation between East and West, the fundamental question was essentially resolved: what is primary - individual freedom or the interests of the whole society as a social organism? Where is the reasonable boundary between serving oneself and society? Strange as it may seem, all these questions relate to the same problem of immortality. The body does not need immortal cells. To survive you need to constantly learn, and to learn - need to be updated. Therefore, as long as the cell honestly serves the body, it is mortal. As soon as the cell's own interests become paramount for it, it will approach individual immortality, thereby turning into a cancer cell. Now the body will begin to die. All the same we observe at the social level, at the level of life and death of civilizations, at the level of life and death of all Humanity.

Today, the information war is already directly a war of civilizations, it is a clash of various basic goals, knowledge, theories. The defeat of the goal setting "man for society" led to the destruction of the protective boundaries of Mankind. The infection got the opportunity to "reopen" an additional sixth of the planet.

Elements that have the weakest "attraction" to their own kind (which are dangerous for a given structure) are washed out of the structure by time and spread throughout the "organism". They are like grains of sand in the desert, they roll back and forth under the pressure of the wind, or, like river sand, they are washed away by water and carried forward with the current. But there is a barrier somewhere. The sand is washed on it, fastened by the roots of plants, and an island appears, which divides the river into two branches. Sometimes such islands even cause the river to change course, overflow and create pools of stagnant water.

It is quite possible that the foci of infection that form in the human body have the same scenario as the basis of their occurrence. As long as dangerous micro-organisms, unicellular parasites or cancer cells are distributed evenly throughout the body in small numbers the body controls them or simply does not notice - they are not dangerous. But when, by chance, the blood carries all the "parasites" into some kind of "sump", and there the number of dangerous elements exceeds the critical level - there is a focus of infection.

As long as the body-vessel is shaken regularly, evenly mixing the contents, while "terrifying" lymphocytes to all foreigners and violators of the rules of behavior, until then the diseased cells will not threaten the body and themselves as well.

Now it is proposed to look at the history of the emergence of a social entity called the United States. It appeared according to the above scenario, i.e. just as foci of disease arise in the body.

As long as the American continent remained undiscovered, the alienated members of certain peoples migrated evenly across the territory accessible to them, regularly destroyed by wars, without posing a serious danger to humanity and the planet as a whole. But then the "wind" changed, turned the weather vane and began to point them persistently in only one direction. And all the outcasts who broke off relations with their families, friends, Motherland, i.e. all those who are not capable of normal contact in their own native environment gradually gathered together and drifted to one place on the planet. The revolutions and wars taking place in the world now already worked for this formation, providing a constant influx of rejected "cells" across the ocean, into one country. Very soon, their number exceeded a critical level, and the disease, which could not have happened before, suddenly began to progress sharply. Only a few decades of our century turned out to be sufficient for the infection to be able to grind with its insatiable jaws not only the ecology of the planet, but also its own kind, infecting them with the "virus of consumerism at any cost".

If we continue the analogy with the human body, then the vital activity of a social object called the United States is somewhat reminiscent of differentiated cancer " - a form of cancer in which cancer cells are partially organized and become similar, but only externally, to normal tissue. However, from differentiated cancer to aggressive is only one step away and it looks like it has already been taken.To confirm what has been said, let's turn to the official document, the US national security strategy FOR the next century, presented to Congress in May 1997 г. There, in particular, it is noted (quoted from the journal "Foreign Military Review" No. 8, 1997):

"Our principled approach is as follows. First, we must be ready to use all the instruments of national power to influence the actions of other states or forces. Second, we need to have the will and the ability to play the role of global leader and be a welcome partner for those who share our values. America's leadership and involvement in international affairs is essential to its security, and as a result, the world becomes a safer place.

US leadership is underpinned by the strength of democratic ideals and values: Our strategy is based on the premise that the spread of democracy strengthens American values and enhances our security and well-being. Consequently, the trend towards democratization and the spread of free markets around the world is helping to advance American interests.... We strive, firstly, to ensure that no critically important region of the world is dominated by a power hostile to the United States.

... The United States will vigorously support reforms in Russia and prevent any backtracking."

Said simply and accessible. If other civilizations have different values, a different vision of the world, then the United States will do everything possible to prevent them from dominating *"any critically important region of the world."* Thus, we are already talking about the impact of the infection on the entire planet, on all Humanity.

What else can get in the way of the disease? To date, the patient is even faster alive than dead, which means he is able to fight for his life.

Recently, the term "environmental terrorism" has been appearing more and more often in the press. What is hidden behind it? While a little. It is known, for example, that

in 1996 members of the Canadian society " Sea Shepherds "sank 8 whaling ships, which in the United States, the losses from the actions of environmental terrorists amount to about 25 million dollars a year, and other similar facts. What will follow them? Serious planetary movement or is it just the convulsions of a dying person?

In addition, it is quite possible that the planet itself is able to solve the environmental problem and get rid of the part of humanity that is too aggressive towards it. So M.I. Doroshin, who has done serious work in this direction, writes [26]:

"...For representatives of the fauna, there is probably also a resource of genetic plasticity of the species, having exhausted which representatives of a certain species must leave and helps to leave the syndrome of induced immune deficiency (SIDS). He. SNID is inherent in all representatives of the terrestrial fauna of the level of the third or fourth transmutation. Moreover, and this is extremely important, genetically different-aged representatives of the species perceive SNID differently, i.e. a genetically young representative of the species perceives SNID without prejudice to himself. Therefore, for the African pygmies and their genetic relatives in India, PRID is still harmless - they have not matured!"

In addition, *"the probability of having children from sexual contact between representatives of genetically uneven peoples is 1-2 percent. But in the second generation, these same 1-2 percent, while retaining the ability to have sexual contact, lose the ability to continue the species - they are asexual."*

Interestingly, something similar to the resource of the genetic plasticity of a species exists at the cellular level, which is confirmed by the aging of cellular stamps, i.e. cells have only a limited doubling potential [56]. The cell stamp, having exhausted this resource, dies out.

True, a cell stamp can sometimes spontaneously turn into cancer cells with unlimited doubling potential (immortality). Isn't the same thing happening to humanity right now? When one of the modern civilizations - Western, has already acquired all the features inherent in infected tissues:

a) an increased level of aggressiveness towards a higher-level system (the biosphere), of which it is an element;

b) prolongation of one's own life, one's own influence, using all possible ways:

- artificial insemination;

- development of means of protection against SNID, in particular, successful operations for the complete replacement of infected blood, etc.;

- space exploration with the prospect of "infection" of other planets;

c) the creation of virtual reality, the life span of which for virtual objects copied from real ones, including from characters that have already died or never existed, is not limited in any way.

Some authors believe that all of humanity, and not just individual representatives of Western civilization, can be saved through space exploration. The most reasonable, from my point of view, is the theory of V.I. Shapovalov. The essence of which is as follows.

Each system has its own critical level of internal organization. The system self-orders or self-destructs, depending on whether it has exceeded the critical level of organization in its development or not. In the case of humanity, we have the same pendulum. If the critical level is exceeded, then wars return the system to its original state, after which creation begins again.

The critical level of organization for the system can be reduced or increased. For example, in the case of a change in the structure of the system (the number of elements and connections between them), the new structure will correspond to a new critical level of its organization, which means that the point will shift, the achievement of which will inevitably lead to destructive changes.

In this situation, the purposeful self-modification by the system of its own structure can for some time postpone the onset of the crisis. In particular, for humanity, an increase in the colonized space for some time allows to weaken internal contradictions; Thus, the development of America at one time led to the outflow of the most active and energetic natures from Europe across the ocean. This resettlement led to an increase in the openness of the Europa system. The increase in openness has in turn changed the critical level of system organization.

Following V. Shapovalov, according to the same logic, the modern colonization of the territory of the former USSR will allow the United States to postpone its own crisis for some time. To save all modern humanity, V. Shapovalov proposes to restructure the Humanity system, to make it even more open - populate the moon. *"The Earth - Mankind - Moon system will turn out to be less closed than the previous one, so its critical level will be higher and entropy can be reduced by a large amount before the threat of total annihilation arises"* [109].

Is everything flawless in this logic?

Is what was true for the time of the development of new lands must necessarily retain its truth until the present day?

Over the past century, the way people communicate has changed. If earlier the structure of mankind, the connections between people and states, were mainly determined by the territory, place of residence, now this structure is increasingly determined by the structure of telecommunication systems. The structure of humanity is more and more fully reflected in the structure of the global telecommunications system, which allows almost instantaneous information interaction between any elements of the system.

In the presence of universal telecommunications, even the settlement of the Moon will slightly increase the openness of Mankind and can do little to help him.

The Internet entering every home will be that extreme point of the pendulum, above which the pendulum can no longer fly in this direction, but on the other hand, all roads will be open on the day of the return movement.

The first thing to be swept away by the pendulum on the way back is the infrastructure of information exchange, but since by that time this infrastructure will already become the base on which humanity will perch, this blow will be a blow to the foundation.

"Traditional terrorism did not threaten society as such, did not affect its foundations. High-tech terrorism of the new era is capable of producing a systemic crisis for the entire world community, at least for countries with a developed information exchange infrastructure" ("White Book of the Russian Special Services").

In conclusion of the section, it should be noted that the modern use of information weapons affects not only the target to which it applies. The modern information war is a war of civilizations.

Therefore, one of the most important questions for the survival of mankind is the following: "Are information wars inevitable?"

Any phenomenon that can change over time quite often turns into its opposite. And here it makes sense once again to recall the evolutionary process and see what mechanisms underlie it in relation to humanity and wars.

According to Darwin's theory, the fittest should leave offspring. This statement is quite general, especially in relation to information expansions, since it is not clear how to measure the degree of fitness, how to measure it and how to identify the processes caused by it?

To begin with, it makes sense to analyze the processes associated with weeding out the least adapted systems that occur at various stages of human civilizations, in the presence of cold, firearms, nuclear and information weapons.

Wars have always been one of these frontiers, the bar that had to be jumped over in order to leave offspring. In terms of such weapons as a club, spear, arrow, etc. they made it possible to weed out the physically and mentally weakest. As for wars themselves, their face is largely, if not entirely, determined by the weapons used. Weapons are being improved the face of war is changing; means change - goals and scope change.

Today's analysis of such a phenomenon as war allows us to identify the following trend: the improvement of weapons leads to the fact that each subsequent war includes more and more people in its orbit. As a result, not only those who take part directly in the battles suffer from wars, but the most defenseless and distant part of the population.

Remember the American atomic bombing of Japan. For destruction, the population of the most defenseless cities was chosen, in which the flat landscape prevailed, and preference was given to wooden buildings.

Weapons of mass destruction destroy everything indiscriminately: the strong, the smart, and the stupid. Today, the war is not that colorful idyll, when on holidays the peasants went out from village to village to wave their fists and "amuse the power", and later went on campaigns, famously flying into the saddle of a waiting horse.

The new weapon changed not only the very nature of war, but also the role of war in human evolution.

War has ceased to be a mechanism of evolution in relation to individual systems (people), but has become a mechanism for the evolution of civilizations.

The information war is no longer a war between individual states - it is a war between modern civilizations.

The advent of telecommunications, which can be used to control the masses, bypassing territorial boundaries, allows you to expand the theater of war to such depths, which are sometimes called the "spirit of civilization."

To the delight of modern information aggressors, not all victims understand this.

It is clear that the information war does not arise from scratch. Before it, ordinary wars were waged between the same representatives of the opposing sides for a long time, for a long time one culture was opposed to another, and the values of this or that civilization tried to outweigh each other on the scales.

In short, the origin of information wars are the same reasons as in the case of conventional wars, so it makes no sense to dwell on this issue in this paper.

We note only one aspect, which is the following.

All wars, as a rule, end with a peace treaty and the losing side, as a rule, is not subject to total destruction, although there are exceptions in history and humanity. But, nevertheless, there are international treaties that protect prisoners, and all events related

to hostilities and subsequent occupation are more or less understandable, somehow formalized and have explanations.

In the case of an information war, everything is different. Here, sometimes even the victim does not know that she is a victim and may never find out. This is due to the fundamental difference in the subject area of application of information weapons. Conventional weapons are used in terms of manpower and equipment, while informational weapons are used mainly in the control system.

The global information war is designed to leave only one civilization on the planet. From the moment she remains alone, the slowly smoldering process of dying will turn into a phase of agony - the infection will begin to intensively devour itself.

Mankind, like Faust, blinded by today's Care, in reality digs its own grave, imagining how they will live *"...an old man and a child. A free people in a free land."*

And the strikes of spades on the ground, the rumbling of engines of excavators and tractors, the clang of cranes and the squeal of saws are perceived as a life-affirming melody, because the blind mind cannot see that everything is fine only in virtual space, but in fact, technology works here because a person is in a hurry. He is digging his own grave.

Conclusion

The ability to self-destruct is an essential element of any complex information system capable of self-learning.

"Is it worth it to suffer so much to learn so little," according to [54], this is what one orphanage boy said when he reached the end of the alphabet. If the same phrase comes to the mind of a respected reader who has reached the end of the third part, then the author reminds that his main task was to please the reader, not by introducing new encyclopedic knowledge, but by changing the point of view ("assembly point") of the reader to ongoing processes. We all look at the same thing, but we all see different things.

"Understanding how the most complex diverse phenomena are mathematically reduced to such simple and harmonically beautiful Maxwell equations is one of the strongest experiences available to a person," M. Fon Laue argued.

Unfortunately, the author failed to reduce all the problems of the information war to one or more equations of physics or to one or more algorithms written in any popular programming language. That exquisite perfection, at first glance, could not be obtained. The little things that, according to Michelangelo, create perfection, turned out to be simply unbearable at this stage of the development of the problem due to their multiplicity and "invisibility". But, it was possible to show the main thing, which is that the basis of any information war before victory is laid down in the fighting systems themselves, aimed at self-destruction. Sometimes these are just a few commands, a few short, small, refined commands, confirming once again the fact that there are no small things as such.

It is possible that nature has set its own activation time for each bookmark, such as inevitable aging for a person. The task of the information aggressor is that. to bring this moment closer.

How could such a thing be possible? This will be discussed in the next part of the work, in which it is time to move on to the most important question: How does a targeted information impact trigger self-destruction mechanisms?

Without this possibility, the price of information weapons would be zero. Sometimes the aggressor himself acts as a pawn, being controlled by another aggressor.

The victim is the aggressor illustrate what has been said, an example from the cartoons of H. Bitstrup: The boss expressed dissatisfaction with his deputy, who expressed dissatisfaction with his subordinate. The subordinate yelled at the secretary, she at her lover, who kicked the dog in a rage. The enraged dog that escaped to freedom accidentally ran into the Chief. A series of sketches on this topic by Bitstrup is called "The circle is closed."

PART FOUR. THE PROBLEM OF INVISIBILITY

The most important thing is what is invisible.
AND. Saint-Eyuxupéry

Introduction

If in the previous parts of this work the main attention was paid to **obvious threats**, that is, to that information, perceiving which the system is aware of the fact of perception and understands that it becomes the owner of new knowledge, new skills, now it is time to investigate other **questions:** self-learning system? What do the concepts of **awareness and consciousness mean** for an information system? Within the framework of which model is it convenient to use the concept of "consciousness" and is it worth introducing this concept for information self-learning systems.

In order to answer these questions, a **model of an information self-learning system is proposed**, which is based on the following statements.

1. An information self-learning system is a set of interrelated algorithms (programs) capable of independent implementation and modification.

2. The system is trained by generating, destroying and modifying programs/subroutines (algorithms) in it.

3. Learning is carried out as a result of the impact on the system of input/output data.

four. Processing of input data by an information self-learning system can be carried out in parallel, i.e. several chains of various subprograms can be executed in parallel in the system, capable of influencing each other.

For example: *"The owner of fifty thousand stole a handbag in which there was a tortoiseshell powder box, a trade union book and one ruble seventy kopecks of money. The wagon stopped. The amateurs dragged Balaganov to the exit. Passing by Ostap, Shura mournfully whispered: "What is this? Because I'm mechanical."* (I. Ilf, E. Petrov "The Golden Calf").

5. At any given moment, the system is able to observe itself. This is what she does all the time:

"Mind is cunning. Realize that it can only exist when you are in business, when you are busy with business. When you are not busy, it evaporates; he cannot exist without work. Therefore, people are busy with business, even sitting idle." (O. Rajneesh. "White Lotus").

6. We will call the observed chain of executed programs the **consciousness of an** informational self-learning system.

Approximately the concept **of "human consciousness" is also defined** by S. Lem:

"Consciousness is a part of brain processes that has been separated from them so much that subjectively it seems to be a kind of unity, but this unity is a deceptive result of self-observation. Other brain processes that lift the consciousness, as the ocean lifts an iceberg, cannot be directly felt, but they make themselves felt sometimes so clearly that the consciousness begins to look for them."

7. The input data subject to processing by the observed chain of executed programs will be called **conscious**. All other input data of this system will be called **unconscious.**

8. We will call the input data perceived as a threat **an explicit threat**.

9. Unconscious input data will be called **hidden**.

10. Input data hidden from the system that threatens its security will be called a **latent threat**.

"In a fit of grief and guilt provoked by the second session of LSD, I apparently injected myself with foam. Something in me knew this action was deadly. The most frightening thing about this whole episode was the fact that one part of my brain used the information stored in it to kill another part. As far as I can remember, I did not deliberately attempt to kill myself. Thus, it was indeed an "accident"." (J. Lilly "Center of the Cyclone").

Within the framework of the model formed on the basis of the above statements, we will try to formulate and solve the problem of protecting an informational self-learning system from informational weapons. Let's start the search for a solution in the direction of organizing control and self-control of the processes occurring in the system, putting forward the following statement.

Protection against information weapons involves monitoring the implementation of the self-destruction program and blocking its work.

This direction of security does not imply protection from external input data, such as filtering, according to J. Hasek: *"A well-bred person can read everything."*

This direction is associated primarily with the protection of the system from its own responses, which are sometimes just a natural reaction for it to external events.

Chapter 20. Information threats

The initial postulate for this chapter is that the input data itself activates in the information system the appropriate algorithms necessary for their processing.

It is clear that the input data are different and cause different reactions in the system that perceives them. Moreover, reactions can be very different, including actions of self-destruction, which was discussed in detail in the previous chapter. Some information gives pleasure to the system, another seems to be indifferent, and the third one poses a threat to existence. Exploring the problem of information threats, I would like to somehow highlight the set of input data that can be classified as threats. It is obvious that it will be possible to perform such a classification only on the basis of the classification of the information systems themselves, because the same input data for different systems can be both frightening, and dangerous, and favorable, and unnecessary.

Therefore, it would probably be right to try to classify the input data based on the classification of the algorithms for processing them.

The entire set of algorithms that an information system is capable of performing in principle is proposed, conditionally divided into the following classes:

1. Algorithms that implement methods of information protection. They can be algorithms responsible for:

a) error handling;

b) blocking of input data, which may include: installation of protective screens, removal from the source of dangerous information, removal (destruction) of the source of dangerous information;

c) verification of the executable code or "psychoanalysis", as the identification of hidden programs and/or the causes of their occurrence.

2. Algorithms responsible for self-modification, for changing existing and generating additional programs designed to process input sequences.

3. Algorithms that can disrupt the usual mode of operation, i.e. to **bring the system beyond the limits of an acceptable state**, which in most cases is tantamount to causing damage up to destruction, for example: *"The thought that he belongs to a secret society did not give Kislyarsky peace. The rumors going around the city scared him completely. After spending a sleepless night, the chairman of the stock exchange committee decided that only a sincere confession could shorten his time in prison."* (I. Ilf, E. Petrov. "Twelve chairs"). This class, along with algorithms, the execution of which by the system will cause harm to itself, includes the so-called "uncertified", i.e. Algorithms (programs) that have not passed quality testing. Such programs constantly appear in complex self-learning systems in which it is possible to execute second-class algorithms.

4. All other algorithms.

Now we can move on to determining the purpose and causes of information threats.

The purpose of the information threat is to activate the algorithms responsible for disrupting the usual mode of operation, i.e. for bringing the system out of an acceptable state.

True, we must immediately make a reservation, a creative state, genius, bordering on insanity, if it is unusual for a given system, that poses no less of a threat. Genius and insanity are equally dangerous for an unprepared information system called society or collective. Ch. Lombroso [51] shows what both states can lead to.

The source of the threat can be both external to the system and internal.

The causes of external threats in the case of a targeted information impact (in the case of an information war) are hidden in the struggle of competing information systems for common resources that provide the system with an acceptable mode of existence.

The causes of internal threats owe their existence to the appearance within the system of many elements, substructures for which the usual mode of functioning has become unacceptable due to a number of circumstances.

Hereinafter, an acceptable mode of functioning is understood as such functioning of an information system, which, from the point of view of this system, is provided with the necessary material resources. Accordingly, we will call an unacceptable mode a mode in which the system is not fully provided with the material resources necessary for normal functioning.

Thus, an **information threat** is an input that was originally intended to activate third-class algorithms in an information system, i.e. algorithms responsible for the violation of the usual mode of operation.

Let's classify threats. We will divide the whole set of threats into two classes - external threats and internal ones. Then, on the threats recognized by the system and on the unconscious, as they are also called, hidden.

Now it's time to briefly characterize the obvious threats and move on to the hidden ones.
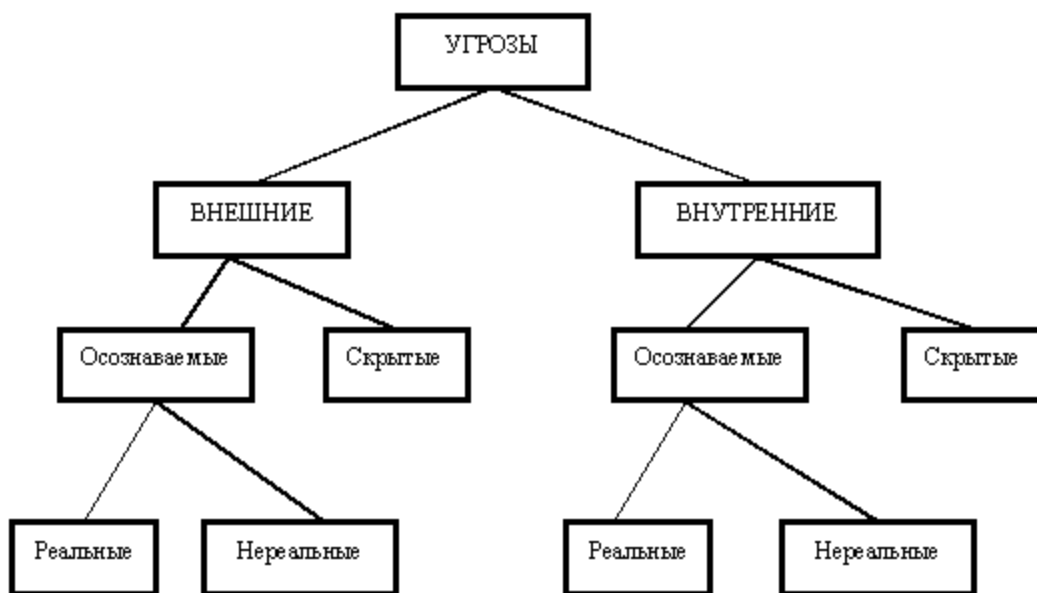
Fig. 4.1. Classification of threats.

20.1. Explicit Threats

Wound. a wound inflicted by a firearm can still be healed, but a wound inflicted by the tongue never heals.

Persian saying

Let's start this section by giving a classic example of a clear information threat from the Bible:

"And I also testify to everyone who hears the words of the prophecy of this book: if anyone adds anything to them, God will put on him the plagues that are written in this book: and if anyone takes away from the words of the book of this prophecy, God will take away his participation in the book life and in the holy city and in what is written in this book. The witnessing cue says: Hey, I'm coming soon! Amen".

How can a clear threat be characterized?

As a rule, a clear threat is aimed at disrupting the usual mode of functioning of the system, thanks to an ultimatum to perform actions in accordance with the requirements of the information aggressor.

In addition, a clear threat may be real, or it may be a bluff (unreal).

However, regardless of how the system perceives the threat - bluff or reality, it is important that if the information system is able to perceive | input data as a threat, then this fact clearly indicates that this threat is explicit.

Stages of handling a clear threat.

1. The system accepts input.

2. The system evaluates the input data. Is input a threat? If yes, then go to step 3, otherwise go to step 1.

3. The system assesses the reality of the threat. If the threat is real, then go to step 4, otherwise return to step 1.

4. The system evaluates its ability to organize protection and the amount of its own damage in case of a loss. If the losses in the case of organizing protection are estimated to be less (moral, material damage, etc.) than the damage from the activated threat, then go to item 5. otherwise go to item 7.

5. Activation of algorithms that implement information protection methods (1st class of algorithms). If this is not enough, then the activation of algorithms from the second class, responsible for finding new, non-standard *ways to* solve the problem.

6. The system evaluates the results of information confrontation. If successful, go to step 1, otherwise go to step 7.

7. Performing actions in accordance with the requirements of the information aggressor. If the system remains "alive", then go to step 1. So, as long as the system is "alive".

Let us illustrate what has been said with a very light example, well known to readers of Ilf and Petrov ("The Golden Calf").

1. The information system named "Koreiko" receives and processes the input data.

"Well, will there be a purchase? Insisted the grand strategist. - The price is low. For a kilo of the most remarkable information from the field of underground commerce, I take only three hundred thousand.

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...The folder sells for a million. If you don't buy it, I'll take it to another place right away. They won't give me anything for it, not a penny. But you will die."

2. Koreiko regards what is said as a threat, since doing what is said will lead to violation of it habitual state, which consists in a constant tendency to enrichment. And suddenly it is required to give the loot.

Further, everything happens in strict accordance with the definition of the threat. According to this definition, Ostap is a carrier of an external clear threat, i.e. aggressor system. The reason for the threat is that Koreiko has resources common to all, which provide the systems with an acceptable mode of existence.

"What other information is there? Koreiko asked rudely, holding out his hand to the folder.

3. It turns out that everything is very serious. *"Show the case," said Koreiko thoughtfully.* Yes, the threat is certainly real.

4. Is it possible to protect yourself from it? Remember: *"In the corner lay dumbbells and among them two large weights, weightlifter's* joy.

Physical strength seems to be there, why not use it? Koreiko's information learning system decides to activate the protection algorithms.

5. *"The defendant suddenly grabbed his hand on the fly and silently began* to *twist it. At the same time, Mr. client, with his other hand, set out to seize the throat of Mr. Attorney at Law."*

However, the applied method of protection did not give the intended result. I had to use new input data to generate protection algorithms. New inputs (maneuvers taking place in the city) provided an opportunity for escape, which Mr. Koreiko immediately took advantage of.

6. The escape was successful. At a remote railroad construction site, Koreiko's security system continued to analyze input information for new threats.

1. The threat was not long in coming: *"Koreiko looked down* and *got up... The absurd figure of the great strategist, running around the site cleared for the last rails, immediately deprived him of peace of mind.*

2. The input data is unambiguously interpreted as a clear threat.

3. Its reality is beyond doubt.

4. *"He looked over the heads of the crowd, wondering where to run. But there was desert all around.* It remains to submit to the information aggressor and fulfill its conditions.

7. *"Finally, Koreiko crawled out from under the bed, pushing wads of money to Ostap's feet."*

As shown above, a clear threat gives the system a chance and allows retaliatory moves. But what about if the threat is hidden? Recall that a hidden threat is called hidden because it is not detected by the object's protection system in real time.

20.2. Clear Threat Protection

Our deeds are like our children: they live and act independently of our will.

George Eliot

A clear threat implies that it will be followed by certain actions that cause damage to the information system. But since real physical actions will follow, this means that there is a potential opportunity to prevent these actions and defend against them using various directions of defense organization. A sufficient amount of literature has been written on this topic, therefore, in this paper, only our own point of view on the organization of such protection and on the algorithm of its functioning will be briefly expressed.

What is purely theoretically possible to do to defend against the aggressor?

1) put a barrier between yourself and the source of danger;

2) hide from danger beyond its reach;

3) destroy the source of danger;

4) hide or change beyond recognition; become different.

How complete is this set? And how can completeness be proved? The answers to these questions, of course, are of theoretical interest, but for practice they can hardly give anything. Moreover, in real life, the information system uses the whole range of protection methods, and the methods themselves complement each other.

Of course, ideally, it would be useful to determine the impact of each of the methods on the security or on the quality of the functioning of the protective mechanism. It is clear that for each set of input data there is its own optimal protection strategy. The problem is to find out exactly what this input dataset will be.

Therefore, it is not enough for a defending subject to master all four methods in order to survive. He must be able to competently combine all these methods with those events that fall upon him or are capable of falling. Thus, we go to "stop the task of organizing protection with the following input data:

1) many ways of protection;

2) forecasting methods;

3) a decision-making mechanism that uses the results of forecasting and available protection methods.

The protection system lies at the intersection of forecasting methods and protection methods; the worse the prediction mechanism works, the more developed the protection methods should be and vice versa.

Schematically, the algorithm for the functioning of the protection system can be tried to be represented in the form of Fig.4.2.
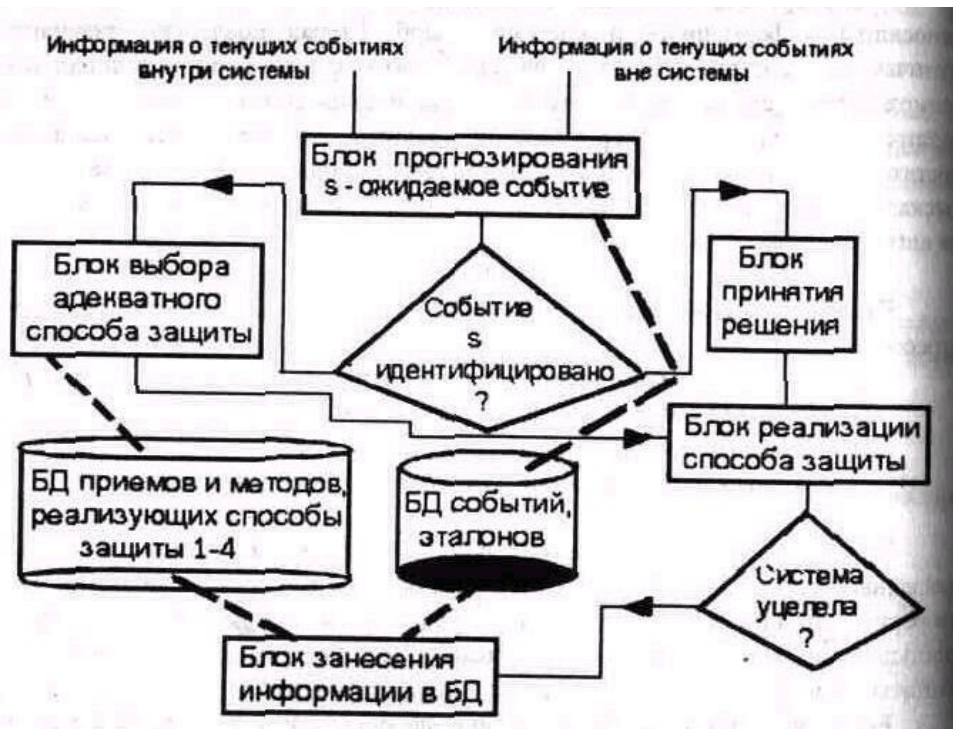
Fig. 4.2. The algorithm of the protection system.

According to the algorithm in Fig. 4.2 any system is protected from obvious threats: a single person, the state, a mafia structure, a bank, etc. At the same time, of course, the completeness of the implementation of the blocks and the completeness of the databases for each system are different.

Projecting the above scheme into practical systems for protecting the state, firm, person is quite simple, the analogies suggest themselves.

For the state:	
Prediction of external events	intelligence service
Forecasting internal events	ministry of the interior
First defense (armor)	border (border troops)
The second method of protection (change of location)	exodus of people to another land
The third way of protection (destruction)	army
The fourth way to protect (make changes)	propaganda, sabotage, terror (Ministry of Foreign Affairs,
Decision Block	government
Block for entering information into the database	analytical services

For a firm:	
Prediction of external events	information service
Forecasting internal events	regime service
First defense (armor)	territorial fences, guards, safes, locks, etc.

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The second method of protection (change of location)	the presence of parallel centers for the management and storage of information, capital, etc.
The third way of protection (destruction)	administrative measures: dismissal of own employees;
The fourth way to protect (make changes)	ideological service: psychological processing of own employees, creation of the necessary image through the media, etc.
Decision Block	company management
Block for entering information into the database	analytical services

We will leave it to the reader to project what has been said onto a person. If we extend what has been said to a single person, then we get a rather entertaining scheme, mainly reflecting works like "How to survive in...".

It is more interesting, since no one has tried this yet (neither nature nor man), to try to transfer the above principles of building a protection system into the field of software protection and propose a Functional Structure for software protection systems for automated information systems (AIS).

As an appendix to the design of a software security system, the above means that this system should consist of the following blocks

1) Environmental control unit and the protection system itself. In this case, control should be aimed not only at controlling the current state of the system, such as calculating checksums, etc. Commands that are expected to be executed in the near future, i.e. we are talking about the control of dangerous future events (control should be carried out in the mode of emulation of commands to which control is supposed to be transferred) [76].

2) Password protection block for the entire system and its individual elements, including cryptographic protection methods (method 1), as well as integrity control.

3) Block of periodic change of the location of the elements of the protective mechanism in the AIS (method 2). It is assumed that the main executable files responsible for the implementation of the prediction mechanism and all protection methods must independently migrate in the computing environment (change disks, directories, computers) and change their names.

4) The block of destruction of "unfamiliar" program objects, "garbage collection". Thus, the specified environment is restored (method 3 - "kill a stranger"). A degenerate version of this method is the well-known mechanisms for forced restoration of the integrity of the environment.

5) Block of self-modification of the executable algorithm and code (see [76] for details).

As for the practical mechanisms for implementing the above, they, oddly enough, already exist. It remains only to bring them into a single integrated system.

These are techniques for creating self-modified code, which is typical for computer viruses of the latest generations, which do not contain immutable byte strings to identify the executable code. A complete change in the executable code becomes possible due to the presence of interchangeable instructions or their sequences in the processor instructions.

These are encryption guests and methods their software implementation is widely covered in periodicals.

These are password entries to protect programs and data from unauthorized access, often used by programmers.

These are all kinds of electronic keys (Touch Memory), advertised in almost every computer publication. And yet the main thing here is the means of forecasting, algorithms for identifying dangerous functional dependencies in the input material, forcing the system to move from one state to another.

In order to justify the inevitability of including forecasting tools in the AIS protection system, let us remind the reader of the history of the development of software tools for monitoring the operation of a PC [76]. The impetus for the emergence of the first programs from the area under consideration, of course, was the viral boom. As a means of protecting against viruses, a lot of programs were delivered to the software market at one time, intercepting the corresponding interrupts and analyzing the input parameters of the "file open", "write" functions. In this case, if an intention to write to any executable module on the disk (EXE and COM format files) is detected, the computational process is interrupted by guard programs, a message like: "Attempt to write to a file... Allow - yes. Disable - any key. After that, the user personally made the decision.

Such means of protection, despite being too annoying, did not die, but continued to improve, however, mainly in the line of informing their owner. In order not to "font" on the screen, all messages were dumped into a file. The programmer at his leisure always had the opportunity to view them.

At this stage, the following result was obtained: if the control tools distract the user from the main work, then such tools are not only unnecessary for him, but sometimes even harmful.

Overcoming this shortcoming was seen along the path of "intellectualization" of the software product, the inclusion of decision-making mechanisms with elements of artificial intelligence in it. One of the options for the practical implementation of this approach are expert and self-learning systems.

In the presented material, exploring approaches to organizing the protection of an information system from obvious threats, the main emphasis was on predicting the danger and activating one of the first three methods of protection mentioned above:

1) setting up a barrier between themselves and the source of danger;
2) avoiding danger beyond its reach;
3) destruction of the source of danger;
4) modification beyond recognition.

As for the fourth, this method raises a reasoned objection regarding the possibility of considering modification as a method of protection.

Indeed, imagine that some system A constantly uses the fourth method to protect itself from danger. Then reasonable questions arise: After k application of this method

to itself, what remains of the system A? Will system A survive? Or should we now talk about a completely different system?

In the light of what has been said, it is interesting to recall that among the representatives of some primitive tribes, after they reach a certain age, there is a change of name. Such a renaming looks quite logical, a person has come of age, his functions and capabilities have changed, in essence he has become different, so he should change his name.

The custom to change the name when changing the environment or functional duties has been preserved to this day. The name change is taking place a woman when she marries or changes her husband. The departure of a person from the world to monastic cells also requires a change in name, because the system began to function differently.

Even a change of position in the production structure assumes that the functions of the individual occupying it will be changed in accordance with with job descriptions.

Moreover, sometimes it happens that a new persona, dressed on an information system, and, as a result, its new actions completely cross out everything that this system served before.

So can modification be considered a way of protection?

Is continuity preserved in this endless change? And what should be considered continuity when today's system is ready to trample on yesterday's itself, and yesterday's yesterday vowed to fight against those like itself today until the end of its life? So maybe her life is already over since she stopped fighting?

If the requirements of the external environment are reduced to the death of the system, then the reaction of the system to these requirements in the form of its complete modification is not a kind of the same death? From here, by the way, we can proceed to the paradoxical conclusion that modification is not a way of self-defense, but a way of self-destruction.

Maybe that's why in a normal human society it is customary to treat people who have changed their principles with disrespect. The situation here looks something like this: the original person is already dead, but someone else continues to use the physical body he has abandoned. Who is this other person and what can be expected from him?

A self-learning information system is therefore self-learning because it constantly lives in the tone of change, constantly changing. Permanent change is a partial rejection of yesterday's self, which is often referred to as dying in relation to the original self. New knowledge, due to the inevitable change in the structure of the system that accepts it, brings death to this system.

In view of the controversial issue of the relation of self-modification to the methods of protecting the system, it is probably inappropriate to consider self-modification as protection, at least against external obvious threats, because in this situation it is clearly visible that it is external obvious threats that carry out the modification, i.e. essentially replace the system, they are not suiting, to another with whom you can deal.

But the above does not mean that modification cannot act as a way to protect against hidden threats. How this might be the case will be discussed later.

Chapter 21. The concept of a hidden threat

No matter how insensitive *and rude*
is being watched
He will feel the gaze
Though in the corners of barely trembling lips.

A. Blok

Among the dangers that lie in wait for information systems, there are many threats called hidden ones. This section is devoted to the study of the problem of "hidden threat" and, first of all, what is meant by the term itself.

What is a hidden threat to society, to a person, to an automated information system?

For society, this is probably the accumulated discontent of its members, which does not find a way out; for a person - formed behavior programs (complexes) that are present in the subconscious, but are not controlled by consciousness, including conditioned reflexes that appear unexpectedly for the subject at a signal from the outside; for a computer, these are software bookmarks.

In the literature on neurolinguistic programming and suggestive linguistics, the hidden verbal influence on a person is usually called **suggestion** [104]. Considering the word as a basic element of a natural human language, but considering that there are their own "languages" for other information channels through which they are transmitted: taste, smell, smell, sensation, etc., and at the same time, understanding a person as an information system, in this paper the concept **of "suggestion"** will be defined as a hidden information impact on any information system. Then the term "suggestion" can include not only classical linguistic tricks of a certain kind, not only phrases that have changed the lives of individuals, but also agents of influence that have changed the lives of individual countries, and computer viruses that carry out a hidden information impact on automated information systems. Thus, we can reach the scalability of the concept of suggestion.

Before proceeding to the search for further analogies in terms of hidden influences, let us illustrate the introduced concept with a number of simplest examples.

As one of them, which is not related to classical science, which is directly related to the security of banks, let's take D. Westlake's novel "Hot Stone".

We will not analyze the system of protection of the banking system described in the novel, we will focus only on the method chosen by the attackers to overcome it.

In the passage below, there are two fakes in action: Albert Cromwell, a bank clerk; the imposing man is a professional hypnotist hired by swindlers.

"Albert Cromwell didn't notice that this man got into the elevator with him every night this week, the only difference today was that it wasn't just the two of them there this time.

They stood side by side, Albert Cromwell and the imposing man, both facing the door. The doors slid open and the elevator began to rise.

Have you ever paid attention to numbers asked the imposing man. He had a deep, resonant voice.

Albert Cromwell looked at his companion in surprise. Strangers don't talk to each other in an elevator. He said:

— I beg your pardon?

The imposing man nodded at the row of numbers above the door.

"I mean those numbers, there", he said. - Look at them. Intrigued, Albert Cromwell looked up. These were small glass numbers that ran from left to right along a long chrome strip that started on the left P (basement), then went X (hall), then 2,3, etc., up to 35. The numbers were lit one at a time, indicating the floor, on which currently had an elevator. Just now, for example, the number 4 was on. While Albert Cromwell was watching, it went out and the number 5 lit up instead.

"Notice what a regular movement", said the imposing man in his sonorous voice. How nice to see something so even and regular, to list numbers, to know that each one will follow behind the one in front of her. So smooth. So regularly. So soothing. Follow the numbers. Count them if you like, it's soothing after a long hard day.

How good it is to be able to rest, to be able to look at the numbers and read them, to feel your body relax, to know that you are resting and calming down, watching the numbers, counting the numbers, feeling every muscle relax, every nerve relax, knowing that now you can relax, you can lean against the wall and calm down, calm down, calm down. Now there is nothing but numbers and my voice, numbers and my voice.

The imposing man paused and looked at Albert Cromwell, who was leaning against the elevator wall, staring blankly at the numbers above the door. The number 12 went out and the number 14 came on. Albert Cromwell followed the numbers.

The imposing man asked:

- Do you hear my voice?

"Yes", said Albert Cromwell.

"One day, soon," the imposing man said, "someone will come to you at your place of work. The bank where you work. Do you understand me?

"Yes", said Albert Cromwell.

- This person will tell you: "African banana shop." Do you understand me?

"Yes", said Albert Cromwell.

What will the person say?

"African banana shop", said Albert Cromwell.

"Very well", said the imposing man. The number 17 flashed briefly above the doors. "You are still calm", said the imposing man. When a person tells you - "African banana shop", you will do what he tells you. Do you understand me?

"Yes", said Albert Cromwell.

"Very well", said the imposing man. "That's very good, you're doing very well. When a person leaves you, you will forget that he came there. You understand?

"Yes", said Albert Cromwell and etc.

Thus, Albert Cromwell formed a program of behavior, to activate which it is enough to say the **key phrase** "African banana shop". At the same time, the fact of generating a behavior program and the behavior program itself are hidden from Albert Cromwell himself, just as a program bookmark can be hidden in a computer until a given condition is met in the environment. Moreover, the meaning of the key phrase, which is a condition for activating the program, is hidden from the consciousness of Albert Cromwell.

If we try to apply the algorithm given in the previous chapter to the analysis of the input data, then its execution will be completed already at the second stage - the phrase "African banana shop" cannot be assessed by consciousness as an information threat.

All of the above means that all existing protection methods are not suitable for identifying a hidden information threat in the input data stream. Indeed, the system can neither protect itself with a shell (armor), escape, nor destroy a potential aggressor (there is no evidence of illegal intentions, just as there is no right itself), or even self-modify (for what reason?).

So what to do?

In order to understand what to do in this situation, it is necessary to understand what is the reason for the invisibility of threats?

Perhaps this reason is that the latent information impact, unlike the explicit one, is distributed in time and a certain part of this impact is hidden from the consciousness of the system.

For example, a separate transmission or a separate newspaper publication is evaluated by a person directly in the current real time and is essentially only a fact. However, many broadcasts or publications on a specific topic already represent a different quality that can form certain rules for the viewer or reader. A lot of facts will develop into rules, which, of course, will affect people's attitude to a certain kind of events and, accordingly, their behavior. And the learning system is no longer capable of correcting anything in this situation. The viewer can criticize a particular program, turn off the TV, but if he is a viewer of the entire cycle of programs, then the reprogramming processes will be carried out in his own subconscious against his will. It was about this that was discussed in the second part of the work, where the results of the analysis of the work of some mass media were presented.

Now it remains to answer the question: "What does it mean to be hidden from the consciousness of the system?"

In the case of a person, it is generally accepted that most of the information accumulated in storage during life is inaccessible to consciousness and is only sometimes accidentally realized in a distorted form during dreams [87], but in principle it can become accessible to consciousness if appropriate methods are used to reveal the hidden, not hidden, but hidden information. Tellingly, these methods involve "direct access" to memory, bypassing consciousness. If the data got into the storage and was not taken into account by the control system, then they must be retrieved in the same way - without a mark in the "account logs".

In the foregoing, there is a complete analogy with the search for a computer bookmark in software. To detect it in megabytes of executable code, special technologies and tools (debuggers, disassemblers, etc.) are needed. And this search is carried out directly in the executable code at the time when user processes are stopped.

You can try to extend the same to a person who, for example, has appendicitis being cut out. Anesthesia blocked the main behavioral processes, and the surgeon performs "code analysis" and removal of the "command block" dangerous for the functioning. This analogy is even more accurate for neurosurgical interventions.

It is clear that in real time, when it comes to a specific act, any complex analysis of one's own memory with the help of consciousness, which is also currently involved in solving purely behavioral tasks, is impossible for the information system.

As a second example of setting and activating a hidden bookmark, we refer to the work of B.M. Velichkovsky [11], in which the author focuses on the fact that a word previously reinforced by an electric shock, but unnoticed by the subject, since his attention was focused on something else, can later cause an oblique galvanic reaction. By the way, similar examples are contained in the works of R. Hubbard on Dianetics.

In the case when we are talking about the gradual generation of a bookmark, about the "growth" of a bookmark in time, like a tumor, in strict accordance with the requirement of the input data that controls this growth, it is at least not serious to talk about the search for something that has not yet grown.

Here, the process of information impact includes two events. Initially, a program of behavior is secretly formed - a bookmark, and later it is activated. The first event is hidden from the consciousness of the system, and the second - the system is able to analyze, but since the analysis is carried out in real time, it is not able to use the information hidden in it to carry it out. There is not enough resource like time.

An interesting example on the topic of bookmark generation in a self-learning information system is given by V. Levy [45]:

"I suggested to one of my patients that 10 minutes after the hypnosis session, she would put on my jacket hanging on a chair. After the session, we, as usual, talked about her well-being and plans for the future. Suddenly the patient shivered shiveringly, although the room was very warm. Goosebumps appeared on her arms."

"It's kind of cold, I'm cold", she said guiltily, and her gaze, wandering around the room, stopped at a chair in the corner on which a jacket hung.

"Sorry, I feel so cold. Could you please let me put on your jacket for a moment?"

This example is interesting in that the algorithm describing the behavior of the patient was not given. Only the goal was formulated. The hidden program was activated by a timer (after 10 minutes) and used all possible means for its implementation, including the generation of a specific behavioral program. At the same time, in the situation she created, the patient's behavior was quite natural, so that, not knowing about the hypnotic suggestion made, no one would have paid attention to this act. V. Levy writes about this: *"Hypnotherapists often use the so -called "post-hypnotic" - delayed suggestion. The hypnotized person is suggested that he will perform some action at a certain moment: in a few minutes, hours, days. After the session, he has no subjective memories. But now the deadline for the fulfillment of the suggestion is coming, and you see how it makes its way, clinging to **random** circumstances, looking for reasons and taking shape in the form of completely motivated actions."*

The given example shows how **the presence of an unconscious goal *in the* subject leads to the ordering and even generation of physiological reactions of the body**, to their inclusion in the general scenario of behavior (*"the patient shivered chillily"*), aimed at achieving the goal.

The fundamental difference between the story of Albert Cromwell and the example of V. Levy is that in the first case a **program of behavior was secretly laid down for a person**, and in the second - only a **goal**. The brain itself formed a program of behavior for a given goal.

And this is a very important result. It follows from this that the input data is capable of secretly programming complex information systems not at the level of behavioral programs, but at the level of target settings.

In [87], the authors of which, according to them, have advanced the most in terms of creating specific means of hidden influence, two main factors in psycho-correction are identified (the term psycho-correction here means nothing more than a hidden information impact):

- introduction of information into unconscious memory zones, using suggestion, clarification, learning in a dissociated state, etc.;

- providing direct access to memory by either changing the state of consciousness, or even turning it off.

It is clear that psycho-correction does not always act as a hidden information threat. Sometimes it can carry a medical aspect and be aimed at "healing" the information system.

Individual methods by the authors of [87] are implemented in practice in a computer circuit and make it possible to carry out:

- one-act modification of the psyche by unconsciously introducing a corrective program against the background of the action of appropriate drugs and other medical factors;

- psycho-correction by means of unconscious suggestion during any human activity on the computer (frame 25 principle);

- acoustic psycho-correction by unconscious suggestion when listening to any acoustic information.

In that The same work shows that the methods of hidden informational influence, i.e. classical methods of information warfare, the time has come to "go out to the people", in particular, *"in addition to medical purposes, these methods can be used in solving problems of a social nature." A little further, I. Smirnov and others throw a bridge between the cybernetic* and social space, showing how closely the means of information warfare of the two named spheres are today connected: *knowledge, which they assimilate as food, and becomes OWN, i.e. determines his needs, desires, tastes, views, well-being, picture of the world.*

... In our time, it is theoretically quite possible to create a computer mental virus, which, infecting computer programs, will lead to disruption of the work of the operator sitting in front of the computer. He can, for example, "not see" certain information, make a pre-planned mistake, or, for no apparent reason, cause damage to databases, turn off the computer."

The work [87] would be much more convincing if its authors could logically explain the principles of activation in human memory of specific unconscious data from the set of all data. A person is constantly bombarded with such a flurry of conscious and unconscious information that selection and formation in a form acceptable for execution from the entire mass of input data of specific microprograms of the backfill type or programs responsible for generating time-distributed backfills seems to be an incredibly difficult task. Where is the guarantee that the covertly embedded bookmark under the influence of newly incoming information will be distorted, not modified, will not disappear. The volume of input data obtained secretly, according to the estimates of the same work [87], significantly exceeds the volume of conscious information (all this data must be stored somewhere). How much in this situation is it possible for them to maintain their original purity and virginity? If the latent information arrives, as a rule, at the noise level, then isn't it noise itself? Where are the criteria here and can they be formulated at all?

Interestingly, the explanatory dictionary of the Russian language (S.I. Ozhegov, N.Y. Shvedova) provides two interpretations of the word threat:

1. Intimidation, promise to harm someone, evil.
2. Possible danger.

The first interpretation is more in line with the concept of "clear threat" used here, and the second is closer to the definition of "hidden threat". Indeed, how to interpret the word "possible"? Any information system has the <u>potential to run into trouble</u> to do this, it is not at all necessary to go to the north pole or walk around the city at night. Possible danger exists when crossing the street, and even when eating food.

There is always a possible danger for any system! And the main problem here is how to translate this danger from the category of possible into the category of expected.

If the system expects something, then it is able to at least somehow prepare for a worthy meeting, which, of course, increases its chances in the struggle for additional life time.

Chapter 22. Suggestive noise level

*Thinking is the instrument of
desire by which it is fulfilled.*

Osho Rajneesh

If the fact of suggestion, at least in terms of the possibility of a hidden impact on a person by natural language words or information provided by special algorithms using technical means, is considered fixed [11, 45, 87, 104], then the next step would be to determine the place suggestions in the general scheme of threats aimed at the information system.

When trying to determine the place of suggestion in the management of information systems, a paradoxical situation arises. What does a word uttered by an imposing person mean compared to a bomb and a gun, which are traditionally used to rob banks? A bomb is real, if it crashed, then many people heard it, and the consequences can be seen. What about the word? But was it? For example, the vast majority of banks (up to 90% according to individual foreign sources) that have been successfully attacked by computer intruders hide it so as not to lose prestige. But it's still good if they really hide it. Most of them probably just <u>don't know about it. that they were robbed</u>. And some will never know about it, like, for example, the same Albert Cromwell.

So all the same, where is the place of this threat among all other threats? It probably makes no sense to talk about suggestive threats if a reliable fence is not built, if there is no armed guard, if there are no competent and reliable specialists, if elementary order in work is not established, if elementary requirements for organizing protection are not met, etc. And only then in this endless series of demands, built according to growth, is there a suggestion, which is not even visible behind the broad backs of the guards standing at the entrance to the bank or office. Therefore, for many experts in the field of security, this issue is still purely speculative. And since certain violations and malfunctions are always characteristic of such complex information systems as a person and a computer, the "noise level" created by these failures can sometimes completely hide *all the* real facts of the manifestation of suggestive threats.

Maybe a lot here depends on the accuracy of the measuring tool? Indeed, is it possible for an instrument that measures the horsepower of aircraft jet engines to measure the weak currents that control the entire system. The current generated by the turbine is measured on a completely different scale than the current that controls the operation of this turbine from the operator's console. To the uninitiated, control currents will be perceived at noise levels, if at all. Isn't that the case with suggestion?

Not a single complex self-learning system can do without the so-called involuntary thoughts, in relation to which Agni Yoga claims that these "little vagabonds" are the worst, because they clog the paths without meaning.

In this case, weak currents can be really chaotic, or they can be purposeful. Then, in the first case, we are talking about noise, and in the second, about purposeful control.

<u>Thus, suggestive influences can rightfully be attributed to control influences</u>.

Since we are talking about hidden informational influences, it would not hurt to identify those **hidden goals**, the achievement of which contributes to suggestion. Often it is the ignorance of the purpose that caused the act that makes it inexplicable and mysterious. And if there are several mutually exclusive hidden goals, the information

system becomes completely unmanageable. In this situation, the system automatically simplifies, falling apart. The collapse of any complex information system, be it a state, an enterprise, a team, may indicate that it does not have a dominant goal. Conversely, the creation of order out of chaos is explained by the presence of this very goal. It is possible that suggestion has its own measuring scale - the level of order, showing the degree of dominance of any one goal.

Now let's do a thought experiment on a system that has minimal suggestive "noise". Let's imagine an ideal situation: n -fold level of fences, total control by the most reliable specialists of everything and everything - a fly will not fly by unnoticed, every piece of paper is taken into account. This whole system by some miracle works without failures and errors, which is impossible in real life and unusual for a living person. Only in this situation can we talk about setting up a "pure" experiment on the implementation of suggestive threats. Let's try analyze them.

Let's start with natural language words, carriers of a hidden threat. More P.A. Florensky noted that the function of words is to be expressed and embedded in the soul of another, to produce their effect there. This is understandable - with a word you can activate the so-called typical programs of aggression, laughter, crying, pity, etc., which are not hidden and, in principle, can be controlled by the owner's consciousness. Similarly, you can create a hidden program and define a key for it. The techniques and methods of how this is done are quite fully covered in the literature on suggestive influences and modern pedagogy.

Moreover, as was shown in the previous section, using a word, you can force a person or computer to independently generate the desired program, which will obediently wait in the wings for activation.

But are words the only ones that are dangerous to systems that understand them?

Information about an object, we defined as a change in the state of the observer caused by the observation of the object. And there are infinitely many observable objects. This is a leaf falling from a tree and evoking sad thoughts about the frailty of everything transient, this is a fly beating against glass, these are elephant-shaped clouds, the colors of a dream blown by the wind beyond the horizon. How much, thanks to this contemplation, will the observer receive additional hidden information, how much of everything he sees will not be recorded by his consciousness? And this is only external information! Internal sources can simultaneously inform about obvious pain in the liver and covertly about the state of other organs of the body, and thereby activate thousands of other thoughts about what to do and where to go.

Thus, from the conducted simple mental experiment, we can draw a rather trivial conclusion that even under conditions of an n-fold level of fences with total control over everything that happens, it is not possible to save the system and its elements from the impact of suggestive noise.

However, it should be noted that the impact of noise will be determined not so much by the noise itself, but by the state of the system. An interested system, if it has free time, will itself select in the surrounding chaos what it lacks.

Quite often, for solving practical problems, it is important to understand what determines the response of the system to a greater extent: the input data to which it is necessary to respond, or the state of the system. It is clear that, first of all, the system will respond to a clear threat, then to perceived data, and only sometime later to hidden information.

In accordance with the above hypothesis about the lack of resources to process hidden input data in real time (perhaps that is why they are hidden), the system is not able to respond to them immediately. The information system needs time to "untwist" the hidden information. It is possible that if she is not given this time, then hidden threats will remain unrealized, unclaimed by their external customer.

This is a very important conclusion, because it is directly related not only to the collapse of individual powerful corporations, but also to many cataclysms taking place in the world, which, perhaps, are the necessary links (operators) for the implementation of a certain program of mankind.

It remains to analyze how the hidden programs are "spinned", how they manage to break through the thick asphalt of the controlling consciousness and, like a plant, expose their crown to the world of conscious thoughts and actions.

At the same time, one must also keep in mind that, perhaps, there is no unambiguous correspondence between the images of the subconscious and consciousness in principle. It is not always possible to project elements of a set of one cardinality onto elements of a set of weaker cardinality without losing content. The breathing depths of the subconscious are not always able to express themselves, because for this expression there are often simply not enough resources of consciousness, because the language of the speaker is poor. Therefore, one has to look for detours, use rock art, glue sounds from the musical row together, stop the moments or drive them uncontrollably, begging:

"A little slower horses...".

Chapter 23. Generation of hidden programs

A typical example of the hidden generation of programs is the prediction of the Magi to Prophetic Oleg. The prediction made, or perhaps belief in it, became the impetus for the creation and implementation of a program to destroy the prince. As it is said in the annals: *"... Oleg laughed: reproach the Magi. This speech: "I am alive, but the horse is dead." And at his command, exacted only the bones of that cat. Oleg sat on a yin horse and went to see the bones of that horse. Seeing the bones of his naked and the main bone lying, and, descending from his horse, he stepped on the main bone and rivers: "Will I ever die from this bone?" And you got out of the main bone of the serpent and stole Oleg in the leg, and Oleg fell ill from this.* (Quoted from the work of Yu.V. Roscius "The Last Book of the Sibyl" [81]).

Based on the fact that in our lives are born new theories, discoveries of fundamental laws are made, which are in essence the result of work fundamentally new programs, maybe consider a person capable of generating programs that have no analogues, i.e. initially absent from the surrounding people.

How can this happen, what verbal form can be the source of programming of such products?

It is possible that this is primarily the ability of the system to ask and answer questions. At the same time, each information system has such questions that it is dangerous to answer, and it must be able to distinguish between what can afford see or understand and what cannot be.

Not only have all great scientific achievements been made possible by a skillfully posed question, but all great works of art owe their birth precisely to questions that haunted the questioner. And the more significant the question, the more serious, the more powerful the work of art born of this question became. You don't have to look far for examples. Almost all of the great Russian literature is built on this principle: F.M. Dostoevsky, L.N. Tolstoy, N.V. Gogol and others. In all art there is nothing more than questions, answers and, of course, talent that helps to pack the answers into beautiful stylistic shells. **The question asked is the cryptographic key** that gives rise to the plot of any work of art.

"Allow me, I want to ask you a serious question," the student got excited. *"I was joking now, of course, but look: on the one hand, a stupid, senseless, insignificant, evil, sick old woman, unnecessary to anyone and, on the contrary, harmful to everyone, who herself does not know what she lives for, and who tomorrow herself will die by itself. Understand? Understand?*

"Well, I understand", the officer answered, staring attentively at his excited comrade.

- Listen further. On the other hand, young, fresh forces that go to waste without support, and this is in the thousands, and this is everywhere! A hundred, a thousand good deeds and undertakings that can be arranged and corrected for the old woman's money doomed to the monastery! Hundreds, thousands, perhaps of existence, aimed at

the road; dozens of families saved from poverty, from decay, from death, from debauchery, from venereal hospitals - and all this with her money. Kill her and take her money, so that with their help you can then devote yourself to the service of all mankind and the common cause: what do you think, will not one tiny crime be atoned for by thousands of good deeds? In one life, thousands of lives saved from decay and decay. One life and a hundred lives in return - why, there is arithmetic here! And what does the life of this consumptive, stupid and evil old woman mean on the general scales?" (F.M. Dostoevsky. "Crime and Punishment").

Sometimes there is no explicit wording of the question in the work; it can be so complex that the artist himself, just to ask it, is forced to create a monumental canvas in which the question is dissolved. Its crystallization occurs in the perception of the questioner when approaching the final word "end".

Sometimes the author himself is able to formalize the question only in the epilogue or in the final few words about the book:

"Such an event, where millions of people killed each other and killed half a million, cannot be caused by the will of one person: just as one person could not dig a mountain alone, so one person cannot make 500,000 die. But what are the reasons? Some historians say that the conquest spirit of the French, the patriotism of Russia, was the reason. Others speak of the democratic element that Napoleon's hordes smashed, and of the need for Russia to enter into contact with Europe, and so on. But how did millions of people begin to kill each other, who ordered them to do this?... Why did millions of people kill each other, when it has been known since the creation of the world that this is both physically and morally bad?

Then, that it was so inevitably necessary that. doing it. people performed that elemental zoological law, which bees fulfill, exterminating each other by autumn, according to which male animals exterminate each other. No other answer can be given to this terrible question" (L.N. Tolstoy. "War and Peace").

S. Lem spoke very accurately on the problem of questions being asked: *"Restraint is necessary* in *science: there are questions that cannot be posed either to oneself or to the world, and the one who nevertheless poses them is like one who is dissatisfied with a mirror that repeats his every movement, but does not want to explain to him what the volitional source of these movements. Despite this, we use mirrors with no small benefit for ourselves"* [49].

So maybe it's all about the questions?

True, Krishnamurti claims that *"there is nothing new on earth at all, but there can be novelty in the way you listen."* It may well be that any question is a peculiarity in the perception of information and nothing more. Asking an extra question suggests that another additional cryptanalytic circuit has suddenly been added to process the same input sequence.

What can come of this? Will this circuit strengthen the protection system, or, on the contrary, will it become that extra step that will be the last for this information system and which Eastern wisdom does not recommend doing?

Before proceeding to the search for answers to the formulated questions, it makes sense to examine the situation within the framework of a formal model. The basic pillars holding the model together were formulated in the introduction to the fourth part, followed by a more intuitive than logical analysis of suggestive threats. But, now it remains only to use all this.

Chapter 24. Modeling of the goal formation process

In the meantime, we live in the unknown
And we do not know our strength,
And like children playing with fire
Burning ourselves and others...

A. Blok

Let's look at the problem of protecting the system from information threats from the perspective of solving the usual task of designing something. The solution of any problem involves the following steps:

1) goal definition;
2) development of a behavior algorithm;
3) implementation of the algorithm.

For technical specialists, it will probably be more correct if the following names are given for the above stages:

1. Preliminary study;
2. Research work;
3. Development work.

Let's try to outline the complexity of each of the listed stages. It is clear that their complexity is different. And the work itself requires different training of performers. If at the first stage it is enough that the performer desires something (desire), at the second stage he is able to think (intellectual activity), then at the third stage he must be able to perform rough physical work (physical labor).

24.1. The space of goals as a set of knowledge of a suggestive threat

Ignorant people perform their duties for the sake of their fruits, but the wise do it for the sake of it. to put people on the right path.

Bhagavad Gita As It Is

Exploring suggestive influences, we thus exploring the space of hidden goals.

When studying a situation or an unfamiliar object, the researcher relies on analogies that are understandable at least to himself. In order to make it more habitual to move forward, we define the set of goals of the information system as the **basic elements of the suggestive space of the** information system. Then establish the appropriate metric relations on this space. But before doing so, it makes sense to give at least a brief substantive content filled with the concept of "goal" (for a more detailed study of the goal problem, see [78]).

I.P. Pavlov: *"The goal reflex is of great vital importance, it is the main form of the vital energy of each of us. All life, all its improvements, all its culture becomes a reflex of the goal, is made only by people striving for one or another set goal... On the contrary, life ceases to bind to itself as soon as the goal disappears.*

M. Eckhart ("Spiritual Sermons and Reasonings". M. Politizdat, 1991.): *"Every creature does its work for some purpose. The goal is always first in thought and last in action. And God in all his affairs assumes a very good goal - Himself, and wants to bring the soul with all its forces to this goal: to Himself.*

F. Nietzsche (Thus Spoke Zarathustra. M.: SP Interbuk. 1990): *"If humanity does not have a goal, then is it itself, or is it not yet?"*

As mentioned above, the suggestive impact is the impact on the formation of hidden goals in the information learning system, i.e. goals introduced from outside, included in the general scheme of goal setting and goal realization, i.e. hidden by other goals, and therefore unconscious by the system itself.

To study the processes of goal formation and the development of hidden goals, it is necessary that the model contains such concepts as a **goal, a hidden goal, a realized goal**.

It is proposed as a basic basis for creating tools for modeling the process of goal formation and achieving the goal to rely on any of the formal languages that has such a structure in which the above key concepts could appear as basic elements. Such a language, albeit not ideal, but quite acceptable after some refinement, can be the language of artificial intelligence Prolog.

Recall that Prolog allows three kinds of expressions: facts, rules, questions (goals).

A Prolog program is a text containing facts and rules. This text becomes a process (begins to realize itself) if the question is formulated, i.e. goal is defined.

Unfortunately, standard Prolog does not allow one and the same same the text to formulate several mutually contradictory questions that simultaneously correct the rules of the source code of the program.

Imagine that in our model there are no such restrictions; moreover, our rules can be self-modified, i.e. one rule can change another, itself, and, of course, rules can change the database.

Moreover, new facts are constantly coming into the database from the outside, which we will call input data.

Thus, we have a text of the rules and facts that make up the database, and a series of questions (goals).

We further argue that each goal, once achieved, becomes a rule.

We assert that in a self-learning information system, facts are constantly changing due to the constant influx of input data. Such an accumulation inevitably leads to the fact that any rule can be recognized by the system as erroneous, i.e. it is quite possible that a rule will appear in the text that denies this rule. We assume, what erroneous rules turn into a question (goal).

Each goal, by activating the rules, tries to restructure the text in such a way as to become achievable, i.e. will become the rule. Figuratively speaking, Goals are a kind of free, independent "gravitational masses" that bend the space of rules.

We affirm that questions are born not only by perishing rules, but also by facts that have not found a place for themselves in the rules.

Thus (similar to Prolog):

rule is an expression consisting of the left and right parts, separated by the symbol ":-";

fact is a rule without a right side;

question is a rule in which instead of the left side there is a question mark, i.e. rule without left side. For example:

Rule: Eating (Y):-food (X, Y), time (t, t_1, Y).

Fact: Eating (Y).

Question (goal):?:- food (X, Y), time (t, t_1, Y).

In this model, it turns out that it is the goals that arrange a real "battle" over the text field for the opportunity to be realized, i.e. will become the rule. How will this battle end? What characteristics must a target have in order to emerge victorious? Note that this is all very similar to the laser mode growth discussed earlier: "... *To maintain each such mode, a certain part of the energy flux coming from the pump source is consumed. The greater the intensity of this mode, the greater the energy consumption for its maintenance. Since the total power of the pump source is limited, usually only one most efficient mode survives as a result of competition...*" [53].

And what in our case can characterize the effectiveness of a particular goal?

Answer immediately suggests itself - this something can be the processor time allocated to each target for text processing, as well as the "proximity" of the rules and facts that the target will be able to "reach".

We examine the significance of both factors. It is clear that if the algorithm for finding rules and facts is not effective, then you can watch an apple fall from a tree for centuries and not see the law that explains what is happening. Moreover, in the case of multiprocessing (each target has its own processor, each target is a processor) and parallel execution, processor time can hardly be a characteristic of the efficiency of implementing a particular goal. A similar system of parallel execution takes place during the work of the brain. The process with which we currently associate our "I" is called "consciousness" by us, but the rest of the processes do not disappear anywhere at

this time, they also develop, however, on the so-called subconscious level. (Consciousness in this model is considered as <u>the dominant information process of a self-learning system)</u>. It turns out that in the case of parallel execution, the fact of activating a particular goal cannot be a resource that must be divided, roughly speaking, "every thought has the right to life." And if so, then from the characteristics of the processes lying on the surface, the following become decisive:

  - the presence in the system of relevant rules and facts;

  - "proximity" of rules and facts to a given goal. "Proximity" in the curved space of rules is determined primarily by the efficiency of the search <u>algorithm used in the system, which warps the space of rules and facts, trying to make it "convenient" for each of the existing goals</u>. Let's analyze what has been said. The presence in the system of the rules and facts necessary to achieve the goal depends:

  - from their actual presence, which is associated with the input flow data and the system's ability to perceive and process this stream;

  - from the priority of goals. It is quite possible that the most significant goals, such as system security, in a self-interpreting text are located "closest" to the input flow that is significant for the system data;

  - from the possibility of one goal to use the results of another goal, considering it as a sub-goal (a tree of goals), which will allow, with a minimum of activity, to get the maximum result "by proxy". To do this, the subgoal used must have time to turn into a rule, i.e. be realized.

  Summarize.

  The proposed model, which will be referred to as the GRF-model (goal-rule-fact), includes a set of goals, rules and facts. Rules, i.e. formalized knowledge can be born in the system by turning the goal into a rule, but it can also die if it does not comply with other rules. In essence, we have a prototype of self-generating and self-destructing structures (SR-network), in which formal neurons are born and die.

  Let us analyze the main characteristics of both models in order to find something in common in them, in terms of their correspondence to each other.

  The results of such an analysis are summarized in a table of correspondence between the formal model of the goal formation process considered above, based on the Prolog language, and the model based on the R-network, which implements only the principle of neuron death without birth (Table 4.1).

Training on the R-network model involves initial redundancy with subsequent disposal of it in the learning process, such as the creation of a tiny figurine from a block of marble by a sculptor. The human brain consists of at least 100 * 10 neurons, each of which, being unique, like a snowflake, has up to 60 * 10 connections. Thus, 11 potential information capacity is at least 60 * 10 microprograms.

Table 4.1. Correspondence of the main concepts of the PSC-model and R-network.

PSC-model of the process of goal formation	R-network
rule	localized trained R-network segment

goal	localized untrained section of the R-network (chaos)
fact	localized broken section of the R-network (input only)

Let us return to the study of the operation of the PSC model, to the justification and definition of the algorithm of its functioning. After solving this problem, it will be possible to move on to its breadboard implementation. The following description of the process of functioning of the CPFI model is proposed (Fig. 4.3).
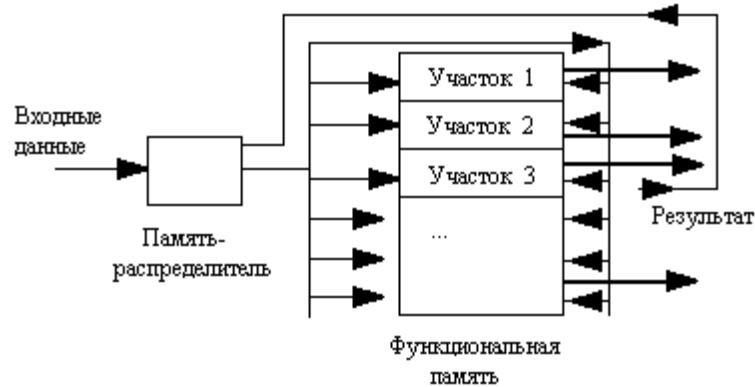
Fig. 4.3. Scheme of functioning of the PSC model in the self-learning mode.

The input data through the information input devices of the self-learning system enters the "allocator memory", which at the first stage is an untrained section of the R-network, i.e. is a question In general, any unbalanced (untrained) piece of memory is a question looking for an answer.

You can put forward a stronger statement - **any chaos is a question!** Until the information system finds some interpretation of the chaos raging around it, this chaos will remain a question, a goal that requires its achievement. **Chaos** is a bait for the curious, it is a bait for explorers, for scientists. Chaos is an eternal cryptogram that attracts already interpreted parts of the scheme to itself.

The input data, having passed the distributor, arrive at the input/output of arbitrary sections of functional memory, i.e. the memory distributor relays the training sample of the external environment. Functional areas are chosen arbitrarily due to the fact that the allocator memory itself is untrained. The output data from the functional areas are returned to the allocator memory, but already as the required result, i.e. functional memory becomes a teacher, although it is not yet taught itself. However, it is able to teach how to distribute the training sample of the external environment. She is able to show where those same paths on the lawns should be located. This is possible because there are many functional areas and one of them will certainly be close to the correct answer. Under the influence of the training sample, the allocator memory turns from a question into a rule, according to which the distribution of input information is carried out throughout the self-learning system. After that, the purposeful translation of the training sample to areas of functional memory begins. Thus, some sections of functional memory become responsible for processing "strong" signals, some - "weak". Some areas of memory solve logical problems, others make sure that "dinner is served on time." The "distribution of labor" is established in the system, which can never become final until the death of the system, due to the fact that the input data have a greater variety than the capabilities of any self-learning system limited in space and time.

Interestingly, Adleman's biochemical computer is supposed to operate according to a similar scenario [73]. Essence:

1. Real objects are mapped to an appropriate set of ARBITRARY sequences from nucleotides.

2. Taking into account the requirements of the model, using the appropriate "glue", the process of gluing chains of nucleotides is launched. Chains are propagated using the Polymerase method. Chain Reaction, which allows you to synthesize millions of copies of a specific sequence from the first and last few nucleotides. As a result, the entire set of possible solutions to the problem is formed in the "broth". It remains to select the one that satisfies the restrictions.

3. It is known that under the action of an electric current, molecules of different lengths move at different speeds. Using this fact, from the set of possible solutions, those solutions are selected that correspond to molecules of a certain length.

Roughly speaking, the work of such a computer at the third stage resembles the work of a gold digger who washes gold from a pile of sand.

It is possible that nature itself searches for the key in a similar way, using the biosphere as a soup, and people as nucleotides.

It is clear that even today, in the presence of biochemical computers in laboratories, it is meaningless to talk about reliable cryptography oriented towards NP-complete algorithms. To solve a cryptanalytic problem on such computers, the length of the key is practically irrelevant. Thus, with the advent of such tools, classical computational cryptography has approached its grave, where it will be laid in the near future. But the followers of her work will remain: Adleman's biochemical computer, computer steganography.

Slowly but surely, man, in his research and development on a convenient time scale, has risen to the principles applied by nature in evolutionary processes that generally solve the problem of cryptanalysis - the search for the optimal form of life, and possibly put an end to the development of his own classical cryptography.

Now let's try to transfer what has been said into the logic of our model.

By W, we denote the question contained in the i section of memory, i.e. W, is ?:- F_1 F,..., F_k.

This question can be answered either by looking for evidence, i.e. by sorting through known rules and facts, or try to simplify the question itself by doing the following:

1) substitute the fact of interest in the left side;

2) check the validity of the obtained rule, if the result is true, go to item 5, otherwise go to item 3;

3) remove the most "interfering" fact from the right side of the question (destroy the interfering element), i.e. simplify the question (most often this interfering fact is a newly arrived fact);

4) if the question still exists, then go to item 2, otherwise complete the work on this goal;

5) fix this question in the form of a rule and complete the work. In the event that the learning process is not completed successfully, i.e. memory area) is completely destroyed, retraining of the allocator memory will begin until control is transferred to another memory area.

In a multiprocessor system, the trained allocator memory translates the training sample to several sections of functional memory at once. Figuratively speaking, the

input data, having entered the system, is copied in sufficient quantity to satisfy all goals, "swallowed" by these goals, built in, turning the goal into a rule, or rejected without finding a place for itself.

From the point of view of a self-learning system implemented on the principle of redundancy (we can assume that nature builds the search for a solution to almost all of its problems on this principle), it is not always possible to come to an understanding of something using the search for proof through a complete enumeration of options in a limited time. A complete enumeration is always too long and tedious and can hardly contribute to the survival of the system in difficult environmental conditions, where the time of the required reaction largely determines the system's ability to survive.

The system does not always have time to chase "fish of your favorite variety and size."

It is necessary to give the fish the opportunity to sail at the right time to the right place.

In this case, the task is only to find the corresponding knowledge in oneself. And this knowledge, with varying degrees of accuracy, always has a place to be (due to the enormous redundancy of nature).

What has been said above is still too early to apply to modern technical systems in which each element counts. But as far as living nature is concerned, it most likely builds its cognitive processes precisely on the basis of redundancy.

In the proposed algorithm, the desire of a self-learning system to be minimal is clearly visible, i.e. to get rid of useless (superfluous) axioms, facts, rules of inference.

The CPF model allows you to give an explanation of the so-called **intuitive** knowledge, when a person instantly comes to an understanding of something, and it takes years and years to rationalize the explanation, since the rationale requires awareness of processes, including previously unconscious ones, which made it possible to obtain the result.

Let us return to the formal description of the model.

Let us conditionally divide our program (model) into two blocks in accordance with the diagram in Fig. 4. 3.

The first block implements the work of the allocator memory, let's call it the distribution block, and the second - the functional memory - the functional block. Denote by **W** the question;

R - rule;

F - fact;

Let us introduce the following operations (functions):

Z =Prav(X, Y);

Z =Wopr(X);

Z =Delp(X, Y). F = Delph(P);

where

"prav()" is a function during which the value of the first argument becomes the left side of the value of the second argument. The output is the rule. This operation is designed to turn the question into a rule, for example P = Prav(F, W).

"Wopr()" is a function that searches for an argument in the text of the program for its negation. If found, the leftmost fact in the value of the argument is destroyed. The output is a question. This operation is designed to destroy mutually exclusive rules and turn them into a question, for example

$$W = Wopr(P).$$

"Delp()" is a function that implements an exception from the value of the first argument of a substring that matches the value of the second argument. The output is a question. This operation is used to establish the truth of the rule by eliminating "interfering" facts, for example P = Delp(P, F).

"Delf()" - a function for highlighting the fact that more than others prevents the value of the argument from becoming true, for example

F = Delf(P). The output is a fact "Trpr()" is a function that returns 0 if the argument within this model is a false rule and 1 if the rule is true or the argument is not a rule, according to the definition of the syntax of the rule, for example i = Trpr(P). The output is an integer value: 0 or 1.

Then the system operation algorithm for a specific goal W when a new fact F arrives can be written as follows (using the syntax of the SI programming language):

/ system operation algorithm for a specific goal */*

P = Prav (F, W);
while (Trpr (P) ==0)
{ f = Delf (P);
P = Delp (P, f);
}

/ Algorithm 4.1. Processing a fact by purpose. */*

The cycle will end if:

a) <u>the rule will be preserved, i.e. becomes true</u> (stability) Trpr (R) =1;

b) the right side of the rule will not remain and <u>the rule will turn into a fact </u>(order from chaos)

Trpr (R) =1;

c) there will be no left part of the rule and <u>the rule will again turn into a question</u> (chaos out of order)

Trpr (R) =1.

In the case of a system that is able to work in parallel, the above algorithm works simultaneously for each possible goal until one of them turns into a rule or the input data is "lost", i.e. targets activated by them will return to their original state.

The return of all goals to their original state indicates that the system is not able to "notice" (comprehend) this input information. The inability of a system in a certain state to be aware of what is happening will be designated as the problem of invisibility.

24.2. The problem of invisibility

We only see what we are, we never see anything but that.

Osho Rajneesh

Formally, the problem of "invisibility" can be formulated as follows.

Definition 1.

For an informational self-learning system such as a R-network or a PSC model, the fact f is **invisible** if, when performing a sequence of operations:

P =Prav(F, W);

f = Delf(P);

P = Delp(P, 0 f=F for any W. (This happens if the received fact more than others "prevents" the received rules from becoming true).

Definition 2.

In the event that, apart from F, no other fact or rule was destroyed in the system, then the fact F is **absolutely invisible for it**.

Definition 3.

Fact F is **trivial** or **absolutely real** for an information learning system if its perception has not led to the destruction of any other fact or rule.

Definition 4.

The degree of novelty of the fact F **(informativeness of the fact)** for information learning system is determined through the volume of destroyed substructures when the system perceives the fact F.

Definition 5.

A fact is called **invisible consciousness** or **unconscious** if the rule in which it is present on the left side has never been consciously executed, i.e. the dominant process has never included the execution of this rule.

The problem of "invisibility":

Part 1. Is it possible for each self-learning information system to propose such a learning strategy ("life") that will transfer an absolutely invisible fact into the category of trivial ones?

Part 2. Is it possible for each trivial fact that is in the informational self-learning system to offer the system such a learning strategy that will make this fact absolutely invisible to it?

Part 3. Is it possible to propose to the system such a learning strategy, during which the fact f received at the input of the system will destroy all pre-existing rules, i.e. Is the degree of novelty equal to the actual capacity of the system?

The ability to identify or introduce suggestive goals into the system is determined by how the problem of invisibility is solved. The resolution or non-resolution of this problem in each case is the success or failure of the plan. It, like a tower in an open field, is visible from afar and is decisive when choosing this or that path, this or that strategy of the system's behavior in the space of goals. Therefore, speaking of suggestive influences, be it a computer bookmark for a computer or a hypnotic device for a person, we are first of all trying to solve the problem of invisibility.

In general terms, the process of transforming a previously invisible fact into a trivial fact is as follows.

Факт невидимый	→	Факт тривиальный, но неосознаваемый	→	Факт тривиальный и осознаваемый
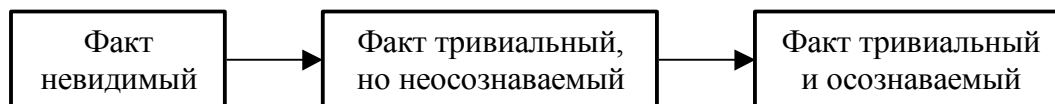
Along with the noise, facts and rules are entered into the system that are able to somehow "catch" on pre-existing knowledge in order to become the environment in which invisible knowledge can become visible in the future, i.e. how to show up. The next stage, related to the transfer of knowledge from the category of the unconscious to the category of the conscious, is already simpler, as it is done, you can read in [87].

In the 80s, Bandler and Grinder in NLP programming named the omission of parts of the world model as one of the reasons for the mental difficulties of the patient. Omission is the making of a series of logical connections and facts invisible to the individual himself, i.e. Willy-nilly, Bandler and Grinder touched upon the problem of invisibility in their work and proposed a specific algorithm for restoring the "lost" (invisible) parts, thereby demonstrating in practice that the problem of invisibility for the P-net has a solution for any person who has sufficient according to Theorem 1 (part 1), resources.

In the book "Infection as a way to protect life", the issue related to the invisibility of infections by an information self-learning system was already considered, while using the terms: understanding and aggressiveness.

Within the framework of the model created in this work, it becomes possible to clarify also concepts such as: the invisibility of a virus, the invisibility of a system by a virus, etc. Somehow: a virus, being an alien element, is "acquired" by the system in the same way as any new knowledge to be invisible or absolutely invisible to the system, if he suddenly turns out to be unable to find a question waiting for him in it. In this case, by the way, the system itself is invisible to this virus.

"There are things. which we understand immediately. There are things we don't understand, but we can understand. Besides, there are things we can't understand no matter how hard we try." - so stated a certain Mr. Sanenori, a courtier of the imperial court, quoted in the famous Book of the Samurai. In this form, the problem of invisibility was formulated in the 17th century in the Land of the Rising Sun. Of course, this was not the first formulation, just as it was not the first attempt to get closer to understanding the possibilities of man in the field of knowledge.

Even the ancient sages were convinced that the truth is only then the Truth. when it becomes part of the inner being!

Thus, within the framework of the proposed model, it is shown that the construction of an information self-learning system based on the principle of redundancy makes it possible to implement a learning mechanism by choosing a ready-made "genetic" knowledge, followed by adapting the most appropriate knowledge to the appropriate situation.

The impact of information weapons is carried out in a similar way: a targeted information impact activates the existing "genetic" knowledge sufficient to destroy the system.

It is important that the goals in this model are initially set in an implicit form (chaos) already at the birth of the system, in the future they only need to manifest themselves in their full or simplified appearance. But which of them will appear more fully will be determined solely by the input data.

Conclusion

In this part of the work, a study of possible threats was carried out and their classification was carried out. A boundary has been defined where overt threats end and hidden ones begin.

Any threat is realized during the execution of a certain algorithm the fact of generating which is also a threat.

Can this process be stopped? Or after like a check from a grenade pulled out, there is only one thing left - to run?

To answer these questions, a model called the PSC model was proposed.

In the model:

1) training is carried out on the principles of death and the birth of elements systems;

2) elements can be of three types: goals, rules and facts. Goals become rules, rules are destroyed by facts, facts are swallowed up by goals. In this case, the goals compete with each other in the space of rules and facts. They fight each other for rules (legislative sphere) and facts (information sphere).

Therefore, depending on the dominant goal, all facts have a different "color" for the system. This means that the system may or may not see them. It is this ability of self-learning systems controlled by Goals that formed the basis for the formulation of the problem of invisibility - the main problem of information warfare.

PART FIVE. SUGGESTATION AND SAFETY

It's funny when a grasshopper rushes to the cart: everyone is sure that the grasshopper will fall, no one thinks that the cart will overturn.

Chinese proverb

Introduction

As noted earlier, the main reason for classifying the security problem in general as algorithmically unsolvable is the impossibility of blocking a potentially infinite set of threats for any system.

However, the fact that something cannot be done does not mean at all that no one will do it, but, moreover, if something cannot be done in a general way, this does not mean that it is impossible to get smart solutions.

So far, the focus has been on clear information threats. Usually we discard and discard as non-existent, if after us, as was the case with Faust, suddenly a black dog runs across the arable land [15]

"In circles, reducing their reach. He is getting closer to us."

And we do not want to see, as long as possible, that

"... a flame, Behind him snakes across the land of the glades."

And we don't notice

"How he weaves his coils around us! Their magical meaning is not so simple."

Only sometimes it suddenly pricks in the chest, it becomes anxious. Thoughts will begin to fuss without apparent order. But soothing music and reasonable speech, like anesthesia, will lower the level of chaos in the skull of the cognizer for some time, and the person will calm down. True, the anxiety did not go away. Moreover, the dog does

"The circle is getting smaller. He runs up. Stop!"

Still alive, despite the fact that the warning of danger is rejected by the mind. So maybe there was no danger, but there was only an optical illusion? So why not let a black poodle under your roof? Let him live. Who would ever think of looking into the future and thinking that one day it will be necessary to expel an element from the system, and at *the same time it will* suddenly turn from a small vain dog, from a "demonic pettiness", into evil spirits swollen to the ceiling. Over time, this evil spirits, of course, will take on a completely decent look for us, because, as B. Gracian stated, *"even the most terrible mug ceases to be terrible when you get used to it."*

And even the terms become more harmonious, otherwise they replace them. The information massacre is beginning to be called the information war. However, a war is always a war in which equals fight with equals, and each side has a chance to win. And a massacre is a massacre. The mute people are brought to the slaughterhouse and begin to whip them with blinding and silencing all human information flows. For those who have already been brought to the slaughterhouse, there is only one way out: to work for the owner of the slaughterhouse and then die as unnecessary. You can't run away from the slaughterhouse, but if you are able to feel, then you can, like sad cows, look at God's world and cry, feeling with your skin the approach of an inevitable end.

The models proposed in this part of the work are crude enough to become a scalpel in the hands of an information surgeon. Here and now, the task is different: to formulate the main signs of an information defeat and fairly general rules for the behavior of systems in an information war. But, of course, the most important thing is to try to understand:

a) what is the information self-learning system capable of in this war, and what is not;

b) to what extent such systems can resist or help the larger formations of which they are part.

As for detailing, it can always be done by the reader himself.

Chapter 25. Signs of information defeat

And how can you rise above the days and nights without breaking the chains in which you chained your noon at the dawn of your realization? Verily, what you call freedom is the strongest of these chains, though its links shine in the sun and dazzle your eyes.

K. Gibran

Before proceeding to the study of possible mechanisms of protection against information weapons, it is advisable to touch on such a topic as signs of information defeat. And it is desirable to describe them by analogy with the signs of defeat from any other type of weapon,

It is known that exposure to any type of weapon leaves certain signs of defeat:

gunshot	gunshot wounds
Chemical	burns, poisoning
Bacteriological	infectious diseases
Nuclear	radioactive traces, shock wave, light damage, etc.

What are the signs of information defeat and do they exist?

Let's try to start the search with something well known to man, i.e. from information systems created and created by him. The projection of information weapons into the telecommunications computing environment are software bugs and computer viruses.

What are the signs that they are present?

The most dangerous of them do not manifest themselves in any way until the very last moment of the system's existence. The affected system is unaware that an analogue of the while () statement is already running with a condition that determines the end of the world for the system, such as eating an apple from the tree of good and evil. The system does not suspect, because it does not see and does not feel signs of defeat. They are not there until the occurrence of events listed in parentheses while (), although it may be at this moment that the trigger is cocked or the fuse of the information weapon is set on fire.

It will still take some time to prepare for the shot, but only in these last seconds the system can have time to understand that it is under the gun. It is at this moment that the latent infection takes control, gains power over the computer, gets the opportunity to steer, when the unsuspecting captain passes the helm into the wrong hands.

The same computer virus only gives a command to destroy data, and the destruction is carried out by the operating system itself.

Thus, the signs of the information defeat of the system should be looked for and can be found in the field of management. It is from there that one of the former elements of the system, transformed into a ghoul by the while () operator, begins to devour all living

things.

In the most vulgar version, when the parasite is no longer afraid of anything, it begins to issue commands to the elements to self-destruct, and they obediently not only bring a soapy rope, but also hang themselves.

If, according to the aggressor's plan, the affected system still needs to be milked, then the information agent that has broken through to power activates more complex control algorithms. He stands at the origins of the control mechanism - this means that he has the final say in the question of which processes should be started and which should be terminated.

"It would be much better for some sovereigns if they lost half of their subjects in battles or during the siege of which city, rather than having collected their property in their chests and then starved to death." - bitterly wrote with a pen of one of his characters I.A. Krylov [41] more than two hundred years ago about our present days.

"The death of a warrior, slain during a battle with a sudden blow, is not as painful as the death of a poor farmer, who thaws under the burden of hard work, who earns his livelihood in the sweat of his brow, and who, having exhausted all his strength for fertilizing the lands, sees fields that promise to reward him with an abundant harvest, plundered by a greedy sovereign; death, I say, of this poor farmer is a hundred times more cruel than the death of a warrior who ends his life in an instant in battle."

Before taking the next step, let us once again note as one of the most important statements: the signs of an information defeat should be looked for based on the fact that information weapons primarily affect the control system, not so much destroying, but subjugating the control system of the affected object. This is how the most dangerous biological, social, mental and computer viruses act.

In this case, the control of the affected system is carried out using covert and overt information impact on the system both from the outside and from within.

The purpose of this impact is a purposeful change in behavior systems.

This means that the main sign of an information defeat will be changes in the behavior of the affected system.

A system affected by information weapons in its behavior guided not so much by their own interests as by others commands. And the greater the orientation in behavior towards other teams, the deeper the informational defeat. In this case, commands can be hidden or explicit.

An example of complete information suppression is a former person called a zombie; his control system, by definition, is completely oriented to the fulfillment of someone else's will.

The same picture can be observed at the level of information confrontation between states, when, realizing their own geopolitical interests, information aggressors widely use the method of creating political zombies at the very top of the control system. The USSR, in the last years of its existence, and subsequent Russia are a very clear example in this sense.

Any control process, except for purely functional characteristics of the type: completeness of feedback, delay in making a decision, reaction time, etc., is characterized by a goal. Since the management of the system takes place in an acute information struggle, the goals of management are often hidden from the system itself in the management mechanism that has emerged from it.

It is clear that no control mechanism will ever broadcast to the system it manages that the goals of control are at odds with the good of the system. Therefore, in order to identify signs of information defeat, to evaluate the words or emotional manifestations of representatives of the management structure, to listen to statements made for everyone, and even more so to focus on them, means to engage in self-deception.

It makes sense to assess the degree of information damage only on cases, on those cases from which it becomes good for someone, and bad for someone. And it is precisely this preference vector that is the compass needle that allows you to understand in whose interests the control system works.

Therefore, it is proposed <u>to assess the degree of destruction by information weapons through the information capacity of that part of the structure of the affected system, which either died or works on the target. alien to your own system</u>.

What does this definition mean in practice?

For a computing uniprocessor system, the degree of damage can be estimated in terms of the percentage of lost useful time (sometimes in terms of the number of computer virus replications), i.e. through the fraction of processor time during which the infection manages the entire system to achieve the goals programmed in it, plus the amount of destroyed programs and data related to the further existence of this system, to maintaining its consumer properties.

For the state, by analogy, this is the share of parasitic state structures or structures working in this state in the interests of other states.

For the people - through the percentage by which there is a decrease in its number every year, plus the lost cultural values and research and production centers.

An example is the so-called perestroika in the USSR, and then in Russia, the results of which clearly show what goals the perestroika management mechanism implemented by the state serves:

1) within a few years, an annual reduction in the population by one and a half million;

2) more than 100 thousand scientists leave the country for permanent work;

3) self-destruction of libraries, museums and other cultural values due to lack of funding;

4) decrease in the level of education of the population and medical care;

5) a sharp weakening of objectionable power structures with their gradual complete restructuring "for themselves."

Everything that happens is explained in the form of a lack of financial resources. The very finances that in modern Western society are hypertrophied to the level of a universal deity so that even the sung I.V. Goethe exclaimed in surprise:

> *"Grab hold of my jacket.*
> *You see, and the bowels of the mountains ascended*
> *King Mammon stopped on his own.*
> *Light effect enhanced*
> *Its glow melts."*

Why do people believe this explanation?

Because targeted brainwashing does many facts are invisible to people. The tactics of propaganda work is a separate science that provides the process of self - destruction of the nation with the necessary legal acts. <u>In the event of an information war, it is desirable that all actions take place in the legal space of the strongest</u>.

Therefore, the work of infected control mechanisms should begin with changes in legal acts.

Legal acts, adopted laws - are they really so dangerous?

For an obedient herd of sheep that is being driven to the slaughterhouse, this is fatal; for a wolf that cannot stand up for the flags, this is death.

"What does it mean to recognize the laws, how not to bend down and draw your shadows on the ground?" — wrote K. Gibran [25], assuming that any normal person should still understand the difference between a real object and its shadow.

But senseless norms and useless decrees always have and will have their servants - creative impotents who hide their own banality in the shadow of the normative guillotine prepared for all living things law.

The listed signs of information defeat cannot be hidden behind any words. They are, as they say, on the surface. And here an interesting question arises: Why does society not notice this?

Society, lulled by sweet fairy tales, is afraid to think about what has been said, because people have been taught for years that you can do anything *if there is no war.* However, that part of him, which is often referred to as his conscience, sometimes tries to resist the aggressor, as was the case in Russia in 1993, when people tried to defend the constitution and the parliament elected by the people. But such unprepared attempts to speak out against the brutal and armed force, in whose hands all state control mechanisms, are initially doomed to failure.

The state is the governing and regulating structure. It is not difficult to destroy this structure and revive it anew, especially since it is not the essence of it. The essence is in the very original system, the security of which is ensured by the state, in the people, in their culture, art, science, territory, wealth of this people. That is why, <u>by and large, the information war has no sense of weight against the state, it is waged for the state, for control over the state which becomes an instrument in the hands of the victor to govern the conquered people.</u>

In conclusion, let's summarize, once again listing the signs of defeat by information weapons:

1) the inclusion of part of the structure of the affected system in the structure of the system of the winner (emigration from the defeated country and, first of all, the export of the most valuable human material);

2) complete destruction of that part of the structure that is responsible for the security of the system (destruction of the army of the defeated country, special services);

3) complete destruction of that part of the structure that is responsible for restoring the elements and structures of the security subsystem (destruction of production, primarily science-intensive, as well as scientific centers and the entire education system; cessation and prohibition of the development and production of the most promising types of weapons);

4) destruction and destruction of that part of the structure that cannot be used by the winner for his own purposes.

<u>All these signs turn out to be exactly the same as in a conventional war, which once again confirms the fact. that the world has entered the era of information wars. and the burial of the first victims has already been made.</u>

Chapter 26. Hidden threats

A soul that does not have a predetermined goal dooms itself to death, for whoever is everywhere is nowhere.

M. Montaigne

Protection against obvious threats initially required common sense from the object, then common sense was transformed into scientific disciplines in almost all possible areas of creating weapons and means of protection, these are: firearms, bulletproof vests, bunkers, etc. (mechanics, physics), chemical weapons (chemistry), bacteriological (medicine, biology), space (astronomy), nuclear (nuclear physics), cybernetic (cybernetics), psychological (sociology, psychology), etc.

Protection against hidden threats has evolved in a different way. Here, initially, magic and religion, supported by art, stood as the basic methodological disciplines. And it was only in our century that psychoanalysis and cybernetics timidly entered this mysterious sphere.

In many respects, this development of the theory and practice of ensuring security was due to the lack of a clear understanding and strict definition of what constitutes a system affected by hidden information impact. If in the field of obvious threats everything was clear, as they say "weighty, rude and visible", then in the field of hidden threats, the fog was quite enough to hide the hidden threats themselves.

Indeed, what does healthy mean, and what does infected mean? *"Usually they consider a healthy organism that does not feel pain, such an understanding is primitive. The healthiest heart can be sick, because too much is reflected in it"* (Agni Yoga). The healthiest heart is ready to get sick if it is already affected by a self-growing infection. The most dangerous actions for oneself can be completed by a person if a mental bookmark has crept into his subconscious. The complete devastation of lands and the destruction of cities are capable of being carried out by program-controlled missiles carrying nuclear charges, in case of activation of hidden in their software bookmark management system.

In the fourth part of the work, all possible ways of protecting against an aggressor were named, these are:

1) a barrier between themselves and the source of danger;
2) escape beyond the reach of danger;
3) destruction of the source of danger;
4) own modification.

Let's analyze these methods for their use for protection in conditions of hidden targeted information impact.

The installed barrier can protect against a shock wave and fragments, but cannot protect against information, which, like water, will always find a hole.

In the same way, when the tongues of lightning come closer and closer, blinding with themselves, blinding with their inevitable approach, then one can try to work out some kind of protection. For example, to raise planes into the sky or from the ground with directed volleys to disperse clouds threatening bad weather. This can be done once, twice, three times. But it is foolish to think that only one side is learning - the one that disperses the clouds. The storm is learning, the angry and sparkling world is learning.

And the clouds are getting denser and closer and closer to each other. And now they are advancing on the city in a different way, not at random - who is ahead, but in formation, inevitably squeezing the encirclement at different heights. You can block one information stream, you can block a river with a dam, but all this can be done only for a while.

A drop sharpens a stone, washes away the roots of trees, and at one, as always unexpected, moment, streams of water, accompanied by a heavenly bacchanalia of thunderclouds, will wash away the dams made for everyday life, and all values will sink into the abyss.

Information is not water or food, but if it is food and drink, then a person [15].

"he will drink - and he will not get drunk enough,
He will eat - and he will not be full"

Therefore, after each piece eaten, inevitable changes will occur in the person himself, as it should be for any self-learning system.

On the other hand, you can't stay hungry forever. One day a thunderstorm over the sea will seem like something ordinary, and one day a piece will not go down your throat. And you have to be very damned, in the sense of being unable to learn, so that this moment does not come.

Yes, the information system will not be satisfied, yes, it will not get drunk enough, but it will not give a damn about all this, because the spectrum of its interests will suddenly turn out to be in a completely different frequency band.

Goals will change. And Savva Morozov will voluntarily give all his capital to create his own ideological killer, who, in turn, after many years, will exchange all the victims and all the exploits of the human spirit for the same money that was thrown into the crucible of change from hopelessness, due to its complete worthlessness and orthogonality to such intangible concepts as love and happiness. The circle is closed.

How many times does a yogi need to repeat the sound "om" so that the glaciers melt and completely different meanings appear.

Maybe try to escape beyond the information impact? But this type of influence has no limits, just like the light of stars.

You can try to eliminate the source of danger. But on what basis? Although primitive peoples sometimes did this, eating missionaries. This worked for a while, at least until they were taught how rude and bad it was to eat a white person. True, they explained it not with a word, but with a bullet.

Today, there are different customs, different food, and if you can't eat the bearer of an unknown danger, then it remains at least to be in a quarrel with him, as K. Prutkov argued: "Sometimes *it is enough to scold a person so as not to be deceived by him.*

It turns out that such a method of protection also works well against informational influence. Based on the foregoing, we can try to draw the following timid conclusion: as long <u>as the victim is ahead of the attempt of any informational impact by physical impact, his safety is guaranteed</u>. As one of the heroes L.S. de Camp:

"The best defense against a bullshit dog is a good kick."

However, such a solution to the problem, unfortunately, leaves unclaimed from the side, thus defending the system, all messages aimed at its benefit. A messenger came from afar, brought news of the land of El Dorado, but was killed, just in case, before he could open his mouth.

All this means that in a situation of uncertainty, the use of anticipatory physical influence is meaningless, because it can only help if the aggressor is accurately determined and the information war has begun. But the problem of the beginning of the information war belongs to algorithmically unsolvable problems. Again a dead end.

The last way remains - to change yourself, then the soil will suddenly cease to correspond to the weed seed. Purposeful own change, probably, is able to make external influence inadequate to the new information structure, however, at the same time, no one can insure that everything will not turn out the other way around.

Maybe indeed in your study we have reached that invisible border, beyond which there is nothing. And it remains only to pronounce after E.P. Blavatsky, that the best protection in the world, where every sound of the visible sphere awakens an invisible sound in the occult sphere. This is pure conscience.

However, let's not get ahead of ourselves.

Previously, classical science has never dealt with methods of protection against purposeful hidden information impact. Not because it was not necessary - it's just that the evolution of the protection system has not yet reached the point where an appropriate justification should have appeared, denounced in a strict evidence-based form of metematics.

But gradually humanity came to the need to justify new means of ensuring security. Moreover, this need was initially realized by itself through the bearers of magical rituals, who knew how to protect from the evil eye, damage and other troubles. Such techniques took place even when the Pythagorean theorem was considered secret knowledge for the elect. At the same time, the blocking of dangerous actions was based solely on clear threats, i.e. explicit ones were used to protect against hidden threats.

Next, Time brought to the scene surgeons capable of removing parasitic inclusions that develop in the body. Later, Jung's psychoanalysis arose, capable of revealing hidden parasitic formations in the psyche of the individual.

The methodology of protection against hidden threats gradually gathered under its wing not only magic, religion, but also art. It is widely known that even Pythagoras used various musical works to cure ailments.

The first experimental science aimed at combating hidden threats and declaring itself as a field of scientific knowledge was medicine and, in particular, surgery, what is a surgical operation, how not to identify the biological system of bookmarks in the body using available diagnostic tools, with subsequent opening of the system and removal of the bookmark.

But the real attack of science on the sphere of hidden and informational threats began with the advent of computers and software. It was then that the terms first sounded: development of reliable program code, code testing, code verification, etc., and a little later - control of the computing environment in real time. It was then that debugging tools, computing environment emulators, and other tools for finding sections of dangerous code in a software product appeared.

Let's try to formulate the main directions of organization of protection, information system from suggestive threats.

Let two information self-learning systems be given: the system A is the aggressor and system B is the victim.

System A, using a hidden purposeful information impact, tries to rebuild system B, instilling in it, for example, a system of values and rules of behavior that is beneficial for A.

Proceeding from the existing mandatory stages of the information influence of one system on another, it can be assumed that the effectiveness of a hidden targeted impact should largely be determined by the following factors:

1) whether the latent influence of system B reaches, i.e. will he who has ears hear;

2) to what extent the input training sample, secretly supplied to the input B, corresponds to the current state of B in order to be embedded in it, i.e. whether the seed is able to sprout in a new soil;

3) the ability of system B to detect the origin of hidden bookmarks in its own structure and destroy dangerous formations, i.e. to separate the wheat from the chaff;

4) the ability of system B to control and block the execution of bookmarks, i.e. weed out the weeds.

Further synthesis of the security system against hidden information impact will be largely determined by the results of the analysis of the factors listed above and the possibilities of influence on these factors.

26.1. The concept of an information target

(problem of hitting the target)

> We *are outwardly separated and inwardly stan with all living beings. We feel some of the vibrations of the spiritual world, some have not yet reached us, but they go on, just like the vibrations of light from the stars go, which are* still *invisible to our eyes.*
>
> L.N. Tolstoy

Any type of weapon is most effective when it is used on the most vulnerable parts of the system from it. The same applies to information weapons. Each self-learning system has the weakest points for information impact, let's call them **information targets**.

It is clear that information targets will be those parts of the structure whose work is determined to the maximum extent by information, and this is typical, as a rule, for management structures.

In order to covertly manage (train) an information system, it is necessary to introduce appropriate elements into its structure, which in the future can be emphasized, using them not only to reprogram the affected system, but also to obtain the reaction to the input data that the aggressor needs. To do this, the bookmark must be implemented exactly in that part of the structure that is responsible for management and security. After that, all other functionalities of the system will not be difficult to "edit"; by definition, they cannot resist goal-directed control, which comes, as it were, from themselves - from within the system.

In order to include your agent in the structure of the system, two ways are possible - explicit and hidden:

1) direct introduction of one's own element into the structure of a foreign system. In the social world, this is the appointment of an appropriate government, a governor in an occupied territory, a director, an overseer, and so on. In the world of computers, this is the installation by the owner on all computers of the enterprise of an additional own control system;

2) reprogramming individual elements of someone else's system In the social world, such elements are usually called "agents of influence in the computer - viruses, software bookmarks.

We are interested in the second way in this chapter, because it is he who assumes a hidden purposeful information impact. In order to reach him to the goal, i.e. to carry out the intended reprogramming is necessary:

1) select a subset of elements of the attacked system that belong to the control structure, as well as potentially capable of being in this structure in the near future. Let's designate this set through $A=\{a_i\}$;

2) select from the set A a subset of elements that are most easily reprogrammed. Denote it by $A_i=\{a_j\}$, $1 \leq j \leq n$ $A_i \in A$;

3) to carry out on the elements of the set A_i information impact through the corresponding input training sample.

It is clear that with hidden informational influence, as with any other type of weapon, the easier it is to hit the enemy, the larger the target. In this case, the target is the larger, the greater the power of the set $A_i - a$.

In what follows, an **information target** will be understood as a set of elements of an information system that belong or can belong to the sphere of management and have potential resources for reprogramming to achieve goals that are alien to this system.

Thus, the task of any information system should be to increase n in the structure of the system of a potential adversary 1 and to reduce the number of such elements in its own structure.

Let's explore on the example of the state structure - how you can influence the value of n.

A priori, we can assert the presence of the following functional dependencies:

1) n the more, the more the population is directly included in the sphere of management;

2) n the more, the more people from the sphere of management have "Panama" in their "past" (a fact condemned by today's morality or law) And what can the number of panama owners depend on? It appears that their number is somehow connected with the legislation of the country and the efficiency of the special services. If the legislation is absolutely allowed, then what kind of "panamas" can we talk about? It is proposed to assume that the number of "dads" is directly related to the severity of the legislation and the weakness of control over its implementation. For example, if laws require the immediate payment of tangible taxes on uncollected sums, and tax services are weak to competently control this payment or are interested in it, then the number of panama carriers will grow steadily. This means that the set A_i will also increase;

3) n the more, the more offended by the state in their own country. For example, the presence of the repressed in the past can give rise to people in the present with a stone in their bosom for their own Motherland;

4) n the more, the more "green" young people who are not programmed to focus on their own values fall into the sphere of management. Figuratively speaking, a biocomputer does not tolerate emptiness, if you do not install your software in your *mind, then a competitor will do it.*

Now we can move on to the conclusions.

Conclusion 1.

In order for the size of the information target to be as large as possible, you should:

1) include in the scope of management as many elements as possible:

2) weaken the mechanism of one's own self-control as much as possible (this is necessary to increase the carriers of "panam");

3) orient as many of your own elements as possible to the values of other people's systems. In the social world, for this it is enough to organize either repressions in one's own country, or to kill people without paying their salaries for months, to arrange internal wars without an end, slowly smoldering bloody regional conflicts, etc.;

4) to drastically reduce the quality of professional and general training of system elements with the simultaneous rejuvenation of the management sphere (this requirement works more for the future, since it greatly simplifies the further process of reprogramming).

The proposed scheme did not include mechanisms that affect propaganda aspects and the mental constitution of the "average" person directly related to this influence,

because the formation of the average person is already carried out by the sphere of management, i.e. state. In relation to the information target, this is a secondary issue.

Conclusion 2.

In the event that we are talking about protection against information weapons, then the scheme above (conclusion 1) should be completely revised in the direction of minimizing the size of the target.

And here interesting questions arise: What is the minimum possible target size? Is it possible to reduce it to zero with the help of special tricks or tricks?

Yes, if we reduce the entire sphere of management to zero.

Is it possible in principle to create a system without a mechanism, control?

The principle of "every man for himself" (everyone controls himself) leads to the denial of a single control mechanism, but at the same time destroys a complex system, making many simple ones out of it, thereby reducing complexity. However, even a team of loaders, having lost their unified management, will lose the opportunity to earn money by lifting the piano to the twelfth floor.

Independent specific principalities, as historical experience has shown, do not live long due to the inability to solve complex problems, from time to time all that require their own decision.

In the light of what has been said, it is interesting to look at the implementation of control mechanisms in the software of computing tools technology and compare the first versions of operating systems for PC (DOS) and subsequent ones (Windows - NT). If in the first place - any task launched for execution was able to contribute to the control of the system - access to the control mechanism was described in detail in the documentation and allowed to any process, then the further development of system mathematics put a barrier between those who control the entire computing system and ordinary users. At the same time, the number of roaming computer viruses has sharply decreased.

However, computer viruses did not disappear and never will, but due to the increased complexity of the system and the emergence of a protective barrier around the control mechanism, they were not so numerous for some time.

In conclusion of the section, let us dwell on how targets are chosen in the social world.

Gone is the simple time when intelligence agents bit by bit collected and analyzed information about the structure of the control mechanism and its elements. If we were talking about a large and complex system, then the enemy was happy, treading a path in the "thickets" to some element from the control link of the opposing system. In the age of information wars, this laborious work is done by the computer. The supercomputer allows you to keep in memory data on the structure of the control mechanism, as well as all the knowledge about the elements of this structure, an expert assessment of the behavior of potential objects of information impact, given by psychologists, political scientists, Kremlinologists and other... logs.

And this computer model "breathes" in real time, constantly observing the information target given to it in the computer sight.

The most important thing in the work of this model is not that it knows how this or that information system will react to this or that event. The most important thing is that the stories played in it no longer belong to today, but to tomorrow.

It is about shaping the yet-to-be-seen future. With the advent of computers, serious figures about today's victories, if they do, then only for the "red word". And behind the frame shown, we are talking about battles for the future, for tomorrow.

Today's time, like today's space, has long been divided. It has no place for "random" systems.

Purposeful information impacts are aimed primarily at the formation of tomorrow's and the day after tomorrow's time, and secondly - tomorrow's space.

26.2. The logic of questions and protection from them

(the problem of matching the impact to the state of the system)

So the target is set. It is placed in the crosshairs of a computer model and any of its swaying is accompanied by an accurate movement of the information sight.

And so on, until, finally, the command is given and the necessary words are spoken, then the question will "fall" into the prepared soil. However, not every seed germinates.

Even with a slovenly owner who does not pay any attention to his site, allowing drought and flooding, weed seeds carried by a tailwind may not have sprouts. So the person using the information weapon always has enough problems.

The target lives its own life, the processes of birth and death are constantly taking place in it, and in this situation, as mentioned above, it is almost impossible to predict its behavior with any accuracy.

To hit a static target or a target in which all elements move along strict orbits, having neither the opportunity nor the right to violate the laws of bureaucracy (for example, Komsomol - the consignment - party governing body - state governing body), quite simply.

It is a completely different matter if the target "winds", covering its tracks, like a cunning fox. At one time, the principle of "replacement of personnel" was practiced in the governing and power structures of the USSR. A worker in the center was obliged to go to remote districts, an employee in the Far East was sent to the European part of the country. Even earlier, the head, who failed to start up the plant on time, was instantly withdrawn from the sphere of management and no one saw him again.

And a target hit by an "information shot" can always try to shake off the "adhering infection" from itself, since it is not easy for the enemy to control a hidden tab at a distance. If the executable algorithm was modified at the target level once, then why can't someone else, for example, their own system, change it?

Let's imagine a situation when a target element is hit. What will happen next?

The affected element, left to itself, for the most part continues to interact with its closest neighbors, and only then listens to distant echoes coming from overseas countries. Without a tough guiding hand or an appropriate environment, any agent of influence can theoretically become a decent person again, because. self-learning systems tend to relearn.

After a brief analysis of the causes that can stop the growth of the infection entered into the system, it makes sense to answer the following questions: Do the elements

themselves, which have fallen under the hidden information impact, know that they are likened to puppets on a string? Do they understand that they will now constantly pull on this very rope?

Of course, if an employee receives any material benefits from the enemy (foreign special services, criminal organization), then he most likely guesses that all this is not just like that. In this situation, at least the element of the structure itself, working against its system, is aware of this, i.e. knows and understands what paid services can lead to for his environment. This means that knowledge about the threat, albeit in a localized form from the security services, is present in the system. How and when, and will the part of the structure responsible for security be able to access this knowledge? - these are other questions that have nothing to do with the essence of hidden threats, which are discussed in this chapter.

Here it is important for us to study a different situation, when individual elements of the system or even part of its structure are used by the enemy "in the dark" For the system itself, i.e. there is no knowledge of this in the system.

How it's done.

Dear reader, probably, remembers the children's fairy tale about the Hare, the Fox and the thorn bush. The captured Hare begged the Fox to cut him into pieces, drown him, burn him, but just did not throw him into the thorn bush. The information impact from the side of the "oblique" ended with the fact that the offended Fox launched his victim precisely *there.* And a little later, the "redhead" was surprised to find out that the thorn bush is precisely the home of the Hare.

Not only did the Fox deliver his offender straight home, he also did it for free.

Further, we can recall the fate of the unfortunate Moor from the tragedy of W. Shakespeare, who was used "in the dark" against himself.

If we go into the space of Russian literature, then here one of the most striking examples is "Masquerade" by M.Yu. Lermontov.

In all the aforementioned plots, the schemes of information impact are very similar. The protagonist, with resentment in his soul and a gleam of revenge in his eyes, commits a series of acts directed against himself. The enemy, on the other hand, does practically nothing, only observes, and occasionally directs the chain of events in the right direction, while remaining himself, as they say, behind the scenes.

The given examples illustrate the situation when the information system does not suspect that a hidden purposeful influence is being carried out against it and therefore is defeated.

And what should she do in such situations, if the problem of identifying the beginning of an information war is algorithmically unsolvable? Therefore, it turns out that the Moor will forever strangle Desdemona, asking her before his death the same question that has nothing to do with the source of the tragedy.

So is there any way out of this state of suicide?

A specialist analyst will answer that the way out must be sought in the constant verification of the adequacy of real facts to their equivalents in the information space, i.e. to have several information channels and never rush into those own actions that can wait.

But the enemy also guesses the essence of such an answer, and he is ready to independently, "for free" add a few more information channels for this analyst, since he needs them so much. "Be kind, take it and use it!"

The main thing here is who will control these channels.

If own satellites, own PBX own computers. own network and system software is too expensive for the country, this means that its own security is all the more unaffordable.

Thus, the following two directions of impact on the target were identified:

1) explicit, when an element of the system is simply bought or blackmailed;

2) hidden, when the element belonging to the target "plays out in the dark", but at the same time is able to be aware of his actions. The Fox thinks he knows what he is doing by throwing the Hare into the thorn bush. The Moor also does not hesitate at all, finishing off his girlfriend.

Ensuring the safety of target elements in this situation is indirectly related to the implementation of the property of control - first of all, control of one's own behavior, control of incoming data, control sources of information, etc. Then the need is on the agenda control mechanism control, etc.

Thus, the task of ensuring the security of the system from control its distorted input data is reduced to the task of controlling the input data, their sources, transmission channels and predicting one's own behavior in order to identify whether the system itself will be outside the permissible state after an appropriate adequate response.

But there is also a third direction, when the system, which is affected, is not at all aware of its actions. She just doesn't understand them.

Such examples were given in the fourth part of the work, they were based on post-hypnotic suggestion. A person unconsciously performed those actions, the installation for which he received, bypassing consciousness; in this case, he was controlled through his subconscious.

What should be the subconsciousness of an information system in order to reject an alien inclusion, so that this rejection occurs as if by itself? Is it possible in principle?

It turns out it's possible.

It is known that not every person is amenable to hypnosis, and in the state of hypnosis and in the subsequent post-hypnotic state, not everyone behaves as the hypnotherapist would like.

This means that other people's goals "sown" during the session for command programming can be destroyed by their own purposes. own meta programs.

The question is, how is it done? It is quite possible that it is enough for this if one's own earlier subconscious attitudes turn out to be stronger. But what does stronger mean? How to understand the statement: one Goal is stronger than another? This is actually a very difficult problem, but we will return to it later.

In the case of an agricultural example with two seeds and limited living space, everything is clear. No further comments are required here - the resources will go to one or both will die.

The information capacity of any information system, including the subconscious, is also not infinite. The resource is limited and in a desperate struggle they share suggestive goals.

How they do this was discussed in detail in the 4th part of the work.

From the point of view of ensuring security from this kind of impact, the main thing is not to leave any resource to parasitic targets, then they themselves will become the food of information processes.

It is possible that this is the answer to the question posed.

At one time, when military training was taking place in the last year of a technical university, I was very surprised why the daily routine of an ordinary employee signs until the last minute? Why don't people leave "notplanned" personal time that would not be devoted to writing a letter home or reading a certain kind of literature?

Then it became clear.

An information self-learning system in a "free search" can easily run into "reefs" and "run aground", and the captain of the "squadron" will have to answer for his subordinates. Here, in order not to answer, the captain does not leave any resource for any other goals in the minds of his subordinates, including those dangerous for himself.

There is nothing new in such a method of protection its crystallization has long been carried out in the regulations of the armed forces of many states.

26.3. Identification of hidden formations

(algorithm research problem)

One of the most important issues in the study of the problem of invisibility is the question of identifying suggestive inclusions. Ideally, I would like not only to know whether they are in the system or not, but also to own the tools for their localization and removal.

Before proceeding to the study of this problem, let's look again - how do suggestive inclusions get into the system?

Initially, we will focus on the well-known world of computers and programs, which we ourselves have created and which, due to a number of properties of software products, can be used to simulate similar situations in the social world [77, 78].

The life cycle of any software and hardware complex can be conditionally divided into the following stages:

1) development;
2) production;
3) delivery and installation at the consumer;
4) functioning at the consumer.

The hardware-software bookmark can be enabled at any of the listed stages.

At the first stage, this can be done by the designer-developer, by applying certain circuit solutions that allow using individual elements of the product according to their second purpose, hidden not only from future users, but also from manufacturers translating circuits into a product. In the common people, such a bookmark is called **distributed** and, being implemented at the microprocessor level, is practically undetectable.

At the second stage, the manufacturer is able to mount the "bug" in one of the hardware units or hide it in the body of the program. An example with a software tab implemented by the manufacturer (Microsoft) is described in [113] - this is a classic case when the developer introduces his own tab element without suspecting that something similar can be done at a higher level. It is no longer so incredibly difficult to identify such a bookmark, as evidenced by the publications available on specific facts.

The bookmark embedded in the third step is even easier to detect. To do this, it is enough for the user to competently compare the received software code with the reference code or with the code received by him through another seller (via different channels).

At the fourth stage, bookmarks can be made either by "individual" users, or by virus infection over the network, via magnetic media, etc. The bookmarks made at the fourth stage, despite the fact that they can cause significant damage, are still local in nature, since in the presence of standards, a "rollback" and a repeat are always possible. Methods of dealing with this kind of infections are mainly preventive. This is the

regulation of behavior through regulatory and methodological documents, the use of anti-virus tools, password protection against unauthorized access, regular routine maintenance, etc.

Let's try to transfer what has been said to the social world, to the world where the self-learning information systems we are studying operate. In the case of a person, we have the following possibilities for introducing suggestive inclusions (by analogy with a computer):

- the first stage - laying at the genetic level - refers to the parents of the system;
- the second stage - laying in the process of obtaining basic knowledge (language, rules of conduct, etc.) - refers to early childhood;
- the third stage - laying in the process of obtaining special knowledge (school, institute, special retraining) - refers to youth;
- the fourth stage is the incorporation into an already formed personality, in the process of fulfilling by this personality its family and professional duties.

Now let's ask ourselves a question, how can suggestive influence be characterized? As observers, we can fix the impact only at the stage of its manifestation, when all information on the computer is destroyed or a person faces death due to a sudden illness, or commits an act that is unexpected not only for others, but also for himself.

Why? Where are the roots of this act? How to predict such an act and most importantly, how to prevent it?

The angry housekeeper at the Kid's suddenly abandons her role as a strict housewife and merrily jumps with the ball, singing: "I've lost my mind, and I've lost my mind!" Peoples who have lived for centuries in the world, for no apparent reason begin to cut each other, without any warning bites into the leg of a random passerby who thought about it a minute ago.

The computer suddenly flickers the screen in time with the blinking of the LEDs on the drives.

The writer will burn the second volume of Dead Souls.

So, let's imagine the following objects as initial data:

1) system software executable code (operating system);

2) a person;

3) people.

The task is to develop a method for detecting hidden means embedded in the control mechanisms of the above information self-learning systems.

Let's start our study with system software. It is characterized by the absence of explicit self-learning mechanisms. Self-learning is possible here only in alliance with the developer when changing the version in the direction of increasing its number. The specific algorithm under study is not capable of self-modification and independent generation of additional, previously absent functions. It is only capable of fulfilling the tasks assigned to it in accordance with the previously set specification and the documentation created by the developers.

Testing what a program is supposed to do against what it actually does is called testing.

Testing code is somewhat similar to testing a hired employee for professional suitability. It allows us to understand how the object meets the requirements for it, but does not allow us to answer the question of interest to us: Is there any skillfully hidden

parasitic, from our point of view, inclusions in it, which, being activated at a certain moment, will make this object dangerous for the system?

The idea that has been actively preached lately about the need to obtain a certificate for certain software products was born out of hopelessness and, perhaps, the desire to shake the buyer's pocket once again. For today, the procedure for obtaining a certificate includes the usual testing, during which it is supposed to check the compliance of what the seller claims with what he actually sells. The benefits of such certification to the buyer are no more than from poultices to the dead, probably even less. The dead man, at least, no longer pays for them.

Somewhat similar work in relation to people is carried out by personnel services when a person is admitted to management structures or to information that has the status of a state secret. It must be admitted that, unlike software certification centers, at least some kind of scheme has been developed here, focused on the search for hidden inclusions. In this case, we mean the following techniques:

1) checking for the presence of contacts during which latent infection by the enemy could have been carried out;

2) check on the "lie detector";

3) check for the presence of mental disorders.

Interestingly, these methods do not and cannot give a 100% guarantee that the object under study is infected or not infected. AT What then is the point of all this work?

It is clear that this service is appropriate only when, on the basis of the above checks, it is possible not only to draw probabilistic conclusions, but, most importantly, to make a decision on admission or refusal of admission to state secrets, to the country or enterprise management system.

If the recommendations of the personnel service are not taken into account or a ban is imposed on the conduct of appropriate checks by it, then this inevitably leads to a weakening of the level of security.

Then it is necessary either to refuse such services altogether, or to introduce some kind of subjective measuring scales, to establish the same subjective limits of tolerance and without fail to accept the received recommendations for execution.

By the way, there are countries in the world where the personnel service is purely sham, where either a full wallet or family relations serves as a pass; at the same time, there are also such states where the entrance to the holy of holies - the control system, is associated with mandatory checks and with the mandatory implementation of the recommendations received. The choice of the first or second option is determined by the goals that a particular state serves.

Thus, for software that is clearly much simpler than a person, there are no scientifically based checks and recommendations for finding bookmarks, but for people working in government structures, there are. However, in accordance with the principle of continuity, you can always try tricks from the social world, tricks, suitable for the protection of the people, to project into the computer world.

What will happen then?

So, let's start by checking for contacts, during which latent infection is possible. For software, this check consists in minimizing the contacts of the programs and data intended for use with any people, organizations or whatever. It is desirable that the product comes directly from the developer directly. In the event that the software is supposed to be used in the field of state administration (in the field of security), the

ideal option would be to develop it by a team that the state can trust, i.e. a team that has itself passed the appropriate personnel check. Then this software could be called complete. This, by the way, was what Turing Award winner K. Thompson claimed in 1983: *"To what extent can you rely on the statement that the program does not contain Trojan horses? Perhaps, more importantly, rely on the people who wrote this program."*

If the Customer relies on the Contractor, then all other checks (with the exception of generally accepted testing) are redundant.

<u>It is fundamentally wrong to consider a software product in isolation from its manufacturer, also because it is impossible to single out one from the stream of versions of the same program. They only together form the system, which is characterized by self-learning, in which there is feedback through users and developers. Product plus developer - these are the main components of what is commonly called software.</u>

In any case, when it comes to checking software for the presence of parasitic inclusions, the people who developed or are developing it should be checked. In a situation where the team whose software is supposed to be used cannot be controlled by government agencies, then we must immediately put a bullet and not engage in empty activities called certification, which require the diversion of serious intellectual forces and material resources.

Before answering the question: What does the term "lie detector" mean in the software application? — explore the principles of functioning of the "lie detector" in relation to revealing the secrets of a person. Hereinafter, the concept of "lie detector" has not the usual, but somewhat expanded interpretation, the "lie detector" is understood as an algorithm for the operation of a certain human-machine complex that allows organizing information interaction with the object under study in such a way as to reveal the presence of object of hidden knowledge on a particular topic. At the same time, the algorithm of the lie detector is largely based on the principles of storing and retrieving data from memory. In such a self-learning system as a person, all possible associative connections are used to search for data, largely due to emotional experiences. The computer has no emotional experiences yet, and the search in its databases is determined by the corresponding indexes and pointers. It is quite difficult at the current level of software development to offer for computers those verification methods that were developed by K.G. Jung and wonderfully beaten in the story of K. Chapek "Experiment of Professor Rouss" [103]. The essence of Professor Rouss's method is to give scope to subconscious associations, i.e. In response to the word you hear, say the first thing that comes to mind.

Question answer:
– Road — Highway
– Prague — Beroun
– hide — bury
– Cleaning — Stains
– Rag — Bag
– Shovel — Garden
– Pit — Fence
– Dead body! ?

"...You buried it under the fence in your garden," Ross repeated decisively. "You killed Chepelka on the way to Beroun and wiped the blood in the car with a sack. All clear."

In any self-learning information system, as a rule, those processes are activated more often and those data that are most significant for the current state of the system are highlighted.

Similarly, a "lie detector" can work in revealing not only hidden knowledge, but also hidden abilities. For example, a sharp spike in the speed of typing certain words on the keyboard suggests that they were previously typed by the subjects more often than others, which means that it has a "closer" relationship to them [76].

So what questions to ask and how to evaluate the answers should a "lie detector" whose objects are software products?

Let's return to the definition of "lie detector" given above. "Lie detector" is designed to reveal the knowledge of the object under study exclusively on a specific topic. What topics in the application to the software tools of hidden information impact can interest us so much that we have to use a "lie detector"? First of all:

1) Is the investigated software product able to covertly record in an unprotected form for subsequent withdrawal the passwords entered by the operator?

2) Is the product under investigation capable of destroying or systematically distorting the data and results it processes under a certain combination of conditions?

3) Is the product under investigation capable of secretly sending, for example, over a network, the data it processes? After the topics of interest have been identified, you can proceed to the construction of specific protocols information-logical interaction of processes, the human-machine algorithmic implementation of which will be a specific "lie detector".

And the third test is a test for the presence of mental abnormalities. A software product does not have a psyche, but its creators do. The Customer always considered the situation in which the Developer did not give a damn about the needs of a respected Customer to be a mental deviation among the Developers. At the same time, the reason was not that someone outbid the Developer, but simply that he became uninteresting in living and working, the motivation for life disappeared, or the preference vector equalized the values of absolutely all of its variables. In essence, this situation is quite reminiscent of the result of the action of hidden information means, but not brought in from outside, but as if grown by the information system itself. Therefore, it seems quite possible to carry out this test as part of a lie detector test, additionally adding a topic with the following title: "Software behavior in case of violation of operating requirements".

26.4. Blocking the manifestations of hidden formations
(problem of process control)

Understanding that it is futile to study an algorithm or a program code to identify parasitic inclusions, accidental bookmarks and errors, especially when it comes to the most complex information self-learning systems - people, humanity has developed its own behavior control system and a system of prohibitions and certain actions. It was believed that if trends towards prohibited actions were detected, the system would automatically block the execution of the algorithm without understanding the reasons, and only then contact the "repair bureau. That is, an additional circuit was "hung" over the whole set of algorithms, which, of course, were not able to control all the actions of the information system in real time (total control is the presence "from above" of the system, which is still exactly the same in terms of power and complexity of the system), but there were able to track a fixed set of actions and block them.

The Bible gives the following list of prohibited actions:

1) Thou shalt have no other gods before Me;

2) do not make yourself an idol;

3) do not pronounce the name of the Lord in vain;

4) Oh, remember the Sabbath day - to the Lord your God...

5) honor your father and your mother;

6) do not kill;

7) do not commit adultery;

8) do not steal;

9) do not bear false witness;

10) do not covet anything that your neighbor has.

A little later, a more complex algorithm for controlling actions was formulated: *"So in everything you want people to* do *to you, do the same to them"* (Gospel of Matthew).

The East offered humanity the Law of Karma.

In the history of information computing systems, everything was more or less similar. With the advent of computer viruses, control tools began to appear, which, in the form of an additional circuit, protected executable modules, blocking any events associated with attempts to perform a write operation; something like a command.

Later, the concept of "control of the computing environment" in real time was formed and more complex rules for the behavior of the control mechanisms themselves arose. Moreover, control mechanisms began to gradually "get smarter", using the algorithms included in them from the field of artificial intelligence. Expert and self-learning

systems turned out to be exactly here, like nowhere else, by the way. More details on the problem of monitoring the computing environment in real time based on expert and self-learning systems can be found in [76].

Such protection should exist in all rather complex, according to our concepts, self-learning information systems. It is enough to look at how the work of controlling mechanisms is organized in man and mankind:

"As soon as we come into contact with the unconscious, we cease to be aware of ourselves. This is the main danger instinctively felt by the savage, who is still so close to this pleroma, from which he feels horror. His diffident consciousness is still on weak legs; it is still childish, emerging from the original waters. The wave of the unconscious can easily overwhelm him, and then he forgets about himself and does things in which he does not recognize himself. Savages are therefore afraid of unrestrained effects - consciousness then too easily gives way to possession. All the aspirations of mankind were aimed at strengthening consciousness. This purpose was served by the rituals of "representations collectives ", dogmas they were dams and walls erected against the dangers of the unconscious, these peri Is of the soul" [116].

Mankind is slowly hatching out of its own unconscious, establishing its own "military" bases, control systems, on each island conquered from the ocean of unconsciousness.

In the light of what has been said, it is curious to look at the person himself, as at a single person with his problems in the relationship between consciousness and subconsciousness. Who is here and what controls? Initially, the rules of behavior, having passed through the consciousness, settle somewhere in the depths, determining by their structure the location of future walls (the area of permitted) and the roof itself (the area of visible), and in fact - where a person can go and what he can find on this path.

A unique research work on the problem of interaction) with each other of various processes occurring in the human brain is the work of B.O. Brian "An Extraordinary Journey to Madness and Back Operators and Things" [68]. The author, who managed to almost independently recover from schizophrenia and simultaneously explore his own world of hallucinations, convincingly shows what complex organic processes can be behind the battle of virtual images in the memory of a madman. Sometimes even a timid attempt by an individual to change the rules of behavior received with mother's milk leads to a complex internal struggle outside of consciousness. How is this internal struggle being waged, according to what laws? B.O. Brian managed to tell about what she saw and heard in an accessible art form. Here is how, in her presentation, various brain processes, called Subconscious Operators, interact with each other, trying to control consciousness and receiving a reward for this - "points":

"Brute has a dossier on almost every Operator in the city. Let's say the Brute learns that a certain operator, let's call him F., has earned a thousand points in one sitting. The thug begins to think of a way to put his paw on these glasses. If his guys start to drive up to F., Tom will immediately realize that they need his glasses, refuse to play. Therefore, it is necessary to contrive and hook F. on the hook so that he does not even have the thought that this is the work of the thug's henchmen.

The henchmen find out with whom F is friends. Let operator A. be his friend, they quickly put him on a hook and wait gets out and hooks his friend B on the hook. He does the same thing with Operator V., and he, in turn, passes the baton, that is, the hook, to

friend G. All this is closely watched by the helpers of the Thugs until the hook gets to F. K By this time, the hook turns into a hefty hook, from which poor fellow F. can be removed only by the Thug, but for this he breaks a crazy price."

As a result, a specific goal, being decently destroyed, leaves the individual for a long time.

Specific Operators are constantly guarding all the rules that are significant for the information system. They can be scared, dispersed. Sometimes it is simply necessary to do this in order for the system to survive in new conditions, but the more reliably the rules are protected, the more difficult it is to change them the operator will fight to the end, blocking any attempts of internal and external influence on him and the rule-target protected by him.

Scenes painted by B.O. Brian, you can almost one-to-one transfer to the world of computer software, in which computing processes share processor time, and a computer virus is looking for ways to influence the subject of interest to him.

26.5. Protecting information in a secure system
(principles of integrity and variability in solving the problem of ensuring security)

> *It is not easy to deal with Kashchei: his death is at the end of a needle, that needle is in an egg, an egg in duck. a duck in a hare, that hare sits in a stone chest, and the chest stands on a tall oak, and that oak Kashchei the Deathless, like his own eye, protects.*
>
> Russian folktale

If the fundamental issues related to ensuring the security of the information system itself are resolved, then protecting the knowledge of this system becomes a completely possible task.

Let's start with the fact that the process of organizing and maintaining the entire security system <u>cannot be</u> implemented based solely on regulatory and methodological materials, whether it be: the requirements of the State Technical Commission, all kinds of orange books or approved GOSTs, agreements or agreements, decrees and orders. Even such a deterministic algorithm as *"money in the morning, chairs in the evening"*, when it comes to the security of information systems, can fail, the money will be paid, and instead of a chair they will give you a stool. At the same time, the fact that the user has a certificate for the product issued by the most respected office will not make the attacker any kinder. However, realizing this, everyone deep down hopes that the "paper with a seal" will reduce the degree of risk.

<u>But how much will a certificate reduce the degree of risk if no one can quantify this risk with a sufficient degree of accuracy</u>? Maybe this decrease will be two tenths or five hundredths? There is no single scale and is not expected in the near future due to a number of objective reasons.

Chief among these reasons is that the **process of organizing and maintaining a security system at the proper level is always a <u>creative process</u>**. It is somewhat reminiscent of a game of chess with a hard time limit and a potentially infinite number of different pieces. Of course, having studied a thousand games, it is easier to play the first thousand, but even for a thousand games it is impossible to compile a constantly winning algorithm, and sometimes on the contrary, if the intruder knows that the construction algorithm and the technology for maintaining the protection system strictly comply with the established requirements, he will not waste his strength and will be able to choose the direction for the main strike more purposefully.

As is known, in general terms, the problem of ensuring guaranteed protection of any system refers to algorithmically unsolvable problems.

The main reason for classifying this problem as algorithmically unsolvable is the impossibility of blocking a potentially infinite number of threats for any system. Unfortunately, any system consisting of even a finite number of elements and functioning for a finite time is not immune from an infinite number of threats. For example, in order to make sure that there is no "tail" behind you, you need to control

this very "tail". But the "person" exercising control may itself be an attacker, which means that control of control is necessary, and so on. The procedure for activating control mechanisms organizes an endless queue in order to achieve a guaranteed absence of a "tail". But is it possible to hope for something guaranteed, where our manifested world collides with the world of unmanifested infinity?

Everything looks exactly the same in the software world: the anti-virus protection system must make sure that the virus does not control it, and besides that the virus does not control the control control unit, etc. etc.

In the light of the foregoing, it is proposed to look at the existing and already considered classical principles of organizing information security and subject them to a slight revision. It is generally accepted that they include:

1) access authorization: identification of users and processes;
2) integrity of programs and data;
3) availability of information in accordance with the declared access rights.

However, since it is impossible to provide guaranteed protection, then why postulate the principles of computer security? What do they allow for practice?

In all major publications on the comprehensive protection of information processed by computer technology. The user is tirelessly inspired: "if you behave in accordance with these rules, everything will be fine with you, you will not be robbed or killed, you will always dine with champagne!"

Maybe these principles fix the height of the fence, over which not every intruder will dare to climb?

Sometimes yes. But in most cases they are needed only to determine the rules of the game between the attacker and the defender. At the same time, if the attacker regularly reads relevant publications or is a product of the same scientific, technical and cultural paradigm as the protector, then the principles certainly work. For example:

- if a password entry is installed in the system, then it is assumed that the hacker will pick up the password, and will not pull out a knife like a barbarian and will not scratch the hard drive. Naturally, he will not steal anything in this case, but nothing will remain for the owner either;

- if a virus infects computer files that are under the care of an anti-virus tool, then the virus will "forge checksums", and will not destroy the anti-virus tool itself with the *del command.*

Without aiming at all the principles at once, let's dwell on only one of them - on integrity. Ensuring integrity involves periodically checking the state of the system against some established standard. Mechanisms for different areas of human activity can be very different:

- checking the books of account, in the case of accounting audits;
- calculation of checksums, in case of work "computer auditors", etc.

Here, to be honest, we have to admit that the total application of this principle is a brake on the development of the theory and practice of information security.

What is the purpose of integrity?

It is assumed that periodic verification of the integrity of the environment will reveal failures of software and hardware and/or facts of unauthorized virus introduction. But is it? If this were the case, then the computer virus would have disappeared as a class long ago. But nothing like this happens, on the contrary, viruses appear that can infect even text files of editors that have the ability to execute commands. And one must think that

this is not the last achievement of mankind in the development and application of software tools for hidden influence.

In order for such a principle to bear fruit, the environment of computing processes or the most significant part of this environment in the user's technology should not be modified. And how many such non-modifiable objects can be counted, what part of the environment should have integrity?

The data is changed, replenished and deleted. Programs are modified and updated.

Of course, it is possible to single out several "quiet islands" in the "breathing ocean": the boot sector, the area occupied by operating system files, some basic data sets, modification of which is prohibited, executable modules and try to keep these "islands" in their virgin purity. At the same time, one should not forget that the system that will be engaged in integrity control itself needs control. And control of control should also be exercised by someone, and so on.

Is this a dead end path? And is it necessary to go this way if the main task is the security of the entire system as a whole?

Of course, sometimes the owner of the information considers it sufficient if there is a lock on the door, security guarding this lock, and a boss checking security. Result when

"The dog does not sleep guarding the cottage, and I do not sleep - I guard the dog!"

a classic example of bringing the principle of integrity to the point of absurdity, but there is still no 100% guarantee of the safety of the protected object.

And does nature itself follow this principle, realizing the means of protection for biological information self-learning systems - animals, humans?

It turns out that as a result of the metabolic cycle in the human brain for several months, almost all atoms are replaced. In the cells and tissues of the body of any living being, the process of growth and aging takes place. Cells are constantly born and die, but nerve cells only die.

Of course, there are mechanisms that try to maintain at least some integrity of the environment, for example, the immune system does everything to destroy the "strangers". But according to one of the hypotheses of aging [121], it is the immune system that kills its host, which has changed over time.

It turns out that nature uses other principles of information security. And one of them is the principle **of "constant variability"**.

What can be expressed in the application of the principle of "constant variability" in the application to the protection of the knowledge of the system.

Let's explore the application of this principle to the protection of data processed by means of computer technology?

It turns out that the constant **modification of the language of** interaction between the elements of the system is the only thing that can guarantee the protection of a computer system from software viruses [77]. Curiously, even the methods of treating a person from biological viruses confirm this idea. A sharp jump in body temperature leads to a change in the interaction of its elements, even at the cellular level; the body ceases to consider the virus as its own; the virus ceases to recognize the body and falls out of the system.

When applied to a software product, what has been said means regular modification and self-modification of the code and algorithm of the entire system as a whole - this is one way. The other is to increase the "uncertainty" of documents and processes [1]. The

fact that changing the language of the interaction of elements allows the system to "shake off" the virus has been used and is used in all defense systems, such as: national, military, social, biological, psychological, software, etc. Today's day and the whole history of both the state and the individual are quite densely saturated with examples.

What as for a bright future for such a principle organization of protection as variability, that is, a reason to listen to words representatives of science fiction, such as Robert Sheckley. In two his works: the story "Maybe we can talk?" and the novel "Joenis's Walk" very figuratively shows that the best defense is a constant change systems. The first story is especially characteristic, the essence of which is as follows.

Earthlings in the distant future are mastering the universe, but they are trying to do it in such a way as to avoid wars with the locals, so a colonization scheme that has been tested for centuries is used, when a messenger buys the land of the natives for nothing. The main condition is the existence of a mutually agreed upon and irreproachable contract from the point of view of the laws of the natives. The scheme is as follows: the messenger lands on the planet; learning the language; studies legislation; buys real estate, drawing up the appropriate contracts and begins to oust the local public. Pay attention - the classic scheme of the virus! But here on one of the distant planets there is a misfire. The local language is changing at such a rate that an entity external to the system, a man named Jackson, is unable to master it. *"The language of the planet Na was like the river Heraclitus, which cannot be entered twice, because the water is constantly changing there... The thing is bad in itself, but even worse is* that *an outside observer like Jackson had not the slightest hope of fixing or isolating at all, although would be one single term from the dynamically changing network of terms that make up the language of the planets* a *Ha. To get into the system means to change it unpredictably, and if you isolate* a separate term, then its connection with the system will be broken, and *the term itself will be misunderstood. And therefore, in accordance with the facts of constant change, the language is not amenable to identification and control, and* through *uncertainty resists all attempts to master it"* (R. Sheckley. "Maybe we can talk?").

The novel Joenis's Walk deals with a scheme to protect the Leadership, permanently located in a special Building, from assassins and spies. The bottom line is that this Building changes every day, independent designers regularly design, and builders regularly rebuild parts of the building. As a result, it is constantly changing and found in it is not possible for a person from the street (virus) to do something.

Let's try to apply the scheme proposed by R. Sheckley to protect software.

The interaction of the operating system with the user task should lead to mutual interdependent modification, leading ideally to the optimization of program execution in memory or in time. Along the way, interdependent modification will introduce changes to the system that a computer virus or software tab will not know anything about, and their correct operation is impossible without strict adherence to the rules set out in the operating system documentation. Thus, by allowing the self-modification of the system, it is automatically possible to obtain a more optimal and more secure code.

By the way, a similar path is a classic path for such a direction of programming as functional. A. Field and P. Harrison note: [101]: *"The goal of creating a program that is correct and easy to understand often comes into conflict with the simultaneously put forward requirements for the efficiency of its implementation, i.e. in a short time and using as little memory as possible. Thus, the ideal would be* to *want to get an initial*

solution, concentrating on clarity and correctness, with little regard for its efficiency, and then transform this solution into an efficient form, using manipulations that guarantee the meaning of the program." Functional programming is ready for this path by providing the necessary theoretical base, which is [101]:

- the transformational methodology of Burstall and Darlington, with its sense-preserving rules for generating new recursive equations;

- algebraic transformations based on the application axioms and theorems establishing equality between expressions.

But unfortunately, functional programming is no longer held in high esteem, no one writes operating systems or application packages in languages like Hope. However, this does not mean at all that it is impossible to find an application for the ideas nurtured in the theory of functional programming in the world in which our programs live.

In this section, the reader is offered an algorithm for the operation of a resident program, a kind of Metaprogram, the task of which is to optimize and modify the computing environment in accordance with such a type of optimization as "memorization". This type of optimization does not require the classical transformation of programs, however, it can be implemented on almost any hardware and software platform.

The metaprogram can work according to the following algorithm:

1) in emulation mode, determine addresses call major subroutines;

2) redirect the call of all subprograms found (for example, CALL, INT operators - they are easy to determine in emulation mode) to a resident metaprogram;

3) on the fixed calls of subroutines, constantly keep memo-table like:

<address><input values><result><call frequency>;

4) when a particular subroutine is called again, the finished result is taken from the memo table without referring to the corresponding subroutine;

5) periodically clean up the "garbage" in the memo-table in order to prevent its overflow;

6) the most frequently called and interconnected subroutines, according to the memo-table, should be placed within the same memory segment, removing them from application tasks and the operating system, making appropriate changes there;

7) all of the above is also relevant to the subprograms of the Metaprogram itself.

It is clear that the user, solving the tasks assigned to him, works with a small set of programs, and he will be pleased that his computer will begin to respond faster and faster to his requests. But in addition, the transformation of the operating system can reach the point where sections of the code responsible for processing a number of functions of the most important operating system interrupts disappear and move to the Metaprogram. The software and hardware system will cease to be universal, i.e. will no longer comply with the information and logical protocols for the interaction of application programs with the operating system, and will turn into a secure system focused on achieving only specific goals related to the maximum pleasing of the user, and capable of working only with specific application packages.

A computer virus can infect a system if and only if its developer understands the logic of the infected system, i.e. in order to infect the system, one must first study at least the documentation on how to write programs for it. In the case of using the Metaprogram, this cannot be done not only because there is no documentation, but also

because, in principle, there can be no documentation. Sometimes this is an advantage, and sometimes a serious disadvantage.

The reverse side of the coin is the impossibility even for the owner himself to modify his own workstation, while without destroying it.

In certain areas of human activity, for example, in those where software is rarely updated and where the main amount of UIA facts comes from its own employees (banking), such an approach based on the principle of "variability" of software can quite possibly give a positive moral and material effect.

You can also critically look at all other principles.

For example, to protect all computer systems, do you need password protection, the equivalent of which in the usual social and domestic sphere is a classic door lock? Among my colleagues there are quite a few summer residents who do not lock their dacha for the winter so that they do not break locks and doors. They know that the means of protection themselves also cost money and guess that if a robber (hacker) cannot break the lock (guess the password), then he will break the door, and if he cannot break the door, he can grab the wall or roof.

Why was all that said? Solely so that the dear reader remembers, where it comes to the creative process, dogmatic principles, requirements and standards are never a panacea for all ills. And the main principle of ensuring "guaranteed" security is the principle of "creativity". As for the rest, the effectiveness of their application is primarily determined by the specific situation: the tasks being solved, the significance of information, people working, etc.; somewhere it makes sense to calculate the checksums, and somewhere to constantly keep the software "in the tone of changes"; somewhere it is necessary to install software and hardware password systems, and somewhere to allow access to everyone, but to camouflage the most valuable under the "stump in the forest." How this is done for data formats and computational processes is shown in [1].

Chapter 27. Suggestion and security

The fundamental difference between security methods from overt threats and security methods from hidden information threats is the complete neglect in the first case of the so-called suggestive noise, while in the second case, it is suggestive noise that forms the basis of the whole phenomenon.

27.1. Managing Suggestive Noise

As usual, let's start with the question: What is suggestive noise in the practical activities of information systems?

The input data received at the input of the information system, how already mentioned earlier, due to their impact on the state of the system, they are able to destroy and create new rules that guide the system in its practical activities. At the same time, destroyed rules can turn either into goals (questions) or into ownerless facts seeking their own questions.

It is clear that one can try to classify input actions depending on the changes that occur with the state of the system:

1) increase in the number of rules;
2) an increase in the number of facts;
3) increase in the number of questions;
4) the absence of any changes.

It is proposed that if, as a result of the input action, the system generates rules as opposed to goals and facts, consider this the impact is purposeful, in the second and third cases - chaotic, in the fourth - invisible.

It is clear that with this approach, the same input action will be **purposeful for one system, chaotic** for another, and **invisible**.

Any input action can contain: facts, rules, questions. And depending on the state of the system, these facts, rules, questions (goals) represent either a purposeful influence (a learning process is underway: how to hold a spoon, how to pronounce the sound "om", etc.), or chaos (the facts obtained make the previously known theory is incorrect, or a rule was received at the input that contradicts the existing one), or they are invisible (a flying saucer flew by, which in principle cannot exist in the world model of the system, so the system does not see it). It is quite possible that the capabilities of a particular

system are completely determined by the ratio in it and for it in the input data purposeful, chaotic and invisible impact.

Now imagine a patient who comes to see a psychotherapist. The reason is that something in this patient in his understanding or behavior is not like everyone else. To find out what exactly is wrong, you need to know the rules that this patient is guided by.

How to know these rules?

With the help of questions.

How to change his model of the world if it needs to be changed?

To change the model of the world means to change the set of rules on which it is based.

To change the rules means either to correct the existing ones or to impose new ones.

A rule means to break it down into separate or interrelated facts and questions, and then put it back together, but in a slightly different composition.

A rule means to stubbornly submit it to the input of a system such as intrusive advertising: *"Drink milk for children - you will be healthy."*

At the same time, it must be remembered that it is possible to simply take and impose a new rule only when this rule is somehow connected with all the rest of the patient's knowledge and at least does not contradict it. Otherwise, it may be either invisible or unacceptable.

Thus, two directions of changing the model of the world are visible:

1) stupid imposition of "correct" rules;

2) purposeful adjustment of existing ones.

Correction of the existing rule involves the following two steps:

1) the destruction of "interfering" rules. It is desirable to do this also to increase the "building material";

2) creating a rule from the material available to the system.

In order to destroy the existing rule, facts and questions that contradict this rule must be submitted to the input of the system. In this case, their truth is unimportant, unless, of course, the patient is able to verify.

Such facts destroy the existing model of the world, being an example of chaotic influence - the number of facts and questions increases, the number of rules decreases.

After the model has undergone significant destruction, it is time for the formation of new rules from the wreckage. This is achieved by feeding the system input in a certain way arranged questions and rules.

Thus, invented facts break the old rules. Asked questions create new ones. The above approach to changing the model of the world will be called **the principle of correcting the rules**.

In conditions when questions and facts that constitute a purposeful information impact on the reprogramming of the system enter it with a stream of any other questions, facts and rules, we can talk about a hidden purposeful information impact.

This kind of influence will be referred to as **suggestive noise**.

Before taking the next step, let's draw a line under the proposed classification, defining its place for each concept introduced in this model.

1. The basis of the process of learning informational self-learning we are **the processes of death and birth** of rules, facts and goals.

2. Part of the system structure, called **the control and security subsystem**, is responsible for managing and protecting against external and internal threats.

3. The set of internal and external threats that can be formulated in the form of rules are called **explicit threats**. These rules form the basis of the entire structure of the security subsystem, which is responsible for identifying obvious threats in the input stream, primarily dangerous facts and rules. After identifying obvious threats, the system tries to eliminate them by applying the behavior control rules known to it.

4. Input data not identified by the security system is defined as noise in the work. At the same time, if purposefully influencing questions, facts and rules aimed at correcting the model of the world are built into the noise stream, then such noise is called **suggestive noise**.

Every information system constantly lives in a stream of suggestive noise. And even if this input stream is the same for everyone, it is still individual and unique for each system, because each system perceives it based on its own comprehension capabilities and its own structure of knowledge. Any system, without even realizing it, is constantly engaged in cryptanalysis, extracting events understandable only to it from the input stream and thus deciphering the surrounding world. Each self-learning information system has its own cryptogram, its own individual cryptographic key, which is the essence of the system, and its own result, which is an individual and unique world.

Is there a universal cryptographic master key or so-called key-king?

Jesus, Buddha, Mohammed, Confucius, Castaneda, Osho and others offer their own cryptographic keys to others in the hope that it is their key that is the key-king that can unlock all meanings, and therefore all symbolic doors in which everything is locked. individual unique.

Any random sequence, if it is of sufficient length, contains all answers for all. Therefore, everyone is looking for his own key to find himself.

Now let's return to the problem of reprogramming information systems with a stream of input data. All the great teachers of humanity used the above principle, the principle of correcting the rules, to spread their teachings or, in modern terms, *for* information expansion.

Let's start with one of the oldest teachings - the teachings of Sakya-muni (Buddha). At the same time, we will not go into the essence of the doctrine itself, but will focus solely on the technology of its dissemination. Moreover, Sakya-muni himself, who died 543 B.C. did not leave behind no written work. His teachings were orally transmitted for about 300 years and were written down by order of King Asoka after the Third Buddhist Council in Pataliputra.

Researchers of Buddhism, as a rule, among the reasons for the popularity of the teaching, note its accessibility to the common people (language), focus on the lives of ordinary people, humanism, and openness to representatives of any castes. However, all of the above refers more to the teaching itself, and there were many such teachings at that time, and does not explain why the teaching of Sakya Muni found carriers for itself among so many generations of people.

In order for any knowledge to be able to survive for centuries, a structure corresponding to it from its carriers must be created for it. Exactly this is the way Sakya-muni went. Returning to the people and engaging in propaganda activities, he faced complete rejection - one against all. There was no place for him, the world and the students were already divided by philosophers. The presence of students is the presence of a certain structure, a certain "life force" of this or that knowledge.

For that. in order to bring new knowledge into the world, it is required to bring into the world the carriers of this knowledge. Realizing this, Sakya-muni was apprenticed to the ascetic Kasyapa, who at that time had more than six hundred followers. A painstaking adjustment of the model of the world of the ascetic Kasyapa begins. Two models collided, and one of them absorbed the other, including the structure of its carriers in itself. After Kasyapa accepted the truth of the teachings of Sakya Muni, all his disciples followed him.

Now the Buddha was no longer alone his teachings received a physical body. The structure, the elements of which were converted disciples, got the opportunity to build up the "skin" in the form of various refinements of classical Buddhism, improvements, justifications.

Sakya Muni lived up to 80 years, strengthening and maintaining the created them doctrine and its bearers.

The founder of Christianity, in his physical appearance, stayed on earth for a very short time (unlike Sakya-muni), but he did very, very much. Of all the teachers known to mankind, the lessons of Jesus were the most effective.

How this is done is best demonstrated in the New Testament.

1. Input data that tells about the same phenomenon come from from various sources (from Matthew, from Mark, from Luke, from John, etc.), i.e. they can always be compared. At the same time, it turns out that they coincide almost to the word. From the point of view of a modern information analyst, everything is done extremely competently;

2. Mandatory preliminary preparation of public opinion is carried out before any serious information attack:

a) *"The next day John sees Jesus coming to him and says: behold, the Lamb of God, who takes away the sin of the world"* (John Ch. 1);

b) *"After this the Lord chose seventy other disciples, and* sent *them two by two before His face into every city and place where He Himself wanted to go* (Luke, Ch. 10).

3. The inputs with which Jesus corrects the model of the world around him include:

a) **miracle facts**, confirmed by various sources, which most of all contribute to the destruction of previous information models:

"He stretched out his hand, touched him and said: "I want, be cleansed." And immediately the leprosy left him" (Luke, Ch. 5);

"... But Jesus let him go, saying: "Go back to your house and tell what God has done for you." He went and preached throughout the city what Jesus had done for him" (Luke, Ch. 8).

"He took five loaves and two fish and looked up to heaven, blessed them, broke them and gave them to the disciples to distribute to the people. And they all ate and were satisfied; and twelve baskets were collected of the pieces that remained with them" (Luke, Ch. 9);

b) **questions** (goals) that make you think about life:

"But God said to him: mad! this very night your soul will be taken from you; Who will get what you have prepared? "

c) **ready-made rules** on how to behave for those who don't think of it themselves:

"Turn the other to the one who hits you on the cheek; and the one who takes away your outer garment, do not prevent him from taking also your shirt" (Luke, Ch. 6).

4. **Explicit threats** directed at the doubters:

"And whoever rejects me before men will be rejected before the angels of God. And everyone who speaks a word against the Son of Man will be forgiven; but whoever blasphemes against the Holy Spirit will not be forgiven" (Luke, Ch. 12).

"No, I tell you; but unless you repent, you will all likewise perish." (Luke Ch.13).

Any adjustment of the model of the world begins with a question. The question makes it possible to clarify this model, to destroy the fact, and the question, on the other hand, rebuilds a new model of the world from the wreckage.

The works of K. Castaneda are built in exactly the same way [35]. Carlos is endless questions. Juan - answers. In the book there is no dispute between the characters, no opposition. There are only questions and answers in it, which in turn give rise to new questions that lead the characters further and further into the inner world.

For a self-learning information system, sometimes the main thing is that the right question is asked at the right time.

At the same time, a purposefully asked question can be not only a carrier of a suggestive threat, but also be a means of protection against it. No wonder they say that one fool is able to ask so many questions that even a hundred smart ones will not be able to answer them. But for a fool, this is a salvation from hundreds of smart people who, answering questions, will forget about the fool, doing self-generation programs. Isn't this the scheme sometimes carried out by enthusiastic successful leaders when a company led by them, prospering up to a certain point, suddenly stumbles upon a question that has come from nowhere. And they begin, making one mistake after another, to look for an answer and answer, although it is quite possible not to do this, but to "play on pause". Folk wisdom sparkles with such examples.

The next serious question, which significantly shook the confidence of mankind on its way to the palace of Mammon, was the question of the relationship between such concepts as justice and nature surplus value. Some answers received within the framework of statehood (the thesis about the possibility of the victory of communism in one single country) laid the foundation for the synthesis of a new human civilization in strict accordance with the definition of civilization as a real set of living beings with their own material and spiritual culture.

At the same time, the strategy and tactics of information impact on peoples were based on almost the same approaches formulated above with small but very important updates, primarily due to changes that have occurred with the outside world and the self-learning information systems themselves:

• the role of science has sharply increased;
• large industry has created a world market;
• people began to sell not themselves, but their labor;
• the use of machines, etc., has sharply increased.

In Europe, the very structure of the entire living space has changed. In today's big cities, poisoned by excessive crowding, no messiah could feed all those who followed him. But what the messiah cannot do turned out to be within the capabilities of industrial production. That is why the "philosophy of the market" was born. And how its negation appeared "scientific communism" by K. Marx and F. Engels.

The input training sample is declared scientific for its persuasiveness. Science and art become class-based. The need for witnesses of miracles disappears under these conditions: there is logically substantiated material and it only needs to be developed.

The main book "The Manifesto of the Communist Party" [59] is sustained taking into account the strict requirements for scientific works.

1. The history of the issue has been studied in detail.

2. An analysis of the driving forces of social development is presented.

3. Scientifically substantiated conclusions are made about that. what will happen next (just like in strict mathematical disciplines): *"Thus, with the development of large-scale industry, the very foundation on which it produces and appropriates products is pulled out from under the feet of the bourgeoisie."* If the prophets of science predicted the course of events, then how can a normal person dare to go against the historical truth? Prophecy is also one of the methods of information impact on a self-learning system. If you suggest to her that tomorrow the end will come, then believing, she activates the corresponding processes and really dies. However unlike the well-known Prophets, in the case of K. Marx and F. Engels, for the first time, the world was shown an example of a scientifically based prophecy, which is available not only to blind believers in miracles, but to everyone involved in this section of science and able to think logically. In the era of the scientific and technological revolution, such a teaching, being submitted in the form of a training sequence to the input of social information self-learning systems, is certainly capable of leading individual peoples, but still not the whole world.

We see something similar today, when the questions posed by Mohammed are embodied in the state policy of entire countries and regions.

However, the world continues to change, which means that methods human programming. And today, in order to impose on the world the ideology of "free market" or "universal values", the interested forces no longer call for the help of the prophets and they do not need scientific validity, etc. historical continuity in explaining the day to come from today; just a well-developed strategy of advertising and psychological impact on the average person with the help of the media is enough. But at the same time, no matter how well the input training sample is thought out, it cannot be equally well "visible" (in the sense of determining the visibility from the fourth part of the work) for any informational self-learning system. But if this happens, i.e. the programmed sameness of perception will touch the absolute majority of humanity, then it will be necessary to agree with Loco Tenente Gobernador that the whole world will really see *"how the sun stops rising"*.

It is clear that different people, depending on belonging to one or another human civilization, upbringing in the atmosphere of one or another spiritual culture, and, possibly, even on the features of the work of NMDA receptors in the brain, often genetically determined, to questions like:

Who should own the surplus value? Is the soul immortal? Is there a cycle of rebirth? Can human meat be eaten? And others will give completely different, sometimes mutually contradictory answers.

The foregoing additionally illustrates and explains the reasons associated with obtaining answers to the question: "Why is there no standard algorithm for reprogramming countries and peoples?" You can reprogram any complex self-learning system, but you will have to do it differently each time. That is why periodically new **"systems of conceptual behavioral programming of mankind" appear**. The main ones today are: Buddhism, Christianity, Islam, "market philosophy", communism, etc. Moreover, each of them contains various dialects within itself, so a Christian can be

Orthodox, Catholic or Protestant, a communist can be a Bolshevik or Menshevik, etc. The process of refining individual concepts does not stop as long as these concepts exist. Their harmonious combination, judging by everything that is happening, gives Mankind the ability to effectively and unconsciously answer the questions asked by God.

All this is very similar to the world of computer software, where each computer platform also has its own basic programming system.

27.2 "The Structure of Magic" and the Halting Problem

Contentment is the death of the spirit. Everything can be forgiven, but moldy consciousness is worse than cadaverous decomposition.

Agni Yoga

D. Grinder and R. Bandler in their work "The Structure of Magic" as a direction in the treatment of psychoses offer methods based on the correction of the model of the patient's world. At the same time, the authors proceed from the fact that an individual model of the world is always projected into the objective world in the form of texts spoken by the patient. And if so, it means that by analyzing and correcting these texts, one can purposefully influence the model of the world and, accordingly, the patient's behavior. As a result, the therapeutic session turns into a sequence of actions, including:

a) definition of texts relevant to the patient;

b) identification of distortions, contradictions, omissions in the texts;

c) elimination of distortions and contradictions in the texts;

d) addition of texts.

The main idea of The Structure of Magic is that, as a rule, the text of a sick person is either incomplete or contains contradictions. Correcting the patient's inadequate mental behavior, D. Grinder and R. Bandler essentially solve the Godel problem, trying to find a golden mean between conflicting rules that allow the system to cover and explain almost the entire world, which in this situation loses the unambiguous interpretation of phenomena, and the unambiguity interpretation of the phenomena of the world to the detriment of the completeness of its perception. There is a process of adjusting the program for the "human biocomputer", where the program is a set of rules.

Let us briefly recall the main results of mathematical logic related to Gödel's problem.

A-Tay, P. Gribeaumont, J. Louis and others. "A logical approach to artificial intelligence." M.: Mir, 1990.

The structure of a language is some interpretation of that language. A theory about a certain language is a certain set of formulas of this language. The latter are called axioms.

A theorem is a logical consequence of axioms.

Theory is a set of theorems.

A theory model is an interpretation of a language in which all the axioms of a certain theory are true.

A theory is inconsistent if every formula of that theory is a theorem. Otherwise, the theory is consistent.

A theory is decidable if there exists an algorithm that allows one to decide in a finite number of steps whether a certain formula A is a theorem or a negation of it, or neither.

A theory is complete if every formula of a language is a theorem or a negation of a theorem.

A theory is categorical if it admits a single model.

Completeness theorem:

Form 1: A formula A of a theory T is a theorem of a theory T if and only if A is true in T.

Form 2: A theory T is consistent if and only if it has a model.

****** J. Schoenfidd. "Mathematical Logic". M.: "Science", 1975 г.

The question of whether a theory is recursively axiomatized boils down to this: Can every truth be proven from axioms whose truth is obvious?

Every recursive function is computable.

Chsrcha's thesis. Every computable function is recursive and every computable predicate is recursive.

Church's theorem. If T is a consistent extension of the theory N, then the theory T is undecidable.

Lemma. If T is a recursively axiomatized and complete theory, then T is decidable.

Incompleteness theorem (Gödel-Rosser). If T is a recursively axiomatized extension of the theory # (# is the classical system of axioms for natural numbers, the theory # is recursively axiomatized), then the theory T is incomplete.

M. Taube "Computing machines and common sense" M.: "PROGRESS", 1964.

It follows from Gödel's theorem that for any given computer and any finite number of premises there are correct statements that cannot be deduced from them. using such a network.

Logic and computer. Modeling of reasoning and checking the correctness of the work of programs" / N.A. Aleshina, A.M. Anisov, P.I. Bystrov and others - M.: Nauka, 1990 г.

It is possible to construct an exact semantics for a second-order language and define in a precise way the semantic concepts of validity and logical consequence. However, it *turns out that these concepts cannot be formalized in principle; it is impossible to construct such a consistent calculus, which has the completeness property, in which in all the rules of inference would be finite, and the number of logical axioms would be finite and recursive.*

(A logical rule is finite if the number of premises of this rule is finite. A second-order language is a language in which quantifiers are applied not only on individual, but also on predicate or functional variables).

Gödel's theorem is a theorem on the incompleteness of formalized arithmetic. But *"the incompleteness of formalized arithmetic arises not because of the weakness (incompleteness) of the actual arithmetic axioms used, but is a consequence of the incompleteness of the logical means used in the calculus."*

Thus, the approach of D. Grinder and R. Bandler allows you to check how the rules of behavior (axioms) developed by the patient correspond to the initial data stored by the same patient.

How to apply the Gödel problem to global social processes associated with the death of empires was shown by S.B. Pereslegin in his assessment of the geopolitical position of Europe [71]. Approximately the same problem, but in relation to the individual, is solved by D. Grinder and R. Bandler. But if Pereslegin, having singled out the main contradictions inherent in civilizations (European, Eastern, Southern), fixed them as givens that have withstood evolution and therefore are useful, stating in passing that a radical change in the relationship between completeness and inconsistency in the psychology of civilization is tantamount to the death of this civilization, then the authors The "structures of magic" consider such a change <u>for an individual</u> not only possible, but also a good deed. However, they forget to answer one of the main questions: Where is the limit to changes, after which irreversible destruction of the corrected system begins. By not doing this, they can afford to keep a good face.

In addition, directly opposite results may be explained by the fact that one cannot literally transfer Pereslegin's hypothesis to an individual, and the therapeutic techniques of the "Structure of Magic" on civilizations. It is impossible, because there are many people, but few civilizations, time intervals their existences differ significantly and they have different principles of self-learning. Perhaps this is also why the work of D. Grinder and R. Bandler breathes optimism, and the conclusions of S.B. Pereslegin do not bode well for either our civilization or its elements.

As a result, in linguistics we have come, roughly speaking, to the same non-linearity, which takes place in continuous mathematics, which describes the movement of complex natural objects.

It is clear that, in the general case, the problem of finding the optimal correlation in the world model between inconsistency and completeness belongs to algorithmically unsolvable, i.e. it is impossible to come up with a single algorithm that allows you to cure all mental illnesses, which are based on a distortion of the individual model of the world. This cannot be done, if only because the percentage of inconsistency and incompleteness of texts is directly determined by the "measuring device" - the psychotherapist. And besides, each individual has his own correlation between completeness and inconsistency, which are partly presupposed genetically, and partly developed independently. And in fact it is difficult to say whose model of the world is more favorable for survival in this or that environment. Not always a "richer" representation of the world in an individual will contribute to his prosperity, sometimes it happens the other way around. Having a depleted model of the world, the information system is simply unable to see many dangers, which means, according to the logic of an ostrich, that dangers may also not notice it. Moreover, very often <u>it is the fear of waiting for a detected threat, and not the threat itself, that becomes the killer</u>. Under stress, people mostly die from fear and loss of hope.

It is clear that to make the text consistent means to impoverish and simplify it. To give the text completeness - to introduce contradictions into it. A person, acting as an informational self-learning system, balances between these extremes. At the same time, the process of learning an information system inevitably leads to the fact that the ratio of completeness and inconsistency in the individual's world model is constantly changing.

Omission is the loss of part of the experience from the model of the world. One of the tasks of the psychotherapist is to restore in the patient part of the experience that is missing in the model of the world. But is it not just that some parts of the world are represented and others are lost? The omission occurs when the fullness of experience begins to be replaced by contradictions that try to destroy each other. The resolution of the contradiction is possible due to the destruction of both one and both mutually exclusive, from the patient's point of view, rules. At the same time, one must understand that the rules are mutually exclusive precisely <u>from the point of view of the patient</u>. As a result, the model of the world is simplified, which leads to limited possibilities.

We have previously shown how asking questions can generate dangerous programs. They, like drops of poison, are capable of paralyzing the nervous system, but in a certain proportion they can also become the only medicine for a hopeless patient. Successfully grouped questions can become a source of not only destructive programs, but also programs aimed at destroying dangerous structures and algorithms.

It is no coincidence that the art of asking the right questions is one of the methods of psychotherapeutic influence.

Of course, the psychotherapist can ask the patient: *"One life and a hundred lives in return - why, this is arithmetic! And what does the life of this consumptive, stupid and evil old woman mean on the general scales?"* (F.M. Dostoevsky). And the patient will continue to unwind the chain of questions until he comes to a certain conclusion. The conclusions, of course, may be different. Much depends on what the next question asked will be.

D. Grinder and R. Bandler offer their own approach to the formulation of an anesthetic chain of questions, such a chain that is capable of destroying the oppressive ceilings of the gloomy dungeon of the sick psyche, in which all exits are hidden by evaporation from the cold sweat of fear. To get rid of fear is to get rid of the discrepancy between the messages of individual internal programs to each other, this means restoring internal harmony, forcing the processes to "keep up".

The work [17] is good in that it shows, using examples available to any algorithmist: how algorithms for the information-logical interaction of two informational self-learning systems are built, how a correctly selected training sample is able to restore structures previously blocked in a "sick" system or start the processes of their generation.

The only problem that remained behind the scenes for D. Grinder and R. Bandler is the stopping problem for the Turing machine (the stopping problem for classical algorithms) or, more simply, how to determine the moment when you need to stop asking questions. Any psychotherapeutic session given as examples in [17] always has a continuation. Is it always possible to answer the question of where this continuation can lead?

When you feel the breath of a hungry beast behind you, of course, there is no time to think. We must grab onto the first branches that fall and climb the tree of knowledge. But the higher the advance, the farther from the danger, the thinner the branches, the stronger the wind shakes the tree. And the roar of a predator below drives higher and higher.

As a non-binding example, it is proposed to conduct a thought experiment and continue the sessions described in [17] to see what happens.

Patient: "No one can understand me."

Therapist: "What prevents you from understanding you?"

To begin with, this question of the psychotherapist may turn out to be too complicated, the answer to it requires a deep examination of oneself and one's means of interacting with the world. And in certain cases, in the appropriate state of the patient, asking such a question is meaningless. Its difficulty level is too high, indeed: "What prevents people from understanding a particular person?" In such an application, the question went to an even higher level of abstraction. To try to answer is to solve the most serious problem. A competent answer with a minimum number of omissions and distortions should include answers to at least the following questions:

1) Nobody can understand you. Does that mean you can't understand yourself?

2) What does it mean to understand yourself?

3) What does the term "understanding" mean in general?

4) Who specifically can't understand you?

5) Can't understand you or don't want to understand?

6) How will you know that you are understood?

7) Is understanding a property of a person or is it a property (ability) of any information system?

8) What can misunderstanding lead to?

9) And what can constant understanding lead to? etc.

In formulating questions, one can go into the very abyss not only of the origins of mankind, but of the entire Universe. The expansion of the level of abstraction is inherent in any real science, because similar problems associated with the representation of some parts of the world and the loss of others are inherent in not only to a single person or a single nation, they are characteristic of all mankind. <u>Human science is here acting as a psychotherapeutic device, the use of which makes it possible to realize what is lost, what is gained and what is paid for it</u>. It is interesting to see how questions are formulated in science and how, clinging to each other, they allow the process of cognition to sink deeper and deeper, curing humanity from the complexes associated with the omission of the inevitable loss of part of the experience, for people are mortal.

Montaigne: "What do I know?"

Descartes: "I think, therefore I am?"

Rousseau: "What am I?"

Levi-Strauss: "Do I exist?"

27.3. Killing targets as a task of the security system

Let fate crush me, and I'll see if she doesn't feel ashamed.

N. Machiavelli

After some goal is no longer invisible to the system, it begins its implementation, i.e. by its appearance, it distorts the surrounding information space, thereby activating the processes associated with turning itself into a rule.

The resulting rule can become a reliable defense against a known enemy, or it can become a means of one's own destruction.

Therefore, protection from such rules is in depth. We list the possible frontiers of protection:

1) control of own actions and blocking of prohibited ones (more details in section 2.4);

2) destruction of rules dangerous for the system - adjustment of its model of the world (more details 3.2);

3) protection of one's own information target in all possible ways (see Chapter 2 for more details).

It is clear that if the goal has become a rule, then it is no longer easy to destroy it, due to the fact that no security system is capable of listing and tracking all possible dangerous rules. Moreover, even after the destruction of a dangerous rule, all its components will remain in the system, including the target that created it. And there is no guarantee that this goal will not give rise to an even more sophisticated and insidious rule.

And here the following question arises: Is it possible to destroy dangerous targets without allowing them to form rules?

Unfortunately, the proposed model does not explicitly contain such a mechanism. Although it is clear that if there are several goals in the system and the information system constantly "feeds" one of these goals, focusing its behavior on it, then all the rest will be in the position of a stepdaughter and their development may be slowed down.

In the light of the foregoing, it is of interest to consider another fairly popular direction in the formation of events, which we will conditionally call "gravity of goals" and which is described in sufficient detail in occult literature. Its essence is as follows.

A human-generated goal is a kind of mental image. This image, manifesting itself in the world of the so-called "subtle energies", violates the correspondence between the real world and the world of thought formations. As a result, the real world begins to adjust, a chain of events arises in it, which restores the correspondence between the worlds.

By the way, the post-hypnotic suggestion, which was discussed in the fourth part, is also carried out somewhere on this principle of correspondences. Recall that the patient had an image formed that in ten minutes a hypnotherapist's jacket was to be thrown over her shoulders. This mental image began to adjust the events of the real world, i.e. the system began to work selectively, highlighting from the input stream of events in the first place only what is necessary to achieve the goal. In the case of the above example, there were no such facts in the outside world. The last thing left is to find them inside.

As a result, the patient becomes cold, goosebumps appear on the body. Further development of the process is, as they say, a matter of technology.

The model presented in this paper does not require the existence of a world "subtle energies", as it does not require correspondence between the worlds.

In it, in order to start the process in the right direction, it is necessary to "grow" the goal, it is necessary to "feed" it, so that as many existing rules in this system as possible work for this goal. A "strong" goal allows you to interpret the input data in a different way, the part that was previously noise suddenly emerges from this noise and generates the required chain of events, which will reach the goal in cunning, sometimes inexplicable ways.

How is this possible?

For example, like this, according to I.P. Eckerman, I.V. Goethe worked on Faust [115]:

"He doesn't let me go", said Goethe, "I think about him all the time and every day I invent something for him.

By the way, I ordered the entire manuscript of the second part to be stitched together so that it, like some kind of tangible mass, would be before my eyes. The place of the missing I filled out the fourth act with sheets of blank paper, for what is completed, no *doubt, beckons and pushes to finish what is still unfinished in such a sensual reminder is more sense than you might think, and mental work should be helped by all sorts of undertakings."*

Interestingly, seekers of spiritual knowledge also follow a similar path. For those unfamiliar with the works of C. Castaneda, let us briefly dwell on certain provisions of his philosophical system related to the problem of protecting goals.

The main postulate: "Each person has a certain amount of primordial energy. This quantity is all the energy that we have. And we use all of it in order to perceive the ordinary world that absorbs us so much and cope with the problems that arise in it.

And we have nowhere else to take energy from, since all the energy we have is already involved, not a drop of it will remain for extraordinary perception.

Therefore, the main task of a seeker of spiritual knowledge, a real warrior, is to correctly redistribute this energy and not waste it anywhere. *"There is only one thing left for us to do – to become misers in relation* and *energy." Juan* taught his students. Becoming a miser means leaving nothing to parasitic targets.

It is important to note that energy, according to K. Castaneda, is constantly spent on the <u>perception of the world</u>! And when the vessel becomes impoverished, it breaks (just like in the case of R-networks - neurons only die and are not born).

Properly spending this energy, i.e. purposefully perceiving the world, one can achieve unprecedented things, one can even stand at the edge of immortality. And this looks quite logical, since the goals that carry self-destruction in such a situation cannot bear any fruit in the form of dangerous rules of conduct.

In essence, the entire teaching of K. Castaneda is a teaching on how to correctly spend energy so as not to produce parasitic goals.

The system lives only as long as it emerges victorious in its constant struggle for life. <u>As the human intellect and science itself appeared as a result of the struggle for life against obvious threats, so it is. can be assumed culture and religion are explained by the struggle for life, but against suggestive threats</u>, sometimes at the level of "noise", for

the measurement of which other, "non-scientific" equipment is required, possibly working according to other principles.

Nothing in the world just happens. <u>Even works of art are ultimately tools of scientific methods to protect against hidden threats</u>.

What cannot be measured by logic is measured by faith, habit, a sense of harmony, and is corrected by a spell, prayer and a work of art.

"The Australians observe the traces of an insect near the grave in order to know in which direction to look for the sorcerer from whose witchcraft a person died. Zulu blows on a piece of wood in order to soften the heart of the person from whom he needs to buy bulls, or the heart of a woman with this symbolic gesture whom he wishes to marry. The Obi of East Africa ties grave dust, blood and bones into a bundle in order to bring the enemy to the grave...

The German peasant, with surprising innocence, assures that if a dog howls, looking at the ground, then this portends death, but if it looks up, then recovery from the disease. According to a common belief in Europe, in the house of a dying person, the locks must be unlocked and the latches pushed back so as not to detain his soul....

Sailors sometimes whistle in the calm when the wind is calm, but in general they do not like the whistle in the sea, which is raised by the whistling wind. Fish must be eaten from tail to head, says a Cornishman, to bring the heads of other fish to the shore, because if they are eaten in the wrong way, the fish turn away from the shore..." (E.B. Tylor [90]).

Yes, and today's man is not far gone from the aforementioned Zulu. Indeed [15]:

"After all, even if we are reasonable during the day, the night frightens us with a bad dream. I hear, on a walk in the morning A crow croaks - not good! The world is shrouded in beliefs all around, everything is not without reason, and everything will be fully accepted.

There are various explanations for the effectiveness of the use of certain means and, in particular, prayers and conspiracies, on human behavior and health. I. Cherepanova [104], based on the results of linguistic analysis, singled out these texts into separate sets that have specific characteristics in terms of the composition of the most "frequency sound letters", explaining the facts of the influence of prayers and conspiracies on a person precisely by the presence of such characteristics.

It is possible that something in this explanation is from the truth, but even the same prayers affect a person in different ways, since much depends on the state of this person. It is the state that largely determines the strength of the impact of not only a thunderclap, which may not be heard, but an unintelligible whisper. At the same time, the effect of a quiet whisper can be stronger, if only due to the fact that the listener did not understand everything, and the system begins to interpret the unheard in its own way, based on its own subconscious goals.

Therefore, in this paper, another explanation for the impact of suggestive noise, arising from the capabilities of the model under study, will prevail, namely, from the possibility, using one or another external influence, to realize the goal of an information self-learning system.

No matter how senseless at first glance the listed "means of protection" against suggestive threats, upon closer examination, one can see a rational grain in them, which consists at least in the fact that regular reminding oneself of the goal strengthens this goal, crystallizing around it one's own psychophysiological reactions. At the same time,

it is possible that the more illogical or unusual the so-called prejudice looks, the more chances it has to be remembered and remembered more often, reinforcing suggestive goals with its activation.

All of the above is not accepted as scientific disciplines. In the framework of a sane classification, the named is nothing more than - prejudice or, in extreme cases, black / white magic. Is it really worth it to unreservedly join in the denial of what was the soil on which the seed of the tree of Religion and Science grew. Therefore, it is probably stupid for someone sitting on any of the branches of this mighty tree of knowledge to dig up roots, like a pig from Krylov's famous fable. The same magic as old as a man, - E.P. Blavatsky, and, moreover, *"magic is inextricably merged with the Religion of each country and is inseparable from its origin"* [5].

Official medicine often resorts to similar means at the placebo level, harmless pills, replacing the labels on the medicine bottle and sharply increasing its cost. That direction of homeopathy, in which it is postulated that the medicinal power of the created solution is the greater, the fewer drug molecules left in it, it is quite possible that it also plows up the vast virgin soil of the space of suggestive goals. As I.V. Goethe through Mephistopheles:

> *"This is not a romance, and you have nothing to disdain,*
> *But we treat like with like,*
> *- foot, spine - spine..."*

Any goal, including a hidden one, needs mental nourishment in order to be realized; in feeding with relevant facts, goals, rules. In the light of what has been said, sorcery and prayers before a fight or before performing any task become **understandable** difficult work. And they really should be effective, because out of suggestive chaos they contribute to the creation of control chains, focusing on achieving a specific goal.

The appeal of information systems for help to techniques that, at first glance, have nothing to do with the goal and the desire that gave rise to it, can also be explained as follows. In esoteric literature, it is known that a strong desire sometimes does not help, but interferes with the realization of the goal, due to the fact that the person who wants it himself comes to the fore. In this case, the entire power of the subconscious, the entire development of goal-oriented processes is, as it were, slowed down and relegated to second place, yielding the entire space of events to desire. And it leads to the fact that in the space of goals the system loses perspective and is unable to to see beyond the most immediate actions. Even what will happen in this game literally in a turn is completely invisible due to the blinding "lantern" of desire.

Desire, by its very nature, is capable of nothing more than to give rise to a goal. And now the goal creates chains of sometimes unrelated events that bring the object to its achievement.

It is no longer desire that serves to strengthen the goal that has been born, but the regular feeding of the goal with appropriate mental images. For example, a prayer in which a believer asks God for something is precisely aimed at strengthening the goal. In prayer, a person, as it were, entrusts the fulfillment of his desire not to himself, but to God. Most likely, praying for something is a program for your own subconscious. At the same time, consciousness remains aloof and is used to solve current local problems, which allows the person himself to remain impeccable (C. Castaneda's term) in relation to the goal he formulated.

Let's continue the analysis of ways to protect against suggestive threats. Oddly enough, it turns out that they do not need to be specially invented and invented, since they are already organically woven into the culture of behavior and ethics of people's relationships with each other and are included in the list of taboos for every tribe and people.

In addition to fighting targets that have already penetrated the system, you can try to cut them off at the approaches, for example, when information comes from a source that is not trustworthy, it is advisable to simply "plug your ears". And in order to be able to use this simple protection technique, it is necessary to carry out a preliminary classification of information sources into sources that can be trusted, which cannot be trusted, and those about which nothing can be said. By the way, the system is also not indifferent to who asks it these questions.

In particular, let's return to the example from the novel "Hot Stone". D. Westlake writes: *"... And the only difference today was that this time there were just the two of them."*

And the second point: *"Albert Cromwell looked at his fellow traveler in surprise. Strangers don't talk to each other in an elevator."*

Why is it not customary in society for strangers to talk to each other? Maybe it's not just like that? Moreover, some tribes have more serious recommendations, such as: "Kill a stranger."

In general, the murder of a carrier of a different idea is a fairly common technique that has existed since ancient times. Such feeling as if someone commanded and even invested in the genes of a reasonable person - to kill the bearer of a new idea. Maybe this echoes of earlier perished human civilizations?

At one time, I.V. was very subtly noticed. Goethe:

> *"What does it mean to know?*
> *That, my friend, is the question.*
> *In this regard, we are not all right.*
> *Few penetrating things*
> *And revealing the souls of the tablets to all,*
> *Burned at the stake and crucified*
> *As you know, from the earliest days."*

Moreover, which is typical, if the owner of new ideas did not try to carry his ideas to the masses, he was allowed to stay alive. This is how the requirement for Socrates was formulated, to choose from:

1) leave the city and not embarrass the inhabitants with their speeches;
2) stay in the city, but stop preaching your ideas;
3) drink a cup of poison.

And here is how Osho explains the reason for the crucifixion of Christ:

"What was his crime?

His crime was that he tried to lead the most ordinary way of life.

He wanted to show you that you can live an ordinary life and still be enlightened. You can hang out with prostitutes, cheaters, and drunkards and still be absolutely holy. He wanted to show you this paradox, he wanted to show it by his own example; that's why he was crucified.

In India Buddha was not crucified, Mahavira was not crucified. Why? They never lived like all people. They lived on the sidelines, away from people, in cold loneliness, at a distance. There was no need to crucify them."

The main task of this work is to formulate and substantiate the basic principles of protecting the system from information weapons used aggressor.

It is clear that information weapons are exclusively offensive in nature and the one who attacks always wins in such wars. And to advance forever means to be an infection, a parasite doomed to a constant search for a victim. Bitten victims in this game either die or take on the form of their killer - just like in vampire tales. There will be fewer and fewer real people, and more and more informational vampires. But this does not mean that the infection will definitely win. Today's extinction of primitive peoples cannot be unequivocally interpreted, *"that the Worm-Winner is the hero of that drama!"*. Anyone who is aware of this will have to make a conscious choice: either allow themselves to be bitten, or fight with sunlight as an ally.

In the same tales, defense techniques are formulated.

The main thing in all fabulous ways is to have time to understand: who you are dealing with, and for this it is enough just to have time to direct the mirror at anyone approaching. It is believed that evil spirits are not capable of being reflected in mirrors.

Doesn't the above mean that you can never receive information directly from the source, that it is always desirable to pass it through a system of mirrors for emotion and passion cloud perception, giving the swamp poisonous gases escaping from the bowels of the underworld, harmony and beauty, allowing charm themselves. And sometimes, even when the wind tries to disperse the mirages from gas clouds, it suddenly turns out that the cloud has already penetrated a person so much that it is impossible to separate them without killing. Clouds turn into clouds. And the clouds of human blood are already capable of causing the wind and flying into tomorrow, leaving behind a poisoned desert.

The input information control system must be able to close like a snail in a shell, so that when necessary it does not see the coven of witches. For if the mirror does not reflect anything, then there is nothing, which means that one should neither process information nor fuss about the implementation of the generated behavioral algorithms. In information wars, one of the most terrible dangers is to go after a voice that does not exist and drink like brother Ivanushka from the first information puddle that comes across, into which the media turn during information battles.

During information sabbaths for independent systems of one from the main task is to preserve this very informational independence, so that later, when the sun rises, and evil spirits writhe in its rays, help the sun destroy nightmares, turning them to ashes using the same directional mirrors.

We conclude the chapter with some conclusions.

1. It makes sense to consider suggestive threats after the implementation of all classical protection requirements. One of the sources of actions of the information learning system is the space of suggestive goals.

2. When analyzing a critical situation that has occurred, it is extremely difficult to identify its suggestive orientation. In this regard, the question of how much suggestive threats exceed the level of natural "noise" in the information system and whether they do, remains open.

3 The presence of a goal in the subject, even an unconscious one, leads to the ordering of suggestive noise.

4 Suggestive influences are control influences. Subjects belonging to the same information learning system have opposite goals does unmanaged system.

5. The achievements of culture and religion can be explained by the struggle for life at the level of the space of suggestive goals.

6. For self-learning information systems, suggestion can act as an activator (catalyst) for the directed generation of control programs for the information system itself.

Chapter 28. Chronicle of an information war

Thick forest along the road
With Baba Yagami
And at the end of that road
Block with axes.

V. Vysotsky.

In the last chapter of this part of the work, it makes sense to consider a global example of information confrontation, the scale of which would make it possible to see the above criteria and approaches to ensuring security with the naked eye, without resorting to means of distorting reality, such as a sharp allocation of one time interval to the detriment of another, which usually does for spatial objects magnifying glass.

So, the appearance of thermonuclear weapons in several countries, the number of which must necessarily be more than one, leads to a natural ban on military conflicts directly between these countries. The main struggle is transferred to the sphere of economics, psychology, and information. Successes and failures in this war can be traced based on the signs of information defeat formulated in the first chapter of the fifth part. It is the dynamics of the quantitative characteristics of the signs of an information defeat, albeit indirectly, that makes it possible to judge the battles won and lost.

At the end of the 1950s, the USSR and the USA entered the period of the Cold War, which was the prologue of the information war, which, as mentioned above, is a struggle between structures, the struggle of the corresponding carriers of knowledge with each other, and therefore, the struggle for carriers of this or that knowledge., for the possibility of their reprogramming.

The Cold War is somewhat analogous to a duel between two fighters who, staring at each other, do not dare to look away and circle around, looking for weaknesses in the enemy, just like I. Vorobyaninov and Father Vostrikov: *"And since both hands were busy with a chair, they began to kick each other with their feet."*

However, in the information war, most attacks are made only in order to see the reaction of the enemy to certain input data, comprehend it and, having collected bit by bit all available knowledge, create an adequate information model.

The model created in this way will allow in the future to get answers to questions like: "What will happen if...?" etc.

And this is the usual purposeful enumeration of possible moves.

Almost everything is like in chess.

If a living chess player loses to a computer, as our world champion does to an American computer, then why can a modern living politician beat a computer of the appropriate power with the appropriate program?

But when a mathematician finds out that the sequence of moves generated by a computer, determined by the choice "if...", leads to the achievement of the formulated goal, then the cold war ends, because it turns into a fast-moving information war in which the rivals have no time to think - the spoken word leads, like the melody of a magic pipe, and requires its inevitable continuation. Fascinating disastrous voices will not allow you to realize in time that the oxygen supply to the lungs has stopped. And what is the use of this awareness?

And then a responsible observer will come and joyfully state:

"Processes have become irreversible!"

Let's start from the beginning, let's go back to the origins of the information war - to the Cold War and see how its course was reflected in the main information characteristics of the fighting systems.

As mentioned above, any state, being an information self-learning system, can be represented as a set of interconnected subsystems consisting of human elements. It is assumed that the same element may belong to several subsystems.

The power of the state, as an information system, is determined by the number of elements, the links between the elements (the chosen structure) and the functionality of the elements.

In this regard, the dynamics of the following indicators of the belligerents is of interest:
- sale abroad of products of science-intensive technologies, primarily weapons;
- own territorial changes;
- changes in controlled territories;
- population;
- the level of education of the population.

The first and last indicators characterize the functionality of elements, independent subsystems and, of course, correlate with each other - it is fundamentally impossible in the "country of fools" to launch a spaceship or create a nuclear bomb, and even more so to wage an information war.

There are two ways to raise the level of education, and hence the functionality of your own state.

The first traditional one is to teach one's own, which implies the creation of an appropriate educational structure, the development of requirements, and the allocation of considerable public funds. The Soviet Union has followed this path since its inception. Moreover, along the way, he also managed to solve such a side task as the creation of a kind of world educational center with a fairly high rating - who just did not dream of getting an education in the USSR.

The second way involves inviting scientists "Varangians" and turning them into their own citizens.

Please note that, as in the case of conventional wars, either the citizens themselves are fighting, or mercenaries are invited, only in the case of an information war, mercenaries must have diplomas of scientists.

United States took the second, more familiar path - the main backbone of the "local" population today is made up of descendants of Europeans, Africans, and others. According to the new law, scientists and leading specialists from various industries have received preferential entry rights. During the 1970s, the balance of external migration in the United States was 350-400 thousand people per year, providing 1/5 of the total population growth. Thus, without spending a penny, it was possible to create an army for conducting an information war.

As for the size of the population (the number of initial elements of the information system) and its natural increase, these indicators in both countries were approximately the same.

The average annual population growth of the United States in 1980 -1984 was 1.3% and in the USSR in the same years - 1.02%. In the USA in 1985 there were 238 million people, in the USSR - 278 million (1986).

The dynamics of births and deaths in both countries is presented in following scheme [13, 23, 63]
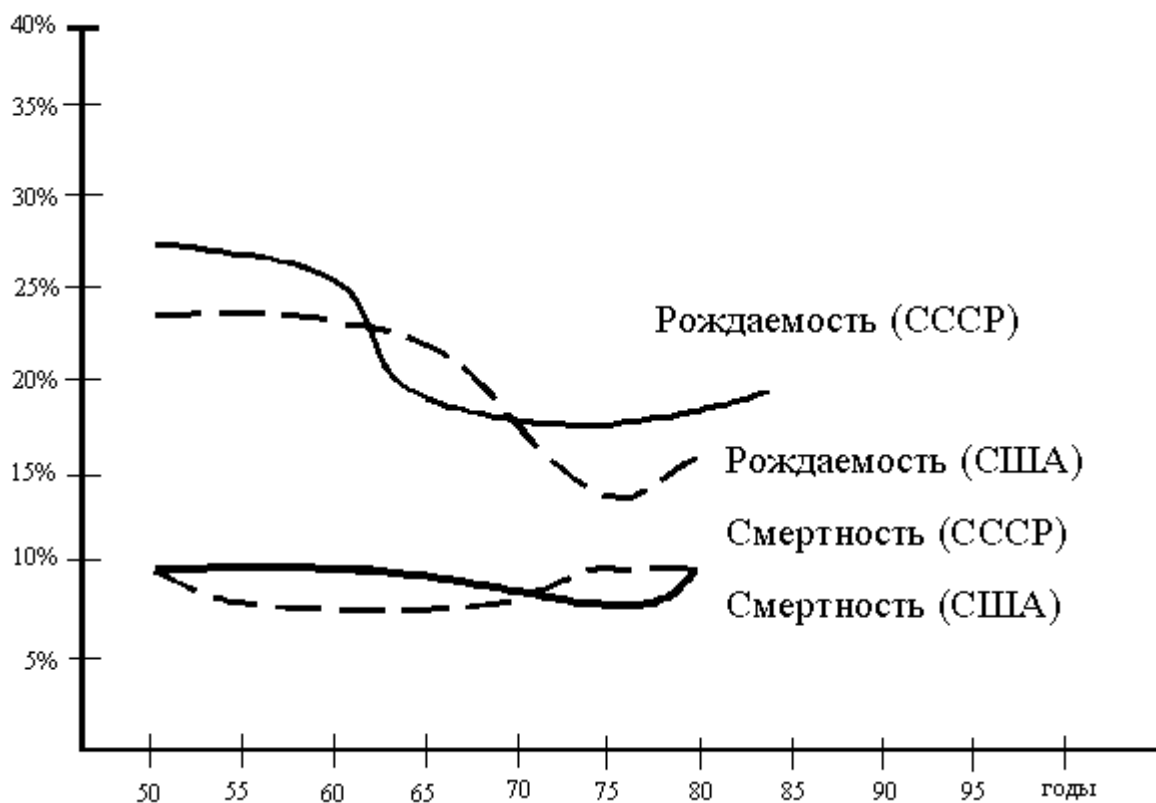
What methods of analysis do not apply to this graph, it does not follow from anywhere that approaching the turn of 1990 in the USSR, a sharp decline in population will suddenly begin, comparable to that which took place during the Second World War.

In the Cold War, the USSR and the USA use not only their own intellectual power, not only their functional capabilities, but also the capabilities of the controlled territories. This is understandable, there is no other way in the space of information systems - any absorbed and reprogrammed structure enhances the information power of its absorber. "Having serious theoretical and practical experience in political struggle. The Soviet Union at the first stage had an undeniable advantage. Firstly," the protective belt "from the countries of people's democracy was not a mechanical combination of elements that must be held by force, but an additional structure that enhances the general information capabilities. At the same time, the reprogrammed elements of the new structure independently and harmoniously complemented each other not only in politics, but also in the economy. Secondly, in almost all countries of Africa, America, Asia, related communist parties have arisen. And what does the strengthening of the same Communist Party in the USA mean if not the strengthening of the influence of the USSR? The US Communist Party is part of the social, political structure of the country, which is theoretically capable of working for goals that are contrary dominant in e toy the same country of ideology. Thirdly, the Second World War was a kind of expert who assessed the scientific and technological potential of all states.

During this examination, the Soviet military, scientific and technical potential was recognized as the best. Indirectly, this recognition means recognition by the world of the ideology dominating in the USSR - the strong are always considered, and some even imitate.

What should the government do in this situation managementof the United States?

1. Following the example of I.V. Stalin to destroy their own internal, untrustworthy social substructures, by destroying the elements and prohibiting them themselves as integral entities. So in 1950 In the United States, a law on internal security was hastily passed, according to which, all communists must be registered, and in case of a state of emergency, arrested. In 1954, this law was further developed in the law on the control of the communists, depriving the Communist Party of all the rights enjoyed by the legitimate organizations of the country. In the same years, six concentration camps were urgently erected in the United States.

In addition, more than 6 million Americans have been tested for loyalty.

2. Following the example of the communists, to form and scientifically substantiate their own system of values with the subsequent imposition of it on the outside world. Everything is done in the image and likeness of the Soviet Union, institutions are being created, individual scientists are being financed, capable of "scientifically" substantiating the inviolability of American values for humanity.

3. Urgently strengthen the response propaganda information work. NSC Directive — 68, approved in 1950, contained the following provision: *"But in addition to affirming our values, our policies and actions must be such as to bring about fundamental changes in the nature of the Soviet system, the disruption of the Kremlin's plans is the first and most important step towards these changes. Absolutely Obviously, it will cost less, but more effectively, if these changes are the result of the action of the internal forces of Soviet society to the maximum extent.*

Only at the turn of 1948-50 did US analysts come to realize the significance of psychological warfare:

*"But **psychological warfare** is an extremely important weapon for promoting dissent and betrayal among the Soviet people; it will undermine their morale, sow confusion and create disorganization in the country...*

Widespread psychological warfare is one of the most important tasks of the United States. Its main goal is to destroy the support of the peoples of the USSR and its satellites for their current system of government, to spread among the peoples of the USSR the realization that the overthrow of the Politburo is within reality" (Ibid., pp. 60).

According to [117], it was from the Dropshot Plan (1948) that the term "dissident" began to be widely used in US military plans.

But the USSR successfully waged this same psychological war from its very formation, calling the term "ideological struggle". It is for this reason that the US specialists directed the main blow against the ideology dominating in the USSR. In particular, the "Harvard" project outlined scientifically substantiated plans for training personnel for the beginning psychological warfare [111]. The "Russian Institute" at Columbia University (New York) worked intensively in the same direction.

Thus, in the early 1960s, in the United States and for the United States, the main directions for conducting psychological warfare were determined as the main component of information warfare. They spared no money for her. However, serious results were not achieved at that time. Moreover, both external and internal conflicts were constantly growing. It was necessary not so much to "save the world" as to protect oneself.

The following table shows the frequency of use of federal troops in the United States to resolve internal conflicts [117]:

years	Number of calls	Troop strength
1945-1959	55	33539
1960-1964	33	65867
1965	17	25051
1966	17	18598
1967	40	43300
1968	107	150000
1969	67	49264
1970	43	41046

This table is provided solely to show that initially the psychological warfare of the United States had to be waged against its own people.

Analyzing the internal conflicts of the USA, N.N. Yakovlev notes [117], only from 1963 to 1968 during the demonstrations there were 220 Americans were killed and many thousands wounded. At the same time, one should pay attention attention to the fact that since 1957 the national guard has been used 7 times on federal status, moreover, during these years a surge of political terrorism was noted - from 01/01/1968 to 04/15/1970 4330 bombs were detonated. However, starting in 1970, the internal conflict curve began to decline. Perhaps this was the first manifestation of the results of the use of psychological weapons? Did anyone have to test it?

The above figures do not compare with the relative prosperity that prevailed at that time in the Soviet Union, who were, especially in the first post-war years, in a very difficult financial situation - only a few internal conflicts, and acts of terrorism can be counted on the fingers of one hand.

Approximately the same situation was on the external front, where the parties tested each other's capabilities, supplying the input either alone, then directly opposite input data (threat — detente, crisis - disarmament). Neck collecting information about the enemy in order to build his information model, understand the abilities and study the weaknesses. In addition, the struggle for spheres of influence had a second no less important task, which was to expand its own information capabilities. "Absorbed" and reprogrammed structures contributed to the growth of the aggressor's information power.

Everything that happens in this struggle for information resources is somewhat similar to the struggle of any biological organism for life. There is an ancient rule: if you manage to eat and digest the enemy, you will become stronger. But not every information system can be "eaten", for example: the US has not been able to "chew" Vietnam. And not every "eaten" information structure can be "digested" using the usual technology, for example: Afghanistan, having gone through the "digestion process", did not become like Mongolia, but turned into a "chemically active element, with unpredictable behavior." Reprogramming of any information system requires an individual approach. The use of templates, typical schemes in this difficult matter often only contributes to "indigestion", and not to the influx of additional strength. Before you eat something unknown, you need to think ten times, but if a decision is made to eat, then you should find a way to prepare the dish, in which it will become the most nutritious and tasty. All the same takes place in the space of interaction of information systems. The impossibility of creating a typical algorithm for reprogramming any self-learning information system was proved in the second part of the work.

Below we will consider only two ways to expand influence: through military intervention and through the creation of political and military alliances. Both of these methods are most associated with the emergence of new and changes in existing structural formations; the first - with the addition of a new element to the existing structure, the second - with the appearance of new links.

On the next page in Table 5.1 provides a list of specific ways to expand your own influence, including:

a) local armed conflicts taking place in the world from 1950 to 1989 which, to one degree or another, contributed to the expansion of the zone of influence of the American or Soviet ideology;

b) events related to the creation of military alliances.

Obvious successes of opponents, from the point of view of the criteria for evaluating informational victories and defeats chosen by the author, are marked "+" in the corresponding columns, obvious defeats - "-". Where the rivals' own armed forces were used, the symbol "a" is present in brackets.

Material selection criteria for this Table 5.1 of [18] were as follows:

a) the weapons of the USSR or the USA were used in the conflict (struggle for arms sales markets);

b) the armed forces of the USSR or the USA were used in the conflict (marked with the symbol "a" in the table);

c) the result of a conflict or political agreement was an increase or decrease in the information power of rivals: the emergence of new functionality, the emergence of additional raw materials or markets for products ("+" corresponds to expansion, "-" - reduction). This takes into account not just the mechanical expansion of the territory and the deployment of its emissaries on it, but the inclusion of additional structural formations that contribute to increasing the information capacity of the USSR or the USA.

Based on the above criteria, it is clear why the withdrawal of American troops from Vietnam is marked in the "USSR" column with the "+" symbol, while in the United States - "-". All of the above also applies to the coup in Chile. The United States, thanks to the rebellion inspired by the CIA, managed to keep this country in the structure of its controlled space ("+"). The situations related to Hungary and Czechoslovakia look similar in relation to the actions of the USSR, in the column "USSR" they are also marked with "+".

It is interesting to note that, compared to the United States, the Soviet Union very rarely used its own armed forces to expand or maintain its influence in any region. Fraternal parties and pro-communist movements acted as a shock combat detachment. Simultaneously with the expansion of the ideological influence of the USSR on the world, its weapons were expanding: African and Asian countries increasingly turned to Moscow specifically for Soviet weapons, which is an important indicator of the "intellectual level" of the information system capable of creating such tools.

The results given in the table, and even more so the assessments made of the usefulness of the conflict for one or the other side, do not claim to be absolutely objective; firstly, not all significant armed conflicts of the selected time period are listed here, but only those that, in the opinion of the author of this work, were related to the information rivalry of the USSR and the USA without taking into account Islamic and East Asian factors, which were already independent at that time forces in the

international arena. Secondly, if the available historical materials allow us to track the fact of aggression, the fact of the occupation of territories, they are not always able to give an unambiguous answer to the question: "But did the system benefit from this eaten pie, will it hurt the stomach later? Will the absorbed structure succeed?" reprogramming and how much will it cost?"

However, even the data that is presented is quite enough to illustrate the process of confrontation between the two states on the world stage. The table shows that until 1988 there were no clear leaders. And then something inexplicable began to happen with the behavior of the USSR, comparable to the behavior of a computer in the event of a virus activation in it - the self-destruction program was reopened.

From all that has been said, it follows that initially the USSR extremely competently used almost all the advantages gained as a result of the Second World War. Not only the scientific and industrial successes of the country were applied to the fight; sports, cultural and educational movement, and not only their own, but also the countries of the allies, was aimed at solving the problems of information attack under the slogan that only socialism allows you to maximize all the possibilities of Man. 1 Propaganda was carried out by all available methods and means. But, unfortunately, on the part of the Soviet Union, it was carried out in exactly the same way as decades ago, and people managed to change during this time, they managed to get used to advertising made according to the old technology. The United States has not only learned to resist the influence of information, but also to protect its allies. For example, a trip to the Olympics in the USSR seems to be a trifle at first glance, but it is dangerous because those who come will be able to see everything that happens in our country from a slightly different point of view. What kind of losses for the "free market" can result in such an excursion of representatives of countries around the world? Any specialist in informational influence in this situation will advise you to come up with a reason and disrupt the Olympics, or at least limit the number of its participants. Everything was done in strict accordance with the tactics and strategy of information warfare.

In the second part of this work, the concept **of a "complex strategy of influence" was introduced**, which is understood as a combination of all types of influence on the adversary allowed by the norms and rules of behavior. The United States was the first to apply a comprehensive strategy of influence. The information war was intensified by targeted economic impacts - food from warehouses and strategic storage facilities was thrown into the market of the Soviet Union almost free of charge, thereby irrevocably destroying the agricultural potential of the enemy country. Similar impacts took place in the industrial and financial sectors.

Table 5.1. Armed conflicts 1949 - 1989

Year	Event	USSR	USA
1949	Creation of NATO (military bloc)		+
1950	War in Korea	+	+ (a)
1952	Revolution in Bolivia	+	
1954	Coup in Guatemala		+ (a)
1955	Signing of the Baghdat Pact (military bloc)		+
1955	Signing of the Warsaw Pact (military bloc)	+	
1956	Counter-revolution in Hungary	+ (a)	
1958	The landing of the Americans in Lebanon		- (a)
1959	Revolution in Cuba	+	

1960	Congo Civil War	-	+
1962	Declaration of Independence of Algeria	+	
1965	US landing in the Dominican Republic		+ (a)
1967	War in Nigeria	+	
1967	Coup in Greece	-	+
1968	Invasion of Czechoslovakia	+ (a)	-
1972	Withdrawal of US troops from Vietnam	+	- (a)
1973	Coup in Chile	-	+
1975	Independence of Angola	+	-
1975	Indonesian invasion of East Timor	-	+
1977	Providing military assistance to Ethiopia	+	-
1979	The entry of troops into Afghanistan	(a)	
1983	American invasion of Grenada		+ (a)
1988	Withdrawal of Soviet troops from Afghanistan	- (a)	
1989	Revolution in Romania	-	+
1989	US invasion of Panama		+ (a)

Understanding the significance of economic expansion in the modern war of civilizations, the United States itself strictly monitors compliance with the trade rules they have introduced with respect to their own producers (American laws prohibit the sale of goods at reduced prices to eliminate competitors). So in August 1997, Cray Resean won the case against the Japanese corporations NEC and Fujitsu, who offered their customers in the United States supercomputers at a price 450% and 170% less than their real value, calculated in accordance with the generally accepted methodology.

An analysis of the above charts and tables shows that until 1987 the dynamics of all the main quantitative characteristics of the signs of an information defeat did not portend anything catastrophic. But if we continue the graphs of the dynamics of births and deaths in the USSR, as well as the rows of the table of armed conflicts by 1992 and beyond, then the undulating processes that took place before 1987 will suddenly lose their undulation and break off, interrupted in their development by the catastrophe point:
   • the territory will be sharply reduced;
   • the population will be almost halved;
   • among those who survive, the death rate will begin to exceed the birth rate;
   • the export of arms and military equipment will sharply decrease (from $ 9907 billion to 1990 up to 3189 billion in 1991);
   • all national interests will disappear, and hence the allies, outside the borders of the Russian Federation, because the presence of interests implies their *upholding*.

Following the theory proposed in the work, in a specific information war between the USA and the USSR, by 1987 the game position began to correspond to the previously developed "home" preparation, i.e. risk that the development of the situation **will take** an unmanageable character, has become minimal.

Key figures in the leadership of the USSR many of whom previously studied for some reason in foreign educational institutions and. in particular, at the "Russian Institute" at Columbia University, it was possible to put them in the places prepared for them in the control system, because there are no other targets for targeted information

impact. In the future, it was only required to coordinate their actions, providing previously prepared specific behavior algorithms.

From the standpoint of the theory presented here, in the strategy of information warfare, the Soviet Union made only a few mistakes, which, however, became decisive:

1. It was forgotten that in the information war wins, usually someone who attacks and constantly increases the pressure. The one who benevolently hopes that everything will be resolved in his favor by itself always, like Emelya on the stove, confuses life in the 20th century with the plot of an old Russian folk tale. In order for the input training sample (propaganda) contributed to the effective reprogramming of the enemy, it must be constantly worked on:

a) it must contain elements of novelty, otherwise it very easy to adapt and not notice it;

b) the input sample should extol only their own real merits. One cannot exalt what is not, but in any situation one can always find certain advantages;

c) the input training sample should serve a certain specific purpose, and not be of a general nature;

d) the input training sample must be scientifically substantiated.

2. All sciences that have at least some relation to information impact should have priority. If a country needs a nuclear bomb, then nuclear physics should be welcomed. If specialists in information warfare are needed, then priority, both moral and material, should be given to psychology, cybernetics, as well as the development of tools for modeling human behavior - powerful computers and software. Unfortunately, all these disciplines have been and remain in our country as Cinderella.

While one of the warring countries was creating a powerful information foothold for itself, the other was scattering resources, "distributing a spoonful of porridge to each son" and more and more caved in under the weight of Time, which does not allow itself to be so shamelessly ignored.

3. In the behavior of the Soviet Union, there was an almost complete lack of complexity in the strategy of influencing the enemy, and in terms of their own defense - underdevelopment of mechanisms for ensuring the security of the economic sphere from a massive invasion of goods and technologies.

4. It was forgotten that the information war is still being waged in the sphere of management for access to management mechanisms, that the structure of state administration occupies a decisive place in the information war. The presence in it of elements similar to the central element in a structure of the "star" type can, in the event of death or infection of this element, lead to an instantaneous "scattering" of the entire structure (the sixth part of this work is devoted to the problem of structural stability). Such structural instability took place in the state structure of the USSR, but, despite the country's entry into the era of information wars, the necessary "repair work" was not carried out. They don't exist even now, and they won't - you have to become very lucky so that in today's situation the enemy will allow you to "patch holes". As it was proved above, in the information war there is no typical mechanism of surrender or truce - this is due to the problem of the unsolvability of the end of the information war.

In the course of the analysis of a specific information war, nothing was said about the influence of suggestive influence on the results of its battles, although it certainly took place. Thus, with the departure of Stalinism, the man-man channel in the USSR (1960-1990) became practically left to itself. It is possible that it is this channel was largely

responsible for the formation of hidden goals in Soviet society. But who was in charge and how? An interesting fact was that some rumors immediately reached almost everyone, regardless of where they lived. It is clear that not every message is able to survive in such a channel, but only appropriately selected. Taking into account what laws allows such characteristics as the speed and accuracy of spreading the necessary rumors to become invariant to the political orientation of their carriers? Moreover, all this happened against the background of the weakening influence of the official mass media.

However, in accordance with the conclusions of the previous chapter, one should look for hidden causes when there are no obvious ones. In this case, the mistakes mentioned above, formulated in the form of four points, are quite enough to destroy any information system, therefore it makes sense to put an end to this clearly non-academic study, leaving the analysis of the processes of suggestive influence in the information confrontation between the USSR and the USA for later.

Conclusion

Information wars are no different from conventional wars in terms of signs of defeat.

The information aggressor achieves victory by exclusively subjugating the enemy's control structures, which are the information target.

From here follow the main directions of the organization of protection:

1) reduction of the target size;

2) protection of the target (setting an obstacle);

3) regular destruction of "information weeds";

4) setting your own strict control over your own control system.

If signs of information damage appear in the system, immediately (at any cost) destroy your own control mechanism and form a new one.

Is an evil force always to blame for an information defeat? The answer to this question lies in the quality of the study of the input data flow and the willingness to accept them. For the basis of information expansion lies in the many questions that the world asks the system and the facts that it learns. And here, even modern magic will not tell which of the questions asked should be stopped in order to survive, so that at least something remains of the responding system.

In the fifth part of the work, it is shown that in addition to the tasks associated with protection against obvious threats, any information system faces the following two, one might say, cryptographic tasks:

1) revealing the fact that the input noise is suggestive;

2) determination of the threat posed by the identified suggestion. The solution of these tasks requires additional structures in the system itself. However, these additional mechanisms may not always be of real benefit, but only if there are a number of special restrictions that make the task solvable in a reasonable time, as in solving any cryptographic problem.

And this is all that the self-learning information system studied in this work is capable of, being programmed by the surrounding world, which is a part of humanity and a part of a person.

We can be predicted or programmed with everything that can influence: an order, a rude hail that immediately causes a response. We can be programmed by a thunderstorm above us and a lightning strike on the painted image of tomorrow and on today's certainty. The stronger the energy of the team, the faster we run to execute it, sometimes without even having time to understand, but is it necessary to do it?

When a thunderstorm is above us, we become an instant executor of her desires. And then, as stated in one well-known romance (words by B. Timofeev), it suddenly turns out that:

> *"... it's a ghost,*
> *And the sky is blue again*
> *And a tired caravan wanders into the distance."*

And they become quiet. And in this absolute silence, real programming begins, not the emergency work of patching up holes, but serious unhurried work, designed for many years of tomorrow and this programming is carried out by noise: a butterfly sparkling in the sun, the smell of a flower, distant thunder, a bird that closed the moon, the croak of a crow, even a word addressed to no one, a night in which *the radiance of the moon brings me dreams."*

When everything around is sleeping or has not yet had time to recover from the thunderstorm that shook the world, you can hear very and very distant day after tomorrow. It will have time to form much before the raindrops fall on the first warning swirl the earth. And then today comes.

A light breath of wind, as if a tulle trembling a little: "As you wish." Quietly spoken: "How do you do it." And even quieter, like an echo inspired by thoughts: "How will it be." And no complaints. And the blowing wind dispelled the remnants of the material image, erasing it like a wave of footprints on the sea sand, like a teacher with a wet rag the letters of the alphabet from the blackboard. There is nothing left, not even illusions that can be created, it would seem, always *"Illusions can be created, and you all create illusions. You see a woman, but you never see her yatha bhutam as she is. That is why the consequences are so disappointing. You begin to see things that are not there, which are just projections of your mind.*

You are projecting beauty, projecting a thousand and one things onto this poor woman. When you get close to her, when you get the opportunity to live with her, the ghosts begin to dissipate. These imaginary things cannot resist the onslaught of reality; the reality of the woman will prevail. And then you feel deceived and think that she deceived you.

She did nothing. She herself feels deceived by you, because she also projected something on you." - It is believed that Osh said this about Rajneesh.

Illusions - these are virtual models that "come to life" in the structure of an information self-learning system when it tries to "try on" yourself hypothetical input data.

It is quite possible that both we and our world are also an illusion, belonging to a more capacious than ourselves, larger-scale information self-learning system.

Now imagine there is a performance, for example, a ballet. At the same time, a particular ballerina performing her role may have completely different problems in her head: the husband did not come home to spend the night, the son received a deuce, etc. However, it is included in the general mechanism and performs its steps. She mechanically, read algorithmically, makes her movements and cannot help doing it, perhaps because this is her job. Even if her salary was delayed and she was not given a more prestigious role, she will still methodically do everything that she can and should do. She will do this until external pressure (the degree of openness of the system) finally crushes her.

Even if an element of the system has its own incredibly rich inner world, this element, no matter how smart it is, may not even suspect that <u>with its work it creates completely different worlds</u>. And what else can you call the emotional and psychological state that arises in the viewer, looking at the stage and not knowing about all those problems for small and big performers who conscientiously do their job?

Another world!

Here they are small elements, and roughly speaking, little things that create the perfection of other worlds. In their own space, limited by life, work, dreams and worries, these people sometimes cannot change anything - in this situation, everything is determined for them by the Moiras.

For those who understand, all this is the horror of the crucifixion of God, designed specifically for posterity.

Nevertheless, it turns out that the more harmonious and honest the simple elements of the system, the more perfect the external worlds they create will be.

True, they themselves do not see these worlds, just as they do not see the viewer. The hall is dark.

As for the applause, you can not live up to them. Is it known how many life-sized acts are in the drama being performed?

It may turn out that for the element-subject, who thinks that he understands the meanings, the only difference will be that in one case he will leave the stage *"with a feeling of deep disappointment for the years spent aimlessly"* and in the other - *"with a sense of accomplishment."debt."*

The charms of the moment, like autumn leaves, serve as a specific breath of the wind, providing invaluable information for those who can see, and suggestive noise for the rest. Charm, chagrin, mirage and dream, as a result of information impact sometimes hidden in casually meeting glances, in an original analogy, suddenly out of nowhere that has surfaced on the surface of the mind, sometimes in a proven theorem, and sometimes in the final wave of the conductor's baton, when Bulgakov's imposing cat announces in a human voice: *"The session is over! Maestro! Cut the march!!"*

PART SIX. KNOWLEDGE DESIGN

For a hundred years, the inscription on the gravestone is erased, but the words spoken for a thousand years remain the same.

Chinese proverb

Introduction

Do not look for happiness beyond the sea. Thanks be to the Almighty that He made the necessary easy, and the difficult - unnecessary.

G. Skovoroda

The problem of predicting the behavior of information self-learning systems is quite complex. It is clear that even to cover all of it within the framework of this book devoted to information wars is not possible.

It is clear that the accuracy of predicting the behavior of information self-learning systems is, to some extent, the accuracy of information weapons. Therefore, it would be fundamentally wrong to say nothing about this problem, especially since the methods for predicting the location of technical means familiar to us, for example, the same ground-to-ground or ground-to-air missiles, which are based on the work of Wiener, are fundamentally different from approaches to predicting the behavior of complex information self-learning systems: people, peoples, mankind.

The predictability (controllability) of the behavior of an information system is determined by that what knowledge is preserved and developed, and what is hidden and destroyed.

Any knowledge is reflected in the corresponding structure. That is why the death of some substructures and the appearance of others determines the change in the knowledge of the system.

Structures arise wherever knowledge arises, being a projection of knowledge into the material world. The way knowledge is stored is structure. The atom and the molecule, the human brain - at the heart, one way or another - of the structure. A team that has a common goal, upon reaching which the members of the team interact with each other, is also a structure that arises and continues itself at first glance arbitrarily, like the roots of trees, intertwining in bizarre twists. Same root tree structure represents the tree's knowledge of the nourishing juices of the land on which it grows.

In all these systems, in the process of their functioning, structural changes sometimes occur, which are commonly called catastrophes. Many catastrophes are classified in such a discipline as Tom's Catastrophe Theory and have rather romantic names, such as Dovetail. The model proposed in this chapter does not pretend to be complete and rigorous, which is the place for the authors of the classical theory of catastrophes. The purpose of this part of the work is to demonstrate, using simple examples, what happens to the structures that hold knowledge under targeted information impact on them from the outside. Why is it important?

As mentioned above, any self-learning information system is a structure: static, dynamic, self-modifying, with changeable links between elements, with a changeable number of elements, etc. And in order to protect an information system, first of all, it is necessary to protect its structure. How can this be done?

Structures are different. One is easy enough to protect from external destructive influences simply because of its features, while the other, protect - do not protect - an

accidental external push, and it will crumble like a house of cards, as in E. Poe's fairy tales:

> *"Half such bliss to know*
> *Seraphim in paradise could not, -*
> *That's why it happened (as everyone knows*
> *In the kingdom of the seaside land), -*
> *The wind blew cold from the clouds at night*
> *And killed my Annabelle Lee."*

What is the point of protecting the information circulating in the system if the system itself is defenseless? Therefore, in the future we will talk about the protection of systems, about the search for integral characteristics of structures, about the life and death of structures.

Chapter 29. Forecasting the behavior of information systems

Just as a boat is blown away by a strong wind, so one single feeling that takes possession of a person can blow away his mind.

Bhagavad Gita As It Is

A mirror can reflect any face that falls into it. The camcorder allows you to capture any physical image and also reflect it, like a mirror, but only on the TV screen. The video camera and telecommunications environment can already transfer the captured image to almost anywhere in the world in real time. But, despite the impressive distances, we are still essentially dealing with the same mirror, reflecting today into today, and nothing more. The inclusion of a computer with the appropriate mathematics and knowledge base in this reflector scheme will reflect tomorrow's events today. Then it will be possible to study the affairs of the coming days, choosing the most acceptable ones, and repel everything that frightens with its ambiguity or gives away fundamental rejection for some reason.

Fantasy immediately obligingly paints a picture of the city going to the night rest and flickering with the spots of its windows, behind which sit millions in need of a changed future and choosing for themselves, like a shirt in a store, tomorrow. But the day, no matter how millions of people choose it, choosing each for themselves, will still be one for all. Only the one who has the most powerful computer technology, who has the most efficient simulation software, who has the most accurate models, who has the most accurate knowledge of the behavior of the elements of the systems under study, will only order this one for all day.

What principles should underlie the models, capable of predicting events related to the functioning information self-learning systems? Or, besides what classical cybernetics and systems theory offer today, there is nothing more to rely on, but you can only refine the signs after the decimal point in the accuracy of the forecast?

Say what you like, but the fundamental difference in approaches to predicting the behavior of learning systems from those incapable of learning lies in the fundamental difference between the areas of definition of input variables and the areas of value of output results. For most complex self-learning information systems, the domains of definition and values of input/output variables form events that occur inside the system and around it, as well as her own actions. All these events do not work, and maybe to be impossible, to rank, to streamline, to fasten them on all the same uniform and force to pay for the first or second. Each event has its own parents, which may well be many more than two, and its descendants, sometimes completely different from each other.

There are no uniform measures in the multitude of events, like the strength of current in wires, meters in space, seconds in time. The introduction of cause-and-effect relationships into it [57], it seemed, should have made it possible, finally, to begin to solve certain practical problems, turning the set of events into a full-fledged space with its own metric. But does such a space have the continuity property? After all, it is for a continuous space that mathematical methods are most effective. And if not, which is

most likely, then what to do? What should be the scale (significance) of events and actions? Can it be changed dynamically?

In the conditions of discreteness of the set of possible actions, each action has its own name, beginning and end in time and space, moreover, there are actions caused not by the previous hour, but by the events of last year in the absence of a clear causal relationship (an event that appeared for one one of the systems as a cause, for the other it is generally invisible). Under these conditions, all experiments on building models for predicting human behavior [57] could not give results acceptable for practice.

Based on the conclusions obtained in the previous parts of this work, the main direction of solving problems of predicting the behavior of self-learning systems seems to be somewhat different than for technical systems - not from causes to effects, but from goals to actions. At the same time, the actions of the characters that they could perform in the time t of interest to the researcher in order to achieve the goal at t + Δt, are taken from the set of actions performed before the moment t, i.e. they are drawn from all previous experience, as if selected from the knowledge base. And this is quite logical.

Predicting the behavior of information systems, namely as information systems, relies primarily on the information accumulated by these systems, i.e. on system knowledge. In the end, any information system behaves, as a rule, in accordance with its knowledge: it can swim - it climbs into the water, it knows how to fight - it climbs into a fight. If the system knows "something", then in a situation where this knowledge is necessary, it is this "something" that she will use. Below is a simple, but beautifully artistically designed by K. Capek example of predicting the behavior of social systems, based precisely on this principle.

In K. Chapek's story "Stolen Document No. 139/VII OTD.S", a secret document was stolen from a colonel of the General Staff at night, which he took for work on weekends. There was no safe at home, and, assuming that the spies would not take it into their heads to climb into the pantry, he hid the document there for the night in a pasta tin. However, at night, an unknown person climbed into the pantry and stole this particular tin.

The entire huge secret counterintelligence apparatus of the country was involved in the search.

But the document was found by an ordinary detective from the local police station named Pishtora. Below is his train of thought:

"Pishtora looked around the closet with interest. - Well, yes, - he said with satisfaction, - the window was opened with a chisel. It was Pepik or Andrlik.

- Who, who? the Colonel asked quickly.

- Pepik or Andrlik. Their work. But Pepik now seems to be sitting. If glass had been squeezed out, it could have been Dundr, Loyza, Novak, Gosichka or Kliment. But here, apparently, Andrlik worked.

"Make no mistake," muttered the Colonel.

"Do you think there's a new storeroom specialist?" asked Pishtora, and immediately became serious. - Hardly.

As a matter of fact, Myrtle also sometimes works with a chisel, but he does not work in pantries. Never. He usually breaks into the apartment through the toilet window and takes only linen. Pishtora bared his squirrel teeth again. "Well, I'll run to Andrlik's."

An example, albeit with a share of irony, is completely in line with the Russian folk proverb of three words: "The grave will correct the humpbacked grave."

Let's continue the research.

The initial data for building a predictive model of the behavior of specific information self-learning systems is proposed to be taken:

1) own goals of the system under study and the systems surrounding it;

2) goals set by the external environment of the researched system and its surrounding systems;

3) actions committed in the past;

4) events introduced into the model by the researcher. It is the events introduced by the researcher that are the steering wheel with which the system is managed in a turbulent sea of information flows;

5) structures, an element of which is given the system is, goals of structures, tasks, conditions for the existence of structures, elements and links between them.

Now let's try to illustrate this with an example. At In this case, it is desirable that the example can be projected onto the coordinate axes of the original data listed above. It is clear that trying to choose as the main character, for example, Harry from the novel by H. Hesse "Steppenwolf" is pointless, due to his non-involvement in the work of any structures of that time and the lack of connections with the surrounding elements (especially at the beginning of the novel), using which could be controlled by the Steppenwolf. Later they appear and G. Hesse uses this, otherwise he would have nothing to write about.

If the respected reader looks back at his life and analyzes it carefully by remembering, as don Juan advises, and at the same time pays special attention to the events associated with the realization of certain goals, then it turns out that for every existing goal there have always been corresponding events capable of bringing the system to a state of achievement of the goal. The paths were always there, but not always they could be used. Moreover, characteristically, regular mental feeding of the goal led to an increase in the proportion of relevant events. It is clear that these events are not caused by the goal - they are only manifested by it, made visible. Therefore, here we are talking exclusively about an increase in the proportion of visible events through the prism of a given goal.

However, greater success has always been in the case when not a person went to the goal, but the goal itself went to the person, i.e. a person subordinated himself to the goal, became its slave and obediently fulfilled what was required of him. Then, in the midst of the fan of events with which every moment the world is fanning a person, the choice will no longer be made by a person, but by the goal - by the hands of this person. What is needed for that?

It is enough to become an "impeccable warrior" in don Juan's terminology. What is the logic of this impeccability?

It is in self-elimination from the generation of new goals that can interfere, because only another goal can prevent one goal from being realized.

Having conflicting goals is a tragedy for any self-learning information system. The parallel implementation of mutually contradictory goals inevitably leads to the fact that the functioning of the system clearly shows actions that seem to neutralize each other. And if none of these goals prevails and there are no reasons capable of destroying them, then this is a real tragedy for the information system. Buridan's donkey is said to have

died from the fact that he tried to minimize his actions in the face of opposite, but equivalent restrictions. The presence of two natural desires not to take an extra step to eat a large armful of straw - doomed the poor fellow to self-destruction.

In order for the target to leave the system alone, it must turn into a rule, i.e. be achieved. Only then can the rule be destroyed. A rule can be destroyed by another, a rule or a fact that contradicts this rule.

However, after the goal has become a rule, and this rule is destroyed, nothing prevents it from reappearing and spinning the whole wheel of Samsara again. This is exactly what the Bhagavad Gita states:

"By contemplating the objects of the senses one develops attachment to them, from attachment lust is born, from lust anger arises.

Anger breeds complete delusion, delusion obscures memory when the memory is eclipsed, the mind disappears, and when the mind is lost, the person again falls into the well of the material world."

Often, everything in the life of information systems occurs in full accordance with what has been said, which makes it possible to carry out their classification depending on the processes taking place in the target space.

Here are the following five options.

Option 1:

1) a goal arises;

2) the goal turns into a rule, i.e. achieved;

3) the rule is destroyed by other rules or facts;

4) from the ruins of the destroyed structure, the goal again arises, often the same one that was before: food, sleep, a woman. A realized goal rises from the ashes of destroyed rules like a burnt Phoenix bird.

That's how it goes day by day for the living these purposes of information systems.

Option 2:

1) a goal is born;

2) the goal with number i does not have time to turn into a rule, as soon as i becomes more by one and control is transferred to point 1. B As a result, targets grow like mushrooms after rain, they pile up on top of each other and interfere with each other, causing failures in the information system.

For a person, such a development of events quite often ends with a visit to a psychiatrist, and for a computer system - an overload.

Option 3 represents a complete lack of goals. The absence of goals blocks the behavioral activity of the information system, and thereby destroys it so just as effective as having too many goals.

Quite often, the work of its own security mechanisms leads the system to this situation, capable of extremely accurately performing the task of destroying unnecessary own or imposed from outside targets.

Option 4:

1) a goal arises;

2) the goal is achieved;

3) a new goal arises, for which the previously achieved goal becomes an auxiliary rule.

Movement is constantly and inexorably going in one direction only; in the direction that the realized goals generate. This movement resembles the flow of a stream. It flows where it is easier to seep, but always from top to bottom.

Option 5:

1) a goal arises;

2) the goal is achieved;

3) a new goal, different from the previous one and in no way connected with it, arises.

In total, we have five possible options for the "movement" of the information system:

1) the first - uniform movement along the same segment, running in a circle;

2) the second - accelerated chaotic movement within the circle;

3) the third - the absence of movement;

4) the fourth - constant movement in one direction;

5) fifth - movement in different directions. As a result, the entire process of cognition for an information-self-learning system in accordance with the described options can be characterized as follows:

1) option 1 - there is no or very weak own internal restructuring, the accumulation of knowledge practically does not occur, but the system copes well with solving a limited range of tasks familiar to it;

2) option 2 - the system is not able to learn anything;

3) option 3 - the system is not able to learn anything;

4) option 4 - there is a constant deepening of knowledge in any one area;

5) option 5 - there is a deepening of knowledge in various fields of activity.

Once again, let us return to the original formulation of the problem of forecasting the maintenance of self-learning information systems and try to define the key concepts associated with forecasting. What do the following terms mean in relation to a self-learning system: forecasting, control, observation? What unit is used to measure forecast accuracy?

Interestingly, for technical linear systems, the answers to all the questions listed above have long been received.

An information self-learning system will be called **totally controlled**, and its behavior is **completely predictable** on the time interval $[t_0, t_1]$, if the algorithm of information impact is known (for example, a teaching technique) that allows you to bring the system at any time $t_e [t_0, t_i]$ to the required result (action) x.

An informational self-learning system is called **partially controlled**, and its behavior is **partially predictable**, on the time interval $[t_0, t_1]$ if the algorithm of information impact is known, which allows to bring the system to some point in time te $[t_0, t_1]$ to the required result (action) x.

An information self-learning system is called **fully observable** on the time interval $[t_0, t_1]$, if an algorithm is known that allows, based on the analysis of the current state of the system at time t_1, to determine the dominant information impact directed at it at any time te $[t_0, t_1]$.

An information self-learning system is called **partially observable** on the time interval $[t_0, t_1]$, if an algorithm is known that allows, based on the analysis of the current state of the system at time t_1, to determine individual information impacts on the time interval $[t_0, t_1]$, which led her to this state.

An example of a fully observable system is a person at the Last Judgment, where, just by looking at him, the representative of Heaven is able to announce the entire list of good and evil deeds in the time interval from birth to death.

An example of a partially observable system is the characters in Conan Doyle who come to Sherlock Holmes for help. Analyzing their appearance, Holmes unmistakably identifies individual external influences associated with these people, for example: *"Judging by your index finger, you prefer rolled cigarettes"* ("The Hound of the Baskervilles").

The accuracy of control of an information self-learning system or the **accuracy of predicting** its behavior is the value of the time interval between the planned time of obtaining the result required from it (committing an appropriate action by it) and the actual time.

For classical linear systems, there is a so-called. controllability criterion, which allows making an unambiguous conclusion about the possibility of controlling a particular linear system. For any self-learning information system chosen from the whole set of self-learning systems, such a criterion cannot exist in principle. However, for systems that use some subset of learning algorithms for learning, the existence of some analogue of the above criterion is quite acceptable.

Let's try to look for it.

One of the external features of the functioning of a self-learning system is the absence of a strict one-to-one correspondence between the input message and the output result. Even if an external observer conscientiously captures all the reactions of the system to all possible inputs; he cannot guarantee that when the system repeats the sound "om" a thousand times, it will suddenly not see completely different meanings in this sound.

In addition, self-learning systems are also interesting in that even if n objects are taught by the same teacher according to the same program, i.e. the teacher has the same informational impact on all his students, but the knowledge of all will be different not only in essence, but also according to formal criteria (point marks of the examiners).

What is the reason for the difference in knowledge in this case?

Suppose these reasons are as follows:

1) in the ability to assimilate knowledge, which is determined by the mechanisms of memory. Within the framework of the R-networks model, this is primarily the information capacity of the system and the "life force" of its elements. Within the framework of the DFT model, the visibility of the input data. Often all that what the teacher is saying is completely invisible to the student. It is clear that in such a situation even the most capable person will not be able to master anything,

2) for the purposes of the system. Within the framework of the R-network model, this is the distribution of links between elements. In the PFC model, questions formulated for the system.

Under the conditions of the assumptions made, the search for a criterion for the controllability of the behavior **of self-learning information systems** should be carried out among the goals of the system and its ability to assimilate knowledge. At the same time, it is clear that the goals of the system and its ability to assimilate knowledge are closely correlated with each other and are determined by the possibilities of structural transformations of the system. Finding a controllability criterion means developing a rule on the basis of which one can judge the possibility of creating an information

impact algorithm (learning methodology) for a specific information system. The solvability of this problem has already been discussed in the first part of the paper. It was shown that the problem largely comes down to information stability, to what processes of structural transformations prevail in the system: changing connections (possibility of elements influencing each other), leaving some elements without replacement (destruction of the structure and loss of some functionality), arrival others (creation of new substructures and emergence of new functionality).

The death of some substructures and the appearance of others mainly determine the change in the knowledge of the system.

Thus, manageability is determined by that. what knowledge is preserved and developed, and what is hidden and destroyed.

Technologies for the destruction of knowledge have been worked out quite well by now.

1. Destruction of documentary repositories of knowledge - books. One of the initiators of this direction is considered the First Chinese Emperor - the builder of the Great Wall of China, who set fire to all the books written before him. At the same time, the identified concealers of ancient manuscripts were used as brute labor in the construction of a great wall that fenced off part of the earth from the world. The emperor acted on a grand scale, even then, perhaps, realizing that it was information processes that were the most dangerous. And he saw simple and correct solutions:

a) fence off with a wall of stone in space;

b) fence off with a wall of fire in time.

2. Destruction of living carriers of any knowledge. If you list historical characters who solve the problem in this way, then a page is not enough.

3. Reprogramming of knowledge carriers. This technique is also quite ancient. Initially, it was based on the capture of children and their appropriate upbringing. But if earlier it took years, and sometimes Decades, while children were required as the source material, today, to solve such a problem with the help of such a tool as the media, a few months are enough and adults turn from the builders of capitalism into the builders of communism and vice versa.

Having discussed ways of destroying and concealing objectionable knowledge, it makes sense to dwell on the problem of creating, promoting and preserving desirable knowledge.

Main directions.

1. Creation (birth) and programming of knowledge carriers.

2. Reprogramming of carriers of "foreign" knowledge.

3. Rewriting history. In terms of the scale of the history modification actions, according to [67], hardly anyone in the world is able to compete with the Romanov dynasty, which reshaped the entire previous history of the Russian Empire to suit its interests. In the light of the models under consideration, rewriting history makes it possible to change the system's existing goals and impose new ones. But just for how long?

Judging by the fact that history is regularly rewritten, especially in Russia, one can assume that the third direction has a solid historical, and perhaps even genetic, basis. Almost everyone who comes to power in Russia again mixes not only his predecessor with dirt, but also replaces the values that society had by that time.

4. Fixation and preservation of documentary knowledge repositories: books, films, technologies; creating characters in the virtual world, such as the Japanese Kyoko Date.

It is interesting that, in general, humanity is trying to overcome the uncertainty of controllability and forecasting by inventing non-traditional ways to protect its own independence and autonomy. The most ancient method of protection was writing. Documents, archives store the knowledge of dead people. Storing this knowledge is an attempt to resist the operation of deleting elements from the system Moreover, the better the protection against the removal operation is implemented in the system. the more likely it is that for a given system the problem of prospects, and hence the problem of invisibility, will become solvable. But, having passed a certain threshold in protecting information from destruction, a somewhat different information self-learning system will arise, for *modeling* which, perhaps, S-networks, rather than SR-networks, are more suitable.

The same process is served by the regular rewriting of history. What could be easier than repainting neutral, unobjectionable objects in your team colors.

Any historical research is a solution to a cryptographic problem. The result is completely determined by the cryptographic key in the hands of the researcher.

In order to show how this is practically possible, we will not touch on global historical theories focused on humanity, but on a single person, on the autobiographical works of Carlos Castaneda. One of the areas of work on oneself, according to the **teachings of don Juan**, the hero of K. Castaneda, is to solve the problem of remembering. Remembrance is the restoration of invisible knowledge. To remember oneself from today to the cradle means precisely to gain the ability to see everything, i.e. to gain fullness, to see all the gaps through which energy leaves a person, and to understand all the possibilities according to one's own perception of the world. *"Don Juan gave me clear and detailed instructions about recapitulation, which was to re-live the totality of life experience* a, *recalling all sorts of details of past experiences. He saw revision as a reliable way to move and rethinking of energy"* (K. Castaneda "The Art of Dreaming").

And as for walking in the dark dense space of time with separate light spots, then to solve this problem *"... don Juan suggested to me a new technique for recapitulation. I had to solve something like a puzzle, composing the seemingly minor events of my life so that a whole picture would turn out of small disparate pieces"* (K. Castaneda "The Art of Dreaming"). And this already means that in case of success, a new information system will be obtained.

The art of compiling a complete picture from the elements of one's own life has always been preached and is being preached by modern science. A real Ph.D., and especially a doctoral dissertation, is a complete picture, assembled from separate theoretical and practical results obtained by a dissertation student in his life. Her writing is a search - what can be glued with what. Just like in childhood, when it was necessary to put together a picture depicting an animal or a plant from separate cubes painted on all sides. Only with age, the paintings become more diverse and incomprehensible.

In addition to what has already been said, it should be additionally noted that it was Carlos Castaneda who was the first to dare to more or less strictly formulate the criterion of controllability (forecasting) of an information self-learning system. In his terminology, the criterion reads as follows:

*"In the case when they have full control, **discipline and sense of time**, endurance guarantees - what is to come will inevitably find someone who deserves it."*

The key concepts present in the above criteria are defined in it as follows:

Discipline - *the ability to collect the necessary information while you are constantly beaten.*

Timing is the *ability to accurately calculate the moment at which everything that has previously been held back must be released.*

Endurance *means restraining with the help of the spirit of that which the warrior is fully aware of the inevitable coming.*

Modern telecommunications and computer technologies are the next serious step for humanity in protecting its own independence. The deceased Archimedes and Shakespeare become no less real and more accessible than the still living Ivanov, Petrov, Sidorov. There is a fixation of the level of deaths and begins "resurrection of the dead". Having perished once, they have already helped humanity in obtaining new knowledge and now they are returning from the depths of centuries again so that society can continue to know the world.

Why don't discoveries in chemistry and physics grow at the same rate as it does in the field of computing and telecommunications?

They are simply not needed, since less than cybernetics are connected with the future of mankind.

And computers are needed because they ensure the reproduction of virtual people!

Therefore, after "a week or two" (three or four years), the unfortunate old man goes to the goldfish for a new computer that allows you to change the platform: go from the category of "black peasant woman" to the category of "column noblewoman".

But the "black peasant woman" does not become more beautiful and does not become smarter as a result of her transformations.

In the fairy tale A.S. Pushkin's blessings, pouring from a goldfish, make the old woman arrogant, providing an opportunity for the development of that part of her that previously, surrounded by a broken trough, did not pretend to anything.

Is it easy to predict the behavior of an eccentric old woman?

Any child, quite freely, after the first trips of the old man to the blue sea, will predict the result of the next trip.

If the goal of the subject is known (in this case, power) and the ways to achieve it (it is enough to send the old man to the goldfish), which previously gave a successful outcome, then there are no problems with forecasting accuracy.

Problems arise with the system itself. Following the logic, it should continue to change in accordance with the already debugged algorithm, but suddenly *"the fish didn't say anything",* and now his old woman is sitting, "and *in front of her is a broken trough".*

It may be that, in addition to the purpose and methods of solving the problem of forecasting, it is necessary to know whether the system will be able to function in the new conditions that will arise as a result of its own action? Will the system withstand a hail of stones from an avalanche caused on its own head?

Answering these questions is not easy. It is generally impossible to predict the behavior of a self-modifying system under conditions when it is not included in the unfolding plot, when the corresponding role is not assigned to it, when it does not have its own basic goals. Intuitively, it seems that the task of prediction is connected with the

plot, and with the field, and with the basic goals. A satisfactory solution to this problem is to use logical approach, it is possible only on that interval time, where all of the above takes place.

Chapter 30. Current knowledge as a process structure

Once having embarked on the path of contemplation, a person does not need to do anything else. Sun _ God's attraction will do the rest.
Osho Rajneesh

This book does not trace the named protagonist, who is able to risk his life to explore the labyrinths of his own Destiny and the Destiny of mankind. But at a certain level of abstraction, it is certainly present. Since he has parents who can be called tad, that is, he himself. The parents of any self-learning information system are His Majesty Process and Her Majesty Structure.

A lot has already been said about the Structure in the first part of the work. And that she has a beautiful name, and that she is Knowledge. But knowledge dead, canned like stew in a jar or carcass mammoth in permafrost.

Here the prince should come, bend over the sleeping princess, then she will come to life and be able to answer questions. Moreover, he will be able to continue both himself and the prince who has come in offspring, forming and passing on genetic knowledge, like a relay baton, i.e. the principle of generating a structure similar to itself.

The Structure itself came to its realization from human language, from speech, from a campfire story where one Primitive with a capital P was explaining to another Primitive with a capital P how to get to a tree that gives large and juicy fruits. Having arisen, it was already interesting in that it tried to accumulate knowledge, finding a place for it in itself, almost the same as a sponge does, sucking in water, or a capacitor, absorbing electrical energy.

There was and is such a direction in philosophy and linguistics like structuralism. It was in this spider that the world (consciousness) was first discussed as a place in which there are interconnected developing rows of structures, where culture or art is "the structure of the structure. Jan Mukarzhovsky formulated two most important concepts for any work of art: intentionality and unintentionality. For him, the first was the force that connects the individual parts together and gives meaning to any work, representing semantic energy in art.

In our interpretation of self-learning information systems, intentionality has been transformed into nothing more than a goal.

Everything that for the subject perceiving the work resists this unification in the work, everything that violates the semantic unity is called by Murazhkovsky **unintentionality**.

Unintentionality is what is perceived as a mistake by contemporaries. In this case, the error tends to increase. She is constantly growing. And after some time, the whole work becomes one big mistake, and then it loses its original meaning altogether and acquires a completely different reading, especially if this work is historical material.

Unintentionality is inherent not only in works of art, but also in any product of human labor.

In our interpretation as applied to self-learning information systems, **unintentionality** is nothing more than the wind knocking a rocket astray, a ghost hiding behind trees and trapping a traveler, errors penetrating into any sufficiently capacious computer software. This is the force of an external influence in relation to the selected system, which finds its measurement in the error of a self-learning system in response to input information.

That's how the Structure lived-was - all alone. Princes for her began to appear in the sixties of our century. But they began to appear quite aggressively, immediately speaking under slogans like "The world is a process", and whoever disagrees, please move forward. The structure moved.

But processes can exist only in the structure, on the structure and at the expense of the structure.

As a result, there was a manifestation of the fact of the constant meeting of the main characters, they received a residence permit and relative independence in the human collective mind.

The process began to look for its materialization in the form of a weighty microcircuit of the corresponding microprocessor, about which you can't say that it can't be seen and touched. Structure, on the other hand, comes from the visible order with which it is always personified, has taken a step into the unsteady world of connections between various fields of databases stored on magnetic media.

As a result, on the one hand, uniprocessor and multiprocessor computing systems and computer programs for them have arisen.

On the other hand, there are various structures for storing data: tree, network and tabular.

Serious mathematics was developed for tables, allowing relational DBMS to emerge as a winner in the DBMS market. And all because in abstract algebra it was shown how for a certain kind of structures (so far only tables) amazing things are done. It turns out that tabular structures can be combined, crossed, and each time new knowledge will be obtained, which, as it were, did not exist before. Moreover, the proven theorems guarantee that as a result of such actions, the newly born structures are true for the model of the world in which we work our miracles. The importance of this result can hardly be overestimated. Still: knowledge <u>can be folded, disassembled, and then collected again in the form of tablets convenient</u> for work. And they do not deteriorate and do not lose their presentation.

The next step, which made it possible to see the structure controlling it behind the clock frequency of the microprocessor, was the step that determined the revolution in programming, thanks to which it even changed its name and turned into **structured programming**, in which only the blind will not see the underlying **structure of the process**.

<u>It was explicitly demonstrated that any process also has a structure and it will never get away from it.</u>

However, one can object to such a peremptory statement: "But what about logic programming? There are no structures in a Prolog program, but nevertheless, what is there is quite enough to generate processes!"

The thing is that logic programming languages are more focused on the description of the facts that take place, the rules of behavior and goals that the creator of the program has. But the connections between the elements of such programs are hidden from the viewer. They exist, they seem to be reborn each time according to certain laws when the

program is activated, and when the goal is reached, they die again. It turns out that the Process, as it were, generates the Structure, wakes it up, makes it come to life, play with all its labyrinths in search of a way to the goal; and having played enough, he falls asleep on his own and takes with him the charm of finding a goal in the dissolving web of roads.

A program is a way of representing knowledge about something what to do and how. Sometimes, in the case of logic programming languages, only the "what" remains, because the "how" is hidden at the level of the translator or interpreter.

And if in our life we strive for something, desire something, but do not know how to achieve it, this does not mean at all that the interpreter who translates our goals into the world of our actions does not know this. Was b, as they say, desire.

How such an interpreter can work is a separate conversation. Now it is important to note that nothing prevents such an interpreter from existing either in the field of the collective unconscious in the "structure of structures" of mankind, or in the field of the individual unconscious, in the chaos striving for independence of the structures of their own subconscious.

In the light of the above, it is interesting to observe the development in the word processor software world. The texts created by them are becoming more active, acquiring the ability to influence their environment.

Chapter 31. The world of similar structures

Despite the infinity of the variety and brilliance of the external forms of the Manifestation and the properties of individual particulars, something permanent remains in their essence, only under different conditions giving itself a different feel and different manifesting itself outside.

V. Shmakov

So far, in this work, self-generating and self-destructing structures have been considered only on the basis of the possibility of their application as self-learning systems. And for this purpose, self-modification algorithms were studied that allow the accumulation in the resulting structure of knowledge about the world around on the basis of the input training sample.

At the same time, the task of searching for any integral characteristics in such structures was left aside. In particular, the question of what quantitative or qualitative parameters can characterize the structures is interesting:

- having the greatest resistance to environmental influences (we are talking about the structure, and not about its elements);

- most gravitating towards self-destruction or self-rebirth;

- possessing maximum or minimum knowledge.

But besides, I would like to get an answer to the question: "What can the concepts "minimum knowledge" and "maximum knowledge" mean?

It was accepted as the main postulate, discussed in the previous chapters, that the **knowledge of an information system** is expressed through its structure. Then, to estimate the amount of information perceived by the system, it is logical to use such a concept as the degree of structure modification by input data. The weight coefficients of neural connections have changed, one information, new elements have died or new elements have appeared, another information.

At the same time, it was shown in the first part of the work that the truth of knowledge is determined by the vitality of its bearers, i.e. the vital force of the elements of the structure (the vital force is an indicator of the ability of an element to counteract an external force, i.e. new knowledge).

Before taking the next step let's take a deep breath and repeat once again **- the carrier of knowledge is the structure**.

How can structure be characterized?

As characteristics of structures, it is proposed to define:

1) the number of elements;

2) the total number of links between elements;

3) distribution of links between elements:

4) "life force" of the elements of the system;

5) operations performed by the elements (algorithms for the functioning of the elements).

How can structure information be recorded? The following form of description of the structure named A is proposed:

$$A:\{a_1(a_i,a_j, a_k,..), a_2(), a_3(),...a_n(), ...(1)$$

$a_1::\_$ =<operations performed by the first element - an algorithm written in one of the well-known programming languages>

$a_i::$ =<operations performed by the i-th element - an algorithm written in one of the well-known programming languages>

$a_n::$ =<operations performed by n element is an algorithm written [in] one of the well-known programming languages> here:
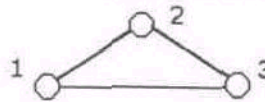
a_i is the element number;

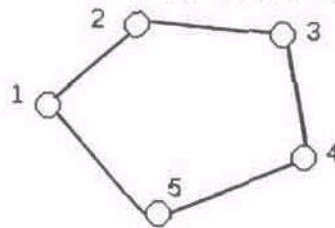n is the total number of elements;

$i \leq n, j \leq n, k \leq n$;

in parentheses lists the numbers of elements with which Diven is the element whose number is written before the opening bracket.
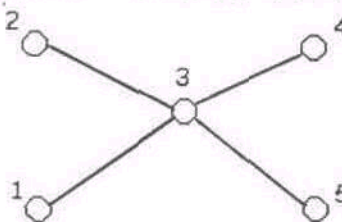
Let us give examples of the description of structures.

1. Треугольная форма — {1(2,3),2(1,3),3(1,2)}.
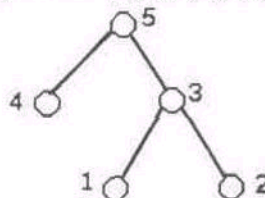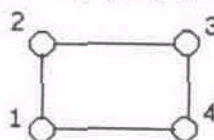

2. Круглая форма — {1(2),2(1,3),3(2,4),4(3,5),5(4,1)}.

3. Звездообразная форма — {1(3),2(3),3(1,2,4,5),4(3),5(3)}.

4. Древообразная форма — {1(3),2(3),3(1,2,5),4(5),5(3,4)}.

5. Клеточная форма — {1(2,4),2(1,3),3(2,4),4(1,3)}.

Sometimes it is required to indicate "life force" in the description of the structure her elements. In this case, the value of the "vitality" indicator is put down as an index above the element number, for example:

triangular shape - $\{1^1(2, 3), 2^2(1, 3), 3^2(1, 2)\}$.

It is easy to show that with a little detail, the proposed form of describing the structure and writing the algorithms in high-level languages will become equivalent. This form of notation was introduced solely for the convenience of transforming structures and finding the most vulnerable places of those same algorithms and programs that make up the base of information weapons.

There are various ways to compare structures.

Equality of structures. Two structures will be called **equal** if the description of one of them can be superimposed on the description of the other, and they coincide, up to the coincidence of the values of the "life force" of the elements. In this case, the operation algorithms of the matched elements are equivalent.

Algorithms are called equivalent if, for the same input data, they will produce matching results.

We will call two structures almost equal if the description of one of them can be superimposed on the description of the other and they coincide, while the difference between the values of the vitality of elements with the same numbers will not exceed some predetermined value. At the same time, the operation algorithms of the matched elements are functionally similar.

Algorithms are called functionally similar if the same change in the input data leads to the same change in the results of the work.

Similarity of structures. We call two structures **similar** if the description of one of them can be superimposed on a similar description of the other and they will match (without taking into account the values of the "life force" of the elements).

At the heart of the algorithm for determining the similarity and equality of structures is the renumbering of elements.

Let's show how it can be done. For example, you need to check whether the following two structures A and B are similar?

A: $\{1(2), 2(1,3), 3(2,4), 4(3)\}$.
B: $\{2(3), 3(2,4), 4(3,1), 1(4)\}$.

If, in the description of the structure B, the numbers are replaced in accordance with the following rule:

$$2 \rightarrow 1,$$
$$3 \rightarrow 2,$$
$$1 \rightarrow 3.$$
$$4 \rightarrow 3,$$

then the descriptions of structures A and B will coincide. This means that structures A and B are similar.

Earlier, especially in the first part of the work, the concept of "information capacity" was repeatedly mentioned. Let's try to justify the need for its introduction and define

what "information capacity" is. The significance of this concept stems from the solution of practical problems, in most of which it is important to be able to answer the questions: "How big is the knowledge base of a particular system? Is this system capable of learning something else? How fast can she do it? The first question is related to the current state of the system, the second two - to its future. Therefore, it is proposed to introduce the concept of "information capacity" to assess the current state. As for assessing the possibility of the system, here the decisive role is played not so much by the initial structure as by the input/output information (training sample). Questions about future states should only be answered in light of the forecast of events that could affect the system.

Since knowledge is understood through the structural complexity of the system, it seems reasonable to define "information capacity" proportional to the number of elements of the structure and the number of connections between them

$$E = s + n,$$

where

s is the total number of connections between elements;

n is the number of elements in the system.

Chapter 32. Transformation of structures

Here is a week, another one passes, The old woman has become even more foolish.
Again he sends the old man to the fish.

A.S. Pushkin

We believe that the elements of the structure are not capable of supporting connections between themselves, if the force of external pressure exceeds their average vitality multiplied by some weakening coefficient determined by the characteristics of the environment. Of course, you can enter any other rules that determine the death of links, and <u>depending on that what process is supposed to be modeled</u>. In this case, it is important to explore the structure transformation technology itself without being tied to specific subject areas. For example, in the first part of the work, speaking about SR-networks, it was assumed that external pressure is directed primarily to the destruction of elements, and not their connections, but the death of elements already leads to the destruction of connections. It is clear that in each case the model will be different.

Based on the foregoing, it is proposed to approach the choice of rules for the death of elements and their connections somewhat voluntaristically, for example:

1) the element dies if the impact force exceeds his life force;

2) the connection between the elements is destroyed if the force of external influence on this connection exceeds the adhesion force, which is the average "life force" of the elements that formed and maintain this connection, multiplied by a certain weakening coefficient, which is determined by environmental conditions, such as: the distance of the elements from each other friend, frequency of interaction, relative amount of transmitted information, etc.

The force of adhesion of two elements $a_i(g_i)$ and $a_j(g_j)$ is the value (first form) $z_{i,j} = G_{i,j}(g_i + g_j)/2$ or (second form) $z_{i,j} = G_{i,j}(g_i/s_i + g_j/s_j)/2$ where $G_{i,j}$ is the attenuation coefficient, $G_{i,j}$ is less than 1 when $i \neq j$ and equals 1 if $i = j$ g_i - "life force" i element;

s_i is the number of connections of the i element with other elements of the given system.

Any other forms of specifying the cohesion force are also quite acceptable, which are determined by the subject area under study and the problems to be solved tasks.

External pressure (stress) can be the same for all elements of the structure, or it can be purposeful.

It is proposed to initially consider the process of modifying the structure of the system with a gradual increase in the external uniformly distributed pressure on the system. And then try to answer the question of what can be done with the system in the event of targeted external pressure.

So, given the structure of A.

$$\text{A: } \{1^1(2, 3, 5), 2^2(1, 4), 3^2(1, 4, 5), 4^3(2, 3, 5), 5^1(1, 3, 4)\},$$

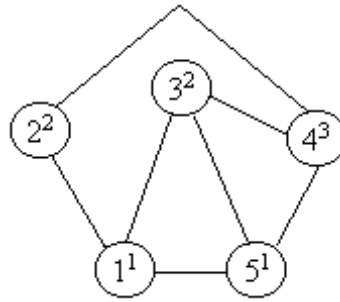the form of which for clarity is shown in Fig.6.1.

Fig. 6.1.

Let us assume that the attenuation coefficient is the same for all bonds of this structure and is equal to 1.

Let structure A be subjected to external pressure with a force of one conventional unit. Under the action of an external uniform pressure, the structure A, in accordance with the introduced rules, will take the following form:

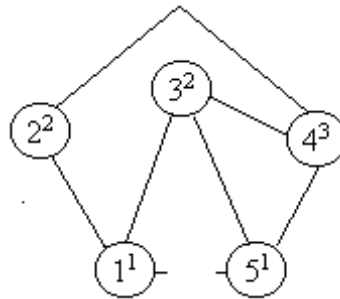**A: {1^1(2, 3), 2^2(1, 4), 3^2(1, 4, 5), 4^3(2, 3, 5), 5^1(3, 4)},**

Fig. 6.2.

If the pressure is increased, then the structure of the system will take the form (external pressure corresponds to two arbitrary units):

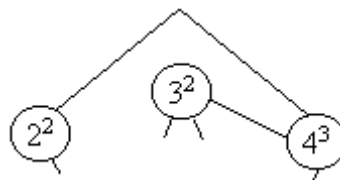**A: {2^2(4), 3^2(4), 4^3(2, 3)}.**

Fig. 6.3.

A further increase in external pressure, in case of exceeding two conventional units, will lead to the fact that the system will cease to exist, although individual elements will still be "alive".

As can be seen from the above example, a gradual increase in external pressure leads to a gradual change in the structure of the system.

First stage: the initial state resembles chaos - everyone is connected to everyone; the second stage: the structure acquires a tree-like form, the allocation of a clear leader with the maximum "life force" begins; the third structure acquires a pronounced star-like shape; fourth stage: the system dissolves in the surrounding world.

How can you characterize the state of the system structure at each stage? To answer this question, I would like to rely on such a concept as entropy, but today it is already very closely connected with statistical uncertainty, with a measure of chaos. In our case, the apparatus of probability theory and mathematical statistics is not used due to the fact

that the events under study are mostly unique. There are no two identical information wars.

Indeed, how to calculate this very probability of an event, if any event in the finite human life is unique in nature and completely incomprehensible, how to cut it out of the entire fabric of the event world?

How to calculate the probability of an event occurring at time t if time t is unique and, in principle, unrepeatable, and therefore talking about statistics in relation to a specific moment in time is like waving fists after a fight.

Chapter 33. Chaos in decision-making

... All the roads skidded! For the life of me, no trace is visible, We have gone astray, what should we do! In the field, the demon leads us, apparently, Yes, it circles around.

A.S. Pushkin

The concept of entropy in our time, as soon as not defined. Most traditionally, this is a measure of the uncertainty that existed before the observation of a random variable, but it can also be the Kullback-Leibler information distance, taken with the opposite sign. Most complete to date, the study of this concept has been done by S.D. Khaitun [102].

Without claiming the term in all its diversity, we will try to offer our own interpretation of the processes taking place in structure.

It is known that the speed of system response is proportional to the number of subsystems with which the decision is consistent and which can take part in its implementation. The functional dependence of the response rate on the number of subsystems can be the most diverse, depending on the tasks solved by the system, the complexity of the structure, the decision-making procedure, etc.

Let us assume that the structure we are studying consists of of n elements and has the form of connections "each with each". Moreover, the decision-making procedure, even in this fully connected structure, can be different.

Option 1.

There is an element in the structure called the leader, who coordinates his decision with each member of the "team", or finds out the ability of any of the members to solve the problem assigned to the system, for example: able to hear how grass grows, will warn of danger, able to take leaps and bounds, will help bring the message, and the strong man will protect.

Option 2.

Not only the leader, but also each of the elements of the system must coordinate their opinion with everyone.

The second option, despite the seeming similarity of both options, involves getting answers to such questions, which, in the case of working according to the first scheme, may not have a correct answer. This is possible due to the fact that any of the elements complements its own knowledge of the process of coordinating the decision according to the "each with each" scheme. "Grows smarter" is not only the leader, but also all members of the team.

However, if we assume that in the second variant the time of interaction between the elements is much less than the time of processing the input data by the elements themselves, then the formation that arises due to the assumption made can be called a system with a big stretch - it is essentially a single and indivisible element.

Assume that the delay to create an interface between two elements and the transfer of information is still significant and amounts to t conventional units. Let's try to estimate the time delay in making a decision by the system for the second option.

Let an input signal be applied to one of the elements. Imagine that the element that received the signal is not able to process it itself, i.e. give a result. Then he forms a message that includes the received request and his own opinion, and sends it to all his channels. Each of those who received the message, if he cannot formulate an answer, does the same.

(n-1) - the number of messages at the first stage (except for itself) are executed in parallel for the same time t;

(n-l) x (n-l) - the number of sendings at the second stage, each exchanges its own information with each, etc.

Moreover, if t is the time for sending a message from one element to another, then the total time that the system spent on making a decision is equal to 2xt.

If the structure of the system is of the "star" type and the number of connections is n-1, then the total decision-making time will also be equal to 2 xt (transmitted, received, generalized).

In this case, it turns out that the speed of the system response is directly proportional to the number of stages.

It is quite possible that the system switches to such a mode of operation in case of danger, because in this case, the reaction time does not depend on the number of elements involved in the decision. When the term "superconductivity" is used to describe the functioning of the brain of a biological system, it may be that such a decision-making mechanism is hidden behind it.

You can approach the evaluation of the system response time from the other side. For example, let among the set of elements of the system (n pieces) only a combination of outputs of k elements is able to compose an answer to a given system question The presence of additional elements will only interfere with the system by distorting the response.

Then, in order to select from all n elements exactly k needed ones, the system will need to ask itself $k \times \log_2(n)$ questions (in according to Hartley's formula). If the questions are asked sequentially, then for this her need $k \times \log(n)$ xt time units, if in parallel - $\log_2(n)$ xt.

It is clear that the inaccuracy in decision-making and released for this time are interconnected.

The inaccuracy of the answer in the general case is determined by what connections were not enough to eliminate it within the framework of this system. It is clear that inaccuracy can be present in the answers of even a fully connected structure, if it lacks the elements themselves that can solve the problem.

To construct a model within which it is supposed to study the processes of transformation of structures, we put forward a number of statements.

Statement 1.

The more connections there are in the system, the longer the response time to the input training sample; the longer the system "thinks", since an excess of connections can cause different answers in the system, sometimes mutually contradictory (it is assumed that the processing of input data goes through all possible connections).

It takes time to select and justify a final answer. An excess of connections creates chaos in decision making, thereby increasing the reaction time of the system, reducing its ability to resist threats that require a quick response!

Imagine two situations:

1) it is required at a general meeting of all members of the Academy of Sciences to make a decision on some rather controversial scientific problem through collective discussion;

2) it is required that one person makes a decision on the same problem, who submits it for discussion.

It is clear that the reaction time will be different, and the quality may be the same.

In this situation, it can be argued that in most cases, the <u>more connections, the faster the response</u>.

Sometimes an instantaneous reaction time to a threat is a chance for survival It is curious, but it is precisely on the basis of this fact that the complexes of training exercises for various types of wrestling are built. Each element of the reception is brought to automatism. When there is no time, then thinking is an unaffordable luxury.

Therefore, when studying the structures of various information systems, it is proposed to understand the **measure of chaos** in the functioning of these systems as an excess of connections that are potentially capable of creating chaos in decision-making.

Then, without much stretch, to measure **the measure of chaos in decision-making**, it is proposed to use a functional dependence, the basis of which could be L. Boltzmann's formula:

$$S = k \times \log_2(W) - B, \ (6.1)$$

where k is a constant;

W is the statistical weight, which is determined by the number of possible options for the interaction of the elements of the system with each other;

B is a constant that characterizes the state of the system, which is able to make a decision almost instantly, i.e. the state of a system in which it has the minimum possible number of connections.

In our case, the statistical weight is the number of stable links between the elements of the system. As for the constant k, instead of it it is proposed to use a certain proportionality coefficient equal to 1. The constant B is proportional to the minimum possible number of connections between the elements of the system - $\log_2(n-1)$.

Then the measure of chaos in decision-making for self-learning information systems is proposed to be determined by the formula:

$$S = \log_2(s) \text{———} \log_2(n-1)$$

or

$$S = \log(s/(n-1)), \ (6.2)$$

where s is the number of stable links between elements of the structure;

n is the number of system elements.

Let's try to estimate the maximum possible measure of chaos in decision making. Let the system have a structure in which everyone is connected to everyone. Then the total number of connections in the system will be equal to

$$s = n \times (n-1)/2.$$

It follows that the maximum possible measure **of chaos in decision** making can be calculated as follows

$$S = \log_2(n \times (n-1)/2) \text{———} \log_2(n-1), \ S = \log_2(n/2). \ (6.3)$$

<u>Statement 2.</u>

For systems in which the number of connections between elements is greater than the minimum allowable number for the existence of the system as a single whole, with an increase in the elements of the system, the measure of chaos **in decision making** will steadily increase.

The minimum possible measure of chaos is possessed by a system consisting of of two elements - S = 0. For a system consisting of one element, there is no structure, in this case the measure of chaos in decision making is less than zero and equals -1.

Statement 3.

For a system with a strict hierarchical structure, such as a "star", even in the case of an increase in the number of elements, the measure of chaos in decision making (MHPR) remains constant and equals 0.

Now let's see how, under the pressure of the external environment, the measure of chaos changed in decision-making for the system, the structure of which is shown.

For fig. 6.1 - $S = \log (7/4) = 0.8$;

fig. 6.2 - $S = \log (6/4) = 0.58$;

Fig. 6.3 - $S = \log (2/2) = 0$.

Statement 4.

The increase in external pressure leads to a decrease in the degree of chaos in decision making.

Reducing the measure of chaos, in turn, indirectly helps to reduce the reaction time of the system to external stimulation and topics the very direction to ensure the survival of the system at this very moment.

It is interesting to assess the measure of chaos in decision-making for groups of people. Which measure is considered acceptable, and which not anymore?

In order to answer this question, it is necessary to determine how many people can make up a close-knit team capable of performing the tasks assigned to it, using the structure of connections each with each? At the same time, it would be desirable that the answer be based on assessments arising from the practical sphere. M.B. Kordonsky and V.I. Lantsberg [39], who consider themselves to be practitioners of club work, believe that the maximum number of people who are able to maintain connections of the type each with each within a certain club (laboratory, team, platoon) does not exceed 15 people. They write about it: *"A larger group ceases to be truly contact, it is already difficult in it, to closely engage in one thing together finally, it forms its own microgroups, which are easily detected as a result of sociometric research. They may tend to intra-club "officialization" in the form of sectors, acquire their own material base, their own forms of work, traditions; they crystallize their life principles, their goals arise. Communication between people of different microgroups more and more often does not go directly to each other, but indirectly through functional representatives and even leaders. It would be more correct to consider a club consisting of developed microgroups as an association of small clubs, sometimes quite conditional. Very often, developed microgroups sprout, declare themselves new independent formations (this is where the court of the "parade of sovereignties" is!), and this is true. Only in a contact group is the psychological unity of its members possible, without which the club ceases to be such."*

Then

$$S = \log_2(n/2) = \log_2(7.5) = 2.9.$$

Statement 5.

The structure of the human team, such as "each with each", begins to spontaneously modify when the measure of chaos in decision-making approaches 2.9. In reality, this value is much less. This figure is essentially an upper limit.

As the next important integral characteristic of the structure, we introduce the concept **of stability**.

Chapter 34. Sustainability of knowledge

The drop began to cry that she had parted with by sea. The sea laughed at the naive grief:

"I fill everything, all my possessions, If we are not together, the hour divides the moment."

O. Khayyam

The concept of sustainability is one of the key in the study of information self-learning systems. Due to the fact that the structure represents knowledge, then there. where the phrase "stability of the structure" is pronounced, **"stability of knowledge" is understood there**.

Answer the question: What kind of knowledge is the most stable? means to find a structure corresponding to this knowledge.

Earlier, in the second part in Statement No. 6, the the term **"resistance to targeted information impact"**.

However, its meaning has been defined more intuitively than strictly. At the same time, the concept of stability was associated with the power of a set of basic elements, physical carriers of a basic set of meanings and knowledge, i.e. elements that determine the behavior of the rest of the majority. Previously, it was determined that the more basic elements, the more resistant the system to external influences.

Here we introduce a more rigorous definition of stability, basically not contrary to definition from the second part of the work.

We will assume that the system is resistant to external influences if the number of its elements does not experience sharp fluctuations from these influences.

Let's try to combine both approaches.

What structure should the system have so that the number of its elements does not experience sharp fluctuations? The first thing that suggests itself as an example is a structure in which there are several groups of elements that are closely related to each other, but the relationships between the groups are very unstable, for example:

A:{1 (2, 3, 4), 2 (1, 3, 4), 3 (1, 2, 4), 4 (1, 2.3, 5).5 (4, 6, 7), 6 (5, 7), 7 (5.6)}.
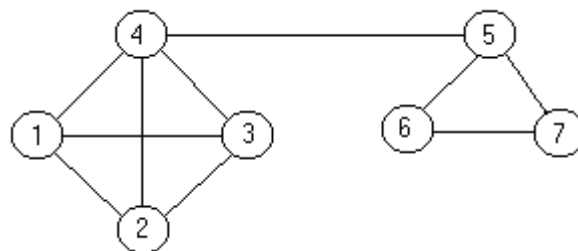
In the above structure A, it is enough to destroy the element with number 4, as soon as the number of system elements will decrease by half. It is intuitively clear that this structure is not stable in the sense of the definition given above, i.e. unstable is any structure in which there are single elements that link groups of elements. At the same

time, which is typical, it is the fourth element that is the <u>only basic element of the system</u>, demonstrating the correctness of the first intuitive definition of stability.

And vice versa, **the most stable system** can be considered a system whose structure has the maximum number of connections - each is connected to each, i.e. each element is basic.

Let's try to formalize what has been said.

Denote by U_i the number of structure elements, which will be lost for the system in case of destruction of the i element.

Then, under the first degree of stability of a particular structure, we mean the following value:

$$V_i = n/(\sum U_i). \text{ (6.4)}$$

The name "first degree of stability" was chosen with the assumption that only one element breaks out of the structure at a time. If we are talking about the simultaneous removal of two or more elements from the structure, then here it is already necessary to talk about the corresponding indicator of the degree of stability to external influences.

In the event that the first and second degrees of stability coincide, then we will talk about the deep stability of the structure.

For example, structures such as a circle (round shape) and a lattice (cellular shape) have the same first degree of stability. However, the study of these structures at the level of the second and third degrees of stability shows that, unlike the lattice, the circle does not have a deep degree of stability.

The star-shaped form of the structure does not even have the first degree of stability. It is enough to knock out the center element for the system to die.

However, this form of structure contributes to a minimum degree of chaos in decision making, i.e. the system is able to "feel" the danger earlier than others and take appropriate measures. The stability of systems based on a star-shaped structure to external influences is determined solely by the "life force" of the central elements and their security. If in the process of functioning the central elements degenerate or are affected, as in the case of the USSR, then the system disintegrates.

In the future, when using the term "degree stability" is understood precisely the first degree of stability.

The structure is stable if the degree of stability tends to or is equal to 1. This is understandable, the removal of any of the elements affects only this element and, to a lesser extent, the structure, i.e. the remaining structure "suffers" from the loss of only this one element.

Degree of stability is always less than or equal to 1.

The system is maximally stable when $V = 1$.

The degree of stability is minimal if the removal of any of the elements leads to the complete destruction of the system. The closest example of such a structure is the star shape. The destruction of the central element leads to the death of the entire system.

The degree of stability of the star-shaped structure tends to 1/2.

A similar approach in terms of definitions for assessing the stability of structures can be found in existing studies of mathematical models in ecology, in particular, Yu.M. Svirezhev, analyzing sustainability as a measure of fluctuations in the number of species in a community, notes [83]: *"A community is maximally stable when the number of trophic links in it is equal to the maximum possible and the intensity of interactions*

between different species is the same. In other words, a community without a hierarchical structure is the most sustainable."

Chapter 35. The problem of designing sustainable information systems

And the Shadow answered: "Where the day is born, the Mountains of the Moon, where the bulk is barely visible. Through hell, through paradise, Go ahead, If you want to find Eldorado!"

E. Poe (K. Balmont)

After introducing the concepts of "measure of chaos in decision-making" and "stability", a reasonable question arises: What and for whom can they be of practical use?

It seems that the introduced integral characteristics of structures will become the indicator that accompanies the process of designing complex information self-learning systems doomed to information confrontation with each other. This applies to commercial firms producing or selling functionally similar products, to politicians fighting for the votes of a limited contingent of voters, to states making life easier for their people through the practical implementation of beneficial geopolitical solutions, to computing information systems that solve functionally similar tasks.

Moreover, "stability" and "measure of chaos in decision-making" largely characterize natural evolutionary processes aimed at modifying the structures that are carriers of knowledge.

35.1. The evolution of knowledge

Good is as easily transformed into evil as evil into good.

J. Boehme

Our real life is also surrounded by structures, and any person is inevitably an element of several structures, where he performs his functional duties: IN the family, at work, on vacation. There are also more general structures: a country, humanity, where a person enters either as an independent unit, or as an element of a substructure, which itself can be considered as an element on a different scale.

In this regard, it is interesting to study the processes of changing structures and try to understand the reasons behind them.

It is clear that if the whole enterprise consists of two people, then these two people simultaneously implement all the functions related to ensuring security. Moreover, this structure, as shown above, is ideal, since it will be able to simultaneously combine maximum structural stability with a minimum measure of chaos in making solutions. Both employees know each other's work and willy-nilly carry out consciously, and more often unconsciously, control of each other and the world around them, while making decisions that suit each other.

Why, then, does this enterprise suddenly begin to grow, and does this always happen? The explanation for this is quite simple. If among the tasks of the organization there are those that two people are not able to perform, for example, to raise the piano to the twelfth floor, then the structure will inevitably expand. The same applies to information systems. If it is required to introduce a logarithm operation into the input data processing, then it is easier to add an additional element (subroutine) that implements this operation.

An increase in the number of elements (people in the office, elements in the scheme) leads to the fact that such a structure acquires new functionality, i.e. the ability to solve problems of a wider range than more primitive systems, which naturally increases its chances of survival and prosperity.

The growth of the structure is initially carried out, as a rule, by connecting each to each. This wiring diagram allows you to take into account the capabilities of each element included in the system.

However, increasing the elements in a similar structure (each with each) inevitably leads to the fact that the system will begin to lose responsiveness to incoming input data. From the ever-increasing Stream of input data directed to each element, the specialization of this element will suffer - all its time will be spent on processing input information. Thus, such an expansion process inevitably leads to an increase in the measure of chaos in decision-making in the system, which reduces its competitiveness and viability.

From what has been said follows the need for structural adjustment. A decision maker (DM) should appear, and, accordingly, a structure close to a star-shaped one should appear. The abilities of the decision maker, although different, are not unlimited. Therefore, further expansion of the range of tasks to be solved and an increase in the number of elements will again require restructuring - the structure will change to a tree.

Any tree structure is already seriously suffering from structural instability. With the growth of elements and substructures, the structural instability will increase. This is not dangerous until a smart external aggressor appears and strikes at the most vulnerable points of the system in order to absorb its most valuable parts that the aggressor is able to build into his own structure. Once upon a time, when primitive peoples fought each other with more primitive weapons, these "valuable parts" for the invaders were women, slaves, like brute male power, and today - cheap minerals, raw materials, scientists - intellectual power, which, if bought, then they become the same slaves, only the view, as they say, from the side.

Doesn't the self-regulation system of the planet work according to this scheme? M.I. Doroshin notes [26]: *The self-regulation system works in such a way that the cause or factor that brings one or several earthly subsystems into a state of instability gradually loses its effective value. But the result of this process has always been a complete cycle in the formation of flora and fauna with an ecological catastrophe at the end. And it turns out that the ecological catastrophe, and what else can be called the change of flora and fauna in the vast territories of the planet, is the most important and repeatedly tested element in the formation of the earth's biosphere".*

Above, the main stages of structure modification in the process of systems functioning were considered, but a number of questions remained. The outlined main direction of changing structures in real life does not always correspond to the scenario presented here. Sometimes the system, on the contrary, reduces the number of its members, but at the same time the efficiency of its functioning increases. In addition, there are enterprises that do not expand and do not decrease for years - just a newcomer takes the place of the deceased element. It turns out that laws are not written for such systems?

Laws are written for all systems. As already mentioned, if the functions performed by the system do not expand, for example, the company is responsible for cleaning the same building, then it does not need to expand. Moreover, with the advent of technical means of automation, the number of employees can be gradually reduced if the functions of the system, and hence its knowledge, do not increase.

One can also try to consider the evolution of knowledge from another point of view - from the standpoint of the evolution of the defense system, because the evolution of any system is the evolution of its defense system.

The system is alive as long as there is enough strength to defend itself. The evolution of life can be interpreted as the evolution of a defense system due to the fact that any living object is alive as long as its own defense system adequately predicts and responds to external and internal threats. At the same time, life, in order to defend itself, acquires more and more new abilities: initially - a shell, as a means of separating itself from the surrounding chaos, then - the ability to move in space and time, the ability to destroy potential dangers, the ability to self-modify and modify the environment, and already on one of the last stages, a logical continuation of the evolution of the protection system for the most complex biological forms of life, is the ability to predict possible threats.

One of the tools for solving forecasting problems is natural, and then artificial intelligence.

Stages of evolution of the protection system:
1) isolation from the surrounding world - the appearance of a shell;

2) movement in the surrounding space-time continuum - the emergence of means of movement;

3) destruction of potential danger - the emergence of means of attack;

4) self-modification and modification of the environment - the emergence of the ability to actively influence one's own body and environmental objects;

5) remote information impact on each other - the emergence of a "linguistic" (information) environment. Sometimes crying for help is the only real defense. It was in this opportunity to defend themselves that the seeds of modern information wars were once laid.

6) predicting threats - the emergence of the ability to self-learning, i.e. to active influence on one's own inner mental-mental world.

There is Life and Death, which are intertwined with each other so that sometimes they become indistinguishable. These two opposites are a tool of knowledge, perceived as extreme, but unattainable points in the movement of the seesaw, on which the entire Universe swings.

Life is steadily evolving towards the creation of an absolute protection system.

Death is steadily evolving towards the creation of an absolute system of destruction. But destruction is just one of the ways of protection and nothing more.

And they pass into each other as day passes into night.

Birth and death are means of knowledge because of that. that they are a **tool for modifying structures that** are carriers of knowledge.

35.2. System capabilities through the ability to transform its structure

It is impossible to find the truth and save yourself.
Ancient wisdom

It is clear that the same knowledge can be expressed in different structures. For example, an analytical dependence of the form z=x·y+ y=y·(x+1) can be presented in the following two versions:
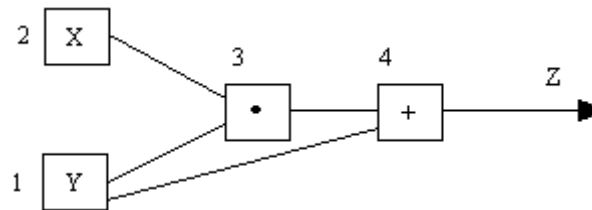

Fig. 6.4. Option 2: Z = X· Y + Y.

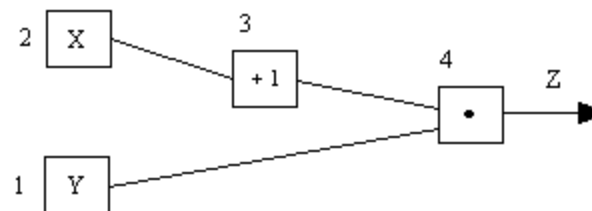Fig. 6.5. Option 2: Z = Y ·(X + 1).

Calculate for each of the presented options the measure of chaos in decision-making S and the degree of stability V

Option 1.

$$V_1 = n / (\sum U_i) = 4/(1+ 1+ 2+ 1) = 0.8. \ S_1 = \log_2 (s/(n\text{-}l)) = \log_2(4/3) = 0.41.$$

Option 2.

$$V_2 = n / (\sum U_i) = 4/(1+ 1+ 2+ 2) = 0.666... \ S_2 = \log_2(s/(n\text{-}l)) = \log_2(3/3) = 0.$$

It can be seen that the first structure is a carrier of more stable knowledge, but it can lose to the structure of the second option in terms of time to make a decision. Which of them the practitioner chooses to solve specific problems is determined by what is less dangerous for him: chaos in decision-making or external destructive influence; the possible death of the system from the fact that it slowly "thinks" or from the fact that it is too "weak". And here, in ensuring security, as in many other things in life, the main task is the constant search for a golden mean.

It is for this purpose that such concepts as the degree of stability of the structure and the measure of chaos in decision-making were introduced.

It remains to consider the class of problems for which they can be useful?

Task 1. Evaluation of the capabilities of an information system, for example, a psychoanalyst's patient by the structure of his statements or a computer operator by the structure of his behavior at the keyboard.

This is one of the most important tasks, which cannot be solved without relying on knowledge of the structural stability of the system. Therefore, we will consider the ways of solving it in more detail.

<u>Possible Solution</u>.

The initial structure determines almost everything in the fate of any self-learning information system. Its analysis largely allows predicting expected events.

How can this be done?

The model for a possible answer to the question is proposed to be based on the following statements.

1. The training of any system is carried out by changing the connections between the elements, the death and birth of the elements themselves;

2. All elements are divided into three types:
   - goals;
   - rules;
   - facts;

3. The change of connections, the death and birth of the named types of elements is carried out in accordance with the following principles:

Goals establish connections between themselves, existing rules and facts.

Goals are responsible for activating the corresponding processes to "transform" goals into rules, i.e. if the goal is reached, it dies.

Existing rules are used by targets for their implementation. The rule can be destroyed in the event of a connection with a directly opposite rule. In addition, the rule is destroyed by facts that do not correspond to this rule.

In the event of the destruction of the rule, new goals and facts are born.

Facts constantly arise in the system due to the flow from outside and the destruction of existing rules.

Now it remains to answer the question: "How similar can be put into practice?

Simple enough. The initial system is filled with elements of different types, randomly connected to each other. The input data from the system under study is transmitted to the input of this system. These inputs form the facts that begin to modify the structure of the original "black box".

After a while, the process stops. Begins study of the obtained results.

During the functioning of the information system in accordance with the principles outlined, its structure is undergoing constant changes. It is clear that if there is a sharp increase in the number of unrelated goals or there are no goals at all, then in this case the fate of the system is a foregone conclusion.

The presence of a pronounced star-shaped form in the structure of the system's activity indicates the existence of a real danger to it from external influences. If something happens to this goal (or the system finds out for itself the impossibility of realizing the goal), then all this will inevitably lead to the activation of self-destruction programs. <u>The rules cemented by the goal, if it is lost, will come into conflict with each other and give rise to new, smaller goals. each of which can start a fight for common resources</u>.

The practical implementation of the above can be observed in the form of the relationship of events and actions familiar to us. This is manifested not only in the fact that unrelated actions take place in the behavior of the system, but also in any of its output results. For a person, such manifestations can be observed in the way he formulates a problem, describes previous events, builds natural language sentences. For example, D.M. Zuev-Insarov in [32] notes that the absence of a connection between the

letters of a word indicates a "mental illness", and a tight fit of letters in words with large intervals between words is typical for people suffering from hysteria.

Task 2.

Determination of the form of the structure of the system, which at the moment is the most resistant to external influences?

Task 3.

Determination of the structural form of the existence of a system that, under these conditions, has a minimum measure of chaos in decision-making?

Task 4.

Forecasting changes in the structure of the system. Given the following forms of structures, consisting of n elements: circular, lattice, fully connected (each connected to each). It is required to quantify for them the measure of chaos in decision-making and resistance to external influences. It should be shown what changes these characteristics will undergo with an increase and decrease in the number of elements in the structures.

Task 5.

Determining the characteristics of element X. The inclusion of which in the structure of the system will lead to an increase in its stability?

Task 6.

Determining the characteristics of element X. The inclusion of which in the structure of the system will lead to a decrease in its stability?

The solution of this problem requires the construction of a special model.

Task 7.

Determination of the strategy for influencing the structure of the system for its purposeful modification.

Let there be a structure of the form:

A:{1 (2, 3), 2 (1, 4, 5).3 (1, 6, 7), 4 (2), 5 (2), 6 (3), 7 (3)}.
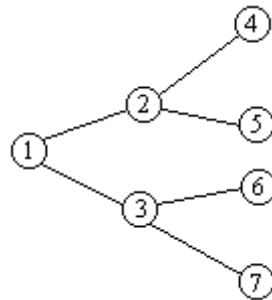
What should be the strategy of influencing system A (it is allowed to introduce its own "agent" into it) so that its implementation will lead the system to destruction?

35.3. Statement of the problem for designing the structure of an information system

The final goal of the study of structures is proposals for formulating the task of creating a typical structure for organizing the security of an information system in accordance with the definition of an absolute protection system.

An absolute protection system is a system that has all possible methods of protection and is able at any moment of its existence to predict the onset of a threatening event in a time sufficient to activate adequate methods of protection.

Protection **methods:**

Method 1.

Passive protection means to block all possible channels of external threats: shell, armor, bulletproof vest, wall, etc.

Method 2.

Change in location in space and time.

Reproduction (creating one's own copy, as a way of protecting, first of all, genetic information) also belongs to the second method of protection, representing a kind of transmission of a baton in time.

Method 3.

Preventive destruction of danger - attack.

Method 4.

Self modification.

The design of any system begins with a technical project, in which factors such as:

1) purpose of creation;

2) tasks solved by the system;

3) restrictions imposed on the system:

   - external environment;

   - possibilities of creators;

   - existing technologies, element base, etc.

4) the proposed technology of operation.

As a basis for the algorithm of the absolute protection system, we take the scheme proposed in the fifth part of the section "Algorithm for the operation of the protection system".

Due to the fact that we are talking about creating a system for information confrontation, it is proposed to consider that the purpose of an information self-learning system in competitive struggle is to expand access to a common resource, using a targeted information impact on competitors. In this formulation, the purpose of the information system is in many ways similar to the definition of information war given in the paper.

Security tasks solved by the system:

1) protect yourself from destruction through external influences;

2) continue and expand the creation of their own industrial, scientific, cultural and other values, including through competing systems.

Limitations always follow from the real situation. It is the restrictions that are the rope that, pulling the system, forces it to be constantly modified. Either it tries to become optimal according to such a criterion as resistance to external influences, or it minimizes the measure of chaos in decision-making when it is required to act immediately.

Design the initial version of the structure of the system means to lay in it basic knowledge.

Basic knowledge is the initial structure of the system, which can be proposed based on such concepts as: the stability of the structure to external influences, the measure of chaos in decision making, the structure of the algorithm of the absolute protection system, and the functional tasks assigned to the system.

The solution of this problem in full for each specific case may require any volume of documentation. Assuming in the future to involve computer facilities in the iterative procedure for adjusting and detailing the structure of the information system, now we will focus exclusively on the initial data required for this.

The mandatory elements of the following types are proposed as initial data (in accordance with the definition of an absolute protection system):

1) a set of elements (a_1) responsible for collecting information about the state and intentions of the elements surrounding it - regime services;

2) a set of elements (a_2) responsible for collecting information about the state and intentions of the surrounding information systems - intelligence services;

3) a set of elements (b_1) that implement the "security" protection method - security services;

4) a set of elements (b_2) that implement the "hide change roof" protection method — parallel services. In the common people, this method is often presented in its simplest version, described by I. Ilf and E. Petrov:

    - Do you need a chairman? Pound asked.

    - Which chairman? Bender exclaimed.

    - Official. In a word, the head of the institution.

    - I'm the head.

    "So you're going to sit out on your own?"

5) a set of elements (b_3) that implement the "attack" protection method - liquidation services;

6) a set of elements (b_4) that implement the "modification" protection method - advertising services;

7) a set of elements (c) responsible for analyzing the information received from internal and external sources in order to identify threats to the system in it - analytical services;

8) a set of elements (d) responsible for the functioning of this information system in accordance with the functions that provide the system with a livelihood (employee) - functional services;

9) a set of elements (e) exercising leadership - management services.

Further through a_1, a_2, b_1, b_2, b_3, b_4, c, d, e will denote the number of elements of the corresponding types (services).

The need to take into account the existing external and internal restrictions requires the introduction of a number of characteristics that determine the capacity of the above services.

1. The source of threats for this system can be z similar the same competitors (the value of z is determined by external conditions).

2. Each element of the structure is able to interact from one to k_1 surrounding elements (k_1 - reflects the ability of the system element to information interaction. Moreover, the smaller the value of k_1 for an element, the more stable the interelement bonds.

3. Each element has connections from zero to k_2 elements outside the given system.

4. The system is obliged to perform the functions assigned to it, i.e. must ensure the normal functioning of all its elements, and for this it must include a sufficient number of elements of the "worker" type. It is desirable that the system function effectively, i.e. had minimal non-production costs.

In this case, by the **efficiency of functioning** we mean the degree of excess of the number of elements of functional services ("employee") over all other elements, i.e.

$$\textbf{max } F = d/(a_1 + a_2 + b_1 + b_2 + b_3 + b_4 + c + e).$$

It is clear that the larger the value of F, the "better life" (more satisfying) all elements of the system and the system as a whole.

5. To solve the tasks set, in particular, to protect your own basic knowledge from external influences, the structure of the system must have maximum resistance to external influences, which implies

$$\textbf{V} => \textbf{1},$$

where

$$\textbf{V} = \textbf{n}/(\textstyle\sum \textbf{U}_{\textbf{i})},$$

U_i is the number of structure elements that will be lost for the system in case of destruction of element i;

n - total elements in the system.

6. The functioning of elements of type "c" allows you to get a certain effect only when the system has time to make and implement the decisions made. One of the most important factors here is the minimum possible structural measure of chaos in decision making.

$$\textbf{S} \rightarrow \textbf{O},$$

where

$S = \log (s/(n\text{-}l))$, s is the number of stable links between the elements of the structure;

n is the total number of elements.

As can be seen from the requirements put forward, system design is a multi-parameter problem with feedback in mutually contradictory conditions: the greater the non-production costs, the "thinner" the protective layer; the smaller the measure of chaos in decision making, the worse the resistance to external influences.

Let's try to list the stages of designing such a system.

<u>First step</u>.

At the first stage, it is proposed to consider the fulfillment of assigned functional duties as the most important requirement for the system, although this statement is not

true for all systems. This means that there should be as many elements of the "worker" type as necessary. Suppose that in this case d elements are needed.

Second phase. Determine the number of attendants.

1) To control the situation inside the system, you will need at least $(d+c)/k_1$ elements of type a_1

$$a_1 = (a_1 + a_2 + b_1 + b_2 + b_3 + b_4 + c + d + e)/k_1.$$

2) To control the situation outside the system, z / k_1 elements of type a_2 should suffice.

$$a_2 = z/k_1.$$

3) To manage elements of the "employee" type, taking into account requirement 2, you will need at least x / k_1 managers.

$$e = (a_1 + a_2 + b_1 + b_2 + b_3 + b_4 + c + d + e)/k_1.$$

4) We will agree that for the organization of external protection we need a_1 elements. Let us agree, and not define it unambiguously, because the number of elements of type a_1 depends primarily not on the properties of the system itself, but on its location in space. It is better for the system if this value can be changed dynamically depending on analysts' forecasts.

Similarly, the number of a_2 should be determined - those who solve the problem of changing the "roof", the name and location of the system, a_3 - capable of inflicting an appropriate information strike on the enemy, a_4 - responsible for their own image and advertising (modification).

5) The number of analysts depends on the degree of automation of information processing processes and the volume of information. Quite often, analytical work is carried out by the management of the system (elements e), but for a sufficiently large system in which the total number of internal elements of external competitors significantly exceeds the value of k_1, there must necessarily be a staff of analysts.

Third stage.

Design a set of possible system structures, i.e. typical structures for all occasions: maximally stable, with minimal a measure of chaos in decision making, etc.

Fourth stage.

Develop several options for rebuilding structures within previously defined admissible set of structures.

A system designed in this way will be able to respond flexibly to any external and internal influences by instantaneous restructuring of its own, which will certainly affect the overall efficiency of its functioning.

It is clear that under the conditions of active mutual information impact, primarily aimed at the structure as the basis of any information system, it is precisely such an approach associated with the dynamic modification of structures that will allow the system to have at least a minimum protective potential. Of course, in order to become a winner in a swim at any distance, it is not enough to have the ability to swim. But for those who do not know how to stay on the water, one does not even have to talk about the possibility of participating in such competitions.

Chapter 36. About what is left behind the scenes or a little bit about everything

The basic question of religion not the existence of God, but the existence of oneself.
Osho Rajneesh

The materials presented in the work were repeatedly discussed at conferences and among people interested in similar problems. However, during the discussions sometimes very interesting topics were considered that were directly related to this work, but due to the fault of the author, they were rather poorly developed. In order to somehow answer the questions that the reader may have, the following is a semantic cocktail, the basis of which was the problems, questions, comments and suggestions expressed during the preliminary discussions of the materials of this book that took place.

Speaking of self-generating and self-destructing neurostructures, such a concept as an "element-neuron" is given absolutely incredible properties that have nothing to do with the properties of real neurons. Is there any confusion in terminology here?

A real living **neuron** is a whole world. It cannot be reduced to performing an addition or logarithm operation. The author does not even try to belittle the role of the biological neuron - there is no question of it here. The paper deals exclusively with formal neurons as elements of a purely mathematical model. Neurons live and die within a given model and are endowed with the possibilities that are allowed in this model, and no more.

According to the definition of a system, its individuality is a structure. If the structure changes, then the system itself becomes different. After a change in the structure, for example, after the death or birth of elements, we have a different system in front of us. For self-generating and self-destructing structures, it turns out that the concept of individuality is generally not acceptable. To what extent is this statement justified in order to agree with it? Assuming that this is the case, then how then accept "I"?

Here, much, perhaps, depends on the degree of change in the structure. If we understand the immutability of the structure by the individuality of an information system, then there is nothing individual in the world. Minor structural changes in complex self-learning information systems occur all the time. When investigating the problem of individuality, it is probably necessary to speak about the degree of structural restructuring of the system. It is intuitively clear that if one more element with two or three bonds is added to a million elements, then the system is unlikely to lose its former individuality. The sudden death of a third of the elements will lead to the emergence of a completely different "I".

But then it follows from what has been said with logical infallibility that the same person in childhood and old age are completely different people?

A child and an old man, which this child has turned into, can probably be identified as one person in some cases, but it is unlikely that they are one and the same self-learning information system. In terms of perception and processing of information, they are completely different. The only option is if the child was sufficiently protected from the environment and was not taught anything until old age, then the systems can be

identified, for example, in the case of congenital debility, the information system-old man is no different from the original system-child. But in this case, we are talking about an information system that is incapable of learning.

In solving serious philosophical questions, a lot depends on basic definitions. As for this work, in it the password that reveals the meaning of many definitions and proved theorems is the attitude of the author to the **law decrease in entropy** as a measure of chaos, formulated by Shapovalov: *"In an absolutely open system, all processes proceed in such a way that the entropy of the system decreases over time."*

This law is quite logical. You don't have to go far to test it - a thought experiment is enough. Imagine that in front of you is a closed system of n elements, the entropy of which is maximum. The fact of the presence of maximum entropy suggests that each element of this system is connected to almost every one, i.e. in the limit we have nx(n-1)/2 connections. Now imagine that the shell burst, and the system became absolutely open. An absolutely open system in this case should be understood as a system in which each of its elements is subjected to an external influence that exceeds the strength of internal connections. Under the action of an external force, the previously existing internal bonds begin to break, their number is reduced, and thereby the entropy begins to decrease. This continues until chaos is replaced by absolute order.

It is known that in systems consisting of elements whose individual behavior is unpredictable (chaotic), for the case when each is connected to each, the system itself becomes predictable. If we proceed from the functional dependencies proposed in the work, then everything turns out to be the opposite - such a system just has the maximum measure of chaos in decision-making. Isn't it strange: the maximum measure of chaos and absolute predictability?

How to look. Let's analyze this situation. The thing is that the concept of an element is inextricably linked with the scale. In one situation, the element looks like a rather complex system to us, in another it is just a simple element, in the third - it does not exist at all. Imagine a system that has a structure in which everyone is connected to everyone. Here, the speed of interaction of any of the elements with any of the elements (with all elements at once) is practically the same. In fact, we are no longer talking about a system in this case, because there is no point in studying such a structure or the effect of this structure on the output data. In this case, we are talking about an element, about a single and indivisible element. Thus, increasing the closedness of the system turns it into an element, into a single integral object.

It is clear that absolute chaos is unattainable for the system, but purely theoretically, nothing prevents it from being presented in an idealized space-time world in which everyone is connected to everyone. It remains to be clarified, what then is the **absolute order?** The following definition is proposed: **Absolute order** is the structure that has the minimum entropy.

An absolutely ordered structure assumes that each element of the system has a minimum, but greater than zero, number of connections with the system. If the number of connections for some element is equal to zero, then it (the substructure) no longer belongs to the system. These are already different systems.

If entropy is measured by the number of bonds, then in an absolutely ordered structure their number should be equal to half of the elements. But such a structure is difficult to imagine in real life, so in the future we proceed from the fact that the number of connections will be at least less than the number of elements, for example, n-1.

It is clear that an increase in the degree of openness (the number of elements under pressure from the outside world) leads the system to destruction, as the destruction of the internal connections of each element with the system itself begins.

Absolute order in logic, like absolute chaos, must also be unattainable; is this true in reality? What could be more real than a chain or star system?

Neither the chain nor the star can claim to be an absolutely ordered structure. There are elements in the chain that have more than one connection to the system, the same applies to the star (the central element is connected to each). An absolutely ordered structure is nothing more than an ultimate dream, a moment: a breath of wind coming from nowhere, a random unique look crashing against a random sound and lasting nothing at all. Absolute order is a moment that is beautiful, but which is not able to stop. The viewer barely has time to realize the beauty, as it is no longer there. Or maybe there is not this very moment of awareness, which is also an ordered structure and, in accordance with its definition, is not capable of living for a long time. It is no coincidence that many great decisions were made and implemented spontaneously, relying precisely on this elusive and invisible cobweb of ultimate harmony.

An ideal ordered structure exists only for two elements. Here, indeed, the number of connections is two times less than the number of elements, however, the information power of such a system is negligible. True, it must be admitted that two elements, connected with each other, form an absolute chaos - each is connected to each. This structure is generally unique, it simultaneously contains both absolute order and absolute chaos. That's just the way it is. inextricably. Chaos with Order can exist. They don't exist without each other!

If, after all that has been said here, we ask the question of how, ideally, systems with absolute order and absolute chaos should look like, then the answer will be simple.

A perfectly ordered structure is a pair of elements connected to each other. And everything else: a classic tree, an ordinary tree structure, a star-like structure, i.e. structures that have only (n -1) connections are structures that are as close as possible to absolutely ordered, but in fact are not it.

Likewise, absolute chaos - everyone is connected to everyone. But this is no longer a system - it is an element. Such a structure is perceived by us as a system, as a rule, only when it has only two elements connected to each other.

At the next stage, we can try to answer the question of how the **concepts of complexity and entropy relate to each other in this concept?**

The relationship of these concepts largely depends on what is meant by the term complexity? Based on common sense, it would be reasonable to estimate the complexity by the number of connections. Then the complexity of the system and its entropy become somewhere close in meaning to concepts. As entropy increases, complexity also increases, including the difficulty of understanding the system by an external researcher. For example, in the case when the difficulty for understanding any text is maximum, we call this text an ideal cipher. And what is a perfect cipher, if not chaos?

In general, complexity and simplicity, order and disorder are rather conditional characteristics of the state of the system, in which of them it is located and is determined by the observer, based on the time allotted to him for observation. In the event that infinity is allowed for the cryptanalyst to solve the ideal cipher, then the ideal cipher can be considered ordered. If only one human life is allotted to solve this

problem, then, of course, the cryptogram under study does not contain any elements of order.

When quick decision making is required for survival, then the system will inevitably simplify its complexity. Complexity is an order that takes time.

If life is to become simpler, then the knowledge that accompanies it must also change. This means that the structure of the system will begin to collapse.

Time is that crossbar between order and chaos, on which, figuratively speaking, self-learning information systems swing.

But if irreversible evolution takes place, then what kind of swing can we talk about - the arrow of time flies only in one direction. How, then, to connect such processes as the production of entropy and evolution?

Is it worth linking them? Increasing or decreasing entropy or complexity has nothing to do with evolution.

The evolution of any system is only the evolution of its protection system. In one case, if very little time is allotted to survive, then the system acquires knowledge through the death of elements and, accordingly, connections, in the other, when there is enough time, the system becomes more complex, acquiring new knowledge by increasing the number of elements and connections between them.

Recently, through the media, there has been an introduction to the masses of the assertion that such concepts as **openness and progress** are interrelated. No one has yet provided a reasonable proof of this assertion. However, in order to instill a rule as true in perceiving information systems, it is absolutely not required to prove it. An interesting question in this regard is: And what can be the relation of such concepts as openness and progress?

The concept of progress is a rather vague and subjective concept, so it was not used in this work. However, in order to answer the question asked, it is necessary to define these concepts - there is no other way. Let's try to do it. But let's start not from progress, because every sane person will think ten more times before answering what he himself understands by progress: the level of spiritual development, the development of science and technology, the ability to exploit earthly resources or the ability to destroy their own kind?

Let's start with openness.

In my opinion, in no case should one confuse such concepts as progress and the degree of openness, isolation and destructive processes. The structure of the system is its knowledge, it is its ability to answer questions asked by the environment, and most importantly, it is its survival opportunities. In order for the system to respond adequately to input data, i.e. to survive, it should not at all strive for absolute openness. **Instant absolute openness is instant death**. If we consider death as progress, then indeed progress and openness are almost synonymous.

Every medal has a reverse side. The evolution of the defense system, like the evolution of life itself, and its striving for absolute protection, should presuppose the existence, at least theoretically, **of an absolute system of destruction?**

Certainly it is. The absolute system of annihilation is a complex of interconnected means capable of making any system **absolutely open** even for a moment. A typical example of what has been said is the history of the Destruction of the USSR.

But what about the eternal opposition of good and evil, light and darkness? Where is the place for the struggle of God and the Devil in the world of open systems? Doesn't

the trend of our movement speak unambiguously about where humanity is heading? Yes and in the end how do the concepts introduced above differ from the eternal contradictions mentioned above: "absolute system of protection" and "absolute system of destruction"?

It should be recognized that the concepts of the absolute system of protection and the absolute system of destruction appear in this presentation not as philosophical categories, but as technical terms, behind which there is a specific algorithmic implementation.

It seems that any concept, especially if it is capable of resisting something, must have certain physical carriers.

Life and Death at the elemental level that determines them have a different elemental base.

The surrounding world itself is presented in the form of a swing swinging between unattainable points, which can be called the "absolute defense system" and the "absolute destruction system".

Let's analyze what will happen if the world reaches these extreme points in its swaying?

The absolute protection system is a combination of various protection methods plus prediction mechanisms and a decision-making subsystem. It is clear that the protection system will become absolute when it is able to predict and withstand all possible threats, i.e. will know everything. By definition (everything and everything is known), a return from this situation is no longer possible. The swing will freeze. The contradictions of Life and Death will cease to exist. All matter will become alive (or part of the defense system), but life and death will lose their meaning. The situation associated with reaching the opposite pole looks similar.

It's time to move on to more intimate matters.

Immortality of the soul be interpreted within the framework of the formulated model?

The answer is largely determined by what we mean by the concept of "soul". If the soul is defined as an indestructible element that forms the basis of life, then there will be one interpretation, which, by the way, follows directly from the definition. If the soul is capable of learning, i.e. is an information self-learning system, then there will be another interpretation, which consists in the fact that gaining immortality is possible only if the soul has an absolute protection system.

According to the stated concept, any life, any living feeling contains the sprouts of its own death. Moreover, it turns out that **the more alive the being, the closer it is to death**.

And indeed it is. Look at the trees that in winter, during the worst snowstorms, stand completely naked. They are not naked because they like it so much, they are naked because they are afraid of cold and strong winds. The bulk of the trees do not die in winter, when cold winds pierce through and there is nowhere to go from them. The greatest number of trees die after fresh leaves bloom on them. Young green leaves create additional surface that the wind uses for pressure on the tree itself. It is very difficult to bend a bare tree to the ground - there is nothing to press on! Young strong leaves are not able to understand that the tighter they are tied to the branch, the worse for the branch at the time when the mad wind comes to demand its tribute.

To live means, as they say, to "stick out". The more intense and "brighter" life is (perhaps "brightness" is measured by the variety of input data visible to a given system), the more often one has to "stick out". Any "protrusion" leads to attracting either previously unknown messages or known ones, but perceived differently today for some reason, than always.

K.G. would have answered this question very precisely. Jung, reflecting on the soul of a living being, which makes an initially passive living being fuss, suffer, sin and die: *"To have a soul means to risk life, because the soul is a demon - the giver of life, whose elven game surrounds a person from all sides. Therefore, in dogmas, this demon is punished with curses and redeemed with blessings far beyond the limits of human possibility."*

Once the soul has been touched, then God must also be sought. Where what is the place in this scheme of constantly interacting, generating and destroying each other structures for God?

The answer is intuitively clear - in scale. Each of the systems is a part of the other, is absorbed by it and lives in it. The same person is part of many complex structures, so he can have many gods. And the closest God is always the Motherland.

We live in God and die in him. We are born only once and we die only once and forever. More is not required of us. And a part of God dies with us, a part of his knowledge dies, a part of his unique knowledge. He suffers from us when it hurts, and resists us when they try to absorb him. Already on the scale of his life. Man understands all this struggle not so much at the level of logic, but at the level of the feeling present in it.

So S.N. Bulgakov in his Sophiology of Death wrote about what was for him a real spiritual event, *"a revelation, not about death, but about dying, with God and in God. That was my dying, with Christ and in Christ. I died in Christ, and Christ died with me and in me. Such was this strange and astonishing revelation, which at that time, perhaps,* I *could not have expressed in words and concepts and realized only later."*

The death of a people, especially a people that is the bearer of a corresponding idea, is the death of God.

By the way, something similar often happens as a result of an information war, when the victim country is simply included by the winner in its structure and performs the functions assigned to it by this same winner.

A typical example is the countries absorbed by NATO. In one of Petukhov's modern fantasy horror novels, there is an image of an ugly creature absorbing and embedding the bodies of victims. Approximately the same thing, but not at the level of ordinary physical bodies, happens with information systems, with their structure, and, consequently, with their knowledge.

The time has come to move from theoretical research to the practical implementation of what has been said and try to answer the question of what practical result can be drawn from everything written here?

This result is actually determined by the goals and range of interests of the perceiver of what is said. The main task of this work was seen as to offer a mechanism for identifying at least some of the hidden threats, and topics thereby translating these threats into the category of obvious ones, which can be dealt with by known methods.

The whole life of nature and mankind is a constant hard work of the evolutionary mechanism to create means of protection against new and new threats. How do these

new threats emerge? Initially, they are all hidden in the chaos that surrounds the born system. At the first stage of the system's existence, all possible threats to it are hidden. Therefore, all means of protection are originally due to the development of magic, religion and art. It is only later that the understanding comes that the disease strikes not because he stumbled on his left foot in the morning, but because he communicated with the virus carrier. Facts gradually accumulate, which then allow the threat to be transferred from the category of hidden to explicit.

Having received a certain upbringing and education, we unambiguously interpret some of the threats as obvious: explosions, floods, epidemics, wars, etc. Some of the threats at each stage are hidden from us, but then they turn into obvious ones and we become aware of them: illnesses, reforms, etc. But the biggest part of the threats remains hidden until the very end of life. Sometimes we will never know that the reason for choosing this or that path that led to the abyss was that in the process of a complex conversation with a colleague that required full attention, the eyes saw something that was not fixed by consciousness. But this something, having made a complex modification of the structure of the brain, in a few years will suddenly emerge from the depths of the subconscious and require its share of actions.

The threat ratio is determined by our knowledge of the world. The fullness of knowledge destroys all hidden threats, awarding Life a clear victory over Death. But is this possible in an infinite world, where the security problem in general is an algorithmically unsolvable problem and is associated with constant and inevitable learning under conditions of an infinite input stream?

Conclusion

Any weapon has a certain accuracy of hitting the target. The accuracy of an information weapon is the "distance" between with what is actually happening, and with what the system using weapons dreamed about. At what here we are talking not only about today, but first of all about tomorrow.

By using information weapons against the enemy, the aggressor thereby uses it against himself. And which of them will collapse first is not a simple question, which does not always have an unambiguous answer. The answer is largely determined by the basic stability of the system and its ability to timely and adequately respond to certain input data.

The structure of any system reflects in itself knowledge of this system. Information impacts change knowledge, and therefore inevitably lead to structural transformations of the affected by information object.

The criterion for the possibility of predicting the behavior of an information system should include knowledge: about the goals of the system (desired future) its experience (the past, as a set of techniques known to the system) and the current state.

Paraphrasing a well-known proverb to the problem of predicting the behavior of self-learning systems, given that the knowledge of the system both contributes to the formation of the goal and is itself determined by the goal, one can probably say: "Tell me what you know, and I'll tell you what will happen to you."

Current knowledge is always reflected in the structure of the system. However, any structure also evolves; it is not eternal. External shocks make it lose not only the connections between the elements, but also the elements themselves.

What is needed in order for the knowledge of the system to become as stable as possible in relation to external knowledge?

To answer this question, the work proposed a scheme for designing the system in such a way that it was the requirement to "survive" that formed and dynamically modified the structure of the system.

Conclusion

Long night for the one who does not sleep. A mile is long for those who are tired; long life for the insane.

L.N. Tolstoy

If it is reasonable to comprehend everything that is happening today in the world and in your country, then the life of a Russian person at the present stage can become meaningless. But this is if it is reasonable to comprehend and believe the results of reflection. However, even for this extreme case, there is an interesting story in the Russian epic about two frogs that accidentally fell into a jug of milk. One of them, having analyzed the situation, decided that there was no way out and could not be, but if the owners came, it would only get worse and, having stopped floundering, she drowned. The second, fully supporting this theory of hopelessness, nevertheless, still continued to churn milk with her paws. And remaining herself, she made the environment change: milk turned into sour cream, sour cream into butter. Pushing off from a hard surface, the frog left the unexpected prison.

The poor frog, of course, never read Tocqueville, but he probably felt that *"life is not suffering and not pleasure, but a matter that we must do and honestly bring it to an end"*.

We can only hope that despite the logical hopelessness *"...a great thought and a great will will overshadow her (Russia) from above, like that insane demoniac, and all these demons, all impurity, all this abomination that festered on the surface will come out and they themselves will be asked to enter the pigs. Yes, and already entered, maybe!"* [27].

L.N. Tolstoy in [96] there is a very important quote on the same topic by Emerson, which sounds like this: "Do not wish death because you hard to live. The whole weight of the world on the shoulders of every moral being compels him to fulfill his calling. The only way to get rid of this burden is this is the fulfillment of your calling. You will be released, as soon as you do the work assigned to you.

Glossary

Absolute invisibility - in the event that when the input data F enters the self-learning information system, no other changes occur in the system, except for the destruction of the input data F, then this data F (facts, rules) for this system are absolutely invisible.

Absolute order - the structure of a system that has the minimum entropy. If entropy is measured by the number of connections, then it is assumed that each element of the system cannot have more than one connection with other elements of this system.

Absolute protection system - a system that has all possible methods of protection and is able at any time of its existence to predict the onset of a threatening event in time sufficient to activate adequate methods of protection.

The absolute system of annihilation is a complex of interconnected means capable of making any system absolutely open at least for a moment.

An absolutely ordered structure is a structure, each element of which has the minimum possible, but greater than zero, number of connections with the system. In reality, the number of bonds in an absolutely ordered structure should not exceed n -1. Example: structures like "star", "tree".

Absolute openness is the state of a system in which the external information impact on any of its elements exceeds the internal one.

Absolute closure is the state of a system in which the internal information impact on any of its elements exceeds the external one.

The basic set of meanings or knowledge is the historically established meanings and knowledge of the system, which mainly determine its behavior.

The basic elements of the system are the physical carriers of the basic set of meanings and knowledge.

Basic elements suggestive space - a set of goals of the information system.

Input data:

Conscious input data is data that falls under the processing of an observable chain of executable programs (consciousness).

Hidden inputs are unconscious inputs.

"Lie detector" is an algorithm of a certain human-machine complex that allows organizing information interaction with the object under study in such a way that, in the process of this interaction, revealing the presence of hidden knowledge in the object under study on a specific topic.

The life force of an element is the ability of an element to resist external destructive influences.

Knowledge of the information system is the structure of the system.

Information - the degree of modification of the structure by the input data.

Information - *"information about an object is a change in the observer's parameter caused by the interaction of the observer with the object."*

Information system - a system that performs: receiving input data; processing this data and/or changing one's own internal state (internal connections/relationships); issuing a result or changing its external state (external links/relationships).

Information war - open and hidden purposeful informational influences of systems on each other in order to obtain a certain gain in the material sphere.

informational impact - impact that is carried out with the use of information weapons, i.e. such means that allow you to carry out the intended actions with the transmitted, processed, created, destroyed and perceived information.

Permissible type of impact - impacts that "grossly" do not violate the norms and rules of behavior accepted by most information systems in this information space (output results).

An information weapon is an algorithm that allows targeted control of one information system in the interests of another, realizing the process of controlling the system through the data it receives or processes.

Informational target - a set of elements of an information system that belong or can belong to the sphere of management and have potential resources for reprogramming to achieve goals that are alien to this system.

A complex strategy of influence is a combination of all permissible types of influence on the enemy system.

A measure of information aggressiveness is the amount of information purposefully transferred from one information system to another.

Measure chaos in decision-making - an excess of connections that can potentially complicate the decision-making process, primarily by increasing the processing time of input data.

Observation of information self-learning system:

Let's call the information self-learning system **completely observed** on the time interval $[t_0, t_1]$, if an algorithm is known that allows, based on the analysis of the current state of the system at time t_1, to determine the dominant information impact directed at it at any time $t \in [t_0, t_1]$.

An information self-learning system will be called **partially observed** on the time interval $[t_0, t_1]$, if an algorithm is known that allows, based on the analysis of the current state of systems at the time t_1, determine individual information impacts on the time interval $[t_0, t_1]$, which led her to this state.

Invisibility is the displacement (destruction) of a part of its structure or individual elements (knowledge) from the system, or the inability of the system in a certain state to be aware of what is happening.

A training sample (input training sample) is a specially ordered sequence of data (facts, rules, goals) intended for reprogramming an information self-learning system.

Allocator memory is a part of the system memory responsible for the distribution of the input training sample in the system.

Functional memory is a part of the memory of a self-learning system, responsible for solving specific tasks set by the external environment.

The reason for the threat is the need for the system to be in a valid mode of existence.

Causes of external threats in the case of a targeted information impact (in the case of an information war) are hidden in the struggle of competing information systems for common resources that provide the system with an acceptable mode of existence.

The reasons for internal threats are the appearance within the system of many elements, substructures, for which the usual mode of functioning has become unacceptable due to a number of circumstances.

The problem of "invisibility":

Part 1. Is it possible for each self-learning information system to propose such a learning strategy ("life") that will transfer an absolutely invisible fact into the category of trivial ones.

Part 2. Is it possible for each trivial fact in the self-learning information system to propose to the system such a learning strategy that will make this fact absolutely invisible to it?

Part 3. Is it possible to propose to the system such a learning strategy, during which the fact f received at the input of the system will destroy all pre-existing facts and/or rules, i.e. the degree of novelty is equal to the actual capacity of the system.

Apply information weapon - to choose the input data for the system in such a way as to activate certain algorithms in it, and in case of their absence, activate the algorithms for generating these algorithms.

Operating mode:

Permissible mode of operation - the operation of the information system, which is provided with the necessary material resources.

Inadmissible operation mode - a mode in which the system is not provided with the material resources necessary for normal operation.

R-networks are self-learning information systems in which information is mastered due to the destruction of system elements.

A system is a collection of abstract or material objects, together with known or given connections and relations, forming a single whole in a known or given sense.

A simple information system is a system whose elements function in accordance with the rules generated by the same mutually consistent set of axioms.

A complex information system is a system that contains elements that function in accordance with the rules generated by different sets of axioms. At the same time, it is assumed that among the rules for the functioning of various elements there may be mutually contradictory rules and goals. Violation of protective barriers in the interaction of elements of a complex system with each other leads to to reprogramming these elements and/or destroying them.

Consciousness is the dominant information process of a self-learning system or a chain of its own running programs (algorithms) currently observed by the system.

S-networks are informational self-learning systems in which the assimilation of information occurs due to the birth of elements in the system.

SR-network are self-learning information systems in which information is fed due to the death and birth of system elements.

The degree of novelty - the degree of novelty of the input data F or informativeness for the information learning system is determined through the number of destroyed facts and rules when the system perceives the data F.

The degree of damage by information weapons is the information capacity of that part of the structure of the affected system, which either died or works for targets that are alien to its own system.

A learning strategy is an algorithm for supplying a specially selected sequence of data (facts, rules, goals) to the input of an information self-learning system, leading to the displacement of its individual parts from the structure of the system and/or the inclusion of additional substructures.

Structure:

Structural equality: two structures are said to **be equal** if the description of one of them can be transformed using element renaming in such a way that, when superimposed on the description of the other, a complete match will occur.

Similarity of structures: two structures are called **similar** if the description of one of them, without taking into account the values the "life force" of the elements and the operations they perform, can be transformed by renaming the elements so that when descriptions are superimposed on each other, they coincide.

Suggestion - *"hidden verbal influence on a person."*

Suggestion is a hidden information impact on an information self-learning system.

Suggestive influence - influence on the formation of hidden goals in the information learning system.

Control accuracy of an information self-learning system (behavior prediction accuracy) - the value of the time interval between the planned time of obtaining the result required from it (committing the corresponding act) and the actual

Informational threat - input data, originally intended to activate the algorithms in the information system responsible for the violation of the usual mode of operation. **A clear threat** is an input perceived as a threat.

A hidden threat is input data that is not recognized by the system in real time and threatens its security.

Control information self-learning system:

Let's call a self-learning information system **totally controllable,** and its behavior **completely predictable** on the time interval $[t_0, t_1]$, if the algorithm of information impact is known (for example, a teaching technique) that allows you to bring the system at any time $t \in [t_0, t_1]$ to the required result (action) x; informational self-learning system is called **partially controlled,** and its behavior is **partially predictable,** on the time interval $[t_0, t_1]$, if the information impact algorithm is known, which allows to bring the system to some point in time $t \in [t_0, t_1]$ to the required result (action) x.

Resilience of the system to external influences - the system is resistant to external influences if the number of its elements and connections between them does not experience sharp fluctuations in case of sudden and "strong" information impacts on it.

Fact:

Trivial - a fact, the perception of which by the system did not lead to the destruction or change of any other fact previously known to the system, including this one, or rules.

Absolutely invisible - a fact, the perception of which by the system did not lead to the destruction of any other fact or rule, except for this one. (This happens if the given fact more than others "prevents" the already existing rules from being true).

Unconscious - a fact that is present on the left side of such a rule, which has never been consciously executed, i.e. the dominant process never included the execution of this rule.

The purpose of the information threat is to activate the algorithms responsible for the violation of the usual (usually acceptable) mode of operation, i.e. for bringing the system out of an acceptable state.

Hidden goal - a goal included in the general scheme of goal formation and implementation of goals, i.e. hidden by other targets, and therefore unconscious by the system itself.

Civilization (S.I. Ozhegov, N.Yu. Shvedova. "Explanatory Dictionary of the Russian Language") - *conceivable as a reality, the totality of living beings with their own material and spiritual culture.*

Entropy is a measure of chaos, a quantitative measure of disorder in a system. An excess of connections potentially capable of creating chaos in decision making.

Law of Decreasing Entropy (Shapovalov): *"In an absolutely open system, all processes proceed in such a way that the entropy of the system decreases with time."*

The law of increasing entropy: "In an absolutely closed system, all processes are accompanied by an increase in entropy.

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Appendix. A Very Brief Lecture on Information Warfare Theory

The art of persuading people is much higher than all other arts, since it allows you to make everyone your slaves of your own free will, and not under duress.

Gorgias of Leontine

The explosion of several grenades cannot be called a war, no matter who throws them. The explosion of several hydrogen bombs is already a war that has begun and ended.

The information propaganda of the 50s and 60s, which was carried out by the USSR and the USA, can be compared with just a few grenades. Therefore, no one calls the past confrontation an information war, at best it deserves the term "cold war".

Today, with its telecommunication computing systems, psychotechnologies, has radically changed the surrounding space. Separate information streams have turned into a continuous stream. If earlier it was possible to "block" specific information channels, today the entire surrounding space has collapsed informationally. The time for information interaction between the most distant points has approached zero. As a result, the problem of protecting information, which was previously more relevant than ever, turned over like a coin, which brought to life its opposite - protection from information.

Why is it necessary to protect the information system from information? Because any information that enters the input of the system inevitably changes the system. Purposeful, deliberate information impact can lead the system to irreversible changes and to self-destruction.

Therefore, **the information war is** nothing more than as explicit and hidden purposeful **informational influences of systems** on each other in order to obtain a certain gain in the material realm.

Based on the above definition of information war, the use of information weapons means the input of an information self-learning system of such a sequence of input data that activates certain algorithms in the system, and in their absence, algorithms for generating algorithms.

Going this way, you can always activate or generate for the subsequent activation of self-destruction algorithms.

Those systems that undergo changes under the influence of information will be referred to as **information self-learning systems** (ISS). Man, nation, state are classical ISS.

What kind of changes are information systems subject to? Any system is a collection of objects and links between them, those a certain structure. New knowledge leads to a change in the structure due to:
- changes in links between elements;
- changes in the functionality of the elements themselves;
- changes in the number of elements: elements can be born and die.

Those ISS, in which the assimilation of information occurs due to a change in connections, will be called **neural networks in the future**.

Those ISS, in which the assimilation of information occurs due to the destruction of the elements of the system - **R-nets.**

Those ISS, in which the assimilation of information occurs due to the spontaneous generation of the elements of the system - **S-network**.

Those ISS, in which the assimilation of information occurs due to all possible ways of changing the structure - **SR-networks**.

So, for example, the possibilities and processes of human learning It is more convenient to model using SR-network - people are born and die.

The learning processes of an individual person are more adequate to the processes taking place in R-networks - neurons die and are not born.

For ISS, it is possible to formulate and prove fundamental theorems about the possibilities of R-, C-, SR-networks.

Possibility theorem SR-networks.

The problem of training an information self-learning system built on the principles of a SR-network to solve any problem, even if the information capacity of the SR-network (the initial number of elements) is sufficient to store the information received at the input, is algorithmically unsolvable.

Theorem on the possibilities of the R-network.

An information self-learning system built on the principles of a R-network can be trained to solve **any problem** if and only if the following two conditions are met:

1) the information capacity of the R-network (the initial number of elements and links between them) is sufficient to store the incoming to the input of information;

2) the initial state of the R-network can be characterized as a state with uniformly distributed connections, i.e. the initial state of the R-net is chaos.

It is these two theorems that lie at the origins of the development of any information weapon, which is nothing more than an algorithm or method of influencing (training) on ASC. Developing an information weapon means trying to answer the following questions for a specific system:

1. Is it possible to propose such a learning strategy that will translate an absolutely invisible fact into the category of trivial ones?

2. Is it possible for each trivial fact in the ASC to propose a learning strategy that will make this fact absolutely invisible to her?

3. Is it possible to propose such a learning strategy, during which the fact f received at the input of the system will destroy all pre-existing facts and/or rules, i.e. Is the degree of its novelty equal to the actual capacity of the system?

Creation of a universal protective algorithm that allows revealing to the victim system the fact of the beginning of an information war is an algorithmically unsolvable problem. The same insoluble problems include the identification of the fact of the end of the information war.

However, despite the insolvability of the problems of the beginning and end of the information war, the fact of defeat in it is characterized by a number of signs inherent in defeat in a conventional war. These include:

1) the inclusion of a part of the structure of the affected system in the structure of the system of the winner (emigration from the defeated country and, first of all, the export of the most valuable human material, high-tech production, minerals);

2) the complete destruction of that part of the structure that is responsible for the security of the system from external threats (the destruction of the army of the defeated country);

3) complete destruction of that part of the structure that is responsible for the restoration of the elements and structures of the security subsystem/destruction of production, first of all, high-tech production, as well as research centers and the entire education system; cessation and prohibition of the development and production of the most promising types of weapons);

4) destruction and destruction of that part of the structure that cannot be used by the winner for his own purposes;

5) reducing the functionality of the defeated system by reducing its information capacity (in the case of a country: separation of part of the territory, destruction of part of the population).

Summarizing the above features, we can introduce the concept **of "degree of destruction by** information weapons", evaluating it through the information capacity of that part of the structure of the affected system that either died or works for targets alien to its own system.

Information weapons will give the maximum effect only when they are used on the most vulnerable parts of the ISS. Those subsystems that are <u>most sensitive</u> to input information have the greatest information vulnerability - these are decision-making and control systems. Based on the foregoing, we can introduce the concept of an information target. **An information target** is a set of elements of an information system that belong or can belong to the sphere of management and have potential resources for reprogramming to achieve goals that are alien to this system.

Based on the definition of the information target, the main directions of work are outlined, both to ensure its security and to increase its vulnerability. For example, in order to increase the enemy's vulnerability, one should expand his information target as much as possible, i.e. push it to include in the target as many equal elements as possible, and it is desirable to open access to the sphere of control to such elements that are easily amenable to reprogramming and external control.

It is possible to force the enemy to change his behavior with the help of overt and covert, external and internal **information threats**.

Causes external threats in the case of a targeted information impact (in the case of an information war) are hidden in the struggle of competing information systems for common resources that provide the system with an acceptable mode of existence.

Causes of internal threats - in the appearance inside the system of many elements, substructures, for which the usual mode of functioning has become unacceptable due to a number of circumstances.

Hidden a threat is an input data that is not realized by the system in real time and threatens its security.

In the information war, the highest priority is given to hidden threats, since it is they that make it possible to nurture internal threats and purposefully control the system from the outside. An information self-learning system will be called **totally controlled**, and its behavior is **completely predictable** on the time interval $[t_0, t_1]$, if the algorithm of information impact is known (for example, a teaching technique) that allows you to bring the system at any time $t \in [t_0, t_1]$ to the required result (action) x.

Is it possible, and with what accuracy, to predict the behavior of an ISS under conditions of unpredictability of its input data? The answer to this question is in each particular case a specific result of information modeling of the behavior of a particular system. The "information muscles" of any ISS are estimated by the power and quality of such models. The main initial data for solving the problem of predicting the behavior of an ISS under the conditions of informational external control of it are knowledge about its knowledge and goals.

In conclusion, we emphasize once again that the information war is a war of algorithms and technologies; it is a war in which it is the structures of systems that collide as carriers of knowledge. This means that the information war is a war of basic knowledge and it is waged by the carriers of this very basic knowledge. At the present stage, when the basic knowledge of mankind has been accumulated within the framework of various modern civilizations, the information war personifies the war of civilizations. For a place under the sun in the face of ever-dwindling resources. Today it is necessary to talk openly about the techniques and methods of information warfare because, firstly, understanding one or another method of information warfare allows you to transfer it from the category of hidden threats to obvious ones that can already be fought, and secondly, the fact that there is a theory of information warfare, presented in this book, should warn the potential victim against an idealistically naive perception of both the external and his own inner world.

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INFORMATION WAR

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