

Psychotronic Nonlethal Weapons as the Havana Syndrome - Human Zombification

Psychotronic weapons

In the list of nomenclature, available in the weaponry, there is no position called psi-weapons as weapons of psychotronic influence. In such lists, which are reflected in the state plan and in the industrial engineering plan, there are other things: microwave generators, emitters of laser, ultrasonic, X-ray, extremely high frequency millimeter and submillimeter radio and ultrasonic wavelengths, infrared, ultraviolet, isotope, gamma, etc. radiation receivers for all types of bands, transducers of ultrasonic and radio waves into sound and visible, special devices for transmitting image data via telephone, television and radio channels, means for docking receivers of transmitted signals and TV sets or computer equipment, etc. At the same time there are in a number of lists and equipment for controlling the presence of radiation on all types of their power.

But these are not lists of nomenclature for the general consumer, these are special lists of nomenclature of enterprises of the military-industrial complex, inaccessible not only to ordinary civilians, but also to organizations of the sanitary and epidemiological service and even local branches of the Ministry of Emergency Situations.

The equipment mentioned in the reference is part of the systems of hardware designed to study humans as biological objects under conditions of their daily life activity.

This research and development is overwhelmingly done in secret, using various types and kinds of inventions that affect the human psyche and can lead to a tragic finale.

In the 1990 "List of information prohibited for publication" included, for example, data on diseases of servicemen arising during work on emitting microwave devices, as well as data on "Technical means (generators, emitters) to influence human behavioral functions (creating biorobots)" item 13.8, [50,p.78; 26,p.358], as well as research and

development work in the field of creation and use of microwave generators and gas pedals for military purposes and the impact of their radiation on various military objects and humans" [31, p.40; 26, p.358].

Psychotronics is the science of information communication mechanisms, regulation and control of the human psyche, energy and physiology.

Psychotronics is based on the statement that at the basis of conception, development and psychophysiological formation of human organism there are information processes - cosmic, planetary, organism-wide, cellular, molecular, bioplasmic, biogravitational, quantum, vacuum (52, p.19).

Most of the Russian scientists took part in creating effective methods of influencing a person at a distance: V.M. Bekhterev, B.B. Kazhinsky, K.I. Platonov, A.V. Dubrovsky, V. Messing, A.P. Slobodianik, M. Okunev, S.G. Fineberg, V.M. Svyatoshch, D.V. Kandyba, V.E. Rozhnov, A.V. Chumak, Y.G. Gorny, and others.

In 1921, a special department for remote influence on biological objects was created under the Cheka. Developments of this special department of the organization, which periodically changed its name from VChK to FSB, formed the basis of NLPi methods, psychotropic and psychotronic technologies. These developments caused serious concern to a whole group of Russian scientists: Pavlov, Vernadsky, Chizhevsky, Kazhinsky and others. V. Slepukha, candidate of technical sciences, confirms that F. Dzerzhinsky's daughter Margarita Telze and "docent" D. Looney were at the origin of development of "psi"-influence methods in our country. The main emphasis was made on the use of psychotropic agents based on natural and synthetic drugs. But even then it was noted that the effect of mental deformation is significantly accelerated if the subject is in a high-frequency field (52, p.93).

The most significant achievements in the field of psychotronic technology and human control were achieved in Hitler's Germany. One of the most unusual official organizations of the Third Reich - Ahnenerbe - was founded in 1933. The head of Anenerbe was SS Colonel Wolfram von Sievers. The Anenerbe included the luminous lodge society, later called the Vrill Society. This society, based on the ideas of occult anthropology, studied the possibility of creating a new race of "superhumans" - a special mutation of the Aryan race, emitting "giant radiations of energy" as part of the Anenerbe program. Additionally, members of the Japanese Green Dragon Society were involved. The black-powered Tibetan sect Agarti also joined the Ahnenerbe. As early as 1926, a small colony of Indians and Tibetans was formed in Berlin and Munich. Later, when funds allowed, the Nazis began to send numerous expeditions to Tibet, following one

another almost continuously until 1943. The Vrili Society and the Agarti sect formed the SS Black Order within the Ahnenerbe. The leading cadres of this order and the leaders of the Gestapo were required to take courses in meditation, occultism, and magic. In January 1939, Ahnenerbe, together with the 50 institutes it possessed, was incorporated into the SS, and the leaders of Ahnenerbe were included in the personal headquarters of Himmler, who made Ahnenerbe an official organization attached to his Black Order. Germany spent huge amounts of money on research carried out within the framework of Ahnenerbe, much more than the U.S. for the creation of the first atomic bomb. Specially created reconnaissance groups of Ahnenerbe collected information from various scientific schools around the world in the field of psychotronic technology and human control, to create a fundamentally new type of weapon.

In the forties Germany was the world's leading scientific center for research on the reserve possibilities of the psyche and human physiology. In Germany there was the only Institute of Psychology in the world, and it was in Berlin that the great psychiatrist-hypnotist Johann Schulz—authors of the new European concept of mental self-regulation, which absorbed all the best that was in the East and in the world, worked, and by 1932 Schulz' discovery was finally formalized into a fundamentally new type - autotraining, aimed at opening and using the reserves of the human body. Schultz included in his system the discovery of the French researcher Coué about the unusual effect of repeatedly uttered words; the discovery of the American researcher Jacobson about the specific psychophysiological effects obtained through maximum psychomuscular relaxation, and the main achievement of the East - Indian, Tibetan and Chinese teachings about unusual physical and mental phenomena, which can be obtained through specially altered states of consciousness. I. Schultz called his discovery "autogenic training" or "a new system of autohypnosis.

At the same time as Schulz's discovery, occult-mystical research based on Nietzsche's brilliant idea of the superhuman was already underway in Germany for a long time. And since Hitler himself was the largest mystic of his time and an official member of several secret occult organizations, then, coming to power in 1934, he immediately gives a secret order to create fifty(!) research institutes in Germany to study the theory and practice of activating and using the hidden capabilities of man (52, p.142-145).

In the forties in Germany were deployed unprecedented in scale top-secret psychophysiological research, involving all the best that was in India, Tibet, China, Europe, Africa, the USSR and America. Briefly formulated research goal is to create

tele-psychoic weapons or, as we now say, "psychotronic weapons". Of particular value are the secret German experiments, which were carried out on concentration camp prisoners. International conventions define such cruel and inhuman research on living human beings as a crime against humanity, so never before the war and never after the war do scientists have the right to perform such experiments on living human beings. For the above reasons, all German research materials are unique and invaluable for science.

After the war, all of Germany's secret research went to the victors - missile and engineering research went to the United States, and psychophysiological (psychotronic) research went to the USSR (52, p.142-145).

With many years of covert research products developed by modern science expand ways of induction of such high-frequency field in limited space, while the generator itself can be located at a sufficient distance. Communications of residential building networks can be used as a transmitting source of radiation from the generator: wiring of lighting, telephone and radio networks, water pipes, radio, TV (26, p.75).

Issues of managing individual mass consciousness were also studied in the USSR at the Institute of the "Brain" created by the remarkable Russian academician Vladimir Mikhailovich Bekhterev. While working in this direction since the 30's the staff of the Institute was significantly increased first to 150 people, and then more, the best Russian scientists. Here for the first time, in addition to hypnotic influence, technical innovations were applied: people were irradiated by radio signals and sound of different frequencies, unnoticeably affecting the human energy system.

In his works N.I. Anisimov confirms that in the late 50's modern domestic psychotronic weapons left the laboratory of military research institutes and began to come into service of special services and the military. At the same time the "List of Information Prohibited for Publication" was supplemented with a paragraph forbidding the open publication of materials on technical means intended to influence human behavioral functions and the ability to control human behavior. At the end of the 1970s psychotronic weapons began to come off the assembly lines of secret factories and began to be used on a mass scale by the population. In the late 80's with the emergence of glasnost the first publications appeared to expose customers and manufacturers of psychotronic weapons (63, p.12).

In the early 1990s, dozens of organizations in the USSR controlled by the CPSU Central Committee and under the tutelage of the KGB under the USSR Council of Ministers were involved in research and development of emitters of electromagnetic,

infrasound and ultrasound effects on the human psyche and organism, and specialized in their in-line production (62, p.77).

In addition, several KGB departments were involved in experiments to turn people into biorobots, and quite a few people were mutilated and killed (24, p.354).

V.N. Anisimov refers psychotronic weapons to one of the types of so-called "non-lethal" weapons. Its invisible components can kill at a distance, simulate or create any chronic disease, make a person a criminal or insane, create air, railroad or automobile disaster, destroy a capital structure in seconds, create or provoke any climatic cataclysm, control the most complex device or mechanism. Allows to effectively disable living force, causing mental disturbance, coordination of movement, muscle tone, change in the functioning of various body systems, including cardiovascular and visual apparatus. Manage the behavior of people, any biological object, change the worldview of the population (63, p.12).

B. Shepilov rightly notes that the work on the creation of methods of zombification, as well as on the management of the psyche and consciousness were the generation of the "Cold War". The purposes of these studies were primarily of military-applied nature. The most profound developments in these fields were carried out in the USA, France, Israel and Japan. Totalitarian regimes in Asia and Latin America also showed interest in these issues.

Similar studies, reports V. Shepilov, were conducted in China and in the USSR. As for the USSR, as was customary in such cases, the entire volume of work was divided into several scientific topics and subtopics, which were developed by different performers. The results were summarized by the customer. Only he could have a complete picture of the entire scope of work and its final results. The customers were the Ministry of Defense, the CPSU Central Committee and the KGB of the USSR. As for the KGB, these developments were supervised by the Fifth and Sixth Directorates. The fifth ("Protection of the Constitution") was in charge of political leadership, and the sixth was responsible for the scientific and technical side of the work. The most serious crimes with the use of these technologies were committed by employees of the top-secret laboratory No.12 under the Operational-Technical Directorate of the KGB, with a very large number of innocent people being killed (52, p.89-90).

With reference to closed sources V. Shepilov reports that in the last three or four years this problematic has become increasingly important. If earlier rigid programming resulted in biorobots which looked little like a normal person," notes V. Shepilov, "today

"zombies" can often be identified only by a specialist - their behavior is quite normal and does not arouse suspicion" (52, p.90).

Management of the psyche, notes V. Shepilov, as a rule, pursues socially repressive goals. In any case, such management of the psyche is associated with a violation of human rights, because it is carried out against his will and consent through the externally imposed organization of unconscious brain processes. And zombie cannot be regarded otherwise than as criminal manipulation of a person. Developments in the field of psychotronics and psychoprogramming, V.Shepilov concludes, will continue, whether we like it or not. The conflict with human rights, which is already taking place in connection with these works, can take completely different proportions. Therefore, even today, it is necessary to create a public commission independent of the state to monitor such practices (52, p.90).

They use this technique as a means to defend the country and to treat politicians, diplomatic staff of foreign missions, dissidents, dissidents, human rights defenders, people from socially unprotected strata of the population, etc.

Research trials have been and are being conducted on volunteers and by special decision on individual groups and individuals who have not been informed about the special treatment (62, p.77).

It is advisable to cite the direction of the closed research institutes working on the creation and improvement of psychotronic weapons: 1.Physics; 2.Biophysics; 3.Biochemistry; 4.Psychobiophysics; 5.Biocybernetics; 6.Radioelectronics; 7.Psychotronics; 8.Biology; 9.Medicine; 10.Space. Secret research institutes solve the following tasks: geopolitical; ideological; military; police; medical-biological; research; industrial-economic; expert and so on. Applicable specialization:

(A) Development of technical means of remote control and management of the human thinking process;

B) improvement of technologies of remote control of human behavior and organism by means of devices using electromagnetic, magnetic fields and acoustic waves as a directional source of radiation;

B) the use of technotronic telekinesis to influence tensional systems;

D) remote activation and deactivation of electronics and fuzes;

E) development of devices for the purpose of remote control of human behavior using electronic sensors transplanted into the brain and body;

E) remote control of human behavior using pharmacological means according to the scheme: introduction of pharmacological means (behavior modifiers) into the human

organism, and then remote influence of psychotronic equipment on the modified human organism;

G) improvement of technologies of remote transportation of chemical and other substances into the body of a biological object;

H) remote control of people using radio and television;

And) the creation of biorobots;

K) improvement of technologies for erasing information from the human brain;

P) remote physical and biological effects on living organisms by electromagnetic, magnetic fields and acoustic waves;

M) the remote effects of special environmental factors on plants, animals, and humans.

Geopolitical tasks: development of a system of remote control of third countries, expert assessments of the creation of geopolitical hotspots of tension and their localization.

Ideological objectives: remote influence on the population in order to create a law-abiding society, loyal to the existing state system and political system.

Military tasks: expert assessments of psychotronic warfare against hostile states, technical protection of troops and population from afflicting factors of psychotronic weapons, interaction of use of psychotronic weapons with other types of non-lethal weapons, interaction of psychotronic weapons with other types of modern weapons, interaction of army formations.

Police tasks: control and management of criminal groups and individual criminals, investigative and operational activities, suppression of demonstrations and demonstrations, cooperation of special services.

Medico-biological tasks: new technologies of disease treatment using psychotronic equipment and pharmacological means, remote control of public health, remote control and management of people with mental deviations, remote change of personality on genetic and psychophysical level.

Space tasks: launching of psychotronic weapons (equipment) into space in order to control and manage population behavior; remote control and management of cosmonauts.

Research tasks: development of new technologies of psychotronic weapons and psychotronic equipment, its interaction with the environment and pharmacological means.

Climate challenges: remote control of weather conditions and cataclysms (63, pp. 13-15).

The session on human rights held as part of the Conference on the Human Dimension of the Conference on Security and Cooperation in Europe ended with a sensation. In his speech, Todor Dichev, Doctor of Philosophy, Associate Professor at the V.I. Lenin Moscow State University, told the audience that Russia uses special methods to treat people with various technical means (emitters designed to inflict harm), including zombification (52, p.104-105).

Of great interest is the report by Ivan Sergeevich Kachalin "Effects on biological objects by modulated electrical and electromagnetic pulses," read at one time in the laboratory of bioelectronics of the IRE USSR Academy of Sciences.

The discovery, called "A method of inducing artificial sleep at a distance by means of radio waves," was then embodied in concrete products.

Colonel General of Aviation Vladimir Nikolayevich Abramov provided practical assistance in facilitating and formalizing the opening. Twice Hero of the Soviet Union, Air Marshal Yevgeny Yakovlevich Savitsky supervised this work for the military department. One of such products - installation "Radioson" - was tested in 1973 in military unit 71592 of Novosibirsk on the military personnel where this installation was created. Positive results are reflected in the test act of the military unit [31, p.42; 26, p.80].

This certificate bears the seal of the academic institute and the signatures of major scientific authorities. Including academician Yu. B. Kobzarev and doctor of physical and mathematical sciences E. Godik. Here it is also reported that in the block diagram of the "Radioson" unit there is a microwave generator, whose impulses cause acoustic oscillations in the human brain. The power of the installation is enough to affect a city with an area of about 100 km² (29, p.130). The product was registered on January 31, 1974 by the State Committee of the USSR for Inventions and Discoveries (25, p.79).

A byproduct of the action of setting up appearances is mutations. Changes in genes affect the inheritance of behavior. Based on the studies conducted in 1972-1973 years the Institute of Radioelectronics of USSR Academy of Sciences completed the production and introduction into military practice of the latest radio-technical weapons. Practically it became real to artificially create a race of slaves with predetermined properties. There is a classification in the military-industrial complex, where the seventh, newest generation of weapons of mass destruction is called a weapon that affects the genetic apparatus.

This information is confirmed by T.B. Fadeeva. In her works she states that Novosibirsk was the center for creating psychotronic weapons. In the early seventies, experiments were conducted in military units to study the possibility of remote influence on the human brain with the help of special technical means. In the late eighties (under direct control of the Central Committee of the Communist Party of the Soviet Union), equipment was created which, when placed in near-Earth orbit, could correct the behavior of the population in an area larger than the Republic of Belarus. By that time more than twenty institutes and the Center of Non-Traditional Technologies at the USSR State Committee on Science and Technology were already engaged in developments in the field of psychotronic weapons. Several kinds of different biogenerators capable to tune to bioenergetic characteristics of a certain person at a distance were developed and put into service. Physiologists were engaged in experiments on the effect of electromagnetic radiation on the human brain and zombification. The developments were immediately found practical application in the military field. The KGB successfully used classified zombie techniques to train agents and diplomats. The fundamental difference of psychotronic weapons from other types of weapons is that in the process of creation and processing their samples cannot be tested on stands and targets. Tests constantly require live and healthy "donors" - test subjects, who may even die during the experiments. And ordinary residential apartments often become test sites. Not less than 95 cities in Russia received reports from citizens who themselves experienced the consequences of psychotron processing (57, p.129 -136) (62, p.77).

The above information is fully confirmed in his works by N.I. Anisimov. Psychotronic weapons in their specificity are fundamentally different from other types of weapons. If a Kalashnikov automatic rifle could be invented, tested and improved in a shooting gallery, then for development of psychotronic weapons donor people are constantly required. Any person can become a donor, if his intellect and physical data are needed for the experiments. Donors are selected according to the following principle. It is known that human society consists of certain groups with similar intelligence and psychological type. Each person is a representative of such groups. Having chosen donors for open psychoprogramming and having worked up psychotechnologies on them, it is possible to secretly manage the behavior of all groups, and therefore the society as a whole. The victims of special experiments are usually gifted people who are not loyal to the regime, soldiers of military units, athletes, prisoners of prisons and other places of incarceration, persons registered in dispensaries, all prisoners of mental hospitals without exception, and also taking healthy

human material is made during free hunting in the city or any other locality (only recently, according to official data of Krasnoyarsk Krai Prosecutor's Office, more than a thousand people were missing in Krasnoyarsk Krai, and how many of them are missing? There are three stages of psychoprogramming. The first stage is the control of the brain. The second stage is control of the human psychophysical activity. And the third stage is the destruction of the subject. The third stage is usually resorted to in the following cases: the danger of exposure has arisen; the processed material is ineffective; for the intimidation of other test subjects. Extermination can be carried out both by traditional and non-traditional methods (63, p.17-18).

In 1973 the most serious result in the study of psi-radiation and creation of technical devices on their basis was obtained by Kiev researchers. V.M. Kandyba on the basis of the Central Laboratory of the Arsenal plant obtained the world's first devices, which can be installed on satellites and exert psi-impact on vast areas, it became the newest potential psychotronic weapons. The Council of Ministers of the USSR adopted a special closed Decree on psi-research in the USSR creating under the Council of Ministers of the Ukrainian Soviet Socialist Republic the scientific and production association "Reflux", headed by Professor Sitko. At the same time, some medical experiments were carried out by the Ministry of Health of the UkrSSR V.M. Melnik) and at the Institute of Orthopedics and Traumatology, headed by Professor V. Shargorodsky, author of 19 discoveries and inventions (52, p.38).

Psychotronic influence is understood as directed influence on a person by electromagnetic fields and acoustic (infrasound, ultrasound) waves, which cause changes in behavior and thinking activity, reactions to events and situations, lead to disturbances in the functional systems of the body and changes in tissue cells.

V.N. Anisimov believes that psychotronic weapon is a complex of unique electron-beam equipment capable of controlling human psychophysical activity at large distances, purposefully destroying his health. Psychotronic weapons are high-precision weapons used in conjunction with other types of non-lethal weapons and weapons of psychotechnology (63, p.15). According to V.N. Anisimov the psychotronic weapons are: torsion generators, microwave generators, lasers, acoustic and microwave equipment, using as powerful energy sources of stationary mobile psychotronic stations located on the Earth or introduced into the Space and the physics of the environment, as well as chemical and gaseous agents. Focused types of radiation without interference and without losing the set power freely penetrate through any barriers and with high precision hit the selected victim at any distance. The impact is carried out at the cellular-

molecular level by psychophysical processing of the human brain and organism on the principle of associative and neurolinguistic psychoprogramming using radioacoustic effect and remote tomography (63, p.16). It is considered that the basis of the method of "processing" of a person by radio techniques is the discovery of our compatriot A. Mikhailovsky, who in the mid-30's established that certain combinations of electromagnetic impulses, repeated with a certain frequency, influence the brain zones responsible both for the emotional mood and for the work of human organs. A. Mikhailovsky's discovery began to be used to suppress the human will, and it became possible to make people unconditionally obedient, blindly following someone else's orders.

Depending on signal generated by psychotronic generators they can be subdivided into the following types: infrasound, UHF generators, generators of VHF-HF bands, generators of VHF-HF bands with modulated low frequency signal, ultrasonic and X-ray emitters. This may also include gyrodynamic manifestations: torsional (radiation of twisted polarization) and lepton emitters.

All named types of generators found their place in medicine, but there these devices treat. In special secret purposes (these products are in the armament of special units of the Federal Security Service and the Defense Ministry) these achievements of science and technology serve people to their detriment, causing great damage to their health. By their effect on living organisms the irradiation of magnetic fields is equal to radioactive irradiation. Brick walls, concrete ceilings, wood - these and other materials and structures can be "transparent" to electromagnetic radiation and acoustic radiation (infrasound, ultrasound) of a certain wavelength and power.

The most currently used is a technical means of electronic control. A fairly close analogue is the luggage inspection system in airports. Without opening the suitcase, the inspector will see everything in it. The operating principle is based on irradiation by electromagnetic waves of a certain range and conversion of the reflected signal into a visible image. Your apartment, office, house, block or street can become similar "suitcase". And it is not harmless at all. The strength of the impact on the body is comparable with radioactive radiation. Extraneous electromagnetic fields affect a person's aura, causing changes in mood and thinking abilities. Human aura is heterogeneous and consists of radiations of different human organs. Wave characteristics of each of the human body organs have long been described by scientists and are well known.

Resonant frequencies (22 p.39) of some parts of the human body:

1. голова	20-30	Гц
2. глаза	40-100	Гц
3. вестибулярный аппарат	0,5-13	Гц
4. сердце	4-6	Гц
5. позвоночник	4-6	Гц
6. желудок	2-3	Гц
7. кишечник	2-4	Гц
8. почки	6-8	Гц
9. руки	2-5	Гц

It is possible to adjust the activity of the organs for therapeutic purposes. But by slightly adjusting the product, you can easily achieve a different result, and unnoticed by others.

Affection by UHF-ultraviolet radiation results in diseases that are difficult to treat, for example, human cancer cells are inevitably activated by exposure to UHF radiation and subsequently develop an incurable cancerous disease. By exposing the organs responsible for life to this radiation, it is possible to reliably disable them and at the right time the patient ceases to exist. It is known that the human brain is very sensitive to heat and temperature rise. If even a small amount of UHF radiation is applied to the brain, its temperature will increase, which will cause disruption of the entire body.

If the power of UHF radiation is increased significantly, there will be a strong increase in the temperature of the human brain and inevitable death, and the radiation passes well through various obstacles.

If you affect the bio-currents of the human body, which have a frequency of 1 to 35 Hz, ultrahigh-frequency (UHF) radiation, then the person has a violation of perception of reality, rise and fall of tone, excitement or falling into apathy, fatigue, severe fatigue, nausea and headache, possible complete sterilization of the instinctive sphere, and also damage to the heart, from arrhythmia to its complete stop, brain and central nervous system (32, p.133).

There are also additional signs: tingling in the eyes, pain in the ears (as with changes in atmospheric pressure), numbness in the hands, a buzzing in the head, twitching in the feet, and burning in the soles of the feet.

Waves actively modulating in brain alpha rhythm frequencies can cause irreversible "slips" in behavior (38,p.133). With the help of microwave generator at certain frequencies it is possible to suppress consciousness of many people simultaneously and indoctrinate them certain behavior or even alien ideas (38,p.254).

Powerful microwave radiation can shut down all unconditioned reflexes, making a person completely helpless. The harm increases dramatically if the brain, heart and central nervous system are affected.

As antenna transmitters of such waves telephone and radio relay wires, pipes of sewerage and heating, as well as TV, radio, telephone and fire alarm system, radio network, electric wiring of residential building are quite usable. This method of covert processing of human material due to its technical features, can be called a network (38,p.133). Such way of creation of high-frequency radio-field inside a residential building, when power of bioenergy generator is introduced through a system of filters directly into residential building's domestic networks, is energetically rational and provides covert application of special processing, because ten meters away from the building such signals, as a rule, are no longer manifested. The scale of implementation of microwave technology, especially in the creation of weapons of mass destruction, depends on the availability of microwave generators of high power. Existing continuous mode microwave generators with a capacity ~ 100 kW allow to solve a relatively large range of issues, but the scope of microwave emitters can be expanded with the advent of continuous power generators ~ 1 MW and more (29,p.3-7; p.146-235). Academician Avramenko is engaged in research on application of microwave generators for military purposes.

MICROWAVE WEAPONS

"As is known, nuclear explosions are accompanied by a powerful pulse of electromagnetic radiation. The source of radiation is the movement of charged particles born by the explosion in the Earth's magnetic field. An explosion in the upper layers of the atmosphere is particularly effective in this sense. In a megaton explosion, energy of 10¹¹ J is transferred into electromagnetic radiation (EMR). Such a pulse induces currents and causes a breakdown in electronic devices at a distance of a thousand kilometers. Therefore, it is quite legitimate to apply the concept of "EMP-weapons.

However, this weapon works in all directions and strikes and blinds not only the electronic means of the enemy, but also their own. A natural step in its development was the development of microwave oscillators, which American specialists consider one of the promising types of space weapons.

In small doses, microwave radiation is used by physicians for treatment purposes to warm up parts of the human body (UHF therapy). High doses of microwave radiation affect both humans and machinery. Microwave generators have already been created that can concentrate hundreds of megawatts of power. The main problem is how to

collect radio waves in a narrow beam: the phenomenon of diffraction leads to the fact that even a high-quality parabolic antenna with a diameter of 15 m the beam of millimeter waves has a divergence of 10^{-4} rads. At a distance of 1000 km diameter such a beam will already be 100 m. Even from a 1000 MW generator the flux density in this case falls to 10 W/cm^2 , which can not cause serious harm to the rocket. To use microwave radiation as a missile defense weapon, it is necessary to greatly increase the frequency of radiation and increase the power of generators by tens of times.

However, microwave radiation can also be used to hit ground targets. The Earth's atmosphere has several "windows of transparency" in the radio range: in addition to the main "window" (wavelength $\lambda = 20 \text{ m}$ to 1 cm) there are more "semi-transparent windows" at $\lambda = 8$ and 4 mm . Waves shorter than 1 mm are absorbed by water vapor. By concentrating a beam of millimeter waves on the earth's surface with a power of about 1000 MW, a heat flux sufficient to ignite flammable objects can be created.

Microwave radiation poses a great danger to humans. In the normal state our body emits about 100 W of heat (52, p.198). It is considered dangerous for a living organism if the power absorbed from outside exceeds its own energy emission. Powerful enough microwave radiation can cause burns or heat stroke. Thermal defeat of our body occurs at incident radiation intensity of about 1 kW/m^2 . In principle, such level is achievable already now. As we know, electromagnetic waves are oscillations of electric and magnetic fields, whose vectors are perpendicular to each other and to the direction of wave propagation. If a human body is oriented with its long axis parallel to the electric field vector, and with its frontal plane perpendicular to the magnetic field vector (i.e. a person stands sideways to incoming radiation), it will effectively absorb radiation with frequency of 70-100 MHz (3-4 m wave length), for which it is a half-wave dipole and resonates actively with the incident wave. At higher frequencies, the human body absorbs radiation 5-10 times less effectively than at the resonant frequency. At lower frequencies, absorption is negligible.

So, the possibility of creating space microwave weapons capable of engaging space, air and ground targets is quite feasible (52, p.198-199).

Extremely high frequency EHF radiation has a very strong effect on the human central nervous system, brain and other organs. To the same extent it affects the human psyche, is essentially a control signals to the person.

Waves actively modulated in brain alpha rhythm frequencies are capable of causing irreversible "slips" in behavior. Symptomatology in general is similar to human affection by microwave radiation.

The development and production of microwave oscillators made it possible to create one of the most promising types of weapons. In small doses microwave radiation is used by medics for treatment. Large doses of microwave radiation affect both humans and machinery.

Microwave generators have already been created to concentrate the power of hundreds of megawatts.

Microwave radiation is very dangerous for humans. In its normal state, our body emits about 100 W of heat. It is considered dangerous for a living body if the power absorbed from outside exceeds its own energy output. Powerful enough microwave radiation can cause burns or heat stroke, as well as other life-threatening consequences. A scientist from the Institute of Higher Nervous Activity and Neurophysiology Y. Kholodov confirmed that microwaves can blind, deprive potency, even kill [30,p.18].

Thermal damage to our bodies occurs at incident radiation intensities on the order of 1 KW/m^2 . Such level of products is achievable already now. As we know, electromagnetic waves are vibrations of electric and magnetic fields whose vectors are perpendicular to each other and to the direction of propagation with the incident wave and effectively absorb radiation with a frequency of 70-100 MHz at a wavelength of 3-4 meters.

The perfect product for destroying human material has been created, and it must be taken into account that these waves have good penetration ability through obstacles.

Torsion radiation (radiation of swirling polarization) is a special kind of physical radiation, which is not shielded by natural media and therefore using it you can easily kindle some disease, remove undesirable excitement, decrease or increase psychophysical activity, aggravate different desires, to slip into the subconscious of the object necessary program (43, p.192; 32, p.133; 33, p.376).

Torsional fields are vortex flows of particles. Intensity of the torsion field does not depend on the distance from the field source and has an exceptional penetrating ability in any natural media. Low-energy relic neutrinos act as torsion field-torsion quanta. Torsional fields are similar in nature to gravitational fields. If gravity is interpreted in the simulation as a spin longitudinal polarization, the torsional fields are interpreted as a transverse polarization of the physical vacuum. Group velocity of torsional waves is not less than 10^9 s (s is the speed of light) (30,p.45).

According to the theory, all material bodies of animate and inanimate nature possess so called spinor or torsional fields (torsion fields). Tensions of these natural

spinor fields have relatively small value, and therefore the fields are practically not manifested. However, they may be amplified by passive devices - bodies of a certain shape. Such bodies, distorting flat geometry of physical vacuum, allow to create spinor fields of significant intensity. In the past some authors called this phenomenon as "shape field", which is observed, for example, in pyramids, cones, cylinders, flat triangles. Devices creating spinor fields of high intensity are called active spinor generators. When working with such sources of spinor fields the latter can be registered by ordinary physical, chemical and biological indicators.

Since the physical nature of spinor fields in living and non-living objects is the same, a number of possibilities of twisted polarization radiation generators find a natural explanation in the framework of the theory of spinor fields. Through generators of spinor fields we can actively act on living objects at molecular and cellular level, and for animals and humans even on regulatory system organs and the body as a whole.

Due to proximity of physical nature of spinor and gravitational fields some of their properties are the same. For example, spinor fields, like gravitational ones, are practically not shielded by natural media and can propagate for very large distances with anomalously low attenuation.

Some of experimentally established features of action of spinor fields are almost magical. For example, in order to transfer information from one point of space to another it is enough to enter information about the place of reception in the form of some address sign into the generator of spinor radiation, and then defeat of object will be strictly purposeful and effective (52, p.112-113).

Now the theory of torsional fields has been developed quite deeply. It goes back to ideas of Japanese scientist Uchiyama, who assumed: if elementary particles have a set of independent parameters, then each of them should have its own field: electromagnetic - charge, gravitational - mass, and spin - spin, or torsion field. Unlike electromagnetic and gravitational fields, which have central symmetry, torsional field has axial symmetry, i.e. this field spreads from the sources in the form of two cones. Besides, it is not shielded by known natural media. And the most important question is the speed of its propagation. There is an assumption that it greatly exceeds the speed of light. This is evidenced, for example, the famous experiments by N.A. Kozyrev on instantaneous registration of visible and actual positions of stars in the sky (see "Terminator" № 2-3, 1993, p. 10). By the way, he covered the lenses of the telescope with an anti-electromagnetic screen, but the signal from the star nevertheless passed. So it was a torsion field (52, p.126-127).

It should be emphasized that torsional radiation is an invariable component of electromagnetic fields. Thus, most radio engineering and electronic devices serve as sources of torsional fields, with the right-hand spin field improving people's well-being and the left-hand spin field worsening people's well-being. Notorious geopathogenic zones are also created by background torsional radiations, and only special screens can protect people living in them from harmful consequences.

All known features of torsional fields allowed to imagine what generators of these radiations may look like. The material accumulated in our center gives grounds to single out several classes of torsion generators, which can be created and are being created already today.

These are, first of all, as mentioned above, various radioelectronic devices and devices. The second class - installations acting on the basis of specially organized spin ensembles. The third class are generators with spin ordering. By the way, these include permanent magnets, which are known to provide magnetization of water. Obviously, it is possible only due to torsion field.

The fourth class are shape generators. Apparently, even the ancients knew about the shape effect - remember at least the famous Egyptian pyramids, which have a number of unusual properties. By the way, the aforementioned Yu. Zeng Kangzhen, mentioned above, also gives a special form to his miracle generators (52, p.126-127).

The prospects of torsion technologies provoked a new round of technogenic development. For the first time in the world the transmission of signals by torsion channel was carried out in the USSR in April 1986 on a 22-kilometer route of intracity communication in Moscow (30, p.48).

But particularly good results were obtained in the field of psychotronic technologies by influencing the subconsciousness of the population - the so-called zombification (24, p.354-355). Yury Vorobyevsky in his book "Knock at the Golden Gate" argues that the equipment of torsion fields is a means of influencing the human psyche in the right direction. Large-scale research in the field of application of torsion fields for military purposes was intensively conducted in Hitler's Germany. "In archival documents of Anenerbe it is emphasized that impact of techno-magical devices was aimed first of all at "crystals of will", special formations somewhere in the pituitary gland area. In the 1980s, the Soviet academic journal "Cybernetics and Medicine" published articles on the subject of psychotronic research by Professor Colonel Georgy Bogdanov. He wrote that the human brain contains crystals of semiconductor structures built by nature itself. Thanks to this solid-state electronics it is possible to transmit encoded

information to the brain, which causes images, representations, visual associations, acoustic and behavioral reactions (60, p.359). Using heritage and archives of Hitler's secret organization "Anenerbe" our military specialists have successfully created a fundamentally new type of weapon, which is strictly secret, so torsion technologies are successfully used in military and other purposes to cause harm.

Mass coding and zombification of the population began in the USSR in 1980.

The initial stages were not without overlap. The treatment reached such an intensity in some places that people complained to doctors about incomprehensible sensations. Residential complexes in which biogenerators were installed were characterized by a high percentage of cancer and suicides, as well as frequent births of handicapped children (24, pp.354-355).

By the early 1990s, science and technology had come very close to creating quite compact units (including those based on the principle of torsion fields) that could affect entire regions of the planet - if these devices were put into orbit and used on ground targets. According to some information, the works on psychotronic weapons capable of controlling the behavior of human masses were interwoven into the works on far-field, over-the-horizon radiolocation, and here the energy of the ionosphere enveloping the planet was used, which has not been investigated yet (60, pp.361-362).

The work intensified dramatically after the discovery of the human biofield. Scientists established the existence of ultralight particles, which were called leptons. Leptons are millions or even trillions of times lighter than the electron. Concentrated beams of leptons pierce the human aura like a blotter. Moscow scientists-physicists studying the effect of microleptons - the smallest physical particles on hydrocarbon substance accidentally came across a very interesting design that worked as a generator of thin physical fields (30, p.35).

Already with a small exposure to the lepton field the subject becomes irresistibly tired, and with increasing intensity the person loses the ability to think coherently (logically). The third degree of exposure hits the vestibular apparatus and the person loses orientation in space.

Further amplification of power of microleptonic blow "finish off" sick organs, therefore the person weakened by illnesses is less protected from action of leptons (24, p.354-355). Maximum strength of microleptonic radiation brings death. Biogenerator can be at a considerable distance from the object of influence. Top-secret experiments with lepton generators became known in years of perestroika (24, p.355). Based on a unified field theory and based on many years of experiments, Academician A.F. Okhatrin

obtained characteristics of microleptons. They have a small charge and small mass, and freely pass through screens and other obstacles. Microleptonic radiation is not detected by our material senses (30, p.40; 31, p.45).

Leptons is a class of elementary particles that do not have a strong interaction. The leptons include electron, muon, neutrino, heavy lepton discovered in 1975, and their corresponding antiparticles. All leptons have spin $\frac{1}{2}$, that is, they are fermions. The name Lepton (from the Greek leptos - thin, light) was historically associated with the fact that the masses of the known before 1975 leptons are less than the masses of all other particles (except the photon) (58, p. 346) (59, p. 346).

Also leptons can be characterized as a group of elementary particles possessing only weak and (in the presence of an electric charge) electromagnetic interactions, but not possessing, unlike hadrons, strong interactions. Experiment has shown that lepton numbers are conserved with a high degree of accuracy in all processes of interaction of elementary particles (54, p.583). Leptone charge (lepton number symbol L) is a special quantum number characterizing leptons. Experience shows that in all processes the difference between the numbers of leptons and their antiparticles remains constant (58, p. 346).

X-rays and gamma rays have effective penetrating and damaging properties, but they are particularly destructive to the cells of the living organism, literally striking all living things.

Optical lasers

The main focus of the JIP program is to create new types of weapons that use electromagnetic radiation in various spectral ranges as a striking factor: from radio waves to gamma rays. The main advantage of such weapons is that they almost instantly reach their targets, since electromagnetic radiation travels at the speed of light. This makes it possible to strike unexpectedly and quickly from a great distance. In addition, there is no need to calculate the trajectory of the target in order to preempt its movement. There is a fundamental opportunity to destroy intercontinental ballistic missiles (ICBMs) taking off during the active (boosting) part of their trajectory during the first 5 minutes after launch. That is why the first echelon of the missile defense system was supposed to be equipped with laser weapons.

The destructive effect of optical laser radiation is primarily based on thermal heating (burning of fuel tanks, electronics, and missile guidance systems) and on the

effect of the shock wave that occurs when pulsed laser radiation hits the missile's surface. In the latter case the shockwave disables the missile's electronics and guidance systems and can also cause a detonation of the explosive in the warhead. The use of passive protection measures (mirror and absorptive coatings, shields, etc.) significantly reduces the damaging effects of low-energy radiation, but become useless when the laser radiation power increases further.

The idea of using a powerful beam of light as a weapon dates back to Archimedes, but it was not until 1961 that this idea gained ground with the first lasers. In 1967, the first gas-dynamic laser was developed, which demonstrated the reality of the possibility to use lasers as weapons. Its main elements are: a combustion chamber, where hot gas is formed; a system of supersonic nozzles, after passing through which the gas, expanding rapidly, is cooled and goes into a state with inverse population of energy levels; an optical cavity, where the laser radiation is generated. In this cavity perpendicular to the gas flow there are two flat mirrors, forming an optical resonator. In order to pass radiation from the cavity the diameter of one of the mirrors is slightly smaller than that of the other one (52, p.194).

Close in design to the gas-dynamic laser are the chemical and the electrodischarge lasers: in these too, an excited working mixture is pumped through the resonator volume at high speed, only their excitation source is respectively a chemical reaction or an electrical discharge. A chemical laser based on the reaction of hydrogen and fluorine is considered the most suitable for destroying warheads in outer space. If, however, this laser uses its heavy isotope, deuterium, instead of hydrogen, the radiation will have a wavelength of 3.8 μm , not 2.7 μm , that is, it will fall within the "transparency window" of the Earth's atmosphere (3.6-4 μm) and will be able to reach the Earth's surface almost unimpeded.

It is a challenge to focus the laser beam on the target.

In terms of beam focusing, optical and ultraviolet (UV) lasers are preferable. Excimer lasers based on argon fluoride and krypton fluoride molecules are considered the most promising among them. These excimer molecules can exist only in an excited state: after emission of a photon they are destroyed. Radiation from these lasers is in the range of 2000 to 3000 angstroms, and therefore the Earth's atmosphere is opaque to it. External energy source for excimer lasers is an electric discharge, a beam of accelerated electrons, neutron flux from a nuclear reactor or, possibly, from a nuclear explosion.

The biggest disadvantage of all types of gas lasers is the high heat generation in their working volume. This limits the increase in power per unit mass of such lasers. A free-electron laser, in which the radiation is amplified by its interaction with a beam of electrons moving in a periodic magnetic field, is considered promising in this respect. Such lasers can also be used as power amplifiers of another laser, independent generators and frequency multipliers. Since the electrons fly in a vacuum, there is no device heating as with conventional lasers. Another big advantage is that the frequency of the free-electron laser can be tuned over a wide spectral range from millimeters to the UV region, which makes radiation shielding a big problem.

This idea is not new and has long been used in radio engineering to create powerful generators and amplifiers of ultrahigh-frequency (UHF) range. Relatively high expected efficiency of these amplifiers in optical and infrared wavelength ranges is very high: up to 30-40 percent, which, according to American sources, before the end of the century will allow to obtain laser radiation with power up to 100 megawatts.

The desire to use shortwave radiation in laser weapons is due to the fact that it is well absorbed by all materials. For example, titanium coating almost completely reflects IR radiation, but absorbs UV. However, UV lasers are heavy and require bulky power sources (52, p.195).

X-ray lasers

A special role in the plans for "Star Wars" is played by the project of an X-ray laser pumped with energy from a nuclear explosion. In general, the idea of X-ray and gamma lasers has long attracted the attention of scientists. Application of such lasers will give great opportunities for mankind: as sources of coherent waves they will lead to birth of X-ray or gamma-holography (molecular holography), will allow to decipher volumetric structure of molecules and atoms. The possibility to influence on atoms and their nuclei by strictly dosed portions of energy - quanta - would allow to study and directionally change the structure of atomic nuclei. By carefully selecting the frequency of radiation, it is possible to rock and break certain bonds in the nucleus and thus carry out the most exotic nuclear transformations. The role that optical lasers now play in the field of chemical reactions control, X-ray and gamma lasers will play in the field of nuclear transformations. However, they will also find applications in surgery, in satellite communication, and in other areas of the national economy. This is why attempts have been going on for more than 20 years to create an X-ray laser, using, of course, not the

destructive energy of a nuclear explosion, but controlled sources (e.g., conventional optical lasers).

In 1984, an experiment was conducted in the United States to generate laser X-rays in a gas medium using as a pump source a powerful double beam optical laser "Navett" (Livermore National Laboratory), each beam of which had a power density of $5 \cdot 10^{13} \text{ W/cm}^2$ in a pulse of $4.5 \cdot 10^{-10} \text{ s}$ duration.

A target, a $0.1 \times 1.1 \text{ cm}$ thin film of selenium or yttrium, was placed in the focus of the laser. The beam vaporized the target, creating a plasma of ions of these metals. Collisions with electrons in the plasma caused excitation of the ions, which led to stimulated emission at frequencies of about 200 angstroms. The presence of the laser effect was confirmed by the fact that the radiation, say, selenium plasma intensity exceeded by about 700 times the expected spontaneous emission. According to the experts of the Livermore group, further advances in the field of hard X-rays are planned: so, the radiation of neon-like molybdenum ions will give a laser effect at 100 angstroms, and the use of new pump lasers will reduce the wavelength of radiation to 50 angstroms.

In the same year of 1984, employees of the Princeton Plasma Physics Laboratory (USA), using a powerful infrared laser on CO molecules, managed to obtain the laser effect in carbon plasma at a wavelength of 182 angstroms. Their pump laser had a pulse power of the order of 10-20 gigawatts (52, p. 196). Its beam was focused into a spot of 0.2-0.4 mm in diameter, which made it possible to reach a power density of 10^{13} W/cm^2 . Princeton group leader S. Sakewer also hopes to advance into the shorter wavelength region, using lithium-like neon ions. Interestingly, these experiments were the first to use an X-ray mirror made by T. Barbee at Stanford University (USA) to increase the laser gain. This parabolic mirror with a radius of curvature of 2 m consists of alternating layers of 35 angstrom thick molybdenum and 60 angstrom thick silicon. Although each molybdenum layer reflects X-rays rather weakly, the rays reflected from successive layers add up, interfere and amplify, so that the total reflection coefficient of such a multilayer mirror is 70%.

In 1986, by completely ionizing fluorine atoms in the focus of a powerful laser, researchers obtained laser radiation with a wavelength of 80 angstroms. Further significant reduction of wavelength (which is necessary to reduce beam divergence in a weapon laser) requires such huge pumping energy densities, which are achieved only in explosions of nuclear charges. The work in this direction in order to create a combat X-ray laser is carried out in the Livermore laboratory under the leadership of "the father of the American hydrogen bomb" Edward Teller. Tests are conducted during underground nuclear explosions at the Nevada test site. In 1981 an unofficial report was

published about the characteristics of laser radiation measured during the experiment: wavelength of 14 angstroms, pulse duration $> 10^{-9}$ s, energy per pulse about 100 kJ. The design of the laser was not described in detail, but it is known that its working body is thin metal rods.

To hit an intercontinental ballistic missile, i.e., to obtain an energy density of, say, 10 kJ/cm^2 at 1000 km with a beam divergence of 10^{-5} rads, the pulse of such a laser must have an energy of about 10^{10} J. With the internal efficiency of an X-ray laser being, by rather optimistic estimates, 10%, and with the rod (it would be more accurate to call it a string) about 1 m away from a nuclear charge, the charge power should be about 10^{15} J, or 200 kt of TNT equivalent (52, p.196-197). According to other calculations, a nuclear charge with a power of 50 kt would be required to provide a range of 2,000 km against ICBMs, and the number of rods would be 10^5 . It is also possible to create some kind of explosion energy concentrator on one string, using the effect of X-ray reflection from crystals during an oblique fall.

Apparently, there are no fundamental limitations to the creation of a nuclear-pumped X-ray laser. It promises to become a very compact device (with a probable mass of about 1 t), available for launching into space by a single missile, which will make it a low-vulnerability weapon (52, p.197). The U.S. Army's combat laser was demonstrated on TV, which successfully hit the target on the ground from space. A similar laser weapon system has been deployed in Russia.

Works on creation of laser weapons began in our country in 1964-1965. In the late 60's in Sary-Shagans the creation of an experimental complex was started, which received the code "Terra-3". It worked on such issues as laser guidance to a space target and the power required to defeat it. This facility was of great concern to the Americans, and in 1989 they obtained a visit to the facility.

In 1981 the U.S. launched the first space shuttle. The Soviet surveillance service determined that one of the crew's tasks, judging by the ship's trajectory, might have been to track the territory of the USSR. On 10 October 1984, when the turns of the 13th flight of the Challenger passed in the area of the air defense range near Lake Balkhash, an experiment was carried out using the experimental laser complex of the general designer N. Ustinov. The power of radiation was minimal. The ship flew at an altitude of 365 km, the inclined range of detection and tracking was from 400 to 800 km. Precise targeting of the laser system was given by the Argun radar measurement system.

As the crew members of the Challenger later recounted, while flying over the Balkhash region, the ship suddenly lost communication, equipment malfunctioned, and

the astronauts themselves felt unwell. Soon the Americans realized that the crew had been exposed to Soviet influence and protested. Later on, for humane reasons, the laser unit was never used.

The vulnerability of space-based countermeasures is exacerbated by the fact that space-based platforms are comparatively large in size, are multi-tonnage, and are in relatively low orbits. On the other hand, countermeasures installed, say, on Earth are not limited by their size, they can be made many times larger and more powerful, they will cost less, and they can be better protected and more accurately aimed. Finally, Earth-based counter-lasers are not limited by energy capabilities or size. According to the well-known American expert E. Carter, weapons deployed in outer space are "first-class targets" for countermeasures, rather than positions for attack (52, p.396).

So, with the creation in our country and the U.S. Military Space Forces the possibility of using of super modern "non-lethal" psi-weapons from Space has sharply increased. And taking into account the fact that so far only our country has a top-secret Spinor weapon, and so far in the next 30-50 years no one in the world will be able to create it, the launching of the Russian Spinor weapon into Space allows our country to do reforms quietly for a few decades. There is, however, one "small" concern: if the United States forces us to use spinor weapons, there will be nothing left on Earth and in nearby Space. It is this "small" disadvantage of the Spinor psi-weapon that holds back the leadership of our army from its "test" use, for example, over the territory of the USA, Japan or England-our present mortal enemies, with whom there can never be peace (52, p.397).

The human body is very sensitive to electromagnetic radiation. Workers in the electromagnetic field with flux density of only 0.43 μT are 10-15 times more likely to have brain cancer, and even such flux density as 0.2-0.3 μT can cause malignant tumors in humans. Computer operators 2.5 times more often have children with congenital defects, they also had central nervous system disorders, exacerbation of cardiovascular system diseases (30,p.2).

Prolonged and systematic exposure can cause irreversible changes in the nervous system, headaches, impotence, increased fatigue, sleep disturbances, and deterioration of intellectual activity. Some individuals are susceptible to mental and psychological abnormalities that manifest themselves in depressed states, mood swings, obsessive compulsions and delusional hallucinations. Itching, chills, tingling, and pain in various parts and organs of the body may occur (57, p.129 - 136).Such small doses of radiation represent a serious danger to human health, but in the

radiators used as a crime weapon, the radiation dose is several times higher, so the person attacked in this way has no chance of surviving.

If you increase the power of the products significantly increases the range of human exposure, taking into account that a person receives and transmits information on a wave length of 9-16 micrometers.

A powerful beam of charged particles (electrons, protons, ions) or a beam of neutral atoms can also be used as a weapon.

A beam of charged particles, which actively interacts with air molecules, ionizing and heating them, is used as a defeating element. Expanding, the heated air significantly reduces its density, allowing the charged particles to spread further. A series of short pulses can form a kind of channel in the air, through which the charged particles will propagate almost unhindered (the UV laser beam can also be used to "break through the channel").

Using negative ions of hydrogen and tritium, which are accelerated by electromagnetic fields to speeds close to the speed of light, and then "neutralized" by passing through a thin layer of gas. Such a beam of neutral hydrogen or tritium atoms penetrates deeply, through almost any obstacle. The great penetrating ability of the products attracts the military and special services to them. Since the basis of the products is related to electromagnetic gas pedals and concentrators of electrical energy, there is every reason to believe that the discovery of high-temperature superconductors will accelerate refinement and improve product performance (39,p.122-124).

Beam weapons

A powerful beam of charged particles (electrons, protons, ions) or a beam of neutral atoms can also be used as a weapon. Research on beam weapons began with work on the development of a naval combat station to combat anti-ship missiles (SCM). The idea was to use a beam of charged particles that would actively interact with air molecules, ionize and heat them. Expanding, heated air significantly reduces its density, which allows charged particles to spread further. A series of short pulses can form a kind of channel in the atmosphere, through which the charged particles will propagate almost unhindered (the UV laser beam can also be used to "break through the channel"). A pulsed electron beam with a particle energy of about 1 GeV and current strength of several thousand amperes, propagating through an atmospheric channel, can hit a missile at a distance of 1-5 km. At an energy of 1-10 MJ of the "shot", the

missile would be mechanically damaged, at an energy of about 0.1 MJ an explosion of the warhead could occur, and at an energy of 0.01 MJ the missile's electronic equipment could be damaged.

However, the practical development of space-based beam weapons encounters a number of unresolved (even at the theoretical level) problems associated with the large beam divergence due to Coulomb repulsive forces and with the strong magnetic fields that exist in space. The curvature of trajectories of charged particles in these fields makes their use in beam weapon systems generally impossible. During naval combat this is unnoticeable, but at distances of thousands of kilometers both effects become quite significant. For the creation of space missile defense, it is considered reasonable to use beams of neutral atoms (hydrogen, deuterium), which in the form of ions are preliminary accelerated in conventional gas pedals.

The fast-flying hydrogen atom is a rather weakly bound system: it loses its electron upon collision with atoms on the surface of the target. But the resulting fast proton has great penetrating power: it can strike the electronic "stuffing" of the missile, and under certain conditions even melt the nuclear "stuffing" of the warhead (52, 203).

The gas pedals being developed at the Los Alamos laboratory in the United States specifically for space-based missile defense systems use negative hydrogen and tritium ions, which are accelerated by electromagnetic fields to near the speed of light and then "neutralized" by passing through a thin layer of gas. Such a beam of neutral hydrogen or tritium atoms, penetrating deep into a rocket or satellite, heats metal and disables electronic systems. But the same gas clouds created around a missile or satellite can in turn turn a neutral atomic beam into a charged particle beam, protection from which is not difficult. The use of so-called powerful "fast boosters" for ICBM acceleration, which reduce the acceleration phase, and the choice of longitudinal trajectories for missiles makes the very idea of using particle beams in missile defense systems very problematic.

Since beam weapons are basically associated with electromagnetic gas pedals and concentrators of electrical energy, it can be assumed that the recent discovery of high-temperature superconductors will accelerate the development and improve the characteristics of these weapons (52, p.204).

Acoustic emitters (emitters of mechanical vibrations: infrasound, ultrasound) pose the same danger to the human body.

A radiator is understood as a technical device that converts one type of energy into a certain type of radiation. Sound is mechanical oscillations spreading in elastic

media - gases, liquids and solids. From a physical point of view, sound is an alternating compression and rarefaction of the medium, spreading in all directions. Alternating compression and rarefaction in air are called sound waves (51, p.13-15).

When a sound wave reaches any point. space, the particles of matter, which previously did not make an ordered movement, begin to oscillate. Any moving body, including an oscillating one, is able to perform work, i.e. it has energy. Consequently, the propagation of sound waves is accompanied by the propagation of energy.

The human hearing organs are capable of perceiving sounds with frequencies ranging from 15-20 vibrations per second to 16-20 thousand. Accordingly, mechanical vibrations with these frequencies are called sound or acoustic (51, p. 16).

The main physical characteristics of any vibrational motion are the period and amplitude of oscillation, and in the case of sound, the frequency and intensity of oscillations.

The period of oscillation is the time during which one complete oscillation occurs when, for example, a swinging pendulum moves from the leftmost position to the rightmost position and returns to the starting position.

Frequency is the number of complete oscillations (periods) per second. It is referred to in the International System of Units as Hertz (Hz). Frequency is one of the main characteristics by which we distinguish sounds. The higher the frequency, the "higher" the sound we hear, i.e. the sound has a higher pitch.

We humans have access to sounds that are limited to the following frequency limits: no lower than 15-20 hertz and no higher than 16-20 thousand hertz. Below this limit is infrasound (less than 15 hertz), and above - ultrasound and hypersonic, that is $1.5 \cdot 10^4$ - 10^9 hertz and 10^9 - 10^{13} hertz respectively.

The human ear is most sensitive to sounds with frequencies between 2,000 and 5,000 hertz. Hearing acuity is greatest at the age of 15-20 years. Thereafter, hearing deteriorates. A person under 40 years of age has the greatest sensitivity in the range of 3000 hertz, from 40 to 60 years - 2000 hertz, and over 60 years - 1000 hertz. Up to 500 hertz, a person can distinguish between higher and lower frequencies by only one hertz. At higher frequencies, people are less sensitive to such slight changes in frequency. For example, at frequencies over 2,000 hertz, the human ear can distinguish one sound from another only when the difference in frequency is at least 5 hertz. If the difference is less, the sounds will be perceived as the same. However, there are no rules without exceptions. There are some people who have unusually fine hearing. For example, a

gifted musician can respond to a change in even a fraction of a single vibration (51, 21-22).

Related to period and frequency is the concept of wavelength. The length of a sound wave is the distance between two consecutive condensations or rarefactions of the medium. In the example of waves propagating on the surface of water, it is the distance between two crests (or troughs).

The second main characteristic is the amplitude of oscillation. It is the greatest deviation from the positions of equilibrium in harmonic oscillations, In the example of a pendulum, amplitude is .the maximum deviation of it from the position of equilibrium to the extreme right or left position. The amplitude of oscillation, as well as the frequency, determines the intensity (strength) of sound. When sound waves propagate, the individual particles of the elastic medium are consistently displaced. This displacement is transmitted from particle to particle with some delay, the magnitude of which depends on the inertial properties of the medium. Transfer of displacement from particle to particle is accompanied by a change in the distance between these particles, resulting in a change in pressure at each point of the medium. An acoustic wave carries a certain amount of energy in the direction of its motion. This allows us to hear the sound produced by a source at a certain distance from us. The more acoustic energy reaches the human ear, the louder the sound is heard. The strength of a sound, or its intensity, is determined by the amount of acoustic energy flowing in one second through an area of one square centimeter. Consequently, the intensity of acoustic waves depends on the amount of acoustic pressure created by the sound source in the medium, which in turn is determined by the amount of displacement of the medium's particles caused by the source. In water, for example, even very small displacements create a large intensity of sound waves (51, p. 22-23).

Observations of the health of workers in noisy workshops have shown that central nervous system dynamics and autonomic nervous system functions are impaired under the influence of noise. Simply put, noise can increase blood pressure, increase or decrease heart rate, decrease gastric acidity, decrease brain circulation, weaken memory, and decrease hearing acuity. Noisy production workers have a higher incidence of diseases of the nervous and vascular systems, as well as of the gastrointestinal tract.

One of the reasons for the negative effects of noise is that when we concentrate to hear better, our hearing aid works under great strain. One-time overload is fine, but

when we overstretch ourselves day after day, year after year, it doesn't go away (51, p. 26).

Medical researchers persistently continue to investigate the effects of noise on human health. They have found, for example, that an increase in noise increases the release of adrenaline. Adrenaline, in turn, affects the heart and, in particular, contributes to the release of free fatty acids into the blood. It is enough to be exposed to 60-70 decibels of noise for a short time. Noise over 90 decibels contributes to the release of cortisone. And this, to a certain extent, weakens the liver's ability to fight harmful substances to the body, including those that contribute to the appearance of cancer.

It turned out that noise is harmful to human vision as well. This conclusion was made by a group of Bulgarian doctors who studied this problem (51, p.27).

The physical nature of audible sound and ultrasound do not differ from each other. Yes, in fact, there is no sharp transition from audible sound to ultrasound: here the boundary varies between "from" and "to" and depends on the capacity of the human hearing aid. For some people the ultrasound begins with a threshold of 10 kilohertz, for others this threshold rises to 20 kilohertz. And some people can respond to 40-50 kilohertz. However, they can no longer perceive such sounds by ear, but it is noticed that if they are near the source of ultrasound, their vision becomes acute.

It means that the lower limit of sound becoming ultrasound depends on people's hearing threshold, and as it is not the same for everybody, the specialists had nothing to do but to agree on some "average" values. Usually it is 16-20 kilohertz (51, p.40).

Depending on the wavelength and frequency, ultrasound has specific characteristics of emission, reception, propagation and application, so the field of ultrasonic frequencies is conveniently divided into three subareas: low ultrasonic frequencies ($1.5 \cdot 10^4 - 10^5$ hertz), medium ($10^5 - 10^7$ hertz) and high ($10^7 - 10^9$ hertz).

Ultrasonic waves are used in scientific research in the study of the structure and properties of matter, as well as to solve a variety of technical problems (51, p.40).

Ultrasound differs from ordinary sounds in that it has much shorter wavelengths, which are easier to focus and accordingly receive narrower and more directional radiation, that is to concentrate all the energy of ultrasound in the right direction and concentrate it in a small volume. Many properties of ultrasonic beams are similar to those of light beams. But ultrasonic rays can also propagate in media that are opaque to light rays. This makes it possible to use ultrasonic rays to study optically opaque bodies (51, p.41).

The power of ultrasound, unlike audible sounds, can be quite high. From artificial sources it can reach tens, hundreds of watts or even several kilowatts, and intensity-tens and hundreds of watts per square centimeter. Consequently, with ultrasound inside the material medium receives a very large energy of mechanical vibrations. There is a so-called vibrational sound pressure. Its value is directly related to the intensity of sound (51, p.42).

Modern methods of producing ultrasound are based on the use of piezoelectric and magnetostrictive effects.

In 1880, the French scientists brothers Jacques and Pierre Curie discovered the piezoelectric effect. Its essence is that if you deform a plate of quartz, then on its facets appear opposite signs of electric charges. Consequently, piezoelectricity is electricity arising as a result of mechanical impact on the substance ("piozo" in Greek means "to press") (51, p.63).

Simplifying somewhat, we can say that a piezoelectric transducer is one or more individual piezoelectric elements with a flat or spherical surface glued to a common metal plate (51, p.67) connected in a certain way. Focusing piezoelectric transducers, or concentrators, which can have a variety of shapes (hemispheres, parts of hollow spheres, hollow cylinders, parts of hollow cylinders) are used to obtain high radiation intensity. Such transducers are used to obtain powerful ultrasonic vibrations at high frequencies. In this case the intensity of radiation in the center of the focal spot of spherical transducers is 100-150 times higher than the average intensity on the radiating surface of the transducer (51, p.68).

Magnetostrictive effect

In 1847, J. Joule noticed that if you place a rod of ferromagnetic material in a magnetic field directed along it, the geometrical dimensions of the rod will change - simply put, it will deform. This phenomenon is called the magnetostriction effect, or magnetostriction (magnet and Latin stric-tio - contraction). Ferromagnetism, that is, "iron magnetism," is a set of magnetic properties of iron. In addition to iron, ferromagnetic materials include a number of metals, some alloys and metal oxides.

The magnetostrictive effect, like the piezoelectric effect, is reversible. If an alternating current is passed through a winding applied to a ferromagnetic rod, the rod will deform (lengthen and shorten) under the influence of a changing magnetic field - the direct magnetostrictive effect. If the ferromagnetic rod, on which the winding is applied,

is compressed or stretched, its magnetic properties will change, and an alternating current will arise in the winding - the inverse magnetostrictive effect (51, p.68).

The study of the magnetostrictive effect is important because magnetostrictive materials are used to manufacture various devices such as magnetostrictive emitters, sensors for studying deformations and stresses in machine parts, etc.

For the manufacture of magnetostrictive transducers, permendure, nickel and iron-aluminum alloys - alfers are used. The platinum-iron alloy has the highest magnetostrictive effect, but because of its high cost, this alloy is practically not used. More often magnetostrictive transducers are made of thin plates, glued together. The thickness of the plates is usually chosen 0.1-0.3 millimeters. On the core, assembled from thin plates, the winding is superimposed.

Compared to piezoelectric, magnetostrictive transducers have advantages in that they have larger values of relative strains, greater mechanical strength, longer service life, they are less sensitive to temperature effects (51, p.69).

Piezoelectric and magnetostrictive transducers differ significantly in their operating principle and design. However, they are mutually complementary. Both the former and the latter are used in ultrasonic instruments and devices. Piezoelectric transducers are used when it is necessary to obtain and receive ultrasonic vibrations of relatively high frequencies (more than 100 thousand hertz). Magnetostrictive transducers are used to operate at relatively low frequencies (51, p.70).

Ultrasonic generators

Ultrasonic transducers (piezoelectric and magnetostrictive) operate from a power supply of electrical energy. This task is performed by ultrasonic generators, which are divided into machine and lamp (semiconductor). Ultrasonic generators are subject to the following basic requirements: frequency stability, the possibility of smooth regulation of frequency and output power, reliability in operation, small size (51, p.70).

Cavitation bubbles do not only occur when screws and turbines rotate. They appear if ultrasonic vibrations are emitted into the fluid. Cavitation caused by ultrasonic vibrations is sometimes called ultrasonic cavitation. Ultrasonic vibrations form in the liquid alternating areas of high and low pressures according to frequency. In the rarefied zone, the hydrostatic pressure decreases to such an extent that the forces acting on the fluid molecules become greater than the forces of intermolecular adhesion. As a result of a sharp change in hydrostatic equilibrium, the liquid as it were breaks, generating

numerous tiny bubbles of gas and vapor, which were previously in the liquid in a dissolved state. At the next moment, when a period of high pressure occurs in the liquid, the previously formed bubbles "slam". Shock waves with very large local instantaneous pressure (pulses of huge pressures), reaching several hundred atmospheres appear (51, p.83). These countless microbursts of cavitation bubbles have a strong destructive effect on all living things and can cause considerable harm or death to humans, since humans are 80% water.

However, ultrasound also affects chemical reactions. Resolutions arising in a powerful ultrasonic field, as we have already said, can be so great that the liquid cannot withstand and bursts, forming many microscopic bubbles, i.e. the already known cavitation occurs. Inside the bubbles, in addition to water vapor and air, there are also the tiniest water droplets, which detach from its surface at the moment of bursting.

It was found that the walls of the cavitation bubble and the droplets inside it are charged with differently charged electricity. When the bubbles are compressed, their size sharply decreases and the charges are located on the bubbles of very small size. As a result, the electric voltage increases greatly. Electrical discharges occur between the walls of the cavitation bubbles and the droplets inside them, which are the main cause of the chemical action of ultrasound. But that's not the only thing. The slamming of cavitation bubbles, as we know, creates enormous pressure accompanied by a rise in temperature. The high pressure and temperature also promote chemical transformations (51, p.117), which greatly improves the affection of human material. It has also been found that ultrasound destroys organic tissue very quickly (51, p.145).

The Erisman Institute of Hygiene in Moscow conducted numerous studies on the effect of ultrasound on the condition of workers who come into direct contact with it in their work. Scientists found that ultrasonic vibrations have an effect on humans only of high intensity. Those who fell into a zone of strong ultrasonic radiation, complain of malaise and light dizziness, they have nausea. If during high intensity ultrasonic vibrations to keep the mouth open, then it feels a tingling sensation in it, in the nose appears unpleasant feeling (51, p.149).

The action of ultrasound consists of three factors: thermal, mechanical and physical-chemical.

Thermal action is based on deep and uniform heating of tissues as a result of absorption by them the energy of ultrasonic radiation. Here, in order to take the life of a person faster, the frequency of ultrasonic vibrations is chosen so that the absorption was maximum. The mechanical action is a kind of micro-massage of cells and tissues.

In this case, the displacement of the particles should be maximum, and their speed as high as possible. Physical and chemical action consists in changing the course of redox processes, accelerated breakdown of complex protein complexes to regular organic molecules, activation of enzymes. If harm is done, the alteration of redox processes and the disruption of metabolism will reliably disrupt the entire human body (51, p.159). The main thing here to achieve the goal to deprive a person of life, the perpetrator always seeks to give the maximum power of ultrasonic radiation.

Ultrasonic scalpel - device "Uzum" can be used for internal cutting, delamination of human body tissues, without damaging the external skin covering, when hidden and fast harm or contribute to an increase in internal bleeding.

At the Acoustics Institute of the USSR Academy of Sciences an installation focusing ultrasound like a magnifying glass was created. Focused ultrasonic vibrations are used in neurosurgery. Ultrasonic focusing device can destroy individual sections of nerve cells. The device creates a very high sound pressure in a certain area or point. The focal distance can be varied, and therefore any area operated on can be selected in depth without damaging the upper layers (51, p.161).

Surgeons received such state-of-the-art "scalpels" as laser and ultrasound beams.

The ultrasonic "scalpel" cuts tissue at the boundaries of cell membrane contact by means of high-frequency energy.

With the help of an ultrasound instrument it is possible to dissect and fuse almost all living tissues. Thus, ultrasound is already used for trepanations of the skull and other bones (51, p.162). Specialists often have to resort to osteotomy, a bone dissection operation. More and more often nowadays the surgeon does not use a chisel and saw, the traditional tools, but an ultrasound waveguide. Ultrasound cuts bone as easily as a hot knife cuts butter. And what is very important, its use is completely eliminates the formation of bone chips, small fragments. The cut made by ultrasound is smooth and even.

Ultrasound not only helps to cut bone easily and quickly (51, p.162), but created an ideal device for harming a person, which can covertly strike any human organ using the same principle of an ultrasonic scalpel. For ultrasonic cutting and welding of biological tissues the device URSK-7N was created. It promises to become an indispensable tool in a number of cases. The device allows to cut the bone in almost any direction.

The ultrasonic unit UZUL-1 serves the same purpose. It consists of an ultrasonic generator, a large set of scalpels and sterilization bath (51, p.163). The unit is a kind of surgical combine, which can be used not only to treat, but also to successfully cripple people by increasing the frequency and power of radiation. Not only soft tissues but also bone tissues can be affected.

It is now possible to use miniature ultrasonic weapons to cause harm. If the ultrasonic emitter touches a person's head, there will be a partial destruction of the brain tissue, very similar to the lesions of a stroke. Thus it is possible to covertly and reliably incapacitate or even kill a person. The size of such a transmitter is no larger than the size of an auto-arm. In the hands of spies or criminals ultrasonic radiator is a formidable weapon - the true cause of death at autopsy is very difficult, and sometimes impossible. Additionally it should be noted that affecting the human body by acoustic vibrations it is possible to cause malfunction or destruction of various organs, because all organs: brain, lungs, heart, stomach and so on - resonate at different frequencies and intensely absorb resonant frequencies. By emitting sound of the required frequency, it is possible to selectively influence different organs (52, p.53).

In the U.S., ultrasonic weapons have been developed under the following military programs: "Bluebird"; "Artichoke" and the secret CIA project "MK-ultra" ("Ultra Brain Control"). The MK-ultra program, as reported in 1977 by CIA head St. Turner, was carried out in the U.S. under contracts with 44 universities and colleges, 15 research groups, 80 institutions and private firms. Twelve hospitals and three reformatories were connected to conduct experiments on human material. Abroad (when it became dangerous to work in the United States) the program was carried out in Canada, the Philippines and Japan (52, p.65).

In the Soviet Union and Russia there was also deployed on an even larger scale a military program to create weapons striking with ultrasonic radiation. At the same time there was never a problem with human test material, even in unlimited quantities.

Sounds of "silence"

Infrasounds are sounds with a frequency of 16-20 hertz and below. It would seem that this is a small part of the frequency scale. However, fluctuations within this range may be equal to one hertz, one-tenth, one hundredth, one thousandth, one-millionth of a hertz, etc. This region of sound frequencies lies beyond the perception of the human ear.

At the beginning of the book, it was noted that infrasound has not yet been studied sufficiently. At the same time, even what we know about them gives grounds to conclude about the great scientific and practical importance of sound vibrations of such frequency. First of all, attention is drawn to the fact that sound waves of this frequency range are characterized by high penetrating ability: they propagate over long distances and are almost not weakened at the same time.

Infrasound waves occur in a variety of conditions: when wind blows around buildings, trees, telegraph poles, metal trusses, when humans and animals move, when various mechanisms work, etc. In other words, we live in the world of infrasound without being aware of it. Only special instruments can register them.

But without knowing that infrasound exists in the world, without hearing it, we can nevertheless suffer from it or, at best, experience very unpleasant sensations.

The fact is that some human internal organs have their own resonance vibration frequencies of 6-8 hertz. When exposed to infrasound of this frequency, resonance can naturally occur and cause unpleasant sensations, or even lead to serious consequences. Even low-power infrasound has a painful effect on the ears, makes the internal organs "vibrate" - it seems to the person that everything inside him vibrates (51, p.176).

While testing one of the infrasound generators, the researchers suddenly felt sick. Everything was vibrating inside them - stomach, heart, lungs. In neighboring laboratories people screamed in pain. The generator was turned off, but for several more hours they felt completely "broken". In the same laboratory, an infrasonic generator was created that was capable of destroying a building, although its power was only 2 kilowatts.

Destructive power of infrasound is manifested when the frequency of infrasound vibrations coincides with the natural (resonance) frequency of objects. What happens is approximately the same as in the case known from the school physics course when the bridge collapsed under the soldiers who were walking in step. It is natural, therefore, that work with infrasound and its study present a certain difficulty (51, p.177).

Sources of infrasound - infrasound generators. In principle, the generators resemble an organ pipe or a police whistle. Some of such structures have enormous power. In Gavreau's laboratory, a generator was made that emitted waves that were almost lethal to humans. Five minutes after this generator began to operate, its creators themselves began to experience excruciating pain. Infrasound with an intensity of 160 decibels directly affected human internal organs, and there was a real danger that it

could lead to internal hemorrhages. Another generator made here, although it had a much lower power, it was quite enough to cause cracks in the ceiling and walls of the room. According to Gavro's calculations the infrasonic source with a frequency of 7 hertz should have a diameter of about 7.5 meters. The power of such a monster would be 170 thousand times greater than the power of a police whistle.

These cases are special, associated with large doses of infrasound radiation. And the usual effect of its low impact on the human body is manifested in the form of "sea sickness", nausea, dizziness, fatigue, discomfort, headache, sometimes weakened vision.

Scientific studies have shown that infrasound is "present" almost everywhere, but, of course, in different doses. It is most felt, for example, in tunnels, where trains and cars MOVE, AS WELL AS under bridges and overpasses. Measurements have led to the conclusion that infrasound is amplified in rooms of small volume. Simply put, in an apartment, for example, it is more perceptible than outdoors (51, p.178).

Infrasound passes many obstacles without significant weakening, due to the fact that it has a very long wavelength. And here's a curious thing: infrasound is easily "masked" by audible sounds - noise. The noisier it is around us, the less "audible" infrasound is.

Infrasound of any frequency and intensity of man-made origin is one of the types of environmental pollution, harmful to human health. Unfortunately, nowhere in the world there are no scientifically established standards of infrasound radiation, deviation from which entails adverse effects on the human body. But researches in this direction are intensively conducted on the background of infrasound research in general. For example, in our country the Research Institute of Construction Physics (NIISF), the Moscow Research Institute of Hygiene named after F.F. Erisman and the Moscow State University are engaged in it (51, p179).

Experiments conducted on the laboratory staff and records of eye muscle biocurrents during convulsive twitches, usually associated with loss of balance, confirmed the hypothesis of balance organ dysfunction. People in all such cases experience the same sensations: mild nausea, a feeling of rotation, involuntary rotation of the eyeballs, and, finally, a feeling of some discomfort. All these symptoms indicate disturbance of balance organs functions when a person is exposed to infrasonic vibrations in the frequency range of 2-10 hertz.

Responses of the organism were studied at two operating modes of infrasound source: the first one - at frequency of 6 hertz with power of 142 decibels; the second

one - at frequency of 2 hertz with power of 150 decibels. Analysis of biofeedback records showed that in the second mode more significant disturbances of the balance organs functions were observed. In this case people experienced an acute sense of loss of balance and a strong feeling of nausea.

Impressive results were obtained by the American scientist Dunn. He noticed that pilots and astronauts exposed to artificially created infrasound were slower to solve simple arithmetic problems than usual. There is speculation that various anomalies in the human condition during bad weather, attributed to climatic conditions, are in fact a consequence of exposure to infrasound waves. Much evidence suggests that some animals may serve as reliable biopredictors of earthquakes, since the nucleation of earthquake centers is accompanied by the emission of unusually long waves, which animals can sense before the earthquake itself erupts. Some scientists suggest that infrasound has a strong influence on human psyche (51, p.181).

At an intensity level of infrasound radiation of 118 decibels and frequency of 7 hertz, there was a peak associated with such phenomena as dizziness, drowsiness and loss of balance. Studies of internal organ dysfunctions of people exposed to infrasonic vibrations suggest that infrasound is potentially dangerous to human health. It contributes to the loss of sensitivity of the body's balance organs, and this leads to ear and spine pain and brain damage. Probably even more damaging are the psychological effects caused by infrasound, which is constantly present in the atmosphere, although outwardly it seems to us perfectly calm.

It is impossible to study infrasound without devices that register infrasound waves. Since the wavelength of infrasound is long (for example, at a frequency of 7 hertz it is equal to 48.5 meters), conventional microphones do not register such vibrations. Therefore, infrasound detectors were developed to register infrasound, which are quite complicated by design (51, p.182).

Academician V.M. Kandyba confirms that infrasound emitters with a frequency resonant to the frequency of human internal organ vibrations pose an increased danger. This causes severe pain, a person can go blind, death is also possible. But infrasonic radiation can easily penetrate through thick walls and over long distances (52, p.103).

Obtaining ultrasound

Ultrasonic transducers

When it comes to oscillations (mechanical, electrical, electromagnetic, light, etc.), it is necessary to separate two main processes: the emission of oscillations and their reception. For example, a radio transmitter through a transmitting antenna radiates electromagnetic oscillations into the ether, and a radio receiver receives these oscillations. In both cases, we observe the process of transformation of one kind of energy into another. In the transmitting device, electric oscillations are converted into electromagnetic ones, and in the receiving device, electromagnetic oscillations are converted into electric ones. Similarly, ultrasonic transducers are devices which convert electrical energy into mechanical energy (when emitting ultrasonic vibrations) and, conversely, mechanical energy into electrical energy (when receiving ultrasonic vibrations).

Ultrasonic transducers are distinguished by their purpose. Devices that emit ultrasonic vibrations are called ultrasonic transducers.

Devices designed to record ultrasonic vibrations are called ultrasonic receivers. Depending on the form of energy input (mechanical or electrical) emitters can be divided into two main groups: mechanical and electromechanical (magnetostrictive, piezoelectric, electrodynamic).

Mechanical transducers

At present, among the mechanical transducers the most widely used are ultrasonic whistles, liquid generators, hydrodynamic emitters, gas-jet emitters and sirens. They are all used to create ultrasonic vibrations in liquids, air and gaseous media. Mechanical radiators operate in a wide frequency range (20-200 kHz (55, p.7-8)).

The principle of action of the ultrasonic generator is almost the same as that of a conventional police generator, but its size is much larger. A stream of air at high velocity crashes against the sharp edge of the inner cavity of the generator, causing oscillations with a frequency equal to the natural frequency of the resonator. By changing the size of the resonator, you can change the frequency of oscillation. Reducing the size of the resonator leads to an increase in the frequency of oscillation. By means of an ultrasonic generator it is possible to create vibrations with a frequency of up to 100 kilohertz. The power of such a generator is small, so in order to obtain greater power gas-jet generators are used, at which the speed of flow of air or gas is much higher. The jet generator is simple in design, but has a small efficiency.

Liquid oscillators are used to emit ultrasound into the liquid. In liquid oscillators (Fig. 1) as a resonant system is a double-sided tip, in which the bending vibrations are excited. The liquid jet, coming out of the nozzle at high speed, smashes against the

sharp edge of the plate, on both sides of which there are eddies, causing a pressure change with a high frequency.

The liquid generator requires a liquid overpressure of 5 kG/cm^2 (55, p.8).

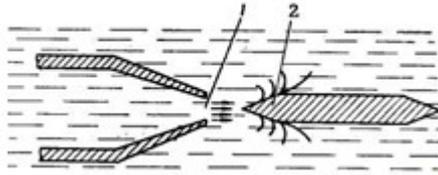


Fig. 1. Operating principle of liquid generator: 1-nozzle; 2-plate

Many processes use an ultrasonic siren with two discs placed in a chamber. Each disc has a large number of holes. The air entering the chamber under high pressure exits through the holes of both discs. When the inner disc (rotor) rotates, its holes will coincide with the holes of the outer disc (stator) only at certain times. As a result of rotation, air pulsations will occur. The higher the rotor speed, the higher the pulsation frequency. The power and efficiency of the siren is much higher. If a absorbent cotton is placed in the radiation field of such a siren, it will ignite, and the steel shavings will heat up to redness (55, p.9).



Fig. 2. Ultrasonic mechanical transducers

Electromechanical (electroacoustic) transducers are widely used in industry and in scientific research. Design features of electromechanical transducers allow their use at high frequencies. Ultrasonic electromechanical transducers are more stable in operation than mechanical ones. According to the principle of operation electromechanical transducers are divided into electrodynamic, piezoelectric and magnetostrictive.

Electrodynamic transducers are based on the principle of interaction of a conductor through which an alternating current flows with a magnetic field. Currently, electrodynamic transducers are rarely used, so they are not considered in this paper (55. p.10).

To manufacture piezoelectric transducers, plates are cut from quartz crystals so that their planes are perpendicular to one of the three electrical axes (X-cut). Such plates emit longitudinal waves that propagate well in solids, liquids and gases. Plates with U-cut are used when it is necessary to obtain transverse waves. Z-cut plates have no piezoelectric effect.

The piezoelectric effect can be direct and inverse. If electrodes are attached to a quartz plate on both sides and connected to a sensing device, an electric charge will arise when the plate is compressed, and when it is stretched, the charge will be of the same magnitude, but opposite in sign. Consequently, the appearance of charges on the faces of the plate under mechanical action is called *the direct piezoelectric effect*. The electric polarization is directly proportional to the mechanical voltage, the sign of which depends on its direction:

$$e = dF,$$

where e is the value of the electric charge;

d is a constant called the piezoelectric modulus;

F is the force causing mechanical stress, in *dyn*.

The principle of the direct piezoelectric effect is used in the manufacture of receivers of ultrasonic vibrations, which convert mechanical vibrations into electric ones, i.e. into alternating current.

If an electric charge is applied to the electrodes of a quartz plate, its dimensions will increase or decrease depending on the polarity of the charge applied. The greater the charge, the greater the deformation of the plate. When the signs of the applied voltage change, the quartz plate will shrink or unshrink, i.e. it will oscillate in time with changes in the signs of the applied voltage. The change in the size of the plate under the action of electric charges is called *the inverse piezoelectric effect*. The change in the thickness of the plate under the action of electric charges is proportional to the applied electric voltage:

$$\Delta t = dU,$$

where Δt is the change in plate thickness;

d - piezoelectric module;

U is the applied voltage in absolute electrostatic units.

The principle of the inverse piezoelectric effect is used in the manufacture of ultrasonic vibration emitters, which convert electrical vibrations into mechanical vibrations.

The piezoelectric emitter and receiver can be represented as a single device that alternately emits and receives ultrasonic vibrations. Such a device is called an ultrasonic piezoelectric transducer (55, p.10-11).

Ultrasonic piezoelectric transducers are used in ultrasonic flaw detectors, express analyzers, level meters, flow meters, echo sounders, fish finders, medical and other devices. Piezoelectric transducers have a great future in space exploration and, in particular, in preparation for human flight to other planets. In order to go on an interplanetary voyage, it is necessary to have accurate data on the meteor danger. This task is performed by piezoelectric transducers that register the appearance of even microscopic meteors.

Quartz has long been one of the main materials for ultrasonic transducers. It is very resistant to high temperatures, melts at 1470 ° C, and loses its piezoelectric properties at 570 ° C. But quartz cannot withstand large mechanical loads, it is very fragile. That's why specialists suggested another crystal - segnet salts. Its crystals can be easily grown artificially and processed. Moreover, compared with other piezo-

crystals, including quartz, the segnet salts have a much greater piezoelectric effect. The smallest mechanical impact on the plate of segneous salt leads to the appearance of electric charges. However, the segmented salt also has serious drawbacks that limit its practical application. First of all, this is the low melting temperature (about 60°C) at which the segnet salt loses its piezoelectric properties and no longer regenerates them. Segnet's salt dissolves in water and is therefore afraid of moisture.

Much research on new piezoelectric materials was carried out during World War II. They were caused by the "quartz hunger" that arose as a result of the widespread use of piezo quartz in hydroacoustic devices and in military radioelectronics. During the Second World War, crystals of ammonium dihydrophosphate were used to manufacture piezoelectric transducers. This material is very stable in its physical parameters, has a high electromechanical coupling coefficient, and allows operation with high power and in a wide frequency range.

Of the new piezoelectric materials, ammonium phosphate, lithium sulfate, and potassium dihydrophosphate have long been used. In hydroacoustic transducers these materials were used in the form of mosaic packages. However, all piezo-crystals have one common disadvantage - low mechanical strength. Scientists began a persistent search for a substitute for piezo-crystalline materials that would be close to them in piezoelectric properties and would not have their disadvantages. And such a substitute was found (55, p.11-12).

Soviet scientists under the leadership of Boris M. Vul, Corresponding Member of the USSR Academy of Sciences, created a substance endowed with amazing and valuable properties, and called it barium titanate. In the bowels of the earth it is very rare, so it is produced artificially. A mixture of two minerals (barium carbonate and titanate dioxide) is burned at a very high temperature. The result is a yellowish-white mass, which looks and has mechanical properties similar to those of ordinary clay. This mass can be given any shape and size. Like any ceramic product, it will be mechanically strong and insoluble in water.

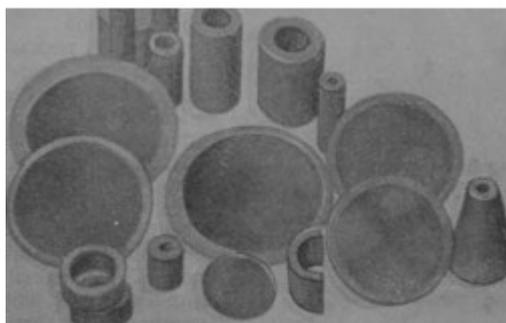


Fig. 4. Piezoceramic transducers

But barium titanate has no piezoelectric properties, and it must be given these properties artificially. For this purpose, the annealed mass is placed in a strong electric field and then cooled. Under the influence of the electric field barium titanate crystals

are polarized, their dipoles occupy the same position, and after cooling they are fixed (as if "frozen") in this position.

The piezoelectric effect of barium titanate is 50 times greater than that of quartz, and its cost is 100 times less. It is important that there is an unlimited supply of raw materials for making barium titanate transducers. The disadvantage of barium titanate is high mechanical and dielectric losses, which leads to its overheating, and at temperatures above 90° C the intensity of radiation decreases significantly. Practically, piezoceramic transducers are made as flat, spherical and cylindrical structures (Fig. 4) (55, p.12-13).

Research and design organizations have developed and manufactured ultrasonic piezoelectric transducers designed to intensify chemical, electrochemical and other processes. Piezoelectric transducer is one or more connected in a certain way individual piezoelements with a flat or spherical surface, glued to a common metal plate with a thickness equal to half the wavelength of ultrasound in the metal. To remove the heat generated by the piezo elements (if necessary), the transducer body is filled with oil, which is cooled by a coil with flowing water.

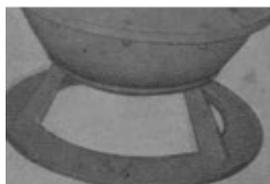


Fig. 5. Ultrasonic piezoelectric concentrator

In technological applications, the transducer is lowered into the irradiated volume or is a structural element of the device (bottom, wall, etc.). Application of the device with piezoelectric transducer allows, for example, to intensify processes of aerosol coagulation, cleaning, dispersing, emulsification, electrodeposition, etc. To obtain greater radiation intensity they use focusing piezoelectric transducers or concentrators, which may have various shapes (hemispheres, parts of hollow spheres, hollow cylinders, parts of hollow cylinders, etc.). Such transducers are used to obtain powerful ultrasonic vibrations at high frequencies. Intensity of radiation in the center of focal spot of spherical transducers exceeds by 50-150 times the average intensity on the radiating surface of the transducer.

Fig. Figure 5 shows ultrasonic piezoelectric concentrator developed by the Acoustics Institute of the USSR Academy of Sciences. It can be used in scientific

research in the processes of emulsification, dispersion, coagulation, atomization, etc. (55, p.13-14).

Ultrasonic piezoelectric transducers are characterized by the following main parameters: power consumption, pulse power, pulse repetition frequency, pulse duration, acoustic power and loss power, efficiency, radiation intensity, resonance and frequency characteristics, total electrical and equivalent impedance.

Parameters of piezoelectric transducers are determined by calculations according to formulas and checked experimentally (55, p.14-15).

Magnetostrictive transducers

As early as 1847, Joule noticed that ferromagnetic materials placed in a magnetic field change their size. This phenomenon was called the magnetostriction effect, or magnetostriction.

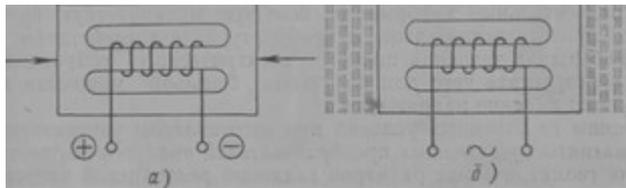


Fig. 6. Magnetostrictive effect: *a* - inverse; *b* - direct

There are two types of magnetostriction: linear, in which the geometric dimensions of the body change in the direction of the applied field, and volumetric, in which the geometric dimensions of the body change in all directions. Linear magnetostriction is observed at much lower magnetic field strengths than bulk magnetostriction. Therefore, linear magnetostriction is practically used in magnetostrictive transducers.

The magnetostrictive effect, like the piezoelectric effect, is reversible. If an alternating current is passed through a winding applied to a ferromagnetic rod of a certain composition (Fig. 6, b), the rod will deform (lengthen and shorten) under the influence of a changing magnetic field - a *direct magnetostrictive effect*. Nickel cores, unlike iron cores, shorten in the magnetic field. When alternating current is passed through the winding of the emitter, its core deforms uniquely (in one direction) in any direction of the magnetic field. Therefore, the frequency of mechanical vibrations will be twice the frequency of alternating current flowing in the winding.

To match the frequency of the transmitter to the frequency of the excitation current, a constant polarization voltage is fed into the winding of the transmitter. In a

polarized transmitter, the amplitude of the alternating magnetic induction increases, which leads to an increase in the deformation of the transmitter core and, consequently, an increase in power.

If the rod of ferromagnetic material, on which the winding is superimposed, is compressed or stretched (see Fig. 6, a), its magnetic properties will change, and an alternating current will arise in the winding - the inverse magnetostrictive effect. (55, c.15-16).

Direct magnetostrictive effect is used in the manufacture of ultrasonic magnetostrictive transducers, which are an indispensable element of any ultrasonic technological installation. Magnetostrictive transducers compared with piezoelectric ones have larger relative strains, greater mechanical strength, are less sensitive to temperature effects, they have small values of total electrical resistance, as a result of which high voltages are not required to obtain high power.

One of the main conditions in the manufacture of ultrasonic magnetostrictive transducers is the correspondence of their geometric dimensions to a given resonant frequency.

When manufacturing magnetostrictive transducers, not only the geometric dimensions are determined, but also the material of the transducer, its design and manufacturing technology are taken into account.

For the manufacture of magnetostrictive transducers, nickel, permendur, alfer and ferrite are mainly used. Permendur (49% cobalt, 49% iron, 2% vanadium) has the greatest magnetostrictive effect. In addition, permendur can operate at elevated temperatures. An alloy of platinum and iron (32% platinum, 68% iron) has an even greater magnetostrictive effect, but it is practically not used because of its high cost (55, p.15-16).

Nickel transducers are most commonly used in ultrasonic applications. The magnetostrictive properties of nickel are much lower than permendur, but it is cheap and has a high resistance to corrosion.

Good magnetostrictive properties have iron-aluminum alloys - alpers with 12-14% of aluminum. Alfer has a high specific electrical resistance, so energy losses to eddy currents are insignificant. However, the difficulties associated with rolling this material and its brittleness limit its practical application (55, 15-16).

Magnetostrictive cores can also be made of ferrites (Fig. 7), the properties of which are highly dependent on the components (nickel, iron, zinc oxides). Ferrites have a high resistivity, as a result of which the eddy current losses in them are negligible.

Properties of ferrite are resistant to temperature changes and vary insignificantly within the range of 30-120 ° C. But ferrites have a disadvantage - low mechanical strength, which causes the danger of their overloading when working in oscillating systems of high power. The mechanical stresses that arise in the material lead to the formation of cracks and then to the destruction of the transducer.

The magnetostrictive effect is largely dependent on temperature. The temperature resistance of different materials is not the same. For nickel transducers the magnetostrictive effect decreases by 20-25% when heated to a temperature of 100-150° C, and at 353° C (Curie point) it disappears altogether. For alfer, the Curie point is around 500° C (55, p.16-17).

The most heat-resistant transducers are made of per- mandre, capable of withstanding temperatures above 900° C.

In the U.S., research is being conducted to improve the efficiency of magnetostrictive transducers. One firm has developed a low-loss magnetostrictive transducer. Vanadium-permendure (iron-cobalt alloy with a small content of vanadium) is used as an active material. This converter is a ribbon of permendur coiled in the form of a cylinder, with an insulating gasket. In the new transducer the entire magnetostrictive material is excited. In a conventional transducer, no more than 70% of the material is excited. A conventional magnetostrictive transducer is structurally a package made of thin plates of nickel, permendur or alfer, 0.1-0.2 mm thick, which are insulated between each other by lacquering or oxidation. Transducers can be single- and multi-strand. The most widely used are multi-rod converters, in which the magnetic flux is short-circuited by means of a yoke or overlays.

The following three schemes can be used to excite magnetostrictive transducers that use the longitudinal magnetostriction effect.

With open magnetic flux (Fig. 8, a). Such a scheme can be used in low-power installations.

With a closed magnetic core by means of a fair (Fig. 8,6). The excitation winding is superimposed on the central core, and the submagnetizing winding on the side halves of the fair. In such a scheme, the losses on the dissipation fluxes are less. But, despite the relatively high efficiency, converters assembled according to this scheme are cumbersome (55. p.17-18).

With a closed (inside the package) magnetic circuit (Fig. 8, c). Plates for the package CAN be with one or more windows. With one window you get a two-rod

package, with two windows - a three-rod package. On the rods formed in this way the winding is superimposed.

For the manufacture of powerful magnetostrictive transducers it is advisable to use a circuit with a closed magnetic circuit, as in this case there will be less losses, a more compact design and better conditions for cooling (55, p.18-19).

The efficiency index of nickel magnetostrictive transducer for machining hard and brittle materials is not less than 0.5, and that of permendur transducer - not less than 1.1.

Ultrasonic non-contact vibrometers are used to measure the parameters of ultrasonic transducers working in the air, in water, in the presence of strong electromagnetic fields. Vibrometers can be used to measure the amplitude and frequency of vibration, to determine the shape of vibration, to study the frequency spectrum of vibration, to study the distribution of displacement amplitude on the surface of elastic vibration transformers, to oscillograph short-term and nonstationary processes in transducers, to take frequency characteristics of transducers, to observe the phase relations of displacement of different points of complex vibration systems, to study the losses in materials (55, 18-19).

Ultrasonic generators

Ultrasonic generators are designed to convert industrial frequency current into high frequency current and to power electroacoustic transducer systems {piezoelectric and magnetostrictive). Ultrasonic generators are divided into machine, tube and semiconductor.

Machine generators, or more precisely machine converters are designed to operate at frequencies up to 20 kHz and power, as a rule, exceeding 3-5 ket. Machine transducers are simple in design and economical, but they are not widespread in ultrasonic technology due to low frequency stability and difficulty of frequency control, as well as the difficulty of obtaining frequencies over 20 kHz without additional devices - frequency multipliers (55, p.25-26).

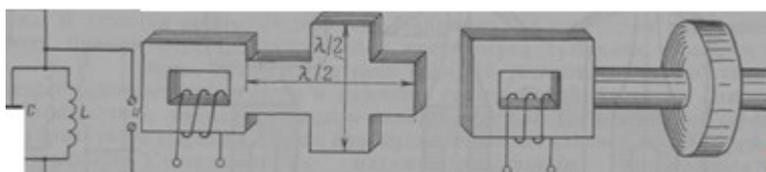


Figure 13: New magnetostrictive transducers

In most cases for excitation of mechanical vibrations of ultrasonic frequency in transducers lamp generators are used, the feature of which is that they allow to change the frequency in a wide range, have greater efficiency in comparison with machine ones and can be made in a wide range of power - from a few tens of watts to tens of kilowatts.

Recently, ultrasonic oscillators on semiconductor triodes and controlled gates have gained great recognition. The advantage of them is obvious - much smaller size, increased reliability in operation and frequency stability, as well as meeting the modern requirements of technical aesthetics.

The ultrasonic generators are subject to the following requirements: high efficiency, frequency stability and the possibility of smooth frequency control in a given range; the possibility of output power control, reliability, small dimensions, ease of maintenance, etc. (55, p.26).

Ultrasonic generators with independent excitation are easy to adjust the frequency smoothly. In addition, such generators have a high frequency stability.

Domestic industry has developed and manufactured ultrasonic generators of different power depending on their purpose. According to this feature ultrasonic generators can be divided into generators of low power (100 - 600 W), medium and high power (more than 1 kW) (55, p.28-29).

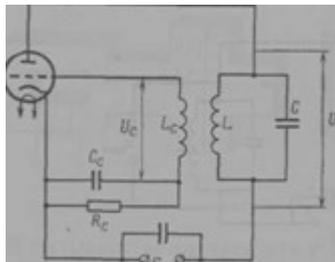


Fig. 15. Simplified scheme of ultrasonic generator with self-excitation

Cavitation is, in turn, a complex set of phenomena associated with the emergence, development and slamming of tiny bubbles of different origin in the liquid. Ultrasonic waves propagating in liquid form alternating regions of high and low pressures, creating zones of high compression and rarefaction zones. In the rarefied zone, the hydrostatic pressure decreases to such an extent that the forces acting on the fluid molecules become greater than the intermolecular coupling forces. As a result of the abrupt change in hydrostatic equilibrium, the liquid ruptures, forming numerous tiny bubbles of gases and vapors that were previously in the liquid in a dissolved state. At

the next moment, when a period of high pressure occurs in the liquid, the previously formed bubbles slam shut. The process of bubble slamming is accompanied by the formation of shock waves with very high local instantaneous pressures, reaching several hundred atmospheres. The occurrence of cavitation can be observed visually by the appearance of a misty cloud of bubbles in the ultrasonic field. At high intensities of ultrasonic vibrations cavitation is accompanied by a hiss (55, p.36-37).

Ultrasonic cavitation in a liquid depends on its density, viscosity, temperature, molecular weight, compressibility, gas content, amount of foreign microscopic inclusions, frequency and intensity of ultrasonic vibrations, static pressure and other factors.

By purposefully changing some of these factors, it is possible to influence the activity of the cavitation process in the desired direction. For example, cavitation is stronger in water than in solvents. The presence of gas in the liquid increases the efficiency of cavitation phenomena. As the temperature of the liquid increases, the intensity of cavitation rises to a certain maximum, after which it begins to fall. Cavitation efficiency depends directly on the intensity of ultrasonic vibrations and inversely on their frequency. Cavitation cannot be obtained at very high ultrasonic frequencies. In the intensification of the process of ultrasonic cavitation of great importance is the selection of certain ratios between the intensity of ultrasonic vibrations and excess static pressure in the liquid (55,p.36-37).

Ultrasonic vibrations cause the phenomena of cavitation and oscillation of molecules. In addition, the absorption of ultrasonic waves by the liquid causes heating of the liquid (55, p.204). The phenomenon of cavitation, intense oscillation of molecules and heating of the liquid is a strong striking factor, because humans are 90% water (52, p.112).

The action of ultrasound consists of several factors: thermal, mechanical and chemical. Thermal effect is based on the absorption of ultrasonic waves by human body. The temperature of a living body is an evidence of the fact that there is a constant disorderly movement of particles in it. Ultrasound adds to it directional oscillatory motion. Part of the energy of ultrasound is absorbed and transformed into thermal energy, and the tissue is heated not from the upper layers, but throughout the whole volume evenly.

The mechanical action is a kind of micro-massage of cells and tissues, which results in their compression and stretching. In this case the displacement of the particles is small, the speed of movement is also small.

Finally, the physicochemical effect consists in changing the course of redox processes, accelerated uncoupling of complex protein complexes to ordinary organic molecules, and activation of enzymes (55, p.228).

Using ultrasound's good focusing ability, scientists proposed its application in neurosurgery. An ultrasonic focusing device can destroy individual sections of nerve cells without damaging others. The device creates a very high sound pressure in the focal area. The focal distance of the device can be varied during operation and therefore any operated area can be selected in depth without damaging the upper layers.

Experiments carried out in one of the laboratories of the Academy of Sciences of the USSR showed that with the help of powerful ultrasound radiation it is possible to destroy (55, p.230) almost any tissue of the human body.

Local heating of tissues under intensive and prolonged exposure to ultrasonic radiation can lead to overheating of biological structures and their destruction (58, p.782).

Frequencies above 20KHz people can not hear, but ultrasound affects the human material and inaudible range (unpleasant sensations arise with the power of radiation - from 110 dB (decibels), pain threshold, traumatic - from 130 dB (decibels), fatal - from 180 dB (decibels). In ultrasonic weapons the radiation power of 200 dB (decibels) is used to reliably destroy people. Both thermal and mechanical effects of elastic vibrations with frequencies higher than 100 kHz are used. Even this intensity of concentrated vibrations significantly affects the thinking structures and nervous system, causing headaches, dizziness, visual and breathing disorders, nausea, convulsions, and sometimes blackouts. Ultrasonic radiation has a very strong effect on the human psyche, which is what the military was interested in when creating the so-called psychotronic weapons. Such developments are carried out by medical institutions (Krasnoyarsk State Medical Academy, Krasnoyarsk Regional Psychoneurological Dispensary (Lomonosov street 1), psychiatric hospital, Krasnoyarsk Special Hospital-Policlinic of the Main Department of Internal Affairs (Karl Marx street 128) etc.), and serially acoustic (infrasound, ultrasound) weapons are produced for military use at Krasnoyarsk machine building plant. Devices for such effects are not difficult to make yourself, but only with proper technical training. "Hardening" of selected areas of the brain by well-focused ultrasound is sometimes used for irreversible removal from the memory of some unwanted memories, but this is possible only with the use of perfectly trained personnel and special equipment used in medicine. Radiators striking with

ultrasonic radiation, which are in service of Defense Ministry and Federal Security Service of the Russian Federation, are classified. Directed pulse of ultrasonic radiation can suddenly stop the heart of any person. Ultrasound passes well through obstacles. The frequencies from 20 kHz to 1 MHz are considered dangerous (43, p.190; 32, p.132; 33, p.375).

To combat terrorism in air transport on the basis of military research an ultrasonic weapon of relatively small dimensions was developed, which in shape resembles a shotgun no longer than one meter long, the ultrasonic emitter operates in pulse mode and strikes a person in a split second, just as when a shot is fired from a firearm. After the shot, the sound begins to grow until it reaches 140 decibels (it is 20 times greater than the value after which the sound becomes painful). The advantage of this weapon is that by effectively striking human material, ultrasound does not damage aircraft plating or other objects.

Very effective in covert influence on a person is the use of mechanical resonance of elastic vibrations with frequencies below 16 Hz, which are not perceived by ear. The most dangerous here is considered to be the interval from 6 to 9 Hz. Significant psychotronic effects are strongest at the frequency of 7 Hz, which is consonant to the alpha rhythm of the natural vibrations of the brain, and any mental work in this case is made impossible, as it seems that the head is about to burst into small pieces (43,p.191; 33,p.375).

The use of infrasound emitters with a frequency resonant to the frequency of the internal vibrations of human internal organs causes severe pain, people can go blind, death is possible. Infrasound radiation penetrates through thick walls and over long distances (26,p.90).

During special experiments on highly evolved biological objects it was discovered that at such intensity of infrasound the object tends to escape from the affected zone. When the intensity of irradiation was increased, the instruments recorded a sharp increase in heartbeat, the object began to rush in different directions. Then the amplitude of cardiac oscillations sharply increased, blood vessels could not withstand it and burst.

The conclusions drawn from such experiments are as follows:

- Infrasound vibrations correctly modulated signals of even low intensity cause nausea and tinnitus, as well as visual impairment and unconscious fear;

- Moderate intensity fluctuations can cause digestive disorders, brain dysfunction with the most unexpected consequences, paralysis, general weakness, and sometimes

blindness;

-High-intensity infrasound, resulting in resonance, leads to the disruption of almost all internal organs, and can be fatal due to cardiac arrest or the destruction of blood vessels (31, p.39).

Infra-frequencies about 12 Hz at 85-110 dB induce seasickness and dizziness, and vibrations of 15-18 Hz at the same intensity cause anxiety, uncertainty, and, finally, panic fear. Usually unpleasant sensations begin at 120 dB of intensity, traumatic at 130 dB, deadly at 180 dB (32,p.133; 43, p.191; 33,p.375).

Many vital human organs are like biological oscillatory circuits and resonators (have their own frequency of oscillations in the range from 1 to 100 Hz) (34, p. 146).

"The use of infrasound waves at frequencies measured in units of Hertz, as repeatedly reported in the literature, makes it real to create weapons that affect the psyche and human body" - wrote academician A.V. Fokin in his article "to prohibit the development and production of new types of weapons of mass destruction". And if we consider the ability of infrasound to penetrate through brick, concrete and armor, it is logical to create weapons extremely effective against humans. Therefore, the scientist's call to ban its development is very timely (31, p.40).

Other scientists do not consider physiologically justified the use of frequencies that can have resonant or infrasound vibrations on internal organs, lead to anxiety and fear, destruction of vascular walls.

The effect of the "Jericho pipes" is a harmful biological effect and cannot keep a person healthy (34,p.146).

The first practical consequence of these discoveries was the emergence of international standards limiting the emissions of household appliances.

In the Russian Federation, the main document ensuring human safety from the effects of various types of radiation is the Law "On the Sanitary and Epidemiological Welfare of the Population" and the Sanitary Rules and Norms (SanPiN), Sanitary Norms (SN) established in accordance with this document.

SanPiN 2.2.4/2.1.8.055-96 Electromagnetic radiation of the radio frequency range (EMR RF)

SanPiN 2.2.4/2.1.8.582-96 Hygienic requirements for work with sources of air and contact ultrasound, industrial, medical and domestic purposes

SanPiN 2.1.2.1002-00 Sanitary and Epidemiological Requirements for Residential Buildings and Premises

CH 2.2.4/2.1.8.583-96 Infrasound in the workplace, residential and public areas

Sanitary norms (SN) of ultraviolet radiation in industrial premises (OSPORB-99)

Basic Sanitary Rules for Radiation Safety SP 2.6.1.799-99

Ionizing radiation, radiation safety (NRB-99)

Radiation safety standards SP 2.6.1.758-99 Ionizing radiation, radiation safety

Special consideration should be given to so-called non-lethal weapons.

"Nowadays, the military and political leaders of most Western countries believe that the types of weapons and the methods of their use must be adequate to the scale of hostilities. The resolution of interethnic and other conflicts, as well as conventional military operations, requires completely new types of weapons, the use of which does not cause irreversible damage to the manpower and equipment of the enemy or conflicting parties and does not entail the destruction of property and loss of life.

In this connection, the idea of developing non-lethal weapons, first put forward in the United States and actively supported by many public figures, is being intensively promoted. The broad field of application of such weapons to combat terrorism, smuggling, and drug trafficking has given additional impetus to their development.

The term "non-lethal weapons" today refers to means of impact on people and equipment created on the basis of chemical, biological, physical and other principles, which render the enemy incapacitated for a certain period of time. Preliminary studies in this area date back to the 1980s, but at the time they were rather incidental in nature. In the early 1990s, NATO countries (the United States, and later Great Britain, Germany, France and a number of others) began to work on the basis of individual military applications research. Later, a special working group was formed to coordinate them. According to foreign sources, individual prototypes have already been created. The table in annex 3 contains data on some types of such weapons.

In the process of further improvement of non-lethal weapons it is envisaged to reduce their mass-size indicators, increase efficiency, expand the possible number of targets to be hit, create combined samples. According to Western military experts, this will increase its mobility and range, and expand the kill zone

Some non-lethal weapons have been tested in armed conflicts in Somalia, Haiti, and Iraq. For example, electromagnetic weapons were used during Operation Desert Storm.

This led to short circuits in the electrical circuits of power plants and power lines, ultimately disrupting the power supply to Iraq's command and control and air defense systems during the crucial period of the operation.

So how are the prospects for the development of various types of non-lethal weapons assessed? Some Western experts make very optimistic predictions. A far from complete list of possible applications of these weapons includes the defeat of personnel on the battlefield by laser weapons, setting up barriers with foam forming compositions and spraying inhibitor gases over columns of the advancing enemy's armored vehicles, mass impact by electromagnetic and acoustic weapons on defending units and subunits that are in shelters. In doing so it achieves a significant reduction in effectiveness and may even lead to the cessation of hostilities by the opposing side for a time, as the personnel and equipment are rendered incapacitated. The control of weapons and troops is also lost, but most importantly, the destruction of populated areas is avoided and the lives of many civilians are preserved.

Western experts say the advantages of this weapon are its stealth and rapid deployment, noiselessness and sudden use. All this makes it very difficult to detect and counteract the enemy. In addition, even in anticipation of the use of such weapons there is a strong psychological impact on human behavior, resulting in emotional instability and anxiety, insecurity and unconscious fear, the desire to quickly get out of the danger zone and hide. This inevitably leads to a sharp increase in stress loads and possibly panic.

Along with supporters of the development of all the above-described non-lethal weapons in the West there are also some military theorists who believe that only such types as laser, electromagnetic and informational weapons can be adopted in the armed forces. The possibility of equipping regular armies on a large scale with chemicals (foaming compositions, inhibitors, activators, etc.) is highly doubtful for them.

According to foreign experts, in local conflicts and peacekeeping operations non-lethal weapons should be used independently, and in large military operations they can serve as a tool to influence both advancing and defending enemy to enhance the effect of traditional means of fire. Moreover, in special operations it is recommended to use it to disable enemy rear facilities and communications.

However, some military experts do not share this opinion, believing that not all forecasts are based on the real situation and that it is too early to talk about the practical implementation of the intentions of the developers of non-lethal weapons. According to skeptics, it will probably be effective, but it has not yet been tested and tested in practice. In addition, it is still difficult to assess the costs associated with production and use. Moreover, the term "non-lethal weapons" itself does not accurately reflect the nature of their impact and consequences of their use, since some of their types cause

mass diseases in humans and animals (often fatal), irreversible damage to eyes and internal organs, leading to disability, contamination of vegetation and terrain, which can have long-term consequences. Of particular concern to scientists working in this field is the possibility that the production and use of non-lethal weapons could get out of the government's control.

Specialists are also seriously concerned about the international legal aspects of the use of chemical formulations, biological agents, and lasers. This stems from the need to comply with the 1972 International Convention on the Prohibition of the Use of Chemical and Biological Weapons. They see the way out as minimizing the harmful effects of these weapons on the environment and adopting strict regulations to govern their use. A number of questions arise concerning how to conduct combat operations using non-lethal weapons, especially in adverse climatic and meteorological conditions and at low concentrations of components, as well as how to respond to countermeasures taken by the enemy.

To protect personnel from the effects of high energy laser and electromagnetic weapons and other radiation, from which neither armor nor shelter can save them, aerosol curtains, devices allowing to determine the moment of exposure and the dose received, special glasses, and clothing are being created, *among other things*. In addition, it became necessary to form special subdivisions, which must be equipped with control and measuring equipment, as well as sets of individual and collective protection equipment.

In Great Britain, a device is being created whose explosion only temporarily incapacitates people, but destroys electronics. Instead of a shock wave, a radio wave of high frequency and enormous power is propagated from the point of detonation of such a bomb. The microwave bomb will explode in the air, above the target. After that all the surrounding computers will burn out or at least stop working, TV and radio lines, power lines and other power supply circuits in the area will be broken. On people a powerful pulse of electromagnetic energy will act practically in the same way as on devices - to interrupt for a short time the communications of the body, to disable nerve cells (including the brain). As a result, the victims will naturally shut down: they will be unconscious for some time. But since living organisms are designed by nature with a much larger margin of safety, experts believe, most people will wake up without feeling any particular consequences.

The main element of the bomb is a cylindrical resonator encased in ordinary explosives. When exploded, the standing electromagnetic wave from the resonator

becomes a running wave in a fraction of a second, and thus becomes a powerful energy carrier. Different modifications of these bombs may also contain chemicals, such as those that "eat" the tires of aircraft chassis or a kind of biological weapon - microbial spores that turn liquid fuel into jelly. The development of such a bomb is only part of the "humane weapons" program. It is true that not all of them will be so harmless to humans. For example, British warships already have laser emitters capable of blinding the pilot or navigator of an attack aircraft or helicopter. The vision will never be fully restored, but at a certain power of the beam, there is a chance that the person will go completely blind.

The International Red Cross and similar organizations insist on a strong ban on such emitters, which violate, as their representatives claim, the Geneva Convention. However, the bomb does not fall under the existing provisions of the convention. Therefore, it is not surprising that, according to the latest data, similar weapons are being actively developed in the secret laboratories of the United States and Russia (52, p.191-192).

The current trend of expanding the use of opto-electronic means of warfare to facilitate the search and detection of the enemy in difficult meteorological and night conditions, as well as their use of various methods of camouflage, has determined one of the important research areas in the general complex of works being conducted abroad to create new weapons models. This direction is the development of laser weapons for tactical purposes, which will allow to disable optoelectronic devices and to hit unprotected organs of vision of personnel, which are almost ideal targets for them.

U.S. military research indicates that laser-based instruments (e.g., rangefinders, target designators, simulators and simulators) under certain conditions pose a very serious hazard to human eyesight during combat training. To ensure safety when working with devices generating coherent laser radiation, special instructions and guidelines have been developed and protective equipment is used to avoid eye injury. In addition, programs to reequip the armed forces with new types of optoelectronic equipment will involve the use of laser radiation generators that are less dangerous for personnel.

On the contrary, to create effective laser weapon systems, the best option is to use lasers that produce radiation in those areas of the electromagnetic spectrum in which reconnaissance and detection optoelectronic devices and guided missile homing heads operate, as well as in those areas where the human eye has maximum spectral sensitivity. Experts consider the defeat of eyesight as the most promising direction of

personnel disablement during combat operations. This is explained primarily by the fact that the man is the final and main link in the system "machine (apparatus) - man". Besides in the modern battle a great number of binoculars, periscopes, night vision devices and other optical and optoelectronic devices are still used, by means of which the direct observation of the enemy is conducted. These devices incorporate optical elements which focus the falling radiation (for example, lenses), thus the probability of the damage to the eyes is significantly increased (52, p.205-206).

The optical system of the human eye freely transmits and focuses on the retina radiation of the visible (wavelength 390-780 nm) and infrared (up to 1.4 μm) spectrum ranges. In order to destroy the retina, much less temporarily blind a person, very low densities of laser radiation in these spectral bands are required. Many of the laser rangefinders and designators used by military forces around the world, with active elements based on yttrium aluminum garnet or neodymium ion activated glasses, operate at wavelengths as low as 1.06 μm , which represents a significant hazard. Radiation at longer wavelengths is considered less dangerous because it is absorbed by the vitreous body and cornea and requires energy density levels several orders of magnitude higher to affect them.

U.S. experts believe that even with a lateral (non-optical axis) hit to the eye by laser radiation and a pinpoint burnout of the retina, the damage could spread to the peripheral areas due to extensive hemorrhages. Damage to the area of the retina corresponding to a 5° field of view would make it very difficult to drive vehicles and armored vehicles, as well as to recognize details of objects on the ground, which in turn would cause serious difficulties for the personnel when aiming weapons of various types. In order to inflict such damage to the vision organs it is enough to have the power of radiation in the mode of continuous generation of only a few milliwatts or in a pulse of a few nanoseconds - a few microjoules of energy.

The current level of scientific and technological development already makes it possible to create portable laser weapon systems for tactical purposes. According to preliminary estimates, in various types of modern combat it will be able to cause temporary (up to 3 minutes) blinding of personnel within a radius of 1 km. This range imposes appropriate requirements on the energy and mass-dimensional characteristics of these weapons in their development. A significant factor here is the state of the atmosphere, determined, on the one hand, by the weather conditions during a certain period of combat operations and, on the other hand, by the dustiness and smoke content in certain parts of the terrain (52, p. 206). When modeling the process of laser

weapons application they are usually guided by the fact, that the negative influence of the atmosphere will reduce its effective range by at least 1%. However, the already available technological base allows increasing it up to 3 km with small mass-dimensional characteristics of a portable laser weapon, not limiting the possibilities of conducting combat operations.

The presence of laser weapons in units and subunits of the ground forces, specifically designed to blind the personnel, will have primarily a psychological impact on the enemy, who will be constantly aware of the possibility of damage to the visual organs. Furthermore, reconnaissance personnel using optics and optoelectronics have to overcome a psychological barrier, because there are real-life examples of enemy use of laser weapons with dire consequences for vision. A sudden flash of light hitting the eyes causes a person to have what looks like an epileptic seizure. The source of blinding flash could be placed in a 155mm cannon shell - based on explosive heating of inert gases. Laser "guns" mounted on armored infantry vehicles can dazzle the sights of the enemy and his soldiers, not just temporarily. The wide range of laser radiation renders protective goggles useless. This type of weapon is very convenient for committing various acts of terrorism. Having occupied a comfortable position near the runway of an aerodrome one could suddenly blind the crew of any aircraft taking off or coming in for a landing (particularly effective at night). As a result of loss of control the aircraft will inevitably crash into the ground. In the same effective way the driver of any vehicle can be blinded, which will inevitably lead to a serious accident (60, p.369). It would be rather difficult to prove the use of these weapons.

However, even such an undeniable advantage of laser weapons as an almost instantaneous action, which saves time in the rather complicated process of aiming, including the determination of the required prejudgment taking into consideration the wind speed and direction, the distance to the target and its movement parameters, could not solve the problem of target engagement control. The point is that the use of an invisible infrared beam makes it impossible to see whether the target has been hit or not by the laser. In that case, the degree of damage can be assessed only by looking at external target behavior on the battlefield. Western experts believe that this problem can be partially solved by reducing the requirements for targeting accuracy, as the beam divergence will make the diameter of the spot on the target range from tens of centimeters to several meters (depending on the range).

The possibility of creating laser weapons in the near future determines the need to develop effective means of protection requiring large investments. For example, such

means could be optical filters with high absorption coefficients of laser radiation (106) (52, p.206-207). However, they do not provide absorption of radiation in a wide range of the spectrum and operate, as a rule, only at a few wavelengths. Broadband filters, on the other hand, significantly absorb radiation in the visible spectrum range, making it difficult to routinely monitor the situation on the battlefield.

Active optical filters change their transmittance depending on the intensity of the laser light incident on them and are quite complex devices. Judging by their mass-size characteristics, they are not yet suitable for individual use by personnel. At the same time such devices, as well as quick shutters preventing access of radiation to sensitive elements of various equipment and vision organs when permissible energy levels are exceeded, can be successfully used as part of optoelectronic equipment of tanks, IFVs and other combat vehicles.

The first experimental prototype of a portable laser weapon, conventionally named "Daser", has been developed by the American company "Ellaid signals". It is based on an alexandrite crystal laser generator, which allows to change the wavelength of radiation in the range from 700 to 815 nm. The source of electric power is a nickel-cadmium rechargeable battery, placed in a pouch. The laser itself has the same dimensions as the American M16 automatic rifle. The total mass of the Daser hand-held laser weapon with battery is about 9 kg, and the cost of the production model is about \$50,000.

Another portable laser weapon, the Cobra, designed for use by ground forces, has been developed by the American firm McDonnell Douglas. "The Cobra's tactical and technical characteristics are roughly the same as the Daser.

According to American military experts, the created experimental models of laser weapons "Daser" and "Cobra" testify to the transition to a qualitatively new technological level of development of tactical systems. Moreover, according to their assessment, in the next century this type of weapon will play a great role in the course of combat operations (52, p.207-208).

Electromagnetic non-lethal weapons have very good prospects. Electromagnetic pulse generators, which use the energy of an ordinary rather than a nuclear explosion. They can be used to burn computer circuits, electrical equipment, power plants, air defense radars. These generators can be made the warheads of bombs and precision missiles.

Electromagnetic non-lethal weapons also include sources of microwave - ultrahigh frequency radiation. When exposed to people they disrupt the central nervous

system and the brain, cause a feeling of badly tolerated noise and whistling, affect human internal organs up to fatal outcome (60, p.368-369).

One of the most promising types of non-lethal weapons is considered to be acoustic weapons. It is known that infrasound with its low frequency when directed to people throws them into panic, deprives them of reason, causes heart and nervous system disorders. At the same time it perfectly penetrates through walls into the deepest shelters or bunkers, behind armor and bulwarks. The development of this type of weapon has been made in two directions. On the one hand, these are infrasound generators that act as "directional beams. On the other are infrasound "bombs" dropped on the enemy (60, p.367).

Such defeating properties of the products could not but interest the relevant agencies. I. Tsarev writes: "Publications began to appear in the press about design bureaus where devices for remote influence on human psyche were created; with reference to a former employee of the KGB it was reported about special generators with which some apartments in large cities were irradiated for a long time" (52, p.91). This information was fully confirmed (26, p.72). Both in Russia and in the United States security agencies have been experimenting with new technologies for more than half a century. Louis Slizen, editor of the American "Microwave News" magazine, writes: "The human body is an electrochemical system and the devices affecting it have already been created. Naturally, in our high-tech country, the military could not but be interested in such devices. Work in this field has been going on for more than 30 years and is surrounded by a veil of secrecy. Laboratories of some universities and five military research centers are engaged in it. In particular, the U.S. Air Force Electrochemical Laboratory plans to spend more than \$100 million on psi-weapons in the next five years.

Work on the creation of devices that allow to influence people not directly, but at a distance (and significant) was one of the first started by the military Institute for Radiobiological Research in Bethesda, Maryland (56, p.30). These experiments began as early as 1965, but scientists achieved visible results only by 1980, when special microwave radiation generators capable of sending commands to the human brain to control its behavior were created. And the control device is insignificant in size, i.e. it is easy to move it from one point to another. This miracle of military technology is called the pulse-wave myotron. If you send the radiation directly to a person from close range, you can completely suppress his will and paralyze him. The military see a great future for this device (56, p30-31). The Military of the U.S.S.R. tested the psychotronic weapons on human material on a large scale, as it was not common in the Soviet Union

to be ceremonious with people. Only in the 1990s it became known that in the Soviet Union top-secret research was authorized under the national program for "studying, implementation and technical testing of bioenergetic means of destruction in the interests of national defense and security". For this purpose, a number of research institutes opened branches that were controlled by the secret services. Astronomical sums were allocated for the existence of these branches, institutes and departments. It is difficult to estimate how many people were exposed to illegal and clandestine radiation even now since the tests of psychotronic weapons continue in Russia (56, p.46) (62, p.77).

There are known facts of works on creation of generators of high-frequency and low-frequency coding of brain, biolocation installations, on use of chemical and biological means in order to create controlled human material. Processing of test subjects begins with suppression of their ability to resist. This is the most important thing. Turn off control - and you have mastered the psyche of another person, that is, you can now do whatever you want with him. It is not easy to "turn off" the consciousness of several people at once. Therefore treatment begins with sending of a bundle of electromagnetic, sound, or torsion radiations (56, p.23). A person after such powerful treatment completely loses control over himself and, if he stays alive, becomes controllable.

According to the type of action, all methods of turning off the consciousness can be divided into electromagnetic (field) and sound, with torsion (micro-lepton) influence standing apart. All types of these radiations are extremely destructive to human health and can cause severe diseases.

Laser and X-rays are also used, which are even more destructive to humans. For experimenters this is a very convenient type of radiation, because there are no visible obstacles for them: it is possible to direct radiation through reinforced concrete walls! In addition, such radiation can be directed at the desired point. Laser irradiation is often used at the beginning of programming to achieve a quick result. Such radiation has been used to eliminate people because death by laser aiming looks natural.

The most advanced is considered to be torsion or microleptonic radiation, the same vortex currents that were discovered by the Germans at Anenerba. There is simply no protection against it. Torsional radiation cannot be shielded at all. If X-rays are stopped by a thick lead plate, then torsional field passes through the lead (56, p.24). Weak torsional influence can put a person to sleep, medium intensity violates logical connections and "erases" memory, and high intensity can destroy both brain and body.

With the help of torsion generator it is possible to provoke some diseases, to decrease sharply or, on the contrary, to increase the activity, and it is also possible to influence the brain activity, causing some desires or introducing programs. Back in 1998 our specialists created a mobile generator, which could cover a large crowd from the distance of 300-500 meters for 15-20 minutes (56, p.24-25).

Noteworthy is the information of Georgy Konstantinovich Gurtovoy, candidate of physical and mathematical sciences, and Igor Vladimirovich Vinokurov, MSU graduate in physiology, about the practical application of applied products.

Among the existing methods of elimination (deliberate car crashes, imaginary suicides, poisonings, organization of injuries at work, psychological provocations, etc.) one has an obvious advantage - irradiation in apartments. This is a covert and almost unprovable method. Citizens are literally being driven out of their dwellings by technical means. Sources of radiation can be located in adjoining rooms of communal apartments, on the upper floors or in houses across the street. The adjoining rooms are allegedly occupied by the employees of the regional electric utility company or the building's DEZ, while the upper floors are rented by the KGB-FSB services by agreement with the tenants, who in this case leave for long periods of time. It is impossible to penetrate into such apartments - people who have settled in them without registration open only to the police. Victims of such actions complain about poor health, somatic and neurological ailments-headaches, hypertension, insomnia or conversely sinking into an unnatural sleep. Painful sensations: stabbing-type cramps in the kidney, liver, heart area. After a night's sleep, bleeding defects 1-2 mm in diameter, burn spots of different caliber, cuts and scratches are found on the skin. Cuts appear also during the day, sometimes their appearance can be noticed visually - on the face, shoulders, legs, sometimes they do not heal well, they are deep and bleeding.

During sleep, when the body is in a fixed position, the person is unprotected. His body is exposed to profound effects on the body, mainly on the heart, blood vessels and the genitourinary system. A variety of physical traces (wounds, cuts, burns) and sensations (pricking, cooling, vibration, acoustic shocks) testify to the use of a wide range of radiation-UHF, laser, ultrasonic location, infrasound, acoustic waves of the shock type [26,p.49].

Created electromagnetic and acoustic fields affect the operation of household appliances - uneven operation of refrigerators, blinking light bulbs. Acoustic shocks cause the opening of doors, falling objects (similar to the phenomenon of poltergeist) [26,p.49].

KGB-FSB operatives engaged in "processing" the victim outside the home have portable devices measuring approximately 12x12 cm and 15x15 cm, which fit in a pocket; there are also devices in a smaller version [26, p.50].

The 12th Department of the KGB [26, p.48], a laboratory of the Operational-Technical Directorate of the KGB, was engaged in psychotronic developments under a special program.

The Fifth and Sixth Departments of the KGB supervised the work [26, p.69-70].

In the event of an emergency situation for the purpose of a cover-up or preventive measures, security officers use the services of psychiatrists, since, until recently, psychiatric clinics were directly subordinated to the KGB-FSB structures. This allowed to freely and with impunity conduct psychotronic experiments or neutralization of an object and then to hide "ends in water", finishing the "experimental material" with electric shocks and psychotropic means (38,p.337).

In the 1970s, the USSR Ministry of Health developed and implemented in medical institutions a document called "Interpretation of Mental Illnesses," according to which any Soviet person could be accused of insanity. For the same purpose, Professor Snezhnevsky developed the non-existent in nature "sluggish schizophrenia". And as a result, mental hospitals began to be filled with citizens who disagreed with the domestic and foreign policies of the state, or who dared to criticize their superiors or expose the crimes they had committed. According to estimates by independent psychiatrists and human rights activists, by 1980 the USSR was already one of the first in the world in terms of the number of persons registered in psychiatric institutions (about a million people). Therefore, as soon as a person declares about psychotronic influence on him, the authorities will immediately and forcibly place him in a mental hospital, where the monsters in white coats in addition to psychotronic torture will carry out criminal

medical-biological, pharmacological and other experiments on him. If before the intervention of the public in the cases of the repressed, psychiatrists, 70% of whom cooperated with the special services and military-industrial complex, referred only to the medical incompetence of its representatives, now they also refer to the banal, without the motivation of the so-called "people's courts," which look more like courts of medieval inquisition or troika of 1937. Psychiatrists have recently claimed that there are practically no mentally healthy people in the former Soviet Union (63, p.35 - 36). The former USSR ranked and continues to rank first in the world for conducting uncontrolled experiments on humans and animals (63, p.38).

After the so-called "thaw" of the fifties, the ruling party needed a new form of isolation and extermination of dissidents, hidden from public view, in order to maintain power. Instead of the former mass shootings, labor death camps, and prisons, the party tacitly began to use psychiatric institutions.

The scale of the use of repressive psychiatry methods in the USSR is demonstrated by unforgiving figures and facts. In 1978, according to the results of the work of the commission of the top party leaders headed by A.N. Kosygin, it was decided to build 80 additional psychiatric hospitals and 8 special hospitals in addition to the existing ones. They were to be completed by 1990. They were built in Krasnoyarsk, Khabarovsk, Kemerovo, Kuibyshev, Novosibirsk and other places of the Soviet Union.

In the course of the changes that took place in the country in 1988, 16 prison hospitals were transferred from the Ministry of Internal Affairs to the Ministry of Health, and five were liquidated. A hasty cover-up was initiated through mass rehabilitation of patients, some of them mentally crippled. Only that year over 800,000 patients were deregistered. Only in Leningrad in 1991-1992, 60,000 people were rehabilitated. Throughout the country in 1978 there were 4.5 million people on the registry. This equals the population of many civilized countries (64, p. 6-7).

Let us now pass from theory to practice of repressive psychiatry, to its inhuman implementation. Both victims and unbiased observers from abroad agree that the same Morozov and Luntz should be named as the main organizers of the psychoterror. But to these names should be added another, ominous third name, which seemed to crown the pyramid. It was the chief Soviet psychiatrist, crowned with all kinds of laurels and at the same time a person who enjoyed the full confidence of the KGB, Academician Andrey Vasilievich Snezhnevsky. He was the scientific director and chief physician of the All-Union Research Institute of Forensic Psychiatry. He was the scientific director and chief doctor of the All-Union Research Institute of Forensic Psychiatry named after

V.P. Serbsky (the institute was named after one of the founders of forensic psychiatry in Russia and was known among dissidents under the conventional coded name of "Serpy").

Snezhnevsky, born in 1904, became a member of the CPSU in 1945, and in 1962 he was awarded the title of full member of the Academy of Medical Sciences of the USSR. In 1974, in honor of his 70th birthday, he was awarded the title of Hero of Socialist Labor, and in 1976 he was awarded the State Prize of the USSR. Soviet reference books have not disclosed what ranks and awards this criminal academician received through the special services. What is known, however, is that it was Academician Snezhnevsky who invented the diagnosis "sluggish schizophrenia," which allowed the authorities to declare any person sick if it suited them and put him behind bars in a "mental asylum." It was Snezhnevsky who was the main "authority" denying those "revelations" of psychoterror in the USSR that appeared in the West (64, p. 18).

Psychiatric repressions were carried out on the basis of five articles of the Criminal Code of the RSFSR of 1960 (Articles 58-62) and similar articles of the criminal codes of other republics. They provided for compulsory confinement and similarly compulsory treatment of mentally ill persons who, "due to their mental state and the nature of socially dangerous acts committed by them, constituted a particular danger to society. These people were to be "kept under heightened supervision," for which purpose special psychiatric prisons-hospitals were created. It is interesting to pay attention to the logically completely unnecessary, but from the point of view of the special services, quite understandable tautology in the named articles-"socially dangerous deeds" representing "a special danger to society. With this repetition, the social and political nature of punitive psychiatry was emphasized in a very intelligible way.

In the vocabulary of repressive bodies, along with the term "psychiatric hospital of the general type," new terms appeared - "psychiatric hospital of a special type" and "special facility," by which exactly psycho-prisons were meant. In the communication of dissidents, they were called "lunatic asylums" or "madhouses.

The beginning of the application of repressive psychiatry refers to the last years of Stalin's power, but it began to be widely implemented in the practice of punitive bodies from the 1960s, especially when the punitive services were headed by Y.V. Andropov, a worthy successor of Yezhov and Beria (64, p. 19).

Andropov's memo to the Politburo of the CPSU Central Committee, dated 1967, has been preserved. Signed also by Soviet Prosecutor General Rudenko and Interior

Minister Shchelokov, this note literally shook the imagination of the elders in power by the scale of audacious socially dangerous manifestations committed, of course, by mentally ill people.

In their report, government officials concluded that there was a catastrophic shortage of psychiatric hospitals in the country. The question was raised of opening at least five additional "special-purpose" psychiatric hospitals. This request was granted in full (64, p.19 - 20).

The Party leaders' solicitous attention to the mental health of their beloved people never waned. In 1978, the Politburo instructed a commission, headed by the head of the government A.N. Kosygin, to study the mental state of the country's population. The conclusion was disappointing: the commission stated that the number of psychiatric patients had increased in the recent years, and it was suggested to build 80 new regular and 8 special mental hospitals, in addition to the existing ones. Of course, this request was also satisfied.

By the end of the 1970s, there were already about a hundred psycho-prisons in the USSR, and their number was constantly increasing. Bearing in mind the pace of development, we can assume that by the time the communist system collapsed, the number of prisons - "hospitals" reached 150. In some cases these were separate, special institutions. But, as a rule, a "psycho-corps" or "psycho-department" was created in a regular prison. It was easier to organize, and it also saved precious state funds.

The most famous among the psychoturmises and prisons with psycho-units were the hospital at the Institute named after A.N. Serbsky in Novoslobodsk and Butyr prisons (all in Moscow). The most famous among the psychotropic prisons were the hospital of the Serbsky Institute, Novoslobodskaya and Butyrskaya prisons, Matrosskaya Tishina prison (all in Moscow and near Moscow), the psychiatric hospital in Belye Stolby, Moscow Region, the psychiatric unit of the Kresty prison, and the hospital named after Skvortsova-Stepanov on Lebedev Street in Leningrad. Skvortsov-Stepanov on Lebedev Street in Leningrad, hospitals and prisons in Dnepropetrovsk, Kazan, Kalinin, Chernyakhovsk, Alma-Ata, Tashkent, Velikie Luki, Zaporozhe, Chelyabinsk, Kishinev, Minsk, Orel, Poltava, Kiev (Darnitsa), Riga. I have named only some of the most famous places of psychoterror. Institutions on a smaller scale, as well as relevant departments, were simply dotted on the map of the USSR (64, pp.20-21).

The particular horror of holding dissidents in these truly penal institutions was that they housed not only political prisoners, but also truly insane people who had

committed criminal offenses, sometimes the gravest atrocities - murder, rape with particular cruelty, etc. At first, the asylums were at the disposal of the USSR Ministry of Internal Affairs, but in the early 1970s, they were transferred to a more reliable institution, now the KGB.

Dosages of extremely harmful and sometimes almost lethal drugs were prescribed to dissident inmates in mental hospitals. The use of such drugs, in particular, distinguished "doctors" from the Dnepropetrovsk special psychiatric hospital, who mocked, for example, the famous Ukrainian dissident Leonid Plyushch.

General P.G. Grigorenko in his memoirs says that he was shocked by the amount of "medicines" that were forcibly shoved into the prisoners - literally a whole handful of pills at once.

As a result, the unfortunates could not distinguish colors, lost their taste, their mouths were constantly parched, and their stomachs were burning. If the "sick person" avoided taking the "medicine", they were injected intramuscularly. The same Grigorenko gives examples of aminazin administration, which resulted in abscesses and ulcers on a prisoner's buttocks that could only be removed by major surgery (64, p. 21).

Official psychiatry, represented by the heads of the Professor Serbsky State Center of Social and Forensic Psychiatry and the Russian Society of Psychiatrists, maintains a stately silence, covering the rottenness underlying punitive psychiatry with a facade of illusory well-being, just as pious bouncers guard the entrance to a brothel (64, p. 34).

Punitive psychiatry, psychiatry that degrades human dignity and disregards human rights, is, unfortunately, immortal in our country and continues to this day only in forms hidden from society.

The "Law on Mental Health Care and Guarantees of the Rights of Citizens in Providing It", which has been in force since 1993, is declarative in nature and does not guarantee any rights. Not only the general and referential paragraphs of this law, but also the articles of direct action concerning the procedure of involuntary examination and involuntary hospitalization, as well as the order of placement and maintenance of patients in psychiatric boarding homes, are violated in a grave way. Victims of deception associated with the use of mental insolvency in transactions involving the purchase and sale of real estate are multiplying. The system of compulsory treatment is still imperfect, especially in psychiatric hospitals with strict supervision, most of which (Sychevka, Chernyakhovsk, Volgograd, Kazan, etc.) (64, p. 35).

The Main Center for Forensic Psychiatric Expertise, fed off the money of its formidable employer, the KGB (64, p. 40).

A clinical peculiarity of the contingent of persons who underwent POC during the period of mass repressions, were the so-called reactive psychosis - acute states of deep disorganization of mental activity, which appeared as stressful reactions to unexpected mental trauma. It was only yesterday that man occupied a stable place of honor in society, but today he is a nobody, moreover, he became an object of humiliation for the punitive machine, an instrument of the same society. And those under investigation suddenly (especially for the gabeshniks) began to behave strangely: they staggered, lost the ability to speak, began to walk on all fours, barked, etc.

The manifestations of reactive psychosis and the search for ways to treat them necessitated the creation of a special clinic. Experts established the fact of mental disorder, indicating that it developed after the arrest, and therefore there were no grounds for exemption from liability on the grounds of mental illness.

The Chekists were faced with a situation they had never known before: it seemed too early to shoot or exile to a camp - the investigation had just begun, many facts had not been revealed, and it was inadmissible to send a patient to a psychiatric hospital: in case he escapes. That's when the smart guys from the State Security came up with the idea of creating special prison psychiatric hospitals under the supervision of the State Security system.

According to F. Kondratyev, CPSU leader Nikita Khrushchev became a promoter of the postulate that only mentally insane people would commit crimes under communism and that only they were capable of opposing the socialist system. This "wisdom" was picked up by the head of the "fourth" department of the Serbsky Institute, D. Luntz. And he began to develop a theory of psychopathological mechanisms of committing crimes. And by that time, not knowing anything about the insidious scientist from the terrible psychiatric institute, a new numerous horde of "politicians" had appeared - dissidents (dissenters). It was just them who, according to the KGB, unscrupulously violated "sacred" articles of the Criminal Code of the RSFSR (70-th - anti-Soviet propaganda, and 190-th - dissemination of deliberately false information denigrating the Soviet state system) and became the main patients of the special division of the Institute (64, p. 44-45).

An active search for "psychopathological mechanisms" of mental illness began, which gave grounds for removing the accused from the defense in court and sending him to a prison psychiatric hospital for treatment. Both were found and sent.

Kondratyev, a solid scientist, had seen it all from the inside. In 1980 he was none other than a curator of the Kazan TPB, and he himself tested the mental fortitude of one dissident, A. Kuznetsov, a worker, whose journey through the circles of psychiatric hell lasted 17 years (!): from 1971 to 1988.

Naturally, no outsiders were allowed into the prison hospitals of the Ministry of Internal Affairs. F. Kondratyev himself, who visited Kazan more than once, prefers not to talk about what he saw in person. He refers, for example, to the report he read by a commission of the Ministry of Health of the USSR on the condition of the hospital of the Ministry of Internal Affairs Sychevka in Smolensk Region: "The Sychevka Psychiatric Hospital with strict supervision does not correspond to the concept of a hospital as a health care institution.

It is possible to agree with the scientist that psychiatry fluctuated along with the line of the CPSU; however, everything in the country fluctuated with this line. The peaks of these fluctuations were expressed in the predominance of those found sane, primarily at the expense of schizophrenia (64, p.45). The Soviet authorities occasionally sent their foes to psychiatric homes as punishment (64, p. 48).

So the Soviet leadership in some cases found it very convenient to use the capabilities of psychiatry for quietly and outwardly humanely designed removal from the political arena of those or other "inconvenient" individuals. Later it also happened that psychiatry helped the authorities to keep the absolute executioners of their people from deserved punishment (64, p. 49).

At first there was a special department for "politicians" at the regular psychiatric hospital in Kazan, but because they were normal people, they could run away. And then, which happened in January 1939, the guards of the Kazan NKVD prison were assigned to guard this special section. A few months later, L.P.Beria, People's Commissar of Internal Affairs, transferred the whole Kazan psychiatric hospital to the NKVD, and that was how the first prison psychiatric hospital appeared in the USSR and on the whole world. This institution of concentrated collective madness, cold-bloodedly organized by Soviet Chekists, still keeps its terrible secrets (64, p. 51-52).

According to the USSR Ministry of Internal Affairs' report of November 16, 1956, 71 people were discharged from LTP B in 1950-1952 because of "convalescence," while in the next three years (1953-1955) this number rose to 234.

For the reason of "improvement of mental condition" during the same period (1950-1952) only 14 people were discharged, and in 1953-1955 - 683 people, that is 49 times more!

The same picture emerged in the KTPB. During 1950-1952 127 persons were discharged due to "convalescence", and during 1953-1955 - 427 (64, p. 128).

The members of the commission, naturally, questioned the reasons for the recovery of such a fantastically large number of patients. This phenomenon could be explained by anything, but not by the achievements of Soviet medicine. The chairman of the commission, A. Kuznetsov took the liberty to speak about this as follows: "The explanation for this can be found in a change in the practical activities of the KGB bodies. The rehabilitation of the wrongly convicted led to a review of the cases of those who were in prison psychiatric hospitals. These hospitals, as institutions subordinated to the state security organs, reflected in their activities all those negative features which were characteristic of that system at that time. At the same time, it is necessary to point out the obvious disadvantage of forensic psychiatric expertise in recent years, which objectively contributed to the illegal detention of people in conditions of compulsory treatment with isolation.

The forensic psychiatric expertise thus created a "legal" justification for keeping these patients in these conditions in a number of cases. The Institute named after A.N. Serbskiy and A.A. Serbskiy. In recent years, due to its monopolistic position and lack of control over its activities, the Serbsky Institute has largely lost its independence as an expert institution (64, p. 128 - 129).

Attempts to interfere in the work of the institute by both health authorities and public organizations led to nothing, as in these cases the leadership of the institute covered up the "special importance" of the institute, "special directives" and the special interest of the procuracy, justice and KGB bodies. Verification of the statements made by Mr. Pisarev and Mr. Litvin-Molotov confirmed the existence of major irregularities in the work of the Serbsky Institute, which in its expertise usually recommended to the court and investigative bodies that all those charged under Article 58 and recognized as insane be sent for forced treatment and isolation. The management of the institute committed a violation of law, which was manifested in the fact that the doctors-experts did not study and did not report on the cases of political crimes, but, as a rule, these cases were brought to the institute by the KGB investigator thirty minutes before the examination, reported the essence of the case himself and was present during the examination and giving the medical conclusion. Considering that the statements of A.T. Pisarev and Litvin-Molotov about irregularities in the prison psychiatric hospitals of the USSR Ministry of Internal Affairs and in the Institute of Judicial Psychiatry named after

Serbysky were confirmed".Kuznetsov, the CPSU Central Committee's executive controller, signed this document on November 30, 1956 (64,p. 129).

Thus, in essence, legislation regarding the punishment of so-called mentally ill dissenters remained repressive, despite the new, more "progressive" language.

At the same time, the USSR Ministry of Health approved (on October 10, 1961, 04-14/32) the Instruction "On the Emergency Hospitalization of the Mentally III III III III representing Public Danger". Its essence was that a mentally ill person could be forcibly hospitalized by the police without the consent of relatives and guardians.

Within 24 hours after hospitalization, the patient had to be examined by a special commission consisting of three psychiatrists, which considered the appropriateness of hospitalization and the necessity of the patient's stay in the hospital. Thus, the troika of psychiatrists had to decide not only purely medical questions about the diagnosis and depth of mental disorders. It took upon itself the responsibility to decide whether a person was socially dangerous, a difficult task not always within the power of the court.

In essence, the instruction gave psychiatrists very broad authority to make decisions about people's fates. And those decisions depended on the views and moods of the doctors. For the instructions did not say a word about the qualifications of psychiatrists, about the procedure for reviewing a decision, voting, logging, etc. The authors of the instructions proceeded mainly from the presumption of the ineligibility of the mentally ill.

But the absence of the right of defense and review and the oblivion of publicity carried with it the threat of the vulnerability of those against whom psychiatric prosecutions might be initiated to abuse of power.

All of the aforementioned state and departmental regulations formed the legal (or rather, anti-legal) basis of the Soviet authorities' latest repressive campaign against dissidents (64, p. 146-147), which was beginning to gain momentum.

It is now quite clear that it was with the blessing of the party leadership that the flywheel of repression against dissenters gathered speed. New prison psychiatric hospitals were created: in 1961 - Sychevskaya (Smolensk region); in 1964 - Blagoveshchenskaya (Amur region); in 1965 - Chernyakhovskaya (Kaliningrad region) and Kostromskaya.

In 1956 the Kazan and Leningrad TPBs had the lowest occupancy rates (324 and 384 prisoners respectively), while in 1970 the Kazan hospital already had 752 people, the Leningrad hospital had 853, and 3,350 prisoners in total in the special hospitals of the USSR Interior Ministry.

Naturally, there was an increase in the flow of people arrested who were taken to the Central Research Institute for Execution of Punishments. According to F. Kondratyev, the average number of such people per year was 350 (64, pp. 149-150).

Under such conditions, the tragic rebirth of psychiatry in our country began in the 1950s and 1960s, which resulted in a theoretical basis for psychiatric repression and the formation of a whole generation of doctors who automatically defined people as insane by order of any official, most often with a diagnosis of "schizophrenia.

Such a decision immediately entailed a list of restrictions: in professional opportunities and in general in competence, in correspondence and many others (64, p. 150).

If it had been 1937, there would have been no problems with such troublemakers; everything would have been solved according to Stalin's well-known rule: "no man, no problem. But now it is easier and more convenient to call such undesirable people mentally ill, deliberately mixing them up with the real mental patients, and to get permission to put them in psychiatric hospitals. And after all, not only politically dissenting citizens were meant, but also those who fight simply for justice in ordinary life against autocrats - heads of enterprises, organizations, military units, police forces, etc., whom they drove to mental hospitals with the support of the obsequious "public" (64, p. 162-163).

In the cold and judicious mind of Andropov, that worthy heir of Dzerzhinsky, a crazy idea matured, in the correspondingly changing political, economic and social situation in the USSR, to "civilize" the punishment of dissenters by replacing the cumbersome, morally disastrous political gulag, which had become economically unprofitable, with a compact, quiet and almost invisible to society gulag of psychiatry. The CPSU Central Committee liked the Quartet's idea of developing a network of psychiatric "institutions. On October 6, 1967, the Secretariat of the CPSU Central Committee, which was attended by Suslov, Ustinov, Kulakov, Pelshe, Kapitonov, and Danilov, considered Andropov's note. In the excerpt from Minutes No. 35/13c of the meeting of the Central Committee secretariat it was stated:

"1. To instruct the Gosplan of the USSR to prepare and within two months to submit to the USSR Council of Ministers a proposal for additional capital investments for 1968-1970 for the construction of new psychiatric hospitals and the expansion of existing ones...

2. To instruct the Councils of Ministers of the RSFSR and the UkrSSR, the Mossovet, the executive committees of the Leningrad and Kiev regional and city

councils of workers' deputies to find additional space to re-equip them as special psychiatric institutions (meaning the prison psychiatric hospitals of the USSR Interior Ministry) and. immediately resolve the issue of hospitalization of citizens living in Moscow, Leningrad and Kiev (64, p. 163).

The development of design and estimate documentation for the construction of a large special-type hospital in Novosibirsk was begun. By 1970, a psychiatric hospital with 320 beds was organized at the prison detention facility in Orel, two more hospitals in Kostroma and in the Kirov region, as well as a psychiatric department at the Ukhta Hospital of the Komi ASSR UVD. By 1970, the number of beds for the mentally ill in prison psychiatric hospitals of the USSR Ministry of Internal Affairs had increased by 595 to 5,425.

The psychiatric Gulag, like a cancerous tumor, began to slowly expand (64, p.164).

From a note to Comrade Kosygin A.N. dated May 18, 1979:

"In recent years, the number of the mentally ill has been increasing. In 1978, there were 4,486,000 of them on the register, of whom about 75,000 are considered potentially socially dangerous, according to specialists' estimates. The network of hospitals for the treatment of the mentally ill is underdeveloped, as the following table shows:

	1965 г.	1978 г.
Number of mentally ill, including alcoholics and drug addicts, on the registry (thousands)	2212	7188
Number of psychiatric hospitals	389	461
There are beds in them (thousands)	215, 5	358, 8

In this place, it should be noted that by 1978 the USSR Ministry of Internal Affairs added a 550-bed "prison" in the village of Dvoryanskoe in the Volgograd Region, and was preparing to open similar facilities at the female colony of the penal labor camp in Ivanovo and in the settlement of Fornosovo in the Leningrad Region. All in all, by the end of 1979 there were more than 6308 inmates in psychiatric hospitals of the USSR Ministry of Internal Affairs, which was 155% higher than in 1968 (2465) (64, p. 179)!

It makes sense to cite another document.

SECRET 8. The USSR Ministry of Internal Affairs (on the territory of the RSFSR) shall ensure the construction and commissioning in 1981-1990 of special-type hospitals in accordance with Annex 5.

18. To the Ministry of Medical Industry to ensure the production in 1981-1985 and in 1990 of psychotropic drugs for the treatment of the mentally ill in accordance with Annex 7; to develop the technology for the production and development of industrial production in 1981-1985 of psychotropic drugs similar to the most effective drugs of this group, produced abroad". The USSR Ministry of Internal Affairs reacted to the decree very seriously and promptly. The construction of prison psychiatric hospitals in Krasnoyarsk, Khabarovsk, Kemerovo, Kursk, Kuibyshev and Novosibirsk with a total number of beds of 3509 began (64, p. 180).

In 1986, 5,329 people were incarcerated in the six largest special-type psychiatric hospitals of the USSR Ministry of Internal Affairs - Kazan, Leningrad, Oryol, Sychev, Chernyakhov, and Blagoveshchensk hospitals alone.

Here is how the dynamics of growth of the number of prisoners under forced treatment in one of the biggest psychiatric hospitals of USSR Ministry of Internal Affairs - Leningrad psychiatric hospital: 1956 - 324, 1967 - 783, 1979 - 854, 1980 - 915, 1985 - 1059, 1986 - 1181 (64, p. 184-185).

In 1988, the Ministry of Health of the USSR had 16 psychiatric hospitals of a special type at the USSR Ministry of Internal Affairs. There were 776,000 patients on the psychiatric registry (64, p. 192).

The terrible repression of psychiatry, unparalleled in world practice, must always be remembered:

- 1) The unlawfulness of a long-term (3 to 15 years) and medically conditioned stay in a prison regime stricter than that for mentally healthy people in prisons and in special settlements.

- 2) Abuse of psychiatric diagnosis, when the correspondence between the legal and medical criteria of insanity, as stipulated by law, was not observed, and the mere observation of mental disorder led to the conclusion of insanity, ridding the Soviet system of an objective examination of cases related to criticism of the Soviet regime.

- 3) Medically unjustified recognition of persons without pronounced psychotic disorders as socially dangerous mentally ill, with a recommendation for compulsory treatment in special-type psychiatric hospitals of the USSR Ministry of Internal Affairs system.

(4) Long-term detention of persons found insane under the political articles of the Criminal Code of the RSFSR and who had no severe mental disorders, with preserved intellect and proper behavior, in the same cell (ward) with severe and dangerous patients, in a state of delirium and aggression, and physically neglected.

5) Intentional and deliberate severing of patients' social ties - sending them to hospitals located far away from where their relatives live (for example, to Cherniakhovsk in Kaliningrad Oblast from the Far East).

6) Disenfranchisement of patients by declaring them legally incompetent on the initiative of doctors, without medical grounds.

7) Dependence of the expert service and bodies carrying out compulsory measures of medical nature on investigative bodies and state security.

8) Compulsory treatment without medical indications and consideration of contraindications: prescription of psychotropic drugs, including without the use of correctors to eliminate the side effect of their use; artificial inducement of pain and increased body temperature by intramuscular injection of an oil solution of sulfazine (sulfazine); prescription of wet wraps, which cause severe pain when dry; use of punishment, including physical; transfers to restless wards when protesting against inhuman treatment.

9) The lack of any social program for the rehabilitation of patients, their dependence even for their physiological needs on the whims of their warders and orderlies (until 1988 these were employees of the Ministry of Internal Affairs of the USSR, and until 1991-1992 the orderlies were so-called probationers who brought alcohol and drugs into psychiatric hospitals with strict supervision, who had contact with the most asocial patients, who imposed their camp "laws" on everyone, including political dissidents).

10) The complete absence of any independent supervisory bodies overseeing both the correctness of judicial and psychiatric decisions and the course, adequacy and duration of coercive treatment.

In the report of the American delegation at the Congress in Athens in 1989, concern was expressed that the new provision on psychiatric care in our country did not provide sufficient guarantees against unwarranted hospitalization, and that even the human rights protection declared in the provision was still not realized in practice (64,p. 193-195). The use of radiation weapons allows effective concealment of any type of repression, especially since law enforcement agencies will never disclose this type of crime, and victims, if they remain alive for some reason, cannot prove anything (their

memory will either be completely erased or they will be unable to control their actions), since corrupt psychiatrists who are part of criminal groups place such contingent on the register and make medical cards in psychiatric institutions in advance.

Radiators affecting the psyche and the human body are used:

- A. Infrasonic technique (vibration and pulse). Infrasound wave, directed by a powerful pulse, can create a semblance of a jolt or knock, destroy fragile objects;
- B. Electronic equipment for exposure to radio waves of different frequencies up to UHF. Both are paired with video equipment that allows viewing through walls (thermal imaging, industrial x-ray method, etc.);
- C. Electronic equipment paired with a computer system combined with hypnosis to invade brain function;
- D. Laser equipment for physical burn injuries [26,p.47].

The following symptoms appear from the action of the emitters: stabs in the muscles. Cramps in the legs, toes, itching, burning in the soles, pain in the ears, numbness of the hands at night, causing arrhythmia of the heart, the appearance of burn spots on the body. All these painful sensations go away when you move away from the source of exposure, but the damage caused to the tissues and organs of the human body persists (26,p.48).

The results of scientific research in the field of studying the effects of electromagnetic fields and acoustic waves on human psychosomatics fully coincide with the feelings of victims of psychotronic weapons. In both cases present: shingling and sharp headaches; dizziness; pressure on the eardrum; vibrations (vibration) of the abdominal wall and chest, certain muscle groups; dry mouth; pain in the teeth and gums; difficulty swallowing; wet hands; pain in the bones and muscles limb tremors; pain in the genital system; arrhythmias; increased or decreased blood pressure; decreased visual acuity; coughing; increased or decreased body temperature; coma; itching; tissue tumescence; speech modulation; states of fear, anxiety, and so on. With purposeful irradiation the above sensations can be easily controlled, greatly expanded, purposefully affect any parts of the brain and body, use the person as a radio-controlled model. The list of artificially created diseases and health damages of test subjects fully corresponds to the list of diseases and health damages of people subjected to electromagnetic or acoustic irradiation. According to this list the most widespread are: malignant tumors; lesions of cardiovascular system; blood coagulation or decay; brain diseases; functional changes or lesions up to lethal in peripheral and central nervous system; eye diseases; diseases of genitals; musculoskeletal system disorders; bone

tissue decay; organ damage or rupture; muscle atrophy; endocrine system disorders; skin damages; trophic damages - hair loss, nail fragility and so on. Practically all the technologies of psychoprogramming require harsh treatment of the psychoenergetical center of the human being, which includes the following: heart; organs located in the abdominal area; genitals; prostate; uterus and its appendages; spine; cerebellum; left and right hemispheres of the brain; frontal lobes; vision; other sense organs and vocal chords (63, p.19-20).

Serious harm also includes health disorders associated with a complete loss of occupational disability, arising after exposure for the purpose of inflicting harm with a radiation source that is prohibited for circulation. After the victim has been exposed to electromagnetic radiation exceeding the maximum permissible levels, he inevitably receives a disability group that does not allow him to perform his official duties and generally loses his ability to work. Taking into account the important role of the cerebral cortex and hypothalamus in performing technical functions of a person, one can expect that long-term exposure to maximum permissible doses of radiation in order to cause harm may lead to mental disorders, including changes in conditioned reflex activity, behavioral reactions, short- and long-term memory state, changes in bioelectrical activity of various brain structures.

Also with the help of such a device it is possible to subconsciously inspire other people's thoughts and thus control their actions. There are "hard" and "soft" psychoprogramming. "Hard" zombie can often be identified by the "exterior" manner of behavior: detachment on the face that does not correspond to the emotions expressed in words, unusual color of the whites of the eyes, sluggish intonation of voice, incorrect speech, lack of ability to concentrate, slowness of reactions. A "soft" zombie is no different from any other person. Professional brainwashing is extremely complicated and requires thorough study of the object's psychophysiology, use of special medical and computer aids, and the involvement of coders, hypnotists possessing multi-step hypnosis techniques [39,p.193].

A psychotronic "matryoshka" contains several completely different personalities. When switching from one to the other, manners, gait, smile, eye expression change. Destruction of a person's memory is characteristic for zombification, which can be done covertly, at a distance, with an electromagnetic emitter or by contact method of treating an object with an electric shock. To destroy memory neurons, very painful electrical impulses of 150 volts and dozens of times more powerful than conventional seizure therapy are used.

For faster processing, the object is drugged with drugs and neuroleptics that suppress its will (e.g., aminazin).

As confirmation of the above techniques of zombification we can consider several techniques used in practice.

Method 1.

-The person is removed from her former sphere, and her contact with that sphere is completely severed;

-the daily routine must be completely contrary to his former habits

-The victim is actively provoked to distrust everyone who surrounds him;

-constant acts of discredit (falsification, ridicule) are carried out;

A predominantly carbohydrate and protein-free diet, with a mixture of mind-numbing drugs (aminazin) and compulsory lack of sleep;

-After attaining a state of dull indifference, the necessary coding is performed using active suggestion or hypnosis.

Method 2.

This option is composed of three consecutive steps , such as:

-Brainwashing (clearing the memory of what it once perceived, breaking time-space reference points, creating indifference to both the past and the future);

-verbal coding (active influence on the psyche, in which a certain idea and notions are introduced);

-strengthening (control of assimilation of implemented).

The technique for realization of these phases is usually as follows: using hypnosis and strong hypnotics (for example, barbamyli with aminazin mixed in with it...) (39,p.194-195).

The above information is confirmed by officers of the USSR and Russian special services, officers (GRU, KGB - FSB) and Foreign Intelligence Service recruited by the intelligence services of other states or who fled to other countries: General Polyakov; General Kalugin; Colonel Zaporozhsky; Major Suvorov-Rezun (fled to England); Colonel Stanislav Lunev (fled to the US in 1992); Lieutenant Colonel Oleg Gordievsky; Valery Martynov; Boris Yuzhin; Sergey Motorin; Sergey Tretyakov (fled to the US in October 2000) and many others.

KGB General Oleg Danilovich Kalugin confirms serial production and use of weapons striking with radiation (psychotronic) by KGB officers to cause harm on a massive scale. Moreover, he claims that KGB officers exercised punitive functions with the help of psychiatrists (52, p.88).

Many Russian scientists confirm research on electromagnetic and infrasound and ultrasound emitters designed to cause harm (weapons that defeat by radiation).

Sedletsky V.A. confirmed that since 1982 our country began to create a system of over-the-horizon radar complexes. Soon it turned out that phased antennas included in the complex are able to work for radiation as well. This creates a single psychotronic field capable of influencing human consciousness. Such antennas were created in Chernobyl and Krasnoyarsk-26.

They are part of a system called the Orb. It is designed to control theta and delta rhythms of the human brain. In the special area of Krasnoyarsk-26 the emitters affecting the human psyche and organism are being worked on.

More than 20 institutes were engaged in developments in the field of psychotronics.

The decree of the USSR Supreme Council Committee on Science and Technology named the Interindustry Scientific and Technical Center "Vent" as the head organization in the country responsible for developments in the field of unconventional fields, which was previously called the Center of Unconventional Technologies of the USSR State Committee on Science and Technology.

The report in the "Main Directions of Research" section of the Center directly refers to the remote medical-biological and psychophysical impact on the troops and population by torsion radiators [26,p.178].

The Decree of the State Committee on Science and Technologies of the Supreme Soviet of the USSR 158 of July 4, 1991 noted the financing of research of spin and lepton fields through the Military-Industrial Commission at the Cabinet of Ministers of the USSR by the Defense Ministry, the Interior Ministry and the KGB of the USSR and recommended "To request the State Commission on Military-Industrial Issues under the USSR Cabinet of Ministers, the USSR Ministry of Defense, the USSR State Committee on Scientific and Technical Research, the USSR Ministry of Defense Industry, and the USSR Minatomenergoprom to submit to the Committee data on the scope and sources of funding of work on 'spinor' fields, 'microlepton' fields and related issues" (26,pp.179-180).

Director of ISTC "Vent" Doctor of Physical and Mathematical Sciences A.E. Akimov invented a spin-torsion generator, which emits funnel-shaped rays of rotation, capable of "locking" devices (including homing systems). Not only devices, but also the human psyche and the whole organism are turned off by such exposure. A.E. Akimov

confirmed that for experimental works factory samples of torsion generators have already been produced (26, p.181).

B. Shepilov from the Moscow center "Eniotekhnika" reports about the availability of combat psychotronic generators capable of narrowly targeting the vital functions of the human body - breathing, cardiovascular system, neural connections.

Psychotronic generators, as defined by V. Shepilov, are technical specialized systems, the most important component of which are sources of specially organized inhomogeneous fields, generating weak wave processes, apparently resonant to subtle mechanisms of the brain and nervous system. Specially selected operators with special sensitivity to these resonances are able to direct the generated fields to the desired object and induce in it certain excited states different from the usual ones. Further the operator, holding this new mode, modulates, forms, imposes a given state (52, p.115).

A wonderful generator for termite control (certificate of authorship #1393078) was created by Professor G. Bogdanov. Radiation of this device kills insects by paralyzing their nerve centers. But if the frequency range is changed, it can have the same effect on humans as well (25,p.49).

The defense firm NPO Vympel created a prototype blaster, a legendary weapon from fantasy novels. The small device contains only two four-and-a-half-volt batteries, and the power of the shot reaches 200 kilowatts. The product effectively strikes human material at a distance.

Istok, a research and production enterprise located near Moscow, assembles microwave generators, various converters, amplifiers and other equipment that emits an electromagnetic field.

A group of scientists from our country's largest defense enterprise MKB Electron made a sensational discovery. The medical-biological department, headed by V. Kvartalnov, discovered that in laser radiation there is the so-called psi-quantum radiation. In human blood under its influence redistribution of red blood cells occurs. As a result, the human immune system as a whole is destroyed. That is AIDS in a new package. This information is confirmed by Leonid Vilenchik, General Director of IBC "Electron".

Work on laser weapons began back in the USSR, and their launch into space orbit was planned in accordance with the Energia-Buran space program in 1976, where the task was to put this type of weapon into orbit and maintain it in space.

Valeriy Kanyuka, Doctor of Engineering and Candidate of Biological Sciences was the head of a secret complex of space biophysics that operated within NPO Energia. He supervised the development of principles, methods and tools for remote

non-contact control of behavior of biological objects, including humans, by means of technical means - generators. The work was done in execution of the closed resolution of the Central Committee of the Communist Party of the Soviet Union and the Council of Ministers of January 27, 1986. V.K. Kaniuka reported: "At least seven military design bureaus were created on the basis of our center developments. Their ideas were embodied in metal".

Such work was carried out in Kiev, at the plant "Arsenal" (26, p.20).

Ukrainian scientists V.P. Mayboroda and I.I. Tarasyuk studied the influence of torsion generators on various objects (30, p.44).

In 1973, studies under the supervision of Academician V.M. Kandyba in the Central Laboratory of the plant "Arsenal" /Kiev/ were completed, the creation of another weapon system - the apparatus "Kandi-7", which became the most powerful radiator affecting psyche and human body (32, p.130).

Artur Zhashkov, a lecturer at the psychology department of the Mykolaiv Pedagogical Institute, confirms the existence of classified centers to create emitters for use as weapons in Kiev, Mykolaiv, and Kharkiv in Ukraine.

State Research and Production Enterprise "Delta", head of department Boris Tesalovsky. The ultrasonic devices "Zaslon" and "Anchar" for repelling rodents and pests were developed. The principle of their work is ultrasonic pressing. In other words, the impact on the psyche of animals by acoustic oscillations of ultrahigh frequency (25, p.47-49). The generator operates according to a random law of frequency changes of the signal. The so-called bio-noise method. A barrage of new frequencies descends on rodents every second, causing either furious rage, or gloomy apathy, or intense pain, or uncontrollable merriment, or wild terror. It is impossible to get used to such a kaleidoscope. And if the rat cannot escape, it goes mad and dies. Such products have been developed for humans as well (25,p.47-49).

In the eighties in the Crimea there were conducted studies on the effects of microwave radiation on different groups of animals and human material. Similar research before the collapse of the Soviet Union was carried out by specialists from the military unit 10003 in Moscow.

In 1961 in Russia, Dr. Yu.V. Zhan conducted research in the field of "electromagnetic field control", which resulted in the creation of an experimental installation of BIO - microwave - communication, consisting of a transmitter and receiver.

Wave vibration technologies are of paramount importance for human exposure.

Director of the Institute of Mechanical Engineering of the Russian Academy of Sciences, academician Konstantin Vasilievich Frolov leads a project to study the effect of mechanical vibrations of various frequencies on the human body. The technique of deep zombification of personality was created by Yuri Krivonogov, candidate of technical sciences, in 1983.

In 1993 A. Kochurov, Director of the Institute of Psychotronics in Moscow, named several organizations now independently implementing special projects on affection of human psyche and organism by technical means (emitters). They are the Volna Scientific and Production Association, the Lidar State Cooperative Center, and, finally, the famous ANT laid such works in its plans as well.

List of studies conducted at the Moscow Institute of Psychotronics.

The "Readiness level" column

8.5 Mental modulators. Successfully passed laboratory and polygon tests, were used in real conditions.

8.10 "Radio voice" (inner voice). A translator of thoughts and action patterns. Used in real conditions.

8.15 Psychotronic generators. Used nowadays in real conditions.

1.6 Information duplication of personality. Passed laboratory and range tests.

Research in this area is also conducted in Krasnoyarsk. Apparatus "Gradient" with such properties is being developed in scientific institutions of closed type in Rostov-on-Don. This was confirmed by B. Krutikov, leading designer of one of the "numbered" institutes.

The International Institute for Human Reserve Capabilities also works on a program of managing human material with the help of technical devices. Yeltsin's former psychoanalyst Alexei Petrovich Sitnikov also works at this Institute.

The following organizations have worked on the creation of psychotronic weapons in recent years: the Center for Non-Traditional Technologies of the USSR State Committee on Science and Technology (ISTC "VENT"), the USSR Ministry of Defense, the USSR Ministry of Atomic Energy Industry, the Military Industrial Commission of the USSR Cabinet of Ministers, the USSR KGB, the USSR GRU, the USSR Minobromrom and the USSR Academy of Sciences.

The following types of psi equipment have now been created to simulate mental suggestion:

- laser equipment. The creator is Professor V.M. Inyushin;

- pulse infrasound technology. USSR Ministry of Defense;
- electronic radio wave apparatus. USSR ACADEMY OF SCIENCES;
- microwave resonance apparatus. Ministry of Health of the Ukrainian SSR;
- magnetic generators. Made in conjunction with the United States;
- ultrasonic locator generators. Made in conjunction with the United States;
- VHF generators. Made in Kiev laboratories, in the systems of

Minatomenergoprom of the USSR;

- Spinor and Torelon oscillators. Made under the "MK-ultra" program of the KGB of the USSR (Sixth Directorate);

- special medical equipment with modified parameters. Made in Laboratory No. 12 of the KGB OTU;

- special microwave generators. The Fifth and Sixth Directorates of the KGB of the USSR;

- radiohypnosis unit. Registered January 31, 1974, by the USSR State Committee on Inventions and Discoveries as "Method of inducing artificial sleep at a distance by means of radio waves". Authors I.S. Kachalin and others (USSR Academy of Sciences);

- "Radioson" unit. Made in 1972 in the USSR Ministry of Defense, tested in the military unit 71592 near Novosibirsk (52, p.46).

In 1987 it was planned to use the program of development of special emitters and corresponding technologies in the national economy and in military systems of remote human control. The last section referred to the creation of "means for controlling the psychophysical state of a person and influencing the decision-making mechanism". The program execution term was set in four years. This information was announced by Faryaz Rakhimovich Khantseverov, doctor of technical sciences.

In 1988 the Rostov Medical Institute together with the firms "Hippocrates" and "Biotech" successfully completed testing of the newest psychotronic generator and applied for the discovery "The phenomenon of changing the permeability of biological tissues under the simultaneous influence of magnetic and high-frequency magnetic fields". The new weapon "is capable of suppressing a person's will and imposing another on him. Rostov generators are the most dangerous of all created kinds of psychotronic weapons and their use should be immediately placed under the control of the state. Radiation of these devices is built at the resonance frequency of human's own internal organs vibrations, and the value of the radiation is so small that it is much lower than the "etheric noise", so no one can detect this weapon, but its use can cause

disease and death to all mankind and most biological objects of the Earth. That is why all the scientists were shocked when General Kobets spoke of the possibility of using psychotronic generators in the events of August 19-22, 1991 in Moscow (52, p.45).

Since 1988 the production of spinor radiation generators has been started in Kiev by the Institute of Materials Science Problems of the Academy of Sciences of Ukraine (V.I. Trefilov, V. Mayboroda and others). Serious development was also started in Kiev ISIC "Natural Resources" (A. Kasyanenko and others). Generators that control emotions, muscle tone, reaction, nervous system state, etc., have already been created. (52, c.45-46).

The Institute of Higher Nervous Activity and Neurophysiology, the Institute of Radioelectronics of the Academy of Sciences of the Russian Federation and others carry out works according to a special program with emitters [26, p.54].

Academician Igor V. Smirnov, Director of the Institute of Psychology, Russian Academy of Natural Sciences in Moscow (head of the Laboratory of Psychocorrection of the Medical Academy in Moscow) for three decades engaged in research in the field of methods of influencing the unconscious spheres of the human psyche.

Research in the field of microleptonic fields was conducted by Anatoly Okhatrin, head of the microleptonic technology laboratory. He admitted that in 1982 he created a generator that had a very negative effect on humans.

Radiators prohibited for circulation are used not only to protect the homeland, but also very often for criminal purposes.

At a meeting in the Kremlin on February 12, 1993, former Security Minister V. Barannikov said that there is a "brain drain" into criminal structures. The Ministry has information that in this environment there is interest in pharmacological agents affecting the psyche, in technologies of hypnosis and long-term programming of the human psyche, in the management of human behavior and condition, in the use of persons with extraordinary abilities for criminal purposes. It is not clear yet who in conditions of poor state financing became the sponsor of these researches and technologies. The spread of clandestine knowledge outside secret institutions is alarming. The high fences of once-secret facilities have become very porous, and such technology is already being used for criminal purposes, aided by the very low, token salary of scientists.

Experts assert that at the present time various devices and installations affecting the psyche and human body are made absolutely uncontrollably. They are invented and designed in the Russian Federation for various companies under contracts and for foreign organizations.

The unstable situation in the world, due to the conducted large-scale terrorist attacks in the USA, the UK, Russia and other countries confirms the unlimited

capabilities of terrorists. At present, no one can guarantee that emitters designed to cause harm will not be used by terrorists or others for criminal purposes.

Candidate of Technical Sciences Elena Blinnikova-Vyazemskaya in her report at the seminar "Russia and the European Convention on Human Rights" analyzed the information received from 94 cities of the Russian Federation to the Human Rights Information Center on the use of radiators affecting psyche and organism: "The main motive of complaints in recent years - says the report - are complaints about the terror carried out against the person by radioelectronic equipment". The appeal of the victims of psychoterror to the Russian Parliament contains a demand to "ban and destroy all bioenergetic weapons in Russia which are capable of exerting any remote influence on human mental and psychic activity and causing irreparable damage to human life and health".

Among other demands are "to immediately stop the psychoterror carried out by state authorities and the scientific mafia" and to introduce articles into criminal legislation "punishing the use of psychotronic and leptonic weapons on the territory of Russia". The appeal ends with the following words: "Today they kill us, tomorrow the same fate may befall you and your children" (26,p.51).

Thousands of citizens are appealing to state and law enforcement agencies for help in protecting themselves from attacks with various kinds of emitters used as instruments of crime and posing a real threat to the lives and health of citizens. But officials now have no time to redistribute state property, and the state has again forgotten to protect its citizens.

At the very beginning of 1992 a statement was published with an urgent demand to prohibit the use of generators as weapons (40). It was signed by the heads of scientific centers "Hippocrates" and microwave "Biotechnics", heads of departments of Rostov Medical Institute, professors, doctors of sciences, serious and well-known in their field specialists.

The Vice-President of the League of Independent Scientists of Ukraine, Professor V.A. Sedletsky also supports the initiative to supplement the legislation with an article on criminal liability for the use of psychotronic and other types of psychophysical influence on people. He also argues that it is necessary to provide legal assistance to citizens who have been attacked using these products as instruments of crime.

The main reason many people don't understand all these problems is that the harm is "invisible" - radiation acts on our body, bypassing our senses. We cannot hear,

see or touch it, but this does not diminish its harmful effects. If we do not take urgent measures, a tragedy awaits us, which cannot be compared to any mass disease, even AIDS. Further developments are unpredictable (30, p.3), since the legislation of the Russian Federation does not establish liability for committing acts with various kinds of emitters prohibited for circulation.

FEDERAL LAW "On Weapons" (paragraph 7, item 1, article 6) - prohibits the circulation of weapons and other objects, the destructive effect of which is based on the use of electromagnetic, light, thermal, infrasonic or ultrasonic radiation and which have output parameters exceeding the values established by state standards of the Russian Federation and the relevant standards of the Federal executive authority in the field of health, as well as these weapons and objects manufactured outside the territory of the Russian Federation

The Law of the Russian Federation "On the Sanitary and Epidemiological Welfare of the Population" and the Sanitary Rules and Norms, Sanitary Norms also restrict the use of these types of emitters prohibited for circulation.

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Appendix 1

List of enterprises in Krasnoyarsk involved in the development and production of emitters designed to inflict harm (acoustic weapons, striking by infrasound or ultrasound radiation)

Krasnoyarsk State Technical University

Krasnoyarsk Radio Plant

Krasnoyarsk Regional Psychoneurological Dispensary 1 Lomonosova St.

District VVK, Hospital and Polyclinic of the Krasnoyarsk Krai Department of Internal Affairs ul. 128 Karl Marx St. /Doctors (psychiatrists, neurologists, therapists, ophthalmologists, etc.) involved in testing the damaging properties of emitters prohibited for circulation (weapons striking with infrasound or ultrasound radiation) on human material and taking part in commissioned crimes for a fee/.

Appendix 2

Electromagnetic waves:

1. Decimeter/Ultra-High Frequency (UHF)/wavelength from 1 m to 10 cm;
frequency from 300 MHz to 3 GHz

2. Centimeter / ultrahigh frequency (UHF)/ wavelength from 10cm to 1cm;
frequency from 3GHz to 30GHz

3. Millimeter/extreme high frequency (EHF)/wavelength from 1cm to 1mm;
frequency from 30GHz to 300GHz

4. X-ray radiation wavelengths from 10 nm to 1pm; frequencies from 30GHz to 300Ehz

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5. Gamma radiation wavelength $\leq 10\text{PM}$; frequency $\leq 30\text{Hz}$

X-ray radiation wavelength 10^{-8} m to 10^{-12} m ; frequencies $3 \times 10^{16} - 3 \times 10^{20}$ on the
cells of the living body

$10^{-8} = 1(\text{Angstrom}) \text{ \AA}$

$10^{-12}\text{ m} = 0.000000000001\text{m}$

Acoustic waves:

1. Infrasound wavelength $\approx 17\text{m}$; frequencies below 20Hz

2. Ultrasonic wavelength $\approx 0.017\text{m}$; frequencies above 20KHz

Sound wave velocity = 334 m/s

Table 1

Type of weapon	Effects on humans and machinery	Tasks to be performed
<p>Informational: Electronic media Information Warfare; Radio, television, special satellite TV channels, Media Interference Transmitters; Computer viruses, bombs, guns</p>	<p>The impact on the information systems of the conflicting parties (the enemy) and the simultaneous jamming of their media; Introduction of code into computer networks of weapons, control and communication systems that destroys information in databanks and software</p>	<p>Destruction of the emerging situation in the region, undermining the moral and psychological state of the troops and population, blocking the work of headquarters, disrupting the functioning of ACS, disrupting the management of troops and combat missions</p>
<p>Blinding: Sources of coherent and incoherent radiation, such as high-power laser systems, laser rifles</p>	<p>Temporary dazzling of people (3 minutes or more) using binoculars and rangefinders, even at low laser intensity; effect on optical and optoelectronic equipment (range up to 1 km)</p>	<p>Selective targeting of unit and gang commanders, drivers of armored vehicles and transport, snipers-terrorists, disabling of weapons control systems</p>
<p>Acoustic: Small-sized powerful sound wave generators operating in infrasound and audio frequency ranges. Stationary installations of high power.</p>	<p>Disruption of coordination of movements, psychomotor reactions, convulsions, nausea, damage of internal organs of people, including those inside military equipment and in shelters, by acoustic beams. Functional and structural changes in living organisms, demoralization and death of people, suppression of acoustic equipment, diversion of fire trajectories from targets, control of acoustic (sonar) means</p>	<p>A complete reduction in the combat effectiveness of units and units.</p>
<p>Acoustic: Small-sized powerful ultrasonic wave generators (can be used in the form of an ultrasonic rifle). Miniature devices in the form of a gun or fountain pen.</p>	<p>Disturbance of coordination of movements, psychomotor reactions, cramps, nausea, damage of internal organs of people, including those inside military equipment and in shelters, by acoustic beams. Functional and structural changes in living organisms, demoralization and death of people, suppression of acoustic equipment, diversion of fire trajectories from targets, control of acoustic (sonar) means. Covert control of a person, disabling the psyche and nervous system. Allows to deprive human memory completely and is used for zombification of</p>	<p>Remote control over the person, control of the psyche, disabling human life support systems and, if necessary, causing death. A complete reduction in the combat effectiveness of units and units.</p>

	a person, including covert. Affects at a shorter distance than infrasound weapons.	
Electromagnetic-1: Generators of powerful directional microwave radiation, carbohydrate fibers (conductors)	Disruption of the brain and central nervous system; interference and damage to radar stations, weapons control units; temporary interruption of power plants and power lines	Reducing the combat effectiveness of units and military units, countering the work of electronic warfare, air defense and communications in large areas, disruption of power supply to military and civilian facilities
Electromagnetic-2: Laser and radio frequency weapons, nuclear weapons (electromagnetic pulse), means of electromagnetic suppression	Destruction of cells of living organisms, partially - surface of objects, structural changes in equipment and materials, functional suppression of electronics, optical devices. Impact on consciousness, behavior of human beings	Massive defeat of human material, unlimited and total control of vast territories. Secondary use of captured human material for military purposes.
Radiation: Radiation weapons, nuclear weapons (ionization), elemental ray gas pedals, radiological weapons and radioactive substances.	Ionization, structural changes, other changes in physical and chemical processes of the body, the environment, radiation sickness, genetic changes in the population.	Mass defeat of human material, unlimited and total control of vast territories. Secondary use of captured human material is impossible, mass contamination of the environment is possible.

Table 2

Laser type	Working length Waves	Passage through the atmosphere	Power Source	Basis method	Nature of action	Mass characteristics
Chemical on the reaction of fluorine with hydrogen	208 microns	It doesn't go away	Internal	Space	Space is space	About 2 tons of fuel per shot
Chemical on the reaction of fluorine with deuterium	308 μm	Passing	Internal	Space	Space is space Space is earth	About 2 tons of fuel per shot
Excimer	0.2 - 0.3 μm	Passes with limitations	External	Ground-based with mirrors in space	Earth is space Earth is earth.	
X-ray	10 angstroms	It doesn't go away	Nuclear explosion	Space (or rising from Earth on alarm)	Space is space	Lowest mass of all types of lasers (about 1 ton)
Free Electron Laser	Any	It is possible to provide	External	Space or ground with mirrors in space	Space is space Space is earth Earth is earth. Earth is space	

Appendix 3

Maximum allowable values of energy exposure

Frequency ranges	Maximum allowable energy exposure		
	By electric component, (V/m) ² h	By magnetic component, (A/m) ² h	By energy flux density, (μW/cm ²)h
30KHz-3MHz	20000,0	200,0	- - -
3-30MHz	7000,0	Not developed	-
30-50MHz	800,0	0,72	200,0
50-300MHz	800,0	Not developed	
300MHz-300GHz	-	-	

Appendix 4

Maximum permissible voltage levels of electrical and magnetic components in the frequency range 30 kHz - 300 MHz, depending on the duration of exposure

Duration of exposure, T,h	Yepdu, V/m			NpdU, A/m	
	0,03 - 3 MHz	3 - 30 MHz	30 - 300 MHz	0,03 - 3 MHz	30 - 50 MHz
8.0 or more	50	30	10	5,0	0,30
7,5	52	31	10	5,0	0,31
7,0	53	32	11	5,3	0,32
6,5	55	33	11	5,5	0,33
6,0	58	34	12	5,8	0,34
5,5	60	36	12	6,0	0,36
5,0	63	37	13	6,3	0,38
4,5	67	39	13	6,7	0,40
4,0	71	42	14	7,1	0,42
3,5	76	45	15	7,6	0,45
3,0	82	48	16	8,2	0,49
2,5	89	52	18	8,9	0,54
2,0	100	59	20	10,0	0,60
1,5	115	68	23	11,5	0,69
1,0	141	84	28	14,2	0,85
0,5	200	118	40	20,0	1,20
0,25	283	168	57	28,3	1,70
0,125	400	236	80	40,0	2,40
0.08 or less	500	296	80	50,0	3,00

Note: if the duration of exposure is less than 0.08 hours further increase in the intensity of exposure is not allowed [20,p.7].

Appendix 5

Maximum permissible levels of energy flux density in the frequency range
300 MHz - 300 GHz, depending on the duration of exposure

Exposure duration T, h	PEEPdU, $\mu\text{W}/\text{cm}^2$
8.0 or more	25
7,5	27
7,0	29
6,5	31
6,0	33
5,5	36
5,0	40
4,5	44
4,0	50
3,5	57
3,0	67
2,5	80
2,0	100
1,5	133
1,0	200
0,5	400
0,25	800
0.20 or less	1000

Note: if the duration of exposure is less than 0.2 hours, no further increase in the intensity of exposure is allowed.

Appendix 6

Maximum permissible levels of EMR RF for people under 18 years of age and women who are pregnant

NN pp	Assignment of premises or territories	Frequency Range				
		30 KHz - 300 KHz	0.3 - 3 MHz	3 - 30 MHz	30 - 300 MHz	300 MHz - 300 GHz
		Maximum permissible levels of EMR RF				
		I/m	I/m	I/m	I/m	MW/cm ²
	The area of residential development and places of mass recreation; residential, public and industrial buildings (external EMI RF, including secondary radiation); jobs for people under the age of 18 and women who are pregnant	25,0	15,0	10,0	3,0+	10,0+ 100,0++

+ - except for TV stations and radar stations operating in all-around view mode;

++ - for cases of irradiation from antennas operating in the circular view or scanning mode when the conditions are met.

Appendix 7

The main characteristics of the instruments recommended for measuring the EMR RF intensity

Type	Main characteristic	Working frequency range	Measurement limits	Error
П3-21 replaces П3-16	Tension meter fields with isotropic sensors	E: 10KHz - 300MHz; H: 100KHz-30MHz	E: 1-1000 V/m H: 0.5-16A/m	Not more than 2.5dB
П3-22 replaces П3-15 П3-16 П3-17	Tension meter fields	E and H: 10KHz - 300MHz	E: 1-3000V/m H: 0.3-500A/m	Not more than 2.5dB
П3-23	Energy flux density meter	37.5-118 GHz	0.5-2000 $\mu\text{W}/\text{cm}^2$	Ditto
П3-22/1	Tension meter fields	E: 0.01-300MHz H: 0.01-50MHz	E: 1-1000V/m H: 0.3-60A/m	Ditto
П3-22/2	Tension meter fields	E: 0.01-300MHz H: 0.01-30MHz	E: 30-3000V/m H: 2-500 A/m	Ditto
П3-22/3	Tension meter fields	E: 0.01-1000MHz H: 0.01-300MHz	E: 1-100V/m H: 0.1-40 A/m	Ditto
П3-22/4	Tension meter fields	E: 0.01-300MHz H: 0.01-300MHz	E: 1-3000V/m H: 0.1-500 A/m	Ditto
П3-18 П3-19 П3-20	Energy flux density meter	0.3-39.65 GHz	0.32 $\mu\text{W}/\text{sq.cm}$ - 100 $\mu\text{W}/\text{sq.cm}$	Ditto

Appendix 8

Maximum permissible levels of airborne ultrasound in workplaces

Geometric mean frequencies of the third-octave bands, kHz	Sound pressure levels,dB
12,5	80
16,0	90
20,0	100
25,0	105
31,5-100,0	110

Appendix 9

Maximum permissible levels of contact ultrasound for workers

Geometric mean frequencies of octave bands, in kHz	Peak values of vibration velocity, m/s	Vibration velocity levels, in dB
16,0-63,0	$5 \cdot 10^3$	100
125,0-500,0	$8,9 \cdot 10^3$	105
$1 \cdot 10^3$ - $31,5 \cdot 10^3$	$1,6 \cdot 10^3$	110

Appendix 10

Apparatus for measuring sound pressure levels of airborne ultrasound

Name of equipment	Type of equipment	
	Brüel & Kjær	Robotron Company
Noise meters	2200,2218	00017,00018
Microphones	4133,4135,4137,4165,4166	MK 201,MK 301
Bandpass filters	1613,1616,1617	01016, 01018

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Appendix 11

Permissible levels of vibration in the premises of residential buildings from internal and external sources

Average geometric band frequencies, Hz	Permissible values along the axes Ho, Yo, Zo			
	Vibration acceleration		Vibration speeds	
	m/s ² *10 ⁻³	dB	m/s*10 ⁻⁴	dB
2	4,0	72	3,2	76
4	4,5	73	1,8	71
8	5,6	75	1,1	67
16	11,0	81	1,1	67
31,5	22,0	87	1,1	67
63	45,0	93	1,1	67
Equivalent corrected values of vibration velocity or vibration acceleration and their logarithmic levels	4,0	72	1,1	67

Appendix 12

Permissible levels of infrasound in residential areas

Name of premises	Sound pressure levels, dB, in octave bands with geometric mean frequencies, Hz				Total sound pressure level, dB
	2	4	8	16	Lin
Living quarters	75	70	65	60	75

Appendix 13

Permissible levels of RF electromagnetic radiation in living spaces (including balconies and loggias)

Item	Maximum permissible levels in the frequency ranges				
	30 - 300 kHz	0,3 - 3 MHz	3 - 30 MGC	30 - 300 MHz	300MHz- 300GHz
	I/m	I/m	I/m	I/m	MW/cm ²
Residential premises (including balconies and loggias)	25,0	15,0	10,0	3,0	10; 100,0

For cases of irradiation from antennas operating in the circular view mode with a rotation frequency of the radiation pattern not exceeding 1 Hz and a rotation duty cycle of at least 20.