The NanoTech Network

Science-Fiction Novel by Alexander Lazarevich

DISCLAIMER NOTICE

The intent of this notice is to anticipate possible accusations against me that I am trying to create a distorted notion about historical characters, both still alive and dead, by ascribing to them the words they never actually said. I hereby state that the text following after this notice is a product of my imagination. The words that I put into the mouths of historical characters of the past or the present only represent my idea of what these characters might have said, had they found themselves in the imaginary situation described in the following text. To the best of my knowledge they never actually said these words.
As far as I know, the events described in this text did not take place in reality. However, the latter statement should not be construed to mean that the events described hereinafter could not have happen in reality, or that they will never occur in the future.

The author
END OF THE NOTICE

Part One: Cyborg-Bacteria

1.1. Dissemination. May 15, 1997, 11:35 AM, Moscow subway

Around noon, as usual, the subway car was full of foreign tourists. A group of American high-school students, maps of Moscow subway in their hands, were unsuccessfully trying to pronounce the Russian names of the stations written on the map in English transcription. Closer to the door there stood an elderly Japanese couple, video cameras and other high-tech gadgets hanging from their necks.
A middle-aged man, who looked like a Russian, and who did not at all look like he was suffering from a cold, suddenly sneezed, bespattering the Americans with his saliva. "Excuse me" said he in English with a strong Russian accent, and

started getting through to the door. At the door he sneezed once again, this time bespattering the Japanese. Apparently he did not know any Japanese, so he just excused himself in Russian. The train arrived at the station, he got off, and was forever lost in the crowd...

The next day, 2:50 PM, Moscow International Airport "Sheremetievo"

An elderly Japanese couple, who dropped by a duty-free souvenir shop to buy a Russian nested doll before leaving Moscow, approached the salesgirl to pay for the souvenir. When proffering his credit card to the salesgirl, the Japanese man unexpectedly, even for himself, sneezed. So unexpectedly, in fact, that he did not even have time to cover his mouth with his hand. Extremely embarrassed, he started jabbering rapidly in his own tongue, hurriedly bowing. The salesgirl impatiently waved her hand, meaning "That's OK"...

The Japanese couple flew out to their Japan, without even suspecting what other souvenir, besides the nested doll, they were carrying from Moscow...

Same place, an hour later.

The salesgirl in the duty-free shop suddenly sneezed. She had not felt any symptoms of an incipient cold, not a hint of a headache. She just had suddenly wanted to sneeze, without any apparent reason. "Probably some kind of allergy" - thought she, while aloud she apologized to an Arab-looking customer, whom she seemed to had bespattered. After the Arab came a Latin-American, then came an African, and after the African came a Chinese. All the world was coming. Everybody was going home, to hundreds of countries on all the continents. Each of them was to take along some invisible souvenirs and to become the sources of dissemination in their own respective countries...

1.2. Detection June 25, 1997. Center for Communicable Decease Control, Atlanta, USA

- "It's hard to say now who was the first to spot them. It might have been that schoolgirl during a biology class who was looking through a microscope and suddenly asked her teacher: what's this? And the teacher could not answer. In appearance they are not very different from conventional bacteria, but at high magnification, or rather, at a relatively high magnification, the highest magnification a conventional school microscope is capable of, if you look very carefully you could see some particles inside that have regular geometric shapes."

The deputy director for science of the center for communicable disease control put the first of the photographs on the director's desk. At first glance there was nothing extraordinary about them. The usual assortment of all kinds of bacteria that one can see wherever one points one's microscope. Some of the bacteria were marked

with a felt pen circles, and inside those one could indeed see some rectangles and geometrically perfect spheres that were interconnected by some strings and pipes.

-"The teacher contacted us. At almost the same time we were also contacted by some lab assistants who had been doing some routine medical analyses and also noticed something unusual. It is worth noting here that they all live in different states, hundreds of miles from each other. They have mailed us some samples. But I'm afraid, they were too late."

-"How do you mean, too late?" The anxiety in the director's voice increased.

The deputy director for science took one more photograph out of his folder, and hesitated for a moment, as if not daring to put it on the director's desk. After a momentary pause he said:

-"This photograph was taken this morning. It has nothing to do with the samples that we received. We just took some water out of tap, out of the city water works, and took a picture through a microscope."

He went silent and put the picture on the desk. The director gingerly took the picture in his hands. He had braced himself for the worst. But what he saw was a shock to him. Almost a third of all the bacteria in the picture had been marked with a felt pen by somebody's slightly shaking hand.

-"Do you mean to say "-said director in a constrained voice-"that they are already... everywhere?"

-"They are anywhere you look. If you washed your face and brushed your teeth this morning, I bet your have millions of them in your bloodstream by now. Just as I have in mine as well."

-"Is this dangerous?"

-" We don't now. We have gone through all the epidemiology reports for the last week from all over the country. There don't seem to be any new unknown diseases, no unusual symptoms. So if we assume it to be an agent for some exotic disease, its incubation period is apparently longer than one week. The only thing it seems to be doing now is just breeding like hell. Although, some data suggest that it may cause sudden fits of sneezing - that seems to be its method of propagation. But no other symptoms. There is, however, one strange fact that transpires from these reports..." - the deputy director for science hesitated for a moment.

-"I'm listening. Go ahead." -said the Director.

- "It's unlikely that it has anything to do with these... "things". Most likely it's just a coincidence. The mortality rate throughout the population went down. Earlier in the week it dropped just a little, within the normal statistical fluctuation range, but by the end of the week its value plunged far beyond usual statistical variations and continues to go down. There are lots of reports about terminal cancer patients whose condition unexpectedly improved during this week. There was also a steep decline in the number of deaths related to heart attacks and strokes."

-"A bacteria that does not cause diseases but rather

cures them - that's something new. We've got to stop this epidemic before all of us medical folks are out of our jobs" - nervously joked the director.

The deputy director did not even smile at the joke: "The most terrible thing is - and I've been saving the worst news for the end - it is that this "thing" just is not a bacteria at all. Or, rather, not quite a bacteria. We have managed to photograph it through an electron microscope. Have a look at this."

What was shown in the picture looked a little bit like a sparse forest made up of industrial robots in place of trees, photographed from a helicopter. Mechanical manipulator arms, a little cumbersome in appearance, looking as if they were made of thick glass, stuck out here and there from the surface of a great pain.

-"This is a close-up of one of the areas on the surface of this so-called "bacteria". Just to give you an idea of the scale of this picture, let me point out that the grapple on this manipulator arm is merely several tens of atoms of carbon thick."

-"But this means that... that..." - the director was momentarily at a loss for words - "This means that this thing is artificial!"

- "In a certain sense it is. The first one was indeed created by somebody, but after that they multiplied by themselves, by making copies of their own selves. They are half bacteria, half self-replicating engineering systems. We nicknamed them cyborg-bacteria. Look at the next picture. This is what they have inside. This here is an ordinary cell nucleus, although the number of chromosomes in it is somewhat higher than one would normally expect to find in a bacteria. But all around the nucleus..."

All around the nucleus, there were strange structures floating in the cell's cytoplasm, that bore a remote resemblance to some kind of space stations interconnected by a maze of tubing."

-"But who created them?" - asked the director.

-"No idea. Or, rather, there are several options. The first thing that comes to mind when looking at these photographs is an extraterrestrial invasion. But this option seems to be so implausible that one's mind involuntarily searches for a different explanation. For example, this could be a new type of weapons - a combination of biological weapons with the latest in nanotechnology, a sort of microscopic time bomb that will come into action as soon as they have sufficiently multiplied. Of course, I use the word "bomb" figuratively. For example, they might suddenly start to produce a toxin. It may well be that we are under an attack launched by a hostile nation, or by terrorists. And there is also the most reassuring option - this thing just inadvertently escaped from some secret lab and it is not meant to be activated."

"In any case, one thing is clear: we've got to keep all this in strictest secrecy." - said director - "If it turns out that this thing is indeed of an extraterrestrial origin, just imagine the panic that will break out when people learn

that they have millions of alien-made robots circulating in their blood streams! But if it's just a leak from some top-secret lab, once again, the government is not going to pat us on the back for exposing a closely-kept military secret. You've got to think up some kind of official hog-wash to feed to that schoolteacher and all the others. In the mean time, I'll try to contact the military and the CIA."

1.3. Investigation. July 3, 1997. Nanotechnology lab at MIT, Mass, USA.

- "You know, Professor" - said the plain-clothes man - "what baffles me most is that in your lab, where you have all these microscopes that are, according to my sources, the best in the world, nobody ever noticed the cyborg-bacteria until you were specially notified of their existence."

-"Nothing baffling, really. If you walk around our facility, you'll see that we have quite a system here for protecting us against any extraneous contaminants. We are working here on objects that are millionths of a millimeter in size, that is, nanometers, which is comparable to the size of individual atoms. A bacteria, about ten thousand times larger then this and containing billions of atoms is, from our standpoint, a whole mountain that can wreck all our work. It could never, in principle, enter our microscopes. Even the first, the coarsest air filters would screen it out. But when a week ago you told us about them, and asked us to investigate, we let them under our microscopes. What we saw there, nearly cost some of our people their sanity.

We have been working in the field of nanotechnology for the last fifteen years, and we have always considered ourselves the leaders in the field. We did make some things we thought we could be proud of. We were, or we thought we were, the first to produce a few gears where each tooth consisted of only 20 atoms. We have even built a fully functional electric motor less than one micron in size. But what we saw inside the cyborg-bacteria was a real shock to us. This was an entirely different level of technology. Whoever it was who made them, these guys are ahead of us by twenty to twenty five years."

-"Are you sure that it is only twenty and not a thousand or a million?" - asked the man in plain clothes.

Professor gave him a wry smile: "If you are still thinking in terms of extra-terrestrials, forget it. This thing is of an earthly origin. A significant portion of genes in the nucleus of the cyborg-bacteria are borrowed from common bacteria."

-"So, you believe that you yourself could make something similar in about twenty years time?"

-"Even earlier than that, if only I had unlimited funding. It is hard to imagine the amount of man-hours of highly-skilled, highly-paid labor invested in the design of this cyborg and the manufacturing of the first model. This work must have involved the efforts of thousands of first-class engineers and scientists. It is incredibly expensive. The costs must be comparable to the costs of Manhattan Project or Apollo Project."

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-"I want to make sure that I got you right: you say that most of the expenses in this business are caused by the labor costs, not the cost of hardware? Are you sure? This could be very important for figuring out who did it - there are some countries in the world where the labor of highly-skilled scientists comes very cheap."

-"Well, of course the equipment is also expensive. But you need it only in the initial phase, the one that we, by the way, are not through yet. This first phase consists in the development of the first self-replicating micro-robot capable of manipulating individual atoms. As soon as you have it built, this very robot becomes you primary tool. You'll need virtually no other equipment after that. The only other piece of equipment you'll still have to use will be your own brains, because you'll have to know precisely what atom you want moved and where you want it placed. You enter into an entirely new technological ballgame. It's a technological breakthrough that is beyond comparison to anything in the previous history of mankind. The creation of the first microrobot is the barrier beyond which lies a wonderland. He who has passed this barrier comes into possession of seemingly magic powers that defy all imagination. For example, he can create absolutely new genes by directly manipulating the sequence of amino acids - something which is still impossible for the present-day genetic engineering that has to be content with mere cutting and pasting of fragments of the already existing genes, and what is worse, genes cut only at certain specific locations, rather than at locations chosen at will. Well, coming back to where we started, it looks like somebody on our planet Earth has already passed that barrier, and does things which are unthinkable from the standpoint of conventional technologies.

You asked me the question of whether it was twenty years or one million. To give you a perfectly correct answer I should say that time estimates like this are only applicable to a steady growth phase in the evolution of a technology. They are absolutely irrelevant in the situation of a technological breakthrough of this scale. In a situation like we have here, twenty years are as good as one million. They are past the barrier, while we are still not, they are omnipotent, while we are powerless. Do you know what the mechanical structures inside the cyborg-bacteria are made of? Of diamond! Of course, this could be expected, since the only construction material available to them is carbon. But the very fact that they take carbon dioxide molecules out of the atmosphere, extract from them atoms of carbon that they then put together into a diamond lattice at ambient temperature and pressure, seems to be a miracle from the standpoint of present-day technologies requiring crushing pressures and searing temperatures to create a diamond."

-"They put diamonds together atom by atom?"

- "Not quite so. Although they do seem to be capable of doing this as well, this would still be a very slow process, while they multiply very fast and need a lot of construction material. The solution their creators have found is absolutely amazing - they put together a gene for producing

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an enzyme that promotes the assembly of carbon atoms into a diamond lattice. And I suspect that this gene is not the only artificial gene inside the cellular nucleus of the cyborg-bacteria. For all we know, their genes may contain the complete information on the design of both the biological part and the "engineering" part of the cyborg-bacteria. Although we cannot be certain about this yet. The matter is, the engineering part of the cyborg-bacteria includes not only purely mechanical end effectors. In our latest scanning electronic microscope photographs, one can see a structure inside the cell which we provisionally named the "on-board computer". Have a look at this. See this field in the picture, dotted with a multitude of tiny light and dark specks, located seemingly at random? Each speck is just a few atoms in size. And here you can see a picture of the same field taken just a few seconds later. As you can see, the pattern of the specks in the upper right corner remained the same. We provisionally called this area "ROM", which stands for the "Read-Only Memory". But the partern of specks in that other area over there has changed beyond recognition. That is why we provisionally named it "random access memory". Although, for all we know, this might actually be a microprocessor. Or what I would rather call a "nanoprocessor".

-"And what about these straight lines going all the way across the field?"

-"Our provisional nomenclature for them is "wiring". These seem to be leads for data input and output."

-"Wires? Made of metal?"

-"No metals here. Everything made of carbon. Carbon is the most wonderful of all the chemical elements in the periodic table. Put the carbon atoms together in one way - and what you get is a graphite, a soft, electrically conductive material. But re-arrange the atoms in the crystal lattice just a little bit - and you end up with the hardest material in the world, and the best electrical insulator as well. And these are just the two extremes of the whole range of properties. In between, you can find materials with virtually any desired properties, the only thing you need to know is the pattern of the carbon atoms. And here we are talking about an element that can be "mined" directly from the ambient air, that is exactly what all the plant life on Earth does every day - mining carbon from air. This element is the basis for all the living things on Earth, and this explains the ease with which the creators of the cyborg-bacteria were able to combine seemingly incompatible things: live creatures with inanimate matter, organisms with mechanisms. They joined them so seamlessly that we cannot even figure out how they breed: whether they do it by conventional biological cell fission (this would mean that all the information about the cyborg's mechanical part is stored in the genes), or whether the mechanical part of the daughter cell still has to be completed using mechanical manipulator arms of the mother cell. We have not yet observed the latter, while the former is too hard to believe in."

The plain-clothes man looked at his watch: "Professor,

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what you are telling me is terribly fascinating, I would even say, fascinatingly terrible, but I've got to catch a plane to Washington - tomorrow morning the President calls a secret meeting to discuss this issue, and I've still got to put together an executive summary for that meeting. So, could you please summarize what you have been able to learn during the last two days. We have heard some frightening rumors about the cyborg-bacteria's power source, and about their ability to communicate with each other. The latter is of special concern to the President. The existence of an unknown global communications network, which is independent of the Internet, and which carries no one knows what kind of data, is a serious potential threat to the United States national security. Do you have anything to say about this?"

- "First a few words about their power supply. Initially we assumed that they extract their energy from organic substances which they take from their environment. Simply speaking, we believed that when they swim in the water they eat, for example, green algae, and when they enter animal or human circulatory system, they feed on nutrients available in the blood. However, even the first rough estimates showed that if they had used as their power source the organic matter from the environment, they would not have been able to breed as fast as is actually the case. We have made an experiment: we put one cyborg-bacteria in a glass of germ-free chemically pure water, containing no organics, and then put the glass into a hermetically sealed box in complete darkness to rule out any possibility of photosynthesis. In one hour's time the water in the glass was teeming with cyborg-bacteria, while the level of helium in the air inside the box had risen, by a very small amount, at the sensitivity threshold of our instruments, but it did rise, all right. You can tell the President we are almost certain that the source of power used by the cyborg-bacteria is the cold-fusion reaction of hydrogen atoms. Since they extract hydrogen directly from the water they swim in, they have a virtually unlimited power source at their disposal.

We still do not know any details of this process, but we think that there must be some "power plant" inside cyborg-bacteria, which breaks up water into oxygen and hydrogen, then picks up individual hydrogen atoms and brings them into a certain relative position required to trigger off their fusion into atoms of helium. The energy released in the process is then apparently used to build up the organic molecules necessary for the normal operation of the organic part of the cell, to generate electric power for the cyborg's mechanisms, or maybe that energy is directly transmitted to the mechanisms in the form of mechanical work without intermediate conversion to electrical power - we still don't know the details. Of the greatest interest here is the cold fusion reaction itself. In the cold fusion, the most important thing is the proper relative positioning of the atoms. If we manage to trace this process, we'll eventually be able to reproduce it, and our country would get a new environmentally clean power source. But we need additional funds for this research. I would like you to draw the President's attention to this."

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-"Sure I will," - nodded the man in plain clothes - "but at the moment the President is mostly concerned about the second issue I mentioned."

-"I was just getting to that. We have indeed managed to establish that cyborg-bacteria are capable of communicating with each other by sending and receiving narrow-beam infrared pulses."

-"You mean they communicate with each other using the same infrared rays as an ordinary TV remote control?"

- "Not quite so. The frequency range they use lies a little bit lower than the one used in the IR remote controls. The cyborg-bacteria's range is closer to microwave radiation. But the principal differences lie, firstly, in modulation. The data throughput of an ordinary remote control is negligibly low because is uses a very primitive method of carrier-wave modulation. But in fact, the electromagnetic waves of such high frequency are capable of carrying huge amounts of data, and as far as we could see, the cyborg-bacterias use this capability to the fullest extent possible. We are talking here about tens of megabytes, or maybe even gigabytes per second. Secondly, they have a very narrow beam radiation pattern. Although individual bacteria also use omnidirectional radiation to communicate with their closest neighbors at the distances of up to a few millimeters, the strength of such signal is very low and it cannot be used for communications at a long range of, say, tens of meters. For long-range communications, groups of neighboring bacteria cooperate with each other to create, for the time of a long-range communications session, a sort of phased antenna array with a pencil-beam radiation pattern. In other words they radiate in a very narrow beam, where the signal strength decreases with the distance ever so slightly. In this way one group of cyborg-bacteria may communicate with another at distances of up to hundreds of feet."

- "But a hundred feet is not very much."

- "It is more than enough."

- "Enough for what?"

- "Enough for any cyborg-bacteria located at any point on Earth to be able to communicate with any other cyborg-bacteria located at any other point on the globe, even at a distance of tens of thousands of miles. You've got to understand that by now the cyborg-bacteria have spread all over the Earth. Wherever you might happen to be, with a possible exception of a desert, you will always be able to find within a hundred feet range from you either some living thing, or a pond, or at least a puddle. If those cyborg-bacteria that live inside you, wanted for some reason to communicate with their cousins in Europe, the only thing they would need to do would be to call the cyborg-bacteria that live inside that water faucet over there in this room. Those would pass on their message to other bacteria living further down along the water-pipe, those other ones would pass the message to still other ones, and so on, all the way to the Atlantic Ocean. And the ocean is teeming with these bacteria, so from there on the message would be traveling very fast."

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- "Are you certain that such things are actually happening?"

- "Of course, this is just a speculation, but a very plausible one. Judge for yourself: the capacity of random access memory per one cyborg-bacteria is estimated at hundreds of megabytes. A glass of water contains at least several hundred thousand cyborg-bacteria, which means that cyborg-bacteria in just one glass of water can hold in their memories the whole Library of Congress. And their memories do hold something, and it seems that a considerable portion of those memories differ from one bacteria to another. So, where do all these data in their memories come from? The only possible answer at the moment is that all the cyborg-bacteria are joined together in a single global data network with a continuous data traffic. To verify this hypothesis we staged the following experiment: a single cyborg-bacteria was left alone to multiply in a container shielded from infrared and microwave radiation. The container housed an electron microscope that was taking pictures of the newly formed bacteria. In this case, where we cut all the external data links, the contents of the random access memory inside all the new cyborg-bacteria turned out to be the same. At least the pattern of light and dark specks in all of these pictures is the same."

The man in plain clothes glanced at his notepad: "Well, to make sure I understood everything that you've just told me, let me summarize. So. At this very moment, all over the world there have spread microscopic self-replicating devices (so-called cyborg-bacterria), capable of living in the water and in the human and animal blood streams. They are an advanced product of nanotechnology and genetic engineering. Their origin: unknown, presumably - a country with cheap but highly-skilled workforce. Their purpose: unknown. Material: carbon in all its forms -diamond, graphite, fullerins. The source of material: carbon dioxide from the atmosphere. Power source: cold nuclear fusion. Fuel: hydrogen from water. They exchange data using narrow-beam electromagnetic radiation in a range between microwave and infrared radiation. The content of the data being exchanged is..." - the man in plain clothes shot an inquiring look at the Professor.

- "Unknown." - responded the latter. And after a short silence, added: "You left out one more item - micro-robotic arms on the cyborg-bacteria outer surface. We have not yet seen them in action, but there must be a reason for their existence. And this may hold the key to the secret of cyborg-bacteria. For now they are just multiplying and waiting for something. But sooner or later a time will come when a signal passes throughout this whole global network, a signal for them to do some job. What kind of job - we don't know, who will issue the signal - we don't know either. But something of this kind must eventually happen, otherwise, what we see now just doesn't make any sense at all."

1.4. The President holds council. July 4, 1997. Electromagnetically shielded room for secret meetings, White House, Washington D.C.

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The President: "Gentlemen, I'm perfectly aware that on holiday everybody would rather be at home, but today the United States are facing a crisis of such proportions that it dwarfs into insignificance even the Carribean missiles crisis of 1992. Over the last few days we have been observing an absolutely incomprehensible phenomenon, which potentially poses a tremendous threat to the national security of the United States. My understanding is that CIA Director has something to say on the subject."

CIA Director: "Central Intelligence Agency's experts have done a study reviewing all kinds of hypotheses about the cyborg-bacteria's origins and their possible impact on the US national security. What I'm going to give you now is a summary of their report.

First, a few words about the possible origins. Our experts have reviewed all the four regions in the world, that had sufficient scientific and industrial potential for developing a nanotechnological system of this kind: Western Europe, Japan, China, and the former Soviet Union. Western Europe and Japan were dismissed by our experts almost immediately: the costs and manpower required for the development of such system are so great, that they are virtually impossible to hide in a democracy. If they had tried to conduct such work in secret from us, it would have become known to our intelligence before long. Then our experts considered China, but in the end they had to dismiss this possibility as well, because under the current conditions it would be difficult to imagine a political rationale for such an action. The current Chinese leadership builds its relations with the West on a pragmatic basis. Provoking the West by putting it under a threat is not consistent with the current Chinese interests. So we are left with the only option: the former Soviet Union."

- "You mean, it was done by Russia?" - exclaimed the President.

- "Russia?" - the CIA director made a wry face - "Who said anything about Russia? Russia is a country with collapsed economy, dying science, and disintegrating educational system. Russia is in principle incapable of doing anything in the field of high technologies. But the former Soviet Union was something absolutely different. In that country anything was possible.

In the Soviet Union of the 1970-ies, science was officially proclaimed to be "a productive force of the society". The Kremlin rulers regarded science as a possible solution to all their problems and were pouring into it inordinate amounts of money received from oil sales. During that period, fundamental research in the USSR enjoyed better funding than anywhere else in the world at any time in history. They built up a tremendous scientific infrastructure, something beyond any comparison - thousands of research institutions, millions of scientists, most of them working under strictest security.

The Soviet Union have never published any scientific papers on the subject of nanotechnology. Of course, to

explain this fact one could assume that they never did any research on that subject at all. It could be assumed, but it is very hard to believe. A country that played the role of a superpower just could not afford to ignore nanotechnological research, since its military ramifications are too important. Our agency has some circumstantial evidence that in 1983 a western company, that was suspected of acting as a front for KGB, smuggled out of Japan a consignment of equipment banned from export to socialist countries. This equipment included scanning tunneling microscopes. I think I should explain here that a scanning tunneling microscope is an instrument which not only allows to observe individual atoms, but also allows to manipulate individual atoms, putting them together into almost any desired configuration. This is the principal tool used for building up nanotechnological devices. So we are almost sure that the Soviets did work on nanotechnology, and that Russia has inherited from the Soviet Union some fairly advanced projects."

- "Is this supposed to means that we do indeed deal here with a hostile act of the Russian government?" - asked the President.

- "Hostile acts towards us are just as bad for the best interests of the Russian government as for the best interests of any other country. What we believe we have to deal with here is an act committed without the knowledge of the Russian government. In simple terms this means that we are dealing with conspirators or terrorists. With the sort of chaos reigning in today's Russia, it is no problem to sneak materials out of a secret lab. That could be done by anyone. And this is especially true of a nanotechnological lab working on products that can hardly be seen under a microscope.

After the dissolution of USSR in 1991, the power in Russia was seized by a government that absolutely does not care about scientific research. The only thing they want is to sell raw materials to the West and live in the same way as, say, Arabian sheiks live on their petrodollars. We encourage this, since we see here a double advantage to us: on the one hand, our economy gets access to a new source of raw materials and a new market for our products, and on the other hand, in a few year's time, when Russia completely loses its intellectual potential, it will never again be able to regain its power and become a dangerous military adversary to us, and we will be able to live free of the nuclear war fears. But there is always a fly in the ointment. In this case it's the problem of what we are supposed to do with this huge Soviet scientific infrastructure, with all those millions of scientists, for whom there is no use under the new policy. The money that used to be spent on their salaries nowadays is spent on buying Mercedes-Benz cars for the newly rich New Russians. The salaries in the research institutions are delayed for months, but still these people don't quit their jobs - many of the scientists consider it beneath their dignity to hawk matches in the streets. This is a whole multimillion army of hungry, angry and highly skilled specialists. One could

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expect anything from them."

- "Like selling nuclear secrets to Iraq" - said President.

- "Or stealing cyborg-bacteria from a secret military lab and spreading them all over the world" - added CIA Director.

- "What kind of threat could these cyborg-bacteria pose to us?" - asked the President.

- "I was just getting to the section of the report that analyzes potential threats to our security. Once, in the past, we did a feasibility study on the use of nanotechnological systems for intelligence and sabotage purposes. First, a few words about sabotage. Theoretically speaking, the cyborg-bacteria that already live inside everyone of us, can kill any one of us at any moment they might choose. And they could do it in thousands of ways."

- "Can they manufacture poisons?" - asked the President.

- "Sure they can, but that's not the best way - poisons are easily detectable during post-mortem. The perfect way would be to induce a heart or asthma attack - in that case everything would have appeared as death from natural causes. To succeed in this, the cyborg-bacteria should be capable of finding those nervous fibers in the body that control the heart beat or the diaphragm muscles, hooking up to these fibers and feeding into these fibers electrical pulses of very low voltage, which cannot do any harm by themselves, but these would be control pulses that commanding the heart or the lungs to stop working. And the "on-board computer" of each of those bacteria we have to deal with now, appears to be powerful enough to accomplish such a task.

Some of our experts even think it to be too powerful for such a task. They suspect that cyborg-bacteria are designed not for sabotage, but for intelligence-gathering activities. A tremendous traffic of data is being continuously exchanged between these bacteria, but we still don't know what kind of data this is. We can only make guesses. For example, we could assume that the cyborg-bacteria that live (this is only an example) inside you, Mister President, have tapped into the nerve fiber that goes from your ear to your brain. All the sounds that you hear are converted by your ear into a sequence of nerve pulses that are further sent into the brain. The bacteria that have tapped into your nerve fiber in the same way as an eavesdropping device might tap into a phone line, intercept these pulses, convert them into infrared radiation that is transmitted to another group of bacteria located a few dozen feet from you, those other bacteria pass it on to yet another group, and so on. Almost immediately, the information about what is being spoken in this room arrives in Moscow."

- "The chief of my security service has assured my that the walls of this special conference room won't let any radiation out." - said the President.

- "The total data storage capacity of all the cyborg-bacteria that currently live in your body is such that they could easily store several hours of conversation and transmit it as soon as you leave this room. Or I leave this room. Or any of those present here. We have very good reasons to believe that by this very moment the cyborg-

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bacteria already inhabit every human being on Earth."

- "And as soon as these pulses arrive in Moscow they will be decoded on a computer and the sound will be restored?"

- "That wouldn't be the most efficient method. There is a much simpler way to do this. Since these bacteria already live inside everyone on Earth anyway, we could safely assume that they also live inside those who might be eavesdropping on us in Moscow. We could also assume that one of the cyborg-bacteria has hooked up to his auditory nerve in the same way as it did to yours, the only difference being that your bacteria is recording electrical pulses coming from your ear, while his bacteria is reproducing these pulses, inducing them in his auditory nerve. From the standpoint of his brain these pulses are indistinguishable from the ones coming from his own ear. Thus, however quiet it might be in his room, he will distinctly hear every word we are saying now in this room.

But as I have already mentioned, all of these are just conjectures. For all we know, the purpose of the cyborg-bacteria may not be limited to eavesdropping. There is still one more possibility, which at first glance might seem absolutely wild. But if we keep in mind how far ahead of us are the developers of this system, we should admit that there is nothing that is totally impossible. This other possibility I'm referring to is the possibility of gaining total control over other peoples' bodies, gaining control not only of the nerve fibers that go to the heart, lungs or brain, but of all the nerve fibers in the body and turning a human being into a remotely controlled puppet.

Just as in the case of eavesdropping through cyborg-bacteria, where your ear becomes, in a way, the ear of that other man, the eavesdropper, one could also make your arms, legs, throat, the whole of your body into the arms, legs and throat of that other man. Let's imagine that his brain sends a command to move his arm. These commands are issued into the nerve fiber that goes from his brain to his arm. Half way to the arm these nerve pulses are intercepted by a cyborg-bacteria, and are eventually transmitted to a cyborg-bacteria that lives on your nerve fibers going from your brain to your arm and are fed into these fibers. For all that your arm knows, these pulses might have come from your own brain, and so your arm obeys the command. Add to this the possibility that cyborg-bacteria may suppress the signals that come from your own brain, and what we have here is that the control over your body is completely transferred to somebody else. You may well imagine what vistas of new opportunities may open up for espionage or sabotage, if a spy takes control over the President's body."

Everybody in the room fell silent and looked at the President. After a short pause, the President said:

- "Or over the body of the CIA Director."

- "Under the circumstances, nobody can be above suspicion." - replied the CIA Director.

- "Do you seriously believe that all you've just described is really possible?"

- "It's our experts who allow for such a possibility, and I see no reason why I should not trust them. Cyborg-bacteria

in themselves are so fantastic, that we can safely assume their purpose to be absolutely fantastic as well. As I have already mentioned, we are most likely dealing here with terrorists from among disgruntled former Soviet scientists. If this is indeed the case, then, within the nearest future, they are going to put cyborg-bacteria to work, making them do something that will be supposed to scare the whole world. Don't ask me what they are going to do, I don't know. In view of the awesome capabilities of the cyborg-bacteria, they might do absolutely anything. And after that demonstration of their power, they'll make their demands known to us. And if the public gets scared enough, we may have to accept their terms."

- "What kind of terms that might be?" - asked the President.

- "All depends on what kind of people we are dealing with here. If they are just ordinary extortionists, they will demand money for themselves personally. That would be the least painful option for us, since here we are talking about no more that tens of millions of dollars. However, I'm inclined to expect from the Soviet scientists something more idealistic and unselfish, like a demand to change our current policy towards Russia. And that may cost us hundreds of billions of dollars."

One of the President's aides, who had been silent up to that moment, suddenly asked to speak.

President's aid: "Mister President! I have already tried many times in the past to draw your attention to the fact that our current policy towards Russia is potentially very dangerous for the United States, and today we once again had an opportunity to see this for ourselves. But I want once again to draw your attention to the fact that such policy is not only dangerous, it is also amoral. We have always publicly proclaimed that our objective is to create a technologically advanced society, where the advancements of Science will eliminate poverty and disease, and give equal access to education to everyone. But at the same time, in Russia, we support a political regime which destroys the intellectual potential of its own country. Millions of scientists, who could have greatly benefited the whole of mankind , are loosing their jobs and skills.

Today, in the era of global communications, when people of Earth are interlinked via satellite TV and Internet, the policy of double standards quickly becomes evident to the people and undermines their trust in the government. The time is coming when we no longer will be able to afford to form our policies on the basis of transitory political expediencies at the expense of moral principles."

- "What is your concrete proposal?" - asked the President - "Is it to let Russia build up its intellectual potential? And what if tomorrow the power in Russia will be seized by fascists, and the Russian scientists will develop for them a weapon that'll make the atom and hydrogen bombs look like baby toys in comparison?"

- "But it is our policies that are pushing Russia towards fascism! Having lost their intellectual and industrial

potential, the Russians feel humiliated, and it is the national humiliation that paves the way to fascism."

President: "We have been through this many times before, so let's please not start this again. The current regime in Russia! There is just nothing to replace it with. You know as well as I do, that we had to choose the lesser of the evils. So let's get back down to our today's problem. What can we do under the circumstances?"

CIA Director: "Not very much. First, we should continue the study of cyborg-bacteria, so as to understand what they are really capable of and be prepared to face it. The most important thing to do is to try and decipher the data they are transmitting. If our guess that all these bacteria are joined into a global network is true, we've got to try to "crack the password" and break into the network. We might even be able to try to seize control over the network. If we succeed in this, we will be able to turn this dreadful weapon against its creators. For these purpose we are now putting together a team of programmers and hackers.

Secondly. We've got to put pressure on our Russian counterparts. To demand from them all the information on classified projects conducted in the USSR in the field of nanotechnology. To demand from them the names of scientists involved in these projects. In short, it's high time for us to start looking into this case in earnest. For this purpose we intend to send to Moscow our liaison officer with special powers. I want to ask you Mr. President, to contact Moscow on the hot line and demand from the Russians that they grant him such special powers."

President: "What do you mean by special powers?"

CIA Director: "Free access to any classified archive, permission to conduct investigation on the Russian soil and so on. Ideally, they should allow him to do whatever he asks and be very cooperative in giving him any assistance he might ask."

The President: "This may not be easy - lately the Russians have started playing independent, but I'll do my best. We still have the means to bring pressure to bear. Anything else?"

CIA Director: "For the moment, that seems to be all that we can do. In conclusion I would like to once again stress the need to keep it all secret from the public. Under the circumstances, the general panic is the last thing we want."

1.5. The autograph July 6, 1997. Nanotechnology lab at MIT, Mass, USA.

Computer monitor displaying in real time the image from electronic microscope. Two researchers looking at the screen.

The first one: "And now let's try having a high resolution scan of the back wall of this bacteria's 'on-board computer'."

The second one: "It's a waste of time. Low-res images have clearly shown that there is absolutely nothing there - just a blank wall."

The first one (holding a picture to the light): "Are you sure? And what is this dot here? A photographic artifact? I still want to see this spot under high magnification. "

The second one: "Are you satisfied now? Still no features."

The first one: "Stop! Did you see that? Move back a little. Here it is! Increase magnification!"

The second one (looking at the screen): "Wow! Does anybody here read Russian?"

The first one: "I don't think that will be necessary. There seems to be an English translation here as well."

Each character was composed of just several dozens of atoms, carefully arranged on a smooth wall surface. But there could be no mistaking - those were indeed characters. The writing on the wall read: "Made in the USSR by Alexei Levshov and a team of his comrades."

Part Two: "Something wonderful is going to happen..."

2.1. Gloomy morning. July 6, 1997, Moscow, 7 A.M.

Alexei Levshov went out onto the landing closing behind him the door to his apartment and started locking it up. The rundown-looking door was made of wood and badly needed a new coat of paint. There was only one lock in it. Almost immediately Levshov heard behind his back a series of loud clicks as the many locks in the new armored metal door on the opposite side of the landing started to unlock.

- "That's strange" - thought Alexei. It was only on rare occasions that his neighbor got up so early. His neighbor who lived behind the armored door was known to everybody in neighborhood from his earliest childhood as "Mityai". Actually his name was Dmitrii, but it is amazing how many diminutives there are in the Russian language for any name, each diminutive expressing a certain distinct attitude towards the person. If Dimitrii had been a well-behaved boy, everybody would have called him "Dima" or "Mitiya", but "Mityai" suggested someone unruly, and unruly he was. As a kid he was considered a local imbecile. When he was 13 he landed up in a labor camp for juvenile delinquents for stabbing somebody with a knife, not to death, though. He served his term of several years and came back. Then came the new policy, the Prestroika. Mityai became one of the so-called "New Russians" - that is, the newly rich, and started buying for himself expensive foreign-made cars, one after another. Nobody knew exactly what was the nature of his business, but there were some dark rumors whispered around the neighborhood that Mityai had become a hit man, a "killer" - one of the many words that Russian language has borrowed from English during the Perestroika years.

The armored door opened. Mityai appeared in the doorway. He wore dark glasses and black leather costume adorned with multiple gold chains. He cast a disparaging glance at Levshov's old suit that was coming apart at the seams and said: "You are wearing rags, old man. Our Science has gone completely to seed!"

Mityai never passed up a chance to pick on Levshov, who had gotten used to it long ago and did not pay any attention. This time, as always, he left Mityai to lock up all his locks and went downstairs. Mityay caught up with him in the yard. Twirling the keys of his new Mercedes-Benz car around his finger, he clapped Levshov on the shoulder and said: "Listen, Science, I'll give you a hundred bucks, buy yourself some decent trousers, 'cause you look disgusting."

Levshov froze in his tracks. He felt a wave of anger rising inside himself, while Mityai continued in the same impertinent tone: "Let's take you, Science, as an example. You studied all your life, and all you've got for it is living like a homeless dog. And as for me, they threw me out of school when I was in the eighth grade for bad behavior and all that, but I now live as a Man. And you know why? It's because in the past the Communists were perverting the economy, but now the Free Market has come and shown everybody's true worth. And it turned out that I'm a valuable member of society, 'cause I'm in demand. But there is no demand for you, and so it turns out that your science is shit and you are a piece of shit yourself. Take the bill." Mityai shoved a one hundred dollar bill into Levshov's fist and started walking towards his Mercedes car.

Levshov felt a wave of hatred and anger flooding his soul like water that burst a dam. For a fraction of a second, through the mist of choking frenzy, he had in his mind's eye a fleeting vision of all the power of NanoTech coming down upon Mityai, exploding this impudently smirking nonentity into a myriad of tiny fragments, smearing his remains all over the wall, splattering them on the blacktop.

Stop this! Being the NanoTech Network System Administrator means not only to be in possession of powers beyond imagination, it also means bearing an unimaginable responsibility. The First Commandment of the Nanotech Network System Administrator reads: "Thou shalt not make decisions in wrath".

"NANOTECH" - mentally said Levshov. And although he pronounced this command only in his mind, without any audible sound, the cyborg-bacteria that were permanently hooked up to the nerve fibers going from Levshov's brain to the muscles of his throat, easily picked up those weakest action currents that are always generated when we want to say something, even when we say it inaudibly, to ourselves. The cyborg-bacteria took only one thousandth of a second to decipher the action current patterns in the nerve fibers and to understand that what they had received was the system activation command. One more thousandth of a second later, the cyborg-bacteria that were permanently hooked up to the nerve fibers going from Levshov's ear to his brain sent into these fibers a sequence of pulses, which, upon arrival to his brain, were perceived by it as a sequence of sounds,

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namely as words enunciated by a pleasant, "radio announcer's" voice: "SYSTEM READY". The further commands-and-messages exchange between Alexei Levshov and the NanoTech System was as follows:

AL:>SUBROUTINE "I AM CALM"

NT:>PARAMETERS?

AL:>BRING DOWN: BLOOD PRESSURE, RESPIRATION RATE, BRAIN ACTIVITY; STEP "MEDIUM"; DO UNTIL "ENOUGH".

NT:>OK

Millions of cyborg-bacteria residing in Alexei's body immediately got down to work. In a second he felt an icy calmness come over him.

AL:>ENOUGH

NT:>OK

"So," - said Alexei to himself - "Firstly, disclosing the existence of the NanoTech network now would mean bringing the whole effort to ruin. Secondly, Mityai is an imbecile and a ruffian, but it is not his fault. He was made an imbecile by his parents, who conceived him when they were drunk. He was made a ruffian by the existing political regime. In the future, NanoTech might be able to correct both, and that means that potentially he is a human being, and therefore, he should be treated as a human being, and not as a bug to be smeared all over the wall."

In the meanwhile, Mityai who was absolutely unaware of the terrible fate that he had just escaped so narrowly, sat into his Mercedes and stuck his head out of the window: "Goodbye, Science. A client waits for me." He took a hand gun out of the glove compartment, released a safety catch, and tossed it back. Suddenly, a new idea struck him, and he once again poked his head out of the window and said:

- " And you know, Science, what's funny? I have no orders for finishing off your kind, I mean, scientists. I have orders for businessmen, for politicians, even for journalists. But no orders for scientists. You are not even worth killing. That's how the things stand. Supply and demand. The invisible hand of the market. Adam Smith. That's what I call real science!"

He bared his teeth, showing a gold tooth, in what was probably meant to be a smile, stepped on the gas, made a complete circuit around the yard, at full speed ran the car into a puddle splashing water all over Levshov, and roaring with insane laughter rode into the street and was gone.

Levshov looked at the one hundred dollar bill in his hand, put it into his pocket, calmly shook the water droplets off, and headed for the bus stop. One hundred dollars almost amounted to his two months' salary at the research institute. But even this pittance have not been paid him for the last four months.

2.2 The nightmare continues One hour later, Institute for Molecular Biology Studies, Moscow.

If a researcher on the staff of the Institute for Molecular Biology Studies had fallen into a lethargic sleep ten years ago, to be awaken only today to come and visit his institute, such visit would have left him in a state of

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complete shock. His first thought would have been that while he was asleep, some terrible and irredeemable calamity had happened. What once had been a proud edifice of shining glass and polished marble, erected back in the days when science was proclaimed to be a "productive force of society", was now reduced to a state of decay and desolation, covered with layers of dirt, with many of the glasses broken and replaced with plywood. Inside, he would have seen deserted corridors - the staff was reduced to one tenth of what it had used to be and the people who were left were mostly those approaching their retirement age. True, he would have also seen some young people, who surely did not look like intellectuals and were carrying some boxes to and from lab rooms. Upon entering one of such rooms (if only he had been allowed to), he would have been shocked to see the valuable scientific instruments piled up into a heap in a corner, while the room itself had been converted into a warehouse for a commercial company dealing in ladies' boots, or wallpaper, or some such stuff. In the Institute's scientific library he would not have been able to find even one scientific book published within the last five years. He would be astounded to see that librarians had been allowed to turn the library into a store selling all kinds of things that had absolutely nothing to do with books. True, among these sundry things he would indeed have been able to find some newly published books, but not scientific, but rather antiscientific in character: books on astrology, chiromancy, occultism, black magic and witchcraft, and so on, which would have led him to the conclusion that civilization is dead, and the mankind has been thrown back into the Dark Ages.

People can get used to the most horrible changes, especially if these changes don't happen overnight, but are spread over several years. And people got used to them and resigned themselves to them.

Alexei Levshov also got used to them. But never resigned.

That day, when he got to his work, he stopped for a second before a notice-board in the corridor. The most recently posted notice began with the words: "In view of the fact that the employees of our research institute have not been paid their salaries for the last four months, the collective members of the research staff have petitioned the city authorities that they should not impose fines for arrears of rent and electricity bills...". Alexei skipped reading the rest, and stepped into the room where his lab was based. One glance at the faces of his staff was enough to tell him that something was wrong.

- "I have made up my mind" - said a researcher, young woman with her face turned to stone - "I have nothing to feed my kids with. I have made up my mind."

Everybody in the lab knew the story of this single mother. One old and loathsome "New Russian" had been propositioning her for a long time, offering lots of money.

Alexei came up to her desk, bent to her and said in a low voice: "I can't explain to you everything now, I have no right to, but I want you to know that this nightmare" - he made a sweeping gesture - "will soon be over. I implore you

to refrain from making any rash decisions. You are talented, you must continue your research. You've got to stick it out for one more month. Take this for now." - he took the crumpled one hundred dollar bill from his pocket - "I don't have the right to tell you anything, but trust me, very soon, maybe even sooner than one month, something must happen ... something tremendous, something wonderful, something that is going to change everything ..."

2.3 Arrest The same day, July 6, 1997, 6 PM, Moscow.

They came up to him in the street when he was walking back from work, two from behind, one in front, all of them in civilian clothes. The one in front promptly produced a red KGB ID card, momentarily showed it to Levshov, and rattled off: "Alexei Petrovich Levshov, I presume? You'll have to come with us in this car.". Sooner than Alexei could reply, he found himself sitting on the back seat of a black "Volga" car, caught between the two men in civilian clothes who had come up from behind. The one who showed his ID took the right front seat and the car sped off.

- "Here we are! It has started!" - thought Alexei - "So they have finally found my 'autograph'. Now the things will start moving!"

2.4 Interrogation. The same day, half an hour later.

At first the Colonel was very polite and smiling.

- "Alexei Petrovich!" - said he, addressing Levshov with patronymic, which is the polite form of address in Russia - "I think I don't need to explain to you the reason why we have invited you here. But just in case you might presume to deny everything, I would like to show you this picture right away."

The Colonel passed to Levshov a picture where one could distinctly see the inscription: "Made in the USSR by Alexei Levshov and a team of his comrades".

- "A good picture." - said Alexei - "A good microscope. We never had one like this. And I guess you still don't have one like this. I would say it were Americans who took the picture."

The Colonel didn't respond.

- "So, it were Americans. " - said Alexei - "That means that my babies are already over there, in America. That's good. And the inscription did come off well. You know, it's the first time that I actually see it. I did issue the command to make the inscription, but I wasn't completely sure that the characters will come out well, or that the command will actually reach as far as America. That means that the system is fully operational. That's good. You, Colonel, can't even imagine how pleased I am with this photograph."

- "So, you are not going to deny anything, are you?" - Colonel's voice betrayed his slight disappointment - "In that case, I have only two questions: why did you do it, and who are the members of this 'team of comrades' ?"

- "I'm not going to give you any names. The team of

comrades, who prefer to remain anonymous, have authorized me to conduct negotiations with the authorities. This picture," - Alexei put the picture to the Colonel's very nose - "this picture is my business card. It means that there is a power behind me, a great power, maybe even greater than you could possibly imagine. And that's why it's me who is going to make demands, and you better meet them."

- "Alexei Petrovich, I'm afraid that you are not fully aware of your current situation. Let me first read to you some excerpts from our file on you. Now then, Levshov, Alexei Petrovich, born 1946; in 1969 graduated with honors from the prestigious PhysTech Institute, Moscow, and went to work at a secret unnamed research institute, known only as the post office box number such-and-such; in 1976 became the head of the nanotechnology lab that was founded at the time at that research institute.. But all this is not very interesting ... Here we are. This is sort of curious: in spring 1983 you wrote a letter to Yurii Andropov, soon after he had become the Secretary General of the Communist Party of the Soviet Union. Our man on the General Secretary's staff managed to make a copy of this letter. A very curious letter, and it reads as follows:

"Dear Yurii Vladimirovich,

I took the liberty to address you because I would like to draw your attention to a very important issue, so important that the fate of the whole of mankind may eventually hinge on it. In one of your recent speeches you exhorted the Soviet people to return to the roots of our ideology, to return to Marx. One of the fundamental ideas of Marxism is the idea that new socioeconomic formations come into being as a reaction of society to the emergence of new productive forces. From this standpoint, Communism as an economic formation cannot at present exist in our country in principle, because we are still using the same productive forces as the capitalist countries, and the economic formation that currently exists in the USSR can only be characterized as a form of state-monopoly capitalism. A social formation is a superstructure over a foundation consisting of productive forces. The breakthrough to Communism can only happen as a consequence of emergence of a radically new technology, the very logic of which shall make the social superstructure adapt itself to this new foundation. And such a technology may emerge very soon. However, if improperly used, it may not only fail to free mankind from capitalism, but even might assist in perpetuating it, and the great historic chance will be lost forever.

My field of work is nanotechnology. It is not just one more technology. Potentially, it is a complete revolution in the methods of production, that is even greater than the Great Industrial Revolution of the 18th century, which, in its time, caused the demise of feudalism and ascendancy of capitalism. If we take the right steps, the emergence of nanotechnology should cause a similar natural extinction of capitalism. However, at present, all the research and development activities in the field of nanotechnology in our country are geared exclusively to military needs, and are

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not aimed at the above mentioned objective. We need to redirect the efforts of at least one of our nanotechnological labs from military to peaceful applications. I request that you grant me an audience so that I could explain to you my ideas and proposals on the subject."

The Colonel stopped reading, gave Levshov a disapproving look and said: "One can clearly see from this letter that even as far back as 1983 you were reluctant to work on strengthening the defensive potential of our Motherland."

- "Is this the only thing that you can see from this letter?" - asked Levshov, mildly amused.

The Colonel ignored the remark and went on leafing through the thick folder containing Levshov's file:

"... So, the all-powerful General Secretary Andropov makes some inquiries, and soon afterwards grants an audience to Levshov, a chief of research in an obscure lab, virtually unknown to anybody. He has a conversation with him that lasts an hour and a half, instead of the scheduled ten minutes. The content of their discussion is unknown to us. But we know that soon after that the nanotechnology lab headed by A.P.Levshov is taken from under the control of the Ministry of Defense Industry, and moved to

the Institute for Molecular Biology Studies which belongs to the USSR Academy of Sciences. However, the work in that lab still continues in strictest secrecy, even stricter than under the military. Our organization gets a directive from the "very top" to obtain for that laboratory some advanced Japanese equipment banned from export to the socialist countries... Well, all this, once again, is not very interesting, so we'll skip it... And now, we have reached the crux of the matter. In November 1991, when the country was in the state of complete disarray and chaos, our organization decided to assume the responsibility for the protection of the important state secret, which the work conducted in the A.P.Levshov's lab clearly was, and to move that lab from an Academy of Sciences institute to one of our secret research facilities. Some of the lab staff, including Levshov, refused to transfer to our organization and stayed at the Institute for Molecular Biology Studies. During the relocation to our secret facility some of the lab materials were lost. In particular, a test tube containing an experimental hybrid of a bacteria with a nanomechanism was found missing, which, in the opinion of some of our experts, set back the lab's work by at least fifteen years. Even back then there was some suspicion that it was A.P.Levshov who stole the materials, but at the time his guilt was not proven.

The same experts are of the opinion that by the end of 1991 the work on the hybrid of bacteria with a nanomechanism had progressed to a phase where the further work would not require the use of complex and expensive laboratory equipment. Some of them even go as far as to say that that the only thing needed for the further work on the bacteria hybrid was the bacteria itself, since it already had in itself all the tools required for any further modifications or upgrades, and that means that all the further development

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effort could be conducted at home... That's how the things stand, Mr. Levshov" - the Colonel looked up from the folder and once again glanced at Levshov - "This photograph is an irrefutable evidence that it was you who, back in 1991, stole the test tube with the hybrid, which was government property, and by so doing have inflicted a considerable damage to the defense potential and state security of our country. Moreover, by the mere fact of letting the hybrid loose, you have given all our potential military adversaries the knowledge about the current status of nanotechnology research in our country, which can only be interpreted as an act of espionage. All of this is sufficient to put you away for a very long time. That's why I don't recommend you to be impertinent and make demands. It is me who is going to make demands here."

Levshov replied with an inscrutable smile: "Oh, Colonel, you can't even realize how ridiculous all your threats seem to me. If you had only known what is going to happen within the next week. We are standing on the threshold of a new world, a world where everything will be different, where, in particular, the mankind will not be divided into nations and nationalities. The individuality of a person will become more important than his or her belonging to any particular ethnic or social group. With the disappearance of nations, their respective nationalisms will also disappear, and such notions as national defense, or espionage, or national security will just stop to make any sense, and will start looking like atavisms inherited from the Stone Age..."

- "Don't you even try to push me all this bullshit, Levshov!" - barked the Colonel - "What I want from you is a clear and intelligible answer to the questions that I asked: who else works with you and why have you done this?"

- "Done what?" - asked Levshov.

- "This, for example." - the Colonel poked with his finger at the picture with the "autograph".

- "Oh, this! This was done in order to draw the attention of the authorities, to make them lend an ear to our demands. By the way, Colonel, you still have not heard our demands, and I think that you should have had. If you had had, you would have asked a very different kind of questions."

- "So what are your demands?" - said the Colonel grudgingly.

- "Inform your superiors that I need a series of my TV appearances arranged, half an hour, prime time, each day for a week."

- "Do you realize how much this would cost? On what grounds do you presume to have it?"

- "On the simple grounds that I have something to say to the mankind, in stark contrast to the ones who use this time on the air now. I have a message of utmost importance."

- "Why do you need a whole week?" - asked Colonel - "Usually, terrorists take no more than five minutes to make all their threats and demands."

- "Now we have really come to the crux of the matter. You believe that I'm a terrorist. But actually, nothing could be farther from the truth. You are just too much used to the idea that nanotechnological research and development were

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pursued with military applications in mind. You just cannot imagine the peaceful applications of nanotechnology. You have absolutely no idea of what I and my comrades have done in this field over the last five years, while working at home. What we have done can improve the lives of billions of people on this planet. But we've got to have a way of letting people know about the possibilities they now have. Of course, we could do this using the built-in capabilities of the NanoTech System itself, but we are concerned that if people suddenly hear a voice in their heads, a voice coming from nowhere, or see moving pictures materializing from the thin air right before their eyes, some of them might get panicky. We don't want anybody going crazy with fear and jumping out of the window, or anything like that. Television is something which is familiar to people, that's why we want to start a series of lectures on the uses of NanoTech on TV, and only after that we'll gradually switch to the purely NanoTech means of communication. As a matter of fact, we could have built our own TV transmitter - we have the capability - but we don't want to be pirates on the air. We decided to go through official channels. It might be hard for you to believe, but me and my comrades are actually law-abiding citizens. "

The Colonel was silent for half a minute, digesting what he had just heard, and finally said: "From what you have just told me, I understood only two things. First: you consider me a complete idiot who is supposed to believe all that bullshit you gave me. Second: you have finally admitted that you have stolen the test tube with the hybrid. And as for your law-abidance, when I went to the public procurator's office this morning and showed him this file on you and this photograph, he signed a warrant to search your apartment without asking any further questions. The search is being conducted right now as we sit here, and I expect to have news from there any moment now. I think we are going to have lots of new subjects for our conversation pretty soon."

This time Levshov's smile was even more inscrutable than before. He said: "Well, let them search. I wonder what they'll be able to find there. And more importantly, whether they'll be able to understand what they are going to find there..."

2.5 The Search. At the same time at Levshov's apartment.

One of the two witnesses summoned to the search was Levshov's next-door neighbor, that is, Mityai.

While they were opening the door, the investigator once again went in his mind over the list of objects that criminals usually adapt to serve as hiding places for all kinds of incriminating things. But nevertheless, he was absolutely unprepared for what he saw as soon as the door was opened. Entering into the apartment he stopped, completely at a loss. His carefully laid-out plan for the search had collapsed in a wink.

- "Oh, my!" - muttered Mityai pensively, looking around - "Our science has completely gone down the drain!"

There was absolutely nothing in the apartment. That is, not a single thing. Bare floors. Bare walls without wallpaper. In the hallway, there were no coats or slickers hung up on pegs. Actually, there were no pegs, not even a nail to hang things on (if there had been anything to hang up, but there was not a thing). They went to the kitchen. In the kitchen, not only there wasn't a counter, there was not even a fridge. Only a gas range and a sink. The range was covered with a thick layer of dust, attesting to the fact that it had not been touched by a human hand for many months.

- "Poor devil!" - exclaimed the second witness, a warm-hearted old lady who lived one story up - "I wonder what he ate. He lived exclusively on cold food, I guess. After his wife left him for a New Russian four years ago, he completely went to seed."

As for the sink, its hole was plugged, and it was filled with water to the brim. But only with water. There was nothing else in the sink. No sign of any dishes.

In the bathroom, there was also not a thing, not even a mirror. Not even things for shaving, although Mityai immediately affirmed that Levshov went to work every morning smoothly shaven. In the bathroom, there were only a bath and a sink. Both were plugged and brimming with water. The biggest surprise was waiting for them in the living (?) room. There was also no furniture and no things in that room, except that more than half of the room was occupied by something very similar to a huge aquarium tank, but there were no fish in it. There was nothing in it but water. The walls of the tank were made of some strange sort of glass, very transparent, and infused with a mysterious luster. The last ray of the setting sun came through the window, fell on the tank, reflected from its walls, re-reflected, and the room was suddenly lit up with a piercingly brilliant iridescent glow. "It shines like diamond!" - exclaimed Mityai. He came up to the tank, and before the investigator could stop him, he pressed a small diamond, which was mounted into a gold ring that Mityai always wore, against the glass, and ran it across the tank wall. The result left him absolutely dumbfounded. He could not even say anything - the words stuck in his throat. The diamond has not left even a tiniest scratch on the tank wall. A six by nine feet tank, five feet tall, standing in the room of an impoverished scientist, was, to all appearances, cut out of a single diamond crystal...

2.6 The first demonstration of the NanoTech system capabilities.

The Colonel replaced the receiver and remained sitting deep in thought.

- "Well, have they found anything?" - inquired Levshov.

- "Levshov, why have you sold all the furniture and all the things from your apartment? Were you preparing to flee from the country?"

- "First of all, I have not sold them, I gave them away for free. But not because I wanted to flee, but because I no

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longer needed them. Being a System Administrator of the NanoTech Network, I can enjoy all the benefits of nanotechnology even now."

- "How did you come into possession of a water tank made of diamond?"

- "I've grown it. Glass can break, you know, but diamond is much stronger and from that standpoint is more practical. You see, I just needed some vessel for all that water."

- "I see. You have grown it." - said the Colonel in a flat voice.

- "You know, Colonel, I really think I've got to give you a small demonstration, otherwise you just won't believe a word of what I say. A demo is worth more that thousands of words... Do you have a sink somewhere around here?"

- "A sink?"

- "Yes, a water basin with running water. A bathtub would be even better, but I don't expect you to have one here."

... Behind the door at the back of the Colonel's desk, there was a private rest room with a sink.

- "Well, just as I expected, you don't have a plug for this sink." - said Levshov - "But we'll fix this in no time."

He turned on the tap, cupped his hands and filled them with water. Turning to the Colonel, he said: "At the moment, I hold in my hands, together with the water, several million cyborg-bacteria. They are currently inactive. Now I am going to give them a command to speed up their reproduction. You won't hear this command - I'll enunciate it inaudibly, in my mind. Inside me, just as inside you and all the other people on Earth, there now live the same cyborg-bacteria, and these particular bacteria inside your body provide an interface between the nervous system of your body and the NanoTech System, that is, all the other cyborg-bacteria that live throughout the globe. This interface has two layers: a physical and a logical. Physical interface is implemented by the bacteria attached to the nerve fibers in your body, who tap into the action currents in these fibers and convert them into infrared signals used for data exchange between cyborg-bacteria. Or sometimes they do the reverse, converting infrared signals into action currents and feeding them into nerve fibers. As for the logical layer of the interface, it can be implemented by both the bacteria that reside inside you and all the bacteria of the NanoTech Network operating as a single global distributed computer - it all depends on the complexity of the task. At the logical layer, the commands of a NanoTech System user that are given in a high-level, almost natural, language, are converted into the NanoTech System executable machine codes. And now, watch closely."

AL:> NANOTECH

NT:> SYSTEM READY

AL:> OBJECT: IN THE WATER IN MY HAND

NT:> OBJECT FOUND AND LOCKED ONTO, OBJECT BOUNDARIES SET BY DEFAULT

AL:> MULTIPLY OBJECT ELEMENTS; RATE: MAX; DO UNTIL "ENOUGH"

NT:> OK

The Colonel suddenly saw the water in the Levshov's hands start to turn opaque and opalescent. In a couple of seconds it definitely started to look like milk, in a couple of seconds more it reached the consistency of sour cream.

AL:> ENOUGH

NT:> OK

Levshov turned to the Colonel once again: "What I am holding in my hands now is just an amorphous mass of cyborg-bacteria, that have no mechanical links with each other. To impart a structure and rigidity to such mass, we need to establish mechanical links between the bacteria. For this purpose I'm going to use the manipulator arms located on the outer surfaces of each of the bacteria. Figuratively speaking, I'll ask them to join their "hands". Watch!"

AL:> LINKS BETWEEN ELEMENTS: PLASTIC; PLIABILITY:4

NT:> OK

"What I have done now was to activate the so-called "plastic links". This means that the bacteria don't hold each other's "hands" very firmly - if a certain external force limit is exceeded, these links will break up, only to be immediately re-established. Simply speaking, the mechanical properties of this mass are similar to those of modeling clay. You can probe it with your finger. Go ahead, Colonel, don't be afraid!"

The Colonel poked his finger at the mass resting in Levshov's hand, and the finger left a deep imprint.

- "Now" - said Levshov - "I'm going to model a plug out of this "clay". I'll do this modeling manually, although I could have used for this purpose the resources of NanoTech, such as the capability of the bacteria to move themselves around, and the NanoTech built-in CAD/CAM - Computer Aided Design and Manufacturing System with graphic interface fed into the user's optic nerve, with the IRV - Ideal Result Visualization controlled by the user, and the automatic fitting of the real object to the ideal one. But in this particular case, doing it by hand would be much simpler, although it may not be so spectacular. But this is not NanoTech Demo yet, these are still preparations - I just need a plug for the sink. Now we've got something which looks like a plug. I am putting this plug on the bottom of the sink, and now I see that the plug turned out to be a little bigger than needed and its shape is rather irregular. That is why I issue to NanoTech a command to shrink the object."

AL:> SHRINKAGE; RATE:3; DO UNTIL "ENOUGH"

NT:> OK

To his amazement, the Colonel saw that the plug began to shrink rapidly and finally droped into the sink hole.

AL:> ENOUGH

NT:> OK

- "You see, Colonel, the plug is now in the sink hole, but it won't stop the water yet, because its irregular shape doesn't fully conform to the circular shape of the hole, and there are gaps between them. That's why I'm going to do two things now: I'll switch from the plastic link mode to elastic link mode, that is, I'll change its mechanical

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properties from "clay" to "rubber", and then I'll issue a command to expand."

AL:> LINKS BETWEEN ELEMENTS: ELASTIC; ELASTICITY: 5

NT:> OK

AL:> EXPANSION; RATE:3; DO UNTIL "ENOUGH"

NT:> OK

The plug began to grow, gradually filling the gaps, until they were completely closed.

AL:> ENOUGH

NT:> OK

- "Well, Colonel, now we have a plug. Of course one could have worked on it a little bit more to give it a more presentable appearance, but for our purposes it'll do as it is. So, let's proceed with the Demo proper." - Levshov turned on the tap and the sink began filling with water - "While we wait for the water to fill the sink, I would like to briefly explain what you are going to see. Back in 1993, when we began our first experiments in manufacturing things using NanoTech, VCRs were still considered a luxury in Russia, and that was one of the reasons we decided to take VCR as an example. One of our comrades has nobly sacrificed for science his own video recorder.

By that time, we had already developed a program for copying any object atom by atom. Physically, the copying process went as follows: the object to be copied was submerged into a tank with water containing cyborg-bacteria, and these bacteria gradually disassembled, one might even say dissolved, the object atom by atom. That was a fairly slow process which took, in the case of the VCR, about three months. But since, as a result of this process, the cyborg-bacteria recorded into their database the information about where each atom had been located, this process was reversible, that is, a command could be issued for the cyborg-bacteria to start placing proper atoms at their appropriate places, and if the water in the tank had the atoms of the necessary elements dissolved in it in the required quantities, that meant that after some time (longer than three months, because now the bacteria also had to fish for the required atoms and to transport them to the required positions) the object once again would come into existence out of the seeming nothingness. Moreover, this process, besides being reversible, was also reproducible - by using the information from their database, the cyborg-bacteria could reproduce any number of identical copies of the initial object as long as they had a sufficient supply of the necessary atoms dissolved in the water. By the way, from that one initial VCR we finally obtained three absolutely identical (down to every scratch) VCRs, and all three were working normally. One must note though, that the whole process took more than a year. In other words, we have created what science-fiction writers call a "replicator", but there was no practical use for it, because it worked excruciatingly slow.

So we began to look for ways to speed up the process. The first way was to refrain from the atom-by-atom assembly in those cases where it is not really needed. For example, the VCR body - do we really need to assemble it atom by

atom, when we could just issue a command for the cyborg-bacteria to link up, the same way I have just linked them up into this plug right before your very eyes, specifying the required mechanical properties of the link. The surface color and reflectivity can also be varied by arranging the bacteria into different configurations, so that light waves of one wavelength cancel each other, while the waves of another length reinforce each other, giving the object a certain color, making it light or dark. Another way was to stop using atoms of any chemical element other than carbon. By changing the atomic lattice of carbon, one can simulate the physical properties of virtually any substance. By 1995 we have managed to write for the NanoTech system a program that converts the data bases obtained in a "replicator" into the databases for things to be assembled out of cyborg-bacteria and atoms of carbon. And that is what I want to demonstrate to you now - our VCR of 1995. And the sink is already full of water - just in time!."

Levshov turned off the tap. "Now, Colonel, watch very closely."

AL:> OBJECT: WHAT_I_AM_LOOKING_AT

Levshov stared fixedly at the water for a couple of seconds - he had to allow some time for the cyborg-bacteria to measure the contraction of his eye muscles, to recalculate these contraction values into the coordinates of the point in space at which his stare was fixed, and to contact the bacteria located at that point using an infrared link.

NT:> OBJECT FOUND AND LOCKED ONTO, OBJECT BOUNDARIES SET BY DEFAULT

AL:> PROGRAM VCR_1995

NT:> PROGRAM FOUND. PROCEED WITH EXECUTION?

AL:> YES

NT:> OK

Initially, just as it had been the first time in the Levshov's hands, the water started to cloud. However, when in a few seconds time it approached the consistency of milk, the upper layer of the water suddenly began to clear, while at the bottom of the sink the density of the whitish substance started to grow even faster, and it gradually began to assume a definite shape. It was several more seconds before the Colonel realized that on the bottom of the sink, under a layer of slightly cloudy water there lay... The Colonel could have sworn that it was a printed circuit board, were it not absolutely white and colorless! In the first second he thought that there were no components on that "circuit board", but soon he did notice a few small parts, although a second before he was absolutely sure that there were none. Then he finally saw white rectangles, that looked more like ghosts of integrated circuits rather then the real things, to materialize on the board out of coagulations of turbid water that were running over the circuit board like ribbons of mist over a morning land. For a brief moment the water in the sink became completely transparent, and the Colonel could clearly see on the bottom a perfectly real circuit board with lots of components, only unnaturally white, looking as if it were made of alabaster.

But the circuit board stayed in this ghostly state for only a fleeting moment. What happened next was as if somebody turned on a switch - the circuit board suddenly took on color - green substrate, golden conductors, black cases of integrated circuits. Now the circuit board was indistinguishable from a real one.

- "Well, we did it for purely aesthetic reasons." - Levshov commented on this sudden transfiguration - "It does not really affect the operation of the circuit."

The Colonel did not respond. He stood staring at the sink with his mouth agape with wonder, while the work in the sink proceeded at an astonishing pace. Over the circuit board, the mechanical part of the VCR started to grow up. It grew up like flowers grow in the films shot by the one-frame-per-hour process, where weeks flash by in mere seconds. One second - and it sprouted levers and springs, couple of seconds more - and a video head cylinder burgeoned like a huge flower-bud. Couple of more seconds - and it all became enwrapped into a transparent filmy case, which grew more solid and opaque with every passing second, until it completely obliterated the view of the components inside it. One more instant - and the case suddenly turned from white to black with golden trimming. Levshov took the VCR out of water and put it on the table. The VCR was steaming.

- "We'll have to wait a few more seconds to let it dry up, and then you can check its operation - I saw a TV set in your office." - said Levshov - "By the way, did you time it? All of this should have taken three minutes and 20 seconds."

- "That fast?" - asked the Colonel. He stepped forward and touched the VCR. It was still warm to touch, although it had already stopped steaming.

- "That slow." - answered Levshov - "Too slow for our purposes."

- "What purposes?"

- "I'll explain it later. And now, let's go and see whether it works."

2.7 All the things in the world.

On returning to the office, Levshov hooked up the newly made VCR to the TV set.

- "Why doesn't it have a power cord?" - asked the Colonel.

- "We have introduced some changes into its design. It is now powered from a built-in power source. Have you ever heard about cold nuclear fusion?"

- "That's one of the questions I was supposed to ask you: how did you do it? Physicists throughout the world has been puzzling over the cold fusion problem for years."

- "We don't know it ourselves. I guess one might say we did it empirically. The first versions of cyborg-bacteria operated on organic power sources, the way ordinary bacteria do. One of our comrades was experimenting with what he called "nanotechnogonics" - in simple terms, it was artificial selection of cyborg-bacteria. He artificially increased the rate of mutations in some of the bacteria, and

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was placing them in various strange environments to see which way the evolution would take in those environments. In particular, he was trying to make one of the strains adapt to low levels of lighting, and he was putting them in darker and darker rooms. Most of those bacteria just died out, but there was one strain that turned out to be capable of living in complete darkness. Thanks to cold fusion, as we found later. Subsequently, we built this function into standard cyborg-bacteria, but we still don't know how and why it works - I think we should let physicists figure it all out."

- "But isn't the work with mutants hazardous?"

- "Very much so. We had one accident... Very gruesome... I just don't want to recall it. But those bacteria which we have released now are perfectly safe. We have disabled their mutations, but if by any chance a mutant were to come into existence, it would be immediately destroyed but its normal fellow bacteria before it had time to do any real damage. Modifications in the design of cyborg-bacteria of this kind can only occur on purpose, by commands received from the NanoTech Network... However, let's get back to the VCR. Please insert a cassette and press "play" button."

The VCR worked perfectly.

- "Had I not seen this with my very eyes" - said the Colonel - "I would have never believed that a VCR can be sent over a water supply line. "

- "Water supply has nothing to do with this. I only needed water as an environment which makes it easier for the cyborg-bacteria to move around. In principle, we could have used the cyborg-bacteria who live inside you or me, and take the hydrogen for nuclear fusion from water vapors that are always present in the atmosphere, but in that case the whole process would have taken much more time. And as for "sending", I hope you realize that this particular VRC was not sent from anywhere. It just exists in the NanoTech Network as a purely informational entity, as a data set and a program, which can always be "executed", and it can be executed any number of times, and each time the result of executing this immaterial program will be a material VCR. One could say that the NanoTech Network is the place of potential existence of an innumerable number of VCRs, as well as lots of other things."

- "What things?"

- "In principle, all kinds of things. You just place an already existing thing into a replicator, dissolve it there, obtaining an atom-by-atom database, convert this initial atom-by-atom database into a database for manufacturing that thing out of cyborg-bacteria and carbon atoms, and store this final database in the NanoTech Network memory, which is virtually infinite, since it grows along with the multiplication of cybor-bacteria. And please note that the whole process does not involve any resources beyond those of the NanoTech System itself, since the system already includes a program for creating a replicator, and the data processing and storage are performed by cyborg-bacteria. After the information about any particular thing is entered into the system, any NanoTech System user can access the program for bringing a copy of that particular thing into

material existence, execute the program and use the resulting thing."

- "What other people are NanoTech System users, besides you?"

- "There are not very many active users at the moment, but as soon as I issue the command to activate the system to its full potential, each human being living on Earth will be able to use NanoTech. I believe that by now the cyborg-bacteria have already infiltrated the bodies of all the people on our planet. These bacteria are so designed that as soon as they find themselves inside a living organism, they automatically determine whether this organism is an animal or a human being, and if human, they establish a data interface between this person's nervous system and the NanoTech Network, and automatically assign to this person a NanoTech Network User's ID number."

- "And how are you planning to collect payments for the use of this network? And, especially, who is going to benefit from these payments? I hope you have not forgotten that these bacteria were stolen, and they are actually Government's property?" - asked the Colonel.

- "There'll be no payments. I mean, no payments in money."

- "But you've been working on these bacteria for a long time, and probably expected to somehow benefit from your efforts?"

- "But I'll benefit. And you'll benefit. And the whole of the society shall benefit. Imagine that somebody invents something new - and somebody will always be inventing something, a thinking human being just cannot stop inventing - and thanks to NanoTech this person's invention will immediately become accessible to all people on Earth. Including me. And this will recompense my efforts."

- "I think I'm missing something." - said the Colonel - "Well, suppose NanoTech will give you things for free. All kinds of things. Can it create clothes?"

- "Easily."

- "And an automobile?"

- "No sweat."

- "And a house?"

- "As easy as anything else."

- "OK, I can see that you won't have to pay electricity bills...' - the Colonel nodded towards the VCR running without a power cord.

- "Neither shall I have to pay for gasoline." - added Levshov - "The automobile will draw its power from cold fusion."

- "Let's assume that it is indeed so." - conceded the Colonel - "But you will still need something to eat! That means that you still need money! For food, if not for anything else!"

Levshov gave one more of his inscrutable smiles: "And how do you know that one really needs to eat? Have you recently tried not to eat?"

- "What do you mean by that?" - asked the Colonel suspiciously. The world he knew and understood started to develop a flaw in its structure. A feeling started to well

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up from the depth of his soul, a feeling as if he were being dragged to the brink of an abyss he dared not to look into.

- "The fact is that cyborg-bacteria are so designed that whenever they find themselves inside a human body, they automatically start to monitor the levels of nutrients in the blood, and as soon as these become dangerously low, bacteria automatically activate the genes that produce these nutrients, and immediately discharge the produced nutrients into the bloodstream."

For a few seconds the Colonel sat stunned and silent. Finally, he said in very low voice: "So, you mean that ... Do you want to say that no one needs to eat anything anymore?"

- "Actualy, I would not recommend this. We still don't know the long-term effects of such fasting on the digestive tract. But there might be some difficult situations where such direct replenishment of nutrients in the bloodstream could actually mean the difference between life and death. Try to look up the latest statistics on the third-world countries. I'm sure that over the last month or so they have not reported a single death caused by starvation."

- "So, one still needs to buy food for oneself?" - asked the Colonel, his spirits revived.

- "As a matter of fact, one needs not. The nucleus of each cyborg-bacteria cell contains a library of genes each of which can be selectively activated by a command from the NanoTech Network. Instead of that mass of white material that you just saw during the demo, I could easily produce a piece of meat or yolk. The standard gene library includes the most popular staple foods, but if you would like to eat something special and are willing to wait a little, the cyborg-bacteria have the capability to assemble new genes from individual nucleotides using "blueprints" - that is, the information obtained from the NanoTech Network databases. By the way, Colonel, it's high time to have a supper. How about some caviar? If you allow me to use your sink once again..."

- "That's it! The sink! The waterworks!" - the Colonel once again regained his spirits, which had begun to flag for a moment - "I should have remembered about it all along! You'll still have to pay for water supply! That clinches it! You'll never be able to do without money! Money is a material manifestation of the relationships that cement society, and you cannot live in a society and be free from it!"

- "Oh, Colonel, what a muddle of ideas you have in your head! Capitalism jumbled together with communism... As for the waterworks, let me explain it to you once again. Massive amounts of water are only used to facilitate the movement of cyborg-bacteria, but, in principle, they are not absolutely necessary for manufacturing things using the NanoTech Network. Water is needed for sustaining the life of the human being though, but there is always a sufficient amount of water vapor in the air. Even now, in the memory of the Nanotech Network are stored a number of simple devices that allow to condense a glass of water out of the air in a matter of a few minutes. And don't forget about clouds that

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are almost always present in the sky. They consist of minute water droplets, that also contain cyborg-bacteria. You only need to give them a command to merge, and the cloud will produce rain."

- "You want to say that you can even control weather?"

- "To a certain extent, yes. At least, I can always pour a glass of water out of a cloud."

- "OK, let's assume that you can always get yourself some water for free. But your house - even if we assume that it will be completely built by NanoTech and won't cost you a penny - it will still be standing on land, and a plot of land costs money, and that means that you still won't be able to build it, if you don't have any money!"

- "Tell me Colonel, have you ever camped out? Ever put up a tent in a forest?"

- "Suppose I did."

- "You didn't pay any money for the land you put up your tent on, did you?"

- "But I put up the tent for one night only, while a house will stand there permanently!"

- "Who said that a house must stand in one place permanently?"

- "What on earth do you mean by that?" - asked the Colonel. The feeling that he had been dragged to the very brink of an abyss and was being forced to look down there, at another, frighteningly alien world, that feeling became almost unbearable.

- "Our team of comrades have formulated for ourselves three rules of 'good' design practices that are most consistent with the NanoTech System capabilities. The first, and the most important rule is that things must be what we call 'living'."

The Colonel opened his mouth to ask something, but Levshov had anticipated his question: "Let me explain what I mean. Take for example that very first VCR that we produced, the one that we assembled in the replicator. That one was an absolutely 'dead' thing. 'Dead' not in the sense that it didn't work - it actually worked perfectly - but it didn't hold a single living cyborg-bacteria, and that meant that it could not rebuild itself, couldn't change its own design, couldn't repair itself and so forth. It was a very ordinary thing, one of those things that we usually find all around us, the only difference being that it had not been built with machine tools at a factory, but rather had been assembled by cyborg-bacteria in a replicator. That was the only difference, and the difference lay not in the thing itself, but in its earlier history, which was absolutely immaterial from the standpoint of its consumer qualities.

Now, let's have a look at the VCR which I have just produced before your very eyes, the 1995 model. This one is already what we call a 'semi-live' product. It already incorporates quite a lot of living cyborg-bacteria. They provide power to this thing, they can even re-grow the video heads, if they get worn-out. However, this product also contains a lot of 'dead' parts, that, built by the cyborg-bacteria though they were, don't contain cyborg-bacteria themselves. And this means that this thing will never be

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able to instantaneously disappear, to decompose itself into individual cyborg-bacteria that could once again disperse."

- "Why would they need to do this?" - asked the Colonel, baffled.

- "Don't you see it? As things stand now, you'll finish watching your video cassette, switch off the VCR, and it'll just be left standing in the corner gathering dust and occupying space to absolutely no purpose, until you once again decide to watch something. How much more convenient it would have been if, for the time between the two viewing sessions, it had just disappeared, with the cyborg-bacteria that had been its building blocks re-assembling into some other thing, the one that you need at that specific moment in time. They could have become a part of a plate, a spoon, a toothbrush, a razor, a coat, a shoe, a chair for you to sit on, anything that you actually need at the current moment in time. And they would have left that thing as soon as the need for that thing is no longer felt, and they would have gone into a new thing, the one you are going to need at the next moment in time.

Look at this empty chair near me. Why does it have to stand here, while nobody is sitting on it? And nevertheless it does stand here and occupies space. In a perfect world, it should have only appeared here if a third person came into this room. And this applies to the majority of things around us - we only use them one percent of the time, at best. But they occupy space in our houses the whole one hundred percent of the time. Dead things demand that their owner dust them, maintain them in proper condition, and always take them with him every time he moves house. Oh, those moves! There seems to be nothing so terrible as moving house, and this terror can chain a man to one and only place of living forever. Dead things turn their owners into their slaves!

And now imagine a house built in the true spirit of NanoTech. At any given moment in time, only a few things exist in it physically. Actually, only those things that you need at that particular moment. And at the same time, there exist in it an infinite number of things - all the things in the world that have been entered into the NanoTech Network database are potentially present in that house, since any of them at any moment can be brought out of non-existence and be given a material form. And the NanoTech-type house itself , if you live in it alone, contains only one room, since you cannot simultaneously be in more than one room. And at the same time, potentially, it contains an infinite number of rooms, since that one and only room can indefinitely change its appearance and size, filling itself with all kinds of things, effectively transforming itself into a different room, into an infinite number of rooms. And as soon as you leave your house, it disappears or transforms, for example, into your car, or into a house for another man who was passing by and decided that it would be a good idea to live in that place for a day. And if you, during your outing suddenly have a wish to find yourself back at home, your house will immediately reappear in front of you wherever you are."

- "Immediately? I find that hard to believe." - said the Colonel - "It took you almost four minutes to grow only one VCR."

- "Let me repeat it once again - this VCR is a semi-live thing. It grows so slowly only because in this case we force NanoTech into reproducing a thing which was designed to be manufactured using an absolutely different method of production, that is, the serial industrial machine production method characteristic of capitalism. In this case we abuse NanoTech by making it operate in a manner which is completely inconsistent with its character. I have done this demonstration on purpose, so as to show you that in principle NanoTech can even cope with such difficult task as an almost perfect reproduction of things characteristic of a historically antecedent method of production. It is worth noting here that machine production cannot always cope with the task of reproducing, by its own means, things that are characteristic of an antecedent era - the era of master craftsmen working manually, the era of feudalism.

And now I'm going to give you a demonstration of a video system designed in the true style of NanoTech. Please note the difference in the time required for its manufacture. This time I won't need much material, so I'll just use the bacteria that live inside my body."

Levshov put his hands on the table, palms up, and suddenly the palms started to cover with a sort of perspiration, to glisten with little beads that began to quickly grow and turn whitish. The beads began to roll off onto the table, and in a second they merged into a single thin white sheet. Half a second later the sheet suddenly changed its color to deep black.

- "So it's ready now. Two and a half seconds." - said Levshov.

- "What's ready?" - asked the Colonel.

- "The video system is ready. Please, order the movie you want to watch."

Only then the Colonel noticed that the sheet lying on the table was no longer black, but was glowing as if it were a computer screen, and on that screen a list of movie titles was slowly scrolling.

- "We don't have a very wide selection yet." - apologized Levshov - "as of now, only a few hundreds of movies have been stored in the NanoTech Network memory, but we believe that as soon as the Network becomes accessible to the general public, the users will transfer to it everything that is now available on video cassettes... Don't be shy, Colonel, choose a film title and touch it with your finger!"

The Colonel warily poked at the title of his favorite movie, the list of titles immediately cleared off the screen, and instead the Colonel saw the familiar movie characters, in full color and motion.

- "I just can't understand where the sound is coming from." - said the Colonel after a few seconds of viewing.

- "The film soundtrack is fed directly to your auditory nerve, by-passing the phase of its transformation into sound waves, which makes for the high quality of the sound,

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because there are no intermediaries, no loudspeakers which usually introduce sound distortion. Generally speaking, the picture could also be fed directly to the optic nerve, and this would be more consistent with the Third Principle of good design in the style of the NanoTech. The Third Principle says: always use only direct interface between the human nerve system and the NanoTech Network, without any intermediaries like human body's sense organs or muscles. In practical terms this means that if, for example, we design a automobile for the NanoTech, it should not have a dashboard - all the necessary information about the status of the car systems should be fed into the driver's optic nerve, to be superimposed on his actual field of vision. Also, such a car should not have a steering wheel or pedals - mental commands from the driver should be routed directly to the car's final controls, without any mechanical intermediaries. All this allows to radically simplify the design, and consequently, to considerably reduce the time needed to "grow" a car.

- "You said it was the Third Principle. And what is the Second one?" - asked the Colonel.

- "The Second Principle of good NanoTech-style design says: for a power source of the device you are designing always use the internal power of the cyborg-bacteria, and the power should always be generated at the same location where it is to be consumed. This allows to eliminate all the contraptions for transferring power within the device. For example, our semi-live VCR complies with the Second Principle only in part: the power is indeed generated inside it by cyborg-bacteria, but after that it has to be transferred to 'non-live' components, such as electrical motors, integrated circuits, and so on. That's why it has so many extra wires, levers and shafts serving the only purpose of transferring electrical and mechanical energy from one location to another. From the standpoint of the Second Principle, a much better design is the video system that you can now see on the table." - Levshov nodded towards the glowing sheet, where the scenes from the Colonel's favorite movie still continued to unfold. - "Each luminous dot on this surface is a cyborg-bacteria that itself generates the power for its own glow. That means that the power is consumed at the same spot where it is generated. This is only possible in a completely 'live' product."

- "So, if I understand you correctly," - said the Colonel musingly - "an automobile built in compliance with the NanoTech principles doesn't have any transmission, and the function of the engine is performed by the wheels themselves?"

- "You got the idea absolutely right. And to completely visualize a NanoTech-style car, please remember that it always has just as many seats as it has passengers and its trunk is never larger than the luggage it carries. And if you take into account the fact that it just doesn't make any sense to transport things that can always be grown at your destination, it means that usually such car doesn't have any trunk at all."

- "And all of this, all this things, cars, houses, all this will immediately become available to every human being

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on Earth as soon as you give a command to activate the system?" - asked the Colonel in a slightly trembling voice.

- "In principle, yes, although it will take some time for the people to learn to use the system. But it's not very difficult, anyway. We have recently developed a graphic user interface, where the signals are fed directly to the user's optic nerve which results in the user seeing an illusory, or a "virtual", to use the current buzzword, space, or rather a "virtual store" filled with all kinds of things, where he can walk around and choose whatever he or she needs. After that it's just a matter of the user reaching for the chosen thing and grabbing it in virtual space. The thing will immediately materialize..."

- "That's not what I was asking about." - interrupted the Colonel, impatience showing in his voice. He felt that the abyss had already opened up under his feet, and he was falling, falling, falling... - "It's money. The money in your virtual shop - is it also virtual or is it real, after all?"

- "You know Colonel, I just can't imagine what other explanations do you need. I've been speaking about this for an hour now, and you still don't seem to understand that there'll be no money at all. Think for yourself: who and for what purpose may need any money at all, when any one can get out of NanoTech any thing he or she may need, absolutely for free? Money will take its rightful place in museums as an evidence of a past-and-gone era in the history of mankind."

In despair, the Colonel squeezed his head between his hands and fell silent. The world around him was coming down. The Colonel had spent all his life to make a career for himself, to reach the position which allowed him, back in the days of the total chaos of late 1991, to grab hold of a certain amount of the Party's money, to transfer it abroad and stash it away in a Swiss bank account. This money was supposed to provide for a comfortable existence in his old age and a secure future for his heirs. All the terror he had to go through to do that, all the nerves and energy spent! And, as it turns out, everything was in vain?! The monstrous unfairness of this all was searing the Colonel's soul. His brain was in hectic search for a rebuttal.

- "There can be no market without money, and the market is the only force that can fine-tune the required amount of production!" - spluttered the Colonel and immediately realized the stupidity of his remark.

- "Why would you need to additionally fine-tune the production when everybody produces exactly what he needs, at the exact moment when he needs it, and in the exact quantities he needs?" - Levshov seemed surprised - "The market forces are only needed to adjust the amount of production at that phase in the development of productive forces where things have to be produced before they are actually needed."

- "Without money there'll be no incentive for increasing the efficiency of labor!" - persisted the Colonel.

- "Whose labor?" - asked Levshov, surprised - "The labor of cyborg-bacteria? Since it's them who'll be doing all the work."

- "What I mean is creative work. There'll still have to be somebody who'll be inventing new things for NanoTech, otherwise the progress will stop. Does it make any sense for an inventor to work, if his invention won't in the end give him any advantage over the rest of the people?"

- "You know, Colonel, I think you are seriously mistaken about the motives behind creative work of an inventor. The desire to create is a need deeply rooted in every human being. This need exists not only because in satisfying it one may gain some advantages for oneself, but also because of the very fact that a human being has a brain which needs a workout from time to time, just as muscles do. Just as you'll never be able to sit in an unchanging posture for hours - you'll finally need to stretch your legs - your mind also needs stretching from time to time. The brain wants to work just because it exists, however, under the existing method of production, only a chosen few can afford the luxury of brain-streching, while most of the other people have to earn their living by doing purely mechanical mind-numbing jobs. Under capitalism only a few lucky ones can afford to do some creative work, but even they are forced to sell their creative products in order to be able to buy their freedom from mechanical work. In contrast to this, NanoTech opens up the possibility of doing creative work to every person on Earth, and also allows any person to immediately use the creative products of any other person. I think that as a result of this we are going to see a creative progress like we could never imagine under capitalism."

The Colonel would not give up: "I just don't want to listen to all this babble about mind-stretching, need for creativity, and the like bullshit. The people won't understand your system and won't accept it, because the motive force behind the progress of the human race has always been and forever will be the desire of each individual to get ahead of his neighbor, to become richer then his neighbor, more powerful than his neighbor, to become famous and make his neighbor green with envy, to buy things which only you can buy and never your neighbor. You want to destroy all this, to let everybody have anything he wants, but the people will never accept such a state of affairs where nobody can envy anyone. If this happens, nobody would want to live at all, because there would be nothing to live for! Imagine a typical everyday situation: one guy, let's call him Kolya, strolls down the street and meets his friend, let's call him Vasya, and says to him: 'Come and visit my place, I want to show you something. Show what? Just come and you'll see.' And it turns out that Kolya has, for example, a luxury model VCR, a genuine Panasonic from Japan, and Vasya does not have anything like that! And Kolya also has video cassettes, direct from US, with the latest Hollywood blockbusters, and Vasya still has none of these! And that's what makes Kolya happy! And that's why he needs a VCR and cassettes! He doesn't really need these idiotic blockbusters! He needs the satisfaction of knowing that he is superior to Vasya! But if Vasya were to have the same VCR, and the same movies, why would Kolya need a VCR at

all, if this VCR doesn't help him to become superior to Vasya? Why would he torture himself watching these idiotic movies? And, on the other hand, why would Vasya want to have a VCR, when Kolya, Petya, whoever, can at any moment obtain the same VCR for themselves? You have invented an absolutely useless thing, Mister Levshov. The people won't understand you."

- "People? What do you know about people, Colonel? Do you know how many people on planet Earth are starving? Physically starving, and can actually die of starvation. NanoTech can feed them and save them from death. Do you know how many illiterate people are there on Earth? Really illiterate people, people who cannot read, people who are denied all the wonderful treasures of knowledge accumulated by our civilization? NanoTech can open up to them these treasures. And a VCR, as a means of obtaining knowledge, could be very helpful in doing this. But when the age of NanoTech arrives, neither a VCR, nor any other thing will ever be the means of establishing Kolya's superiority over Vasya, or Vasya's over Kolya. The time of apish games is over. And, I hope, forever."

- "What do you mean by apish games? Explain yourself!" - said the Colonel through clenched teeth.

- "You see, Colonel, human beings did descend from apes. This is a firmly established scientific fact, whatever various naysayers may say. Therefore, every human being carries in his genes a burden inherited from the past - the instincts of his wild ancestors. The apes are tribal animals, and each tribe has its own hierarchy: it has its chief and its outcasts, and it has all the rungs of the hierarchical ladder between them, and each ape craves for a higher rung on that ladder. That's the source of the people's craving for power, glory, recognition, money, in a word, for getting ahead of one's neighbor. All the social systems of the past used this craving as a driving force for their own development. The capitalistic system is especially outstanding in this respect - it's not just an apish game, it's a whole apish Olympics, which very efficiently exploits all the instincts that humans inherited from beasts of the wild. But human nature is not confined to bestial instincts, human beings have one thing which beast lack. Humans have reason. Reason can overcome instincts. Reason is the only chance of freeing man from the tyranny of instincts. But this chance cannot materialize while the social system itself makes people to take part in the apish games. NanoTech gives us a chance to stop this protracted apish Olympics, to stop living as apes live, and at long last start living as human beings should live, that is, live by reason, not by instinct."

- "I can't understand you, Mr. Levshov. You seem to be an intelligent man, an outstanding inventor, but your reasoning is ridiculously naïve. Do you really believe you can go and change all the social structure just like this? You want to carry out a world revolution which will make everybody equal overnight. To make the powers that be as powerless as anyone. How can you seriously hope that those who have power and money, and high social status, let go of their

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privileged positions? What a political naiveness! And you still hope that we shall help you to get time on TV? Of course I'll report your request to the higher authorities, but it's a foregone conclusion that nobody will give you any time on the air. Moreover, you'll go to jail for stealing governmental property, disclosure of military secrets, and, as it has just turned out, also for an attempt to overthrow the existing social, political and economic system of the Russian Federation!"

- "First of all, Colonel, it's very difficult to imprison me. Physically impossible..."

- "Why so?" - asked the Colonel.

Without saying a word, Levshov picked up from the table the "video system" which was still working. He held it at the edge and it hung down like a piece of soft cloth. For a fraction of a second, a moving picture could still be seen on its rumpled surface, but suddenly that picture disappeared to be replaced with a checked pattern... like on a handkerchief. It took the Colonel one more second to realize that what Levshov was holding in his hand was indeed a handkerchief. Levshov used the handkerchief to loudly blow his nose and then threw the handkerchief on the floor, where it sort of dissolved into nothingness before the Colonel's very eyes, and then said: "Well, just try to imprison me, and then you'll understand why it's impossible. That was the first thing I wanted to say. Now, the second: nobody is going to take away from the ruling circles of the Russian Federation their villas, Mercedes-Benz cars, Swiss bank accounts, portfolios - all their playthings and baubles. If they still want to play their apish games - let them play themselves crazy. The only thing that NanoTech is going to take away from them are the people of the Russian Federation. But from the very moment when the Russian Federation came into existence as an independent state in 1991, the people were only a burden to them. They have brought the industry and agriculture in this country to ruin - and thus deprived the people of any means to fend for themselves, so now the people have to be fed "from above". That means the new rulers have to share their petrodollars with the people, but they don't want to, they are too greedy. And although they starve the pensioners to death with low pensions, and although they have destroyed the public health system, and reduced the standards of living to such a low level that the birth rate has dropped almost to zero, and although they are waging senseless wars where they kill off young men, the surplus population has not been sufficiently reduced (from their standpoint), and there are still more people around than they know what to do with. NanoTech is going to rid the government of this burden by taking upon itself the responsibility for maintaining the people, so the government should actually be thankful to us for this. And the only thing we want in return for this service, is that government forever forget that the people exist, and never again bother the people with taxes, elections and army drafts."

- "So, Mr.Levshov, you are going to let people live without a government. Then will you be so kind as to explain

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how are you going to maintain law and order among the people? By the way, could one use NanoTech to produce arms and drugs?"

- "Theoretically, it is possible. But we are going to close access to programs for manufacturing dangerous things like that to ordinary users of the NanoTech Network. Only the System Administrators of the Network will have access to arms, just in case somebody does make an attempt to use NanoTech to harm people and we have to fight such an offender."

- "Well. That's great. That's terrific. That means that in your brave new reasonable world everybody will be equal, but some will be more equal than others. Marvelous." - said the Colonel. The world which had all but completely collapsed around him, began to gradually restore itself. There was not going to be a uniform mass of people with equal rights after all. Everybody would once again stratify. There might not be money any more, but there would certainly be levels of access to information. The higher you are in the social hierarchy, the wider the access. And of course, they would need a police. Everybody needs a police. But still it was sad that there would be no money - he spent so much nerves on it. The Colonel's spirits slightly uplifted. The system based on the apish striving of everyone to stand above everybody else was unshakable and eternal and it would live as long as human beings live. And that was the only system that the Colonel believed in. Intellectuals might invent capitalism, communism and all kinds of other "isms", but in reality what had always existed and would exist was only one system, The System, and it was only this System that the Colonel had served and would ever serve, because only within this System the Colonel was worth something in his own eyes. The idea behind The System was primevally simple, and it was exactly from this simplicity and primitivity that it drew its unshakable and eternal nature. The idea behind The System was the struggle for power. This struggle could be waged by all kinds of means: by accumulation of money, by political games and by passing laws, by palace intrigues, or, as a last resort, simply by bludgeoning the competitor. It was not the means that mattered. What mattered was the final objective, and the final objective was power. This was part of the human nature, and therefore, it could not be uprooted...

The Colonel's reverie was interrupted by Levshov's voice: "I know what you are thinking about, Colonel. You are thinking about The System." The Colonel started and wanted to say something, but Levshov anticipated his question: "Don't worry, I'm not eavesdropping on your thoughts, although, in principle, NanoTech does have such a capability. Your thoughts are easy to guess. You are thinking that the new world opened up by the NanoTech will be the same as the old one, that the apish games will continue, that nobody as yet has managed to suppress apish instincts in humans, neither the church in a thousand years, nor the communists in the seventy years of their rule. But you've got to keep in mind one thing: up till now a human being who might have wanted to leave The System didn't have

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a chance to survive outside it - he would have simply died of cold and starvation. For the first time in the history of mankind, NanoTech gives us this chance. For the first time in history, one won't need to snap the food out of the hands of one's neighbor so as not to be hungry. Will we be able to use this chance to get from under The System, and to conquer at last our animal instincts? If we don't, we'll turn the new world into a semblance of the old one, but even more terrible, where the power of one group of people over the others will be infinitely amplified by the new, previously unheard of means of NanoTech. The loss of this historic chance will result in an unimaginable tragedy for the mankind."

- "But if you are not certain that you'll succeed, why did you have to start all this in the first place?"

- "I just had no choice. I know what is happening now in nanotechnological labs all around the world. Tens of thousands of scientists are working on creating a new terrible weapon of enslaving man by man, a weapon which will give the rulers a complete and absolute control not only over the actions, but also over the very thoughts and feelings of people, a control none of the tyrants of the past could even dream of. The last chance to stop the impending catastrophe is to put NanoTech into the hands of the people, and hope that in the long run the reason will prevail over the dark instincts. There is no other way out. Whatever happens, it won't be worse than what is now being prepared in secret labs. And there still is a chance of creating a society ruled by Reason, Freedom and Equality. It's a small chance, but it does exist."

2.8. An hour later, in an office one story up.

The video recording of the interrogation ended and the Colonel switched the VCR off. The General was silent for half a minute and finally said: "Yea, this son-of-a-bitch has us up against the wall... We know next to nothing about his real capabilities, and he uses this to put pressure upon us. And what's most frustrating, we just can't quietly finish him off, because we don't know how his "Team of Comrades" will react in that case. They are all at large, and probably all of them have access to NanoTech."

- "Do we know who they are?" - asked the Colonel.

- "The members of his laboratory staff who, together with Levshov, refused to be transferred to our secret facility. We have complete files on them - their names, pictures, home addresses. The only thing we don't have is their present location. Half a year ago these people, all twelve of them, disappeared without a trace. Nobody saw them afterwards. But he must be keeping in touch with them through this network of his. And they must have instructions telling them what they are supposed to do if he gets killed. We need him alive. We've got to get out of him the password for the NanoTech System Administrator. The future of Russia as a great power hinges on this now."

- "What about giving him a shot of truth serum?" - suggested the Colonel.

- "Won't work. I talked with our experts. Everybody says that whatever we inject him with, the cyborg-bacteria in his blood stream can decompose the substance and get it out of his system in a fraction of a second, before it has time to produce any effect. And if they can, they sure as hell will do it. I assume he had done his homework before he came to us. This option is out of question. In this case we've got to find a more subtle approach. Could you run once again the end of the interrogation?"

The screen once again showed Levshov and the Colonel.

The Colonel: "Levshov, I hope you realize that we just can't let you walk away now, and you'll have to spend the night here, in the lockup ward."

Levshov: "Colonel, I agree to spend the night in the lockup, but I want you to clearly understand that it's purely a goodwill gesture on my part. I reserve the right to leave the lockup at any moment. This is to give you notice that I have the capability to do so, and that you are not going to have any chance to stop me."

"What a rascal!" - said General, his eyes glued to the screen.

"Comrade General, what about a copy of this cassette? Are we still going to hand it over to that American or not?" - asked the Colonel.

- "We have to. If today we try to withhold the cassette from their liaison officer with special powers, tomorrow they'll know about this at CIA - I am pretty sure that we have a CIA mole in our directorate. Then we'll have diplomatic notes - you know, unwillingness to cooperate, and all that. And of course, we will be the guilty party. Better turn the cassette in. But there is one thing I want you to do..." - the General suddenly lowered his voice - "Arrange for me a visit to Levshov's cell tonight. But do it in secret. Nobody else should know about this. I'm going to have a man-to-man talk with him..."

2.9 At the same time in the lockup ward.

Levshov could not get to sleep. Or rather he could have, if he had chosen to use the services of the NanoTech. But he did not want to. His thoughts were focused on that gray March day of 1983...

2.10 March 1983, Kremlin, Moscow. The office of the General Secretary of the Communist Party of the Soviet Union.

"...Thus, Karl Marx was absolutely correct when he predicted that capitalism would be superseded by communism. He was also absolutely correct in believing that this change would come about as a result of the development of productive forces. He was in error only about one thing, that is, at what level of the productive forces development this change was to occur. Back in the nineteenth century he believed that the mankind had already reached the level where the capitalism could be superseded by communism. This error in judgment was caused by a very human weakness - the

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author of the theory was too eager to see it put into practice. But this error resulted in his violating history, in his trying to force upon the mankind a kind of social system for which it was not yet mature enough."

- "Well, well, young man..." - said General Secretary Andropov and smiled slyly, smiled to the extent the continuous ache in his kidneys allowed him to - "So, in your opinion, Marx was not right, after all?"

Levshov stopped short and fell into a frightened silence. Finding fault with Marx's opinions in the Soviet Union was fraught with a lot of trouble.

- "That's OK." - said the General Secretary, giving Levshov a wink - "you can discuss things like that with me, but I don't recommend that you do it with the others."

Levshov recognized the quotation - a line from a popular Soviet spy TV series - and smiled back.

- "So you say that it was a violation of history?" - asked the General Secretary. His face grew serious once again and turned into a mask of stone - "But imagine for a moment that the Great October Revolution of 1917 never happened and all of the world now belongs to capitalism. Who would you have come to with your invention in that case? To monopolies? But they are interested only in one thing - in power, in an absolute power over everything and everybody. They would have used your invention to augment their power, to perpetuate the capitalism. The possibility of communism emerging on the basis of these new productive forces would have forever remained an unfulfilled possibility. If we had not 'violated' the history, it would have been them who would have violated it. Do you think it would have been better if they did it instead of us?"

Levshov wanted to say that it was exactly what he had written in his letter, but thought better of it. He decided that the General Secretary just wanted to give him a hint about the ideologically correct way of presenting his invention: Marx is right, Marx is always right, Marx just cannot be wrong. However, from the further words of the GenSec (Soviet vernacular acronym standing for the General Secretary) it became clear that what he meant was far more serious than simple observance of ideological decorum.

- "I'm reading a book now" - said the GenSec - "A curious book. Some dissidents who have defected to United States wrote a book about my ascent to power from a petty party official to the Chief of KGB, and, eventually, to the position of the General Secretary. They presented me as a sort of a Machiavellian ruler who will stop at nothing. Most of the facts seem to be true, but there is one thing missing in that book. There is no answer to a seemingly simple question: what did I do all that for?. The authors of the book seem to believe that the answer is self-evident, and isn't even worth righting about: they think I did it all for power. But they apply their own yardstick.

I'm an old and very sick man. Too old and too sick to enjoy those pleasures of life that the position of the General Secretary potentially places within a man's reach. They can kill me at any time - there are too many people around me who don't like to see me in this position. So why

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did I take up the burdens of this office, while I could have retired and been sitting now peacefully at my country house? And the answer is simple: because there is nobody else to do the job properly. If I had not taken this office, it would have been taken by somebody for whom the position of GenSec does indeed mean only one thing - unlimited power, somebody who does not care about the ideals of socialism, about our painful and bloody history, who does not care about the things for the sake of which we have been enduring all that pain and spilling all that blood for the last sixty years. When I'm looking around me I can see that the pinnacle of power is surrounded by exactly such people, and when I am no more, this chair will immediately be occupied by one of them...

You probably wonder why am I telling you about all this? I just want you to clearly understand: you have no more than ten years to finish the work on your invention."

- "Why?"

- "Because we are going to loose the cold war to the West."

- "But comrade General Secretary, I don't think that..."

- "Young man, I know the true condition of this country much better than you do. We just don't have any resources left to continue confronting the West. And please, remember, that after me this chair will be taken by the people who don't care about our ideals. They will surrender the country to the West at the West's first beckoning. That means you don't have more than ten years. Can you make it?"

- "I'll try."

- "Please, try hard. And remember that you are going to assume an awesome responsibility. If you don't make it, all those millions of sacrifices our people made in the cause of socialism will turn out to be meaningless. But if you do make it, the Soviet Union, even if it falls at the hands of traitors, will nevertheless have fulfilled its historic mission of opening for the mankind the road to communism. You are our last hope. Always remember it.

And now, back to business. I hope you realize that this work should be done in strictest secrecy. And keeping it secret from Americans is the easier part. Although even this is fairly difficult, in view of the fact that KGB is already heavily infiltrated with CIA agents. But we'll be able to solve this problem - security in your lab will be maintained by my own tried people. The most difficult part will be keeping it secret from our own bureaucracy. Your invention is going to encroach upon what's holy for them - the pyramid of power, the very principle of power. If they learn about this before time, they'll reduce you to dust. That's no joke. Yes, to dust. By the time you are ready to announce your invention to the world, you must be fully armed. Yes, fully armed..."

2.11 The night of July 6, 1997, lockup ward.

... Levshov's reminiscences were interrupted by a groan of the metal door being opened. In the doorway stood a man in a uniform with general's shoulder boards.

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- "Here we go again. This time it's a general." - said Levshov, and sat up in his bunk, putting his feet on the floor, trying to find a comfortable sitting position - "Well, general, since you are here, sit down. I'll try to arrange a chair for you."

Only now the General noticed a strange device of unknown purpose standing in the corner, a device, which, strictly speaking, was not supposed to be there. Levshov noticed General staring at it: "Oh, this. This is a device for condensing water out of the air. Here you can see a small thermoelectric refrigerator, which cools this plate. As you can see, water from the air condenses on this plate and runs off it into this receiver. I had to grow this machine because your colonel had had the water line to my ward disconnected. Although I had warned him that I had the capability to build the machine for extracting water out of the air, he did not seem to believe me... Ah, here is a chair for you."

A white mass that had just crawled out of the device's receiver, quickly took the shape of a chair, then suddenly changed its coloring, and began to look like a piece of furniture made of real wood. The General tentatively touched the newly grown chair with the tip of his finger.

- "Don't worry, general, the chair is strong enough for you to sit on it. But if you don't trust me and are afraid that one of the legs of this chair may suddenly disappear, I can sit on the chair and you can sit on the bunk."

- "I'll sit on the chair." - said General - "I don't think that you are going to play practical jokes on me."

- "That's correct, general. It's no joking matter that brought me here."

The General sat down on the chair, paused for a second, gathering his thoughts, and finally said:

"I came to you not as a law enforcement officer to a detained, but rather as one Russian to another Russian. I want you to clearly understand all the consequences of your actions for our Motherland. In my opinion, you have your head in the clouds, and I want to bring you down to earth. In theory, all the things that you preach are very nice - you know, all this talk about instituting the Reign of Reason, Universal Equality, Brotherhood of Man, and all that. But let me tell you what is going to happen in reality. The Americans have now put together a big team of outstanding scientists, gave them the best equipment and offered them lots of money, and all this to achieve one task - to crack the password of the NanoTech Network System Administrator. And nobody doubts that eventually they are going to achieve this. This can happen any moment now. And as soon as they achieve their goal, they will disconnect from the Network its creator, that's you, and all your noble intentions will forever remain just that - intentions without any power to carry them out. The Americans will use the power of NanoTech to reign supreme over the rest of the world for ever. If this happens, Russia will never be given a chance to rise from her knees. If you still have at least a vestige of patriotism left in you, you must immediately surrender the control over the NanoTech Network to us."

- "Who is 'us'?"

- "We are a group of true Russian patriots, who, for a long time, have been preparing the overthrow of the pro-western puppet government. Up till now we didn't have enough power to carry out our plans. But with the help of NanoTech we'll finally be able to take the offensive. This Network is ideally suited for performing acts of sabotage on the enemy's territory without physically entering that territory. We are going to carry our a pre-emptive nanotechnological strike at the West, to throw it into chaos, the chaos they won't be able to sort out in years. They'll have too many problems on their hands to care about supporting their puppets here, in Russia. And it is then that we'll be able to get our country out of this current mess and establish here the true Russian Order. Russians will once again become the masters of their own country."

- "And what about all the other nationalities living in Russia. Will they become sort of your guests?"

The General screwed up his face, as if he had a toothache: "Listen, Levshov, are you really concerned about what'll happen to all those black-asses?" - the General used the vulgar derogatory expression applied in Russia to all those nationalities whose complexions are not as fair as the Russians' - "It were the communists who were forcing us to be internationalists. But now, thanks to the fall of communism, one no longer needs to be afraid of being a nationalist."

- "You see, General, because of the event which you call "the fall of communism", it is now possible not to be afraid of being any kind of scoundrel, but I prefer not to take advantage of this possibility. I'm perfectly aware that being nationalist or racist is a part of human nature - the people of your own tribe are closer, easier to understand and sympathize with than some aliens. A strange complexion, or an unfamiliar shape of somebody's nose may even be repulsive at a purely biological level. But all these are purely emotional, biological reactions. Beside pure biology, a human being is also endowed with reason, and at least at the level of our reason we must try to see ourselves not just as members of our own tribe, but also as members of the united mankind. Otherwise, the only prospect we have is an interminable war, unending retaliatory strikes at the "other tribe", a vendetta handed down from generation to generation, without anybody remembering the cause of the initial conflict. And the weapons grow more dangerous and destructive with each passing year. This is the road to complete self-destruction. Do you have any idea how the West might respond to your "pre-emptive nanotechnological strike"?

Somebody must break this vicious circle, and stop the madness of the war of peoples that has been dragging on for thousands of years now. NanoTech gives peoples a chance to escape from under the authority of their governments, and thus end the division of the single mankind into different nations. Such division only serves the interests of the governments and national elites, but not the interests of the peoples themselves who have to spill their own blood in

the wars protecting the interests of these elites. So, excuse me General, but I absolutely don't like your idea of using NanoTech as a weapon.

And as for the attempts to crack the password of the Network Administrator, please tell those hackers who are making such attempts - I believe you have the capability to contact them - that cracking a conventional computer system is very different from cracking NanoTech. Please, remind them that conventional computer systems are always located outside the hacker, while in the case of NanoTech a part of the system is actually located inside the hacker himself and is capable of controlling some vital functions of his body. Please tell them that if during an attempt to break into the system they set off alarms built into the NanoTech system, this might have a very deleterious effect on their health. Will you?"

The only response from the General was an annoyed nod.

- "Very nice of you." - said Levshov - "I've given the warning, so if anything happens to them now, my conscience will be clear. And now, to the most important question, General. What about my televised address?"

- "I think you'll have to make a pre-recording of your address. The proper authorities will have to view it and make a decision. I hope you realize that we can't put on the air something that has not received the proper clearance."

- "When can I make this recording?"

- "Anytime you wish. As soon as tomorrow, actually."

- "And when can I expect the decision?"

- "That's something I don't know. You must realize that the issue will be decided at the highest level."

2.12 Ten minutes later at the General's office.

- "Any results?" - asked the Colonel.

- "All to no avail." - answered the General - "Stubborn bastard. He knows he has the game in his hands and behaves accordingly."

- "So, what do we do now?"

- "There are only two things we can do now - play for time and pray that the specialists in our secret lab crack the password before the Americans do. Although we don't have the kind of equipment the Americans do, but some of our specialists used to work with Levshov, they understand his psychology and this gives them a certain advantage. Levshov mentioned something about an alarm system that might go off, though. It sounded like a threat. Let's hope he was just bluffing. We'll have to take this risk."

Part three: on the brink of a revolution

3.1 July 7, 1997. Recording of A.Levshov's address to the people.

"Comrades, ladies and gentlemen, and just people! The things that I'm going to tell you now may seem to you so improbable, that it's possible you may not want to continue listening to me and will want to switch to another channel.

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Please don't do it, because at the end of my speech I'm going to give you such proofs of the truth of my words that can convince even a most hardened skeptic. I cannot present these proofs immediately, because, without my preliminary explanations, the things you are going to see and hear may frighten some of you. So please be patient and listen to me for a quarter of an hour. Even if the first part of my speech may seem boring, or obscure, or unbelievably absurd to you, I can promise that by the end of my speech you won't be disappointed.

You all know that the current social order called capitalism didn't always exist. Way back at the dawn of history, at the time when there was still no technology, whenever a man needed food, or an animal skin for his clothing, or firewood for his bonfire, that man just went to a nearest forest and took whatever he need directly from Mother Nature. It goes without saying that there was no money back then. It was a sort of prehistoric communism. This state of affairs lasted for tens of thousands of years, which is much longer than the time that has passed from the moment when money was invented a mere few thousand years ago. In other words, one may say that a moneyless society is, in a certain sense, more 'natural', more in harmony with the human nature.

It may well be that many of you won't agree with such statement. The official propaganda is now trying to convince everybody that capitalism is the society most fully consistent with the human nature, and, consequently, capitalism is eternal. I think that falseness of the latter statement is obvious to any thoughtful mind: nothing in this world is forever, everything that has a beginning has an end. The only question is: What is going to replace capitalism?

To answer this question, we've got first to understand what made capitalism possible in the first place, that is how did it happen that almost every thing in the world (with a few exceptions, like air, which one can still get for free) could be assigned a certain numerical value called the cost of that thing. The fact is that the cost of any thing consists of four components. The first component is the rarity of the material of which this or that thing is made: the shorter the supply of the material, the higher the cost of the product. The second component is the mechanical work required to manufacture the thing: the more physical energy went into building a thing, the costlier it is. The third and the fourth components are related to the information imparted to the thing during its manufacture. Every thing differs from an amorphous mass of raw materials of which it is made in that it has a certain structure, in that the initial raw materials in it are arranged and ordered in accordance with drawings, or with programs loaded in a numerically controlled machine tool, or simply with the ideas in the head of a craftsman. In other words, whenever a thing is manufactured, an information contained in drawings or in some other source is copied onto the initial raw materials. And this information also contributes to the cost of the final product. When we consider this phenomenon we've

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got to distinguish between two aspects - the cost of creating the information itself, and the cost of copying this information during manufacturing of a product. The cost of creating information is the cost of the creative labor of inventors and designers who create drawings of a future, still non-existent product, the cost of the labor of a writer who is writing a book which is still to be printed, that is, converted into a final product, a thing. The cost of copying the information is the cost of the labor of workers cutting the metal according to the drawings, the cost of the labor of typographical workers printing the book. The more difficult it is to perform this process of copying, the more expensive the final product will be. Thus, the rarity of the material, the amount of expended energy, the effort required to create information, and the effort required to copy it are the four components of the cost of any product.

Capitalism can successfully evolve and progress only if there are proper conditions for providing adequate remuneration for the creative effort of the information makers, that is, only if the cost of creating the information can be included in the price of the final product, thus providing an incentive for the inventor to further improve his product. In the nineteenth century, which was the age of rapid growth for capitalism, this was not a problem because of a peculiarity of the then level of technology. The peculiarity consisted in the fact that in order to manufacture almost any thing, you need a fairly large factory with a large number of machine tools and workers. Back in those times, if somebody would have wanted to copy, for example, a book without paying fees to the author, he would have had to find a printing house, which employed at least several people, potential witnesses to his act of piracy. In other words, in the nineteenth century, due to a low level of technology, the process of copying was very complicated, which made infringements of copyright or patent law almost impossible. The inventors and authors were receiving proper rewards for their inventions and works, which resulted in a rapid progress of technology.

As technological progress went on, in all the industries the process of copying was growing increasingly simple, requiring less and less labor, while the copying equipment was growing smaller and less expensive. And so now, by the end of the twentieth century, the situation in some of the industries is such that a man sitting at home can single-handedly and fairly quickly copy any product of that industry. And that's why the end of the twentieth century became the era of mass piracy, which cannot be stopped in principle. When I say "mass piracy' I don't mean factories somewhere in China that churn out unlicensed products - these are actually the ones that can be easily detected and closed down, if only there is a political will to do so. No, what I really mean is individual piracy that we indulge in at our own home when we tape a movie aired on TV on our VCR, take a computer game from a friend and copy it on our diskette, or scan and print out on our home printer a book written by somebody else. And the home printer is just a

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beginning. If we extend this technological trend into the future, we'll see that in a few decades we are going to have an all-purpose home robot that will be able to copycat and manufacture any product, not only a book . And then the individual piracy will make inroads into all the industries, not only video, audio, software and publishing industries that are the hardest-hit today.

And you also have to keep in mind that the accessibility of information will also be continuously growing. Probably all of you have heard about Internet, and many of you have actually used it. Today, the home printer is probably the only "machine tool" that can be hooked up to the Internet. But as soon as the all-purpose home robot comes into existence, there will be programs posted on the Internet that will allow to manufacture all kinds of things using that robot. You'll need only one hacker in the world to make any licensed product freely available to all the mankind. Sure enough, the makers of information will do their best to protect their copy rights and patents. Tougher and tougher laws will be passed against piracy. But the only way to enforce such laws would be to create a totalitarian state that watches over every little step of its citizens, monitors their every phone call, and conducts regular searches in every household to check for the existence of unlicensed things in that household. As a result of the development of information technologies, from a society of economic freedom capitalism will turn into a society of non-economic coercion. The Internet, originally hyped as the triumph of capitalism, will actually turn out to be its gravedigger.

The only way to avoid the rise of the global state of total surveillance is to legalize free use of information, to recognize that any information is the common property of all the mankind and can be copied by any citizen of planet Earth free of charge and without any restrictions. You might ask what the inventors will have to live upon, if they cannot sell their inventions, because they won't even have money to buy themselves food? The only answer to this question is to abolish money. Using today's science and technology one can transform the Nature in such a way that man will once again be able to freely take from Nature all that he needs, just as he did throughout the major part of the mankind's history, up till the moment when society based on money came into being.

The evolution of society moves along a spiral path - after completing a full circle society returns almost to where it had been before, but on a higher plane.

And now we have reached the most important part of my today's speech. Comrades, ladies and gentlemen, and simply people! I am proud to have been entrusted with the honor of announcing to you the most important news in the history of mankind. The spiral has completed a full circle - a technological system capable of supporting all your needs has already been developed, tested and deployed, and is ready for operation from today on. The only thing left to do is to issue a command to completely activate the system, and I'm going to do this in a few minutes' time. But before I

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inaugurate this system, I would like to briefly explain to you how it works. As you probably know, inside each person there have always lived billions of bacteria, some of them absolutely innocuous, some less so. Not long ago, a team of scientists which I represent here, took the liberty of spreading a strain of bacteria which was engineered in our lab and which is absolutely harmless to human beings. I want to emphasize this last fact - these bacteria are not only absolutely harmless, they are actually good for your health, and can help your body fight off many kinds of diseases. These are no ordinary bacteria, these are self-replicating engineering systems, which took us fifteen years of hard work to develop. These bacteria, which have by now spread all over the world, are capable of storing and exchanging data in the same way as computers hooked up to the Internet. We have called this data network of bacteria the NanoTech Network, since its physical basis are the nanotechnological devices built into these bacteria. This network can do absolutely every thing that the Internet can do. Actually, we even have a gateway to Internet, we can retrieve data from it. So, in a certain sense, NanoTech is a subnetwork of the global network Internet. But on the other hand, NanoTech is capable of doing many things of which the Internet is still incapable, and in that sense NanoTech represents the next evolutionary step after the Internet, its logical extension.

As I have already said, the only "machine tool" that at present can be hooked up to the Internet is a printer. In a few years, a home robot may be added to that list. But in any case, the robot will need a source of power and materials for manufacturing new things, and that means that even if the information is free, the final product itself isn't, because the other two components of price - power and materials - still remain. Add to this the amortization of equipment - the robot and computer eventually are going to wear out - plus the phone bills, and you'll realize that one cannot change over to a moneyless society using the classical Internet concept.

On the other hand, NanoTech takes all the power and materials it needs quite literally out of the air, and that's why one can safely say that it's as gratuitous as the air itself. For the raw materials, NanoTech extracts carbon atoms from its environment, arranges them into a thing in accordance with the data stored in the network, and as soon as the need for that particular thing ceases to exist, it just releases these atoms back into the environment. This kind of technology is environmentally safe from all aspects. It doesn't produce wastes. It mimics nature in its workings - one may even say that it just adds one more cycle to the natural recycling of atoms. This new cycle is man-made, but it is made in similitude to the Nature's own cycles.

Conventional technologies pull atoms out of their natural cycles for prolonged periods of time, and bind them inside dead things that are very rarely used, if ever. Conventional things exist regardless of the fact whether we need them in this particular moment or not. That's why conventional technologies need so much raw material - because the

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efficiency of their use of that material is extremely low. And that's why conventional technologies are such a burden on the environment.

In contrast to this, NanoTech requires very little amounts of raw materials, because it doesn't bind atoms in dead things, because at any given moment in time most of its things exist only as virtual things, as data in the network, and they materialize only when they are actually needed. It's exactly because of this that NannoTech puts very little load on the environment, and it's exactly because of this that NanoTech can satisfy all the needs of all the people on Earth, and not only of the chosen ones living in the rich countries, and do all this without causing an ecological disaster.

And when I say 'all the needs' I do mean all the things that have been invented by Man, and all the things he is still to invent in the future. Currently the NanoTech Network doesn't contain too much data, and there are still not very many things that it knows how to build (although the things which it already knows how to build are quite sufficient to allow any person to lead an independent life with a living standard adequate for preserving one's dignity and self-respect). But you will be able to fill it with new data and teach it to build many new things. The NanoTech is an all-purpose machine that can be infinitely upgraded, improved and enhanced. The most important thing is to use it in Reason, and not to teach it evil. Governments originally developed this system as a means of sabotage against other countries. Eventually, this system could be used as a means of total surveillance over every citizen, if the above-mentioned regime of strict enforcement of copyright and patent law were to be instituted. I saw what the things were coming to, so I stole this system from the rulers to give it to you people. That was the only chance to stop the impending disaster. But to make this chance into a reality, you've got to use this system right. This system must serve only Reason, and it must never be used for seeking and gaining advantages over other people, otherwise the history will repeat itself - once again there will emerge the Rulers and the Ruled, the Rich and the Poor, the Elite and the Outcasts - and then the Disaster will become inevitable. Then, wars, fights and killings will continue, but this time with an assured total mutual destruction at the end of the road, since this time the weapons will be one hundred percent accurate, efficient and deadly.

But we do have a chance to avoid this, because now, for the first time in the history of mankind, you, each and everyone of you, are absolutely free and independent. As recently as this morning each of you had the Damocles' sword of fear hanging above your heads, fear that your neighbor will get ahead of you and will snatch your bread from your mouth. This fear was suspended over every person throughout the entire history of mankind, and it was this fear that made people trample their neighbors, elbow aside the weak, trying to snatch a bigger piece of pie, to carve out their place in the sun.

In a few seconds I'm going to activate the NanoTech

Network, and each of you will get access to the means for a dignified life. But before I do this, I want you to clearly understand one thing: nobody will ever be able to take away from you what you are going to receive now. You will never again have to be fearful of your neighbor. Whatever happens to you from now on, you'll always have food and lodgings. You'll have to learn to treat other people not as competitors, but as friends to whom you'll be giving the fruits of your creative labor and receiving the fruits of their creativity from them.The NanoTech belongs to all the mankind, and at the same time it belongs to each of you. These are not just empty words or slogans. This is reality, because the NanoTech is first and foremost the information it contains, and the information, by virtue of its very nature, can simultaneously belong to an infinite number of people. Bernard Shaw once said: "If you have an apple, and I have an apple, and we exchange these apples, both you and I will still have one apple. But if you have an idea, and I have an idea, and we exchange ideas, you'll have two ideas, and I'll have two ideas." And since NanoTech contains not things themselves, but rather the ideas of things, the only way to get rich in the NanoTech System will be to give your ideas to all the mankind, in order to augment the common bank of ideas. To give, rather then to take away, as it used to be throughout all the previous history of mankind, when people had to live not among ideas, but among material things that indeed could only be acquired by taking them away from other people.

But now all this is over. I want you to clearly understand that from now on there is no objective need to behave in this way. From now on you are free. You are free to be humans, not beasts that snatch gobbets from each other's maw. And the only things that may prevent us from living happily are bad habits and customs that have accumulated over the previous history of mankind, and the instincts that we have inherited from our bestial ansestors. Only our reason can overcome these last barriers. And I believe that the Reason will at last prevail, because now, for the first time in the history of mankind, the material circumstances of peoples' lives will be on its side.

I intend to demand from all the governments in the world that they immediately let anyone, who will express such a wish, give up his or her citizenship in their respective countries, and become simply citizens of planet Earth. In so doing, the governments will be obligated to destroy all their records, files and any other documents related to such persons, and begin to consider such persons as non-existent, that is, the governments will no longer be supposed to levy taxes on such persons, to conscript them into military service, and so on. All the care about the well-being, health, education and security of such persons will be assumed by the NanoTech Network and voluntary societies of the citizens of NanoTech."

Levshov fell silent for a couple of seconds and then said:

"I have just issued the command to enable access to NanoTech Network for all the people on Earth. We'll have to

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wait for a couple of seconds until this command reaches the farthest corners of our planet. This command gives you all access to the network resources at the ordinary user's level. This level of access allows you to get from NanoTech any kind of foodstuffs and medicines, except narcotics, and any kind of things, except weapons. This level of access also provides a wide variety of information services. You'll be able to talk to any person located at any point on the globe, you'll even be able to hear what his ears hear and see what his eyes see - but only with that person's consent, of course. The capability to eavesdrop, spy and control other person's actions is disabled at this level of access.

And now a briefing on how to log on to the network. All you'll have to do is to say in your mind one word. Don't be frightened when in response you'll hear a voice coming seemingly from nowhere, sort of from your own head - it's just the system sending its reply directly to your auditory nerve bypassing your ear. So, try now to say in your mind, but as clearly as possible, just one word: "NanoTech". If you don't hear the reply: "System ready", try to say this password once again. It's even possible that you'll have to say this word aloud once or twice - the system must learn to recognize your manner of speech. It learns very quickly, because it recognizes not the sounds which always have lots of acoustic noise in them, but rather the action currents in the muscles of your throat. And this means that even when your voice gets hoarse, the system still understands you perfectly, because what it recognizes is what you wanted to say, rather than what you have actually enunciated.

A small digression for our viewers from abroad. I hope that my speech, or at least excerpts from it, will be shown by TV companies from abroad. If you don't understand Russian you can switch the NanoTech user interface from Russian to English. (Unfortunately, at the moment the system does not support any other languages besides Russian and English, but we expect that with your help we'll be able to rectify this omission in no time). In order to switch to English, all you have to do after you log on is to say two words: "English interface". After that your user's interface will be permanently set up to work in English until you choose to change the interface language once again.

Well, I think that by now most of you have already heard the "system ready" reply and we can proceed to the next step. Now, just as clearly as the first time, you'll have to say in your mind (or maybe aloud, if speaking in your mind doesn't work yet) two words. But before I give you these words, I once again want to warn you that you needn't be afraid when in the air right in front of you you'll suddenly see a sort of a "window" in space through which you'll be able to look into some other world. In reality, physically speaking, there will be no "window" in the air. This will be the same kind of illusion as the voice that said to you "system ready". What will actually happen is that cyborg-bacteria that are attached to your optic nerve will make a virtual inset into the picture that your eyes actually see. So, say now, as clearly as possible, two words: "Graphic Interface".

And so, if the system has been able to correctly recognize your command, you must now see right in front of you a "window" that takes up about a quarter of your field of view. Inside the "window" you must see what we call a "virtual mall" - a long street with lots of small shops on each side. Each shop has a sign with the names of supplies it provides.

Now you'll have to learn to move in the virtual "space" without moving in the real space in the process. Since this might take some skill, at the initial phase of learning small movements of arms and legs in real space are allowed. However, you must try to get rid of them as soon as possible, just as you must try to desist from saying commands aloud and start issuing them mentally.

So now, imagine that you want to look down. I say imagine that you look down, but don't actually look down. The cyborg-bacteria attached to the nerve fibers going to the muscles in your eyes and neck are sensitive enough to pick up those weak action currents that the brain sends to muscles even when the movement is not actually performed, but is only imagined. And now, if you clearly visualize that you are turning your eyes downwards, you'll see the image in the "window" moving in accordance with this visualization - in the virtual space you'll be looking down at your feet, while according to the image of the real space that surrounds the "window", you'll still be looking straight ahead. Or, rather, you'll be looking straight ahead only if you have performed this action correctly, that is, only in your imagination, and not in the real world. Otherwise you'll be looking downwards in the real space as well. Actually, we decided to leave a border of real-world image around the virtual "window" on purpose, so that you could monitor your actions both in the virtual and in the real world simultaneously. I don't want any one of you to fall off a balcony in the real world, while making a step ahead in the virtual space. As soon as you learn to move around in the virtual world without moving in the real one, you'll be able to switch to the graphic interface that completely fills your field of view, but for now please train a little bit with the one-quarter field.

So, what you see now in the virtual window are your feet. Of course, these are not your real feet. These are your "virtual" feet. You can control them by imagining that you move your feet. Now we'll try to make a step forward in the virtual space. For the purposes of monitoring, please turn your eyes downward in the real world and look at your real feet. They are not supposed to move. And now clearly visualize that you take a step forward. If you did everything correctly, the feet in the virtual window must take a step forward, while your actual feet in the real space must not budge. You don't always succeed at the first try. If you fail, try once again.

So, now you have taken your first step in the virtual space. Now go forward and look around you. In so doing, try not to turn your head in the real world, just imagining that you turn your head is quite enough. Now your hands. The same thing - your virtual hands must act, while your real hands

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must quietly lie in your lap, or just hang relaxed by your sides, as you like. Try to visualize each movement as clearly as possible, while your real muscles should be relaxed - and you'll succeed. Walk around in the virtual space a bit, flail your virtual arm a little. If you can do this right away, that's excellent, but if you can't, don't despair, all it takes is a few more minutes of practice, and you'll succeed.

The next step. NanoTech draws its power from water. Those of your who'll venture to live exclusively on NanoTech, won't always have tap water readily available, that's why the first thing that you've got to learn is how to extract water from the air. If you have wandered off far along the virtual street, please return now to its beginning. The very first shop in that street is the shop for water-extraction devices. Enter the shop. Inside you'll see lots of water extracting machines of all sizes. Take with your virtual hands the smallest machine, size number 1. What's coming next is a little bit irregular for NanoTech, and it has to do with the fact that today you are visiting NanoTech for the first time, and you still have not been assigned a "default object", that is, the raw material from which, by default, all the things of NanoTech will be manufactured for you. What I'm going to ask you to do now, you'll have to do maybe only once in your life in NanoTech. While you continue holding in your virtual hands the water extraction device Size 1, please cup your real hands in the real world. (Those of you who don't have hands, or whose hands are for some reason disabled, will find instructions about what they should do in this case in the virtual book shop, which I'll describe later). Now, in the virtual space, press with your right thumb the big red button on the right side of the device. A light must come on inside the button signaling that you did everything correctly. And now just wait a little. Droplets of whitish liquid will transpire now from the pores on your real palms. Some people may find this unpleasant, but please be patient - as I have already mentioned, you'll have to do this only once. In a few seconds you'll have in your real palms a white mass which will quickly assume the same shape as the water-extraction device that you hold in the virtual space.

Now your first water extraction device is ready. You no longer need to hold it in your real hands, you can put it wherever you like, but not far away, because all the things that you'll be taking from the virtual space, in real space you'll be taking out of this device. True, size number 1 is too small, and for most of the things you'll hear an error message: "Object Resources Inadequate". That's why, before you leave the water extracting machine shop, it would make sense to acquire a water extracting machine size number 2. Since you already have your default object, all you need to do is just grab a Size 2 machine and put it in your shopping basket. On the handle of the basket a yellow light will come on, which is the system confirmation that you have acquired the thing that you put in. After some time a green light should come on to notify you that the manufacturing of this thing in the real world is now complete. After that, in the

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virtual world, the virtual image of this thing will just disappear from the basket leaving free space for new things on your shopping list. If the green light is not on yet, that probably means that the Size 1 machine has not yet extracted enough water from the air to manufacture a Size 2 machine. Maybe you'll have to wait half a minute more. An extraction machine of any size fully filled with water has enough resources to manufacture a machine that is one size bigger. Have a look in the real world at your Size 1 machine. I think that by now it should have grown to Size 2.

Now, let's leave the water-extracting machines shop, and stroll around other shops. Let's stop by the baker's shop. Choose your favorite sort of bread and put it in your shopping basket. Once again, first a yellow light, and then a green one should come on. After that, in the real world, you can take your favorite bread out of the water extracting machine.

I'm not going to accompany your on a tour of the other shops, I think that you already understand how it all works. If you suddenly get a message that object resources are inadequate, go back to the water-extracting machines shop and select a machine one size bigger. But if you decide to travel (I mean, in the real world, not in the virtual one), choose once again water-extracting machine Size 1, it is very compact and suitable for travel. This time you won't need to press the red button and extract the material from your own palms, just put it into your virtual shopping basket, and in the real world your machine of, say, Size 40, will quickly shrink to Size 1.

Before we conclude this first tour around the virtual space of the NanoTech Network, I would like to draw your attention to one of the shops in this virtual mall - the book shop. Enter it. Inside, you see lots of shelves with books. You can take any of these virtual books from the shelf, open it and read it as if it were a real-world book. Please note that books are grouped according to their subjects. The subjects are written on the labels attached to the shelves. The very first shelf has a label: "NanoTech System User's Help". If you have any questions about the NanoTech Network, you may find the answers in the books on that shelf. Any time you have problems come here. Besides, you probably noticed that in a corner of this shop there is a desk with a computer on it. This virtual computer operates like a real one. It has an on-line NanoTech help, as well as a browser for Internet surfing (as I have already mentioned, NanoTech has a gateway to Internet).

Now it's up to you to learn to walk around this virtual world and to get acquainted with it. When you want to return to the real world, all you'll need to say is: "Close NanoTech Session". Got it?

During the next talks that I'm going to give you I'll tell you how you can transfer your favorite things into the virtual world of NanoTech, if they haven't yet been transferred to it, and how new things can be designed using the NanoTech System. Then I'll tell you how you can use NanoTech to communicate with the people that are as far from you as the other side of the globe. NanoTech is a wonderful

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communications tool, which will allow billions of people to think together, to make decisions together. The mankind will become a single intelligent being. Nay, not only mankind, all the biosphere, all the hydrosphere of the planet Earth are replete with cyborg-bacteria, and that's why if we wish we can always learn how the soil under our feet or clouds over our heads are doing. The dark depths of the oceans will no longer be a mystery to us and will become a part of ourselves. The weather will no longer be an incomprehensible external force of elements, for we will be able to feel the movements of air masses as if they were blood streams in our own body. We will be able to see what birds' eyes can see from the height of their flight, or fishes' eyes from an ocean depth. We'll be able to see the world with the eyes of an ant, a bee, or an octopus. We'll be able to see the world with each other's eyes. The term noosphere, which up until now has been just a beautiful figure of speech, a poetic metaphor, will turn into a physical reality.

And when we have learned to think together, we'll have to address the most difficult issue. As I have already mentioned, there is no access to weapons, or to the tools of control over other people at the user's level. However, such functionality does exist in the NanoTech System, and it would be unreasonable to completely destroy it, since NanoTech will still have to protect itself against the people whose intellect cannot prevail over their apish instincts. We'll have to define who and how is going to use these functions, who and how is going to license the access to them. These capabilities may give their users a tremendous power over the lives of other people, and we must see to it that this power be used for the good of the people, and not against them. Power always corrupts. It awakens in men their animal instincts, the striving for an even greater power, power for power's sake. We'll have to work out a system that will allow NanoTech users to exercise control over those who will be given this power. We've got to come up with such a mechanism of control, which would allow to use these functions only for maintaining the freedom and safety of the citizens of NanoTech, only for fighting the criminals who would dare to encroach upon such freedom and safety, and would never allow the criminals to take possession of these weapons.

This ends my today's talk. I congratulate everybody with the first day of the World Communist Revolution."

The light on TV camera went off, the recording session was over.

- "But you have not actually enabled the access to NanoTech Network for the general public yet." - said the Colonel.

- "I'll do this as soon as this speech will be on the air." - said Levshov - "I don't want somebody to stumble upon NanoTech before time by chance, just by saying some word which sounds like "nanotech". I don't want somebody to be scared to death by this."

- " And you still hope that this will be allowed on the air?" - chuckled the Colonel.

3.2 July 8, 1998. An entry in the personal diary of the CIA liaison officer with special powers in Moscow.

"Strictly speaking, I'm not supposed to keep a diary. And I never did before. I always believed that keeping a diary was something that only acned teenagers do, being unable to understand themselves and the world around them. But now, this is exactly the case with me. Recently I found than I no longer understand myself.

I've just sent to the Center the latest information about Levshov, along with a video recording of his TV address, which, I'm sure, will never be allowed on the air. This address contains some new technical details, which might be of help to our experts trying to crack the NanoTech network. They had been saying that any casual word said by Levshov, any minute detail might turn out to be the clue. This may well be true.

In this case I just don't understand why I'm doing all this. The more I read Levshov's interrogation transcripts, the less I understand why I should fight against him. Sure enough, he is a communist and an atheist, and I was told ever since I was a kid that godless communists wanted to destroy our country, our freedom and our democracy, and that it was the duty of any true American patriot... and all that. Maybe that was exactly how it was, and those communists did indeed want to destroy America.

But now I'm sitting here in Moscow trying to understand what this communist and atheist Levshov really says, trying to translate all that he says into terms that are readily understandable to a Christian, and to my dismay I discover that when he talks about the Reason, he refers to what is good and divine in man, while when he speaks about apish instincts he means the Evil and the devil's temptations.

The horror of it is that this man came out against all the evil in the world virtually alone. And I'm forced to fight him. It follows from this that I, who always prided himself on being a true Christian and Patriot, a straight arrow and a champion of Freedom and Democracy, suddenly find myself fighting in the cause of the Evil.

For the first two or three days I did not admit this to myself. I took refuge in patriotism, I told myself that if we don't take over the power of NanoTech, it will be taken over by the Russian nationalists, which will have dire consequences for the freedom and democracy all over the world.

But today I was struck with a disgusting thought: all these justifications are based on the assumption that Levshov can never win, that this game has only two possible outcomes: either we win, or the Russian nationalists win. But why can't he win? He can't, because the forces of Evil are too strong, and even when Levshov has all the power of NanoTech behind him, he still cannot win, because the forces of Evil draw their strength from the apish instinct, ages of tradition deeply rooted in the very cultures of peoples, and, what is most important, organizations based on the apish instinct. Organizations are not just a simple sum of their members. Any organization has a will and interests of

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its own that are different from the wills and interests of the people it consists of. Just as me, each of these people may be against evil, but all of them together will be working to strengthen and expand their organization, because the number one interest of any organization is to protect its own existence through its growth and strengthening. Levshov trespasses against the very foundation upon which any organization is based - the apish instinct. And this means that all the organizations all over the globe, warring against each other although they may be, will join their forces to fight him. This man does not have a chance. He will be crushed.

The most disgusting thing following from the above is that I'm on the side of the Evil only because the Evil is strong and therefore will prevail. So much so for the True Christian, Patriot and the Champion of Freedom and Democracy. And now I'll go and get myself drunk. Thank God, vodka is cheap in Russia...

Part Four: The Crisis

4.1. The General decides to play an All-or-Nothing game. July 10, 1997, Moscow, the General's office.

There were two men sitting opposite the General: the Head of the special research lab set up to crack the NanoTech System, and the Colonel.

- "The reason that I summoned you here, gentlemen, is to break to you a very bad news: Americans have demanded that we extradite Levshov to them. They have sent us a diplomatic paper to the effect that Levshov had committed a crime on the US territory by illegally infecting the population of that country with cyborg-bacteria, and therefore he falls under the jurisdiction of the US law. The paper contains lots of legal gobbledygook, but it won't hold water as a legal document: all their arguments in support of Levshov's extradition to the US are actually much more applicable to Russia than to the USA. But one can easily see that they didn't even try to make their paper legally valid, because they knew that our government would surrender Levshov to them anyway, just because they are stronger and they have the levers to bring pressure to bear. Although our government is still in session on that issue, the result is easy to guess: Levshov will be taken away from us tomorrow, or the day after tomorrow at the latest, if we use the red tape and delay the processing of all the papers related to his official hand-over.

I would like to hear you opinion why did the Americans suddenly decide to get Levshov into their hands? I now recall that a couple of days ago you mentioned in passing that the Americans might soon demand Levsov's extradition." - the General turned towards the Head of the lab - "But back then I didn't pay much attention to your words. Could you please explain what you meant?"

- "That remark was based on one of our hypotheses about the system that protects the NanoTech Network against unauthorized access. What I mean here is the access at the

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level of the Network Administrator - at the user's level, as we now understand it, there is virtually no protection at all. But we, just as the Americans, are mostly interested in the access to the Administrator's resources, which include weapons, means of intelligence-gathering, sabotage, remote control over other people's behavior, in a word, all the things we originally developed the NanoTech for, and which Levshov decided to put out of reach of an ordinary NanoTech Network user. To come back to your question, one of our hypotheses is that the Network Administrator doesn't really have any password to access the Administrator's resources."

- "I don't understand." - said the General, surprised - "Then how on earth..."

- "If an ordinary user attempts to request the access to the Administrator's resources, the system will start to check the physical characteristics of the body of the person who makes the request. I don't know which ones in particular - may be the cyborg-bacteria that live inside his eyes will check his iris pattern against iris patterns of the network administrators that are stored in the network. Or they may check some internal characteristics of the body - there must be some other spots inside the body that are just as unique as fingerprints or iris patterns. These unique physical characteristics of a body are a person's biological ID, a proof of identity that can't be counterfeited. And if the physical characteristics of the person who makes the request don't match those stored in the NanoTech memory, not only will the system deny access to the Administrator's resources, it may even set off an alarm, with all the unpleasant consequences that Levshov warned us about.

That was our hypothesis. But it's something more than just a hypothesis now. The fact that the Americans did indeed request Levshov's extradition, confirms that we were right. They realized that the only way to gain access to the Administrator's resources is through Levshov himself, and they need him there, in their lab."

- "But will he be of any use to them, if he is most likely to refuse to cooperate with them?" - asked the General.

- "Theoretically speaking, there is one way to gain access to the Network Administrator's resources without his cooperation. Let's assume that we found a way to put Levshov to sleep..."

- "But you yourself told me that the cyborg-bacteria can destroy any soporific in his body within a fraction of a second!" - exclaimed the General.

- "But what I'm saying now is let's assume, theoretically, that there is a way. Let me first finish what I wanted to say, and you'll see what I'm driving at. So, let's just imagine that Levshov is, some way or other, knocked out cold, and while he doesn't feel anything we do a little surgery on him: we implant microelectrodes into the nerve fibers that go from Levshov's brain to the muscles of his throat, as well as into his auditory nerve. Let's also imagine that by that moment we have already performed a similar surgery on one of our men, but our man doesn't sleep, and is fully alert. We use ordinary wires to hook up

his electrodes to the corresponding electrodes in Levshov's body: throat to throat, auditory nerve to auditory nerve. It may well be that there will be some intermediate amplifiers and signal correction circuits, but I'm not going into technical details here.

And now imagine that our man gives to the NanoTech a voice command to open access to the Network Administrator resources. The action currents from the nerve fibers in his throat are fed through the wires to the nerve fibers going to Levshov's throat inside Levshov's body, and there they are picked up by the cyborg-bacteria living on his nerve fibers. These cyborg-bacteria have no way of knowing that these action currents are not coming from Levshov's brain, and therefore they process it as a command given by Levshov himself. From the standpoint of NanoTech, the request will be made by Levshov himself, and that means that before NanoTech grants the access, it'll check the physical characteristics of Levshov's body. These, of course, will match the physical characteristics of the Network Administrator, and the access will be granted. A message about this will be sent to Levshov's auditory nerve, from where it will be sent by wire to the auditory nerve of our man. As soon as our man gets access to the Administrator's resources, the first thing he'll have to do is to assign the Network Administrator rights to himself or to some of our people. Then this newly assigned Network Administrator gets access to the Administrator resources in his own name and divests Levshov of his Network Administrator rights. Levshov awakes a virtual nobody, and the Network is completely in our hands. Just as simple as that."

- "That's all very fine in theory" - said the General - "but how do we knock him out cold? May be, bludgeon him on the head?"

The Chief of the lab shook his head: "The cyborg-bacteria would immediately repair any damage caused by the blow and he'll recover his consciousness very quickly. We won't have enough time to perform the surgery.

- "Then I just don't understand you." - said the General.

- "Well, I believe that what they have chosen as the standard body characteristics for NanoTech to check prior to granting access" - said the head of the lab - "are some relatively stable bodily features that don't change as the function of the body's physiological condition. Even if we assume that the body is dead, such features won't significantly change for, let's say, half an hour after the death occurred. If the surgery had been well rehearsed, such time period might prove to be adequate."

- "Well, let me make sure I understand you: what you need is Levshov's dead body?" - asked the General.

- "Only a very fresh one." - said the head of the lab.

- "And is this operation of yours well rehearsed?" - asked the General.

- "I foresaw that the things might eventually come to this, and so for the last two days we have been continuously training for such an operation. Just in case. But I want to warn you right away that I'm not giving you any guarantees. We are taking a very long shot. It may turn out that at the

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moment of death a System Administrator is immediately automatically deleted by NanoTech from the list of persons authorized to access the Administrator resources. Although I doubt that the creators of NanoTech have programed this into the system. I still think it unlikely that the programmers could foresee the current situation. But it's also possible, that NanoTech will be able to detect the commands not only in the nerve fibers of Levshov's throat, but also the same commands in the nerve fibers of our man, and we don't know what the system's reaction might be in that case. Of course, we are going to take all the precautions - we are going to put our man in a box shielded against infrared radiation and we'll only have the wires running out of that box, but one cannot foresee everything, so there is no guarantee. However, there is a chance. But if they take Levshov away from us, we won't even have that chance to get access to the Administrator's resources."

- "The Americans will have it instead." - said the General somberly - "How many minutes do you give us to deliver the corpse, form the moment of death to the arrival at your lab?"

- "Zero minutes."

- "You mean we'll have to finish him off right in your lab?"

- "You may do that in the hallway right outside the door, but no farther then that."

The General turned to the Colonel: "What are your proposals?"

The Colonel scratched his head: "Well, I can see the following scenario. Tomorrow morning I'll pick up Levshov for an interrogation and take him on a different route that'll take us past the lab's door. As we will be passing the lab's door, a stranger that will have entered our building using a false ID card will suddenly approach Levshov and shoot him with a hand gun. The guard who will be escorting Levshov will return fire and kill the stranger. The stranger will turn out to be a man that has for a long time been suspected of being a hired killer involved in a number of assassinations. So it will be a clear-cut case of a hired killing, and there'll be no clues as to who was behind the killing."

- "No clues? And what about the faked ID card?" - asked the General and the Colonel's spirits immediately flagged. "Well" - continued the General - "under normal circumstances I would have never OK'd such a messy act. But in view of the fact that we are hard pressed for time, and absolutely everything is at stake... If everything comes out well, we won't have to justify our actions to anyone, including the Americans. If we get hold of NanoTech, the balance of power in the world will immediately change. Success is never blamed. But even if we fail to access the Network, at least the Americans won't be able to do this either - there'll be no Levshov anymore. Colonel, get down to work!"

- "Just a moment," - said the head of the lab - "I want to emphasize one thing: shoot him only in the head. NanoTech will be able to repair any wounds in the heart or any other organs. The bullet must hit him exactly in the middle of his

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forehead, an inch above the eyebrows, and the bullet trajectory must be strictly horizontal. If you make holes in other parts of the head, I can't guarantee the success of our operation to implant the electrodes."

- "We'll keep that in mind." - said the Colonel.

4.2 Assassination attempt. July 10, morning, Moscow, Levshov's place of detention

The heavy metal door screechingly opened. The Colonel stood on the doorstep: "Come out, Levshov. Today we are going to another room - I want to show you something."

In the corridor the Colonel lead the way, Levshov followed him with an armed guard behind him. When the Colonel and Levshov turned round the corner, the armed guard momentarily fell behind. Suddely Levshov heard a familiar voice behind his back: "Rejoice, Science! At long last, there is a customer who wants you killed too!"

Levshov turned around. He didn't immediately recognize Mityai. Instead of his usual black leather with chains, he was wearing a dark suit with a tie - a uniform of a civilian-clothes man - which was so much more in harmony with the spirit of the building they were in.

- "And what a customer! You know, Science, I even began to respect you!" - said Mityai slowly drawing out of his pocket his favorite black hand gun.

Levshov was silent. At least he didn't say anything aloud.

AL:> NANOTECH

NT:> SYSTEM READY

AL:> ADMINISTRATOR RESOURSES ACCESS REQUEST

NT:> REQUESTER BEING IDENTIFIED. WAIT...

- "Don't be afraid, Science! You are in a professional's hands. You won't even feel that you are dead!" - Mityai couldn't resist the urge to pick on Levshov for the last time.

NT:> REQUESTER IDENTIFICATION COMPLETE. ACCESS RIGHTS CONFIRMED. ADMINISTRATOR RESOURSES ACCESS OPEN.

AL:> PROGRAM: REMOTE CONTROL OF MUSCULAR ACTIVITY. OBJECT: WHO I AM LOOKING AT.

Levshov was silently and steadily looking at Mityai. Mityai deliberately gripped the hand gun with both of his hands, extended his arms, and carefully aimed at the Levshov's forehead - on the centerline, one inch above the eyebrows, as per the customer's specifications.

- "I'm sorry, Science. Nothing personal. I'm just doing my job."

- "Stop blabbering! No time!" - snapped the Colonel.

Mityai pressed the trigger, thinking about all that square footage he would enjoy after cutting through the wall of his apartment to the now unoccupied Levshov's appartment. "I'll remove the range from Lewvshov's kitchen. I don't need two kitchens. I'll make it a living room. It's strange, I didn't hear the report of the gun. But I did press the trigger. Or did I?"

Mityai pressed the trigger once again. Only now he realized that he doesn't feel his finger, doesn't feel the

pressure of the trigger on the finger. Mityai looked at his finger and tried to move it. The finger didn't move. Mityai felt panic starting to overwhelm him. He tried to bring his hands closer to his eyes. The arms did not obey. They froze in the extended position with the gun between the hands. Startled, Mityai began to whirl around. The arms, with the hands holding the gun, were stiff as sticks.

- "Stop this circus!" - snapped the Colonel, starting to move towards Levshov and Mityai. Levshov looked at the Colonel.

It took the Colonel some time to realize that he didn't feel his legs. They became sort of petrified. The Colonel lost his balance and came down. Fortunately, his hands worked and he managed to land on them.

"I think that after what has just happened, my further stay here becomes pointless. Excuse me, gentlemen, but I have to leave you." - said Levshov and disappeared round the corner.

When Levshov, running along the corridor, reached a rest-room, an alarm siren went off somewhere inside the building. Fortunately, the restroom was empty. Levshov stopped in front of the sink and opened the faucet. The first thing was to do something about the clothes...

... A guard's uniform turned out to be fairly convincing. Now, the face. Two lumps of cyborg-bacteria formed under the skin on the left and on the right made the cheekbones look much wider. Levshov looked in the mirror and decided that his jaw also needed some padding out. Then he broadened his nose a little bit. And finally, as an afterthought, he grew under the faucet a little false mustache and stuck it to his upper lip.

When Levshov reappeared in the corridor, the siren was still sounding, and everybody was running along the corridor, strangely enough, in both directions. When the Colonel, who had finally regained control of his legs ran past, Levshov stood at attention and saluted him. The Colonel distractedly glanced at a new guard with broad cheekbones and rakish little mustache, whom he had never seen before, curtly nodded and ran along.

Levshov really had nothing more to do here. But before leaving the building he had to examine the adjacent streets. He asked NanoTech to hook him up to a bird flying over the building. A second later he was looking at the world with the eyes of a pigeon soaring above. Levshov was mostly interested in the street where the main entrance to the building was situated. It was long since the last time Levshov had flown as a pigeon, so the first couple of wing beats were not very successful, the pigeon lost altitude, and for a moment it seemed that he was going to crash. However, the flying skill quickly returned - after all, flying a pigeon is like riding a bicycle, you only need to learn it once and the skill remains for a lifetime. Levshov quickly pulled the pigeon out of a dive, and landed in the street in front of the main entrance. The pigeon walked a few meters along the sidewalk, until he found a suitably large puddle, right opposite the entrance. The water in the

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puddle suddenly began to grow murky and whitish.

Levshov disconnected from the pigeon and started walking towards the exit. The guard at the exit had only enough time to say "Your ID..." and turned to stone, as Levshov walked past him.

In the street, a few amazed passers-by could see how a big white bubble started to grow from a puddle right opposite the main entrance to a gloomy imposing building without any signs. In a few seconds the bubble turned into a very strange-looking, compact single-seater car. One could see only one seat under its transparent upper body. There was no driving wheel in front of the seat, no pedals, no control panel. The strangest thing of all was that the car didn't have any doors. In a few more seconds a mustached guard with high cheekbones came out of the building and approached the strange car. A big oval hole suddenly appeared in the car's upper body. The passers-by were staring with their mouths wide open. "Good morning" - said the polite guard, eased himself into the hole, and sat in the only seat there was. The hole immediately healed over as if it had never existed, and the car pulled out without producing any sound or exhaust gases.

In fifteen minutes' time, when Levshov was already driving along an out-of-town highway he saw his pursuers. The car increased its speed. And then it sprouted wings, like aircraft wings. In one more minute it got off the ground, and its wheels dissolved - not retracted or folded, but dissolved, while at the same time the wings became a little longer. In a few more seconds the plane left his pursuers beyond the horizon.

The plane was flying eastwards, towards the rising sun, climbing higher and higher. For the first time in the last few days Levshov had a chance to sit back and consider the situation. He was to account to the NanoTech Network Administrators' Board for his use of the Administrator Resources, but he was not much concerned about this - he had used the Administrator Resources exclusively for self-defense, this would be corroborated with the records of what his eyes had seen, and he was absolutely confident that the Administrators' Board will vindicate him. His real concern was that the initial plan of an instant revolution had failed. Of course, he had foreseen the resistance of the System, but he had never expected it to be so vehement - as any inventor he was prone to see only the advantages of his invention, and he had believed that he would be able to make these advantages obvious to anyone. Only now he was beginning to see that the struggle between Communism and Capitalism would continue as long as the struggle between Reason and Instinct inside the human soul. That is, probably, forever. The Administrators' Board had to come up with a new plan of action.

The plane momentarily entered a cloud to take additional "raw material". The engines grew in size, became more powerful. The wings swept back readying to pass through the sound barrier. The plane continued climbing. It became cold in the cockpit. Levshov's clothes started to transform from a guard's uniform into something thick and warm, with a

built-in thermal control system. Levshov got warm and fell asleep. He wasn't worried about ground radars - the plane containing no metal was absolutely invisible to them. NanoTech was piloting the plane further and further to the east. Soon, a green carpet of impenetrable Siberian taiga forest was stretching under the plane from horizon to horizon...

Epilogue.

In a couple of months after the above events, a retired secret service general started haunting the corridors of the Russian parliament. He was said to had been forced into an early retirement for disgracefully failing a very secret operation. What kind of operation, nobody knew, because it was too secret. It was also rumored that the general had been so much upset by his failure that his mind became slightly deranged. The General would offer to the members of parliament a leaflet written by himself and reproduced on a copier. The title of the leaflet was "Nanotechnology as a Flunky of the International Communo-Masonic Conspiracy". The leaflet stated that the villainous "masonic communists" and "rootless internationalists" contaminated the population and the water with "germs remotely controlled by radio", with the aim of subverting the last vestiges of the Russian economy and nationhood by gratuitously providing VCRs and other consumer goods via water taps, as well as by inciting people to stop paying taxes and to dodge military conscription. Further in his leaflet the General mentioned that he had personally arrested the ringleader of the gang that had been carrying out the evil plans of the cosmopolite conspirators, but he soon managed to escape.

"Nowadays 'comrade' Levshov changed his tactics." - wrote the General at the end of his leaflet - "If you take a sample from your water tap today and look at it through a microscope, you won't be able to find in it the remotely controlled germs anymore. Most of them have self-destroyed after Levshov's escape. However, I have evidence that Levshov has not recanted his evil designs.

Lately, in Siberian taiga, in the area around Malyi Ulyui mountain range, whole villages started to disappear. To be more exact, the houses remain, all the things inside the houses, even IDs and money remain, but the people are gone. I am absolutely certain that the vicious communist Levshov takes the people away into taiga where he has set up his commune, and feeds people with the water directly form Ulyuika river. The last time he went as far as to brazenly take away a whole district. We have got to put a resolute end to this outrage, before the communist plague in the form of remotely controlled germs has spread all over Russia and ruined it, this time irrevocably.

I propose to drop a nuclear bomb on the Malyi Ulyui mountain range. This is the only way to completely sterilize this focal point of infection with remotely controlled germs. I am perfectly aware that this is a very cruel way of dealing with the situation, and a lot of people will die, but when a limb is infected with gangrene, the only way to

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save the rest of the body is to amputate it."

The members of parliament usually listened to the retired general for a few minutes, then smiled and called the policeman to take the General out of the parliament house because he was not supposed to be there. But on the next day the General would once again find a way to get into the corridors of power and once again tried to hand out his leaflets.

The ideas of the retired general didn't find an echo even in the hearts of the most ardent supporters of the World Conspiracy Theory. "Generally speaking, the General is a well-intentioned old geezer" - they would say - "But he certainly overdid it with that story about VCRs distributed out of the water tap. His ravings discredit our cause, and it would be a good idea if he received some medical treatment".

Then the General suddenly ceased to appear. According to some rumors he now lives in an institution where there are ward attendants with a straitjacket always at hand, just in case the General might want to continue his writings about "masonic communists" and "remotely controlled germs".

The current exact whereabouts of Levshov are unknown. It may well indeed be the case that he has retired to Siberian taiga. He might have realized that one should not let us into the Communism just as we are - jealous, greedy and at a loss about what we are supposed to do with our own lives. We would have fought each other, maimed each other, lost any sense of purpose with all that wealth of gratuitous things around us, and ruined our bodies and souls with free supply of vodka. We need somebody to teach us to live a new kind of life, to guide us. We need some rule, some sort of a state. But not the kind we have seen up till now - all of them based on the same model, the model of a pack of wild animals where the top-dog always receives the best piece of meat and the best female just because he is a top-dog. The main objective of a state based on such a model has always been and will always be to dominate the people, rather than serve and help them.

How to build a state based on the Reason instead of the apish instinct? Nobody knows the answer to this question. And it may well be that Levshov, being a true scientist, tries to find an answer in his Siberian experiment on a relatively small group of people, before presenting NanoTech to the whole of the world.

But this doesn't mean that we, each of us, can stop looking for an answer - may be some of us will be able to find it. Just confining ourselves to saying that capitalism and democracy may be bad, but that's the best the mankind has managed to come up with, won't do. There is always something better than the best, but we just have not found it yet.

The only thing that is now definitely known about Levshov

is that he also has written a book about the World Communist Revolution that all but happened in the summer of 1997. That book presents the events in an entirely different light from the General's writings. A very curious book it is. The title is "The NanoTech Network"...

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The above is a preliminary text of the English translation of a novel that was originally written in Russian. If you are a native English speaker and you have any suggestions as to how this translation could be improved, please don't hesitate to e-mail your comments to lazarevicha@online.ru

The current plans are to publish the final English version of this text before the end of 1998 on the Alexander Lazarevich's home page at http://webcenter.ru/~lazarevicha.