Global World Book

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Email: wein600@gmx.de
ISBN: 978-3-924205-95-9

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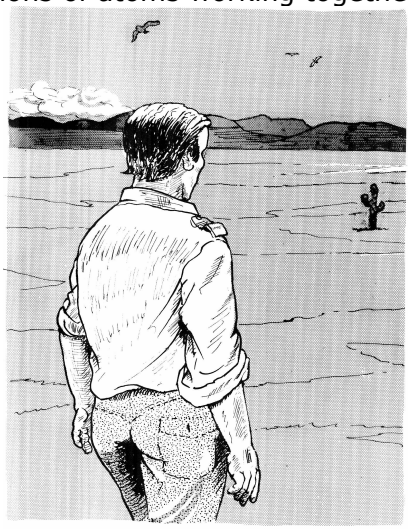
1. From flint to computer chip

It took people a long time to gain insight into the invisible world that stands behind everything that is visible and perceptible to them: stones, earth, plants, animals, water and air. It finally gave them the insight, because everything is based on the organization of trillions of atoms, which determine the properties and behavior of all substances.

The ancestors 10,000 years ago took stones to build the first tools, formed and burned clay for vessels, struck fire from the flint, loosened bronze and later iron from the rock by means of heat and built new and better tools and weapons.

Today's microelectronics have succeeded in storing what computer systems still needed a whole room for on small chips and accommodating them in a pocket computer. Today's technology may seem very small compared to what was previously required in terms of space. Even so, it is still the work of trillions of atoms working together here.



For what is possible in the future with even more powerful technology, today's devices still seem vast.

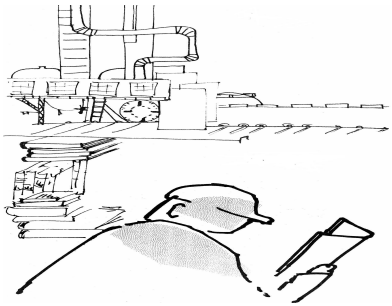
Until now, atoms and molecules were processed and put together en masses, it was a technology of the masses. The coming technology will process atoms and molecules

individually with high precision and purity, let's call it molecular or nanotechnology.
This technology will fundamentally change our lives, from wear and tear to durability, from large to small and invisible, from expensive and complex to free, from sick and defective to healthy.

2.What is man? A grain of sand in the gears of the world system! Where do we come from, where are we going? Why do we live? Can't the sight of the starry sky lead us to resignation? Are we apable of facing infinity?

3.What is a human being? They are born, undergo a process of development, and don't know what drives them or where they are headed. Development occurs in a way that every other living being goes through: development – growth – maturity. What is special about humans is their spiritual and mental development. It seems as if nature uses humans to become aware of itself.

4. Homo sapiens: development of brain function
The brain grew larger, from 500 to 1400 cbcm, compared to gorillas and humans. However, the size of the brain is not the only requirement for intelligence.
Neanderthals were the first specimens of Homo Sapiens in the period 20,000 to 100,000 years ago. CRO-Magnon humans lived in parallel for about 20,000 years.



Little was known about this human history until the mid-19th century. The study of fossils was still in its infancy, the stone tools only made guesswork.
In 1856, larger bone finds were made in the Neander Valley near Düsseldorf. It now became apparent that nature had planned for long periods of time.
There was evolution, the point in time when the first humans stood up and only walked with their feet so that their hands became free.
The mouth was no longer needed only for eating and holding, it could develop sounds and speech. The arms made tools.
God distinguished humans from animals because he intended to do more with them. Intelligence developed with language and tools. The brain could store knowledge and remember.

5.We live in periods. The processes in our body develop in periods. All our actions are subject to this process; the whole world moves and changes in periods.

6.We are born, we develop, we train our minds, we provide functions in society, we work in the production process, we reproduce, we die and dissolve again. Everything is period. Someone will ask what all these statements mean. For him it may not be a new insight. Even better, the faster he will find access to the system.

7.The system conveys fundamental truths that every person can understand and experience in their own life. These truths are not new; let's look again at these basic truths:

8.All processes in the world take place in periods. Each period has its timing, which can be of short or long duration. Each period triggers new periods. These periodic processes create infinity. This means that every end of a period awakens the urge to start again. All changes in the world create space: houses, machines, cars, factories; trees, water, mountains; plants, animals, people; books, thoughts, words. Everything is space created by periodically infinite processes.

9.Every period needs strength to come into being. We need strength to get up in the morning to go to work to tackle our work. Energy keeps all these processes going until they have reached their goal. Force is cause, energy is effect. Technology is the process that determines the construction of houses, the construction of the machines, the work flow of the production process, the origin and development of plants, animals and people, the thoughts and words of language

10.The system has as the basis of general knowledge the periodically infinite space, which is determined by force, energy and technology. The system that can be derived from this basis is a guide to action. It shows the new design of life and the change in the environment.

11.The system is characterized by the fact that it gives life processes a direction. It leads these processes

towards the goal of development. The system operates according to rules. But there are no rigid rules. There is a constant need to make decisions. However, if a decision leads in the wrong direction, the path is interrupted. What is special about the system is that it controls processes and developments and makes errors visible.

12. Machines of the future

What will these machines be like? Technology was used again and again to improve technology. Tools have been replaced by better ones, as computers and programs make better computers.

Protein nano machines are used to build better nano machines. Enzymes show how it is done: They create larger molecules by collecting smaller molecules from their environment and holding them together. Enzymes take everything, DNA, RNA, proteins, fats, hormones, chlorophyll, all of the molecules found in the living world.

Bio engineers will develop new enzymes that assemble new atomic structures, e. g. Carbon atoms are placed on a pot, layer by layer, with a strength 50 times that of aluminum.

But the time will come when more complex nano machines will be built that will change the human body and end diseases like the plague of the Middle Ages.

13.How do we find the way to the system? First, by seeing everything that happens in the world and also ourselves as a periodically infinite space that is

determined by force, energy and technology. We have to consciously lead our life in periods. We must always be ready to begin new periods.

14. Building blocks of life

DNA and RNA, abbreviations for deoxyribonucleid acid and ribonucleid acid. They are used to build proteins, which are huge complex molecules, the basic material of life.

The proteins are involved in thousands of chemical and physical reactions, some are additionally controlled by enzymes and hormones.

They also protect us as anti-bodies in the immune system.

Although there are thousands of proteins, they are all built in the same way, the basic patterns being found in DNA and RNA. Each cell contains this instruction in the core.

The human embryo begins by fertilization. Every sperm cell and egg cell brings its DNA. The embryo develops through cell division, each new cell contains a copy of the DNA from the original cell.

15.We have to be ready to develop forces that give the impetus, we have to be ready to release energy that enables us to endure. In all of our projects, we have to find procedures and methods that enable us to carry them out.

16.How is the transition to a new period realized? It starts with imagining what we want to do. At first it will be an imprecise idea. Therefore we have to deal

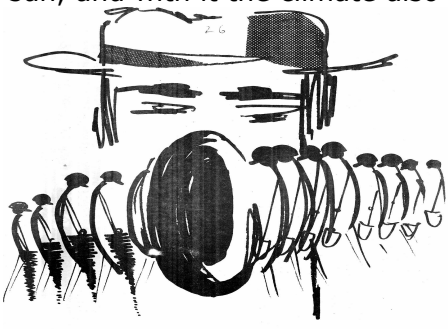
with it for a long time, a few days or weeks, in order to finally find out exactly what we want to do.

17. The geological ages

The earth has a long history, enormous changes have taken place over millions of years. Many plants and animals have emerged and then disappeared again. However, everything happened over long periods of time.

A warm climatic phase came to an end around 40 million years ago. The large reptiles lived during this time, the Antarctic had separated from Australia. Later the world became colder, the large reptiles disappeared, other animals adapted and spread.

The most important changes were probably triggered by astronomical events, the earth changed its position in relation to the sun, and with it the climate also changed

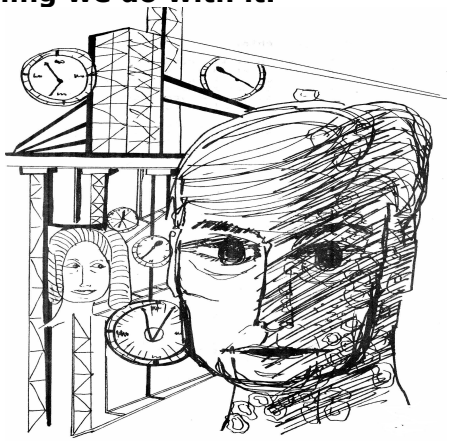


18.Once a clear picture has emerged, we must now deal with the question of whether we can make the idea a reality. We have to check whether we have the necessary skills, whether we will find support from other people. Even this process of testing can take a long time. Did it lead us to the conclusion that we can have the necessary trust in ourselves, then it is important to make the decision.

19.Often a favorable moment is needed to say: "So, now I am ready to realize my ideas." Then we have to find the necessary energy to drive us out of the

previous life cycle. This means that we constantly keep the ideas we have gained in mind. It is important to show those around us that we are serious about our intentions.

20.The more firmly we are convinced, the less hindering influences from our surroundings can dissuade us from the chosen path. This path now requires physical and mental exertion. We need the will to persevere. We will only be able to develop endurance if we constantly keep our ideas awake and align everything we do with it.



21. In the beginning everything is small

Atoms are the smallest particles of matter that take part in chemical reactions. They consist of protons and neutrons in the nucleus, which is surrounded by electrons. The atoms of around 100 different elements differ in the number of building blocks, their atomic weight and properties.

Atoms are invisible and in constant motion, e.g. the cesium atom has a diameter of 0.0000005 mm.

Greek philosophers believed in the existence of atoms, it was not until the 19th century that Dalton brought further evidence and Rutherford showed in an experiment that an atom consists of a nucleus surrounded by negatively charged electrons.

22. The smallest living unit

The cell, smallest unit of life, and independent unit of life. It multiplies through division and forms new cells. All living things are made up of one or more cells; humans are made up of trillions of cells. Viruses, bacteria, only. Protozoa are unicellular.

The membrane encloses and protects the cell, inside there is a gelatinous mass, the cytoplasm, and in the middle the cell nucleus with the genetic material, the DNA.

Cell division causes DNA to duplicate and the nucleus to split up. The process is triggered by meiosis or mitosis.

23.Often we will find that all our efforts are not enough. Then we have to think of a method that can help us further. It can enable us to use our forces better and to strengthen our stamina.

24.If finally it turns out that both all efforts and all methods constantly place greater demands on us without getting us any further, then we have to carry out a fundamental review of our ideas. This temporary withdrawal can give us new impetus to find other means to achieve the goal.

25.We have to constantly check whether the forces employed will help us, whether our methods are correct. We will often have to wait until we find better methods. But as long as we are convinced of the

feasibility of our ideas, nothing will be able to dissuade us from realizing them.

26.When we have finally reached our goal, a path of exertion, mental and physical concentration lies behind us. At the same time, however, this path gives us experiences that we can use in later actions. We must be willing to constantly learn from past events in order to complete new and perhaps more difficult tasks.

27.This system of action creates certain characteristics in people: One becomes flexible, constantly ready to take on new tasks. You learn to concentrate and have endurance. One becomes open to one's fellow men, because one is often dependent on their experience and help.

28.You learn to give in temporarily but still pursue your intentions continuously. You are able to overcome environmental obstacles through patience and perseverance. You learn to assess yourself accurately. You get a free attitude towards life and you will enjoy your life.

22.Some people will now say what am I supposed to do with such a system; it only takes me effort. This system frees us from random events in the world. We design and determine the course of the periodically infinite space. We create new periods and thus new space ourselves.

30. Nano computers
Assemblers will open up new ways for engineers to drastically reduce the size of machines and increase their speed enormously.

With current technology, patterns are created on silicon chips by randomly applying atoms and photons. Everything is flat and unclean.

With the assemblers, circuits become three-dimensional and with a pure atomic structure. These new computers are a thousand times faster in calculating and executing commands and are much smaller.

31. Disassembler
Molecular computers will control molecular assemblers that will trigger the precise arrangement of atoms. Nanocomputers with molecular memory will store data that describe structures.
Assemblers help engineers assemble devices, disassemblers help with analysis, assemblers bring enzymes together and control the processes. Disassemblers capture the structure to make exact copies.

32.If we leave ourselves to the action, then we are at the mercy of chance. Certainly, the world goes on without our intervention. If we followed the periodic processes of this world, then we would succumb to the often slow processes, all undesirable developments would have to go through to the end. Because nature

has no such system for the development of periodically infinite space.

33.If the path leads in the wrong direction, there is usually no end, unless it is total destruction, think of the great hurricanes of nature. They are periods of nature that cause destruction; they only come to an end when their power is exhausted. The system here always leads to an end that does not consist in destruction.

34. Carbon and half-life.
Carbon-14 is only found in living matter that has had an exchange with the atmosphere, e.g. wood, grain, leather, bones. Timing above carbon-14 does not work for minerals. The half-life can be determined for dead material with 5730 years, in which half has decayed. Correspondingly, further periods of time can be determined.

35.Whoever lives in the consciousness of the system finds the fulfillment of his life in the formation of the periodically infinite space. This process can take place in any environment: in the apartment, on the street, in the car, on the road, at work, in the office, in the factory, while walking, studying, physical and mental development. The system is all-encompassing.

36.The space exists in periods. The universe, the earth, all of nature are the result of periods of development. One feels lost by thinking about the development of the world, unimaginable what must have happened there, in time periods that no one can imagine. It was five billion years ago that it began, when the sun and planets emerged from a sea of clouds of gas and dust. Spinning clouds formed spinning disks that grew thicker and denser. This is how the planets emerged, including the earth, a pile of stardust, cold, the temperature a little above absolute zero in space.

37. Attraction

The many forces of nature can be traced back to four, of which the most famous is attraction. According to Newton, it is the only universal force that is active between all bodies. The origin of the force is the mass of the body, a force that grows with the mass.

It also works over great distances in the cosmic realm. However, the absolute force is very small. It does not play a direct role in the atomic domain.

38.Another 500 million years later, the sun has developed into a radiant body in which hydrogen atoms collide and atomic reactions take place. The surrounding planets are bombarded with protons, electrons and photons from the sun. The earth contracts, inside it a rising radioactive heat development takes place, which turns it into a glowing ball. In the following period of one billion years, the once white-hot earth cools down steadily. A liquid core of the earth

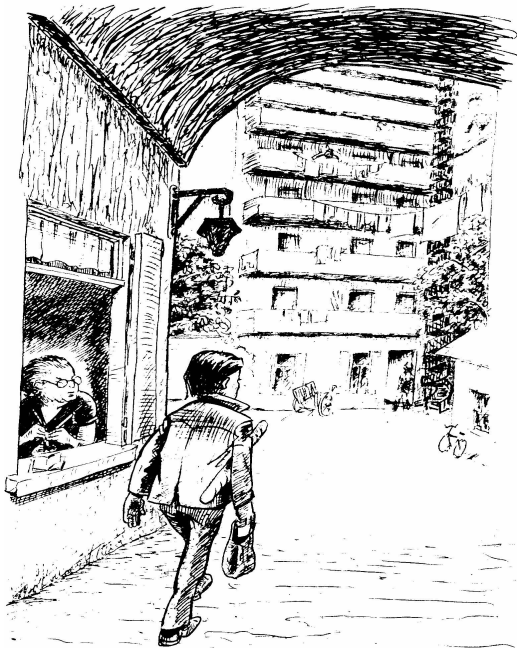
remains behind, which is out of molten iron and nickel and surrounds the earth with a magnetic field.

39.A solid outer coat of basalt rock initiates the development of the earth's surface, volcanic activities shape the earth, change the surface, create new mountains, water vapor from volcanoes blown out, fills basins and rivulets with water, ammonia, methane and carbon dioxide get out from the inside of the earth and fill the atmosphere, in which the oxygen is later formed from the water vapor for the origin of life that a billion years ago in water the primeval ocean begins.

28.If the people get lonely, they try to cope with themselves, relying on their own strength. There were times when the community was everything, anyone who separated himself was watched with suspicion, mostly he was a troublemaker or a peculiar type. "All for one, one for all" was the motto for those who were accepted into the community. A comforting feeling when others were there who took care of everything.

29."I scold and scream and still remain calm. When other people give me angry looks, I smile. Laughing faces around me make me serious. I listen faithfully to the orders around me and soon begin to forget them.
If others say yes, then I say maybe. I get up when others stay

seated. If my neighbor is treated badly, scolded, shunned, then I go to him and talk to him.



Fear is alien to me. What should I be afraid of? From hunger, from illness? From the destruction, from the imprisonment? From the oppression, from the coercion? It's all behind me. Do you really think it can get worse than it already was?

30.Should I be scared of losing some of what I surround myself with every day? What have those done who had to leave their property, their house, their apartment, their fields, their land overnight? What else should they have been afraid of? And should I fear for my bottle of beer, for my beautiful car, for my money, for my wealth? What should they have said who were sitting in the dark cellars when the houses collapsed above them and covered everything? They were dug up again and lived on.

44. Matter
What is matter, does it occupy a space, does it have mass and inertia, does it have shape and volume. Molecules in solid bodies hold fixed positions, in liquids the molecules are in motion. The attractive forces are reduced by heat, the molecules start moving faster and faster and finally take on a gaseous state. All of this determines the state of matter.

47. Life
It is the ability to grow, to reproduce, to respond to light, heat and sound. Life on earth began 4 billion years ago, from single cells to complex multi cellular cells.
Life originated in the oceans; the original atmosphere consisted of carbon dioxide, nitrogen and water. In the laboratory, simple amino acids were formed when electrical charges were sent through this primordial soup. The cells were formed from simple molecules.
Life begins with fertilization, embryo development, adolescence, adulthood and procreation until finally death occurs.

54. Electrical energy
A copper wire is made up of copper atoms. Each atom has 29 electrons orbiting the nucleus, which has 29 protons. A proton holds an electron in its orbit. Here protons and electrons are in equilibrium.
If additional electrons are sent through the wire, the equilibrium is disturbed by sending electrons to the next atom. Energy comes in different forms.
Mechanical energy where whole packets of molecules are in motion.
Thermal energy where molecules are set in motion.
Chemical energy where molecules and atoms are separated and reunited. Electrical energy where electrons move in a stream.

We register particles that have no size and no mass, that only exist when they are moving at the speed of light, and disappear when they stop. They can exist in periods of

seconds or light years. These particles are called photons, as a result of processes in the atom. When electrons orbiting around the atom change their orbits and lose energy, photons are emitted.

55.I always think about it: I can't learn more than what has already happened. If I want to live as a person, then I have to learn to survive. I am ready to fight and still finish the fight quickly. I want to win and soon I will mingle with the audience. I have already won many victories and have suffered many defeats. What else do i want?

56. Replicators

History shows how life is constantly evolving, changing and duplicating. Today's technology has created new machines which, however, cannot simply be reproduced.

A replicator is a unit that can automatically copy itself. Just as genes use proteins to replicate, so machines use the human brain and hands to do so. A replication could be realized with nano computers that control assembler and disassembler.

The human brain, using language, writing, and drawing, can be used to replicate mental models of what has been used in history to pass on experience and skills.

58. Origins

Humans seem to differ from animals in so many traits, in language, creativity, artistic ability, mathematics, writing and culture. They are intelligent.
Nevertheless, paleontology shows that humans are descended from animals.
Homo sapiens is a branch of the monkey family.
The differences to the animals come from our brain and the upright gait, which released two hands with which the ideas of the brain can be implemented.

61. Natural choice

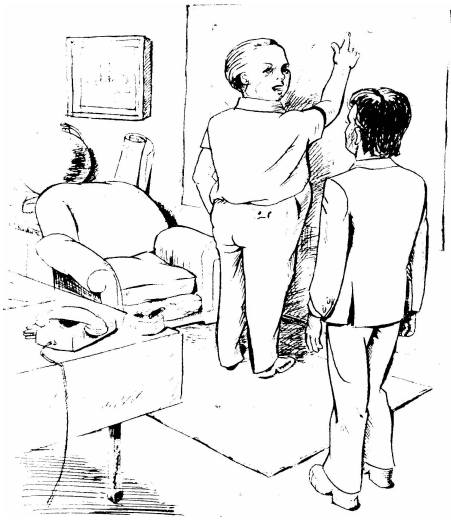
A process in which parts of a species develop genetically improved properties in order to be able to better survive and reproduce in their environment.
The process is slow, more random, through mutation or combination of traits in reproduction. It is the trigger of evolution, where the organisms are favored that adapt their properties better to the environment and prove to be more capable of living.

62.I work and exert myself and still don't increase my movements. I want to be alone and still look for company.
I talk and talk and still listen to what others say. When others ask me to do something, I never say no. You can always do something.
If someone orders me, then I am against the orders inside. What damage have orders already done?

63. Variables, values and factors

The results are obtained when the variables are replaced with values. For example, $x^2 + y^2$ have the result 25 if $x = 3$ and $y = 4$ are set.
Variables play an important role, they can be replaced by various values, in contrast to constants, which have a fixed value. Variables can be dependent and independent.

The function of x, written y = f (x), contains the independent x and the dependent y, it applies:
$y = 4x^3 + 2$
Factors can still change the variables, as in y = kx or as a fixed value y = 2x.

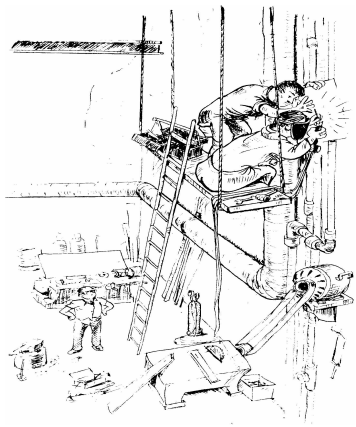


66.Science
For a long time philosophers thought that they could fathom the mysteries just by looking at the world.
Galileo and Newton made experiments and observations in order to explore the movements of the bodies. They ushered in a new era of scientific progress.
The ideas in the physical sciences arose under some basic rules.
Scientists only accepted ideas that could be proven by tests, otherwise further tests were carried out to find results that would allow reliable statements about the behavior of the bodies.

67. Progress
Progress for mankind means improving material needs, extending life expectancy, improving health, and generally

improving living standards. Progress also means further development of human intelligence.
Of course, there can be setbacks, as the history of the earth shows. Meteorite strikes have caused downturns in development.
The dinosaurs were probably destroyed by such a catastrophe 70 million years ago.
It took millions of years to bring a new advance to earth.
There has not always been an advance in intelligence. Greek philosophers developed mathematics and astronomy as early as the 3rd century, but it wasn't until the 17th century that Copernicus continued the development.

68.By Orders were released bombs and atomized cities. They sunk ships and buried their crew at the bottom of the sea. By Orders people have been arrested and locked up. They had others shot. Commands tormented and tormented and they pushed, forced, kicked.



69. Movement

According to Newton there are the laws of motion:
A body at rest remains at rest as long as no other forces act on it; a moving body keeps moving unless it is prevented from doing so by external influences.

Gravitation acts between two bodies and decreases with distance.
Einstein's theory of relativity led to a new understanding of these laws, but they still apply to the orbits of the planets and the spacecraft that fly to the planets.

70.If I carry out orders after all this, then I am ready to give myself orders if necessary. Even if others give orders and are responsible, whether I will live or die depends on the execution of the orders.

74. Lenses and levers

In optics, a piece of glass can influence the light, a convex lens brings the light rays together, a concave lens brings the light apart. Lenses are important for glasses, telescopes, cameras and all optical instruments.
The light is deflected by the lenses, which can be offset by using multiple lenses.

Just as the lenses can amplify the light, so there are the laws of levers in mechanics that can amplify the force.
Heavy loads can be lifted with the lever and the forces acting can be multiplied.

78. Enzymes

An organic catalyst that supports certain chemical reactions without being consumed in this process itself.

The greatest success of enzymes is that they enable life that constantly requires chemical processes. Thousands of such reactions take place in complex organisms, large molecules are broken down into smaller, small molecules form larger units, e.g. Body Parts. All of this is done by enzymes. There are thousands of them, each responsible for specific reactions.

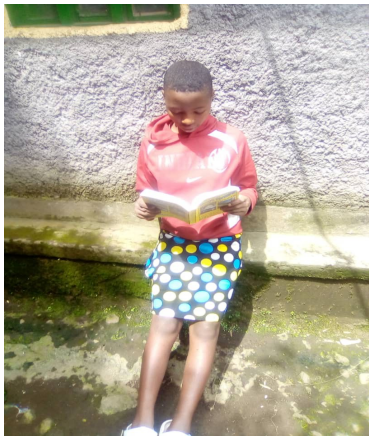
79.I answer everything I am asked and I also tell everything after I am not asked.
I raise an objection, sense danger, am against it and forgot about it the next day. I neither bow to the strong, nor do I look exalted above the weak; 'Cause I'm neither strong nor weak I look up into the air and watch the wide space, but I can still feel the ground beneath my feet. I sit in front of machines, press levers and switches and think. When I get books, I read what makes the strong weak and the weak strong.

81. Hydrogen
Hydrogen, colorless, odorless, a gas, not metallic, symbol H, atom no. 1 is the lightest element that occurs on earth in connection with oxygen as water.

93% of the atoms in the universe are hydrogen, so it is part of the stars, including the sun, whose heat and light are generated by nuclear processes, whereby hydrogen is converted into helium.
The hydrogen solidifies under high pressure, otherwise it is used for welding because of its high temperatures. Combustion with oxygen creates water during combustion.

84. Quantities
A number of elements that are combined in a group must meet certain properties.

The set of all integers (positive and negative) has the following properties in common with regard to addition:
· The sum of several numbers is always the same regardless of the sequence
· The addition always results in whole numbers
· The empty element 0 has no effect
Every whole number has an inverse (e.g. +7, -7)



90 Transgenes
Genetic engineering, a technique in which part of a DNA is taken from one cell and combined with the DNA of another cell. The new organism now contains transgenes.

Genes contain the genetic material that determines what a living being is, how it develops and functions, and what its offspring are like. The new technology changes both the organism and the offspring.
By 1988 hundreds of such genes had emerged, e.g. produce insulin or vaccines against diseases.

The first attempts were made to use genetically modified cells in humans.
Modified bacteria can be used to insert new types of genes into plants to improve their performance.
Regulations are designed to make things safer. Even if no serious problems have arisen, ethical concerns remain.

92. Chips
Basic material silicon, onto which electronic conductors are pressed. Most chips are not much larger than an inch square. The electronic structures are pressed on, created using photographic processes. The original is a large diagram that is reduced using a lens and applied to the chip.

98 Radioactivity
The spontaneous decay of atomic nuclei combined with the release of rays and energy. Radioactivity has been around since the beginning of the universe.

Uranium and thorium are heavy elements that occur in nature; when they decay, alpha, beta and gamma rays are produced. Uranium-238 emits alpha particles when it breaks down into thorium-234, has a half-life of 4.5 billion years.

105. Assembler
Self-copying assemblers require no labor to manufacture once they are built. The whole process from making molecules to building skyscrapers could be done without labor costs.
Assembler systems will be able to produce everything, above all they can duplicate themselves several times a day, only

the demand and the available material determine the amount.

Since molecular machines arrange atoms as needed, little material is required, most structures can be made with common materials such as hydrogen, carbon, nitrogen, oxygen, aluminum, silicon. They are light and form strong bonds, and air and waste contain enough of these substances.
Assemblers, like plants, can convert solar energy; no people are needed for production, programs take care of production.

106. Purity
From the beginning one has to understand that all appearances are ephemeral and pass away. Empty space is free from any content and therefore cannot be destroyed.
Your mind unites the properties of sight, hearing, taste, smell and touch. These form consciousness.
Individually they are pure, but when you mix them it is like water mixed with dust and sand, they become impure.

109. Robot
A machine controlled by the computer that can move and do work, and is mainly used in industry, e.g. to assemble electronic components or in space or in the deep sea, where it becomes dangerous for humans.
With built-in cameras and sensors, the robots can also react to events and make decisions.

111. Metal
About 75% of the 109 elements are metals. They form alloys with one another, bases and acids. Most of them occur in nature in connection with others, some also in their pure form, human ages are named after them: Copper, Bronze and Iron Ages.
Gold and silver are precious metals, iron, copper and zinc are heavy metals, aluminum and magnesium are light metals. Technetium, which is corrosion-resistant, is produced in nuclear reactors.

112. Repair cells
With molecular technology one will have the exact description of the cells and be able to build biological machines that can control and repair cells.
They are comparable in size to bacteria or viruses, but much more complex. They can penetrate tissues and cells, examine the contents, detect defects in enzymes or in the DNA and make corrections.
Complex machines contain nano computers for control, which are so small that you cannot see them, yet they contain more information than the DNA of the cell.

119.I go to sleep and calmly wait for the next day. Why get excited, why tremble; why have concerns? Back then, trembling, they pressed their faces to the ground, in the ice, in the mud, in the dark apartment, in the fire of the burning street. What should I still tremble?
I have parties and I am exuberant. But I am already thinking of the next day.

120 Healing
The simple application of the nanomachines will cause selective destruction. To fight certain diseases, one has to destroy the dangerous replicators, such as bacteria, cancer cells, viruses or worms.

This can clear arteries for blood circulation as well as damaged molecules. The repair machine will first identify

proteins and amino acids and look up the correct structure in a database in order to correct the errors.

123. Proteins

The building blocks of proteins are amino acids, of which there are 21 types. The way they are connected determines what type of protein is produced.

The genetic code or DNA determines the exact order in which the amino acids are linked.

The information to produce proteins is transmitted from the nucleus to the cytoplasm through the RNA.

128. Age

If the cells can be repaired with molecular machines, then an extension of life will be possible.

Slow healing of wounds, wrinkled skin and weak bones, poor memory are the result of a broken molecular machinery. When the cells are restored, the body regains its youthful structure.

131. Disorder

The physicist Claudius defines the law of thermodynamics that disorder increases in a closed system and that some energy is always given off in heat until an absolute temperature is reached. He formulates the concept of entropy.

135 Laws
They are the great designs of the universe, features determined from context.
Theoretically, organisms are characteristics of an ecosystem, societies are characteristics of the interaction of human bodies and spirits.
Our laws of nature are not ultimate truths, but they capture important features of how the universe works.

137. Population
The molecular machines will prolong life and lead to an increase in the population. But nanotechnology will also help protect the earth, conserve resources, and above all long-lasting products can be manufactured. With biological machines, humans can also produce their food independently of nature; they no longer need to kill animals to get meat. Nanotechnology will also create better ways to spread life from Earth to space.

138.I am learning foreign languages and still do not forget my own language. When others throw foreign words around, I use words from my own language.
I'm sitting in my beautiful car and still don't think it's beautiful. Everything beautiful can also be ugly. I party with friends, sing and drink, but I still don't get drunk. I turn to others for help when I can't cope myself and am still willing to try it myself if necessary.

146 Amino Acids
Organic molecules mainly made up of carbon, oxygen, hydrogen and nitrogen. Proteins are made up of several amino acids.
All proteins consist of a maximum of 20 different amino acids. Plants can make all of these they need using solar energy and the minerals from the soil.

147. Amoeba
One of the simplest living things, consisting of one cell. The body consists of colorless protoplasm. Amoeba live in water and take in organic components as food. They multiply through cell division.

148. Bacteria
Microscopic protozoa that multiply by dividing every 20 minutes, making about 20 million copies a day. Some are parasites and cause disease, others can spoil food. But many are also useful, break down cellulose or help ferment cheese and yoghurt.

150 Alpha Particles
Positively charged particles, charged with high energy, are emitted from the core of radioactive atoms. They consist of

protons and neutrons, have a short range due to their large mass and can be stopped by a sheet of paper.

151. Alternating current
A current that flows once in this direction and then in the other. This electricity is normally generated in the power plant. The voltage can be better increased or decreased by a transformer. Railways, factories and households use alternating current

152.My life takes place entirely in periodically infinite space, which is determined by force, energy and technology. I often change my life, do something, learn something, start a new project, I look for new periods, and yet I don't forget the past. I expect an end and yet I know that it will continue. I close my eyes and listen all the more carefully to what is being said around me. Silence and renunciation is often advisable. But just then you have to watch the world closely. When the time to speak comes back, you know what to say.

153. Electronic structure
The atom as the smallest unit that can react chemically and cannot be further chemically broken down. It consists of neutrons and protons in the nucleus, surrounded by electrons. The atoms of the various elements differ in their atomic weight and chemical behavior. Atoms are in constant motion.

154. Coordinates
The horizontal x-axis and the crossing vertical y-axis form the coordinate system. A point on the surface can be defined by x and y coordinates.
Lines are described as equations, $y = 2x + 1$ gives a straight line.

159. Pattern
Atoms that form our body are in constant exchange, our body is constantly being re-formed in the course of life. The human body always contains atoms that were once part of other living beings. But all atoms of an element are identical, so that no difference can be determined.
The pattern of a body is retained with all the changes, at most, unless there are defects or damage that is repaired.

160.I hear the noise and still don't scream. When others are quiet, I raise my voice.
I get strength when others become weak and despair. I make an effort and still don't use my strength. If you use all your strength, you will quickly use it up.
I'm hungry, but I eat slowly and calmly. I laugh when others are sad. Laughter helps over a lot, it makes things easier.

161.I live the system of periodically infinite space, which is determined by force, energy and technology. And I believe in the power of technology and still have no hesitation in it.
I help set up technical organizations and don't follow the many rules. I admire the machines and don't take them seriously.

162.I operate machines and let them do the work for me. Nevertheless, I would like to achieve something myself.

163.Blood
Circulates in arteries and veins, brings oxygen and food into the body's cells and brings waste with it, such as carbon dioxide.
The normal adult has 5.5 liters of blood, which contains red and white blood cells. Blood cells are constantly renewing themselves.

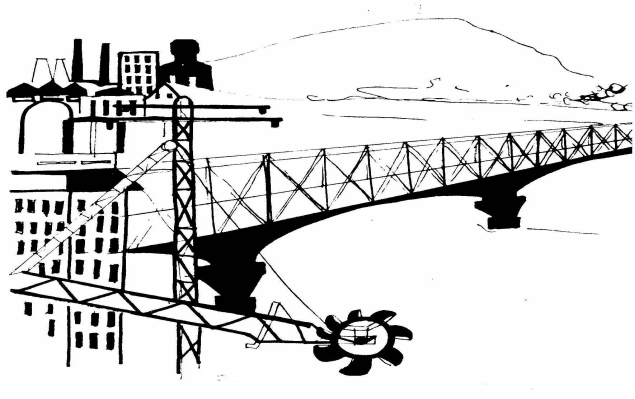
166. Earth
It is the third planet from the sun, 70% is covered by water. In the solid core it consists of iron and nickel surrounded by a molten layer, on the outside a layer of rock and on the surface a crust.
The mantle consists of 12 movable plates, some of which carry the continents. The plates are in a constant and slow motion.

167. Reproduction
Reproduction that does not require two partners has great advantages since there is no fertilization by a male or by pollen. This reproduction by division can lead to rapid multiplication.
The disadvantage is that only identical beings, clones, are created, there are no variations.

168 Lines
Artificial lines to define a position on the globe, latitudes, parallel to the equator and longitudes parallel to the zero meridian through Greenwich. When the chronometer was not yet invented, the length could not be determined. Because of this, there was no ocean crossing.

173.CPU
Central Processing Unit, the most important part of a computer that executes programs. The CPU consists of the logical unit, the control unit and a memory unit. All units have registers, memory locations to carry out the tasks.

174. Parameters
A variable factor. Variables are often used in programs. If e.g. you have written a routine to draw a rectangle, general parameters are used for length, height and line width. Any rectangle can be created by assigning different values to the parameters.



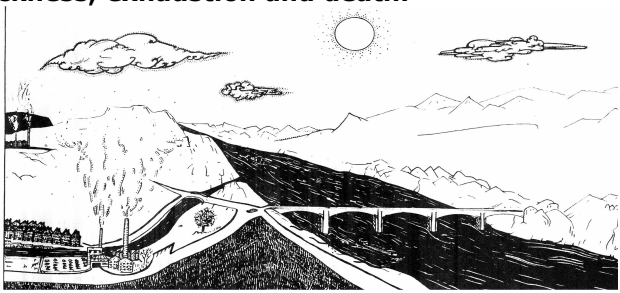
175. Quantities
A collection of certain elements that are different but are created according to certain rules. Afterwards it can be decided whether an element belongs to this set.
E.g. L stands for the set of all letters of the alphabet L, the symbol e stands for: is part of, then p e L means that p belongs to the set L.

176.When there is calm, I create unrest. When there is grief, I am kind. I do everything, dare everything, say everything. I am involved in politics, I carry secrets with me, but I still say what I think because what should happen to me. So many times speeches have been forbidden, words broken off

and written material destroyed. That's why I will talk and not let myself be stopped. "

177.There was a beginning that opened the door to the world we live in today. It was the voyages of discovery that began about 500 years ago. The continent of Europe broke its geographical borders. A new period began. Humans developed the strength to search for new seas, for new lands and still new people. And they also had the energy to continue on their way in times of discouragement and fear. They sailed the sea on their ships for weeks. They didn't know if they would ever get to land again. But there was no turning back. The goal had grabbed them.

178.In the period that followed, each new limit was soon crossed again. It was a never ending process. For the first time people lived in the feeling of infinity. Because no discovery, no limit, no goal could satisfy them. The end was often sickness, exhaustion and death.



179.This departure into constantly new periods of life has expanded the European field of vision and created a new space. What happened at the beginning when discovering new lands was repeated later when exploring nature, fighting hunger and disease, changing society, building industry and inventing new machines. It was the constant departure into a new period of life.

180. Oil

A green-brown flammable liquid that has accumulated inside the earth after the decomposition of organic substances. New technologies have been developed to get the petroleum out

of the earth.any products are made from it, such as gasoline, diesel, wax, plastics, medicines.

181.Dynamo

The electric dynamo for the mass production of electricity was developed by Werner von Siemens in 1866.

185. Pangea

Pangea once united all current continents about 250 million years ago, the rest of the earth was covered by the Panthalassa Ocean. Two land masses emerged: Laurasia in the north and Gondwanaland in the south. From this emerged today's continents, which have shifted to their current position.

186. Heat rays

Heat is given off by bodies such as the sun, of which only a small part reaches the earth. The atmosphere still absorbs a part. The radiation is strongest at the equator.

The earth also gives off heat, also due to the climatic differences between the continents and the oceans.

188. Computer

Several stages can be seen in development.

1940-50 as the first generation, from 1960 use of transistors and printed circuits, then the use of microprocessors up to parallel processes. In addition, the programming languages

have continued to develop in order to solve the most complicated tasks today.

192. Electronics
Science that deals with the creation of electrons and their manipulation. The first electronic device was the vacuum tube, through which an electron beam was passed that could be deflected.
Other developments include radio, television, radar and computers.

193. Code
Instructions for the computer's CPU (Central Processing Unit), which understands and can execute. Machine code is represented in the binary system, which is why higher-level languages were developed for programming, where a compiler later converts it into the corresponding code.
As an intermediate stage there is also the assembly languages, where an assembler program carries out the implementation.

194. Microcomputers
Developed as an individual computer for personal use. In the network, however, these can be connected in order to work together or to work with larger systems. In 1975 the Altair 8800 came out as the first micro-computer.

195. OOP
Object Oriented Programming, programming method based on objects. The data is linked to the procedures that work with it. A circle on the screen can be seen as an object, with data such as the center point and radius, as well as procedures to create, modify, or remove the circle.

196.OCR
Optical Character Recognition, optical text recognition for the computer. First a digital image is generated by a scanner, then the text is analyzed by a text recognition software and made available in a word processor for further processing.

197 Pixels
A point on the computer screen. All images are made up of a collection of pixels, with the density determining the level of resolution. The number of bits with which a pixel is represented determines the number of colors. 24 bit results in high quality.

198. Cycle
Sequence of repeated processes when running a program. The central unit of the computer constantly executes instructions, fetches program instructions from the memory, as well as required data, changes the data and stores the results before further instructions are executed.

199. Program
Set of instructions that control what is going on on the computer. There are application programs that carry out user-related work and system programs that control the internal processes of the computer. Programs are written in special languages, each of which is converted into machine code before it can be executed.

201 System
System analysis in order to transfer business processes to a computer, the existing business processes have to be brought into a system in order to create programs. Forms are developed to record the data, as well as input masks on the screen and lists for the results.

202. Exam
Procedure to check input data, however it cannot be guaranteed that only valid data will be received. Formal checks determine that only valid characters such as letters or numbers are used; the length of the input can be checked, e.g. a 6-character field must be checked for this. Control sums can be included in the check or a check digit such as with the ISBN numbers.

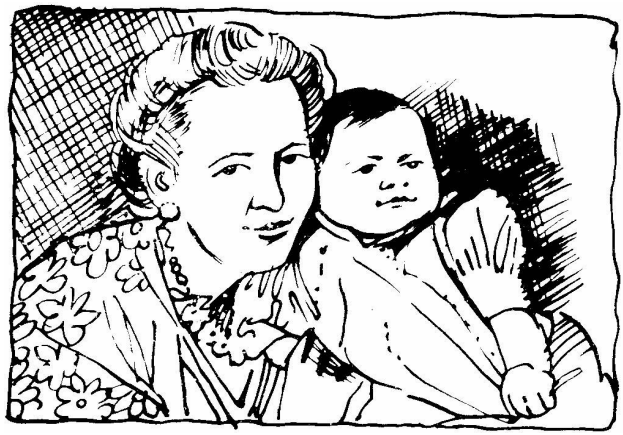
203. Variable
Can have different values. Variables play an important role in computer programming because they can represent different data values. A global variable can be used by all program instructions, a local variable only by the respective subroutine.

204.The exploration of unknown continents and their inhabitants had confronted Europe with new knowledge. One had got to know other people and different views of life. Although one had initially considered one's own outlook on life to be superior, later the great reflection on one's own point of view began. The period of comprehensive criticism of the social order in Europe and the development of new ideas began. It was a spiritual awakening that grasped all of human life.

205.This process took place in France. A tremendous force drove the mind to jump over previous limits and search for new horizons. The world became one great field that had to be plowed up in order to bring all knowledge to light. The mind no longer accepted boundaries. It assumed that with

the help of thinking it could grasp all processes in the world. Man himself and the society in which he had lived for thousands of years now became the object of the inquiring mind.

206.In the past people had been taught again and again that there had to be absolute orders, that there had to be rulers and subjects, that there had to be rich and poor, and that there had to be education and ignorance. But in nature there are no absolute orders and conditions. Everything is movement and change. The person himself, his body and his mind are in constant movement and change. Absolute orders in society were directed against nature.



207. Threat

Living organisms cannot produce everything, they are set on a system with DNA and RNA and ribosomes. In the future there will be life-like machines based on nanocomputers and assembler.

Assembler based replicators will be able to mimic what life can do and more.

Plants with artificial leaves could outperform existing plants, and powerful bacteria could replace existing ones. They could multiply like pollen and cover the biosphere like a cloud of dust if no precautions are taken.

214. X-ray
In 1895 the German physicist Wilhelm Conrad Roentgen discovered X-rays, now known as Roentgen rays.

215. Cathode
In 1895 the French physicist Jean-Baptiste Perrin discovered that cathode rays are not waves, but consist of negatively charged particles.

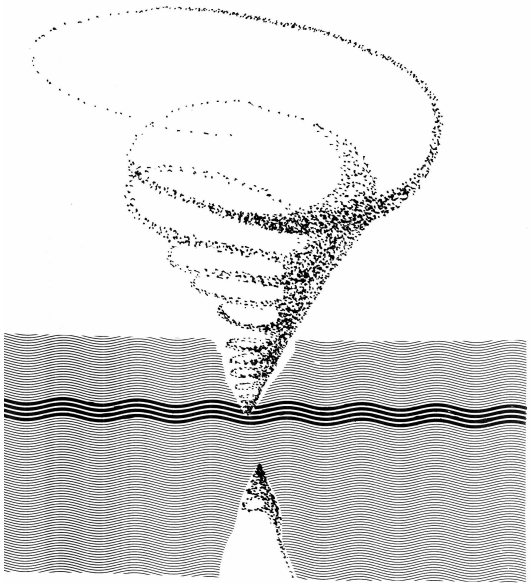
216. Mass
The Dutch physicist Hendrik Anton Lorentz found in 1895 that mass increases with speed and increases to infinity as it approaches the speed of light.

217.From then on the fight against political inequality, against oppression and exploitation began. It was a fight that was first triggered by the French Revolution and later spread all over the world. Slaves demanded their freedom, oppressed classes of society demanded equality, the spirit demanded its development, the dispossessed and the poor demanded their share in the wealth of society. Constant unrest spread across the world. And this restlessness generated the energy that subsequently kept the process of change going.

218.The preoccupation with human coexistence led to the question of the material conditions of life. Principles such as freedom, equality, and fraternity could give the spirit new impetus, but they could not satisfy hunger. Because the

human body needed food in order to be able to carry out movements and changes. This food had to be produced, worked for, or wrested from the ground. The change in material life began. This period found its greatest expression in England. It was a departure that took place around the same time as the departure in France.

219.Thinking in Europe was increasingly concerned with nature. Physics, chemistry, biology entered a new period. The experiment, the search for laws in nature, determined this development. Processes have been developed in order to be able to observe and understand what happens in nature. This refinement of observation techniques was the basis for the dawn of the natural sciences.

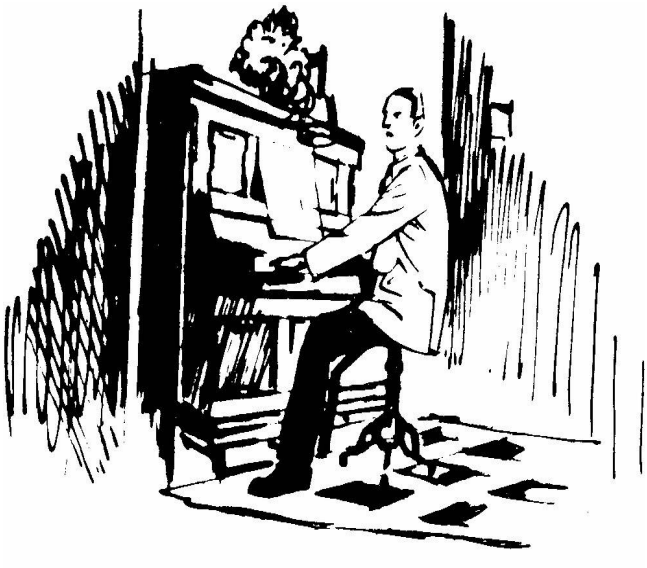


222. Defense

Viruses are molecular machines that attack cells. Cells use molecular machines such as enzymes or anti-bodies to defend themselves against it.
Likewise, human societies have a police force for defense or armies against attackers.

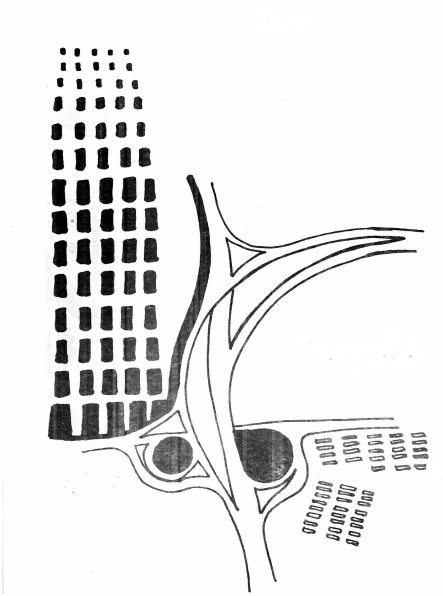
Molecular machines have successfully defended themselves against molecular replicators for millions of years.
Because of this, it will also be possible to use nanomachines against the reproduction of harmful nanomachines.

223.Information
We have to deal with a lot of information. Printed publications are difficult to understand and organize. Books contain our cultural values.
Today, electronic media are opening up new ways of organizing and making information available much more efficiently.



224. Hypertext
It helps to connect texts and make inquiries more efficient.
Comments can be entered and found easily on a hypertext system. Questions can be posted so that others can post their answer. This creates a network of experience and knowledge.

225. Progress
Technological progress can make life better and longer. Nanotechnology will dominate everyday life, e.g. products that clean themselves, other systems can produce fresh food, e.g. meat, vegetables, cereal products. Cells can develop and multiply in a special environment in plants and animals.
No more animals have to be killed to get meat.
Nanotechnology will open up new avenues. Biological systems will be able to produce food, health protection, shelter and everything that humans need. This does not require large bureaucracies or large factories.



226. Focus
It's a point in or near an object where all of the weight appears to be coming from. A symmetrical object like a cube has its center of gravity in its physical center.

228. Colors
Visible white light contains different wavelengths with colors. From short to long waves, the range is 400-700 nanometers.

White light is partially absorbed on an illuminated surface, depending on the molecular structure of the material.
A red surface absorbs light from the blue end of the spectrum, but reflects light from the red spectrum.

229.Biology researched life, divided animals and plants into systems, into classes. This made the relationships visible and ultimately also the development from the cell to the complex body of a mammal. Metabolism, growth and reproduction were found to be common characteristics in all living things. Every plant, every animal and also humans consume food. The metabolism takes place in the body. New substances are built up from the food ingested, which the body needs to generate the energy it needs for movement and growth. Every living being only lives a certain period. The increase results in the beginning of new periods of life.

230.Life is infinity. It is realized in periods and creates space. This space is represented in the trunk of a tree, in a fly floating through the air, or in the highly developed human organism.

231.Chemistry led the knowledge to the approximately 100 elements that are the basic materials of the world. The space of our environment is built up from them. But these elements are made up of basic building blocks - the atoms - and these atoms themselves consist of elementary particles with different properties.

232.The combination of the elementary particles determines the properties of the atom and thus also the properties of the respective element. The combination of the various elements determines the properties of the compound and thus the substance. Every atom, every substance represents a period in space. If substances break down into their elements, new combinations and thus new substances arise.

233.When atoms disintegrate, the elementary particles create new atoms. Physics has given measurement a special meaning. Everything is measured, the length of a

road, the weight of a load, the pressure of the air, the temperature of the water, the speed of a car. By measuring, the forces and movements of nature could be related to each other. The result of many experiments or events in nature can be calculated.

234.The technical breakthrough began in various European countries. The aim was to apply the acquired knowledge of the forces and laws of nature. The development of industrial production began. Machines did a lot of work for people. Natural forces such as steam, electricity and heat were brought into a technical system in which their effects could be kept under control. The engine drove wheels and carried people and goods. It drove ships and made them cross the seas faster than ever.

235.Large factories arose in which people were organized into a fixed system of production. They operated machines that automatically woven fabrics or pressed a piece of red-hot iron into a new shape. There were the same movements on the machine every day. But the real work was done automatically. It was the period of industrial development.

236.Machine manufacturing techniques made it possible to produce larger quantities than ever before. Goods that were previously only available to a small group of people could now be produced in large quantities and at low prices. With the correct distribution of the goods produced, equality in the material field had become possible. The life and environment of the people in Europe began to change. Man became more agile. The railroad, and later the car and plane, made it possible to cover the distances quickly and easily.

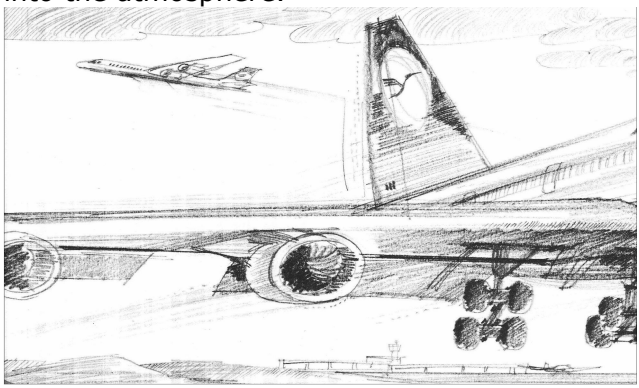
237. Death

The end of all life functions, so that molecules and living structures dissolve.

Living organisms generate the energy necessary to maintain life processes, especially for cell renewal. At death this energy is no longer available, so that the dissolution becomes inevitable.

238. Carbon

Carbon goes into the atmosphere when living things breathe, plants take up the carbon again through photosynthesis and release oxygen into the atmosphere. Today, fossil fuel burning has disrupted this cycle by releasing too much carbon into the atmosphere.



240. Chromosomes

Structure in the cell nucleus that contains the genes. Each chromosome consists of a long thread called DNA.

Higher organisms have two copies of each chromosome, they are diploid, others have only one, they are haploid.

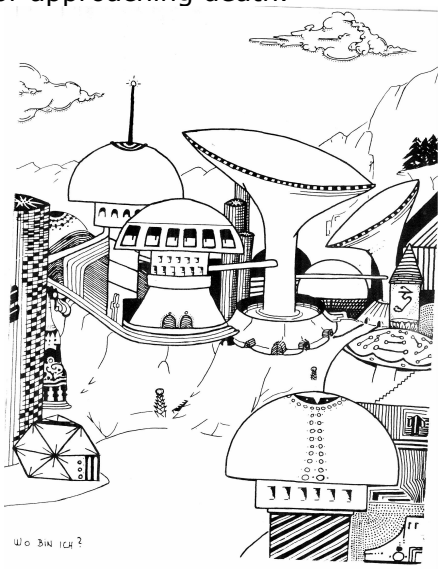
241. Development

A process where a cell becomes a complex multi-cellular organism with limbs and with functions such as breathing. Aside from sex cells, all cells in the body share the same genetic code. The organs into which a cell develops depends on which genes trigger the development.

242. Food

The most important components are proteins, carbohydrates, fats, vitamins, minerals and water. Different living beings need the substances in different proportions.

The food requirements of living things depend on their living situation, whether they are growing, reproducing, being highly active, or approaching death.



243. Dissemination

Molecules move from a region of high concentration to one of poor distribution until an even concentration is achieved. In biological systems, diffusion plays an important role in the

transport of molecules from food, gases from respiration. In this way, the entry and exit of molecules into the cells is controlled.

244 Digestion
Food is broken down through physical and chemical processes from ingestion in the mouth to the stomach. In the intestine, the substances are absorbed or passed on if they are not used.

245. Illness
Any situation that changes the normal state of the organism and affects the functioning of the organs. Mostly it is certain symptoms that characterize an illness. Diseases can be congenital or caused by infection.

246.But this period of development was a period of hard work. The construction of machines and the mass production of goods required great efforts. This period aroused a great thirst for knowledge among the masses. It was generally understood that this new environment required a great deal of knowledge in order to live in it and develop it further. Everyone had to be able to read and write. The new knowledge was collected in books. One had to be able to read them. In order to be able to hold onto knowledge, one had to write it down. Then others could read and evaluate it again.

247.Knowledge gave power over machines and people. Knowledge itself was power. But in order to exercise power, decisions had to be made. Reality was now in a state of constant development. It was determined by movement and change. A decision that was right today could be wrong tomorrow because the situation had changed. So you needed constant information about the movements and the state of development. This information had to be evaluated and then provided the knowledge for new decisions. More and better information meant more and better knowledge.

248.But the more complicated the processes in the environment, the more extensive the information that had to be evaluated. Here, too, machines helped. Computers were developed. They were able to process huge amounts of information and deliver evaluations at breakneck speed. Man had created new, large brains for storing extensive knowledge.

249.In connection with the expansion of knowledge and the change in life and the environment, the ideological awakening began in Germany. The views of life that were valid up to now mostly came from periods in human history when life was still going on in simple forms. All of these views had led to forms of life that had meanwhile been fought in Europe, such as slavery, bondage, inequality, exploitation, oppression, ignorance. These all marked the past periods. Great intellectual achievements, which had also existed in these times, were the prerogative of a few. The mass of people could not benefit from them.

250.In Europe, the knowledge of what was happening in the world had been greatly expanded, above all through research in the natural sciences and practical application in technology, for miracles which in earlier times were accepted everywhere when there was no explanation for what was happening in the world there was no place now.

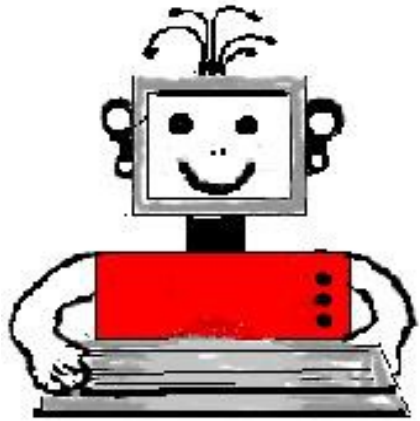
254. Chemistry

Science of the structure of matter and the possible changes. The decomposition of substances is analysis, the assembly is synthesis.

If substances come about without changing the molecules, then it is a mixture. New substances are created through a chemical reaction that changes the structure of the atoms in the molecules.
Organic chemistry deals with carbon compounds, inorganic chemistry deals with all other substances.

255. Electrochemistry
Study the chemical reactions when there is electricity. Electricity is generated in batteries using chemical reactions. Since all chemical reactions cause changes in the electron structure of atoms, they are known as an electrochemical reaction.
Oxidation is now defined as a process where electrons are released.

256. Elements
Substances that cannot be further broken down into simpler substances. The same elements have the same number of protons (their atomic number).
95 elements occur in nature, 81 of them are stable, the others are radioactive. They are divided into metallic, non-metallic and semi-metallic. Symbols are used to denote: C for carbon. Ca for calcium, Fe for iron.



257. Energy
Is the quality of doing work. There is potential energy, like water in an elevated reservoir.
Bodies that move have kinetic energy. All of the energy remains the same. A body that falls loses energy from gravity and gains energy from movement.

260. Artificial intelligence
A machine with real artificial intelligence has not yet been developed, at the moment it is about the creative possibilities of a machine to simulate thought processes and understand human decision-making processes.

261. ASCII
A well-known code made up of letters, numbers and symbols used on computers. It consists of 0 and 1, always seven per character. 1000001 means A and 1100001 means a.

263. Big Bang
In cosmology, the Big Bang is the beginning of the universe, i.e. the starting point for the creation of matter, space and time. According to the standard cosmological model, the Big Bang occurred about 13.8 billion years ago.

264.Binary system
A number system with base 2 used in computers. The system of ten that we use probably goes back to the 10 fingers we have.
Here 77 means: 7 times 10 and 7 times 1

270. Enzymes
Biological catalysts that are produced in cells and are able to accelerate chemical reactions. They are complex proteins, each chemical reaction requires its own enzyme. Temperatures above 60 degrees damage the structure of the enzymes and cause reactions to stop.

271.The development of man became the great task that thought in Germany was concerned with. At first it was moral principles. Everyone should act in such a way that their deed could be viewed as exemplary and generally applicable. Ideals should rule life. For the realization of these ideals you had to do everything, if necessary sacrifice your own life. But it was soon recognized that man's actions were influenced by many factors: by feeling, by his physical satisfaction, by his upbringing, by ideological ideas, by his mind.

272.Biology had determined the evolution of life from simple to complex forms. Every living being passed on its properties to its offspring. However, changes in these genetic factors could occur. The new properties were also passed on to the offspring, living beings could only survive development if they proved to be viable in the struggle for existence, stronger than other species, resistant to diseases and threats from the environment.

273 Helium
Color and odorless gas, He, atom no. 2. It does not form compounds. After hydrogen, it is in second place in terms of distribution in space.
In the sun, hydrogen is converted into helium by releasing heat and light.
274 Kinetics
Describes the physical properties of matter with regard to the movement of atoms and molecules. A gas is made up of rapidly moving atoms and molecules.
When temperature drops, the movement slows down. At –273 degrees, the absolute zero point, the movement stops.

276. Air
At –196 degrees, air becomes liquid. This happens through the Linde process, where air is pressed, cooled and expanded again. The expansion always leads to a lower temperature.

277. Molecules
The smallest unit of an element consisting of one or more atoms. It goes from simple molecules (H2) to macromolecules in the case of polymers.

278. Neutron
One of the three building blocks of the atom (proton and electron the other). Neutrons have the same mass as protons

but have no charge. They influence the mass of the atom but not its chemical properties.

279.Man was subject to the same development. He also lived through the struggle for existence, passed on his characteristics to his offspring, experienced changes and mutations in his genetic make-up, which could lead to a higher development.

280.Technical development had given man unimagined means of power. Motors, machines, new chemical substances, electricity were the means with which he could now change his life. The will to power over the forces of nature and the means of technology had to lead to higher development. The belief arose in a new person who would be healthier, stronger, smarter, better, more powerful than ever before. This new man had to be realized.

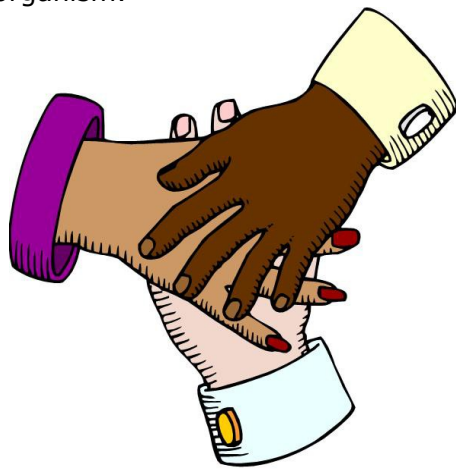
281.Boole
George Boole (1815-1864) Professor of Logic and Mathematics at Queens College provided the logic for the computer. Boolean algebra is based on the three terms: AND, OR, NOT and their combinations NOT-AND (NAND) and NOT-OR (NOR).
The logic can be represented in electronic circuitry and with on-off switches.

282 Elementary Particles
Electrons have so far resisted any further division. However, around 200 elementary particles were found in the particle accelerators: Leptons, mesons, baryons, quarks seem to form protons, neutrons and other particles.

283. Fiberglass
A system for transmitting light, made of glass or plastic. For telephone cables, fiber optic cables are used instead of copper. A pair of extremely thin glass fibers can transmit several thousand telephone calls at the same time, a great

saving in space and money. The telephone signals are converted into light pulses for transmission.

286. Evolution
A slow process of changing from one form to another, like the evolution of life on earth.
In the 19th century Darwin developed the theory of natural selection, through spontaneous changes or mutations in the genes of the organism.



288. Exchange
Release of gases into the atmosphere, especially oxygen and carbon. Living things take in oxygen to burn food and give off carbon dioxide as a waste product.

289. Genes
Genetic material, with the code of DNA. Contain the hereditary factors e.g. the gene for the color of eyes.

292. Heart
A muscle that contracts in rhythm to pump blood around the body. Mammals have hearts with 4 chambers, two to take in blood and two to pump the blood out.
293.Body

The physical structure of man. The body develops from a fertilized egg cell, is born after 40 weeks and reaches sexual maturity between 11 and 18 years of age.
The circulation supplies muscles and organs with blood. The body's functions are controlled by the nervous system and hormones.

294. Immunity
Protection that organisms have against foreign microorganisms such as bacteria and viruses and also cancer cells. This is what white blood cells do. Natural killer cells can destroy cells with viral infection and cancer cells.

295. Neurons
Nerve Cells found in the nervous system that quickly transfer information between different parts of the body.

296. Nitrogen
Nitrogen is absorbed by plants and converted into proteins there. With the excreta, the nitrogen is released into the soil. 78% of the atmosphere is nitrogen.

297. Oxygen
O2, a colorless, odorless gas, is used by organisms for breathing. 21% of the atmosphere is oxygen..

298. Photosynthesis
Process where green plants absorb light and thus initiate a series of chemical reactions.
299. Red cells
Cells in the blood that carry oxygen around the body. Contain the red dye hemoglobin. When they get into the tissue, they give off the oxygen.

300.Life in the system is not a life that is governed by many rules and regulations but one has to respect others. Its peculiarity is that it is in periodic motion. No state has to be as it is. It can be changed.

301.Whoever lives in the consciousness of the system knows about the changeability of human emotions. He does not take his own feelings so seriously either, but regards them as a temporary state of periodic movement. This state of affairs can change quickly and many decisions are required of every human being in the course of his life. Those who live in the system don't take their own decisions so seriously. Because every decision can be changed again. All demands that life makes on a person are temporary conditions.

302.Those who encounter them with strength, energy and the appropriate technology will experience the effect of the system. All life takes place in a periodically infinite space. That is why every result of an action is a spatial state that can be changed.

303. Uranium-235
In 1935, the Canadian-American physicist Arthur Jeffrey Dempster discovered uranium-235, an isotope of uranium that was used to sustain the first nuclear chain reaction.

305. Cleavage
In 1938 the German physicist and chemist Otto Hahn carried out the first nuclear fission by bombarding uranium-235 with

neutrons and separating the nucleus into two parts.

308.RAM
There are two types of computer memory: RAM (random-access-memory) and ROM (read-only memory).
RAM can be written, read and changed. ROM can only be read.

310. Gravitation
The mutual attraction of all bodies in the universe. The strength depends on the matter in the body and on the distance. It is not known how gravity works, whether it is transmitted through a particle called graviton is theory.

311. Galaxy
A collection of stars, dust, gas, and planets and other astronomical objects. On a clear night, the pale ribbon of the Milky Way can be seen in the sky, the Galaxy we live in.

315. Gamma
Electromagnetic radiation that comes from the atomic nucleus during radioactive decay.

Gamma rays can be stopped by lead, otherwise they can penetrate tissue and cause damage.

317. Half-life
In radioactive decay, the time at which half of it decays. Carbon-14 takes 5,730 years for half of the material to decay and again 5,730 years for the next half.

318. Heat
Heat always goes from a high temperature area to a low temperature area. The effect on a substance can be:
Raising its temperature, its expansion, its melting when it is solid, its evaporation when it is liquid, or in the case of a gas, the pressure is increased.

319. Light
Light appears as a wave or as a quantum, the light quantum is called a photon. The speed of light is around 300,000 km / sec.
Newton discovered in 1666 that sunlight is a mixture of light of different colors and can be broken down accordingly.

320. Machine
A device that can process a greater force with little force. There is the inclined plane, the lever and the wheel. And the axle.

All machines work according to these principles.

321. Magnet
An object that forms a magnetic field either permanently or temporarily by induction. This allows bodies to be attracted. A magnet has two magnetic poles.

322. Induction
The creation of magnetic properties in non-magnetic iron. Electromagnets create induced temporary magnetism to lift steel plates by approaching a magnet to create the magnetism. By switching off the current, the magnetic effect disappears again.

323. Magnetism
Region of a magnet where the magnetic properties are strongest. A magnet has two poles, the north pole points to the north pole earth. It attracts the south pole of another magnet.

324. Mass
The amount of matter in a body. The mass also determines the acceleration in a body by a force. The standard unit of mass is the kilogram.

334 Organic Chemistry
A part of chemistry that deals with carbon compounds, especially the more complex ones.
It is based on the ability of carbon to form long chains of atoms, branches, rings and other complex structures.

336. Oxygen
Symbol O, atom number 8, relative atomic mass 15.9994, is the most abundant element in the earth's crust, 21% of the atmosphere consists of it, and is in a composite form in water, carbon dioxide and other compounds.

337. Steel
Mixture of iron, up to 1.7% carbon, partly with other elements such as magnesium, phosphorus, etc.
During production, oxygen is blown into the liquid iron at high pressure. The oxidizing foreign matter is burned as gases or excreted as slag.

338. Valence electron
The electron in the outermost shell of the atom, which indicates the maximum valence for many elements and corresponds to the number of the group that the element occupies in the periodic table of the elements.

339. Valence
A measure of the ability of an element to combine with other elements. The elements are referred to as one-valent, two-valent, three- and four-valent when they combine with one to four one-valent atoms.
The valence for oxygen is 2: H2O (hydrogen is one-valent)

375. Computer Age
The greatest technical development since 1945 was in information technology, the complex science of managing electronic machines to process information. The rapid growth in capacity and speed, the constant downsizing of devices and the improvement of input and output on the screen meant that much more information could be processed much

faster. Within 30 years, a credit card-sized microchip was doing the work that a living room-sized machine did before.

376. Technology
In modern technology, the role of science has become extremely important. In the nuclear power plant or in a computer system, the role is very visible, in the manufacture of plastic material it is rather hidden in the chemical processes. The path from science to the technical production of an end product is usually very fast today.

377. Physics
In the period between 1895 and 1914, the foundations of physical theories were laid. Röntgen, who discovered the Röntgen rays, Becquerel, who discovered the radioactivity, Thomson, who localized the electron, Curie, who isolated radium and Ruhterford, who examined the atomic structure.
The universe presented itself as a cluster of atoms, the particles of which behaved like small solar systems

379. Understanding
The revolution that has long been going on in the human mind was the belief in changing and improving the environment and living conditions.

In the past the instruments were magic and prayer; today they are science and technology. It is man's confidence in his ability to change the natural world, from the invention of fire, agriculture, the discovery of nuclear power, and the landing on the moon.

380. Food
In the future, assemblers will produce human food at low cost, including meat, everything that nature has previously produced in long processes can be produced quickly and in a targeted manner. In this way man will become independent of nature.

Guide to action:

381.The system of the periodically infinite space, which is determined by force, energy and technology.

We live in periods. The processes in our body develop in periods. All our actions are subject to this process; the whole world moves and changes in periods.

Every person whose life has been shaped by the knowledge of the natural sciences will have this experience continuously. Whoever lives in a society that is developing becomes aware of the periodic changes.

382. We are born, we develop, we train our minds, we provide functions in society, we work in the production process, we reproduce, we die and dissolve again. Everything is period. Someone will ask what all these statements mean. For him it may not be a new insight. Even better, the faster he will find access to the system.

383. The system conveys fundamental truths that every person can understand and experience in their own life. These truths are not new; let's look again at these basic truths:
All processes in the world take place in periods. Each period has its timing, which can be of short or long duration. Each

period triggers new periods. These periodic processes create infinity. This means that every end of a period awakens the urge to start again. All changes in the world create space: houses, machines, cars, factories; trees, water, mountains; plants, animals, people; books, thoughts, words. Everything is space created by periodically infinite processes.

388. How is the transition to a new period realized? It starts with imagining what we want to do. At first it will be an imprecise idea. Therefore we have to deal with it for a long time, a few days or weeks, in order to finally find out exactly what we want to do.

389. Once a clear picture has emerged, we must now deal with the question of whether we can make the idea a reality. We have to check whether we have the necessary skills, whether we will find support from other people. Even this process of testing can take a long time. Did it lead us to the conclusion that we can have the necessary trust in ourselves, then it is important to make the decision. Often a favorable moment is needed to say: "So, now I am ready to realize my ideas." Then we have to find the necessary energy to drive us out of the previous life cycle. This means that we constantly keep the ideas we have gained in mind. It is important to show those around us that we are serious about our intentions.

390. The more firmly we are convinced, the less hindering influences from our surroundings can dissuade us from the chosen path. This path now requires physical and mental exertion. We need the will to persevere. We will only be able to develop endurance if we constantly keep our ideas awake and align everything we do with it.

391. Often we will find that all our efforts are not enough. Then we have to think of a method that can help us further. It can enable us to use our forces better and to strengthen our stamina.