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Построено на материале аутентичной технической литературы и включает в себя 25 текстов, подобранных с учетом их информативности и актуальности. Представленные тексты охватывают грамматический и языковой материал и могут быть использованы как при работе в аудитории, так и для самостоятельной работы.

Для студентов технических специальностей заочной формы обучения.

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I. Read the following texts with help of the dictionary

Overseas Telephone Service

Overseas and international telephone service is highly developed nowadays. It links the telephone systems of about 25 countries and territories throughout the world. The number of telephones is constantly growing; it has grown for a number of years at an annual rate of about 6 %. It is of interest to note that this figure represents a growth equal to nearly twice the growth of the world population. At the beginning of 1979 there were a total of 448 250 000 reported telephones in the world. 98.5 % of the world's telephone numbers are reported to be automatic.

Overseas telephone facilities are known to provide telephone service; in addition they transmit music and voice programs for broadcasters. They are also used for military and industrial purposes: for voice, data, teletypewriter, and facsimile services (maps, charts, pictures, weather reports and so on).

Overseas telephone circuits are also used by international telegraph companies and agencies for communication purposes.

As to their equipment, overseas telephone circuits are provided mainly by three transmission systems; tropospheric scatter radio, submarine cable, and space satellites. Each of these systems has its own characteristics and limitations, which determine fields of their use. The advantage of submarine telephone cable systems and satellites is that they are not subject to the fading and interference that hinder high-frequency radio systems. For this reason submarine telephone cable systems and satellite systems provide superior transmission performance. Another advantage is their great circuit capacity. Thus they can be extended over extremely long distances.

A Program

Man guides and controls the flow of information into, through, and out of the computer by means of a plan called a program. Once a problem is defined, an analyst breaks down the steps that must be followed and constructs a system flow chart showing that job is to be done from the viewpoint of the data processing equipment, and then makes a program flow chart to show how it is to be done by pointing out the detailed decisions and operations to be performed. The programmer uses this program flow chart during the coding of the program as a guide to the sequence in which logical and arithmetic operations occur, as well as

the relationship of one portion of a program to another. Programming is not simply a coding task. It involves many different jobs such as taking care of the housekeeping or allocation of storage locations to data, instructions, etc.; setting up a system of handling tables, files, along with plan for editing input data; specifying operator and error message; deciding upon the best mathematical technique of handling the processing of data; and outputting the results in a clear manner so that they are usable by the people responsible for their application. The programming language may take the form of convenient equivalents of machine instructions called mnemonics having symbols such as ADD for add, SUB for subtract, DIV for divide, etc. The computer, using a previously written language program called a processor, translates these mnemonics into equivalent machine instructions in the binary mode, its own internal language.

Radar

Radar is an abbreviation of the words Radio Detection and Ranging. This method of locating objects by using radio techniques was greatly improved during World War II due to its wide range of application.

Radar as a term is now used to include any system employing microwaves (that is wavelengths from 30 cm to 1 mm) for locating, identifying, or guiding such moving objects as ships, aircraft, missiles, or artificial satellites.

The basic principle of radar is the scanning of the area by a beam of microwaves and the detection of the waves reflected from the objects to be located. The speed of the waves being known, it is only necessary to measure the time between the transmission of the microwave pulses and the arrival of the reflected waves in order to locate, in both direction and range, the object.

Radar equipment includes a movable aerial, the transmitter and its modulator, the receiver and its indicator, and the power supply system. The aerial is rotated continuously when in use. The modulator causes the transmitter to radiate microwaves in short pulses. The transmitter being active, a pulse of power is passed to the aerial. Then an acting electron switch transfers the aerial connection receiver circuit. Having been received from the obstacle, the echo signal is rectified and impressed upon the tube of the indicator, causing a bright spot to appear on the screen. This technique has been extended so that automatic guidance and navigation can be effected by computers – electronic devices which accept data, apply logical processes to it, and supply the results of these processes as information.

Telemetering

Telemetering is a branch of engineering. It deals with the presentation of measured data at a location remote from the source of the data. There exist different telemetering systems. Some of them are complex; an example of a highly complex telemetering system is the equipment utilized for measuring the temperature in a space vehicle in flight, radioing this temperature to a ground observing station, and providing a usual display to the observers.

Telemetering performs three different functions: 1) generation of a signal (electrical or some other), 2) transmission of the information to the remote location, and 3) conversion of the data into a form suitable for display and recording.

Telemetering systems are classified according to the transmission medium; the systems fall into three main categories: 1) mechanical, 2) electrical, and 3) radio. Mechanical telemetering has mechanical coupling between the points of measurement and of data utilization. It is used mainly for short distances because of the high attenuation of mechanical media, the low velocity of propagation of sound, and the difficulty of constructing efficient and simple mechanical amplifiers. Electrical telemetering is used in wired telemetry systems. In them the information is transmitted by variations of a voltage or current in the electric circuit. Modern electrical telemetering systems possess complex electronic equipment, when the information is transmitted over wires in the form of a television picture. Radiotelemetry is contrasted to electrical telemetry.

Alternative Sources of Energy

It is not a secret that energy consumption has increased immensely in the last decades. But do we have enough fossil fuels to satisfy our needs? As fossil fuels are nonrenewable we are highly interested in developing alternative sources of energy.

Solar Power is renewable. It is used for heating houses. Solar cells and furnaces make electricity from sunlight. Solar cells are expensive. Solar power isn't much use unless you live somewhere sunny. It doesn't cause pollution and doesn't need fuel.

Wind Power is renewable as well. It doesn't cause pollution, doesn't need fuel. However, a lot of generators are needed to get a sensible amount of power. It is necessary to put them where winds are reliable. And the noise can drive you nuts.

Hydroelectric Power plants are built for getting energy from flowing water. Usually we build a dam, and let the water turn turbines and generators as it goes through pipes in the dam. Renewable. No pollution, no fuel needed, no waste. Very expensive to build. Building a dam we flood a lot of land.

Waves Power. There's a lot of energy in waves on the sea. However it is not easy to get it. A wave power station needs to be able to stand really rough weather, and yet still be able to generate power from small waves. This source of energy is renewable – the waves will come whether we use them or not.

Geothermal Energy means heat from underground hot rocks. Hot water comes up and we use the heat to make steam to drive turbines, or to heat houses. It is renewable – so long as we don't take out too much, the energy keeps on coming. However, there are not many places you can do it – the rocks must be suitable. Sometimes we get poisonous gases coming up too.

Steel Quality

In order to understand tool quality, remember that steel is basically iron with a carbon content of 1.7 percent or less. Adding carbon makes the metal harder, but also more brittle, less malleable and less resistant to stress and shock. As tools differ, steel is matched with a suitable carbon content for each tool.

Tool-quality steel must have at least 0.6 % of carbon content. This insures that the steel can be heat-treated. Traditionally, heat treating involves heating the metal to about 1,3500 F and then plunging it in to cool water. This abrupt cooling technique, called quenching, changes the carbon particles in the metal into hard carbide crystals. Heat treating produces a hard edge on tools. However, it only penetrates about 1/8 into the metal and thick tools retain a soft center.

Obviously, the quality of each tool depends on the skill of the smith, but many old tools are still in use today. These «water-hardened steel» tools are made of carbon steel and hold a very keen edge. Yet, they have two serious drawbacks. These tools tend to rust easily and to lose their temper and edge at high temperatures: e. g. carbon-steel drill bits will dull quickly when used in an electric drill; a carbon-steel turning chisel, for use on a lathe, loses its edge when subjected to the friction of the rotating wood.

In order to make better steel, metallurgists experiment with various alloy ingredients. For example, adding tungsten or molybdenum results in

high-speed steel resisting a great heat build-up. When buying drill bits, be sure to look for ones made of high-speed steel. Chromium and nickel make steel stainless or rustproof. Early stainless steel knives had one major drawback however; they could not hold a sharp edge the way carbon steel knives could. Chefs and serious cooks preferred carbon steel knives (even though they were prone to rusting) for this reason.

Machine-Tools

Machine-tools are machines designed for cutting metal parts by means of a cutting tool. The machine-tool comprises the principle manufacturing equipment in a machine shop. It is the original source of every manufactured article we use or touch. It can not only reproduce itself but it is the only machine which can create other machines.

Without a machine-tool the engineer would be stripped of his power and opportunities. Every tool, machine and material stems directly from machine-tools or was evolved from machines which themselves were produced by machine-tools.

Machining operations, or metal-cutting processes, lie at the basis of all modern industrial production.

The general term «machine-tool» is applied to various classes of power-driven metal-cutting machines employed in the machine shop for the purpose of shaping many commercial products.

The function of machine-tools is to hold both the work and a cutting tool or tools and move them relative to each other to obtain the proper cutting action and at an economic speed.

The part of the machine-tool which removes the metal during a metal-cutting process is called a cutting tool. Cutting tools used for various metal-cutting operations may be different and the type depends on the work which is performed and on the material. The main types of machine-tools used for industrial production are lathes, drilling machines, milling machines, etc.

The lathe is a machine-tool in which work is held so that it can be rotated about an axis. The cutting tool is traversed past the work from one end to the other.

Laser Beam Welding

The unique properties of lasers account for their widespread application in manufacturing industry. Laser beam welding is currently used in order to weld steels, aluminum alloys and dissimilar materials. This

high power density welding process has unique advantages of cost effectiveness, deep penetration and narrow bead in comparison with conventional welding processes. As the thermal cycles of laser beam welding are generally much faster than those of arc welding it is possible to form a rather small weld zone that exhibits locally high hardness.

However, it is important to point out that the metallurgical and mechanical properties of laser welds and the response of conventional materials to this new process have not been fully established yet. It is currently difficult to determine the tensile properties of the laser welded joint area owing to the small size (2–3 mm) of the fusion zone. Therefore an experimental investigation of the mechanical properties of laser-welded joints was carried out. To determine the hardness profile of the welded metal three similar joints were produced by a CO_2 laser and microhardness measurements were conducted at three locations. It is important to mention that the microhardness test results, however, exhibited no significant difference between these three locations for all the welded joints.

The welding process may lead to drastic changes in the micro-structure with accompanying effects on the mechanical properties and, hence, on the performance of the joint. Laser welded joints, like all other welded joints, may contain defects in the form of cracks in the narrow weld area. The size and location of such cracks directly affect the joint performance and the lifetime of a structure. Nevertheless, it is essential to remember that laser beam welding has a number of advantages over conventional processes. Despite the high investment cost of laser welding equipment, it is expected that laser beam welding will have a great impact on fabrication and manufacturing industries within the next decade.

Forging

Forging is the shaping of a piece of metal by pushing with open or closed dies. It is usually done hot in order to reduce the required force and increase the metal's plasticity.

Open-die forging is usually done by hammering a part between two flat faces. It is used to make parts that are too big to be formed in a closed die or in cases where only a few parts are to be made. The earliest forging machines lifted a large hammer that was then dropped on the workpiece, but now air or steam hammers are used, since they allow greater control over the force and the rate of forming. The part is shaped by moving or turning it between blows.

Closed-die forging is the shaping of hot metal within the walls of two dies that come together to enclose the workpiece on all sides. The process starts with a rod or bar cut to the length needed to fill the die. Since large, complex shapes and large strains are involved, several dies may be used to go from the initial bar to the final shape. With closed dies, parts can be made to close tolerances so that little finish machining is required.

Two closed-die forging operations are given special names. They are upsetting and coining. Coining takes its name from the final stage of forming metal coins, where the desired imprint is formed on a metal disk that is pressed in a closed die. Coining involves small strains and is done cold. Upsetting involves a flow of the metal back upon itself. An example of this process is the pushing of a short length of a rod through a hole, clamping the rod, and then hitting the exposed length with a die to form the head of a nail or bolt.

Milling Machine

In a milling machine the cutter (фреза) is a circular device with a series of cutting edges on its circumference. The workpiece is held on a table that controls the feed against the cutter. The table has three possible movements: longitudinal, horizontal, and vertical; in some cases it can also rotate. Milling machines are the most versatile of all machine tools. Flat or contoured surfaces may be machined with excellent finish and accuracy. Angles, slots, gear teeth and cuts can be made by using various shapes of cutters.

Drilling and Boring Machines

To drill a hole usually hole-making machine-tools are used. They can drill a hole according to some specification, they can enlarge it, or they can cut threads for a screw or to create an accurate size or a smooth finish of a hole.

Drilling machines (сверлильные станки) are different in size and function, from portable drills to radial drilling machines, multispindle units, automatic production machines, and deep-hole-drilling machines.

Boring (расточка) is a process that enlarges holes previously drilled, usually with a rotating single-point cutter held on a boring bar and fed against a stationary workpiece.

Shapers and Planers

The shaper (поперечно-строгальный станок) is used mainly to produce different flat surfaces. The tool slides against the stationary workpiece and cuts on one stroke, returns to its starting position, and then

cuts on the next stroke after a slight lateral displacement. In general, the shaper can make any surface having straight-line elements. It uses only one cutting-tool and is relatively slow, because the return stroke is idle. That is why the shaper is seldom found on a mass production line.

The planer (продольно-строгальный станок) is the largest of the reciprocating machine tools. It differs from the shaper, which moves a tool past a fixed workpiece because the planer moves the workpiece to expose a new section to the tool. Like the shaper, the planer is intended to produce vertical, horizontal, or diagonal cuts. It is also possible to mount several tools at one time in any or all tool holders of a planer to execute multiple simultaneous cuts.

The Past and the Future of the Laser

A laser is a source of light but unlike anything that had ever been seen before 1960 when Theodore H. Maiman of Hughes Aircraft placed a specially prepared synthetic ruby rod inside a powerful flash lamp similar to the type used for high-speed photography. Activating the flash lamp produced an intense pulse of red light, which possessed the unique properties of monochromicity (the light is of the same wavelength or colour), coherence (all the waves move precisely in step), and directionality (the beam can be easily manipulated). These features account for the enormous difference between the output of a laser and that of an incandescent light bulb.

With Maiman's invention the laser age was born. Everybody became interested in exploring this promising area of science. Within a very short time, numerous solid-state materials, gases, liquids, and semiconductor crystals were found possessing laser qualities. Almost every imaginable material was tried in order to produce new and interesting lasers. Even some varieties of jelly brand dessert were announced emitting xenon light, and according to this legend, they are supposed to work fairly well.

In many ways, the laser was a solution looking for a problem. Well, the problems soon followed in great numbers. It would be hard to imagine the modern world without lasers. They are used in everything from CD players to laser printers, fibre-optics and free-space communications, industrial cutting and welding, medical and surgical treatment, holography and light shows, basic scientific investigations in dozens of fields, including Star Wars weapons research. The unique characteristics of laser light make these and numerous other applications possible. In fact, it is safe to say that the vast majority of laser applications have not yet even been suggested.

Solar-Powered Cars

One of the ways we can reduce the amount of pollution from traffic seems to power our vehicles using renewable resources. To demonstrate this, the World Solar Challenge Car Race from Darwin to Adelaide annually involves dozens of cars that are powered only by the energy of the Sun. The cars are reported to use photovoltaic (PV) cells to convert sunlight into electricity. A single PV cell is known to produce only a small amount of electrical power (approximately 0.5 volts). To increase the power, lots of PV cells are connected together to make a «solar panel». Panels can be linked to form a large solar array that is certain to produce enough electricity to power a car.

When the World Solar Challenge teams design their electrical systems they have to take into account variations in the intensity of sunlight. The Sun's energy is supposed to power the car's motor and also charge a battery for use at night or at times when the Sun is hidden by a cloud. If a car is designed to put all its energy toward driving and keeps nothing in reserve, it is sure to stop completely in .cloudy weather. If too much energy is diverted to the battery, the engine is found to run too slowly.

Engineers still have many questions and problems to tackle before solar power becomes an efficient and economical way to fuel vehicles. Today’s solar-powered cars are rather expensive but as the pressure on fossil-fuel resources is certain to increase scientists will continue to search for alternative energy sources, including harnessing the Sun’s energy to drive vehicles. The most fascinating part of using solar power as an energy source is that it is considered to be pollution-free and inexhaustible. If research continues, stopping for petrol is likely to become a thing of the past.

Industrial Gases

We know of many gases used in industry for making various products. They are called industrial gases. Some of them are man-made and some are found in their natural state. Let us consider the most important ones.

Colourless, odourless, tasteless, non-toxic, and non-flammable, nitrogen has many uses, including glass making, food conserving, preventing semiconductors from oxidation.

Oxygen is the second largest volume industrial gas used in producing steel, building bridges and making electric equipment.

Being the most abundant element (98 %) in the universe hydrogen has almost as many industrial uses as nitrogen and oxygen. It is needed in metal industry, in food industry for preparing margarine and in oil processing. Also, power stations depend on hydrogen cooling their high-speed turbine generators.

Can you imagine your life without eating ice-cream, spraying .deodorants, drinking sodas, and fire fighting devices? All these things are possible due to carbon dioxide.

Some people believe that balloon flying is for children. Still, helium is a serious gas capable of rays detecting and aircraft lifting. It is also used in arc welding.

It is impossible to imagine present-day life without air conditioning, refrigerators, spraying aerosols and packaging foam for the TV or VCR. However, freon, necessary for making these common things, is found depleting the ozone layer, which protects us from the destructive solar ultraviolet radiation. That is why scientists all over the world insist on fluorocarbon refrigerants being banned.

Argon is a noble gas comprising 0.98 % of the atmosphere and forming no-known chemical compounds. Colourless, odourless, tasteless and non-toxic, argon is mainly used in producing high quality welding in stainless steel and aluminium industry.

Chlorine gas is very toxic; nevertheless it protects us from falling ill by purifying drinking and swimming water. It also takes part in making many chemicals, including solvents, plastics, rubbers and pesticides.

Flying Cars

Just a decade and a half after the Wright Brothers took off in their airplane over the plains of Kitty Hawk, N.C., in 1903, other pioneering men started dreaming of a flying car. The attempt to develop a gliding horse cart in the 18th century, to no great surprise, failed. Numerous flying cars are being invented today. Moller's latest project, the Skycar M400, is designed to take off and land vertically, like a Harrier Jet, in small spaces. Having a range of 900 miles, it will cruise at around 350 mph with the top speed of 400 mph using petrol, diesel, alcohol, kerosene and propane as fuel. The fuel mileage of the Skycar will be comparable to that of a medium-sized car, getting 20 miles to the gallon. To make the Skycar safe and available to public, it will be completely controlled by computers using the Global Positioning System (GPS) satellites – a so-called «fly-by-wire system». In an emergency the vehicle will release a parachute

and airbags, internally and externally, to cushion the impact of the crash. The cost of a Skycar is estimated to be $ 60,000 if mass-produced.

MACRO Industries' SkyRider X2R will use the same fly-by-wire system to safely transport passengers. Drivers will simply get in, turn on the power and enter the address or phone number of the desired destination, with the SkyRider doing the rest. MACRO said that the system would be fully automatic, but allowing some manual control. Commands will be entered just by telling the car what you want it to do.

Similarly to Skycars and SkyRiders, CityHawks also take off and land vertically. However, there are some key differences. The CityHawk will be powered by fans driven by four internal combustion engines.

Holography and Holograms

History. Holography and hologram are normally referred to as a process and as a plate or film itself respectively. In 1947 Dennis Gabor (the father and the first theorist of holography, awarded with the Nobel prize for his research) coined the term hologram from the Greek words «holos» meaning *whole* or *complete* and «gram» meaning message. Gabor's theory was originally intended to increase the resolving power of electron microscopes. Incidentally, it was proved not with an electron beam, but with a light beam. The result was the first hologram ever made. Gabor's hologram was clear, but imperfect, as he lacked the correct light source – the LASER, which was first seen operating in 1960.

Types. The latest achievements in laser technologies being applied, holography has developed considerably. Numerous types of holograms can be noticed operating everywhere. The following are considered the most frequent:

a) transmission holograms. They are viewable with laser light when both beams approach the film from the same side;

b) reflection (white-light) holograms. These are viewable with white light from a suitable source (spotlight, flashlight, the sun, etc.) when both beams approach the film from the opposite sides;

c) multiple-channel (rainbow) holograms. These holograms with several images are not only visible from different angles; they also change colour at each new angle;

d) real-image holograms. They produce the image in front of the plate towards the viewer. Most holograms in holography museums are of this type.

Application. Holography being an art that attracts people's attention and curiosity, colourful multidimensional images are widely used in

advertising, stamps, jewelry, with holography museums exhibiting masterpieces. Credit cards are considered original if supplied with a hologram. Holographic lenses are lighter than traditional lenses and mirrors and can be designed to perform more specialized functions, for instance, to make the panel instruments of a car visible in the windshield in order to increase safety.

II. Read the following texts and answer the questions

2,500 Years Ago People Knew the Earth Was Round

It is generally thought that the concept of a round Earth is a principle that was hard-won by science in the face of stiff opposition. There is a well-known image of Cristopher Columbus (1451–1506) holding up an egg to illustrate the roundness of the Earth to skeptical onlookers[1]. However, the truth is that most educated people since the days of the Greek were convinced that the world is round.

It is said that Pythagoras was the first to suggest that the Earth is round about 525 BC. The suggestion was made on philosophical grounds - the sphere was considered to be the perfect shape. Later, Aristotle had convincing evidence[2] that the Earth is round. He noted that as one travelled north or south while observing the night sky, visible stars disappeared beneath the horizon behind and new stars appeared over that horizon ahead. He also noted that when ships sailed out to sea, regardless of the direction, they always disappeared from sight hull[3] first. On the other hand, ships heading towards land always showed their masts[4] first as they came over the horizon. All of these observations could be explained only by assuming that the earth was a sphere.

The idea of a rotating Earth was much less easily established. The Greek philosopher Heraclides of Pontus suggested in 350 BC that the Earth rotates on its axis but most ancient and medieval scholars refused to accept this idea.

The Copernican model of the solar system (1543), in which the Earth revolves around the sun, made the idea of a non-spinning Earth illogical, and slowly the idea that the Earth rotates on its axis was accepted by all. However, it was not until 1851 that the Earth's rotation was experimentally demonstrated by the French physicist Jean Bernard Foucault (1819–1868). The Earth is not a perfect sphere. Centrifugal forces tend to push material away from the centre of rotation.

Notes:
1) onlooker – зритель, наблюдатель;
2) convincing evidence – убедительное свидетельство;
3) hull – корпус корабля;
4) mast – мачта.

1. Who was the first to suggest that the Earth is round?
2. What proved that the Earth is round?
3. Was the idea that the Earth rotates on its axis easily accepted?

Alien Creatures on Earth?

In stories alien creatures [1] have visited the Earth for thousands of years. The ancient Greeks and Romans told tales of gods who visited the Earth from the heavens and who possessed exceptional powers. Although science has proven that these tales are myths, many people say that they had seen unidentified flying objects (UFOs)[2] and creatures who came to the Earth from the space.

Some of these stories are rather convincing. One such event happened on July 5, 1947, near Roswell, New Mexico, USA. On this day Dr. Holder, professor at Texas Tech University, and some of his students were working on the archeological site when they found the craft and bodies of alien creatures. Dr. Holder immediately reported about the find to the mayor who arrived at the site with military personnel. They cordoned off[3] the site and checked it for radiation. Photographers took close-up pictures[4]. The mayor and the military personnel questioned Dr. Holden and his students about what they had seen and then took them to the air base. The mayor instructed them not to tell anybody about their findings because the event could threaten [5] national security.

The eyewitnesses at the site stated that the craft was about seven meters wide and had a rounded nose. Inside the ship they could see the bodies of space beings. They described the bodies as slender and about 1 to 1.5 meters tall with very large heads and long thin arms, definitely not human.

The bodies were put in bags and taken by ambulance to the military base. At night they were sent to Washington, D.C., so that top government officials could see them. The craft was sent to Wright Field in Ohio, USA where the army could study it. To date, there is no reliable report about this event.

Notes:
1) alien creatures – инопланетяне;
2) unidentified flying object – неопознанный летающий объект;

3) cordon off – отгородить;
4) close-up pictures – фотографии крупным планом;
5) threaten – угрожать.

1. What did Dr. Holder and some of the students find on the archeological site?
2. Why did the mayor instruct the students not to tell anybody about their findings?
3. What was the width of the craft?

Annual Report on Spaceship Earth

Passengers of Earth: we are on a spaceship which is called «Earth». It is time for you to hear the annual report on the state of our ship. As you know, we are flying through space at about 107 000 km/hr on a fixed course. Although we can never return to home base to take on new supplies[1], the ship has a reliable life-support system. The system uses solar energy to provide us with water, air and food.

Let me briefly sum up the state of our passengers and our life-support system. There are about 6 billion of us on board, with more than 150 nations occupying various sections of the craft. About 25 % of us have taken good places in the tourist and first-class sections, and they have about 80 % of all available resources. In fact, most of the North Americans have the best places. Even though they represent only about 5 % of our total population, they consumed about 35 % of last year's resources.

I am sad to say that things have not really improved this year for 75 % of our passengers traveling in the hold[2].

Over one third of us are suffering from hunger, malnutrition[3], or both, and three quarters of us do not have adequate water or shelter. At the same time, the North America consumes 25 to 50 times as much as others, and causes 25 to 50 times more pollution than other sections.

Passengers of Earth, we are now entering early stages of our first major spaceship crisis – a crisis of pollution, resource depletion, and danger of mass destruction by inter-group wars. Our best experts agree that the situation on this ship is serious, but certainly not hopeless. On the contrary, they feel that it is well within man's ability to learn how to control pollution and resource consumption, and to learn how to live together in co-operation and peace. But we have only 30 to 50 years to deal with these matters, and we must begin now.

Notes:

1) supplies – запасы;

2) hold – трюм;

3) malnutrition – плохое питание.

1. What does the life-support system use to provide us with water, air and food?

2. How much does North America consume and how much pollution does it cause?

3. What do experts say about how to control pollution and resource consumption?

The Secret of the Bermuda Triangle

According to some reports over 100 ships and planes have disappeared in the Bermuda Triangle since 1945. There are many explanations of this mystery. But I think it is very difficult to believe that in this area there are some sea monsters[1] who pull the ships into the sea bed[2] or visitors from outer space who take the planes, ships and the people to the unknown planet.

More reasonable people say that a large number of losses in this part of the world can be explained more simply. Let's sum up the information we have and try to find some reasonable explanation.

Disappearances very often happen in good weather, without any warning. Ships and planes just seem to vanish[3] into the air. Usually radio contact is broken and SOS signals are seldom received from the planes and ships that disappear.

Some people survived the dangers of the Bermuda Triangle and returned to land safely. A ship's captain and an aeroplane pilot are among them. They say that the compass was spinning wildly. They couldn't see the horizon. They didn't know where they were because there was a cloud around the ship and the plane. There was no electricity, all the instruments stopped working The electric system started working only after the ship and the plane moved forward out of the cloud.

So the simplest explanation is connected with the earth's magnetic field. There are only two places on the earth where the compass points to a true north. One is in the Pacific Ocean, off the east coast of Japan, and the other is in the area of sea known as «The Bermuda Triangle». It is possible that the magnetic field may cause pilots and captains to lose their direction. It may also cause changes in the atmosphere and create storms, which pull ships and planes into the sea. It is interesting to note that both these places are well-known for such mysterious disappearances.

Notes:

1) sea monster – морское чудовище;

2) sea bed – морское дно;

3) vanish – исчезать.

1. Are SOS signals received from the planes and ships that disappear?

2. When did the electric systems of the plane and ship with people survived start working?

3. What can the earth's magnetic field cause?

Edison

One of the most outstanding American inventors is Thomas Edison. There are a lot of stories about him.

Edison is known as one of the greatest inventors of his time. He invented so much that it is difficult to say which of his achievements is the greatest. He was an experimenter and a practical man more than a theoretician.

Edison did not have any education. He went to school only for three months. Then he left it because the teacher considered him a dull boy. His mother became his teacher. The boy loved books and his mother said that he had a wonderful memory. When he first visited a public library and saw a lot of shelves with books he decided that he would read all the books and then he would know everything in the world. He measured the shelf and decided to read a foot of books every week.

In 1868 Edison built his first patented invention – an electromagnetic device.

It is told that he planned to ask three thousand dollars for his invention, though he secretly decided he would sell it for two thousand if necessary. He was invited to a meeting of businessmen who were interested in buying his invention, but when he was asked to name the price he was very nervous and quite unable to speak.

«It is no use asking us a big price», said one of the businessmen, «we have already decided how much we will pay. Forty thousand dollars is our limit».

With this money Edison established a workshop and began his career as a professional inventor at the age of twenty-two.

A lot of new inventions appear every day to make our lives easier, longer, warmer, speeder. All Edison's inventions were the result of hard work. He sometimes made thousands of experiments. According to his

words the idea that a genius works only by inspiration was absurd. «Genius is 2 per cent inspiration and 98 per cent perspiration», he often said.

1. In what way did Edison read books?
2. How old was Edison when he patented his first invention?
3. How did he make his inventions?

Inventors and Their Inventions

Samuel Colt was an American. He lived in the 19th century. In 1836 he designed and patented a pistol. It was a pistol with a revolving barrel that could fire six bullets[1] one after another. It was the first pistol of its kind. Later there came many other pistols with six bullets.

Rudolf Diesel was a German engineer. He was born in 1858. In 1897 he invented a new internal combustion engine. This engine is known as a diesel and it began a transport revolution in cars, lorries, trains and ships. The main advantage of diesels is that they run on rather cheap fuel.

Samuel Finley Morse was born in 1791. He was a portrait painter. Then he became an inventor. For twelve years he tried to perfect the telegraph and he was a success. Later he invented the telegraphic dot-and-dash[2] alphabet. Now it is known as Morse code. Morse code was hot only one in America of that time. There were some others. But now we use Morse code all over the world.

Charles Makintosh lived from 1766 to 1843. He lived in Scotland and was a chemist by profession. He worked in a textile industry. In 1823 he developed a rubber[3] solution. This rubber solution was used for raincoat production. Raincoats with this rubber solution didn't allow water to penetrate. These raincoats were called makintoshes. Now people all over the world use them in spring and in autumn.

Charles Rolls was born in 1881 in Great Britain. He was an aristocrat and businessman. He was especially interested in cars. Once he met another enthusiast of cars Henry Royce. Henry Royce was a famous car engineer. They decided to design the most comfortable and reliable car. At the beginning of the 20th century it seemed to be a fantasy. But they worked hard and at last in 1907 they created the world-famous Rolls-Royce car. It was so comfortable and reliable that one of the models of Rolls-Royce cars «Silver Ghost» hadn't changed greatly for 20 years since 1907.

Notes:
1) bullet – пуля;
2) dot-and-dash – точка-тире;
3) rubber – каучук.

1. What kind of pistol did Samuel Colt invent?
2. What is the main advantage of diesels?
3. What raincoats are called makintoshes?
4. Who was Henry Royce?

The Great Escape

Moving to small towns is a new trend in the USA which is very evident now. In the 1990s, two million more Americans moved from metropolitan centers to rural[1] areas than migrated the other way. In the 1980s, by contrast, rural areas suffered a net loss of 1.4 million people. Unlike the middle class escape from multiethnic cities to the suburbs a generation ago, this middle-class migration is from crowded, mainly white suburbs to small towns and rural counties[2].

Thanks to the newcomers, 75 % of the nation's rural counties are growing again after years of decline. Some towns are even booming[3], with high-tech industrial parks and busy downtowns in which you can find restaurants and community theaters, pubs and coffee bars.

Inevitably, a cottage industry is springing up to service the newcomers. At last four recent books promise to teach city folk how to find the village of their dreams, and one entrepreneur has a company, the Greener Pastures Institute, that helps urban people plan great escape.

The trend, which began in the back-to-nature 1970 but stopped in the 1980, has returned back because of powerful technological forces that are decentralizing the American economy. The Internet and the overnight shipping[4] are enabling high-tech industries to settle in the countryside, creating jobs for skilled workers almost anywhere.

There's a software-design company in Bolivar, Mo (population 6,845), a big computer-maker in North Sioux City, SD (population 2,019), a major catalogue retailer in Dodgeville, Wis., all attracting people who want to live in places where the landscape is emptier, the housing costs lower, the culture is more gentle.

If young professionals move because their jobs can move with them, pensioners are moving because their fat accounts can put them almost anywhere. And whether young or old, the new emigrants believe that in rural America they won't get lost, and maybe they'll even leave a mark.

Notes:
1) rural – сельский;
2) county – графство;
3) boom – процветать;
4) overnight shipping – ночные перевозки.

1. What is the direction of middle-class migration now?
2. What enables high-tech industries to settle in the countryside?
3. Why do young professionals move to the countryside?

Kids Are Bored to Death by Learning

Arthur Godsil, headmaster of a high-profile fee-paying secondary school in south Dublin has something on his mind other than academic process. He is concerned about the growing number of his students, who, even with a 10 to 1 pupil-teacher ratio, one of the state's lowest, are unable to deal with the basic demands of a secondary-level curriculum. He says the school provides a significant amount of personalized support for children with what are called «specific learning difficulties». These cover the reading problems, difficulties with concentration, attention, verbal[1] reasoning[2] and comprehension.

Mr. Godsil believes the way children are being raised in the Ireland of the 1990s is inhibiting their academic and social development. He mentions such factors as the pressures on working parents; the extraordinary range of leisure activities and constant entertainment available to children; the passivity of TV-dominated households; and the very high expectations children have in a new affluent society[3].

A few miles further north, Paul Meaney, principal of Marian College, boy's school, takes in a much broader mix of students. He talks about a contrast between the tempo of the electronic home and the traditional school. The computer culture is very fast, and teenage boys play sophisticated computer games at a high speed.

If you don't like something on one of Ireland's 25 TV channels, you zap[4] to something else. He compared this to the teacher with his chalk and teenagers sitting in rows in old-fashioned classrooms designed for the industrial age. In the face of such contrasts, the students' concentration level may suffer.

Notes:

1) verbal – словесный;

2) reasoning – логический ход рассуждений;

3) affluent society – общество изобилия;

4) zap – переключать ТВ с программы на программу.

1. Does the school provide a significant amount of personalized support for children?

2. What are the factors inhibiting children's academic and social development?

3. What is the contrast between the tempo of electronic home and traditional school?

What Are Biorhythms?

At the beginning of the 20th century, medical scientists made a surprising discovery: we are built not only of flesh and blood[1] but also of time. The scientists demonstrated that we all have an internal «body clock» which regulates the rise and fall of our body energies, making us different from one day to the next. The forces which create the «highs» and «lows» in our everyday life are called biorhythms.

The idea of an internal «body clock» should not be too surprising since the lives of most living things have the 24-hour night-and-day cycle. The most obvious[2] feature of this cycle is the way we feel tired and fall asleep at night and are active during the day. If the 24-hour rhythm is interrupted, most people experience unpleasant side effects.

As well as the daily rhythms of sleeping and waking, we also have other rhythms that last longer than one day and which influence wide areas of our lives.

Most of us would agree that we feel good on some days and not so good on others. There are days when accidents happen and you easily lose your temper[3]. On some days you work hard and your head is full of ideas and on some other days you can't concentrate on anything.

Scientists identified three biorhythmic cycles: physical, emotional and intellectual. Each cycle lasts about 28 days and each is divided into a high energy period and a low energy period of equal length. During the high energy period we are more resistant to illness, better coordinated and more energetic; during the low energy period we are less resistant, worse coordinated and are easily tired.

The «critical» or weakest time is the time of changeover from the high energy period to the low energy period, or vice versa. This

«critical» time usually lasts a day. On the critical day of a physical biorhythm there is a greater chance of accident and illness. Some car insurance companies in Japan have issued biorhythm forecasts to its clients to cut the number of accidents.

Notes:
1) flesh and blood – плоть и кровь;
2) obvious – очевидный;
3) lose one's temper – потерять самообладание.

1. What regulates the rise and fall of our energy?
2. What problems can people have if their 24-hour rhythm is interrupted?
3. What three biorhythmic cycles have scientists identified?

Television in Our Life

No doubt, television is one of the greatest achievements of the twentieth century. It is difficult to estimate its role in modern life. It has done much for education, for bringing culture to very distant places. You can choose a programme to your taste. If you like classical music, you can listen to it on a special channel.

Sport events are broadcast almost every day for those who are interested in sports. With a TV-set at home you need not go to the cinema – you can see most of the feature films on TV. And it is television that is considered to be one of the main factors[1] responsible for the decline in cinema-going.

But nevertheless it is a great thing. With the help of television you can reach every corner of the world and see things that take place thousands of kilometres from your home.

Intervision gives you a chance to witness world festivals and Olympic Games and other interesting events.

For those who are interested in politics there are many political programmes including news, debates, interviews with famous public figures.

TV serials gather millions of viewers before the screen. The cinema can hardly give you an opportunity like this.

In addition, educational programmes are very popular with the young people. Television helps them to study foreign languages, to improve knowledge in some subjects, to learn new discoveries.

People often ask about harmful emission the TV-set generates. Specialists reply the TV-set does not create any harmful electromagnetic

field since it is not an emitting apparatus, it is a device that converts emission into a visible image. Its electromagnetic field practically does not differ from the powerline[2] field in the room.

Though the TV-set's kinescope is electrostatically charged its intensity drops practically to zero at a half-a-meter distance from the screen. And hardly anyone watches the TV that close. «Watch TV from the distance not less than three meters», specialists recommend.

Notes:

1) it is television that is considered to be one of the main factors – именно телевидение и считается одним из главных факторов;

2) powerline – линия сети электропитания.

1. What TV programmes are the most popular with young people?
2. Does the TV-set create any harmful electromagnetic field?
3. How far from the screen should you sit?

Ernest Rutherford

Ernest Rutherford was born on August 30, 1871, in New Zealand, in the family of English settlers.

In 1861 gold was found in New Zealand and many foreigners came to live there. Industry began to develop, the country began to increase its export.

Ernest's father earned his living by bridge-building and other construction work required in the country at that period. At the same time he carried on small-scale farming.

Little Ernest was the fourth child in the family. When the boy was five he was sent to primary school. After finishing primary school he went to the secondary school. He liked to read at school very much. His favourite writer was Charles Dickens. He also liked to make models of different machines. He was particularly interested in watches and cameras, he even constructed a camera himself.

At school he was good at physics, mathematics, English, French and Latin. He paid much attention to chemistry too. Ernest became the best pupil at school. At the age of 19 he finished school and entered the New Zealand University.

At the University Ernest Rutherford was one of the most talented students. He worked hard and took an active part in the work of the Scientific Society of the University. But he was also fond of sports and took part in the students' sport competitions.

At one of the meetings of the Scientific Society he made his scientific report «The Evolution of Elements». At the same time he began his research work. For his talented scientific research he got a prize. After graduation Rutherford went to Cambridge where he continued his investigations (исследования).

Some years later Rutherford moved to Canada to continue his research work at the University in Montreal. Besides his successful researches he also lectured a lot at the leading Universities of the United States and England.

Rutherford's famous work «The Scattering (распространение) of Alpha and Beta Particles of Matter and the Structure of the Atom» proved that the atom could be bombarded so that the electrons could be thrown off, and the nucleus (ядро) itself could be broken. In the process of splitting the nucleus matter was converted into energy, which for the scientists of the 19th century seemed unbelievable.

1. In what subjects did Ernest distinguish himself (отличился)?
2. In what activities did Rutherford take part when he was a student?
3. What did Rutherford do besides research work?

Little-Known Facts about Well-Known People

Albert Einstein is one of the greatest scientists of our age, yet in his childhood he was slow, shy and backward. He found it extremely difficult to learn even to talk.

Later he became one of the most famous men in the world. The Theory of Relativity brought him fame on five continents. Yet, he led a very simple sort of life, went around in old clothes, and seldom wore a hat. He said that he did not care for fame or riches. The captain of a transatlantic ship once offered Einstein the most expensive rooms on the ship; Einstein refused and said he would rather travel on deck than accept any special favours (привилегия).

Einstein impressed everybody as being a very happy man. He said he was happy because he didn't want anything from anybody. He didn't want money or titles or praise. He made his own happiness out of such simple things as his work, his violin and his boat. Einstein's violin brought him more joy than anything else in life. He said he often thought in music.

Einstein's Theory of Relativity, which seemed a flight of imagination (полет воображения) to many at first, is now the cornerstone of modern physics. Many physical phenomena could never be explained without the Theory of Relativity.

Einstein said that there were only twelve people living who understood his Theory of Relativity, although more than nine hundred books had been written trying to explain it.

He himself explained relativity by this very simple illustration: «When you sit with a nice girl for an hour, you think it is only a minute; but when you sit on a hot stove for a minute, you think it is an hour. Well, well - so that's relativity. It sounds all right to me; but if you don't believe me and would like to try it out (хотели бы проверить), I'll be glad to sit with the girl if you'll sit on the stove».

Mrs. Einstein said that even she didn't understand the Theory of Relativity; but she understood something that is more important for a wife; she understood her husband.

Mrs. Einstein said that her husband liked order in his thinking, but he didn't like it in his living. He did whatever he wanted to, whenever he wanted to, he had only two rules of conduct (поведение). The first was: don't have any rules whatever. And the second was: be independent of the opinions (мнение) of others.

1. What brought Einstein more joy than anything else?
2. By what illustration did Einstein explain his Theory of Relativity?
3. What two rules of conduct did Einstein have?

Different Kinds of Land Transport

In Washington the story is told of a director of the Patent Office who in the early thirties of the last century suggested that the Office be closed because «everything that could possibly be invented had been invented». People experienced a similar feeling after the invention of the steam engine.

But there was a great need for a more efficient engine than the steam engine, for one without a huge boiler, an engine that could quickly be started and stopped. This problem was solved by the invention of the internal combustion engine.

The first practical internal combustion engine was introduced in the form of a gas engine by the German engineer N. Otto in 1876.

Since then motor transport began to spread in Europe very rapidly. But the person who was the first to make it really popular was Henry Ford, an American manufacturer who introduced the first cheap motor car, the famous Ford Model «T».

The rapid development of the internal combustion engine led to its use in the farm tractors, thereby creating a revolution in agriculture.

The use of motor vehicles for carrying heavy loads developed more slowly until the 1930s when diesel-engined lorries became general.

The motor cycle steadily increased in popularity as engines and tyres became more reliable and roads improved. Motor cycles were found well suited for competition races and sporting events and were also recognized as the cheapest form of fast transport.

Buses were started in Paris in 1820. In 1828 they were introduced in London by George Shillibeer, a coach builder who used the French name Omnibus which was obtained from the Latin word meaning «for all». His omnibuses were driven by three horses and had seats for 22 passengers. Then in the 20th century reliable petrol engines became available, and by 1912 the new motor buses were fast replacing horse-driven buses.

Trams were introduced in the middle of the 19th century.

Another form of transport used in London, Paris, Berlin, Moscow, St. Petersburg, Kiev and some other crowded cities is the underground railway.

1. What was the reaction of the people after the invention of the steam engine?
2. Who introduced the first cheap motor car?
3. When did diesel-engined lorries become general?

The First Voyage Round the World

Magellan lived from 1480 till 1521. The first voyage round the world was made by him over 400 years ago. He thought that by going west he could travel by sea round the world and come to the same place again.

In those early days many people in Europe were interested in India. They knew it was a very rich country whose culture was older than theirs. Magellan wanted to find a new way to India. His country, Portugal, did not help him, but he got money, ships, and all things necessary for the voyage from Spain.

At last the great day came and the voyage began. That was in September of 1519. Some people thought that nothing would come of it, that Magellan and his men would get lost and never come home again; others were sure that the whole thing would be a success. Who would be right, it was difficult to say at the moment. Magellan belonged to those who stop at nothing and always do their best to get what they want.

One day, after a voyage of many months, Magellan's crew saw land. It turned out to be South America. As the travellers were badly in need of

food and water, Magellan decided to stop there. With some of his sailors he went to see what the country was like. They were soon met by a crowd of men and women, who looked quite different from them.

These people were dark and had neither shoes, nor clothes. They soon made friends. They could not speak, of course, but understood one another well enough. Then these people went off, but soon returned, bringing with them many different things to eat. In his turn Magellan and his men gave them things which were not dear but looked beautiful. Everyone was well pleased.

Magellan did not stay long in South America: he was in a hurry to get to India. This voyage was long and difficult. Islands were few and far between, and the travellers were often in need of food and water. Many of them fell ill, but at last, after many months of travelling, they reached the Philippine Islands. People used to get to India going east, while Magellan wanted to get there by travelling west.

In the Philippine Islands Magellan and his men were well met by the people. They stayed there for some time and took part in a war between two different peoples of the islands. Magellan was killed in this war.

Of Magellan's five ships which started for India in 1519 only one returned three years later, after making the first voyage round the world.

1. What was the aim of Magellan's voyage?
2. What kind of person was Magellan?
3. Why was the voyage to the Philippine Islands difficult?

London Airport Serves the World

If you have travelled by plane (we also say «by air»), you will probably agree that travelling by plane is a very exciting experience. An airport is so different from a railway station or a bus stop, the people you meet and the things you see are very interesting and new. What is more, a big airport is like a town – with its own shops, banks and police.

London airport is one of the most modern in the world today and is a popular visiting place for both old and young. The airport covers over four square miles, and the road round it is 13 miles long. The airport has five main runways: the longest is 12,000 feet. The total number of people who work at the airport is nearly 36,000. London airport is one of the busiest in the world – more than 50 airlines operate from it every week. Every day of the week in the summer, over 800 planes land or take off.

London airport is unique in its layout (планировка). All passenger and control buildings are in the centre of the airport. The only way for

passengers to approach these buildings is by a tunnel which has been constructed under the main runways.

This great airport is famous for the efficiency of its service to the passengers who are continually travelling to all parts of the world. At the airport, all luggage (багаж) is mechanically handled. This is done by a system of conveyor belts, which enables the passengers to pass this great airport with ease.

The cost of making such an airport was approximately 20 millions, but much more will be spent before the work is completed. Each year money is needed for the development of the airport to accommodate great new transatlantic aircraft. Runways have to be lengthened to enable these airplanes to take off with their heavy loads. Air bus system started in 1977.

One of the big attractions at London airport is the Roof Gardens which are open to visitors who wish to see how a modern airport operates. The Roof Gardens give a view of the whole of the airport. From the garden you can see all the aircraft landing and taking off: you can see VC-10 – an intercontinental airliner – which has its engines at the back, and has a speed of 600 m.p.h., the Trident, the Boeing 707, the Concord, and many others.

1. Why is a big airport like a town?
2. What helps the passengers to pass London airport easily and quickly?
3. From what place can the visitors see how London airport operates?

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