

ENGLISH FOR ECOLOGISTS



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English for Ecologists

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Предисловие

Учебно-методическое пособие предназначено для студентов-бакалавров Географического факультета, направления «Экология и природопользование» профилей «Экология» и «Природопользование». Содержание пособия соответствует программным требованиям Федерального государственного образовательного стандарта.

Актуальность данного пособия обусловлена необходимостью издания учебных пособий, соответствующих программным требованиям для бакалавров. Новые стандарты высшего образования предусматривают увеличение количества часов выделенных на самостоятельную работу, именно поэтому пособие содержит достаточное количество текстов и упражнений для внеаудиторных занятий.

Оригинальность данной разработки заключается в том, что в нее включены упражнения, способствующие формированию навыков аннотирования и реферирования англоязычных текстов, а также задания на словообразование, подбор синонимов и антонимов.

Целью работы с пособием «English for Ecologists» является обучение профессиональному иностранному языку. Пособие предназначено для обучения чтению и переводу профессиональных текстов, а также для овладения специализированной лексикой.

Данная разработка способствует формированию языковой и коммуникативной компетенции, а именно способности к обобщению, анализу, восприятию информации, способности аргументированно и ясно строить свою речь, умению адекватно переводить аутентичные тексты, развитию навыков просмотрового и изучающего чтения.

Пособие состоит из трех частей. Выбор тем и последовательность их изучения обусловлены профессиональной тематикой профиля и внутренней логикой курса. Пособие

освещает такие темы как управление природными ресурсами, проблема загрязнения окружающей среды, охрана природы, деятельность природоохранных организаций, причины и последствия глобального потепления и т.д.

Первая часть данного пособия предназначена для обучения чтению и переводу профессиональных текстов, а также для овладения специальной лексикой. Вторая часть пособия поможет научить студентов основам аннотирования и реферирования англоязычных текстов. Третья часть пособия состоит из текстов, рекомендованных для самостоятельного внеаудиторного чтения.

Каждый урок имеет четкую структуру. Занятие начинается с дотекстовых упражнений, затем дается текст на определенную тематику, далее следуют упражнения, способствующие расширению активного словарного запаса, формированию навыка говорения, развитию монологической речи.

Конечным этапом работы с текстом может быть устное или письменное сообщение на заданную тему с использованием нового лексического материала.

Пособие может быть использовано на занятиях для бакалавров, магистров, и студентов, получающих дополнительную квалификацию по направлению «Переводчик в сфере профессиональной коммуникации», в самостоятельной работе студентов. Также пособие может оказаться полезным при подготовке к международным экзаменам по английскому языку.

Авторы-составители

PART 1

UNIT ONE EARTH DAY

Pre-reading tasks

1. Look up the following words in the dictionary and translate them. Write out their pronunciation and learn it.

acid rain, atmosphere, carbon dioxide, CFC (chloro-fluoro-carbons), compost, conservation, decompose, ecology, ecosystem, environment, extinct, fertilizer, fossil fuels, geothermal, global warming, greenhouse effect, groundwater, habitat, landfill, organic, organism, oxygen, ozone, pollutants, recycle, rainforest, renewable resource, solar energy, solid waste, threatened, toxic poison, wastewater.

2. Find suitable words from task one to the following definitions.

- a gas produced when animals breathe out or any material containing carbon is burned;
- gases used in refrigerators, fire extinguishers, air conditioners, and plastic foam that damage the ozone layer;
- the study of organisms and their environment;
- a community of plants and animals living together;
- all the surroundings of an organism, including other living things, climate, air, water, soil;
- when animals and plants die out and are gone from the Earth forever (dinosaurs);
- when gases from the factories, electric power mills, cars trap the sun's heat and warm up the Earth;
- a gas that makes up about 21% of the Earth's atmosphere; all living things need it to survive;
- of gas high in the sky, which protects us from the harmful ul-

traviolet (UV) rays of the Sun that cause skin cancer & crop damage;

- tropical evergreen woodlands that receive at least 100 inches of rain a year;

3. Translate the following sentences:

- a) Plants and animals are organic nature.
- b) On the Earth plants make one third.
- c) The cycle of nature links plants and animals.
- d) This natural process gives man and animals oxygen.
- e) The Sun gives energy for heating homes.
- f) Plants are special living things; they accumulate sunlight.
- g) Man and animals breathe in oxygen and breathe out carbon dioxide.
- h) Rotting process will give back minerals to the soil, where plants will again use them.
- i) Trees give off a lot of oxygen into the air.
- j) It is necessary to have 1,000 square kilometres of forest for ten million people.

TEXT

Read the text, translate and get ready to retell it.

April 22 - is a special day around the world. On that day inhabitants of Earth celebrate Earth day. Earth day is a time when many people show that they care for our fragile planet. They show concern about the threats the planet faces - destruction of the rainforest, holes in the ozone layer, the greenhouse effect, and too much garbage, and all forms of air and water pollution. It is a day for people to learn what they can do to preserve the planet Earth. The first Day was held in the USA 35 years ago, in April 1970. At that time, Americans were just beginning to learn about the problems facing the planet.

WHAT'S HAPPENING

Air pollution

Until about 150 years ago, the air was pure and clean – perfect for people to breathe. Then people started building factories. Those factories, then cars - put a lot of harmful gases into the air. Today the air is so polluted that it's not always safe to breathe. Many cities have air filled with a pollution called "smog". It is so strong in some places that the air looks brown. Polluted air is bad for people, animals and trees.

Acid rain

When we look up, we see the clouds and the blue sky. But there are other things in the sky that we don't see. Some of these are harmful to Earth. When power factories burn coal to make electricity and when cars burn gasoline, invisible gases are released into the air. Some of these gases can mix with water and make it acidic, like lemon juice or vinegar.

Sometimes gases get into rain clouds, where they get mixed with rain or snow. Then the acid falls back to earth with rain and snow. This is called acid rain. Acid rain is harmful to plants, rivers, creatures, that live in them. Acid rain kills forests, pollutes water.

Disappearing animals

Every day there are more and more people living on the Earth. All those people need room to live. So they move into places that are already homes for plants and animals.

When people move into new land the plants and animals that we live there begin to disappear. Some even become extinct – which means that they all die out, and are gone from the Earth forever.

Too much garbage!

When you throw sometimes away, it goes in a garbage can. Once a week the garbage truck comes and the can is emptied.

Almost all garbage is taken to a garbage dump, or landfill, where a big tractor comes along and pushes dirt on top of the garbage. So, most of our garbage is just buried. Now we are making so much garbage that in many places there is not enough room to bury it all.

Water pollution

The planet Earth is mostly water. Oceans cover the biggest part of it and there are lakes, rivers, streams, and water underground. All life on Earth depends on water. But we don't always keep water clean. Rivers and lakes are polluted by garbage, or by poisonous chemicals.

The ocean, which is a home to so much life, has been used as a place to dump garbage and poisonous chemicals for a long time.

The greenhouse effect

The Earth is surrounded by a blanket of invisible gases (carbon dioxide) that act just like a greenhouse. The sun shines in, and the blanket of gases traps the heat like a roof. That's good – we can't live without warmth.

Factories, electric power mills, cars make a lot of new gases. The new gases are trapping more and more sun's heat. This is called the greenhouse effect or global warming.

If the Earth's temperature gets hotter by just a few degrees, it could change the weather all over the planet. Places that are warm would become too hot to live in, and places that are cold would become warm. The places that grow food could get too hot to grow crops.

The ozone hole

Up in the sky, above the air we breathe, there is a layer of gas, called ozone. It helps us by blocking out rays from the sun that can harm our skin, and by letting the rays that are good for us come through. We are lucky to have the ozone to protect us.

Now the ozone layer is being damaged by gases that people have made. The gases are called CFCs, and halons. The CFCs float up to the top of the atmosphere, where the layer of ozone is, and "eat up" the ozone, and "eat up" the ozone. Scientists are very concerned about the ozone layer, because a lot of it has gone away in just a few years.

Exercises

1. Answer the following questions:

1. Why is April 22 a special day?
2. How is air polluted?
3. What have you learned about acid rains?
4. What could happen to many wonderful creatures?
5. What could people do with garbage?
6. Do people need to save our water?
7. Is the greenhouse effect good or bad?
8. What do you know about ozone hole?

2. Find sentences in the text with the following words and translate them:

rainforest, harmful gases, acidic, extinct, garbage truck, garbage dump, water pollution, chemicals, greenhouse effect, carbon dioxide, give off gases, global warming, ozone hole.

3. Put the words in the right order and write down their sentences:

- depends / this water / on / on / Earth / life / all.
- a / blanket / gases / of / by / surrounded / is / the / Earth.
- layer / the / ozone / scientists / are / about / concerned.

- lakes / to / protect / we / streams / rivers / can / oceans / help.
- the Earth / anyone / can / green / help / to / keep.
- greenhouse / trees / fight / help / effect / and us / give / oxygen.
- April / 22 / day / Earth / inhabitants / of / celebrate / Earth.
- air / polluted / for / people / trees / other / plants / but / for / animals / is / not / only bad.
- harmful / for / acid / to / plants / is / rain / rivers / live / in / creatures / them.

4. What sentences do these letters make?

Plants combine carbon dioxide with sun energy water and minerals.
 Protection of the environment is everybody's concern.
 These seas are in danger.
 The Aral sea is on the brink of extinction.
 People support green parties.

5. Fill in the table and translate the words.

Noun	Verb	Noun	Adjective
Change		Variety	
	Achieve		Ecological
	Advance	Environment	
Development		Danger	
	Protect		Industrial
	Pollute		Global
Action		Nature	
	Increase		Safe
Elimination			Numerous
Interaction			Oceanic

6. Give 10-15 words and word phrases, which are connected with “Environment” and make up questions with them.

7. Read the text. What did WHO study? What report did WHO make about super cities? Where do you want to live – in a big city or in a small town? Why? Give your arguments.

Ecological problems of big cities

There are over 150 super cities in the world with population from one to 15 million and more. Tokyo, New York, London, Mexico city, Rio de Janeiro, Moscow are just a few of the cities which have become super cities.

People in super cities suffer from polluted environment: bad water, bad air and noise. A new term, urban climate, is used now for such cities. It means higher temperature, oppressive atmosphere and intensive smog.

Some experts consider that it is practically impossible to protect the big cities from pollution. The World Health Organization (WHO) studied air pollution around the world for over 8 years. Sulphur dioxide and smoke pollute water and have a serious effect on forests, buildings and health of people.

In the WHO report it is shown that the cities with the most considerable level of CO2 in the air are Milan, Teheran, Prague, Santiago and San Paulo. However, some cities with clean air get worse in winter. Helsinki, for example, becomes one of the cities with the largest proportion of it in the air in winter. This must be connected with the heating of houses. They say Glasgow and Warsaw suffer in the same way in winter.

UNIT TWO
CAN THE ATMOSPHERE BE PROTECTED?

Pre-reading tasks

1. Why do you think you know the words without looking up?

carbon dioxide, sulphur, oxide, nitrogen, oxygen, affect, assimilate, atmosphere, base, botanist, centrifuge, collection, cyclone, decorative, delicate, filter, gas, group, ocean, period, principle, resource, selection, separation, ventilation.

2. Match a word in A with a word in B

A	B
consume	a) pollutant
combust	b) variety
eject	c) cleaner
emit	d) combustion
pollute	e) purification
produce	f) consumption
purify	g) ejection
vary	h) production
clean	i) emission

3. What tree names do you know out of the following? Look up the ones you don't know. What tree can you describe? Which one do you like most of all? Why?

oak, cypress, spruce, chestnut, pine, willow, maple, poplar, alder, lime, larch, beech.

TEXT

Read the text and answer the questions.

It is reported that every 10 years the volume of pollutants in the atmosphere is doubling. The amount of wastes released into the "fifth ocean" is to be reduced. But not every industrial plant has a filter. The impact of industry on the biosphere is compensated by the inner resources of nature's self organization.

There were undertaken industrial ventilation steps according to the air sanitation programme in Russia. Specially selected varieties of trees and plants were suggested by the botanists as "sky cleaners". These "green friends" are capable of assimilating various components of industrial pollutants from the atmosphere. There are some plants which became reliable protectors of the atmosphere. They absorb noxious gases which have a negative effect on the environment and release oxygen into the atmosphere.

Air pollution destroys trees. The closer they stand to the buildings and towers of industrial enterprises the more wilted their crowns are. Still it is known that plants have been absorbing as much carbon dioxide as people and animals have been exhaling. This implies a typical example of B "closed-cycle" principle of self-purification in nature.

Green hedges of trees, shrubs and grasses produce a decorative effect and protect the nearby fields from pollutants, ejected from pulp and paper mills. The front rows of the hedge are formed by the most reliable specimens: oak, maple, cypress. These are followed by "medium-strength" plants (chestnut, spruce, alder) and behind their spreading crowns stand more delicate trees — limes, pines and larches. Such excellent "vacuum cleaners" as willow, beech, poplar, have the ability to absorb at least 100 kgs of chlorine and disulfide especially in their vegetation period. One hectare of spruce forest annually "sucks in" 30 tonnes of dust.

Exercises

1. Match English words and their corresponding Russian equivalents.

waste water	выбросы газов
waste gases	сточные воды
waste paper	отработанный щелок
waste liquor	макулатура
waste wood	повторное использование
waste recovery	отходов
waste land	зброшенные земли
	древесные отходы, дрова
vacuum dryer	фильтр
vacuum filter	сушилка
vacuum pump	очиститель, пылесос
vacuum regulator	насос
vacuum cleaner	сборник
vacuum collector	регулятор

2. Choose a suitable English word.

- | | |
|-----------------|--|
| 1. ботаника | a. botany, b. botanical, c. botanist |
| 2. потребитель | a. consume, b. consuming, c. consumer |
| 3. сокращение | a. reduce, b. reduction, c. reduced |
| 4. промышленный | a. industry, b. industrial, c. industrialization |
| 5. защита | a. protect, b. protection, c. protecting |
| 6. поглощать | a. absorb, b. absorption, c. absorbing |
| 7. выброс | a. waste, b. wasted, c. wasting |
| 8. сжигать | a. combust, b. combusting |

3. Translate the following adjectives into Russian:

self-restoring, self-organizing, self-producing, self-supporting, self-purifying, self-regulating, self-maintaining, self-protecting, self-collecting, self-cooling.

4. Write down adverbs using the suffix -ly.

annual, excellent, close, special, heavy, direct, wide, usual, natural, rapid, efficient.

5. Complete the sentences, using the text:

1. The hedges are formed by...
2. The effect of self-purification of the trees is based on...
3. During their vegetation period trees...
4. It is the task of the industrial enterprise...
5. Industrial ventilation studies were developed according to... .

6. Translate the sentences:

1. Уменьшает вредные выбросы в атмосферу.
2. Сокращает загрязнение воздуха.
3. Воздействует на разрушение крон деревьев.
4. Компенсирует внутренние ресурсы природы.
5. Защищает от проникновения в почву.
6. Поглощает продукты вредных выбросов.

7. Say in 5-6 sentences how the atmosphere can be protected?

UNIT THREE WATER IS LIFE

Pre-reading tasks

1. Do you know the words? If you do, can you say why?

atmosphere, ocean, cycle, mile, cubic, condensation, globe, planet, material, industry, irrigation, container, reservoir, climate, topography, utilization, conservation, protection

2. Write down two groups of the following words (nouns and adjectives):

container, salty, harmful, never-ending, condensation, evaporation, unchanging, supporter, resourceful, precipitation, quantity, quality, irrigation, pollution, consumer, usable, supplier, natural, important, cubic, topography.

TEXT

3. Read the text, find some sentences which could be its subtitles:

Water is the natural resource we all know very well. One cannot live without it. We know it's many forms - rain, snow, ice, hail, vapour, fog. Yet, water is the natural resource we least understand.

How does water get into the clouds? What happens when it reaches the Earth? Why is there sometimes too much and other times too little of it? And, most important, is there enough water for all the plants, and all the animals, and all the people? Water covers nearly three fourths of the Earth, most being sea water. But seawater contains salts, including those that are harmful to most land plants and animals. Still, it is from the salty seas and oceans that most of our fresh water comes - no longer salty and harmful. Water moves from clouds to land and back to the ocean in a never-ending cycle. Ocean water evaporates into at-

mosphere leaving salts behind, and moves across the Earth as water vapour. Water in lakes and rivers also evaporates and rises into the air. Having cooled in the air the water vapour condenses and falls to the Earth as rain, hail or snow, depending on region, climate, season and topography. This part of the cycle is very important because man can use water stored in the atmosphere only when it falls to the land.

Every year about 450,000 cubic kilometres of water evaporates from the oceans and about 61,000 cubic kilometres from land sources. Water is an unchanging and ever renewing, resource, but its distribution on the surface of the globe varies greatly - there is either too little or too much water. Many problems are caused by too much water when we do not need it or too little when we want it. No natural resource on our planet has so many uses as water. We need water to support our lives, to grow our crops, to water our stock, to power our industries and for many other purposes.

Our water needs are great and they continue to grow. Agriculture requires great quantities of water to provide food and raw materials for industry; industry consumes not less water than agriculture. Per capita (на человека) use of water is increasing rapidly in the world.

There is plenty of water on the Earth. Man's activity is accelerating the process of water pollution, the amount of fresh water available to use is decreasing rapidly.

Measures must be taken against waste of water and pollution of water. We have to improve methods of irrigation in order to use water more efficiently.

Exercises

1. Translate the following word combinations, paying attention to Participle 1 and Participle 2:

irrigated lands, irrigable lands, irrigating canals; changed conditions, changeable weather, man changing nature; Methods used

by the scientist, usable material, the scientist using this method; accepted quality, acceptable plan, people accepting plans; measured distances, measurable distances, measuring instruments; water controlled, controllable water, measures controlling the use of water.

2. Which of the underlined words are nouns, which of them are verbs?

1. Water vapour rises and falls due to temperature changes. 2. Greenhouse effect changes climate. 3. Temperature changes cause either evaporation or precipitation. 4. We water vegetables in the evening. 5. Everyone needs water. 6. Air and water support life on our planet. 7. What measures have you taken? 8. Who measures the field before sowing? 9. Some animals make a store of food for winter. 10. They store food for winter. 11. It is waste of time to wait for him any longer. 12. Don't waste time! 13. Put waste paper into a dustbin!

3. Say the following in one word:

1. Salt water, which covers most of the Earth's surface. 2. The planet on which we live. 3. The system of things of which we ourselves are a part. 4. The mixture of gases that surrounds the Earth. 5. The common liquid, which fills the rivers, lakes, seas and oceans. 6. Water vapour either in the air or condensed on a surface. 7. Any form of vegetable life. 8. Any kind of plant, which is used for food. 9. The earth in which things grow. 10. The surface of the Earth. 11. The slid part of the Earth's surface contrasted with water and sea.

Air, Earth, water, sea, nature, plant, vegetable, moisture, soil, ground, land

4. Ask your classmates: What is air?, What is water?, What is earth? etc. Refer to the 3d exercise.

5. Link two sentences using conjunctions as, because, though, when, if, but:

1. Plants are very important. People use them for many purposes. 2. They do not obtain high yields of crops. The climate of the area is good for agriculture. 3. Some students worked as ecologists. It was a good practice for them. 4. To work in an industrial enterprise with ecological problems is useful for students of our speciality. It helps them become good specialists. 5. There is much water on the Earth. Its distribution varies greatly. 6. The students will gather fruit. The weather is fine. 7. There is always a change in the ecosystem. The population of one kind of animals increases.

6. Translate the following word combination. Mind that in the noun chain the last noun is the main one, the others become attributes.

farm crop cultivation, farm crop cultivation improvement, plant protection measures, great soil erosion difficulties, industry and agriculture contribution, modern farm equipment requirement, new farm machinery and equipment deliveries, land reclamation work, fertilizers producing plant construction, world water resource distribution, ecosystem equilibrium state, soil nitrogen content analysis, farm machinery maintenance problems, per capita water consumption.

7. Look through the text and render it in Russian, then in 5-7 sentences in English.

Water

Every day 25.000 people die as a result of bad water management. Some two thirds of the world's population is without clean water - and as a result diarrhoea kills 4.600.000 children under five every year.

Only a tiny fraction of the water, which covers the Earth, is of use to humanity: 97% is salt water, filling the oceans and seas.

Of the remainder, 99% is out of reach - frozen up in icecaps and glaciers, or buried deep underground. We depend on what is left - in rivers, lakes and accessible aquifers - to quench our thirst, wash away our wastes, water our crops and, increasingly, to power our industries.

In most parts of the world, this limited supply is overstrained. Industrial wastes, sewage and agricultural run-off overload rivers and lakes with chemicals, wastes and nutrients, and poison water supplies. "Acid rain" - often caused by power station emissions thousands of kilometres away - sets off a chain reaction, which kills life in vulnerable lakes and rivers. Sediments from eroded land silt up dams, rivers and hydroelectric schemes. Where water sources are shared by more than one country, these problems are compounded. One country's waste disposal unit may be another's drinking water. Deforestation upstream may cause floods or shortage downstream, while a country's hydroelectric, irrigation and public water projects may cut off its neighbour's supply. About 40% of the world's population depends on water from a neighbouring country. Of over 200 river systems shared by two or more countries, several have already caused international conflict - and as the world grows thirstier these tensions increase.

UNIT FOUR WASTEWATER BECOMES USEFUL

Pre-reading tasks

1. Look up the pronunciation of these words and practice to pronounce them:

biochemical, biological, effective, filtration, form, hydrological, industry, irrigation, manufacture, material, method, mineralization, norm, organic, problem, process, production, regime, reservoir, role, specific, substance, technological.

2. Which of the following words do you know, which don't?
water supply, urgent, depletion, hydrological cycle, non-returnable losses, snowmelt water herbicides, integral part.

TEXT

Read the text and underline the sentences which may serve as its outline.

In the recent decades the problem of water supply to people and economics has become extremely urgent. The depletion of such water resources as surface water and ground water is inevitable. Water resources are continuously renewed within the hydrological cycle. But with the abundance of water in the technological processes in major industries non-returnable losses of fresh water may increase its shortage.

Building dams, reservoirs and canals is the important factor of the transformation of the hydrological regime. An essential measure is the conservation of water by all possible means, so as to decrease its expenditure per unit of production until "dry" technologies (технология с сухой обработкой) are established. It is very important to combat the pollution of rain and snowmelt water through the use of herbicides, pesticides and other toxic chemicals. Settling basins should be built to collect the

most polluted run-off water especially at the beginning of snowstorms and during snow melt.

It is advisable to use industrial wastewater for field irrigation. This measure is of importance since soil is a very favourable medium for rendering waste water harmless especially if used with small irrigation norms. Thus, waste water which is harmful when discharged into rivers and reservoirs becomes useful. Irrigation can be applied to increase soil moisture, to protect plants from frosts and dry winds, to apply fertilizers. Another measure is the conversion of industrial and heat power generation to closed-recirculating water-supply systems, which do not require water of high quality. This method of rendering waste waters harmless must form an integral part of production technology.

Exercises

1. Match English and Russian word combinations.

ground fresh white clarified purified non-waste polluted residuary	water	вода	безотходная свежая попочвенная осветленная оборотная очищенная загрязненная
to make less harm to	environment atmosphere water resources soil trees	причинять меньше вреда	почве водным ресурсам атмосфере окружающей среде деревьям

2. Which of the two Russian variants corresponds to the English equivalents:

1. distilled water a) дистиллируя воду
 b) дистиллированная вода
2. treated pollutants a) обработанные загрязнители
 b) обрабатывать загрязнители
3. removed particles a) удаленные частицы
 b) удалять частицы
4. installed clarifiers a) устанавливающие осветлители
 b) установленные осветлители
5. contaminated sources a) загрязнять источники
 b) загрязненные источники
6. decreased norms a) сниженные нормы
 b) снижать нормы
7. provided volume a) обеспечивающий объем
 b) обеспеченный объем
8. eliminated discharges a) удаленные выбросы
 b) удалить выбросы

3. Find words close in meaning

sewage water, prior, pollute, facility, amount, treat, reduce, quantity, decrease, produce, process, manufacture, aim, goal, contaminate, possibility, before, residuary water

4. Find antonyms:

harmful, minority, many, near, small, increase, harmless, liquid, far, majority, safe, few, large, decrease, dangerous, solid.

5. Translate the following word chain:

potential environmental pollutants, artificial wastewater cleaning, water pollution control plant, surface stream substances, colour removal techniques, specially installed clarifiers, distilled water evaporator, municipal sewage system.

UNIT FIVE ECOSYSTEMS

Pre-reading tasks

1. All these words you will find in the text. Do you need a dictionary to understand them?

ecosystem, organism, component, organic, climate, temperature, process, photosynthesis, energy, bacteria, material, cycle, evolution, equilibrium, to regulate, to adapt, vegetation, region, factor, atmosphere, ozone, utilization, globe, resource

2. Find suffixes and prefixes in the following words. Do you know any other words with the same suffixes and prefixes?

interrelated, decomposer, interact, inorganic, development, evolution, physical, impossible, unreasonable, wildlife, movement, consumption, relation, moveable, replace, non living, chemical

3. Read the sentences. Can you say what the text will be about?

- An ecosystem consists of a number of living organisms and their physical environment.
- There are 6 major components in an ecosystem.
- The main processes in ecosystems include: food chains, materials cycles, development, evolution.
- An ecosystem exists in a state of equilibrium.
- The evolution of an ecosystem is caused by factors, inside and outside it.
- Today life on the Earth is in danger: man himself might destroy the equilibrium of ecosystem by pollution, extinction of wildlife and unreasonable utilization of the globe's material resource.

TEXT

An ecosystem consists of a number of living organisms and their physical environment. The living organisms and their non-living environment are interrelated and interact with each other.

There are 6 major components in an ecosystem:

1. inorganic substances
2. organic compounds
3. climate, temperature, wind, light and rain which affect all the processes in an ecosystem
4. producers; green plants which are able to manufacture food from simple inorganic substance in the process known photosynthesis
5. consumers; Primary consumers: they obtain their energy, from green plants. But secondary consumers such as dogs and cats feed on other animals.
6. decomposers, such as bacteria and fungi. Bacteria break down the flesh of dead animals. Fungi break down plant material. They enable chemical substances to return to the physical environment.

The main processes in ecosystems include:

1. food chains
2. materials cycles
3. development
4. evolution

Food chains. The Sun's energy travels through an ecosystem. The proper transfer of energy through an ecosystem by the producers, the consumers and the decomposers is called a food chain.

Materials Cycles. Materials cycles include cycles of nitrogen, carbon, oxygen, water and mineral salts. Chemical substances move from the non-living environment to living things. They are then returned to the environment.

Development. An ecosystem exists in a state of equilibrium. It can support a certain number of plants and animals of differ-

ent species. If the population of one animal increased, there would not be enough food and water for all the animals. Consequently, some would die. In this way the ecosystem regulates itself and returns to its state of equilibrium. Ecosystems are not static - they change all the time. Plants and animals are able to adapt to changes in the physical environment. For example, if fire destroyed the vegetation in a region, there would be certain changes. First grass and some flowers would grow. Then insects would appear. The wind would blow the seeds of small trees. These trees would grow and birds and animals would appear.

Evolution. During long periods of time ecosystems evolve. The evolution of an ecosystem is caused by factors inside and outside it. Consider the evolution of the atmosphere: when life began there was no oxygen in the atmosphere. Consequently, the Sun's rays prevented life from developing on land. The first living organisms developed under the sea. After the evolution of photosynthesis, the oxygen in the atmosphere increased and life expanded. Complex living organisms developed. As the oxygen in the atmosphere increased, a layer of ozone was formed; life would be impossible without it on the surface of the Earth.

Today life on the Earth is in danger: man himself might destroy the equilibrium of ecosystem by pollution, extinction of wildlife and unreasonable utilization of the globe's material resource.

Exercises

1. Complete the following interrogative sentences, answer them.

- a) What would you do if you... (to make a good ecologist; to see too much garbage in your yard; to see that someone cuts down a birch; to make a good biologist; to protect our nature).
- b) What would have happened if you... (not to protect our environment; not to save rainforests; not to save ozone layer; not to prevent global warming; not to stop polluting air and water).

2. Say it one word.

1. Heat or light produced by burning.
2. One thickness of matter or substance.
3. Substance consisting of two or more elements chemically united in fixed proportions by weight.
4. A gas without colour, smell or taste, necessary for all life, which forms about one fifth of the air.
5. A gas without colour, which forms about four fifth of the air.
6. Non-metallic chemical element occurring in carbon-dioxide and carbonates and in all organic compounds.
7. Kind of material having more or less constant properties.

(Substance, compound, nitrogen, carbon, oxygen, fire, layer)

3. Divide the sentences into two groups (real and unreal).

1. He would give you a lot of examples without any difficulty.
2. The engineer demanded that the tractor should be tested.
3. Provided your sister sees the picture ask her to describe it.
4. The student will not be able to translate this text unless he gets a good dictionary.
5. I.V. Michurin grew different kinds of fruit so that he might provide the people with such food as had never existed before.
6. Without the Sun there would be no light, no heat, no energy of any kind.
7. If there had been oxygen in the atmosphere when life began, the sun's rays would not have prevented life from developing on land.
8. Without decomposers chemical substances would not be able to return to the physical environment.
9. If the amount of energy at the end of a food chain did not depend on the length of the chain each plant would provide a large amount of energy.
10. Without respiration of all living things carbon dioxide would not be returned to the air.
11. If ecosystems did not change all the time plants and animals would not be able to adapt to changes in the physical environment.
12. Without the radio scientists cannot watch man-made satellites.
13. Many scientific and technical problems might be solved with the help of mathematical formulas.
14. If

there were no atmosphere, there would be no clouds, no rain.

4. What question would you ask in the following situation?

1. Suppose large industrial cities appear all over the world.
2. Suppose the ozone layer is growing thinner.
3. Suppose all the world governments pay attention to the environmental problems.
4. Suppose there are no acid rains on the Earth any more.
5. Suppose lots of wonderful creatures are extinct.
6. Suppose dinosaurs live on the Earth now.
7. Suppose we (people) do everything to keep out water clean and healthy.
8. Suppose the Sun warms the Earth more and more.
9. Suppose the Earth's temperature gets hotter by just a few degrees.
10. Suppose anyone can help to keep the Earth green.

5. Read the text and find the sentence which is the definition of the biosphere.

Both living and non-living components make up ecological systems that may be of different size. A forest or an ocean may be considered to be an ecosystem. The largest ecosystem of all is our planet that is known as an ecosphere or biosphere. The biosphere is the region extending a few thousand feet above and below the Earth's surface in which life exists. The biosphere did not always exist. The evolution is likely to have been very slow. The modern biosphere seems to have had its beginning two or three billion years ago.

6. Work in pairs: one is a journalist, the other is an environmentalist. Discuss the disappearance of the rainforests.

7. Answer the questions. (Mind that "Don't, aren't...isn't..." etc. takes quite a lengthy explanation).

1. Isn't it possible to live without a car in the city?
2. Don't all large cities have the problem with the air?
3. Don't you think to forbid cars in the city is a good idea?
4. Doesn't one need a car more in the city than in the country?
5. Didn't people live in harmony with environment for thousands of years?
6. Hasn't Nature served Man since ancient times?
7. Hasn't Man's interference in nature increased with the development of civilization?
8. Doesn't world industry pollute the atmosphere every year?
9. Isn't air and water pollution the result of Man's careless interaction with nature?
10. Aren't pollutions in big cities harmful?

UNIT SIX SOIL AND ITS MANAGEMENT

Pre-reading tasks

1. Can you guess the meaning of the words?

factors, phosphorus, calcium, magnesium, system, mixture, rock, organic materials, machinery, natural, operation, practice, recommend, result, macro elements, molybdenum, cultivated.

2. To what part of speech do the following words belong to. Can you do it just looking at the suffixes?

management, factor, natural, condition, farming (system), successful(ly), consideration, organic, existence, directly, indirectly, domestic, machinery, fertilizer, loamy, sandy, various, treatment, production, growth, irrigation, primary, secondary.

3. Write down new words and memorize them.

farming - сельское хоз-во, занятие сельским хоз-ом, хозяйствование

loamy soils – суглинки

consume – потреблять

consumer - потребитель

to till - возделывать, обрабатывать землю

tillage - обработка почвы (с помощью с-х орудий)

tiller- 1) земледелец, 2) культиватор

tilth - состояние почвы после обработки

lime - известь, известковать

treatment - обработка

to lack - испытывать недостаток, не хватать

rate - норма, степень, скорость, темп

germination – прорастание

TEXT

Read the text and answer the questions.

1. What does good soil management mean?
2. Has man depended on the soil during his entire existence?
3. What should people do to get good soil?
4. What microelements do you know?
5. Why should farmers make soil tests?

Good soil management means proper use of many factors such as natural conditions, land, crops, livestock, machinery, fertilizers and some others. All these factors have to be put together to farming system work successfully. One of the most important things to be taken into consideration in producing plants and crops is the soil, which is known to be a natural resource that supports plant life. It is a mixture of particles of rock, organic materials, living forms, air and water.

During his entire existence upon the Earth man has depended upon the soil either directly or indirectly. Grain, fruit and food products obtained by man directly from the soil, domestic animals consume grain and forage and provide people with meat, milk, eggs and other products used as human food. These are the products obtained from the soil indirectly.

Some good clay and loamy soils are naturally highly fertile; some light sandy soils are naturally poor. Various factors that make up the soil fertility are moisture conditions, plant food, and soil structure. All these components may be regulated by proper management of the soil. Soil management is the science of tillage operations, cropping practices, using fertilizers, lime and other treatments conducted on, or applied to, soil for the production of crops.

Plant growth and yields can be increased by applying certain recommended soil management practices, liming, fertilization and irrigation producing, as a rule, immediate yield increases. Good soil management results in better yield and lower cost per

unit of production. Fertile soils produce plants that are less affected by diseases and less attacked by insects. In this case we have smaller losses of crops.

Some time ago attention was centred on such macro elements as phosphorus, nitrogen and potassium. Now, it is well known that in addition to primary plant food elements mentioned, so-called secondary elements (calcium, magnesium, and sulphur) as well as microelements (boron, copper, manganese, zinc, and molybdenum) may be highly important, for crop yields, for livestock and human health.

That is why all farmers should make soil tests in order to determine whether any essential elements are lacking in the soil and to determine the rate of fertilizers to be applied. Thus, the most important thing for the farmer is to get the land into good condition and to keep it that way. Such land is more easily cultivated and provides better conditions for seed germination and plant growth. The quality and yields of crops produced partially depend on the soil management followed. They also depend on the quality of the seed to be used, the variety of the crop to be grown, and some other factors.

Exercises

1. Translate into Russian:

crop cultivation, crop cultivation improvement, plant protection measures, great soil erosion difficulties, industry and agriculture contribution, modern equipment requirements, new machinery and equipment deliveries, land reclamation work, world water resource distribution, ecosystem equilibrium state, soil nitrogen content analysis, machinery maintenance problems, per capita water consumption

2. There are three groups of the words according to their meaning. Find them.

East, soil, purpose, tree, stage, winter, raise, aim, seedbed,

North, wheat, sheep, summer, land, crop, level, timber, South, grow, task, cow, spring, cultivate, degree, horse, forest, potato.

3. In the text find English equivalents to the following:

Моменты, которые нужно принять во внимание; суглинистые почвы; все существование; прямо или косвенно, внимание было сосредоточено; основные питательные элементы растений, факторы, которые составляют плодородие почвы; операции по обработке почвы; другая обработка; поражаемые болезнями; быстрое увеличение урожая; так называемые вторичные элементы; в этом случае; таким образом; как правило; вот почему; для того, чтобы определить; норма удобрений; для прорастания семян; качество семян.

4. In the text find synonyms of the following:

domestic animals, to take into account, whole, to eat, to get, different, to concentrate, harvests, usually, rapid, quick, cultivation, besides, kind, sort

5. Find antonyms of the following in the text:

artificial, man-made	fertile
inorganic	the same
directly	decrease
neither... nor	drainage
produce	worse

6. Match a word in A with a word in B.

A	B
sandy	management
natural	germination
domestic	health

yield	elements
organic	conditions
proper	soils
small	increase
secondary	animals
human	losses
seed	matter

7. Are the following sentences true or not?

- a) Dairy and meat products are obtained directly from the soil.
- b) Loamy soils are less fertile than sandy ones.
- c) Ploughing and harrowing are tillage operations.
- d) Liming is harmful for the soil and does not produce any yield increases.
- e) Irrigation is usually done on watery soils.
- f) Zinc and copper are primary plant food elements.
- g) Farmers should do soil tests in order to determine if there are insects and worms in it.
- h) The variety of the crop to be grown is not very important for good yields.
- i) Every day the probes of air, water, soil are tested and radioactive background is researched.
- j) But environmental problems have grown beyond the concern of a single country. Their solution requires the cooperation of all nations.

8. Write down all the words and word combinations connected with "soil". What can you add about that subject?

Soil

Soil is one of major and invaluable natural resources. It provides raw materials for the plants on which we depend for food. The soil and the living organisms of a region are interdependent. Soil is both affected by the flora and fauna of the region and the

type of soil determines the flora and fauna of the region.

Consequently, harm to soil will destroy the balance of nature, which is dangerous to human life. Cause of such harm can be physical or chemical; it can be caused by man or by natural phenomena. As it is known unscientific farming practices deplete soil fertility and cause a loss of minerals.

Erosion can be caused by wind or by flowing and falling water. The problem of saving soil much depends upon the control of water. There are several ways of preventing harm to soil, including the use of fertilizers to prevent loss of minerals and the use of grass and other plants to prevent erosion.

Some researchers have come up with a new formula that helps form a crust in to protect it against wind and water erosion stabilizing its fertility. Tests have shown that the new substance increases the amount of useful water-stable mineral elements in the soil. Thus, fruit gardens and cotton fields in sandy areas treated with this substance have shown a 30-per-cent increase in the yields.

Soil plays an important role in the life of the world and mankind, but it cannot reproduce itself. Only by careful study of the soil will man be able to provide food for all the people on globe. Man should improve it through good management and treatment so that in future farming could be more efficient than it is today.

UNIT SEVEN UTILIZATION OF NATURAL RESOURCES

Pre-reading tasks

1. What suffixes are used in the following words?

utilization, greatest, natural, economically, unlimited, harmful, environment, preservation, economy, intensive, industry, agriculture, practical, economic, investment, specialist, ecological, geologist, forester, professional, agronomist, education, mathematician.

2. Give the infinitive of the following non-standard words:

taken, built, meant, been, had, shown, known, come, learnt, held, begun, seen, got, fallen, cut, thought, kept.

3. Do you know the following words in English?

социолог, биолог, экономист, физик, биохимик, математик, геолог, агроном, лесник, инженер, специалист, эколог.

TEXT

Read the text and tell in few words, what the text is about?

The problem of national utilization of natural resources is of greatest importance all over the world today. There are two main aspects of the problem: first - all natural resources are to be used more economically as they are not unlimited, and second - measures are to be taken to prevent harmful effect of waste products of industrial enterprises on the environment.

All people are interested in nature preservation as all natural resources are national property. In Russia the programme on nature conservation has always been part and parcel of the development of national economy. As a result in Russia pollution of the environment as a whole is 10-20 times lower than in the USA or FRG.

Now in the period of most intensive development of industry and agriculture, the programme of nature conservation is of special importance. According to this programme, practical measures on rational and economic utilization of natural resources in different spheres of economy are planned.

One of the means to solve both aspects of the problem is to build complex enterprises. It means that the production process in the complex must be organized so that waste products of one enterprise could be utilized and processed by another. On the one hand, it will have great economic effect, and, on the other hand, will protect air and water from pollution.

Though complex enterprises will require rather big capital investments, it is better both from economic and ecological point of view to prevent pollution of the atmosphere than to liquidate its effect.

For example, it has been shown that under the influence of air pollution the yield of wheat decreases by 40-60%. When we use natural resources we should be careful not to destroy the balance of the biosphere in order to preserve nature not only for people living now, but also for those who will live many thousand years after.

To realize measures to be taken for nature conservation, to fulfil the programme on rational use and reproduction of natural resources, co-operation of specialists in different spheres of science and practical activities is wanted.

To solve ecological problems sociologists, biologists, economists, physicists, biochemists, mathematicians, geologists, agronomists, foresters, engineers are coordinating their work. That is why some basic information on ecology is to be part of professional education of specialists in different spheres of science.

Exercises

1. From the context guess about the meaning of the bold words:

1. To solve this complex problem **cooperation** of specialists in different spheres is needed. 2. This year the level of water is **two** times higher than last year. 3. Natural resources are not **unlimited**. 4. The programme on rational utilization and **reproduction** of natural resources is of great importance for nature conservation. 5. The workers must **fulfil** the plan in time. 6. Cooperation of specialists in different spheres of **practical activities** will help solve the problem of nature conservation. 7. **Basic information** on ecology is to be given to future ecologists, biologists, geologists, economists, engineers, and students of other specialties. 8. There is a plant in the town where fruit and vegetables are **processed**. 9. **Waste products** of chemical enterprises are harmful for environment. 10. Natural balance must not be **destroyed**.

2. Translate the sentences with the construction "there is", "there are".

1. There will be a new chemical plant not far from the farm. 2. There may not be enough snow in the fields this winter. 3. There must be a new milking machine on that farm. 4. Can there be any new information about land reclamation in this journal? 5. There exist many new varieties of this vegetable crop. 6. There can be no growth without air. 7. Will there be solar energy warning our houses? Will there be flying machines but no cars in future? Was the air pollution in AD 1000? Where there great scientists in that year? Will there be air and water pollution in every part of the world in AD 2100? Will there be cities with millions of people and no countryside in AD 2100?

3. The following phrases and sentences make a plan of the text but one moment is missed. Which one?

Natural resources are not unlimited; nature preservation and con-

servation; complex enterprises will require big investment; not to destroy the balance of biosphere; cooperation of specialists in different spheres; basic information on ecology.

4. Which of the following statements are not true according to the text?

1. The problem of national utilization of natural resources is of the least importance.
2. All people are interested in nature preservation.
3. Practical measures on rational utilization are planned.
4. To solve the problem is enough to protect air and water from pollution.
5. When we use natural resources we should be careful to destroy the balance of biosphere.
6. Cooperation of different specialists is wanted.
7. To solve ecological problem only environmentalists have to cooperate.

5. Make up an annotation of the above text according to the model.

Annotation

New Energy from Old Sources
Ecological Journal, volume 82, №5, 2004, New York

The article is titled "New Energy from Old Sources". It is written by an ecologist of New York University - Professor J. Brown. The article was published in Ecological Journal, volume 82, and №5, 2004, New York.

The paper focuses on the problems of energy sources. Recommendations are given on the usage of some unusual resources. The article is intended to assist ecologists, engineers and those who are interested in ecological problems.

6. Make up an abstract (a brief summary) of the text according to the model.

Abstract

New Energy from Old Sources
Ecological Journal, volume 82, №5, 2004, New York

The headline of the article is "New Energy from old sources". The author of the article is an ecologist of New York University - Professor J. Brown. It is taken from Ecological Journal, volume 82, and №5, 2004, New York.

The article deals with the problems of sources of energy. It describes how people can get energy from unusual sources. The author outlines the problems of natural resources as well.

Accordingly the paper is devoted to the important problem of finding solutions of energy problems. Data are presented on the fact, that the stock of fossil at present time is the main source of energy and it is constantly reducing. Besides, the author brings to light the idea of developing some methods of realizing new sources of energy. Suggestions are made on the usage of energy from under-Earth stock of steam, reusing of deposit's energy.

Therefore the need is stressed to save more energy and to employ other sources of energy (the heat of the steam deposits, currents and tidal energy; the power of wind; subterranean hot waters, wave power, etc). Moreover, the article attempts to clarify the possibility heating dwelling-places with the warmth of the Sun's heat and supply energy for small villages from the wind-mills. Suggestions are made on the usage of the solar cell. Finally the author comes to the conclusion that the problem of getting new energy must be thoroughly studied, as it is very actual and important today.

Thus, the mentioned sources can give good chance for energy in the future. It's safe to say, the article may be of great importance for ecologists, engineers and those who are interested in ecological problems.

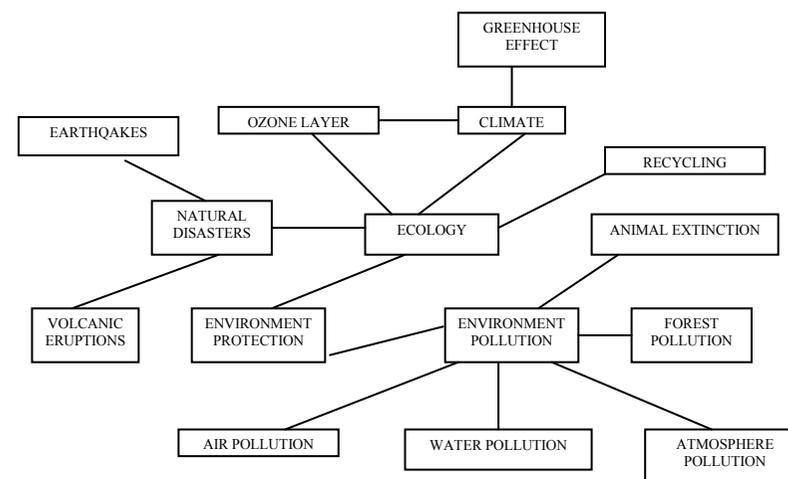
PART 2

**UNIT ONE
PROBLEMS AND SOLUTIONS**

Pre-reading tasks

1. Do you know all the words and word combinations in the chart?

Do you agree that *ecology* is concerned with all these problems? What other problems would you add to the chart?



2. Read and remember the following words and expressions:

- conquistador - захватчик, грабитель
- cope with - справиться с
- deterioration – ухудшение
- discrepancy - расхождение
- doomsday - день страшного суда

TEXT

Look through the text without a dictionary and give the main idea of it. Say it in 5-6 sentences.

If a chemist or a physicist or anyone for that matter endeavoured a brief description of the current environmental problems, he would find it troublesome and far exceeding the knowledge of an individual scholar, for the situation with our environment has long become a subject of joint research of scientists from different fields who have to combine their wisdom and information from still other domains, with experts in sociology, psychology, philosophy hurriedly coming into the picture.

Yet, to put it briefly, one of the causes of the current situation with our environment should be searched in the lack of development of particular fields of knowledge, and of an inadequate picture of the intricately acting whole, which our planet.

It is man's intervention in nature that has singled him out from the rest of the animal world since his early days. It is this very intervention that has landed him in this highly technological world of ours, with the rate of progress in particular fields being faster than that in our fundamental knowledge of the general operation of the Earth.

It is this very discrepancy between the two rates which appears to be the cause of most of today's problems. This is, by no means an exhaustive explanation, overlooking as it does, the social factor.

The threat to his environment is a demanding problem man has to cope with at the beginning of the 21st century. What is so particular about the environmental crisis when compared with the other menacing problems that of a nuclear catastrophe, say? Surely not its global character and everybody's involvement.

A nuclear catastrophe, as seen nowadays by practically even one everywhere, would inevitably involve any country, no matter how small or big it is, and would disturb every individual, whatever life he might be living. Should it happen, its inescapa-

bility is too obvious to be disputed. So is its explosive character.

In contrast to this the environmental crisis is of an accumulative nature. It is just not clearly understandable and the intricate pattern of the interaction of all factors that makes it so hazardous. For no single action taken, or decision made, can bring about an immediate catastrophe, nor could there be the last step that would set in motion an avalanche of irrevocable and immediate events leading to the ultimate doomsday. It is only step by step that we approach the critical point.

Consequently, what is needed first and foremost is that we take close to our hearts the possible adverse impact of the long-range effects of our actions, however noble the motives may seem to us at present, on the entire human civilization. Should we fully realize the danger, quite a new approach to the problem would appear.

Next comes the urgent need for basic research to get more profound knowledge of the cause-effect relationship, the time factor necessarily taken into account, in the whole realm of human environment, both natural and man-invaded.

Fundamental and irreversible as they may often be, the changes in our environment are not likely to bring mankind to the brink of extinction overnight. It would take us some time yet to get there. So let us use the time for learning how to preserve our planet in good shape and in running order for an indefinitely long time.

Exercises

1. Read the text with a dictionary and answer the following questions.

1. Why can't an individual scientist describe the environmental situation?
2. What is a demanding problem man has to cope with at the beginning of the 21st century?
3. What is common and what is different between environmental

crisis and nuclear catastrophe?

4. What has separated man from the rest of animal world?

5. What is necessary to do to preserve our planet?

2. Look through the text again. Could you say what words, word combinations, phrases the author uses to describe the following:

environmental crises

possible solutions of the problems mentioned

threat to living organisms

threat to the Universe

3. Could you adopt and abridge the text. Suppose you are to tell teenagers about the problem.

4. Translate the following sentences. Pay attention to emphasis with "it":

1. It is these properties of crystals that are the most important. It was the laboratory where all this started.

2. It is crude oil that comes from the ground.

3. It is man's intervention in nature that has singled him out from the rest of the animal world.

4. It is this mixture that returns to the Earth in the form of acid rain.

5. It is in this stable layer that disturbing changes are occurring.

6. It is essentially Vernadsky's concept that we use today.

5. Do you know that...

The weather has a powerful effect on people. It influences health, intelligence, and feelings.

In August, it is very hot and wet in the southern part of the U.S. Southerners have many heart attacks or other kinds of health problems during this month. In the Northeast and the Middle West, it is very hot at some times and very cold at other

times. Many people in these states have heart attacks after the weather changes in February or March.

The weather can influence intelligence. For example, in a 1938 study by scientists, the IQ (коэффициент умственного развития) scores of undergraduate college students were very high during a hurricane, but after the storm, their IQ scores were 10 percent below average. Hurricanes can increase intelligence. Very hot weather, on the other hand, can lower it. Students in the U.S. often do badly at exams in the hot months of the year (July and August).

Weather also has a strong influence on people's feelings. Winter may be a bad time for thin people; they usually feel cold during these months. They might feel depressed during cold weather. In hot summer weather, on the other hand, fat people may feel unhappy. At about 65 °F people become stronger.

Low air pressure relaxes people. It increases sexual feelings. It also increases forgetfulness: people leave more packages and umbrellas on buses and in stores on low-pressure days. There is a perfect weather for work and health. People feel best at a temperature of 64°F with 65 percent humidity.

Are you feeling sick, sad, tired, forgetful or very intelligent today? The weather may be the cause.

6. Are the following statements true or false?

1. Weather influences people's health and feelings.

2. There is the same number of heart attacks in every part of the US in every month of the year.

3. Intelligence (IQ) never changes.

4. Hot and cold weather affects all people the same way.

5. Very hot weather usually lowers intelligence.

6. Some weather influences are temperature, storms and air pressure.

7. The higher the air pressure is, the higher people's forgetfulness.

8. Winter may be a bad time for fat people.
9. There is a perfect kind of weather for people's work and health.
10. Humidity level is very important for people to feel well.

7. What information in this text is new to you or seemed strange or funny?

8. What do you think connects the two texts, though the subject seems different?

UNIT TWO AIR POLLUTION

Pre-reading tasks

1. You know the following scientific terms, don't you? And what about their pronunciation?

chemicals, sulphur, nitrogen, oxide, mixture, sulphuric, nitric acid, symptoms, acidified.

2. Say the following in one word:

- a) used, damaged or unwanted matter
- b) precipitation containing high levels of nitric and sulphuric acid resulting from car exhausts and factories
- c) substance that pollutes especially a waste product of an industrial process
- d) the external world in its entirety.

pollutant, waste, acid rain, nature.

3. Form adjectives from the following nouns by means of the suffix "-al". Translate them into Russian.

N + al = adj.

e.g. practice - практика

practical – практический

industry, theory, structure, tradition, culture, nature, physics.

TEXT

Read the text and find a sentence which may be its title.

"The most alarming of all man's
assaults upon the environment is the
contamination of air, earth, rivers and sea with

dangerous and even lethal chemicals."
Rachel Carson, *Silent Spring*

Air pollution is the result of man's use of lethal chemicals, and is a common hazard in both industrial and developing countries. One form of air pollution is acid rain.

Acid rain results from the release into the atmosphere of sulphur oxide and nitrogen oxide. Electrical generating plants, industrial boilers, large smelters, and automobiles are among the chief sources of these emissions. The gases react with water droplets, forming a diluted mixture of sulphuric acid and nitric acid, and it is this mixture that returns to the Earth in the form of acid rain, mist, or snow. Pushed by wind currents, the acid rain often falls to the ground far from its point of origin.

Acid rain is killing vast stretches of forest in Canada, the United States, and central and northern Europe. In Europe nearly every species of tree is affected. Symptoms include thinning of leaves and needles, deformed growth, and, in some cases death. Acid rain has acidified lakes and streams, rendering them unable to support fish, wildlife, plants, or insects. In Sweden at least 40,000 of the 90,000 lakes have been affected, and in the United States one of five lakes suffers from this mistype of pollution.

Exercises

1. Answer the following questions:

1. What does this text deal with?
2. What are the most alarming of all man's assaults upon the environment?
3. What does acid rain result from?
4. What are the chief sources of harmful emissions?
5. What are the after-effects of acid rains?

2. Use the following phrases in sentences of your own.

air pollution; both ...and; chief sources; wind currents; vast

stretches; deformed growth; acidified lakes (streams, rivers); northern Europe; affected trees.

3. Could you add any information about the problem; if you find it difficult try to recollect some texts from Part One about acid rains.

4. Do you know that...

In many lakes the fish are dying. Fishermen are worried because every year there are fewer fish and some lakes have no fish at all.

But dead fish may be just the beginning of the problem. Scientists are finding other effects of acid rain. In some large areas trees are dying. Not just one tree here and there, but whole forests. At first scientists couldn't understand why. There were no bugs or diseases in these trees. The weather was not dry. But now they think that the rain was the cause. Acid rain is making the earth more acidic in these areas. Some kinds of trees cannot live in the soil that is very acidic.

Now scientists are also beginning to study the effects of acid rain on larger animals. For example, they believe that some deer in Poland are less healthy because of acid rain. If deer are hurt by the rain, what about people? This is the question many people are beginning to ask. No one knows the answer yet. But it is important for us all.

5. Translate the following sentences into Russian. Pay attention to the Infinitive Constructions:

A.

1. I want him to tell me about the application of this method.
2. I've heard the professor speak about a new method of using solar energy.
3. They expect scientists to find other effects of acid rain.
4. No one wants him to report about the results.

B.

1. People living there don't want this electrical power plant to be built.
2. The fishermen of the village would like the lake to be purified.
3. We expect our pond to be purified too.
4. Most parents like their children not to throw litter on ground

C.

1. The students are said to know the ecology well.
2. This method is believed to be the best one.
3. Acid rains are considered to be a very serious problem.
4. Many people consider acid rain to be a serious threat to the environment.
5. They are expected to kill many trees in the area.

D.

1. To study its effects one needs good laboratories.
2. To give the students the necessary knowledge of the lethal chemicals was the main task of the laboratory work.
3. Not to hurt by acid rains we should find the solution.
4. To support wild life much more attention must be paid to ecology.

6. You can make a report about acid rain and its harmful effects, can't you? Can you do it using not less than 20 sentences?

**UNIT THREE
STRATOSPHERIC OZONE**

Pre-reading tasks

1. Match a line in A with a line in B.

A.

- a) ecology
- b) environmentalist
- c) ecologist
- d) environment
- e) ozone layer
- f) green house effect

B.

- a region in the upper atmosphere containing a high amount of ozone gas that absorb the Sun's ultraviolet radiation.
- the phenomenon by which the Earth's atmosphere traps some of the Sun's heat as it radiates from the Earth's surface.
- a person who works toward protecting the environment from destruction or pollution.
- a specialist in a branch of science concerned with the interrelationship of organisms and their environment.
- a division of biology concerned with the relationship between living things and their environment.
- the complex of climatic, adaptive and biotic factors that act upon organisms and ecological community and ultimately determine its form and survival.

2. Say to what part of speech the following words belong to. Translate them!

result – resultant; diffuse - diffusible - diffusion – diffusive;
evaporate - evaporated - evaporation - evaporator – evaporative;
contain – container; soluble – solution; science - scientist - scientific;
react - reaction - reactionary - reactive – reactivity; emit – emission – emissive;
produce – product – production - productivity

TEXT

3. Look through the following text taken from J. Firror's book "The Changing Atmosphere" and describe the problems of stratospheric ozone. Use the following expressions:

The article deals with... - статья связана с...

I'd like to draw your attention to ... - мне бы хотелось привлечь ваше внимание к ...

In my opinion ... - по моему мнению...

The fact is that... - дело в том, что...

As far as I know... - насколько мне известно...

Ozone plays an important role in the high atmosphere in addition to screening out UV-B. By absorbing ultraviolet sunlight, ozone deposits the heat associated with this light into that level of the atmosphere, thus creating a layer much warmer than those immediately below. The stable region so named is the stratosphere. It is in this stable layer that disturbing changes are occurring. As scientists' understanding of the chemical reactions that create and destroy ozone increased, it became clear that relatively small quantities of some substances could change these reactions and hence the amount of ozone in the stratosphere, provided those substances were placed in the high atmosphere. And chlorine, an effective chemical catalyst that can change ozone into normal oxygen, is appearing in rapidly increasing

concentrations in the atmosphere.

Ordinarily there is very little chlorine in the stratosphere. Chlorine gas is sometimes spilled in industrial or shipping accidents, but this gas reacts strongly with almost any water drop or particle it touches and, as a result, is used up long before it can diffuse upward. Ocean waves throw up small droplets of salty water, some of which evaporate, leaving salt particles in the air. Although these particles contain chlorine, the chance that one of them will get as high in the atmosphere as the ozone layer is small, since salt is very soluble and these particles are readily washed out of the air by the rain. Some biological systems emit methyl chloride, a gas that contains chlorine. But this gas reacts fairly rapidly with other substances, and most of it disappears before it can diffuse to the stratosphere. Thus, strong barriers prevent chlorine from reaching high in the atmosphere, unless people contrive to put it there.

If we did wish, for some reason, for chlorine at the Earth's surface to move into the atmosphere, we would have to arrange for the emission at the surface of the Earth of a chlorine-containing gas. We would, in addition, have to find a chlorine-containing gas that did not react readily with anything, one that was not very soluble, and one that, upon reaching the stratosphere, could be broken down to release free chlorine only by the action of strong ultraviolet light. (If it were broken down too soon, by sunlight that penetrates low into the atmosphere, the free chlorine would react with something and be removed.) The properties I have just described would also make the gas extremely useful here at the surface of the Earth, and people have worked hard to create such a substance.

Laboratory scientists created such substances decades ago. They are called chlorofluorocarbons, indicating that they contain carbon, fluorine, chlorine, and sometimes hydrogen. The name is frequently abbreviated to CFC, and a numbering scheme is used to tell how much of each element is in the molecule of the

particular CFC under discussion. CFC-12, for example, has one atom of carbon, no atoms of hydrogen, two atoms of fluorine (and, by implication, two atoms of chlorine) in each molecule.

Two of these substances, CFC-11 and CFC-12, have proved so valuable in a number of applications that more than 20 million tons have been manufactured worldwide. Most of these 20 million tons still exist and either escaped to the atmosphere or eventually will. Once in the air, these substances mix and diffuse, finally reaching all parts of the atmosphere. Those CFC molecules that find themselves in the stratosphere are subjected to intense ultraviolet radiation from the Sun; they split apart into smaller fragments, releasing chlorine. The chlorine then starts a new career as a catalyst in the reactions that destroy ozone.

Damage to the layer of ozone in the high atmosphere by human activity is complex, esoteric, and completely invisible to anyone but the scientists who are studying the issue. Yet, Wound the world, people who twenty years ago had never heard the word ozone are now worried about its disappearance.

Exercises

I. Translate the following sentences paying attention to the predicate in the passive voice. You know that passive forms are rather often used in scientific style, don't you?

1. They are called chlorofluorocarbons.
2. The name is frequently abbreviated to CFC, and a numbering scheme is used to tell how much of each element is in the molecule of the CFC under discussion.
3. These particles are readily washed out of the air by the rain.
4. Those CFC molecules that bind themselves in the stratosphere are subjected to intense ultraviolet radiation from the Sun.
5. The stable layer is disturbed by chemical reaction.
6. Chlorine gas is something spilled in industrial or shipping accidents.

2. If you were a teacher could you pick out key words of the text? Make up sentences with them.

3. Do you know that...

Oxygen usually consists of two molecules, but in the form O₃, it has 3 molecules. O₃ is a pale blue gas which when concentrated can easily explode, and it causes the dark colour in the sky when there is a storm. It is created by nitrogen oxides and hydrocarbons from car exhausts and it is the most dangerous chemical in air pollution in our cities. But if O₂ is bad for life near the ground, high in the atmosphere is good for life. Here it is destroyed by chlorofluorocarbons produced by fridges, sprays and air conditioners, and in 1985 scientists noticed for the first time that above Antarctica there was now a hole in the O₃ layer. This hole lets in ultraviolet rays from the sun, which in the next seventy years will cause at least seven million extra cases of skin cancer in the United States alone.

4. How is this text connected with the "Stratospheric Ozone"?

5. Write out all the scientific terms from the both texts. Are you sure of their pronunciation? If not, look them up! Can you make up simple sentences with them?

6. "Stratospheric Ozone" is not easy to read. Can you adopt, abridge it and then retell?

UNIT FOUR GREENPEACE

Pre-reading tasks

1. Do you know the pronunciation of the words? Sure you know some. The ones you don't know, look up in a dictionary!

delicate, destruction, conservationist, balance, ecosystem, nuclear, sabotaging, wildlife, species, annual, arisen, organization, maintain, climb, unconscious, inflatable.

2. What do you know about Greenpeace and its activities in Russia? Would you like to be its member?

TEXT

Read the text. There are 10 paragraphs in it. Which one expresses the idea of the text most brightly?

Most people are aware that the earth is a delicate thing, and that it cannot last for ever, if we don't take care of it. Apart from the dangers of blowing each other up, there is the problem of pollution of the environment, and the destruction of wildlife by hunters.

Many species of whale, for example, are in danger of extinction because of hunters who continue whaling despite the world's attempts to limit the annual catch. Seals are also threatened; and with the increasing use of nuclear power to generate electricity, a new danger has arisen; the pollution of ocean by nuclear waste.

The Greenpeace organization exists to draw our attention to these problems. It is a conservationist group, and its aim is to protect the environment and maintain the balance of ecosystem.

It uses direct action to prevent the killing of whales and seals, and to stop the dumping of nuclear waste at sea.

As well as actually sabotaging activities in these areas, it uses diplomatic pressure to persuade governments to pass new laws to make these things illegal. It is also a supporter of alternative technology and the use of wind, solar, and sea power to generate electricity.

In its most recent campaign, Greenpeace sent two of its ships, Sirius and Cedarlea, to the Atlantic to meet up with two Dutch ships which were dumping nuclear waste at sea. The action took place about 250 miles off the Spanish coast. Members of the Greenpeace team climbed aboard one of the Dutch ships and handcuffed themselves to a crane. Later on they launched inflatable boats and sailed underneath the falling barrels of waste. Unfortunately they had to call off their action when one of their pilots was injured; a falling barrel had turned his boat over and thrown him against the engine, knocking him unconscious.

This is the way Greenpeace operates: actions speak louder than words. It is to prevent the sea being used as a nuclear dustbin. If the barrels ever leak, they argue, nuclear contamination would quickly spread through the sea and present a serious threat to many countries. Spain would be among the first affected. For this reason the Sirius was given a very friendly reception when it called at the Spanish port of Vigo, even though the mission had been called off.

Greenpeace has had several adventures at sea. Apart from its involvement in anti-nuclear activities, its concern for whales has also taken it to the oceans, where its methods of stopping the work of whaling ships have been just as daring.

Greenpeace places its boats between the harpoon and the whale, forming a human barrier through which the whalers are unwilling to shoot. This gives the whale time to escape. Success has rewarded the campaigners' efforts to save whales.

They are also active in trying to save the lives of the world's

seals. Every year 250,000 seals are slaughtered in Newfoundland, Canada. These unfortunate seal pups are shot or clubbed to death, and their pelts are then sold in Europe. Efforts to put a stop to the slaughter have included blocking the way of the hunters' ships, protecting the seals, and making their pelts useless by daubing them with harmless but indelible dye.

In these ways Greenpeace makes us aware of how our activities disturb the ecosystem, and forces official organizations to think of the long-term consequences of their actions.

(Sven Parker. From "Modern English International")

Exercises

1. Form the opposite of the following words by omitting the prefixes and translate them into Russian:

e.g. independent – dependent

inorganic, unequal, improbable, unreal, insufficient, illegal, impossible, incomparable, unstable, irregular, unconscious, inflatable.

2. Read the text. Which text do you find more interesting the first or the second? Give your reasons.

GREENPEACE CRUSADE

After scaling the chimney of a St. Petersburg incinerator and unveiling banners in protest against pollution of the Baltic Sea, Greenpeace activists left the city at the end of April 2001 and sailed for a similar action in Russian one enclave of Kaliningrad. Tom Masters joined them aboard the ship, "Greenpeace", to sample the life at sea of members of the world's most famous environmental group.

Stepping aboard "Greenpeace" in the docklands of St. Petersburg is like passing through a portal into a different world. Away from the brown, oily water of the Neva and the air thick

with industrial emissions and traffic pollution, the inside of the ship is a model of environmental respect.

Refuse is strictly divided up for recycling, the use of detergents for washing is kept to an absolute minimum, and a biological sewage treatment system on board uses bacteria to consume human waste, rather than dumping it into the sea. Despite the arrests of fifteen Russian Greenpeace activists, none of the ship's crew was detained, and the action is pronounced a success.

It had been ten years since the last Greenpeace boat visited St. Petersburg, and while the crew was expecting a warm welcome, no one was prepared for the lines and lines of people wanting to come on board and see the ship up close, or the estimated 10,000 people who attended a Greenpeace rock concert. "It was just amazing to have so many visitors to the boat", says Matilda, Greenpeace press officer. "We had over 5,000 visitors on the first day alone. On Saturday, a newly married couple came straight from their wedding ceremony to the ship".

The trip to Kaliningrad is one leg of its Toxic Free Future Tour, a global tour undertaken to promote awareness of persistent organic pollutants (POPs) that will end later this month in Stockholm, Sweden, with the signing of a treaty banning the use of toxic pollutants produced in industrial processes, Greenpeace first enjoyed fame when it sailed into the sight of U. S. nuclear testing on Amchitka Island off the coast of Alaska in 1971, and, borrowing a tradition that had its roots in Quakerism, bore witness passively to events that were outside their power to prevent.

While bearing witness has often been replaced by non-violent direct action, Greenpeace remains an essentially maritime organization and currently operates six boats, a helicopter, an action bus and a hot-air-balloon.

Later this year, Greenpeace hopes to launch its seventh boat, which, as radio operator Emily explains, will be nothing short

of revolutionary", since it is equipped with a specially designed engine that, cutting edge technology, will give off almost no emissions whatsoever. The vessel is also unique in that it has already become the first boat ever to have its name chosen by an Internet vote. The name, Esperanza, beat out rivals when voting took place through the Greenpeace International Web site.

3. Find the English equivalents to the following expressions from the text.

to appear; nuclear tests; to number; headquarters; to launch; a campaign; the Mururoa atoll; to denounce; to dump; radioactive waste; to result in; acid rains; to set out; sailing boat; yacht; to climb; chimney; to rouse public opinion; humanity itself; to undertake actions; to blow up; "Rainbow Warrior"; to be about to; to frighten.

4. Render the text in English.

«Гринпис» - международная организация защитников окружающей среды. Она возникла в начале 70-х годов из группы активных противников испытаний ядерного оружия. Сегодня в нее входят почти два миллиона человек из пятнадцати стран. Международная штаб-квартира «Гринпис» находится в Лондоне. Однако организация имеет десятки своих представительств и контор во многих государствах.

«Гринпис» приступила к активным действиям сразу после своего создания. В 1972-1973 годах она начала кампанию протеста против ядерных испытаний Франции на атолле Муруроа. Она осудила практику захоронения в океане радиоактивных отходов, бесконтрольную деятельность монополий, порождающую кислотные дожди и Северной Америке и Европе.

Основной метод борьбы «Гринпис» - пассивное

сопротивление. Активисты «Гринпис» направляются на парусниках и яхтах к районам испытаний ядерного оружия, взбираются на заводские трубы и т. д. Таким образом они пытаются будоражить мировое общественное мнение, привлечь его внимание к проблеме выживания самого рода человеческого.

10 июля 1985 года агенты французских спецслужб взорвали одно из судов организации - «Рейнбоу Уорриор» в новозеландском порту Окленд. Это судно готовилось отплыть к атоллу Муруроа. Взрыв был устроен с целью запугать активистов движения, настойчиво требующих немедленного прекращения испытаний ядерного оружия, проводимых Францией в южной части Тихого океана.

5. Try to speak on the topic "Living Green" or make up a detailed plan for a report.

6. Chose one of the given topics for a written report.

1. Industrial pollution and Waste disposal.
2. The Destruction of the Rainforests.
3. The Ozone Layer.
4. Petroleum - the Driving Force of Energy.

UNIT FIVE

FIGHTING TO SAVE BAIKAL'S PURE WATER

Pre-reading texts

1. Write down the transcription of the words.

unique, illegal, safeguard, commercial, location, venture, threat, sewage, nurture, financial, percent, onslaught, pressure, southern, nonchlorine.

2. Read and remember the following words and expressions.

to bottle - разливать по бутылкам

venture - рискованное предприятие

threat - угроза

sewage - сточные воды, нечистоты

remote - отдаленный

nurture - питание, питать, выращивание

"Jewel of Siberia" - Жемчужина Сибири

self-purification - самоочистка

the Mediterranean - Средиземное море

TEXT

Look at the title of the text. Can you say what it is about.

What do you know about the problem?

Scientist Mikhail Grachev spent a decade studying the natural wonders of Siberia's Lake Baikal - so ancient and isolated its water is acclaimed as among the purest in the world. Last year he helped open a factory to bottle the lake water and sell it.

For Grachev, the commercial venture is an attempt to combine Russia's economic transformation with environmental preservation: to save the world's oldest and deepest lake by making money from it. Although the bottling plant for drinking water is not yet a financial success, the scientist hopes that it will safeguard the 640 kilometre-long lake from growing manmade

threats.

Lake Baikal, with 20 percent of the world's supply of fresh water, was long protected by its remote location north of Mongolia. But today, its legendary purity and unique life forms are under attack from industrial pollution, illegal logging and untreated sewage. Cherished by Russians as the "Jewel of Siberia," Lake Baikal is like an inland sea, with the world's only species of freshwater seals, a complex system of self-purification and hot water vents that nurture life in the deep. Environmentalists worry that the lake's ecosystem may not be able to survive the chemical onslaught for many more years. No one is sure how much longer the lake can take this pressure.

Among the two dozen scientific expeditions to the lake each year, a team of US, Russian and Japanese experts, has begun taking core samples from the lake bottom. An earlier 195-meter-long sample provided a geological record dating back more than 2.5 million years. This winter, they hope to extract sediment dating back more than 5 million years. Scientists can use the sediment to study the pace of evolution and compare it with climatic change. Lake Baikal supports more than 2,500 species - including 960 kinds of animals and 400 plants found only here.

The most visible symbol of Baikal's degradation stands on its southern shore: the Baikalsk Pulp and Paper Mill. Although the mill, a former military factory, filters the tons of waste water it pours into Baikal every day, enough toxic chemicals reach the lake to kill creatures in a contaminated zone about a square kilometre and a half. The mill, with its 30-year-old equipment, is nearing the end of its life span, but its managers and workers are eager to keep the mill open so they can continue working and living in Baikalsk.

In an attempt to save both the mill and the lake, the US Agency for International Development paid the US company and Grachev's institute to draft a plan for rebuilding the factory. Under the proposal, the mill would switch to a nonchlorine

manufacturing process - eliminating dioxin, waste water and the burning of coal. The biggest drawback of the project is its \$600 million price.

Experts agree that in the long run, the best way to protect the lake and provide jobs is to develop ecologically sensitive tourism. If Russia and foreign investors had enough money to spend, they could create a world-class tourist centre with new roads, lake-shore hotels, docks and ski resorts.

Exercises

1. Read the text again and describe the problems facing environmentalists in Baikal Lake's ecosystem.

2. Read the following sentences and say whether the statements are true or false. Correct the false ones using the following expressions:

As far as I know...

The point is that...

To my mind...

If I'm not mistaken...

- The main idea of the studying the natural wonders of Siberia's Lake Baikal by scientist Mikhail Grachev was to intensify the geological prospecting for natural resources.

- Scientific searches have provided core samples from the lake bottom dating back more than 5 million years.

- The Baikalsk Pulp and paper Mill is harmful for the environment.

- The best way to protect the lake and provide jobs is to develop ecologically sensitive tourism.

3. Look through the interview made by A. Bombard, a well-known French biologist in 1973. What problems are discussed here?

Q. Dr. Bombard, is the Mediterranean actually dying from pollution?

A. I would say, yes, it is. If pollution continues at its present pace my estimate is that the northern half will be almost dead in 10 years. It would take only 15 years for the whole of Mediterranean to become dead as far as marine life is concerned.

Q. Is there anything about the Mediterranean that makes it highly vulnerable to pollution?

A. Yes, it's much more fragile - in the ecological sense — than most people realize.

First of all, it's a closed area. In fact, it has more of characteristics of a lake than a sea. There are no permanent currents which could move waste materials. That's why, if a big oil tanker ever breaks up in the Mediterranean, the coasts will be polluted for 20 years or so.

And finally, the Mediterranean has densely populated coasts, especially along the northern rim.

Q. Under the best conditions, how long would it take the Mediterranean waters to be renewed?

A. If you stop all pollution of the Mediterranean now, it would still take about 100 years before the sea becomes clean.

Q. Is the Mediterranean polluted everywhere?

A. Not exactly, because there are several kinds of pollution. 'Surface pollution - mainly from petroleum products — is something you find everywhere.

Then there is the vast human and industrial pollution generated by the densely populated coasts stretching from Strait of Gibraltar to the heel of Italy. Along the Yugoslav and Greek coastline there are fewer industrial and population centres, but the situation is getting worse there, too.

Q. Who is hit hardest by pollution in the Mediterranean?

A. In the long run, everyone suffers. But the vitality of a sea is measured by the amount of life in it, so it is the fisherman who suffers most. Scientists - Spanish, and Italian, and French - have

pointed out that the fish in the Mediterranean are declining rapidly. Sardines are getting harder to find. And tuna fish are doomed in the not too-distant future. In 10 years there won't be a single tuna in the Mediterranean. Aside from the fishermen, it's the tourists who pay the heaviest price.

They will find fewer beaches where it's safe to swim and fewer pleasant spots for camping.

Q. Is anything being done about water pollution?

A. Until there is an international agreement on environmental problems, there is not much that can be done. All countries and all peoples are so linked by the seas that international cooperation is the only answer to our mutual problems.

As for myself, I don't believe in vast projects, such as trying to reach zero economic growth. I do not think it's realistic. But we could create products which are recyclable. We could try to agree on measures to stop tankers from flushing out their fuel compartments at sea. We could get industries to agree to put antipollution measures into their factories. That's where the start has to be made.

4. Are the problems raised in the 1973 interview by a French biologist actual today?

5. Do you know if the pollution of the Mediterranean Sea and Lake Baikal has grown less or more since 1973.

6. If you were Prime-Minister what would you do to save "The Jewel of Siberia"?

UNIT SIX WHY SAVE TROPICAL RAINFORESTS?

Pre-reading tasks

1. Do you know the pronunciation of the words? Consult a dictionary if you don't.

jungles, dozens, equator, vegetation, encourage, deserts, value, species, enormous, erosion, release, vegetation, absorb, enormous, carbon dioxide, export, erode.

2. Read and remember the following words and expressions:

rainforests - тропические леса

to be concerned - беспокоиться

benefit - польза, выгода

to go beyond - превышать что-либо

released into - разрешать, выпускать

soil - почва

at a rate - со скоростью

per minute - в минуту

overlook - игнорировать

TEXT

Read the article to find out benefits to be gained from saving rainforests.

Tropical rain forests—those steamy jungles shown in movies, where it's always hot and it rains every day - are in trouble, and people around the world are becoming concerned. The rock star Sting has organized concerts to save the Brazilian rain forest, I dozens of environmental groups have raised millions of dollars to save tropical rain forests and send experts to help. Yet there are many people who say, "Why save rainforests? Aren't people more important than trees?"

Located in a belt of 33 countries, mostly around the equator,

more than half of the tropical rain forests have disappeared in the past fifty years. Some are actually turning into deserts. With these forests disappearing at a rate of 100 acres per minute every minute, nearly everyone in the world has something to gain from saving them. For example, scientists have learned that over 1,300 rain forest plants in the Amazon have medicinal value. So far less than 10 percent of the plant and animal species in the world's rain forests have been studied for their possible medical benefits and -of those that have been studied - less than one percent has been tested for the potential value in the treatment of cancer.

But the value of tropical rainforests goes beyond medicine. These forests have a critical impact on global weather patterns. Their vegetation absorbs enormous quantities of solar energy, thus affecting wind and rainfall patterns around the world. This vegetation contains huge amounts of carbon dioxide. As the forests disappear, the carbon dioxide is released into the air and contributes to "global warming" - what we know as the "greenhouse effect." Rainforests also help to prevent soil erosion in areas that could be damaged by floods and wind, and they also prevent pollution.

However, the benefits of rain forests are often overlooked, especially in developing countries where poor farmers move into forest land because they have no alternatives. Many governments encourage forest clearing to make room for mining, cattle, or export crops. The cutting down of forests is viewed in terms of a short term gain that benefits relatively few people - those who take over the land.

The loss of a tropical rain forest affects many more people - the forest people who lose their homes, the farmers whose soil erodes, the people whose water supplies are polluted, and others. Income from mining, export crops, timber, and cattle can be calculated in dollars, but the benefits of the forest as a protector of the land cannot.

Exercises

1. Answer the following questions.

- a) Where are most of the world's tropical rainforests located?
- b) How many tropical rain forests have disappeared in the past fifty years?
- c) Besides medicine what are some other benefits to be gained from saving rainforests?
- d) Why are the benefits of rainforests often overlooked?
- e) Who is affected by the loss of rainforests?

2. The list below presents some of the reasons people have given for saving rainforests.

Rank the reasons from 1 (most important) to 7 (least important):

- to preserve knowledge as native rain forest people die or are forced to move their knowledge of rainforest plants and cycles is lost forever.
- to prevent local problems the destructions of rainforests causes serious local problems such as soil erosion and water pollution.
- to respect nature people have no right to destroy the world's rainforest and other habitants for their own purposes.
- to save bird species outside the tropics many bird species from other parts of the world migrate to tropical rainforest and depend on these forests for survival.
- to preserve tropical plant and animal species.
- to allow new medicines to be discovered.
- to prevent wood and food products from becoming scarce people all over the world depend on rainforest products and foods, such as bamboo, bananas, nuts and coffee.

3. Do you know that...

From earliest times plants have played a very important part in everyday life of mankind. The three great necessities of life - food, clothing and shelter - and a number of others are supplied

to a great extent by plants. Without plant life neither animals nor human beings would be able to live.

Most of the things we use in everyday life are made from plants. The chairs we sit on, the paper we write on, the houses we live in - all come from plants. Our clothes also come from plants. Plants are used as timber in the making of furniture and as fuel. There is a great number of drugs (opium, camphor, quinine, etc.) derived from plants. Industry is largely dependent on plants: they yield dyes and oils used for soap, fibres, rubber, scents and many other valuable products.

Thus according to their usage plants may be divided into three classes: food plants, industrial plants and medicinal plants; the first support life, the second protect life, the third preserve life.

Plants can also be classified as annuals, biennials and perennials. Annual plants produce seeds the first year. Biennials produce seeds the second year. Perennials produce seeds during many years. And finally one must never forget the great aesthetic value of plants.

Plant is alive. It breathes and absorbs food, and so it has different organs which carry out its lifework. The most important organs of a plant are roots, stems, leaves, flowers, fruit and seeds. Roots help the plant in food-making. They take water from the soil containing dissolved minerals and pass them to the leaves through vessels in the stem. Leaves make food for the plant from the air with the help of light and the water supply from the roots. The plants begin flowering when they are mature. Due to the wind and insects the seeds are formed in the flower to reproduce the plant.

4. Answer the following questions.

1. What do plants supply to people?
2. What plants supply food?
3. What do plants give to industry?

4. What plants are of aesthetic value to people?
5. What does a plant consist of?
6. What are roots necessary for?
7. What happens in leaves?
8. When do flowers appear?
9. What do plants have in stems?
10. Is it possible to live without plants?
11. What classifications of plants do you know?

5. Translate into Russian, pay attention to reduced relative clauses.

e. g. Have you found the keys (that/which) you lost?
Вы нашли ключи, которые потеряли?

The bed (that/which) I slept in last night wasn't very comfortable.

Кровать, на которой я спал прошлой ночью, была неудобной.

- I enjoy my job because I like the people I work with.
- Why do you always disagree with everything I say?
- Who was that girl you were with last Sunday?
- The man she is married to has been married twice before.
- Have you planted the seeds I gave to you yesterday? - No, the ones I have planted are mine.

6. Translate the sentences into English.

1. Общество, в котором мы живем, должно быть обеспокоено проблемами окружающей среды.
2. Сосуды, по которым вода поднимается к листьям и цветам, находятся в стебле.
3. Помещение, в котором мы работаем, не имеет хорошей вентиляции.
4. Аппараты, которые используют инженеры-экологи,

имеются в лаборатории.

5. Этот участок земли, который мы хотим исследовать, не очень плодородный.

6. Клубника, которую мы должны пересадить в ящик, в теплице.

7. Большинство лекарственных растений, которые мы покупаем в аптеке, собирают в лесу или на лугах.

8. Волокно, которое люди получают из хлопка и льна, ценнее, чем синтетическое.

9. Шпаргалки (cribs), которые студенты пишут, помогают запомнить материал.

7. Find the right words from the text for the following definitions.

- right, suitable, correct.
- to cultivate the soil.
- one who buys and uses goods and services.
- are very small piece of matter.
- to have not enough of something.
- first or most important.
- a white substance used on acid soils.
- whole, complete.
- not first in value or importance; of education, coming after primary or elementary school.

UNIT SEVEN HOW GREEN ARE YOU?

Pre-reading tasks

1. Find pairs of opposites.

throw away, environment, rubbish, reason, begin, illness, not right and good, anxiety, dustbin, bad, throw out, surrounding, trash, garbage can, landfill site, disease, cause, worry, start, garbage dump.

e.g. throw away - throw out

2. Match a line in A with a line in B.

A	B
landfill	the process of collecting
recycling	used products and remanufacturing them into new products instead of throwing them away.
hazardous waste	not poisonous
	nuclear waste of industrial by-product that is potentially damaging to the environment and harmful to the health and well-being of living organisms
non toxic	a method of solid waste disposal in which refuse is buried between layers of dirt to fill in low lying areas

TEXT

Look through the extracts below and say if they deal with recycling.

American doctors believe that there is a new illness - earth anxiety. What is it? It's anxiety, or worry, about our environment. One of the main causes of worry is rubbish. Years ago we used to throw things away and not think twice about it. Now people are beginning to learn the facts:

In Britain, each, family throws out one tonne of rubbish each year.

90% of this rubbish goes into 'landfill sites' - big holes in the ground in places far away from the city centres. Town councils burn 8% of the rubbish.

Britain only recycles (saves it in some way and uses it again) 2% of all rubbish. America produces 160 million tonnes of rubbish (they call it garbage) and recycles 10%. Britain is very bad at recycling compared with some other European countries.

Britain recycles 16% of all glass bottles.

Holland recycles 62% of all bottles.

Britain recycles 5% of the aluminium from aluminium cans (Coca Cola cans, etc).

Canada recycles . 65% of all aluminium cans.

Britain recycles 26% of all waste paper.

Holland recycles 57% of waste paper.

Sheffield is one of Britain's cleanest cities. Each family has separate dustbins for different kinds of rubbish - one for bottles, one for plastic, one for paper and cloth, one for cans. Is your city or village doing anything to help stop the world's 'rubbish mountain'? Write to your local Council. Persuade them to copy Sheffield. Try to help - it's your world!

Exercises

1. Answer the following questions.

1. How much trash do the British throw out each year?
2. Where does the trash go?
3. Who or what is to blame for the increase in the amount of trash produced?
4. What are some possible solutions to the trash problem?
5. What kinds of trash do you throw away every day?
6. Who is responsible for the collecting trash in your community the department of sanitation or a private company?
7. What are some things people can do to reduce the amount of

trash they throw away?

8. Do you know of any recycling centre or companies in the area where you are living now?

9. Is trash a problem in your home city culture? If so, what efforts are being made to solve the problem?

2. We are much more aware now of the need to look after our environment. Make two lists of things we should do and things we shouldn't do if we want our city not to look ugly and dirty.

3. John Baines, an educational consultant, writes books about the environment. He tries to be "green", that is, to be friendly to the environment. Read about what he has done to be more friendly to the environment.

I think it's a couple of years since I got my bicycle out of the garage and repaired it, and now I use it as much as possible. I use my car less. I try to do ten per cent fewer miles every year, so last year I drove eleven thousand miles, and this year I'm going to try to do only ten thousand. This doesn't mean I travel less, this means I walk more often. When I do my shopping, I always walk now. I use public transport when I can. It's cheaper, and it keeps the air cleaner. In the home I save as much as I can, I don't throw all away. I have different bags for different things. One bag has all the cans going into it, from the cat food to the beer. The second bag has all the papers going into it, and the third bag has bottles, from olive oil bottles to wine bottles to lemonade bottles. But the milk bottles still go on the doorstep so that they can be re-used. I take them to places where they can be recycled. There's a place in the village where you can take my bags. I get washing-up liquid and washing powder that doesn't harm the environment.

4. What are some of the things he does more of and some of things he does less of?

5. Complete the following sentences.

1. John uses his bicycle more because...
2. He's going to try to use less petrol by...
3. He uses unleaded petrol because...
4. When the bags in his kitchen are full...
5. He's a vegetarian because...
6. John thinks that if we don't look after...

6. John thinks that people should try to change their lifestyle little by little, not all at once. How could you become more 'green'? What could you do to be more friendly to the environment? What do you think how 'green' you are?

UNIT EIGHT THE WORLD ENERGY RECOURSES

Pre-reading tasks

1. Look up the following words and write down the translation.

campaign, communication, conservation, hasty, announcer, fairly, representative, resources, flexible, warming, acknowledge, affection, estimate, fossil.

2. Match a line in A with a line in B.

A	B
policy	contribution
solar	energy
valuable	interest
nuclear	fuels
fairly	optimistic
alternative	sources
great	cooker
fossil	flexible

TEXT

Read the communication devoted to the problems of the world's limited resources and say what the position of the speaker is and what organization he represents:

ANNOUNCER: Our final speaker in the studio on the subject of energy is Joseph Huang, Under-Secretary of Energy.

HUANG: Thank you very much for the opportunity to join the discussion.

First, I should like to thank Professor William White of the New England Institute of Technology for his valuable contribution to the discussion. It's also a pleasure to express my thanks to Jane Black, the representative of CANE, the Campaign Against Nuclear Energy for her emotional warning on the harmful use of nuclear energy. I also acknowledge with gratitude and affection the brilliant proposals on the use of alternative sources expressed by Dr. Catalina Burgos, the author of several books on alternative technology. I've been listening to them all with great interest. By the way, I don't agree with some of the estimates of the world energy resources. There's no cause for concern as far as fossil fuels are concerned. Let me assure you that more oil and gas is being discovered all the time. If we listened to the pessimists (and there are a lot of them around), none of us would sleep at night. In the short run, we must continue to rely on the fossil fuels - oil, coal and gas. Wouldn't you agree that we must look to the future? It would be in our own interests if our policy were flexible. Unless we thought new research was necessary, we wouldn't be spending money on it. After all, we wouldn't have a Department of Energy unless most people thought it was important. The big question is where to spend the money - on conservation of present resources or on research into new forms of power. But I'm fairly optimistic. I wouldn't be in this job unless I were an optimist. I can't help feeling that under no circumstances should we come to a hasty decision on that.

Exercises

1. Answer the following questions:

1. Who is the last to speak?
2. Why does Joseph Huang thank Prof. White?
3. Why is he thankful to Jane Black?
4. Why does he highly appreciate Dr. Burgos' work?
5. How does he estimate the world's energy resources?

2. Act out the dialogues. Use the following expressions:

It is important to say... - важно сказать...

It is necessary to note... - необходимо отметить...

This fact deals with... - этот факт связан с...

I fully agree to... - я полностью согласен...

It is considered that... - считается, что...

I am not sure - я не уверен

3. Formulate the main idea of the text. It may be introduced by such word combinations as:

to be of particular interest, of prime significance, of great value.

4. Do you know that...

Ms. Kuehl became fascinated by solar cookers after seeing a demonstration on television in June 1989. She wanted to build one herself so she called her state energy office for help and was referred to the National Appropriate Technology Assistance Service (NATAS) in Butte, Montana, for help. Her case was assigned to information specialist Jim Masker who sent her descriptions and plans for three different solar cookers.

Ms. Kuehl, a frugal homemaker who enjoys doing "craft things," elected to build the least expensive cooker. She found a heavy cardboard box at a local machinery dealership and bought a pane of glass for the top of the cooker. She rummaged around her house for the rest of the materials—glue, black paint, newspapers, and contact paper. "The only thing I had to pay for was the piece of glass," she said. Using plans Masker sent, she went to work assembling her cooker. "It took four to five hours to make," Ms. Kuehl said.

Roasts and other dishes she has cooked in her solar oven have taken a while longer—the pot roast, for instance. Early in the morning, she placed it in a pot and tucked vegetables around it. Then she forgot about it except to turn the box occasionally toward the sun throughout the day. By dinner time, the roast

was done and her kitchen was still cool.

Kuehl has used the cooker to bake apples and roast other meat and vegetable dishes. She doesn't use it every day, of course, and she doesn't use it for every meal. "It has to be a hot, sunny day for it to work," she said. "If it's a little cloudy, it doesn't work well."

5. Answer the following questions.

1. Who is Cindy Kuehl?
2. How did she become interested in solar cookers?
3. What organization provided her with plans for building a solar cooker?
4. What materials did she use to build it?
5. How long did it take her to build it?
6. What are some other things she has already cooked?

6. Translate the following sentences into Russian. Pay attention to the conditional sentences.

1. If we listened to the pessimists (and there are a lot of them around), none of us would sleep at night.
2. It would be in our own interests if our policy were flexible.
3. Unless we thought new research was necessary we wouldn't be spending money on it.
4. After all we wouldn't have a department of Energy unless most people thought it was important.
5. I wouldn't be in this job unless I were an optimist.

7. Write a one-page summary of the information you obtain about substitutes for energy produced by fossil fuels, (coal, oil, natural gas)

biomass, geothermal power, hydropower, nuclear power, solar power.

UNIT NINE

GLOBAL FORECAST: HOT AND GETTING HOTTER

Pre-reading tasks

1. Read and translate the following words and expressions.

climatologists, surface, commission, potential, region, productive, precipitation, unchecked, to cause, flood, saltwater, freshwater, to trap, to fuel.

2. Say the following in one word:

- the increases in world's temperature due to the greenhouse effect of or concerning the whole world
- a statement of future events based on some kind of knowledge or judgment
- the science that studies climate
- the average weather conditions at a particular place over a period of years
- to become or make larger in amount, number or degree.

(forecast, climatology, increase, global warming, climate)

TEXT

Read the text. Could you say anything about the problem by its title?

The year 1990 was the hottest ever recorded. Climatologists estimate that the earth's surface temperature has increased by between .5 and 1.25° F. (-17.5 and -17.08 ° C.) in the past 150 years because of the global warming. Increases of .5 or 1.25° F. may seem small, but the experts are talking about more than a change in the weather—the daily change in temperature, winds, and precipitation. They are talking about a change in the climate—the average weather over a large area for many years. And it may get hotter. In 1990 a United Nations commission of

more than 300 scientists said that if global warming continues unchecked, the earth's average temperature could rise between 6 and 9° F. (-14.4 and -12.7° C.) by the end of the 21st century. What are some of the potential effects of global warming? The weather could become hotter and drier. Important farming regions would dry out and become less productive. The polar ice caps could melt. As the temperature goes up, the melting of the polar ice caps would cause the sea level to rise several hundred feet. Low-lying land areas such as Cairo and the rice floodplains in southern Asia, and entire countries such as the Netherlands and Bangladesh, would be flooded. Saltwater would flow into freshwater, destroying drinking water and irrigation sources.

Climate zones could move. A change in temperature of just a few degrees would cause areas favourable for certain plants and animals to move hundreds of miles. Species unable to keep up with the changes might become extinct.

Global warming, sometimes called the "greenhouse effect" is caused by atmospheric gases—such as carbon dioxide, chlorofluorocarbons (CFCs) and methane—that trap the sun's heat next to the earth, the way that glass traps heat in a greenhouse. Some of these greenhouse gases are a natural part of the atmosphere. The problem, according to some scientists, is that the greenhouse effect is increasing because of human activities: the cutting down and burning of rain forests, the operating of power plants fuelled by coal and oil, and the running of automobile engines fuelled by gas (petroleum).

Exercises

1. Answer the following questions.

1. What are some things that could happen if the earth's average temperature rose between 6 and 9°F (-14.4 and -12.7°C)?
2. How does the greenhouse effect work?
3. What human activities could increase the greenhouse effect?
4. If you were a climatologist, what would you like to discover

about global warming?

5. To your knowledge, has there been any change in weather patterns in your home country in recent years? If so, describe the change.

2. Translate the sentences into Russian. Pay attention to modal verbs: "may, can, could, should".

1. To solve this problem one should know many things.
2. This problem can't be solved without the cooperation of scientists in different branches of science.
3. The weather could become hotter and drier.
4. The polar ice caps could melt.
5. Climate zones could move.
6. And it may get hotter.
7. In 1990 a United Nations Commission of more than 300 scientists said that if global warming continues unchecked, the Earth's average temperature could rise between 6 and 9° F by the end of the 21st century.

3. Give the English for:

глобальное потепление, доказательства, усиление солнечной радиации, парниковый эффект, отработанные промышленные газы, влияние человека, повышение температуры, выброс промышленных газов, среднегодовая температура, флора и фауна, северное полушарие, антарктический ледяной покров, стабилизировать климатическую обстановку.

4. Give the Russian for:

valuable contribution, world energy resources, look to the future, research of new forms of power, the hottest year ever recorded, the average weather, unchecked, potential effects, less productive, polar ice caps, temperature goes up, low-lying land, extinct, human activity, cut down, fuelled by coal (oil).

5. Translate the sentences into English.

1. Обнаружены дополнительные доказательства в глобальном потеплении.
2. Это связано с увеличением отработанных промышленных газов и активизацией человеческой деятельности.
3. Потепление связано и с солнечной активностью и с выбросами промышленных газов, создающих парниковый эффект.
4. Некоторые ученые не согласны с этим.
5. Ученые построили график изменения температур.
6. Метеорологическая весна наступает раньше и северном полушарии.
7. Концентрация углекислого газа будет расти.

6. Render the following text in English.

КТО ВИНОВАТ В ГЛОБАЛЬНОМ ПОТЕПЛЕНИИ?

Состоящий из видных ученых межправительственный Совет ООН по проблеме потепления климата пришел к неутешительному выводу: обнаружены дополнительные доказательства вины человечества в глобальном потеплении.

Ученые, правда, отмечают и иные причины глобального потепления. Например, усиление солнечной радиации и сульфатные брызги, выбрасываемые при вулканических извержениях. Эти выбросы могут, с одной стороны, создавать парниковый эффект, с другой — охлаждать атмосферу, так как отражают солнечный свет. Однако влияние человеческой деятельности все же решающее. Это связано, прежде всего, с увеличением объема отработанных промышленных газов типа углекислого, удерживающего тепло в атмосфере, и аэрозолей промышленного происхождения. Именно этот комплекс создает новую климатическую модель. Эта популярная в научной среде

теория привела к тому, что Совет по проблеме изменения климата склонен теперь более критически оценивать влияние человека.

Группа исследователей во главе с Саймоном Тедом обнаружила, что повышение средней температуры в начале XX века можно объяснить увеличением солнечной активности или сочетанием этого фактора с ростом выброса промышленных газов в атмосферу. Но, начиная с середины 70-х годов, основной причиной потепления всё больше становились промышленные газы, создающие парниковый эффект.

Об этом ученые говорили на научной конференции, устроенной Вашингтонской исследовательской организацией «Ресурсы будущего».

Однако некоторые участники были осторожны в суждениях. Например, профессор Иллинойского университета климатолог Майкл Шлифингер считает, что наука еще не располагает знаниями, позволяющими измерить долю влияния человека на глобальное потепление. Эту точку зрения разделяет и другой эксперт - Рональд Прин из Массачусетского технологического университета.

Тем временем глобальное потепление становится все очевиднее, а его влияние все опаснее. В начале 1999 года ученые из Массачусетского и Аризонского университетов построили график изменения среднегодовой температуры в Северном полушарии за последнюю тысячу лет. При всей приближенности расчетов стало видно, что XX столетие самое теплое.

Каковы бы ни были причины потепления, даже незначительное повышение температуры на планете меняет поведение флоры и фауны.

Так, в журнале "Nature" рассказывается о том, как ученые-орнитологи из английского Института экологии земли

исследовали 20 видов пернатых в Великобритании. Выяснилось, что по мере потепления климата птицы начинают откладывать яйца всё раньше. Это означает, что метеорологически весна в Северном полушарии наступает тоже раньше, и есть свидетельства того, что осень приходит позже.

Другое исследование, о котором сообщает всё тот же журнал, обнаружило по анализу пузырьков атмосферного газа, содержащегося в пузырьках льда из антарктического ледяного покрова, что сегодня концентрация удерживающего тепло углекислого газа выше, чем когда бы то ни было за последние 420 тысяч лет, а точнее, на 20 процентов выше, чем в самые теплые времена межледниковых периодов, и в два раза выше, чем во времена ледникового периода.

Если выбросы газов, способствующих образованию парникового эффекта не снизятся, говорят члены неправительственного Совета концентрация углекислого газа в атмосфере будет расти, а температура на планете повышаться. В докладе Совета в 1995 году прогнозировалось, что к 2100 году температура на Земле повысится на 1-3 градуса. На этом, скорее всего, глобальное потепление не остановится. И если оно пойдет нынешними темпами, считают члены Совета, то вызовет очень серьезные климатические и экологические изменения, включая сдвиги климатических зон, усиление тепловых волн, потепление северных зим, увеличение осадков в период дождей и усиление засухи летом, подъем уровня моря с постепенным затоплением небольших островных государств, что вызовет переселение десятков миллионов человек не только с островов, но и из прибрежных районов, в которых всё чаще будут бушевать разрушительные ураганы и штормы.

PART THREE

Texts for Independent Reading

Text I

MAN AND THE BIOSPHERE.

TWO COURSES OF ACTION

Interrelations between man and the biosphere are of a fairly complex nature. Man, like every other living organism, depends for: his life on what the biosphere provides: water, oxygen, food and shelter. On the other hand, the biosphere is strongly affected by all sorts of human activity.

Technology powerfully amplifies the effects of human beings on the biosphere. Prehistoric man withdrew from the atmosphere only the oxygen he required for respiration; technological man consumes a far greater amount of oxygen to support fires, power plants and chemical processes. The carbon dioxide produced by technological processes has measurably altered the carbon dioxide concentration in the atmosphere. Apart from the amplification of such natural processes in the biosphere, technology has introduced into the biosphere substances wholly new to it: Man-made radio-isotopes and a wide variety of synthetic materials such as plastics, insecticides, herbicides and numerous industrial materials. These, too, alter the biosphere.

The problem has already been discussed at a large number of conferences, some of them sponsored by the UN. However, relatively little has so far been done to check environmental pollution.

The problem of the environment crisis has recently assumed global proportions. Both scientists and politicians agree that unless some radical steps are taken before long, life on our planet may be irrevocably damaged if not destroyed altogether. It seems therefore worth while to consider the fundamental conflict which underlies the surface manifestations of the present crisis. For there undoubtedly exists a conflict, an incompatibility between the tenets of an industrial society and those of ecology.

Industry is bound to expand continuously; all ecological systems tend toward stability and equilibrium.

There seems to be at least two general courses of action which might be adopted in order that the environmental doom may be averted.

One would be to curb the dynamics of industrial development; the other - to turn technology to the construction of physiologically and socially healthy environment. The former possibility being highly unrealistic, the latter one seems to be the only path to follow.

Text II

SOLID-WASTE CHARACTERISTICS

The sources of solid waste include residential, commercial, institutional, and industrial activities. Certain types of wastes that cause immediate danger to exposed individuals or environments are classified as hazardous; these are discussed separately in Hazardous-waste management. All nonhazardous solid waste from a community that requires collection and transport to a processing or disposal site is called refuse or municipal solid waste. Refuse includes garbage and rubbish. Garbage is mostly decomposable food wastes, rubbish is mostly dry material such as glass, paper, cloth, or wood. Garbage is highly putrescible or decomposable, while rubbish is not. Trash is rubbish that includes bulky items such as old refrigerators, couches, or large tree stumps. Trash requires special collection and handling. Solid-waste characteristics vary considerably among communities and nations. American refuse is usually lighter, for example, than European or Japanese refuse. In the United States paper and -paperboard products make up close to 40 percent of the total weight of municipal solid waste; food waste accounts for less than 10 percent. The rest is a mixture of yard trimmings, wood, glass, metal, plastic, leather, cloth, and other miscellaneous materials. In a loose or uncompacted state, municipal solid waste of this type weighs approximately 200 pounds per cubic yard (120

kilograms per cubic metre). These figures vary with geographic location, economic conditions, season of the year, and many other factors. Waste characteristics from each community must be studied carefully before any treatment or disposal facility is designed and built. Rates of solid-waste generation also vary widely. In the United States, for example, municipal refuse is generated at an average rate of approximately 4.4 pounds (2 kilograms) per person per day. Japan generates roughly half this amount, yet in Canada the rate is almost seven pounds per person per day. In some developing countries (e.g. India) the average rate can be lower than one pound per person per day. These data include refuse from commercial, institutional, and industrial sources, as well as from residential sources. The actual rates of refuse generation must be carefully determined when a community plans a solid-waste management project. Most communities require household refuse to be stored in durable, easily cleaned containers with tight-fitting covers in order to minimize rodent or insect infestation and offensive odours. Galvanized metal or plastic containers of about 30-gallon (115 litres) capacity are commonly used, although some communities employ larger containers that can be lifted mechanically and emptied into collection trucks. Plastic bags are frequently used as liners or as disposable containers for curbside collection. Where large quantities of refuse are generated - such as at shopping centres, hotels, or apartment buildings - dumpsters may be used for temporary storage until the waste is collected. Some office and commercial buildings use on-site compactors to reduce the waste volume.

Text III

IRRIGATION

Irrigation is the artificial application of water to soil to assist in the production of crops. In general, irrigation is most extensively practiced in arid regions where agriculture without it is not profitable but it is also used to lands of the semiarid regions

to increase the yield and to special crops in humid regions such as rice, garden flowers and vegetables.

In fact, there are comparatively few regions where irrigation would not be profitable if it could be cheaply provided.

The surface of the Earth is composed of land and water, the latter being roughly three fourths of the area and not habitable by man. More than half of the remaining one fourth of land area is either too cold or too rocky for cultivation and the major portion of the rest is too arid for production of crops.

Thus, the area naturally available for cultivation is a very small proportion of the whole. Fortunately, man can increase the area for cultivation by artificially applying water to soil where nature fails to do this.

An irrigated region has certain advantages over a humid region. There is much advantage in being able to apply the water at the proper time and in the quantity needed. There is much advantage in being able to stop application of water at will. The soils of arid regions are usually better supplied with the mineral plant foods which have not been washed out by excessive rains. Sunlight providing life and growth is more intense and constant in an arid than in a humid region. The yields under irrigation may be made larger and more stable, than under natural precipitation, provided sufficient care and skills are applied.

The choice of a method of irrigation depends upon topography, soil conditions, crops to be grown, value of crop products, available water supply and other factors.

Improper irrigation may waste large amounts of water and reduce crop yields. It frequently results in plant nutrients being leached from the soil. Excessive application of water causes high water (уровень грунтовых вод) table, waterlogging (заболачивание) and salinity of soil. This may be corrected only by the construction of expensive drainage systems. Very often drainage works are constructed together with irrigation development to discharge both excess water and excess salts.

Improving irrigation would be much easier if we could see what is taking place below the soil surface, how rapidly the water moves downward, how far it penetrates into the soil, what happens when it reaches the hard soil layer, how and where the water is stored in the soil, how it is removed from the soil by plant roots and other soil conditions.

Text IV

INTRODUCTION TO HYDROGEN ENERGY

Hydrogen is the simplest element. An atom of hydrogen consists of only one proton and one electron. It's also the most plentiful element in the universe. Despite its simplicity and abundance, hydrogen doesn't occur naturally as a gas on the Earth - it's always combined with other elements. Water, for example, is a combination of hydrogen and oxygen (H₂O). Hydrogen is also found in many organic compounds, notably the *hydrocarbons* that make up many of our fuels, such as gasoline, natural gas, methanol, and propane.

Hydrogen can be separated from hydrocarbons through the application of heat - a process known as *reforming*. Currently, most hydrogen is made this way from natural gas. An electrical current can also be used to separate water into its components of oxygen and hydrogen. This process is known as *electrolysis*. Some algae and bacteria, using sunlight as their energy source, even give off hydrogen under certain conditions.

Hydrogen is high in energy, yet an engine that burns pure hydrogen produces almost no pollution. NASA has used liquid hydrogen since the 1970s to propel the space shuttle and other rockets into orbit. Hydrogen fuel cells power the shuttle's electrical systems, producing a clean by-product - pure water, which the crew drinks.

A fuel cell combines hydrogen and oxygen to produce electricity, heat, and water. Fuel cells are often compared to batteries. Both convert the energy produced by a chemical reaction into usable electric power. However, the fuel cell will produce

electricity as long as fuel (hydrogen) is supplied, never losing its charge.

Fuel cells are a promising technology for use as a source of heat and electricity for buildings, and as an electrical power source for electric motors propelling vehicles. Fuel cells operate best on pure hydrogen. But fuels like natural gas, methanol, or even gasoline can be reformed to produce the hydrogen required for fuel cells. Some fuel cells even can be fuelled directly with methanol, without using a reformer.

In the future, hydrogen could also join electricity as an important energy carrier. An energy carrier moves and delivers energy in a usable form to consumers. Renewable energy sources, like the sun and wind, can't produce energy all the time. But they could, for example, produce electric energy and hydrogen, which can be stored until it's needed. Hydrogen can also be transported (like electricity) to locations where it is needed.

Text V

INTRODUCTION TO OCEAN ENERGY

The ocean can produce two types of energy: *thermal energy* from the sun's heat, and *mechanical energy* from the tides and waves.

Oceans cover more than 70% of Earth's surface, making them the world's largest solar collectors. The sun's heat warms the surface water a lot more than the deep ocean water, and this temperature difference creates thermal energy. Just a small portion of the heat trapped in the ocean could power the world.

Ocean thermal energy is used for many applications, including electricity generation. There are three types of electricity conversion systems: *closed-cycle*, *open-cycle*, and *hybrid*. Closed-cycle systems use the ocean's warm surface water to vaporize a *working fluid*, which has a low-boiling point, such as ammonia. The vapour expands and turns a turbine. The turbine then activates a generator to produce electricity. Open-cycle systems actually boil the seawater by operating at low pressures. This pro-

duces steam that passes through a turbine/generator. And hybrid systems combine both closed-cycle and open-cycle systems.

Ocean mechanical energy is quite different from ocean thermal energy. Even though the sun affects all ocean activity, tides are driven primarily by the gravitational pull of the moon, and waves are driven primarily by the winds. As a result, tides and waves are intermittent sources of energy, while ocean thermal energy is fairly constant. Also, unlike thermal energy, the electricity conversion of both tidal and wave energy usually involves mechanical devices. A *barrage* (dam) is typically used to convert tidal energy into electricity by forcing the water through turbines, activating a generator. For wave energy conversion, there are three basic systems: *channel systems* that funnel the waves into reservoirs; *float systems* that drive hydraulic pumps; and *oscillating water column systems* that use the waves to compress air within a container. The mechanical power created from these systems either directly activates a generator or transfers to a working fluid, water, or air, which then drives a turbine/generator. See the U.S. Department of Energy's fact sheet about *Ocean Energy* for more basic information, as well as its list of ocean topics and links.

NREL no longer conducts research in ocean thermal energy technologies. However, NREL still provides information on ocean thermal energy conversion.

NREL also doesn't perform any research in ocean mechanical energy technologies. Most of the research and development is happening in Europe. See the European Commission's Atlas Project for more information on both wave energy and tidal energy.

Text VI

THE FUTURE OF INDUSTRIAL ECOLOGY

The ideas and practices that fall under the heading of industrial ecology are still in their infancy. In all probability, only a small fraction of U.S. manufacturing companies are aware of

them or have actually put them into practice. On the positive side, however, this group includes such major companies as Xerox, 3-V, Dow Chemical, AT&T, and the largest automobile manufactures in the United States, all of whom, in varying ways and to varying degrees, are attempting to apply the principles of industrial ecology to their businesses. The U.S. National Academy of Sciences, along with a number of university and private groups, is also spreading the message. In Europe, measures such as the German "take-back" laws are encouraging firms to get on board.

The traditional practices of some industries also provide a solid basis for an industrial ecology system. Examples include recycling in the metal casting and machining industries and other manufacturing industries, along with the chemical industry's attempt to develop markets for its by-products. The growing interest in recycling durable goods (particularly in the automotive, electronics, and paper industries), along with the routine recycling of household wastes, is another good sign.

These developments may mean that industrial ecology is entering the exponential-growth phase of the familiar S-curve pattern of development. The introductions of a major new technology and its adoption by industry seems to have a "half-time" (the time required for half of those who will eventually adopt the technology to do so) of about 20 years. It is thus possible that by 2020 most manufactures in industrialized countries will be employing the methods of industrial ecology (either the current techniques or those that emerge in the next 25 years).

Just as a commitment to quality has once again become important to business in the last 15 years or so, new attitudes toward the use of materials and energy could move to the forefront. In the future, manufactures and service companies may require their suppliers to use industrial ecology practices in the same way they are now beginning to require them to practice quality control and comply with international quality standards

such as ISO (International Organization for Standardization) 14000.

Text VII BRITAIN'S ECOLOGICAL ACTIVITY

Mankind long believed, whatever we did, the Earth would remain the same. We know now that is untrue. Nature is under threat. Our country's pollution can be every country's problem. We all need to work together to safeguard our environment.

We have a moral duty to look after our planet and hand it on in good order to future generation. We need growth to give us the means to live better and healthier lives. We must not sacrifice our future well-being for short-term gains, nor pile up environmental debts, which will burden our children. Where there are real threats to our planet we have to take great care. Prevention can often be better and cheaper than cure. But action in Britain is not enough. The government will play a full part in working out international solutions, through bodies like the United Nations, the World Bank, the Organization for Economic Cooperation and Development, and the European Community.

The British government will aim: to preserve and enhance Britain's natural and cultural inheritance; to encourage the more prudent and efficient use of energy and other resources; to make sure that Britain's air and water are clean and safe, and that controls over wastes and pollution are maintained and strengthened where necessary. The world's population doubled between 1950 & 1987. More people mean more mouths to feed, and that demands more agricultural land. That in turn can lead to deforestation and soil erosion.

By burning forests, draining wet lands, polluting water, courses and over fishing mankind is rapidly driving many species to extinction. The government is supporting international efforts for global agreement to protect species of plant and animal life. The government supports projects to conserve endangered species of wild life such as the black rhino and the African

elephants.

Action taken. Britain attaches particular importance to the environmental policy of the European Community. Much has already been achieved: since Britain joined, the Community has adopted some 280 environmental measures, including far-reaching-legislation to combat acid rain, curb pollution from cars and industry, conserve wildlife and ensure public access to information about environment.

Text VIII NATURE OF THE ST. PETERSBURG REGION AND ITS PROTECTION

The St. Petersburg region covers 84,600 km² stretching 450 km from West to East and something like 100 to 300 km from South to North. The nature of the region merits closest attention as it has a range of peculiar features.

The peculiarity of its physico-geographical conditions is connected with an intricate quaternary history of the north-west of the Russian plain, which has seen several glaciations, variations in the level and shape of the Baltic Sea, multiple changes of climate, and consequently a change of plant cover as well as the large-scale migration of plant and animal species.

The territory of the St. Petersburg region includes a huge industrial city of 5 million people and a number of smaller towns and workers' settlements with developed and expanding industry, and a network of thermal power and hydroelectric stations. Local agriculture, specifically the construction of livestock complexes, is developing rapidly. The mining of minerals, namely bauxites, phosphorites, combustible shale, sand, clay, and peat, is also growing and this process has led to the emergence of such technogenous formations as quarries, terricones and dumps. Tourism and other forms of recreation are increasingly influencing the nature of the region. Under all these influences there have been sharp-changes in the landscape, the disappearance of forests or the dwindling of forest areas,

the pollution of rivers and lakes; animals are moving farther away, birds have stopped flying in, and plants are perishing, specifically those with beautiful flowers and of medicinal importance.

Until recently, there were no specifically protected territories in the St. Petersburg region except for several hunting grounds, water protection forests, and only a small section in the east of the region — the Vepsk forest which was formalized as a wildlife sanctuary of the St. Petersburg Research Institute of Forest Management under Russia State Committee for Forest Management.

The St. Petersburg Regional Executive Committee officially instituted in the region another 17 permanent sanctuaries, 19 relics of nature, and five protected zones for the spawning of salmon, and placed 42 animal species and 48 plant species under protection. This decision results from the extremely rapidly changing nature in the region, including, at times, the complete destruction of selected objects.

A survey of the sanctuaries proved that many are very important in nature protection. Thus, the Nizhne-Svirsk sanctuary, following the destruction of the shoals in the Gulf of Finland, is a very important place for the resting and feeding of migratory birds. This sanctuary was transformed into a state reserve. This reserve is a major contribution to nature protection not only in the St. Petersburg region, but throughout the taiga zone of the European part of Russia, since there is not a single reserve in the lowland area ranging from the Baltic to the Urals.

The Mshinsk and the Vepsk forest sanctuaries may be considered as standard complexes of forest and marshland ecosystems of the central and south taiga with their varied animal and plant world.

The Vyborg sanctuary is very important as a place of feeding and resting of birds flying to north Karelia and to the Kola Peninsula.

Text IX

URGENT PROBLEMS OF A MODERN CITY

What do we know about the ecological situation in the cities we live in? Not much, if anything. We may do something to protect lakes from factory waste or from drying up, we are concerned about the future of our great forests, the age-old taiga, and we develop ecological models of whole seas. But what about the cities?

As scientific and technological progress continues (and this process is irreversible) it demands an increasingly cleaner environment. A cleaner technology calls for a cleaner natural environment: cleaner water and air. And whereas in the factory, we can in some way limit the effect of an aggressive, eroding environment by insulation, ventilation, filters and air-conditioning, once its products leave the workshop they are attacked by the aggressive environment of any large city. Even the buildings and structures deteriorate and you can see the effects with the naked eye. You may have noticed how often they have to be given a fresh coat of paint, for instance.

The larger cities have the biggest concentrations of advanced technology. The most expensive plants and equipment, buildings, structures and communication networks, etc. are there. They also have the largest concentrations of people, the best educated and trained personnel. A large city is a model of the undesirable ecological future which would befall all of us if we had not already alerted ourselves to the danger and begun thinking about what is to be done. The task now is to study the ecological problems of large cities. The main problems here include: human health in a large city, the potential for further scientific and technological progress and, finally, the preservation of natural elements present in the city itself and its environs.

The scientists of the Institute of Social and Economic Problems of the Russian Academy of Sciences in St. Petersburg do a research into methods of ecologically planning larger cities.

They are trying to compile ecological maps of St. Petersburg. These maps will reflect the state of the city's environment and serve as practical tools in the effort to improve it. St. Petersburg scientists engaged in this project use the findings of daily observations and measurements conducted by the city's hydrometeorological, sanitary and epidemiological services. Over 60 automatic monitoring posts gather information on the state of the city's environment, on the extent of dust, fly-ash and gaseous pollutions. These data are marked on the map to produce a kind of an atlas of St. Petersburg's state of health. The maps help in determining the effects of various types of pollution on human health.

These urban environment maps also record medical statistics. So far the most complete information has been collected on the sickness rate among infants and children, which, as expected, was found to be the highest in areas with heaviest pollution. This is especially true in the case of respiratory and allergic diseases and bronchitis. This kind of information is not only food for thought but is a practical guide to action. There are two kinds of maps. The strategic ones are designed to help the city's design and planning organizations correctly distribute the generous funds the government allocates for environmental protection: for instance, where the provision of waste-treatment installations should get first priority, where a delay would not be tragic, and where extraordinary financial sacrifices are to be made.

The tactical maps indicate changes in the city's ecological environment on a routine, day-to-day basis. The ecological environment may change within hours and pollution levels may rapidly reach dangerous proportions. The notorious London smog of 1952 killed five thousand Londoners. The concentration of harmful substances on busy thoroughfares on a windless day may rapidly increase by dozens of times above normal. This will call for emergency measures and orders will be issued to close a particular road to traffic and begin watering the streets.

A whole range of emergency measures has to be carried out quickly and efficiently. Or take another situation: a major soccer game is held on a windless day, with a one-hundred-thousand-strong crowd in the stadium, next to which are industrial plants. An order is issued for the plants to suspend atmospheric emissions in areas A and B and halt production at points C and D.

Scientists predict that there will be doctor-ecologists who, in assessing the health of their patients, will look at where they live, through which parts of the city they travel, where they work, and using ecological maps will make recommendations. How does one determine the level of human health?

The human organism is a kind of self-sustained lab that integrates all the harmful influences present in the city. The blood contains a number of substances which may indicate change. For instance, haemoglobin changes over a wide range depending on air pollution level.

Generally speaking, the ecology of a modern city is a complex and multidimensional problem. It would be useless to change any single department or agency with the task of solving this problem. It will take the joint efforts of architects, public health agencies, sociologists, economists, landscapists, and the staff of the hydrometeorological service. Nothing but a comprehensive attack on the problems and collective efforts will yield the desired effect and allow a more rational use of the liberal funds the state allocates for environmental protection.

Text X

ST. PETERSBURG MONITORS ITS WATERS AND AIR

St. Petersburg is justly described as the Venice of the North - the city is intersected by numerous streams and canals and a total water surface of 60 square kilometres. St. Petersburg is washed by the Gulf of Finland and as a large city, it may be a major polluter of the sea. On the other hand, the ships from different countries which operate in the Baltic, may contribute to the deterioration of the urban environment on its shores.

St. Petersburg has a permanent efficient service to monitor its waters and air. The services of sixty monitoring posts set up in different parts of the city supply data around the clock on the state of the atmosphere over the city. As soon as the level of air pollution exceeds the permitted limits, members of the special services rush to the offending factory to ensure that action is taken immediately. Failing that, the factory has to pay a stiff fine or is shut down altogether. Soviet and foreign specialists who have visited St. Petersburg can testify that the air over Leningrad is far cleaner than that over most of Europe's major cities.

St. Petersburg has inherited from its pre-Revolutionary past not only the splendid palaces, architectural relics, beautiful parks, architecture, impressive granite embankments, etc., but also a very primitive sewage system based on the principle of dumping your rubbish into water. With this kind of attitude the mighty Neva river was threatened with the fate of many European rivers on which capital cities stand, which have long lost their romantic appeal and beauty in the foul-smelling, super-pollution of their waters. St. Petersburg's master water supply and sewage scheme calls for the integration of all the water ducts and conduits in the city into a single system.

Several deep collectors have been built and more are under construction, which carry away domestic and industrial waste. When fully operational, the first section of the city's waste-treatment facilities will have a daily capacity of half a million cubic metres of water. Already, one can safely bathe and fish with some luck in the Neva. When new advanced treatment facilities are put into operation, Leningrad's rivers, large and small, will be fully protected - not a single cubic metre of untreated waste will get into them within the city limits. When that happens the Neva will carry into the Gulf of Finland that clear and sweet water for which Lake Ladoga is famous, and which according to experts is second only to Lake Baikal's in terms of limpidity and taste.

A good deal is being done in St. Petersburg to protect and increase its greenery. In 1981 the city had eight square metres of greenery per resident. St. Petersburg has a unique tree-protection service known as the "green ambulance service". Special ambulance teams respond to emergency calls from in and around the city. Specialists examine sick trees, diagnose what is wrong with them and administer treatment. The "green ambulance service" has its permanent "patients" too, including the twelve lime-trees in the famous Summer Garden, that legendary oak-tree on Krestov Island which is reputed to have been planted by Peter the Great who founded the city, the beech-trees on the Chornaya river, the site of the duel between the poet Pushkin and Dantes, the unique triple lime-tree walk outside the Catherine the Great Palace. All these "patients" were threatened with slow death and all have been saved.

The green ambulance service has performed over fifty thousand operations to save trees. The men of the service do not only look after the famous parks but also "ordinary mortals" — trees in the streets and under a contractual arrangement with factories and plants, the trees planted within their grounds. A famous amount of work has been done to reduce air pollution by thermal power stations and coal-burning industrial furnaces and boiler rooms. The project is developed in two sections. The first is the replacement of the numerous small boiler rooms by powerful heat and power stations which burn natural gas and with their 180-m-high smokestacks disperse their heavy smoke into the upper atmosphere. A case in point is the Severnaya Heat and Power Plant which, with a capacity of 1.2 million kw, serves an area with 300,000 inhabitants.

The second trend is towards the conversion to natural gas and other technical modifications of industrial processes which pollute the atmosphere heavily. St. Petersburg also has a master scheme for combating air pollution from its motor traffic. The scheme calls for the construction of expressways and roads run-

ning along railway lines within the city and for the conversion of conventional traffic lights to a synchronized mode of operation. Traffic flow systems have been introduced to reduce waiting time and stops thus reducing the engine-idling which increases car exhaust four-to five-fold.

Text XI

AN ARSENAL OF DEATH

For almost 40 years the chemical weapon — lewisite — has been lying in a pine forest in the Udmurtian village of Kambarka in the Izhevsk region. The guarantee period of this combat toxic substance expired eight years ago. However, it is not being destroyed. Each day brings Udmurtia closer to an ecological catastrophe.

Kambarka is the largest of Russia's six chemical arsenals. Until 1989 residents of this village were not aware that they were living on top of a powder keg. The facility was kept so secret that not even the republic's leaders knew that Udmurtia had been the home of two chemical weapons arsenals since 1953 (the second one is in Kizner). When military officials were asked what was being kept at the secret facility, the generals would evasively reply: "property". They reason why the "property" was being guarded by chemical troops or why the Defence Ministry had banned the construction of chemical works and nuclear electric power stations in Kambarka never entered their minds. However, the warehouses with their gas masks scattered around the village brought on various thoughts. However, the secret was easy to keep also because lewisite was not produced in Udmurtia. It was delivered from Central Russia.

At the end of the 1940s The Defence Ministry of the USSR passed a decision on the construction of stationary warehouses for long-term storage of chemical agents three kilometres away from the village of Kambarka. There are 16 tanks with the capacity to hold 50 cubic meters in every one of the five storehouses, which are supported by concrete blocks. There are 80

tonnes of lewisite in each tank. Direct disposal of the fumes from lewisite is impossible. The overall volume of the combat toxic substance totals 6,400 tonnes.

In 1989 chemical weapons were withdrawn from service and the problem arose with their destruction. A special factory was built for this purpose in Chapayevsk in the Samara region. It was precisely here there that the chemical weapons from Russia's several arsenals were supposed to be scrapped. However, the Soviet Union fell apart and, shortly thereafter, so did the program for the destruction of chemical weapons. Environmentalists from the Volga region insisted that the association in Chapayevsk be preserved. Chuvash Khimprom, the place where the lewisite was produced, flatly refused to do anything about their removal. Tatarstan has banned the transportation of weapons on its territory. In the 1992 the Russian president signed an edict on the destruction of chemical weapons in the places where they are being stored so Udmurtia was left alone to deal with its two arsenals.

The events in Chapayevsk forced the military to violate its vow of silence. For Udmurtia this was a blow below the belt. "People have started to come to us saying let's build a scrapping plant where you are," the head of administration in the Kambarka region, said. "The population's reaction to this was hostile. People will simply not allow new enterprises to be built because we do not have gas; there is no sewage system, water scoop, purification installations, or a medical diagnostic centre. We understand that today no one will take chemical weapons. However, we will not give our consent to the construction of a plant until social problems are solved. Another reason why Kambarka protested is because the federal centre is demanding the placement of facility which is a health hazard without providing any guarantees of security or ensuring the social protection of the people.

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