Министерство образования республики Беларусь
Учреждение образования
«Гомельский государственный университет
имени Франциска Скорины»

Е. В. САЖИНА

АНГЛИЙСКИЙ ЯЗЫК
ПРАКТИЧЕСКОЕ ПОСОБИЕ

для студентов 1–2 курсов
специальности 1-33 01 02 «Геоэкология»
по теме
«DISCUSSING ECOLOGICAL PROBLEMS»

Гомель 2011

УДК 811. 111 (075. 8)
ББК 81. 432. 1 – 923
С 147

Рецензенты:
С. Н. Колоцей**,** доцент, кандидат филологических наук, кафедра французского языка учреждения образования «Гомельский государственный университет имени Франциска Скорины»

Рекомендовано к изданию научно-методическим советом учреждения образования «Гомельский государственный университет имени Франциска Скорины»

Сажина, Е. В.
С 147 Английский язык: обсуждение экологических проблем: практическое пособие для студентов 1–2 курсов специальности 1-33 01 02 «Геоэкология» / Е. В. Сажина; М-во образования РБ, Гомельский гос. ун-т им. Ф. Скорины. – Гомель : ГГУ им. Ф. Скорины, 2011. – 48 с.

Данное пособие предназначено для обучения студентов 1–2 курсов геолого-географического факультета различным видам чтения профессиональных текстов, владение которыми необходимо будущим специалистам, а также формирования устной речи, письма, переводческих навыков. Эффективное практическое овладение языком обеспечивается системой языковых упражнений.

УДК 811. 111 (075. 8)
ББК 81. 432. 1 – 923

СОДЕРЖАНИЕ

Введение

Предлагаемое практическое пособие предназначено для чтения на английском языке для студентов неязыковых специальностей. Представленные аутентичные тексты отвечают динамике современного научно-технического прогресса, а также требованиям программы по английскому языку для студентов высших учебных заведений.

Книга направлена на обучение студентов различным видам чтения профессиональных текстов, владение которыми необходимо будущим специалистам, а также формирование навыков устной речи, письма, переводческих навыков. Помимо этого пособие может быть использовано при работе в студенческих группах с углубленным изучением английского языка для развития навыков чтения и говорения по теме «Моя будущая профессия».

В пособии пять тематических разделов (Units), содержание каждого из которых предусматривает выполнение следующих упражнений:

- чтение и перевод аутентичного текста;
- вопросы по содержанию текста;
- поиск лексических соответствий;
- определение соответствий высказываний тексту;
- заполнение пропусков необходимыми по смыслу предлогами;
- заполнение пропусков необходимыми по смыслу лексическими единицами;
- пересказ текста.

Оригинальные тексты по темам разделов, а также комплекс условно-речевых и речевых упражнений, входящие в настоящее практическое пособие, отвечают принципам современной коммуникативной методики.

Unit 1 Ecological Studies

Ex. 1 Read and translate the text:

ECOLOGY

Ecology is the study of the relationship of plants and animals with their physical and biological environment.

The physical environment includes light and heat or solar radiation, moisture, wind, oxygen, carbon dioxide, nutrients in soil, water, and atmosphere. The biological environment includes organisms of the same kind as well as other plants and animals.

Because of the diverse approaches required to study organisms in their environment, ecology draws upon such fields as climatology, hydrology, oceanography, physics, chemistry, geology, and soil analysis. To study the relationships between organisms, ecology also involves such disparate sciences as animal behavior, taxonomy, physiology, and mathematics.

An increased public awareness of environmental problems has made ecology a common but often misused word. It is confused with environmental programs and environmental science. Although the field is a distinct scientific discipline, ecology does indeed contribute to the study and understanding of environmental problems.

The term “ecology” was introduced by the German biologist Ernst Heinrich Haeckel in 1866; it is derived from the Greek “oikos” (“household”), sharing the same root word as “economics”. Thus, the term implies the study of the economy of nature. Modern ecology, in part, began with Charles Darwin. In developing his theory of evolution, Darwin stressed the adaptation of organisms to their environment through natural selection. Also making important contributions were plant geographers, such as Alexander von Humboldt, who were deeply interested in the “how” and “why” of vegetation distribution around the world.

The thin mantle of life that covers the earth is called the biosphere. Several approaches are used to classify its regions.

BIOMES

The broad units of vegetation are called “plant formations” by European ecologists and “biomes” by North American ecologists. The major difference between the two terms is that “biomes” include associated animal life. Major biomes, however, go by the name of the dominant forms of plant life.

Influenced by latitude, elevation, and associated moisture and temperature regimes, terrestrial biomes vary geographically from the tropics through the arctic and include various types of forest, grassland, shrub land, and desert. These biomes also include their associated freshwater communities: streams, lakes, ponds, and wetlands.

Marine environments, also considered biomes by some ecologists, comprise the open ocean, littoral (shallow water) regions, benthic (bottom) regions, rocky shores, sandy shores, estuaries, and associated tidal marshes.

ECOSYSTEMS

A more useful way of looking at the terrestrial and aquatic landscapes is to view them as ecosystems, a word coined in 1935 by the British plant ecologist Sir Arthur George Tansley to stress the concept of each locale or habitat as an integrated whole. A system is a collection of interdependent parts that function as a unit and involve inputs and outputs. The major parts of an ecosystem are the producers (green plants), the consumers (herbivores and carnivores), the decomposers (fungi and bacteria), and the nonliving, or abiotic, components, consisting of dead organic matter and nutrients in the soil and water. Inputs into the ecosystem are solar energy, water, oxygen, carbon dioxide, nitrogen, and other elements and compounds. Outputs from the ecosystem include water, oxygen, carbon dioxide, nutrient losses, and the heat released in cellular respiration, or heat of respiration. The major driving force is solar energy.

ENERGY AND NUTRIENTS

Ecosystems function with energy flowing in one direction from the sun, and through nutrients, which are continuously recycled. Light energy is used by plants, which, by the process of photosynthesis, convert it to chemical energy in the form of carbohydrates and other carbon compounds. This energy is then transferred through the ecosystem by a series of steps that involve eating and being eaten, or what is called a food web.

Each step in the transfer of energy involves several trophic, or feeding, levels: plants, herbivores (plant eaters), two or three levels of carnivores (meat eaters), and decomposers. Only a fraction of the energy fixed by plants follows this pathway, known as the grazing food web. Plant and animal matter not used in the grazing food chain, such as fallen leaves, twigs, roots, tree trunks, and the dead bodies of animals, support the decomposer food web. Bacteria, fungi, and animals that feed on dead material become the energy source for higher trophic levels that tie into the grazing food web. In this way, nature makes maximum use of energy originally fixed by plants.

The number of trophic levels is limited in both types of food webs, because at each transfer a great deal of energy is lost (such as heat of respiration) and is no longer usable or transferable to the next trophic level. Thus, each trophic level contains less energy than the trophic level supporting it. For this reason, as an example, deer or caribou (herbivores) are more abundant than wolves (carnivores).

Energy flow fuels the biogeochemical, or nutrient, cycles. The cycling of nutrients begins with their release from organic matter by weathering and decomposition in a form that can be picked up by plants. Plants incorporate nutrients available in soil and water and store them in their tissues. The nutrients are transferred from one trophic level to another through the food web. Because most plants and animals go uneaten, nutrients contained in their tissues, after passing through the decomposer food web, are ultimately released by bacterial and fungal decomposition, a process that reduces complex organic compounds into simple inorganic compounds available for reuse by plants.

IMBALANCES

Within an ecosystem, nutrients are cycled internally. But there are leakages or outputs, and these must be balanced by inputs, or the ecosystem will fail to function. Nutrient inputs to the system come from weathering of rocks, from windblown dust, and from precipitation, which can carry material great distances. Varying quantities of nutrients are carried from terrestrial ecosystems by the movement of water and deposited in aquatic ecosystems and associated lowlands. Erosion and the harvesting of timber and crops remove considerable quantities of nutrients that must be replaced. The failure to do so results in an impoverishment of the ecosystem. This is why agricultural lands must be fertilized.

If inputs of any nutrient greatly exceed outputs, the nutrient cycle in the ecosystem becomes stressed or overloaded, resulting in pollution. Pollution can be considered an input of nutrients exceeding the capability of the ecosystem to process them. Nutrients eroded and leached from agricultural lands, along with sewage and industrial wastes accumulated from urban areas, all drain into streams, rivers, lakes, and estuaries. These pollutants destroy plants and animals that cannot tolerate their presence or the changed environmental conditions caused by them; at the same time, they favor a few organisms more tolerant to changed conditions.

Thus, precipitation filled with sulfur dioxide and oxides of nitrogen from industrial areas converts to weak sulfuric and nitric acids, known as acid rain, and falls on large areas of terrestrial and aquatic ecosystems. This upsets acidbase relations in some ecosystems, killing fish and aquatic invertebrates, and increasing soil acidity, which reduces forest growth in northern and other ecosystems that lack limestone to neutralize the acid.

POPULATIONS AND COMMUNITIES

The functional units of an ecosystem are the populations of organisms through which energy and nutrients move. A population is a group of interbreeding organisms of the same kind living in the same place at the same time. Groups of populations within an ecosystem interact in various ways. These interdependent populations of plants and animals make up the community, which encompasses the biotic portion of the ecosystem.

DIVERSITY

The community has certain attributes, among them dominance and species diversity. Dominance results when one or several species control the environmental conditions that influence associated species. In a forest, for example, the dominant species may be one or more species of trees, such as oak or spruce; in a marine community, the dominant organisms frequently are animals such as mussels or oysters. Dominance can influence diversity of species in a community because diversity involves not only the number of species in a community, but also how numbers of individual species are apportioned.

The physical nature of a community is evidenced by layering, or stratification. In terrestrial communities, stratification is influenced by the growth form of the plants. Simple communities such as grasslands, with little vertical stratification, usually consist of two layers, the ground layer and the herbaceous layer. A forest has up to six layers: ground, herbaceous, low shrub, low tree and high shrub, lower canopy, and upper canopy. These strata influence the physical environment and diversity of habitats for wildlife. Vertical stratification of life in aquatic communities, by contrast, is influenced mostly by physical conditions: depth, light, temperature, pressure, salinity, oxygen, and carbon dioxide.

HABITAT AND NICHE

The community provides the habitat – the place where particular plants or animals live. Within the habitat, organisms occupy different niches.

A niche is the functional role of a species in a community – that is, its occupation, or how it earns its living. For example, the scarlet tanager lives in a deciduous forest habitat. Its niche, in part, is gleaning insects from the canopy foliage. The more a community is stratified, the more finely the habitat is divided into additional niches.

Ex. 2 Answer the following questions:

1 What is ecology?

2 What types of environment are mentioned in the text? What are the differences between them?

3 Who introduced the term “ecology”?

4 What are biomes?

5 What are inputs into and outputs from the ecosystem?

6 How do ecosystems function?

7 What removes nutrients from the ecosystem?

8 What are the functional units of an ecosystem?

9 What is stratification? Where does it take place?

10 What is a niche?

Ex. 3 Match the equivalents:

a) - moisture;
- soil;
- diverse approaches;
- an increased public awareness;
- estuaries;
- convert;
- a grazing food web;
- organic matter;
- fungal;

b) - различные подходы;
- пастбищная пищевая система;
- грибковый;
- органическое вещество;
- превращать;
- дельты (рек);
- почва;
- влажность;
- возросшее общественное сознание.

Ex. 4 Match the equivalents:

a) - эродировать;
- земной;
- обеднение почв;
- биотический;

- среда обитания;
- водные беспозвоночные животные;
- утечка;
- черно-красная танагра;
- скрещивающийся;
- лиственный;

b) - leakage;
- erode;
- terrestrial;
- aquatic invertebrates;
- interbreeding;
- biotic;
- habitat;
- scarlet tanager;
- deciduous
- impoverishment.

Ex. 5 Are these statements true or false?

1 The biological environment includes organisms of the same kind as well as other plants and animals.

2 Ecology does not contribute to the study and understanding of environmental problems.

3 The broad units of vegetation are called “plant formations” by North American ecologists and “biomes” by European ecologists.

4 The major parts of an ecosystem are the producers (green plants), the consumers (herbivores and carnivores), the decomposers (fungi and bacteria), and the nonliving, or abiotic, components.

5 Within an ecosystem, nutrients are cycled externally.

Ex. 6 Fill in the gaps with the appropriate preposition:

1 Nutrients eroded and leached … agricultural lands.

2 The physical environment includes light and heat or solar radiation, moisture, wind, oxygen, carbon dioxide, nutrients … soil, water, and atmosphere.

3 It is confused … environmental programs and environmental science.

4 Influenced … latitude, elevation, and associated moisture and temperature regimes, terrestrial biomes vary geographically.

5 Ecosystems function … energy flowing in one direction … the sun,

and … nutrients, which are continuously recycled.

Ex. 7 Complete the sentences using the words in brackets:

(evolution, cycles, precipitation, photosynthesis, trophic level, a community, biological environment)

1 The … includes organisms of the same kind as well as other plants and animals.
2 In developing his theory of …, Darwin stressed the adaptation of organisms to their environment through natural selection.
3 Light energy is used by plants, which, by the process of …, convert it to chemical energy in the form of carbohydrates and other carbon compounds.
4 Energy flow fuels the biogeochemical, or nutrient, … .
5 The nutrients are transferred from one … to another through the food web.
6 Thus, … filled with sulfur dioxide and oxides of nitrogen from industrial areas converts to weak sulfuric and nitric acids.
7 The more … is stratified, the more finely the habitat is divided into additional niches.

Ex. 8 Find English equivalents:

его путают с; означает; растительность; объединенные пресноводные сообщества; подчеркивать идею; неживые компоненты; которые постоянно повторно используются; доля энергии; выветривание; включать в себя, поглощать; вид; травяной слой; кустарник; разнообразие; живая природа; глубина; соленость; зарабатывать себе на жизнь; тщательно подбирать.

Ex. 9 Give a summary of the text using the following phrases:

the title of the text is ...; the text deals with ... (is devoted to ..., is about ...); the text stresses the importance of ...; the text further says ...; in conclusion the author says ...; concerning the problem.

Unit 2 Threats to the Environment

Ex. 1 Read and translate the text:

ENVIRONMENT

Environment comprises all of the external factors affecting an organism. These factors may be other living organisms (biotic factors) or nonliving variables (abiotic factors), such as temperature, rainfall, day length, wind, and ocean currents. The interactions of organisms with biotic and abiotic factors form an ecosystem.

Even minute changes in any one factor in an ecosystem can influence whether or not a particular plant or animal species will be successful in its environment.

Organisms and their environment constantly interact, and both are changed by this interaction. Like all other living creatures, humans have clearly changed their environment, but they have done so generally on a grander scale than have all other species. Some of these human-induced changes – such as the destruction of the world’s tropical rain forests to create farms or grazing land for cattle – have led to altered climate patterns. In turn, altered climate patterns have changed the way animals and plants are distributed in different ecosystems.

Scientists study the long-term consequences of human actions on the environment, while environmentalists-professionals in various fields, as well as concerned citizens-advocate ways to lessen the impact of human activity on the natural world.

UNDERSTANDING THE ENVIRONMENT

The science of ecology attempts to explain why plants and animals live where they do and why their populations are the sizes they are. Understanding the distribution and population size of organisms helps scientists evaluate the health of the environment.

In 1840 German chemist, Justus von Liebig first proposed that populations could not grow indefinitely, a basic principle now known as the Law of the Minimum. Biotic and abiotic factors, singly or in combination, ultimately limit the size that any population may attain. This size limit, known as a population’s carrying capacity, occurs when needed resources, such as food, breeding sites, and water, are in short supply. For example, the amount of nutrients in soil influences the amount of wheat that grows on a farm. If just one soil nutrient, such as nitrogen, is missing or below optimal levels, fewer healthy wheat plants will grow.

Either population size or distribution may also be affected, directly or indirectly, by the way species in an ecosystem interact with one another. In an experiment performed in the late 1960s in the rocky tidal zone along the Pacific Coast of the United States, American ecologist Robert Paine studied an area that contained 15 species of invertebrates, including starfish, mussels, limpets, barnacles, and chitons. Paine found that in this ecosystem one species of starfish preyed heavily on a species of mussel, preventing that mussel population from multiplying and monopolizing space in the tidal zone. When Paine removed the starfish from the area, he found that the mussel population quickly increased in size, crowding out most other organisms from rock surfaces.

The number of invertebrate species in the ecosystem soon dropped to eight species. Paine concluded that the loss of just one species, the starfish, indirectly led to the loss of an additional six species and a transformation of the ecosystem.

Typically, the species that coexist in ecosystems have evolved together for many generations. These populations have established balanced interactions with each other that enable all populations in the area to remain relatively stable. Occasionally, however, natural or human-made disruptions occur that have unforeseen consequences to populations in an ecosystem. For example, 17th-century sailors routinely introduced goats to isolated oceanic islands, intending for the goats to roam freely and serve as a source of meat when the sailors returned to the islands during future voyages. As non-native species free from all natural predators, the goats thrived and, in the process, overgrazed many of the islands. With a change in plant composition, many of the native animal species on the islands were driven to extinction. A simple action, the introduction of goats to an island, yielded many changes in the island ecosystem, demonstrating that all members of a community are closely interconnected.

To better understand the impact of natural and human disruptions on the Earth, in 1991, the National Aeronautics and Space Administration (NASA) began to use artificial satellites to study global change. NASA’s undertaking, called Earth Science Enterprise, and is a part of an international effort linking numerous satellites into a single Earth Observing System (EOS). EOS collects information about the interactions occurring in the atmosphere, on land, and in the oceans, and these data help scientists and lawmakers make sound environmental policy decisions.

FACTORS THREATENING THE ENVIRONMENT

The problems facing the environment are vast and diverse. Global warming, the depletion of the ozone layer in the atmosphere, and destruction of the world’s rain forests are just some of the problems that many scientists believe will reach critical proportions in the coming decades. All of these problems will be directly affected by the size of the human population.

POPULATION GROWTH

Human population growth is at the root of virtually all of the world's environmental problems. Although the growth rate of the world's population has slowed slightly since the 1990s, the world's population increases by about 77 million human beings each year. As the number of people increases, crowding generates pollution, destroys more habitats, and uses up additional natural resources.

The Population Division of the United Nations (UN) predicts that the world's population will increase from 6.23 billion people in 2000 to 9.3 billion people in 2050. The UN estimates that the population will stabilize at more than 11 billion in 2200. Other experts predict that numbers will continue to rise into the foreseeable future, to as many as 19 billion people by the year 2200.

Although rates of population increase are now much slower in the developed world than in the developing world, it would be a mistake to assume that population growth is primarily a problem of developing countries.

In fact, because larger amounts of resources per person are used in developed nations, each individual from the developed world has a much greater environmental impact than does a person from a developing country. Conservation strategies that would not significantly alter lifestyles but that would greatly lessen environmental impact are essential in the developed world.

In the developing world, meanwhile, the most important factors necessary to lower population growth rates are democracy and social justice. Studies show that population growth rates have fallen in developing areas where several social conditions exist. In these areas, literacy rates have increased and women receive economic status equal to that of men, enabling women to hold jobs and own property. In addition, birth control information in these areas is more widely available, and women are free to make their own reproductive decisions.

GLOBAL WARMING

Like the glass panes in a greenhouse, certain gases in the Earth's atmosphere permit the Sun's radiation to heat Earth. At the same time, these gases retard the escape into space of the infrared energy radiated back out by Earth. This process is referred to as the greenhouse effect. These gases, primarily carbon dioxide, methane, nitrous oxide, and water vapor, insulate Earth's surface, helping to maintain warm temperatures. Without these gases, Earth would be a frozen planet with an average temperature of about

–18 °C (about 0 °F) instead of a comfortable +15 °C (59 °F). If the concentration of these gases rises, they trap more heat within the atmosphere, causing worldwide temperatures to rise.

Within the last century, the amount of carbon dioxide in the atmosphere has increased dramatically, largely because people burn vast amounts of fossil fuels – coal and petroleum and its derivatives. Average global temperature also has increased – by about 0.6 Celsius degrees (1 Fahrenheit degree) within the past century. Atmospheric scientists have found that at least half of that temperature increase can be attributed to human activity.

They predict that unless dramatic action is taken, global temperature will continue to rise by 1.4 to 5.8 Celsius degrees (2.5 to 10.4 Fahrenheit degrees) over the next century. Although such an increase may not seem like a great difference, during the last ice age the global temperature was only 2.2 Celsius degrees (4 Fahrenheit degrees) cooler than it is presently.

The consequences of such a modest increase in temperature may be devastating. Already scientists have detected a 40 percent reduction in the average thickness of Arctic ice. Other problems that may develop include a rise in sea levels that will completely inundate a number of low-lying island nations and flood many coastal cities, such as New York and Miami. Many plant and animal species will probably be driven into extinction, agriculture will be severely disrupted in many regions, and the frequency of severe hurricanes and droughts will likely increase.

DEPLETION OF THE OZONE LAYER

The ozone layer, a thin band in the stratosphere (layer of the upper atmosphere), serves to shield Earth from the Sun’s harmful ultraviolet rays. In the 1970s, scientists discovered that chlorofluorocarbons (CFCs)-chemicals used in refrigeration, air-conditioning systems, cleaning solvents, and aerosol sprays-destroy the ozone layer. CFCs release chlorine into the atmosphere; chlorine, in turn, breaks down ozone molecules. Because chlorine is not affected by its interaction with ozone, each chlorine molecule has the ability to destroy a large amount of ozone for an extended period of time.

The consequences of continued depletion of the ozone layer would be dramatic. Increased ultraviolet radiation would lead to a growing number of skin cancers and cataracts and also reduce the ability of immune systems to respond to infection. Additionally, growth of the world’s oceanic plankton, the base of most marine food chains, would decline. Plankton contains photosynthetic organisms that break down carbon dioxide. If plankton populations decline, it may lead to increased carbon dioxide levels in the atmosphere and thus to global warming. Recent studies suggest that global warming, in turn, may increase the amount of ozone destroyed.

Even if the manufacture of CFCs is immediately banned, the chlorine already released into the atmosphere will continue to destroy the ozone layer for many decades.

In 1987, an international pact called the Montreal Protocol on Substances that Deplete the Ozone Layer set specific targets for all nations to achieve in order to reduce emissions of chemicals responsible for the destruction of the ozone layer. Many people had hoped that this treaty would cause ozone loss to peak and begin to decline by the year 2000. In fact, in the fall of 2000, the hole in the ozone layer over Antarctica was the largest ever recorded. The hole the following year was slightly smaller, leading some to believe that the depletion of ozone had stabilized. Even if the most stringent prohibitions against CFCs are implemented, however, scientists expect that it will take at least 50 more years for the hole over Antarctica to close completely.

HABITAT DESTRUCTION AND SPECIES EXTINCTION

Plant and animal species are dying out at an unprecedented rate. Estimates range that from 4,000 to as many as 50,000 species per year become extinct. The leading cause of extinction is habitat destruction, particularly of the world's richest ecosystems-tropical rain forests and coral reefs. If the world's rain forests continue to be cut down at the current rate, they may completely disappear by the year 2030. In addition, if the world's population continues to grow at its present rate and puts even more pressure on these habitats, they might well be destroyed sooner.

AIR POLLUTION

A significant portion of industry and transportation burns fossil fuels, such as gasoline. When these fuels burn, chemicals and particulate matter are released into the atmosphere. Although a vast number of substances contribute to air pollution, the most common air pollutants contain carbon, sulfur, and nitrogen. These chemicals interact with one another and with ultraviolet radiation in sunlight in dangerous ways. Smog, usually found in urban areas with large numbers of automobiles, forms when nitrogen oxides react with hydrocarbons in the air to produce aldehydes and ketones. Smog can cause serious health problems.

Acid rain forms when sulfur dioxide and nitrous oxide transform into sulfuric acid and nitric acid in the atmosphere and come back to Earth in precipitation. Acid rain has made numerous lakes so acidic that they no longer support fish populations. Acid rain is also responsible for the decline of many forest ecosystems worldwide, including Germany's Black Forest and forests throughout the eastern United States.

WATER POLLUTION

Estimates suggest that nearly 1.5 billion people worldwide lack safe drinking water and that at least 5 million deaths per year can be attributed to waterborne diseases. Water pollution may come from point sources or nonpoint sources. Point sources discharge pollutants from specific locations, such as factories, sewage treatment plants, and oil tankers. The technology exists to monitor and regulate point sources of pollution, although in some areas this occurs only sporadically. Pollution from nonpoint sources occurs when rainfall or snowmelt moves over and through the ground. As the runoff moves, it picks up and carries away pollutants, such as pesticides and fertilizers, depositing the pollutants into lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water. Pollution arising from nonpoint sources accounts for a majority of the contaminants in streams and lakes.

With almost 80 percent of the planet covered by oceans, people have long acted as if those bodies of water could serve as a limitless dumping ground for wastes. However, raw sewage, garbage, and oil spills have begun to overwhelm the diluting capabilities of the oceans, and most coastal waters are now polluted, threatening marine wildlife. Beaches around the world close regularly, often because the surrounding waters contain high levels of bacteria from sewage disposal.

Ex. 2 Answer the following questions:

1 What forms an ecosystem?
2 What does the science of ecology attempt to explain?
3 What does the Law of the Minimum say?
4 What did Robert Paine study?
5 What factors threaten the environment?
6 How does the number of people affect the environment?
7 What is the global warming caused by?
8 What is the ozone layer and how is it affected?
9 What will happen if the world's rain forests continue to be cut down at the current rate?
10 What other kinds of pollution, mentioned in the text, do you know?

Ex. 3 Match the equivalents:

a) - environment;

- rain forests;
- the tidal zone;
- introduction;
- environmental impact;
- greenhouse effect;
- devastating;
- fossil fuels;
- air pollutants;

b) - разрушительный;
- приливно-отливная зона;
- агенты, загрязняющие воздух;
- тропические леса;
- ископаемое топливо;
- окружающая среда;
- влияние на окружающую среду;
- парниковый эффект;
- введение в состав животного мира.

Ex. 4 Match the equivalents:

a) - скалистые поверхности;
- наводнение;
- свалка;
- сточные воды;
- размещение;
- морской;
- отходы;
- заболоченные территории;
- вымирание;
- дефицитный;

b) - in short supply;
- rock surfaces;
- extinction;
- flood;
- wetlands;
- dumping ground;
- wastes;
- sewage;

- disposal;
- marine.

Ex. 5 Are these statements true or false?

1 Organisms and their environment constantly interact.

2 The amount of nutrients in soil doesn't influence the amount of wheat that grows on a farm.

3 To better understand the impact of natural and human disruptions on the Earth, in 1991, NATO began to use artificial satellites to study global change.

4 The problems facing the environment are very few.

5 Human population growth is at the root of virtually all of the world's environmental problems.

Ex. 6 Fill in the gaps with the appropriate preposition:

1 Like all other living creatures, humans have clearly changed their environment, but they have done so generally … a grander scale than have all other species.

2 For example, the amount of nutrients in soil influences the amount of wheat that grows … a farm.

3 When Paine removed the starfish … the area, he found that the mussel population quickly increased in size, crowding out most other organisms from rock surfaces.

4 As non-native species free from all natural predators, the goats thrived and, … the process, overgrazed many of the islands.

5 Human population growth is … the root of virtually all of the world's environmental problems.

Ex. 7 Complete the sentences using the words in brackets:

(smog, fall, contaminants, acid, banned, nonpoint sources, fuels)

1 Even if the manufacture of CFCs is immediately …, the chlorine already released into the atmosphere will continue to destroy the ozone layer for many decades.

2 In fact, in the … of 2000, the hole in the ozone layer over Antarctica was the largest ever recorded.

3 When these … burn, chemicals and particulate matter are released into the atmosphere.

4 …, usually found in urban areas with large numbers of automobiles, forms when nitrogen oxides react with hydrocarbons in the air to produce aldehydes and ketones.
5 … rain has made numerous lakes so acidic that they no longer support fish populations.
6 Water pollution may come from point sources or … .
7 Pollution arising from nonpoint sources accounts for a majority of the … in streams and lakes.

Ex. 8 Find English equivalents:

переменные; влиять; долгосрочный; достигать; потеря; глобальное потепление; изолировать; увеличение температуры; средняя толщина; затоплять; ураганы и засуха; производство фреона; выпадение осадков; удобрение; прибрежные воды; подземные источники; гниющий мусор; соленость; разлив нефти; разжижающий.

Ex. 9 Give a summary of the text using the following phrases:

the title of the text is ...; the text deals with ... (is devoted to ..., is about ...); the text stresses the importance of ...; the text further says ...; in conclusion the author says ...; concerning the problem.

Unit 3 Ecosystems

Ex. 1 Read and translate the text:

HOW ECOSYSTEMS WORK. ECOSYSTEM MANAGEMENT

Ecosystem comprises organisms living in a particular environment, such as a forest or a coral reef, and the physical parts of the environment that affect them. The term ecosystem was coined in 1935 by the British ecologist Sir Arthur George Tansley, who described natural systems in “constant interchange” among their living and nonliving parts.

The ecosystem concept fits into an ordered view of nature that was developed by scientists to simplify the study of the relationships between organisms and their physical environment, a field known as ecology. At the top of the hierarchy is the planet’s entire living environment, known as the biosphere. Within this biosphere are several large categories of living communities known as biomes that are usually characterized by their dominant vegetation, such as grasslands, tropical forests, or deserts. The biomes are in turn made up of ecosystems.

The living, or biotic, parts of an ecosystem, such as the plants, animals, and bacteria found in soil, are known as a community. The physical surroundings, or abiotic components, such as the minerals found in the soil, are known as the environment or habitat.

Any given place may have several different ecosystems that vary in size and complexity. A tropical island, for example, may have a rain forest ecosystem that covers hundreds of square miles, a mangrove swamp ecosystem along the coast, and an underwater coral reef ecosystem. No matter how the size or complexity of an ecosystem is characterized, all ecosystems exhibit a constant exchange of matter and energy between the biotic and abiotic community. Ecosystem components are so interconnected that a change in any one component of an ecosystem will cause subsequent changes throughout the system.

The living portion of an ecosystem is best described in terms of feeding levels known as trophic levels. Green plants make up the first trophic level and are known as primary producers. Plants are able to convert energy from the sun into food in a process known as photosynthesis. In the second trophic level, the primary consumers – known as herbivores – are animals and insects that obtain their energy solely by eating the green plants. The third trophic level is composed of the secondary consumers, flesh-eating or carnivorous animals that feed on herbivores. At the fourth level are the tertiary consumers, carnivores that feed on other carnivores. Finally, the fifth trophic level consists of the decomposers, organisms such as fungi and bacteria that break down dead or dying matter into nutrients that can be used again.

Some or all of these trophic levels combine to form what is known as a food web, the ecosystem's mechanism for circulating and recycling energy and materials. For example, in an aquatic ecosystem algae and other aquatic plants use sunlight to produce energy in the form of carbohydrates. Primary consumers such as insects and small fish may feed on some of this plant matter, and are in turn eaten by secondary consumers, such as salmon. A brown bear may play the role of the tertiary consumer by catching and eating salmon. Bacteria and fungi may then feed upon and decompose the salmon carcass left behind by the bear, enabling the valuable nonliving components of the ecosystem, such as chemical nutrients, to leach back into the soil and water, where they can be absorbed by the roots of plants. In this way, nutrients and the energy that green plants derive from sunlight are efficiently transferred and recycled throughout the ecosystem.

In addition to the exchange of energy, ecosystems are characterized by several other cycles. Elements such as carbon and nitrogen travel throughout the biotic and abiotic components of an ecosystem in processes known as nutrient cycles. For example, nitrogen traveling in the air may be snatched by tree-dwelling, or epiphytic, lichen that converts it to a form useful to plants. When rain drips through the lichen and falls to the ground, or the lichen itself falls to the forest floor, the nitrogen from the raindrops or the lichen is leached into the soil to be used by plants and trees. Another process important to ecosystems is the water cycle, the movement of water from ocean to atmosphere, to land and eventually back to the ocean. An ecosystem such as a forest or wetland plays a significant role in this cycle by storing, releasing, or filtering the water as it passes through the system.

Every ecosystem is also characterized by a disturbance cycle, a regular cycle of events such as fires, storms, floods, and landslides that keeps the ecosystem in a constant state of change and adaptation. Some species even depend on the disturbance cycle for survival or reproduction. For example, longleaf pine forests depend on frequent low-intensity fires for reproduction. The cones of the trees, which contain the reproductive structures, are sealed shut with a resin that melts away to release the seeds only under high heat.

ECOSYSTEM MANAGEMENT

Humans benefit from these smooth-functioning ecosystems in many ways. Healthy forests, streams, and wetlands contribute to clean air and clean water by trapping fast-moving air and water, enabling impurities to settle out or be converted to harmless compounds by plants or soil. The diversity of organisms, or biodiversity, in an ecosystem provides essential foods, medicines, and other materials. But as human populations increase and their encroachment on natural habitats expand, humans are having detrimental effects on the very ecosystems on which they depend. The survival of natural ecosystems around the world is threatened by many human activities: bulldozing wetlands and clear-cutting forests – the systematic cutting of all trees in a specific area – to make room for new housing and agricultural land; damming rivers to harness the energy for electricity and water for irrigation; and polluting the air, soil, and water.

Many organizations and government agencies have adopted a new approach to managing natural resources – naturally occurring materials that have economic or cultural value, such as commercial fisheries, timber, and water, in order to prevent their catastrophic depletion. This strategy, known as ecosystem management, treats resources as interdependent ecosystems rather than simply commodities to be extracted. Using advances in the study of ecology to protect the biodiversity of an ecosystem, ecosystem management encourages practices that enable humans to obtain necessary resources using methods that protect the whole ecosystem. Because regional economic prosperity may be linked to ecosystem health, the needs of the human community are also considered.

Ecosystem management often requires special measures to protect threatened or endangered species that play key roles in the ecosystem. In the commercial shrimp trawling industry, for example, ecosystem management techniques protect loggerhead sea turtles. In the last thirty years, populations of loggerhead turtles on the southeastern coasts of the United States have been declining at alarming rates due to beach development and the ensuing erosion, bright lights, and traffic, which make it nearly impossible for female turtles to build nests on beaches. At sea, loggerheads are threatened by oil spills and plastic debris, offshore dredging, injury from boat propellers, and being caught in fishing nets and equipment. In 1970, the species was listed as threatened under the Endangered Species Act.

When scientists learned that commercial shrimp trawling nets were trapping and killing between 5000 and 50,000 loggerhead sea turtles a year, they developed a large metal grid called a Turtle Excluder Device (TED) that fits into the trawl net, preventing 97 percent of trawl-related loggerhead turtle deaths while only minimally reducing the commercial shrimp harvest. In 1992, the National Marine Fisheries Service (NMFS) implemented regulations requiring commercial shrimp trawlers to use TEDs, effectively balancing the commercial demand for shrimp with the health and vitality of the loggerhead sea turtle population.

ECOLOGY AND ENVIRONMENT

The three elements namely earth, water and space constitute the whole cosmos therefore it re-affirms to work with people towards creating awareness and as a movement for perseverance, sustenance of flora and fauna and cosmic elements and to usher ecology and environment of this earth where integrity of creation will be a cherished value.

AIR

- Air pollution has now become a major killer with three million people dying of it every year.
- Carbon emissions doubled in three decades. Global warming is now a serious threat.

- US Carbon emissions are 16 % above 1990 levels making it a major polluter.

WATER

- Forty percent of world population now faces chronic shortage of fresh water for daily needs.
- Half the world's wetlands have been lost and one-fifth of the 10,000 freshwater species is extinct.
- Contaminated water kills around 2.2 million people every year.

LAND

- Since 1990, 2.4 % of the world's forests have been destroyed. The rate of loss is now 90,000 sq. km. every year.
- Now two-thirds of the world's farmlands suffer from soil degradation.
- Half the world's grasslands are overgrazed. India is 25 % short of its fodder needs.

WILDLIFE

- 800 species have become extinct and 11,000 more are threatened.
- Almost 75 % of the world's marine captures is over fished or fully utilized. In North America, 10 fish species went extinct in the 1990s.
- Of the 9,946 known bird species, 70 % has declined in numbers.

PEOPLE

- The world added 800 million people since 1990. In 2000, global population was 6 billion, up from 2.5 billion in 1950.
- In 10 years, the world will have to feed and house another billion

CARING FOR THE NATURE

"Nature has everything for man's need but not his greed", – said once Mahatma Gandhiji. A large-scale deforestation that is taking place around the globe is causing tremendous ecological and environmental imbalances throughout the world. The resultant fury of the nature is witnessed all around through drastic change in the climate, flash, floods, failure of rain and many more, causing damage to thousands of lives and live stocks throughout the world.

Ex. 2 Answer the following questions:

1 What does ecosystem comprise?
2 What are biomes?
3 What is photosynthesis?
4 What is a food web?
5 What processes are important for ecosystems?

6 What threatens ecosystems?

7 What approach have many organizations and government agencies adopted to managing natural resources?

8 What elements constitute the cosmos?

9 What is polluted nowadays?

10 What is the reaction of nature to different threats?

Ex. 3 Match the equivalents:

a) - vegetation;
- convert;
- herbivores;
- secondary consumers;
- decomposers;
- lichen;
- a disturbance cycle;
- expand;
- damming river;

b) - преобразовывать;
- лишайник;
- прерывный цикл;
- второстепенные потребители;
- то, что вызывает гниение;
- расширяться;
- река, перекрытая плотиной;
- растительность;
- травоядные животные.

Ex. 4 Match the equivalents:

a) - биологическая вариативность;
- большеголовые морские черепахи;
- сдирать;
- вспышка;
- последующая эрозия;
- обрабатываемая земля;
- радикальное изменение;
- дисбаланс;
- процветание;
- орошение;

b) - irrigation;
- biodiversity;
- prosperity;
- loggerhead sea turtles;
- ensuing erosion;
- farmland;
- overgraze;
- imbalance;
- drastic change;
- flash.

Ex. 5 Are these statements true or false?

1 At the top of the hierarchy is the planet's entire living environment, known as the biosphere.

2 The living, or abiotic, parts of an ecosystem, such as the plants, animals, and bacteria found in soil, are known as a community.

3 Green plants make up the first trophic level and are known as primary consumers.

4 The third trophic level is composed of the secondary consumers, flesh-eating or carnivorous animals that feed on herbivores.

5 Elements such as carbon and nitrogen travel throughout the biotic and abiotic components of an ecosystem in processes known as carbon cycles.

Ex. 6 Fill in the gaps with the appropriate preposition:

1 The physical surroundings, or abiotic components, such as the minerals found … the soil, are known as the environment or habitat.

2 The living portion of an ecosystem is best described … terms of feeding levels known as trophic levels.

3 … the fourth level are the tertiary consumers, carnivores that feed on other carnivores.

4 Primary consumers such as insects and small fish may feed … some of this plant matter.

5 … addition to the exchange of energy, ecosystems are characterized by several other cycles.

Ex. 7 Complete the sentences using the words in brackets:

(cycle, resources, complexity, detrimental, extinct, decompose, feeding)

1 Any given place may have several different ecosystems that vary in size and ….
2 The living portion of an ecosystem is best described in terms of … levels known as trophic levels.
3 Bacteria and fungi may then feed upon and … the salmon carcass left behind by the bear.
4 Another process important to ecosystems is the water …, the movement of water from ocean to atmosphere, to land and eventually back to the ocean.
5 But as human populations increase and their encroachment on natural habitats expand, humans are having … effects on the very ecosystems on which they depend.
6 Using advances in the study of ecology to protect the biodiversity of an ecosystem, ecosystem management encourages practices that enable humans to obtain necessary … using methods that protect the whole ecosystem.
7 Almost 75 % of the world’s marine captures is over fished or fully utilized. In North America, 10 fish species went … in the 1990s.

Ex. 8 Find English equivalents:

плотоядные животные; наводнения; происходить; непоколебимость; выживание; почвенная деградация; заболоченные территории; безвредный; защищать; демонстрировать; взаимообмен; мировое население; огромный; жадность; злоба; целостность; широкомасштабная вырубка леса; взаимозависим; пустыни; урожай.

Ex. 9 Give a summary of the text using the following phrases:

the title of the text is ...; the text deals with ... (is devoted to ..., is about ...); the text stresses the importance of ...; the text further says ...; in conclusion the author says ...; concerning the problem.

Unit 4 The Environment in the New Millennium

Ex. 1 Read and translate the text:

THE WAY OF THE WORLD

“The Economist”, the famous magazine of the United Kingdom, has analyzed the trend of the world in the twentieth century. The environment of the past 100 years has not been as bad as the people have thought. On the contrary, the environment of the world has been good and will be so until the next century. Although the population of the world has been increasing quickly during the last century, it has not caused any serious problems as world production has also been highly increased. The environment of the world has not been a disaster (like the prophecy of many others) because of the changes of many factors. There is the change of resource prices and society. The development of democracy and the planning of environment are to meet the pressure from the people.

It is seen that when there are more people, more consuming, more production, the use of natural is increasing. The price goes up when there is the need. There is then the force of being economical in use, the need to find new resource sites, new kinds of resources, new technology, and new ways for humanity. The mechanism of prices has been quite efficient in solving the problems of natural resource.

However, we need to accept that marketing mechanisms have not been quite satisfactory in solving environmental problems, particularly, where there is something in nature, which does not belong to any one. Therefore, there is the tendency that resources will be used inconsiderately. There is no one to care for conservation.

There is the example that resources in the sea and the ocean will continue being in hazard in the next century. Moreover, in some cases, the hazard in the environment has not been reflected in the way we can see like «price». There is the case that pollution is setting into air and water. The pollution occurs to the ecology and community. However, the price does not reflect any of these damages. It is because private business wants to decrease the capital amount and want to continue getting the highest profit. They let the disasters happen.

Communities, society and nature meet danger from the environment as we see in the developing countries all over the world “The Economist” points out that in a country with advanced industry, pollution is not a big problem because they have developed democracy, which then has the checking, there is always the pressure from the people.

The democratic government has answered the people’s needs with the awareness that something needs to be done and some things have already been done. We can see that air pollution in industrial society, which had been increasing for 300 years, is solved satisfactorily. This will be continued for a long time. In a developing country, this problem may continue to the next century.

THE CRISIS OF ECOLOGY IN THE DEVELOPING WORLD

In the analysis, “The Economist” may be too positive in assessing the environmental problem and regarding only one aspect like pollution in industry. There is the conclusion that the incidence of pollution in the air has been decreasing. Nothing is said about the pollution of toxic waste, which has been left, and keeps piling up in the environment for so long in the world of industry. This tendency will continue until the next century as the government in industrial countries like America, Japan and Germany have not been successful in solving the problems of toxic waste, which has been accumulating for so long. It is because the main environmental policy emphasizes only the problems, which are visible and can be felt. The emphasis is on short-term pollution, which has an immediate effect to on people’s health. The accumulating pollution cannot be seen easily, it is then neglected.

Besides, the analysis of the population of the world overlooks one main fact – although the growth rate is not as high as before the population of the world in this turn of the century will increase by approximately 80 million a year. (The amount is equal to the number of people in Germany.) It means that this amount of population among the impoverished and the deterioration of rural environment will heighten the environment crisis, which will have an effect on the production system and the ways of living of the people in developing countries.

The very high increase of the population has affected the development in city and the living in urban areas. At present, there are 2.6 billion people living in cities. 1.7 billion of that amount live in the cities of developing countries. There is the prediction that the ratio will accelerate until the year 2015. Three quarters of the world population is in developing countries, which are very crowded, and the health problems are serious.

When we adopt the well-known “environmental formula” of Anne and Paul Ehrlich as the base on considering problems, we get the conclusion that the environment crisis has the tendency to become very critical. This formula says: “Environment crisis (I) is settled by the amount of the population (P), the economic growth (A) and Production Technology (T), that is I = P × A × T”.

Economic growth is also another main variable. The more development, there is the more the increase in production. It heightens the ecology system. Moreover, the production of one unit may cause a large quantity of pollution because of the use of unclean (unhealthy) technology, which endangers the environment. It is worrying that the trading, the production and the consuming will enhance the squandering of resources and the environment will be seriously destroyed.

DEMOCRACY AND ENVIRONMENT

We can give the main conclusions for the future of the developing world as follows.

1 The worst pollution may occur among the poor countries. It reflects some basic problems. These countries hardly have democratic development, their people have no rights, no vote, they do not get information on the environment, and they are unable to force their government to be against the businesses threatening environmental conditions. The lack of democracy is then the main factor causing environmental crisis.

2 The seriousness of pollution has not occurred because of the over development of the economy. It is because the first part of the development by government and private business emphasizes only the economic enlargement (to increase population income and the export). After a certain period, people in various fields started to develop their conscience of “Green” and there is a large cry for the awareness of “Sustainable Development”.

During this time, the government has to respond to the starting of environmental planning with the aims of economic development along with environmental protection. However, there needs to be “Democracy of the environment” as the main base.

3 Regarding the long 100 years of experience of the West, we may look further ahead that in the 21st century the developing countries may be trying to solve environmental crises by themselves. However, there are many other factors for their success, particularly, the following:

– there needs to be information which is quite complete for the comparison of capital for the controlling of environment and the benefits from which society will gain;

– there are efficient criteria, which is the mixture of the standards of marketing and the price, and the criteria in setting up the environmental standards.

Finally, the solving of the crisis of the environment is not only the economic problems (e.g. the promulgation of Green Tax) but also the political problem. If there are too strict standards, it may not be accepted politically.

The people may criticize. The business world may be against it and react (by decreasing the investment in employee’s wages or increasing the price so high that it causes people to be in trouble.) In a democracy, the politicians who plan the policy on environment do not usually like strict standards. There is no one being concerned about how much the standard and the policy on environment will be affected.

It is predicted that in the twenty-first century the green power group in developing countries will increase.

The movement will be in a wider scope and there will be the call for solving the problems down to the root.

This is because the environment problem is becoming serious while the reaction from the government is quite slow. It is because the government has the tendency not to have strict standard that they may have to be concerned with private business and the national economy.

ENVIRONMENTAL INNOVATION

Among the rich countries, it is assumed that it is not so hard to solve environmental problems of the 21st century. These countries will compete with each other in improving the quality of their products. There is always the search for innovation, environmental innovation, in particular, is an important instrument in encouraging the progress of the industrial world. At present, the rich countries have already had the high potentiality of developing new technology for the production process with the regard for environmental quality.

The innovative analyst regards that the ability of industry in responding to the environmental problems is the main indicator if that kind of industry can compete at the world level. Those who want to succeed must integrate the main idea with the production system. It means the protection of the environment, solving the problem of pollution, increasing the efficiency in using natural resources and power. The strict standard of the environment will enhance the thinking of production method, which will benefit the environment.

At present, the governments of the industrial world, like Sweden, agree with "Environment Innovation Ways". There is a conclusion in the latest report of the national environment that "The policy on environment of the Swedish government is very important in enhancing the modernity in industrial business sectors. The improvement of the environment has turned out to be the main factor in accelerating the competition in this industry."

This is the entire new western concept, which emphasizes "How to bring about Ecological Modernization."

It is the new concept on new environmental technology and every step is used for the industrial production process. However, there needs to be adaptation of the whole production structure, which needs systematic "environmental planning", and the adapting of world vision and the conscience of the environment of the people in every field. The concept of "Ecological Innovation" does not emphasize only the technology but also regards the importance of "Environmental management" which needs to be done in both the governmental and private sectors. This can be seen in countries like Sweden, Denmark, Holland and Germany, which are regarded as the leaders in "Environmental Innovation".

Ex. 2 Answer the following questions:

1 What was the condition of the environment a hundred years ago?

2 What problem do the development of democracy and the planning of environment face?

3 Are resources used considerately?

4 Is the pollution of toxic waste increasing?

5 What does the growth of population mean for the planet?

6 When do we get the conclusion that the environment crisis has the tendency to become very critical?

7 The worst pollution may occur among the poor countries, mightn't it?

8 Is the solving of the crisis of the environment is only a political problem?

9 What is a new concept on new environmental technology?

10 What needs systematic "environmental planning"?

Ex. 3 Match the equivalents:

a) - world production;
- pressure;
- accumulate;
- visible;
- analysis;
- affect;
- accelerate;
- seriousness;
- economic enlargement;

b) - мировое производство;
- серьезность;
- накапливать;
- экономическое расширение;

- давление;
- анализ;
- влиять;
- ускорять;
- видимый.

Ex. 4 Match the equivalents:

a) - инновационный;
- объединять(ся);
- эффективность;
- опыт;
- польза, прибыль;
- улучшение;
- управление;
- придавать особое значение;
- сравнение;
- считать;

b) - experience;
- comparison;
- benefit;
- innovative;
- integrate;
- efficiency;
- improvement;
- emphasize;
- management;
- regard.

Ex. 5 Are these statements true or false?

1 The population of the world has been decreasing quickly during the last century.

2 When there are more people, more consuming, more production, the use of natural is increasing.

3 Air pollution in industrial society isn't solved satisfactorily.

4 The very high increase of the population has affected the development in city and the living in the country.

5 Three quarters of the world population is in developing countries.

Ex. 6 Fill in the gaps with the appropriate preposition:

1 … the contrary, the environment of the world has been good and will be so until the next century.

2 The environment of the world has not been a disaster because … the changes of many factors.

3 The price goes … when there is the need.

4 The mechanism of prices has been quite efficient … solving the problems of natural resource.

5 There is the example that resources … the sea and the ocean will continue being … hazard … the next century.

Ex. 7 Complete the sentences using the words in brackets:

(resource sites, accumulating pollution, conscience, green power group, 2015, hazard, environment)

1 The … of the world has not been a disaster (like the prophecy of many others) because of the changes of many factors.
2 There is then the force of being economical in use, the need to find new …, new kinds of resources, new technology, and new ways for humanity.
3 In some cases, the … in the environment has not been reflected in the way we can see like "price".
4 The … cannot be seen easily, it is then neglected.
5 There is the prediction that the ratio will accelerate until the year ….
6 After a certain period, people in various fields started to develop their … of "Green" and there is a large cry for the awareness of "Sustainable Development".
7 It is predicted that in the twenty-first century the … in developing countries will increase.

Ex. 8 Find English equivalents:

анализировать; природный; риск, опасность; отходы; доведенный до нищеты; кризис; производственные технологии; повышать; угрожающий; рост; разрушать; защита; критерии; соревноваться; осуществлять; идея; модернизация; правительственный; важность.

Ex. 9 Give a summary of the text using the following phrases:

the title of the text is ...; the text deals with ... (is devoted to ..., is about ...); the text stresses the importance of ...; the text further says ...; in conclusion the author says ...; concerning the problem.

Unit 5 Environmentalism As a Future Speciality

Ex. 1 Read and translate the text:

ENVIRONMENTALISM AND TECHNOLOGY

Wait a minute, you might say, it is environmentalism against technology, for isn't technology a fundamental source of environmental problems?

This has been the position of deep greens. In fact, some trace all environmental problems to the beginning of agriculture, arguing that it was the shift from hunter-gatherer to farming that created what they consider the human cancer consuming the globe. Even moderate greens can be anti-tech, reflecting both skepticism about capitalism and the counter cultural ideology that characterizes most environmental discourse.

Consider, for example, something as mainstream, as the precautionary principle, which holds that no new technology be introduced until it can be demonstrated to have no harmful environmental impacts. Taken at face value, this embeds within it a strong preference for "privileging the present" – that is, attempting to ban or limit technological evolution – for the potential implications of all but the most trivial technological innovations cannot be known in advance.

Positioning environmentalism against technology, however, has its problems. For one, it misunderstands the nature of complex cultural systems. These inevitably evolve, generally towards greater complexity; consider, for example, how much more complex international governance, information networks, or financial structures are now than just a few years ago.

And technologies are evolving rapidly as well, particularly in the three areas that promise to impact environmental systems the most: biotechnology, nanotechnology, and information technology. The first will, over time, give us design capabilities over life; the second will let us manipulate matter at the molecular level; the third will change how we perceive and understand the world within which the first two are accomplished.

Moreover, developing such capabilities will give the cultures that do so significant competitive advantages over those that opt for stability rather than technological evolution. There are historical examples of this process – for example, China, from roughly the 11^{th} to the 14^{th} centuries. At that time, China was the most technically advanced society, but for a number of reasons its elite chose stability over the social and cultural confusion that development and diffusion of technologies (such as gunpowder and firearms) might have caused. Northern Europe, however, followed a more chaotic path, including the Enlightenment and the Industrial Revolution, which favored technological evolution. The result: Eurocentric, not Chinese, culture forms the basis of today's globalization.

Applying this lesson to current conditions raises the question of whether deep-green opposition to certain technological advances, especially genetically modified organisms, could halt technological advance. Some societies – Europe, in particular – may choose stasis over evolution. But biotech is such a powerful advance in human capabilities that other societies – especially developing countries with immediate needs that biotech can address – are not likely to forego its benefits. And to the extent, their cultures become more competitive by doing so, they may come to dominate global culture.

So is the answer then to simply give up and let technology evolve, as it will? Not at all. In fact, the essential problem with an ideological opposition to technology is that it prevents precisely the kind of dialog between the environmentalist and technological discourses required to create a rational and ethical anthropogenic earth. For technologies are not unproblematic, and their evolutionary paths are not preordained; rather, they are products of complex and little-known social, cultural, economic, and systems dynamics, it is important that they be questioned and understood.

The challenge is thus not unthinking opposition, or maintenance of ideological purity, or even meaningless repetition of ambiguous phrases such as "precautionary principle." It is far more demanding. It is to learn to perceive and understand technology as a human practice and experience, and to help guide that experience in ways that are environmentally appropriate.

BUT I WANT TO WORK ON ENVIRONMENTAL STUFF!

One of the horrible existential challenges of being a student is that, in most cases, one must at some point leave school and begin work, presumably in an area for which one has been training these many years. For those reading this column, the area of interest is likely environmental, usually expanded these days to include sustainability. Put bluntly, the relevant questions are likely to be "How do I do well and what is the job market like?" Recognizing that planning your career on the basis of a 750-word column is probably not a great idea, here are some thoughts while you hit the books.

First, the good news. There are plenty of opportunities to do great things: to help your employer (be it a private firm, government, or NGO), help the world, and feed yourself. Now, the bad news. Most of these opportunities are disguised, most have nothing to do with environment as currently taught and thought about at most schools, many of the opportunities have yet to be invented, and almost any worthwhile job will require that you develop it yourself, from inside.

To begin with, traditional environmental jobs that is, those based on current regulatory and policy structures, primarily cleanup and end-of-pipe emissions control will be with us for a long time, especially in developing countries. They are necessary. But this field is not growing, offers few intellectual challenges, and will have little to do with solving the larger problems of the anthropogenic world albeit improving health significantly in developing countries. So if you really want to help the environment in the broader sense – perturbed climatic and oceanic systems; anthropogenic carbon, nitrogen, sulfur, and hydrologic system changes; biosphere disruptions – this is not the place for you.

The next step up is a position in the “sustainability industry.” Superficially, at least, such jobs, which are frequently with niche consulting firms, are broader in scope and offer more intellectual opportunities. But caution is in order. The term “sustainability” has now grown to be so politically correct, and at the same time flown so far beyond mere ambiguity, that there is no substantive content to much of this work. In too many cases, it now amounts to a somewhat patronizing, highly ingrown dialog within a small circle of friends that tend to regard themselves as the great and the good, and spend a lot of time reinforcing one another’s mental models.

The result is a nouveau utopianism that has tenuous connections with the real world, except for the few that are already True Believers. Thus, for example, I recently participated in a sustainability workshop where one conclusion was that firms should exist not for profit, but only to redistribute income (and that, by the way, money should be banned). Those with any historical background will recognize that this proposed policy closely tracks that of the early Leninist/Marxist Soviet Union. They did ban money – and the economy collapsed.

Moreover, you can imagine how the typical executive would greet such a proposal as a model for how his/her firm could be “sustainable.”

So, be careful if you want to work in this area. Before you jump in, you may want to work inside a firm first to get an idea of what companies really are like. It will help you maintain perspective. There are a few real opportunities – but caveat emptor.

So what to do? Back to first principles. The challenge of environmental (and related social) issues is precisely that they have become so all encompassing. They are not separable from the messy, multidisciplinary worlds of commerce, of ordinary life, of birth and death, of long natural cycles. So the kinds of things that contribute most to social and environmental progress – employee telework options, efficient network routing algorithms for air and ground transport systems, low-energy and reduced-water manufacturing technologies – come not from the environmental staff, but from the core operating competencies – engineers, business planners, product designers, and others. So, by all means remain committed to sustainability, but get expertise in international business, chemical engineering, or finance. Then, when you get your non-environmental, line position, you can start to change the world.

WORKING FOR THE ENVIRONMENT – INDUSTRIAL COMPLEX

A while ago, I was reading an article on pollution prevention written by an ex-EPA consultant, and was both amused and somewhat surprised to see “industrial ecology” identified as industry green wash.

My first response, of course, was dismissive: didn’t the author realize that meaningful environmental progress could be achieved only through such systematic approaches as industrial ecology, and its implementation through (for example) Design for Environment and Life Cycle Assessment methodologies?

Indeed, pollution prevention as usually interpreted by environmental regulators is a singularly limited concept, a relatively insignificant extension of end-of-pipe approaches, and it requires something like industrial ecology to energize it.

But my initial reaction was both unfair and superficial. The author was not really reacting to industrial ecology as laid out in existing texts or as being implemented in some firms today. Rather, the article implicitly made an important point about the nature of “environment” itself: the very concept (and closely related concepts such as “wilderness” and “nature”) is constructed from underlying mental models, which may differ significantly and carry very different policy and governance implications.

Thus, “industrial ecology” does not enter the environmental discourse as an objective concept (although industrial ecology studies strive for objectivity and good science). Rather, an environmentalist will see it as a response to growing political pressure by powerful administrative and bureaucratic systems, with a belief system based on scientific and technical rationality – as, in short, a defensive thrust based on a state/corporatist managerialism mental model.

Seen in this light, the concept carries several implications which to an environmentalist may be problematic: a powerful (and polluting) elite co-opting “real” environmentalism; establishment of a playing field (high technology and industrial systems) which implicitly degrades the knowledge base and operational characteristics of traditional environmental NGOs; and, more subtle but all the more powerful for that, a vision of a future “sustainable” world based on a high technology, urbanized society as opposed to an agrarian, localized world with large portions of limits to people.

It was important, therefore, not to take that article as just a naive rejection of industrial ecology and its promise, but to understand it as a reflection of deeply conflicting worldviews which were all the more critical for being implicit and, to a large extent, even unconscious.

And, of course, these two mental models – call them the managerialistic and the edenistic – are not the only common ones. Others which might be identified include the “authoritarian” (environmental crises require centralized authoritarian institutions); “communal” (with the caution that some communities can be extraordinarily violent towards minorities and outsiders); “ecosocialist” (capitalistic exploitation of workers and commoditization of the world are the source of environmental degradation); “ecofeminist” (male exploitation of nature and women derive from the same power drive, and must be addressed concomitantly) and “pluralistic liberalism” (open collaboration involving diverse interests is the proper process to achieve environmental progress).

All of these raise some very difficult questions. For example, ecosocialism is somewhat tarnished by the abysmal environmental record of Eastern European communist governments.

The obvious question for the manager blessed with the opportunity to manage among these minefields is which one of these mental models is “right”? The unfortunate truth is that we as a society are not ready to answer that question yet.

This is not just because most people – environmental professionals, environmentalists, regulators, industry leaders – are naive positivists, and therefore unwilling or unable for the most part to recognize their own mental models, much less to respect other parties’ mental models.

It also reflects a disturbing and almost complete ignorance about the implications of each model for the real world. What levels of human population, of biodiversity, of economic activity, would each mental model imply?

What kind of governance structure? Who would win and who would lose (more precisely, what would the distributional effects of each model be)?

The important point, I think, is not the correctness of any particular model. Rather, it is the need to understand that differences among stakeholders in environmental disputes may arise not just from factual or economic disagreements, but from differences in fundamental worldviews – and that, at present, our current knowledge cannot anoint any particular one as “privileged.”

A little sensitivity to how one’s position and practices are understood by others can go a long way towards facilitating collaborations, which are both necessary and plenty difficult as it is. Before one too readily criticizes others, one should recall the Socratic admonition and know thyself – and thy mental models.

Ex. 2 Answer the following questions:

1 According to some ecologists what led to ecological problems?

2 What three areas promise the greatest impact on the environment?

3 What are traditional environmental jobs mentioned in the text?

4 How can meaningful environmental progress be achieved according to the author?

5 Does “industrial ecology” enter the environmental discourse as an objective concept?

6 What is somewhat discoloured by the abysmal environmental record of Eastern European communist governments?

7 What are the mental models mentioned in the text?

8 Why can’t we, as a society, say which mental model is right?

9 From what may differences among stakeholders in environmental disputes arise?

10 What one should recall before criticizing others?

Ex. 3 Match the equivalents:

a) - trace;
- mainstream;
- positioning environmentalism;
- competitive advantages;

- human capabilities;
- sustainability;
- evolutionary paths;
- anthropogenic;
- natural cycles;

b) - соревновательные преимущества;
- естественные циклы;
- главное направление;
- позиционирование науки, занимающейся проблемами окружающей среды;
- устойчивость;
- вызванный деятельностью человека;
- направления в эволюции;
- человеческие возможности;
- след.

Ex. 4 Match the equivalents:

a) - те, кто регулирует процесс защиты окружающей среды;
- крупный землевладелец;
- эксплуатация;
- чистое производство;
- точность;
- профессионалы, занимающиеся защитой окружающей среды;
- не относящийся к окружающей среде;
- интеллектуальные модели;
- распределительный эффект;
- народонаселение;

b) - non-environmental;
- industry green wash;
- environmental regulators;
- an agrarian;
- exploitation;
- environmental professionals;
- correctness;
- mental models;
- human population;
- distributional effects.

Ex. 5 Are these statements true or false?

1 Biotechnology will, over time, give us design capabilities over life.

2 Biotech is such a powerful advance in human capabilities that other societies – especially undeveloped countries with immediate needs that biotech can address – are not likely to forego its benefits.

3 It is far more demanding. It is to learn to perceive and understand technology as a human practice and experience, and to help guide that experience in ways that are environmentally appropriate.

4 Traditional environmental jobs that is, those based on current regulatory and policy structures, primarily cleanup and end-of-pipe emissions control will hardly be with us for a long time.

5 The term "sustenance" has now grown to be so politically correct, and at the same time flown so far beyond mere ambiguity, that there is no substantive content to much of this work.

Ex. 6 Fill in the gaps with the appropriate preposition:

1 Even moderate greens can be anti-tech, reflecting both skepticism … capitalism and the counter cultural ideology that characterizes most environmental discourse.

2 Taken … face value, this embeds within it a strong preference … "privileging the present".

3 Applying this lesson … current conditions raises the question of whether deep-green opposition … certain technological advances could halt technological advance.

4 Recognizing that planning your career … the basis of a 750-word column is probably not a great idea.

5 Superficially, … least, such jobs, which are frequently … niche consulting firms, are broader … scope and offer more intellectual opportunities.

Ex. 7 Complete the sentences using the words in brackets:

(like, challenges, impact, broader sense, human cancer, concept, globalization)

1 It was the shift from hunter-gatherer to farming that created what they consider the … consuming the globe.

2 Technologies are evolving rapidly as well, particularly in the three areas that promise to … environmental systems the most.

3 Eurocentric, not Chinese, culture forms the basis of today's … .

4 One of the horrible existential … of being a student is that, in most cases, one must at some point leave school and begin work.
5 If you really want to help the environment in the … this is not the place for you.
6 Before you jump in, you may want to work inside a firm first to get an idea of what companies really are … .
7 Seen in this light, the … carries several implications which to an environmentalist may be problematic.

Ex. 8 Find English equivalents:

источник; животноводство; господствующая тенденция; вредный; заранее; неизбежно; нанотехнология; молекулярный; стабильность; преимущество; неопределенность; жизнеспособный; сеть; предотвращение загрязнения; эксплуатация; деградация; меньшинства; сотрудничество; с готовностью; предостережение.

Ex. 9 Give a summary of the text using the following phrases:

the title of the text is ...; the text deals with ... (is devoted to ..., is about ...); the text stresses the importance of ...; the text further says ...; in conclusion the author says ...; concerning the problem.

ЛИТЕРАТУРА

1 Макеева, М. Н. Современные экологические проблемы: сб. текстов на английском языке / авт.-сост. : М. Н. Макеева, Л. П. Циленко, А. А. Гвоздева. – Тамбов: Изд-во Тамб. гос. техн. ун-та, 2004. – 96 с.

2 Swan, M. Practical English Usage / M. Swan. – 2-d ed. – Oxford: Oxford University Press, 1995. – 221 p.

3 Thomson, A. J. A Practical English Grammar / A. J. Thomson, A.V. Martinet. – 2-d ed. – Oxford: Oxford University Press, 1976. – 246 p.

Учебное издание

САЖИНА Елена Владимировна

АНГЛИЙСКИЙ ЯЗЫК

ПРАКТИЧЕСКОЕ ПОСОБИЕ

для студентов 1–2 курса
специальности 1-33 01 02 «Геоэкология»
по теме
«DISCUSSING ECOLOGICAL PROBLEMS»

В авторской редакции

Лицензия №02330/0133208 от 30. 04.04.
Подписано в печать . Формат 60x84 1/16. Бумага писчая № 1.
Гарнитура «Таймс». Усл. печ. л. . Уч.-изд. л. . Тираж экз.
Заказ № .

Отпечатано на ризографе с оригинала-макета
учреждения образования
«Гомельский государственный университет имени Франциска Скорины»
Лицензия № 02330/0056611 от 16.02. 04.
246019, г. Гомель, ул. Советская, 104