**МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ**

**Государственное образовательное учреждение**
**высшего профессионального образования**

**«Нижегородский государственный**
**лингвистический университет**

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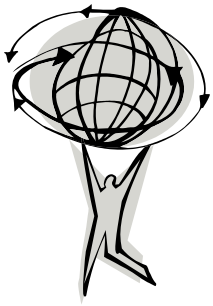
Факультет международных отношений, экономики и управления

Кафедра иностранных языков



# ЭКОЛОГИЯ

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**Английский язык**

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Настоящее учебное пособие предназначено для аудиторной и самостоятельной работы студентов II-III курсов над совершенствованием всех видов речевой деятельности в рамках экологической тематики, усвоением основных понятий экологии и формированием у студентов экологически осознанного отношения к окружающей среде.

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## Введение

Настоящее пособие предназначено для студентов II-III курсов различных специальностей, изучающих «Основы всеобщей экологии» как основную учебную или дисциплину по выбору.

Пособие состоит из 8 разделов и  словаря. Каждый раздел включает один или несколько тематических текстов, освещающих экологическую проблему и семантизирующих новую лексику. Послетекстовая работа над материалом включает два типа упражнений – языковые (тренировочные) и речевые (коммуникативные).

В блоке языковых упражнений (Vocabulary) предлагаются словарь и набор разнообразных упражнений для активизации словаря. Коммуникативный блок (Discussion) состоит из упражнений репродуктивного и творческого характера для развития как монологической, так и диалогической речи.

Каждый раздел завершается заданием на развитие письменной речи с использованием информации с интернет-сайтов.

Кроме этого, даются также

Пособие может использоваться как для аудиторной, так и для самостоятельной работы студентов.

# UNIT I

## Introduction Into The Problem

### Warm-Up

Is it correct to connect the word “ecology” with the word “problem”?

Are there many people around who are concerned about environmental problems?

Are you one of them?

Should more attention be drawn to ecological problems nowadays?

### TEXT I

*Environment* describes the physical conditions that somebody or something exists in. The environment is the natural world in which people, animals and plants live.

*Ecology* is the way in which people, animals and plants are related to each other and to their environment, or the scientific study of this.

The world has reached a crisis point. Our modern lifestyle is destroying the fragile Ecology.

Environmental issues have received much attention over the past years, both from scientists and consumers. The media daily expose us to examples of the environmental crisis. Carbon dioxide levels in the air we breathe are excessively high and may cause dangerous climatic changes in the coming years; the ozone layer is in serious danger of being destroyed, thereby increasing our exposure to harmful radiation from the sun; we are rapidly running out of places to dump our garbage. These seemingly endless crises overwhelm many people, often leading to the attitude that “there is nothing I can do about any of this!” This attitude paves the way for three traps of personal inaction:

1) blind technological optimism – a belief that technology and science will “save” us;

2) gloom-and-doom pessimism – a belief that there is no hope;

3) apathy – a lack of caring due to a fatalistic outlook.

There is another attitude you can take toward the environment, however. You can accept the challenge of creating a personal lifestyle that is both fulfilling and ecologically sound. Environmental sensitivity of this sort will affect your personal “space”, providing valuable support for your wellness lifestyle. Additionally, it will affect the larger environment, fostering higher levels of wellness for your community. As University students you are in a special position to become the future leaders of your community. Learning to understand and care for the environment will help you to contribute to the well-being of your local community as well as to the global environment.

## VOCABULARY

**Remember:**

environmental issues
to expose smb to smth
exposure
to cause climatic changes
ozone layer
to destroy
carbon dioxide level
to increase
to overwhelm
challenge
to affect

## EXERCISES

### I. Match the words with the appropriate definition:

| | |
|---|---|
| 1) ecosystem | a) people who try to stop damage to the environment |
| 2) ecofriendly | b) all the animals and plants in a particular area and the way in which they are related to each other and to their environment |
| 3) ecotourism | c) not harmful to the environment |
| 4) ecoterrorism | d) a person who takes an active part in nature protection |
| 5) ecoactivist | e) the level of ecological requirements that is considered to be acceptable |
| 6) ecocatastrophe | f) the business of organizing holidays to natural areas in a way that will not hurt the environment |
| 7) eco-warriors | g) organizations or companies' activity, that do things harmful to the environment |
| 8) ecostandard | h) a terrible event in which there is a lot of damage to nature |

### II. Fill in the table with the missing derivatives where possible:

| Verb | Noun | Adjective |
|---|---|---|
| | climate | |
| to expose | | |
| to lay | | |
| | destruction | |
| | | environment |
| | harm | |
| to provide | | |
| | danger | |
| to contribute | | |
| | | global |

### III. Translate the following sentences into English:

1. Отсутствие заботы о природе привело к глобальному экологическому кризису.
2. Средства массовой информации ежедневно предоставляют нам примеры экологического кризиса.
3. Разрушение озонового слоя в атмосфере может вызвать повышение уровня радиации.
4. В последние годы проблемам экологии уделяется всё больше внимания.
5. Бесконечные разговоры о кризисе и его опасных последствиях ведут к безразличию и бездействию со стороны населения.

### IV. Complete the sentences:

1. In the coming years environmental crisis may affect…
2. Indifferent attitude towards environmental problems…
3. However, you can take another attitude…
4. Environmental awareness provides valuable support…
5. It is challenging …
6. You can contribute to the well-being of your community…
7. Learning how to care about the environment…

## DISCUSSION

### I. Answer the questions on the text.

1. Who is usually more concerned about ecological situation: scientists, government, or consumers?
2. Why do many people today speak about an “environmental crisis”?
3. What examples of the environmental crisis are we daily exposed to by the media?

4. What makes many people feel overwhelmed?
5. What traps of personal inaction are mentioned in the text?
6. What is the other kind of attitude you can develop towards ecology?
7. In what way can you contribute to the well-being of your local community?

**II. Agree or disagree with the following statements:**

1. Environmental problems are ignored by modern society.
2. Ecological problems are exaggerated in mass media.
3. There is no need to expose people to endless examples of the ecological crisis.
4. All people feel alarmed and appeal to the government to take action.
5. Environmentally responsible lifestyle of each of us can contribute a lot to conserve nature.
6. Inactive attitude to environmental issues is typical of our society.
7. People should be taught environmentally responsible behaviour since childhood.

**III. Discuss in groups:**

- your attitude to environmental problems;
- the problems which seem very important to you;
- your participation in “green” campaigns.

**TEXT II**

## Historical Insight Into Ecology

Some people think that we make too much fuss about ecological problems nowadays. Some are convinced that ecology should be paid more attention to because of industrial growth. Ecology, in general, is considered to be a relatively young science, but that doesn’t mean that mankind never faced ecological problems before the beginning of industrial development.

Ecological problems become more and more burning nowadays. They say, that in order to be able to make decisions, that won't harm our life in future, we should learn about our past first.

We tend to imagine that ancient people were "ecologically friendly" and lived in harmony with nature. Some people did indeed respect and protect the environment. But there are many historical examples of ancient people who destroyed the land they inhabited. In doing that some of them destroyed their own livelihood.

Many communities today burn down trees to clear land for growing crops. Some of the earliest human communities also burned large areas of woodland for this purpose.

We probably discovered how to manipulate fire about a million years ago. Until that time, most of the earth's land surface was covered in thick forests, large forest fires, probably started deliberately by humans, created a new type of landscape – the savannah. The world's population then was only five or ten million. But these people changed the face of the earth. Several centuries later, the inhabitants of the Easter Island in the Pacific Ocean cut down all their trees in order to erect huge religious statues. The islanders apparently forgot that the trees were their major source of food, fuel and shelter. Within a few years, the rich and sophisticated society on Easter Island was reduced to destitution and starvation.

The dodo was a large bird, rather like a turkey, that lived on the island of Mauritius in the Indian Ocean. The bird had no natural predators and never developed the ability to fly. Despite this, the dodo population thrived on the island for thousands of years. When the first humans arrived in Mauritius in the early 16$^{th}$ century, they found that the dodos were very tame. They walked right up to the human shelters and did not try to run away. The settlers killed the dodos, partly for food and partly for sport. By 1680 less than 200 years after the

human settlement on Mauritius, that last dodo was dead. Only the expression “as dead as a dodo” lives in the English language.

Other animals who suffered at the hands of our ancestors include the elephant and the buffalo. Thousands of years ago, elephants walked freely over much of the earth. Elephant hunting by the humans, mainly for the ivory trade, eliminated the elephant population from the Middle East and North Africa. The great explorer Marco Polo discovered a lucrative market for ivory in China because the Chinese had already killed all their own elephants.

The European explorers, who settled in America, spent several centuries trying to eradicate the native American Indian population. In the 19th century, they deliberately set out to kill all the buffalo in North America, because the Indians ate the buffalo meat and used the hide of the buffalo for making clothes and shelters. In 1800, there were more than 60 million in the United Stated; by 1890 there were just 1000 animals left. Today, the buffalo remains an endangered species.

## VOCABULARY

**Remember:**

| | |
|---|---|
| to eliminate | starvation |
| to eradicate | predator |
| to suffer at the hands of | endangered species |
| destitution | |

## EXERCISES

**I. Practice the pronunciation of the words above. Find sentences with them in the text and translate them into Russian.**

**II. Fill in the table with the missing derivatives where possible:**

| Verb | Noun | Adjective |
|---|---|---|
| | harm | |
| to respect | | |
| | | protectful |
| | destruction | |
| | | inhabited |
| to damage | | |
| | destitution | |
| to starve | | |
| | | eliminating |

**III. Complete the following sentences:**

1. In order to be able to make decisions, that won't harm our life in future, we …
2. There are many historical examples of ancient people who …
3. The inhabitants of the Easter Island in the Pacific Ocean cut down all their trees in order to …
4. In less than 200 years after the first human settlement on Mauritius …
5. Other animals who suffered at the hands of our ancestors include …
6. The great explorer Marco Polo discovered a lucrative market for ivory in China, because …
7. In the 19$^{th}$ century, they deliberately set out to kill all the buffalo in North America, because …

## DISCUSSION

**I. Answer the questions on the text:**

1. Did the ancient people really respect and protect the environment?
2. When did people discover how to manipulate fire?

3. What did they burn down forests for?
4. Why did the inhabitants of the Easter Island cut down all the trees? What were the consequences?
5. Why did the dodo bird disappear?
6. What other animals suffered at the hands of our ancestors?
7. Why was the elephant-hunting so popular?
8. What happened to the buffalo?
9. Why does the buffalo still remain an endangered species?
10. Why didn't the ancient people care much about the environment?

**II. Summarise the text using the following connectives:**

It's common knowledge that…
First(ly)…
However…
Moreover…
Another reason for… was
We can't deny the fact that …
We doubt …
In conclusion…

**III. Discuss in groups the following statements giving reasons for or against them:**

1. Modern people are selfish, but probably no more selfish than most of their ancestors.
2. During the past two hundred years people have invented powerful technology which increases their destructive impact on the environment.
3. The environmental crisis we are facing today is not easy to overcome.
4. If we do not take action immediately, the crisis may cause irreversible damage to the entire planet.

5. Population growth and modern technology mean that we cannot afford to repeat the mistakes of our ancestors.

## WRITING

I. Write a short paragraph about the environmental situation in our country (region) now or a hundred years ago. Exchange your paragraphs with these of your groupmates and entitle them.

## INTERNET

Search Internet for more information about the historical aspect of environmental issues. Use the data in doing the written task.

# Unit II

## Waste Disposal

### Warm-up

- Have you ever tried to sort domestic waste?
- Do you know how waste is disposed?
- What do you know about bioplastic? What are its advantages?

### TEXT I

### Domestic waste is a big environmental problem

Our society is consumer-oriented. People manufacture consumer goods in endless quantities, exhausting the earth's resources.

We produce more and more waste. And the problem of pollution is aggravated by our "throw-away" technology. Each year only Americans dispose of about 10 million autos, 20 million tons of waste paper, 50 million cans.

We are turning the world into a gigantic dump. Instead of repairing a radio set, for example, it is easier and cheaper to buy a new one and discard the old. It is no longer fashionable to re-use anything. Cities are surrounded by junkyards full of rusting automobiles. Cans and bottles have piled up.

"Throwaway" products such as drink cans, plastic bags and disposable diapers are all avoidable sources of domestic waste. When you buy a takeout meal such as a McDonald's hamburger, the packaging often weighs more than the food! Domestic waste is either burned in large **incinerators** or buried in **landfill sites**. Both these processes cause environmental damage. Burning garbage produces carbon dioxide, toxic fumes, soot and other airborne particles as well as an unpleasant smell. Burying garbage in landfill sites can contaminate the soil with toxic products, which then enter the water supply. Besides garbage promotes the growth of disease-causing bacteria. Another hazard of landfill sites is the generation of explosive gases, particularly methane, when organic waste

decomposes. Other hazard of buried garbage includes lead from old pipes and paint, and organic solvents. Children often play on landfill sites because they find the trash sites more interesting than their intended playgrounds; they risk accidents, injuries and poisoning.

When people learn of the irresponsible dumping of industrial waste into rivers and oceans, they are usually horrified. But on a smaller scale, most of us are just as irresponsible with our own waste!

Is there any hope that we can solve the pollution problem? Fortunately, solutions are in sight. Cars are flattened in a giant compressor that reduces a car to the size of a television set in matter of minutes. Any left-over scrap metal is mixed with concrete and made into exceptionally strong bricks that are used in buildings and bridges.

To eliminate the problem of man-made pollution, to make our earth beautiful again, each of us must take some steps to clean up the environment. The latest idea is an “ecology drive”. Students in New York, New Jersey and Connecticut, for instance, collected tons of discarded bottles and cans and transported the junk to collection centres.

About 80 percent of all our domestic waste can be recycled. Most developed countries now have recycling centres for glass, paper, aluminum cans and plastic. But we are often too busy or too lazy to sort our trash for recycling. If we do not change our philosophy of “live now; pay later”, our children will bear the burden of our throwaway lifestyle.

## VOCABULARY

**Remember:**

| | |
|---|---|
| to consume | |
| to recycle | a landfill site |
| to incinerate | carbon dioxide |
| to eliminate | methane |

| | |
|---|---|
| to contaminate | toxic fumes |
| a dump | scrap metal/paper |

## EXERCISES

### I. Choose the correct word out of the list below to fill in the gaps:

toxic fumes, recycle, dump, aggravate, junkyard, scrap metal, eliminate, discard, incineration plants.

1) For a long time, industry in every country treated the world as a vast free rubbish _____.
2) Everything must be _____ to conserve the world's resources.
3) This food should be _____ from your diet.
4) Pollution can _____ your illness.
5) We wouldn't like to have _____ in our neighbourhood.
6) How can we _____ old manufactured goods?
7) Tons of _____ can be recycled.
8) Burning garbage at _____ is also dangerous, because they produce _____.

### II. Fill in the table with the missing derivatives where possible.

| Verb | Noun | Adjective |
|---|---|---|
| to incinerate | | |
| | consumer | |
| to exhaust | | |
| | | toxic |
| | use | |
| to dispose | | |
| | | poisonous |
| to eliminate | | |
| | process | |
| | | combustible |
| | | explosive |

**III. Give the Russian equivalents of the following words and word-combinations. Make up sentences with them:**

потребительские товары, свалка, сжигание мусора, токсичный дым, сажа, отравлять почву, болезнетворные бактерии, безответственное поведение.

**IV. Translate the sentences into English.**

1) Если люди будут выбрасывать мусор, мир может превратиться в гигантскую свалку.
2) Не все люди согласны сортировать мусор.
3) Мусоросжигающие заводы могут также нанести вред окружающей среде.
4) Пищевые отходы могут использоваться как удобрение.
5) Рециклинг – оптимальный способ переработки отходов.
6) Металлолом и макулатура легко использовать повторно.

**V. Test each other: look at the words below, with your partner try to recall exactly how these words were used in the text:**

| | |
|---|---|
| consumer-oriented | take steps |
| a gigantic dump | man-made pollution |
| left over scrap metal | an ecology-drive |
| a junkyard | collection centres |

## DISCUSSION

**I. Answer the following questions:**

1) Why is our society called consumer-oriented?
2) What is meant by “throwaway” lifestyle?
3) What kind of trash can be easily recycled?
4) What are the disadvantages of the incineration plants?
5) What are the hazards of landfill sites?
6) Why is it necessary to sort domestic waste?
7) Why are most of us not willing to sort our trash? Are you, personally, willing to do it?
8) Have you ever taken part in an “ecology drive”? When was it? Did you collect scrap paper or anything else?
9) Is garbage disposal a problem in your city?
10) How often many different forms of garbage disposal are used?

**II. Read the article below and discuss it with your group-mates. Imagine you are Mayor of Machida. You are being interviewed by journalists on the new approach to garbage disposal.**

### Waste not, want not

Disposing of the garbage we produce every day is a major problem in cities around the world. In the United States, over 160 million tons of garbage are produced every year. Ten percent is recycled, ten percent is burned, and the rest is put in landfills.

A city that has solved this problem in an unusual way is Machida, in Tokyo, Japan. They have developed a totally new approach to garbage disposal. The key to the operation is public cooperation. Families must divide their garbage into six categories:

1) garbage that can be easily burned (that is, combustible garbage), such as kitchen and garden trash;
2) noncombustible garbage, such as small electrical appliances, plastic tools, and plastic toys;
3) products that are poisonous or that cause pollution, such as batteries and fluorescent lights;
4) bottles and glass containers that can be recycled;
5) metal containers that can be recycled;
6) large items, such as furniture and bicycles.

The items in categories 1 to 5 are collected on different days. (Large items are only collected upon request.) Then the garbage is taken to a center that looks like a clean new office building or hospital. Inside the center, special equipment is used to sort and process the garbage. Almost everything can be reused: garden or kitchen trash becomes fertilizer, combustible garbage is burned to produce electricity; metal containers and bottles are recycled; and old furniture, clothing, and other useful items are cleaned, repaired, and resold cheaply or given away. The work provides employment for handicapped persons and gives them a chance to learn new skills.

Nowadays, officials from cities around the world visit Machida to see whether they can use some of these ideas and techniques to solve their own garbage disposal problems.

**III. Imagine: you are back from Japan. Tell your fellow-citizens about the new approach to garbage disposal. Explain whether it is (im)possible to use it in your city. Why? Use the vocabulary:**

a major problem, a new approach to, public cooperation, to put in landfills, to sort garbage, (non) combustible garbage, to cause pollution, can be recycled, repaired and resold, to solve garbage disposal problems.

**IV. Speak of your city (or any other city). Say if:**

- this city is confronted with the problem of land pollution;
- its council has a reputation for strict policies on land use;
- there are a lot of landfills on the outskirts;
- there are a lot of recycling sites;
- there is an incineration plant;
- the citizens are enthusiastic about sorting their garbage;
- the council controls the operations of disposal sites.

**V. Study the leaflet issued by "Friends of the Earth". Which of the appeals below is most urgent in your city? In your country? Give an explanation.**

**TIME FOR ACTION**

**REMEMBER ... PACK UP YOUR PAPERS, BOX**
**YOUR BOTTLES, CRUSH YOUR CANS, COMPOST**
**YOUR VEGETABLE WASTE ... AND ... THINK**
**BEFORE YOU THROW!**

**USE MAINS POWER, NOT BATTERIES**

400 million batteries are sold each year in the UK. They are notoriously pollutant, contain toxic metals and use vast amounts of energy in production. If you must use them, favour long life or rechargeable. Urge your local authority to adopt a collection policy.

**CONSIDER YOUR WORKPLACE**

Don't leave your waste-conscious ideas at home — take them to work. Check if recycled paper is used for envelopes, stationery, computer paper, etc. If not, why not? Set up an in-house paper collection scheme.

**USE LOCAL FACILITIES**

Always use existing bottle/can banks and collection schemes. Remember that recycling should be used a lot more — could you arrange to go with a neighbour and do one trip to the bottle bank instead of two? Introduce others to recycling — spread the word! And don't forget your local charity shops for old / outgrown clothes, etc.

**FAVOUR RETURNABLE CONTAINERS**

Choose them whenever possible. For example, glass bottles can often be returned to source, and to reuse glass saves many times more energy and resources than recycling. If a deposit scheme is in use — take advantage of itl

**BUY IN BULK**

Buy bigger whenever possible. Not only do you reduce waste, e.g. one large bottle of coke creates less waste than 6 cans, but it is also much more economical.

**DON'T DROP LITTER!**

Obvious but important! Think before you throw. Dispose of all litter thoughtfully and encourage your local authority to provide an adequate number of bins.

**SEPARATE YOUR RUBBISH**

Don't mix up rubbish. Sort it into paper, glass, metals, organic materials, etc. It makes recycling much easier, and is also more effective as the manufacturers do not have to spend time sorting the waste at the plant. Only send to landfill what you can't reuse.

**LOBBY FOR CHANGE**

Find out about schemes in your area — urge your MP, the District Council and local businesses to take an interest. Ask for a bottle bank if there's not one near you.

**REDUCE CONSUMPTION**

Exercise restraint when using water, power and energy sources of all kinds. Take showers instead of baths, insulate your loft, draft proof your doors and windows, use low energy light bulbs. Remember to turn off lights and heating when not in use. You'll benefit the environment as well as your pocket. And use gas rather than electricity.

**AVOID OVERPACKAGING**

Choose products with the least amount of packaging. Don't buy fresh food pre-packed in plastic, plastic containers for takeaway foods. Favour natural coverings such as paper and cardboard, and complain to the manufacturers if you feel there is too much packaging.

**THINK BEFORE YOU BUY**

Buy products that are recycled, recyclable, reliable, repairable, refillable, reusable: avoid disposables. Ask yourself if you really need it — and favour reuse as much as possible. More generally, avoid aerosols and run your car on lead-free petrol, and find out about catalytic converters.

**USE YOUR GARDEN**

Kitchen leftovers (vegetable matter), natural fibres (wool, cotton, linen), newspapers and cardboard will all decompose. Favour a compost heap instead of burning, and so reducing smoke / smut and providing a good fertiliser.

**VI. Render the following text into English:**

**Как избавиться от мусора?**

В сентябре 2000 года активисты британского отделения Greenpeace начали сидячую забастовку у крупнейшего в стране мусороперерабатывающего комбината (incineration plant) в Эдмонтоне, на севере Лондона, тем самым, парализовав его работу. По мнению

представителей Greenpeace, из-за вредных выбросов в атмосферу комбинат можно было бы назвать «завод по производству раковых заболеваний». Организация не раз пыталась довести свои соображения до владельцев завода и властей, но в ответ «зеленые» слышали лишь заверения о безопасности завода. Тогда они решились на крайнюю меру, пытаясь остановить производство. В то же время представители ведущих лондонских больниц, которые пользовались услугами предприятия, сообщили, что остановка комбината грозит Лондону куда большими проблемами, чем выбросы в атмосферу, вполне соответствующие европейским стандартам безопасности. Пока комбинат в Эдмонтоне стоит, в больницах накапливается огромное количество потенциально опасных отходов, которые по соображениям безопасности невозможно уничтожить на месте, в больнице, или вывезти в отдаленные места.

В самом деле, эти комбинаты не решают экологическую проблему: при горении мусора образуются опасные для человека и окружающей среды вещества. Что же делать?

Одной из альтернатив мусоросжигающим заводам являются так называемые полигоны, где происходит цивилизованное захоронение твердых бытовых отходов. Полигон – это достаточно сложное инженерное сооружение, которое представляет собой углубление, выложенное специальными материалами, не позволяющими вредным веществам, которые выделяются из отходов, загрязнять грунтовые воды, почву. Место захоронения разравнивается бульдозерами, утрамбовывается катками и засыпается затем глиной. Получается своеобразный слоеный пирог: два метра уплотненного мусора и 25 сантиметров грунта и так далее. Получается холм высотой до 20-25 метров. А сверху насыпается метровый слой плодородной почвы.

Сегодня количество полигонов и мусоросжигающих заводов может быть сокращено путем переработки, или рециклинга, отходов. Например, в

США доля мусора, подлежащего вторичной переработке, уже составляет 82%, у нас же – максимум 10%.

Идеальный процесс – это 100%-й рециклинг, когда все произведенное человеком не выбрасывается и возвращается на нужды человека. Такого «вечного двигателя» не существует, и обязательно будут полигоны, мусоросжигающие заводы, но не в таком количестве. То есть экологическая нагрузка, которую они добавляют городу, будет меньше.

Если у нас в стране только начинается строительство подобных полигонов, то Европейское сообщество уже приняло решение о полной ликвидации завоза твердых бытовых отходов на подобные объекты к 2015 году. Это значит, что процесс изъятия под свалки и полигоны земель остановится. Но куда же денется мусор? Ученые надеются, что к тому времени им удастся разработать технологии, которые позволят практически полностью перерабатывать все бытовые отходы.

Удастся ли ученым за столь короткий срок построить светлое безотходное будущее, сделать так, чтобы 70 кг мусора, которые производит человек в год, снова вернулись к нам в виде полезной продукции?

## TEXT II

## Plastic

**What is plastic?**

Plastic is derived from oil, comes in a multitude of shapes and forms, and is used for a vast array of purposes. Being strong, light and flexible it is a symbol of our disposable society.

**Plastics and environment**

Getting rid of plastics after usage (which is usually a very short term) is notoriously difficult. One option is dumping in ever decreasing landfill sites, but most plastics will not biodegrade and once underground, will remain intact almost indefinitely. The second alternative is burning the waste plastic, but here

there is the possibility of toxic emissions which could be highly poisonous. Neither method is at all satisfactory.

**The myth of biodegradability**

Biodegradable plastic takes a very long time to break down and prevents the plastic from being recycled. It is environmentally unfriendly because it does not biodegrade into something useful — resources are still being lost. So biodegradability is no longer the appropriate answer and is currently sourcing a polyethylene plastic bag that can be recycled — again and again and again. Recycling is the way forward.

**Plastics recycling**

It makes far more sense to reduce our consumption and overcome problems associated with recycling, especially as plastic is made from oil which is a non-renewable resource. A major obstacle here is the wide variety of plastics which cannot be mixed and recycled successfully: collecting, sorting and reprocessing various types is very costly. But the technology does exist and the variety of uses for recycled plastics is growing all the time. And, of course, the energy and raw material required is only minimal compared with production using fresh raw materials.

**The future**

Plastics recycling is a subject which concerns the European Commission. It will be introducing measures to force and dramatic increase in waste plastics recycling and industrialists believe it will aim to reduce the volume of plastics going to landfill by about 80%. Draft legislation is expected shortly, promoting and enforcing plastics recycling. In the meantime, lobby your local MP, protest at packaging, write to manufacturers, and make your voice heard — it's about time!

**I. Discuss the problem of plastic. Look through the ideas "for" and "against". Express your own ideas. Add them to the list.**

| FOR | AGAINST |
|---|---|
| 1. Plastic is safe, hygienic, cheap, compatible with our products and requires minimum packaging during transportation. | 1. The world without plastics. People are misinformed about the current situation. |
| 2. Plastic can be reused. No alternative to plastic. | 2. The current uses for recycled plastic are few — plastic park benches, fence posts. |
| 3. Reuse should be our first priority, recycling comes second and discard is the last resort. | 3. There are currently no large plastic recycling schemes available to most people in this country. |
| 4. The technology does exist and the variety of uses for recycled plastics is growing all the time. | 4. The waste plastic cannot be burnt for fear of toxic fumes. Plastic should be used as little as possible as a disposable packaging material. |
| 5. Providing the refill service is one of the most important procedures we carry out environmentally. Every time you refill a bottle, you are conserving resources. | 5. There are items we cannot refill: those in tubs and tubes, for example. |

## TEXT III

- Think for a minute and write down different words you associate with the word "plastic". Share your words with your partner(s) and talk about them.
- One of your words is surely "a plastic bag". Read the article below and express your opinion if plastic bag should be banned. Why (not)?

# London set to ban plastic bags

London may soon be changing the habits of shoppers in the city and helping the environment by banning the use of the ubiquitous plastic shopping bag. Estimates are that Londoners and tourists use 1.6 billion plastic bags each year, many of which are thrown away after just one use. Shoppers may soon have to buy reusable bags in an attempt to reduce the strain on landfill sites, where the bags take 400 years to break down. Local authorities have asked the British government to ban retailers from giving away free plastic bags. A spokesman said stores should sell reusable bags and pass the money raised on to environmental projects. “As a society, we need to do far more to reduce the amount of waste we are sending to landfill and London as a city is determined to take an ambitious lead on this issue,” he said.

Retailers are up in arms at the idea and have promised to fight the government to stop the ban from going ahead. The British Retail Consortium said there was no need for the ban as it would simply cause inconvenience to shoppers. A spokesman told reporters: “We think it's excessive and misguided because retailers are already committed to reducing the environmental impact of bags by 25 per cent by the end of next year.” He was worried the ban would affect sales, saying: “If somebody is going to go into a supermarket or convenience store, it's hard to see in practical terms, unless they have brought a bag with them, how they will be able to buy more than a few items.” A recent survey found 92 percent of Londoners supported a total ban on plastic bags or a tax on them.

## VOCABULARY

## EXERCISES

**I. Put the correct words from a-d below in the article.**

London may soon be changing the (1) _____ of shoppers in the city and helping the environment by banning the (2) _____ of the ubiquitous plastic

shopping bag. Estimates are that Londoners and tourists use 1.6 billion plastic bags each year, many of (3) ____ are thrown away after just one use. Shoppers may soon have to buy reusable bags in an attempt to reduce the strain on landfill sites, where the bags take 400 years to break (4) _____. Local authorities have asked the British government's to ban retailers from giving away free plastic bags. A spokesman said stores should sell reusable bags and pass the money (5) _____ on to environmental projects. "As a society, we need to do far more to reduce the amount of waste we are sending to landfill and London as a city is determined to take an ambitious (6) ____ on this issue", he said.

Retailers are up in (7) _____ at the idea and have promised to fight the government to stop the ban from going ahead. The British Retail Consortium said there was no need for the ban as it would (8) _____ cause inconvenience to shoppers. A spokesman told reporters:" We think it's excessive and misguided because retailers are (9) ____ committed to reducing the environmental impact of bags (10) _____ 25 percent by the end of next year." He was worried the ban would affect sales, saying: "If somebody is going to go into a supermarket or convenience store, it's (11) ___ to see in practical terms, unless they have brought a bag with them, how they will be able to buy more than a few items." A recent survey (12) _____ 92 percent of Londoners supported a total ban on plastic bags or a tax on them.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. | (a) | habitation | (b) | habit | (c) | habits | (d) | habitat |
| 2. | (a) | useful | (b) | use | (c) | using | (d) | user |
| 3. | (a) | which | (b) | whom | (c) | that | (d) | who |
| 4. | (a) | away | (b) | out | (c) | in | (d) | down |
| 5. | (a) | heightened | (b) | upped | (c) | increased | (d) | raised |
| 6. | (a) | leading | (b) | leader | (c) | lead | (d) | leads |
| 7. | (a) | legs | (b) | arms | (c) | head | (d) | feet |
| 8. | (a) | simply | (b) | simple | (c) | simple | (d) | simplest |
| 9. | (a) | yet | (b) | already | (c) | as | (d) | by |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10. | (a) | at | (b) | with | (c) | for | (d) | by |
| 11. | (a) | hard | (b) | hardly | (c) | harden | (d) | hardness |
| 12. | (a) | findings | (b) | finding | (c) | found | (d) | find |

**II. Paraphrase or use synonymous words or word-combinations instead of those in bold type. Keep the same meaning of the sentence.**

1) Shoppers may soon have to buy reusable bags in an attempt **to reduce the strain** on landfill sites.
2) Local authorities have asked the British government **to ban retailers** from giving away free plastic bags.
3) London **is determined** to take a lead on this issue.
4) Retailers are **up in arms** at the idea of banning plastic bags.
5) We think that such a ban is **excessive.**
6) He worried that the ban would **affect** sales.
7) It's hard to see **in practical terms** how they will be able to buy more than a few items.

## DISCUSSION

**I. Discuss the article with your partner:**

Student A's questions (do not show these to Student B).

a) Did the title of the article attract your attention?
b) What are your feelings after reading the article?
c) What do you think about plastic bags?
d) Are there too many plastic bags in your country?
e) Does your country have any campaigns to recycle plastic?
f) Do you think shops need to give plastic (or any) bags to customers?
g) Do you think our throwaway society has gone too far?
h) What do you think of the idea of selling reusable bags and giving the money to environmental projects?
i) Could you easily live without bags?

Student B's questions (do not show these to Student A).

a) Did you like reading this article?
b) Do you think retailers are right to be up in arms over this issue?
c) When was the last time you were up in arms about something?
d) Do you think no free plastic bags would inconvenience shoppers?
e) What other everyday things do you think should be banned to help protect the environment?
f) Do you think people really would buy less if there were no free plastic bags?
g) What questions would you like to ask the head of the retail organization?
h) What do you think his answers would be?
i) Did you like this discussion?

**II. Look back at the article and write down some more questions you would like to ask the class about the text.**

- Share you questions with other classmates.
- Ask your partner / group your questions.

## WRITING

1. Write a letter to your local member of Duma. Bring to his / her attention the problem of garbage disposal in your city / district. Express your suggestions.
2. Write a magazine article about how plastic bags can affect the environment. Appeal to the public how to reduce the use of plastic.

## INTERNET

Find more information about countries that have had campaigns (passed the laws) regarding:

- garbage disposal;
- the use of plastic bags;
- recycling.

# Unit III

## Air Pollution

### Warm-up

- Is the quality of air important for our health?
- How does air quality affect our organism?
- What are the health effects caused by air pollution?
- What diseased caused by air pollution do you know?
- Is air pollution a global problem?

### TEXT

**I. Read the text and practice the pronunciation of the underlined words.**

**Air pollution** is a chemical, particulate matter, or biological agent that modifies the natural characteristics of the atmosphere. The atmosphere is a complex, dynamic natural gaseous system that is essential to support life on the planet Earth. Stratospheric ozone depletion due to air pollution has long been recognized as a threat to human health as well as to the Earth's ecosystems.

Worldwide air pollution is responsible for large numbers of deaths and cases of respiratory diseases. While major stationary sources are often identified with air pollution, the greatest source of emissions is actually mobile sources, mainly automobiles. Gases such as carbon dioxide, which contribute to global warming, have recently gained recognition as pollutants by some scientists. Others recognize the gas as being essential to life, and therefore incapable of being classed as a pollutant.

The World Health Organization thinks that 4.6 million people die each year from causes directly attributable to air pollution. Many of these mortalities are connected with indoor air pollution. Worldwide more deaths per year are linked to air pollution than to automobile accidents. Specialists suggest that 310.000

Europeans die from air pollution annually. Direct causes of air pollution related deaths include aggravated asthma, bronchitis, emphysema, lung and heart disease, and respiratory allergies. Specialists from the US say, that a proposed set of changes in diesel engine technology could result in 12.000 fewer *premature mortalities*, 15.000 fewer heart attacks, 6.000 fewer emergency room visits by children with asthma, and 8.900 fewer respiratory-related hospital admissions each year in the United States.

The health effects caused by air pollutants may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions. These effects can result in increased medication use, increased doctor or emergency room visits, more hospital admissions and premature death. The human health effects of poor air quality are far reaching, but principally affect the body's respiratory system and the cardiovascular system. Individual reactions to air pollution depend on the type of pollutant a person is exposed to, the degree of exposure, the individual's health status and genetics. People who exercise outdoors, for example, on hot, smoggy days increase their exposure to pollutants in the air.

## VOCABULARY

**Remember:**

to affect smb, smth
to have an effect (influence) on
respiratory diseases/allergies
to emit – emission (automobile emissions)
to be essential to smth
a pollutant
ozone depletion
premature mortality

## EXERCISES

### I. Match the definition with the correct word:

| | |
|---|---|
| 1) pollutant | a) gas from radioactive decay within the Earth's crust; |
| 2) emission | b) making some substance (oil) pure using an industrial process; |
| 3) exposure | c) the state of being put into a situation that is harmful; |
| 4) premature | d) a substance that makes air, water, soil, etc. dangerous dirty; |
| 5) incinerator | e) happening before the natural or proper time; |
| 6) radon | f) a machine designed to burn things in order to destroy them; |
| 7) oil refining | g) brown unhealthy air caused by smoke from cars and factories; |
| 8) smog | h) the gas (steam) produced when an engine is working; |
| 9) exhaust (gases) | i) an amount of gas or other substance that a machine or factory produces and sends into the air. |

### II. Fill in the gaps with a word or word-combination from the list below:

essential, major, affect, depletion, premature mortality, effect, methane, to emit, attributable, range.

1) Scientists are investigating the ways in which the oceans _____ the climate.
2) The reduction of exhausts can have a beneficial _____ on the ecology.
3) The air quality has always been _____ to human health.
4) Low quality of the air may increase _____.
5) A lot of chemical pollutants are _____ by industry.
6) The pollutants which cause the _____ of the ozone layer are especially dangerous.
7) Thousands of people's deaths are directly _____ to air pollution.
8) Health disorders caused by air pollution may _____ from subtle biochemical changes to serious problems.
9) _____ is gas emitted by the digestion of food by animals.
10) Industrial activity is a _____ source of air pollution.

**III. Match the words in the first column with their synonyms in the second column. Use them in sentences of your own.**

| | |
|---|---|
| 1) anthropogenic | a) to release |
| 2) to emit | b) rate |
| 3) level | c) exhausts |
| 4) pollutants | d) human |
| 5) emissions | e) harmful particulates |
| 6) major | f) incineration |
| 7) waste burning | g) important |
| 8) essential | e) chief |

**IV. Find the Russian equivalents of the following words and word combinations:**

major stationary sources, carbon dioxide, essential to life, automobile emissions, increased medication use, to affect the cardiovascular system, individual health status, exposure to pollutants.

## DISCUSSION

**I. Look through the text again and answer the following questions:**

1) What definition is given to the phrase “air pollution” in the text?
2) Why is air pollution considered to be one of the major threats to human health and Earth’s ecosystems?
3) What sources of air pollution could you name?
4) What gases contribute to global warming?
5) What are the health effects of air pollution?
6) How many people die every year from causes directly attributable to air pollution?
7) What is the range of health disorders caused by air pollution?
8) What individual reactions to air pollution are registered?

9) What do individual reactions to air pollution depend on?

10) Why is the exposure to air pollutants more dangerous on hot, smoggy days?

**II. Look through the list of sources of air pollution and group them in the table below.**

Air pollution sources:

- volcanic activity
- oil refining
- motor vehicles
- wildfires
- radioactive decay within the Earth's crust
- burning wood
- crop waste burning

| Anthropogenic sources (human activity) | Natural sources |
|---|---|
| | |

- Which of these sources do you think to be the most dangerous?
- Is it possible to avoid or minimize the harmful effects of these kinds of air pollution?
- Could you add to the list any other kinds of air pollution?

**III. Summarize the information from the text using the words below:**

to threaten human health, to destroy plant and animal life, emissions, to affect, to result in, the degree of exposure.

**IV. Render the following text into English:**

**Загрязнение атмосферы** – привнесение в атмосферу или образование в ней физико-химических агентов и веществ, обусловленное как природными, так и антропогенными факторами. Естественными источниками загрязнения атмосферы служат вулканизм, лесные пожары, пыльные бури, выветривание и пр. Эти факторы не угрожают отрицательными последствиями природным экосистемам, за исключением некоторых катастрофических природных явлений. Например, извержение вулкана Кракатау в 1883 г., когда в атмосферу было выброшено 18 км$^2$ тонко измельченного пеплового материала; извержение вулкана Катмай (Аляска) в 1912 г., выбросившего 20 км$^2$ рыхлых продуктов. Пепел этих извержений распространился на большую часть поверхности Земли и вызвал уменьшение притока солнечной радиации на 10-20%, что вызвало в северном полушарии понижение среднегодовой температуры воздуха на 0, 5º С.

Также источником запыленности атмосферы могут быть крупные лесные пожары; например, летом 1915 г. огромные лесные пожары охватили в Западной Сибири площадь около 1,5 млн км$^2$, а дым от них распространился на площади в 6 млн км$^2$. Это привело к значительному уменьшению притока солнечной радиации к земной поверхности, причем хлеба созрели на 10-15 дней позднее обычного.

Однако в последние десятилетия антропогенные факторы загрязнения атмосферы стали превышать по масштабам естественные, приобрели глобальный характер.

К основным источникам загрязнения относятся: промышленные предприятия, транспорт, теплоэнергетика, сельское хозяйство и др. Среди отраслей промышленности особенно токсичные выбросы в атмосферу дают предприятия цветной металлургии, химической, нефтехимической,

черной металлургии, деревообрабатывающей, целлюлозно-бумажной промышленности и т.д.

**V. Speak on:**

a) the kind of air pollution in your region/city; the measures undertaken by the local government to reduce it;

b) the global ecological problems air pollution can lead to.

## WRITING

1. The rate of air pollution in your city is increasing by the year. People are aware that they must take action. Help them to write a complaint letter to the local government. Express citizens' suggestions how to improve the situation.

2. Write a list of recommendations one is able to do to reduce the negative effect of air pollution on the human organism.

## INTERNET

Find some information on what is done by the governments of different countries to reduce the threat of air pollution.

# Unit IV

## Water Pollution

### Warm-up

- Do you think our health depends much on water?
- Are you satisfied with the quality of drinking water in your city?
- How can you improve the quality of water you want to drink?
- Do you have a chance to use water from pure natural sources?

### TEXT

### Man's Last Great Resource

The population of the world is increasing so rapidly that its growth has been called a “population explosion”. By the year 2006 the world population will double in size. A large number of mouths must be fed by each acre of land. This increasing demand creates a temptation to overgraze or to plow land that should remain in grass and forest. Cultivable land is being destroyed by erosion at a greater rate than ever before. The problem persists all over the world.

How will we feed all these people? Where will we get minerals and other natural resources to run our industries? The answer is simple: the world's last great resource is the ocean.

Oceans are of great importance to humans. Coastal and deep-sea fishing are important elements in the economics of many countries. For example, dense populations in coastal areas such as Japan and parts of Africa are dependent upon fish as a source of protein but overexploitation has led to a depletion of fish stocks in many fishing grounds.

Oceans are also of great economic importance. The extraction of bromide, magnesium and salts such as sodium chloride from sea water dates from early historical times. Other exploitable economic resources found in the oceans

include sands and gravels, as well as oil and gas reserves in the North Sea, the Tasmanian Gulf and the Gulf of Mexico.

Pollution of the oceans is a serious and growing problem. Marine pollution is the form of oil spills, untreated human sewage and industrial waste can have catastrophic effects on oceanic environments which, in turn, can have repercussions for humans; for example, the contamination of shellfish by heavy metals and other toxins has led to serious outbreaks of poisoning among human populations dependent on seafood.

We must learn how to protect the menace of pollution.

Beaches from England to California have been soaked in oily slime. Fish and wildlife have been destroyed. Insecticides seeping into the rivers and then the oceans, have killed fish and waterfowl and revived fears that other lethal chemicals may contaminate our waters when they are used as garbage dumps.

The future disposal of increasing amounts of atomic waste is an unresolved problem. Millions of acres of offshore seabed have been leased for drilling.

Now offshore drilling extends more than 50 miles out to sea and accounts for 15 per cent of US oil production. Estimates of known reserves of natural gas have more than tripled in the past 15 years.

One of the techniques that can increase our food supply is the use of the seas for farming, “aquaculture” in which fish and shellfish are reared in enclosed ponds, tanks and cages, or on protected beds. The use of ponds to breed and raise fish such as carp dates back to several thousand years in parts of China and Southeast Asia, but the extension of agriculture to marine areas is a recent development. Marine agriculture enterprises have concentrated on raising shellfish, especially molluscs such as oysters, mussels and clams which are relatively immobile and command high market prices.

In the millions of miles of ocean live 4 out of 5 living things on earth. In the seabed, minerals and oil have been proved to exist in lavish supply. The main problem is how to dispose of this wealth and exploit these possibilities.

## VOCABULARY

**Remember:**

| | |
|---|---|
| to deplete – depletion | oily slime |
| to exploit | insecticides |
| to contaminate | lethal chemicals |
| to slick | offshore drilling |
| oil spills | |
| to dispose | |
| untreated sewage | |

## EXERCISES

**I. Fill each space with a noun having the same root with the verb in the left-hand corner.**

| | |
|---|---|
| to pollute | Marine oil _____ is a serious problem which affects coastal tourism, fishing grounds and marine ecosystem. |
| to pollute<br>to leak<br>to release<br>to clean<br>to pollute<br>to dispose | Oil is a major marine _____ which may result from tanker collisions, ___ from pipelines, the accidental ___ of oil from terminals and the illegal ___ of ships' bilges at sea. More than 66 per cent of all marine ___ originates from the illegal ___ of waste oil from industrial sources and from motor vehicle sumps. Between 2 and 5 million tonnes of crude and proceased oil are spilled into the seas each year, although about two-thirds of the oil of this comes not from ships, but from land-based sources, in particular from the |
| to dispose | illegal ___ of waste industrial and vehicle oil directly into rivers and drains which flow into the sea. |
| to slick<br>to spill | Depending upon the prevailing wind speed and direction and tidal movement oil ___ s can extend over a substantial area, for example, the ___ from the supertanker Exxon |

| | |
|---|---|
| to damage<br>to slick | Valdez in Alaska in 1989 covered the area of over 2,500 $km^2$. Great ___ can be done to marine life forms and if the ___ is washed onshore, then it can pollute the land between low and high water marks |

**II. Match the words from the first column with the definition in the second column:**

| | |
|---|---|
| 1) wastewater<br>2) sewage<br>3) acid<br>4) organic waste<br>5) discharge<br>6) toxins<br>7) insecticides | a) having a sharp sour taste<br>b) waste produced by or from living things<br>c) the mixture of waste from the human body and used water that is carried away from houses by pipes under the ground<br>d) to send out gas, smoke, liquid etc. or to allow it to escape<br>e) chemicals used to kill insects<br>f) poisonous substances |

**III. Give the Russian translation for the following words and word-combinations:**

a depletion of fish stocks, garbage dumps, oil spills, a disposal of atomic waste, offshore drilling, untreated sewage, marine agriculture, exploitable resources.

**IV. Test each other: look through the words below; with your partner try to recall how these words were used in the text:**

oil spills
sewage and industrial waste
in oily slime
insecticides
contamination
aquaculture
toxins and chemicals
garbage dumps

## DISCUSSION

### I. Answer the questions on the text “Man’s Last Great Resourse”:

- Why are the oceans of great importance to humans?
- In what way is pollution dangerous to seas and oceans?
- What forms of pollution are mentioned in the text?
- Where have the beaches been soaked in oil?
- What is meant by “aquaculture”? What do you know about its history? What are its possibilities?
- What should people be concerned about nowadays?

### II. Summarize the information from the text using the words below:

to be of great importance, overexploitation, to lead to a depletion, exploitable economic resources, marine pollution, to seep into the rivers and oceans, to contaminate fish, aquaculture enterprises.

### III. Look through the list enumerating the sources of water pollution.

Sources of water pollution:

- industrial discharge of chemical wastes and byproducts
- discharge of sewage
- surface runoff containing spilled petroleum products
- acid rains
- tank leakage

- Which sources of pollution do you consider to be the most dangerous?
- Are there any ways to avoid or diminish the disastrous effects of these kinds of pollution?
- Could you add to the list any other sources of water pollution?

**IV. Speak of the ways water pollution can spread and the ways water can be purified.**

## WRITING

Write an essay on “Water-pollution-related health problems”.

Lexical prompts: long-term human health risks, seafood hazardous to health, birth defects, genetic and chromosomal mutations, nervous system damage, cancer, kidney and liver trouble, to transmit bacterial diseases (cholera, typhoid, dysentery).

## INTERNET

Find in the Internet some information about the medical cases caused by water pollution. Use them as examples in the written task.

# Unit V

## Deforestation

### Warm-up

- Is there a park or a forest near your place?
- Would you like the entertainment area to be expanded in the parks of your city?
- Could you recall any campaign in defence of a park in your city?
- Did you take part in it?

### Earth Has Lost Two-thirds of Its Forests

Despite Earth Summits, television documentaries and all the public awareness of deforestation, woodlands are being cut down, burned and turned into farmland or scrub at an ever increasing rate with an area the size of England and Wales disappearing each year.

Two-thirds of the world's forests have been lost forever. In one generation we are facing the almost complete loss of natural forest.

The new figures are far worse than previously thought and the Asia Pacific region, where fires are raging in Indonesia, had lost 88 per cent of its forest cover even before the current disaster. Only two per cent of the world's forests are protected. At least 10 per cent of each forest type need to be saved to have any hope of preventing mass destruction of species that live there.

For some countries like the UK it is too late with 97 percent already destroyed. But even here woodland is still being lost.

The burning of forests, brush and pasture in the Amazon in 1997 was worse than ever. The government estimate for deforestation in the Brazilian Amazon was 15,000 square kilometres a year, an area nearly as large as Wales — but that dates back as to 1994.

The strongest argument for conserving biodiversity is to protect the “ecosystems” on which humanity itself depends. Diversified ecosystems protect watersheds, local rainfall, food supply and soil. The Amazon ecosystem is so vast that it creates its own climate. Most rainfall is recycled, and the forest affects light reflection, cloud formation, regional rainfall and temperature. Most important, the rainforest is also a bulwark against global warming. You cannot chop it down or burn it without running large climatic risks.

Empty fields, as far as the eye can see, line the highway for most of the 300 km (186 miles) from Belem, eastern Amazonia's main city, to the timber-cutting town of Paragominas. Once it was all forest, but since the 1970s most of the trees in a broad strip beside the road have been cut — not just to extract timber, but to clear pasture for cattle-raising. Now, though, most of the fields lie empty and are becoming overgrown with scrub. Cows are seen so infrequently that they might be imagined to be an endangered species.

The deforestation, mostly in the past thirty years, of about a third of the Amazon rainforest, the world's biggest, has been as much as economic as an environmental disaster. The land would often be worth more, when cleared than it had been as untouched forest. This value, however, was due partly to excessive optimism over the region's agricultural potential, and partly to a set of economically perverse incentives provided by the government. When farming was actually tried, it was frequently found to be unprofitable. And many did not even bother to try. Some chopped down the trees, grabbed the grants and then abandoned the land. As a result, there are now about 165,000 $km^2$ of abandoned land in Brazilian Amazonia.

From the American mid-west to Mozambique, the costs of deforestation are now being felt in the form of altered climates, droughts, flash floods, landslides and soil erosion. The result can be human and economic suffering on a grand scale. Once created, such suffering is not easy to cure. In the long run,

reforestation may be the only answer, but plantations do not function as well as a diversified forest that is the product of several thousand years of evolution.

## VOCABULARY

**Remember:**

| | |
|---|---|
| deforestation | droughts |
| public awareness of | flash floods |
| to run climatic risks | landslide |
| an endangered species | soil erosion |
| altered climate | |

## EXERCISES

### I. Find the definition fitting each of the following words:

| | |
|---|---|
| 1) deforestation | a) a forest where the heavy rainfall leads to dense vegetation |
| 2) extinction of species | b) steady rise in average world temperatures |
| 3) fertility | c) the world's growing understanding |
| 4) rain forests | d) disappearance of types of animals/plants |
| 5) public awareness | e) destruction/clearing of forests |
| 6) flooding | f) possible negative changes in the weather/climate |
| 7) global warming | g) the ability of the land or soil to produce good crops |
| 8) climatic risks | h) a situation in which an area of land becomes covered with water |
| 9) drought | i) a long period of dry weather when there is not enough water for plants and animals to live |
| 10) erosion | j) the process of being gradually destroyed by rain, wind, the sea |

**II. Choose the necessary word to fill in the gaps:**

1) Parks and gardens will be _____ as green, open spaces and new areas will be developed in inner city areas.

a) defended b) protected c) shielded d) guarded

2) Water companies will have to _____ lead pipes in order to comply with a new European law on soft drinking water.

a) replace b) displace c) substitute d) destroy

3) They are going to _____ down half the forest to make room for their plant.

a) raise b) pull c) cut d) grow

4) Deforestation has brought massive _____ of plant and animal species.

a) killing b) extinction c) escaping d) vanishing

5) The thirsty plant has _____ all the water I gave it in morning.

a) poured b) drunk c) drained d) cooked up

6) Soil and ash are washed into rivers _____ them.

a) clogging b) blocking c) stocking d) bulking

7) Tropical forests need protection and proper _____ .

a) defense b) work c) exploitation d) development

8) It is difficult to _____ the role of handicrafts in the overall economy of Latin America.

a) calculate b) estimate c) count d) appreciate

9) It’s necessary to clean up the river bed to avoid a pollution _____ .

a) disaster b) problem c) hurricane d) explosion

10) Turn off the water at the main to stop the _____ .

a) flood b) emission c) leakage d) running

**III. Give the English equivalents of the following Russian words and word-combinations. Use them in sentences of your own.**

Засуха, наводнение, сохранение биологического разнообразия, обезлесение, подвергать риску, создавать свой собственный климат, зарастать мелколесьем, пастбища для скота, восстановление леса, нетронутый лес.

**IV. Match the words in the first column with their antonyms in the second one:**

| | |
|---|---|
| deforestation | to lose |
| plantation | to plant |
| to destroy | to invade |
| to abandon | to restore |
| to conserve | diversified forest |
| to clear | to overgrow |
| to cut down | reforestation |

## DISCUSSION

**I. Answer the questions on the text:**

1) How much of the world’s forests have been lost forever?
2) Why is it thought too late for the UK to take any measures to protect their forests?

3) What does the loss of forests cause?
4) In what way does the Amazon ecosystem function?
5) What problem does Indonesia have to face?
6) What problems does Brazil have?
7) What climatic risks does deforestation lead to?

**II. Summarize the information from the text using the words below. Make a plan of your summary.**

Public awareness, rain forests, to cut down, mass destruction, extinction of species, soil erosion, flooding, local climate change, to provide pasture and croplands, environmental disaster.

**III. Make a list of consequences deforestation can lead to. Compare it with that of your group-mates. Suggest your ideas as to how the situation can be improved on the level of:**

- legislation
- public awareness
- individual input.

**IV. Render the following text into English. Find some additional information of the kind and share it with the other students of the group.**

## Лес

Уже в XIX веке каждый ребенок во Франции знал, что причина частых наводнений в стране — истребление лесов. Однако роль лесов никогда не ценилась столь высоко, как сегодня.

Леса синтезируют биомассу и аккумулируют солнечную энергию на Земле. На всех широтах они успешно несут службу по охране,

регулированию и защите воды. На горных склонах древесные посадки препятствуют эрозии, на сельскохозяйственных угодьях защищают почву. Леса закрепляют пески, приостанавливают расползание оврагов.

Вокруг городов создаются леса, возникают природные и национальные парки, заповедники.

Леса обладают замечательными свойствами самовосстанавливаться. Однако чтобы лес «работал» на человека, необходимо обеспечить ему определенные условия. Чахлый лес никогда не защищает окружающую среду. Лес как носитель активной силы, направляемой человеком, способен влиять на окружающую среду.

Сейчас количество углекислого газа в атмосфере составляет 4000 миллиарда тонн. Леса мира продуцируют ежегодно до 20-23 миллиардов тонн органической массы, расходуя на это 30-50 миллиардов тонн, углекислого газа и, непрерывно восстанавливая запасы атмосферного кислорода.

В последнее время люди все больше осознают разрушительные последствия эксплуатации человеком природного богатства. Поэтому на планете укоренилось «зеленое» движение. Наибольшую обеспокоенность испытывают народы, которые живут за счет природных ресурсов: индейцы Америки, жители Сибири и Дальнего Востока. Ухудшение экологической обстановки весьма ощутимо сказывается на их жизни.

К сожалению, природу начинают оберегать тогда, когда ее уже лишились. Западная Европа уже потеряла рысь, бурого медведя, теряет волка, европейскую норку. В результате трансформации мест обитания человека Западная Европа потеряла то, что еще сохранила Россия, — дикую природу. Это обстоятельство, обнадеживающее для нас: мы имеем шанс пойти не только по пути охраны природы в процессе использования ее ресурсов. У нас есть заповедные места, где царствует дикая природа. Есть еще жилье для бобра и серого журавля, тетерева и ондатры.

Имеются у нас и так называемые экорегионы, такие, как Хакассия, Тува, Алтай и Саяны, которые необходимо сохранить и защитить, И здесь нет непреодолимых трудностей. Как говорят эксперты из Всемирного фонда дикой природы, если мы сохраним 233 таких экорегиона, нам удастся сберечь 95 процентов видов биосферы.

Таковыми являются и юг Дальнего Востока, Северный Кавказ, Уральские горы, часть территории Таймыра и северной Якутии и другие регионы страны. Здесь наибольшее разнообразие флоры и фауны. А на юге Дальнего Востока представлены флора и фауна нескольких климатических зон, включая и субтропическую. Алтай и Саяны уникальны из-за разницы климата на северных и южных склонах гор, огромного разнообразия видов, которые пришли и из Европы и из Азии, а также таких, что встречаются только здесь.

Большинство средств (62%) международной неправительственной организации — Всемирного фонда дикой природы — это деньги простых граждан, что дает фонду независимость. Их число доходит до 4,7 миллиона человек. Они платят немалые взносы, финансируя природоохранную деятельность фонда как в своих странах, так и в других. Наиболее активными вкладчиками являются Голландия, Германия, Швейцария, Дания, Швеция, Великобритания. Именно на их деньги будет, например, осуществляться проект «Алтай — Саяны».

Голландия занимает второе место в финансировании проектов сохранения российских экорегионов. И здесь дело не только в осознании того, что мы живем в одном мире. Одним из мотивов оказания помощи голландцами является то, что птицы, живущие на территории нашей тундры, зимуют в их стране. Там всегда ждут их прилета и боятся, что однажды птицы к ним не прилетят. Ведь во всей Западной Европе сейчас всего несколько тысяч коростелей. У народа этой маленькой страны надо

учиться ценить природу, и тогда мы всегда будем иметь возможность видеть птиц, зверей, цветы, деревья и травы.

## WRITING

Write a leaflet to launch some “Greenup” campaign aiming at:

1) planting trees;
2) enlarging green spots in the inner parts of the city;
3) keeping the parks clean etc.

## INTERNET

Find information about “forest situation” in your home area. Estimate it using the active vocabulary.

# UNIT VI

## Global Climate Change

### Warm-up

Because of concern for the world in which we live ecological issues attract media attention. So the terms which were previously used only by environmental scientists have become articles of everyday speech.

Here are some of them:

- greenhouse effect
- global warming
- depletion of the ozone layer
- acid rain
- carbon dioxide
- automobile emissions

Write definitions for each of them.

### TEXT I

## Global Climate Change

Global interdependence is nowhere as clear and inescapable as in our shared environment. There is a universal recognition that the world's environment is under attack, the environment has been severely damaged. All human beings are directly affected.

The increase in human population and economic activity is producing a dramatic buildup in $CO_2$ (carbon dioxide) and other substances that trap the sun's heat inside the atmosphere, resulting in a sharp rise in the earth's temperature.

Of all the environmental problems, global climate change is in many ways the most threatening and intractable. The linkage between mankind's economic activities and climate change is quite clear nowadays. Climate change is closely connected with radical changes taking place in the chemical composition of the

atmosphere. The combustion of fossil fuels is a principal source of heat-trapping carbon dioxide ($CO_2$), which is accumulating in the atmosphere at an alarming rate. Carbon dioxide levels are now 25 per cent higher than they were in preindustrial times. Other heat-trapping gases, such as chlorofluorocarbons and methane, are also released into the atmosphere at a growing rate.

The research carried out by Russian scientists in Antarctica jointly with French colleagues has revealed the strong correlation between high concentration of carbon dioxide and methane in the atmosphere and warm interglacial climate regimes. What is especially alarming in these Russian-French findings is that current levels of both of these heat-trapping gases are higher than they have ever been in the past 160,000 years and are rising.

If these temperature increases occur, marked changes in weather patterns will happen and severe social and economic dislocations will result.

The full consequences of global warming are not completely understood. While there might be some benign consequences in some limited parts of the world, it is clear that most regions, particular coastal areas, would be visited by catastrophe. Few nations will be able to adapt rapidly enough to escape major economic and ecological disruption.

Countries in temperate latitudes could see the climatic bands associated with their current forests migrating northward faster than the forests could follow. The frequency of extremely hot days, as would the frequency and intensity of destructive tropical storms. Currently fertile areas could become arid as precipitation patterns change. This has profound implications for agriculture and water resource management. Models predict that the best grain-growing regions in both the USA and Russia will become much drier as global warming progresses. Developing countries would suffer the most severe consequences since they possess fewer resources to adapt to change. There is clearly the capacity to adjust if the climatic change is slight, but continuing rapid, radical change would have consequences far beyond the abilities of the nations of the

world to undertake the adaptive strategies. On the contrary, there is a necessity to make every effort to maintain the climate balance we now have.

With a continuation of the current rates of release of carbon dioxide and an equal effect from increases in other greenhouse gases, a temperate rise of 1.5-4.5°C by the third quarter of the 20th century can be expected. A significant acceleration in sea-level rise is also possible. Over the last hundred years, as temperatures have risen 0.5°C, sea level has risen approximately 10 cm. But the rate of sea-level rise is also accelerating and is currently 2.1 cm per decade.

No one nation can solve these problems on its own, because averse environmental trends spill over all national boundaries.

The countries of Europe and America, Asia and Africa have an urgent duty to join together, face their challenge.

The time to act is now.

As a first priority, energy consumption, particularly fossil fuel combustion, must be curtailed.

The people of the earth share life on one planet. Only by acting together we can meet the common dangers that face us all. Bold steps must be taken to stop the environmental degradation.

## VOCABULARY

**Remember:**

| | |
|---|---|
| to affect | ecological disruption |
| combustion | temperate latitudes |
| fossil fuels | fertile areas |
| heat-trapping gases | consequences |
| to adapt to | to curtail |

## EXRCISES

**I. Fill in the table with the missing derivatives where possible.**

| Verb | Noun | Adjective |
|---|---|---|
| to implicate | consumption | adaptable |
| to reduce | linkage | fertile |
| to affect | disruption | special |
| | combustion | |

**II. Give the Russian equivalents of the following words and word-combinations. Find and translate the sentences with them in the text.**

To trap the sun's heat, to result in, intractable linkage, chemical composition, benign consequences, sea-level rise, to meet the dangers, to face the challenges, to maintain the climate balance.

**III. Give the English equivalents of the following words and word-combinations. Use them in sentences of your own.**

Высокая концентрация углерода, химический состав атмосферы, выхлопные газы, катастрофа, разрушительные ливни, бесплодные земли, выходить за национальные границы, потребление энергии.

**IV. Find a synonym from the column to substitute the underlined word:**

| | |
|---|---|
| 1. Climate change may have bad <u>implications</u> for agriculture.<br>2. It is necessary <u>to keep up</u> the | Maintain |

| | |
|---|---|
| climate balance.<br>3. Ten nations will be able to get used to new environment rapidly.<br>4. The connection between mankind's economic activities and climate change is quite clear nowadays.<br>5. Fossil fuel combustion must be curtailed.<br>6. Carbon dioxide is released into the atmosphere at a growing rate.<br>7. Burning fossil fuels contaminate the atmosphere severely.<br>8. The ozone layer protects the planet from harmful ultraviolet radiation.<br>9. All people must help to reduce potential danger to the environment.<br>10. The growing use of energy is inevitable. | adapt<br>linkage<br>consequences<br>cut down<br>consumption<br>emitted<br>exhaust fumes<br>shield<br>curtail |

**V. Test each other: look at the words below; with your partner try to recall exactly how these words were used in the text:**

| | |
|---|---|
| severely damaged | ecological disruption |
| threatening and intractable | sea-level rise |
| the combustion of fossil fuels | especially alarming |
| a top priority | the full consequences |

## DISCUSSION

**I. Answer the following questions on the text:**

1. What danger is universally recognized nowadays?

2. What causes the rise in the earth’s temperature?
3. How does the chemical composition of the atmosphere change?
4. What has the research carried out by Russian and French scientists revealed in Antarctica?
5. What consequences are going to happen if these temperature increases continue?
6. Are there any dangers to the countries in temperate latitudes?
7. What countries would suffer the most severe consequences of global climate change? Why?
8. What nations can solve the problems of climate warming? Why?
9. What do scientists call for?
10. What should be done as a first priority?

**II. Summarize the information and speak on the problem of local climate change and its consequences.**

## TEXT II

What do you know about the ozone layer and ozone holes? What is greenhouse effect?

### A Time-bomb in the Earth's Atmosphere

Ground and satellite readings confirm a decline in global ozone: the stratospheric ozone shield that protects life from damaging ultraviolet radiation is being rapidly depleted. The depletion of the ozone layer is an immediate global environmental problem threatening the survival and development of humanity.

Industrial chemicals such as chlorofluorocarbons (CFCs), widely used as refrigerants in auto air-conditioning, halons, used as fire retardants, aerosol propellants and solvents, foam-blowing agents and others which destroy the ozone layer allow harmful ultraviolet rays to enter the atmosphere, damaging

plant and animal life. These chemicals also contribute to global warming. Created and used by man for industrial and commercial purposes, the chemicals appear to be the sole cause for this destructive effect.

Destruction of the ozone layer may be compared to the effect of a bomb that has been primed: its timing mechanism is counting off days, hours and minutes up to the “explosion”, which could threaten all civilization with disaster. And the cause of the disaster, if it happens, will not be atomic or hydrogen bombs or laser weapons — it will be nothing more exotic than the ordinary everyday deodorant can and refrigeration systems using CFCs.

When they were first synthesised over 60 years ago, these chemicals were the pride and joy of the chemists who invented them: they were harmless, non-toxic and cheap to produce. Now they are called “killers”.

Each one percent drop in ozone is thought to allow a 2 to 3 percent rise in the ultraviolet light reaching Earth. Any large increase would be reason for serious concern. The light is destructive to DNA, the hereditary material, and to proteins.

The most dramatic evidence of damage to the global ozone shield appears each spring in the polar regions. The continent-wide hole over the Antarctica was first detected by British researches in 1982. A retrospective examination of satellite data reveals that the hole was virtually undetectable prior to 1979. In 1987, a 50 percent reduction in ozone was measured during October. In January 1989, a major international research effort confirmed that conditions similar but less severe than those found in the south polar atmosphere prevailed over the Arctic. The chemistry resembled that found over the Antarctica. As the Antarctic ozone hole dissipates each summer, great masses of ozone-deficient air have spread as far as New Zealand, Australia, and southern Argentina and Chile, resulting in significantly higher radiation exposure for the populations of these nations. In addition, ozone levels over midlatitudes of the northern

hemisphere are decreasing. The average levels of ozone in the midlatitudes of the northern hemisphere appear to have decreased by about three per cent.

High concentrations of chlorine and bromine occur where ozone depletion is the most severe. Some scientists conclude that the sudden onset of the ozone hole was triggered when chlorine levels exceeded two parts for billion. This is an example of how sensitive the earth's atmosphere is to man-made chemical effects.

Even if the production and use of ozone-depleting substances is stopped immediately, the chemicals already released will continue to accelerate ozone depletion for ten years. It will require nearly three centuries for the ozone hole to fully heal.

The increased ground-level intensity of ultraviolet radiation that accompanies stratospheric ozone depletion is linked in a way to increases in skin cancer, cataracts and change in the immune system in humans.

We do know enough now to recognise that the continued release of CFCs, halons and other chemicals put all of the mirth's human and natural environment at risk. The threat to plant and animal life has direct consequences for humans. Commercially important fish and shrimp species, for example, 11 have been shown to suffer mortality rates when exposed to increases in ultraviolet radiation.

These findings are truly alarming.

Ecologists call for a complete, worldwide phaseout of CFCs and halons, for restrictions on other related gases that contribute to ozone depletion.

How can the transition to a total phaseout be managed? To begin with, approximately one-third of CFCs presently in use can be substituted by CFCs which decay more rapidly and present less threat to the atmosphere; one-third of CFCs can be contained and reused through recycling processes; and one-third of present uses can be phased out by the introduction of non-CFC technologies.

## VOCABULARY
## EXERCISES

**I. Look up the following words in the dictionary. Write down the transcriptions and definitions. Practice the pronunciation:**

chloroflaorocarbons, ultraviolet rays, laser weapons, ozone deficient, chlorine level, bromine level, refrigerants, aerosol (propellants), solvents, hydrogen bombs.

**II.Suggest three nouns which would collocate well with each of the verbs below:**

1) to confirm
2) to shield
3) to detect
4) to accelerate
5) to dissipate
6) to accompany

**III. Find synonyms for the underlined words out of the list:**

1) The chemicals already released will continue <u>to accelerate</u> ozone depletion.
2) Ecological <u>call for</u> a complete worldwide phaseout of CFC's.
3) One-third of CFC's presently in use can be <u>substituted</u> by CFC's which decay more rapidly.
4) Ecologists call for <u>restrictions</u> on the use of gases that contribute to ozone depletion.
5) NASA has predicted a 10% <u>decrease</u> of the ozone layer by 2050.
6) There is not enough <u>information</u> of its consequences.

Words: appeal, replace, data, speed, fall, limitations.

**IV. Give the Russian equivalents of the following words and word-combinations:**

| | |
|---|---|
| to be exposed to | to be detected |
| to put smth at risk | to contribute to |
| mortality rates | a total phaseout |
| an increase in | |

**V. Give the English equivalents of the following words and word-combinations. Use them in sentences of your own:**

| | |
|---|---|
| разрушение озонового слоя | воздух с дефицитом озона |
| нетоксические вещества | уменьшается на … процентов |
| ультрафиолетовая радиация | подвергать риску |
| прямые последствия | |

## DISCUSSION

**I. Look through the text again and answer the following questions:**

1. What is considered to be the most urgent environmental problem today?
2. Where are the chemicals that destroy the ozone layer used?
3. What scientific data were revealed prior to 1979? in 1982? in 1987? in 1989?
4. What regions are exposed to significantly higher ultraviolet radiation nowadays?
5. What do you know about the levels of ozone over the northern hemisphere?
6. How could the sensitiveness of the earth's atmosphere to man-made chemical effects be illustrated?
7. How long will it require to cure our planet of ozone depletion?
8. How does the production and use of ozone depleting chemicals influence life on Earth?

9. What do ecologists call for?

10. How can the transition of a total phaseout of CFCs be managed?

**II. Work in groups. Fill in the table using your own knowledge and the prompts below. Comment on each of the items.**

| Human impact on climate change | External (non-human) impact on climate change |
|---|---|
| | |

Prompts: greenhouse gases, fossil fuels, aerosols, volcano eruptions, orbital variations, land use, solar variation, livestock, carbon dioxide, emissions from manufacturing, deforestation.

**III. Speak on the problem of the ozone layer depletion using the following words and word-combinations:**

to threaten the survival of humanity
the destructive effect
alarming
a reason for serious concern
the dramatic evidence
man-made chemicals
a threat to animal life
to cause serious health problems
a total phaseout

**IV. Render the following text into English.**

## Забота Всей Планеты

Нарушение слоя озона в земной атмосфере и связанное с ним изменение климата — невидимы и неосязаемы. Но если не предотвратить

дальнейшее ухудшение обстановки, то возникнет угроза здоровью и даже жизни каждого землянина. Быстрая индустриализация, современная техника и рост материального производства все сильнее влияют на окружающую среду, и скорость, с которой происходят эти изменения, вызывает тревогу.

Глобальные задачи стоят выше национальных интересов, и международное сотрудничество в этой области уже началось.

Человек со своими техническими открытиями нарушил равновесие в природе и нанес ей тяжелый ущерб. Так, отрицательно влияют на слой озона ХФУ (хлорфторуглероды). Ущерб озоновому слою уже столь велик, что если истощение озона будет продолжаться еще 10 лет, то потребуется около 100 лет, чтобы нынешние потери озона восстановились.

В последнее время с целью избежать применения ХФУ разрабатываются новые методы, процессы и продукты.

Развивающиеся страны не хотели бы, чтобы меры по спасению озонового слоя наложили серьезные ограничения на развитие их экономики. Новые, ныне разрабатываемые технологические процессы и вещества должны помочь этим странам избежать ошибок, допущенных высокоразвитыми странами. Им не нужно будет проходить фазу применения ХФУ.

Вещества в аэрозолях — значительный источник их попадания в атмосферу. Во многих странах ХФУ в аэрозолях либо запрещены, либо постепенно выводятся из употребления.

Более серьезную тревогу вызывает не менее широкое применение ХФУ в холодильниках, кондиционерах воздуха, в изготовлении пенопластов, а также в качестве растворителей — особенно в растущей электронной промышленности. Весьма сильно повреждают озоновый слой и вещества, применяемые в огнетушителях. С повышением жизненного уровня во многих регионах мира и с приростом населения спрос на такую

продукцию будет, по прогнозам, значительно расширяться. Однако идут поиски новых технологических процессов, продуктов и химикатов, заменяющих ХФУ для кондиционеров воздуха и холодильников.

Сейчас общепризнано, что проблему разрушения озонового слоя нужно решать очень срочно. С 1969 по 1986 год объем озона над районами земли от 30 до 64° северной широты сократился на 1,7-3%. А эти широты — самые густонаселенные на планете.

Слой озона вокруг Земли столь важен потому, что он поглощает большую часть ультрафиолетового излучения солнца, предотвращая проникновение вредных ультрафиолетовых лучей сквозь стратосферу к живым существам на Земле.

Повышение интенсивности ультрафиолетового излучения земной поверхности может, например, увеличить частоту заболеваний определенными видами рака кожи и катаракт, может серьезно нарушить равновесие экологических систем в океанах, повредить растения и сельское хозяйство.

Разрушение стратосферного озона приводит к возрастанию опасности появления фотохимического смога и ухудшению качества воздуха в городах.

Разрушение озона — не единственная беда. ХФУ — также сильные «тепличные» газы. Если бы концентрация тепличных газов удвоилась, то средняя температура на Земле поднялась бы на 1,5-4,5°С. Это привело бы к постепенному повышению уровня моря от 200 мм до 1,4 м — в связи с таянием ледников и расширением океана. В результате последовало бы затопление многих земель и речных дельт, проникновение соленых вод в грунтовые.

Меры, принимаемые для защиты слоя озона от дальнейшего разрушения, недостаточны. Ученые все более единодушны в том, что нужно гораздо резче сокращать выпуск ХФУ в атмосферу. А вообще,

единственный способ предотвратить дальнейшее истощение слоя озона и позволить земной атмосфере восстановиться — это полностью прекратить выпуск ХФУ.

Сигнал тревоги звучит так громко, что и мировая общественность, и главы государств должны услышать. Мы не можем позволить, чтобы какие-либо сомнения помешали нашим действиям.

## WRITING

Write a short essay about the future of Earth as you see it.

## INTERNET

Find in the Internet some information about global warming and climate change.

# Unit VII

## Biodiversity

### Warm-up

- Are there many forms of life on the Earth now?
- Are they all important?
- Some people say that it would be good if snakes or mosquitoes disappear completely. Do you agree with them?
- What is biodiversity in your opinion?

### TEXT I

**Biodiversity** is a neologism and derived from biology and diversity. Since 1986 the term and the concept have achieved widespread use among biologists, environmentalists, political leaders, and concerned citizens worldwide. It is generally used to equate to a concern for the natural environment and nature conservation. This use has coincided with the expansion of concern over extinction observed in the last decades of the 20$^{th}$ century.

The term "natural heritage" pre-dates "biodiversity", though it is a less scientific term and more easily comprehended in some ways by the wider audience interested in conservation.

The most straightforward definition is "variation of life at all levels of biological organization". A second definition holds that biodiversity is a measure of the relative diversity among organisms present in different ecosystems. "Diversity" in this definition includes diversity within a species and among species, and comparative diversity among ecosystems.

A third definition that is often used by ecologists is the "totality" of genes, species, and ecosystems of a region. An advantage of this definition is that it seems to describe most circumstances and present a unified view of the traditional three levels at which biodiversity has been identified.

When we think of wildlife extinction, we are usually thinking of large majestic animals such as whales, elephants and rhinos. These creatures are indeed at risk of extinction because of irresponsible and cruel hunting by human predators. It is easy to become angry at the plight of these endearing mammals. But the threat of extinction is not limited to the few aspects that we can recognize in pictures or visit in zoos. The threat of extinction affects almost every species on earth, down to the tiniest microbe.

The **balance of nature** within any ecosystem depends on the complex interaction between millions of species of animals, plants and micro-organisms. The death of one species could threaten the survival of hundreds of others. A second species might lose its food supply and it, too, might become extinct. Another species could lose its predators, so it might become more numerous. The populations of parasites and microorganisms that depend on these larger species will also change.

Conserving biodiversity was one of the most controversial subjects of the UNCED conference in Rio de Janeiro in 1992. The genetic resources in the rainforests, coastal waters, and agricultural landscapes promise financial profits in future years if we invest money in protecting biodiversity today. But the developing countries, which own the rainforests, argued that most research into genetic resources will occur in the industrialized countries, which protect their discoveries by patent, and most commercial benefits from these discoveries will go the multinational companies in the West. This is already the case for certain medicinal plants. The poor countries therefore demanded that the rich countries pay the full cost of the planned conservation and research programs. The UNCED conference produced the **biodiversity treaty** (a legal agreement between countries to protect wildlife and conserve genetic resources), but the delegates from the richest country in the world, the United States, refused to sign it because they thought that the financial liability for their country would be excessive.

Extinction is final. It does not just mean death; it means an end to birth. Once the last member of species has died, that species is lost to the planet forever. Man has the power to upset the balance of nature but he does not have the power to restore that balance. This is why we must try to protect every living species on the earth – even the ugliest insects and the tiny, invisible, unglamorous bacteria. Of all the world's resources, its genetic resources are the least renewable of all.

## VOCABULARY

**Remember:**

biodiversity
extinct – extinction
a species – species
ecosystem
to upset the balance
treaty
renewable

## EXERCISES

**I. Match the definition with the correct word or word-combination:**

| | |
|---|---|
| 1) biodiversity<br>2) a species<br>3) genetic resources<br>4) renewable<br>5) extinction<br>6) a treaty<br>7) a predator | a) something that is made to continue that is never used up<br>b) an end to birth<br>c) many different forms of life<br>d) a legal agreement between countries<br>e) a group of animals, plants or microorganisms sharing a common genetic structure<br>f) the great variety of different species of animals, plants and microorganisms<br>g) somebody or something that hunts |

**II. Match the words in the first column with their synonyms in the second. Use them in sentences of your own.**

| | |
|---|---|
| 1) to upset the balance | a) renewable |
| 2) influence | b) license |
| 3) expired | c) affect |
| 4) patent | d) to restore |
| 5) expansion | e) extinction |
| 6) agreement | f) treaty |

**III. Translate the following Russian word-combinations into English and use them in questions of your own and answer them:**

1) получить широкое распространение;
2) генетическая вариативность;
3) разнообразие внутри вида;
4) взаимодействовать с другими организмами;
5) нарушить баланс;
6) озабоченность по поводу исчезновения видов;
7) договор о сохранении биологического разнообразия;

**IV. Test each other. Look through the words below; with your partner try to recall how these words and word-combinations were used in the text:**

the expansion of concern over
natural heritage
a unified view of
the balance of nature
at risk of extinction
a controversial subject

## DISCUSSION

### I. Answer the questions on the text.

1) What does the term “biodiversity” mean?
2) What term predates the term “biodiversity”?
3) Which species face extinction at higher risk?
4) What does the balance of nature within any ecosystem depend on?
5) What can the death of one species lead to? Why?
6) Why is it profitable to invest money into protecting biodiversity?
7) When and where was the biodiversity treaty developed?
8) Did all the countries sign that treaty?
9) Why did the USA delegates refuse to sign the biodiversity treaty?
10) Why are the genetic resources considered to be the least renewable?

### II. Expand the following statements:

1. Extinction is final.
2. Man has the power to upset the balance of nature but he doesn’t have the power to restore that balance.
3. This is the case for certain medical plants.
4. The threat of extinction is not limited to the few species.
5. Developing countries wanted industrialized countries to pay for conservation and research.

**III. Imagine: you are a journalist. Arrange an interview with one of the delegates (from Russia, or Germany, or one of the countries in Latin America, etc.) at the Rio de Janeiro conference. Act out a conversation.**

## TEXT II

A little more than a century ago a man could watch by the hour as million of passenger pigeons winged overhead, literally shutting out the sun.

A little more than half a century ago the last passenger pigeon on earth died in a zoo.

A little more than a century ago a man might have watched by the hour as a herd of bison thundered across the land.

A little more than half a century ago the American bison had been reduced to a few hundred stragglers. But a spark of concern caught fire, and the bison was brought back from the edge of oblivion to continue as part of America's wildlife heritage.

Before the arrival of man, species disappeared because of gradual climatic changes, glacial advances, or inundation by ancient seas. These changes eliminated or adversely modified their habitats. Some lost out in their fight for life when competition with other species grew too intense.

Changes have been speeded up by civilized man with his technological means of rapidly altering the environment, his propensity for introducing competing species, both wild and domestic, and his more direct means of destruction. As a result, species are now disappearing faster than they are evolving.

**What Makes a Species Become Extinct?**

How can you tell if an animal is in jeopardy? To determine whether a species is in danger, information is needed about the area it originally occupied and its abundance, the changes in its distribution and the causes of those changes, its present status in numbers and range, and the natural and human factors that may act upon it. We need to know when pollution may be making unlivable the only stream that is the habitat of a race of fish; or when the drying up of the last bit of marsh will wipe out the only source of food or nesting cover for a species of bird; or when expansion by another species will bring about,

through interbreeding, the disappearance of the special characteristics that distinguish an interesting subspecies.

Specialists at the Bureau of Sport Fisheries and Wildlife of the U.S. Department of the Interior have suggested the circumstances under which wildlife should be considered in peril and have prepared a list of those considered rare and endangered. The terms used to show the status of wildlife species and subspecies or races are these:

An *endangered* form is one whose prospects of survival and reproduction are in immediate jeopardy. Its peril may result from one or many causes – ravages of disease, predation by other animals, competition from a more aggressive species, or changes in and loss of habitat. Endangered animals must have help, or extinction will probably soon follow. In this classification are about 90 mammals, birds, fish, reptiles, and amphibians.

A *rare* form is one whose numbers are few throughout its range. So long as conditions remain stable and favorable, such species may continue to survive in limited numbers. When such an animal occupies a limited habitat, adverse influences are more critical, and unfavorable changes in its environment may quickly make it endangered. In this classification are nearly 45 mammals, birds, fish, reptiles, and amphibians.

**Are we cruel to animals?**

Most of us never question the assumption that human beings have the right to kill animals. We eat them as food, we use their skins to make coats and shoes, and we test drugs and cosmetics on them. Some of us even hunt animals for sport. With our growing awareness of environmental issues, these activities are becoming less acceptable. Deliberate and cruel killing of animals is not a new phenomenon. The people of the Faroe Islands in the Atlantic have probably undertaken their annual cull of pilot whales for centuries. The cull is a sporting tradition, similar to bullfighting in Spain or fox hunting in Britain. Fewer and fewer people believe that cruelty to animals for sport is justified, particularly

when the animal is an endangered species. Shooting tigers in India was once a popular sport for gentlemen; it is now illegal. Killing rare animals for economic gain (**poaching**) is another environmental problem. The black rhinoceros is one of the world's rarest species, with less than 3.000 animals remaining. Two thousand of these are in Zimbabwe, where there is a huge illegal trade in rhino horns. The rhino horn is said to have magic properties. The poachers shoot the rhinos with machine guns and leave them to bleed to death. They smuggle the horns into neighboring countries and sell them. The trade continues despite a worldwide ban on ivory trading and Zimbabwe's shoot-to-kill policy for poachers. The black rhino will be extinct within a few years unless the trade stops.

The fur trade is another industry where animals suffer needlessly. Four hundred million animals, including foxes, raccoons, sables and ermine, are killed every year for their coats. Most of them die in traps in North America, Russia and Scandinavia. The trap ensnared one of the animal's legs. The animal lies helpless and in pain for several days until the trapper arrives to kill it. It may try to bite off its own leg in order to escape. The fur trade also has factory farms where animals such as mink and Arctic foxes are kept in dark, cramped conditions until they are killed. Most vegetarians refuse to buy or wear fur coats, and many non-vegetarians also boycott garments made of real fur. The campaign against the fur trade has been so successful that real fur has gone out of fashion and many companies which sold expensive fur coats have gone out of business.

**What is to be done?**

Countries can – and do – open national parks, big and usually very beautiful places without buildings. These are homes for animals living freely, but also for birds, trees and flowers. Visitors can go there but hunting or taking things away is forbidden.

The first national parks opened more than a hundred years ago. One of the first was Gran Paradiso National Park in Italy. Yosemite and Yellowstone are old and very famous North American parks. These days you can find parks in most countries.

**Protecting wildlife should be a national objective**

Responsible citizens must not only obey the laws themselves but must encourage others to obey. Organizations and individuals who have an interest in our native wildlife must take every opportunity to convey the conservation message to everyone. The subject is front-page news. Interesting articles and pictures are readily accepted by the press and they form the basis for popular television programs.

Practically untouched are the opportunities for bringing this conservation message to schoolchildren. The story of endangered wildlife is the chronicle of much of our wasted natural wealth, though wildlife not yet extinct is a renewable resource.

Man’s wisdom and experience have not been extensive enough to grasp the full significance of the loss of a species of wildlife. Each occupies a niche and makes a contribution to the whole of life.

Human happiness is the sum total of all the desires and enjoyments and accomplishments of all the individuals who make up the human population. Take one part from the whole and it is no longer complete.

As the numbers of our wildlife grow fewer, their true individual value grows greater, for in the few are concentrated all the worth of one small but valuable part of our whole world.

## VOCABULARY

**Remember:**

oblivion

habitat

to alter (the environment)

to evolve

an endangered species

an extinct species

to convey the conservation message to smb

a ban on smth

## EXERCISES

### I. Match the definition with the correct word or word-combination:

| | |
|---|---|
| 1) a ban<br>2) habitat<br>3) interbreeding<br>4) poaching<br>5) an endangered species<br>6) inundation<br>7) to evolve<br>8) a mammal<br>9) an amphibian<br>10) a status | a) producing young animals from parents of different breeds or groups<br>b) killing rare animals for economic gain<br>c) order that forbids something from being used or done<br>d) the prospects of survival and reproduction are under threat<br>e) covering with water<br>f) the natural home of a plant or animal<br>g) to develop or make something develop by gradually changing<br>h) the legal condition or position of a person, country<br>i) one of the class of animals that drinks milk from its mother when it is young<br>j) an animal that can live on both land and water |

**II. Match the words in the first column with their synonyms in the second column and fill in the gaps with them in the sentences below:**

| | |
|---|---|
| to change | to convey (the message) |
| in jeorpardy | in peril |
| gain | to alter |
| properties | in a large quantity |
| in abundance | profit |
| to bring (the message) to | characteristics |

1. If the habitat is _____ by man-made process, the species tries to move away from the place.
2. There was a time when bison lived on Earth in _____.
3. Environmentalists must take every opportunity _____ to conservation message to everyone.
4. Killing rare animals for economic _____ is an environmental problem.
5. The disappearance of the special _____ may happen through interbreeding.
6. An endangered species is that whose prospects of survival and reproduction are in _____.

**III. Match the words in the first column with their antonyms in the second column:**

| | |
|---|---|
| to disappear | in safety |
| a ban | inbreeding |
| in georpardy | accidental |
| interbreeding | to evolve |
| deliberate | permission |
| to perish | to survive |

**IV. Translate the sentences into English:**

1. Климатические изменения могут разрушить среду обитания многих видов.
2. Что делается сейчас, чтобы защитить редких животных?
3. Панда – одно из животных, которые находятся под угрозой исчезновения.
4. С ростом экологической культуры охота на животных как спортивное занятие становится неприемлемым.
5. Несмотря на запреты, до сих пор животных убивают ради экономической выгоды.
6. Многие люди в Европе и Америке объявляют бойкот торговцам изделиями из натурального меха.
7. Отстрел тигров в Индии когда-то был популярным видом спорта, а теперь является незаконным.

## DISCUSSION

**I. Answer the following questions on the text:**

1. Did wildlife look different a century ago?
2. What speeds up the extinction of some species?
3. Could you name any species which are extinct now?
4. What are the natural reasons for the extinction of animals?
5. Do you share the point of view that people can kill animals for their needs?
6. In what way can the ecological awareness of the population be increased?
7. What is the role of zoos and national parks in protecting wild animals?
8. Why are people so much concerned now about protecting wildlife?

**II. Agree or disagree with the following statements. Give arguments.**

1. Most of us never question the assumption that human beings have the right to kill animals.

2. Poaching must be claimed illegal throughout the world.
3. Wearing natural furs must be disapproved of.
4. There is no need to protect all the species living now.
5. Species are disappearing faster now than a century ago.
6. The zoo is not a good place to protect an animal from extinction.
7. National parks may give permits for a limited number of hunters.
8. Animals bred in zoos must be set free.

**III. Make a list of species you know which are:**

| Extinct | Endangered | Rare |
|---|---|---|
| | | |

Compare your list with that of your group-mates.

**IV. Look through a list of endangered species. Say a few words about each of them (size, appearance, habitat).**

- gorilla
- whooping crane
- green pitcher plant
- Indian python
- humpback whale
- giant panda
- giant tortoise
- gray bat
- timber wolf
- Philippine eagle
- birdwing butterfly

Now you are members of a team that is working to save the 11 endangered species above. However, you have only enough money to work with one species at a time. Look over the list and then number the plants and animals in the order in which you will try to save them, from 1 (the most important species to save) to 11 (the least important species).

Try to reach agreement on the order in which the species should be saved.

**V. Read an article about a famous conservation project. For questions 1-7 choose the answer (A, B, C, D) which you think fits best according to the text.**

## Save Our Seeds

Over the past four hundred years, four hundred and fifty types of plants and trees around the world have become **extinct** as a result of the combined effects of global warming, population growth, deforestation, flooding and the fact that deserts are **advancing** in some regions at a rate of nearly four miles a year. Scientists **estimate** a quarter of the world's remaining 270,000 plant species will be **under threat** of extinction by 2050.

In 1997, in an attempt to try to prevent the loss of such precious resources, volunteers all over Britain began collecting seeds from Britain's 1,400 species of wild plants, three hundred of which are already facing extinction. The seeds collected are now **housed** in the Millennium Seed Bank, which opened its doors in 2000. Run by the Royal Botanical Gardens department of the famous Kew Gardens in London, the bank is located in Sussex, about thirty-five miles outside of the capital.

The bank is expected to become the world's biggest seed bank and, apart from **preserving** almost all the plant life in Britain, it also aims to have saved the seeds of more than 24,000 species of plant life, almost a tenth of the world's

flowering plants, in the next twenty years. If they are successful, the Millennium Seed Bank Project will be one of the largest international conservation projects ever undertaken.

In order to achieve this aim, the Millennium Seed Bank has a team of scientists who travel to remote corners of the world to find and collect seeds. They work together with local botanists and also help them to **set up** their own seed banks by training local scientists. They also spend a great deal of time **negotiating** with governments to allow them to collect the seeds and bring them back to Britain for storage in the Millennium Seed Bank.

When these seeds arrive at the seed bank, they are **sorted**, separated by hand from their pods, cleaned and dried and then X-rayed to make sure that they haven't been damaged in any way that might stop them from growing into healthy plants. Finally, they are placed in ordinary glass jars and stored in three underground vaults at temperature of -20ºC. Most plant species have seeds that can be dried, frozen and stored for years and still grow into healthy plants. However, the seeds of some species cannot be dried, so they can't be stored in seed banks in the usual way. These seeds include many rainforest tree species and plants that grow underwater.

Roger Smith, head of the Millennium Seed Bank explains that scientists at the bank are already working on finding new ways of storing those seeds that cannot survive the drying and freezing process and also on how to **regenerate** the seeds when they become extinct in their natural habitats. "At the moment, all we're doing is preserving these plants for the future. We won't have managed to **conserve** any species until we find the way to successfully **regenerate** them and grow new plants from them", points out Smith. "But at least this way, when the technology becomes available, and it will, we won't have lost everything."

As well as preserving seeds for the future, the seed bank also receives 2000 requests **per year** for seeds from universities, governments and conservationist organizations for use in various types of research – for example, to find cures for

diseases, to grow food in the **developing world** and to help in projects that **restore** the natural habitats of endangered animal species so they can be **released** back into the wild. Dr. Hugh Pritchard, head of research at the Millennium Seed Bank, says: “While it’s true that many of the plants we preserve at the bank aren’t useful at the moment, that doesn’t mean they won’t become useful in the future. Something like thirty per cent of the medicines we use today, are based on products or chemicals which have been **extracted** from plants. So it’s easy to see why we need to preserve the **diversity** of the earth’s plant life for the future.”

1. What do scientists believe will happen by 2050?

A. All plant life will be altered.

B. 450 types of plants will be in danger of becoming extinct.

C. Part of the world’s plant life will face extinction.

D. Environmental factors will affect only 450 plant species.

2. Where can the Millennium Seed Bank be found?

A. Outside Sussex

B. Outside London

C. In the Royal Botanical Gardens

D. In the Kew Gardens

3. The main objective of the Millennium Seed Bank is to

A. Save the seeds of thousands of the world’s plants.

B. Protect all flowering plants in the world.

C. Start a new international project in the next few years.

D. Undertake a large conservation project soon.

4. The Millennium Seed Bank carries out its work by

A. Training foreign governments to plant seeds.

B. Traveling around the world with botanists from other countries.

C. Helping other international seed banks.

D. Collecting international seeds and returning them to Britain for storage.

5. The methods used in storing the seeds show that

A. All seeds can be preserved for many years.

B. Some species cannot be stored by regular means.

C. Some of the plant species develop into healthy plants.

D. Some seeds are damaged when X-rayed.

6. The Millennium Seed Bank is trying to

A. Reproduce new plants from the seeds.

B. Reduce the storage lives of some seeds.

C. Destroy the seeds that cannot be frozen.

D. Plant the seeds that have a short storage life.

7. Why is this project important, according to Dr Pritchard?

A. It’s useful to medical research.

B. It’s useful in technological research.

C. It helps governments in developing countries.

D. It helps animal habitats.

**VI. Make a list of what the Seed Bank does, then present the topic to the class.**

**VII. Imagine: You work for the Millennium Seed Bank and you are preparing a poster to promote the project. In groups, decide what your poster will show.**

**VIII. In pairs, discuss the following questions:**

- Do you believe the Millennium Seed Bank Project is important? Why? Why not?
- Do you know of any endangered plant species in your country? What is being/could be done to protect them?
- Why are most people more interested in saving large and beautiful animals (mammals, birds) than small and less beautiful one?

**IX. Speak on:**

1. Ecological awareness must become one of the main objectives in ecological policy of any state.
2. National park is the best way of protecting wildlife.

**X. Render the following text into English.**

## Растения и люди: жизнь в общих интересах

«А где же город?» Это был мой первый вопрос друзьям по дороге из аэропорта в Лос-Анджелес. «А это он и есть», - ответили мне. То, что я видел вокруг, никак не напоминало город: горы, пальмы, океан, переплетения автострад, ряды невысоких домов и … полное отсутствие людей. Такое впечатление, что Лос-Анджелес создан не для них, а для автомобилей; пешком ходят в основном бездомные. «Далеко ли почта?» - спрашиваю. «Пять минут вот по этой дороге».

После 40 минут ходьбы до меня доходит, что имелось в виду «пять минут на машине». В средней калифорнийской семье число автомобилей соответствует числу взрослых. Результат – ежедневные пробки и смог от смешанных с туманом выхлопных газов, хотя после московского воздуха здешний покажется удивительно чистым.

Лос-Анджелес занимает первое место среди американских городов по растительному многообразию; здесь насчитывается 690 тысяч деревьев ста пятидесяти пород. Улицы и бульвары пахнут эвкалиптом, магнолией, жасмином и можжевельником. Один из самых загрязненных городов планеты благодаря обилию растений выглядит то как цветущий луг, то как субтропический лес.

В городе 50 тысяч пальм. Как и большая часть местной флоры, пальмы – растения привозные. До 1913 года, когда в долину Лос-Анджелеса провели канал, здесь не росло почти ничего, кроме кустарников. Иммигранты из разных стран преобразили город, высаживая растения, привезенные с родины. Отвоеванный у пустыни, Лос-Анджелес считается «энциклопедией мировой флоры». Этот город – рекордсмен США и по площади лесов и парков. Один только Гриффит-парк в четыре раза больше Центрального парка Нью-Йорка; 1620 гектаров, пересеченных тропами холмов, куда по воскресеньям горожане с рюкзаками за плечами отправляются подышать свежим воздухом. А растения в ботаническом саду как бы символизируют многоликость этого полиэтнического города. Когда-то здешний магнат Хангтингтон окружил эти садом свой особняк, собрав на площади в 61 гектар 15 тысяч растений и устроив во многих уголках «тематические подборки»: бамбуки, розы, кактусы, пальмы …. Все пейзажи мира соседствуют здесь.

В этом городе люди и растения в полном смысле слова помогают друг другу выжить. Без зеленых насаждений город просто задохнулся бы в выхлопных газах. Поэтому и люди здесь так заботятся о природе:

муниципалитет не только ежегодно высаживает на улицах тысячи новых деревьев, но и охотно снабжает саженцами и семенами садоводов-энтузиастов.

## WRITING

Write about:

1) an endangered animal (or some plant) species in your country; its number, habitat, ways of protection etc. Add your own suggestions;
2) your attitude to raising animals for fur trade, sports, medicine.

## INTERNET

Search for the laws (national and International) governing the conservation of wildlife. Comment on how they are (aren't) used in practice.

# UNIT VIII

## Ecotourism

### Warm-up

- How do you understand the word “ecotourism”?
- Have you ever travelled as an ecotourist?
- What did your trip include?
- Did you like it?

## Ecotourism

Ecotourism essentially means ecological tourism, where ecological has both environmental and social connotations. It is defined both as a concept / tourism movement and as a tourism sector. Born in its current form in the late 1980s, ecotourism came of age in 2002, when the United Nations celebrated the “International Year of Ecotourism”. The International Ecotourism Society (IES) defines ecotourism as “responsible travel to natural areas that conserves the environment and improves the well-being of local people”. However, this is a vibrant, new movement and there are various definitions.

Many global environmental organizations and aid agencies favor ecotourism as a vehicle to sustainable development.

Ideally, true ecotourism should satisfy several criteria, such as:

- conservation (and justification for conservation) of biological diversity and cultural diversity, through ecosystems protection;
- promotion of sustainable use of biodiversity, by providing jobs to local populations;
- sharing of socio-economic benefits with local communities and indigenous people by having their informed consent and participation in the

management of ecotourism enterprises;

- increase of environmental and cultural knowledge;
- minimisation of tourism's own environmental impact;
- affordability and lack of waste in the form of luxury.

For many countries, ecotourism is not so much seen as a marginal activity intended to finance protection of the environment than as a major sector of national economy and as a means of getting currencies. For example, in countries such as Kenya, Ecuador, Nepal, Costa Rica and Madagascar, ecotourism represents a significant chunk of foreign revenue.

The concept of ecotourism is widely misunderstood and, in practice, is often simply used as a marketing tool to promote tourism that is related to nature. Critics claim that ecotourism as practiced and abused often consists in placing a hotel in a splendid landscape, to the detriment of the ecosystem. According to them, ecotourism must above all sensitize people with the beauty and the fragility of nature. They condemn some operators as "green-washing" their operations—that is, using the label of "ecotourism" and "green-friendly", while behaving in environmentally irresponsible ways.

Although academics argue about who can be classified as an ecotourist, and there is precious little statistical data, some estimate that more than five million ecotourists — the majority of the worldwide population — come from the United States, with other ecotourists coming from Europe, Canada and Australia.

Currently there are various moves to create national and international ecotourism certification programs, although the process is causing controversy.

## VOCABULARY

**Remember:**

ecotourism

ecotourism enterprises

to conserve the environment

biological diversity

impact

foreign revenue

to promote tourism

to cause controversy

sustainable development

## EXERCISES

**I. Give Russian equivalents of the following words and word combinations. Find and translate the sentences with them in the text.**

Environmental connotation, social connotation, responsible travel, to conserve the environment, aid agencies, sustainable development, justification for conservation, to provide jobs, local populations, socio-economic benefits, local communities, indigenous people, informed consent, marginal activity, major sector of national economy, foreign revenue, splendid landscape, to the detriment of the ecosystem, to sensitize people, “green-washing” their operations, green-friendly, certification programs, the process is causing controversy.

**II. Give English equivalents of the following words and words combinations:**

Экологический туризм; значение для окружающей среды; существующая форма; международный год экотуризма; природные зоны; улучшать благосостояние; местные жители; коренные жители; организации по защите окружающей среды; удовлетворять нескольким критериям; биологическое разнообразие, культурное разнообразие; управление экологическими предприятиями; повышение уровня культурных знаний; воздействие на окружающую среду; доступность;

отсутствие загрязнения; финансовая защита окружающей среды; на практике; инструмент продвижения на рынок; злоупотребление; красота и хрупкость природы; безответственно по отношению к окружающей среде (природе); статистические данные; национальные и международные программы сертификации экотуризма.

**III. Complete the sentences using the vocabulary from the text:**

1. Ecotourism is defined as …
2. … as a means to sustainable development.
3. In practice ecotourism is often used …
4. Ideally, ecotourism is aimed at …
5. Regrettably, the concept of ecotourism is narrowed down to …
6. In the countries with weak economies ecotourism represents a means of …
7. Increasing environmental and cultural knowledge is one of …
8. Large numbers of ecotourists come from …
9. Increasing environmental and cultural knowledge is one of …
10. “International year of Ecotourism” …

**IV. Give derivatives from the following words:**

| | |
|---|---|
| to minimise<br>to afford<br>to activise<br>sense<br>major<br>to promote<br>to participate<br>current<br>luxury<br>responsible | |

# DISCUSSION

## I. Answer the questions on the text:

1. What is ecotourism?
2. What connotation does “ecological” have?
3. When was ecotourism “born”?
4. What is the definition of ecotourism by IES?
5. Why do many global organizations and aid agencies favor ecotourism?
6. What criteria should true ecotourism satisfy?
7. How is ecotourism seen by different countries? Why?

## II. Agree or disagree with the following statements:

1. The “International year of Ecotourism” was first celebrated in the late 1980s.
2. Ecotourism is supposed to improve the well-being of local people.
3. Ecotourism is a popular kind of tourism which dates back to the XIX century.
4. Not many countries favour ecotourism.
5. Ecotourism contributes much to the conservation of biological diversity and its sustainable use.
6. A lot of countries consider ecotourism to be a major sector of their national economies.
7. There is a lot of statistical data relating to the benefits of ecotourism worldwide.
8. Most ecotourists come from Eastern countries.
9. International ecotourism certification programs have recently been adopted.
10. There is unanimous approval of their certification programs.

## TEXT II

# Travel Wise

Many of us look forward to our summer holidays all year. We can't wait to get away from our everyday lives, to visit new places, try new things, or just to relax and lie in the sun. But how many of us think about the effect our holidays have on the places we visit?

Although tourism has many benefits, such as bringing extra money into the local economy, there are also negative effects. Tourism can do all sorts of damage to the environment, the culture and the people of a country, especially in places which aren't prepared for large numbers of holidaymakers. In recent years there has been a large increase in the number of independent travellers who want to get off the beaten track, and this has meant that many remote destinations are having to adjust to new visitors.

It certainly isn't all bad news though. The last few years have also seen a huge increase in 'eco-tourism'. This is tourism where holidaymakers try to have a positive effect on the people and places that they visit. If you are really committed to this idea, then you can spend your holidays helping out on an organic farm in Britain, or taking part in conservation projects in Africa or the Amazon rainforest. Don't worry, though, if this doesn't sound like your idea of a holiday. Wherever you go and whatever you want to do, there are still ways to make sure that you have the best possible impact on your holiday destination.

If you are heading off to a place for the first time, it is an excellent idea to find out as much about it as you can. A guidebook is a great place to start. As well as learning about the local places of interest, you can read about the way you will be expected to behave and dress. This can save you from making embarrassing mistakes and means that you are less likely to upset or offend your hosts. Don't stop at the guidebook though. If you can, listen to some

music or read some literature from your chosen destination. Knowing a little about the place that you are visiting before you leave can make your holiday much more enjoyable when you arrive.

It is also important to think about how you spend your money when you are on holiday. Whenever you can, try to put it into the local people's hands. You can do this by eating and drinking local products rather than imported brands, staying in locally owned accommodation and using local guides. In some parts of the world, you might be relatively well off compared to the local population. Even in places where you are expected to haggle or bargain, you should always pay a fair price for things. Remember that what might be a very small amount of money to you, can make a big difference to some people.

Another important thing for the eco-tourist is to have as little effect on the local environment as possible. This is easy to do if you follow some common-sense advice. Don't leave litter lying around and use biodegradable products whenever possible. If resources like water or fuel are in short supply, then use as little of these as you can, and of course you should never buy products made from rare plants or endangered animals. If you are lucky enough to visit a truly exotic destination such as a coral reef, remote mountain or desert region, or a rainforest then you should try to leave it exactly as you found it, so that future visitors can enjoy it just as you did.

Ecotourism organisations say that respecting the culture and environment of the places that you visit will lead to much more rewarding and enjoyable holidays. If we try to encourage the local economy, leave the environment undamaged and be aware of the different laws and attitudes in the places we visit, then all of us can enjoy our ‘eco-holidays' much better now and in the future. With more and more of us planning holidays in new locations every year, we should all do our bit to make sure that we are always welcome wherever we go.

## VOCABULARY

**Remember:**

benefits

to do damage

to pay a fair price

to haggle

common sense

exotic destination

biodegradable products

endanged animals

to do one's bit

**I. Match the words in the first column with their synonyms in the second column and then use them in the sentences below:**

| | |
|---|---|
| damage | a) trash |
| benefit | b) participate |
| conservation | c) harm |
| to pay off | d) preservation |
| litter | e) positive effect |
| to take part (in) | f) to reward |

1. Ecotourists may ___ in cleaning up the place.
2. Tourists must be fined for leaving ___ around.
3. This species is included into the ___ list.
4. Sometimes tourists do more ___ than good to the local environment.
5. Countries welcoming ecotourism hope to get ___ on their economies.

6. If you learn something about the place before visiting it you will be ___ with much more enjoyable holidays.

**II. Join the sentences using the appropriate connective word:**

1. We look forward to visiting new places. Not many of us think about the effect our holidays have on these places.
2. You'd better study the customs and traditions of the local people. You may listen to their folk music.
3. Tourism can do all sorts of damage to the environment. There are some benefits too.
4. Tourists may offend the local people. They shouldn't show off their well-being.
5. You should always pay a fair price. What might be a small sum of money to you, can make a big difference to some people.
6. Respecting the culture and environment of the places that you visit will lead to much more rewarding and enjoyable holidays. Ecotourism organizations say it.

**III. Complete the following sentences using the vocabulary from the text.**

1. The number of independent travellers increases by the year and this means that…
2. A huge increase in eco-tourism results in …
3. Wherever you go you must always be aware …
4. … can save you from making embarrassing mistakes.
5. You can show your respect to the place and people by …
6. You'd better use biodegradable products so as …
7. If you are lucky enough to visit a truly exotic destination…
8. If we do our best not to do harm to the environment …

9. Those tourists who consider themselves environmentally conscious will never …
10. All of us are sure to enjoy our eco-holidays if …

**IV. Render the following text into English.**

Чрезвычайно нужная экотуристам и организаторам экотуризма область знаний о природе – это общая экология. Прежде всего весь комплекс представлений о том, чем ценны экосистемы и их компоненты в той местности, которую посещают или собираются посетить туристы. Как не повредить эти экосистемы, каковы возможные экологические последствия развития туризма, по каким признакам можно следить за ними и как эти последствия уменьшать или исключать? – все это вопросы первостепенной важности. Правильные ответы на них и правильная организация экологического тура требуют определенного уровня знаний о свойствах экосистем, о процессах их функционирования, подобно тому как умение управлять автомобилем требует минимальных знаний о его устройстве и работе.

Другая сторона дела – знание экологических факторов, воздействующих на людей. Это уже сфера экологии человека. Без соответствующих знаний пускаться в путешествие, а тем более приглашать кого-либо в путешествие рискованно. Экологические опасности весьма серьезны и часто скрыты от глаз. Кроме того, без таких знаний трудно оценить и ту пользу для здоровья, которую можно извлечь из путешествия. Так, желание «поправиться, накопить сил, отдохнуть» часто являющееся основным побудительным мотивом путешествия в природу, нередко остается неудовлетворенным потому, что турист и организатор тура просто не умеют правильно пользоваться доступными благами природы.

Нельзя не затронуть еще один аспект. Экологические знания, непосредственно связанные с конкретным путешествием, приносят не

только прямую утилитарную пользу его участникам и организаторам. Они имеют и воспитательное – общекультурное – значение. Живое соприкосновение с красотой природы, ее стихиями, понимание опасностей, грозящих человеку и от человека исходящих, опыт участия в природоохранных делах (опыт «врачевания» природы) – все это формирует отношения сотрудничества, а не «покорения» природы, которую в действительности покорить нельзя.

## DISCUSSION

**I. Choose the correct answer A,B,C,D for the following questions on the text:**

1. Tourism does the most damage in countries
   A. Where there has been an increase in ecotourism.
   B. Which aren't ready for a lot of tourists.
   C. Where there are a lot of people travelling on their own.
   D. Which have a strong local economy.

2. What is meant by "ecotourism"?
   A. Helping out on organic farms.
   B. Helping to conserve the rainforests.
   C. Having a positive effect on the environment.
   D. Helping places to get used to new visitors.

3. What should you do before you take your ecoholidays?
   A. Buy a guidebook.
   B. Learn how to dress.
   C. Find out about the local attractions.
   D. Learn about your destination.

4. How can a tourist help the economy of a country?
   A. Bargain for everything they buy.
   B. Buy the goods and services provided by the local people.
   C. Pay a fair price for everything.
   D. Buy expensive imported brands.
5. What is meant by the words “can make a big difference to some people”?
   A. You can change their lives.
   B. You can help to preserve their local environment.
   C. You can help them to have a better life.
   D. You can be fair.

6. What do ecotourist organizations say about tourism?
   A. If we show consideration for the place and people, we will have more satisfying holidays.
   B. If we visit unusual places, we should leave them just as we found them.
   C. If we have a holiday in a new place, we should make sure we will be welcome there.
   D. If we visit a foreign country, we should try to support the local economy.

7. The writer’s attitude to ecotourism is
   A. Hopeful
   B. Disappointing
   C. Interested
   D. Supportive

**II. Find in the text the arguments for or against the following statements:**

1. Although tourism has many benefits, there are also negative effects.
2. Many remote destinations have to adjust to new visitors.
3. Ecotourists try to make a positive effect on the people and places they visit.
4. If you are heading off to a place for the first time, it is an excellent idea to find out as much about it as you can.
5. To make as little impact on the local environment as possible is a very important issue for ecotourists.
6. Whenever they can, ecotourists must try to put money into the local people's hands.

**III. Make a list of common-sense advice to an ecotourist. Compare it with that of your group-mates.**

**IV. Imagine: You are a guide to a group of ecotourists heading off to an exotic destination (in China, Kenya, The Amazon river, Australia etc.). Give a short instructive speech. After it, questions from your listeners are welcome.**

**Do the part of a guide in turns.**

**V. Act out a conversation: You have chosen an ecotourists destination for the first time. Your friend is an experienced tourist. You are making arrangements and your friend helps you with advice.**

## WRITING

1. Write an essay on the topic "I'd like to promote ecotourism in my country/region".
2. Imagine that you are a tour operator. Create a colourful leaflet with "Dos and DON'Ts" for an ecotourist.

## INTERNET

Look for the information on the ecotourist trips in your country/abroad.

## VOCABULARY

| | |
|---|---|
| **A** | |
| acid rain | Acid rain contains sour pollutants |
| to affect | This area **was affected** by the flood. |
| to ail | The huge trees **had been ailing** for years before they were cut down. |
| amphibian | An animal that can live on both land and water. |
| atmosphere | The Earth's **atmosphere** is a thin layer of gases that surrounds the Earth. |
| to be aware | I think my neighbour **isn't aware** of polluting the environment. |
| **B** | |
| balance | Nature's **balance** might be disturbed. |
| biodegradable | All our products are **biodegradable**. |
| biodiversity | The great variety of different plants and animals. |
| biosphere | The **biosphere** is the part of the earth's atmosphere and surface in which animals and plants can live. |

| | |
|---|---|
| **C** | |
| carbon | **Carbon** is a chemical substance contained in all plants and animals. |
| carbon dioxide | The concentration of **carbon dioxide** in the atmosphere is low. |
| carbon monoxide | **Carbon monoxide** is emitted by cars. |
| catastrophe | The Florida Hurricane **Catastrophe** Fund (FHCF) was created in November 1993. |
| to chop down | Poor people often **chop down** trees for firewood. |
| climate | The Mediterranean **climate** is good for growing citrus fruits. |
| coast waters | Many bays and **coastal waters** have been contaminated with heavy metals. |
| cooling agent | **Cooling agents** are expensive. |
| to combat | There should be stricter laws to combat air pollution. |
| combustible | **Combustible** things are able to burn easily |
| to contaminate | The soil has been **contaminated** by burying dangerous toxic waste. |
| to consume | to use smth (energy, good etc.)<br>We **consume** too much energy now. |

| **D** | |
|---|---|
| death of the forests | The **death of the forests** is a big problem in Europe. |
| to destroy | The house was completely **destroyed** by fire. |
| destruction | The use of renewable sources could stop the **destruction** of the rainforests. |
| depletion | The **depletion** of natural resources might become a major problem in the future. |
| to die out | Animals **are dying out** far more often than you might think. |
| to diminish | The people try to **diminish** the pollution of the water. |
| dirt | The **dirt** has been removed from the ground. |
| to disappear | Many species **disappeared** in the last century. |
| disaster | the recent earthquake in India is a **disaster**. |
| to dispose of | to get rid of smth |
| disposal | Unfortunately, few people know of the **disposal** of hazardous waste. |
| drought | **Drought** ruined the crops year after year. |
| to dry up | During the long time of drought many rivers **have dried up**. |
| to dump | Old washing machines have been **dumped** near the beach. |
| dumping ground | City canals are often used as **dumping ground**. |
| dust | Do not inhale the **dust**, it’s dangerous. |

| | |
|---|---|
| **E** | |
| earthquake | On April 18, 1906, shortly after 5:00 am, a great **earthquake** struck San Francisco. |
| ecology | Oil pollution could damage the **ecology** of the costs. |
| ecosystem | Jordan appealed for assistance to help save the **ecosystem** of the Dead Sea, whose water level is dropping. |
| emission | The organization call for stricter controls on **emissions.** |
| to emit | Sulphur gases **were emitted** by the volcano. |
| endangered | The sea turtle is an **endangered** species. |
| energy conservation | **Energy conservation** is a process of saving energy. |
| energy source | Space energy is one of the **energy sources** of the future. |
| energy-efficient | **Energy-efficient** windows help to lower your heating costs. |
| environment | We must protect the **environment.** |
| environmentalist | **Environmentalists** are people who love and defend the nature world. |
| to erode | If the wind, rain **erode** smth as rock or soil, or if they **erode** their surface becomes destroyed |
| erosion | Wind and water are the main agents of soil **erosion.** |
| evolution | A lot of species have changed in the process of **evolution**. |
| exhaust fumes | Over the past month officers have been stopping vehicles in Manchester to test **exhaust fumes**. |
| to be exposed to | You risk skin cancer if you **are** often **exposed to** strong sunlight. |
| extinct | Dinosaurs have been **extinct** for millions of years. |
| extinction | It is an end to birth. |

| | |
|---|---|
| **F** | |
| factory farming | Is **factory farming** a way of animal abuse? |
| famine | The Irish **Famine** of 1846-50 took as many as a million lives from hunger and disease. |
| fertile | **Fertile** land is land where things grow easily. |
| fertilizer | **Fertilizers** are chemicals given to plants with the intention of promoting growth. |
| fume | Workers are exposed to **fumes** from asphalt.<br>The lava gives off clouds of **toxic fumes** as it flows into the Pacific Ocean. |
| **G** | |
| geothermal | The first **geothermal** power station was built in Landrella, Italy. |
| global warming | They started a campaign to slow down the process of **global warming**. |
| greenhouse effect | The **greenhouse effect** is the rise in temperature caused by gases in the atmosphere. |
| **H** | |
| habitat | The forest is a **habitat** (natural home) for lots of animals. |
| to harm | Pollution can **harm** animals and the environment. |
| to be harmful | Air pollution is **harmful** to everyone. |
| heat wave | Slow down and avoid strenuous activity if a **heat wave** is happening. |
| heavy metal | Less **heavy metal** has been introduced by air into the Baltic Sea since the 1990s. |
| hydrocarbon | Various **hydrocarbons** have been found in Jupiter's atmosphere. |

| | |
|---|---|
| **I** | |
| incinerate | It is to burn things in order to destroy them. |
| industrial waste | **Industrial waste** can contain small amounts of radioactive materials. |
| **L** | |
| to leak | Oil **leaked out** of the tank. |
| to load | The owners of the local factories **are loaded** with new environmental laws. |
| **M** | |
| mammal | one of the class of animals that drinks milk from its mother when it is young |
| marine life | Around the islands **marine life** is seriously threatened by oil slick. |
| to menace | Hurricane Hugo **menaced** the US coast for seven days. |
| **N** | |
| natural gas | 61 percent of US households used **natural gas** for heating in 2002. |
| nitrate | a chemical that is used to improve the soil for growing crops |
| **O** | |
| oil slick | Large **oil slicks** were found near the coast. |
| overfertilization | **Overfertilization** is a common problem. |
| oxygen | The cells need **oxygen** to survive. |
| ozone layer | The **ozone layer** screens out the sun's harmful ultraviolet radiation. |
| **P** | |
| to phaseout | to gradually stop using |
| poison | The cat was killed by rat **poison.** |
| poisonous | She has lots of **poisonous** plants in her garden. |

| | |
|---|---|
| the polar ice caps | If **the polar ice caps** melt, the ocean level rise. |
| pollutant | It's a substance that makes air, water, soil etc. dangerously dirty. |
| to pollute | Please do not **pollute** the air. |
| pollution | Air **pollution** is a problem for all of us. |
| to poach | to kill rare animals for economic gain |
| power station | **Power stations** are only about 40 per cent efficient. |
| precipitation | Rain, snow, hail and sleet are types of **precipitation.** |
| predator | It is the animal that hunts. |
| preservation | He is interested in historic **preservation.** |
| prevention | The **prevention** of litter is very important. |
| to protect | Russia wants to **protect** the environment in the Baltic region. |
| to purify | You can **purify** water with two chemicals: chlorine bleach and iodine. |
| **R** | |
| radiation | a form of energy which is harmful to living things if it is present in large amounts |
| rainforest | Tropical **rainforests** are the Earth's oldest living ecosystems. |
| to recycle | This carton is made from **recycled** paper. |
| remedial action | The Great Lakes **Remedial** Action Plan Program was created in 1987. |
| renewable | A **renewable** energy system converts the energy found in sunlight, wind, falling water, waves, geothermal heat, or biomass. |
| reusable | There are two kinds of plastic bottles: **reusable** bottles and single-service bottles. |

| | |
|---|---|
| **S** | |
| to screen from | You should **screen** your eyes **from** the sun when hiking in the mountains. |
| sea level | Death Valley lies 86 metres (282 feet) below **sea level**. |
| sewage | **Sewage**, used water, comes from factories and households. |
| sewage plant | The city needs to have a **sewage plant**. |
| sludge | **Sludge** is often used on agricultural land. |
| soil | **Soil** is the top layer of the earth in which trees, plant etc. grow. |
| solvent | Benzene and turpentine are **solvents**. |
| species ['spiːʃiːz] (pl), an endangered species | It's a group of animals or plants. |
| starvation | **Starvation** is the most severe form of malnutrition. |
| stratosphere | The ozone layer is within the **stratosphere.** |
| surface | About 70% of the Earth's **surface** is covered with water. |
| sustainable | an action that can continue for a long time: sustainable economic growth |
| **T** | |
| to threaten | Toxic chemical substance **threaten** sea turtles. |
| tide | The **tide** is in/out. |
| timber | **Timber** is wood for building ships and houses. |
| toxic waste | A ship with **toxic waste** sank. |
| toxic waste dump | The **toxic waste dump** was built. |
| trawler | **Trawlers** are not permitted on the lake. |

| | |
|---|---|
| **U** | |
| unleaded | **Unleaded** petrol is less harmful to the environment. |
| untreated | Coastal cities often dump their **untreated** wastes into the sea. |
| urbanization | The **urbanization** is a world-wide trend. |
| **W** | |
| waste heat | The use of **waste heat** will reduce electricity consumption. |
| waste paper | Recycling **waste paper** is a favourable method. |
| waste separation | Do you know how to do **waste separation**? |
| wind energy | **Wind energy** is widely used in South Africa for water pumping. |
| windpark/windfarm | Offshore **windfarms** have been built. |

## The Dark Man of Venice

**by Skip Ferderber**

## A roly-poly tuba player has become a waterfowl benefactor and doctor

To several hundred ducks and geese living in the stagnant salty waters which fill the once elegant canals of Venice, California, a roly-poly tuba player has become their benefactor, their doctor—and literally their connection to life itself.

To a visitor to Southern California, the colorful Venice Canals—a sleepy decaying neighborhood located a half-mile from the Pacific Ocean with graffiti-scrawled walls, ill-kempt buildings, long-haired hippies, and an abundance of dirty children who play loudly beside the crumbling seawalls—somehow become more quaint with the constant honking of the waterfowl that have made the old and rundown area their home.

Their charm, however, masks their desperate state. With salt water from the ocean filling the canals being anathema to the freshwater birds; with little or no vegetation to sustain them; and with too many birds and too many hazards such as dogs and cruel human beings, the quackers and honkers are faced with a desperate situation.

It would be far worse without the Duck Man of Venice.

His name is Buddy Hayes, or, more formally, Theodore Hayes. He has taken on the enormously complex job of providing food, water, and medical attention for Venice's troubled waterfowl community.

Twice a day, at 11 A.M. and 5 P.M., the usually quiet neighborhood reverberates with the rasping sound of hundreds of quacking birds who throng and gawk outside the white picket fence surrounding Hayes's two-story house, situated on the corner of a canal intersection.

The ducks, acting like quibbling ladies at a clothing sale, vie for space near where Hayes or his wife, Jean, will offer a smorgasbord of duck pellets, hard corn kernels, lettuce leaves, and other greens.

The door opens and out marches Hayes, a chubby, smiling elf of a man dressed in a gray jumpsuit and poncho, bright red boots, and a wreath of graying hair topped with a pony tail tied with a rubber band.

He approaches the fence, waits for the appropriate moment, and flings the food in a grainy shower. The birds heave to their meal with a vengeance.

And while they eat, Hayes changes their water, providing fresh water for the birds to drink and to bathe in— the only way they have to wash the deathly salt off their feathers, salt which tends to make it increasingly hard for them to fly or to live.

It's been this way seven days a week for the 54-year-old musician, a former regular with the Lawrence Welk ensemble, who views the survival of the ducks as a labor of love—even though the cost of purchasing food, water, and

veterinarian services runs over $600 a year, money he can ill afford.

"It's an unnatural place for the ducks to live," said Hayes one day recently, slouched in a chair, his hands on his potbelly, watching with fondness as his charges loudly gobbled their midday meal. "They're freshwater creatures, not saltwater, and yet people insist on dumping their ducks here in the canals.

"Every year, around Easter especially, we get a lot of ducks, kids having let them go in the canals after getting them for gifts and getting tired of them real fast.

"And they start multiplying and, well, you know, here they are." He looked thoughtful for a moment. "I sure wish these pet-shop owners would stop selling them. Maybe some of them don't know that the animals they sell are going to wind up down here. I don't know. . . .

" When he came to the canals following a long career as a tuba player, a bass player, and a comedian, he bought a house and began the process of transforming it into a delightful two-story local landmark with a gray-painted roof, white stucco, and red trimming.

After years of traveling with bands—including Welk's and at one time, his own—it was time to settle down and enjoy life.

He reckoned, however, without the ducks.

"It was about the time I moved here that I noticed the ducks starting to come," he reminisced, "I began feeding them along with some others in the neighborhood. I'm about the only one left, I guess."

He also converted an empty lot adjacent to his house into a duck shelter and hospital for birds injured by overexposure to salt water or that have been injured by neighborhood dogs and cats.

Over the years, Hayes has pulled through dozens of the waterfowl by providing a recuperation area and by footing expensive veterinarian bills. He is not sure exactly how high the bills are: "I don't dare look at them," he winces.

Aside from the natural dangers, which have included a severe botulism attack, he faces the duck's own reproductive cycle, a problem which continues to create an overpopulation problem in the canals.

On occasion, he has enlisted the help of sympathetic young people who have combed the canal banks for birds' nests, breaking any eggs they found. But he is not always too successful, and the results are tragic when he is not.

"Not too long ago," he said, "I picked up ten baby geese and raised them in my backyard. I released them and it was only a couple of days later that I looked out into the canal near my backyard and found five of them dead, floating in the water. So I got the other five and I've got them here in my backyard. I don't know what I'm going to do with them."

One solution he tried was to give them away to Hollywood Park, one of Southern California's largest racetracks which features an infield area with an extensive waterfowl collection. The park shied away from any outside donations, other than those arranged by the waterfowl manager. Hayes is still looking for some people who would like to become foster parents to the geese.

The ducks and geese are also easy prey to neighborhood pets. To prevent this, Hayes has planted heavy shrubbery around his property in an effort to ward off any marauding dogs and cats. His three dogs, in addition, have voluntarily taken over the job of "watchdog" for the ducks. "Whenever the ducks quack a sort of a warning signal, a sound that the dogs recognize, they'll go over and help to chase intruders off the property."

One danger that he has little control over is the most dangerous animal of all: man.

"The street people eat them once in a while," he said, shaking his head sadly. "I've never seen anyone actually picking up any of the ducks, but every so often I'll see something in a trash can that looks suspiciously like duck feathers."

He added that he didn't think they would be good eating: "With all the salt water they've drunk, the meat is probably too salty."

Another problem facing the Duck Man of Venice is a massive reconstruction of the canals, financed by property owners by assessments to the tune of $24.5 million and which will include draining of the canals. Although the starting date may be years away, owing to a series of lawsuits, Hayes still feels obligated to try to make some sort of arrangements for the birds.

"If the draining of the canals doesn't get them," he said, "the dogs will. I'm just going to try to keep them alive until the project starts and take them somewhere else so they'll have some sort of protection.

"They can't go and join their fellow birds because most of them are domesticated and they don't know how to fly."

Over the years, he has received complaints from some neighbors who become incensed by the rat-tat-tat sound of a gaggle of geese and ducks calling for their food. Hayes threw up his hands. "You know, they were really the ones who helped encourage the ducks. They started putting out food and water and the ducks multiplied and then the people stopped and the ducks were still here."

He has asked for cooperation from the city of Los Angeles—Venice being a suburb of the megalopolis— but he has received little help. According to his wife, Jean, the city was asked to transport some of the ducks elsewhere to avoid overcrowding and to lessen the chance of a botulism epidemic—an ever-current possibility with the presence of even one duck infected with the killer disease.

But waterfowl, she explained, are under the control of the state fish and game commission and the city apparently has been unable to make arrangements to transport the ducks. "They can't place them locally because every place around here is loaded with ducks, she said.

While the Hayeses have been the ducks' chief supporters, they hasten to add that some of the longhaired young people in the neighborhood have eagerly responded to help care for the ducks when help has been requested, especially during a botulism attack.

But by and large, the main responsibility still falls on Buddy Hayes. And he does not shirk that task. Even though his current job—playing in a downtown Los Angeles dance ballroom four nights a week—pays him a somewhat limited wage, and even though he faces paying a hefty assessment on his property as a result of the canals reconstruction project, he is determined to dp what he can for as long as he can.

"As long as I have a dime in my pocket," said Have with a gleam in his eye, "I'll feed the ducks. I might my house"—and he laughed—"but I'll feed the ducks."

***Comprehension***— Read the following questions and statements. For each one, put an *x* in the box before the option that contains the most complete or accurate answer.

1. In the vacant lot next to his house, Buddy Hayes set up

□ a. a duck shelter and hospital.

□ b. a shelter for local street people.

□ c. breeding grounds for ducks from the canal.

□ d. a petting farm where local children can play with the ducks.

2. The future of Buddy Hayes's ducks is

□ a. uncertain.

□ b. encouraging.

□ c. bright.

□ d. destruction.

3. Buddy Hayes became concerned about the fate of the canal ducks

□ a. when he was still a child.

□ b. while touring with the Lawrence Welk orchestra.

□ c. during the first botulism epidemic to hit the canals.

□ d. only after moving to Venice.

4. Which of the following expresses the attitude behind Buddy Hayes's efforts?

□ a. All life is precious.

□ b. Recognition takes time.

□ c. Children are cruel.

□ d. Government is uncaring.

5. The ducks in the Venice canals are mostly

□ a. the multicolored wild species.

□ b. the sea-going variety.

□ c prized for their tasty meat.

□ d. the common white variety.

6. The duck problem in the Venice canals could be reduced and possibly solved by

□ a. an organized effort to educate people.

□ b. a ban on the sale of ducks in pet shops.

□ c pumping fresh water into the canals.

□ d. following the example of Buddy Hayes.

7. It can be inferred from the selection that

□ a. Californians are cruel to wildlife.

□ b. the ducks cannot adapt to conditions in the canal.

□ c. long-haired hippies spoiled the once elegant canals.

□ d. the canals cannot be improved.

8. When Buddy Hayes says, "I sure wish these pet-shop owners would stop selling [ducks]. Maybe some of them don't know that the animals they sell are going to wind up down here. I don't know. . . .", he is speaking

□ a. sarcastically.

□ b. blithely.

□ c. cynically.

□ d. wistfully.

9. Buddy Hayes and his wife Jean are

□ a. inconsistent.

□ b. compassionate.

□ c. bothersome.

□ d. headstrong.

10. The selection is written in the form of

□ a. a report.

□ b. an interview.

□ c. an open letter.

□ d. an editorial

## Dr. Batman

**by Anthony Wolff**

### A Colorado microbiologist studies the stratified evidence of environmental misuse in an unusual material.

In most folk, a fascination with bats might be thought morbid. Bats, after all, are bizarre creatures: dog-faced, bird-winged mammals that frequent the

night. Count Dracula's mythic consorts, they still inspire nightmare sleep and waking fear in normal folk. But for Dr. Michael Petit, a sane, sociable microbiologist at Colorado State University in Fort Collins, bats are a professional obsession. With modest support from the Rockefeller Foundation, he pursues them throughout the Southwest, from Colorado to Mexico.

In fact, it is not the bats themselves that fascinate Dr. Petit, though he likes them well enough. His special interest is reserved for what the bats leave behind in their dark, isolated caves. Each year—generation after generation, sometimes for centuries—the migratory bat colonies carpet the floors of their summer homes with droppings (known politely as "guano," from the Spanish), as well as with corpses and other souvenirs. In that accumulated debris, Dr. Petit is seeking an index to the past. The bats' leavings contain traces of various environmental poisons—mercury, lead, etc.—that the mammals have ingested along with their food and excreted in the guano. Left undisturbed, the guano accumulates on the floors of the caves, forming discrete animal strata. Dr. Petit's theory is that the quantities of environmental poisons in a layer of guano are accurate measures of their concentrations in the area surrounding the cave when the guano was deposited.

Some of the bat colonies, especially the Mexican free tails, have returned yearly to the same cave for three centuries and more. A precise record of pollutants in this relatively near past—too recent for most other techniques to date with sufficient accuracy—would reveal the year-by-year impact of industrialized man on the environment. By the same token, Dr. Petit's research may establish a sensitive technique for establishing realistic standards of pollution control in the future. Dr. Petit explains:

For example, suppose we find that over the next ten years pollution-control techniques can reduce the level of mercury at Carlsbad Caverns by a factor of ten. This may be meaningless if we learn from analysis of guano in the caverns that the level existing there 300 years ago was down by a factor of 10,000. If, on the other

hand, we find that ambient levels in the area today are no greater than they were 300 years ago, the unreasonableness of initiating costly pollution-control measures and setting unrealistic standards for that area will be apparent.

Pursuing the bats to their inner sanctums demands both ingenuity and stamina. To locate likely caves, Petit collects lore from local old-timers, hunters, and gas-station attendants, as well as from fellow scientists. He also has been able to enlist the bats themselves in revealing their hideaways. During all-night vigils he snares thirsty bats in a gossamer "mist net," stretched like a tennis net over likely watering places. To his tiny captives he attaches even tinier radio transmitters of his own devising, powered by hearing-aid batteries. Just before dawn on successive nights, he releases the "bugged" bats from two different locations. If he has netted members of the same colony, Petit can track their signals as they wing homeward and thereby triangulate the approximate spot where they disappear into their cave.

But tracking bats is easier on maps than over the rugged relief of the southwestern mountains. One early morning last May, under an Iberian sky of bottomless blue, Petit forsook a comfortable Tucson motel to search for a cave hidden somewhere along a remote, rocky ridge in the Patagonia range. During two days of painstaking mountaineering around the highest rock outcroppings the previous fall, Petit had failed to find it.

This time, the search covered the slightly lower altitudes, just below the three peaks that punctuated the ridgeline. The two-rut road ended far below; Petit had to make the climb on foot. Near the top of a meadow so steep that the ascent required a series of traverses, his tiring pace quickened, refreshed by a breeze perfumed with guano coming from a fissure no more than six inches high at the back of a shallow rock overhang. After a short scramble uphill around the base of the peak, Petit found the cave's front door, a man-high portal invisible from above and below.

Petit also found disheartening evidence that he was not the first visitor to the cave: The floor was littered with the debris of modern trespassers—tin cans and odds and ends of plastic. Clearly the disturbed guano on the floor would be useless for dating, which depends on strict stratification of annual deposits. Searching the dark recesses of the main chamber, however, Petit discovered a narrow chimney leading to a second story. Exploring cautiously, careful not to disturb the deep carpet of guano, he made his way into the upper room. The narrow beam from his headlamp divided the utter darkness. As Petit's gaze swept the room, the light revealed, stroke by stroke, a world apart—a bat's sanctuary locked in the fastness of the rock. This upper chamber showed no sign of previous human intruders.

The same expedition included a return visit to a cave in Eagle Creek Canyon, in the Gila mountain range. The cave was especially valuable for validating Petit's techniques, because it had been literally vacuum-cleaned of its guano deposits for commercial fertilizer in 1954. Thus, its present layers of guano could be dated with certainty from that year. Moreover, the operation of a massive copper mine and smelter nearby provided a clear test of Petit's hypothesis that the guano would reveal changes through time in the concentrations of industrial effluents in the environment.

Inside the cave the sibilant voice of Eagle Creek gave way to the caterwauling of Mexican free-tailed bats, the vanguard of the summer population. They huddled head down, shoulder-to-shoulder on the ceiling, dropping off in squadrons to fly swift, tight formations in the gloom. Petit estimated three hundred thousand of them, darting through the upturned beam of his light like warplanes on a night raid, miraculously avoiding certain suicide against the cave walls. Later in the season, he knew, the population might explode to several million, feeding on local insects by night, breeding, dying. On the wing inside the huge cavern, they would crowd the air, colliding with intruders and each other despite their sensitive sonar. Their droppings would

saturate the top layer of guano on the floor, and the smell of concentrated ammonia would make the cave inhospitable to visiting scientists. Now, however, early in the season, they had plenty of airspace for their maneuvers, and their droppings floated down like the gentlest rain. Petit's baseball cap was protection enough from above, and the smell from underfoot was no worse than the bouquet of common garden fertilizer.

Dr. Petit's scientific guano-sampling kit consists of nothing more than a length of common stovepipe, which he drives down into the deposit with any handy rock. He then shovels the surrounding guano away so that the stovepipe can be sealed with wax, top and bottom, for the journey back to the Fort Collins laboratory. There the sample is impregnated with paraffin to prevent crumbling before the stovepipe is slit open lengthwise, laying bare the strata for consecutive dating. A sample of the guano from each layer is subjected to sophisticated testing procedures for measuring its burden of environmental poisons.

His test results so far lend support to Dr. Petit's hypothesis. Analysis of the guano samples from Eagle Creek Canyon shows evidence of the mercury wastes associated with the nearby copper industry, correlating closely with fluctuations in the smelter's activity. The correlation is so sensitive that Dr. Petit's graph of the mercury content in his guano samples dips sharply to correspond to the two years when strikes crippled the smelter.

If Dr. Petit can carry his measurements far enough into the past—into guano deposited before man's industrial by-products were added to the environment—his technique will offer a standard for measuring the impact of industry on the environment and on ourselves.

***Comprehension***— Read the following questions and statements. For each one, put an *x* in the box before the option that contains the most complete or accurate answer.

1. Dr. Petit tracks down bat caves by

□ a. putting radio transmitters on bats.

□ b. following trails of bat guano.

□ c. analyzing maps of local terrain.

□ d. observing the flight patterns of bats.

2. The droppings of bats

□ a. reflect man's effect on the environment.

□ b. pollute natural scenic wonders.

□ c interfere with nature's delicate balance.

□ d. interfere with scientific investigation.

3. Dr. Petit found the Patagonia cave useful only because

□ a. previous visitors had not disturbed any bat guano in the main chamber.

□ b. no human intruders had entered the cave's second story.

□ c. it was located near a copper mine.

□ d. he reached it during the bat's mating season.

4. Dr. Petit can draw significant conclusions from his research by using which of the following techniques?

□ a. carbon dating.

□ b. photosynthesis.

□ c. comparative analysis.

□ d. radiobiology.

5. The technique used by Dr. Petit is useful in dealing with the

□ a. recent past.

□ b. bat population.

□ c. prehistoric past.

□ d. daily guano accumulation.

6. Dr. Petit's theory seems to be

□ a. confusing to the untrained person.

□ b. unlikely, considering the habits of bats.

□ c resented by business and industry.

□ d. based on reasonable assumptions.

7. Dr. Petit's cave explorations suggest that bats are

□ a. dangerous.

□ b. supernatural.

□ c harmless.

□ d. destructive.

8. The tone of this selection is

□ a. gloomy.

□ b. scornful.

□ c. serious.

□ d. amused.

9. Dr. Petit seems to be a

□ a. resented meddler.

□ b. popular teacher.

□ c thorough investigator.

□ d. misunderstood scientist.

10. The description of bats "darting through the upturned beam of [Dr. Petit's] light like war planes,on a night raid . . ." is an example of

□ a. a simile.

□ b. a metaphor.

□ c an overstatement.

□ d. an allusion.

## New Use for Old Cars

**by Anthony Wolff**

**Innovative approaches to auto recycling offer a means for conserving important offer a means for conserving important nonrenewable resources.**

A defunct automobile, like a used paper towel or an empty pop bottle, is a disposable item in America. To the car's final owner, junking his old car may be a matter of less concern than finding an overnight parking place for his new one. But for a small group of metallurgists working under Dr. Monroe S. Wechsler at the University of Iowa in Ames, this year's junk could be the potential raw material for next year's model, and the derelict auto junkyard a rich lode of high-assay ore. Though Dr. Wechsler himself drives—gently—a vintage Volvo that shows no signs of decrepitude, he and his colleagues are out to rescue the cars that are rusting away on the scrap heap and recycle them into shiny new steel.

What Dr. Wechsler and his team are looking for is a metallurgical solution to an economic foul-up. Fifteen percent of the six to eight million cars junked in the United States each year are never reprocessed. They remain stalled forever in the junkyards, adding a million more useless hulks to an inventory

that already totals 15 to 20 million. Weighing an average 1,400 pounds each, these car corpses represent hundreds of million of tons of ore laboriously torn from the earth, 10 to 14 million tons of metal exactingly processed and manufactured, and billions of dollars spent—all come to an economic dead-end. There is so little demand for auto scrap that an estimated 12 percent of all cars never even make it to the junkyard. Recently, over 80,000 of them were simply abandoned on the streets of New York City alone in one year, not worth the cost of towing. Untotaled thousands more mar the countryside across America.

Analyzing this junkyard traffic jam, the Ames researchers found there is a bottleneck between the auto wrecker, who strips the corpse of its radio, radiator, and other salable parts, and the auto-scrap dealer, who buys the remaining steel carcass from him and processes it for resale. One major obstacle to this flow is that the wrecker cannot extract all the nonferrous "contaminants"—especially copper, but also nickel, aluminum, and chromium—that are part of the auto body.

The steel industry has a limited appetite for contaminated scrap: as little as 0.3 percent copper, for instance— just four pounds in a 1,400-pound auto hulk—may cause imperfections in their new product. So the scrap dealer can't buy all the auto wrecker's dead bodies, and they pile up in roadside junkyards where they offend beauty-lovers and metallurgists alike.

As a professional soldier might measure a nation by its military strength, or a poet by its literary prowess, so Frederick Schmidt, the principal investigator on the auto-scrap project at Ames and a twenty-year veteran metallurgist, believes with a mixture of faith and reason that "a country's strength depends on its ability to handle metals." From that creed, it is only a short logical jump to the corollary that a nation that squanders metal dissipates its strength. For Schmidt there's something immoral in that.

In his unglamorous, uncomfortable office, with its tabletops, shelves, and boxes crowded with bottled samples of his precious pure metals, Schmidt can

chalktalk a layman through the ABC's of auto scrap, and at the same time persuade him that finding a way to recycle the stuff is "a way to do something for our country."

Schmidt has a point. The recycling of junked metal is *not* primarily a matter of aesthetics, but of conserving nonrenewable resources of which steel mills devour terrifying quantities in relation to world supply.

At first, the Ames group concentrated on several ways of melting auto scrap in a vacuum to separate out the impurities. In one vacuum process, a bar of compacted scrap, identical in composition to auto scrap, is bombarded with electrons from a gun very much like the one at the rear of a TV tube, but many times more powerful and focused on a much smaller area. Visible only through a protective filter, the tip of the scrap "compact" glows red, then white, and eventually melts into a water-cooled mold below. In the molten puddle at the top of the mold, some of the heat-excited atoms of metal evaporate into the very thin air of the vacuum; condensing on the walls of the experimental chamber to await later recovery. The electron-beam-melting experiments succeed in removing 90 percent of the copper and tin from the scrap, while evaporating only 8 percent of the iron. The rest hardens in the mold into an almost pure ingot, ready for reuse.

Although they yield promising results, the vacuum melting experiments also reveal some problems. Not the least of them is the vacuum itself, a difficult and expensive condition to maintain on an industrial scale. Also, it has been demonstrated that some significant impurities — chromium and nickel, for instance—cannot be separated from iron by vacuum melting because the iron evaporates before they do.

With their initial study already funded by the Environmental Protection Agency and under way, the Ames researchers' interest was drawn to an alternative process that involved neither evaporation nor a vacuum: this innovative line of research, called electroslag remelting, attracted the

Rockefeller Foundation's interest. In the electroslag process, electricity flows directly through the scrap "compact" to the mold, passing through a layer of powdered vitreous material—called slag—in between. The slag's high resistance to electricity causes it to heat up, just like the heating element of an electric range. The slag melts; as its temperature rises it in turn melts the bar of scrap. "It's like lowering a wax candle into boiling water," says Schmidt. The slag is concocted with substances that combine readily with the impurities in the scrap: as the molten scrap sinks through the pool of slag, the impurities are filtered out, leaving pure iron.

The trick in the electroslag remelting process is to come up with a slag recipe that includes extractants for all the impurities in the scrap. In theory, according to Schmidt, it should be possible to get them all. The development of the electroslag process is currently proceeding under a new EPA grant, based on the hopeful results of the first year's research. According to the researchers' first-year report, "We believe that electroslag remelting is an extremely promising method for purifying not only auto scrap, but other types of scrap metal such as tin cans, appliances, and selected metal fractions from municipal refuse."

The ultimate proof of the process, of course, will come with its adoption by industry. However, Dr. Wechsler does not anticipate any great enthusiasm from Big Steel for purified auto scrap, no matter how practical and economic the process. He points to the steel industry's huge investment in the "integrated" mills which include ore supplies, transportation, and manufacture, and supply 92 percent of the nation's steel. Indeed, as one observer at Ames comments, "Our biggest enemy has been Big Steel. They pooh-poohed our proposal." Dr. Wechsler foresees that in the beginning his customers for recycled auto scrap are likely to be a growing number of smaller, local "mini-mills." To others, such as the RF's Dr. Ralph Richardson, who recommended the grant-in-aid to the Ames group, all technological innovation starts small, but, says Dr. Richardson, "I can

foresee the day when Big Steel, as part of a new plant or in renovating an old one, might give this a try."

"In current terminology," says Dr. Wechsler, "auto scrap has been treated as an economic 'externality:' But as populations grow and the store of resources dwindles in our finite world, such externalities will become of central importance."

***Comprehension***— Read the following questions and statements. For each one, put an *x* in the box before the option that contains the most complete or accurate answer.

1. If the vacuum melting process were to be used on an industrial scale

□ a. the process would have to be supervised.

□ b. heat-excited atoms would be difficult to control.

□ c. the enforcement of safety procedures would create a problem.

□ d. creating and maintaining the vacuum would present a problem.

2. New ways must be found to recycle discarded metal because

□ a. natural resources are limited.

□ b. the automobile industry is competitive.

□ c. the general public is concerned.

□ d. foreign competition makes it necessary.

3. The Ames group began its research by

□ a. canvassing auto wreckers to learn why steel from junk cars was not being recycled.

□ b. perfecting the definition of "junk cars

□ c. investigating an electroslag process.

□ d. developing a vacuum melting process.

4. Doctor Wechsler and his team of metallurgists have devised a way to

□ a. beautify the countryside.

□ b. decontaminate metal scrap.

□ c. prevent metal rust.

□ d. eliminate auto junkyards.

5. The problem of abandoned cars and eyesore junkyards is really a problem of

□ a. greed.

□ b. apathy.

□ c economics.

□ d. organization.

6. The vacuum and electroslag techniques

□ a. depend heavily upon electrical power.

□ b. are equally preferred by scientists.

□ c. create more problems than they solve.

□ d. are inexpensive to implement.

7. It can be inferred from the selection that

□ a. Big Steel is interested in conservation.

□ b. the strength of a nation is measured by its literature.

□ c tomorrow's needs must be met today.

□ d. natural resources will be available to satisfy demands

8. The tone of the selection is

□ a. factual.

□ b. argumentative.

□ c. conciliatory.

□ d. dogmatic.

9. Frederick Schmidt is

□ a. an organized man.

□ b. a convincing person.

□ c. a confused scientist.

□ d. a boring person.

10. The phrase ". . . the auto wrecker, who strips the corpse of its radio, radiator, and other salable parts. . ." is an example of

□ a. simile.

□ b. fallacy.

□ c. eccentricity.

□ d. personification.

## The Anatomy of Drink, I

**by Rog Habgood**

**Used unwisely, alcohol can destroy everything it enhances. It is a terrifying double-edged sword.**

Alcoholism appears to be as old as the history of alcoholic beverages—a history which is ancient indeed. In the *Wisdom of Ani*, an ancient Egyptian book of proverbs and moral codes, warnings are given against the unwise imbibing too much drink. The Bible, too, is dotted with references to the misuse of alcohol; the "drunkenness of Noah" is a story known to every school child. The Moslems forbid alcohol all together, and in some countries of that faith the mere

possession of it is a capital offense. Yet, stern legislation against alcohol seems never to have deterred the general populace from having its full share. The English were at a loss to stem the phenomenal addiction to gin that ravaged British society during the 18th century; the Volstead Act in the United States was a total fiasco and introduced an element of organized crime which still plagues us. In fact, history has proven that the more a society tries to repress alcohol consumption, the more that consumption is desired and sought after. Plainly, the safe use of alcohol lies in the successful implementation of sensible drinking programs, not wholesale policies of repression and enforced abstinence.

Man likes to drink. The fact is made evident when one considers the incredible list of ingredients that man has fermented and cheerfully ingested: bananas, grapefruit, persimmons, mare's milk, honey, animal blood, rice, all grains, dandelions—the list is endless and limited only by imagination. Thousands of organic substances are capable of fermentation, and man appears to have fermented just about everything, at one time or another, in the search for a "better" potable. Few areas of human endeavor seem to have brought as much ingenuity to bear as some of the ways by which man has arrived at something new to drink; indeed, many men have devoted their entire lives to the pursuit of one new and glorious distillation. Some, like the Catholic abbot Dom Perignon, succeeded brilliantly. (Perignon is credited with the invention of champagne.)

The reason man has devoted such an exorbitant amount of time to such a nonessential pursuit is quite obvious: alcoholic beverages are a pleasure to drink. Alcohol is nature's own tranquilizer—Everyman's Librium. Taken in small quantities, it eases life's many pains and troubles. It provides relaxation and good cheer, a sense of well-being and comradeship. These beneficial properties of alcohol have been realized by man since recorded history, and probably long before that. At the same time, man has realized also that alcohol is a terrifying double-edged sword. Used unwisely, it is capable of destroying everything it enhances: sociability, marriage, livelihood, productivity. It can reduce a man to a

state lower than an animal, and it can kill him ultimately through a hundred deaths. Alcohol ***is*** a great destroyer, but it need not be such. The fault is not that of alcohol itself, but in the way it is used. All programs of sensible drinking must start with that ultimate fact.

**What happens when I drink?**

Alcohol is a drug. It acts on the central nervous system as a depressant *(not as a stimulant).* Normally, it first produces euphoria or a feeling of well-being, then a certain amount of sedation interpreted as relaxation, then intoxication, and, finally, death. Each of these stages is governed by the amount and rate of alcohol entering the bloodstream of the drinker. There is no hocus-pocus involved here. The amount of alcohol in the system can be precisely determined at any time by means of a common blood test. However, the degree of effect of alcohol upon any given person is determined by many factors: weight, amount of food in the stomach at the time alcohol is ingested, the emotional outlook of the person at the time he is drinking, previous drinking history, and overall tolerance to the drug. These factors, and others, can alter the absorption rate of alcohol into the system. Still, the level of alcohol in the blood is the final determinant for assaying states through sobriety into full-fledged drunkenness. As the alcohol level rises, specific physiological and psychological changes can be safely predicted.

The formula works this way: one shot of liquor (one and one-half ounces) will place the alcohol concentration in the blood at approximately 0.03 percent, or 0.03 grams of alcohol for every 100 c.c. of blood. These figures are based on an average adult male of about 150 pounds; the concentration would be higher for most women and children, of course. Now, at this level, it is virtually impossible to label anyone as intoxicated. However, the second drink, if taken within an hour of the first, will raise the alcohol in the blood to a little more than 0.05 percent, and we begin to experience alcohol's first plateau: we feel relaxed, more talkative. Our problems don't seem quite as pressing, and the company

around us suddenly seems more pleasant, more "fun to be with." We are still not drunk in any legal sense, and our judgment and physical coordination is virtually unimpaired. So far, so good.

Somewhere between the third and fourth drink, things begin to happen rapidly. With the fourth drink, our alcohol concentration has reached 0.10 percent, or more, and we can at last be classified as legally drunk. The people we are with may still be "fun," but we're not noticing them as much as we did earlier. We are really becoming more introspective, although we may be the "life of the party" since our normal inhibitions against outrageous or scatological conduct have been repressed. It is at this point that we make the pass at the cocktail waitress, or guffaw too loudly at a dirty joke. Our brain is reacting to the soporific effects of alcohol, and our motor functions are becoming "loose" and uncoordinated. It is at this level that we are a definite hazard on the highway, and most states now consider a blood-alcohol analysis of 0.10 percent as legal evidence for drunkenness.

But it's New Year's, or Armistice Day, or the boss-just-fired-me day, or the mother-in-law-is-here-to-stay day, so we have a few more. The sixth drink jumps our alcohol level to between 0.15 and 0.20 percent. At this level, we are almost unrecognizable, both to ourselves and others. If sleep doesn't overtake us, we are likely to undergo violent changes in our mood and behavior. We may laugh one minute, cry the next. We may pick a fight, or take our clothes off on Main Street. We are no longer in control of our actions, and our behavior is completely unpredictable. If we drive in this state, we stand a high chance of killing ourselves and others.

But let's really tie one on, okay? It's very easy to do. The only requirement is that we stay awake long enough to keep pouring back the hooch. At about the eighth continuous drink, the alcohol level in our blood will rise to somewhere around 0.35 percent. Most of us can't walk at this level, so we had better just stay at the bar provided we can still get service. Better still, we can check into a

hotel with a bottle and there'll be no one to bother us. The company we were with lost their charm a long time ago, and it's better to be by ourselves.

Somewhere between the eleventh and thirteenth drink, our alcohol level jumps to 0.50 percent and we suddenly can't drink another drop. Reason: We have passed out. However, if we drink very quickly, we might be able to down two or three more before the curtain descends. By doing this, we can pretty well assure ourselves that we may hit the alcohol bull's eye with a blood concentration of 0.55 to 0.60 percent. At this point, we will die in an acute alcoholic coma and our little drinking bout comes to a sudden close.

We are talking here of facts, not fiction. While tolerance to alcohol, and other factors, may allow one person to drink more than another, the alcohol concentrations mentioned above will produce the effects exactly as described, plus hundreds of others not mentioned. Alcohol is a drug. It cannot be played with without endangering life itself. It can be consumed *safely*, and that is the whole purpose of sane drinking practices.

**I'm drunk. What do I do now?**

When you become drunk, the only cure is to stop drinking. Coffee will not sober you up. Steam baths will do nothing. Exercise is of no avail. Only time can bring you back to a sober state.

The body's system must oxidize all the alcohol which is ingested. It does this at a rate of approximately .015 percent an hour. The rule of thumb is to allow about one hour of sobering up time for each drink consumed. It takes this long for alcohol to be eliminated within the system. Beyond the one drink an hour limit, alcohol accumulates in the bloodstream and only time (and the liver) can remove it. There are no short cuts.

There are, however, ways in which the absorption rate can be slowed. The principal method is by food. It is always better to drink with food in the stomach than to drink on an empty stomach. While this will not save you from overindulgence, it will provide some moderate protection against the first couple

of drinks. Similarly, sipping a drink over a long period of time will reduce its net effect.

And that's about it. Anything else you may have heard is probably an old wives' tale. If you drink, alcohol will enter your bloodstream. If you continue to drink, it will accumulate in your bloodstream. That's the pure fact, and anything else is myth.

***Comprehsnsion***— Read the following questions and statements. For each one, put an *x* in the box before the option that contains the most complete or accurate answer.

1. The motivation behind man's production of alcoholic beverages is

□ a. evil.

□ b. humanitarian.

□ c. financial.

□ d. pleasure.

2. The logical progression of uncontrolled alcoholic intake

□ a. will produce a feeling of well-being.

□ b. can result in death.

□ c. can encourage complete relaxation.

□ d. will result in drunkenness.

3. The first noticeable effects of alcohol consumption are

□ a. relaxation and a boost in spirits.

□ b. sleepiness.

□ c. loss of coordination.

□ d. violent mood changes.

4. Which of the following best expresses the main idea of the selection?

□ a. Never drink on an empty stomach.

□ b. If you drink, don't drive.

□ c. Social drinking leads to alcoholism.

□ d. Alcohol should be used, not abused.

5. The proper use of alcohol requires

□ a. social acceptance.

□ b. self-restraint.

□ c. financial independence.

□ d. congenial company.

6. The search for the ultimate drink has produced

□ a. trash as well as excellence.

□ b. temperance along with enjoyment.

□ c. quality and high prices.

□ d. confusion and rivalry.

7. As the alcohol level rises in the bloodstream, its effects

□ a. level off gradually.

□ b. baffle medical science.

□ c. heighten mental awareness.

□ d. can be predicted mathematically.

8. The author's tone can best be described as

□ a. sarcastic.

□ b. emotional.

□ c. blunt.

□ d. moralistic.

9. The author seems motivated by a desire to

□ a. panic his readers.

□ b. encourage his readers.

□ c. help people use alcohol wisely.

□ d. stop everyone from drinking alcohol.

10. The statement that alcohol can kill a man "through a hundred deaths"

□ a. is an exaggeration.

□ b. alludes to the many different forms an alcohol- related death can take.

□ c. means it takes many alcoholic binges before death can result.

□ d. refers to the many different types of alcohol that can be fatal.

## The Anatomy of Drink, II

**by Rog Habgood**

**Alcoholism is a disease that cannot be cured, only arrested.**

Every year, doctors treat patients for alcoholism who swear that they can't be alcoholics. They base this belief on the premise that all they've ever drunk in their lives is beer. So they have one or two six-packs a day, so what? Beer, after all, has almost "no alcohol." On first glance, it seems a pretty logical argument. Beer does contain only four percent alcohol. But the alcohol is by volume, and therein lies the rub. An ounce of beer contains four percent alcohol. An ounce of 86 proof whiskey contains 43 percent alcohol. While many people stop drinking after one ounce of whiskey, who has ever drunk just one ounce of beer? You drink 10 ounces, or 20 ounces, and you have increased your alcohol ingestion in direct proportion to the alcohol content by volume. Therefore, one average mug-

and-a-half of beer equals, in alcohol content, about that of one drink. Likewise, a normal sized glass of wine equals one beer, or approximately one drink.

The effects of wine and beer are slightly less noticeable because the alcohol is more diluted by volume than in straight spirits. Similarly, one can retard the effects of hard liquor by mixing it with water or a commercial mixer. On the other hand, about the fastest-acting popular cocktail is the straight-up martini, either of the gin or vodka variety. The proof is high, and the drink unadulterated; consequently, robbed of any "buffering" agent such as water, the alcohol from such a drink enters the bloodstream very quickly. Few are the men, boasts to the contrary, who can imbibe two martinis at lunch and have their work for the rest of the day unimpaired. It would be impossible to calculate the number of man-hours lost every week in the United States as a direct result of the martini luncheon.

**Who drinks, and why?**

Ninety-five million Americans drink something alcoholic at least once a year, that leaves about 32 percent of the adult United States populace as absolute teetotalers. Of the ninety-five million drinkers, at least nine million develop serious alcohol-related problems. But, the most startling fact of all, the nine million problem drinkers affect the lives of more than 36 million people! This is the awful legacy of the problem drinker. If his drinking harmed only himself, his problem would not fall too heavily upon the shoulders of society. But when 36 million people are involved as a result of his problem, the situation becomes an urgent one.

The fact is that heavy drinking kills—and not just the drinker. Fully half of all highway fatalities are alcohol-related. This means that on the average more than 28,000 people lose their lives on the United States highway system a year as a partial contribution to alcohol misuse. This fact alone is enough to rivet us all into a position of taking a serious look at alcohol in the daily pattern of our social fabric.

But the statistics don't end on the highway. Fully one-third of all homicides in our country are also alcohol-related. And arrests where alcohol is a factor average close to two million a year. In dollars, something we are fond of considering, alcohol costs industry, and the American worker and taxpayer, more than $15 billion annually in medical expenses, lost time, accidents, and impaired job efficiency.

On the other side of the coin, Americans spend more than $20 billion each year on alcoholic beverages. The federal government spends less than $4 million a year on alcohol research and alcohol facilities.

Grim as these statistics are, they do not mean that alcohol should once again be prohibited. Clearly, the majority of United States drinkers drink in a sane and safe way. What the figures do prove is that urgent work is needed on the gigantic problem of alcoholism. Nine million lives are directly at stake, plus millions of others who suffer, in one form or another, from the consequences of the alcoholic's problem.

Virtually all medical groups, including the AMA, now recognize alcoholism as an illness. So do many insurance companies and health groups.

We must first instruct the general public in ways of safe drinking, then we must reach the alcoholic himself. Prevention of alcoholism is the first and most important step. This prevention can come about only when all are made aware of the problem. After this, treatment of the alcoholic becomes a much simpler process.

**I drink. Am I an alcoholic?**

One of the most insidious aspects of the disease of alcoholism is its ability to completely mask itself. Few alcoholics, while in the grips of alcoholism, can admit to themselves that they are diseased. Since no one opens their mouths and physically pours drinks down them, they can always delude themselves that they are in control; i.e. to drink they must make the conscious decision to put glass or bottle in hand, and then to raise that hand to their lips. Since this action is

seemingly a voluntary one, alcoholics are provided with the comforting notion that they are operating under their own steam. They can stop drinking any time by closing their fists and their mouths. Nothing could be further from the truth. Alcoholism, regardless of what form it may take, is a physical and/or psychological addiction, and the alcoholic is no more capable of altering his disease than a heroin addict is capable of taking one fix for the day. The disease itself demands alcohol, and an alcoholic cannot be written off as a person with poor willpower.

Willpower has nothing to do with the disease itself, although willpower has a lot to do with treatment. There is a very subtle, but very vital difference contained in the last statement. We do not tell cancer patients to cure their disease through willpower, and alcoholism cannot be cured by that approach. Cancer and alcoholism are diseases. Both are treatable, although alcoholism cannot be cured, only arrested.

So, who is the safe drinker? And the question can be a difficult one to answer. Simplistically speaking, the safe drinker is one within whom no rationalization, regardless of how subtle, is necessary for the taking of a drink. Whenever rationalization for drinking comes into play, the danger signal should go up.

If you have a drink because you are offered a drink, and think nothing more beyond that, it's probably quite all right for you to have that drink. If you attend a cocktail party and have one or two drinks, that's probably all right too. But if you habitually desire a drink before one is offered, or if you attend that cocktail party solely because you want to drink, then these are potential danger signals. Preoccupation with alcohol—planning when you will drink, what you will drink—are sure signs that alcohol may be playing too large a part in your life. Here again is where the rationalizations become so simple. It is so easy to say, “I’ll just have these drinks to be sociable," or, "Of course I want a drink. I've had such a lousy day." The safe drinker is one who does not drink because

an excuse is handy. He drinks. Or he doesn't drink. And he doesn't think of the why and wherefores. He takes it, or he leaves it—and one situation is as easy for him to do as the other. Alcohol makes absolutely no difference in his life.

Alcoholism is difficult to define because there are so many types of the disease. It is impossible to give hard-and-fast rules that say this is alcoholism, and this is not. Even the person who drinks daily will not necessarily become an alcoholic, although such a pattern would certainly predispose one to the disease.

Most medical authorities now agree that it is not necessarily how much one drinks that may lead to alcoholism, but why one drinks. And this goes right back to the fact of rationalizing drinking behavior. If you must think about booze, then you should probably give it up. If you crave a drink, you should give it up. If drink is more important than food, stop now and seek help. If alcohol in any way alters your life or work, you're facing trouble. If a lunch without a drink sounds dull, booze has become too much a part of your life. All these things, and many more, are urgent red flags on the road to alcoholism; only the foolhardly—or the alcoholic—will fail to notice them.

If you drink frequently to relieve problems, soothe tensions, forget cares, get happy, have a fight, go to bed, calm your stomach, increase your sex life, take a trip, meet people—you are drinking for wrong reasons. Drink for the wrong reasons long enough, and you will have a real reason to drink—alcoholism. Nine million Americans are all drinking for the wrong reasons.

Think all alcoholics are skid row bums? Not so. Less than three percent of all United States derelicts have drinking problems. Today's alcoholic individual is likely to be bright, well-educated, middle or top management, 35 to 50 years of age, a family man, and well-respected in his community and profession. He simply drinks too much, for all the wrong reasons, and his drinking has led to alcoholism.

***Comprehension***— Read the following questions and statements. For each one, **put an** *x* in the box before the option that contains the most complete or accurate answer.

1. Approximately 36 million Americans

□ a. are injured in alcohol-related accidents each year.

□ b. are alcoholics.

□ c. find their lives affected by alcoholism.

□ d. are arrested on alcohol-related charges each year.

2. Medical authorities are mainly concerned with

□ a. the quantity of alcohol people take.

□ b. the families of alcoholics.

□ c. legal problems resulting from alcoholism.

□ d. the reasons which prompt people to drink.

3. A warning sign for drinkers is

□ a. acceptance of a drink when one is offered.

□ b. planning when or where to drink.

□ c. indulging in two martinis over lunch.

□ d. preferring hard liquor to beer or wine.

4. Considered from the author's point of view, alcohol is a

□ a. profitable industry.

□ b. necessary evil.

□ c rare pleasure.

□ d. costly commodity.

5. The martini luncheon is a

□ a. boon to the business executive.

□ b. tradition among retired businessmen.

□ c proven obstacle to serious work.

□d. legitimate business deduction.

6. The problem drinker is

□ a. a threat to society.

□ b. his own best counsel.

□ c a misunderstood person.

□ d. a victim of circumstances.

7. An alcoholic

□ a. must be willing to receive treatment.

□ b. has no willpower.

□ c. can undergo a complete cure.

□ d. can never hope to control his drinking.

8. The tone of the selection is

□ a. sober.

□ b. snide.

□ c. unkind.

□ d. encouraging.

9. The unreformed alcoholic is

□ a. callous and defiant.

□ b. dishonest with himself and with others.

□ c weak and self-indulgent.

□ d. excitable and full of energy.

10. The phrase "under their own steam" means

□ a. in an alcoholic daze.

□ b. while they are still angry.

□ c. without outside help or interference.

□ d. in control of their environment.

## Organic Gardening in Perspective

**by Dr. Milton Salomon**

**Organic matter has many values, but it has no special health magic.**

It has only been about a century since the introduction of commercial chemical fertilizers. Since that time, they have become the major source of plant food. Previously, the maintenance of soil fertility depended on the use of animal manures, composts, and crop rotation.

This does not mean that chemical fertilizers are better than applications of manures, but rather they have become a recognized and tested means of filling new and special demands upon the land. This need was associated with expanding populations, an industrial revolution, and an amazing growth of cities.

The values of organic matter have not decreased, but its major values are for quite different reasons than many organic gardeners believe.

Through the years, there has emerged an understandable yet almost mystical devotion to the idea that only by a system of natural organic, nonchemical, or biodynamic farming would it be possible to maintain a bountiful, healthy agriculture. Traditionally, the adherents of this concept have

been a rather small group, mainly middle-aged, who honestly thought this was the only route to take.

Recently, however, the idea has caught the imagination of a broad segment of the youth culture. Generally this group consists of well educated, affluent, middle-class children whose experiences and backgrounds are found in the cities and suburbs. They are a rather unusual segment of the population and no one denies they have made an impact upon our attitudes and values. Their interest in agriculture from a special viewpoint is well worth looking at.

One of the most fascinating by-products of the search by the young for a new identity and meaning in life has been a growing awareness and sensitivity to the natural world and a spiritual awakening of the deeper senses. Evidence of this may be found in a strong yearning for the land, a return to simple values and communal living, a questioning of the establishment, and a revolt against the dehumanizing effects of massive technology. The commitment in many runs very deep and is often accompanied by turning inward, self-denial, asceticism, and, in the extreme, to practices of ancient religious forms associated with the East.

Outwardly, there has evolved a new life-style in dress and manners. More complete involvement often includes a desire for special natural foods and diets. Natural, organic, "macrobiotic," and other health-food stores and outlets that cater to these tastes have mushroomed across the country. Briefly, it is generally accepted by their customers that foods produced and marketed without the use of chemicals (fertilizers, pesticides, additives) are superior to those grown by modern farm-management practices. Crops grown solely by use of animal manures, composts, and such natural untreated products as ground limestone and rock are believed to be healthier, taste better, and have greater nutritive and life-giving properties.

It is generally accepted by these people that agricultural chemicals are poisonous and deleterious to health and should be avoided. In a broad sense,

adherents to this idea are commited to a system of organic or "biodynamic" gardening rather than the commonly recommended practices of modern mechanized argiculture, which includes the use of chemicals. There is much appeal to this concept and many young people (and old) have flocked to the practice and have accepted the whole picture without carefully analyzing some of the claims and accusations.

There is little question that the careless use of pesticides and injudicious additions of certain food preservatives can produce toxic effects in animals and humans. As examples, dieldrin, a pesticide, can cause death in fish, and excess amounts of sodium nitrate, a food additive, can be toxic to very young children.

But government agencies such as the Food and Drug Administration and others continually monitor food products shipped to markets. Allowable residues of chemicals, which are set by law at very low and nontoxic levels, are carefully checked and when there is any doubt about their safety they are withdrawn from sale. The record in this respect, considering the huge quantity and variety of foods reaching the consumer, is very good.

Certainly there must be continuing vigilance in seeing that chemicals used in the production, processing, and preserving of foods have no long- or short-term ill effects on the health of the consumer. However, there is little doubt these chemicals have been most useful in assuring and maintaining high-quality foods in this country.

I believe it important that organic gardeners and special natural-diet advocates distinguish between pesticides, food additives, chemical fertilizers, and organic matter. Their composition, method of application, reasons for usage, and fate in the environment are not the same.

In most instances, pesticides are synthetic chemical compounds not found naturally in the environment. They are used to kill or discourage insects, disease, and weeds. Food additives are normally simpler materials, many occur naturally and are used as preservatives, emulsifiers, coloring agents, and so on. Both

pesticides and additives are usually added directly to the plant, animal, or food and may or may not remain as residues on the product. They may or may not be toxic. The more intriguing story emerges when we compare organic materials with chemical fertilizers and analyze their role and place in the growth of plants and their effects upon the soil and food. When man discovered that he could use inorganic, mineral fertilizers to substitute and augment organic manures, he was merely imitating nature.

When organic matter breaks down in the soil, mineral fertilizer elements such as nitrates, phosphates, calcium, and others are released to the soil solution for subsequent uptake by plants. When chemical fertilizers are added to soils, the same elements are made soluble rather quickly and they, too, are then absorbed by plant roots. The plant does not and cannot distinguish, for example, nitrate from a compost pile from that coming from an inorganic chemical source. They are the same chemical and once in the plant enter into the life activity with no "memory" or special distinguishing attributes.

The plant plays the near-miraculous role of coordinating the processes of mineral uptake with photosynthesis to form its own organic matter. And it is precisely that organic matter, that is, food, which finds its way back to manure piles, compost heaps, or the supermarket to be reused again in the release of chemical mineral elements to the soil or directly to man. This is the greatest recycling operation of all. I see nothing magical, special, or healthier in foods grown only with organic fertilizers.

There are, however, a number of compelling reasons why we should use as much organic materials as we reasonably and economically can. Certainly, they should not be wasted. Many benefits are derived from manure and composts that cannot be duplicated by chemical fertilizers alone.

Manure and composts store and slowly release nutrients and minor elements to the soil solution; they affect the release of nutrients from inorganic fertilizer sources; they are a source of energy and nutrients for soil organisms;

they encourage good soil structure and water movement; they help conserve moisture; they assist the exchange of nutrients from soil colloids, such as clay, to soil solution for plant absorption; they increase carbon dioxide content of the soil; and some manures and composts have inherent growth regulating and antibiotic effects on living things.

On the other hand, there have been fears that continuous use of chemical fertilizers deteriorates the soil, is poisonous to plants and domestic animals, and may result in inferior, poor quality foods. These claims are not supported by careful experimentation and observation performed over the last century. Overwhelming evidence is to the contrary.

Perhaps we should look upon the use of fertilizers as a device created by man to assist nature. Remember that agriculture is for man's purpose and is in effect a diversion and disruption of the balance in nature. When one considers that the practice of agriculture has gone on for several thousand years, the record of the farmer as an environmentalist has not been too bad, relative to some other industries.

We should not forget that man and domestic animals are voracious users and converters of organic confounds into energy. In this sense, they may seriously interrupt the normal organic cycle. The loss of nutrients, for example, through city sewage and garbage disposal, can only partially be reclaimed and this only by the expenditure of great effort and resources, let alone commitment.

It makes very good sense to reuse as much of our waste products as possible. This is a problem that must be faced now. However, based on my experience, I do not believe that for the foreseeable future we can generate and reclaim enough organic residues to be delivered at the right places, at the right time, and in the right condition to feed even our present size and distribution of population.

Additions of chemical fertilizers complement in a very flexible and economical way the benefits derived from organic matter. Chemical fertilizers are a safe, logical way of building and maintaining our soils and agriculture.

***Comprehension*** — Read the following questions and statements. For each one, put an *x* in the box before the option that contains the most complete or accurate answer.

1. When integrated into the soil, organic matter releases

□ a. emulsifiers.

□ b. nitrates.

□ c. soil colloids.

□ d. pesticides.

2. Chemical fertilizers were introduced on the commercial market to

□ a. meet the needs of the times.

□ b. replace organic matter.

□ c. protect the health of the nation.

□ d. increase the nutritional value of food.

3. People who patronize health-food stores do so under the assumption that

□ a. organically grown food is unhealthy.

□ b. natural foods have life-giving properties.

□ c. health foods cost less.

□ d. chemically grown food is sanitary.

4. The author

□ a. laments the abuses of agriculture.

□ b. is preoccupied with public apathy.

□ c. is sympathetic to big business.

□ d. defends the use of chemical fertilizers.

5. Biodynamic farming

□ a. contributes to better health.

□ b. does not contaminate the soil.

□ c. offers many benefits.

□ d. none of the above.

6. People who condemn chemical fertilizers as dangerous are

□ a. scientists. .

□ b. alarmists.

□ c. activists.

□ d. spiritual saviors.

7. Chemical fertilizers are

□ a. safer than organic fertilizers.

□ b. less safe than pesticides.

□ c. as safe as food additives.

□ d. safer than either pesticides or additives.

8. This selection ends on a note of

□ a. regret.

□ b. reassurance.

□ c. irony.

□ d. condemnation.

9. Proponents of biodynamic farming are

□ a. naive.

□ b. sincere.

□ c. callous.

□ d. disingenuous.

10. The selection attempts to present

□ a. a biased argument.

□ b. an undocumented theory.

□ c. an alarming idea.

□ d. a balanced viewpoint.

## Natural Steam for Power

## Is natural steam a possible important source of energy for the future?

With increasing population and industrial expansion, domestic requirements for electric power have been doubling about every ten years. To meet these growing needs, government and industry are vigorously investigating and rapidly developing new sources of energy. Among the possible new sources, atomic energy probably has the largest potential, but geothermal energy — a previously little explored source — may prove to be most important in many areas.

For years man has viewed with awe the spectacular bursts of natural steam from volcanoes, geysers, and boiling springs. Although the use of hot springs for baths dates to ancient times, the use of natural steam for the manufacture of electric power did not begin until 1905. That year the first geothermal power station was built at Larderello, Italy. For the next several

decades, there were no other major developments in the field, and even now Italy leads the world in power production from natural steam. New Zealand began major exploration of hot spring and geyser areas in 1950, and successful results there proved that commercial steam can be developed from areas containing very hot water rather than steam at depth. Today, the United States, Japan, and the Russia are also producing power from geothermal sources, and Iceland uses hot water from geyser fields for space heating. Many other countries have geothermal energy potential, and several are now conducting exploration for sources to be developed.

In the United States, the first commercial geothermal power plant was built by the Pacific Gas and Electric Co., in 1960 at "The Geysers," California.

**Sites for Geothermal Exploration**

Most of the promising areas for geothermal power development are within belts of volcanic activity. A major belt called "the ring of fire" surrounds the Pacific Ocean. The "hot spots" favorable for geothermal energy are related to volcanic activity in the present and not-too-distant past. In the western United States, particularly along the Pacific Coast, widespread and intense volcanic activity has occurred during the past ten million years. The record of volcanism in our western states, therefore, holds promise for geothermal power development. Currently, exploration for power sites is focused in California, Nevada, Oregon, and New Mexico, with some interest being displayed in the whole region from the Rocky Mountains to the Pacific Ocean.

**Sources for Commercial Steam**

Volcanoes produce the most dramatic displays of natural steam. Water that comes into contact with molten lava (temperatures of 2,000 degrees Fahrenheit and higher) near the earth's surface can exist only as steam. Rapid expansion of steam and other gases below the surface causes some of nature's most violent and explosive eruptions. Almost all active volcanoes have fumaroles, or vents, that discharge steam and other hot gases. But, despite the large quantities of

steam discharged during active volcanism, the energy cannot be harnessed as a dependable source of power. In some areas the emission of steam cannot be controlled, and in other areas the costs of controlling the steam would exceed the value of the power obtained.

More promising sources for commercial steam are certain other subsurface hot spots or geothermal reservoirs that are generally found in areas of volcanism. These reservations contain larger and more dependable volumes of steam or hot water. Wells are drilled into the reservoirs to tap the naturally hot fluids that may drive power generators.

Most known geothermal reservoirs contain hot water, rather than steam. Water at depth and under high pressure remains liquid at temperatures far above 212 degrees Fahrenheit, the boiling point of water at sea level. When this water is tapped by drilled wells and rises to the surface, the pressure falls. As the pressure decreases, the water boils, perhaps violently, and the resulting steam is separated from the remaining liquid water. Because the well itself acts as a continuously erupting geyser, the expanding steam propels the liquid water to the surface and pumping costs are nil.

**Why Do Hot Spots Exist?**

Mineral exploration over the world has shown that temperatures in deep mines and oil wells usually rise with increasing depth below the surface. One popular explanation assumes that our planet has a fiery origin and that a shallow crustal layer encases a large molten core. Most geologists, however, now believe that our planet was not hot when it first formed. The weight of the evidence suggests instead that a natural radioactivity, present in small amounts in all rocks, has gradually heated the earth, and that heat is still being produced. Geophysical studies also indicate that the molten core is much smaller than was once supposed, and that it is not, in itself, a source of the heat in the earth's crust. The reasons for the existence and specific location of the earth's volcanic belts are still subjects of vigorous scientific study and controversy, but the

energy from natural radioactivity in rocks of the earth's crust and upper mantle is the fundamental cause of heat within the earth.

**Types of Geothermal Fields**

In a general way, geothermal fields are either hot spring systems or deep insulated reservoirs that have little leakage of heated fluids to the surface. Yellowstone National Park and Wairakei, New Zealand, are examples of large hot spring systems. Larderello in Italy and the Salton Sea area of California are examples of insulated reservoirs.

Hot springs have a plumbing system of interconnected channels within rocks. Water from rain or snow seeps underground. If the water reaches a local region of greater heat it expands and rises, being pushed onward by the pressure from new cold and heavy water that is just entering the system. The hot water is discharged as hot springs or geysers.

Deep reservoirs with little surface area have porous rocks (like those in a petroleum reservoir) capped by rocks such as clays and shales that prevent the free upward escape of water and heat. Larderello, Italy, and the Salton Sea area of California are examples of this type. Both reservoirs have feeble thermal springs coming to the surface, but there may be undiscovered areas that have no leakages.

**Hot Water and Dry Steam Systems**

Because of the pressures at great depths, water can be entirely liquid rather than steam deep in hot spring and insulated reservoir systems, even at very high temperatures. Steam forms in these systems if the hot water rises to levels where the pressure drops to the point where water can boil. This flashing of steam from liquid water is the major potential source of geothermal energy for commercial use because natural hot water systems are relatively abundant.

However, in a few explored systems the heat supply is so high and the rate of discharge of water is so low that steam forms deep in the system. Larderello in

Italy and "The Geysers" in California are examples of the less common reservoirs of dry natural steam.

**Characteristics Favorable for Geothermal Reservoirs**

The most favorable geologic factors for a geothermal reservoir of commercial value include:

1. A potent source of heat, such as a large chamber of molten magma. The chamber should be deep enough to insure adequate pressure and a slow rate of cooling, and yet not too deep for natural circulation of water and effective transfer of heat to the circulating water.

Magma chambers of this type are most likely to occur in regions of recent volcanism, such as the Rocky Mountain and Pacific states.

2. Large and porous reservoirs with channels connected to the heat source, near which water can circulate and then be stored in the reservoir. Even in areas of slight rainfall, enough water may percolate underground to sustain the reservoir.
3. Capping rocks of low permeability that inhibit the flow of water and heat to the surface. In very favorable circumstances, cap rocks are not essential for a commercial field. However, a deep and well-insulated reservoir is likely to have much more stored energy than an otherwise similar but shallow and uninsulated reservoir.

**The Potential of Geothermal Power**

It is too early to judge whether natural steam has the potential to satisfy an important part of the world's requirements for electric power, but in locally favorable areas it is already an attractive source for cheap power. Current exploration, based upon geologic and geophysical methods, is likely to develop presently undiscovered fields. The recent discovery of a new field at Monte Amiata, Italy—where there are only meager surface manifestations of abnormal geothermal energy—was based in part on the use of such methods. These are

now well enough developed to support exploration for wholly concealed reservoirs.

All natural geyser areas of the world are potential sites for commercial geothermal energy, yet it is to be remembered that development of these areas for the recovery of steam may destroy the geysers themselves. Although the need to develop new sources of energy may become urgent, still every effort must be made to protect these scenic wonders of nature.

***Comprehension***— Read the following questions and statements. For each one, put an *x* in the box before the option that contains the most complete or accurate answer.

1. According to the author, which of the following sources of energy seems to have the greatest potential?

□ a. atomic power.
□ b. natural steam.
□ c. natural gas.
□ d. oil shale.

2. The increasing demands for power are related to

□ a. decreasing world supplies.
□ b. people and their needs.
□ c. new scientific exploration.
□ d. wasteful use of energy.

3. The natural radioactivity in rocks

□ a. caused the earth's molten core to shrink.
□ b. was caused by the earth's molten core.
□ c. resulted in the gradual heating of the earth.
□ d. resulted in volcanic belts on the earth's surface.

4. Which of the following titles best expresses the main idea of the selection?

□ a. Population Explosion.

□ b. Natural Wonders.

□ c. Use and Abuse.

□ d. Search and Development.

5. As opposed to hot spring systems, deep insulated reservoirs

□ a. must be vented.

□ b. have less potential.

□ c. have less pressure.

□ d. must be drilled.

6. Active volcanoes are not dependable sources of power because their

□ a. life span is too short.

□ b. locations are inaccessible.

□ c activity is unpredictable.

□ d. use has never been considered.

7. Hot spring systems are

□ a. fed from the surface.

□ b. deep and tightly insulated.

□ c. rare and difficult to find.

□ d. relatively inexpensive to develop.

8. The tone of this article is

□ a. humorous.

□ b. hysterical.

□ c. factual.

□ d. fanciful.

9. In developing geothermal fields for commercial use, geologists appear

□ a. greedy.

□ b. creative.

□ c. reckless.

□ d. naïve.

10. The reference to a group of volcanoes as a "ring of fire" is an example of

□ a. a simile.

□ b. a metaphor.

□ c. an alliteration.

□ d. an allusion.

## If porpoises are intelligent, they will soon discover who their real enemies are.

Drifting in the warm shark-infested waters of the Indian Ocean on a Sunday in 1971, a cabin cruiser with a stalled engine was suddenly struck by a huge wave, overturned, and immediately sank. Three persons drowned as a result, but a determined 23-year-old Yvonne Vladislavich, with an open cut on her foot, began to swim toward the coast. A half dozen marauding sharks picked up the scent of blood and were soon trailing her. As the sharks began circling toward their prey, two porpoises suddenly appeared at her side. The sharks, knowing the speed and agility of their natural enemy, withdrew.

Miss Vladislavich, a strong swimmer, had a 25-mile distance ahead of her before reaching safety. Her strength began failing, but the porpoises helped her stay afloat. Eventually she reached a buoy, climbed on, and waited to be rescued.

Miss Vladislavich insists that she owes her life to the two porpoises—but their lives, unfortunately, may now be in the hands of man and his modern technology.

For centuries, porpoises have been recognized as man's closest aquatic friend. Briny tales have passed from sailor to sailor, telling how they guided lost boats through dense fog, or of rescuing drowning swimmers from dangerous waters. Even early Greek pottery often depicted a human riding on the back of a smiling porpoise.

One Greek myth suggests that some porpoises were once men. The story claims that Dionysus, the god of wine, was kidnapped and taken out to sea. When he realized his fate, the god made the boat's mast sprout grapevines. As the fearful and panic-stricken crew jumped overboard, Dionysus changed them into porpoises and forced the evil sailors to remain in the sea forever.

Evolutionary theory, based on studies done with fossil skeletons, slightly supports the ancient Greek tale—but only to the point that porpoises were once land-dwelling animals. Fifty million years ago, after adapting to life on land, the early ancestors of porpoises gave today's scientists a genuine mystery by returning to the sea. Although the real reason remains unknown, practicality appears to be the only explanation because, at that time, a greater portion of the earth's surface was covered with water.

During the long process of readapting to sea life, porpoises exchanged legs for flippers and grew streamlined, averaging in length between 5 to 12 feet. However, finger bones can still be found in their flippers and they must breathe air through lungs while surfacing. Unlike man, porpoises breathe consciously every six minutes by inhaling two gallons of air within a half-second.

A porpoise's brain is 20 to 40 percent larger than that of man. With that in mind, some scientists believe that in addition to peforming desultory tricks, porpoises probably have the basic capabilities of learning language.

In water, a porpoise communicates by producing sounds originating from air passages in its head. The waterborne sounds move at a speed four times faster than the airborne sounds man is accustomed to. When two porpoises are together, they will exchange a long series of sounds that vary in frequency and length. One remains courteously silent while the other is "talking."

When in the presence of human beings, porpoises politely revert to using mostly airborne sounds that resemble clicks and whistles containing elements of human speech. In fact, porpoises produce humanoid sounds when they hear human speech and come in close contact with people. Aristotle, in 300 B.C., insisted that "the voice of the porpoise in air is like that of a human; that he pronounces vowels and combinations of vowels." A porpoise's initiative deserves praise, considering that few, if any, humans have ever attempted to place their heads in water and attempt waterborne communication.

Some scientists have experimented with creating an interspecies language. An average of 1,000 vocalized syllables, arranged in chains of one to ten sounds, were given to several porpoises. Each animal was rewarded if it correctly repeated the exact series. One porpoise mimicked the vocalizations with few mistakes in either pronunciation or in timing. A human being's memory span limits most people to remembering and repeating chains containing only seven consecutive sounds.

Although concerned scientists seriously study porpoises, other people seriously study profit and have exploited the porpoise's intelligence for both commercial and military use.

The United States Navy, for example, has been attempting to train porpoises to locate underwater objects, such as sunken ships, submarines, or torpedoes by following acoustic signals reflected by the objects. The Navy also

trains porpoises to attack sharks that threaten personnel engaged in underwater salvage or rescue work. A porpoise's hard bony snout and high speed acts as an effective battering ram that has earned the respect of sharks.

Commercial enterprises have also exploited the talents of the porpoise. There are more than a dozen aquariums, marinelands, or oceanariums from Florida to California that buy porpoises, then make them earn their keep by jumping through fiery hoops, dancing, raising flags, and playing basketball. In Hawaii, a pair of trainers, who noted that Christmas was only a few weeks away, wanted a porpoise to pull a brightly colored sled mounted on styrofoam runners. Whatever the gimmick, porpoises are successfully used to entice curious tourists to part with millions of dollars each year.

Hollywood and television have also made their bid for a piece of the action. One bottlenose porpoise was trained to play a leading role in a movie entitled "Flipper." The film was later stretched out into a weekly TV series with the same name, using several porpoises for the starring role.

Porpoises have become a box office draw, and Florida supplies the demand. About 190 are captured each year from Florida waters and used to supply 80 percent of the American oceanariums and all of Europe's. A freshly captured porpoise brings between $400 and $800. A 12-foot adult weighing over 700 pounds might add shipping and handling charges of about $1,700. Regulations make it illegal to capture any porpoise less than six feet.

Fortunately, concerned conservationists recently aimed their attention on limiting the number of captures. Recently, one marine organization netted ten porpoises off the coasts of Naples and Marco Islands in Florida to be sold to exhibits. Though a permit had been issued by the Florida Department of Natural Resources allowing the organization to capture 22, several protests were made by local residents.

The group insisted that 22 porpoises was a significant number when caught in a limited area. The protests were brought to the attention of the

county commissioner who called the captures "crass commercialism." He has been attempting to set a trend in the right direction by asking for an ordinance forbidding the transporting of porpoises "in any manner" from his county.

The Japanese have usually been portrayed as the major killers of porpoises because they use them for food. Between 11,000 and 16,000 are caught for this purpose each year, according to the Japanese government fishing agency. A porpoise is individually valued at about $20 in Japan with variations in price depending upon the annual catch.

Despite international complaints about using porpoises as a food source, the Japanese continue their fishing and defend themselves by pointing an accusing finger at the American tuna industry.

United States tuna fishermen operating out of the West Coast catch up to 45,000 tons of tuna each year. However, because tuna are often inseparable traveling companions with porpoises in Pacific waters, and both feed on similar small fish, porpoises are inadvertently netted, too. In the process, as many as 250,000 porpoises are consciously killed in a year, in addition to those killed by the French, Spanish, and Scandinavian fishing industries.

In 1971 a Congressional subcommittee conducted hearings on proposed legislation designed to stop the useless slaughter of aquatic mammals. Environmentalists insisted that one porpoise death might be too many because so little is known about the size and composition of the porpoise population, or whether those accidental deaths threaten the existence of the species.

As a compromise between environmentalists and commercial fishermen, California representatives introduced a bill that would allow the killing of ocean mammals "if the harrassment, hunting, capturing, or killing is incidental to commercial fishing operations."

The 1972 Federal Marine Mammal Protection Act, in addition to forbidding the United States fishermen from deliberately killing porpoises, also

demands that no marine mammal may be taken or imported by any United States citizen or organization or by any person in United States waters.

The law is of little comfort to the porpoise because it provides the United States tuna industry with a loophole that still allows them to kill porpoises "accidentally" or "incidentally," and, in addition, keeps fishermen from reverting back to their older method of pole and line fishing that was effectively used in the early '60s.

The plight of porpoises proves once again that technology in the hands of man becomes a tool used for conquering nature, instead of helping man live with it. As a result, another species becomes threatened with needless extinction because of man's bottomless greed and perverted sense of entertainment. If a porpoise's intelligence is what it is reputed to be, then they will soon discover who their real enemies are. And what will happen then?

***Comprehension***— Read the following questions and statements. For each one, put an *x* in the box before the option that contains the most complete or accurate answer.

1. Compared to the human brain, the porpoise's brain is

□ a. larger.

□ b. smaller.

□ c. superior.

□ d. equal.

2. The origin of the porpoise is

□ a. explained by the theory of evolution.

□ b. lost in a cloak of mystery.

□ c. explained by Greek mythology.

□ d. strange beyond belief

3. Fishermen captured tuna with pole and line fishing

□ a. before they switched to nets.

□ b. until the Federal Marine Mammal Protection Act was signed.

□ c. after the Federal Marine Mammal Protection Act was signed.

□ d. during the 1971 Congressional subcommittee hearings.

4. The present plight of the world's porpoise population results from

□ a. Japanese fishing techniques.

□ b. public indifference.

□ c. the Hollywood film industry.

□ d. human greed.

5. Based on the information supplied in the selection, the greatest threat to the porpoise comes from the

□ a. fishing industry.

□ b. entertainment world.

□ c. military establishment.

□ d. scientific community.

6. Given the long history of the porpoise's helpfulness to man, man's current treatment of the porpoise

□ a. is a natural outcome.

□ b. repays old debts.

□ c. is dishonorable.

□ d. is expected.

7. Sharks have a highly developed sense of

□ a. sight.

□ b. hearing.

□ c. taste.

□ d. smell.

8. The attitude of the author toward the commercial exploitation of porpoises is

□ a. understanding.

□ b. critical.

□ c. impartial.

□ d. financial.

9. After her ordeal at sea, Yvonne Vladislavich became

□ a. hostile toward porpoises.

□ b. grateful toward porpoises.

□ c. suspicious of porpoises.

□ d. frightened by porpoises.

10. The final two sentences

□ a. provide a lighthearted ending to the selection.

□ b. suggest a solution to the plight of the porpoises.

□ c. serve as a warning to humans.

□ d. are designed to shock the reader

**ВЕРА ВЛАДИМИРОВНА ДЕНИСОВА**

**НАТАЛЬЯ ПЕТРОВНА КУДРЯВЦЕВА**

# ЭКОЛОГИЯ

## Учебное пособие

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