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A Latest American English

主编 [illegible]

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ENGLISH

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A Latest American English

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编者的话

目前，书店里英文书籍琳琅满目，各种应考复习，出国指南或教材辅导之类俯拾即是。但能集多学科信息为一体的、篇幅适中的中高级阅读材料却屈指可数。

为了丰富广大读者的阅读天地，满足大学生、研究生、TOEFL、GRE、GMAT、WSK 应考生及英语爱好者的需要，根据知识新、主题热、语言美、趣味性强的原则，我们从英语教学实践中所积累的大量材料中精选并编写了这本《最新美国英语阅读范文》。本书内容涉及到天文、地理、生态、动植物、医学、计算机、激光、现代科学技术等领域。这些读物语言清新、扣人心弦、结构严谨、趣味盎然、难易适中、可读性很强。每篇文章后均包括难点注释、分类词汇和常用短语及参考译文，本书为中高级英语阅读读物，适用广大英语爱好者、大学生、研究生、教师、科研人员，可以使 TOEFL、GRE、GMAT、WSK、大学四、六级考生在优美地道的美国英语中遨游，涉猎到当代最新的科学发展信息。

本书每个单元编译结构如下：

1.英语原文(正文)；

2.注释(扼要介绍背景知识、专有名词、语言难点、写作常用句型等)；

3. 分类词汇（按照语意及相互关系将众多专业术语合并归类，该部分相当于专题小百科，方便读者学习，记忆）；

4. 有用的短语和习语；

5. 参考译文。

本书请杨茂宗教授审订。

由于作者水平有限，时间紧迫，疏漏之处在所难免，恳请专家和读者不吝赐教。

编者

1998 年 7 月 1 日

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ECOLOGY

The word *ecology* was coined in the late 1860s. It is derived from two ancient Greek words meaning "study of the home." The science of ecology is the study of the relationships among plants, animals, and their home, or environment. Ecologists use information from many branches of science: biology, chemistry, the earth sciences, and so on. They must deal with all this information because the life of every plant and animal depends upon the complex interaction of its internal environment – its physiology – and its external environment – its habitat.

LIFE AND ENVIRONMENT: A DYNAMIC SYSTEM

The whole earth is an *ecosystem*, a system of give-and-take among plants, animals, and their surroundings. As in any system, whatever happens to one part of an ecosystem affects its other parts. Materials are cycled from soil, water, and air through the plants and animals and then back to the soil, water, and air.

The energy that operates the ecosystem originates in the sun. This solar energy is trapped by green plants in the food they manufacture during the process of photosynthesis. The energy is needed to hold atoms together in the compounds we call food. As the food is used by the plants, by animals that eat the plants, and by animals that eat other animals, energy is released and used. By the time the carbon and other elements found in food are cycled through the plants and animals and back into the soil, water, and air, all of the energy has been dissipated.

Thus the sun's energy is not the only essential to life. Green plants are also essential to our planet's ecosystem. They make the food and trap the energy that operates the entire system.

FOOD IN THE ECOSYSTEM

The paths of food materials through the ecosystem are many and complex. A *food chain* describes how one morsel of food might "travel" through the system. A typical food chain begins with a one-celled green alga that manufactures food. The alga is eaten by a tadpole. The tadpole in turn is eaten by a fish, which later may be devoured by a water snake. A hawk may then swallow the snake. Indirectly, then, the hawk has eaten the green alga.

How much food and energy pass along a food chain? How many kilograms of grass are needed to produce one kilogram of grasshoppers? How many kilograms of grasshoppers are consumed to form one kilogram of robins? Ecologists use the term *food pyramid* to describe the quantities of materials that pass from one kind of eater to another.

The word "pyramid" is used because the amount of energy asociated with the food material becomes smaller at every link, or upward step. More than one kilogram of grass is needed to create one kilogram of grasshoppers. More than one kilogram of grasshoppers goes into making one kilogram of robin flesh. The net losses in weight are due to the fact that part of the material is converted into energy to power the transformations of grass into grasshoppers and grasshoppers into robins.

LINKS IN THE CHAIN

When discussing food relationships in the ecosystem, scientists find it easiest to use words that indicate the roles animals play in the food chain. A *herbivore* is an animal that eats plants. *Carnivores* eat animals – both herbivores and other kinds. *Omnivores* eat a variety of both plant and animal foods. *Saprophytes* and *decomposers* eat the leftovers, plant and animal, of what other animals have largely devoured. *Parasites* live on and in the bodies of living plants and animals.

There is a similar situation among plants. Green plants make their own food through photosynthesis. They are the *producers* of food for all life, including themselves. Other plants, such as bacteria and fungi, are not green and cannot carry on photosynthesis. They therefore depend on green plants and, in many cases, animals for their food. Bacteria and fungi may live as parasites on plants and animals. Other bacteria and fungi thrive on the waste products or dead bodies of organisms. They decompose the wastes and dead bodies and return the materials to the soil, water, and air.

PARTS OF THE ECOSYSTEM

As you can see, an ecosystem is very complex. To study such a system, we must examine its parts and learn how these parts relate to the whole. First, we study an individual organism. Second, we examine a *population*. This comprises all the individuals of a species found in a given area. Then we study all the populations in a given area. These make up a *biotic community*.

If the area is very large and has certain general environmental characteristics, it is called a *biome*. A biome contains many communities. There are forest biomes, grassland biomes, desert biomes, and so on. The characteristics that distinguish one biome from others include its temperature, rainfall, type of soil, and amount of available light.

The term ecosystem is sometimes used as a synonym for biome or for biotic community. Or it may be used to refer to all living things and their environment. All these terms include descriptions of the cycling of materials, the food webs, and the flow of energy. But when ecologists talk about biomes or communities, they describe the habitats and the kind of organisms living in them, as well as the feeding habits of the community's animals. When ecologists investigate ecosystems, they concentrate on the materials and energy that flow through the system. This is a more schematic, abstract manner of describing the relationships between organisms and their environment.

The part of the earth in which life is found is called the *biosphere*. This consists of the outer shell of the earth: the upper part of the crust, bodies of water, and the atmosphere. Birds fly through the air; worms burrow into the ground; microorganisms are found in clouds kilometers above the earth and in waters kilometers underneath the ocean's surface. Not only is the biosphere the part of the earth where life is found, it is also the part where solar energy is used to bring about photosynthesis and other chemical and physical changes-changes that are primarily caused by the organisms in the earth's ecosystem.

ECOLOGY OF INDIVIDUALS

A plant or animal lives where it does because that place provides it with at least the minimum requirements for life. These requirements include sufficient space, water, food, and air, and a tolerable range of temperatures. This living place is the organism's *habitat* – its external environment. The most favorable habitat is the one best suited to the organism's structural and physiological needs – its internal enviroment.

Ecologists try to analyze the organism's internal and external environments to learn how they interact. Most frogs, for example, live in wet places. Their thin skin does not protect them from drying out. Therefore, only frogs that stay in wet or damp places survive.

The frog's method of reproduction also limits it to the vicinity of water. Fertilization of the eggs is external. The male frog embraces the female while she emits several hundred eggs in a jellylike mass. The male then emits swimming sperm that penetrate the mass and enter the eggs. Since the sperm must swim to the eggs, fertilization would be impossible on dry land. Because the fertilized eggs have no protection against water loss, the embryos can only develop if they are in water. After hatching, the immature frogs, or tadpoles, are gillbreathers. They must stay in water until they become adult frogs with lungs.

Plants also respond to environmental conditions. A bean seedling will grow toward a source of light. When the growing tip of a morning-glory vine touches a stake or taut cord, the stem begins to twine around it. If a seed or spore lands in a spot where few or none of the conditions are suitable for its existence, it will not sprout.

Plants and animals react negatively to conditions that may cause death and positively to those favoring life. If an environment changes drastically, the plants usually die. Many animals, on the other hand, can move to more-favorable habitats. Now, however, man is changing so much of the environment that many kinds of animals can no longer find suitable places to live or breed. Some of these are thus threatened with extinction.

ECOLOGY OF POPULATIONS

All the organisms of a species living in a given area constitute a *population*. Thus the total number of populations equals the number of different species of plants and animals there.

How large can a population grow? What determines how many squirrels, robins, or maple trees can live in the park? Habitat is probably the most important determinant of the size of a wild population. Food supply, predators, space, disease, and environmental factors such as water, soil, and climate are all part of the habitat.

Ecologists use the term *carrying capacity*[1] when they discuss the number of animals a habitat can support. Carrying capacity depends not only on food supply, but also on the number of places to live.

Even when the physical environment is favorable and when food is abundant, most animal populations do not keep on growing without limit. There seems to be a maximum population density for each species. If left undisturbed[2] a population will become stable and will not show large increases or decreases in numbers.

ECOLOGY AND SOCIAL BEHAVIOR

One of the most important factors that regulate animal population size is their behavior. Most species of birds and mammals, as well as some lower animals, exhibit some kind of social behavior. That is, they react to the presence of members of their own species. Scientists who specialize in the study of the behavior of wild animals are called *ethologists*.

Let's consider an interesting example of animal behavior. In spring, during the breeding season, birds often become fiercely territorial. Each bird establishes a living space for himself which he defends vigorously. A male robin, for example, arrives in a park in early spring. Soon he begins to sing from two or three perches – always the same two or three perches. As other male robins arrive, the first male's singing keeps them out of the territory he is defending. If his persistent singing does not keep them out, he flies toward the trespassers, threatens them, and sometimes fights them off.

When a female robin arrives, she selects a mate and his territory. Thus the number of robins living in the park will depend upon the number of territories it can support. The size of a territory varies with the species as well as with the habitat. Usually a pair of birds defends an area large enough to provide food for a brood of young.

In most cases a male animal defends his territory against members of his own species but is tolerant of some other species. A pair of chipping sparrows may nest in a bush next to a robin's tree, but there are never two robin nests in the same small area.

Are there male robins "left over" after all available territories in an area are occupied by other robins? Yes, there are. These robins are called bachelors. They live outside the boundaries of the territories of mated pairs. If a mated male robin dies, his female partner can soon find another mate from among the bachelors.

ECOLOGY OF COMMUNITIES

A biotic *community* consists of many populations living in one habitat. Some of these plant and animal populations depend on each other. Others are there only because they tolerate the same environment.

Communities are named after some dominant enviromental or biological feature. Thus we speak of a cattail marsh, a cypress marsh, a beech and maple forest, a tropical rain forest, an Arctic tundra, and a desert.

Food relationships in a community are the easiest relationships to observe and understand. All plants and animals use food. Even the green plants that manufacture all the world's food consume some of it as they grow and use energy. If we observe a pond community, we ,will notice that snails, mayfly nymphs, small crustaceans, and some kinds of fish feed on the water plants. Other aquatic insects, crustaceans, and fish prey on the herbivores and on each other. The crayfish, for example, will eat any animal it can catch. Scavengers, such as the water sow bug, eat the dead organic material.

Each plant and animal plays a definite role in food chains and webs in the pond. We call this role, or function, an *ecological niche*[3]. The water sow bug, for example, fills the ecological niche of scavenging. Water plants fill the niche of food production.

HEALTH AND STABILITY

Freshwater biologists have learned to determine the health of water environments by the kinds of plants and animals they find. If they find huge populations of only a few varieties of life, ecologists suspect pollution.

Lakes and rivers that are heavily polluted with organic material, such as the outflow from sewers, sewage-treatment plants, and paper mills, are liable to contain less dissolved oxygen than does nonpolluted water. These waters will support only a few species of tolerant organisms. Sometimes the pollution is so great that not even the most tolerant species can survive. Then the lake or river is said to be dead.

Healthy communities are basically stable. They support many kinds of green plants, many kinds of herbivores, and many kinds of carnivores. Thus there are many paths for the cycling of materials and the flow of energy. If one species of plant disappears, there are other green plants still manufacturing food. If one species of herbivore dies out, there are other herbivores still eating plants. Likewise if a species of carnivore is removed, there are others remaining to continue the cycling of materials and energy through the community.

The community that has only a few kinds of living things is less stable. If one or two species die out, there may not be alternative paths for the flow of materials and energy. If the environment changes suddenly, the whole community may die.

Life, however, is not static, even in the most stable communities. Natural changes occur continuously. Individual organisms are born; they grow, change, and eventually die. Communities also develop and change. Members of a community, by their very activities, tend to change the environment. After a period of time they often make the habitat unfit for themselves. The organisms then die out or migrate elsewhere. But they have made the environment fit for other kinds of plants and animals. A different kind of community develops in place of the old one. This kind of gradual, but continuous, change is called *community succession*, or, in a broader sense, *ecological succession*.

ECOLOGICAL SUCCESSION

A good example of succession may be observed by watching an abandoned farm over a period of many years. During the first few seasons after abandonment, the fields produce only grasses and perennials such as goldenrod and Queen Anne's lace. In another few years briers begin to grow and it is difficult for a person to walk through the fields. Rabbits and other small animals that were chased out by the plow now return. Soon seedlings of so-called "pioneer" trees appear: aspen, thorn apple, and wild cherry.

As these trees grow, the briers and some of the grasses and perennials die out. They cannot survive in the shade of the trees.