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The Web of Life

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出 版 说 明

《大学生英语文库》是一套由上海外语教育出版社奉献给全国大学生及英语爱好者的英语课外读物。该文库是一个开放的系列，内容涉及西方的科技、艺术、历史、文化等诸多方面，通过阅读，读者不仅可以增加有关西方历史、文化、艺术、科技等方面的知识，更能学到大量各类英语词汇。

该系列中每本书均出自原文，英语纯正，内容丰富，深入浅出，经过详细的注释，有助于读者把握原文的精髓。

相信在21世纪，这套经过精心策划的英语文库必将成为我国大学生及广大英语爱好者书架中亮丽的点缀，成为他们英语学习的得力助手。

二〇〇〇年一月

foreword: why this book?

This book is written for everyone interested in the wise use of our soil and water, our forests and wildlife, and for everyone who would learn what has largely been forgotten in our machine age — how all living things fit together into a single pattern.

The book undertakes to separate certain significant threads[1] from a mass of facts and forces that go into the making of life's physical environment, and to crystallize[2] them into a clear and comprehensive picture — a picture intended to show a natural community in action; how it grows, builds its own environment, and changes it until the plants and animals that started it can no longer live there and must give way to others better adapted to live in the newly created surroundings. We see the orderly progression of such changes until at last a condition of balance, or "climax," is reached.

We see the roots, insects, soil bacteria[3], and worms building fertility into the soil, and the shrews[4] and moles[5] that

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[1] thread *n*. 思路,线索。

[2] crystallize *v*. 使明确,使突出。

[3] bacteria *n*. (*pl*.) 细菌。

[4] shrew *n*. 地鼠。

[5] mole *n*. 鼹鼠。

hunt these smaller creatures, "plowing" and aerating the soil, turning it into an absorbent sponge. ...

A snowflake falls on the branch of a spruce[1] tree on a mountainside. Part of it evaporates[2], part flows down to the roots and helps to support the forest that builds and protects the soil. The rest seeps down the hillside through a prepared and porous[3] soil, forming with millions of its fellows a slowly moving reservoir that maintains the flow of brooks and rivers throughout the year.

Human communities in the valleys compete for this water, some of them even tunneling through mountains to divert its course over a radius of a thousand miles, until at length the growth of communities is stopped by the limits of the available water supply. The best use of that water and of the watershed[4] that controls it has become a matter of life and death to those communities. The use and pollution, the cleansing and re-use of the water, in an effort to extend its usefulness, become matters of vital moment, demanding close cooperation between the people dependent on it. ...

Or consider the case of a great spruce forest which, through a catastrophic windstorm, lost the protection of its woodpeckers[5]. With this protection gone, the forest is killed by bark beetles[6], normally rather innocuous members of the community. The tinder-dry, dead forest then becomes a prey to fire, which destroys it and, along with it, the watershed. Resulting floods and droughts damage soil, ruin farms, and inundate[7] cities a thousand miles away ....

Human intelligence, which has learned how to build, to outgrow, and to destroy its environment, raises additional questions.

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〔1〕 spruce *n*. 云杉。

〔2〕 evaporate *v*. 使蒸发。

〔3〕 porous *adj*. 多孔的,可渗透的。

〔4〕 watershed *n*. 水域。

〔5〕 woodpecker *n*. 啄木鸟。

〔6〕 bark beetle 树皮甲虫。

〔7〕 inundate *v*. 淹没。

Take for example, a case in southern Arizona, where a small green pasture[1] of rich native grasses is surrounded by an endless desert of sand and cactus[2]. This whole desert was once an empire of grass as lush as the green pasture; but it was overgrazed[3] and destroyed by cattlemen, who robbed and ruined land that might have supported generations of their descendants.

The small green pasture was properly grazed. It was protected by a strand of wire and, with the addition of improved grasses, is today more productive than ever. That single strand of wire had fenced out the cactus, the sand, and the eroding gullies[4], because it controlled the surplus cattle that prepared the way for them. It was put there by a man with understanding, who knew how to use his land and to maintain its productivity.

In conclusion, we may well ask whether man will develop understanding before he destroys himself by destroying his environment. The way would seem to lie in the building of an informed[5] public interest in certain fundamentals.

I believe this book to be the first of its kind in this field, and of immediate interest to every intelligent citizen.

Winter Park, Florida JOHN H. STORER

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〔1〕 pasture *n*. 草原,牧场。

〔2〕 cactus *n*. 仙人掌。

〔3〕 overgraze *v*. 过度放牧。

〔4〕 erode *v*. 受腐蚀,逐渐销蚀;gully *n*. 隘谷,溪谷。

〔5〕 informed *adj*. 有知识的、有学问的。

CONTENTS

1

the stream of life

We once stood on a hillside in Wyoming and looked across the broad expanse of a lake backed by a rugged range of mountains. Their peaks stood silhouetted[1] black against the late afternoon sun, and under its rays the lake glowed like a sea of liquid fire.

Suddenly, out from the shadow of the distant peaks a tiny black speck moved into the light on the lake's surface. As it moved toward us a trail streamed out behind it, and at last the shape grew into a speeding motor boat with the long lines of its wake sweeping out on either side, dark ribbons on the glowing water.

Finally, as it neared our side of the lake, the motor boat circled twice in wide sweeps and then disappeared behind a headland. On the lake behind it the lines of these circling wakes came together in interweaving patterns. In some places they collided to efface each other. In others they reinforced one another, finally rolling off in long curves to the distant shores.

These rolling waves were set in motion by the energy of the

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〔1〕 silhouetted *v.* 衬托出……轮廓。

moving boat, that displaced the water in its passing. Each wave carried within itself a portion of that energy, finally expending it as it rolled a pebble[1] on the shore, or rocked the roots of a floating derelict[2] tree, or perhaps washed out the final handful of dirt from the undermined[3] roots of a tree that would topple[4] into the water to join the other derelict. Thus, the energy of the motor boat had its impact on the land far beyond the vision of the man who set it moving. Just so, the forces set in motion by every act of man or bird, animal, insect, or bacterium move out to affect the lives of many other creatures.

The principles which govern all these interrelationships are called the principles of ecology — the science which deals with the mutual relations between living organisms and their environment. The subject of ecology is so vast and complex that no human mind has ever fathomed[5] all its secrets. Many of them can probably never be unraveled[6], but the basic principles of ecology are known, and on the functioning of these known principles depends the future of all human lives.

Life is such a very personal thing, wrapped up within the being of every living creature, that it is sometimes hard to realize how intimately each life is connected with a great many other lives.

Life is a flowing stream, forever passing away and as constantly being renewed. The energy that brings us life is supplied from many different sources, most of them beyond our vision of experience.

The bread that comes from the grocery shelf brings minerals and vitamins prepared by wheat plants in the soil of Kansas. Vege-

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〔1〕 pebble *n*. 鹅卵石。
〔2〕 derelict *adj*. 废弃的。
〔3〕 undermined *adj*. 遭到破坏的。
〔4〕 topple *v*. 坍倒。
〔5〕 fathomed *v*. 探索。
〔6〕 unraveled *v*. 揭穿。

tables bring their special contributions from the farms of Texas or California. Meat was built by cattle, out of grass that drew its special qualities from the soil of the western plains. It required five thousand pounds of water to produce the grass that went into the making of each single pound of meat. To store this water and supply it to the grass as needed through summer droughts, the soil had first to be prepared by many generations of earlier plants and animals.

Bread, vegetables, and meat are merely vehicles for transferring to us the special properties of soil, air, and sunlight gathered and organized by the plants. With some minor variations all these living things are composed of the same elements, and in roughly the same proportions. But each differs in its methods of obtaining and using them. Plants and animals vary greatly in the amounts of light, heat, and moisture they must have for their development and in the kinds of soil on which they thrive[1] best. Each is adapted to its own special environment.

In our modern civilization we find the stream of our own lives flowing from many different sources, each adapted to make its own particular contribution. Why should the citizen of New York or Pennsylvania want to draw on the soils of Texas or Kansas, Wyoming, or other far-off[2] places for the minerals and vitamins that go into the building of his life? The answer is that these soils are more richly supplied with the necessary elements. Some of them did not originally exist in these spots but were transported and placed there by a number of different agencies.

The story of their coming, to make possible our own stream of life, lies deep in the past history of the earth.

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[1] thrive *v*. 茁壮成长。

[2] far-off *adj*. 遥远的。

2

what the rocks contribute

There is very much that we do not know about the earth's early history, and our knowledge of its interior today is far from definite. But there is good evidence that the surface of the globe was at one time a mass of molten[1] material. Within this molten mass the heavier elements such as iron and nickel[2] sank deep below the surface, the lighter elements floating over them.

Slowly this liquid mass cooled, and as it did the elements that composed it tended to draw together, each to its own kind, to form crystals[3] — silica[4] forming quartz, crystals, for example — or they gathered into groups to form more complex minerals, such as mica or hornblende[5].

Over most of the earth's original crust, this grouping of crys-

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〔1〕 molten *adj*. 熔融的。

〔2〕 nickel *n*. [化]镍(元素符号 Ni)。

〔3〕 crystal *n*. 晶体。

〔4〕 silica *n*. 硅石。

〔5〕 mica *n*. 云母;hornblende *n*. 角闪石。

tals took the form of granite[1]. Granite ordinarily carries few of the elements needed for life — potassium[2] being one of the few — and is a poor environment for a plant. But this thin crust of granite lay over an uneasy foundation of molten rock. As the hot mass cooled and contracted, great ridges were forced up to form mountains, and in some places huge cracks were opened through which the molten rock from below flowed up to spread in sheets of lava[3] over the lighter outer layers of rock. Smaller cracks were filled with molten material to form veins[4] in the rock. In some cases, vaporized metals from below were cooled and solidified in these veins, and boiling water, carrying elements in solution, welled up[5] from the inner earth, to deposit them in the cracks.

Thus, some parts of the earth's surface became rich with concentrations of rare minerals that were gifts from the deep interior of the earth. In many parts of the world, where hot springs may be seen boiling to the surface, this process is still going on.

These concentrations of minerals, if left undisturbed, would not have supplied a very wide area with the essentials of life. But the forces of nature are constantly at work to break up the rocks and spread them over the earth's surface. Air, water, and sunlight all do their part. Air supplies carbon dioxide. Falling rain absorbs this gas from the air to form carbonic acid[6]. Through the years this acid slowly dissolves the more soluble minerals from the rocks, leaving crevices where water may enter. The sun warms the exposed faces of the rock, causing them to expand and crack, making room for more water. When water freezes it expands, so in cold weather the cracks are widened, sometimes breaking up huge

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〔1〕 granite *n*. 花岗岩。

〔2〕 potassium *n*. [化]钾(元素符号 K)。

〔3〕 lava *n*. 熔岩。

〔4〕 vein *n*. 矿脉,岩脉。

〔5〕 well up 涌出,涌现。

〔6〕 carbonic acid 碳酸。

blocks of rock. Thus the rock begins to disintegrate as soon as it is exposed to the weather until, at last, it is reduced to the small particles that go into the making of soil. Much of this soil material lies in place, where it is born. But a good share is scattered far and wide by other forces of nature.

Wind and flowing water sweep rock fragments from the ridges, drive them against other exposed rocks, grind them to smaller pieces, and sometimes carry them for many miles to drop them at last as sediment in distant valleys or in lake or ocean beds.

Now the water may change from destroyer to builder. As it carries the dissolved minerals in solution, it may deposit some of them among these sediments, thus cementing them into rock again.

Microscopic[1] living organisms absorb minerals from these liquid solutions, too, and turn them to solids within their substance. Through the ages their remains have settled on the bottom to form vast deposits of limestone[2] and phosphates[3].

Later on, through movements of the earth's crust, some of these deposits have been lifted high above the water. Many of our western mountains are capped by rocks holding fossils of shells that were made of lime taken from the water of an ancient sea. These rocks are now attacked in their turn by sun and frost and rain, finally to be scattered over the earth by wind and water. In past ages enormous quantities of rock haye been ground[4] to dust by the ice of moving glaciers[5] and carried many miles before being added to the material of the soil.

It is estimated that there is scarcely a square mile of the earth's surface that does not contain some ingredient from every

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〔1〕 microscopic *adj*. 非用显微镜不可见的，微小的。

〔2〕 limestone *n*. 石灰石。

〔3〕 phosphate *n*. 磷酸盐。

〔4〕 ground *grind*（*v*. 磨碎）的过去分词。

〔5〕 glacier *n*. 冰川。

other mile, because of the action of wind and water. But, despite all this stirring and mixing, the soil usually draws most of its mineral content from the underlying parent rock that produced it. Where this rock is rich in important minerals, as in the case of limestone, the soil can usually provide a rich environment for life. But over rocks like granite or quartzite[1], which offer little mineral food, the life above is apt to find a much less nourishing environment.

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〔1〕 quartzite *n*. 石英岩,硅岩。

3

how the land gets its water

The upheavals[1] and varied contours[2] on the earth's surface spread out their influence to affect our lives in many ways. They are among the important factors in nature's water transportation system that makes life possible on the land.

Among its many useful qualities, water has one that is especially valuable to life. When it is warmed above a certain temperature, it turns to vapor and can be carried by the wind. Warm air will absorb a lot of water vapor. When the air is cooled, some of this vapor turns back to fine[3] drops of water in the form of clouds and under certain conditions precipitates[4] as rain.

The temperature of the air is constantly changing from day to night and with the seasons. While the sun's rays pass through the air without raising its temperature, they warm the surface of the

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〔1〕 upheaval *n*. 隆起。

〔2〕 contour *n*. 等高线。

〔3〕 fine *adj*. 颗粒微小的。

〔4〕 precipitate *v*. 沉降。