



Ecology 生态学

Eugene P. Odum (美) 著



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序 言

英语学习，除了在课堂内下工夫外，课外的阅读也很重要。课外除了读文学类的文章，也要读一些非文学类的文章。这套“小书”就是非文学类的文章，涉及文学以外的许多领域和学科。每本书都由一两个相关的主题构成，图文并茂，融知识性和可读性于一体。这些“小书”谈到的很多东西都和我们的日常生活息息相关；更重要的是“小书”体现了人类要与自然和谐发展的思想，这与我们社会和时代的发展是吻合的。读一些这方面的书不仅有利于学生提高英语水平，拓宽自己的视野，也符合当今大学生要全面发展的要求。在“复合型”人才越来越受重视的今天，我很乐意向大学生朋友推荐这套“小书”。


(郑树棠)

《新视野大学英语》总主编
首届“国家级教学名师奖”获得者

Introduction

The science of ecology understands the world as a household of related members. This expanding and diversifying branch of science goes far beyond its origins in biology. The ecological sciences of the future will encompass the study of energy exchange, material cycles, patterns of organization, ecological succession, food webs, and biodiversity, among other interests. New concepts such as carrying capacity and restoration ecology as well as new professions like environmental engineering and environmental medicine will become increasingly important as the science of ecology matures.

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Ecology as a Science

生态学

Prior to the 1970s ecology was thought of as a branch of biology. It was defined as the study of organisms in relation to the environment.

Ecology has since emerged from its roots in biology. It has become a separate discipline that joins together organisms, the physical environment, and humans. The Greek root of the word ecology is *oikos*, meaning



“household.” Accordingly, ecology may be thought of as the study of the environmental house, including all its inhabitants.

20 世纪 70 年代之前，人们认为生态学是生物学的一个分支，并将它定义为研究个体与周围环境关系的科学。20 世纪 70 年代之后，生态学从生物学中分离出来，成为一门独立的学科，研究个体、物质环境和人类之间的关系。生态学一词的希腊语词根是 *oikos*，意思是“家庭”。因此，我们不妨把生态学理解为研究环境大家庭的科学，研究对象包括所有的家庭成员。

Divisions of Ecology

生态学的分支

At the present time ecologists tend to identify themselves as one of two types: ecosystem ecologists and population ecologists. Ecosystem ecologists focus on large units such as lakes, forests, and watersheds as systems. Population ecologists focus on species or communities of species. This division, however, is far from precise. The overall goal of ecological



research is the understanding of how whole systems and species function and how they interact in time and space.

生态学家目前大致分为两类：生态系统生态学家和群体生态学家。生态系统生态学家主要研究大型生态系统，如湖泊、森林以及流域等。群体生态学家主要研究种及种群。其实，这种分类非常粗略。生态学的总体目标就是研究环境系统和种群的活动规律以及二者在时空内的相互作用。

Because ecology is so broad it tends to fragment into many subdivisions. Groups of scientists have their own organizations, meetings, and journals. Some examples might be conservation ecologists, population genetic ecologists, ecological economists, agroecologists, restoration ecologists, systems ecologists, to name a few.

生态学涵盖面很宽，包括很多分支学科。不同分支的科学家——如环境保护生态学家、群体遗传生态学家、生态经济学家、农业生态学家、生态恢复学家和系统生态学家等——都有自己的组织。他们举行会议，发行相关杂志。

Environmental science holds to ecological principles, but it is different from ecology in some ways. Environmental science focuses on the resource base—air, water, soil, food, minerals—and on climate and earth science. It also involves the control of pollution and other human-caused problems. Environmental studies, as it is taught in many schools and colleges, deals with ecology in relation to economic, legal, ethical, historical, social, and demographic considerations. In other words, environmental studies is the bridge between environmental sciences and the humanities.



Biodiversity may be defined as the variety of life-forms, the ecological roles they play, and the genetic diversity they contain.

生物多样性包括物种多样性、生态系统多样性和遗传多样性。

环境科学遵循生态学的原则，但是在某些方面又不同于生态学。环境科学以空气、水、土壤、食物和矿产等自然资源以及气候和地球科学为研究对象，同时也涉及对污染和其他由人类引起的问题的控制。从很多中学和大学的教科书上，我们可以知



道环境学研究是从经济、法律、伦理、历史、社会以及人口的角度来思索生态问题。换言之，环境学研究是在环境科学和人文科学之间架起的一座桥梁。

Ecological Levels of Organization For purposes of analysis, the biosphere can be divided into several levels, with individual organisms as the smallest but most numerous unit. There is only one biosphere, which is massive in comparison to individual species or particular ecosystems.



生态组织级别 为了便于分析，生物圈可以被分为若干级别，个体有机物是最低，但也是数目最大的级别。生物圈只有一个，它非常巨大，尤其是相对于单个种群或特定生态系统而言。

Despite the fragmentation and overlapping of the science of ecology, some unifying themes are becoming clear. These include energy exchanges, material cycles (such as the water cycle), levels of organization, ecological succession, food chains and food webs, carrying capacity, biodiversity, evolutionary ecology, and the Gaia hypothesis. Since it is still a young discipline, some of the concepts considered basic to ecology are still tentative.

尽管生态学分支众多，各个领域有所重叠，其共同的研究主线却很清晰：能量交换、物质循环（如水循环）、组织级别、生态演



替、食物链和食物网、承载容量、生物多样性、进化生态学和盖亚假设。由于这门学科还相当年轻，因此一些作为生态学研究基础的概念还有待验证。



Energy Exchanges

能量交换

An ecosystem is an open system that requires a continuing inflow and outflow of energy. Energy flow, though, in a certain sense is always one-way in that energy cannot be reused. This is different from materials that can be used over and over again. What is coming into an ecosystem and what is coming out of

