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野生动物英文文献阅读与写作

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前　　言

本书是根据编者几年来为野生动物保护与利用专业的学生讲授专业英语收集的材料编辑而成的。旨在学生们的基础英语水平上进一步提高英文专业文献阅读和写作的能力，并能够初步掌握用英语进行学术交流的技巧。

本书由两部分组成。第一部分是文献阅读，第二部分是科技文章写作和发表。最后附有部分野生动物英文名录。

文献阅读部分共选用了14篇文章，分别代表有关野生物管理、生态、营养、生理、遗传、自然保护区、生物多样性等方面的文献和文章。力求使学生能够接触到有关野生动物学科的文献，掌握各种阅读技巧，扩大学生词汇量，拓宽知识面，提高学生在阐读过程中的分析和判断能力。写作部分是以写作发表论文为题，在阐述科学论文语言特点的基础上，侧重介绍论文主体项目的写作要求和分类选择句式用语，最后介绍了在国际性学术刊物上发表研究论文的有关问题。

本书在编写过程中得到东北林业大学野生动物资源学院和教务处的领导及有关同志的关心、支持和大力帮助，借此机会向他们表示衷心的感谢。

由于编者水平有限，时间紧迫，本书中一定存在不少问题，希望使用本书的教与学的同行不吝赐教，不胜感谢！

邹红菲

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第一部分　阅　　读

PART Ⅰ　READING

Lesson 1 The Status and Conservation of the Bears of the World

Of the 8 bear species worldwide, 6 are likely in decline, and 2 are likely stable in most areas, although information on the status of species and their habitats is fragmentary, at best, over much of the world. Species with the most credible status data include the polar bear(*Ursus maritimus*), giant panda (*Aluropoda melandeuca*), and the black bear (*U. americanus*) throughout much of their range, and the brown bear (*U. arctos*) in North America and parts of Europe and Russia. Information on the spectacled bear (*Tremarctos ornatus*) is limited but increasing while habitat destruction continues. Data on the Asiatic black bear (*U. thibetanus*), sloth bear (*Melursus ursinus*), and sun bear (*Helarctos malayanus*) are minimal and even basic distribution data are questionable for these species.

The activities of man are severely impacting bear habitat for all of the 8 species worldwide. These impacts are most recent and widespread in the tropics. Major human actions influencing bear habitat include timber harvest, oil and gas exploration, and human occupancy and crop cultivation in important range. Direct human impacts on bears include killing of bears for protection of property, unregulated hunting, and vandal killing. A serious threat to bears in Asia is the capture and killing of bears for the use of their parts in primitive medicine, aphrodisiacs, or as pets. The selling of bears and bear parts is a lucrative business in Asia that has the potential to extirpate the Asian species we know the least about.

Conservation efforts on bears range from the intense and highly organized recovery efforts for the grizzly bear (*U. a. horribilis*) in the United States to no knowledge about most Asian species and limited laws to protect the animals and their habitat. Successful international conservation and management is exemplified by the work done on the polar bear in the Arctic. Several other species also need international cooperation to survive.

Conservation efforts on bears must be based on accurate biological information and knowledge of the habitat requirements of the species. In many areas of the world where the impacts on bears are the greatest, this basic knowledge is lacking. Even when required biological data are available, implementation of conservation efforts still requires a structured government effort and incorporation of the needs of the local people into the conservation of the species. Management implementation remains the greatest challenge in bear conservation.

The fate of bears in many areas of the world will be dicided in the next 10～20 years. The future of several species is in serious doubt and elimination of bears from 50%～75% of their historic range will likely occur unless serious effort is given to their conservation. Increasing human demands on bears and bear habitat will require basic ecological information on species and their habitats, support of local people in bear range, and implementation of organized management programs.

Vocabulary and Phrases

1. fragmentary	*a*.不完全的
2. habitat	*a*.生境,栖息地
3. distribution area	分布区
4. timber	*n*.木材
5. aphrodisiacs	*n*.春药;催情剂
6. extirpate	*n*.灭绝
7. survive	*n*.存活
8. implementation	*n*.完成,贯彻
9. incorporation	*n*.混合,参与
10. ecological	*a*.生态的

Question

1. List the bear species.
2. What kinds of activities are impacting the bear habitat and how to improve?

Lesson 2 The Cell

All living creatures are made of cells—small membrane-bounded compartments filled with a concentrated aqueous solution of chemicals. The simplest forms of life are solitary cells that propagate by dividing in two. Higher organisms, such as ourselves, are like cellular cities in which groups of cells perform specialized functions and are linked by intricate systems of communication. In a sense, cells are halfway between molecules and man. We study them to learn, on the one hand, how they are made from molecules and, on the other, how they cooperate to make an organism as complex as a human being.

All organisms, and all of the cells that constitute them, are believed to have descended from a common ancestor cell by *evolution*. Evolution involves two essential processes: ①the occurrence of random *variation* in the genetic information passed from an individual to its descendants and ②the *selection* of genetic information that helps its possessors to survice and propagate. Evolution is the central principle of biology, helping us to make sense of the bewildering variety in the living world.

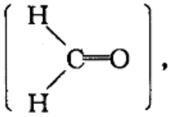
This chapter, like the book as a whole, is concerned wih the progression from molecules to multicellular organisms. It discusses the evolution of the cell, first as a living unit constructed from smaller parts, and then as a building block for larger structures. Through evolution, we introduce the cell components and activities that are to be treated in detail, in broadly similar sequence, in the chapters that follow. Beginning with the origins of the first cell on earth, we consider how the properties of certain types of large molecules allow hereditary information to be transmitted and expressed, and permit evolution to occur. Enclosed in a membrance, these molecules provide the essentials of a self-replicating cell. Following this, we describe the major transition that occurred in the course of evolution, from small bacteriumlike cells to much larger and more complex cells such as are found in present-day plants and animals. Lastly, we suggest ways in which single free-living cells might have given rise to large multicellular organisms, becoming specialized and cooperating in the formation of such intricate organs as the brain.

Clearly, there are dangers in an evolutionary approach: the large gaps in our knowledge can be filled only by speculations that are likely to be wrong in many details. But there is enough evidence from fossils and from comparative studies of present-day organisms and molecules to allow us to make intelligent guesses about the major stages in the evolution of life.

Simple Biological Molecules Can Form Under Prebiotic Conditions

The conditions that existed on the earth in its first billion years are still a matter of dispute. Was the surface initially molten? Did the atmosphere contain ammonia, or methane? Everyone seems to agree, however, that the earth was a violent place with volcanic eruptions, lightning, and torrential rains. There was little if any free oxygen and no layer of ozone to absorb the harsh ultraviolet radiation from the sun.

Simple organic molecules (that is, molecules containing carbon) are likely to have been produced under such conditions. The best evidence for this comes from laboratory experiments. If mixtures of gases such as CO_2, CH_4, NH_3, and H_2 are heated with water and energized by electrical discharge or by ultraviolet radiation, they react to form small organic molecules—usually a rather small selection, each made in large amounts. Among these products are a number of compounds, such as hydrogen cyanide ($H-C\equiv N$) and formaldehyde



, that readily undergo further reactions in aqueous solution. Most important, the four major classes of small organic molecules found in cells—*amino acids*, *nucleotides*, *sugars*, and *fatty acids*— are generated.

While such experiments can not reproduce the early conditions on the earth exactly, they make it plain that the formation of organic molecules is surprisingly easy. And the developing earth had immense advantages over any human experimenter; it was very large and could produce a wide spectrum of conditions. But above all, it had much more time—hundreds of millions of years. In such circumstances it seems very likely that, at some time and place, many of the simple organic molecules found in present-day cells accumulated in high concentrations.

Polynucleotides Are Capable of Directing Their Own Synthesis

Simple organic molecules such as amino acids and nucleotides can associate to form large *polymers*. One amino acid can join with another by forming a peptide bond, while two nucleotides can join together by a phosphodiester bond. The repetition of these reactions leads to linear polymers known as **polypeptides** and **polynucleotides**, respectively. In present-day living organisms, polypeptides—known as *proteins*—and polynucleotides—in the form of both *ribonucleic acids* (*RNA*) and *deoxyribonucleic acids* (*DNA*)—are commonly viewed as the most important constituents. A restricted sets of 20 amino acids constitute the universal building blocks of the proteins, while RNA and DNA molecules are constructed from four types of nucleotides each. One can only speculate as to why these particular sets of monomers should have been selected for biosynthesis in preference to others that are chemically similar.

The earliest polymers may have formed in several ways—for example, by the heating of dry organic compounds or by the catalytic activity of high concentrations of inorganic polyphosphates. The products of similar reactions in the test tube are polymers of variable length and random sequence in which the amino acid or nucleotide added at any point depends mainly on chance. However, once a polymer has formed, it is able to influence the formation of other polymers. Polynucleotides, in particular, have the ability to sepcify the sequence of nucleotides in new polynucleotides by acting as *templates* for the polymerization reactions. For example, a polymer composed of one nucleotide (polyuridylic acid, or poly U) can serve as a template for the synthesis of a second polymer composed of another type of nucleotide (polyadenylic acid, or poly A). Such templating depends on the fact that one polymer preferentially binds the other. By lining up the subunits required to make poly A along its surface, poly U promotes the formation of poly A.

Specific pairing between complementary nucleotides probably played a crucial part in the origin of life. Consider, for example, a polynucleotide such as RNA, made of a string of four nucleotides, containing the bases uracil (U), adenine (A), cytosine (C), and guanine (G). Because of complementary pairing between the bases A and U and between the bases G and C, when RNA is added to a mixture of activated nucleotides under conditions that favor polymerization, new RNA molecules are produced in which nucleotides are joined in a sequence that is complementary to the first. That is , the new molecules,are rather like a mold of the original, with each A in the original corresponding to a U in the copy, and so on. The sequence of nucleotides in the original RNA strand contains information that is, in essence, preserved in the newly formed complementary stands. A second round of copying, with the complementary strand as a template, restores the original sequence.

Such *complementary templating* mechanisms are elegantly simple, and they lie at the heart of information-transfer processes in biological systems. Genetic information contained in every cell is encoded in the sequences of nucleotides in its polynucleotide molecules, and this information is passed on (inherited) from generation to generation by means of complementary basepairing interactions.

Rapid formation of polynucleotides in a test tube requires the presence of specific protein catalysts, or *enzymes*, which would not have been present in the "prebiotic soup." However, less efficient catalysts in the form of minerals or metal ions would have been present; and, in any case, catalysts only speed up reactions that would occur anyway given sufficient time. Since both time and a supply of chemically reactive nucleotide precursors were available in abundance, it is likely that slowly replicating systems of polynucleotides became established in the prebiotic conditions on earth.

Vocabulary and Phrases

1. membrane	*n*.膜
2. aqueous	*a*.水(样)的
3. propagate	*n*.繁殖
4. intricate	*a*.内部的
5. evolution	*n*.进化
6. variation	*n*.变异
7. descendant	*n*.后代
8. replicate	*v*.复制
9. bacteriumlike	*a*.细菌状的
10. specialized	*a*.特化的,特有化的
11. multicellular	*a*.多细胞的
12. speculation	*n*.推测,假想
13. prebiotic	*a*.生物出现前的
14. methane	*n*.甲烷
15. torrential	*a*.急流的
16. ozone	*n*.臭氧
17. ultraviolet	*a*.紫外的
18. organic	*a*.有机的
19. hydrogen cyanide	氰化氢
20. formaldehyde	*n*.甲醛
21. amino acids	氨基酸
22. nucleotide	*n*.核苷酸
23. fatty acids	脂肪酸
24. polynucleotides	*n*.多聚核苷酸
25. synthesis	*n*.合成
26. polymer	*n*.多聚体
27. phosphodiester	*n*.磷酸二酯键
28. peptide	*n*.肽
29. bond	*n*.化学键
30. protein	*n*.蛋白质
31. monomer	*n*.单体
32. catelytic	*a*.催化的
33. test tube	*n*.试管
34. subunits	*n*.亚单位
35. complementary	*a*.互补的

36. uracil *n*. 尿嘧啶
37. adenine *n*. 腺嘌呤
38. cytosine *n*. 胞嘧啶
39. guanine *n*. 鸟嘌呤
40. enzyme *n*. 酶

Question

1. Why is it important for us to know the cell?
2. How can polynucleotide direct their own synthesis?

Lesson 3 Food and Energy

Food

Energy from food maintains the metabolism of an animal, and materials in the food support the growth and maintenance of body structures. Wildlife literature abounds with studies of food habits and requirements of scores of species. Our purpose is not to list food requirements species by species, but rather to describe some generalities that pertian to the ecology and management of food and feeding, using examples to illustrate the concepts. Energy in food is stored in the chemical bonds of food molecules and the chemical components of food include carbohydrates, fats, proteins, minerals and vitamins. Foods vary in their energy and nutrient content (Table 3 - 1).

Table 3 - 1 Composition of Some Foods Eaten by Wildlife

Food	Water (% wt)	Kcal/ 100 g	Nutrients in g/100 g dry wt			
			Protein	Fat	Carbohydrates and Lignin	Minerals (Ash)
Plant						
Grass	80	220	13.0	6.0	73.0	8.0
Jack pine needles	55	524	8.9	11.8	77.0	2.5
White cedar	54	237	3.3	4.4	91.3	2.0
Animal						
Invertebrates						
Snail	79	219	52.0	1.0	0.0	47.0
Crab	26	170	33.0	2.0	9.0	56.0
Vertebrates						
Bird egg (chicken)	73	430	38.0	31.0	0.0	31.0
Whole bird (chicken)	76	446	57.0	24.0	0.0	19.0
Whole mammal (pig)	75	448	89.0	10.0	0.0	1.0

Sources: Brambell (1972); Pendergast and Boag (1971); Gurchinoff and Robinson (1972); Ullrey et al. (1968).

Energy

Energy (conventionally) is released when large food molecules are broken apart. Once released, some of the energy is converted into heat and is used for maintenance of body temperature in birds and mammals. Some energy is transformed into mechanical energy that makes muscles contract, helps transport materials through membranes, or assembles new and different kinds of molecules to build new skin cells, feathers, teeth, liver cells, and other tissues.

How much energy does an animal use? This of course varies with the size of the animal. Small, warm-blooded animals require proportionally more energy than large ones because of their greater ratio of surface area to volume, permitting more escape of heat. The formula of Brody (1945) for active mammals is generally used for wildlife energy analyses: Daily energy requirement (kcal) = 140 × (body wt in $kg^{3/4}$). Thus a masked shrew (*Sorex cinereus*) weighing 5 g needs 2.63 kcal per day, an active 68 kg human needs 3 300 kcal, and a 544 kg brown bear (*Ursus arctos*) needs 15 800 kcal. The shrew needs about 526 kcal per kg of body weight while the bear needs only 28 kcal per kg of body weight. These figures vary with the degree of insulation of the coat, with temperature of the environment, and with cover or shelter surrounding the animal, as will be discussed later.

It would seem that birds, with higher body temperatures and higher metabolic rates, also would have greater energy demands than mammals, but King and Farner (1961) noted that the equation describing energy demands of birds in kcal per kg of body weight is indistinguishable statistically from that of mammals—with one notable exception: for very small birds, those weighing less than 10 g, energy requirements are substantially higher than those of equivalent small mammals. For example, two species of hummingbirds weighing about 4.0 g and 3.5 g, require, respectively, 1 400 and 1 600 kcal per g per day, considerably greater than the 526 kcal needed by a 5 g shrew.

Carbohydrates

Carbohydrates include cellulose, starches, and sugars, and are comprised of carbon, hydrogen, and oxygen. Simple sugars are broken apart easily in an animal's system and therefore are a source of quick energy, yielding 4.2 kcal per gram. Other large molecules, such as those of cellulose and lignin, which form woody parts of trees, contain a great deal of energy (we take advantage of that when we burn wood in a fireplace), but for most animals those calories are not avialable. Only a few, such as beavers (*Castor canadensis*), porcupines (*Erethizon dorsatum*), and lagomorphs (Leporidae) have the properly constructed digestive tract and the right mixture of bacteria within it capable of digesting molecules of wood and extracting its energy. Carbohydrates are common in all parts of plants eaten by animals.

Fats

Fats (and oils) consist of carbon and hydrogen atoms with fewer oxygen atoms than carbohydrates. Fats contain over twice the energy per unit weight as carbohydrates (9.5 versus 4.2 kcal/g), but it takes longer for the body to extract such energy. Fat deposits are manufactured in the body to serve as efficient energy storage depots. The gastrointestinal tract of many grazers and browsers is not adapted for digestion of fats. Fats and oils in the digestive tract are physically broken apart by bile produced in the liver, stored in the gall bladder, and secreted into the small intestine. Deer, lacking a gall bladder, continually secrete small quantities of bile into the intestine, sufficient to emulsify the small amount of fat found in their normal diet. Bur larger quantities of fâts go undigested in deer because they are unable to secrete enough bile to fragment the oils and fats into digestible units. Fats are found in low quantities in vegetative parts of plants but may occur abundantly in seeds such as corn, beans, and peanuts.

Proteins

Proteins contain (in addition to carbon, hydrogen, and oxygen) nitrogen in the form of amino acids (NH_2 groups). Available energy in proteins is about the same as in carbohydrates, but the amino acids of protein are needed for building nucleic acids, essential in cell reproduction and in constructing enzymes which promote practically every chemical reaction in the body. Proteins, like fats, are not aboundant in vegetative portions of plants, although they are concentrated in growing tips of stems. Seeds such as beans, grains, and nuts contain the highest concentrations of proteins in plants. Legumes such as clover, alfalfa, beans, and peas, because of their ability to fix atmospheric nitrogen (with the help of bacteria in their root nodules), are generally good sources of nitrogen for animals that consume them. Because protein is frequently in short supply in plants, its abundance in food available to herbivores is frequently used as an indication of food quality.

Vitamins

Vitamins, essential in small quantities, are complex molecules that function as enzymes in the body. In some locations, vitamin deficiencies may prevent growth and vigor of wildlife populations.

Macronutrients

Macronutrients include several minerals and dissolved ions. These include sodium potassium, phosphorus, calcium, mangesium, and sulfur. Phosphorus and cacium are essential in formation of bones, teeth, and eggshells. The others are necessary for such functions as nerve transmission, muscle contraction, blood coagulation, and maintaining proper osmotic conditions. In gross food analyses, minerals are contained in ash (Table 3 - 1).

Micronutrients

Micronutrients are those elements present in animal tissues in minute quantities, their total making up less than 0.01 percent of the body. The functions of some micronutrients are known. For example, iron forms the core of the hemoglobin molecule, which functions in transporting oxygen in the blood (among other functions), and copper aids in the manufacture of hemoglobin and contributes to enzymes. Our knowledge of the role of many other enzymes remains incomplete. Other micronutrients include cobalt, nickel, zinc, vanadium, chromium, molybdenum, manganese, silicon, tin, arsenic, selenium, fluroine, and iodine (Schmidt-Nielsen 1979).

Vocabulary and Phrases

1. metabolism *n*.新陈代谢,代谢作用
   metabolic *a*.新陈代谢的,the ~ stage 代谢期;
   metabolite *n*.代谢物;
   metabolize *v*.(使)产生代谢变化
2. maintenance *n*.维持,维修,扶养
3. literature *n*.①文学 ②(专题)文献 ③写作 ④印刷品
4. abound *vi*.物产丰富,Natural resources ~ in China 中国自然资源丰富。~ with 盛产,富于,多,充满,
   That region ~s with rain all the year.那地区终年多雨。
5. scores *n*.①刻痕 ②账目 ③方面,理由 ④乐谱 ⑤起跑线 ⑥许多,大量 ~ of
6. generality *n*.①一般性,一般原则 ②根据(性),概念,笼统 ③the ~,主要部分,大多数 the ~ of teachers 大多数教师
7. pertain *vi*.①从属,附属(to) ②关于,有关(to) His remark did not ~ to the question. ③适合,相衬(to)
8. illustrate *vt*.①用图或例子说明,阐明 ~a lesson with pictures 用图画来说一篇课文;~d by charts and diagrams 用图表说明的 ②an ~d magazine 有插图的杂志
   vi.举例
   illstration *n*. ①说明,图解 ②例证,实例,插图
   illustrative *a*.用作说明的,解说性的,作为例证的
9. component *a*.组成的,合成的
   n.组成部分
10. contract *n*.①契约,合同 make ~ with sb 与某人订立契约 sign a ~ 签约 a

breach of ～ 违约行为

vt.①缔结 ②承包 ③把…许配给,使订婚约 ④得病 ⑤使缩短 收缩 ～ oneself out of 约定使自己不受…的约束 ～ out ①立约包出 ②退出合约

contractor *n*.①订约人 ②承包人,包工头 ③收缩物,收缩肌

11. tissue *n*.①薄绢,纱,织物 ②薄纸,棉纸 toilet ～ 卫生纸 face ～s 化妆纸 ③组织 connective ～ 结缔组织 nervous ～ 神经组织 ④[喻](罗织成章的)一套,连篇 a ～ of lies 连篇谎言

12. proportionally *ad*.成比例地

proportion *n*.①比,比率,比例 the ～ of three to one 3 与 1 之比 the ～ of births to the population 人口出生率 direct (inverse) ～ 正(反)比例 ②均衡,相称,调和 in perfact ～ 非常匀称 ③部分,份儿 a large ～ of the earth surface 地表面大部分 ④面积,容积,大小 a building of grand ～s 宏大的建筑物

vt.①使成比例 ②分摊,摊派 in ～ as 按…比例,依…程度而变 out of ～ 不成比例

proportional *a*.①成比例的 be directly ～ to 与…成正比例 ②相称的

n.比例项 mean ～比例中项

13. volume *n*.①卷,册;②容积,容量,体积 ③大量,许多 a great ～ of water ④烟气的大团(复) ⑤音量 ⑥卷轴

vi.(蒸汽、烟)成团升起,成团卷起

vt.①把…收集成卷,把…装订成册 ②成团地散发;

a.大量的

14. masked shrew ①鼩鼱 ②泼妇

masked *a*.①化装的 ～ ball 假面舞会 ②有伪装的 ～ guns 伪装的枪 ③潜伏的,潜热 ～ fever 潜热

15. insulate *vt*.隔离,绝热

insulation *n*.隔离,绝热

insulator *n*.绝缘体,绝缘子

16. indistinguishable *a*.难区分的,不能辨别的

17. statistically *ad*.统计地

statistical *a*.统计的,统计学的 ～ data 统计资料 ～figures 统计数字

statistic *n*.统计学

statistician *n*. 统计学家,统计员

18. notable *a*.①值得注意的,显著的 ②著名的,显要的

n.名人,显要人物

19. exception *n*.①例外 without any ～无例外的 ②反对,异议 by way of ～作为例外 make an ～ of 把…作为例外 make no ～s 不容许有例外,一律办理