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Chapter 1 Natural History Surveys and Biodiversity 自然史调查与生物多样性

Section 1 Reading and Translation

I What You Are Going to Read

We humans share Earth with 1.4 million known species and millions more species that are still unrecorded. Yet we know surprisingly little about the practical work that produced the vast inventory we have to date of our fellow creatures. How were these multitudinous creatures collected, recorded, and named? When, and by whom?

Here a distinguished historian of science tells the story of the modern discovery of biodiversity. Robert E. Kohler in his book *All Creatures: Naturalists, Collectors, and Biodiversity, 1850–1950* (Published by Princeton University Press, 2006) argues that the work began in the mid-eighteenth century and culminated around 1900, when collecting and inventory were organized on a grand scale in natural history surveys. Supported by governments, museums, and universities, biologists launched hundreds of collecting expeditions to every corner of the world.

What you are going to read in this section is an excerpt of the first chapter of the book.

II About the Author

Robert E. Kohler is Professor Emeritus of History and Sociology of Science at the University of Pennsylvania. The recipient of an award for lifetime achievement in his field, he is the author of more than 30 papers and 5 books on experimental and field sciences.

III Reading Passage

Naturalists, Collectors, and Biodiversity

博物学家、标本采集者和生物多样性

By Robert E. Kohler

1 We humans are one in a million: to be exact, one species among 1,392,485, according to a recent **tally** by the **zoologist** Edward O. Wilson[1]. Those are the ones we know: estimates of the total number of

tally *n.* 纪录
zoologist *n.* 动物学家

pollinator *n.* 传授花粉的昆虫或动物
vertebrate *n.* 脊椎动物
cartilaginous *adj.* 软骨的
lamprey *n.* 七鳃鳗（又名八目鳗）
amphibia *n.* 两栖动物
invertebrate *n.* 无脊椎动物
tunicate *n.* 被囊类脊索动物
cephalochordate *n.* 头索动物亚门（脊索动物中最接近脊椎动物的类群）
mollusc (=mollusk) *n.* 软体动物（包括牡蛎、贻贝、蜗牛、蛞蝓等）
arthropod *n.* 节肢动物
protozoa *n.* [*pl* of protozoon] 原生动物
inventory *n.* 详细目录
earthling *n.* 居住在地球上的人；凡人
void *n.* 空间
biodiverse *adj.* 生物多样性的

living species range from five to thirty million and up, depending on how one reckons. A substantial majority of Earth's species are insects: something like 751,000 by Wilson's tally. Plants account for another 248,428, the vast majority being flowering plants (which coevolved with insect **pollinators**). Among the **vertebrates**, bony fishes are the largest group, with 18,150 species, leaving aside the 63 species of jawless fishes and the 843 **cartilaginous** fishes (**lampreys**, sharks). **Amphibia** and reptiles account for 4,184 and 6,300 more species; birds for 9,040, and mammals for 4,000, give or take. Not to mention **invertebrates** other than insects: **tunicates** and **cephalochordates** (1,273), **molluscs** (roughly 50,000), and **arthropods** (12,161). And single-cell organisms: algae (26,900), fungi (46,983), **protozoa** and microbes (36,560). Of our fellow vertebrates we have an **inventory** that is nearly complete—over 90 percent, it is estimated. On the plants and invertebrates, however, we may only have made a start. We **earthlings** sail through the **void** on an ark that is impressively **biodiverse**.[2]

conservationist *n.* 环境保护主义者

2 Biodiversity is a lively issue these days, mainly because of the number of species that are going extinct, either by natural causes, or because we space-hungry humans are destroying their habitats. Wilson estimates that perhaps 17,500 species (mostly insects) go extinct each year in tropical forests, and that we humans have accelerated the historical rate of extinction by a factor of one thousand to ten thousand. Biologists and **conservationists** are concerned that vast numbers of species may be forced into extinction ahead of schedule (extinction is the ultimate fate of all species) before they can be found and classified. There is concern, too, that in our ignorance we may be destroying species vital to the fabric of ecosystems on which we depend for our own survival.

taxonomy *n.* 生物分类学
humdrum *adj.* 平淡的；单调的；乏味的

3 Systematic biology, or **taxonomy**, is reputed to be a **humdrum**, cataloging science—a reputation entirely undeserved, let it be said. We depend on those few among us who collect, describe, name, and classify our fellow passengers on the global ark. But how exactly do we find, collect, identify, and order those millions of species? That is my subject here: not the biology or the ethics of biodiversity, but its practices and their history. Though people have always named plants and animals, the science of species inventory is relatively new,

beginning with the big bang of Carl von Linne's[3] invention of the (Linnaean) binomial system of naming[4] in the mid-eighteenth century. And though much has been written on theories of species, relatively little is known of the practical work that produced the empirical base for theorizing. When and how were those inventories created and made **robust**? Who organized and paid for collecting expeditions, collected and prepared specimens in the field, compiled lists, built museums and **herbaria**, and kept vast collections in good physical and conceptual order? Of these practical activities we do not as yet know much. This book is a step toward acquiring such knowledge.

robust *adj.* 有活力的；强健的
herbaria *n.* [*pl* of herbarium] 植物标本集；植物标本室；植物标本盒

4 The history of our knowledge of biodiversity is first and foremost a history of collecting and collections. Remarkably little has been written about the craft and social history of scientific collecting: it remains a "black box", as the historian Martin Rudwick[5] observed a few years ago, an activity that has "barely been described by historians, let alone analyzed adequately". There are now signs of a growing interest in the history of collecting science, but it is perhaps understandable why this black box is only now being opened. Although collecting is a widespread and varied **obsession**, modern scientific collecting is sober and businesslike, not irregular or **idiosyncratic**. It is done **en masse** and methodically, because modern taxonomy requires large and comprehensive collections. Scientific collecting is exacting and **quantitative** science, as methodical and organized as taking stock of galaxies, subatomic particles, or genes.[6] Modern specimen collections are quite unlike the romantic "cabinets of curiosities"[7] of earlier centuries. Modern herbaria consist of cases filled with hundreds of thousands of large **folios** of pressed plants in paper. Museum study collections are rooms of metal boxes, each with trays of animal skins and skulls in neat rows neatly labeled—all seemingly humdrum and unromantic.

obsession *n.* 牵挂；着迷；困扰
idiosyncratic *adj.* 特殊的，特质的
en masse [法] 全体，一起
quantitative *adj.* 定量的
folio *n.* 对折纸；对开纸

5 Yet the scientific visions that inspire collectors to go **afield**, and the varied activities that go into making large collections, are anything but humdrum. Collecting is an activity that has engaged diverse sorts of people—unlike laboratory science, which is restricted to a relatively few approved types. The **botanist** Edgar Anderson[8] once did an experiment, in which he took a manila folder at random from an herbarium case (a Southwestern grass, it turned out to be),

afield *adv.* 在野外
botanist *n.* 植物学家

flora *n.*（某地区或时期的）全部植物，植物区系
botany *n.* 植物学

to discover the kinds of people who had collected the specimens. It was an amazingly diverse lot: a botanist on the Mexican Boundary Survey of the early 1850s; an immigrant intellectual German who had come to America in 1848 to escape political persecution; the wife of a mining engineer stationed in a remote mountain range, who dealt with the isolation by studying the local **flora**; a Boston gentleman, who made collecting trips to New Mexico for thirty years; a Los Alamos scientist and amateur botanist; university professors of **botany**; and college students who bought a second auto and spent a summer holiday collecting. "Though they have sometimes been contemptuously referred to as 'taxonomic hay' by other biologists," Anderson concluded, "herbarium specimens can be quite romantic in their own dry way."

replicate *v.* 重复；复制
taxonomist *n.* 生物分类学家
naturalist *n.* 博物学家

6 Anderson's experiment is easily **replicated**: page through museums' accession lists, and you will see hundreds of names of people who contributed specimens to scientific collections, from a few odd skins to tens of thousands. Read **taxonomists**' checklists—which give for each species the name of the naturalist who first described it, and when—and you will glimpse a living community of collectors and **naturalists** stretching back 250 years, in which amateurs have the same honor and dignity as the most eminent professionals. Species collectors are as diverse as the species they collect, and no other community of scientists preserves such a deep sense of its collective identity and past. Taxonomists' elaborate system of keeping track of names, which anchors each species to the name historically first given to it and to the actual specimen first described—the "type" specimen—keeps the past forever present.[9] All sciences have their heroes and founding myths, but taxonomy is about the only one with a living memory of all past contributors, famous and obscure.

gene-sequencing 基因测序
logistics *n.* 后勤

7 Scientific collecting was (and is) also an unusually complex and varied kind of work. Collecting expeditions are more complex socially than anything one might find, say, in a biochemistry or **gene-sequencing** lab. They require a great deal of book knowledge, but also practical skills of woodcraft and **logistics**, as well as firsthand experience of animal habits and habitats. Modern natural history is an exacting science whose practitioners must also cope and improvise in difficult field conditions. Collecting expeditions afford an experience

of nature that mixes scientific and recreational culture in a way that lab sciences never do. Collecting parties usually travel light and depend on local inhabitants for information and support, making survey collecting a diversely social experience. And because of that diversity, the identity of scientific collectors has been less fixed than that of laboratory workers. In the black box of modern expeditionary collecting, there is much of interest.

8 We know nature through work, the environmental historian Richard White[10] has observed, whether it is poling canoes against the current of a great river (his particular case), or building dams across it to tap its energy, or hauling fish out of it, or diverting its waters for irrigated farming—or, historians may add, studying its **hydrology** and natural history. So too is our scientific knowledge of nature acquired through the work of mounting expeditions; observing plant and animal life; and collecting, preparing and sorting specimens. Historians have only recently begun to address the work of field science. And of all the field sciences, natural history survey is an exceptionally inviting subject—because the work of systematic, scientific collecting is so varied.

hydrology *n.* 水文学，水理学

9 One is also struck, paging through scientific inventories of species, by the **lumpiness** of the history of their discovery. Species have accumulated steadily, but more rapidly in certain periods than in others. The first such period of discovery was the Linnaean: roughly the second half of the eighteenth century. Then, after a pause of a few decades in the early nineteenth century, another period of rapid discovery set in from the 1830s to the 1850s, which I shall call "Humboldtian", after the **encyclopedic** author of *Cosmos*, Alexander von Humboldt. Following another pause, the pace of finding and naming again quickened from the 1880s into the 1920s, by which time a substantial proportion of vertebrate species had been found and named. Since the mid-twentieth century the pace of discovery of new vertebrate species has been a fitful trickle (though lists of invertebrates grow ever longer).

lumpiness *n.* 凹凸不平；不连贯

encyclopedic *adj.* 包含各种学科的；学识渊博的；广博的

10 These cycles of collecting and naming vary a good deal from one group of animals to another, depending on their accessibility and interest to us. Those that are large, fierce, **freakish**, beautiful, edible,

freakish *adj.* 不寻常的；反常的；奇怪的

carnivore *n.* 肉食动物
primate *n.* 灵长目动物
nocturnal *adj.*（指生物）夜间活动的
rodent *n.* 啮齿目动物（如鼠、松鼠或海狸）
insectivore *n.* 食虫动物

lovable, or dangerous were inventoried early on. These include birds, **carnivores**, **primates**, and large game. Inconspicuous or insignificant creatures, or those that do not appeal—because they are slimy, cold-blooded, annoying, **nocturnal**, or just very good at avoiding our notice—were not fully inventoried until the surveys of the late nineteenth and early twentieth century or even later. These groups include **rodents**, bats, **insectivores**, amphibians, and reptiles.

blip *n.*（雷达屏幕上的）光点
mammalian *adj.* 哺乳动物的
mammal *n.* 哺乳动物
prolific *adj.*（指动植物等）多产的，多育的
chiroptera *n.*（Greek for "hand-wings"）翼手目动物（如蝙蝠）
periodicity *n.* 周期性；定期性；间歇性
tabulate *v.* 将（事实或数字）列成表，列表显示

11 Birds—those visible, audible, and beloved objects of watchers and collectors—were so well inventoried in the Linnaean and Humboldtian periods that the discoveries of the later survey phase show up as mere **blips** on a declining curve of discovery. In contrast, discoveries of **mammalian** species display the most pronounced cyclic pattern, with marked activity in the first two phases, but the most productive collecting in the survey period. The pattern for North American **mammals** is even more pronounced, with discoveries more concentrated in the 1890s, and the earlier peak shifted from the 1830s and 1840s to the 1850s and 1860s. Different groups of mammals show some variation in this basic pattern. Most carnivore species were described in the eighteenth century, and most of the rest in the 1820s and 1830s—we humans have taken a keen interest in our closest competitors. Rodents, in contrast, were hardly known to Linnaean describers and not fully known to science until the age of survey, when it first became apparent just how **prolific** of species this group has been—it would appear that the Creator loves rodents as well as He does beetles. Insectivores display the same strikingly lumpy pattern of discovery; as do also **chiroptera** (bats), though with a stronger period of discovery in the mid-nineteenth century and a less striking peak in the early twentieth. Discoveries of North American reptiles and amphibians also display this **periodicity**, though less markedly: relatively few were described before 1800, most in the 1850s, with small peaks in the age of survey and after. (Data on world species of these groups is either absent or harder to **tabulate**.)

synchronize *v.*（使……）同步

12 These distinctive periods in the pace of collecting and describing suggest that the process of discovery was not random and individualistic, but that individual efforts were **synchronized** by larger cultural, economic, and social trends. This is not a novel thought. It is a commonplace (and doubtless true, as well) that early modern

naturalists were inspired by the flood of new knowledge that was a by-product of the expanding global reach of European trade and conquest. And we now also know that Linnaean taxonomy grew out of the widespread interest in Enlightenment Europe[11] in state-sponsored agricultural improvement, including schemes for acclimatizating exotic species to northern countries.

13 It is also clear that the early-nineteenth-century flowering of collecting and naming resulted from the greater affordability of transoceanic steam travel and from European imperial expansion and settlement, especially in the rich tropical environments of the southern hemisphere. In North America, naturalists like John James Audubon[12] followed the military frontier into the species-rich environments of the southeastern United States. And the western boundary and transport surveys of the 1850s took naturalists like Spencer Baird[13] into the faunally diverse and virtually unworked areas of the American West. No one has tried to map the historical geography of taxonomic knowledge onto that of imperial expansion and settlement, but I would expect a close correlation. If trade has followed flags, so also have naturalists and collectors. Access was crucial: wherever improved transportation technology and colonial infrastructure afforded ready access to places previously expensive or dangerous to reach, there the pace of discovery of new species will soon pick up.

14 The third of these cycles of collecting—I have without **fanfare** been calling it "survey" collecting—is the least well known and the most surprising. We do not think of the late nineteenth and early twentieth centuries as being a great age of discovery in natural history; but they were. One need only peruse the annual reports of national and civic museums to appreciate the enormous enthusiasm for expeditions and collecting. In the United States alone dozens or scores of collecting expeditions were dispatched each year to the far corners of the world between 1880 and 1930: hundreds in all, or thousands—perhaps as many as in the previous two hundred years of scientific expeditioning. They certainly produced as much knowledge of the world's biodiversity as any of the earlier episodes of organized collecting.

fanfare *n.* 夸耀；鼓吹

15 It was in the age of survey that scientists became fully aware of the world's biodiversity. In places that were explored but not

fauna *n.*（某地区或某时期的）全部动物

intensively worked, like the American West or much of South America, **faunas** and floras that had seemed closed books were reopened and vastly expanded. In its first two years of operation in the western states, the US Biological Survey turned up seventy-one new vertebrate species—an abundance that some zoologists found hard to credit. Inventories of vertebrate animals became so complete that subsequent discoveries of new species became media events.[14] Why, then, has this phase in the discovery of biodiversity remained the least well known?

unpretentious *adj.* 不炫耀的；不夸大的
exotica *n.* 奇特的东西
chronicler *n.* 编年史的编写者
polar *adj.*（南、北）极的；地极的；近地极的

16 One reason is that collecting expeditions were mostly small and **unpretentious**, unlike the grand voyages of imperial exploration. Scientific collecting in the age of survey was accomplished mostly by small parties (three to half a dozen) whose purpose was to send back not **exotica** and accounts of heroic adventure and discovery, but rather crates of specimens. It is the dramatic explorations of the earlier periods that have caught the eye, because they were designed to catch the eye—of investors, princes, publishers, readers, **chroniclers**. It is no accident that the heroic voyaging of eighteenth- and early-nineteenth-century explorers—Cook[15], Vancouver[16], La pérouse[17], Humboldt[18], Bougainville[19], Murchison[20]—is well documented and remembered. Or that historians have dwelt on the feats of American explorers from Lewis[21] and Clark[22] to later ventures like the Harriman Alaska Expedition[23], or the adventures of **polar** explorers, rather than on the more numerous but less flashy modern discoverers of biodiversity. Still, this imbalance needs to be set right, and I hope this book will help do that.

Notes

1. **Edward O. Wilson:** 爱德华·威尔逊（1929– ），美国生物学家，研究蚁类及群居昆虫的权威。
2. **We earthlings sail through the void on an ark that is impressively biodiverse:** 我们这些生活在地球上的人们乘方舟漂流在天地之间，在这只方舟上有着各种各样的生物。本句运用了比喻的方法，句中的ark指《圣经》中诺亚及其家人和动物为躲避洪水而乘的大船。在洪水到来之前，上帝吩咐诺亚建造一只方舟，要他带上家人和地球上所有动物乘方舟躲避洪水之灾。洪水消退后，这些动物继续在地球上生息繁衍。
3. **Carl von Linne:** 卡尔·冯·林奈（1707–1778），瑞典博物学家，生物分类学奠基人。
4. **binomial system of naming:** 双名命名体系，双名法。由林奈提出的生物命名体系，动

植物和矿物均采用两个拉丁化的名字（拉丁双名）命名。例如植物命名，第一个名代表“属”(genus) 名，第二个名代表“种本名”(specific epithet)。由属名和种本名组合起来构成物种名（species name)。

5. **Martin Rudwick:** 马丁·罗德威克（1932– ），美国圣地亚哥加利福尼亚大学历史学荣誉教授。
6. **Scientific collecting is exacting and quantitative science, as methodical and organized as taking stock of galaxies, subatomic particles, or genes:** 以科学的方法进行物种收集是一门要求极高的定量学科，与观察星系、亚原子粒子或基因一样需要条理性。句中exacting是由动词exact变化而来的形容词，相当于making great demands, requiring great effort, 意思是“苛求的，严格的”。
7. **cabinets of curiosities:** (also known as *wonder-rooms*) 奇异珍品陈列室，用于珍藏自然史、地质、考古、宗教或历史等方面的遗物以及艺术品和古玩等。
8. **Edgar Anderson:** 埃德加·安德森（1897–1969），美国植物学家，他的*Introgressive Hybridization* (1949) 一书对植物遗传学做出了重要贡献。
9. **Taxonomists' elaborate system of keeping track of names, which anchors each species to the name historically first given to it and to the actual specimen first described—the "type" specimen—keeps the past forever present:** 生物分类学家建立了一套精确记录生物名称的体系，该体系将每一个物种与其在历史上的首次命名和最初描绘的标本（即“类型”标本）进行核对，从而将它的历史永久记录在案。句中anchor...to...原意为“把……固定在……上”，在此转义为“将……与……进行核实、查对（加以确认)”。
10. **Richard White:** 理查德·怀特（1947– ），美国历史学家。
11. **Enlightenment Europe:** 欧洲启蒙运动（17–18世纪)。指17–18世纪在欧洲思想界、科学界与哲学界兴起的运动，涉及宗教、哲学、经济、科学、史学、文学、美术等各个方面。启蒙思想家们用知识、科学启迪人们的心智，反对愚昧无知、传统偏见，打破旧的风俗习惯。
12. **John James Audubon:** 约翰·詹姆斯·奥杜邦（1785–1851），美国鸟类学家、博物学家。
13. **Spencer Baird:** 斯潘塞·贝尔德（1823–1887），美国动物学家。
14. **Inventories of vertebrate animals became so complete that subsequent discoveries of new species became media events:** 脊椎动物的目录已经非常完整，如果再发现新的物种就会在社会上引起轰动。本句中的became media event是比喻的用法，意为“成为媒体宣传的大事”。
15. **Cook:** 库克（James Cook, 1728–1779），英国探险家、航海家、制图员。
16. **Vancouver:** 温哥华（George Vancouver, 1758–1798)，英国探险家、航海家。
17. **La Pérouse:** 拉普鲁斯（1741–1788?)，法国探险家。
18. **Humboldt:** 洪堡（1769–1859），德国博物学家、探险家。
19. **Bougainville:** 布干维尔（1729–1811)，法国探险家。
20. **Murchison:** 穆奇森（1792–1871)，英国地质学家。
21. **Lewis:** 路易斯（Meriwether Lewis, 1774–1809），美国探险家。
22. **Clark:** 克拉克（William Clark, 1770–1838），美国探险家。

23. **Harriman Alaska Expedition:** 哈里曼·阿拉斯加探险。1899年，由铁路大亨和金融家哈里曼在阿拉斯加组织的一次探险活动，此后发表了大量科研文章。

Exercises

I. Answer the following questions.

1. Why is biodiversity an issue that has attracted so much attention these days?
2. What is the relation between the study of biodiversity and species collection?
3. What is the attitude of the author toward the collectors of species throughout the history?
4. Why does the author call the history of collecting science a "black box"?
5. What questions does the author intend to answer in this book?

II. The following statements are incomplete. Search the missing information in the passage and fill in the blanks.

1. The greatest number of living things on earth are ___________.
2. According to Wilson, perhaps ___________ species (mostly insects) go extinct each year in tropical forests.
3. The science of species inventory started in the ___________ century.
4. Species collectors usually travel light and depend on ___________ for information and support, making survey collecting a diversely social experience.
5. Species collecting requires not only book knowledge but also ___________ of woodcraft and logistics and ___________ of animal habits and habitats.
6. The cycles of species collecting and naming vary a good deal from one group of animals to another, depending on their ___________ and ___________ to us.
7. It seems that the development of ___________ steam travel promoted species collecting and naming in the early nineteenth century.
8. It was in the age of survey that scientists became fully aware of the world's ___________.

III. Identify the implied meanings of the underlined parts of the following sentences according to the context of the passage, and translate the sentences into Chinese.

1. We depend on those few among us who collect, describe, name, and classify <u>our fellow passengers on the global ark</u>.
2. "Though they have sometimes been contemptuously referred to as 'taxonomic hay' by other biologists," Anderson concluded, "herbarium specimens can be quite <u>romantic</u> in their own dry way."
3. Remarkably little has been written about the craft and social history of scientific collecting: it remains a "<u>black box</u>".

4. Since the mid-twentieth century the pace of discovery of new vertebrate species has been a fitful trickle (though lists of invertebrates grow ever longer).
5. Rodents, in contrast, were hardly known to Linnaean describers and not fully known to science until the age of survey, when it first became apparent just how prolific of species this group has been—it would appear that the Creator loves rodents as well as He does beetles.
6. In places that were explored but not intensively worked, like the American West or much of South America, faunas and floras that had seemed closed books were reopened and vastly expanded.
7. It is a commonplace (and doubtless true, as well) that early modern naturalists were inspired by the flood of new knowledge that was a by-product of the expanding global reach of European trade and conquest.
8. If trade has followed flags, so also have naturalists and collectors.
9. Inventories of vertebrate animals became so complete that subsequent discoveries of new species became media events.
10. It is the dramatic explorations of the earlier periods that have caught the eye, because they were designed to catch the eye—of investors, princes, publishers, readers, chroniclers.

Translation Techniques (1)

Watch out the "Pitfalls" in Technical Translation

（警惕科技翻译中的"陷阱"）

An English word may have different meanings when it is used in everyday conversations and in scientific papers. This kind of words are just like "pitfalls", which may mislead you and cause inaccuracy or even errors in your translation. For example, if you look up the word *crown* in a general-purpose or non-technical dictionary, it may only provide the meaning as "ornamental head-dress made of gold, jewels, etc. worn by a king or queen on official occasions" (王冠、皇冠). Obviously, this meaning is not appropriate for translating "the *crown* of the tree" because in botany *crown* often means "the upper part of a tree, which includes the branches and leaves" (树冠). Another example is the word *solution*, which means "answer to a problem or a question" (解决方法) when used in everyday life situations, but in chemistry it means "liquid in which something is dissolved" (溶液). Similarly, in steel industry, *pig* is no longer the animal that we are so familiar with but "ingot" (铸块) or "mould" (铸模).

If somebody says, "Through the keyhole, Tom saw the strange animal," you certainly know that keyhole in this sentence means "the hole in the door through which a key can be put for locking and unlocking the door" (锁孔); however, when the word is used in medicine and combined with the word *surgery*, the same translation will puzzle the readers—*keyhole surgery* should be translated as 针孔手术.

To make the matter more complicated, the same English word may be translated differently in different fields of science or professions. For example, the word *family* in zoology is usually translated as 科 (for example, *the cat family* 猫科动物), while in linguistics the same word is often translated as 语系 (for example, *the Indo-European family of languages* 印欧语系).

Similarly, one Chinese word can be translated into different English words in different situations. Take the word *tu* (图) for example. It can be translated into English as *figure, diagram, graph, plot, view, pattern, drawing, map, sketch, layout, line, scheme, draft, delineation, image, plan, detail, project, etc.*, depending on what kind of *tu* you are talking about.

IV. Translate the following sentences into Chinese. Pay attention to the meanings of the italicized words and expressions, which may be misleading.

1. Among the vertebrates, *bony fishes* are the largest group, with 18,150 species, leaving aside the 63 species of jawless fishes and the 843 cartilaginous fishes (lampreys, sharks).
2. Wilson estimates that perhaps 17,500 species (mostly insects) go extinct each year in tropical forests, and that we humans have accelerated the historical rate of extinction *by a factor of one thousand to ten thousand*.
3. There is concern, too, that in our ignorance we may be destroying species vital to the *fabric of ecosystems* on which we depend for our own survival.
4. Though people have always named plants and animals, the science of species inventory is relatively new, beginning with the Big Bang of Carl von Linne's invention of the (Linnaean) binomial system of naming in the mid-eighteenth century.
5. The botanist Edgar Anderson once did an experiment, in which he took a *manila folder* at random from an herbarium case (a Southwestern grass, it turned out to be), to discover the kinds of people who had collected the specimens.
6. Modern natural history is an *exacting science* whose practitioners must also cope and improvise in difficult field conditions.
7. And because of that diversity, the identity of scientific collectors has been less fixed than that of *laboratory workers*.
8. These include birds, carnivores, primates, and large *game*.

Translation Techniques (2)

Amplification（增词法）

Although there should be no addition or subtraction in the meanings conveyed from one language to the other in translation, it is often necessary to reveal the meaning hidden in the original versions by adopting the technique of amplification—adding certain words or expressions—to make the translation more accurate and idiomatic. Amplification is also needed to make the logical relations explicit in the translated versions.

Amplification is adopted when some words are omitted in the original version, when a pronoun is used in the English sentence, or when the meaning is implied but can be understood in the original language. For example:

原文 Biodiversity is a lively issue these days, mainly because of the number of species that are going extinct, either by natural causes, or because we space-hungry humans are destroying their habitats. (*Paragraph 2*)

Compare the following translations:

译文1 近来生物多样性是热点问题，主要是由于濒临灭绝的物种的数量，或者是自然造成的，或者是因为缺乏空间的人类将其生境破坏了。

译文2 近来生物多样性已成为热点问题，其主要原因是越来越多的物种濒临灭绝，这种情况与自然有关，也与人类因争夺空间而造成物种生境丧失有关。

It can be seen that the second translation is much better than the first one because such expressions as 已成为，越来越多的，这种情况与……有关，也与……有关 are used, and the pronoun "their" in "their habitats" is specified by 物种, so that the meaning is more accurate and clearer. For another example:

原文 Collecting is an activity that has engaged diverse sorts of people—unlike laboratory science, which is restricted to a relatively few approved types. (*Paragraph 5*)

译文 物种收集与实验室科学不同，前者是各种不同人员参与的活动，而后者则只涉及很少几类经过挑选的人员。

The words added in the translation are 物种，前者是，而后者则是，and 人员 at the end of the sentence. It should also be noted that some changes have been made in the structure of the sentence as well.

V. **Discuss the translation technique and the ways of applying the technique to the translation of the following sentences. Complete each of the Chinese translations.**

1. Engineers predict that the new technique will make integrated optical circuits smaller, faster and cheaper.（工程师们预言，这项新技术将使集成光纤线路___________更小，___________更快，___________更低。）
2. Artificial intelligence is the key to a successful robot, but some of the simplest tasks for a human mind are difficult for a robot.（人工智能是保证机器人功能优良的关键，但是有些对人脑来说___________，放到机器人身上___________。）
3. New data show that the prevalence of advanced diseases in developed countries might be declining—an optimistic note.（一些新资料表明在发达国家，晚期疾病的发病率可能正在下降，___________乐观的现象。）
4. The prevalence of periodontitis increases with age.（牙周炎的患病率随年龄的___________而升高。）
5. Thanks to these new treatments, people with high blood pressure can live long and active lives.（由于有了这些新的治疗方法，高血压患者也能够长寿，___________积极的生活。）
6. The instruments contained in the probe will measure the temperature and pressure of the atmosphere, analyze the composition of atmospheric gases, and possibly even detect lightning.（探查器所携带的仪器和设备将测量大气的温度和压力，分析大气中所含气体的成分，如有可能甚至探测大气中的闪电___________。）
7. During the decade researchers will identify more and more human genes and the traits they govern.（在这10年中，研究人员将要鉴定越来越多的人类基因，并___________它们所影响的遗传特性。）
8. This theory is usually expressed in the famous formula: $E=mc^2$. E stands for energy, m for the mass, and c for the speed of light.（该理论通常用这个著名的公式$E=mc^2$来表示。___________，E代表能量，m___________质量，c___________光速。）

VI. **Translate the following sentences into Chinese. Pay attention to how the technique of amplification should be used.**

1. Collecting parties usually travel light and depend on local inhabitants for information and support, making survey collecting a diversely social experience.
2. Of all the field sciences, natural history survey is an exceptionally inviting subject—because the work of systematic, scientific collecting is so varied.
3. It is also clear that the early-nineteenth-century flowering of collecting and naming resulted from the greater affordability of transoceanic steam travel and from European imperial expansion and settlement, especially in the rich tropical environments of the southern hemisphere.

4. We do not think of the late nineteenth and early twentieth centuries as being a great age of discovery in natural history; but they were.
5. Scientific collecting in the age of survey was accomplished mostly by small parties (three to half a dozen) whose purpose was to send back not exotica and accounts of heroic adventure and discovery, but rather crates of specimens.

VII. Translate the following passage into Chinese.

Another limitation of this history is that it treats mainly vertebrate zoology and some botany, but insects and other invertebrates hardly at all. This is not an arbitrary limitation: survey collecting in my period, especially by museums, concentrated on vertebrate animals, because scientific fieldwork piggybacked on collecting for exhibits of vertebrate animals. (Insects, plants, and mollusks did not have quite the same potential for eye-catching displays.) In addition, invertebrates are discouragingly numerous for comprehensive survey inventories, and they remained the province of amateur specialists long after vertebrate animals became the objects of organized survey. Invertebrates have recently become the object of systematic inventory, but in ways quite different from earlier surveys.

Like any scientific (or any cultural) practice, natural history survey had its particular period and life cycle. It arose out of a particular set of environmental, cultural, and scientific circumstances; ran its course; then gave way to new and different ways of studying nature's diversity. It was especially well developed in the United States, though not exclusively there. My aim is to describe what natural history survey was in its heyday, the reasons it flourished where it did, and how it worked in practice.

VIII. Translate the following passage into English.

生物多样性

生物多样性指在某一特定的生态系统内生活的不同物种的数量。科学家对现存物种数量的估计各不相同，从300万种到3,000万种不等，其中250万种已进行了分类，包括90万种昆虫，41,000种脊椎动物，25万种植物，其余是无脊椎动物、真菌类、藻类和微生物。尽管还有尚未发现的物种，然而许多物种由于滥伐森林、污染以及建立人类居住区而濒临灭绝。

生物多样性主要集中在热带地区，特别是林区。处于平衡状态的生境意味着现有物种的数量与资源处于平衡状态。生物多样性受到资源、繁殖力与气候的影响。某一生物多样性的生境越原始，就越能更好地承受自然或人类带来的变迁或威胁，因为这种变迁可以通过生境内其他地方的调整加以平衡；遭到破坏的生境可能由于某一单一物种的灭绝，造成食物链的断裂，而最终消逝。由此可见，生物多样性有助于防止物种的灭绝，保持自然平衡。1992年，在联合国环境与发展大会上，150多个国家签署了保护地球生物多样性条约。

Section 2 Reading for Academic Purposes

In your research work, you may need to consult the studies of the others frequently or your supervisor may ask you to increase your knowledge and understanding of a subject by reading comprehensively. In the library you may find many of the scientific documents published in the form of monographs.

Then, what is a monograph?

According to Oxford Advanced Learner's English-Chinese Dictionary, *a monograph is "detailed scholarly study of one subject". However, the above definition does not provide us with much idea about monograph. A more detailed description of monograph was made by National Research Council Canada (NRC) in the following passage with an extended definition.*

Monograph

专著

What Is a Monograph?

1 A **monograph** is a specialized scientific book. As **learned treatises** on clearly defined topics, which may be **intra-**, **inter-**, or **cross-disciplinary**, monographs generally are written by specialists for the benefit of other specialists. Although usually regarded as a component of the **review literature** of science, monographs are works that demand the highest standards of **scholarship**. Their preparation calls for exceptional breadth and depth of knowledge on the part of their authors, who, **inter alia**, must be able to collect, **collate**, analyze, integrate, and **synthesize** all relevant contributions to the **archival** literature of the scientific and engineering journals and to add original material as required. The value of monographs lies in the **coherence** and comprehensiveness of the information and knowledge they contain, which is important to the specialized researchers to whom they are directed and, therefore, to the **advancement** of science and engineering generally. Most monographic **manuscripts** are critically reviewed and tightly edited. The resulting books can be expected to have a reasonably long **shelf life**.

monograph *n*. 专著
learned *adj*. 学术性的
treatise *n*. (专题）论文
intra- [构词成分] 在内，内部
inter- [构词成分] 表示"在……之间"
cross-disciplinary *adj*. 交叉学科的
review literature 评论性的著作或文献
scholarship *n*. 学问；学识；学术成就
inter alia [拉丁] 除了其他事物之外
collate *v*. 检点并整理（信息、书页等）
synthesize *v*. 合成
archival *adj*. 档案的，案卷的
coherence *n*. 连贯性；一致性
advancement *n*. 前进；进步
manuscript *n*. 原稿；草稿
shelf life *n*. 贮存寿命（物品的保存期限）

2 Monographs commonly are confused with other kinds of books; hence, some distinctions need to be drawn. Textbooks are **pedagogical** works which, even if written on fairly narrow subjects, are designed to serve broader and more junior readerships than specialized research communities. Textbooks are not monographs.

pedagogical *adj*. 教学法的

Neither are most books of **conference proceedings**, even though they may deal with specialized topics and be directed at specialized communities. Together with abstracts and the increasingly common "expanded abstracts", conference papers, valuable and necessary as they may be, commonly take the form of **premature** announcements of new scientific discoveries. Many are subsequently expanded and rendered in a form suitable for the scientific and engineering journals. Conference proceedings generally have a short shelf life. Certain books of scientific papers, which involve conference presentation in the course of their preparation, stand as notable exceptions, however, to the **foregoing** description of the conference literature. The papers in such books are designed from **inception** to review and **augment** existing knowledge of particular aspects of a specialized, **unitary** topic. The papers are prepared for inclusion more or less as "chapters" in a carefully planned and structured volume, and their conference presentation is intended primarily as a means of allowing invited contributors to the book to come together to discuss critically with one another the material they intend to include in their published "chapters". Many books produced in this way are indeed monographs, distinguished simply by having an unusually large number of authors.

conference proceedings 学术会议论文集
premature *adj*. 提前的；过早的；未到期的
foregoing *adj*. 在前的；上述的
inception *n*. 开始；开端
augment *v*. 增多；增大；增加
unitary *adj*. 单一的；一元的

3 In summary, therefore, monographs are generally regarded as scientific treatises of book length but otherwise variable format prepared by **acknowledged** experts on specialized topics for the benefit of others who have specialized in, or who wish to obtain a specialist's appreciation of, these topics. Monographs are externally reviewed and tightly edited. Textbooks and most volumes of conference proceedings are not monographs. As a component of the review literature in science and engineering, monographs **facilitate** the advancement of these fields of knowledge in a unique and important fashion.

acknowledged *adj*. 公认的，得到普通承认的
facilitate *v*. 促进

The Main Components of a Monograph

4 In the era of "information explosion", you will find numerous books which relate to your research field directly or indirectly, and it is impossible, and often unnecessary, to read all of them from cover to cover. Therefore, previewing (going over the main parts of the book or browsing initially) is an important procedure before you study a certain book closely. Previewing is helpful in extracting information from books.

It saves time, provides you with important details, and gives you an overview. Each part of a book can yield useful information—as follows.

1. The author

This is a key item for identifying a book or recalling it later. It is important to know the author of a book when quoting from it. Always make a note of the author's full name.

2. Title and subtitle

The title should give you some idea of the book's content. If it doesn't, the subtitle might offer an explanation. Subtitles are particularly important if the main title is a quotation. Make a note of both for a full record in your notes.

3. Date of publication

This tells you when the book was first published. It may be important if you need information which is up-to-date. For full accuracy, make a note of the edition. The number of editions is an indication of the book's success.

4. Dust cover or blurb

On any serious book, this is more than just advertising. It gives you a rapid overview of the contents and approach. It might also say what the book contains and for whom it is written.

5. Contents page (or chapter headings)

This should be a list of the topics covered by the book. It might also have details of the sub-sections in each chapter. It's useful for knowing how useful the book will be for your needs.

6. Bibliography and index

These are usually included in any book intended for serious use. The bibliography is a list of books consulted by the author. It might also include suggestions for further reading. An index lists topics mentioned in the book with page references.

7. Illustrations

These might cover statistics, tables, graphs, diagrams, or pictures. This information should be clearly presented.

8. Preface or introduction

This provides an overview of the contents and the author's approach. At this point, authors say what their book is about, how the book came into being, or how the idea for the book was developed; this is often followed by thanks and acknowledgments to people who were helpful to the author during the time of writing.

Exercises

I. Read the passage and decide whether the following statements are true or false. Write T for True and F for False in the brackets.

1. Monographs are usually the scientific books that deal with the topics of certain areas or the areas which are related to one another. (   )
2. Most authors of the monographs are editors of the scientific and engineering journals. (   )
3. The authors of monographs should have rich knowledge and the ability to do research. (   )
4. Textbooks belong to the category of monographs. (   )
5. Textbooks are written on narrower subjects than those of monographs. (   )
6. Many books of conference proceedings are not monographs because they discuss new scientific discoveries. (   )
7. Only those conference proceedings which have a large number of authors are monographs. (   )
8. Different topics often lead to different format of monographs. (   )
9. Monographs are read by more readers because they are kept longer than other books in the library. (   )
10. The "acknowledged experts" in the passage means the experts who are rich in knowledge. (   )

II. Read the passage again, and complete the following items.

1. The general definition of a monograph: ___________
2. The value of monographs for scientific researches: ___________
3. The qualities of the authors of monographs: ___________
4. The differences between monographs and textbooks: ___________
5. The differences between monographs and books of conference proceedings: ___________
6. The main components of a monograph: ___________
7. An indication of the book's success: ___________
8. The function of the blurb: ___________

Quotations from Great Scientists

Anyone who has never made a mistake has never tried anything new.

—Albert Einstein

一个从未犯过错误的人也从未尝试过新的事物。

——阿尔伯特·爱因斯坦