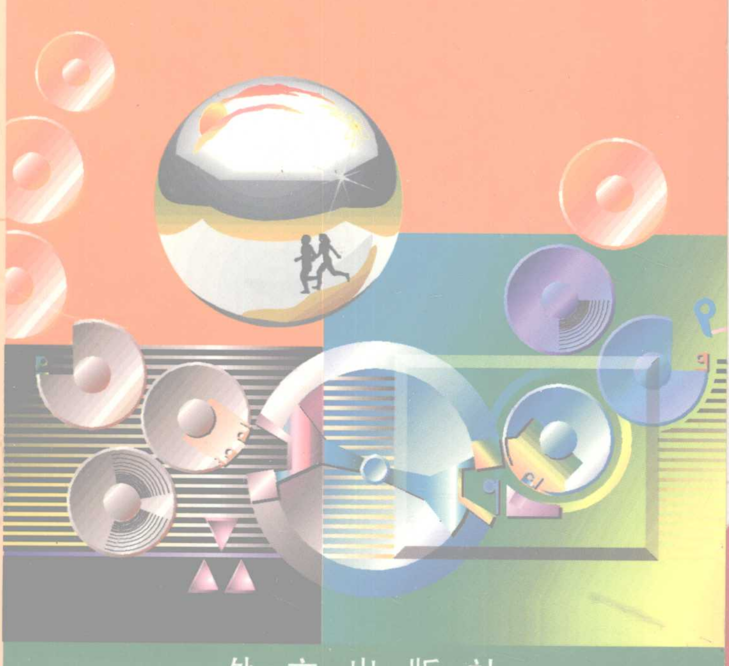
ERUDITE ENGLISH READINGS

阅读

博古通今英语

V



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前　言

“博古通今英语阅读”的编写宗旨是为我国大学生提高英语阅读能力、扩大常用词汇量、增长知识、为以后阅读英语文献奠定坚实的基础。“博古通今英语阅读”的内容涉及古今中外；题材新颖、有趣；涵盖面广，但又并非过于专业化而高深莫测，因而适用于任何专业的大学生。尤其对于准备参加英语四、六级考试和“托福”考试的大学生，这确是一本不可多得的备考书目，而英语自学者也一定会从中获益匪浅。

对于外语教学，教育界一致的意见是要注重“阅读”，因为阅读是“基本功”，是“听”，“说”，“写”，“译”的基础。阅读是最低要求，也最容易做到——只要有适合的读物和词典。但学习者要从浩如烟海的英文书、刊、报纸中获得适合自己的、实用的英语读物并非易事，沉重的经济负担也是个问题。目前教育界同仁深感缺乏适用于教学的英语读物，不利于提高学生的素质。本书正是为了解决这一问题，满足这一需求而编写的。

本书在题材选取、课文编写、词汇范围、知识结构等诸方面都注重知识性、趣味性、可读性、实用性、时效性、示范性、可模仿性；而内容充实、语言规范、逻辑清晰、表现力强又是本书的显著优点。同时，为了节省学习者查阅词典的精力和时间，准确地理解词义和课文，每课都附有词汇表（包括词和词组、国际音标、词性、简明汉语释义）。对于一些课文中的较复杂的语言现象和提到的历史人物、事件及自然科学等一些问题，在附注中以汉语作必要

的、简练的讲解。毫无疑问，本书适应我国英语学习者的需求（学英语、长知识、增才干、备考试），是一本物有所值的英语读物。但是编者并不认为此书尽善尽美，并衷心地期望广大师生在教与学的实践中检验之，使之日臻完美。

何 兆 枢

关于本书

《科技新世界》是"博古通今英语阅读"的第5册。它的宗旨是为我国大学生提供切合实际的科技英语教材。其内容包括：(1)科学技术解决世界面临的迫切问题(2)最新科技成就(3)计算机在现代社会的广泛应用(4)生物工程。这些题材都是人们特别是青年学子普遍关心和感兴趣的。本书中，作者可谓用心良苦，力求采用通俗化的方法处理这些高深的题材，避开深奥的理论，注重实例，并且在每课课文后附加 Notes(以中文讲解一些较复杂的专业知识和语言现象)、Comprehension Questions 和词汇表，目的是让任何专业的大学生和一般读者都能够理解。学生阅读本书，只要细心钻研，培养阅读英文文章的兴趣，就可以扩大实用科技的知识面，并学到与多种专业有关的英语词汇，熟悉英语科技文章的风格和特点，为以后阅读自己专业的英语科技文献奠定基础。具有相当专业知识的读者可以轻松地阅读和正确地理解课文，独立解决疑难问题。如果把它作为大学科技英语教材，在教师的指导下，学生更能学得扎实，学有所获。

本书作者从多年在大学里从事的教学工作中，感受到我国的大学生应该扩大知识面，特别是在科技方面要多看些英文资料，直接吸取国外的先进科技成果以及进步的科学思想方法，施展于蓬勃变革的时代，服务于迅猛发展的中国。这就要求改革我们的英语教学，引导学生注重学习科技英语。二十多年的改革开放，深刻地改变了中国人的生活和求知的观念，而且，未来的改变必

将加速和扩展。到了今天，对于外国语(尤其是英语)的学习和应用，已经不可以止步于泛泛地交谈的工具；高科技领域的发展，要求投身其中的青年人，不仅仅掌握通用的对话手段，同时，还须驾驭专业的语言、内容、技巧和思维。各个行业，特别是高科技业界，越来越强调对专业人员实施“专业资质认证制度”；这催促着现在的学习者将专业外语——正如本书涉及的科技英语，作为基础学习阶段的必修内容。换句话说，进入新世纪，大学生仅仅拥有常规的大学通用英语学习经历显然是不够的；科技英语，应该也一定会成为我国高等教育教与学的需求，因为，这是社会与教育之间必然的互动结果。

看懂科技文章的确比较困难，因为这涉及许多科技专业知识，不仅仅是英语的问题。写作科技英语教材更是困难，因为作者既要懂英语又要掌握科技知识，而且科技的门类是那么广泛，即使懂一点皮毛也不容易啊！怎么办呢？摘取英、美学者写的学术论文？不行，因为它们涉及的专业知识太深奥；自己都未必懂，又怎能要求广大学生读懂？只写些诸如“信鸽为什么能飞回家”“骆驼为什么可以在沙漠里长途跋涉”之类的课文？这些题材虽然易懂，也很有趣，但离实用的要求太远，也不行。有鉴于此，本书的两位作者尝试另辟蹊径，写成这本可供我国各类大学、多种专业使用的科技英语教材。是否恰当，尚需实践检验，尚望学界同仁不吝赐教。

何兆枢

怎样阅读本书？

阅读基本上是个自学过程。一般可以分为“精读”和“泛读”两类。

“精读”的主要目的是学习，包括词汇、词组、发音、成语、习惯用法、语法、句型、表达方法、写作风格等。获取信息是次要的目的。

精读的特点是“精”，“宁精勿滥”。学习者要仔细看课文，认真思考，做到真正理解，切忌囫囵吞枣。遇到不认识的词要查词典或词汇表，不要猜。最好写点读书笔记，至少在阅读过的材料上划出要记忆的东西。

精读不要求快，能快则快，不能快则慢；也不要求每次看很多，能看多少就看多少。

精读要持之以恒；学过的东西要复习，反复看，加强记忆。我主张学生朗读课文(但不必高声叫喊，以免妨碍他人，损坏自己的嗓子)，并进一步记诵精采的段落。这就是“熟读唐诗三百首，不会吟诗也会吟。”

“泛读”的主要目的是获取信息，学习是次要的目的。泛读要训练学生在短时间内从大量阅读材料中获取准确、有用信息的能力。这种能力在现代信息社会里是必不可少的，在考试中也常遇到这种情况。泛读的主要方法是浏览和扫描，但并非泛泛地读、漫不经心地读。遇到不认识的词或词组，可以根据上下文去猜。泛读的结果应是一篇读书札记，总结阅读材料的主题、主要论点、

逻辑、结论。泛读既要求阅读速度高又能抓住要点和逻辑，这就要求阅读者掌握大量的词汇（学生在练习阶段可预习词汇表，以弥补词汇量之不足），熟悉语法，还要有良好的短期记忆力。这些都可以通过长期、认真的训练来培养。

精读和泛读是相辅相成的。精读是基础，而较强的泛读能力来自长期的精读训练。精读和泛读并进，学生可以根据自己的情况和需要安排适当比例的时间，进行每日的精读和泛读训练。

本书的全部课文既适用于精读，也适用于泛读；细心的读者可以发现哪些课文更适合于精读，哪些更适合于泛读。如果有教师指导，学生更能学得好、学得快、学得扎实。

孔子说："学然后知不足，教然后知困"。愿与天下学子共勉。

何兆枢

目　录

The New World Science and Technology
科技新世界

1. Turning Waste into Surprising Use
变废为宝

Use of Chitin and Chitosan

A natural **polymer**, **chitin**, is the main component of the shells of **crustaceans**, **mollusks** and insects, and is found in cell walls of **fungi** and **algae**, jaws and **spines** of worms. Surprisingly, it is such an obscure, petty substance that drives a thriving industry.[1]

Chemically, chitin is a rather dull molecule. It cannot dissolve in most ordinary **solvents** such as water or alcohol; but it can be broken down slowly by **enzyme**. Bound to **protein**, it forms large and complex molecules with enormously varying purities. Chitin taken from the same animal even varies in the length of its molecular chain, its **crystallinity** and the number of **acetyl** (CH_3CO) **group** attached to its molecular chain.

Heated in very concentrated **sodium hydroxide**, chitin can be converted into a chemical called **chitosan**. Unlike chitin, chitosan dissolves easily in such **acidic** solvents as **acetic** acid. Chitosan has **amino** (NH_2) groups attached to its molecular chain, replacing the acetyl groups in chitin. When dissolved in acids, each group adds a **proton** and becomes $(NH_3)^+$ which renders chitosan molecule a positive electrical charge. This contributes to the extreme effectiveness of the molecule for removing negatively charged **particles** dissolved or **suspended** in water. The **suspension** is **destabilized** when chitosan forms **ionic**, or sometimes hydrogen **bonds** with their molecules, and then **precipitates** out as **insoluble** solids.

Chitin and chitosan are used to purify **contaminated** water, removing suspended solids. They are also good **chelate**, binding to metal atoms, especially those of heavy metals such as mercury, lead and uranium. This property is exploited as the basis of a treatment for **toxic** and **radioactive** wastewater. They can work as **flocculants** for the **clarification** of swimming pools and **spas** as they flocculate microbes and remove metal ions.

But most chitin is now used in paper manufacture. Only one percent by weight of chitin added to **pulp** can increase the strength of the paper and speed up the rate, at which water drains from the pulp[2]. With chitin added in the process, manufacturers can use cheap fibers and save up to 90 percent of the energy used for heating the pulp. Note that the world output of newsprint totaled 172 million tones in 1987.

Chitosan is used to make cosmetics. Japanese and German companies have been using chitosan to make salts soluble in water and cosmetics for skin and hair. Wella, the German cosmetics giant, has experimented with the film-forming property of chitosan for making hair sprays and nail **varnishes** and its thickening effects on making creams and conditioners. Italian Chito-Bios of Ancona sells N-**carboxybutyl** chitosan for making shampoos, bath foams, liquid soaps, toothpaste, personal hygiene detergent and face cream. N-carboxybutyl chitosan is a **derivative** from chitin and is now used as substitute for **hyaluronic** acid commonly used in a component of creams and **lotions**.

Chitin and Chitosan for Medical Use

Chitin and its derivatives can break down slowly to harmless **carbohydrates**, carbon dioxide and water. This is one of the most remarkable properties of chitin and its derivatives. For that, they have found their way to **pharmaceutical** industry. American pharmaceutical company Lescarden of Goshen, New York, found **mats**, fibers, **sponges**, **sutures**, **bandages** and films made of chitin were much better than standard **cartilage**-based ones. An artificial skin made of chitosan-**collagen composite** appears to improve recovery from surgical wounds or burns. In 1983, doctors working at Veterans Administration Medical Center in Omaha found that chitosan could speed up blood **clotting** and used it after blood vessel **grafts** to reduce loss of blood. Also, as chitosan is absorbed completely in the human body, it is an ideal capsule for drugs that must be released slowly.[3]

Chitosan shows a property of **emulsification** which food industry finds useful for making **mayonnaise** and peanut butter. It can be used to make high strength films, ranging from sausage **casings** even to wraps and food packaging. Japanese researchers claimed that chitosan reduced **serum cholesterol**, and added it to biscuits and noodles. Some researchers even think they will be the ingredients of **biodegradable** plastics, which will disintegrate under natural condition and do not damage environment.

Resources

Shellfish waste is the major source of raw material for making chitin/chitosan. As estimated in 1987, the world crustacean harvest was 3.69 million tones. If a crustacean contains an average 1 percent of its wet weight as chitin, about 36,900 tons of chitin can be harvested each year from waste of processing shrimps, prawns, lobsters and crabs. The difficulty involved in collecting the waste seems unlikely to be tackled economically, however.

As shellfish or molluscs contain only 1 percent chitin by weight, it seems **out of the question**[4] to harvest the demanded chitin only from fisheries. Fungal **fermentation** is another possible source of chitin. A wide range of biological micro molecules, including vitamin C and **penicillin** has been produced from fungal fermentation in pharmaceutical industries of most countries. The by-product of that process is chitinous waste, the quantity of which, as estimated by one researcher, is as large as 790,000 tons in 1997. The important point is that this source of chitin is predictable and its quality is controllable.

Seemingly, the **zooplankton** that inhabits the upper layer of the ocean may be the largest untapped source of animal chitin. The Antarctic **krill** has been harvested in rather great quantity.[5] In 1989-90, 375,000 tons of krill caught and processed for its tail meat were mainly for human consumption or for **aquaculture**. 85 percent by weight of the krill goes to waste. Of the waste, 85 percent can be recovered as protein. Almost a quarter of the **deproteinized** waste is chitin, about 3.2 percent of the whole animal. About 90 percent of the chitin can be recovered by conventional extraction techniques. As estimated, the total krill stock in the southern ocean is about 100 to 400 million tons. Several million tons of this stock could be harvested annually without endangering its survival, scientists said. Such a catch would **overshadow** the total world crustacean catch of about 4 million tons each year and would become a major source of chitin.

Looking forward into the future, the chitin/chitosan industry will probably rely more on cheap supplies of waste materials provided by biotechnology than on seafood waste. Genetically engineered **microor-**

ganisms can produce chitin with desirable properties in fixed quantity **immune** to the fluctuating protein market. Chitin can be extracted easily from fungal **hyphae**, and some species of hyphae even contain up to 14 percent by weight of chitosan. These chitosan-producing **strains** would dispense with the **deacetylation** step for converting chitin to chitosan.

Some algae contain pure chitin in their **intracellular** fiber, which can account for 10 to 15 percent of the dry weight of the cells and can be easily separated from the non-chitinous portions. The net yield will be 80 percent. But these strains grow slowly under ordinary conditions. Scientists hope for fast-growing strains that provide large amount of chitin.

Notes:

[1] It is such an obscure petty substance that drives a thriving industry. 这是强调型句子,翻译为"正是这样一种不起眼的、微不足道的物质支持着一种庞大的产业。"It 是一个虚词,作名义主语;真正的主语是 such an obscure petty substance。这种句型在科技英语中经常出现。

[2] at which water drains from the pulp 是带介词 at 的间接定语从句,修饰它前面的名词 speed。至于用什么介词,决定于它要修饰的名词。注意 at 前的",",它是区分间接定语从句的标志。

[3] 被动态句子经常出现在英语科技文章中,原因是行为的主体往往是不知道的或无须知道的;在这种情况下,只能用被动态句子。被动态句子注重行为的结果和状态,而不考究行为的主体是谁。这种例子很多,见以后各课课文,读者要经常注意。

[4] out of the question 和 out of question,一字之差,意思相反。前者的意思是"不可能的,办不到的,不必谈的",而后者的意思