基础科学

（科技英语注释读物）

BASIC SCIENCE

上海外语教育出版社

科技英语注释读物

基础科学

Basic Science

机械工业部部属院校编

上海外语教育出版社

科技英语注释读物

基础科学

Basic Science

机械工业部部属院校编

上海外语教育出版社出版
（上海东体育会路166号）
上海市印刷三厂印刷
新华书店上海发行所发行

787×1092毫米　1/32　4印张　84千字
1983年10月第1版　1983年10月第1次印刷
印数：1—20,000册

统一书号：7218·090　定价：0.44元

前　言

本注释读物是由机械工业部部属院校英语学科协作组组织编写的。目的是为理工科大学低年级学生，以及广大科技工作者，提供一本比较合适的、以基础科学浅说为主要内容的英语读物。凡稍学过英语、掌握最基本语法知识和约800个单词的读者，都能通过本书的学习，提高自己的阅读能力，向直接阅读国外一般科技原著过渡。

本读物取材于美国新近出版的一些科普读物。编者作了某些加工与整理，使之更适合我国读者。本读物的特点是用词简洁，文句流畅，内容浅易，图文并重，饶有趣味。读者阅读本书，可以学到地道的英语。

在结构上，按内容的连贯性将四十五篇短文编成五大章，并依语言的难易程度，由浅入深地编排章次。每章内容连贯，词汇复现率高，有利于读者理解课文和记忆单词。

在注释上，着重分析语言难点，并提供难句参考译文。注释尽量简明扼要，深入浅出，为阅读提供方便。

书末附有词汇总表，单词根据本书出现时的上下文进行释义，注明词类，并加注国际音标。

在本读物的编写过程中，机械工业部部属院校许多外语教研室都给予了不少支持和关注。协作组秘书单位上海机械学院公共英语教研室组织了编审会议，与会代表对本书的编写提出了许多有益的建议和意见。为此，谨向他们表示衷心

的感谢。

本读物由合肥工业大学冯韵芳(主编)、田学玲、斯章卿等同志编写。

由上海机械学院戴炜华、陈开明(主审)、湖南大学陈湘霏、沈阳机电学院冯玉桐、上海机械学院轻工分院胡中堂、南京机器制造学校张伯华、湘潭电机制造学校龙友云等同志审校。

由于编者水平有限，书中缺点和错误在所难免，希望读者批评指正。

编　者

1983年7月

CONTENTS

CHAPTER ONE

THE SCIENTIST AT WORK

1. What Is Science?

What is science? Have you ever asked yourself that question? Have you ever wondered about science and scientists?

Science, we know[1], is organized knowledge.[2] That is,[3] science consists of known facts. If you know that air contains oxygen, you know some science. But science is more than[4] a group of facts. It is also a way of doing things.

Someone has said that science is what scientists do.[5] That is a simple definition. At first you may think it is too simple. But this simple definition is really a good one.[6] It has a great deal of[7] meaning to it.

To understand science[8], we must know what the scientist does. We must know how he works.

The scientist has a special way of doing things. We call his way of working the scientific method.

The scientific method can be explained in different ways. We can break it down into[9] six separate steps.

For the moment,[10] let's say that the scientific method consists of two important activities: (1) observation and (2) experimentation.

Notes

1. we know: 作插入语。
2. organized knowledge: 系统化的知识。
   此处 organized 为过去分词，作定语，修饰 knowledge。
3. That is: 那就是，即。作插入语。
4. more than: 不仅，不只。Science is more than a group of facts. 科学不仅是罗列一堆事实。
5. what scientists do: 科学家所从事的工作。作表语从句，what 没有疑问意味，它相当于 the thing(s) which。
6. one 是不定代词，代替前面已经出现过的名词 definition。
7. It has a great deal of meaning to it: 这一简单的定义说明了科学的许多含义。短语 a great deal of 意为"很多，大量"，后跟不可数名词。句尾的代词 it 是指 science 而言。
8. To understand science: 为了懂得科学。这是动词不定式短语，作目的状语，放在句首有强调之意。
9. break down: 细分。
10. For the moment: 目前；暂且。

2. Observation

Science begins with[1] observation. This is the first big step of the scientific method. You must observe what you want to study.[2] If you cannot observe your problem, you cannot use the scientific method.

What does OBSERVE mean? Does observation take in[3] only those things you see with your eyes?[4] Or does it have a broader meaning? Does the scientist observe things he cannot see?[5]

Yes, he does. To observe the world around him,[6] the scientist uses all his senses.[7] He looks closely at things. But he also observes with his sense of hearing. He observes with his sense of smell, his sense of taste, and his sense of touch.

The scientist looks and listens. He tastes and smells. He feels the things he studies.[8] Some things, he knows, can be learned only by touching. Other facts come to light[9] only through taste or smell. Things may be heard but not seen.

Notes

1. begins with: 从…做起。
2. what you want to study: 你要研究的东西，作宾语从句。
3. take in: 包括。
4. you see with your eyes 是定语从句，用来修饰 those things, 句中省略了关系代词 that。关系代词在定语从句中作宾语时往往省略。
5. he cannot see 是定语从句，用来修饰 things。
6. To observe the world around him 是动词不定式短语，用作目的状语。
7. all his senses 即 the senses of sight, hearing, smell, taste and touch（视觉、听觉、嗅觉、味觉和触觉。）
8. He feels the things he studies: 他触摸他要研究的东西。句中 he studies 是定语从句，用来修饰 the things。
9. come to light: 显露；变得清楚。

3. Instruments

A scientist uses instruments to make observations. An instrument is a tool. The scientist uses many instruments.

He uses the microscope, the telescope, and the thermometer. He also uses radio, radar, and television to make observations. He uses many different instruments.

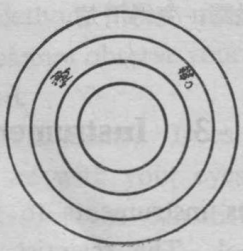
Each instrument makes different kinds of observations. Take radar, for example. At first we may not think of radar as[1] a scientific instrument. But it is. It helps the scientist to "see" things that are far away.[2]

Radar sends out radio waves.[3] The waves "hit" an object many miles away.[4] The waves bounce back[5] to the radar receiver. The returning waves can be seen as bits of light on the radar screen.[6] The radar operator calls these bits of light a"blip".

Look at the picture. See the "blip" on the radar screen. The "blip" comes from an airplane miles away, we do not see the airplane. But we see the "blip". With radar, we can observe the airplane.

Sometimes more than one "blip" shows up.[7] The second "blip" may be a huge flight of birds.[8] The radar operator knows how to read the "blips",[9] He can tell the birds from[10] the airplanes.

The scientist must know his instruments. He must "read" his observations accurately.[11]



Notes

1. think of ... as ...: 把…视为…。
2. that are far away: 定语从句，修饰 things. far away 意为"远处"。
3. send out radio waves: 发射无线电波。
4. The waves "hit" an object many miles away: 无线电波"击中"许多英里以外的目标。
5. bounce back: 反跳，反射回来。
6. The returning waves can be seen as bits of light on the radar screen: 人们可以在雷达屏上看到以光点形式显示出来的回波。这里 as 是介词，意为"作为"。
7. shows up: 显示出来；出现。
8. a huge flight of birds: 一大群飞鸟。
9. how to read the "blips": 如何识别这些可视信号。
10. tell ... from ...: 辨别，分辨。
11. "read" his observations accurately: 准确地识别所观察到的各种现象。

4. Questions

Everybody makes observations. But not everybody asks questions about his observations. The scientist is curious. He is always asking questions as he makes observations.[1] He often asks himself questions. The scientist is a "question asker."

Anyone can ask questions. But the scientist learns to ask good questions. His questions are usually "How?" or "What?" questions. Scientists do best with "How?" and

"What?" questions.[2] They usually get an answer when they ask "How?" or "What?"

Have you ever asked a "How?" or "What?" question? You probably have. Make a list[3] of some of the questions you have asked.

Are there questions like the following on your list?[4]

— What is the shape of a rain-drop?
— What are shooting stars?[5]
— What is radar?
— How was coal formed?
— How many stars are there in the sky?
— How old is the earth?
— How are diamonds formed?
— What is electricity?

Notes

1. He is always asking questions as he makes observations: 科学家在进行观察时总是提出各种各样的问题。句中 "is always asking" 比用一般现在时富有感情色彩，这里表示对科学家善于提问的一种赞许。连接词 as 引出一个时间状语从句。
2. Scientists do best with "How?" and "What?" questions: 科学家最善于处理"如何?""什么?"这类问题。
3. make a list: 列一张表。
4. Are there questions like the following on your list? 在你所列的表上有无类似下列这些问题? 这里 like 是介词，意为"象"。
5. shooting stars: 流星。

5. Experimenting

The scientific method is a way of solving problems. A problem is an unanswered[1] question. To solve a problem, we

must answer questions.

Observations are important. They are important in finding answers to problems.[2] The scientist is careful to make accurate observations.[3] He knows that his answer is only as good as the observations he makes.[4]

You too must be careful. Sometimes people see only what they want to see.[5] They are careless about their observations.[6]

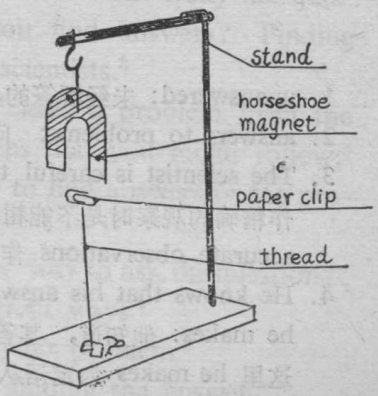
Suppose you make a poor observation. You then may never solve the problem. Your questions will go unanswered.[7]

Good observation means that you must see only what is there.[8] An experiment will help you to see how well you observe.[9] Your teacher will do the experiment. Watch your teacher. Write down what you observe. Write down what the teacher does. Make notes on what happens.[10]

Experiment

You will need: Stand, thread, paper clip, horseshoe magnet, piece of wood, piece of paper, tin from a tin can.

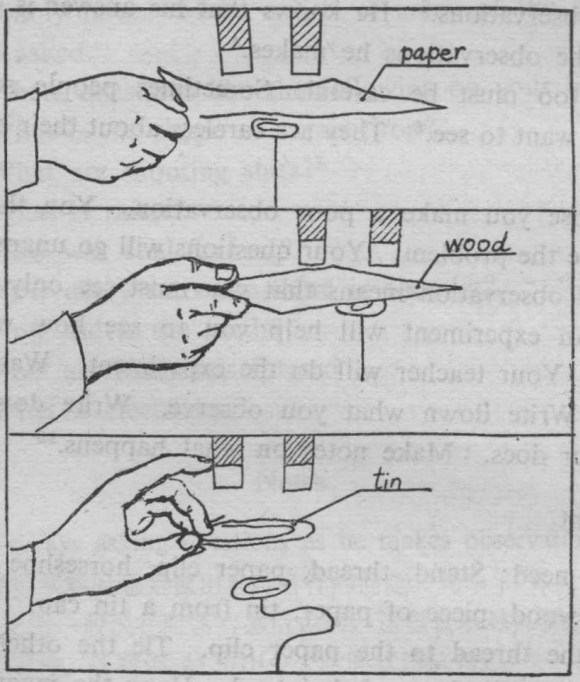
Tie the thread to the paper clip. Tie the other end of the thread to the base of the stand. Hang the magnet from the top of the stand. Let the magnet pull the paper clip into the air.



Now put the piece of paper between the magnet and the paper clip. What happens? Put the piece of wood between the magnet and the paper clip. Put the piece of tin between the magnet and the paper clip.

What happens?

Check your observations carefully. What have you learned from this experiment?



Notes

1. unanswered: 未经解答的。 un- 为否定前缀。
2. answers to problems: 问题的答案。
3. The scientist is careful to make accurate observations: 科学家作精确的观察时是不能粗心大意的。句中不定式短语 to make accurate observations 作状语，修饰 careful。
4. He knows that his answer is only as good as the observations he makes: 他知道，其答案最好也只能和他所作的观察相一致。这里 he makes 为定语从句，修饰 the observations，关系代词

被省略。

5. Sometimes people see only what they want to see: 有时候，人们观察到的只是他们想了解的东西。
6. They are careless about their observations: 他们观察事物粗枝大叶。
7. Your questions will go unanswered: 你的问题就得不到解答。这里 go 的意思是"变为，成为"，相当于 become; unanswered 是形容词，在此作表语。
8. Good observation means that you must see only what is there: 你只有看清了所存在的东西，才算观察得好。这里 that 和 what 各引出一个宾语从句，分别作 means 和 see 的宾语。
9. An experiment will help you to see how well you observe: 做一次实验会有助于你了解你观察的程度如何。
10. Make notes on what happens: 把所发生的一切记下来。这里 what happens 是宾语从句，作介词的宾语，介词 on 意为"关于"。

6. Finding Answers

How do you begin to find answers to problems? This seems like a simple question, doesn't it?[1] But study the question for a moment.[2] How do you find answers? Finding answers is the job of science and scientists.[3]

Take a problem. You might[4] take a problem from the list on page 6. Here are some steps that you might follow.[5] These steps will help you as you try to find answers to the problem.[6]

(1) Ask yourself, "Is this the best way to ask the question?"
(2) State your problem in different ways.[7]
(3) Pick the best statement of your problem.[8]
(4) Now work out a plan[9] for finding the answer.

Notes

1. This seems like a simple question, doesn't it? 看来这好象是一个简单的问题，是吗？
2. study the question for a moment: 把这一问题研究一下。短语 for a moment 意为"一会儿"。
3. Finding answers is the job of science and scientists: 找答案是科学的工作也是科学家的工作。这里 finding answers 是动名词短语，作主语。
4. might: might 是 may 的过去式，但这里不表示过去。这里 might 意思相当于 may，但语气较为婉转。
5. Here are some steps that you might follow. 这里提出几个步骤，供你参考。此句为倒装句。即主语在谓语动词的后面。这里 steps 是主语，that you might follow 是定语从句，修饰 steps。
6. as you try to find answers to the problem: 在你试图找出问题的答案时。
7. State your problem in different ways: 从不同的角度提出问题。
8. Pick the best statement: 选择最佳的提法。
9. work out a plan: 制定出一个计划。

7. Stating a Problem

Let us go back to our experiment with the magnet and the paper clip. We can get our problem from the experiment.

We observed the experiment. First we passed a piece of paper between the magnet and the paper clip. We used a piece of wood. Then we put the tin between the magnet and the paper clip. The paper clip fell.

Now we have a problem. Our problem is:

What makes the paper clip fall?[1]