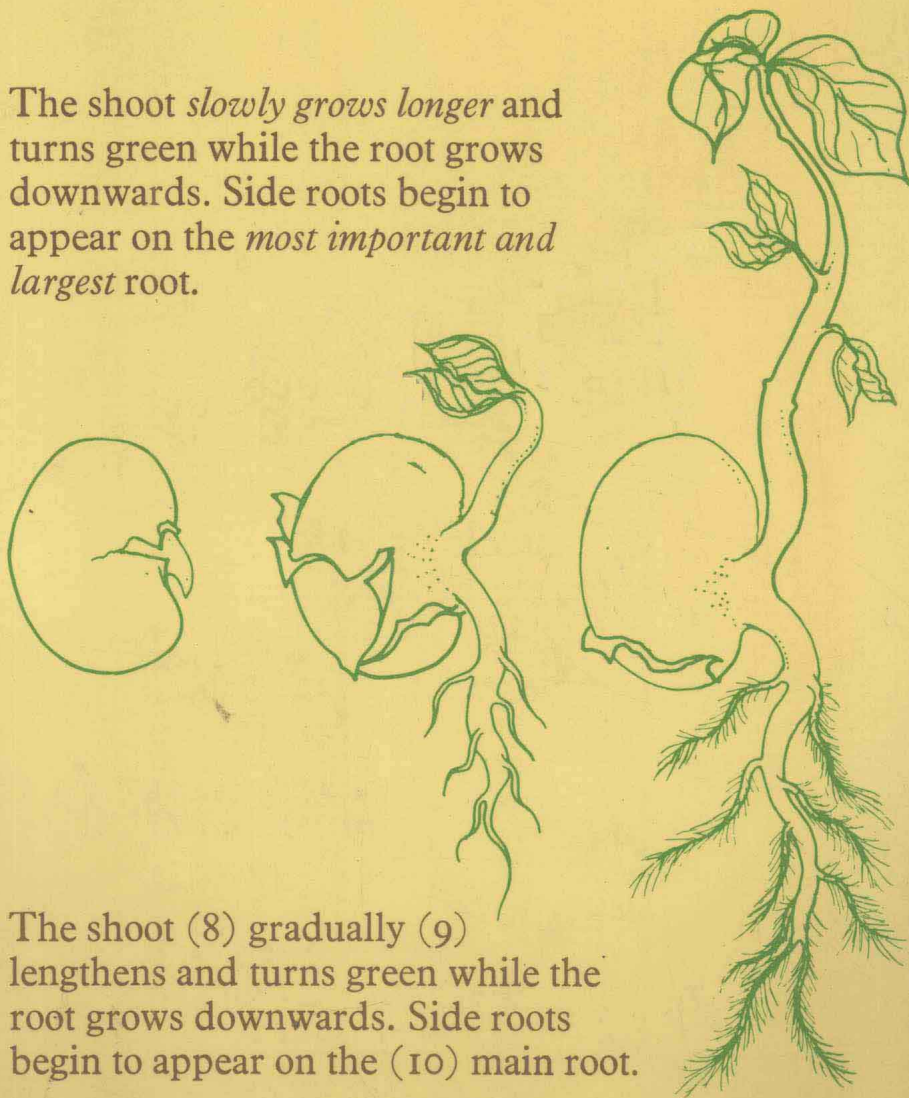


Beginning Scientific English

The shoot *slowly grows longer* and turns green while the root grows downwards. Side roots begin to appear on the *most important and largest* root.



The shoot (8) gradually (9) lengthens and turns green while the root grows downwards. Side roots begin to appear on the (10) main root.

Beginning Scientific English

D. E. Royds-Irmak

BOOK 1

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Preface

Understanding and using scientific English presents many stumbling blocks to those who have achieved a reasonable proficiency in conversational or literary language through the usual course books. The present volume is designed, therefore, to help bridge the gap between such a course book and the science text-book.

Presenting its elementary science material in 40 short, graded texts, 1–22 in Book 1 and the remainder in Book 2, together with Exercises on vocabulary and language items which take a prominent place in technical writing, this book will, I hope, help students of English to overcome the bewildering problems of unfamiliar subject matter, new vocabulary and structures, and the new concept of English language used, not to relate personal experiences or to tell stories, but as an informative, impersonal account of principles and phenomena.

This book may be used by either the English language teacher or by the Science-in-English teacher, who often justifiably complains that the teaching of his subject is greatly hampered by the students' inability to cope with language difficulties.

Work which can be dealt with only in small groups of students, or which requires equipment beyond the means of the ordinary classroom, has been avoided. It also seems essential, in accordance with the principles of learning through meaningful association, that work on language should remain within the limits imposed by the Texts themselves. Therefore, the Exercises do not contain any vocabulary or structural items extraneous to the Texts.

The layout in each Unit is as follows:

- 1 At the head of each Unit, vocabulary which can most efficiently be taught through mother-tongue equivalents.
- 2 Text A, which presents the subject matter in simple, everyday language and structure.
- 3 Text B, which contains exactly the same subject matter, but is reworded in more scientific terms and structures. Each numbered word or phrase corresponds with a word or phrase italicised in Text A, and these are set out for easy reference in Exercise 1 of each Unit.
- 4 Exercises, with brief explanations, pinpointing important language items introduced in Text B. Special emphasis is given to passive structures, since these are particularly common in scientific language.

- 5 Comprehension questions designed to check that content and vocabulary have been mastered, and to give practice in handling them.
- 6 Questions for further discussion, designed to stimulate thought and interest, to develop powers of deduction and application of the principles dealt with in the Texts, and to provide opportunities for the student to achieve greater fluency in free discussion along the lines suggested in the Notes for the Guidance of Teachers given at the end of the book.

Some of these questions require the student to do a little research or enquiry outside class, and can be developed into project work, but most need him only to draw on his general knowledge and observation of everyday life.

- 7 Where possible, suggestions for further activities are included at the end of the Unit, in order to stimulate interest and reinforce learning. They may be carried out in class, where time and space permit, or allocated to be done outside class by a student or a group of students. They have purposely been kept simple and safe, and require a minimum of equipment, such as can be found in the home, or acquired with little difficulty.
- 8 Revision Exercises are provided at intervals, and may be used for reviewing work done, or for testing purposes. In either case students should not refer to the Units while doing them.
- 9 Finally, two word lists are given at the end of the book. The first, Vocabulary, alphabetically lists the vocabulary given at the head of each Text A, together with the words given after Questions for further discussion, and space is provided for the mother-tongue equivalents. The second is an English-to-English Glossary of the numbered terms and phrases of Text B, together with their explanations. A word or phrase occurring in the Vocabulary List of Book 1 is not repeated in that of Book 2, but a language item is included in the Glossary of Book 2 irrespective of whether it has already appeared in Book 1.

How to Use this Book

To the teacher

It is advisable to work through the Texts and Exercises in the order in which they are presented, since the subject matter is graded and grouped in a logical sequence, and vocabulary is built up progressively from one Unit to the next.

Discretion may be used as to how much reading aloud is done, and which Exercises are done in class and which as homework. But it is recommended that your students should hear a Text before attempting to read it themselves, and that the Exercises should be at least started in class before the

student is left to his own devices with them.

Notes for the Guidance of Teachers will obviously need to be simplified and enlarged upon when explained to the student.

If answering comprehension questions as oral classwork, quick, short answers are time savers, but as written work, answers in complete sentences should be encouraged.

When the student is familiar with the presentation of Text B as a rewording of Text A, he will find it useful to try to 'read' Text B while looking only at Text A. This is a good way of testing himself, and pinpoints weaknesses or gaps in his performance. Although this should never be attempted until the whole Unit has been completed, it brings a real sense of achievement when done fluently.

The student may be encouraged to keep a Science Notebook, in which to record new vocabulary and useful diagrams and illustrations, to work the Exercises and to make notes on class discussions and on any research or enquiry he may pursue on his own, particularly on the work involved in the suggestions for further activities.

Suggestions for working

- 1 Give mother-tongue equivalents for the vocabulary listed at the head of each Unit. (As a learning reinforcement, these can be filled in later in the space provided in the Vocabulary list at the end of the book.)
- 2 Read Text A while students follow.
- 3 Read aloud each numbered word or phrase in Text B, while students find its equivalent italicised in Text A.
- 4 Have the student (or group) repeat each numbered phrase in Text B, before it is read in its entirety.
- 5 Work through the Exercises, or use them as homework, leaving time to deal orally with the Questions for further discussion.

Unit 1 Ancient Rope-making

Vocabulary

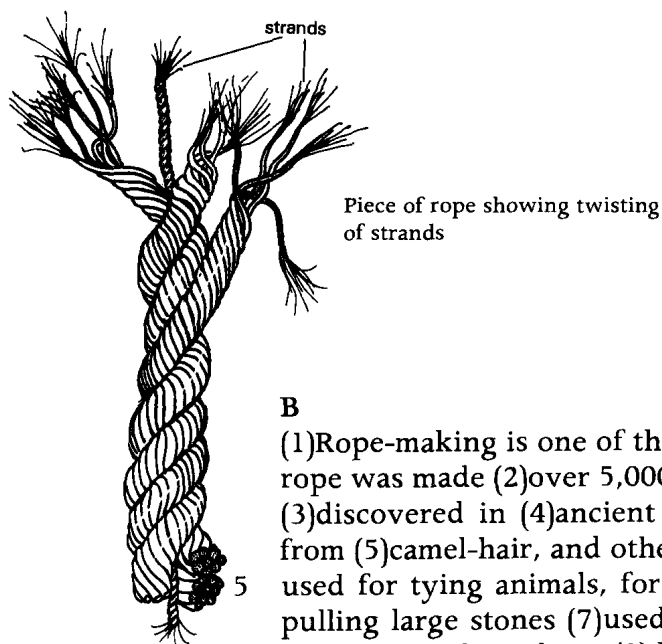
copper	rope	to twist	a well
to destroy	tomb	volcano	wire
Egypt-ian	trade		

A

Making ropes is one of the oldest trades in the world. We know that people made ropes *more than* 5,000 years ago, because we have *found* pieces of rope in *very old* Egyptian tombs. They made some of these from *the hair of camels*. They made others from twisted grass. People used them

5 for tying animals, for *getting* water from deep wells and for pulling large stones *which they used* in building. We have found *too*, ropes *which were made* of thin copper wire in the city of Pompeii, which a volcano destroyed a little *less than* 2,000 years ago.

10 In *the very old days*, people made rope by hand, *but today*, machines make it. In *very poor countries* today, people still make rope as they *made it* in the very old days.



B

(1)Rope-making is one of the oldest trades in the world. It is known that rope was made (2)over 5,000 years ago, because pieces of rope have been (3)discovered in (4)ancient Egyptian tombs. Some of these were made from (5)camel-hair, and others were made from twisted grass. They were used for tying animals, for (6)obtaining water from deep wells and for pulling large stones (7)used in building. (8)Also, ropes (9)made of thin copper wire have been (3)discovered in the city of Pompeii, which was destroyed by a volcano a little (10)under 2,000 years ago.

In (11)ancient times, rope was made by hand ; (12)nowadays, however, 10 it is made by machine. In (13)under-developed countries today, rope is still made as (14)it was in (11)ancient times.

Exercise 1 Find the way in which the words and phrases italicised in Text A are expressed in Text B:

- | | |
|----------------------|------------------------|
| 1 Making ropes | 8 too |
| 2 more than | 9 which were made |
| 3 found | 10 less than |
| 4 very old | 11 the very old days |
| 5 the hair of camels | 12 but today |
| 6 getting | 13 very poor countries |
| 7 which they used | 14 made it |

Exercise 2 These phrases can be rewritten like this:

- | | |
|---------------------------|------------------------|
| (1a) hair of camels | (1b) camel-hair |
| (2a) rope twisted by hand | (2b) hand-twisted rope |

Read and rewrite these in the same way:

- | | |
|---------------------|---------------------------|
| 1 making ropes | 5 twisting ropes |
| 2 water from wells | 6 wire made of copper |
| 3 hair of animals | 7 rope made of grass |
| 4 rope made by hand | 8 rope made by machine |
| | 9 rope twisted by machine |

Exercise 3 We can shorten (a) and rewrite it as in (b):

- | | |
|--|------------------------------------|
| (a) stones <i>which are used</i> in building | (b) stones <i>used</i> in building |
|--|------------------------------------|

Now shorten these sentences in the same way:

- 1 Pieces of rope *which were discovered* in ancient Egyptian tombs were made of camel-hair.
- 2 Grass *which had been twisted* to make it stronger was also used to make rope.
- 3 Ropes *which were made* of thin copper wire have also been discovered.
- 4 Rope *which is made* by twisting is much stronger.
- 5 In countries *which are still under-developed* today, rope is made by hand.
- 6 Ropes *which were made* for pulling stones *which were used* in building ancient Egyptian tombs were made by hand.
- 7 Long ropes are needed to pull up water *which is obtained* from deep wells.
- 8 Pompeii was a city *which was destroyed* by a volcano a little under 2,000 years ago.

Exercise 4 Read and rewrite this passage, using single words in place of the phrases italicised. (Small *changes in word order may be needed):

*Making *ropes* is a very old trade in which *the hair of *camels*, grass, *the hair of *animals* and later, wire **made of copper* was used. Pieces *more than 5,000 years old* have been found. Today, rope **made by hand* can still be seen in some *very poor* countries, but rope **made by machine* is used in developed countries.

The passive used without agent

In science, a sentence is often written in a passive form because the important idea is not WHO did something, but WHAT WAS DONE.

In science:

- | | |
|-----------------------------------|------------------------------------|
| (1a) <i>People made rope.</i> | (1b) <i>Rope was made.</i> |
| (2a) <i>They make it of wire.</i> | (2b) <i>It is made of wire.</i> |
| (3a) <i>We know that . . .</i> | (3b) <i>It is known that . . .</i> |

Exercise 5 Rewrite these sentences using passive forms to avoid mentioning WHO does or did the action; this is called the AGENT. The agent is not always human, however. (The subjects of the passive sentences are italicised):

- 1 People made *ropes* over 5,000 years ago.
- 2 We have discovered *pieces of rope* in ancient Egyptian tombs.
- 3 They made *some of the ropes* from camel-hair.
- 4 They made *other kinds of rope* from twisted grass.
- 5 We have discovered *rope made of thin copper wire* in Pompeii.
- 6 We know that people made *rope* by hand in ancient times.
- 7 People used *rope* for tying animals and obtaining well-water.
- 8 In under-developed countries, people make *rope* in the same way that they made *it* in ancient times.
- 9 Nowadays, however, we make *it* by machine.

Exercise 6 Questions for further discussion:

- 1 What is used in making ropes today? Which makes the strongest ropes?
- 2 What are ropes used for today? Where would you expect to see them?
- 3 Why are ropes made by twisting?

Exercise 7 Suggestions for further activities:

Take a small piece of cotton-wool and stretch it. Notice how easily it breaks. Twist it between the finger and thumb until it is thin. Now try to break it by pulling.

Unit 2 Natural and Synthetic Rubber

Vocabulary

acid	complicated	a liquid	rubber
amount	condition	natural	satisfactory
area	to depend (on)	process	supplies
artificial	factory	raw	war
chemical	industry		

A

People *get* natural rubber from rubber trees as a white, milky liquid, *which is called* latex. They *mix it with* acid, and dry it, *and then they send it* to countries all over the world. As the rubber industry *grew*, people *needed* more and more rubber. They *started* rubber plantations in countries
 5 with hot, *wet weather conditions*, but these still could not *give enough* raw rubber *to meet the needs of* growing industry.

It was *not satisfactory* for industry to depend on supplies *which come* from so far away from the industrial areas of Europe. It was always possible that wars or shipping trouble could stop supplies.

10 For many years *people tried/to make/something to take its place*, but they *could not do it*. *In the end*, they *found a way of* making *artificial, man-made* rubber which is in many ways *better than* and in some ways *not as good as* natural rubber. They make artificial, man-made rubber in factories by a complicated chemical process. It is usually cheaper than natural rubber.

15 *Today, the world needs so much rubber* that we use both natural and artificial rubber in large *amounts*.

B

Natural rubber (1)is obtained from rubber trees as a white, milky liquid (2)known as latex. This is (3) treated with acid and dried, (4) before being despatched to countries all over the world. As the rubber industry (5)developed, more and more rubber was (6)required. Rubber plantations
 5 were (7)established in countries with a hot, (8)humid climate, but these still could not (9)supply sufficient raw rubber (10)to satisfy the requirements of (5)developing industry.

It was (11)unsatisfactory for industry to depend on supplies (12)coming from so far away from the industrial areas of Europe. It was always possible
 10 that supplies could be stopped by wars or shipping trouble.

For many years, (13)attempts were made (14)to produce (15)a substitute, but they (16)were unsuccessful. (17)Finally, (18)a method was discovered of (14)producing (19)synthetic rubber which is in many ways (20)superior and in some ways (21)inferior to natural rubber. (19)Synthetic rubber is
 15 (14)produced in factories by a complicated chemical process. It is usually cheaper than natural rubber.

(22)At present, the world requirements for rubber are so great that both natural and (19)synthetic rubber are used in large (23)quantities.

Exercise 1 Find the way in which the words and phrases italicised in Text A are expressed in Text B:

- | | |
|--------------------------|--|
| 1 get | 13 people tried |
| 2 which is called | 14 to make |
| 3 mix it with | 15 something to take its place |
| 4 and then they send it | 16 could not do it |
| 5 grew | 17 In the end |
| 6 needed | 18 found a way |
| 7 started | 19 artificial, man-made |
| 8 wet weather conditions | 20 better |
| 9 give enough | 21 not as good as |
| 10 to meet the needs | 22 Today, the world needs so much rubber |
| 11 not satisfactory | 23 amounts |
| 12 which come | |



Collecting latex from rubber tree

Exercise 2 KNOWN AS is often used instead of 'called'. Read and rewrite these sentences like the example:

The place in which things are made is *known as* a factory.

- 1 The white, milky liquid obtained from rubber trees is called latex.
- 2 The place where trees are planted is called a plantation.
- 3 Artificial, man-made rubber is called synthetic rubber.
- 4 Rubber which is obtained from rubber trees is called natural rubber.
- 5 The rubber needed in the world is called the world's rubber requirement.
- 6 The weather conditions of a country are called its climate.
- 7 Areas where industry is well-developed are called industrial areas.
- 8 Poor countries where industry is not developed are called under-developed countries.
- 9 Something which can be used instead of something else is called a substitute.

Exercise 3 BEFORE BEING is often used instead of 'and then it is':

- (a) The latex is dried *and then it is* despatched.
- (b) The latex is dried *before being* despatched.