Scientific English Practice

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M.A., PH.D.

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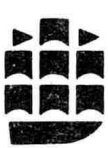

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EASIER SCIENTIFIC ENGLISH PRACTICE
SCIENTIFIC ENGLISH PRACTICE
EASIER ENGLISH PRACTICE
PRACTISE YOUR ENGLISH
FURTHER PRACTICE IN ENGLISH
KEY TO FURTHER PRACTICE IN ENGLISH
ELEMENTARY SCIENTIFIC ENGLISH PRACTICE
STORIES FROM MANY LANDS
POWER AND PROGRESS
WAYS OF THE WORLD
CHANGING HORIZONS

Foreword

This book has been written to provide students of science with suitable material for practice in the English language. The pieces are mostly by well-known writers, some of whom are famous scientists. Few changes have been found necessary in these originals, and an attempt has been made to arrange them in order of increasing language-difficulty.

The standard aimed at has been that of *Practise Your English*, the corresponding book for non-scientists. No science fiction is included: all the pieces are factual. In choosing the pieces, I have tried to avoid those which, however interesting, are technically difficult.

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Contents

1 *How Nature Breaks Rocks*

W. E. FLOOD, M.A., Ph.D.

In the passage given below, Dr. Flood mentions some of the effects of temperature change, and describes how heat and cold cause rocks to break up and form dust and sand. The piece comes from the author's book, *The Earth on which We Live*, in the series Science in the Modern World. The book was first published in 1949, but has been reprinted.

The author is a senior university lecturer and writer on scientific subjects. With Dr. Michael West he has also written *An Elementary Scientific and Technical Dictionary* (1962).

An object which is placed in the sunshine becomes hot, and heat causes most materials to become slightly bigger—that is, to expand. An iron bar, for example, whose ordinary length is 6 feet becomes about $\frac{1}{2}$ inch longer when it is made red-hot. The sun, of course, does not make rocks on the earth's surface red-hot, but rocks which are not protected by soil and plants do become quite warm in the sunshine. The surface of the rock expands very slightly, but the inside of the rock, which is not heated, does not expand. This causes a little crack, and gradually little pieces of the rock break away.

The freezing of water also breaks off little pieces from rocks. When water is made cold enough, it turns into ice, and the ice takes up a little more space than the water from which it is made. One cubic foot of water forms $1\frac{1}{10}$[1] cubic feet of ice. If we take a bottle full of water, tie the cork firmly in place, and leave it where it is so cold that the water freezes, we find that the bottle breaks. This is because the ice which is made needs more space.

Water may fill a crack in a rock; it freezes when it is very cold and, in doing so, makes the crack wider. Gradually little pieces of rock break away. We should expect rocks to be broken in this way near the tops of high mountains, where it is very cold. The little pieces of rock which are broken off from hills and

[1] See passage 1, exercise 3.

The wind wears rocks

mountains roll down into the valleys, and we sometimes find great heaps of rough, sharp stones near the bottom of a mountain.

The wind causes much wearing of rocks, particularly if sand and dust are blown along by it. If the wind blows over sandy country, such as deserts and beaches, it picks up quite a lot of sand and carries it along. The particles of sand rub, scratch and cut the rocks against which they are blown. Soft rocks may be gradually worn away and harder rocks are rubbed so that they become smooth and shiny. Sometimes a rock is made into a very strange shape because softer parts are worn away and harder parts are left. The wind near the ground carries most sand with it and so wears the lower parts of big masses of rock most. The lower part of a cliff may be worn away and then, in time, the upper part falls down.

Sooner or later, the sand and the particles of rock drop from the wind to the ground. In sandy places you can often see heaps of sand forming little hills. They are called 'sand dunes'. Sand is blown along near the ground and some forms a little pile against

a small bush, some grass, or a small rock. The pile grows and forms a sand dune. Sand may be carried many miles by the wind. A dry wind called the *Harmattan*, which blows from the Sahara desert over Ghana and Nigeria, carries much sand and dust. The dust falls to the ground as a fine powder.

Much wearing and breaking of rocks takes place on the seashore; for the action of the sea is very powerful. As you stand on a beach, you can hear and see the sea at its work. Stones are dragged up and down the beach, and worn so that they become round and smooth. On some parts of the coast the waves beat against the rocky cliffs. The mere force of the water would slowly wear the cliffs, but this damage is small compared with that caused by the stones and sand which the water throws against them.

EXERCISES

COMPREHENSION

1. If an iron bar becomes $\frac{1}{2}$ inch longer when it is made red-hot, how long was it before it was heated?
2. Why does the surface of a rock expand more on a hot day than the inside part of the rock?
3. When water freezes, does its volume increase or decrease?
4. Describe one way of breaking a bottle without hitting it.
5. Are the tops of high mountains hot or cold?
6. 'We sometimes find heaps of rough stones near the bottom of a mountain.' Where have these stones come from?
7. How does sand affect hard and soft rocks when it is blown against them?
8. Why does it often happen that the lower part of a cliff is worn away before the top part?
9. What may cause a sand dune to begin to form?
10. Why are stones on a beach usually smooth?

SUMMARISE the first three paragraphs in about 100 words.

COMPOSITION

How do sand and dust affect people and machinery?

LANGUAGE

1. Fill each space with one of the words from the list:
expand; protects; surface; crack; freeze; cubic; particles; mass; pile; powder.
   (a) Spaces are sometimes left between the ends of metal rails on the railway so that they cause no trouble when they —— on a hot day.
   (b) 'Be careful!' he cried. 'That yellow —— is poisonous!'
   (c) It is possible to —— water in a refrigerator.
   (d) The —— of the road was damaged by the bad weather.
   (e) A —— foot of gold is heavy and valuable.
   (f) The water was not pure; —— of sand could be seen in it.
   (g) The tendency of a body to remain at rest is due to its ——.
   (h) When we paint a window-frame, the paint —— the wood.
   (i) The explosion made a —— in the glass of one window.
   (j) A —— of books stood on the professor's desk.

2. Fill each space with one of these prepositions. The passage will help you: *from, of, into, on, near, by, against, in, at.*
   (a) The bit of paper was carried many miles —— the wind.
   (b) Copper is the metal —— which this wire is made.
   (c) Peter's cup is full —— tea.
   (d) They talked while they sat —— the sunshine.
   (e) If you heat this ice, it will turn —— water.
   (f) There was some dust —— the surface of the table.
   (g) Let us watch the scientist —— his work.
   (h) The dust is blown along —— the ground.
   (i) The travellers were protected from the rain —— their coats.
   (j) The heavy rain wet the windows —— which it was blown.

3. Notice $1\frac{1}{10}$ cubic feet. $1\frac{1}{10}$ is read as 'one and one tenth'. In the same way $\frac{1}{8}$ is read as 'one eighth', and so on. $\frac{3}{8}$ is three eighs and $\frac{7}{8}$ is seven eighths. $\frac{6}{19}$ is six nineteenths.

   When the numbers are big, we read them as one over the other. For example, the fraction $\frac{127}{398}$ is read as 'one two seven over three nine eight'.

Write the following fractions in figures:
(a) a half; (b) three quarters; (c) five eighths; (d) seven seventeenths; (e) eight eight one over nine nought seven.

4. Notice: *It is* SO *cold* THAT *the water freezes.*

When we use *so . . . that*, we put the result after *that.*
Complete the following sentences, giving the results:
(a) The rock was so hard that we . . .
(b) The sun was so hot on that day that . . .
(c) The mountain is so high that . . .
(d) The wind blew so violently . . .
(e) The aircraft flew so fast . . .

5. Write down separately the adjectival (relative) clauses in the following:
(a) An object which is placed in the sunshine becomes hot.
(b) An iron bar whose ordinary length is 6 feet becomes about $\frac{1}{2}$ inch longer.
(c) Rocks which are not protected by soil and plants do become quite warm.
(d) The inside of the rock, which is not heated, does not expand.
(e) The little pieces of rock which are broken off from hills and mountains roll down into the valleys.

6. Write the following in the interrogative form (i.e. as questions):
(a) The wind near the ground carries most sand with it.
(b) The particles of rock drop from the wind to the ground.
(c) The pile grows and forms a sand dune.
(d) The action of the sea is very powerful.
(e) The mere force of the water would slowly wear the cliffs.

7. Give the opposites of the following. All the opposites are in the passage:
(a) lower; (b) cold; (c) smaller; (d) cool; (e) empty; (f) bottom; (g) valley; (h) hard; (i) little (sand); (j) coarse (powder).

2 *Dr. Simpson and Chloroform*

EVE BLANTRYE SIMPSON

The use of ether as an anaesthetic in early days brought a great improvement into the conditions of a surgical operation, but Dr. J. Y. Simpson (1811–1870) and some of his friends were not satisfied with ether. They hoped to find a better anaesthetic, and they used to meet at night after the day's work and try different gases on themselves.

This passage comes from *Sir James Y. Simpson*, a book written by his daughter. She obtained her facts from those who worked with her father and visited the house. Mr. Waldie, mentioned at the beginning, suggested new chemicals for Simpson to try.

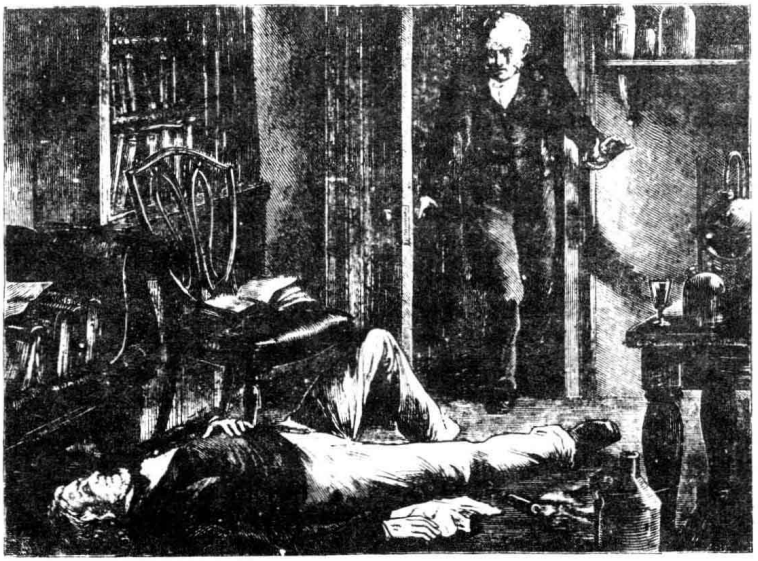
In a letter to Mr. Waldie, Professor Simpson wrote, 'I am sure you will be delighted to see part of the good results of our hasty conversation. I had the chloroform for several days in the house before trying it, as, after seeing it such a heavy liquid, I despaired of it, and went on dreaming about others. The first night we took it, Dr. Duncan, Dr. Keith, and I all tried it simultaneously[1], and were all under the table in a minute or two.'

Dr. George Keith, writing to me in 1891, says: 'Dr. Miller, in the appendix[2] to his work on surgery, published soon after, gives a full account of the scene. It is pretty correct, only he says we all took the chloroform at once. This, with a new substance to try, would have been foolish, and the fact is, I began to inhale it a few minutes before the others. On seeing the effects on me, and hearing my approval before I became unconscious, they both took a dose, and I believe we were all more or less under the table together, much to the alarm of your mother, who was present.'

Professor Miller, his neighbour, who used to come in every morning to see if the experiments had survived, says: 'These

[1] Simultaneously: At the same time.

[2] Appendix: Extra part added at the end of a book.



Professor Simpson experiments with chloroform

experiments were performed after the long day's toil was over, at late night or early morn, and when the greater part of mankind were soundly asleep.' He describes how, after a weary day's labour, the trio[1] sat down and inhaled various drugs out of tumblers[2], as was their custom. Chloroform was searched for and found beneath a heap of waste paper; and with each tumbler newly filled, the inhalers resumed their occupation. A moment more, then all was quiet, and then a crash.

On awakening, Dr. Simpson's first thought was: 'This is far stronger and better than ether.' Then he noticed that he was lying on the floor, and that among the friends around him there was both confusion and alarm[3]. He saw Dr. Duncan snoring heavily, and Dr. Keith kicking violently at the table above him. They made several more trials of it that eventful evening, and were so satisfied with the results that the festivities[4] of the

[1] The trio: The three men.
[2] Tumbler: Drinking glass.
[3] Alarm: Feeling of worry or fear.
[4] Festivity: Merry-making.

evening did not end till a late hour, 3 a.m.

The onlookers to this scene were my mother, her sister Miss Grindlay, her niece Miss Petrie, and her brother-in-law Captain Petrie. Accustomed as they had grown to experiments, they were startled by the results of this first 'inhaling of chloroform'. My aunt often spoke of Dr. Keith's ghastly[1] expression when, ceasing to kick, he raised his head to the level of the table and stared with unconscious eyes on them. She had such a horror of chloroform that she refused ever to try it. My father used to threaten to put her under its influence, and when she fled, he gave chase; but, light of foot as he was in those days, she always escaped; for fits of laughter used to seize him and stop the pursuit. Great was my father's joy at his success, and in having so powerful an agent to deaden the suffering that he had to watch daily.

A certain Duchess expressed his feelings in a letter she wrote before chloroform was a month old: 'Dear Dr. Simpson, I cannot resist one line to wish you joy of your discovery. I think your life must be a very happy one from the relief of *not* witnessing pain. It must make you very happy, dear sir, to have discovered so great a benefit.'

EXERCISES

COMPREHENSION

1. Which doctors tested chloroform with Dr. Simpson? Did it make them unconscious or not?
2. What was the subject of Dr. Miller's book mentioned here?
3. In his letter, Dr. Keith says that it would have been foolish for all three men to take chloroform (for the first time) simultaneously. Why?
4. Who was the first to inhale the chloroform?
5. What alarmed Eve Simpson's mother?
6. Why did Professor Miller go to the house every morning?
7. When the three men found the chloroform and inhaled it, there was a crash. What caused the crash?
8. Why was Dr. Duncan snoring? What was Dr. Keith doing at that time?

[1] Ghastly: White and horrible.

9. Why did Eve Simpson's aunt always escape when Dr. Simpson chased her? Why did he chase her?
10. What was the cause of Dr. Simpson's great joy?

SUMMARISE the third paragraph in about half its length.

COMPOSITION

Ought dangerous experiments to be made?

LANGUAGE

1. Fill each of the spaces with one of the words in its right form: chloroform; simultaneously; surgery; inhale; dose; experimenter; survive; drug; unconscious; relief.
   (a) The art of treating diseases by operating on the body is called ——.
   (b) Aspirin is a —— which is supposed to give —— from headaches. But it does not always cure a headache.
   (c) During a storm in the distance, we do not see the lightning and hear the thunder ——; this is because light travels faster than sound.
   (d) —— is an anaesthetic. It can make people ——.
   (e) Most of the passengers were killed in the air crash, but three of them —— and were taken to hospital.
   (f) Peter —— his cigarette smoke, but Tom does not.
   (g) Be careful to take the correct —— of that medicine. If you take too much it will make you ill.
   (h) When the liquid in the retort turned green, the two —— looked at each other with surprise.
2. Explain in any way you like:
   (a) aunt; (b) niece; (c) brother-in-law; (d) neighbour; (e) onlooker.
3. Notice *In a minute or two* at the end of the first paragraph. This means *After a minute or two*, but English speakers usually prefer *In* to *After*.

   Write original sentences containing the following phrases: (a) in five years; (b) in half a minute; (c) in a week; (d) in six months; (e) in a fortnight.
4. *Accustomed as they had grown to experiments* = Although they had grown accustomed . . .