

BASIC WRITING IN ENGLISH
for
SCIENCE & TECHNOLOGY

M. J. MURPHY Ph. D.

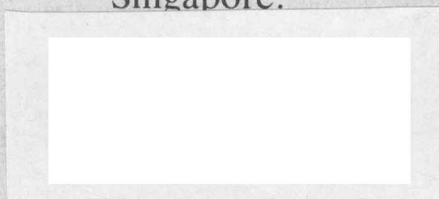


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Graham Brash (Pte) Ltd

Singapore.



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9971 947 23 4

Published

by

Graham Brash (Pte) Ltd

36-C Prinsep St

Singapore 0718

Reprinted 1985

Printed by Khai Wah Litho Pte. Ltd.

INTRODUCTION

The students using this book will not be raw beginners. It is assumed that they will be students who are advancing in the study of their particular scientific or technical subjects and who have to use the English language to write about them. They may use spoken English quite frequently and will most likely have to use and consult English language textbooks and references during the course of their scientific and technical studies.

After more than thirty years of teaching English to students of scientific and technical subjects, the author has come to the conclusion that the best scientific and technical writing uses, as far as possible, straightforward and simple language and uncomplicated structures. This opinion is borne out by the language used in the best scientific journals and magazines, e.g. *The Scientific American*.

Too often students of science and technology who use English as a foreign or a second language have been led to believe that the use of unnecessarily long and unfamiliar words and complicated sentences is the mark of good scientific and technical writing. Very often they have been led to this belief by the poor English in which many textbooks have been written and by the rather stilted textbook style of many lecturers. The truth is that a scientific or technical textbook or article impresses the reader more by the information it conveys and the ease with which he is able to absorb that information than by its grand language and complicated sentences.

In recent times there has been much criticism of the bad English not only of technical and scientific writers but of all sorts of other writers, e.g. journalists, government officials and so on. Many names such as journalese, officialese, Pentagonese, gobblygook and technobabble have been given to these types of bad writing. They are mainly the product of lack of care and thought about writing.

In this book, therefore, the author has concentrated on one of the basic skills required for good scientific and technical writing, the mastery of the most important types of English sentences. After years of correcting thousands of compositions, articles, papers, theses and so on, he has found that too often the student loses control of his sentences. Sometimes they become so long and confused that the subject of the sentence is completely lost, and the reader is continually having to go back over sentences to try to make sense of what has been written. Sometimes the reader succeeds but more often he does not.

If a student can master the use of the types of sentences dealt with in this book, he has gone a long way towards being able to express himself clearly and simply in writing. Of course there is more to writing than just the mastery of sentences but the author would not hesitate to state that this is the first and most important step.

This book has been designed to be used in class by a teacher, or by a student as a self-study book. Whichever way it is used, the student and the teacher must make sure that all the exercises are written and not merely done orally or mentally. This is necessary in order that the student will get the right amount of practice in each type of sentence and also get the feel of the sentence as he writes it.

Many students who make use of English for science or technology will one day hope to use English to write articles for scientific journals and magazines, to present papers at conferences, to write reports and even to write textbooks. A student, therefore, should always bear in mind that very many of those who will want to read his papers, reports, articles or textbooks will not be native speakers of English. To more and more non-native speakers of English, English is becoming the language of science and technology. If a writer wishes to be read and understood by such people, he must convey his information as simply, directly and clearly as possible. In other words he should reduce the language difficulty as much as possible so that the reader can give most of his attention and effort to the main difficulty, which is the understanding and acquisition of the information conveyed by the language. By doing this he will make sure that his writings are of benefit to a much wider readership.

The author hopes that this will be one of the results of using this book.

M. J. Murphy

TO THE STUDENT

You will find that some of these exercises are difficult.

They are meant to be difficult.

In this book purely mechanical exercises have, as far as possible, been avoided. Most of the exercises have been designed to make you think.

In some of the exercises, e.g. the ones in which there are clauses or phrases to be fitted into a passage, you may not be familiar with the subject matter of the exercise. Even if this is so, you should still be able to complete the exercise. By studying the context carefully you should be able to recognise the various links and associations that point to the only place where each clause or phrase can fit into the context. All the logical and grammatical links and pointers are there. Sometimes they can be quite small ones but they are there and they are clear. Look for them carefully.

The same thing applies when you yourself have to complete a context with a clause or phrase of your own. Again, study the context looking for links and pointers and make sure that your contribution to the context fits into it logically and grammatically.

This is what you have to do if you wish to write good clear English for science and technology. It is, like many of these exercises, not an easy process. It demands much thought, organization and arrangement.

A good idea is this. When you have done an exercise, read it over carefully looking for anything that seems out of order or which does not fit logically or grammatically into the context. Remember that good grammar is a help to understanding. When you are satisfied swap your exercise with a fellow student who has done the same exercise. Compare your version with his. Just because they may both be the same, do not assume that they are both right. Discuss your work together putting forward arguments why you put this clause here or that clause there. If your version is different from his, the field of discussion is much greater. In some cases two or more different versions may be acceptable. If they are, make sure you see the reasons why they are.

If the exercise is one in which something original has to be written, be critical of the other person's work as well as your own. Remember that the result must not only be grammatically correct but must be as clear and as well-arranged as possible. Do not be satisfied with the first thing that you write down.

For many of the exercises the answer book can give you only suggested answers.

The rest is up to you.

Good luck!

M. J. Murphy

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CHAPTER 1

EXPRESSING IDEAS IN SIMPLE SENTENCES

Writing is difficult.

It is more difficult when you are writing in a language which is not your own.

Writing is mainly organization.

We can think of it roughly like this: You want to write something. You have a lot of thoughts or ideas more or less floating about in your head. They are fairly vague.

You have to trap these thoughts into words.

When you have done this you can join these into larger units called SENTENCES.

In turn you can organize these into larger units called PARAGRAPHS. You can organize these paragraphs into still larger units that could be called CHAPTERS.

These chapters you can further organize into a BOOK or a THESIS and so on.

This is a simple version of what you really do but it will help you to understand what we mean when we say that writing is ORGANIZATION.

If you are going to organize something you cannot do it without careful thought.

Writing, therefore, demands careful thought.

AIM OF WRITING

When we write our aim is generally to communicate something to someone else by means of the written word.

Organization, which is the result of careful thought, will help us to get our ideas, information, etc., over to other people more clearly and efficiently.

So to repeat: trap our ideas, thoughts into words. Organize these into sentences, into paragraphs, chapters, etc.

Certain words can be called the building bricks of writing.

These words, the ones which contain the idea etc., are: nouns, verbs, adjectives, adverbs.

But like bricks these words have to be held together. The words that hold them together are words like: prepositions, conjunctions, articles. To be a good writer you have first of all be able to write good sentences.

Let us have some practice in trapping ideas into words and joining them into sentences.

Think of a hammer:

Here are some ideas that we put into words:
hammer - tool - two parts - head - handle

Now how can we organize these into a sentence?

We might do it like this:

A hammer is a tool which consists of two parts, a head and a handle.

or:

A hammer is a tool consisting of two parts, a head and a handle.

We may have had more ideas:

hammer - tool - two parts - head (metal) - handle (wooden)

Then we could have joined them like this:

A hammer is a tool which has two parts, a metal head and a wooden handle.

There may have been still more ideas:

hammer - tool - two parts - head (metal) - handle (wood) - mainly used for striking.

We could have joined them like this:

A hammer is a tool which consists of two parts, a metal head and a wooden handle, and which is mainly used for striking.

or:

A hammer is a tool consisting of two parts, a metal head and a wooden handle, and it is mainly used for striking.

Exercise 1: Try joining these thoughts into good sentences:

1. spanner - gripping tool - usually of steel - two parts: gripping head, handle.
2. dam - structure - of concrete or earth - built across river - purpose - impound a large volume of water.

3. bulldozer – large crawler tractor – fitted with blade (large, steel) – used for pushing, moving, excavating.
4. tractor broken down – reason: poor maintenance – careless use.
5. heavy flooding – causes: blocked sewers and drains – exceptionally heavy rains.
6. the student poured acid into large flask – carefully – put stopper on – stored, safe place.
7. solar rice dryer – made, bamboo/plastic – cheap materials – available all farmers.
8. solar energy – 3 important applications: drying, e.g. rice/fish/fruit; heating water; distilling water.

Do not worry if you found these difficult to do. The idea was only to make you realize that the trapping of ideas into words and combining them into sentences is not easy.

In the following lessons of this book you will be practising how to do this more efficiently so that you will be able to write good, clear and easily understandable English. All technical and scientific writing should be of this sort.

Always remember this: It is very easy to write simple thoughts in difficult language but it is very hard to write difficult thoughts in simple language.

Note: In the explanations that follow throughout this book we may use certain terms like: conjunction, preposition, subordinate clause, complex sentence etc.

Remember that these terms are not important in themselves. They are just labels. The important thing is to understand what these terms stand for.

SIMPLE SENTENCES

A SIMPLE SENTENCE has a SUBJECT and one VERB.

The main thing we talk about in a sentence is the SUBJECT of the sentence.

Example: The truck skidded.
 The subject here is **truck**.
Truck answers the questions: What skidded?
 The verb here is **skidded**.
Skidded answers the question: What did the truck do?

Exercise 2: Underline (a) the subject and (b) the verb in each of these sentences:

1. That building is a hotel.
2. The experiment was a success.
3. The students were typing their theses.
4. The computer has been programmed.
5. The light has been burning for ten hours.
6. The project was being planned by the committee.
7. Your investigation must be finished by next week.
8. The project might be completed by the end of the year.
9. The plans have been drawn up already.
10. The votes were carefully counted.
11. The building was completed in six months.
12. The new power station will be operating by the end of the year.
13. The heavily-loaded trucks damaged the road surface.
14. Without his safety belt the driver of the car would have been killed.
15. The heavy rains damaged the rice crop.

Note: If the subject is plural the verb must also be plural if it has a plural form.

The students were typing their theses.

Note: Certain other words that refer to the subject must also be singular or plural.

The students were using their typewriters to type their theses.

Exercise 3: Supply a subject and/or a verb to complete each of these sentences.
The subject should include an article i.e. 'the' or 'a/an'.

1. were damaged by the storm.
2. have been unloaded from the truck.
3. The cause of the children's illnesses contaminated drinking water.
4. The object of these investigations the prevention of accidents.
5. of the sun the skin of some people.
6. of the mountain 10,000 ft above sea-level.
7. a cutting tool.
8. very useful animals in S.E. Asia.
9. The bunch of bananas on the table.
10. beside that building over there the property of the Engineering Faculty.
11. in the Faculty of Medicine their theses.
12. The question of conserving energy at the meeting yesterday.
13. The problems of water pollution for the conference next month.
14. The irrigation project for the benefit of the farmers.
15. The in these two fields by a very serious disease.

In the following sentences there are mistakes between subject-verb, subject-pronoun, etc.

Example: X The members of the committee has voted against the motion. X
The verb should be 'have' i.e.
subject = the members, therefore,
verb = have

so: The **members** of the committee **have** voted against the motion.

or: X The students typed his thesis themselves. X
Should be: The **students** typed **their theses** themselves.

Exercise 4: Now correct the mistakes in these sentences. First identify the subject and then rewrite each sentence correctly.

1. Each student typed their theses themselves.
2. Both men and women students has equal voting rights.
3. All the buildings in that row have faults in its foundations.
4. The socio-economic considerations in this project has been discussed.
5. Each student must put their best efforts into every piece of work.
6. Not one person among all these scientists disagree with this theory.
7. Everyone have passed their examination.
8. The results of the engineer's investigation was inconclusive.
9. The pollution caused by the factories were widespread in their effects.
10. The result of the careless storage and disposal of wastes are the breeding of vectors of disease.
11. The widespread flooding of low-lying agricultural areas cause a great loss of crops.
12. The great number of vehicles in modern cities cause serious congestion.
13. This six people constitutes the committee.
14. The exhaust of vehicles because of their deadly components are harmful to humans.
15. The construction of the dams have been delayed.

Exercise 5: Here is a passage which has the occasional mistake of the above sort in it. Read through the passage carefully trying to identify any such mistakes and to correct them. Then rewrite the passage correctly.

The process of prestressing concrete, which consists of putting it into a state of compression by tensioning steel wires or bars which pass through them, were conceived at the beginning of the 20th century and undoubtedly represent the most important advance in bridge construction since reinforced concrete came into general use. The economies in material which prestressing have rendered possible led to their rapid development in the period of shortages during and after World War II. The use of precast sections supported on novel systems of cantilevered and suspended centring and thereafter prestressed, have led to a marked increase in the length of simple or continuous spans which is able to be built.

Exercise 6: Instructions as for the previous passage.

During recent years the number of cars in most countries have been gradually increasing. In Britain in 1970 there was over 11 million cars for a population of 55 million. There must be a limit to the number of cars that can be allowed and they may be reached before the end of this century.

Cars produce problems for people. One of them are noise; noise from engines and blowing of horns. Noise is measured in decibels and it have been found that too high a level of noise can damage people's hearing and badly affect his nerves.

Another problem is air pollution. Car engines give out exhaust fumes that contains many poisonous chemicals like lead and carbon monoxide gas. In cities the air becomes filled with these chemicals which is breathed in by many people and which can thus affect his health. It can be especially dangerous to children.

Exercise 7: Instructions as for the previous passages.

In the primary school children are seeking simple answers to his questions which usually begins with: 'What is it?' First of all, science is not a lot of things it were once thought to be. What is science then? It is a study of the problems that is found wherever children lives. More formally stated, it is a study of the natural environment – not merely pieces of chemistry, physics and biology etc. Its content is connected with those subjects but it is a study of problems that pops into curious children's mind as he lives and grow from one day to the next. There are problems such as: 'What make the wind blow? What's in a cloud? What's a stone made of? What does a bell do when it ring?' Anyone who have ever worked with primary school girls and boys know that most of them are full of questions like this and like to know the answers to it. Well, finding the answers to such questions – that is science.

CHAPTER 2

A. ADDING INFORMATION TO SIMPLE SENTENCES WITH ADJECTIVES AND ADVERBS

Example: Here is a simple sentence: The bridge collapsed.
What sort of bridge? new
Made of what material? reinforced concrete
How did it collapse? unexpectedly

So, we get the sentence:

The new, reinforced concrete bridge collapsed unexpectedly.

Exercise 1: Now try adding extra information to these simple sentences using only ADJECTIVES and ADVERBS.

1. The water used by the people was polluted.
 - a) What sort of water?
 - b) What people?
 - c) Polluted to what extent?
2. The truck was damaged.
 - a) What colour?
 - b) What make of truck?
 - c) Damaged to what extent?
 - d) When damaged?
3. That flower is poisonous.
 - a) What sized flower?
 - b) What colour is the flower?
 - c) How poisonous?
4. That car has been maintained.
 - a) What sized car?
 - b) What colour?
 - c) What country of manufacture?
 - d) Maintained in what way?
5. That object is part of an engine.
 - a) What sized object?
 - b) What shape is the object?
 - c) Of what material?
 - d) What sort of engine?

6. The disposal of wastes is important.
 - a) What sort of disposal?
 - b) What sort of wastes?
 - c) How important?
7. Effluent can cause pollution.
 - a) What sort of effluent? (2 adjectives)
 - b) What degree of pollution?
8. Faults may occur in buildings.
 - a) What sort of faults?
 - b) What sort of buildings?
 - c) Occur how often?
9. People require housing.
 - a) What sort of people?
 - b) What sort of housing?
 - c) Require to what extent?
10. The floods damaged the crops.
 - a) What sort of floods?
 - b) When were the floods?
 - c) Damaged to what extent?
 - d) What type of crop?
11. The motor broke down.
 - a) What type of motor?
 - b) In what country was it made?
 - c) When did it break down?
 - d) In what way did it break down?
12. The test was difficult.
 - a) What kind of test?
 - b) In what subject?
 - c) When did it take place?
 - d) How difficult?
13. That dog can detect drugs.
 - a) What size is the dog?
 - b) What colour is the dog?
 - c) What type of dog is it?
 - d) What sort of drugs?
14. The project was completed.
 - a) Whose project was it?
 - b) What was the project concerned with?
 - c) How was it completed? (2 adverbs)
15. The storm caused damage.
 - a) What sort of storm? (2 adjectives)
 - b) What sort of damage? (2 adjectives)

COMPOUND ADJECTIVES

Information can also be added to a SIMPLE sentence by using COMPOUND ADJECTIVES (i.e. adjectives that consist of two words).

These adjectives are quite widely used in technical writing as they can convey quite a lot of information in a small space.

The main types of COMPOUND ADJECTIVES that are used are 5. (There are others.)

1. Noun + an 'ed' or 'en' form of a verb: (i.e. a past participle of a verb)
wind-driven; storm-damaged;
steel-reinforced; factory-made
2. Adverb + an 'ed' or 'en' form of a verb: (i.e. a past participle of a verb)
well-organized; badly-arranged;
efficiently-run; easily-forgotten
3. Adjective + a noun + 'ed':
broad-leaved; three-storeyed;
four-wheeled; rubber-tyred
4. Noun + an 'ing' form of a verb:
grass-cutting; time-consuming;
rice-planting; energy-saving
5. Adjective/adverb + an 'ing' form of a verb: slow-drying; quick-growing;
good-looking; sweet-sounding;
loud-talking

- Examples:**
- Wind-driven ships are again becoming popular. (1)
 - An efficiently-run factory does not waste energy, materials or manpower. (2)
 - It was a broad-leaved tree. (3)
 - Typing a thesis is a time-consuming task. (4)
 - Her daughter is a very good-looking girl. (5)

Exercise 2: Change the underlined words in each sentence below into a COMPOUND ADJECTIVE. Make sure that the COMPOUND ADJECTIVE is in its right position in the sentence: For the first 10 the sort of adjective expected is indicated by a number which refers to the list above.

- Examples:**
- a) This type of rice is a type which grows quickly.
This type of rice is a quick-growing type.
 - b) This engine is driven by petrol.
This is a petrol-driven engine.

1. He is a student who works hard. (5)
2. How can people in cities breathe the air which has been polluted by exhausts. (1)

3. That building with the square shape is a pump house. (3)
4. The contractor was using a machine that drove piles. (4)
5. A thesis that has been carefully planned is a pleasure to read. (2)
6. You could see by the leaves that had been eaten by insects how badly the crops were damaged. (1)
7. A tripod is a stand that has three legs.
8. In industry people with clear heads are needed to make important decisions. (3)
9. She is a person who thinks slowly. (5)
10. Traffic which moves slowly should keep to the inside lane. (5)
11. That tool with the sharp point belongs to the carpenter.
12. To speed up the irrigation works they used a machine which digs ditches.
13. The student's thesis consisted of 100 pages that had been carefully typed.
14. Electricity generators which are powered by water are in use in some rural communities.
15. A pentagon is a figure with five sides.
16. The closing of petrol stations on Sundays is a measure which conserves energy.
17. Sugar is a substance that tastes sweet.
18. Every leaf on the plant had on it a stain that was a brown colour.
19. All the activities at the institute should be oriented towards the students.
20. The company had a sale of goods that had been damaged in the fire.

Exercise 3: Now write 5–10 good SIMPLE SENTENCES about your own field of study so that each contains one or more compound adjectives.

THE USE OF ADJECTIVES FORMED WITH THE SUFFIX, – LIKE.

This type of adjective is useful for purposes of COMPARISON.

- Examples:**
1. The pollen of a flower is a yellow, **powder-like** substance.
 2. After the materials had been heated a hard, **rock-like** substance remained.
 3. This animal has a **cat-like** appearance.
 4. Snow crystals are delicate and **flower-like**.
 5. The banana plant is a **tree-like** member of the grass family.

Exercise 4: Change the underlined part of each sentence into a single adjective formed with the suffix, –LIKE.

1. Parts of certain nerve cells in the body are called dendrites because they have a pattern that resembles a tree.
2. The materials were heated in a flask and the result was a substance that resembled jelly.