

ENGLISH IN FOCUS

English in Biological Science

Ian Pearson

TEACHER'S EDITION

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IAN PEARSON

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Editors' Preface

The aim of the *English in Focus* series is to develop in students who are entering higher education an ability to handle the kind of written English that they will be concerned with as an integral part of their specialist subject. The approach is one which recognizes that learning a language is not merely a matter of learning sentence patterns and vocabulary but must also involve an understanding of how people use these linguistic forms in order to communicate. Our purpose is to make students aware of the way English is used in actual written communication, and thereby to help them develop techniques of reading and to provide them with a guide for their own writing.

The books in this series are based on the belief that intermediate and advanced students who are studying English as a necessary part of their specialist studies need a distinctive type of textbook: one which reflects the nature of the learning problems encountered at this stage, and which presents the language as an aspect of the subject they are studying. We feel that a textbook directed at students at this level should attempt to do more than simply repeat the formulas in elementary language teaching material. Most courses of English concentrate on teaching the language system and fail to show how this system is used in communication. As a result, students may know about such formal items as affirmative sentences or modal verbs, but not know how these items are put to use in the making of different kinds of statements and in the production of continuous pieces of discourse.

The principal purpose of the *English in Focus* series is not to teach more grammar, but to show students how to use the grammar they already know. In writing these books two basic assumptions have been made. Firstly, it is assumed that the students have already had a basic course in English, but they will not necessarily have mastered everything that they have met. The aim of this book, therefore, is to consolidate the students' existing knowledge, and to extend it, by leading the student to relate his linguistic knowledge to meaningful realizations of the language system in passages of immediate relevance to his specialist studies. Secondly, it is assumed that students have already done a course in Biology, and have been introduced to some of the basic concepts. It should be emphasized that these books are not designed to teach either language in isolation or subject-matter in isolation but the manner in which both combine in meaningful communication. Our belief is that by relating content and expression in this way, the subject-matter takes on a new interest and the linguistic difficulties are reduced.

In order to ensure the natural communicative function of language, the book focuses on the kinds of sentences which are important in Biology writing. Since it is assumed that the readers of this book have already met a fairly wide selection of English sentences, the author has been able to avoid an unnatural step-by-step presentation of grammatical patterns and vocabulary, and instead aims to show how a fluent writer uses the whole resources of the language in performing various acts of communication. At the same time, care has been taken not to overload the student with new material and complex structures have been avoided except where they are necessary in maintaining a natural use of language. We believe that the books in this series will prepare the student to cope with greater linguistic complexity by developing in him a reading strategy which he can bring to bear on the material in the textbooks he has to read.

All the exercises in this book involve reference to biological facts and ideas. In each case the subject-matter is provided and in order to do the exercise the student must relate the science and the language. Getting the exercise right means getting both the science and the language right. It is hoped that this type of exercise will make the student see the relationship between expression and content, and will therefore persuade him of the relevance of English learning to his own specialist field. In the last resort, it is the student who must be prepared to teach himself. He must concentrate diligently on the features of language exemplified in the texts, and approach the linguistic content of these books with the same spirit of enquiry and desire for knowledge as he would be expected to bring to the study of his specialist subject.

It is appreciated that, even in a course whose primary concern is with the written language, the teaching process must inevitably bring in the spoken form as well. Therefore, in order to assist both teacher and learner, the texts and the list of biological terms have been recorded on tape.

J.P.B.A.

H.G.W.

Introduction

This introduction contains four sections:

1. Rationale of the course
2. Demands on the teacher and students
3. Guide to the book and structure of units
4. Pronunciation of the biological terms

A key to the exercises with notes for the teacher comes at the end of this book. The notes should help the teacher when preparing lessons and the key should simplify his task when marking student work.

1. Rationale of the course

The course is designed for students who have already studied English for four or more years but who need help when faced with having to use this language in order to study Biology. However, this fact alone cannot justify basing all the language work on biological subject-matter, especially in view of the fact that the teacher of English may feel ill-equipped to handle the science.

The first consideration is the connection between content and student interest and motivation. Experience has shown that students who are studying a subject such as Biology are not normally willing to put time and effort into an English course unless they can see that it is relevant and useful for their main studies. This is particularly true if English is given relatively little weight in the overall examination scheme.

Secondly, there is the question of how much time is available for English. Since the students will come to the course with only a limited amount of English, and since as few as eighty hours may be given to English classes, it seems advisable to concentrate upon those elements of the language that are the most important in the given circumstances. This is especially true of vocabulary items, but it holds true for aspects of grammar (at the level of the sentence) and for aspects of paragraph structure (at the level of coherent texts).

Finally, there is the pedagogical consideration that we learn by doing. If what the student must do is read and write about Biology, then the most direct help we can give is to encourage him to do precisely these things.

2. Demands on the teacher and students

Teachers of English cannot be expected to know a lot of Biology and the students who use this course may have little more than a poorly assimilated introductory Biology course behind them. For these reasons this course assumes almost no previous knowledge of Biology as such. It does, however, assume that many of the ideas that are handled will have been met before. For example, while both teacher and students may have no direct knowledge of evolutionary theory, it is reasonable to suppose that the idea of evolution has been met in various contexts.

Biological concepts and the terms needed for handling them are carefully explained and glossed as they are introduced. If the teacher is willing to learn as he goes along, then the book itself will provide him with the minimum necessary science. The biological subject-matter must be studied by the teacher with great care if effective use is to be made of the course, and the teacher should be willing to find out more about the science if he finds himself in difficulty.

The students will come to the course with varying skills in English and with a varying knowledge of Biology. It is likely that they are being required to use English for studying a subject for the first time. They must now come to see that there is a relationship between what one wants to say and how one says it. Like the teacher, they must be willing to learn or re-learn some science as they go along, but their main task is to learn and then practise the English that is needed for reading and writing about Biology. The course sets out to teach English, but a consequence of using it effectively will be that a certain amount of science is learned as well.

3. Guide to the book and structure of units

In the Student's Edition only a very brief Introduction is given, and both the Editors' Preface and the teaching notes and keys are absent. As in this Teacher's Edition, the eight units that form the body of the book are followed by a summary of the grammar covered in each unit and a list of the biological terms used in the book. This list provides a pronunciation guide and also refers the user to the page on which a given term is explained or glossed.

Each of the eight units of the course is built up of five sections:

- I Reading and comprehension
- II Use of language
- III Transfer of information
- IV Guided writing
- V Reading and note-taking

Section I introduces the subject-matter of the unit and requires the student to attend to various aspects of the text provided. Section II can be thought of

as the grammar section, for it deals with types of sentence that are important when writing about the particular subject-matter of the unit. Section III then extends this work by requiring the student to produce sets of two or more related sentences instead of a series of separate sentences, and this activity is brought to a head in Section IV when the student is asked to write a continuous text that is a genuine piece of Biology writing. The final section in the unit is intended not only to provide practice in reading and note-taking, but also to round off the subject-matter of the unit and provide a link to the subject-matter of the following unit.

Each of the five sections has a similar pattern and purpose from unit to unit. The following notes are intended to explain what these patterns and purposes are.

I READING AND COMPREHENSION

This section begins with a reading passage. The exercises that follow serve two purposes: to help the student to a fuller understanding of the particular text, and to encourage good reading habits. It must be stressed that the aims are to assist comprehension rather than test it, and to develop the student's confidence rather than show up his weaknesses. It is therefore far more important for the reader to learn from his mistakes than it is for him to worry about how much or how little he understands.

The comprehension exercises serve one or more of four functions:

(a) *To build vocabulary and provide the student with techniques for handling new words when he meets them in his reading.*

When the English teacher is handling science texts, he often feels forced to tell his students that he cannot teach them the meaning of some of the scientific terms, since he does not profess to be a scientist as well as an English teacher. This is very reasonable, but it can easily lead the students to believe that the whole English course is irrelevant in the face of genuine scientific texts. In this course the teacher is asked to prepare himself to teach the meaning of all the biological terms that occur in the book. The explanations and glosses, and the labelled illustrations, should make it possible for the teacher to learn the meaning of terms that are new to him. The list of terms at the back of the book will enable him to refer back to the first occurrence or the most complete explanation of any term listed.

(b) *To force attention on to modifying and qualifying words and phrases.*

Students frequently fail to notice, or at least fail to respond to, those elements in a sentence which in one way or another modify or qualify the major constituents of the sentence. These elements may be adjectives, adverbs, articles, subordinate clauses, auxiliary verbs, and other features. Some of the exercises are designed to make the reader sensitive to such features.

(c) *To require the student to operate in terms of the meaning of larger stretches of text.*

Many students need to be freed from the bondage of the individual words that make up individual sentences. By turning the student's attention to the grammatical features that tie longer texts together, and by showing him the ways in which facts and ideas can be shown to be related, we can help him towards the goal of being able to handle a text as a whole, rather than as a string of separate sentences.

(d) *To show the student that there are different ways of expressing the same fact or idea.*

In his reading, the student must be able to recognize various grammatical constructions that have a similar semantic value. For example, he needs to be able to recognize a whole set of constructions indicating some kind of contrast. Although the student may not need to be able to employ every one of these constructions in his own writing, he should be aware of the range of possibilities.

II USE OF LANGUAGE

This section deals with aspects of the grammar of formal English that are important in Biology writing. One consequence of this selective approach is that the teacher will almost certainly find that students have problems which are either not covered at all or which are handled in the book after they have become apparent. The teaching notes at the end of this edition are designed to help in those areas where problems are thought likely to arise, but some difficulties and queries will need to be dealt with by the teacher as they appear.

It will soon be apparent that the usual kind of grammatical explanation, which uses a grammatical terminology, is quite absent in the units. There are two reasons for this: first, very many students never master the framework of grammar that they meet at school and are therefore unlikely to benefit from an advanced course which is based on an explicit account of grammar, and secondly, most advanced students resent being exposed yet again to material that they think of as belonging to their earlier schooldays. The approach adopted here asks the students to perform various communicative acts in English. For example, instead of doing an exercise on defining relative clauses, the students are asked to write a number of definitions and naming statements, both of which make use of this particular grammatical structure. However, some teachers and some students feel happier if they are able to refer to explicit grammatical explanations and are able to make use of grammatical terminology. For this reason, there is a summary of the gram-

mar points handled in each unit on pages 106–112 of both the Student's and Teacher's Editions.

None of the exercises in the book require the student to make use of 'outside' knowledge: all the information that is needed is provided. For example, if the task is to compare two organisms, the student will find the information he needs in diagrams, tables, or other sources. Thus, the exercises do two things: they require that the student refer to genuine biological information, and they ask him to check that he has the facts right. The correct answer is then seen to be the one which has both the science and the language correct.

In later units there is a tendency for the exercises to move away from the production of unrelated sentences to tasks which involve writing two or more related sentences. The reason for this is that the students must have as their goal the development of continuous writing skills. In this section, the student may do no more than make a general statement and then give an example, but such activities demand that he turn his attention to grammatical features that tie sentences together, and to reasons for writing a text in one way rather than another.

III TRANSFER OF INFORMATION

As in the preceding section, much use is made here of diagrams and tables as a source of information which can be written about. However, the emphasis here is upon continuous writing, even if this involves no more than two or three consecutive sentences. The main purpose of this section is to give the learner immediate practice in using in context the kinds of sentences that have been met in isolation in the previous section. This work therefore forms a bridge with the work of the next section, where the student is faced with a more complex writing task. In addition, some of the work involves constructing tables, since the Biology student needs to be able to summarize and contrast information in tabular form.

IV GUIDED WRITING

The student is here faced with a task of the type he will meet in his Biology course when he is required to write class essays and to answer examination questions. The work of the two preceding sections should have given the learner the necessary practice in the language he will need here, but a model is usually provided. In addition, the content and overall shape of the paragraph or paragraphs to be written are suggested. Nevertheless, to a real extent the student is now on his own, making use of his knowledge of English to stand on his own feet as a student of Biology.

Many kinds of mistakes will no doubt be made in this work, including some which have not been made in the more controlled exercises of the previous sections. However, unless the students are quite exceptional, the

primary concern in this section *must* be with adequacy rather than with perfection. It is crucially important that the students should put effort into the task of getting across the information in an ordered and accurate manner. This task must not be obscured by too great an insistence upon producing faultless English. Indeed, many experienced teachers maintain that when students are asked to produce continuous writing on a topic of real interest and concern to them, they frequently manage to overcome problems at the sentence level which have previously seemed impossible to eradicate.

V READING AND NOTE-TAKING

This final section has two purposes: the subject-matter of the reading text carries the student from the topics of the unit he is now finishing into those of the next unit, and the tasks he is set give him practice in various reading skills and in note-taking. The text is usually appreciably more demanding than the text in Section I, so that it is important to tackle it in the right way. The essential point is that 'complete understanding' means nothing unless it is defined in terms of the reader's purpose. We must teach the students that the good reader is the one who takes from a text only as much as he needs. For the learner this must often mean that he has to satisfy himself with taking as much as he can from the text. Since the students who will use this book will be faced with the need to use Biology textbooks which will inevitably contain much that is difficult for them to understand, it seems right to show them that reading can be very profitable in precisely these circumstances.

4. Pronunciation of the biological terms

The biological terms used in this book are listed on pages 113–121. Each is transcribed phonetically and a reference is given to the point where the term is explained, glossed, or illustrated. Very many of the terms are those that are printed in bold type in the reading passages of sections I and V of each unit. Thus, not only does the bold type indicate that a word is being defined or glossed at that particular point, but it indicates that it can be found in the list of terms, together with an indication of its pronunciation. In addition, all the Latin names of organisms, plus various anglicized Latin names, are included in the list.

The particular pronunciation indicated for the terms in the list is frequently only one of several possible pronunciations, and it is very likely that the Biology teachers of the students who use this book will themselves use a different pronunciation in many cases. What is important is that both teacher and students should be able to read and pronounce these terms in *some* way; it is quite simply not worth worrying about whether or not this way is completely correct.

A recording of the reading passages from sections I and V of all units, together with the words in the list of biological terms, is available on cassette from Oxford University Press.

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