

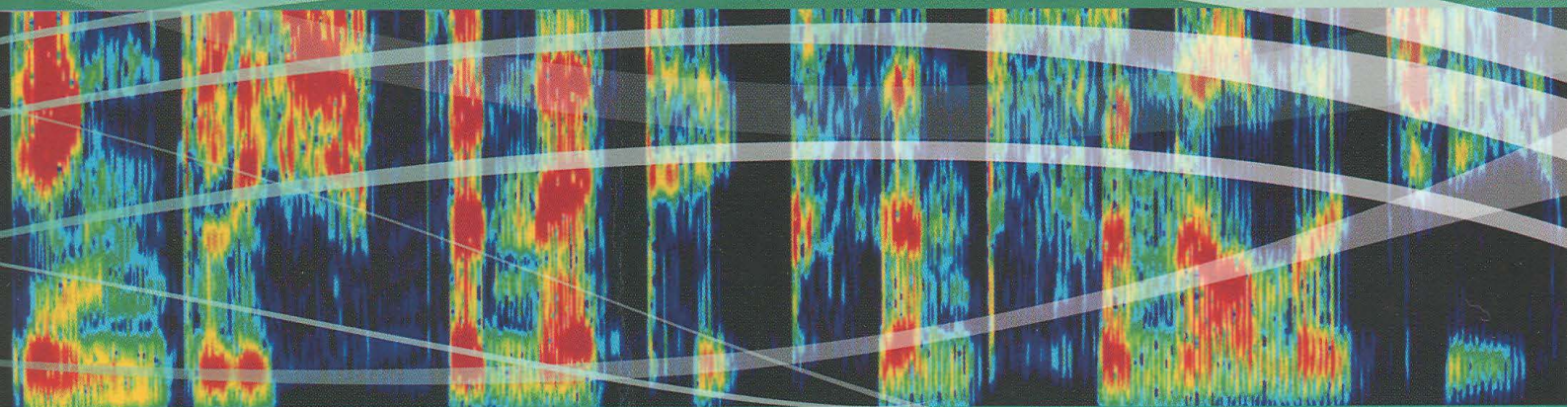
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A practical course

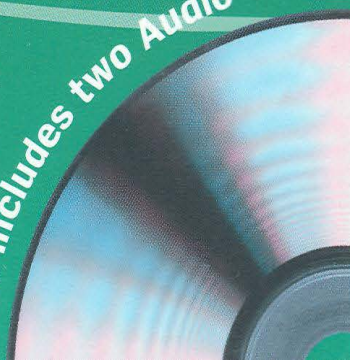
Peter Roach



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English Phonetics and Phonology

A practical course

Fourth edition

PETER ROACH

*Emeritus Professor of Phonetics
University of Reading*

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Preface

In previous editions I have used the Preface as a place to thank all the people who have helped me with the book. My debt to them, which in some cases dates back more than twenty-five years, remains, and I have put copies of the Prefaces to the first three editions on the new website of the book so that those acknowledgements are not lost and forgotten. In this new edition, I would like firstly to thank Professor Nobuo Yuzawa of the Takasaki City University of Economics for his wise suggestions and his meticulous and expert scrutiny of the text, which have been invaluable to me. Any errors that remain are entirely my fault.

At Cambridge University Press, I would like to thank Jane Walsh, Jeanette Alfoldi, Liz Driscoll, Anna Linthe, Clive Rumble and Brendan Wightman.

As in all previous editions, I want to thank my wife Helen for all her help and support.

List of symbols

1 Symbols for phonemes

ɪ	as in 'pit' pɪt	i:	as in 'key' ki:
ɛ	as in 'pet' pet	ɑ:	as in 'car' kɑ:
æ	as in 'pat' pæt	ɔ:	as in 'core' kɔ:
ʌ	as in 'putt' pʌt	u:	as in 'coo' ku:
ɒ	as in 'pot' pɒt	ɜ:	as in 'cur' kɜ:
ʊ	as in 'put' pʊt		
ə	as in 'about', upper 'əbaʊt, ʌpə		
eɪ	as in 'bay' beɪ	əʊ	as in 'go' gəʊ
aɪ	as in 'buy' baɪ	aʊ	as in 'cow' kaʊ
ɔɪ	as in 'boy' bɔɪ		
ɪə	as in 'peer' piə		
eə	as in 'pear' peə		
ʊə	as in 'poor' puə		
p	as in 'pea' pi:	b	as in 'bee' bi:
t	as in 'toe' təʊ	d	as in 'doe' dəʊ
k	as in 'cap' kæp	g	as in 'gap' gæp
f	as in 'fat' fæt	v	as in 'vat' væt
θ	as in 'thing' θɪŋ	ð	as in 'this' ðɪs
s	as in 'sip' sɪp	z	as in 'zip' zɪp
ʃ	as in 'ship' ʃɪp	ʒ	as in 'measure' meʒə
h	as in 'hat' hæp	l	as in 'led' led
m	as in 'map' mæp	r	as in 'red' red
n	as in 'nap' næp	j	as in 'yet' jet
ŋ	as in 'hang' hæŋ	w	as in 'wet' wet
tʃ	as in 'chin' tʃɪn	dʒ	as in 'gin' dʒɪn

∨ *Non-phonemic symbols*

- i as in 'react', 'happy' riækt, hæpi
- u as in 'to each' tu i:tʃ
- ʔ (glottal stop)
- ^h aspiration, as in 'pin' p^hɪn
- ˌ syllabic consonant, as in 'button' bʌt̩n
- ː shortened vowel, as in 'miss' mɪs
- syllable division, as in 'differ' dɪf.ə

∨ *Word stress*

- ˈ primary stress, as in 'open' ˈəʊpən
- ˌ secondary stress, as in 'half time' ˌha:f ˈtaɪm

ε *Intonation*

- | tone-unit boundary
- || pause
- Tones: \ fall
- / rise
- v fall-rise
- ^ rise-fall
- level

- ˈ stressed syllable in head, high pitch, as in 'please \do
- ˌ stressed syllable in head, low pitch, as in ˌplease \do
- stressed syllable in the tail, as in \my .turn
- ˆ extra pitch height, as in ˆ\my .turn

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2009)

CONSONANTS (PULMONIC)

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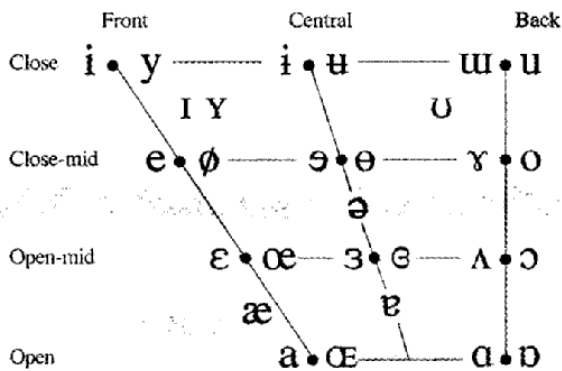
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				r					ʀ		
Tap or Flap		ɸ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
⦿ Bilabial	ɓ Bilabial	ʼ Examples:
Dental	ɗ Dental/alveolar	ɓʼ Bilabial
! (Post)alveolar	ɟ Palatal	tʼ Dental/alveolar
≠ Palatoalveolar	ɡ Velar	kʼ Velar
Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative

VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

- ʌ Voiceless labial-velar fricative
 - ʍ Voiced labial-velar approximant
 - ɥ Voiced labial-palatal approximant
 - ħ Voiceless epiglottal fricative
 - ʕ Voiced epiglottal fricative
 - ʡ Epiglottal plosive
 - ɕ ʑ Alveolo-palatal fricatives
 - ɻ Voiced alveolar lateral flap
 - ɧ Simultaneous ʃ and x
- Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.
- kp̥ ts̥

SUPRASEGMENTALS

- ˈ Primary stress
 - ˌ Secondary stress
 - ː Long
 - ˑ Half-long
 - ˚ Extra-short
 - ˘ Minor (foot) group
 - ˙ Major (intonation) group
 - Syllable break
 - ◌◌◌ Linking (absence of a break)
- founəˈtʃən
- eː
- eˑ
- e˚
- ji.ækt

DIACRITICS Diacritics may be placed above a symbol with a descender, e.g. ᵑ̥

◌̚ Voiceless	ᵑ̚ ɸ̚	◌̤ Breathy voiced	ᵑ̤ ɸ̤	◌̪ Dental	t̪ d̪
◌̤ Voiced	ᵑ̤ ɸ̤	◌̜ Creaky voiced	ᵑ̜ ɸ̜	◌̺ Apical	t̺ d̺
◌̥ Aspirated	t̥ h̥ d̥	◌̟ Linguolabial	t̟ d̟	◌̠ Laminal	t̠ d̠
◌̙ More rounded	ɔ̙	◌̘ Labialized	t̘ w̘ d̘	◌̡ Nasalized	ẽ̡
◌̘ Less rounded	ɔ̘	◌̙ Palatalized	t̙ j̙ d̙	◌̜ Nasal release	d̜ⁿ
◌̟ Advanced	ɹ̟	◌̠ Velarized	t̠ v̠ d̠	◌̡ Lateral release	d̡ˡ
◌̠ Retracted	e̠	◌̜ Pharyngealized	t̜ ɸ̜	◌̚ No audible release	d̚
◌̡ Centralized	ẽ̡	◌̜ Velarized or pharyngealized	ɟ̜		
◌̟ Mid-centralized	ẽ̟	◌̙ Raised	ɟ̙ (ɹ̙ = voiced alveolar fricative)		
◌̠ Syllabic	ɲ̠	◌̘ Lowered	ɟ̘ (ɸ̘ = voiced bilabial approximant)		
◌̙ Non-syllabic	ɹ̙	◌̟ Advanced Tongue Root	ɟ̟		
◌̘ Rhoticity	ɹ̘ ɑ̘	◌̠ Retracted Tongue Root	ɟ̠		

TONES AND WORD ACCENTS LEVEL CONTOUR

- ẽ̃ or ˨ Extra high
- ẽ̂ or ˨ High
- ẽ̄ or ˨ Mid
- ẽ̇ or ˨ Low
- ẽ̈ or ˨ Extra low
- ↓ Downstep
- ↑ Upstep
- ẽ̃ or ˨ Rising
- ẽ̂ or ˨ Falling
- ẽ̄ or ˨ High rising
- ẽ̇ or ˨ Low rising
- ẽ̈ or ˨ Rising-falling
- ↗ Global rise
- ↘ Global fall

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1 Introduction

You probably want to know what the purpose of this course is, and what you can expect to learn from it. An important purpose of the course is to explain how English is pronounced in the accent normally chosen as the standard for people learning the English spoken in England. If this was the only thing the course did, a more suitable title would have been "English Pronunciation". However, at the comparatively advanced level at which this course is aimed, it is usual to present this information in the context of a general theory about speech sounds and how they are used in language; this theoretical context is called **phonetics and phonology**. Why is it necessary to learn this theoretical background? A similar question arises in connection with grammar: at lower levels of study one is concerned simply with setting out how to form grammatical sentences, but people who are going to work with the language at an advanced level as teachers or researchers need the deeper understanding provided by the study of grammatical theory and related areas of linguistics. The theoretical material in the present course is necessary for anyone who needs to understand the principles regulating the use of sounds in spoken English.

1.1 How the course is organised

You should keep in mind that this is a *course*. It is designed to be studied from beginning to end, with the relevant exercises being worked on for each chapter, and it is therefore quite different from a reference book. Most readers are expected to be either studying English at a university, or to be practising English language teachers. You may be working under the supervision of a teacher, or working through the course individually; you may be a native speaker of a language that is not English, or a native English-speaker.

Each chapter has additional sections:

- Notes on problems and further reading: this section gives you information on how to find out more about the subject matter of the chapter.
- Notes for teachers: this gives some ideas that might be helpful to teachers using the book to teach a class.
- Written exercises: these give you some practical work to do in the area covered by the chapter. Answers to the exercises are given on pages १००-१.
- Audio exercises: these are recorded on the CDs supplied with this book (also convertible to mp3 files), and there are places marked in the text when there is a relevant exercise.

- Additional exercises: you will find more written and audio exercises, with answers, on the book's website.

Only some of the exercises are suitable for native speakers of English. The exercises for Chapter 1 are mainly aimed at helping you to become familiar with the way the written and audio exercises work.

1.2 The *English Phonetics and Phonology* website

If you have access to the Internet, you can find more information on the website produced to go with this book. You can find it at www.cambridge.org/elt/peterroach. Everything on the website is additional material - there is nothing that is essential to using the book itself, so if you don't have access to the Internet you should not suffer a disadvantage.

The website contains the following things:

- Additional exercise material.
- Links to useful websites.
- A discussion site for exchanging opinions and questions about English phonetics and phonology in the context of the study of the book.
- Recordings of talks given by Peter Roach.
- Other material associated with the book.
- A Glossary giving brief explanations of the terms and concepts found in phonetics and phonology.

1.3 Phonemes and other aspects of pronunciation

The nature of phonetics and phonology will be explained as the course progresses, but one or two basic ideas need to be introduced at this stage. In any language we can identify a small number of regularly used sounds (vowels and consonants) that we call **phonemes**; for example, the vowels in the words 'pin' and 'pen' are different phonemes, and so are the consonants at the beginning of the words 'pet' and 'bet'. Because of the notoriously confusing nature of English spelling, it is particularly important to learn to think of English pronunciation in terms of phonemes rather than letters of the alphabet; one must be aware, for example, that the word 'enough' begins with the same vowel phoneme as that at the beginning of 'inept' and ends with the same consonant as 'stuff'. We often use special symbols to represent speech sounds; with the symbols chosen for this course, the word 'enough' would be written (**transcribed**) as ɪnʌf . The symbols are always printed in **blue** type in this book to distinguish them from letters of the alphabet. A list of the symbols is given on pp. x-xi, and the chart of the International Phonetic Association (IPA) on which the symbols are based is reproduced on p. xii

The first part of the course is mainly concerned with identifying and describing the phonemes of English. Chapters 2 and 3 deal with vowels and Chapter 4 with some consonants. After this preliminary contact with the practical business of how some English sounds are

pronounced, Chapter 2 looks at the phoneme and at the use of symbols in a theoretical way, while the corresponding Audio Unit revises the material of Chapters 3-4. After the phonemes of English have been introduced, the rest of the course goes on to look at larger units of speech such as the **syllable** and at aspects of speech such as **stress** (which could be roughly described as the relative strength of a syllable) and **intonation** (the use of the pitch of the voice to convey meaning). As an example of stress, consider the difference between the pronunciation of 'contract' as a noun ('they signed a contract') and 'contract' as a verb ('it started to contract'). In the former the stress is on the first syllable, while in the latter it is on the second syllable. A possible example of intonation would be the different pitch movements on the word 'well' said as an exclamation and as a question: in the first case the pitch will usually fall from high to low, while in the second it will rise from low to high.

You will have to learn a number of technical terms in studying the course: you will find that when they are introduced in order to be defined or explained, they are printed in **bold type**. This has already been done in this Introduction in the case of, for example, **phoneme**, **phonetics** and **phonology***. Another convention to remember is that when words used as examples are given in spelling form, they are enclosed in single quotation marks - see for example 'pin', 'pen', etc. Double quotation marks are used where quotation marks would normally be used - that is, for quoting something that someone has said or might say. Words are sometimes printed in *italics* to mark them as specially important in a particular context.

1.4 Accents and dialects

Languages have different **accents**: they are pronounced differently by people from different geographical places, from different social classes, of different ages and different educational backgrounds. The word *accent* is often confused with **dialect**. We use the word *dialect* to refer to a variety of a language which is different from others not just in pronunciation but also in such matters as vocabulary, grammar and word order. Differences of accent, on the other hand, are pronunciation differences only.

The accent that we concentrate on and use as our model is the one that is most often recommended for foreign learners studying British English. It has for a long time been identified by the name **Received Pronunciation** (usually abbreviated to its initials, **RP**), but this name is old-fashioned and misleading: the use of the word "received" to mean "accepted" or "approved" is nowadays very rare, and the word if used in that sense seems to imply that other accents would *not* be acceptable or approved of. Since it is most familiar as the accent used by most announcers and newsreaders on BBC and British independent television broadcasting channels, a preferable name is **BBC pronunciation**. This should not be taken to mean that the BBC itself imposes an "official" accent - individual broadcasters all have their own personal characteristics, and an increasing number of broadcasters with Scottish, Welsh and Irish accents are employed. However, the accent described here is typical of broadcasters with an English accent, and there is a useful degree of consistency in the broadcast speech of these speakers.

* You will find these words in the Glossary on the website.

This course is not written for people who wish to study American pronunciation, though we look briefly at American pronunciation in Chapter ۲۰. The pronunciation of English in North America is different from most accents found in Britain. There are exceptions to this - you can find accents in parts of Britain that sound American, and accents in North America that sound English. But the pronunciation that you are likely to hear from most Americans does sound noticeably different from BBC pronunciation.

In talking about accents of English, the foreigner should be careful about the difference between **England** and **Britain**; there are many different accents in England, but the range becomes very much wider if the accents of Scotland, Wales and Northern Ireland (Scotland and Wales are included in Britain, and together with Northern Ireland form the **United Kingdom**) are taken into account. Within the accents of England, the distinction that is most frequently made by the majority of English people is between **northern** and **southern**. This is a very rough division, and there can be endless argument over where the boundaries lie, but most people on hearing a pronunciation typical of someone from Lancashire, Yorkshire or other counties further north would identify it as "Northern". This course deals almost entirely with BBC pronunciation. There is no implication that other accents are inferior or less pleasant-sounding; the reason is simply that BBC is the accent that has usually been chosen by British teachers to teach to foreign learners, it is the accent that has been most fully described, and it has been used as the basis for textbooks and pronunciation dictionaries.

A term which is widely found nowadays is **Estuary English**, and many people have **been** given the impression that this is a new (or newly-discovered) accent of English. In reality there is no such accent, and the term should be used with care. The idea originates from the sociolinguistic observation that some people in public life who would previously have been expected to speak with a BBC (or RP) accent now find it acceptable to speak with some characteristics of the accents of the London area (the estuary referred to is the Thames estuary), such as glottal stops, which would in earlier times have caused comment or disapproval.

If you are a native speaker of English and your accent is different from BBC you should try, as you work through the course, to note what your main differences are for purposes of comparison. I am certainly not suggesting that you should try to change your pronunciation. If you are a learner of English you are recommended to concentrate on BBC pronunciation initially, though as you work through the course and become familiar with this you will probably find it an interesting exercise to listen analytically to other accents of English, to see if you can identify the ways in which they differ from BBC and even to learn to pronounce some different accents yourself.

Notes on problems and further reading

The recommendation to use the name *BBC pronunciation* rather than *RP* is not universally accepted. 'BBC pronunciation' is used in recent editions of the *Cambridge English Pronouncing Dictionary* (Jones, eds. Roach, Hartman and Setter, ۲۰۰۶), in Trudgill (۱۹۹۹)

and in Ladefoged (2002); for discussion, see the Introduction to the *Longman Pronunciation Dictionary* (Wells, 2002), and to the *Cambridge English Pronouncing Dictionary* (Jones, eds. Roach et al, 2006). In Jones's original *English Pronouncing Dictionary* of 1917 the term used was *Public School Pronunciation* (PSP). Where I quote other writers who have used the term RP in discussion of standard accents, I have left the term unchanged. Other writers have suggested the name GB (*General British*) as a term preferable to RP: I do not feel this is satisfactory, since the accent being described belongs to England, and citizens of other parts of Britain are understandably reluctant to accept that this accent is the standard for countries such as Scotland and Wales. The BBC has an excellent Pronunciation Research Unit to advise broadcasters on the pronunciation of difficult words and names, but most people are not aware that it has no power to make broadcasters use particular pronunciations: BBC broadcasters only use it on a voluntary basis.

I feel that if we had a completely free choice of model accent for British English it would be possible to find more suitable ones: Scottish and Irish accents, for example, have a more straightforward relationship between spelling and sounds than does the BBC accent; they have simpler vowel systems, and would therefore be easier for most foreign learners to acquire. However, it seems that the majority of English teachers would be reluctant to learn to speak in the classroom with a non-English accent, so this is not a practical possibility.

For introductory reading on the choice of English accent, see Brown (1990: 12-13); Abercrombie (1991: 28-33); Cruttenden (2002: Chapter 3); Collins and Mees (2002: 2-7); Roach (2002, 2005). We will return to the subject of accents of English in Chapter 2.

Much of what has been written on the subject of "Estuary English" has been in minor or ephemeral publications. However, I would recommend looking at Collins and Mees (2002: 6-7, 2002-4, 2002-2002); Cruttenden (2002: 87).

A problem area that has received a lot of attention is the choice of symbols for representing English phonemes. In the past, many different conventions have been proposed and students have often been confused by finding that the symbols used in one book are different from the ones they have learned in another. The symbols used in this book are in most respects those devised by A. C. Gimson for his *Introduction to the Pronunciation of English*, the latest version of which is the revision by Cruttenden (Cruttenden, 2002). These symbols are now used in almost all modern works on English pronunciation published in Britain, and can therefore be looked on as a *de facto* standard. Although good arguments can be made for some alternative symbols, the advantages of having a common set of symbols for pronunciation teaching materials and pronunciation entries in dictionaries are so great that it would be very regrettable to go back to the confusing diversity of earlier years. The subject of symbolisation is returned to in Section 2.2 of Chapter 2.

Notes for teachers

Pronunciation teaching has not always been popular with teachers and language-teaching theorists, and in the 1970s and 1980s it was fashionable to treat it as a rather outdated activity. It was claimed, for example, that it attempted to make learners try to sound like

native speakers of Received Pronunciation, that it discouraged them through difficult and repetitive exercises and that it failed to give importance to communication. A good example of this attitude is to be found in Brown and Yule (1983: 26-7). The criticism was misguided, I believe, and it is encouraging to see that in recent years there has been a significant growth of interest in pronunciation teaching and many new publications on the subject. There are very active groups of pronunciation teachers who meet at TESOL and IATEFL conferences, and exchange ideas via Internet discussions.

No pronunciation course that I know has ever said that learners must try to speak with a perfect RP accent. To claim this mixes up **models** with **goals**: the *model* chosen is **BBC** (RP), but the *goal* is normally to develop the learner's pronunciation sufficiently to permit effective communication with native speakers. Pronunciation exercises can be difficult, of course, but if we eliminate everything difficult from language teaching and learning, we may end up doing very little beyond getting students to play simple communication games. It is, incidentally, quite incorrect to suggest that the classic works on pronunciation and phonetics teaching concentrated on mechanically perfecting vowels and consonants: Jones (1906, first published 1909), for example, writes " 'Good' speech may be defined as a way of speaking which is clearly intelligible to all ordinary people. 'Bad' speech is a way of talking which is difficult for most people to understand ... A person may speak with sounds very different from those of his hearers and yet be clearly intelligible to all of them, as for instance when a Scotsman or an American addresses an English audience with clear articulation. Their speech cannot be described as other than 'good'" (pp. 4-5).

Much has been written recently about **English as an International Language**, with a view to defining what is used in common by the millions of people around the world who use English (Crystal, 2003; Jenkins, 2000). This is a different goal from that of this book, which concentrates on a specific accent. The discussion of the subject in Cruttenden (2004: Chapter 13) is recommended as a survey of the main issues, and the concept of an International English pronunciation is discussed there.

There are many different and well-tried methods of teaching and testing pronunciation, some of which are used in this book. I do not feel that it is suitable in this book to go into a detailed analysis of classroom methods, but there are several excellent treatments of the subject; see, for example, Dalton and Seidlhofer (1990); Celce-Murcia *et al.* (1996) and Hewings (2004).

Written exercises

The exercises for this chapter are simple ones aimed at making you familiar with the style of exercises that you will work on in the rest of the course. The answers to the exercises are given on page 200.

- 1 Give three different names that have been used for the accent usually used for teaching the pronunciation of British English.

- ٢ What is the difference between *accent* and *dialect*?
- ٣ Which word is used to refer to the relative strength of a syllable?
- ٤ How many sounds (phonemes) do you think there are in the following words?
a) love b) half c) wrist d) shrink e) ought

Now look at the answers on page ٢٠٠.

2 The production of speech sounds

2.1 Articulators above the larynx

All the sounds we make when we speak are the result of muscles contracting. The muscles in the chest that we use for breathing produce the flow of air that is needed for almost all speech sounds; muscles in the **larynx** produce many different modifications in the flow of air from the chest to the mouth. After passing through the larynx, the air goes through what we call the **vocal tract**, which ends at the mouth and nostrils; we call the part comprising the mouth the **oral cavity** and the part that leads to the nostrils the **nasal cavity**. Here the air from the lungs escapes into the atmosphere. We have a large and complex set of muscles that can produce changes in the shape of the vocal tract, and in order to learn how the sounds of speech are produced it is necessary to become familiar with the different parts of the vocal tract. These different parts are called **articulators**, and the study of them is called **articulatory phonetics**.

Fig. 1 is a diagram that is used frequently in the study of phonetics. It represents the human head, seen from the side, displayed as though it had been cut in half. You will need to look at it carefully as the articulators are described, and you will find it useful to have a mirror and a good light placed so that you can look at the inside of your mouth.

- i) The **pharynx** is a tube which begins just above the larynx. It is about 5 cm long in women and about 4 cm in men, and at its top end it is divided into two, one

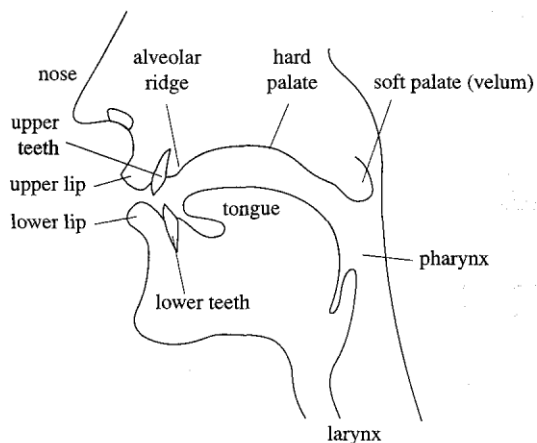


Fig. 1 The articulators

part being the back of the oral cavity and the other being the beginning of the way through the nasal cavity. If you look in your mirror with your mouth open, you can see the back of the pharynx.

- ii) The **soft palate** or **velum** is seen in the diagram in a position that allows air to pass through the nose and through the mouth. Yours is probably in that position now, but often in speech it is raised so that air cannot escape through the nose. The other important thing about the soft palate is that it is one of the articulators that can be touched by the tongue. When we make the sounds k, g the tongue is in contact with the lower side of the soft palate, and we call these **velar** consonants.
- iii) The **hard palate** is often called the "roof of the mouth". You can feel its smooth curved surface with your tongue. A consonant made with the tongue close to the hard palate is called **palatal**. The sound j in 'yes' is palatal.
- iv) The **alveolar ridge** is between the top front teeth and the hard palate. You can feel its shape with your tongue. Its surface is really much rougher than it feels, and is covered with little ridges. You can only see these if you have a mirror small enough to go inside your mouth, such as those used by dentists. Sounds made with the tongue touching here (such as t, d, n) are called **alveolar**.
- v) The **tongue** is a very important articulator and it can be moved into many different places and different shapes. It is usual to divide the tongue into different parts, though there are no clear dividing lines within its structure. Fig. 3 shows the tongue on a larger scale with these parts shown: **tip, blade, front, back** and **root**. (This use of the word "front" often seems rather strange at first.)
- vi) The **teeth** (upper and lower) are usually shown in diagrams like Fig. 3 only at the front of the mouth, immediately behind the lips. This is for the sake of a simple diagram, and you should remember that most speakers have teeth to the sides of their mouths, back almost to the soft palate. The tongue is in contact with the upper side teeth for most speech sounds. Sounds made with the tongue touching the front teeth, such as English T, D, are called **dental**.

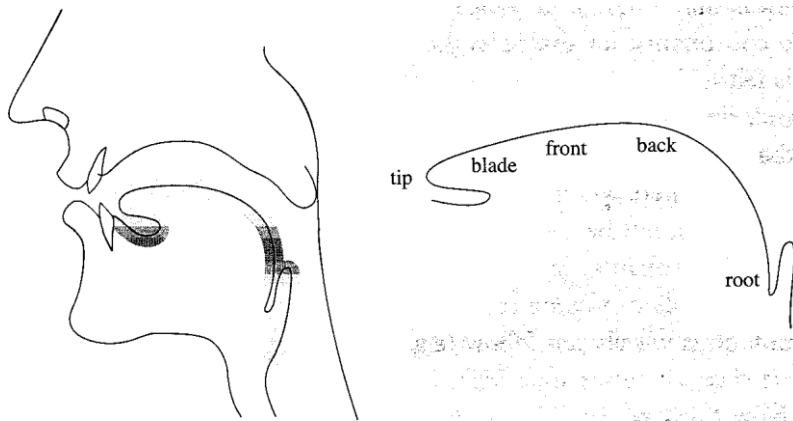


Fig. 2 Subdivisions of the tongue

vii) The **lips** are important in speech. They can be pressed together (when we produce the sounds p, b), brought into contact with the teeth (as in f, v), or rounded to produce the lip-shape for vowels like u:. Sounds in which the lips are in contact with each other are called **bilabial**, while those with lip-to-teeth contact are called **labiodental**.

The seven articulators described above are the main ones used in speech, but there are a few other things to remember. Firstly, the larynx (which will be studied in Chapter 5) could also be described as an articulator - a very complex and independent one. Secondly, the **jaws** are sometimes called articulators; certainly we move the lower jaw a lot in speaking. But the jaws are not articulators in the same way as the others, because they cannot themselves make contact with other articulators. Finally, although there is practically nothing active that we can do with the **nose** and the nasal cavity when speaking, they are a very important part of our equipment for making sounds (which is sometimes called our **vocal apparatus**), particularly nasal consonants such as m, n. Again, we cannot really describe the nose and the nasal cavity as articulators in the same sense as (i) to (vii) above.

2.2 Vowel and consonant

The words **vowel** and **consonant** are very familiar ones, but when we study the sounds of speech scientifically we find that it is not easy to define exactly what they mean. The most common view is that vowels are sounds in which there is no obstruction to the flow of air as it passes from the larynx to the lips. A doctor who wants to look at the back of a patient's mouth often asks them to say "ah"; making this vowel sound is the best way of presenting an unobstructed view. But if we make a sound like s, d it can be clearly felt that we are making it difficult or impossible for the air to pass through the mouth. Most people would have no doubt that sounds like s, d should be called consonants. However, there are many cases where the decision is not so easy to make. One problem is that some English sounds that we think of as consonants, such as the sounds at the beginning of the words 'hay' and 'way', do not really obstruct the flow of air more than some vowels do. Another problem is that different languages have different ways of dividing their sounds into vowels and consonants; for example, the usual sound produced at the beginning of the word 'red' is felt to be a consonant by most English speakers, but in some other languages (e.g. Mandarin Chinese) the same sound is treated as one of the vowels.

If we say that the difference between vowels and consonants is a difference in the way that they are produced, there will inevitably be some cases of uncertainty or disagreement; this is a problem that cannot be avoided. It is possible to establish two distinct groups of sounds (vowels and consonants) in another way. Consider English words beginning with the sound h; what sounds can come next after this h? We find that most of the sounds we normally think of as vowels can follow (e.g. e in the word 'hen'), but practically none of the sounds we class as consonants, with the possible exception of j in a word such as 'huge' hju:dʒ. Now think of English words beginning with the two sounds bI; we find many cases where a consonant can follow (e.g. d in the word 'bid', or l in the word 'bill'),

but practically no cases where a vowel may follow. What we are doing here is looking at the different contexts and positions in which particular sounds can occur; this is the study of the **distribution** of the sounds, and is of great importance in phonology. Study of the sounds found at the beginning and end of English words has shown that two groups of sounds with quite different patterns of distribution can be identified, and these two groups are those of vowel and consonant. If we look at the vowel-consonant distinction in this way, we must say that the most important difference between vowel and consonant is not the way that they are made, but their different distributions. It is important to remember that the distribution of vowels and consonants is different for each language.

We begin the study of English sounds in this course by looking at vowels, and it is necessary to say something about vowels in general before turning to the vowels of English. We need to know in what ways vowels differ from each other. The first matter to consider is the shape and position of the tongue. It is usual to simplify the very complex possibilities by describing just two things: firstly, the vertical distance between the upper surface of the tongue and the palate and, secondly, the part of the tongue, between front and back, which is raised highest. Let us look at some examples:

- i) Make a vowel like the i: in the English word 'see' and look in a mirror; if you tilt your head back slightly you will be able to see that the tongue is held up close to the roof of the mouth. Now make an { vowel (as in the word 'cat') and notice how the distance between the surface of the tongue and the roof of the mouth is now much greater. The difference between i: and æ is a difference of tongue height, and we would describe i: as a relatively **close** vowel and æ as a relatively **open** vowel. Tongue height can be changed by moving the tongue up or down, or moving the lower jaw up or down. Usually we use some combination of the two sorts of movement, but when drawing side-of-the-head diagrams such as Fig. 1 and Fig. 2 it is usually found simpler to illustrate tongue shapes for vowels as if tongue height were altered by tongue movement alone, without any accompanying jaw movement. So we would illustrate the tongue height difference between i: and æ as in Fig. 3.

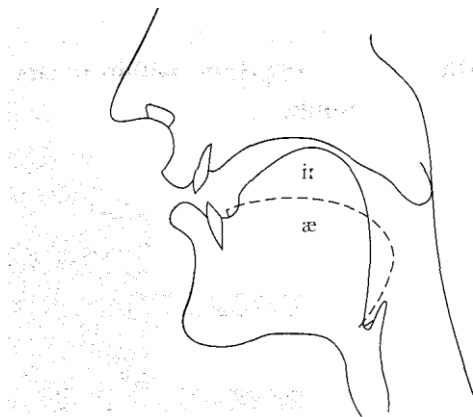


Fig. 3 Tongue positions for i: and æ

- ii) In making the two vowels described above, it is the front part of the tongue that is raised. We could therefore describe i: and æ as comparatively **front** vowels. By changing the shape of the tongue we can produce vowels in which a different part of the tongue is the highest point. A vowel in which the back of the tongue is the highest point is called a **back** vowel. If you make the vowel in the word 'calm', which we write phonetically as ɑ:, you can see that the back of the tongue is raised. Compare this with æ in front of a mirror; as is a front vowel and a: is a back vowel. The vowel in 'too' (u:) is also a comparatively back vowel, but compared with a: it is close.

So now we have seen how four vowels differ from each other; we can show this in a simple diagram.

	Front	Back
Close	i:	u:
Open	æ	a:

However, this diagram is rather inaccurate. Phoneticians need a very accurate way of classifying vowels, and have developed a set of vowels which are arranged in a close-open, front-back diagram similar to the one above but which are not the vowels of any particular language. These **cardinal vowels** are a standard reference system, and people being trained in phonetics at an advanced level have to learn to make them accurately and recognise them correctly. If you learn the cardinal vowels, you are not learning to make English sounds, but you are learning about the range of vowels that the human vocal apparatus can make, and also learning a useful way of describing, classifying and comparing vowels. They are recorded on Track 21 of CD 2.

It has become traditional to locate cardinal vowels on a four-sided figure (a quadrilateral of the shape seen in Fig. 4 - the design used here is the one recommended by the **International Phonetic Association**). The exact shape is not really important - a square would do quite well - but we will use the traditional shape. The vowels in Fig. 4 are the so-called **primary** cardinal vowels; these are the vowels that are most familiar to the speakers of most European languages, and there are other cardinal vowels (**secondary** cardinal vowels) that sound less familiar. In this course cardinal vowels are printed within square brackets [] to distinguish them clearly from English vowel sounds.

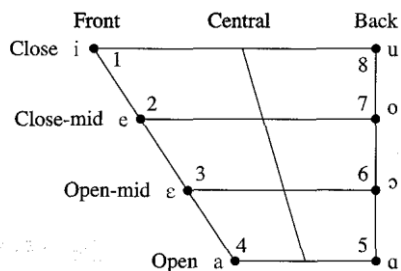


Fig. 4 Primary cardinal vowels

Cardinal vowel no. 1 has the symbol [i], and is defined as the vowel which is as close and as front as it is possible to make a vowel without obstructing the flow of air enough to produce friction noise; friction noise is the hissing sound that one hears in consonants like s or f. Cardinal vowel no. 2 has the symbol [a] and is defined as the most open and back vowel that it is possible to make. Cardinal vowel no. 3 [u] is fully close and back and no. 4 [a] is fully open and front. After establishing these extreme points, it is possible to put in intermediate points (vowels no. 5, 6, 7 and 8). Many students when they hear these vowels find that they sound strange and exaggerated; you must remember that they are *extremes* of vowel quality. It is useful to think of the cardinal vowel framework like a map of an area or country that you are interested in. If the map is to be useful to you it must cover all the area; but if it covers the whole area of interest it must inevitably go a little way beyond that and include some places that you might never want to go to.

When you are familiar with these extreme vowels, you have (as mentioned above) learned a way of describing, classifying and comparing vowels. For example, we can say that the English vowel { (the vowel in 'cat') is not as open as cardinal vowel no. 4 [a]. We have now looked at how we can classify vowels according to their tongue height and their frontness or backness. There is another important variable of vowel quality, and that is lip-position. Although the lips can have many different shapes and positions, we will at this stage consider only three possibilities. These are:

- i) Rounded, where the corners of the lips are brought towards each other and the lips pushed forwards. This is most clearly seen in cardinal vowel no. 3 [u].
- ii) Spread, with the corners of the lips moved away from each other, as for a smile. This is most clearly seen in cardinal vowel no. 1 [i].
- iii) Neutral, where the lips are not noticeably rounded or spread. The noise most English people make when they are hesitating (written 'er') has neutral lip position.

Now, using the principles that have just been explained, we will examine some of the English vowels.

2.3 English short vowels

🔊 AU², Exs 1-2

English has a large number of vowel sounds; the first ones to be examined are short vowels. The symbols for these short vowels are: I, e, {, v, Q, U. Short vowels are only *relatively* short; as we shall see later, vowels can have quite different lengths in different contexts.

Each vowel is described in relation to the cardinal vowels.

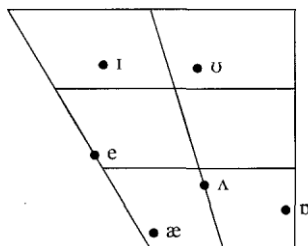


Fig. 5 English short vowels

- i (example words: 'bit', 'pin', 'fish') The diagram shows that, though this vowel is in the close front area, compared with cardinal vowel no. 1 [i] it is more open, and nearer in to the centre. The lips are slightly spread,
- e (example words: 'bet', 'men', 'yes') This is a front vowel between cardinal vowel no. 2 [e] and no. 3 [ɛ]. The lips are slightly spread.
- æ (example words: 'bat', 'man', 'gas') This vowel is front, but not quite as open as cardinal vowel no. 4 [a]. The lips are slightly spread.
- ʌ (example words: 'cut', 'come', 'rush') This is a central vowel, and the diagram shows that it is more open than the open-mid tongue height. The lip position is neutral.
- ɒ (example words: 'pot', 'gone', 'cross') This vowel is not quite fully back, and between open-mid and open in tongue height. The lips are slightly rounded.
- ʊ (example words: 'put', 'pull', 'push') The nearest cardinal vowel is no. 5 [u], but it can be seen that u is more open and nearer to central. The lips are rounded.

There is one other short vowel, for which the symbol is ə. This central vowel - which is called **schwa** - is a very familiar sound in English; it is heard in the first syllable of the words 'about', 'oppose', 'perhaps', for example. Since it is different from the other vowels in several important ways, we will study it separately in Chapter 9.

Notes on problems and further reading

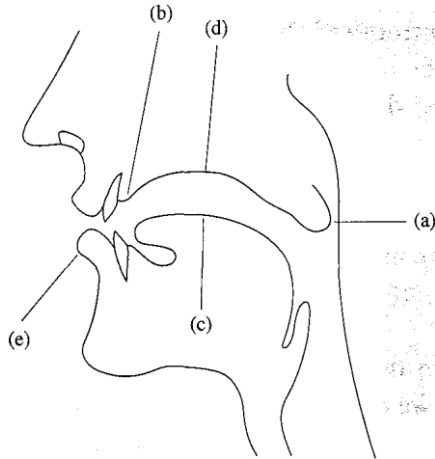
One of the most difficult aspects of phonetics at this stage is the large number of technical terms that have to be learned. Every phonetics textbook gives a description of the articulators. Useful introductions are Ladefoged (1976: Chapter 1), Ashby (1969), and Ashby and Maidment (1969: Chapter 3).

An important discussion of the vowel-consonant distinction is by Pike (1963: 66-79). He suggested that since the two approaches to the distinction produce such different results we should use new terms: sounds which do not obstruct the airflow (traditionally called "vowels") should be called **vocoids**, and sounds which *do* obstruct the airflow (traditionally called "consonants") should be called **contoids**. This leaves the terms "vowel" and "consonant" for use in labelling phonological elements according to their distribution and their role in syllable structure; see Section 2.1 of Laver (1994). While vowels are usually vocoids and consonants are usually contoids, this is not always the case; for example, j in 'yet' and w in 'wet' are (phonetically) vocoids but function (phonologically) as consonants. A study of the distributional differences between vowels and consonants in English is described in O'Connor and Trim (1983); a briefer treatment is in Cruttenden (1988: Sections 4, 5 and 6, 7). The classification of vowels has a large literature: I would recommend Jones (1969: Chapter 1); Ladefoged (1976) gives a brief introduction in Chapter 1, and much more detail in Chapter 9; see also Abercrombie (1967: 50-60 and Chapter 10). The *Handbook of the International Phonetic Association* (1999: Section 2, 7) explains the IPA's principles of vowel classification. The distinction

between primary and secondary cardinal vowels is a rather dubious one which appears to be based to some extent on a division between those vowels which are familiar and those which are unfamiliar to speakers of most European languages. It is possible to classify vowels quite unambiguously without resorting to this notion by specifying their front/back, close/open and lip positions.

Written exercises

- 1 On the diagram provided, various articulators are indicated by labelled arrows (a-e). Give the names for the articulators.



- 2 Using the descriptive labels introduced for vowel classification, say what the following cardinal vowels are:
a) [u] b) [e] c) [a] d) [i] e) [o]
- 3 Draw a vowel quadrilateral and indicate on it the correct places for the following English vowels:
a) æ b) ʌ c) ɪ d) e
- 4 Write the symbols for the vowels in the following words:
a) bread b) rough c) foot d) hymn
e) pull f) cough g) mat h) friend

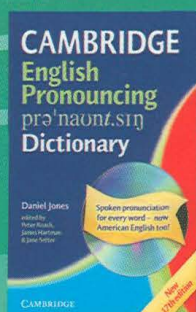
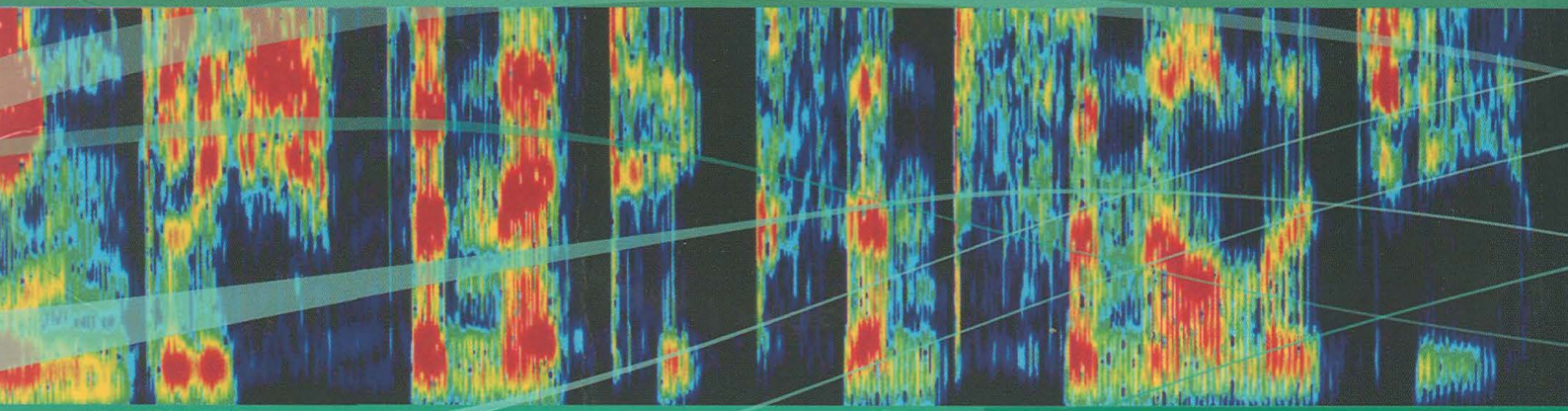
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Peter Roach has taught phonetics and English pronunciation in France and Spain and has been a visiting lecturer in many countries around the world. He is the principal editor of the *Cambridge English Pronouncing Dictionary*, 17th edition, and a member of the International Phonetic Association, the British Association of Academic Phoneticians and IATEFL. Before retiring in 2003 he was Professor of Phonetics and Head of the School of Linguistics and Applied Language Studies at the University of Reading. He is now Emeritus Professor of Phonetics at the University of Reading.



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