

The background of the book cover is a solid blue color. It is decorated with several horizontal white lines representing spectrograms and waveforms. At the top, there are two thin, irregular white lines. Below these, there is a more complex spectrogram with multiple vertical bands of varying intensity. In the center, there is a single, prominent white waveform with a sharp peak. Below this, there is another spectrogram with several distinct vertical bands. At the bottom, there is a final spectrogram and a single waveform with a sharp peak.

A Course in Phonetics

Peter Ladefoged

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University of California, Los Angeles



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A Course in Phonetics

This book is for:

Lise

Katie

Thegn

And for Simba, who faithfully attended
nearly all the LBFS meetings at which it
was written.

Preface

This is a *course* in phonetics, not a book about phonetics. It is intended to be useful to both students of linguistics and to those who are more concerned with studying the sounds of English. How much attention is to be paid to different chapters depends on the objectives of the course for which it is used.

The first chapter presents an overview of articulatory phonetics and the technical terms required for describing speech. The second chapter is concerned with phonetic transcription and a set of symbols for transcribing English. Everyone should master the terminology and symbols in both these chapters before going further in the book.

Many of the main concepts of phonetics are introduced through a discussion of the phonetics of English in Chapters 3, 4, and 5. These chapters should be read carefully by all students, but they may contain too many exercises for some; those students who are not primarily concerned with the sound pattern of English may prefer to give only one or two examples of answers to each question.

Consonants that occur in languages other than English are discussed at length in Chapters 6 and 7. These chapters are obviously of most importance to students of foreign languages and of general linguistics. The questions at the end of each involve materials that are not essential for students of English.

Chapter 8 outlines some of the main concepts of acoustic phonetics and is a prerequisite for the discussion of vowels in Chapter 9. It is also useful to have some knowledge of acoustic phonetics before reading Chapter 10, which discusses the nature of the syllable and the use of stress, length, tone, and intonation in languages other than English.

The final chapters are more concerned with general linguistic concepts.

Breyne Arlene Moskowitz, Mona Lindau (now at the University of Ibadan, Nigeria), Ian Maddieson, Sandra A. Thompson, and Diana Van Lancker. Their comments and criticisms have much improved the draft versions of this book. Helpful comments have also been made by Kenneth C. Hill of the University of Michigan, John Ohala of the University of California, Berkeley, Jimmy G. Harris of the Ford Foundation, Harry Hollien of the University of Florida, William Dyckes of Harcourt Brace Jovanovich, and numerous students. Of course none of the above is in any way responsible for any errors. Wherever possible I have checked the facts with my own observations. The majority of the illustrations are based on my own x-ray tracings or acoustic analyses.

In conclusion, I would like to acknowledge the enormous amount of help I have had from my wife, who has judged every sentence in the book, rewritten many of them, and in a practical sense been a coauthor. I would also like to thank the University of California, Los Angeles, for granting me the sabbatical leave during which most of the book was written. The original research on which parts of the book depend was supported by the National Institutes of Health (Grant USPHS NS 09780 and 04591) and the National Science Foundation (Grants NSF GS 37235x and NSF GS 36045).

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Chapter 11 introduces the basic ideas involved in two different sets of features that have been used by linguists for specifying the sounds of languages. Chapter 12 discusses the relationship between linguistic descriptions and phonetic specifications. It gives more precise definitions of the set of prime features that can be used in phonetic (and phonological) specifications of the languages of the world. This chapter contains more material than is appropriate for students not specializing in linguistics.

Toward the end of the book, the chapters have fewer exercises—largely because varied assignments seem most rewarding at the beginning of a course. Toward the end of a course students should be able to concentrate on a single project. The kind of project that is most useful for students of general linguistics is to give a description of the major phonetic characteristics in some other language. Students of English might profitably try to describe an accent of English that is very different from their own. Each student might try to find a speaker of another language (or a speaker with a different accent) with whom to work. Then, using grammars, dictionaries, or whatever sources are available, the student could try to compile a list of words illustrating the major characteristics of that language. If possible, a tape recording of this list of words should be prepared and submitted along with written observations.

At the end of nearly every chapter there is also a set of performance exercises that involve making and hearing differences between sounds. Nobody can hope to get very far in the study of phonetics without developing this practical ability. A phonetician should be able to produce the sounds he or she describes and to reproduce sounds described by others. Some people are naturally better at doing this than others, but everyone can improve his or her ability to a considerable extent by conscientiously working through exercises of the kind suggested here.

As this is an introductory textbook, many of the ideas presented here are not new. The sources for some of the less familiar data are acknowledged in a separate section at the end of the book, but I cannot properly acknowledge all of the material I have incorporated. From a personal point of view my greatest debt is clearly to David Abercrombie of the University of Edinburgh, from whom I first learned what I took to be the commonly accepted dogma of phonetics, many of the ideas being his own contributions to the field. But, as he is always eager to point out, many are part of the general tradition of phonetics in Britain that goes back through Daniel Jones to such great nineteenth-century phoneticians as Henry Sweet. Even the details of some of the exercises that appear here (for example, the adding and subtracting of voice from an articulation) can be found in their publications.

I have also incorporated ideas from many other people, including my former teachers and colleagues at the University of Edinburgh, Elizabeth T. Uldall and Ian Catford (now at the University of Michigan), and my colleagues at the University of California, Los Angeles, Victoria Fromkin,

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Articulatory Phonetics 1

Phonetics is concerned with describing the speech sounds that occur in the languages of the world. We want to know what these sounds are, how they fall into patterns, and how they change in different circumstances. Most importantly, we want to know what aspects of the sounds are necessary for conveying the meaning of what is being said. The first job of a phonetician is therefore trying to find out what people are doing when they are talking and when they are listening to speech.

The Vocal Organs

We will begin by describing how speech sounds are made. In nearly all speech sounds the basic source of power is the respiratory system pushing air out of the lungs. Try to talk while breathing in instead of out. You will find that you can do it, but it is much more inefficient than superimposing speech on an outgoing breath.

Air from the lungs goes up the windpipe (the trachea, to use the more technical term) and into the larynx, at which point it must pass between two small muscular folds called the vocal cords. If the vocal cords are apart, as they normally are when breathing out, the air from the lungs will have a relatively free passage into the pharynx and the mouth. But if the vocal cords are adjusted so that there is only a narrow passage between them, the pressure of the airstream will cause them to vibrate. Sounds produced when the vocal cords are vibrating are said to be **voiced**, as opposed to those in which the vocal cords are apart, which are said to be **voiceless**.

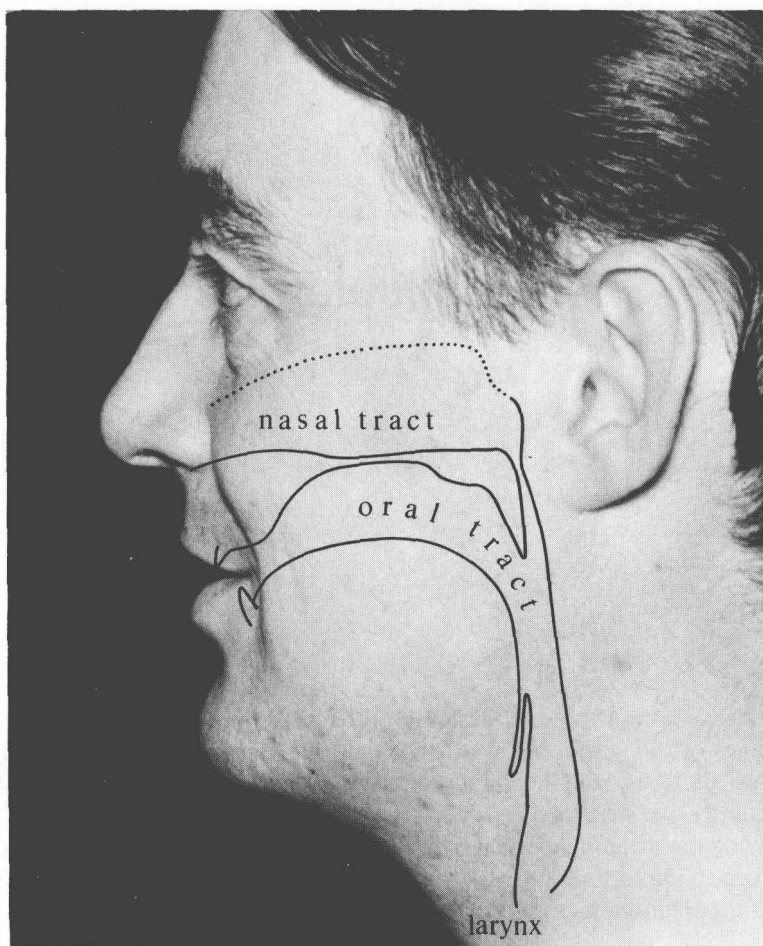


Figure 1.1 *The vocal tract.*

In order to hear the difference between a voiced and a voiceless sound, try saying a long *v* sound, which we will symbolize as [vvvvv]. Now compare this with a long *f* sound [fffff], saying each of them alternately—[fffffvvvvfffff vvvvv]. Both of these sounds are formed in the same way in the mouth. The difference between them is that [v] is voiced but [f] is voiceless. You can feel the vocal cord vibrations in [v] if you put your fingertips against your larynx. You can also hear the buzzing of the vibrations in [v] more easily if you stop up your ears while contrasting [fffffvvvvv].

The difference between voiced and voiceless sounds is important in all known languages. In each of the pairs of words “fat, vat; thigh, thy; Sue, zoo” the consonant in the first word of each pair is voiceless, whereas that in the second word is voiced. Check this for yourself by saying just the consonants at the beginning of each of these words and trying to feel and hear the voicing

as suggested above. Try to find other pairs of words that are distinguished by one having a voiced and the other having a voiceless consonant.

The air passages above the larynx are known as the **vocal tract**. Figure 1.1 shows their location within the head. The shape of the vocal tract is a very important factor in the production of speech, and we will often refer to a diagram of the kind that has been superimposed on the photograph in Figure 1.1. Learn to draw the vocal tract by tracing the diagram in this figure. Note that the air passages that make up the vocal tract may be divided into the oral tract within the mouth and the pharynx, and the nasal tract within the nose. The upper limit of the nasal tract has been marked with a dotted line since the exact boundaries of the air passages within the nose depend on soft tissues of variable size.

The parts of the oral tract that can be used to form sounds are called articulators. The articulators that form the lower surface of the oral tract often move toward those that form the upper surface. Try saying the word "capital" and note the major movements of your tongue and lips. You will find that the back of the tongue makes contact with the roof of the mouth for the first sound, and then comes down for the following vowel. The lips come together in the formation of *p* and then come apart again in the vowel. The tongue tip comes up for the *t* and again, for some people, for the final *l*.

The names for the principal parts of the upper surface of the vocal tract are given in Figure 1.2. The upper lip and the upper teeth (notably the frontal incisors) are familiar enough structures. Just behind the upper teeth there is a small protuberance that you can feel with the tip of the tongue. This is called the **alveolar ridge**. You can also feel that the front part of the roof of the mouth is formed by a bony structure. This is the **hard palate**. You will

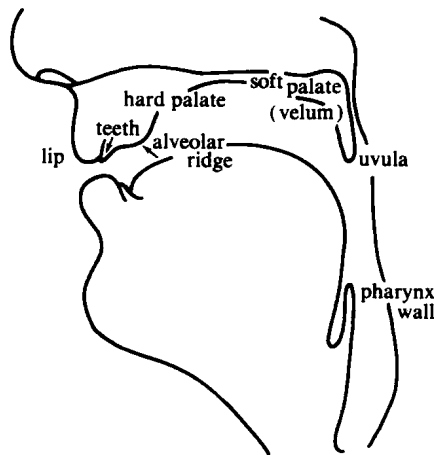


Figure 1.2 *The principal parts of the upper surface of the vocal tract.*

4 Articulatory Phonetics

probably have to use a finger tip to feel further back. Most people cannot curl the tongue up far enough to touch the **soft palate**, or **velum**, at the back of the mouth. The soft palate is a muscular flap that can be raised to press against the back wall of the pharynx and shut off the nasal tract, preventing air from going out through the nose. In this case there is said to be a **velic closure**. This action separates the nasal tract from the oral tract so that the air can go out only through the mouth. At the lower end of the soft palate there is a small appendage hanging down that is known as the uvula. The part of the vocal tract between the uvula and the larynx is the pharynx. The back wall of the pharynx may be considered to be one of the articulators on the upper surface of the vocal tract.

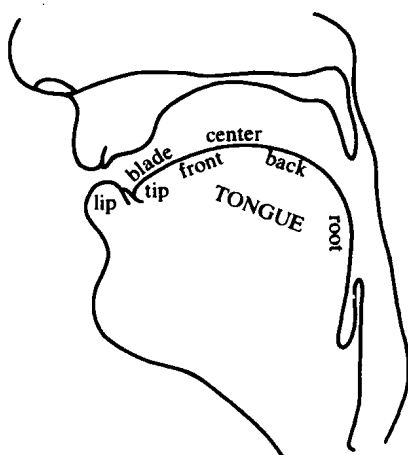


Figure 1.3 *The principal parts of the lower surface of the vocal tract.*

Figure 1.3 shows the lower lip and the specific names for different parts of the tongue which form the lower surface of the vocal tract. The tip and blade of the tongue are the most mobile parts. Behind the blade is what is technically called the front of the tongue: it is actually the forward part of the body of the tongue, and lies underneath the hard palate when the tongue is at rest. The remainder of the body of the tongue may be divided into the center, which is partly beneath the hard palate and partly beneath the soft palate, the back, which is beneath the soft palate, and the root, which is opposite the back wall of the pharynx.

Bearing all these terms in mind, say the word “peculiar” and try to give a rough description of the actions of the vocal organs during the consonant sounds. You should find that the lips come together for the first sound. Then the back and center of the tongue are raised. But is the contact on the hard palate or on the velum? (For most people it is centered between the two.)

Then note the position in the formation of the *l*. Most people make this sound with the tip of the tongue on the alveolar ridge.

Now compare the words “true” and “tea.” In which word is the tongue contact further forward in the mouth? Most people make contact with the tip or blade of the tongue on the alveolar ridge when saying “tea,” but slightly farther back in “true.” Try to distinguish the differences in other consonant sounds such as those in “sigh” and “shy” and those in “fee” and “the.”

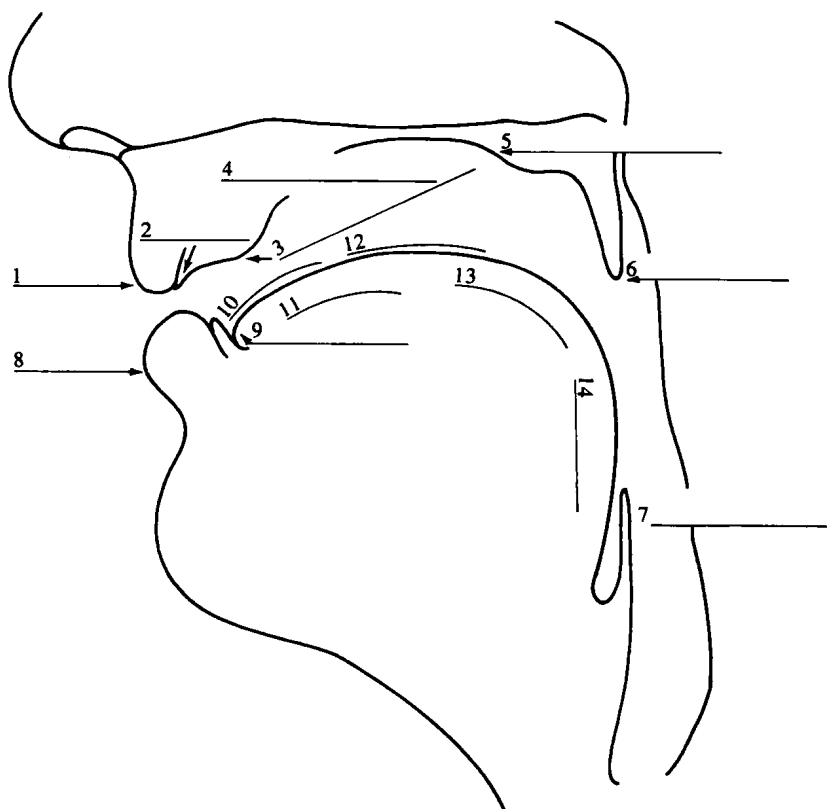


Figure 1.4 Fill in the names of the vocal organs in the spaces provided.