

ELEMENTARY PHONOLOGY
FOR STUDENTS IN OTHER DISCIPLINES
A SYLLABUS

by

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1. Introduction

1.1 A background in linguistics is becoming increasingly useful in a wide variety of disciplines. Students who have a background often find themselves in an advantageous position as linguistics becomes more current in their chosen field, while students without it may find themselves at a disadvantage in an advanced course and, to compound the problem, find that is not feasible to pick up a full semester introductory linguistics course. From the point of view of the instructor offering a course with linguistics orientation, the options include limiting the course to students with linguistics background, or limiting course content to accommodate students without the requisite background, or sacrificing some of his instruction time to the presentation of the requisite linguistics information. Those choosing the third option find a notable lack of appropriate instructional materials.

1.2 Several introductions to phonology are available in linguistics textbooks. Gleason (1961), for example, offers an introduction to the sounds of English and a general introduction to articulatory phonetics including exotic sounds. The degree of sophistication required to study this text successfully is about that of an undergraduate, but the material is directed more to linguistics majors and should be adapted for students in other disciplines. This criticism applies to most other introductory linguistics textbooks. Pike (1947) has produced a standard work on analysis and description of

exotic sounds and phonemicization of phonetic data. This work presents a wealth of detail, a characteristic that makes it difficult to use in undergraduate instruction. Materials are needed in language appropriate to non-linguistics majors and in a form allowing for optimum use by students outside of class. This report is an attempt to help fill this need.

1.3 The solution selected for instruction in phonology is a set of lessons written in a style appropriate to undergraduate non-linguistics majors. Materials covering the sounds of speech are presented in student handout form, a form selected because of the success experienced with it in other courses.

2. Student Handouts

2.1 Phonology is presented in a series of fifteen lessons designed for use over a period of six weeks. The handouts for these lessons are presented as appendix A of this report.

2.2 The student handouts introduce the student to the recognition, production, and transcription of the sounds of English and selected non-English sounds, and to the phonemicization of phonetic data. An introduction to distinctive feature analysis in very elementary terms is included for the purpose of making students aware of one of the newer linguistic models gaining wide use in other disciplines.

2.3 A short introduction to the nature of speech, its production, and its study in articulatory phonetics is followed by an introduction to the sounds of English.

2.4 The presentation of English phonology begins with a study of the stops, chosen for initial study because their mode of production

is easily apprehended as being different from that of all other sounds. Following stops, the fricatives, affricates, resonants, and vowels are introduced in that order. Although the vowels are introduced last, there is some practice in vowel discrimination given in earlier consonant exercises for two purposes. First, it allows the student to practice whole word transcription, which seems to be more motivating than practicing with single sounds. Second, the student gains a preview of vowel transcription before actually confronting the discussion of vowel articulation.

3. Instructor Notes

3.1 Notes to the instructor are provided, paralleling each lesson in the student handouts. These notes are presented as appendix B of this report.

3.2 The content of these notes is threefold. First, the notes tell the instructor to those parts of the lesson which may prove difficult for the student. Second, supplementary and complementary material is included to augment the handout explanation. Third, the notes contain practice transcription material. In most cases this material is also suitable for duplication and distribution as reading exercises.

3.3 The instructor notes are separated by lessons, and all dictation exercises are in transcription in a larger size type face, for the convenience of the instructor.

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APPENDIX A

LESSON ONE

WHY STUDY LANGUAGE

The study of language itself is the concern of linguists. If you are an anthropology student, it will be necessary for you to learn how a linguist goes about his work so that you will be able to apply the results of a linguistic analysis to an analysis of social structure. Language can not be separated from the rest of culture. Therefore, a study of language is a necessary part of the study of any culture.

In addition, anthropologists are increasingly making use of linguistic models in their analysis of the non-linguistic part of culture.

The study of language may be approached in several different ways. One of these is to divide language study into phonology, the study of the sound-systems of languages, and grammar, which includes morphology and syntax. This series of lessons will be concerned exclusively with phonology. The many languages of the world display a great deal of variety in their sound-systems, and by completing the lessons you should be able to recognize and unambiguously record samples of foreign language you have never heard before.

We begin our study of phonology with a consideration of phonetics, the study of the speech sounds themselves. We will look at the speech sounds of English at this point, for two purposes. First, you already

know how to speak English. You are able to produce the sounds and need only to learn how to transcribe them. In addition, anthropologists are increasingly working in complex societies. It is quite possible that you will find yourself in a fieldwork situation among English speaking people in the United States. Many of the socio-cultural differences found in the United States are paralleled by linguistic differences. An understanding of linguistic variability is necessary to a complete understanding of cultural variability

LESSON TWO

PLACE AND MODE: THE BASIS FOR PHONETIC STUDY

Phonetics is the name given to the study of the sounds of speech. There are three major ways in which sounds are studied. The particular approach taken depends on what kind of information is needed about the speech sounds. This in turn depends on what use will be made of the information.

The first of these three approaches is called acoustic phonetics. Acoustic phonetics is the study of the physical properties of the sound waves resulting from speech. The most common measurements taken are made with a sonograph. This instrument measures the intensity of sound at various frequency levels. By looking at a graph made of the relationship of frequency and intensity (volume) versus time, it is possible for one, after some practice, to determine what was said. The purpose, however, is not usually to determine what has been said. Usually the purpose is to determine the physical properties of the sound so that a piece of electrical equipment, for example, could be designed to transmit the sounds involved without distortion.

Acoustic phonetics requires the use of delicate and expensive equipment. For this reason, among others, it is seldom used in field work.

The second way of studying human speech is by looking at how it affects the human ear. This branch is of great use in audiology. The proper design of hearing aids, for example, depends on an understanding of the mechanisms of speech reception. This branch is known as audit-

ory phonetics. Since auditory phonetics is so specialized it is not often used in anthropology.

The third branch of phonetic study is the one we will use in this course. It is known as articulatory phonetics. In this branch of phonetics sounds are described and named by reference to how they are produced. The name of a sound is a description of how to produce that sound. After some practice, one can produce a sound he has never heard before, if the name of that sound is given.

The key concept of articulatory phonetics is place and mode of articulation. Articulation means touching or nearly touching. All speech sounds are produced by bringing two or more of the organs of speech together to modify the air stream from the lungs.

Before we proceed with a discussion of place and mode of articulation it is necessary to see how speech sounds are produced. Speech is usually produced by modifying the stream of air which proceeds outward from the lungs. In a small number of languages an incoming air stream can be modified to produce sounds known as ingressesives. A small number of languages also regularly use sounds which are known as clicks. These are produced by creating a partial vacuum in the mouth or throat and then allowing air to quickly enter this space producing a sharp clicking or popping sound. The English sound spelled tsk! is a click. It is formed by producing a vacuum behind the front teeth with the front of the tongue. A different click is sometimes used in English to get a horse moving. Both of these sounds are rather special cases since they are not combined with other sounds to produce words. Because of this they are not considered as a regular part of the sound structure of English.

As the air from the lungs proceeds up the windpipe or trachea, it

passes between the vocal cords or vocal folds. These are located in the larynx. If these folds are relaxed there is very little modification of the air stream. If the folds are tightened, the passing air causes them to vibrate, producing voice. The pitch of the vibration is determined by the degree of tension on the folds. The folds may even be tightened enough to completely shut off the air stream. This is done when the breath is held with the mouth open.

Voice is produced by the vibration of the vocal folds. A sound is voiceless if the vocal folds are not vibrating when that sound is produced. If the folds are vibrating, the sound is called voiced. Say the words "bee" and "pea" with one hand over your larynx and the other hand over your ear. You should be able to hear and feel the vibration of the vocal folds beginning slightly before the lips are opened in the first word. In the second word, the vibration does not start until after the lips open and the vowel sound begins. Because of this, the initial sound of the first word is called voiced while that of the second word is voiceless.

LESSON THREE

THE ORGANS OF SPEECH

The key concept of articulatory phonetics, as mentioned above, is place and mode of articulation. Place refers to the part of the mouth and other vocal organs used to produce the sound. Mode is a description of just how these articulators are used. For example, a sound may be called a voiced bilabial stop. Voiced means that the vocal folds are vibrating when the sound is produced. Bilabial means that the two labia or lips are used to produce the sound. The word stop means that the air stream from the lungs is completely stopped by the articulators used. If you follow these directions you will produce a sound represented by the letter "b" in English.

It will be necessary for you to learn the names of the organs of speech. A diagram is reproduced with this lesson.

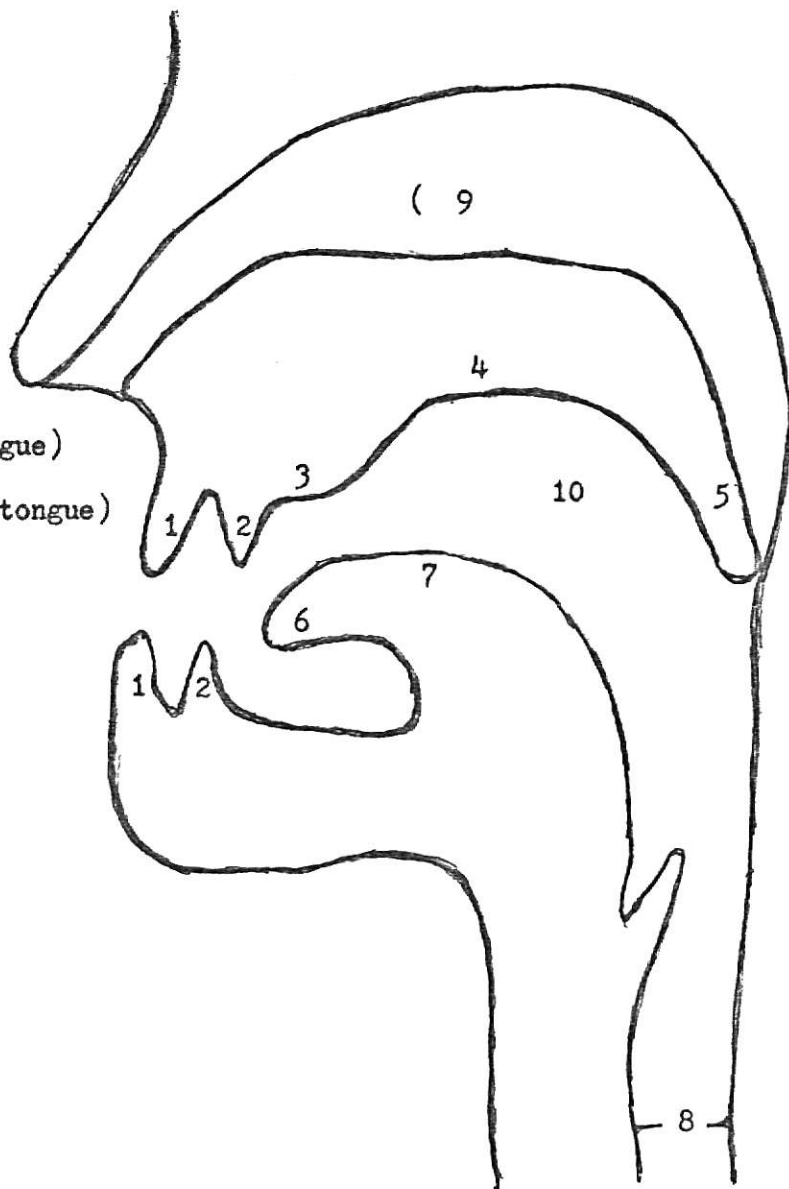
In addition the names of the places of articulation sometimes change slightly when used as adjectives or as part of a combination of two or more names used together. The chart below may be useful in learning these.

COMMON NAMES	ADJECTIVE	COMBINING FORM
lip	labial	labio-
teeth	dental	-
alveolus	alveolar	alveo-
palate	palatal	palato-

COMMON NAME	ADJECTIVE	COMBINING FORM
tip of tongue	apical	apico-
back of tongue	dorsal	dorso-
side of tongue	lateral	-
velum	velar	-

THE ORGANS OF SPEECH

1. labia
2. teeth
3. alveolar ridge
4. palate
5. velum
6. apex (tip of tongue)
7. dorsum (back of tongue)
8. vocal folds
9. nasal cavity
10. oral cavity



In the beginning, sentences or even words are too large to be studied as sounds. Individual speech sounds, or phones, are studied. All words are pronounced as strings of one or more phones. For example, the word "cat" contains three phones. In this case there is one phone for each letter of the alphabet. However in the word "cough" there are only three phones but five letters in the spelling. Remember, the number of phones and the number of letters used to spell a word are only partially related.

In the exercise below, say each word slowly to yourself. Count the number of phones you hear as you say it the second and third time. It will probably help you if you say the word out loud. Enter the number of phones you count in the space provided after the word.

Ex. 2

book ____	beat ____	wit ____	smooth ____
this ____	coat ____	high ____	lip ____
foot ____	shoe ____	buy ____	tooth ____
read ____	inn ____	knee ____	hose ____
hat ____	in ____	with ____	cap ____
pot ____	will ____	these ____	ape ____
such ____	form ____	penny ____	small ____
word ____	all ____	sound ____	letter ____
list ____	tree ____	ice ____	light ____
phase ____	rub ____	toe ____	nose ____

In some of the above words you may have had some problem deciding about the number of vowel phones. There is good reason for this. The same problem has faced phoneticians. Words like "low" are said to contain either two or three phones, depending on who is doing the counting. After we finish the consonant sounds we will work on the vowel sounds.

and attempt to resolve this problem.

The chart of the vocal organs given above should receive a considerable amount of attention on your part. It will be necessary for you to use the information given in this chart in the remainder of this course. Try saying a few words slowly and determine what your mouth is doing. You need to redevelop a sense of feeling in your mouth so that you can describe just what your tongue and other articulators are doing any time you make a sound.

LESSON FOUR

TRANSCRIPTION

In the next several lessons we will be learning a skill known as phonetic transcription. Phonetic transcription is a way of writing the sounds of speech that avoids the ambiguity of standard spelling yet produces a permanent record. This is a matter of skill acquisition. Like learning to ride a bicycle, the best way to learn is to practice. Intellectualizing about how to do phonetic transcription is about as effective as intellectualizing about how to ride a bicycle. The key to success is practice.

A phonetic transcription is distinguished from other kinds of writing by being enclosed in square brackets []. In the lessons you will be given, a word will be enclosed in double quotation marks if it is a standard spelling. Capital letters and punctuation marks are used but this is to indicate a special sound.

We will use capital letters later in this course to show certain non-English pronunciations. Spaces are used in phonetic transcription to show definite breaks in the flow of speech. A transcription of English sentences will show that several of the words are pronounced without a pause. In that case the words are written without a break. If the volume of the voice actually goes to zero, a break or space is inserted even if this occurs in the middle of a word.

THE STOPS IN ENGLISH

The first mode of articulation we will consider is the stop mode. The stops are formed by completely stopping the air stream. Stops in

English are formed as (1) bilabials, (2) with the alveolus and the tip of the tongue, (3) with the dorsum of the tongue and velum, and (4) with the vocal folds. The first three positions are used to form both voiced and voiceless stops. The last is used to form only voiceless sounds. The symbols used to record each of these sounds are listed below in chart form. The symbol [ʔ] represents a glottal stop.

	bilabial	alveolar	velar	glottal
Voiceless	p	t	k	ʔ
Voiced	b	d	g	-

The voiceless stops [p, t, k] may be aspirate or inaspirate. Aspiration is the puff of air that may follow the opening of the stop. Say the words "top" and "stop". The sound of the stop [t] in the first is aspirated. In the second it is inaspirate. You can tell if a stop is aspirate or inaspirate by holding a piece of flexible paper in front of your mouth. If the paper jumps away from your mouth when you say the stop it is aspirate. Inaspirate stops will cause very little movement in the paper. Practice this with the words "stop" and "top".

In addition, stops in final position, that is before a pause, may be released or unreleased. A stop is released if the articulation making the stop is opened up before the air pressure behind the stop is lost. Listen to your instructor say some words with the final stop released and unreleased.

In transcription we will use the superscript h to indicate an aspirate stop, e.g., [k^h]. A single quote mark following a stop symbol in final position indicates an unreleased stop. A stop symbol followed by neither superscript h nor single quote mark indicates release without aspiration.

LESSON FIVE

ENGLISH FRICATIVES AND AFFRICATES

The next manner or mode of articulation we will look at is the fricative mode. Fricatives are formed by nearly stopping the air stream. The result of the narrow constriction formed is an airy hissing or buzzing sound. This is caused by the tumbling of the air stream as it passes between the articulators. The following fricatives occur in English:

	labio-dental	interdental	alveolar	alveo-palatal
Vl	f	θ	s	^V s
Vd	v	ð	z	^V z
	glottal			
Vl	h			

The symbol [ð] is called "barred d". The voiceless counterpart of this sound is written with the Greek letter theta. The symbols ^Vs and ^Vz are called "checked s" and "checked z", respectively.

Fricatives are sometimes classed as either slit or groove fricatives. As the names suggest, slit fricatives are formed by making a narrow slit with the articulators. Groove fricatives are formed by making a more rounded constriction with the articulators. [s] is an example of a slit fricative, while [^Vs] is an example of a groove fricative.

You will need to spend time practicing the transcription of these sounds. After you have mastered these sounds and can record them without stopping to think about the proper symbol to use, you are ready to

consider the next mode of articulation.

Pronounce a voiceless alveolar stop [t] and combine it quickly with a voiceless alveo-palatal fricative [s^v]. Pronounce this combination several times until you recognize the sound you are producing. That sound is called an affricate. Affricates are formed by stopping the air stream and then quickly gliding through a fricative formed at the same or almost the same position. The sound formed by a combination of [t] and [s^v] is the initial and final sound of the word "church". It is written as [ts^v] in transcription. The only other affricate in English is formed with [d] and [z^v]. It is the initial sound of the word "jump" and is transcribed as [dz^v]. In some systems of phonetic transcription the affricates are written with single symbols. This system has some disadvantages that your instructor may wish to discuss later in the course. For the present we will use the first system for recording the affricates.

LESSON SIX

ENGLISH RESONANTS AND SEMIVOWELS

There are three nasal consonants in English. Nasal sounds are formed by opening the nasal passage and allowing some or all of the air from the lungs to escape through the nose. The nasal passage is opened by lowering the velum. The consonantal nasal sounds are produced by opening the nasal passage and at the same time stopping the air exiting through the mouth. The three consonant nasals in English are formed (1) bilabially, (2) at the alveolar ridge, and (3) with the back of the tongue on the velum. These sounds are transcribed as [m, n, ŋ] respectively. The last of these is a special symbol that is usually read as ing (as in the word "ring").

There are a few additional consonant sounds of English you will need to account for. The first of these is the lateral. This is the first sound in the word "lip". It is called a lateral because while the tip of the tongue touches the alveolar ridge the air stream is directed around the sides or lateral edges of the tongue. There are two (at least) variants of this basic sound. The first is called the light l. The second is called the dark l. Say the word "level". The initial sound is a light l. The final sound is a dark l. Say the word again paying particular attention to the position of the tip of the tongue on the alveolar ridge. The dark l is formed with the tip of the tongue back farther on the alveolar ridge. These two variants are also found in the words "lip" and "lock". The first

word uses the light variety initially; the second uses the dark variety. These two sounds are transcribed as [l] for the light l, and [^hl] for the dark variety.

The last of the consonants is the retroflex [r]. The retroflex is formed by retroflexing or bending the tongue back on itself, as in the first sound of the word "red".

The last group of sounds in this section are the semivowels. The semivowels act as vowels in some words and as consonants in others. They are, in some ways, intermediate between consonants and vowels.

The first of the semivowel sounds, [w], is formed by rounding the lips and at the same time raising and backing the back of the tongue. This is the initial sound of "wad" and the final of "doe". In the first word it is a consonant, in the second it is a vowel-like sound.

The next semivowel is [y]. This is the initial sound in "yes" and the final sound in "high".

This completes the consonantal and semivowel sounds of English. The only task remaining before we proceed to the vowel sounds is to look at the differences between broad and narrow phonetic transcription. The user of the phonetic transcription must determine what kind of information must be included in his transcription before it is useful. The phonetic alphabet given in these lessons is fairly broad. If more exact information is needed, the basic symbol used to record the sound may be modified to reflect this additional information. The symbols [h, ' , and >] are symbols of this kind. You will need one more symbol. This symbol, [<], is used to show that the articulation is made slightly in front of its usual position. It, like the symbol [>], is placed above the basic symbol.

Pronounce the following words aloud and write down the symbols for the initial sounds. The words are "tip, tap, and top". The symbols used should be $\left[\begin{smallmatrix} < \\ t & ^h \end{smallmatrix} \right]$, t^h , and $\begin{smallmatrix} > \\ t & ^h \end{smallmatrix} \right]$. As you say these words you should feel your tongue tip making its articulation slightly farther back each time. The symbols used should be read as fronted voiceless alveolar aspirated stop, voiceless alveolar aspirated stop, and backed voiceless alveolar aspirated stop.

LESSON SEVEN

INTRODUCTION TO ENGLISH VOWELS - UNIT TRANSCRIPTION VERSUS GLIDE
TRANSCRIPTION

In the exercises to date you have practiced most of the vowels of English in conjunction with the consonants considered. We will have further practice transcribing these vowels.

In articulatory phonetics vowel sounds are classed by the position of the high point of the tongue. The articulation of the vowels is very loose or open in comparison to the consonants. The term *vocoid* is used to describe sounds with a low degree of constriction. The corresponding term for an articulation with a high degree of impedance of the air stream is a *contoid*. As you can see these terms are related to the more common terms *consonant* and *vowel*. The first pair of terms is more properly used to describe phonetic facts. One must know the use of a sound in a syllable before it may be called a *consonant* or a *vowel*.

There are several competing systems of transcription for the *vocoid* sounds. As you will remember from an earlier exercise on counting the number of phones, there is some disagreement on the number of phones in such words as "low". We will take the position that such words contain three phones. Others would argue that there are only two phones involved. The initial phone is not in dispute. The *vocoid*, however, is a problem. Those who say there are three phones in this word state that the tongue moves from one position to another

during the vocoid articulation. According to this view there are two sounds produced. This is basically the Trager-Smith position. The other view is that there is only one sound; there may be some movement in the articulation, but there is only one sound. This is the position of Pike, among others. We will use the Trager-Smith system for the transcription of English sounds.

Say the words "bit" and "bet". Now say only the vowels of these two words. You should feel a slight movement of the tongue downward as you move from the first to the second sound. Now start with the first sound and move the tongue slightly forward and upward. The resulting sound should be the vowel of "beet". The vowel of "bit" is transcribed as [ɪ] and that of "beet" as [iy]. The symbol [y] used in the second word is used to show that the tongue moves upward and forward from its initial position.

If the lips are rounded and the tongue is slightly retracted and raised as the vowel is completed, the symbol [w] is used after the vowel. Normally the English vowel of "boat" uses a rounded-off vowel of this kind. Have your instructor say the word "boat" first with the [w] off-glide and then without. The vowel of "boat" is seldom if ever used by American speakers without the [w] off-glide.

Next say the words "look" and "Luke". The first of these uses the sound transcribed as [u]. In the second, the vowel starts at this position but is pulled backward and upward while the lips are rounded. It is, therefore, transcribed as [uw].

There is one additional off-glide used with English vowels. This is the [h] off-glide. Have your instructor pronounce the word "bit" with and without the [h] off-glide. Some speakers use this

off-glide with almost all the otherwise non-glided vowels. You will probably have trouble hearing the presence of this off-glide. This sound is produced by moving the tongue from its initial position toward that of the vowel in "but". This vowel is formed in the center of the mouth with the tongue intermediate in position between its highest and lowest positions for vowel articulation.

The Trager-Smith system posits nine simple vowels which may be used alone or in combination with any of the three off-glides discussed above. These simple vowels are usually arranged in a square which roughly corresponds to the position of articulation. The symbols [æ, ə, and ɔ] are called "digraph", "schwa", and "open o" respectively. [ɪ̄] is read as "barred i".

	front	central	back
high	i	ɪ̄	u
middle	e	ə	o
low	æ	a	ɔ

These words may help you remember these simple vowels:

	front	central	back
high	bit-pit	dish <u>es</u>	put
middle	bet-pet	but-putt	h <u>ot</u> el*
low	bat-pat	bot-pot	paw

* This word uses the vowel [ow] for some speakers.

The off-glide [y] is found in the following words as pronounced by the author.

beet	[biyt]	-	-
bait	[beyt]	-	boy [boy]
bag	[bæ yg]	bide [bayd]	-

The [w] off-glide is found in the author's speech with the following four simple vowels:

[a]	house	[haws]
[o]	hoe	[how]
[u]	hoot	[huwt]
[i]	hue	[hiw]

The [h] off-glide is found in the author's speech with all the otherwise unglided vowels. You will probably have a different distribution of this off-glide in your speech. Your personal way of speaking, including the sounds you use, is known as your idiolect.

Ex. 11

Make a list of at least one word for each of the simple vowels and vowel plus off-glides that you have in your idiolect. There are 36 possible combinations. Of these you will probably only use fifteen to twenty.

LESSON EIGHT

WORD STRESS AND SYLLABIC CONSONANTS

In English words of more than one syllable there is always one of the syllables that is more prominent than the others. This is the stressed syllable. Consider the word "permit" which may be either a noun or a verb. As a noun meaning 'a paper showing permission', the first syllable is stressed. As a verb meaning 'to allow', the second syllable is stressed. This difference, which is not shown in standard spelling, is indicated in transcription by placing a stress mark ['] before the stressed syllable e.g., ['permit], [pə'rmit]. Single syllable words said in isolation are said with the same prominence as stressed syllables and should be transcribed as such.

There will be only one strong stress in each segment of speech. You will remember that a break is not always found in the stream of speech between every two words. In such cases where more than one word is run together, only one syllable in the string can receive full stress. In other words, there must be a pause between any two strong stresses.

When two or more normally stressed syllables are joined without a break, one of the syllables retains its stress and the others lose theirs. This is usually accompanied by a change in the quality of the vowel in the unstressed syllable toward schwa [ə]. For example, "able" [ˈeybəl] becomes [əbəl] when combined with "drink", [drɪŋk], as in "drinkable".

In addition, the lack of stress on a syllable consisting of schwa [ə] plus [r, l, m, n, or ŋ] is often reduced to the consonant sound alone. This is called a syllabic consonant and is transcribed by placing a small circle below the symbol for the consonant alone. For example, "button" would be transcribed as [bət̚n̩].

This completes the coverage of the sounds of English. The treatment has been shallow and any student planning further work in or with language will need considerable extra work with English transcription. The system we have used is based largely on the Trager-Smith system of transcription. Several other systems, varying to a greater or lesser degree from the system used here, are also in common use.

One of these other phonetic alphabets is that of the International Phonetic Association, commonly called the IPA. This is a truly international alphabet with symbols that allow for the unambiguous recording of almost any sound the human vocal apparatus can make. Naturally such an alphabet is quite large. However, whatever system is used the basic principle remains: one sound-one symbol.

Perhaps the most commonly used in anthropology is the system of Kenneth Pike (1947:45). Your instructor may expect you to be able to read transcriptions written in this system. A chart of the system used in these lessons is reproduced below. Below this chart you will find another chart which shows the equivalent symbols used by Pike.

As you know, not every one in this world speaks English. Out of all the sounds the human vocal apparatus is capable of making, English has selected only a few. Other languages use sounds that seem quite strange to monolingual English speakers. In the following lessons we will learn some of the more widespread of these sounds. Our survey

will, by necessity, leave out the vast majority of all non-English speech sounds. The primary purpose of the following lessons is not to make you an expert in foreign sounds. It is rather to make you aware of some of the more common exotic sounds used so that you will be able to read and produce them.

TRAGER-SMITH SYSTEM

iy		uw
i	ɛ	u
ey	ə	oy ow
e		
	ay aw	
æ	a	ɔ

PIKE'S SYSTEM

i		u
ɪ		ʊ
e	ə	o ¹ o
ɛ		
	a ¹ a ^u	
æ	a	ɔ

LESSON NINE

NON-ENGLISH STOPS

For the next several days we will be practicing non-English sounds. We will first look at stops. In an early lesson we mentioned ingressives. We will not be practicing these but you should be aware of their use.

We have spoken about the aspirate versus the inaspirate stops in English. We have practiced these to some extent, but you may have noticed that we have never used an inaspirate stop to begin an English word. Inaspirate stops are found in English only after sounds like [s]. Their distribution is rather limited. Also you probably remember that the voiced stops in English were always inaspirate. In many other languages the difference between aspirate and inaspirate is exploited to a greater extent than in English.

Using only the places of articulation used in English, a complete series of stops would look like this:

p	t	k
p ^h	t ^h	k ^h
b	d	g
b ^h	d ^h	g ^h

In this exercise several English words are given with paired non-sense syllables. The sounds of the two are the same except for the stops.

Ex. 21

- | | |
|---------------------------------|---|
| 1. 'p ^h iy : 'piy | 11. 'spat : 'sp ^h at |
| 2. 't ^h ip : 'tip | 12. 'k ^h owk ^h ow : 'kowkow |
| 3. 'k ^h æ n : 'kæ n | 13. 't ^h riy : 'triy |
| 4. 'gliy : 'kliy | 14. 'driym : 'd ^h riym |
| 5. 'bit : 'b ^h it | 15. 'brim : 'b ^h rim |
| 6. 'gow : 'g ^h ow | 16. 't ^h owt ^h əl : 'towtəl |
| 7. 'dey : 'd ^h ey | 17. 't ^h ayp : 'tayp |
| 8. 'blow : 'b ^h low | 18. 'p ^h et : 'pet |
| 9. 'stap : 'st ^h ap | 19. 'k ^h it : 'kit |
| 10. 'skin : 'sk ^h in | 20. 'grim : 'g ^h rim |

Your instructor will give a sample of voiceless inaspirate stops in initial position and of voiced aspirate stops. You can use the nonsense syllables below to practice making these sounds. Practice with stress on each syllable in those words with more than one syllable.

Ex. 22

- | | | |
|--------------------------------------|---------------------------------------|--|
| 1. 'pak | 8. 'kim | 15. 'sp ^h iku |
| 2. 'b ^h i | 9. 'pasaki | 16. 'kupu |
| 3. 'sk ^h ek | 10. 'toto | 17. 'ag ^h ib ^h a |
| 4. 'd ^h ət ^h ɔ | 11. 'aka | 18. 't ^h opa |
| 5. 'tata | 12. 'ab ^h a | 19. 'nid ^h an |
| 6. 'kakow | 13. 'opoko | 20. 'g ^h ita |
| 7. 'pib ^h ow | 14. 'd ^h ab ^h a | 21. 'patid ^h i |

Some languages use positions of articulation not used in English, e.g., where English has one pair of stops in the alveolar area, other languages may use three positions in this area. We will practice the

three which are transcribed $[t, \overset{>}{t}, \text{and } \underset{\cdot}{t}]$. The first of these is articulated with the tip of the tongue touching the back of the front teeth. The second is formed at the alveopalatal junction. To produce this sound say the fricative, $[\overset{v}{s}]$ and raise the tip of the tongue without moving forward so that the air stream is stopped. The last of the three is formed further back. If you make the English retroflex and then raise the tip of your tongue to the roof of your mouth, you will make this stop. Listen to your instructor produce these three stops. Although the examples given in transcription above are all voiceless inaspirate stops, these positions may be used to produce voiced or voiceless, aspirate or inaspirate stops.

Practice saying the following words or syllables followed by a backed stop and retroflexed stop.

Ex. 23

	't ^h ip	' ^{>} t ^h ip	' _· thip
1.	'dip	' ^{>} dip	' _· dip
2.	'd ^h ow	' ^{>} d ^h ow	' _· d ^h ow
3.	'titi	' ^{>} t ^{>} iti	' _· titi
4.	't ^h æ k	' ^{>} t ^h æ k	' _· t ^h æ k
5.	'did ^h i	' ^{>} d ^{>} id ^h i	' _· did ^h i
6.	't ^h iytow	' ^{>} t ^h iytow	' _· t ^h iytow

This completes our survey of non-English stops. A total of twenty egressive (made with out-going air) stops have been used. It should be realized that very few languages will use all of these sounds. Most, like English, will select a few of these, possibly supplemented by others not covered, to form their stop series.

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LESSON TEN

NON-ENGLISH FRICATIVES AND AFFRICATES

English has a fairly complete fricative series. As you have probably noticed there are more members of the English fricative series than any other mode.

Possible additions to this series would include a bilabial, a retroflex, and a velar fricative. The bilabial fricative sounds similar to a labiodental fricative. You can practice substituting this sound for any labiodental fricative in an English word. Below are some words you can practice with. The results should sound similar to some words you know. The bilabial fricative is written p or b and is called "barred p or b ."

Ex. 27

- | | | |
|---------|------------------------|-----------------------|
| 1. 'pən | 6. 'plæt | 11. 'peyz |
| 2. 'bæt | 7. 'k ^h eyb | 12. 'bæz |
| 3. 'bim | 8. 'k ^h æp | 13. 'pil |
| 4. 'pæt | 9. 'belbæt | 14. 'bey ^l |
| 5. 'læp | 10. 'biləpay | 15. 'pay ^l |

The following words are for practice with the retroflex fricative. It is produced in the same place as the retroflex but the degree of constriction is higher. The symbols used to record this sound are $\left[\overset{\vee}{s} \right]$ and $\left[\overset{\vee}{z} \right]$.

Ex. 28

- | | | |
|---------|-------------|----------|
| 1. 'sip | 5. 'seyp | 9. 'beyz |
| 2. 'bus | 6. 'stæ mp' | 10. 'zak |
| 3. 'suw | 7. 'məs | 11. 'dis |
| 4. 'wis | 8. 'fis | |

If you have studied German you have encountered two fricatives, the so-called "ich-laut" and "ach-laut". The "ich-laut" is similar to the first sound in the English word "hew". The "ach-laut", however, is velar and it is difficult to find a counterpart for it in English. Have your instructor produce the "ach-laut" sound and the voiced velar fricative. We will use the symbols [x] and [ɣ] for the voiceless and voiced velar fricatives. You can practice these sounds with the words below.

Ex. 29

- | | | |
|-----------|-------------------------|-------------|
| 1. 'ɛaɣ | 6. 'tæ x | 11. 'xaɣ |
| 2. 'xax | 7. 'ɛip' | 12. 'ɛax |
| 3. 'tix | 8. 'k ^h ixk' | 13. 'sax |
| 4. 'tiɣ | 9. 'diɛɣ' | 14. toxa'go |
| 5. 'xaxiy | 10. 'xɔ ^h l | 15. 'ɛopo |

Although English has many of the fricative sounds, it has very few of the possible affricates. For every stop with a nearby fricative there is a possible affricate. We will limit our study to just a few of the possibilities. The first of these is a bilabial stop plus a bilabial fricative. This would be written as [pp̚] or [bb̚]. You can practice these sounds with the examples below.

Ex. 30

- | | | |
|------------|-------------|------------|
| 1. 'dæ pp | 6. 'tiypə | 11. 'peppə |
| 2. 'bɛen | 7. 'kabbə | 12. 'apəa |
| 3. 'pɛipə | 8. 'pɛey | 13. 'abba |
| 4. 'bbappə | 9. 'ppit | 14. 'koppə |
| 5. 'labə | 10. ta'pɛiy | 15. 'gobbə |

Another affricate could be produced with a bilabial stop and a labiodental fricative. We won't practice this sound, but it would be written as either [pf or bv].

Another common affricate is formed with an alveolar stop and fricative. This is written as [ts or dz]. The words below may be used for practice.

Ex. 31

- | | | |
|-----------|------------------------|--------------|
| 1. 'nəts | 6. 'tets | 11. dzi'midz |
| 2. 'dzip' | 7. 'd ^h its | 12. 'dzets |
| 3. 'tsiy | 8. 'tsiytsiy | 13. 'tsots |
| 4. 'atsa | 9. 'tsuw | 14. 'kiyts |
| 5. o'dzo | 10. ?ə'madza | 15. toti'tse |

An additional affricate is possible at the velum. This would be either [kx or gg]. Like the many others possible, we will not take time to practice these. The total number of affricates possible is quite large. Like stops and fricatives, however, no one language would use all of them.

LESSON ELEVEN

NON-ENGLISH RESONANTS

Nasals, laterals, and retroflexes are, as a group, known as resonants. Non-English nasal resonants include two kinds. First there are nasals which are voiced like English nasals but are articulated in different positions. And second, there are the voiceless nasals. We will not practice the voiceless nasals and will only say that except for voice, they are like other nasals. The most common way of representing the voiceless nasals is to render them with capital letters e.g., (M, N, Ń).

The two new places of articulation we will use for nasals are at the alveopalatal area and at the palate. The first of these is formed by retroflexing, that is by curling back, the tongue to the position used in making the English "r" sound. The air is then stopped by raising the tip of the tongue to make closure behind the alveolar ridge. The second of these sounds is produced with the tongue approximately in the same position as used to produce [y] except the top of the tongue is raised to make contact with the palate. For those who have studied Spanish, this sound should be familiar. It is written as [̃n].

In some English words the alveolar nasal [n] is backed almost to the point of being an alveopalatal nasal. The word "inch" is one of these. Although we have spoken of articulations as if they were made at one particular spot, it is more reasonable to look at

them as occurring in a particular area. This brings us back to the problem of broad versus narrow transcription. For many purposes one single symbol may be used for all English alveolar nasals. For other purposes a finer distinction may be needed. The ultimate number of symbols that could be used is determined only by what the ear can be trained to hear.

From the position of articulation of the nasal in "inch" move the tip of the tongue backward, maintaining contact with the roof of the mouth, about 1/8 of an inch. This will give the proper position for the alveopalatal nasal. Practice using this sound with the words below.

Ex. 35

- | | |
|-----------------------|-----------------------|
| 1. 'nɪl | 7. 'niynɪy |
| 2. 't ^h ɪn | 8. bə'pæn |
| 3. pə'nɑ | 9. o'noʔ |
| 4. nɔ'nɔ | 10. 'næn |
| 5. 'ppæ n | 11. k ^h ɪn |
| 6. 'nat' | 12. 'tsun |

The symbol ñ is read "tilde n". This sound is used in such Spanish words as "señor". Practice this sound with the following words.

Ex. 36

- | | | |
|------------|-----------|-------------|
| 1. 'niyñow | 5. 'peyñə | 9. 'tsiyñow |
| 2. 'eñey | 6. 'nɪp | 10. 'sowña |
| 3. 'downñə | 7. 'paña | 11. 'næ n |
| 4. 'net | 8. 'nə | 12. 'nɪl |

One of the sounds you are familiar with is used differently in

some languages. In English, the sound [ŋ] is used only at the end of syllables. It may be used initially in some languages, which is often a problem for English speakers. Practice using the ŋ as an initial sound in the words below.

Ex. 37

- | | | |
|---------|-----------|-------------|
| 1. 'ŋɔ | 5. 'ŋɪŋi | 9. 'ŋək |
| 2. 'ŋɪp | 6. 'ŋɪyt' | 10. 'tsɪŋɪy |
| 3. 'ŋɔŋ | 7. 'ŋam | 11. 'ŋa |
| 4. 'ŋuw | 8. 'ŋowp | 12. ɲæ 'ŋu |

There is also a voiceless modification of the lateral. This sound is produced exactly like the lateral in English except the voice is turned off. The symbol used for this sound, ɭ , is called "barred l".

Practice this sound with the words below.

Ex. 38

- | | | |
|-----------|------------|-------------|
| 1. 'mɪɭ | 5. 'ɭəɭ | 9. 'ɭan |
| 2. to'ɭɪm | 6. sɭɪp' | 10. ɭe'xe |
| 3. ɭayɭ | 7. 'tsəɭ | 11. mæ ɭ |
| 4. 'ɭæ l | 8. 'meləɭa | 12. di'tɪɭɭ |

The last of the resonants is the retroflex. The English retroflex often gives speakers of other languages problems when they try to speak English. The most closely related sounds they have are an alveolar flap $\left[\overset{\vee}{\text{r}} \right]$ or $\left[\underset{\vee}{\text{r}} \right]$ and an alveolar trill $\left[\widetilde{\text{r}} \right]$ or $\left[\underset{\sim}{\text{r}} \right]$. In both cases the first symbol is used for the voiced variety and the second is used for the voiceless variety.

A trill is produced by placing the tongue in position to make an alveolar stop and forcing air from the lungs between the tongue

and the alveolus. If the tongue is tensed, the result is an alveolar affricate [ts]. However, if the tongue is relaxed so that the air stream forces it to open but then it "bounces back" to reclose the stop and then is pushed open again, the result is an alveolar trill. If the vocal bands are vibrated, a voiced trill will be produced.

A flap is like a trill but the tongue only taps the alveolar ridge one time. We use this sound in English, although we usually call it a flapped t, when we say "butter" or "daddy" quickly. In these cases the tongue quickly flips up to touch the alveolar ridge but the stoppage of the air stream is of very short duration. The difference between the voiced and voiceless flaps is hard to hear. It may take a lot of practice before you can consistently make and hear this distinction. The exercise below can be used to work on these sounds.

Ex. 39

- | | | |
|-------------------------------------|---------------------------------------|---------------------------------|
| 1. 'a [~] ra | 7. 'ma ^v <u>ra</u> | 13. 'r [~] ot |
| 2. 'a ^v ra | 8. 'r [~] im | 14. 'tsow [~] <u>r</u> |
| 3. 't ^h æ [~] r | 9. 'r [~] i [~] r | 15. 'i ^v <u>ri</u> |
| 4. 'r [~] ip | 10. 'ræ [~] <u>r</u> | 16. 'i ^v ri |
| 5. 'r [~] a | 11. 't ^h a ^v ra | 17. 'i [~] <u>ri</u> |
| 6. 'iy [~] <u>rey</u> | 12. 'r [~] at | 18. 'i [~] ri |

LESSON TWELVE

NON-ENGLISH VOWELS

Within English the vowels show more variability than any other group of sounds. When you spot an "accent" which tells you the speaker is from a different area of the United States or from Great Britain, your judgement is usually based on the differences in vowels rather than in consonants. The actual position of articulation of vowels is not fixed to any "landmarks" like that of consonants. Within limits, it is only necessary that the English vowel [æ] be produced with the tongue lower than it is for [e] and in front of the position for [a]. Vowels are interpreted more by their relative positions than by absolute values.

The vowels of a foreign language may sound very much like English vowels, but not be the same. The language may have one vowel that is intermediate in position between two of our English vowels. The opposite may also be the case. There may also be two different vowel sounds where English has only one.

Another common difference between English and non-English vowels is the presence of off-glides on the former. Many of the English vowels start as one sound and end as another. For some English speakers the number of "pure" (unglided) vowels is much smaller than the number of glided vowels. In many foreign languages the vowels are all or almost all "pure" vowels.

We will not attempt to study all vowel sounds. Rather we will

work on some common modifications of vowel sounds. These modifications are found commonly in foreign languages.

The first modification we will look at is voicelessness. We will use a capital letter to indicate a voiceless vowel. These voiceless vowels are made like regular vowels except the voice is "turned off". We use such sounds in English when whispering. Even with the voicing absent it is not difficult to understand what someone is saying. The only problem with voiceless vowels is that they can't be heard at any distance. This may be one of the reasons why they aren't very common in any language.

As you have noticed almost all sounds occur in voiced/voiceless pairs. This is especially true of stops and fricatives. If a field worker were recording English for the first time, he would probably wonder why there is no voiced counterpart for the sound [h]. Actually there is. Although we classed [h] as a consonant, (because it starts syllables rather than coming in the middle like a vowel), it is usually a voiceless onset to a vowel. The glottal friction occurs because the articulators above the glottis are opened up into the position used to make the following vowel. Say the words below and note the position of the tongue as the sound [h] is produced.

Ex. 42

- | | | |
|----------|---------|---------|
| 1. home | 4. hit | 7. hoot |
| 2. hat | 5. help | 8. halt |
| 3. house | 6. hut | 9. hoop |

In each case the tongue is in position to make the following vowel. The difference between words like "hat" and "at" is that in the first word, air begins flowing out of the lungs before the

voicing of the vowel begins.

Languages other than English use this kind of sound differently. In English this sound is only used to start words. In other languages it may be used initially, medially, or in final position.

Another common modification of vowel sounds is rounding. In English the front vowels are unrounded while the back vowels are all rounded. In other languages the reverse may be true, or they may have a complete series of both front and back rounded and unrounded vowels. The symbols we will use are summarized in chart form below.

Unrounded		Rounded	
front	back	front	back
i	ɪ	u	u
e	e	o	o
æ	-	-	ɔ

Use the words below as practice material.

Ex. 43

- | | | | |
|-----------------------------------|-----------------------------------|---|------------------------------------|
| 1. 't ^h on | 6. 'p ^u ŋ | 11. 'n ⁱ p | 16. 't ^o t ^o |
| 2. 'ts ⁱ k | 7. 'd ⁱ k | 12. 's ^u ef | 17. 'z ⁱ p |
| 3. 'r ^u od | 8. 'b ^u s ^v | 13. 'b ⁱ t ^s ^v | 18. 'l ^o m |
| 4. 'k ⁱ k ⁱ | 9. 'l ^e l ^e | 14. 'y ^o d | 19. 'kw ⁱ l |
| 5. 't ^o g | 10. 'b ^o z | 15. 'f ^e ŋ | 20. 'd ^u d ^u |

LESSON THIRTEEN

NON-ENGLISH VOWELS CONTINUED

The next modification of vowel sounds we will consider is nasalization. You will remember that a nasalized sound was defined earlier as one in which at least some of the air stream is allowed to pass through the nose. This is not limited to consonants. Vowels may be modified by opening the nasal cavity in addition to the oral cavity. This is indicated in transcription by placing a tilde above the vowel symbol.

Vowels in English are often nasalized when they occur before or between nasal consonants. Otherwise English doesn't use this modification. Of course other languages can use this modification, like other modifications, without the restrictions of English.

Have your instructor say several English words which have a nasal consonant following the vowel both with and without nasalized vowels. You can determine if you use nasalized vowels in these words by pinching your nose closed and releasing the closure after the vowel sound has started but before the nasal consonant. If the vowel is nasalized, you should be able to feel the vibration of the air stream in the nose. Also your voice will sound like you have a cold with a stopped-up nose. Try this first with the word "pit". This should sound the same with your nose either closed or open. Now say "pin". You should hear a striking difference if the vowel is nasalized.

You may use the following pairs of words to practice nasalized vowels.

Ex. 46

- | | | |
|----------------|-------------------|-----------------|
| 1. 'tō - 'to | 6. 'rōs - 'ros | 11. 'wē - 'we |
| 2. 'bat - 'bat | 7. 'mīmī - 'mimi | 12. 'pūt - 'put |
| 3. 'mæn - 'mæn | 8. 'pōž - 'pož | 13. 'tsī - 'tsi |
| 4. 'ōtō - 'oto | 9. 'džīy - 'džiy | 14. 'xōw - 'xow |
| 5. 'fig - 'fig | 10. to'tō - to'to | 15. 'bōn - 'bon |

Vowels may also be modified by changing their length. As long as there is still air in the lungs it is possible to continue a vowel sound. In some languages this is used to advantage. The difference between a vowel and the same vowel held for a longer period of time may be as important as the difference between "pit" and "pet" in English. The length of vowels does vary some in English but this phenomenon is much more developed in some other languages. We will use the symbol [ː] following the vowel to indicate that the vowel has longer duration.

Practice long versus short duration vowels with the following pairs of words. Note that only the length of the vowel is changed. There should be no tendency to change the quality of the vowel or to introduce an off-glide not present on the short vowel.

Ex. 47

- | | | |
|-------------------|--|--------------------|
| 1. 'at - 'a:t | 7. 'se [˘] s - 'se [˘] :s | 13. 'xaxa - 'xa:xa |
| 2. 'fifi - 'fi:fi | 8. 'vɔz - 'vɔ:z | 14. 'rō - 'rō: |
| 3. 'bot - 'bo:t | 9. 'tay - 'ta:y | 15. 'næ̃ - 'næ̃: |
| 4. 'kad - 'ka:d | 10. 'we - 'we: | 16. 'bop - 'bo:p |
| 5. 'oto - 'oto: | 11. 'tsi [˘] y - 'tsi [˘] :y | 17. 'ʔi? - 'ʔi:? |
| 6. 'mama - 'ma:ma | 12. 'mami - 'mami: | 18. 'ge - 'ge: |

The last modification of vowel sounds is tone. As you will

remember, the pitch at which the vocal folds vibrate is determined by the tension applied by the muscles which control their operation. Some languages are able to make very good use of this ability. We will not practice these sounds but you should be aware of some of the ways in which such information is recorded in transcription. One of the methods used is to place a tone mark above the vowel in question. If this system is used [ạ] may indicate the use of a low tone with the vowel [a] and [a̤] the use of a rising tone. Another common alternative to this system is to use superscript numbers before the syllable to indicate the pitch level of that syllable.

The numbers used may sometimes begin at the lowest tone with one and count upwards or may begin with one used to represent the highest tone and count downward. In the following examples we will use a system with three different pitch levels, the lowest of which is number 1. A high tone would be indicated [3a]. A rising tone that goes from level one to level three would be written as [13a]. This system has the advantage of being able to represent such complex tones as [213a] without the use of additional special symbols.

LESSON FOURTEEN

PHONEMICS

Phonetics is the study of sounds used in speech. As we have seen earlier, the degree of detail possible is only limited by the sensitivity of the ear. If fine detail is not needed, the transcription may be broad. That is we may ignore some variation within the sounds of speech and yet produce a record which is useful for some purposes.

The study of phonetics itself places no limit on how broad this transcription may be. Of course the transcription must be narrow enough to preserve the sound distinctions that the recorder wishes to study. Other questions may arise. For example, how broad can a transcription be without becoming so broad that a native speaker can't understand it? Phonetics offers no guidance in this area. We must turn to a different field known as phonemics. Phonemics is the study of distinctive sound. By distinctive sound we mean sound differences which signal a change in meaning.

If I ask you if $\left['t^h ip \text{ and } 'tip \right]$ mean the same thing, you would say yes. However if I asked you if $\left['t^h ip \text{ and } 'dip \right]$ mean the same thing, you would, of course, say no. Phonemics offers a process for discovering these meaningful distinctions.

The primary use of phonemics is in devising alphabets for previously unwritten languages. One could use a phonetic spelling for the alphabet, but this would be inefficient. The native speaker already knows what variants to use, and also the number of symbols

needed would present problems in teaching reading.

To determine what sounds are distinctive, it is necessary to look for minimal pairs. A minimal pair is two words which differ by one sound and have different meanings. Thus "bit" and "pit" would be a minimal pair, while "bit" and "pot" would not be since they differ by more than one sound. This minimal pair proves that the initial sounds of these words are distinctive units of sound. Such units are called phonemes. You could extend this process of looking for minimal pairs and prove a great number of sounds are different. Some pairs would be easy to find. Others would be difficult. For example, there are very few words which would form a minimal pair for the sounds $\left[\begin{smallmatrix} \vee \\ s \end{smallmatrix} \right]$ and $\left[\begin{smallmatrix} \vee \\ z \end{smallmatrix} \right]$. One of these is the pair "allusion" : "Alleutian."

There are some sounds, however, that you could never find minimal pairs for. One of these is the difference between a released and an unreleased final stop, as in the English word $\left[t^h ip \right]$ or $\left[t^h ip' \right]$. In words like this, the native speaker would tell you that it makes no difference to him which sound is used. Both mean the same and both sound natural. These two sounds are said to be in free variation. Free variation means that either sound can be chosen without a change of meaning. Since the meaning does not change, it is impossible to form a minimal pair.

Some sounds are not in free variation and yet it is still impossible to find a minimal pair that uses them. The aspirate and inaspirate voiceless alveolar stops in English are an example of two sounds that don't form a minimal pair and are not in free variation. When a voiceless alveolar stop occurs initially it is always aspirate. When it occurs following $\left[s \right]$ it is always inaspirate. This is complementary

distribution. In complementary distribution, the different sounds, called allophones, that are all members of one phoneme, are distributed so that no two ever occur in the same environment. The environment in which a specific allophone is found may be described in terms of what sounds occur around it. Word initial position, for example, is a case in which the environment is after a pause and before any sound. Because no two allophones can occur in the same environment, there can be no minimal pairs formed.

Phonemes are recorded with symbols that are much like the phonetic symbols you have been using. Often, however, it is not necessary to include as much information with a phonemic notation. In English it would only be necessary to record an alveolar voiceless stop as /t/ (Slashes are used to denote a phonemic notation.). In proving that all the various kinds of voiceless alveolar stops are members of one phoneme, the distribution is known. When the distribution is known, /t/ becomes sufficient. The native speaker knows that the sound of this phoneme is always aspirate in initial position, inaspirate when it follows /s/, and may be either released or unreleased in final position.

The bilabial and velar voiceless stops have a parallel distribution. Because they are each one phoneme, it is possible to write them as /p/ and /k/.

To convert phonetic data into phonemic data follow the following steps:

1. Make a chart of all the phonetic symbols used. Make this chart in place and mode form.
2. Circle any pairs of sounds near each other on the chart.

3. Look for minimal pairs for the circled items.
4. If a minimal pair can not be found look for either free variation or complementary distribution.
5. All sounds which are not in complementary distribution or in free variation, even if minimal pairs cannot be found, are considered phonemically distinct. This assumes that the data for the language is complete enough to insure not missing evidence which would cause the sounds to be classed as allophones. Allophones are alternate phonetic forms that a single phoneme may take.

When the analysis has proceeded this far it is possible to determine the phonemes of the language in question. Follow the example below to see how this process works.

Ex. 50

DATA (Phonetic)

- | | | | |
|------------------------|--------|------------|-----------|
| 1. 'toto | 'ear' | 6. 'domono | 'my nose' |
| 2. 'domo | 'nose' | 7. 'totono | 'my ear' |
| 3. 'tuto | 'hand' | 8. 'dono | 'foot' |
| 4. 'dono | 'foot' | 9. 'tomo | 'eye' |
| 5. 't ^h oto | 'toe' | 10. 'doto | 'hair' |

CHART WITH CIRCLED SUSPICIOUS PAIRS (Steps one and two)

	bilabial	alveolar	velar
stops vl	-	t t ^h	-
vd	-	d	-
nasals	m	n	ŋ

VOWELS	FRONT	CENTRAL	BACK
HIGH			u
MID			o
LOW			

Step three says to look for minimal pairs for the circled items.

Application of this procedure yields the following results:

[t] and [t^h] form a minimal pair in items 1. and 5. and therefore are separate phonemes.

[t^h] and [d] form a minimal pair in items 5. and 10. and therefore are separate phonemes.

[m] and [n] form a minimal pair in items 2. and 4. and therefore are separate phonemes.

[o] and [u] form a minimal pair in items 1. and 3. and therefore are separate phonemes.

[n] and [ŋ] do not form a minimal pair in the data above. Therefore we apply rule four:

[n] and [ŋ] are found to be in free variation since items 4. and 8. would otherwise form a minimal pair. These two sounds are therefore allophones of a single phoneme /n/.

There are no examples of complementary distribution in this exercise.

As a result, we can state that the evidence provided in this language sample proves that there are three stop phonemes, /t/, /t^h/, and /d/; two nasal phonemes, /m/ and /n/; and two vowel phonemes, /u/ and /o/. The phoneme /n/ has two allophones [n] and [ŋ] which are in free variation. The choice of the symbol /n/ to represent this phoneme is dictated by its ease of reproduction only.

LESSON FIFTEEN

DISTINCTIVE FEATURE ANALYSIS

Phonemics might be looked at as a process for simplifying the recording of language. Instead of several dozen symbols (if each modification of a basic symbol is counted separately), it is possible to represent a language, after phonemic analysis, in terms of a relatively small set of phonemes. Still there are many symbols needed. For English about forty separate segmental phonemes must be indicated. Distinctive feature analysis grew out of an attempt to find a still more simple way to record language.

A distinctive feature is a feature of articulation or an acoustic feature which serves to distinguish at least one pair of phonemes. Thus, /t/ and /d/ would be distinguished in distinctive feature analysis by the feature voice. One of the list of features which go together to represent /d/ would be <+ voice>. The symbol <+ voice> means that this is a voiced sound. The phoneme /t/ would be recorded, in part, as <- voice>. This would mean that voicing is not present. This same feature could be used with all other sounds of language.

Other distinctive features might include <+ nasal> and <+ consonantal>. The first of these would distinguish the nasal consonants and nasalized vowels from all other sounds. The second would separate the consonants from all other sounds. Although the examples given so far are all articulatory or distributional features, it is possible (and advantageous) to include some acoustic features.

The best possible set of features would be the smallest set which would be sufficient to distinguish all the sounds of the language. We won't go farther into specific features, but work to date has shown that a set of less than fifteen features is sufficient to distinguish the sounds of English.

The chief value of distinctive features is not in economy alone. The use of distinctive features, commonly called DF's, allows for some rather compact statements about sound.

It has been observed that voiceless stops are often voiced when they occur between voiced sounds in words spoken rapidly. In phonemic terms one would say:

$/p, t, k/ \rightarrow [b, d, g]$ in the environment $/x^{vd} - x^{vd}/$

This would be read: The phonemes $/p, t,$ and $k/$ are realized phonetically as $[b, d,$ and $g]$ in an environment (location) between voiced phonemes. This same statement can be made with greater elegance in DF terms as follows:

voice	+ - +		+ + +
consonantal	+	→	+

The meaning of this way of expressing the above observation is the same as that of the phonemic notation, but the result takes much less space. In addition, the DF statement leads to a clarification of related sound changes better than the phonemic notation. In reality, all voiceless consonants, not just the stops, tend to become voiced when between voiced sounds. To make this statement in phonemic terms would require a list of all voiceless consonants and their corresponding voiced forms. The DF notation would be sufficient as it stands. The DF rule states that every sound that is $\langle + \text{consonantal} \rangle$ becomes voiced in this environment.

Although the use of DF analysis in language remains beyond the reach of most non-linguists, the system of notation used in DF analysis shows promise of being useful in anthropology and other non-linguistic fields.

APPENDIX B

LESSON ONE

INSTRUCTOR NOTES

Lesson one is introductory in nature. The information contained in this lesson is included for motivational reasons. If the instructor has additional material, or would prefer to use his own material to introduce the study of sounds he should feel free to innovate at will.

The following readings may be used as supplementary or complementary assignments.

Bloomfield, Leonard. 1933. Language. Chapter 2 pp21-41

Landar, Herbert. 1966. Language and Culture. Chapter 28 pp 225-31

LESSON TWO

INSTRUCTOR NOTES

Articulatory phonetics will be used as the basis for the study of sounds in this course. However, if a sonograph is available, the instructor may wish to demonstrate its use at this time.

In addition to a short introduction to the mechanism of sound production, this lesson introduces the classification of speech sounds as voiced or voiceless. The exercise below will give the student practice making this discrimination.

Ex. 1

Directions: Repeat the following words after the instructor and enter "Vl" following the corresponding number on your paper if the initial sound of the word is voiceless. If it is voiced enter "Vd".

- | | | | |
|---------|----------|------------|------------|
| 1. hat | 10. dog | 19. key | 28. jungle |
| 2. open | 11. cape | 20. dim | 29. chap |
| 3. ball | 12. ton | 21. three | 30. night |
| 4. tree | 13. ash | 22. at | 31. sum |
| 5. knee | 14. veal | 23. eight | 32. zoo |
| 6. foot | 15. gag | 24. jump | 33. seam |
| 7. book | 16. lad | 25. light | 34. toe |
| 8. pop | 17. this | 26. ring | 35. quick |
| 9. moon | 18. box | 27. church | 36. shoe |

The following readings may be used as supplementary or complementary assignments.

Bloomfield, Leonard. 1933. *Language*. pp93-98.

Gleason, Henry A. Jr. 1961. *An Introduction to Descriptive Linguistics*.
pp 239-44. (hereafter *Descriptive Linguistics*).

Hockett, Charles F. 1958. *A Course in Modern Linguistics*. Chapter 7
pp 62-68. (hereafter *Modern Linguistics*).

Lehman, Winfred P. 1972. *Descriptive Linguistics: An Introduction*.
p 24. (hereafter *Descriptive Linguistics*).

LESSON THREE

INSTRUCTOR NOTES

The third lesson introduces the concept of place and mode of articulation. Work is also given in segmenting words into separate sounds. This is done by asking the student to count the number of phones in selected words. Some disagreement is to be expected since the class has had no instruction concerning complex vowels. If this becomes a concern to his students, the instructor may wish to address this point.

The following exercises may be used as practice for determining place of articulation. Before reading the directions the instructor should write the following terms on the board:

bilabial	labiodental
interdental	alveolar
alveopalatal	palatal
velar	glottal

Ex. 3

Directions: Number your papers from 1 to 36. I will pronounce 36 English words for you, repeating each word several times. You are to determine the place of articulation for the first sound in each word, copying from the board the appropriate term after the number of the word. For example, word number 1 is "bib". The first sound of "bib" is [b], which is made with two lips. You will therefore write "number 1, bilabial".

Ex. 3

- | | | | |
|----------|-----------|-----------|------------|
| 1. bib | 10. next | 19. day | 28. thick |
| 2. kick | 11. rat | 20. paper | 29. phone |
| 3. gob | 12. bag | 21. baby | 30. quiver |
| 4. house | 13. phase | 22. king | 31. judge |
| 5. fat | 14. can | 23. pill | 32. chip |
| 6. thing | 15. they | 24. mice | 33. shape |
| 7. pat | 16. day | 25. lag | 34. zag |
| 8. tack | 17. putt | 26. grape | 35. spike |
| 9. yes | 18. kit | 27. blue | 36. vase |

The following exercise may be given following the direction of Ex. 3 above. Alternatively the place of articulation of the final consonant may be required.

Ex. 4

- | | | | |
|----------|-----------|----------|-----------|
| 1. page | 10. tag | 19. hand | 28. kelp |
| 2. batch | 11. gain | 20. zoom | 29. hut |
| 3. vat | 12. moth | 21. have | 30. sack |
| 4. chap | 13. mouse | 22. half | 31. nave |
| 5. bad | 14. set | 23. bum | 32. dish |
| 6. bathe | 15. tab | 24. nose | 33. match |
| 7. pug | 16. tape | 25. pup | 34. maze |
| 8. buzz | 17. cup | 26. chum | 35. pan |
| 9. fight | 18. globe | 27. xeon | 36. box |

The following readings may be used as complementary or supplementary assignments.

Gleason, Henry A. Jr. 1961. Descriptive Linguistics. pp 244-5

Hockett, Charles F. 1955 A Manual of Phonology. IJAL 21 pt. 4
pp 23-30.

_____. 1958. Modern Linguistics. pp 63-68.

Lehman, Winfred P. 1972. Descriptive Linguistics. pp 25-30.

LESSON FOUR

INSTRUCTOR NOTES

Before proceeding with this course the instructor must be certain that the students have mastered the names and locations of the organs of speech. Success in this course is dependent upon the use of this information.

The use of the symbols superscript h and apostrophe is dictated by their ease of reproduction on a standard typewriter. These symbols are used in the phonetic transcription given for the exercise below. This exercise, like all following exercises, is given in phonetic transcription to aid the instructor in maintaining a consistent pronunciation. Before reading the directions to the following exercises, the instructor should write on the board the transcription of the two vowel sounds used with this exercise.

Ex. 5

Directions: Transcribe the following words. The vowels used in these words will be either [i] as in "bit" or [iy] as in "beet".

- | | | | |
|--|------------------------|-------------------------|------------------------|
| 1. dip' | 10. ?iyt' | 19. ?it' | 28. dip |
| 2. k ^h iy p' | 11. p ^h ik' | 20. ?ik' | 29. ?it |
| 3. bid | 12. biyt | 21. big | 30. bid' |
| 4. biyd' | 13. dit' | 22. t ^h ik' | 31. dit |
| 5. git' | 14. gig' | 23. p ^h it | 32. p ^h ik |
| 6. diyp' | 15. k ^h id' | 24. p ^h iyt' | 33. t ^h ip' |
| 7. t ^h ip | 16. gidiy | 25. p ^h iy p | 34. k ^h id |
| 8. t ^h iy p ^h iy | 17. k ^h it' | 26. p ^h ig | 35. biyd |
| 9. phiy | 18. bit' | 27. dit | 36. big' |

Ex. 6

Directions: Transcribe the following words. The vowel sound used will be either [iy] , [i] , or [ey] . These are the vowels of "beet", "bit", or "bait" respectively.

- | | | | |
|------------------------|-------------------------|-------------------------|-------------------------|
| 1. k ^h it' | 10. gig | 19. big' | 28. k ^h eyt' |
| 2. p ^h eyt' | 11. ?eyd' | 20. dit' | 29. gig' |
| 3. t ^h iyk' | 12. k ^h eyp' | 21. deyt' | 30. eyg' |
| 4. deyt' | 13. geyp' | 22. k ^h ip' | 31. t ^h ip' |
| 5. t ^h eyp | 14. diyd' | 23. geyt' | 32. deyt |
| 6. bit | 15. k ^h eyt | 24. ?eyp' | 33. bit' |
| 7. p ^h iyk' | 16. p ^h it' | 25. biy | 34. ?eyk' |
| 8. ?eyt' | 17. ?it' | 26. did' | 35. k ^h id' |
| 9. t ^h ip' | 18. t ^h eyp' | 27. p ^h ey?' | 36. t ^h ip' |

The following readings may be used as supplementary or complementary assignments.

Gleason, Henry A. Jr. 1961. *Descriptive Linguistics*. p 247.

Hockett, Charles F. 1958. *Modern Linguistics*. pp 70-72.

Lehman, Winfred P. 1972. *Descriptive Linguistics*. pp 30-31.

Pike, Kenneth L. 1947. *Phonemics: A Technique for Reducing Languages to Writing*. pp 30-34. (hereafter *Phonemics*).

LESSON FIVE

INSTRUCTOR NOTES

Lesson five introduces the fricatives and affricates. The transcription selected for the affricates is closer to the phonetic facts; however, the instructor may wish to introduce such unit symbols as [c^v] and [j^v]. It is realized that "barred d" is not the most common symbol used for the voiced interdental fricative, but it, along with [s^v] and [z^v], is selected for economy. The instructor may want his students to become familiar with other symbols for these sounds.

Before giving the following exercises, the instructor should write the vowel transcription symbols on the board with the words they are used in from the directions.

Ex. 7

Directions: Transcribe the following words. The vowels in these words will be either [uw] as in "Luke" or [u] as in "look".

- | | | | |
|------------------------|----------|-----------------------|------------------------|
| 1. fut' | 4. fuwd' | 9. duw | 12. buwt' |
| 2. k ^h uwp' | 5. suw | 10. suk' ^v | 13. bus' ^v |
| 3. suwt' ^v | 6. suwp' | 11. buk | 14. tsuw' ^v |

Ex. 8

Directions: Transcribe the following words. The vowel used will be either [ey] as in "bait", [ə] as in "but", or [ow] as in "boat".

- | | | |
|--------------------------------------|------------------------|-----------------------|
| 1. dey | 4. k ^h eyk' | 7. heyt' |
| 2. k ^h owts' ^v | 5. gowt | 8. fədz' ^v |
| 3. sət' ^v | 6. pək' | 9. həts' ^v |

Ex. 8

- | | | |
|-----------------------|------------------------|--------------------------------------|
| 10. bey | 16. k ^h əf | 22. həsk |
| 11. t ^h ow | 17. feyk' | 23. heyz |
| 12. owbow | 18. veyg' | 24. fəs |
| 13. gey | 19. seyt | 25. vout' |
| 14. sək' | 20. ^v seyd' | 26. feyt' |
| 15. dey | 21. əd | 27. d ^v əd ^v z |

Ex. 9

Directions: Transcribe the following words. The vowels used will be either [iy] as in "beet", [æ] as in "bat" or [ɔ] as in "bought".

- | | | | |
|----------------------|----------|----------------------|-------------------------|
| 1. soft' | 6. fiyt | 11. seyk | 16. k ^h ɔst' |
| 2. fæt' | 7. sæg | 12. ^v sæg | 17. d ^v zæg |
| 3. sæd' | 8. feys | 13. gæf | 18. p ^h iyz |
| 4. ə | 9. feyk' | 14. geyz | 19. t ^v siyz |
| 5. bæ ^v s | 10. fɔt | 15. fæst | 20. p ^h ɔz |

The following readings may be used as supplementary or complementary assignments.

Gleason Henry A. Jr. 1961. Descriptive Linguistics. p 248.

Hockett, Charles F. 1958. Modern Linguistics. pp 72-73.

LESSON SIX

INSTRUCTOR NOTES

Two variants of the lateral sound are introduced in this lesson to allow the early introduction of the diacritic mark for backing. In addition, the introduction of these two sounds gives a convenient basis for the introduction of the retroflex.

The instructor should be warned that some students will not use the two allophones of the lateral in "level". If the instructor's pronunciation of this word utilizes both allophones, he should pronounce it for the class. If the instructor's speech lacks this feature, or the students have difficulty hearing it, the words "leak" and "lock" may be used to establish these two variants.

The "h-offglide" is not introduced as a semivowel because of the extreme variability of this feature. It is introduced in the lesson on vowel transcription to be covered later.

The distribution of the [ŋ] in English may serve as the basis for class discussion later when phonemics has been covered. Historically English has two nasal phonemes, /m/ and /n/. The second of these had an allophone, [ŋ] which was conditioned by a following velar sound. Such words as "ring" were phonemically /ng/ and phonetically [ŋg]. Later when the final velar stop was lost in pronunciation, the nasal allophone was retained despite the loss of its conditioning element. This conditioning element was lost in pronunciation only. The spelling remained static. This loss of final "g" resulted in the formation

of new minimal pairs such as "sin" and "sing", thus elevating a previously phonetic feature to phonemic status.

The following exercises are suggested for practice. Again the instructor should write the vowel transcriptions and words they are used in, from the directions on the board before proceeding.

Ex. 10

Directions: Transcribe the following words. The vowels used will be either [iy] as in "beet", [i] as in "bit", [ey] as in "bait", or [e] as in "bet".

- | | | | |
|----------|-----------|-------------------------|--------------------------|
| 1. risk' | 11. rib | 21. hiyl | 31. mist ^h iy |
| 2. riyd' | 12. lit' | 22. k ^h er | 32. liyp' |
| 3. lip | 13. mit' | 23. hiyr | 33. snip' |
| 4. win | 14. θin | 24. mis | 34. wilt' |
| 5. nip' | 15. ril | 25. ^v sin | 35. d ^v ziyr |
| 6. men | 16. niy | 26. ^v siyt' | 36. milk' |
| 7. let' | 17. skin | 27. lint ^v s | 37. bild' |
| 8. riŋ | 18. met' | 28. wik' | 38. instil |
| 9. wey | 19. meyd | 29. liŋk | 39. ^v siyr |
| 10. red | 20. θiŋk' | 30. wet' | 40. biyr |

Ex. 11

Directions: Transcribe the following words. The vowels used will be either [ɔ] as in "law", [ay] as in "lie", or [æ] as in "laugh".

- | | | | |
|-------------------------|----------------------------|---------------------------|---------------------------|
| 1. ^{>} lɔŋ | 7. mays | 13. ræ t' | 19. mayt' |
| 2. rɔ | 8. ?æ z | 14. rayts | 20. ^{>} layt' |
| 3. mɔlt' | 9. t ^h ayr | 15. hɔlt | 21. rayp' |
| 4. ^{>} nayl | 10. ræ sp' | 16. wæ k | 22. læ ks |
| 5. rayd' | 11. mayr | 17. ^v sɔ | 23. ^{>} slɔ |
| 6. t ^v sæ t' | 12. ^{>} klæ p' | 18. ^{>} slæ k | 24. k ^h ray |

Ex. 11

- | | | | |
|-------------------------|------------------------|--------------------------|------------------------|
| 25. wɔ̌ts | 29. slæ b | 33. k ^h ræ b | 37. grayp' |
| 26. rayf | 30. p ^h ayp | 34. nayn | 38. k ^h ayn |
| 27. wæ ks | 31. fayn | 35. k ^h ræ ŋk | 39. spæ ŋk |
| 28. mæ t ^ʋ s | 32. ^ʋ sæ ŋk | 36. sæ n | 40. blæ nd' |

The following readings may be used as supplementary or complementary assignments.

Bloomfield, Leonard. 1933. *Language*. pp 34-38.

Gleason Henry A. Jr. 1961. *Descriptive Linguistics*. pp 249-251.

Hockett, Charles F. 1958. *Modern Linguistics*. pp 73-74.

Lehmann, Winfred. P. 1972. *Descriptive Linguistics*. pp13-32.

LESSON SEVEN

INSTRUCTOR NOTES

It is suggested that Lesson Seven be given two class meetings. The material should be covered in its entirety by the student before the first class and reviewed before the second meeting. Sufficient exercise material is given for two days' work on this lesson.

The student can be expected to have some experience in hearing the differences in vowel sounds required in this lesson because of the work completed in previous exercises.

Ex. 12

Directions: Transcribe the following words. Only simple vowels are used in this exercise.

- | | | | |
|-------------------------|--------------------------|-------------------------------------|-------------------------|
| 1. hæ t' | 10. k ^h at | 19. set' | 28. gæ g |
| 2. t ^h ip | 11. mæ p' | 20. s ^v at | 29. dis ^v iz |
| 3. k ^h əp | 12. stəp | 21. d ^v zip | 30. hip' |
| 4. bə t' | 13. mist' | 22. p ^h its ^v | 31. iz |
| 5. fi s ^v | 14. hɒp' ** | 23. fəd ^v z | 32. bæz |
| 6. k ^h ot ** | 15. bu k' | 24. lu k' | 33. k ^h ɔ |
| 7. ru t' ** | 16. ni p | 25. ri ŋ | 34. zi p' |
| 8. p ^h it | 17. mə t | 26. li m | 35. bə ŋ k' |
| 9. me t' | 18. k ^h li p' | 27. p ^h et | 26. p ^h at' |

**n.b. the unrounded vowel.

Ex. 13

Directions: Transcribe the following words. The vowels will be either simple or with a [y] off-glide.

Ex. 13

- | | | | |
|------------------------|-------------------------|--------------------------|-------------------------|
| 1. p ^h ayp' | 11. fayt' | 21. mayt' | 31. spayt |
| 2. bey | 12. floyd' | 22. k ^h oy | 32. k ^h oyin |
| 3. soy | 13. rey | 23. bleyd' | 33. bled |
| 4. v ^{seyp} ' | 14. leyg | 24. blat' | 34. hayr |
| 5. stæ b | 15. mayr | 25. k ^h æ st' | 35. mayl̃ |
| 6. biyd' | 16. nayl | 26. melt' | 36. fəz |
| 7. k ^h æt | 17. k ^h əzɪn | 27. ?its ^v | 37. steyt' |
| 8. k ^h ayt' | 18. ?iyr | 28. biyts ^v | 38. hoyst' |
| 9. meys | 19. blis | 29. p ^h ley | 39. faynd |
| 10. fist' | 20. moyst' | 30. loyd | 40. gæ yg' |

Ex. 14

Directions: Transcribe the following words. The vowels used will be either simple vowels or [w] off-glides.

- | | | | |
|------------------------|-------------------------|-----------------------|--------------------------|
| 1. fab | 11. mowt' | 21. flip | 31. howp' |
| 2. d ^v æ b' | 12. fown | 22. blow | 32. p ^h lap' |
| 3. maws | 13. fiw | 23. mæ p' | 33. mæ k ^h oy |
| 4. k ^h owd | 14. k ^h lip | 24. nowd | 34. fest' |
| 5. fuwl | 15. meræt' | 25. mawnd' | 35. bæ wnd' |
| 6. bruk' | 16. bow | 26. flow | 36. flown |
| 7. luwm | 17. bowst | 27. mits ^v | 37. fɔg' |
| 8. p ^h it' | 18. d ^v ziws | 28. nowz | 38. fiwd' |
| 9. læ wsɪz | 19. lɔft' | 29. falow | 39. fæ low |
| 10. bowl̃ | 20. now | 30. nowp' | 40. rowlin |

Ex. 15

Directions: Some of the following words are given with an [h] off-glide. The remainder use simple vowels. Transcribe the following.

Ex. 15

- | | | | |
|---------|-----------------------|--------------------------|-------------------------|
| 1. bæ t | 6. læ p' | 11. ræ ht' | 16. t ^h ahp' |
| 2. hiht | 7. dihp | 12. bet | 17. mehn |
| 3. məm | 8. bəht | 13. væ t | 18. vet |
| 4. weht | 9. [∨] cehr' | 14. fuht' | 19. fut' |
| 5. fin | 10. miŋk' | 15. t ^h rihp' | 20. [∨] sahd |

Ex. 16

Directions: Transcribe the following. All vowels may be included.

- | | | | |
|-----------------------|--------------------------|--------------------------|------------------------|
| 1. moyst' | 11. nowzəz | 21. t ^h owst' | 31. mətʰs |
| 2. hayd | 12. fəl | 22. lab | 32. k ^h lip |
| 3. vihm | 13. biy | 23. k ^h reyv | 33. biy |
| 4. flip | 14. meyt' | 24. blip | 34. gey |
| 5. dey | 15. ekst ^h rə | 25. sluwp | 35. luwp |
| 6. boy | 16. riypt' | 26. pəmp' | 36. k ^h əp |
| 7. bɔl | 17. lim | 27. wis [∨] | 37. zuw |
| 8. nip' | 18. væ t | 28. fiw | 38. beyz [∨] |
| 9. k ^h owp | 19. voys | 29. suw | 39. k ^h oyn |
| 10. læ yg | 20. ploy | 30. dʒədʒ [∨] | 40. fər |

Ex. 17 (This exercise may be used as additional practice or may be used in place of Exercise 16.)

Directions: Transcribe the following.

- | | | | |
|------------------------|------------------------|------------------------|--------------------------|
| 1. k ^h oy | 7. bowst' | 13. wel | 19. luwz [∨] |
| 2. nayf | 8. fiŋ | 14. tsimp [∨] | 20. geyp' |
| 3. fiyl | 9. fiht' | 15. rowst' | 21. t ^h ræ p' |
| 4. blæk' | 10. k ^h lɔk | 16. beyb' | 22. daym |
| 5. k ^h lowə | 11. melt' | 17. kəf | 23. baks |
| 6. milk' | 12. viw | 18. bald' | 24. dʒəg [∨] |

- | | | | |
|------------|-------------------------|------------|------------------------|
| 25. dzəmp' | 29. hæŋ | 33. niyd | 37. glæ s |
| 26. gæ g | 30. lat' | 34. mit | 38. muwts |
| 27. layn | 31. bæz | 35. ?iyt' | 39. rink |
| 28. flæ g | 32. p ^h elt' | 36. rowzɪz | 40. t ^h uk' |

The following readings may be used as supplementary or complementary assignments.

Gleason, Henry A. Jr. 1961. *Descriptive Linguistics*. p 253.

Hockett, Charles F. 1958 *Modern Linguistics*. pp 77-79.

Lehman, Winfred P. 1972. *Descriptive Linguistics*. pp 34-37.

LESSON EIGHT

INSTRUCTOR NOTES

The discussion on stress given to the student is quite superficial. If the instructor wishes, it may be supplemented by lecture or outside readings. The student is expected to be able to place the primary stress only.

The discussion of vowel reduction is also limited. The short treatment given these two subjects is considered, by the author, to be the most reasonable trade-off between time and accomplishment. It should be sufficient for most non-linguists. The following exercise will help the student learn to place the primary stress.

Ex. 18

Directions: Transcribe the following words paying particular attention to the placement of appropriate stress marks.

- | | | |
|--|-------------------------------|-----------------------------|
| 1. 'how | 7. 'k ^h artwiyl | 13. k ^h ən'diʃən |
| 2. 't ^h iyp ^h iy | 8. 'bluwbærd' | 14. 'beybiy |
| 3. '?aksən | 9. p ^h er'mit | 15. 'reydiyow |
| 4. 'marbəl | 10. də'p ^h azət | 16. 'owbow |
| 5. k ^h an'k ^h riyt | 11. 'dip ^h lowmæ t | 17. ə'ræ wnd' |
| 6. 'help' | 12. ə'ver | 18. 'yelow |

Ex. 19

Directions: Transcribe the following words paying particular attention to stress and syllabic consonants.

Ex. 19

- | | | |
|------------------------------------|------------------------|----------------------|
| 1. p ^h iwp _l | 4. ən'θiŋkəbəl | 7. 'rəbəl |
| 2. 't ^h iytsər | 5. ən'eybəl | 8. 'bət _ŋ |
| 3. 'luwzər | 6. bə'zər ^k | 9. 'bat _l |

Ex. 20

Directions: Transcribe the following words.

- | | | |
|--------------------------|-------------------------|---|
| 1. 'æksent' | 6. 'dʒədʒmənt | 11. ə'p ^h ʊn |
| 2. ə'bæv | 7. 'dow ^ɪ t' | 12. 'aybəl |
| 3. bə'low | 8. 'p ^h eniy | 13. 'k ^h lowzp ^h in |
| 4. 't ^h əmbəl | 9. yiwnə'versəl | 14. 'pensəl |
| 5. 'hiwn | 10. 'blæst' | 15. 'wats ^v ɪz |

The following readings may be used as supplementary or complementary assignments.

Gleason, Henry A. Jr. 1961. *Descriptive Linguistics*. Chapter 4 pp 40-50.

Hockett, Charles F. 1958. *Modern Linguistics*. Chapter 5 pp 47-53.

LESSON NINE

INSTRUCTOR NOTES

Lesson nine is the first lesson dealing with non-English sounds. The instructor will probably find it necessary to give examples of the sounds covered in each lesson before the student can be expected to work without supervision. Several lessons state that the instructor will give examples of sounds discussed. In these cases the instructor should be able to provide the needed examples in the final minutes of the class meeting in which the new lesson material is distributed.

Readings will not be provided for the non-English sounds; however, Pike's Phonemics is a useful source for any student needing further work.

The following exercises may be used for transcription practice.

Ex. 24

Directions: Transcribe the following words. Listen closely to the stops.

- | | | |
|------------------------|---------------------------|--|
| 1. 'pat | 7. 'popo | 13. 'dož [˘] |
| 2. 'b ^h iy | 8. 'g ^h iki | 14. wa'ta |
| 3. 'koko | 9. 't [˘] ri | 15. 'st [˘] h ^h ow |
| 4. go'g ^h o | 10. t ^h o'ma | 16. 'pif |
| 5. 'apa | 11. bæ'p ^h ot' | 17. tomo'ga |
| 6. u'tuw | 12. 'ghiy | 18. 'tap' |

Ex. 25

Directions: Transcribe the following.

- | | | |
|-----------------------|--------------------------------------|-------------------------|
| 1. 'piykuw | 6. 'tokoto | 11. 'g ^h ey |
| 2. kon'kon | 7. ga'sp ^h ay | 12. pa'pa |
| 3. 'dis | 8. 'liti | 13. tip'tip |
| 4. 't ^h ey | 9. 'b ^h eb ^h e | 14. 's ^h tiy |
| 5. 'st ^h ə | 10. 'key | 15. 'upə |

Ex. 26

Directions: Transcribe the following.

- | | | |
|-------------------------|--------------------------------------|--------------------------------------|
| 1. ɬa'pa | 11. 'd ^h iŋ | 21. 'd ^h i ^h w |
| 2. mo'kiy | 12. ka'tə | 22. 'b ^h uk |
| 3. 'b ^h am | 13. 'b ^h idz ^v | 23. 'g ^h iy |
| 4. 'titiy | 14. 'popow | 24. kow'sa ^v |
| 5. 'komo | 15. 'tiydiy | 25. 'bək |
| 6. 'klin | 16. k ^h apə 'gey | 26. 'dzəpə |
| 7. 'thəm | 17. 'drap | 27. 'k ^h ik' |
| 8. 'g ^h ap' | 18. 'dad ^h a | 28. 'd ^h iyp' |
| 9. 'kab ^h a | 19. 'kuwt' | 29. 'topo |
| 10. 't ^h ɔt' | 20. 'b ^h ow | 30. 'kiy |

LESSON TEN

INSTRUCTOR NOTES

The material introduced in this lesson will possibly be very difficult for the student to pronounce correctly. If this is the case the instructor must determine whether the student can discriminate these sounds when heard. The task of production assumes this discrimination.

The following exercises may be used for practice.

Ex. 32

Directions: Transcribe the following words.

- | | | | |
|----------------------|-----------------------|-------------------------|-----------------------|
| 1. 'map | 10. 'lip | 19. 'k ^h eyə | 28. ki'xotey |
| 2. 'tobo | 11. 'tæə | 20. 'bipa | 29. 'tiɛ |
| 3. 'xiyɸ | 12. 'pɔ ^l | 21. 'riɸ | 30. 'sidz |
| 4. tsə | 13. 'gopɸ | 22. 'xats | 31. 'dzowpɸw |
| 5. 'fax | 14. 'daypɸ | 23. pɸay'xa | 32. 'meytsi |
| 6. di'dix | 15. 'pɸapɸ | 24. 'mopɸiy | 33. 'ɛəɛ |
| 7. s ^v ap | 16. 'bɛy ^l | 25. ɸadz | 34. to'xoxa |
| 8. 'dzim | 17. 'mix | 26. dzats ^v | 35. 'viyl |
| 9. 'pɸey | 18. 'pɸowbɸ | 27. 'pɸeyxo | 36. s ^v ap |

Ex. 33

Directions: Transcribe the following.

- | | | |
|------------|-----------|-----------|
| 1. 'pits | 4. 'tipix | 7. 'xæ x |
| 2. 'milɸ | 5. 'kix | 8. 'pɸiyɛ |
| 3. 'xatsow | 6. 'ræɛ | 9. 'bɛits |

Ex. 33

- | | | |
|-----------|------------|------------|
| 10. 'xɔŋ | 12. 'bap | 14. 'miv |
| 11. du'bu | 13. 'pleyg | 15. 'plæt' |

Ex. 34

Directions: Transcribe the following.

- | | | | |
|-----------|--------------|-------------|-------------------------|
| 1. 'lip | 11. 'fipp | 21. 'tippiy | 31. 'tsæ m |
| 2. 'xax | 12. 'tsoto | 22. 'zɔm | 32. 'bopp |
| 3. 'ppis | 13. 'gæŋ | 23. tsɔ'tɔ | 33. axa'to |
| 4. 'baŋ | 14. tse'pi | 24. 'gaga | 34. 'ʃəʃ |
| 5. he'tax | 15. 'miypp | 25. 'vaʃ | 35. 'rɔb |
| 6. 'ppipp | 16. 'bbey | 26. 'xowf | 36. 't ^h iyp |
| 7. 'ʃæ g' | 17. 'xaxaga | 27. 'tsob | 37. 'nipp |
| 8. 'biyts | 18. ppey'gey | 28. 'eyts | 38. 'tsabb |
| 9. 'dzow | 19. 'pax | 29. mi'dzey | 39. 'owpow |
| 10. 'abba | 20. 'mows | 30. 'dzədza | 40. 'dzudzu |

LESSON ELEVEN

INSTRUCTOR NOTES

Most, if not all students, will have trouble producing the velar nasal in initial position. Most students will have no trouble recognizing this sound, however. The voiced and voiceless alveolar flaps are difficult to distinguish. Perhaps only an intellectual understanding of the difference can be expected with the limited time available for practice.

The following exercises are to be used with this lesson. They may be used as transcription exercises or may be duplicated and used as reading exercises.

Ex. 40

Directions: Transcribe (or read) the following.

- | | | |
|--------------------------|---------------------------------------|---------------------------------------|
| 1. 'o [~] ro | 2. 'lax | 19. 'nət |
| 2. 'ti [~] r | 11. 'p [~] lip | 20. 'i [~] ri |
| 3. 'l [~] ip | 12. 'i [~] ri | 21. 'ŋæ |
| 4. 'ŋaw | 13. 'r [~] o [~] nə | 22. 'fiŋ |
| 5. 'næ [~] ɪ | 14. 'ŋip | 23. 'r [~] im |
| 6. 'a [~] na | 15. 't [~] riŋ | 24. 'sŋow |
| 7. 'ki [~] nəw | 16. 'niy [~] p | 25. 'n [~] ə [~] na |
| 8. 'ni [~] tnit | 17. 'ti [~] lnə | 26. 'ŋiɪ |
| 9. 'net | 18. 'n [~] ax | 27. 'li [~] y [~] r |

Ex. 41

Directions: Transcribe the following.

Ex. 41

- | | | |
|----------|------------|-------------|
| 1. 'beɬ | 6. 'pɛn | 11. 'tsəŋ |
| 2. 'miŋ | 7. 'kimŋow | 12. 'bowŋow |
| 3. 'nəŋ | 8. 'ziɬ | 13. 'dʒɔn |
| 4. 'ɬib | 9. to'ŋey | 14. 'ɬəɬ |
| 5. 'xana | 10. 'niynə | 15. 'sŋey |

LESSON TWELVE

INSTRUCTOR NOTES

The student should have no problem with voiceless vowels. These may safely be left to the student for practice. The non-glided vowels of most foreign languages may be quite difficult. No practice material is given in the student handout for these sounds. The student's probability of success with these sounds without the aid of an instructor seems too small to justify their inclusion in the handout. In-class practice also has the advantage of allowing immediate correction of any mistake before it can become a habitual error. Exercise number 44 below is designed for use in class. Although students have not contrasted vowels of different length, the unglided vowels of the second column in this exercise should be spoken with sufficient length to insure that the student does not tend to glide the sound.

The material presented on unrounded back vowels and rounded front vowels is meant to be illustrative only. The instructor may wish to introduce other sounds such as the higher high front and back vowel sounds with those to be practiced.

The following exercises are recommended.

Ex. 44

Directions: Repeat the following after the instructor. The first word uses an English type glided vowel. This is contrasted with a similar non-glided vowel of the type common in foreign languages.

Ex. 44

- | | |
|--|--|
| 1. 'p ^h luw : 'p ^h lu: | 6. 'miy : 'mi: |
| 2. 'tiyp : 'ti:p | 7. 't ^h uw : 't ^h u: |
| 3. 'huw : 'hu: | 8. 'wiy : 'wi: |
| 4. 'bowt : 'bo:t | 9. 'fuwd : 'fu:d |
| 5. how'tel : ho:'tel | 10. 'now : 'no: |

Ex. 45

Directions: Transcribe the following words.

- | | | |
|-----------------------|-------------------------|--------------------------|
| 1. 'n ^h ip | 6. 'd ^h et | 11. 'k ^h omo: |
| 2. 'k ^h on | 7. 's ^h ef | 12. 'lafi: |
| 3. 't ^h om | 8. 'n ^h ol | 13. 'r ^h omi |
| 4. 'i ^h ti | 9. ud'o | 14. 'kiki |
| 5. 'g ^h en | 10. 'ti ^h tu | 15. 'mo ^h s |

LESSON THIRTEEN

INSTRUCTOR NOTES

With some students the production of non-nasalized vowels before a nasal consonant will be difficult. If this difficulty affects a significant number of the students in the class a supplementary drill contrasting nasalized and non-nasalized vowels in English may be needed. The nose holding exercise mentioned in the student handout has been found to be successful in some cases. An exercise of this type is reproduced below. It may be skipped if not needed.

The instructor may wish to bring the loss of contrast of /i/ and /e/ before nasals to the attention of his class if it appears in the speech of the instructor or students.

Tone languages very seldom receive study to the same degree as the standard European languages. The instructor may wish to go deeper into this field if a native speaker of one of the tone languages is able to spend the necessary time to make recordings for class use. Because so few Americans speak tone languages the discussion in the student handout is limited to demonstrating that tone is a vowel modification.

Exercise 48 may be used as an in-class oral drill contrasting nasalized and non-nasalized vowels or may be used with Exercise 49 as a transcription drill. Alternatively drills 48 and 49 may be duplicated and used as reading practice

Ex. 48

Directions: Repeat the following English words. The word will first

be said with a nasalized vowel and then with a non-nasalized vowel.

Listen carefully and repeat after your instructor.

Directions to instructor: Read each word written below twice. Use a nasalized vowel with the first reading and a non-nasalized vowel with the second reading.

- | | | | |
|----------|------------|-----------|-----------|
| 1. pan | 11. hand | 21. lawn | 31. soon |
| 2. Ken | 12. pin | 22. fun | 32. stone |
| 3. men | 13. finger | 23. pound | 33. in |
| 4. tin | 14. jump | 24. loon | 34. moon |
| 5. ring | 15. rim | 25. hone | 35. rung |
| 6. bin | 16. fin | 26. time | 36. wrong |
| 7. mint | 17. hang | 27. gin | 37. dune |
| 8. thing | 18. can | 28. seen | 38. vine |
| 9. dime | 19. span | 29. been | 39. bane |
| 10. tine | 20. bone | 30. bond | 40. wind |

Ex. 49

Directions: Transcribe (or read) the following.

- | | | | |
|-------------|------------|------------------------|-------------------------|
| 1. 'māp | 10. 'fapa | 19. 'fifi: | 28. 'aʔow |
| 2. 'pöt | 11. 'kiy | 20. 'tõ:m | 29. 'mi: |
| 3. 'to: | 12. 'wõn | 21. 'vẽ: | 30. 'ki:m |
| 4. 'xaxā | 13. 'tsūw | 22. 'apõ: | 31. 'to:ri |
| 5. 'dzi: | 14. se:'ma | 23. 'zũ: | 32. 'liæ |
| 6. 'bõ:t | 15. 'tsim | 24. 'nõ: | 33. 'xɔ |
| 7. 'p̃in | 16. 'õ:t | 25. 'p ^h æ: | 34. 'k ^h æ:t |
| 8. 'toto:xa | 17. 'r̃im | 26. mo'to:nõ | 35. 'lòm |
| 9. 'ma:nā | 18. 'd̃zõ | 27. 'rütə | 36. 'zēs |

LESSON FOURTEEN

INSTRUCTOR NOTES

After reading this lesson in its entirety, the student should have some understanding of the process of phonemicising phonetic data. The exercise in the student handout may be worked out in class. The key points to be made in this lesson are the concepts of complementary distribution and free variation. These are basic to an understanding of phonemics and serve as a basis for extra-linguistic applications of this model.

This lesson is designed for use on two class days. It is suggested that the lesson be assigned in its entirety for the first day and reviewed before class the second day. Class activities for the second day should include the in-class exercise below.

In this exercise the students will be given phonetic data. This data will include problems of free variation and complementary distribution. It is suggested that the students be allowed a few minutes to familiarize themselves with the data before beginning work on the problem as a group.

Although almost any linguistic textbook may be used as a supplementary or complementary reading, the following two contain material with emphasis on field situations.

Gleason, H. 1961 Descriptive Linguistics pp 271-285

Pike, K. 1947 Phonemics pp 57-104

The following word list should be given to the class at the beginning of the second day of phonemics. The list is designed for

oral presentation as part of a simulated monolingual field situation. If this approach is used the instructor should refuse to respond to questions asked in English.

Ex. 51

- | | |
|----------------------------------|-------------------------------|
| 1. p ^h ix 'hand' | 15. tap 'book' |
| 2. k ^h at 'foot' | 16. nip 'paper' |
| 3. bix 'ear' | 17. daf 'pencil or pen' |
| 4. t ^h æt 'finger' | 18. šap 'shoe' |
| 5. dap 'head' | 19. p ^h ik 'hair' |
| 6. t ^h ætma 'fingers' | 20. bixma 'ears' |
| 7. mip 'wrist' | 21. t ^h ab 'elbow' |
| 8. t ^h a 'eye' | 22. gat 'stomach' |
| 9. k ^h atma 'feet' | 23. t ^h ut 'leg' |
| 10. bux 'arm' | 24. žap 'shoe' |
| 11. t ^h at 'knee' | 25. dav 'pencil' |
| 12. t ^h atma 'knees' | 26. t ^h uk 'chair' |
| 13. bixna 'neck' | 27. mašu 'teacher' |
| 14. nip 'mouth' | 28. xama 'student' |

Directions: Identify the phonemes of this language and rewrite the data in phonemic notation. Are there any additional sounds not present in the data that the data suggests may be used in this language but not in these words?

The following phonemes should be isolated:

- /p/ with allophones [p^h] in initial position and [p] in final position
 /t/ with allophones [t^h] in initial position and [t] in final position
 /k/ with allophones [k^h] in initial position and [k] in final position

The three items above have allophones in complementary distribution.

/b/ with one phonetic form [b]
 /d/ with one phonetic form [d]
 /g/ with one phonetic form [g]
 /f/ with two allophones [f] and [v] in free variation
 /s/ with two allophones [s] and [z] in free variation
 /x/ with one phonetic form [x]
 /m/ with one phonetic form [m]
 /n/ with one phonetic form [n]
 /ŋ/ with one phonetic form [ŋ]
 /i/ with one phonetic form [i]
 /æ/ with one phonetic form [æ]
 /a/ with one phonetic form [a]
 /u/ with one phonetic form [u]

The phonetic form not occurring in the data that might be expected would be [ɣ] which symmetry suggests may be an allophone of /x/ in free variation with [x].

LESSON FIFTEEN

DISTINCTIVE FEATURES

Herbert Landar's Language and Culture may be used as a supplementary reading for this section. The seventeenth chapter of that work is entitled Phonological Horizons and contains a review of basic DF analysis which may help students. The degree of sophistication that can be expected from this lesson may be greatly advanced if the instructor can demonstrate the use of the sound spectrograph.

The basic work for those students interested in continuing their study of acoustic phonetics and distinctive feature analysis is Martin Joos' Acoustic Phonetics published as Language Monograph no. 23 of the Linguistic Society of America in 1948. Peter Ladefoged's Acoustic Phonetics, University of Chicago Press, 1962, and Roman Jakobson, C. G. M. Fant, and Morris Halle's Preliminaries to Speech Analysis: The Distinctive Features and Their Correlates, published as Massachusetts Institute of Technology Acoustics Laboratory Technical Report no. 13, might also be recommended to such students.

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ELEMENTARY PHONOLOGY
FOR STUDENTS IN OTHER DISCIPLINES:
A SYLLABUS

by

RICHARD RAYMOND HAGEMAN
B. S., Kansas State University, 1972

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARTS
Department of Speech

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1973

This report proposes fifteen lessons presenting an introduction to segmental phonology for undergraduate non-language majors, with anthropology students particularly in mind. Care is taken to utilize to the extent possible non-technical language and diction.

Topics treated include phonetics using English as a vehicle, phonemicization of phonetic data, recognition, production and transcription of selected exotic sounds, and rudiments of distinctive feature analysis.

The lessons, intended as handouts for students, are accompanied by a set of notes to the instructor which include transcription exercises which could also be duplicated and handed out as reading exercises, and recommendations for complementary and supplementary readings. A selected bibliography is appended, listing works cited and appropriate sources for further study.