LINGUISTICS 221 **LECTURE #1**
Introduction to Phonetics and Phonology

Theoretical Preliminaries

PHONETICS: The science, which studies the characteristics of human sound making (especially those sounds used in speech) and provides methods for their *description*, *classification* and *transcription*.

Phonetics examines speech sounds from three perspectives:

- *Production*: how sounds are made (=articulated) -- ARTICULATORY PHONETICS
- *Acoustics*: what are the physical properties of speech sound, how sounds are transmitted between mouth and ear -- ACOUSTIC PHONETICS
- *Perception*: how the sounds are processed by the listener as mediated by the ear, nerves and the brain -- AUDITORY PHONETICS

THE USES OF PHONETICS

Henry Sweet (a British phonetician): "Phonetics is the indispensable foundation of all study of language -- whether that study be purely theoretical or practical as well"...

(*Handbook of Phonetics*. 1877.)

- language teaching (e.g. ESL),
- speech disorders,
- mastering dialects, foreign accents etc. (e.g., actors),
- many other areas.

SEGMENTS (or **PHONES**): individual speech sounds

How many segments are there in these words?

thought ( ) *knocking* ( ) *examination* ( ) *questioning* ( ) *shrewdness* ( )

Are the underlined segments the same, or are they different?

1. pot spot

   DIFFERENT: pot [p^h]

   spot [p]

2. top stop

   DIFFERENT: top [t^h]

   stop [t]

3. car scar

   DIFFERENT: car [k^h]

   scar [k]

4. leaf feel

   DIFFERENT: leaf [l]

   feel [ɬ]

5. goose geese

   DIFFERENT: goose [g]

   geese [g_+]

6. bead bean

DIFFERENT: bead [i]

bean [ĩ]

***PHONEMES*:** Speech sounds (=segments) that serve the function of carrying *meaning*.

seal

/s/ contrasts with /z/

zeal

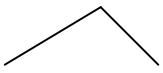
pet

/p/ contrasts with /b/

bet

/s/, /z/, /p/, /b/ ------- PHONEMES!

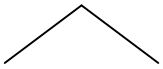
/p/ *phoneme*



[p] [p^h] *predictable variants* (=allophones)

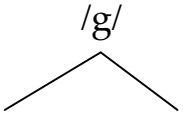
spot pot

/l/ *phoneme*



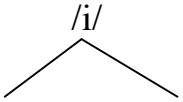
[l] [ɬ] *predictable variants* (=allophones)

leaf feel



phoneme

[g] goose — [g̟] geese — *predictable variants* (=allophones)



phoneme

[i] bead — [ĩ] bean — *predictable variants* (=allophones)

Pronunciation rules are *not* taught; they are *not* imposed from the outside: they are contained in the grammar (=linguistic competence).

THE VOCAL TRACT : those parts of the human anatomy where the air flows during speech production.

- The *lungs* and the *lower respiratory passages*
- The *larynx*
- The passages above the larynx: *pharynx, oral cavity* and *nasal cavity*.

(Latin *os/oralis* 'mouth' Latin *nasus* 'nose")

Study Figure 1.1, p. 2

The lungs

The source of energy for speech production is the *steady stream of air* that comes from the lungs as we exhale.

The lungs consist of *alveoli* (= air sacks). The act of breathing air in and out is controlled by various muscles of the rib cage, and by muscles of the abdomen and the *diaphragm*.

↓

The muscular band that separates the chest from the abdomen; it plays a role in respiration and therefore in speech. During speech it is relaxed.

Air from the lungs travels through the *bronchial tubes* which connects to the *trachea*.

↓

a tube consisting of cartilages;
it leads from the larynx. (Greek *trachea* 'neck')

The larynx (Greek *larynx* 'upper part of the windpipe')

It is a structure cartilages and muscles situated atop the trachea.
There is a protuberance at the front (= Adam's apple).
The functions of the larynx are:

a. BIOLOGICAL: protecting the lungs by preventing food particles and fluids from entering the trachea.

b. LINGUISTIC: involved in the production of several types of sound effects (e.g., voicing, pitch, whisper, etc.).

The larynx contains the **VOCAL CORDS (or VOCAL FOLDS)**.

↓

two horizontal bands of ligament and muscles

They vibrate during the articulation of vowels and of many consonants.
The space between the vocal cords is called the **GLOTTIS**.

Articulation of the vocal cords: GLOTTAL articulation, e.g., glottal stops [ʔ]

HYOID BONE**:** it sits at the back of the base of the tongue and at the top of the larynx. It brings about a muscular interaction between the tongue and the larynx.

The larynx is made up of five cartilages:

Epiglottis, thyroid cartilage, cricoid cartilage, and the two arytenoid cartilages.

Study Figure 1.2., p. 3, and the HANDOUT!

The upper vocal tract

(i) upper surface: upper lip, upper teeth, alveolar ridge, hard palate, velum, uvula, pharynx
(ii) lower surface: lower lip, tongue, epiglottis

Lips (Latin *labia*)

labial sounds
/ \
bilabial *labiodental*

e.g., bee, my fly, veal

The lower lip and the tongue rest on the *jaw*; during speech the jaw raises and lowers the lower lip and the tongue.

Teeth (Latin *dentes*)

dental sounds

e.g., think, they

Alveolar ridge (Latin *alveolus* 'tray')

A small protuberance behind the upper teeth.

alveolar sounds

e.g., seal, zoo, take, dip

Hard palate (Latin *palatum*)

↓

The arched bony structure that forms the forward part of the roof of the mouth.

e.g., yes

palato-alveolar (or *alveo-palatal*, or *post-alveolar*) sounds

e.g., shoe, church, jug

retroflex sounds: articulated with the tip of the tongue curled back at the back of the alveolar ridge (see later).

Velum, or soft palate (Latin *velum* 'sail')

↓

- soft, muscular part of the roof of the mouth;
- it can be raised and pressed against the back wall of the pharynx: the nasal cavity is shut off;
- when the velum is lowered, the nasal passages are open: *nasal* or *nasalized* sounds.

e.g., moon (nasal sound)
bean (nasalized sound)

Velar, or velic port: the passage that is open between the nasal and pharyngeal cavities while the velum is lowered → *nasal resonance*!

NOTE: *velar* sounds:

↓

the tongue is below the lower surface of the velum

e.g. , gum, car

velic movement: the lowering or raising of the velum.

Uvula (Latin *uvula* 'little grape')

↓

The soft fleshy tip of the velum; it hangs down at the back of the mouth.

uvular sounds (Are there uvular sounds in English?)

Pharynx (Greek *pharynx* 'throat')

↓

The part of the vocal tract that extends from the posterior portion of the nasal cavity downward through the back of the oral cavity to the larynx.

The pharynx is the critical area in which the *food passage way* and the *air passage way* cross.

↓

From the back of the lower part of the pharynx the food enters the *esophagus* (= food pipe), leading to the stomach).

pharyngeal sounds (English does not have pharyngeals)

Tongue

The floor of the oral cavity is largely formed by a three-dimensional muscle mass: *the tongue*.

Five regions:

a. **tip, or apex**

apical sounds (*apico-dentals, apico-alveolars*)

b. **blade, or lamina** (below the alveolar ridge at rest)

laminal sounds (*lamino-dentals, lamino-alveolars, lamino palato-alveolars*)

c. **front, or antero-dorsum** (below the palate at rest)

antero-dorsal sounds (= palatal sounds)

d. **back, or dorsum:**

dorsal sounds (*dorso-velar,dorso-uvular*)

e. **root, or radix:** opposite the back wall of the pharynx

radical sounds

Study Figure 1.3., p. 4, and the HANDOUT!

THE BASIC (OR FUNCTIONAL) COMPONENTS OF SPEECH

Any speech sound will *always* have these two components:

1. **INITIATION**: an activity that *initiates* a flow of air (= airstream mechanism)

   The organ used for this purpose is called an INITIATOR (e.g., the lungs).

2. **ARTICULATION:** an activity that modulates or *articulates* the airstream, thus generating a specific type of sound.

The organs utilized for articulation are called **ARTICULATORS**.

EXPERIMENT:

a. Remove initiation while articulating [s], [f] etc.

b. Remove articulation while continuing the initiatory airflow as long as you can.

SPEECH SOUNDS

VOWELS:	**CONSONANTS:**
The airflow is free;	The airflow may be stopped, or impeded;
The vocal folds vibrate during articulation.	The vocal cords may or may not vibrate during articulation.

The **consonants** will be described on the basis of their

a. **MANNER OF ARTICULATION**
(= degree and type of constriction in the vocal tract)

b. **PLACE OF ARTICULATION**
(= where does the articulation occur?)

c. **STATE OF THE VOCAL CORDS**
(= do they vibrate during articulation?)

THE NAMING OF SPEECH SOUNDS

Active articulator: **TONGUE**

Passive articulator: **PLACE →** This is used in the naming of speech sounds, e.g., *palatal*, *velar,* etc.

BOTH articulators are named, if

a. The tongue does not participate in the articulation
e.g., *bilabial*, *labiodenta,l* etc.
b. More accurate description is needed
e.g., *apico-alveola,r* etc.