

INTRODUCTION

§ 1. Phonetics as a science

The word ‘phonetics’ comes from the Greek word *fonetika* meaning ‘the science of the voice’. Nowadays it means the study of the way humans make, transmit, and receive speech sounds. Phonetics is an independent branch of linguistics like lexicology or grammar. These linguistic sciences study language from three different points of view. Lexicology deals with the language vocabulary, the origin and development of words, their meaning and word building. Grammar defines the rules governing the modification of words and the combination of words into sentences.

Phonetics is a basic branch of linguistics, which deals with speech sounds and studies the outer form of the language. Neither linguistic theory nor linguistic practice can exist without phonetics, because language is a system and its components are inseparably connected.

The connection of phonetics with grammar is exercised through orthography and intonation. Thus for example, the system of reading rules helps to pronounce singular and plural forms of nouns correctly (*man — men, foot — feet*). The use of the necessary nuclear tone helps to distinguish between different types of sentences. It’s especially important in colloquial speech where one and the same sentence may be understood as a statement when pronounced with the falling tone (*He came \home.*) or a question when pronounced with the rising tone (*He came ,home?*).

The connection of phonetics with lexicology is exercised through pronunciation and word-stress. For instance, some corresponding forms of verbs and nouns are homographs identical in spelling. They may be distinguished with the help of pronunciation (*wind* [wind] — *to wind* [waɪnd]), word-stress (*'object* — *to ob'ject*), or the combinative use of word-stress and pronunciation (*increase* [ˈɪnkriːz] — *to increase* [ɪnˈkriːz]).

The connection of phonetics with stylistics is exercised through intonational components or graphical expressive means. For example, repeti-

tion of words serves as the basis of rhythm and rhyme; capitalization or italics highlighting underline special prominence of information:

*Look to left and look to right,
Note what traffic is in sight.
Note, too, which light can be seen:
The Red, the Amber, or the Green.
Children, keep from dangerous play
And THINK before you cross today.*

Phonetics as a science examines the inventory, structure and functions of speech sounds. On the expression level phoneticians investigate the sound system of the language: phonemes and their allophones, word stress, syllabic structure and intonation. On the content level phoneticians are interested in the analysis and characteristics of phonetic phenomena and their role in a language. Thus phonetics occupies itself with the study of the ways of sound organization into a system of units, variations and functions of these units in all types and styles of spoken language.

Phonetics is the kind of a science that may have application in various fields of knowledge besides linguistics. Phonetics is also connected with non-linguistic sciences which have educational or social value, like methods of language teaching, logics, history, psychology, sociology. The study of the structure of sound system is indispensable from sciences studying different aspects of speech production, like acoustics, physiology. The connection of phonetics with other sciences is easily observed by the example of its branches. Thus, acoustic phonetics is related to physics and mathematics; articulatory phonetics — to physiology, anatomy, and anthropology; historical phonetics — to general history and archaeology; functional phonetics — to communication theory and statistics.

Phonetics is also a part of some interdisciplinary subjects like sociolinguistics, psycholinguistics, mathematical linguistics, etc. Each of these sciences can have theoretical or practical application in the sphere of phonetic investigation.

§ 2. Process of oral speech production

Human speech is the result of a highly complicated series of events that can be divided into 6 stages: psychological, physiological, physical/

acoustic, reception, transmission, linguistic interpretation. They are interconnected and constitute two parts of the speech act.

I. The first part of the speech act contains the stages made by the speaker. It includes the following:

- 1) the psychological stage concerns the formation of the concept in the brain of a speaker;
- 2) when the message is formed, it is transmitted along the nervous system to the speech organs which produce particular speech sounds within the physiological stage;
- 3) the movements of the speech apparatus disturb the air and produce sound waves during the acoustic stage.

II. The second part of the speech act includes the stages made by the listener, because any communication requires a listener as well as a speaker:

- 1) the sound waves are perceived by the listener's ear within the reception stage;
- 2) the spoken message is transmitted through the nervous system to the listener's brain during the transmission stage;
- 3) the information conveyed gets its linguistic interpretation.

The analysis of the process of oral speech production makes it possible to define four levels of speech production: articulatory, acoustic, auditory and functional. They are inseparable in the real process of communication. But each of them can be singled out in order to characterize different aspects of sound phenomena which in their turn are necessary to define the main branches of phonetics: articulatory, acoustic, auditory and functional.

§ 3. Aspects of phonetics

The linguistic analysis of the sound matter of any language helps to distribute all the sound phenomena into the following aspects: articulatory, acoustic, auditory and functional.

I. The articulatory aspect comprises all the movements and positions of the speech organs necessary to pronounce a speech sound. Speech

organs have different functions and thus can be divided into four groups:

- 1) The power (respiratory) mechanism supplies the energy in the form of air pressure and regulates the force of air stream. It includes the following speech organs: the diaphragm, the lungs, the bronchi, the windpipe (trachea), the glottis and the supra-glottal cavities, the larynx, the mouth cavity, the nasal cavity.
- 2) The vibration mechanism functions as a vibrator when producing voice. It consists of the vocal cords (voice box), situated in the larynx.
- 3) The resonator mechanism consists of the speech organs which function as principal resonators. These are the pharynx, the larynx, the mouth and nasal cavities.
- 4) The obstruction mechanism consists of the tongue (the blade, the tip, the front, the back/dorsum), the lips, the teeth, the soft palate with the uvula, the hard palate, the alveolar ridge. These speech organs form different types of obstructions.

II. The **acoustic aspect** studies sound waves. It is the way in which the air vibrates between the speaker's mouth and the listener's ear.

There may be different types of vibrations which affect the tone of the voice. The basic vibrations of the vocal cords over their whole length produce the fundamental tone of voice. The simultaneous vibrations of parts of the vocal cords produce partial tones (overtones).

The number of vibrations per second is called frequency. Frequency of basic vibrations of the vocal cords is called the fundamental frequency which is very important in phonetic investigation. It determines the pitch of the voice and forms the acoustic basis of speech melody.

III. The **auditory (sound-perception) aspect** is a physiological and psychological mechanism. It combines the process of hearing with the process of discriminating sounds. People can perceive the range from 16 to 20,000 Hz with a difference in 3 Hz. The human ear transforms vibrations of the air into nervous commands and transmits them to the brain. This enables the listener discriminate the quality, pitch, loudness, and length of sounds and identify the sounds.

IV. The **functional (linguistic) aspect** is concerned with the linguistic function of individual sounds and segments of speech. From the func-

tional point of view all sound phenomena of any language present a clear-cut system of interdependent units: phonemes, syllables, stress, and intonation. These phonetic phenomena have no meaning of their own. Their linguistic function is to constitute and distinguish larger meaningful units, such as morphemes, words, phrases, etc.

§ 4. Units and components of phonetic system

The phonetic system of a language is a set of units arranged in an orderly way to replace each other in a given framework. Phonetics in general is divided in two sub-systems: segmental phonetics which is concerned with minimal segments of speech and suprasegmental phonetics which deals with larger speech units.

Segmental units of phonetics include phonemes and their allophones as the representation of individual sounds. Suprasegmental units are syllables, word-stress, and prosodic (intonational) phenomena (pitch, stress, tempo, rhythm, pauses). Both segmental and suprasegmental units are used to form words, phrases and utterances in connected speech.

Thus it's possible to define *phonetics* as a branch of linguistics that studies speech sounds in the broad sense, comprising segmental sounds, suprasegmental units and prosodic phenomena.

The phonetic system of any language comprises 4 components: phonemic, syllabic, accentual and intonational.

The first is the phonemic component. It is the basic component represented by the system of segmental phonemes of a language existing in the material form of their allophones. It may have manifestations in:

- the system of phonemes as discrete isolated units;
- the distribution of allophones of different phonemes;
- the methods of joining speech sounds.

The second component is the syllabic structure of words. It has two manifestations which are inseparable from each other: syllable formation and syllable division.

The third component is the accentual structure of words when pronounced in isolation. Its main manifestations are:

- the acoustic nature of word stress;
- the stress position in disyllabic and polysyllabic words;
- the degrees of word stress.

The fourth component is the intonational structure of utterances with the following manifestations:

- the prosodic components of intonation;
- the structure of intonation patterns;
- the representation of patterns in intonation groups.

All the components of the phonetic system of the language constitute its pronunciation.

§ 5. Branches of phonetics

There are several ways to define branches of phonetics.

I. According to the **object of the study** there are four branches of phonetics. They are interconnected, because the sound matter of a language is a unity of four aspects: articulatory, acoustic, auditory, and functional.

Articulatory phonetics studies the way in which the speech organs are used to produce single sounds and combinations of sounds. It is the longest established and the most highly developed branch. That's why most terms used by phoneticians are articulatory in origin.

Acoustic phonetics is the study of the physical properties of speech sounds and the air vibrations between the speaker's mouth and the listener's ear.

Auditory phonetics studies the way people perceive speech sounds.

All these branches analyse, describe and classify all possible sounds that the human articulatory apparatus can make and thus concern only the material side of phonetic units. But scientists are also interested in the abstract, linguistic side of speech sounds and in the way different sound phenomena function in a particular language.

The branch of phonetics, which studies the functional (linguistic) aspect of speech sounds, is called functional phonetics or phonology.

II. According to the **sphere of application** phonetics can be divided into general phonetics and special phonetics.

General phonetics studies all the sound-producing possibilities of the human speech apparatus and the ways they are used for the purpose of communication.

Special phonetics is based on general phonetics and studies the phonetic system of a particular language.

According to the **number of languages** under study special phonetics is divided into descriptive and comparative phonetics.

Descriptive phonetics studies the system of pronunciation and phonetic units of a single language.

The aim of comparative phonetics is to study the correlation between phonetic systems of two or more languages.

III. According to the **time characteristics** of sound phenomena under study linguists distinguish between historical and contemporary phonetics.

Historical phonetics traces and establishes the successive changes in the phonetic system of a given language at different stages of its development.

The aim of contemporary phonetics is to find and fix the peculiarities of speech sounds of the language at the present moment of its existence.

IV. According to the **field of application** and methods of investigation phonetics is also divided into theoretical and practical.

Practical phonetics studies the substance, the material form of phonetic phenomena with the help of different methods of phonetic analysis.

Theoretical phonetics is mainly concerned with the functions of phonetic units in the language and uses methods of phonemic analysis.

All the branches of phonetics are closely connected with one another and study the language in a set of certain phonetic units arranged in an orderly way.

§ 6. Methods of phonetic analysis

Linguists distinguish between two groups of methods, which may be applied when investigating the sound matter of the language: subjective and objective methods of phonetic analysis.

Subjective (introspective) methods were available from the beginning of the study of sounds. They include the oldest and simplest methods of phonetic investigation: sensory analysis and direct observation. These

consist in observing and fixing the movements and positions of one's own or other people's organs of speech in the production of various speech sounds, as well as in analyzing and comparing one's own articulatory and auditory impressions.

Objective (instrumental) methods of phonetic analysis appeared in the second half of the XXth century with the development of such sciences as physiology and physics. They involve the use of various instrumental techniques like palatography, laryngoscopy, X-ray photography, electromyography, etc. The use of the data of instrumental analysis gives a detailed study of different phonetic phenomena and articulatory processes. It's quite clear that many instruments, which are used in analyzing different phonetic phenomena, derive from other sciences. For instance, the articulatory parameters of speech are observed and fixed with the help of articulograph. The spectra of speech sounds are investigated by means of sound spectrograph. The pitch component of intonation is studied with the help of intonograph.

Nowadays practically no area of practical phonetic investigation can do without the combination of subjective and objective methods when the results of instrumental analysis supplement those available from introspective analysis.

Seminar 1

1. What is your idea of phonetics?
2. What is the role of phonetics in language teaching?
3. What is meant by phonetics as a science?
4. Prove that phonetics is a basic branch of linguistics.
5. How is phonetics connected with other branches of linguistics?
6. What is the object of phonetics on the expression and on the content level?
7. Explain the connection of phonetics with non-linguistic sciences.
8. What interdisciplinary subjects does phonetics overlap with?
9. Name the 6 stages of speech chain production.