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THE FACULTY OF ENGLISH PHILOLOGY

COURSE WORK

THEME: ASPECTS, TYPES AND METHODS.

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Introduction

The Role of Aspects and Methods in English Theoretical Phonetics

The actuality of the course work is revealed in the need and deep investigation of aspects, types and methods variations in English phonetics. Aspects, types and methods rules which were disclosed in the course work are very important in modern English phonetics.

The aim of the course work is to learn out aspects, types and methods variations of English phonetics.

The work fulfils the **following duties**:

- to present general information about aspects, types and methods;
- to learn aspects, types and methods;
- to find out peculiarities of representing a phoneme with an aspects, types and methods;
- to study out phonetic similarity and phonological space.

The object and the subject of research is aspects, types and methods variations of English phonetics.

The theoretical and practical significance of the course work is the large material of investigation which can be used by students at the lessons of theoretical and practical phonetics, in their everyday English, in writing course papers and articles on the theme.

The structure of the work. The course work consists of Introduction, Main part, Conclusion and List of used literature. Introduction has general information about the problem, reveals the aim, duties, theoretical and practical significance of the work. Main part consists of smaller paragraphs and contains important information and salvation of the pointed duties of the work. Conclusion presents the main and significant results of the investigation. List of used literature indicates the scientific issues, articles and thesis used for the work.

In linguistics, function is usually understood to mean discriminatory function, that is, the role of the various elements of the language in the distinguishing of one sequence of sounds, such as a word or a sequence of words, from another of different meaning. Though we consider the discriminatory function to be the main linguistic function of any phonetic unit we cannot ignore the other function of phonetic units, that is, their role in the formation of syllables, words, phrases and even texts. This functional or social aspect of phonetic phenomena was first introduced in the works by I.A. Baudouin-de-Courtenay. Later on N.S. Trubetskoj declared phonology to be a linguistic science limiting articulatory and acoustic phonetics to anatomy, physiology and acoustics only. This conception is shared by many foreign linguists who investigate the material form and the function of oral speech units separately. Ukrainian and Russian linguists proceed from the truly materialistic view that language being the man's medium of thought can exist only in the material form of speech sounds. That is why they consider phonology a branch of phonetics that investigates its most important social aspect.

Apart from its key position in any kind of scientific analysis of language phonetics plays an important part in various applications of linguistics. A few may be mentioned here. Though language is the most important method we have of communicating, it is manifestly not the only, method. We can communicate by gestures, facial expressions, or touch, for instance, and these are not language. The study of the complex of various communication techniques is definitely relevant to teaching a foreign language. Through study of the nature of language, especially of spoken language, valuable insights are gained into human psychology and into the functioning of man in society. That is why we dare say that phonetics has considerable social value. As regards the learning of specific foreign languages, there has never been a time in the world when the ability of growing numbers of people to speak one another's language really well has been of such significance as now. Some training in linguistics and phonetics in general, and in the pronunciation of particular language is coming more and more to be considered equipment for a teacher of foreign languages in school or special

faculties making him more efficient in his routine work on the spoken language, as well as in the variety of other things, such as coping with audio-visual aids like tape-recorders and language laboratories or in knowing what to do about any of his pupils who have defective speech.

A knowledge of the structure of sound systems, and of the articulatory and acoustic properties of the production of speech is indispensable in the teaching of foreign languages. The teacher has to know the starting point, which is the sound system of the pupil's mother tongue, as well as the aim of his teaching, which is a mastery of the pronunciation of the language to be learnt. He must be able to point out the differences between these two, and to arrange adequate training exercises. Ear training and articulatory training are both equally important in modern language teaching. The introduction of technical equipment — disks, tape-recorders, language laboratories, etc. In our technological age phonetics has become important in a number of technological fields connected with communication. On the research side much present-day work in phonetics entails the use of apparatus, and is concerned with the basic characteristics of human speech. Much basic research is to be done with the phonetician working alongside the psychologist on auditory perception as such and on the perception of speech in particular.

Phonetics also enters into the training of teachers of the deaf and dumb people and can be of relevance to a number of medical and dental problems. An understanding of phonetics has proved extremely useful in such varied spheres as the following: investigations in the historical aspects of languages, and in the field of dialectology; designing or improving systems of writing or spelling (orthographies for unwritten languages, shorthand, spelling reform), in questions involving the spelling or pronunciation of personal or place names or of words borrowed from other languages.

Chapter I:

I. The Aspects of English phonetics

Phonetics has 4 aspects:

1. Articulatory Aspect (All speech sounds are articulated by speech organs)
2. Acoustic Aspect (All sounds have acoustic pictures)
3. Auditory Aspect (How we receive info with the help of ears; perception)
4. Phonological Aspect (If we change sounds in the word, meaning will be changed)

The formation of the concept takes place in the brain of a speaker. This stage may be called psychological. The message formed within the brain is transmitted along the nervous system to the speech organs. Therefore, we may say that the human brain controls the behaviour of the articulating organs which effects in producing a particular pattern of speech sounds. This second stage may be called physiological. The movements of the speech apparatus disturb the air stream thus producing sound waves. Consequently, the third stage may be called physical or acoustic. Further, any communication requires a listener, as well as a speaker. So the last stages are the reception of the sound waves by the listener's hearing physiological apparatus, the transmission of the spoken message through the nervous system to the brain and the linguistic interpretation of the information conveyed. . The sound phenomena have different aspects:

- (a) the articulatory aspect;
- (b) the acoustic aspect;
- (c) the auditory (perceptive) aspect;
- (d) the functional (linguistic) aspect.

Now it is possible to show the correlation between the stages of the speech chain and the aspects of the sound matter.

I.1 Articulatory Aspect

Articulatory phonetics deals with the categorization and classification of the production features of speech sounds. A thorough knowledge of how vowels and consonants are generated remains essential for successful assessment and remediation of articulatory and phonological disorders. Although contemporary phonological theories have provided new ways of viewing assessment and treatment of these disorders, knowledge of the speech sounds' production features secures a firm basis for utilizing such procedures. Without this knowledge, phonological process analysis, for example, is impossible.

Articulation comprises all the movements and positions of the speech organs necessary to pronounce a speech sound. According to their main sound-producing functions, the speech organs can be divided into the following four groups:

- (1) the power mechanism;
- (2) the vibration mechanism;
- (3) the resonator mechanism;
- (4) the obstruction mechanism.

The functions of the power mechanism consist in the supply of the energy in the form of the air pressure and in regulating the force of the air stream. The power mechanism includes: (1) the diaphragm, (2) the lungs, (3) the bronchi, (4) the windpipe, or trachea. The glottis and the supra-glottal cavities enter into the power mechanism as parts of the respiratory tract. The vibration mechanism consists of the larynx, or voice box, containing the vocal cords. The most important function of the vocal cords is their role in the production of voice. The pharynx, the mouth, and the nasal cavity function as the principal resonators thus constituting the resonator mechanism. The obstruction mechanism (the tongue, the lips, the teeth, and the palate) forms the different types of obstructions.

Speech sounds are commonly divided into two groups: vowels and consonants. Vowels are produced with a relatively open vocal tract; *no significant constriction* of the oral (and pharyngeal) cavities exists. The airstream from the

vocal folds to the lips is relatively unimpeded. Therefore, vowels are considered to be *open sounds*. In contrast, consonants are produced with a *significant constriction* in the oral and/or pharyngeal cavities during their production.

For consonants, the airstream from the vocal folds to the lips and nostrils encounters some type of articulatory obstacle along the way. Therefore, consonants are considered to be *constricted sounds*. For most consonants this constriction occurs along the sagittal midline of the vocal tract.

This constriction for consonants can be exemplified by the first sound in *top*, [t], or *soap*, [s]. For [t] the contact of the front of the tongue with the alveolar ridge occurs along this midline while the characteristic s-quality is made by air flowing along this median plane as the tongue approximates the alveolar ridge. By contrast, during all vowel productions the sagittal midline remains free.

Vowels can also be distinguished from consonants according to the patterns of acoustic energy they display. Vowels are highly resonant, demonstrating at least two formant areas. Thus, vowels are more intense than consonants; in other words, they are typically louder than consonants. In this respect we can say that vowels have greater sonority than consonants. Sonority of a sound is its loudness relative to that of other sounds with the same length, stress, and pitch.

Due to the greater sonority of vowels The *sagittal midline of the vocal tract* refers to the median plane that divides the vocal tract into right and left halves.

I.2 Acoustic Aspect

It was already stated that the vocal tract may be described as an apparatus for the conversion of muscular energy into acoustic energy. Sound is a physical or acoustic phenomenon generated by the activities of the vocal organs. A sound consists of waves which travel through the air at a speed of about 1,100 feet per second. The repeated movement - vibration creates a wave. Vibration may be periodic or non-periodic and simple or complex. If the same vibration is repeated at regular intervals then the sound waves are periodical. On the contrary, the vibration repeated at irregular intervals creates non-periodical sound waves. Periodic sound waves may be perceived as a musical tone or speech-tone. The non-periodic

sound waves are perceived as a speech-noise. The movement of vibration at a certain distance is called a period or a cycle. The maximum distance of the curve from the point of rest till the last point reached by the vibration is called its amplitude. The frequency of vibration is determined by the specific qualities of the body in question (its weight, or in the case of vocal cords, their tension; in the case of cavities, volume, shape, and size of the opening relative to the volume). The smaller opening of the cavity creates lower frequency. The larger opening of the cavity or higher tone forms greater frequency. Frequency is responsible for the pitch of the tone and amplitude determines intensity. An increase of the amplitude brings greater intensity. Physical intensity is measured by the sound energy which passes through 1 sq. cm perpendicular to the direction of the vibration (measured in watts) in a unit of time. The intensity of a vibration may thus be made four times greater by doubling the amplitude or the frequency. The intensity is proportional to the square of both. Loudness is the term used for the intensity perceived which is measured in db - decibels.

Thus the sounds or vibrations are specified in terms of three parameters or measures; frequency (measured in cs - «cycles per second»); intensity (measured in db - «decibels») and time (measured in ms - «milliseconds»). Roughly frequency corresponds to auditory timbre and intensity to perceivable loudness.

The concentration of energy in certain frequency regions in the production of a sound, or peak of intensity, is known as a formant or spectrum. Formants are numbered F_1 F_2 F_3 from bottom to top. The absence of intensity between formants is called antiresonance. Formants present intensity in different frequency ranges.

The vowel sounds are specified by their first three formants.

Formants generally do not run parallel to the base line, but are bent, which is the result of a continuous change of frequencies. The F_2 bendings of all vowels often point to one particular frequency range known as a locus. Its location depends on the adjacent consonant. The locus is low for /p, b/ (approximately at 60 c/s), high for /ki, gi/ (approx., at 3000 c/s), medium for *It, Al* (approx., at 1800 c/s).

There is also a special apparatus called an oscillograph which specifies acoustic data in terms of complex waves. The curves which this apparatus reproduces are known as oscillograms. In the oscillograms curves have time in the horizontal dimension, and amplitude in the vertical dimension. It is possible to use all the acoustic concepts already explained either in oscil-lography or spectrography both of which constitute a method of acoustic analysis of speech signals.

All the acoustic properties except the duration of a sound measured in time, determine the feature of quality. The length or duration of a sound is known as the quantity feature. The quantity of the sound depends on the tempo of speech (quick, normal, slow), the length of an utterance, the position of a sound (stressed and unstressed, open and close syllables, the influence of the preceding or following sound) etc. As we have seen there is a correlation between the articulatory and acoustic aspects. For example, a vocal resonance chart, based on spectrographic investigation, is practically identical with the classical classification of the position of the tongue: front - back; high - low. This fact was also proved by X-ray photos.

Different articulations bring different acoustic effects. The correlation between the various movements of the speech organs and the process of vibration can be determined by instrumental analysis. In modern phonetics on the results of instrumental research all the articulatory - acoustic features of different languages have been classified into twelve pairs forming binary oppositions (the oppositions which contain two members like a -b)

I.3 Auditory Aspect

If articulatory phonetics studies the way in which speech sounds are produced, *auditory phonetics* focuses on the perception of sounds or the way in which sounds are heard and interpreted. Remembering our conventional division of linguistic communication into several stages of a process unfolding between two parties, the sender of the message and its addressee, we may say that while articulatory phonetics is mainly concerned with the speaker, auditory phonetics deals with the other important participant in verbal communication, the listener. It

is again, obviously, a field of linguistic study which has to rely heavily on biology and more specifically on anatomy and physiology. We should say from the very beginning, however, that the mechanism and physiology of sound perception is a much hazier field than the corresponding processes related to the uttering of the respective sounds. This is so because speech production is a process that takes place roughly along the respiratory tract which is, comparatively, much easier to observe and study than the brain where most processes linked to speech perception and analysis occur. Our presentation so far has already revealed a fundamental characteristic of acoustic phonetics which essentially differentiates it from both articulatory and acoustic phonetics: its lack of unity. We are in fact dealing with two distinct operations which, however, are closely interrelated and influence each other: on the one hand we can talk about audition proper, that is the perception of sounds by our auditory apparatus and the transforming of the information into a neural sign and its sending to the brain and, on the other, eventually leads to the decoding of the message, the understanding of the verbal message. It is obvious, even at an intuitive level, that hearing someone's words and understanding them are two quite different processes. They are chronologically distinct, since we can talk about two successive stages, and they also differ in nature since they involve different operations of the brain. We should not make the mistake, however, of separating them completely since, as we are going to see below, our understanding of what we hear essentially influences the process of hearing itself.

When discussing the auditory system we can consequently talk about its processes and try to show why they are both clearly distinct and at the same time they are closely related.

Before the sounds we perceive are processed and interpreted by the brain, the first anatomical organ they encounter is the *ear*. The ear has a complex structure and its basic auditory functions include the perception of auditory stimuli, their analysis and their transmission further on to the brain. We can identify three components: the outer, the middle and the inner ear. The outer ear is mainly represented by the auricle or the pinna and the auditory meatus or the outer ear

canal. The auricle is the only visible part of the ear, constituting its outermost part, the segment of the organ projecting outside the skull.

It does not play an essential role in audition, which is proved by the fact that the removing of the pinna does not substantially damage our auditory capacity. The auricle rather plays a protective role for the rest of the ear and it also helps us localize sounds. The meatus, or the outer ear canal is a tubular structure playing a double role: it, too, protects the next segments of the ear – particularly the middle ear – and it also functions as a resonator for the sound waves that enter our auditory system. The middle ear is a cavity within the skull including a number of little anatomical structures that have an important role in audition. One of them is the eardrum. This is a diaphragm or membrane to which sound waves are directed from outside and which vibrates, acting as both a filter and a transmitter of the incoming sounds. The middle ear also contains a few tiny bones: the mallet, the anvil and the stirrup. The pressure of the air entering our auditory system is converted by the vibration of the membrane (the eardrum) and the elaborate movement of the little bones that act as some sort of lever system into mechanical movement which is further conveyed to the oval window, a structure placed at the interface of the middle and inner ear. As pointed out above, the middle ear plays an important protection role. The muscles associated with the three little bones mentioned above contract in a reflex movement when sounds having a too high intensity reach the ear. Thus the impact of the too loud sounds is reduced and the mechanism diminishes the force with which the movement is transmitted to the structures of the inner ear. It is in the middle ear too, that a narrow duct or tube opens. Known as the Eustachian tube it connects the middle ear to the pharynx. Its main role is to act as an outlet permitting the air to circulate between the pharynx and the ear, thus helping preserve the required amount of air pressure inside the middle ear. The next segment is the inner ear, the main element of which is the cochlea, a cavity filled with liquid. The inner ear also includes the vestibule of the ear and the semicircular canals. The vestibule represents the central part of the labyrinth of the ear and it gives access to the cochlea. The cochlea is a coil-like

organ, looking like the shell of a snail. At each of the two ends of the cochlea there is an oval window, while the organ itself contains a liquid. Inside the cochlea there are two membranes: the vestibular membrane and the basilar membrane. It is the latter that plays a central role in the act of audition. Also essential in the process of hearing is the so-called organ of Corti, inside the cochlea, a structure that is the real auditory receptor. Simplifying a lot, we can describe the physiology of audition inside the inner ear as follows: the mechanical movement of the little bony structures of the middle ear (the mallet, the anvil and the stirrup) is transmitted through the oval window to the liquid inside the snail-like structure of the cochlea; this causes the basilar membrane to vibrate: the membrane is stiffer at one end than at the other, which makes it vibrate differently, depending on the pitch of the sounds that are received. Thus, low-frequency (grave) sounds will make vibrate the membrane at the less stiff (upper) end, while high frequency (acute) sounds will cause the lower and stiffer end of the membrane to vibrate. The cells of the organ of Corti, a highly sensitive structure because it includes many ciliate cells that detect the slightest vibrating movement, convert these vibrations into neural signals that are transmitted via the auditory nerves to the central receptor and controller of the entire process, the brain. The way in which the human brain processes auditory information and, in general, the mental processes linked to speech perception and production are still largely unknown. What is clear, however, regarding the perception of sounds by man's auditory system, is that the human ear can only hear sounds having certain amplitudes and frequencies. If the amplitudes and frequencies of the respective sound waves are lower than the range perceptible by the ear, they are simply not heard. If, on the contrary, they are higher, the sensation they give is one of pain, the pressure exerted on the eardrums being too great. These aspects are going to be discussed below when the physical properties of sounds are analyzed. As to the psychological processes involved by the interpretation of the sounds we hear, our knowledge is even more limited. It is obvious that hearing proper goes hand in hand with the understanding of the sounds we perceive in the sense of organizing them according to patterns already

existing in our mind and distributing them into the famous acoustic images that Saussure spoke of. It is at this level that audition proper intermingles with psychological processes because our brain decodes, interprets, classifies and arranges the respective sounds according to the linguistic (phonological) patterns already existing in our mind. It is intuitively obvious that if we listen to someone speaking an unknown language it will be very difficult for us not only to understand what they say (this is out of the question given the premise we started from) but we will have great, often insurmountable difficulties in identifying the actual sounds the person produced. The immediate, reflex reaction of our brain will be to assimilate the respective sounds to the ones whose mental images already exists in our brain, according to a very common cognitive reaction of humans that always have the tendency to relate, compare and contrast new information to already known information.

I.4. Phonological (Functional)Aspect

Functional aspect. Phonemes, syllables, stress, and intonation are linguistic phenomena. They constitute meaningful units (morphemes, words, word-forms, utterances). Sounds of speech perform different linguistic functions. Any segment of a language consists of a sound chain which is specified by some articulatory, acoustic and perceptual features. But not all the phonetic features function to distinguish lexical and grammatical forms. Some features serve to distinguish words, morphemes and phrases and some of them cannot serve this purpose. Thus, it is the functions of distinction and also identification which is characteristic of all linguistic units. According to their functions phonetic units - sounds, syllables, stress and intonation can be described linguistically and classified to some ranks, groups and subgroups. The theoretical study which sets up to account all the phonetic distinction of a language is called phonology. Some linguists prefer the terms phonemics and phonematics. But the term phonology has become popular nowadays. Phono-'logy is not an autonomous and independent science. But it is

one of the aspects of studying phonetic data, otherwise it is a purely linguistic and social aspect of studying phonetics.

Phonetics in the wider sense includes phonology as distinct from morphology, syntax and stylistics. But in the narrow sense the term phonetics is used, excluding phonology. These two types of usage of the term phonetics is observed in our country. For some linguists there exist two aspects of studying phonetic data: phonetic - articulatory, acoustic and perceptual studies and phonological - linguistic functions of phonetic units. In both cases a strict separation between phonetics as a natural science and phonology as a linguistic science is not possible as there is a close relationship between them. Although this type of separation was suggested by N.S. Trubetsky and promoted by the representatives of structural linguistics. Without fathoming further into the development of phonology and phonological schools (see chapter II) let us discuss some basic concepts of phonology. Phonetics and phonology have two levels of investigation: segmental and suprasegmental. Segmental phonology studies phonemes realised in various speech sounds. Suprasegmental phonology studies the distinctive features realised in syllables, stress and intonation.

Phoneme is the smallest meaningless unit of a language which forms and distinguishes words and morphemes.

The phoneme is a minimal segment which cannot be divided into further smaller units but for scientific analysis, it can be separated from the material form (the sound structure) of the word. Besides it exists in the form of a number of articulatory and acoustically definite speech sounds, its allophones. All sounds of this kind which have common articulatory and acoustic features constitute the material invariant of the phoneme. It is due to concrete reality that the phoneme is manifested in speech chain in its allophones which are pronounced objectively and differ from each other to some degree.

The abstracted and generalized character of the phoneme is reflected in its definition as a language unit. All the linguistic units are established as a result of an abstraction and generalization of actual speech utterances. In general a phoneme

cannot be pronounced. We always pronounce one of the allophones (variants) of the phoneme but unconsciously generalize all the allophones as representatives of the same phoneme. For example, all sounds of «e - type» as $lc_x, e_2, e_3, \dots, e_n / = Id$) represent the phoneme *Id*. The sound *Id* has its articulatory and acoustic features as a front, half-close unrounded, short, lax vowel. But all these features are established as a result of phonemic abstraction. In reality it is impossible to pronounce a sound many times in the same way without changing its features. Every phoneme consists of a bundle of features generalized from its allophones.

Another fundamental concept of phonology is the **phonological opposition** which is defined as opposition between the speech sounds serving to distinguish the meanings of words. For example:

/p - l/ - pool /pu:l/ - tool /tu:l/,

/l - s/ - let /let/ - set /set/,

It - V - right /rait/ - light /lait/, etc.

There is a classification of phonological oppositions according to the relationship between the oppositions, between the members of oppositions and the force of oppositions¹. This type of classification of phonological oppositions is based on logic and linguistic categorization of phonetic data. Besides there is a principle of **preliminary phonological analysis** suggested by V.A. Vassilyev. According to this principle all the phonological oppositions are classified into two-member oppositions but the main difference between the members of opposition is based on the number of the distinctive features: single - when there is one distinctive feature (e. g. /p - *if*), double - when there are two distinctive features (e. g. /p - d/) and complex when there are more than two distinctive features (e. g. /p - z/). There are also non-phonological oppositions which cannot serve to distinguish words. For example, the difference between aspirated /p^h, t, kV and non-aspirated /p, t, k/ sounds is non-phonological. The feature aspirated - non-aspirated is non-distinctive or phonologically irrelevant in modern English. A feature which is distinctive in one language may be non-distinctive in another. The concept of a distinctive feature is important to analyze the character of phonological oppositions. The

articulatory, acoustic and perceptual feature which can distinguish two phonemes is called a distinctive feature. The feature which cannot serve this purpose is known as a non-distinctive feature.

Let's have a look at the correlation of some phonetic terms discussed above.

articulatory characteristics	acoustic properties	auditory(perceptible) qualities	linguistic phenomena
vibration of the vocal cords	fundamental frequency	Melody	Pitch
different positions and movements of speech organs	formant frequency	quality (timbre)	Phoneme
the amplitude of vibrations	Intensity	Loudness	Stress
the quantity of time during which the sound is pronounced	Duration	Length	tempo, rhythm, pauses

ChapterII:

II. Types of English Phonetics

There are four types of English phonetics.

1. General phonetics
2. Descriptive Phonetics
3. Historical or Diachronical Phonetics
4. Comparative Phonetics.

The branch of linguistics that studies the sounds of language. In contrast to the other linguistic disciplines, phonetics studies both the linguistic function of sounds and sounds themselves: their acoustic properties as well as the functioning of the speech organs. For this reason, phonetics has a relationship with nonlinguistic disciplines: with the anatomy and physiology of speech production and speech perception, on the one hand, and with the acoustics of speech, on the other. Phonetics, like linguistics in general, is associated with psychology, since speech is part of man's psychic activity.

Unlike the nonlinguistic disciplines, phonetics regards sounds as elements in a linguistic system that gives words and sentences a concrete acoustic form without which communication would be impossible. The acoustic aspect of language cannot be understood outside this function. Even an individual speech sound may be isolated from the sound chain only as a phoneme, that is, only in relation to the sound's associations with the semantic units of language. Phonetics may be studied in terms of acoustic and articulatory aspects or in terms of its functional and linguistic aspects. Consequently phonetics is divided into phonetics proper and phonology.

II.1 General Phonetic

General phonetics is distinguished from applied phonetics, or the phonetics of individual languages. General phonetics studies the preconditions for speech

production in terms of the capacities of the vocal apparatus. For example, the speech organs determine whether a consonant will be a labial, front, or back consonant, and the way in which the air stream from the lungs is obstructed determines whether a consonant will be an obstruent or a fricative. General phonetics also analyzes the acoustic properties of sound units, that is, the presence or absence of voicing in the pronunciation of various types of consonants. General classifications of sounds into vowels and consonants are based partly on articulatory properties and partly on acoustic properties.

General phonetics also examines articulation, as well as the principles of sound combinations and the influence of given sounds on adjacent sounds, reflected in various types of accommodation and assimilation. General phonetics studies the nature of the syllable, the principles by which sounds are combined into syllables, and the factors influencing syllabification. It examines the phonetic structure of words, and in particular the phenomenon of stress. It studies such intonational means as pitch, pauses, intensity, and the duration of the individual parts of a sentence.

II.2 Descriptive Phonetics

Special phonetics may be subdivided into descriptive phonetics and historical phonetics. Descriptive phonetics is concerned with the study of the phonetic structure of one language only, in its static form, at a particular period, synchronically. Historical phonetics studies the phonetic structure of a language in its historical development, diachronically.

II.3 Historical or Diachronical Phonetics

Historical linguistics, also called diachronic linguistics, is the scientific study of language change over time. Principal concerns of historical linguistics include.

1. to describe and account for observed changes in particular languages
2. to reconstruct the pre-history of languages and to determine their relatedness, grouping them into language families (comparative linguistics)

3. to develop general theories about how and why language changes
4. to describe the history of speech communities
5. to study the history of words, i.e. etymology

Modern historical linguistics dates from the late 18th century. It grew out of the earlier discipline of philology, the study of ancient texts and documents dating back to antiquity.

At first, historical linguistics was comparative linguistics. Scholars were concerned chiefly with establishing language families and reconstructing prehistoric proto-languages, using the comparative method and internal reconstruction. The focus was initially on the well-known Indo-European languages, many of which had long written histories; the scholars also studied the Uralic languages, another European language family for which less early written material exists. Since then, there has been significant comparative linguistic work expanding outside of European languages as well, such as on the Austronesian languages and various families of Native American languages, among many others. Comparative linguistics is now, however, only a part of a more broadly conceived discipline of historical linguistics. For the Indo-European languages, comparative study is now a highly specialised field. Most research is being carried out on the subsequent development of these languages, in particular, the development of the modern standard varieties.

Some scholars have undertaken studies attempting to establish super-families, linking, for example, Indo-European, Uralic, and other families into Nostratic. These attempts have not been accepted widely. The information necessary to establish relatedness becomes less available as the time depth is increased. The time-depth of linguistic methods is limited due to chance word resemblances and variations between language groups, but a limit of around 10,000 years is often assumed. The dating of the various proto-languages is also difficult; several methods are available for dating, but only approximate results can be obtained.

II.4 Comparative Phonetics

Comparative phonetic is frequently considered to be either branches of phonetics or methods of investigation.

Phonetics has a wide sphere of application. It is used in teaching children to read and write their mother tongue. A knowledge of phonetics is indispensable in teaching and learning foreign languages. Phonetics is also used in teaching deaf-mutes to speak, and, in correcting speech defects, in telephony, in broadcasting, in training actors, teachers, singers, etc.

Chapter III:

III. Methods of English Phonetics

Let us consider the **methods** applied in investigating the sound matter of the language.

It is useful to distinguish between phonetic studies carried out without other instruments of analysis than the human senses and such as are based upon the witness of registering or computing machines and technical analysing or synthesizing devices. The use of such a device as the tape-recorder does not of course imply in itself any instrumental analysis of the speech recorded, but simply serves the purpose of facilitating the speech analysis and conserving a replica of the speech the informants use.

If controlled phonetic experiments employ the use of measuring devices and instrumental techniques, this sub-field of phonetics is called **instrumental phonetics**. Instrumental methods deriving from physiology and physics were introduced into phonetics in the second half of the 19th century in order to supplement and indeed to rectify the impressions deriving from the human senses, especially the auditory impressions, since these are affected by the limitations of the perceptual mechanism, and in general are rather subjective.

The use of instruments is valuable in ascertaining the nature of the limitations and characteristics of the human sensory apparatus by providing finer and more detailed analysis against which sensory analysis can be assessed. In a general way, the introduction of machines for measurements and for instrumental analysis into phonetics has resulted in their use for detailed study of many of the phenomena which are present in the sound wave or in the articulatory process at any given moment, and in the changes of these phenomena from moment to moment. This is strictly an instrumental method of study. This type of investigation together with sensory analysis is widely used in **experimental phonetics**.

Phonetics has 4 important methods:

1. Direct observation method:

2. The linguistic method:
3. The experimental method:
4. The phonological method:

III.1 Direct Observation Method.

The direct observation method is the method of observing the facts of a language in their natural surrounding. In phonetics it comprises three important modes: observation by ear, by sight and by muscular sensation. The method can be effectively employed only if a researcher has been specially trained to differentiate between “the minutest movements of their own and other people’s speech organs, and to distinguish the slightest variations in sound quality” (Dickushina, 1965 : 16).

III.2 Experimental Method.

The experimental method is the method of obtaining data and facts of a language through constructing and modelling special artificial conditions. It is more economic than the direct observation method and makes a researcher able to find out not only what is allowed but also what is prohibited in a certain language. Consider the following example from Russian: the task is to prove the statement that in Russian the sequence of /st/ and /n/ divided by morphological boundary is pronounced as /sn/ (let us schematically represent this as: /st/+⊥+/n/= /sn/). If we apply the direct observation method we need to analyse a great volume of speech material looking for the examples demonstrating or refuting the statement. And still we cannot be sure as some exclusion could well avoid our analysis by accidentally missing to appear in the speech material. The experiment allows us to identify the group of words subject to analysis (because we know what shall be on the left side of our “equation”) and listening to the Russian speaker pronouncing them we can quickly define whether the statement is correct or incorrect. Experiments are especially good in identification of exclusions and what is not allowed in a language. Consider the pronunciation of the Russian words that prove the above statement: *честный, местный, возрастной* – here no phoneme /t/ is

pronounced which supports the original statement and – moreover – the statement that the pronunciation of /t/ under the circumstances is prohibited in Russian

III.3 Instrumental Method.

Instrumental methods are sometimes called experimental, which is not quite correct because, on the one hand, an experiment can be implemented without any tool or apparatus and, on the other hand, the usage of a technical device does not obligatory imply an experiment. If one makes a record of speech in natural conditions with the help of a tape or CD recorder – he/she applies the instrumental method without an experiment. Yet, very often the usage of a technical device, tool, or instrument is combined with an experiment run for a certain purpose, under certain conditions and to obtain certain goals.

There are various and different instruments applied in phonetic studies.

Among the old ones there deserve to be mentioned the laryngoscope, the artificial palate, and the kymograph. “The laryngoscope is a small circular mirror that is introduced into the pharynx as far back as possible” (Dickushina, 1965 : 20), and that allows to see the upper part of the pharynx and the vocal cords. The artificial palate allows seeing “the exact tongue-palate contacts in articulating sounds” (Dickushina, 1965 : 19). It is to be made for each informant specifically “according to the exact shape of the individual hard palate” (Dickushina, 1965 : 19). A fine white powder is sprinkled onto the artificial palate, which is, then, to be fitted into the person’s mouth and the sound is to be articulated. In the place of the contact between the tongue and the palate the powder (chalk or talc for instance) will be removed, and the artificial palate, being extracted, can be then photographed or diagrammed. The drawing or the photo of the artificial palate is called palatogram and it shows the articulatory features of the sound pronounced, such as the place and point of articulation and strength and muscular tension. The kymograph is an apparatus that transmits “the variations in the air pressure of the air stream emitted from the mouth” (Dickushina, 1965 : 21) through the thin rubber tube to a stylus, which leaves tracings on the blackened paper. The kymograms

reflect acoustic characteristics of speech sounds, and allow to identify and to distinguish between vowels and consonants, between different vowels, between voiced and voiceless consonants, between different consonants.

There are other, comparatively new, methods of phonetic research effected by and with the help of special apparatus. They are cinematography and photography, x-ray photography (still and moving), electromyography, tomography, oscillography, and spectrography.

The latter two enable to obtain acoustic characteristics of sounds like frequency, amplitude, spectrum; and auditory characteristics like pitch, loudness, timbre; and prosodic characteristics like length and intonation. Oscillograms (see Pic. 3 below) and spectrograms (see Pic. 4 below) bear indirect information about the articulatory characteristics of speech sounds as well. Therefore oscillography and spectrography are the most widely applied techniques in speech analysis. The oscillograph is an apparatus that transforms sound waves of different frequencies into electric signals of different frequencies that can be viewed on the screen, recorded, photographed or diagrammed. Oscillograms reflect all the acoustic characteristics of a speech sound. The table to follow (Table 1) represents the correlation between some acoustic (physical) and auditory (physiological) characteristics of speech sounds.

Table 1. Correlation Between Acoustic and Auditory Characteristics of Speech Sounds.

#	Acoustic Characteristics of Speech Sounds	Auditory Characteristics of Speech Sounds
	Amplitude=intensity (амплитуда, сила)	Loudness (громкость)
	Frequency (periodical oscillations=musical tone=(or just) tone; non-periodical oscillations=noise) (частота)	Pitch (высота=тон=высота тона=высота голоса)
	Spectrum (спектр)	Timbre (тембр)

Sometimes the acoustic characteristics are called objective and the auditory characteristics are called subjective which mean that the former are physical properties independent of the auditory apparatus of the hearer and the latter are, to certain extent, individual depending on the perception of hearing apparatus and nervous system of a particular person (what is “loud” for one person can be “muffled” or “not so loud” for another person).

As frequencies of different cavities of a human speech apparatus overlap each other in oscillograms it is difficult to read them to discern waves of different frequencies. To overcome the difficulty in reading the spectrum of a speech sound the method of spectrography is used. The spectrograph is an apparatus that divides the spectrum of a speech sound (comprised of sound waves of different frequencies) into its components (i.e. into particular frequencies) by adjusting a special filter to a special frequency.

III.4 Method(s) of Phonological Analysis.

The method(s) of phonological analysis (sometimes called proper linguistic method or functional method of phonetics) includes the distributional method, the statistical method, the method of minimal pairs (semantic method, commutation test, method of substitution). All the methods are interconnected (that is why it is possible to speak about the phonological method or the functional method as it is) and are aimed at establishing the inventory of the phonemes of the given language. The phoneme has several functions and can be viewed from different aspects. That is why there are many definitions of the phoneme in linguistics depending on what aspects or functions of the phoneme are emphasized by a researcher or schools of researchers. It needs to be mentioned here that a phonemic (phonological) system of any language is far from being stable; instead the units of phonological systems tend to change their status and relation to other units constantly. Certainly, it is no easier to identify in general what a phoneme is when every special substance of such a generalization results from one change and aims at another (for evolution and changes of phonological systems see for instance: Plotkin, 1982).

The definition of the phoneme by V.A. Vassilyev is as follows: “the segmental phoneme is the smallest (i.e. further indivisible into smaller consecutive segments) language unit (sound type) that exists in the speech of all the members of a given language community as such speech sounds which are capable of distinguishing one word from another word of the same language or one grammatical form of a word from another grammatical form of the same word” (Vassilyev, 1970 : 136).

The distributional method is the analysis “...establishing the distribution of speech sounds, i.e. all the positions or combinations in which each speech sound of a given language occurs (or does not occur) in the words of that language” (Vassilyev, 1970 : 24). The statistical method is very close to the distributional method and can be defined as the analysis “establishing the frequency, probability,

and predictability of occurrence of phonemes and their allophones in different positions in words” (Vassilyiev, 1970 : 25).

Though the methods resemble each other, which can be seen from the definitions, the results of their applications, so to say, are different, which should be mentioned here: 1) the initial data and the material of the statistical analysis are mostly phonemes and their allophones, already identified as such, whereas the material of the distributional analysis is the non-segmented speech flow which is to be segmented into speech sounds; 2) the statistical method shows in what positions phonemes occur, whereas the distributional method also shows in what positions the sounds in question can never occur; 3) the statistical analysis provides numerical data of occurrence of phonemes and their allophones in certain positions and predicts the occurrence of a certain phoneme in a particular linear succession of phonemes, the distributional analysis investigates the interrelation of speech sounds between each other and substantiates whether they are allophones of the same phoneme or of different phonemes.

Conclusion

As we know that in linguistics, function is usually understood to mean discriminatory function, that is, the role of the various elements of the language in the distinguishing of one sequence of sounds, such as a word or a sequence of words, from another of different meaning. Though we consider the discriminatory function to be the main linguistic function of any phonetic unit we cannot ignore the other function of phonetic units, that is, their role in the formation of syllables, words, phrases and even texts.

We know that in English Phonetics has 4 aspects:

1. Articulatory Aspect (All speech sounds are articulated by speech organs)
2. Acoustic Aspect (All sounds have acoustic pictures)
3. Auditory Aspect (How we receive info with the help of ears; perception)
4. Phonological Aspect (If we change sounds in the word, meaning will be changed).

There are four types of English phonetics.

1. General phonetics
2. Descriptive Phonetics
3. Historical or Diachronical Phonetics
4. Comparative Phonetics.

Phonetics has 4 important methods:

1. Direct observation method:
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4. The phonological method:

A knowledge of the structure of sound systems, and of the articulatory and acoustic properties of the production of speech is indispensable in the teaching of foreign languages. The teacher has to know the starting point, which is the sound system of the pupil's mother tongue, as well as the aim of his teaching, which is a mastery of the pronunciation of the language to be learnt. In our technological age phonetics has become important in a number of technological fields connected

with communication. On the research side much present-day work in phonetics entails the use of apparatus, and is concerned with the basic characteristics of human speech. Much basic research is to be done with the phonetician working alongside the psychologist on auditory perception as such and on the perception of speech in particular.

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