THE MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION

OF THE REPUBLIC OF UZBEKISTAN

THE UZBEK STATE UNIVERSITY OF WORLD LANGUAGES

I ENGLISH FACULTY

REFERAT

THE THEME: **THE ACOUSTIC ASPECT OF THE ENGLISH SPEECH SOUNDS**

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Tashkent 2016

Contents

I. Introduction

This course paper is dedicated to the linguistic analysis of the specific features of the acoustic aspect of speech sounds in modern English which is one of the most important and interesting problems among linguistic researches. The study of the acoustic peculiarities of English phonemes has always been one of the most interesting, disputable and important problems of theoretical phonetics of modern English.

The main aim of the present course paper is linguistic analysis of the specific features of acoustic aspects of English phonemes.

The aim of our research work puts forward a lot of tasks to fulfill such as:

- to define main phonetic terms and concepts;
- to analyze the types and methods of investigation of modern English phonetics ;
- to study the connection of phonetics with other linguistic and non-linguistic disciplines;
- to study the specific peculiarities of main aspects of phonetics such as articulatory, acoustic, auditory and phonological;
- to investigate the acoustic features of English vowels and consonants.

The main material of the given course paper is taken from different books on theoretical and practical phonetics as such English Phonetics. A Theoretical Course (by Abduazizov A.A) T., 2006, A Theoretical Course of English Phonetics (Leontyeva S.F). M., 2002.Theoretical Phonetics of English (Sokolova M.A. and others) M., 1994, English Phonetics. A Theoretical Course, Vassilyev V.A.) M., 1970, Pronunciation Theory of English (by Alimardanov R.A.) and many others.

The theoretical value of the present course paper is that the theoretical part of the work can be used in delivering lectures on the Theoretical Phonetics of Modern English.

The practical significance of the present course paper is that the practical results gained by investigating the given problem may be used as examples or mini-tests in seminars and practical lessons on English phonetics.

Structurally the present research work consists of four parts – Introduction, Body, Conclusion and Bibliography.

Body

1. General Notes on Acoustic Aspect

Language as “the most important means of human intercourse” exists in the material form of speech sounds. It cannot exist without being spoken. Oral speech is the primary process of communication by means of language. Written speech is secondary; it represents what exists in oral speech.[1]

In oral speech grammar and vocabulary as language aspects are expressed in sounds. The modification of words and their combination into sentences are first of all phonetic phenomena. We cannot change the grammatical form of a verb or a noun without changing the corresponding sounds. The communicative type of sentences can often be determined only by intonation. Hence the importance of the sound (phonetic) aspect of a language is obvious. To speak any language a person must know nearly all the 100% of its phonetics while only 50-90% of the grammar and 1% of the vocabulary may be sufficient.[2]

The terms “phonetics” and “phonetic” come from the Greek word (fo:ne:) sound. The term “phonetics” may denote either the phonetic system of a concrete language or the phonetic science. Both the phonetic system of a language and the phonetic science are inseparably connected with each other but at the same time the one cannot be taken for the other. The phonetic system of a language is an objective reality while the phonetic science is a reflected reality.

Every act of speech supposes the presence of at least two persons: one who speaks – a speaker and one who listens – a listener. Phonetics is a branch of linguistics studying language expression which can be pronounced and listened to. All the phonetic units are audible when people speak a language. Pronunciation is a result of a speech noise.

[1] Alimardanov R.A. Pronunciation Theory of English. T, 2009 , p 3
[2]Bloomfield L Language N.Y 1933 p.13

Phonetics is a branch of linguistics studying language has the following four main aspects: articulatory(physiological), acoustic(physic), auditory (perceptual) and phonological (social, functional, linguistic).[3]

Consequently, sound phenomena have different aspects, which are closely interconnected: articulatory, acoustic, auditory and linguistic.

From the physiological point of view every human speech is a production of complex, definite, strictly coordinated movements and positions of speech organs. The articulatory aspect studies voice producing mechanism and the way in which we produce speech sounds. Usually this aspect is called articulatory or physiological phonetics. The founder of modern phonetics, a great Russian – Polish linguist I. A. Baudouin de Courtenay called it "antropophonics" meaning anthropological studies of speech sounds. The articulatory aspect deals with biological, physiological and mental activity necessary for the pronunciation of a language. But the linguistic interpretation of the production of speech sounds makes phonetics a science which is an autonomous from that of physiology and biology.

When we speak about the main methods of this aspect of phonetics we can address at Abduazizov again. He writes: "The oldest and most available method of the articulatory phonetics is direct observation, which studies the movements and positions of ones own or other people's organs of speech pronouncing various speech sounds and judges them by ear. It is a subjective method of phonetics, as our direct observation does not give a concrete description of the position of speech sounds. There are some objective methods of experimental investigation which imply palatography, photography, cinematography, X-ray photography, X-ray cinematography etc." [4]

There are other technics such as laryngoscopy, glottalography and many others which can be used in the process of articulation.

Thus, Physiological phonetics is concerned with the study of speech sounds as physiological phenomena. It deals with our voice-producing mechanism and the way we produce sounds, stress and intonation. It studies respiration, phonation (voice- production), articulation and also the mental processes necessary for the mastery of a phonetic system. Since sounds of speech are no only produced but are also perceived by the listener and the

[3]Abduazizov A.A. Theoretical Phonetics of Modern English, T, 1986, p.12
[4] Abduazizov A.A. op.cit. p.12

speaker himself, physiological phonetics is also concerned with man's perception of sounds, pitch variation, loudness and length.

As we know, 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 activity of the vocal organs. A sound consists of waves which travel through the air at a speed about 1100 feet per second.

Like any other sound of nature speech sounds exist in the form of sound waves and have the same physical properties-frequency, intensity, duration and spectrum.

Frequency is the number of vibrations per second generated by the vocal cords. Frequency produced by the vibration of the vocal cords over their whole length is the fundamental frequency. It determines the musical pitch of the tone and forms an acoustic basis of speech melody.

Frequency is measured in hers or cycles per second (cps).

Intensity of speech sounds depends on the amplitude of vibrations. Changes in intensity are associated with stress in those languages which have force stress, or dynamic stress.

Intensity is measured in decibels (dbs).

Like any other form of matter, sound exists and moves in time. Any sound has a certain *duration*. The duration of a sound is the quantity of time during which the same pattern of vibration is maintained. For this reason the duration of a sound is often referred to as its quantity. The duration of speech sounds is usually measured in milliseconds (msec.).

The complex tone is modified in the resonance chambers (the pharyngeal, oral and nasal cavities). These chambers can assume an infinite number of shapes, each of which has a characteristic vibrating resonance of its own. Those overtones of the complex tone which coincide with the chamber's own vibrating resonance are considerably intensified. Thus, certain bands of strongly intensified overtones are characteristic of a particular shape, size and volume of the resonator which produces a certain vowel sound. These bands of frequencies are intensified whatever the fundamental frequency. The vowel /ɑ:/, for instance, has one such characteristic band of energy in the region of 800 cps and another at

about 1,100 cps; the vowel /i:/ has bands of energy at about 280 cps and 2,500 cps, irrespective of the pitch of the voice.[5]

The complex range of frequencies of varying intensity which form the quality of a sound is known as the *acoustic spectrum. The* bands of energy in the spectrum which are characteristic of a particular sound are known as the sounds *formants.* Thus formants of /ɑ:/ occur in the region 800 and 1,100cps; the formants of /i:/ occur in the region of 280 and 2500 cps. It is known that vowel sounds have at least two formats –F_1 and F_2, which are responsible for the particular quality (timbre) of each vowel type. F_1 is characterized by lower frequencies than F_2. The format of the fundamental tone (marked by F_0) is irrelevant to vowel differentiation. F_0 is present in the spectra of vowels, sonants and voiced consonants because these sounds are formed with voice. It is absent in the spectra of voiceless consonants.

The spectra of consonants have no sharply defined formant structure. There are concentrations of energy at high frequencies or no energy, at a low, fundamental frequency.

Acoustic phonetics is concerned with the acoustic aspect of speech sounds. It studies speech sounds with the help of experimental (instrumental) methods. Various kinds of apparatus are applied for analyzing sounds, stress, intonation and other phonetic phenomena. For example, we use spectrographs to analyze the acoustic spectra of sound, oscillographs and intonographs to analyze frequency, intensity and duration. With the help of an electro-acoustic synthesizer synthetic speech is produced which is a good means of testing the results of the electro-acoustic analysis.

Because of the methods used acoustic phonetics is often called experimental phonetics.

Besides above stated aspects of phonetics there are two more aspects as such auditory aspect which studies the perception of speech sounds and Phonological aspect which deals with the linguistic function of speech sounds.

[5] Alimardanov R.A. op.cit p.11

2. Acoustic Characteristics of English Vowels

Before studying the acoustic characteristics of English vowels we want to look through the distinction between vowels and consonants.

Speech sounds are divided into two main classes – vowels and consonants.

The main articulatory principles according to which speech sounds are classified are as follows:

the presence or absence of obstruction;

the distribution of muscular tension;

the force of the air stream coming from the lungs.

Vowels are speech sounds based on voice which is modified in the supralaryngeal cavities. There is no obstruction in their articulation. The muscular tension is spread evenly throughout the speech organs. The force of the air stream is rather weak.

Consonants are speech sounds in the articulation of which the air stream is obstructed. The removal of this obstruction causes noise, an acoustic effect (plosion or friction) which is perceived as a certain consonant. The muscular tension is concentrated at the place of obstruction. The air stream is strong.[6]

Usually the distinction between a vowel and a consonant is regarded to be not phonetic, but phonemic. From the phonetic point of view the distinction between a vowel and a consonant is based on their articulatory – acoustic characteristics, i.e. a vowel is produced as a pure musical tone without any obstruction of the air-stream in the mouth cavity while in the production of a consonant there is an obstruction of the air-stream in the speech tract.[7]

The articulatory boundary between vowels and consonants is not well marked. There exist speech sounds that occupy an intermediate position between vowels and consonants and have common features with both. These are sonants (or sonorous sounds /m, n, ŋ , j, l, w, r/). Like vowels they are based on voice. There is an obstruction in their articulation and the muscular tension is concentrated at the place of obstruction as in the production of consonants. But the air passage is wide and the force of the air is weak as in the case of

[6] Alimardanov R .A. Pronunciation Theory of English , T, 2009, p. 41
[7] Abduazizov A.A. Theoretical Phonetics of Modern English , T, 1986, p.68

vowels. Because of their strong vocalic characteristics some sonants /w, j, r / are referred to as semi-vowels.

From the acoustic point of view vowels are complex periodic vibrations-tones. They are combinations of the main tone and overtones amplified by the supralaryngeal cavities.

Consonants are non-periodic vibrations-noises. Voiceless consonants are pure noises. But voiced consonants are actually a combination of noise and tone. And sonants are predominantly sounds of tone with an admixture of noise.

Thus, the acoustic boundary between vowels and consonants is not well marked either.

The spectrum of a vowel has a sharply defined formant structure and high total energy which are not observed in the spectra of noise consonants.

In the spectrum of a consonant there is a formant of noise, which is absent in the spectrum of a vowel.[8]

Numerous experiments prove this criterion to be a reliable one in classifying speech sounds into vowels and consonants.

The distinction between vowels and consonants is a very old one. The principle of this division, however, is not sufficiently clear up to the present time, the boundary between them being rather uncertain. The old term “consonants” precludes the idea that the consonants can not be pronounced without vowels. Yet we know that they can and often are; for instance, in the sound that calls for silence: /ʃ:/.

The fact the vowels are usually syllabic, doesn’t mean that consonants are incapable of forming syllables. On the contrary, they may be syllabic too, and we find many instances in the English language of the syllabic sonorants forming syllables by themselves.

Acoustically, vowels are musical sounds. Nevertheless, in the formation vowels considarable noise-producing narrowings are sometimes created; on the other hand, some consonants possess musical tone.

According to Prof. D. Jones: “The distinction between vowels and consonants is not an arbitrary physiological distinction. It is in reality a distinction based on acoustic considerations, namely, on the relative sonority or carrying power of the various sounds.” In the opinion of D. Jones, vowels are more sonorous than consonants. This is correct in most

[8] Alimardanov R .A. Pronunciation Theory of English , T, 2009, p. 57

cases, but some consonants, especially sonorants, are very sonorous (for example, /l/, /m/, /n/, /ŋ/).

D. Jones gives the following definition: “A vowel (in normal speech) is defined as a voiced sound in forming which the air issues in a continuous stream through the pharynx and mouth, there being no obsruction and no narrowing such as would case audible friction.

All other sounds (in normal speech) are called consonants.”

I.A. Boudouin de Courtenay has discovered a physiological distinction between vowels and consonants; according to his theory the main principle of their articulation is different: in consonant articulation the muscular tension is concentrated at one point which is the place of articulation, in vowel articulation the muscular tension is spread over all the speech organs. Knowing this, we have no difficulty in ascertaining whether one or another particular sound is a vowel or a consonant.

Acoustically, a vowel is a musical sound; it is formed by means of periodic vibrations of the vocal cords in the larynx.

The resulting sound waves are transmitted to the supra-laryngeal cavities (the pharynx and the mouth cavity), where vowels receive their characteristic tamber.

We know from acoustics that the quality of a sound depends on the shape and the size of the resonance chamber, the material which it is made of and, also, on the size and shape of the aperture of its outlet. In the case of vowels, the resonance chamber is always the same – the supra-laryngeal cavities. However, the shape and size of the chamber can be made to vary, depending upon the different position that the tongue occupies in the mouth cavity, and also depending on any slight alternations in the position of the back wall of the pharynx, the position of the soft palate and of the lips which form the outlet of the resonance chamber. The lips may be neutral or rounded, protruded or not protruded, forming a small or a large aperture, or they may be spread, forming a narrow slit-like opening. When the lips are protruded, the resonance chamber is lengthened; when he lips are spread or neutral, the resonance chamber is shortened, it is front boundary being formed practically by the teeth.

It has already been mentioned that in producing vowels, the muscular tension is spread equally over all the speech organs, yet the tension may be stronger or weaker. If the muscular tension in the walls of the resonance chamber is weaker, the vowel has a less

distinct quality; it may sometimes be quite obscure. If the muscular tension is stronger, the vowel has a well defined quality. In the first case, the vowels are called lax, in the second – tense.

It is difficult, however, if not next to impossible, to classify vowels correctly from the point of view of tenseness. The degree of tenseness may be ascertained chiefly by comparison, while the result of comparison depends largely upon the articulation basis of the mother-tongue of the person who makes the comparison. To a Russian, for instance, all vowels seem tense, because Russian vowels are lax.

We can now formulate the general principles of vowel articulation.

1. Vowels are based on voice which is modified in the supra-laryngeal cavities.

2. The muscular tension is spread overall the speech organs.

3. The air-stream passes through the supra-laryngal cavities freely, no narrowings being expressly formed on its way.

4. The breath force is rather weak for, it is expanded when the air-stream passes through the larynx and causes the vocal cords to vibrate.

Thus, vowels have no special place of articulation, - the whole of the speech apparatus takes part in producing them. The classification of vowels, as well as the description of their articulation, is therefore based upon the work all the speech organs

Each vowel has its own acoustic spectrum, its own formant structure. The frequency of the formants and their position in the spectrum distinguish one vowel from another. The acoustic characteristics of vowels are based on their articulatory distinctions. Certain formants are characteristic of a particular volume, shape, and size of the resonators which produce a certain vowel. Thus, F_1 is conditioned by the vertical position of the tongue. When the tongue is high in the mouth, F_1 is low and vice versa. E.g. /i:/ and /u:/ have F_1 in the region of 280-300 cps, whereas /ɑ:/ and /ɔ/ have F_1 in the region of 600-800 cps. The second formant (F_2) is conditioned by the horizontal position of the tongue and by the position of the lips. F_2 is high in the case of a front vowel and it is low in the case of a back vowel. Thus /i:/ has F_2 at about 2500 cps, where as /u:/ has F_2 at about 900cps. F_2 of

rounded vowels is lower than of unrounded vowels, e.g. F_2 of /ʌ/ is 1320 cps whereas F_2 of /ʊ/ is 940 cps.[9]

If the formants F_1 and F_2 are in the middle of the spectrum, i.e. close to each other as for /ɑ:, ɔ, æ/, the vowels are classified as compact. If the formants are at each of the extremities of the spectrum as for /u:, ʊ, i:, I/ the vowels are diffuse. Open vowels are compact, close vowels are diffuse.

If the second formant is high, as for /i:, e/, the vowels are of a clear or acute timbre. If it is low, so that both F_1 and F_2 are in the low section of the spectrum (as for /u:, ʊ, ɔ:/, a vowel has a dark or grave timbre. Front vowels are acute, back vowels are grave. F_2 is lower in rounded vowels (as ɔ, ɔ:, ʊ, u:) than it is in unrounded vowels (as i:, I, e, æ, ʌ, ɑ:). Acoustically, rounded vowels are opposed to unrounded as flat to plain.

Thus, from the point of view of their acoustic characteristics, the vowel /e/, for instance, is described as acute, compact, and plain. The vowel /ɔ/ is compact, grave and flat, and /u:/ is diffuse, grave and flat.

[9] Alimardanov R. A. Pronunciation Theory of English, T, 2009, p. 45

3. Acoustic Peculiarities of English Consonants

Consonants are speech sounds formed without any obstruction in the supralaringeal cavities. This can be described from different angles as such from physiological, perceptual, phonological and of course, from acoustic aspect which we are going to deal with in this part of our research.

The acoustic character of a consonant is conditioned by its articulation.

Plosives and affricates (e.g. /t, d, tʃ, ʤ/) differ from fricatives (e.g. /f, v/) mainly in that part of their spectra which corresponds to the articulatory "stop". A plosive is characterized by the absence of noise in part of the spectrum. The plosion is marked by a burst of noise, i.e. the formant of noise appears.

Fricatives are characterized by the presence of a noise formant throughout the spectrum.

Hence plosives and affricates are classed as discontinuous and fricatives as continuant.

Voiceless consonants (fortis) are characterized acoustically as tense and voiced (lenis) as lax, since the burst of noise in voiced plosives and the formant of noise in voiced fricatives are less strong than those in voiceless plosives and fricatives.

The noise peculiar to alveolar and dental consonants /t, d, s, z, n, l, θ, ð/ is contrasted with that of labial and labio-dental ones /p, b, m, f, v/ because it is sharper in character. This means that in the spectra of /t, d, s, z, n, l,θ, ð/ high frequencies are predominant and in the spectra of /p, b, m, f, v / the formant of noise is lower.[10]

The fricatives (alveolar and dental) /s, z, θ, ð/ have the highest frequencies of noise in the spectrum-up to 8000 cps. The frequencies of the noise formant in the spectrum of /f, v/ are low. Therefore, /t, d, s, z, θ, ð, n/ are characterized as acute and /p, b, m, v/, as grave. The consonants /k, g,ʃ, ʒ, tʃ, ʤ/ are intermediate in this contrast.

The spectrum of velar and palatal consonants / k, g, ŋ, ʃ, ʒ, tʃ, ʤ/ is <u>compact</u> while the spectrum of alveolar, labial and dental ones /t, d, n, s, z, m, p, b, f, v, θ, ð/ is diffuse.

[10] Alimardanov R .A. Pronunciation Theory of English , T, 2009, p. 56

Consequently, the former are classified as compact consonants and the latter as diffuse ones.

The sonants /m, n, ŋ/are opposed to all the other consonants as nasal to oral, because in their spectrum there is a special nasal formant.

The consonants /s, z/ having a round narrowing are opposed to /θ, ð/ having a flat narrowing and the affricates /tʃ, ʤ/ are opposed to the plosives /t, d/ as strident to mellow. In the spectrum of strident consonants the intensity of noise formant is greater in the spectrum of mellow consonants.

The first attempt to classify speech sounds on the basis of their acoustic distinctions was made by a group of phoneticians and linguists Jacobson, Fant and Halle, in their work "Preliminaries to Speech Analysis". The authors establish the acoustic distinctions used in human language. These distinctions form 12 binary (or dichotomous) distinctive oppositions. The authors claim that their classification can be applied to all the languages of the world, but not all the 12 oppositions are to be used to classify the phonemes of a particular language. For the English language, according to the authors, 9 binary oppositions are sufficient: 1) vocalic –non-vocalic; 2) consonantal – non-consonantal; 3) compact – diffuse; 4) grave –acute; 5) flat – plain;6) nasal – oral; 7) tense – tax; 8) discontinuous – continuant; 9) strident – mellow.[11]

Vowels are vocalic and non-consonantal; consonants are consonantal and non-vocalic. The sonants /l, r/ are vocalic and consonantal /w, j/ are non-vocalic and non-consonantal.

The traditional vowel /consonant opposition is divided into two oppositions to define the sounds /r, l, w, j/.

The acoustic classification of speech sounds worked out by Jacobson, Fant and Halle is perhaps not absolutely definite. But it is a new classification based on the discoveries of modern electro-acoustics.

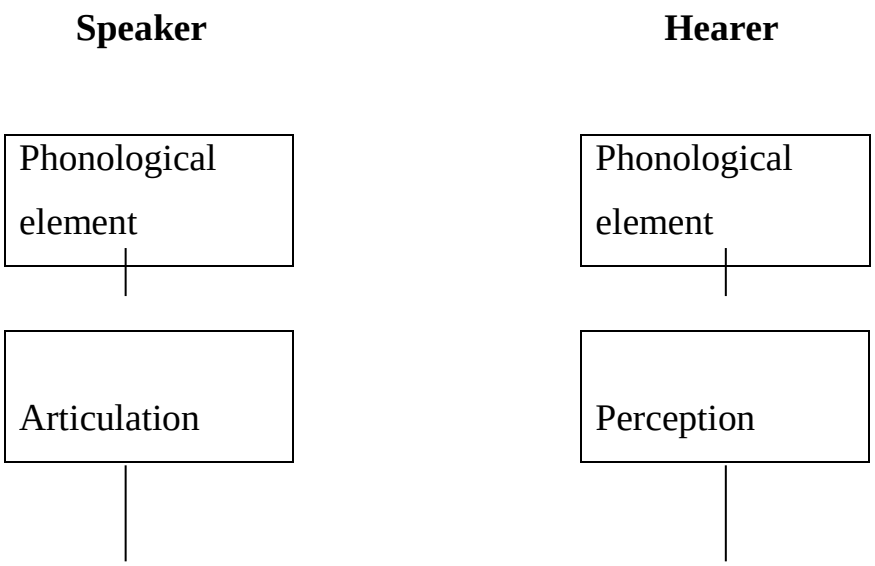
Acoustic definitions and classifications of speech sounds are of great theoretical importance to linguists. Their practical importance and application is also undeniable. Acoustic characteristics of speech sounds are indispensable in technical acoustics for the

[11] Якобсон Р. , Фант Г., Хале М., Введение в анализ речи. Различительные признаки и их корреляты // сб. Новое в лингвистике, М, 1962

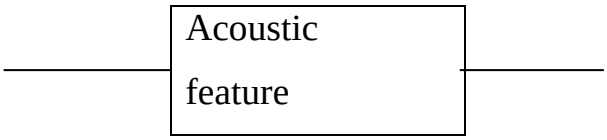
solution of the problem of speech synthetics and sound transmission, for the construction of speech recognizers as well as machines capable of putting out information in spoken words.[12]

As for language teaching the acoustic classification of speech sounds is practically inapplicable. But the acoustic data of spectrographic analysis are of great use when related to the articulatory characteristics of speech sounds.

The theory of distinctive features, which was suggested by Jakobson-Fant-Halle, is known as the acoustic classification. In fact, this theory represents the act of communication and shows the steps involved in inducing the hearer to select the same phonological element the speaker has selected. It may be illustrated as follows in the next page of our work:



[12] Alimardanov R .A. Pronunciation Theory of English , T, 2009, p. 57



This theory is based on the results of the spectrographic (acoustic) and X-ray (articulatory) investigation. Each feature is described in articulatory and acoustic levels (including perception).

The acoustic representation of a distinctive feature corresponds to more than one articulatory feature. In many cases it does not take into consideration the existing allophones, i.e. non-distinctive features of phonemes. In such cases as distinguishing the dental /n/ as in **tenth** /tenθ/ from the alveolar /n/ no acoustic or perceptual feature can be used. These two allophones of the phoneme /n/ can be described only in articulatory terms.

The dichotomic (or binary-meaning to choose two elements or a pair of elements in logic sense) theory has many other shortcomings. Each of the distinctive features involves a choice between two terms of opposition. The mark (+) means “yes”, (-) - “no”, (0) - both distinctive features are possible.

According to this theory 12-15 distinctive features are possible both for vowels and consonants in all languages. The starting point of this classification shows that two binary features define four major classes of segments (minimal segments of sound, which can be distinguished by their contrast within words are called phonemes).They are:

Consonant (C)	**Vowel (V)**	**Liquid (L)**	**Glide (G)**
+C	-C	+C	-C
-V	+V	+V	-V
/p/	/a/	/l/	/ j /
stop	all	/r/	/w/ .
fricatives	vowels	*intermediate between*	
affricates		*the 1st and 2d classes*	
nasals			

The consonant features correlation in acoustic and articulatory terms, their correspondence and representation can be illustrated in the following table:

№	***Binary acoustic features***	***Articulatory correlates***
1.	Vocalic/ non-vocalic	a periodic excitation and constriction/non-periodic
2.	Consonantal /non-consonantal	excitation and obstruction in oral cavity produced with occlusion of contact / with lesser degrees of narrowing
3.	Compact/diffuse	palatal, velar, guttural /labial/ dental, alveolar consonants opposition
4.	Grave/acute	labial, velar/dental, alveolar, palatal
5.	Flat/plain (non-flat)	labial/non-labial
6.	Nasal/oral	nasal/oral
7.	Discontinuous/continuant	stops (plosives), affricates/fricatives, liquids, glides
8.	Voiced /voiceless	voiced/voiceless
9.	trident/mellow	noisy fricatives (labio-dental, alveolar, alveo-palatal affricate)/less noisy fricatives (interdental, palatal, velar), plosives, glides, liquids
10.	Checked/unchecked	glottalization/non-glottalization
11.	Tense/lax	fortis/lenis
12.	Sharp/plain (non-sharp)	palatalized/non-palatalized (in Russian)

In the table of the distinctive features representation eight pairs of them are characteristic of English consonant phonemes.

According to Alimardanov, Distinctive Feature Representation of the English Consonants can be seen in the following table:

Distinctive features	l	ŋ	ʃ	tʃ	k	ʒ	dʒ	g	m	f	p	v	n	s	θ	t	z	ð	d	h	≠
Vocalic/non-vocalic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Consonantal/non-consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Compact/diffuse	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grave/acute								+	+	+	+	+	-	-	-	-	-	-	-	-	-
Nasal/oral		+	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-
Tense/lax			+	+	+	-	-	-		+	-	-	-	+	+	+	-	-	-	+	-
Discontinuous/continuant			+	-	-	+	-	-		+	-	+	-		+	+	-	+	+	-	-
Strident/mellow				+		-	+	-									+	-		+	-

As we can notice in the above table /i/,/r/, /w/, /j/, are omitted be cause the liquids /l, r/ are vocalic and consonantal and the glides /j, w/ are non-vocalic and non-consonantal. Usually American linguists regard the semivowels /j/, /w/ to be positional variants of the lax vowels /i/, /u/, respectively. Thus, this binary classification has restrictions on these four classes. Besides, correlation between the acoustic and the articulatory classification is not very clear in this theory. In spite of the fact that the binary classification of the acoustic features has some shortcomings, it is often used as a universal framework in the description of the distinctive features of phonemes without any experimental research. It is useful to use the binary classification of the acoustic distinctive features after instrumental investigations, as the latter is helpful in making a correct classification. The articulatory correlates of the twelve pairs of acoustic features may correspond to more than twenty features, thanks to the division of the consonant classes. This correlation has its own difficulties which require experimental investigation as well. The articulatory classification is more useful in language teaching practice than the acoustic one.

The feature strident-mellow is distinctive for eight consonant phonemes of English, whereas it is not distinctive for the Uzbek consonants the distinctive feature strident-mellow is very important in Russian as the consonant phonemes form one more correlation on the basis of this feature besides voiced-voiceless correlation.

III. Conclusion

As we have already above mentioned, language as “the most important means of human intercourse” exists in the material form of speech sounds which cannot exist without being spoken such oral speech as the primary process of communication by means of language where written speech is secondary that represents what exists in oral speech. Phonetics as a science is a branch of linguistics. It is concerned with the study of the sound system of a language. The definition of phonetics as “the study of the sounds of a language” is not sufficient in modern linguistics. Nowadays phonetics is a science or branch of linguistics studying articulatory- acoustic features of a language. As a linguistic science phonetics is of great theoretical and practical value. Theoretically it is important to study the formation of speech sounds, their combinations, syllables, stress and intonation. There is close relationship between theoretical and practical phonetics, as it is important to combine theory and practice. It is impossible to represent a good pronunciation rule without a theoretical explanation of a particular question.

As a linguistic science phonetics has different aspects as such the articulatory which studies the voice producing mechanism and the way in which we produce speech sounds; the acoustic aspect which studies different features of sound waves; the perceptual

(auditory) aspect which studies the way of hearing process of speech utterances; the phonological aspect that studies the linguistic functions of speech sounds as the smallest linguistic unit i.e. phoneme.

Usually the distinction between a vowel and a consonant is regarded to be not phonetic, but phonemic. From the phonetic point of view the distinction between a vowel and a consonant is based on their articulatory – acoustic characteristics, i.e. a vowel is produced as a pure musical tone without any obstruction of the air-stream in the mouth cavity while in the production of a consonant there is an obstruction of the air-stream in the speech tract.

From the acoustic point of view vowels are complex periodic vibrations-tones. They are combinations of the main tone and overtones amplified by the supralaryngeal cavities. Consonants are non-periodic vibrations-noises. Voiceless consonants are pure noises. But voiced consonants are actually a combination of noise and tone.

To sum up all above stated, it is possible to deduce that the study of different features of the acoustic aspect of English speech sounds is one of the most interesting and important problems of English phonetics.

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IV. Bibliography

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