

**The Influences of the Four Major Arab Linguists in  
Phonetics and Phonology (From Al-Farahidi to Ibn Sina)**

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**ABSTRACT**

The Arab linguists produced considerable and remarkable theories and ideas to the fields of phonetics phonology from time to time, because the phonetics and phonology have been fundamental aspects of the Arabic language studies.

Arab phoneticians and phonologists have presented major contributions to the studies of phonetics and phonology within Arabic language and they have made voluminous studies on the sound systems, utterances and phonological types on the Arabic language. The Arab scholars and researchers analyze the sounds and their vocalization types and the phonological systems, attempting to recognize the linguistic elements that influence and determine them.

The Arab linguists also analyze and study regional and dialectal variations, historical evolution in the utterance, their effects are worthy in linguistics, language education, language learning and speech studies.

**Keywords: Al-Farahidi, Sibawayhi, Ibn Jinni, Ibn Sina, Semitic languages, Phonetics and Phonology.**

**INTRODUCTION**

The religious environment affects the development of Arabic phonetical and phonological recognition and knowledge, for instance, the readings of the Glorious Qur'an directed the interest in Arabic phonetic and phonological opinions. The interest in phonetics and phonology is not restricted to present-day studies, it is found from the appearance of the human languages.

The Arabic language is one of the Semitic languages and one of the distinctive features of the Semitic language is the standard rule of the consonantal origins, generally with three-lettered origin. The Arabic language is commonly identified into: Classical Arabic, Modern Literary Arabic and Modern Spoken (Colloquial Arabic). (**Haywood and Nahmad, 1965: 1**).

According to **Robins (1976: 24)** Arabs and Indians linguists mention perfect and specific expressions in phonetics and phonology than the expressions by the Roman and Greek linguists.

The current Arabic language is basically come from the ancient dialects of the central and North Arabia which have been divided by the traditional Arab linguists into three classes: Hijazi, Najdi and the nearest ethnic groups' languages. There are many magnificent contributions of the ancient Arabic phoneticians and phonologists who were focused on the sound-system of the Arabic language, they contemplate primary specific understanding to the fields of speech segments which signify a perfect realization for the organs of speech. They surveyed the segments of the Arabic language and identified them accurately; they also have organized principals for these segments and their characteristics as well as their connections and applications with each other. The Arabic investigations of phonetics and phonology as branches of the linguistics begin with the knowledge of the principal Arabic lexicon **Al-Ain (Al-ʿein)** by Al-Farahidi. (**Al-Dubai, 2015: 289-299**).

**1-A-Khalil bin Ahmed Al-Farahidi (100-170 CE/718-786 A.D.)**

Al-Farahidi is an Arab linguist, grammarian, phonologist and lexicographer. He is regarded as one of the most important theorists in the Arabic phonetics, he presents a framework of the Arabic sounds using diacritical marks (points), his framework laid to the establishment for the investigation of the Arabic phonetics.

Al-Farahidi calls the sounds (letters) ‘Huruuf’ and he classifies them in three arranged systems:

- 1- They are classified phonetically as: Consonants Vs. Vowels (Majrusah Vs. Jawf).
- 2- They are classified functionally as: Stable Vs. Unstable (Saheh Vs. Muftal)
- 3- They are classified structurally as: (- Sonant) Vs.+ (Sonant) (Sakin Vs. Mutaḥarik)

**(Sa’addin, 1980: 23-25).**

Al-Farahidi’s lexicon is the first book on Arabic phonetics and phonology, he wrote this lexicon depending on his knowledge in describing the Arabic consonants in terms of the points of Articulations beginning with the sound created in the furthest point of the pharynx which is /ع/ and finished with the sounds created by the lips (the bilabial sounds) /ب/ and /م/ and /و/, then he proposed the vowel sounds. Al-Farahidi suggests that the sounds which are created in one point can classify in one category and the long vowels and glottal stop sounds are suggested in another category, because they are described as equivalent in terms of the manner of articulation when the airflow took place in the vocal tract, at this moment the airflow is released clearly without any occlusion. In Al-Farahidi’s approach there is a variance between manner and points of articulation for Arabic vowels and consonants. **(Ahmed, 1987: 1-2).**

Al-Farahidi begins his categorization of Arabic speech sounds in a very reasonable method in his book ‘Al-Ain’ as the standard of the point of articulation of the Arabic sounds. Al-Farahidi classifies the speech sounds in terms of their ways of vocalization relying on his phonetic feeling, many linguists have imitated him in setting up the syllabus to organize their ideas, this method is known as (The Acoustic School of Lexicographers). **(Ad-Duri, 1998:90).**

Al-Farahidi's method is reasonable and distinguished between consonants and vowels in their manner and place of articulation, even if there are insufficiently points in the role of the vocal folds in generating voicing, and there is a less interest stated for prosodic features with relationship to intonation. The comprehensible ideology of Basra school controlled all features of the Arabic linguistic discussions, such as prosodic investigations, explorations of the Glorious

Qur'an structures and Prophetic Traditions. Al-Farahidi is the chief of this school and his students have different contemplations to present various linguistic efforts which are creation and uniqueness. (**ibid: 91**).

Al-Farahidi also mentions outstanding efforts and contributions to the study of Arabic phonetics and phonology, he suggests the notion of phonetic description in Arabic by using a group of phonetic symbols to identify the segments of the Arabic language, this suggestion put the cornerstone for the following investigations on the Arabic phonetics and phonology.

One of the considerable characteristics of Al-Farahidi's framework is the system of the consonant segments, he suggested a new phonetic method and begun with the gutturals then velar and finally finished with bilabials. Al-Farahidi's new phonetic system is actually personal creation. Al-Farahidi mentioned the Arabic consonants which are found in the Arabic language because they present the core of the Arabs' speech in their words, phrases and sentences, Al-Farahidi explained that Arabs use these consonant segments in their verses, sayings, proverbs and poetry. In Al-Farahidi's explanation of the speech sounds, the human being starting by opening his mouth articulating a glottal stop segment and then crating a consonant segment, for instance, 'ab' 'at' .....etc. (**Versteegh, 1997: 17-20**).

Al-Farahidi is the major figure who presents the Arabic phonology and phonological structures as a science, other linguists like Sibawayhi and Ibn Jinni show derivative enhancements to Al-Farahidi's original work. Actually, the phonological studies are initiated by Al-Farahidi's style in his lexicon Al-Ain which is put in order of the points of articulations, this exceptional style prepared a phonetic/phonemic basis and linguistic discussions.

Al-Farahidi rearranged the ancient Arabic sounds reasonably depending on their properties positions of articulation, his arrangement is significant and considerable, because he relied on the recognition and realization of the sounds and their characteristics, in his lexicon **Al-Ain (Al-ġein)**, his effects to Arabic sounds are not restricted to phonetic studies he also gave fundamental phonological principles which are founded and relevant to the sound system of the Arabic language. (**Al-Surf: 2012: 45-46**).

The School of Basra is the exemplary place for Al-Farahidi with an enthusiastic awareness to scientific issues, linguistic structures and religious readings, this guided to actual appearance of intellectual capabilities and multiple numerous tenets and manners, in that time Al-Farahidi observed these ideas and concepts which supported his authentic views in analysis and research depending on observation and investigation. The linguists of Basra School indoctrinated Al-Farahidi the rules of the Islamic knowledge, Qur’anic recitations and other linguists taught him Arabic grammar and linguistics. (Al-Kiyumi, 2023: 2-3).

In his lexicon Al-Ain, Al-Farahidi searched Arabic phonetics and wrote specified articulatory characterizations and identifications for the places of articulation for the Arabic sounds, as the following:

#	The Place/Point of Articulation	The IPA Arabic Sounds	Arabic Sounds in the Arabic Language
1	Pharyngeal	/ħ, ʕ, x, ʁ/	ع ح خ ح ع
2	Velar	/q, k/	ك ق
3	Palatal	/dʒ, ʃ, d/	ظ ش ج
4	Apical	/s, ʃ, z/	ز ص س
5	Alveolar	/t, d, ʈ/	ط د ت
6	Laminal	/l, r, n/	ل ر ن
7	Bilabial	/b, m, f/	ف م ب
8	Oral	/j, w, a, ʔ/	ء أ و ي
9	Dental	/θ, ð, ð/	ض ذ ث

Table (1)

**Al-Farahidi’s Classifications for the Places of Articulations of Arabic Sounds Adopted from (Muaibed, 1983 and Al-Dubai, 2015: 304)**

**2-Abu Bishr Amr bin Othman bin Qanbar Sibawayhi (148-180 CE/753-793 A.D.)**

Sibawayhi is regarded as one of the greatest linguists in the Arabic language and he is usually referred as the father of the Arabic grammar. He devoted his life to study and investigate the Arabic language, his efforts had an important influence

on the evolution of the Arabic linguistics and put the establishment for the grammatical principles that are still studied today. Sibawayhi was a student of Al-Akhfash Al-Kabeer who is one of the most recognized linguists of his time.

According to **Bakalla (1979: 74-75)** Sibawayhi's phonetic analysis contains various phonetic principles, Sibawayhi suggests many principles regarding the potential/allowed frameworks of Arabic speech segments, and not-allowed frameworks may be found, in this sense Sibawayhi points out to the space and the approaching of the places of the articulation for the consonants. He mentions itemized information and classifications of the various grammatical phenomena of the Arabic language, he also made a comparison among several dialects and accents of the Arabic language.

Sibawayhi distinguishes words in terms of their functions, i.e., nouns, verbs, pronouns and adjectives, ... etc., and he founds principles for analyzing the vowel endings which are primary segments for realization and comprehension the meaning of the Arabic expressions. He also develops a framework of grammatical categorization which is still used by the learners and scholars till today.

Sibawayhi looks into the relation between vowels and consonants from two aspects, the first one is relevant with the phonetic characteristics of the sounds and the second represents the phonological assignments in the language framework. Sibawayhi's phonetic classification, he deals with the expression (softness) "Leen" and (Prolongation) "Maad" to identify the basic vowels, i.e., the vowel segments (y) "ي" and (waw) "و" are distinguished as (softness sounds) and they are classified as semi-consonants. He also explains that the Arabic consonants are apparently distinguished as "ṣaḥiḥ", this expression is implied as a phonological feature. The expressions "ṣaḥiḥ" and "Leen" date back to Al-Farahidi, but the expression prolongation "maad" is not mentioned by Al-Farahidi, Sibawayhi is the first linguist who presents "softness and prolongation" to study the vowel segments phonetically. (**Al-Naṣṣir, 1985: 55-54**).

Sibawayhi classified the Arabic speech sounds into voiced 'majhuur' and voiceless 'Mahmuus' and then he analysed each sound precisely and carefully. Sibawayhi's classification is accepted and applied by the linguists in their phonetic works. Furthermore, Sibawayhi identifies the Arabic sounds in terms of their

articulations and the movements of the vocal folds. Sibawayhi is regarded one of the Arab pioneer linguists who differentiates between phonemes and allophones.

### **- Sibawayhi's Phonetic Characteristics of the Arabic Long Vowels**

Sibawayhi epitomizes the phonetic characteristics of the Arabic long vowels /a:/ (أ), /u:/ (و) and /i:/ (ي), and he mentions some of the following characteristics, such as:

#### 1- Voicing (Jahr) الجهر

This characteristic is set by Sibawayhi, this expression is different from the expression (voiced) "majhuur" (مجهور), Sibawayhi classifies the consonants into voiced (مجهور) and voiceless "mahmuus" (مهموس).

#### 2- Softness (Al-Leen) اللين

Vowels are generally created with the releasing of articulators and there is no required contact or tiny contact, this expression denotes that Sibawayhi is interested in the auditory features of the vowels.

#### 3- Prolongation (Al-Maad) المد

This characteristic is mentioned by Sibawayhi to distinguish the vowels according to vowels production time. Sibawayhi points out that prolongation for the long vowels to confirm the variance in pausing of the consonant with pausing of the long vowels.

#### 4- The Pausing of short Vowels

Sibawayhi acknowledges that there are particular changes during the production time of the short vowels when they come in the final positions during the utterance.

#### 5- Points of articulation of Vowels

Sibawayhi affirms that the points of articulation of the vowels are completely wide for the airflow of the sound, and there is no sound has wide points like vowels. **(Al-Naṣṣir, 1985: 56-62).**

Sibawayhi's classification is identical to the contemporary classification, with the exception of three phonemes /q/ (ق), /t/ (ط) and the glottal phoneme /ʔ/ (ء) they are classified as voiced phonemes by Sibawayhi. He continued with his

instructor Al-Farahidi in his analysis of the vocal organs and the points of articulation of sounds. The arrangement of phonemes in Sibawayhi's suggestion is different from Al-Farahidi arrangement. Sibawayhi initiates his arrangement with the glottal stop segment /ʔ/ (ء) Al-Hamza and the glottal fricative /h/ (هـ) and then with /r/ (ر) and /x/ (خ), and he arranges the segment /k/ (ك) before the segment /q/ (ق). (Al-Dubai, 2015: 307).

### - Sibawayhi's Book

Sibawayhi's most recognized effort to Arabic grammar is his book **The Book 'Al-Kitab'** and it is also called (Sibawayhi's Book) "Kitab Sibawayhi". This inclusive work includes detail analyses of the Arabic language, containing its morphology, syntax, phonetics and phonology. Sibawayhi relied on the Glorious Qur'an Ayas, traditional Hadith, Arabic poetry, observation and investigation of the language as it is pronounced by the native Arabic speakers, he confirms the significance of perception in the spoken style and concentrates on representing the principles and types that influence its application. This method is extremely systematic and accurate, he mentions his analyses and results in a logical and organized style.

Sibawayhi's method is regarded as one of the substantial efforts in the traditional Arabic studies, and his book (**The Book**) '**Al-Kitab**' is a requisite resource for the descriptive way of the Arabic grammar. Sibawayhi's work to Arabic phonology is more inclusive and more specific than that of the previous linguists of Arabic. Sibawayhi's categorization of the Arabic speech segments occurring in two groups (roots) 'uṣūl' and (Branches) 'Furuūṣ'. Sibawayhi's explanations of consonant segments (uṣūl'), the long vowels are correct and agree with the modern phonetic explanation of speech segments. Sibawayhi's explanation is fundamentally dealt with the Arabic assimilation, for instance, the segments may be assimilated and those which may be not. (Ad-Duri, 1998:91).

Sibawayhi's book is a major achievement and extremely influential book in enhancing the Arabic grammar, and his method of grammar is organized on the elements of observation and scrutinization, Sibawayhi is the first linguist who systematically and methodically studies the connection between meaning and sound in the Arabic Language, Sibawayhi's grammatical principles and categorizations are widely studied and preferred by the linguists and learners of the



Arabic language. Until this time this book is regarded an essential text for students and researchers of the Arabic language.

Sibawayhi's book contains sizable investigation of Arabic phonetics and phonology, and it consists major issues that different from the elaboration the place and manner of articulation, and it mentions profound investigation of the Arabic speech sounds, for instance, phonemes, allophones and the allophonic disparities. Moreover, it is a great and extensive written publication which deals with aspects and different subjects of the Arabic language, i.e., morphological structures of words and the syntactical structures of sentences, it includes three different parts, the first one discussed the sound system of Arabic and dealing with their classification, production, distribution and analyses, Sibawayhi compares the allophones of the glottal stop and the phonetic disparities, i.e., the total vocalization of the glottal stop segment /ʔ/. the second part focuses on the Arabic morphology, discussing the nouns functions, verbs classifications and adjectives structures. The last part argues with the Arabic syntax, discussing the principles of word orders and sentence structures. **(Al-Dubai, 2015: 300).**

Sibawayhi was a productive author and writings were not restricted to Arabic grammar, but he also concerned in the philosophy of language, for instance, he is one of the first linguists who suggest language is a system of signs before the Western linguists' ideas.

The earliest arranged method for Arabic phonological study stated by Al-Farahidi and then developed by his pupil Sibawayhi, and some modifications presented by Ibn Jinni. The classical Arabic linguists' suggestion are chiefly a recurrence of Sibawayhi's discoveries, for example, Sibawayhi's analysis of speech sounds containing specific investigation of the Arabic language. i.e., the states of vibration and the popular phonological case at his time front vowel raising, and what is contemporaneous case which is known as (Pharyngealization). **(Benmamoun and Bassiouney, 2018: 11).**

Table (2)

**Sibawayhi's Classifications of the Places of Articulation for the Arabic sounds  
Adopted from (Bakalla, 1979: 72 and Muaibed, 1983: 71-72)**

#	The Place/Point of Articulation	IPA of The Arabic Sound	The Arabic Sounds in the Arabic Language
1	Laryngeal	/ʔ, h, a:/	أ ه ء
2	Pharyngeal	/ʕ, ħ/	ح ع
3	Uvular	/g̤, x /	خ غ
4	Prevelar/ Velar	/k/	ك
5	Post-Velar/Uvular	/q/	ق
6	Palatal	/dʒ, ʃ, j/	ي ش ج
7	Pre-Palatal	/d/	ظ
8	Post -Alveolar	/l/	ل
9	Alveolar	/n/	ن
10	Pre-alveolar	/r/	ر
11	Post-dental	/t, d, ð/	ط د ت
12	Dental	/s, ʃ, z/	ز ص س
13	Interdental	/θ, ð, ð/	ض ذ ث
14	Labio-dental	/f/	ف
15	Bilabial	/b, m, w/	و م ب
16	Nasal	Hidden /N/	ن (المخفي)

### 3- Abul-Fath Othman ibn Jinni (320- 392 A.H./ 933-1005 A.D.)

Ibn Jinni is one of the most effective linguists in the Arabic language, he is considered as a prodigious linguist as well as creative author, his writings are reflections of his predecessors' suggestions, Ibn Jinni's method is devoted to grammatical studies and phonetic analysis and specifically is pointed to the investigation of human speech sounds.

Ibn Jinni set his method with an introduction to speech segments, such as: The segment which is pronounced in any point of articulation which is defined by

him as (Letter) ‘Ĥarf’. Furthermore, he repeated many structures presented by previous linguists, he mentions an extensive explanation for the Arabic vowel segments as a category of speech which are different from consonant segments, and he also refers to the variations of the vowel segments according to the variety. **(Bakalla, 1979: 5-6)**

According to **Bakalla (1984: 463-464)** Ibn Jinni made a comparison between short and long vowels, the short vowels (Alĥarakaat) are types of the long vowels (Alĥuruuf) which are / a: (أ) , u: (و) , i: (ي) / these long vowels are responsible for prolongation ‘maad’ and softness ‘leen’ in utterance.

The new researches in Arabic phonetics investigations mention that Ibn Jinni’s qualifications for Arabic segments are appropriate to Sibawayhi, but Sibawayhi illustrates that the sound /q/ (ق) is created back than /k/ (ك) and the sound /y/ (ي) is created back than /d/ (ض), Sibawayhi and Ibn Jinni have the same realization of the articulatory aspects of phonetics and they were masterful to present an accurate classifications of Arabic segments. **(Al-Fozan, 1989: 10).**

**Bakalla (1996: 315)** writes that Ibn Jinni gives priority for speaking not writing, according to Ibn Jinni the writing is found because of speaking and he made a comparison between letters of the Alphabet and speech sounds and searched some differences between sounds. In Ibn Jinni’s specification of the speech sounds the human being can create unlimited different sounds. Ibn Jinni determines that language is a composed of sounds and these sounds represent a means for expressing and explaining the needs of the human beings, with this idea Ibn Jinni referred to the importance of verbal communication feature of any language.

Ibn Jinni’s phonetic theory is established on Sibawayhi’s theory, but Ibn Jinni desired to analyse the Arabic sounds minutely from former phoneticians, concentrating on the points of articulation and the functions of the speech organs. Ibn Jinni specifies 16 places of articulation for Arabic sounds, he mentions them in four groups as the following:

Table (3)

**Ibn Jinni's 16 Places of Articulation adopted from Bakalla (1996: 317)**

The Group	The Place of articulation	The IPA of Arabic Sounds	The Arabic Sounds in the Arabic Language
<b>A- Gutturals</b>	1- Laryngeal	/ʔ, a:, h/	ه ا ء
	2- Pharyngeal	/ʕ, ħ/	ع ح
	3- Uvular	/g̤, x/	خ غ
	4- Post-uvular	/q/	ق
<b>B- soft/ Hard palate</b>	5- Velar	/k/	ك
	6- Palatals	/j, dʒ, ʃ/	ش ج ي
	7- Palato-lateral	/d̪/	ض
<b>C- Alveolars</b>	8- Lateral	/l/	ل
	9- Nasal	/n/	ن
	10- Trill	/r/	ر
	11- Alveolars	/t, d, ʈ/	ت د ط
<b>D- Dentals</b>	12- Dento-alveolar	/s, z, ʃ /	س ز ص
	13- Inter-dentals	/θ, ð, ð/	ض ذ ث
	14- Labio-dental	/f/	ف
	15- Labials	/b, m, w/	ب، م، و
	16- Homorganic Nasal (Hidden Nasal)	/N/	ن

Ibn Jinni also identifies the Arabic segments according to their manner of articulation, as the following:

- 1- Voiced/ Voiceless
- 2-stop/ fricative
- 3- Emphatic/ Non-emphatic
- 4- Raised/ Lowered Tongue
- 5- Lateral/ Non-Lateral
- 6- Trilled/ Non-trilled
- 7- Plosive/ Non-plosive
- 8- Nasal/Non-nasal (**Bakalla, 1996: 317-318**)

Ibn jinni was a student of the great Arabic grammarians Ibn Muhammed Al-Mawsili Al- Khfash and Abu Ali Al-Farisi, Ibn Jinni was a prolific author and his publications treat huge areas of Arabic linguistics subjects comprising grammatical structures, phonetic analysis, phonological investigations, morphological studies, syntactical explorations, semantic reviews, lexicographical classifications and rhetorical expressions. Ibn jinni is substantially concerned with the interrelations between sound and meaning, and how the sounds of Arabic sounds carrying the meaning. **(Al-Duri, 1998: 92).**

The investigations of sound and meaning in Arabic linguistics include two essential purposes, the first purpose presents Ibn Jinni's concepts on the connections between sound and meaning as mentioned in his book **The Characteristics 'Al-Khaṣ'is'**. The second purpose is to put Ibn Jinni's concepts in two principal situations (contexts):

- 1- The Arabic linguistics heritage.
- 2- The Western linguistics debates. **(Wright, 2000: 1)**

Generally speaking, the Arab linguists describe the place of articulation of [q] as an oral stop segment, Sibawayhi has another idea when he classifies this segment at the furthest back part of tongue and at above area of the soft palate. Ibn Jinni and Sibawayhi's expressions such as the pharyngeal segments [ʕ ] and [ħ] are vocalized at the central point of the larynx, other linguists does not depend this idea and consider that the basic place of articulation of these pharyngeals segments occur in laryngeals and uvular. **(Bin-Muqbil, 2006: 40-45).**

According to **Bassiouney and Katz (2012: 121)** the realistic theory of language sees that language is adopted by Al-Farahidi and developed by Ibn Jinni in his great book (The Characteristics) 'Al-Khaṣ'is', Ibn Jinni's opinion is the Arabs own innate awareness for their language, he adds that the Arabs can describe the characteristics of the Arabic language in systems like the descriptions of the grammarians and linguists.

Ibn Jinni addresses some expressions, such as complete sentences which contains meaningful structures, and incomplete sentences which contain deficiency in their structures, he also mentions the expression (Correct) to identify the verbs which contain three consonant segments in their origins, and the expressions

(Defective Verbs) the verbs with one weak consonant segment in their origins. (**ibid: 207**).

Ibn Jinni regards the uvular sounds are vocalized at the upper point of the larynx along with the edge of the mouth, this idea is a major and significant view point and it is mentioned and approved by present-day phonological investigations.

Ibn Jinni was a cognizant of articulatory phonetics, he confirmed that the creating of any sound is not confined to lips or tongue and any sound is limited by the vocal folds, tongue, the place of articulation and the palate. In fact, Ibn Jinni did not distinguish the speech production activity, but he distinguished the organs of speech production activity, i.e., the lungs, the larynx, the tongue and the mouth. Moreover, he mentioned that the sound /q/ (ق) is created at the side of the uvula and he put it between the sounds /g/ (غ) and /x/ (خ), this description is currently inexact in modern phonetic studies and investigations, the sound /q/ (ق) is created at the side of the uvula but at the back of the sound /x/ (خ), he mentioned that the sounds /s, z, ṣ/ (ص، ز، س) are created at the first part of the tongue with the upper teeth, according to modern phonetic studies and classifications these sounds are physically created in a point at the back of the upper teeth specifically in the alveolar region, these inexact descriptions do not lessen Ibn Jinni's efforts to the phonetical theory of the Arabic language. (**Al-Surf, 2012: 52-54**).

Ibn Jinni is regarded as the major figure in the expansion and increasing the phonetic studies with other Arab linguists, his perfect explanation for the segmental, suprasegmental and some prosodic systems, for instance, vowelization, assimilation, intonation, deletion, replacement and transfer, and he discussed the variation between the letter and phoneme.

#### **4- Abu Ali Al-Hussein bin Abdulla Ibn Sina (370-427 A.H./ 980-1037 A.D.)**

Ibn Sina is also known and written as (Avicenna) in Europe and other Western civilizations. Ibn Sina is one of the omniscient and estimable figures and intellectuals of the Islamic literature, he is also known as (The Sage of the Age).

In his treatise (*The Points of Articulation Speech-Sounds*) '*Fi Asbaab Huduuth Al-Huruuf*' Ibn Sina provides us with a new method for phonetic

investigation with this new method which is known in modern Western culture is (Vibratory Method), Ibn Sina explains his method as:

**The immediate cause for the generation of sound is I think, the wave motion, i.e., vibration of the air expelled rapidly and with force, whatever the cause of this may be. In my opinion, the immediate cause of sound is the wave-like motion of the air.**

**(Semaan, 1963: 12).**

The most noticeable thing is that the 9<sup>th</sup> and 10<sup>th</sup> centuries A.D. scientists and philosophers modify Ibn Sina's method tremendously as well as contemporary scholars modify his realizations from time to another. Another splendid characteristic of Ibn Sina's analysis on phonetics is his cognizance and realization of the sounds which are generated with various influences other than human beings, he finds that there are numerous sounds can be created by reactions of the natural effects, i.e., the movement of water by the air, the clash of a mass, the outflow of liquids, .... etc., the standard of all these is the vibratory power on the airflow. For many researchers and learners, Ibn Sina is considered the first scientist who explains how the person can create synthetic speech when he prepared a test by applauding the hands. **(ibid: 15-60).**

Ibn Sina's explanations and ideas seem to be exceptional and different from his predecessors because he was a physician and philosopher but the others were linguists and grammarians, Ibn Sina's descriptions are perspicuous and perfect because he limited and appointed the speech mechanism of the Arabic sounds. **(Muabid, 1983: 90-91).**

Ibn Sina characterizes the vocalization of the vowels, for example, the long vowel [a:] and the short one [a] are created by a soft releasing of the airflow without any obstruction, and the long vowel [u:] and the short vowel [u] are created by a modicum obstruction of the airflow and narrowing in the lips, and the long vowel [i:] and the short vowel [i] are created with a soft palate releasing and narrowing of the place of articulation with a quiet advancement descending. According to Ibn Sina's exemplification the short vowels are created

with a short time and long vowels need long time more than the short vowels. Ibn Sina also makes a distinction between the two groups of sounds the consonants and vowels, the purpose of these groups is to compare between vocalic and non-vocalic qualities of speech sounds, the consonants can be classified into silent or non-sonorous sounds, and vowels can be sounded or sonorous. **(Bakalla, 1984: 663-664).**

Ibn Sina declares that the emphatic sounds are vocalized with low tongue position at the back of the basic articulation and this is confirmed by present-day research methods. The Arab phoneticians state that the two laryngeal segments are vocalized with lower and back than any other segments. Sibawayhi classifies the laryngeal segments [h] and [ʔ] with the short vowel [a], Sibawayhi explains that the segments whose place is under the larynx, but Ibn Sina gives an extra comprehension articulatory clarification, he elucidates that the glottal segment is created by a laryngeal occlusion of the pulmonic compressed airflow goes out by the movements of the muscles and the larynx is unlock by the airflow. **(Bin-Miqbil, 2006: 31-51).**

Ibn Sina analyses the organs of speech, i.e., the tongue and larynx, and he gives accounts for the structures and functions of different articulators and he defines and classifies the parts of the tongue, he also states the internal and external laryngeal activities consisting the activities of the vocal folds. Moreover, Ibn Sina explains the speech in the subject of sound coming with the vocal quality of speech and the significant point of vibration the airflow. **(Hassan and Heselwood 2011: 6).**

**Al- Surf (2012: 56)** indicates that the effective and magnificent contributions in Arabic phonetics are not achieved without the realizations of anatomy and identifying the points of articulation of the Arabic sounds. Ibn Sina concerned with the creating and specifying the sounds in general and in Arabic sounds in particular. As a physician, Ibn Sina expounded two fundamental phonetic approaches in charge of the creating the sounds of the Arabic language, these approaches are:

- |                         |       |
|-------------------------|-------|
| 1- Percussion/ knocking | القرع |
| 2- Extraction/ Removing | القلع |



**-Ibn Sina's Physical Analysis for the Larynx**

Ibn Sina is considered as the first scientist who attempts and clarifies the structure and functions of the larynx. According to **Al-Dubai (2015: 311)** Ibn Sina's analysis of the larynx contains the following major cartilages:

**1- Thyroid Cartilages**

This cartilage is called Adam's apple it is the biggest one and lies at the top of all other cartilages. The thyroid cartilage contains the vocal folds.

**2- Cricoid Cartilages** This cartilage helps and supplies the links for the cricothyroid, posterior cricoarytenoid and lateral cricoarytenoid cartilages and ligaments required opening and closing the airflow in speaking process.

**3- Arytenoid Cartilage**

This cartilage contains a couple of pyramid-shaped parts in the larynx, these parts are substantial aspects in the generating the vocal sounds, they are found in the dorsal side of the larynx above the cricoid lamina.

**Conclusions**

This research discusses the most significant contributions on Arabic phonetics and phonology presented by the most leading linguists in the Arabic language studies. The achievements and impacts of the Arab phoneticians and phonologists are various and diverse.

The Arab linguists are the pioneer characters in classifying the vocal system of the human being, i.e., Al-Farahidi and Sibawayhi suggest articulatory features to make a distinction between plain and emphatic segments, for instance, the segments /s/ and /ṣ/.

Many theories believe that Arab linguists are competent and idealistic by describing places and manners of articulation, and they locate the speech segments in simple groups and they were skillful in explaining principles and elements for phonetic theories of the Arabic language, Arab linguists do not depend on other cultures or develop other ideas, but they suggest and applicate their own ideas and concepts, because the human learning is a progressive quality and linguistic information is one of the human familiarities.

Arabic phoneticians concentrate on the physical characteristics of speech sounds, investigating their creation, transmission and comprehension and they also survey the articulatory, auditory and acoustic features of Arabic sounds, and they analyzing some points, for instance, the place and manner of articulation and voicing.

The Arab phonologists investigate the types and elements that control the organization, distribution and attitude of the segments in the Arabic language. This contains investigating some idioms, i.e., phonemes, phonemes gathering, phonemes modification, syllable, stress, assimilation and intonation, etc.

One can observe that the Arab linguists' concepts on phonetics and phonology distinguished by the following remarks:

- 1- The development of Arabic linguistic studies specified by phonetical and phonological subjects which effect other cultures and theories.
- 2- Multiple Arab methods focus on and interested in the notion of the phonemes and allophones, and they are relevant to what is recognized in recent schools and theories of linguistics.
- 3- The Arab frameworks offer a real and vivid relation between consonants and vowels.
- 4- The Arab approaches present an arranged works in classifying and identifying the Arabic segments, i.e., voiced/voiceless, short vowels/long vowels.

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